

# chapter 30

## Retirement

Over the last 60 years, two of the most significant changes in contemporary U.S. social history have been the striking increase in the labor-force participation rates of women and the equally impressive decline in the participation rates of men—especially among older men. Economists argue these changes were driven by the following triumvirate: (1) the growth in real incomes of men and women; (2) rapid changes in the home production sector, including technological improvements (the invention of the washing machine and the microwave being notable cases in point) and increased access to child-care; and (3) the growth in both the coverage and generosity of the Social Security system and private pension plans.

The intertemporal substitution hypothesis (ISH), presented in Chapter 28, goes a long way toward explaining the labor-supply patterns of men and women aged 18–55. Nevertheless, the hypothesis is generally viewed as providing an inadequate account of the retirement behavior observed among those in the 55-plus age group. In 2004, while almost 88% of men aged 50–55 participated in the labor force, only 32% of those aged 65–69 did so. The evidence for women is no less striking: 75% of women aged 50–55 are labor-force participants, which compares with a meager 23.3% of those aged 65–69.

The basic difficulty is that the decline in earnings over the latter stages workers' life cycles are too small to explain the gigantic changes in their labor supplies. Similarly, the gradual shift in the male retirement age is difficult to reconcile with the earnings changes that occurred over the period. According to BLS data, in 1950 almost half of those men aged 65 or older were in the labor force but, by 2005, this figure had fallen to only 11%.<sup>1</sup>

Given that changes in the terms of employment cannot apparently explain the changes in the retirement behavior of men and women, economists have increasingly suspected that the smoking gun may lie

### LEARNING OBJECTIVES

After reading this chapter, you should be able to:

- Recognize the retirement behavior of men and women and understand how these patterns have changed over time.
- Recognize the broad institutional features of the Social Security system and private pension plans.
- Understand the distinction between defined benefit (DB) and defined contribution (DC) pension plans.
- Understand why an increase in retirement benefits is predicted to induce an unambiguous decrease in the retirement age.
- Explain why mandatory retirement schemes together with private pension plans can solve a difficult moral hazard problem that results from the possibility of worker shirking.

with changes in the conditions of retirement itself. More specifically, coincidental with the decline in the participation rates of older men, the period also witnessed the striking ascendancy of the Social Security system and the pronounced growth in private pension plans. Thus currently almost 90% of those aged 65 or older are covered by the Social Security system, and the benefits it pays out represent the lion's share of the income accruing to this group of individuals. In fact, Social Security benefits represent the sole source of income for approximately one in five elderly Americans.

The primary goal of this chapter is to describe the links that exist between retirement behavior and the changes that have occurred in both Social Security benefits and private pensions.<sup>2</sup> I begin by presenting some of the core facts concerning the Social Security system and evidence pertaining to the growth of private pensions in the United States.

## 30.1 Social Security and Private Pensions

We must protect the crushable elements at the base of our present industrial structure . . . it is abnormal for any industry to throw back upon the community the human wreckage due to its wear and tear, and the hazards of sickness, accident, invalidism, involuntary unemployment, and old age should be provided for through insurance.

—President Theodore Roosevelt, *New York*, 1912

As noted in Chapter 28, there has been a staggering reduction in the participation rate of elderly men in the United States. In 1950 almost 50% of those aged 65 or older were in the labor force but by 2005 this figure had fallen to only 11%. Contemporaneous with these changes, the period also witnessed the striking ascendancy of the Social Security system. Given the timing of the changes, it is only natural to suspect that Social Security benefits may be the root cause of the observed changes in (male) labor-force participation rates. In this section, we provide some background material pertaining to the system, together with some pertinent institutional details.

### Background

The Social Security system is already a veritable behemoth. Furthermore, projections indicate that it will only continue to grow in stature over the next several decades, as baby boomers begin to retire in droves. In 2006, some 54 million American citizens received some form of Social Security benefits, and combined expenditures on the program exceeded \$588 billion. Together with Medicaid payments, this represented almost a third of the entire federal budget.<sup>3</sup> Currently,

there are serious concerns about the long-term viability of the system. In fact, projections indicate that, unless substantive changes are made, it will become insolvent in about 40 years time.

In the early 1930s, the United States was in the grip of the Great Depression—the second major slump in economic activity that had occurred in a period of just over 40 years. At one point, approximately 25% of the labor force was unemployed. Lacking any sort of welfare support programs, countless millions found themselves in a state of severe economic hardship. For example, in 1934 over half of the elderly in America lacked sufficient income to support themselves. In response to the crisis, between 1930 and 1935, some 30 states fashioned a ramshackle assortment of feeble old-age assistance programs. Yet, only a meager 3% of the elderly in these states received any benefits at all, and the average payment was a paltry 65¢ a day!

At the same time, a variety of tin pot schemes were advanced as panaceas to cure the malaise of the time. For example, “Share Our Wealth,” which marched under the banner of “every man a king,” was advocated by onetime Louisiana governor Huey Long. The program called for the confiscation of the wealth of the nation’s rich and privileged in order that the federal government guarantee every family in the nation an annual income of \$5,000.<sup>4</sup>

**Social Insurance.** In 1935 the United States lagged well behind many other industrialized nations in terms of providing an adequate safety net for economically vulnerable members of society. At that time, over 34 nations had already adopted some form of social insurance scheme to help smooth the rough edges of their capitalist systems. Most were fashioned after the German model, which was promulgated in 1889 by Prussia’s iron chancellor: Otto von Bismarck.

The notion of social insurance was especially appealing as a remedy for the woes facing America at the time. The United States has enjoyed a long tradition of eschewing welfare handouts, which run counter to its founding principles of individualism. Social insurance schemes finesse this philosophical quandary, since they harness the forces of self-reliance. More specifically, during good times, workers contribute to a common pool when they are able to work. They then can draw from this pool, during bad times, after the occurrence of some well-defined adverse realized outcome, such as unemployment, sickness, and the loss of income during old age.

Faced with mounting pressure to remedy the plight of the poor during the Great Depression, President Franklin Roosevelt created a Committee on Economic Security in 1934 to explore potential remedies.<sup>5</sup> The outcome of this was the **Social Security Act**, which was signed into law in August of 1935. The act was both breathtaking in scope, and is arguably one of the most significant pieces of legislation in U.S. history. For our purposes, its most salient features are that it called for the collection of contributions from workers and employers in the

form of payroll taxes (known as FICA contributions—after the Federal Insurance Contributions Act), and it disbursed benefits both to retired workers (aged 65 or older) and unemployed workers. In 1939, the act was amended in a manner that changed the scheme from individual insurance to familial insurance by extending benefits from the primary wage earner to his or her spouse (and any dependent minors). It also provided coverage to survivors in the event of the worker's untimely death.

There have been many emendations to the act following its inception almost 70 years ago. The most significant among them are outlined in Definition 30.1, which also describes some of the main institutional features of the system.

Today, Social Security is administered by the Social Security Administration (SSA). What is commonly referred to as Social Security is, in point of fact, an amalgamation of a variety of schemes that can themselves be classified into two basic groups: The federal Old-Age and Survivors insurance programs (OASI) and the Disability Insurance program (DI). Each program has its own trust fund and disburses benefits to eligible persons who made payroll contributions during their working lives. The two programs are often classified together as OASDI.

**The Current Crisis.** The Social Security Act was a response to the crisis created by the Great Depression, which left many Americans—especially the elderly—in a state of abject poverty. The first FICA taxes were collected in 1937, and the first benefit payments were made three years later in 1940. From its inception, the system has been one in which the payroll taxes of the current younger generation are used to finance the benefit payments made to the current older generation.

This system is perfectly fine on paper, provided that there are no sudden demographic shifts that adversely affect the ratio of those who contribute to the scheme relative to those that draw from it. The snag is that, currently in the United States, this balance is now seriously off kilter because of three significant demographic events. First, the baby boom generation is slowly coming of retirement age. This will lead to not only a sharp reduction in the size of the labor force but also a substantial increase in the number of retirees. Second, as a result of important medical breakthroughs, Americans are living longer than ever. The result is that retirement benefits are being claimed for longer than was originally anticipated. Finally, Americans (especially men) are retiring earlier.

Because of these various demographic shifts, the ratio of contributors to recipients, which was 5.1 in 1960, is projected to decline to a mere 1.9 by 2070. It is estimated that unless steps are taken, these factors will imply that the system will become insolvent in as little as 40 years time at which point it will be unable to meet its financial obligations.<sup>6</sup>

**Private Pensions.** In addition to their Social Security benefits, many Americans rely on private pension plans to see them through their retirement years. According to OECD statistics, in 2006, the value of assets in U.S. private pension funds

**DEFINITION 30.1 Social Security in the United States****The Normal, or Full, Retirement Age (NRA)**

The NRA is the age at which retirees receive full benefits. It was originally set at 65 years of age. The **1961 Amendment** left the NRA at 65, but reduced the age at which men could retire to 62. (Women were given the option of early retirement in 1956.) Benefits were actuarially adjusted for those who retired before the NRA of 65. The **1983 Amendment** was designed to ensure the system's continued financial viability. Recommendations set out in the report of the Greenspan commission led to the taxation of Social Security benefits and an incremental increase in the NRA from 65 to 67. Currently, the NRA is 67 for anyone born after 1960.

**Cost-of-Living-Adjustments (COLAs)**

Benefit levels were originally stipulated in nominal terms that made no allowance for changes in the cost of living. The **1950 Amendment** increased benefits by 70%. Benefits were further increased by 12.5% in 1952 and 13% in 1954. The **1972 Amendment** provided for automatic annual benefit adjustments to accommodate increases in the price level and in the wage base used to calculate future benefit levels.

**The 1977 Amendment**

The 1977 Amendment corrected a *double indexation flaw* in the formula used to determine benefit levels. The problem was that benefit levels were adjusted according to changes in both average nominal earnings and the price level. Loosely speaking, this meant they increased at twice their intended rate. Legislators were forced to quickly act to address the problem, lest the whole system collapse.

The 1977 Amendment resulted in the **notch baby generation**, which refers to the group of seniors born between 1917 and 1921. The amendment led to some striking disparities. Those born between 1911 and 1916 were grandfathered (so to speak) and received substantial excess benefits based on the erroneous formula. As a result someone born in 1916 might receive as much as \$200 per month more than someone born in 1917—even though both had almost identical work histories.

**The Retirement Earnings Test (RET)**

The 1935 act deemed complete retirement (which was subsequently clarified to mean earning less than \$15 per month) as a precondition for the receipt of any benefits. The RET was eliminated for those aged 75 or older under the 1950 Amendment. This age was further reduced in 1954 and 1977 to 72 and 70 respectively. The 1960 Amendment eliminated the all-or-nothing nature of the RET. Workers aged between 65 and 72 could earn up to \$1,200 per annum without a loss of benefits. Those who earned \$1,200–1,500 saw a reduction of \$1 in benefits for every \$2 of earnings (with complete loss after \$1,500). By 1997 seniors between the NRA and the age of 70 could earn up to \$15,500 per annum. Earnings in excess of this led the loss of \$1 in benefits for each \$3 of additional earnings. On April 7, 2000, The Senior Citizens' Freedom to Work Act of 2000 was signed into law by President Bill Clinton, which eliminated the RET for those at or above the NRA.

**Disability and Medicaid**

The ambit of Social Security coverage has increased considerably since the passage of the Social Security Act in 1935. The most significant changes include coverage for disability and health insurance for the elderly.

- **Disability.** The **1956 Amendment** provided disability coverage to those aged 50–64. The **1960 Amendment**, signed into law by President Eisenhower, provided coverage for all age groups. Since then a number of emendations have been passed that are designed to bolster work incentives.
- **Healthcare.** The **1965 Medicare Bill** provided health coverage to Americans 65 and older.

amounted to about \$10 trillion. Moreover, almost two thirds of the workforce will be enrolled in one type of plan or another during the course of their lifetimes. Definition 30.2 offers some background on U.S. private pension plans.

Generally speaking, private pensions are complicated financial instruments that serve a multitude of different functions. First, current tax laws encourage the use of pensions as a savings device, since current earnings that are allocated toward a pension may be tax exempt. Second, private pensions provide a form of retirement insurance. For example, by accepting an annuity payment workers are insured against the risk of living longer than they might have expected.<sup>7</sup> Finally, the formulas used to determine pension benefits (and the contributions of both workers and their employers) are the product of negotiated agreements between the two parties. As such, there is ample scope for crafting them to encourage some types of behavior and to discourage other types of behavior (the attempt to reduce costly turnover at the firm being a notable case in point).

Workers use private pension plans as a savings device to provide for their retirement years. Nevertheless, a variety of hazards can reduce—even wipe out—their values. In fact, the financial fragility of private pension plans—both of the **defined benefit** (DB) and **defined contribution** (DC) kinds—have been much in the news recently. Indeed, as a recent ruling in favor of United Airlines amply illustrates, DB plans are often woefully underfunded (i.e., pension liabilities exceed pensions assets), which puts them at risk in the event of the bankruptcy of the firm. In 2005, United Airlines declared Chapter 11 bankruptcy. This allowed the carrier to walk away from almost \$10 billion in unfunded pension liabilities.<sup>8</sup> As for DC plans, they often suffer from extremely poor risk diversification, with much of the pension's assets being held in the firm's own stock. In fact, Poterba (2003) estimates that, among the 20 largest DC plans in the United States, almost 44.1% of pension assets are held in this form. As exemplified by the recent Enron scandal, this can result in a ruinous loss of pension wealth in the event of the firm's failure.

## 30.2 Retirement

The retirement decision represents a particular outcome of the life cycle labor-supply planning problem: a worker chooses to no longer participate in the labor force upon reaching his or her retirement age. Nevertheless, as emphasized by Lazear (1986), there are important institutional features—such as private pension plans and Social Security payments—that make the topic worthy of separate attention.

### The Microeconomics of Retirement

It is possible to analyze the primary features of the retirement decision using a simple static framework rather than having to wheel in the big guns of the intertemporal labor-supply model discussed in Chapter 28.



### DEFINITION 30.2 Private Pensions

Private pensions are extremely complicated financial instruments. Moreover, the United States has witnessed an enormous number of changes in the laws governing them over the past eighty years or so. Accordingly, here we describe just the basics.

Private (or, as they are sometimes known, *employer sponsored*) retirement plans fall into two basic categories: **qualified** and **nonqualified**. For our purposes, the key distinction between them is that only the former category must meet the stringent requirements of Title I of the Employee Retirement Income Security Act of 1974 (ERISA), which were established to prevent the mismanagement of retirement accounts. In what follows, we focus only on qualified plans as they are the most common by far.

Qualified plans are required to follow prescribed **vesting procedures**. Both employers and (often) workers contribute to workers' pension funds. (For example, the firm may match each \$1 contribution from the worker with a \$0.50 contribution of its own). The following question then naturally arises: what happens to the pension if the worker subsequently leaves the firm? The answer is that the worker gets to keep his own contribution; in addition, depending on the *vesting arrangements* he may be able to keep some (partially vested) or all (fully vested) of his employer's contributions. There are two basic types of vesting mechanisms: **graded vesting**, and **cliff vesting**. As the names suggest, in the former case, the worker gradually becomes entitled to his employer's contributions over time. In the latter case, his pension is initially nonvested (so he is entitled to none of his employer's contributions). However, after some prescribed length of employment has elapsed the worker becomes fully vested.

Qualified pensions can further be classified according to whether they are **defined benefit (DB)** or **defined contribution (DC)** plans. Under the former category, the employer is the sole contributor, and the two parties agree on a formula that subsequently determines the worker's precise benefit entitlements. One type of formula commonly used to calculate benefits is to use the worker's average earnings over the last 5 years of his career. Another is to base benefit levels on years of employment with the firm.

The employer is obliged to make contributions to cover its subsequent pension liabilities. To mitigate the risk that it might get its sums wrong, or even go out of business, it is obliged to obtain pension-insurance coverage through the Pension Benefit Guaranty Corporation (PBGC), which was created as part of the Employee Retirement Income Security Act of 1974.

Defined contribution plans call for a fixed payment into the worker's retirement fund. For example, the worker may choose to contribute (within prescribed limits) some fraction of his earnings toward his retirement, and a formula may circumscribe the firm's matching contribution. Defined contribution plans delimit the input into the retirement fund; the output, depends on the value of the worker's investments when he retires. In turn, this depends on, among other things, the vicissitudes of the stock market.

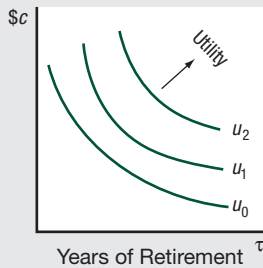
There are apparently an uncountable number of different DC plans. The two best known of them are **401K plans** and **IRAs**. The hallmark of these plans is that they offer tax shelters to individual—as opposed to corporate—retirement savings.<sup>9</sup>

There have been too many changes in the law governing private pensions to cover here. Two of the most important of them are presented next.

- The use of private pensions as tax shelters arose with the Revenue Acts of 1921 and 1926, which allowed them to deduct pension contributions from corporate income and which allowed for the income of the pension fund's portfolio to accumulate tax free.
- Under the Economic Growth and Tax Relief Reconciliation Act of 2001, workers with a cliff-vesting scheme become fully vested after 3 years of unemployment. Under graded vesting, the employee is entitled to 20% of the employer's contribution after 2 years of employment and 100% of it after 6 years.

Source: <http://encyclopedia2.thefreedictionary.com/Pension> (accessed May 4, 2010).

FIGURE 30.1 Indifference Curves



For added concreteness, assume that the year is currently 2005, and consider an individual who is currently enjoying his 55th birthday party. Let us suppose that, after all the party hats have been cleared away, the individual is soberly contemplating his future. Suppose that he expects to live another 25 years and that he must choose how many years to spend in retirement, denoted  $\tau = 0, 1, 2, \dots, 25$ . (To be clear, at one extreme, setting  $\tau = 0$  implies he never retires and, at the other, setting  $\tau = 25$  implies he retires immediately.) For the moment, assume that there is no Social Security system, so he must finance his retirement from his savings and from his private pension plan (if he is enrolled in one).

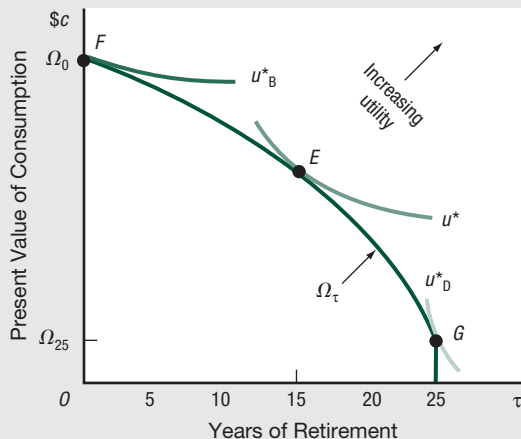
Let  $\$c$  denote the present value of his consumption over the next 25 years. Assume that his utility depends positively on  $c$  and  $\tau$  according to the relationship  $u = u(c, \tau)$ , which is characterized by standard indifference curves of the sort depicted in Figure 30.1. All else equal, the individual prefers more consumption to less and a longer retirement period to a shorter one. The next task is to describe the constraints that circumscribe his feasible choices.

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With this in mind, let  $\Omega_\tau$  represent the present (i.e., year 2005) value of his wealth conditional on spending  $\tau = 0, 1, 2, \dots, 25$  years in retirement. It is plausible to anticipate that his retirement nest egg increases with the number of years he works (and so the fewer years he spends in retirement):  $\Omega_0 > \Omega_1 > \Omega_2 > \dots > \Omega_{25}$ .<sup>10</sup> This is depicted in Figure 30.2 by his retirement budget constraint  $FG$ . At Point  $F$  he never retires, and so maximizes his discounted wealth and consumption. In contrast, at point  $G$ , he retires immediately, at age 55, which results in the lowest levels of discounted wealth and consumption. As shown, he maximizes his utility by selecting point  $E$ , which is characterized by a point of tangency between his highest attainable indifference curve  $u^*$  and his budget line  $FG$ . Consequently, he spends  $\tau = 15$  years in retirement, and therefore retires at the age of  $70 = 15 + 55$ .

The figure also depicts the choices made by Betsy (B) and Dougal (D), who, for convenience, are assumed to face the same budget line  $FG$ . Notice that, because of differences in their preferences, Betsy and

FIGURE 30.2 The Optimal Retirement Age



the figure also depicts the choices made by Betsy (B) and Dougal (D), who, for convenience, are assumed to face the same budget line  $FG$ . Notice that, because of differences in their preferences, Betsy and



Dougal behave very differently. As shown by the indifference curve,  $u_B^*$ , Betsy never retires (point  $F$ ). In complete contrast, as shown by the indifference curve  $u_D^*$ , Dougal retires immediately (point  $G$ ).

**An Increase in the Wage.** Figure 30.3a depicts the experiences of two different workers: Dougal and Betsy. (Notice we have depicted a lifetime budget line as opposed to a budget curve. This is inconsequential and merely simplifies the graphs.) As shown, Dougal and Betsy are assumed to face the same initial budget line  $FG$  and to choose the same initial point  $E$ , where they both pick  $\tau^*$  years of retirement.

An increase in the wage causes their common lifetime budget line,  $FG$ , to pivot outward around point  $G$ . The reason the line pivots is that point  $G$  corresponds to immediate retirement: obviously, the value of retirement wealth is completely unaffected by the level of a wage that is never earned. Following the change, Betsy picks point  $B$ , which implies that the increase in the wage induces her to defer her retirement (i.e.,  $\tau^*$  declines). In complete contrast, Dougal picks point  $D$ , and so retires earlier (i.e.,  $\tau^*$  rises).

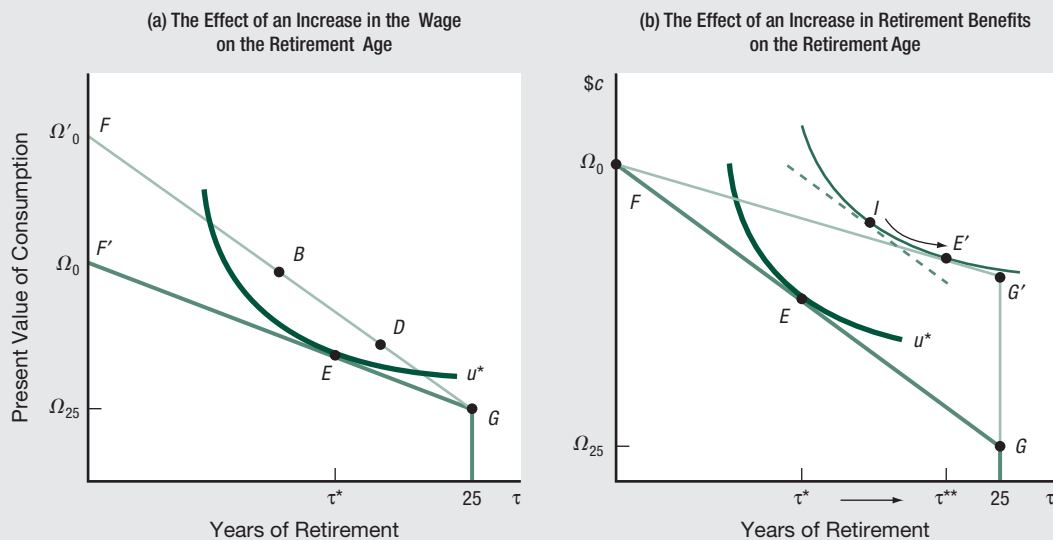
The underlying source of the difference in their behavior—and hence the theoretical ambiguity—is that the increase in the wage triggers conflicting income and substitution effects. The income effect encourages each of them to retire earlier, but the substitution effect encourages them to retire later. The outcome of this tug-of-war determines whether their retirement age rises or falls.

Nevertheless, there is a general consensus among economists that, empirically, the substitution effect is a little stronger than the income effect, so that the increase in the wage tends to increase the retirement age. Consequently, the observed reduction in the average retirement age among men, over the past 50 years or so, is not thought to have resulted from the increase in earnings that occurred over this period.

**Pensions.** Figure 30.3b depicts the effects of an increase in retirement benefits—that results from, for example, the passage of the 1935 Social Security Act—on an individual whose optimal choice is located initially at point  $E$ . This time, the budget line pivots outward around point  $F$ . The reason is that (at least under the original legislation) the individual must retire to be eligible for any retirement benefits. At point  $F$ , the individual never retires and consequently gains nothing from the posited increase.

It might be tempting to suspect that, just as was the case for the wage increase, this change also triggered conflicting income and substitution effects. While it is true that the change does precipitate an income and a substitution effect, this time they both work in tandem to unambiguously reduce the retirement age.

As shown by the shift in the optimal choice from  $E$  to  $E'$ , in Figure 30.3b, the individual in question responds to the increase in retirement benefits by raising the number of years he spends in retirement:  $\tau^{**} > \tau^*$ . The figure also decomposes

**FIGURE 30.3** The Effect of an Increase in the Wage and Pension Benefits on the Retirement Age

the movement from  $E$  to  $E'$  into its constituent income and substitution effects. Holding fixed the slope of the budget line, the leisure-inducing income effect, induced by the increase in retirement benefits, takes the individual from point  $E$  to point  $I$  (as shown by the dashed line that is parallel to the original budget line  $FG$ ).

Notice, however, that the increase in retirement benefits tends to flatten out the slope of the budget line. This implies, of course, that the cost of another year of retirement (measured in terms of forgone consumption) decreases following the availability of Social Security benefits. Consequently, the substitution effect also encourages the worker to retire sooner rather than later, which is shown by the movement from point  $I$  to its final destination  $E'$ .

Summarizing, the basic retirement model provides strong theoretical support for the hypothesis that the observed reduction in the male retirement age could have resulted from the increase in retirement benefits provided by the Social Security program and by private pension plans.

## The Evidence

Previously, we reported the large decline in male labor-force participation rates—especially among older men—that occurred over the last 60 years. To recap, in 1950, almost half of those men aged 65 or older were in the labor force, but this figure had fallen to a mere 11% by 2005. The same period, however, also witnessed the Social Security system broaden in scope and the real value of retire-

ment benefits increase dramatically. In fact, currently over 90% of those aged 65 and older are entitled to Social Security retirement benefits (which constitute the largest source of income for this group), and the real value of Social Security benefits increased by almost 25% between 1966 and 1973.

It is only natural—especially in light of the theoretical results just reported—to anticipate that the changes in the Social Security system might be the root cause of the observed changes in (male) retirement behavior over the last several decades. Nevertheless, bringing empirical evidence to bear on the issue is by no means a trivial exercise. Indeed, despite the vast number of empirical studies that have sought to quantify the effects of the Social Security system on male participation rates, there continues to be a heated debate among economists concerning the magnitude of the effect.<sup>11</sup>

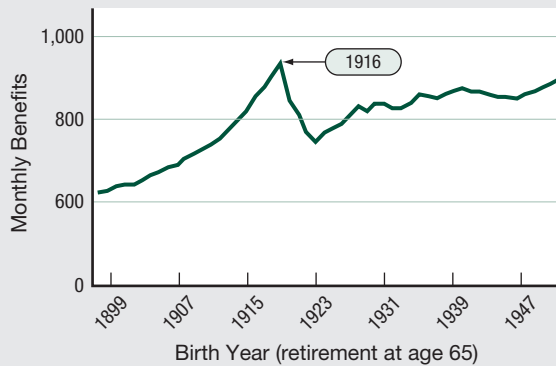
**Estimation Difficulties.** The root source of the empirical problems stems from the fact that it is both very difficult and costly to perform the kinds of social experiments that would bring direct evidence to bear on the effects of the system, implying economists must indirectly infer the effects of the system by observing individual behavior in nonexperimental settings.<sup>12</sup> In practice, this usually means using either time-series or cross-sectional data (or panel data, which combine elements of both). Time-series data allow economists to examine how changes in the Social Security system (e.g., in the level of benefits) are related to changes in participation rates over time. The basic difficulty with this approach is that many economic variables change over time.<sup>13</sup> This, of course, raises the specter that perhaps it is changes in these other variables—rather than the change in retirement benefits—which are responsible for the observed changes in behavior.

As for cross-sectional data, they provide economists with a snapshot of the retirement behavior of individuals at a particular point in time. The basic problem with this type of data is that at each point in time everyone is subject to the same Social Security system, so there is no variation in the way the system treats workers with identical backgrounds. Lacking such variation, it is difficult to isolate its effects on workers' behavior.

Of course, the system treats workers with different backgrounds differently, as retirement benefits generally increase with lifetime earnings. Yet, to learn, for example, that those who receive benefits of (say) \$18K per annum retire a year earlier than those who receive benefits of \$12K is to learn little at all. The benefits of the former group are higher than the latter because their earnings were higher. But this begs the question, did they retire earlier because of their higher earnings or because of their higher benefits? Unfortunately, absent additional data, it is generally extremely difficult to disentangle these two effects.

**Natural Experiments.** Although the attempt to obtain reliable estimates of the impact of the Social Security system is fraught with difficulties, it is not fruitless. Sometimes, certain policy changes generate a natural experiment that provides

FIGURE 30.4 The “Notch”



\* Constant 1994 dollars

Source: [www.ssa.gov/history/notchfile1.html#chart6](http://www.ssa.gov/history/notchfile1.html#chart6) (accessed on May 3, 2010).

valuable information concerning economic behavior in general and the effects of Social Security retirement benefits in particular. One such change was the 1977 Amendment to the Social Security Act, which led to the so-called notch-baby generation (Figure 30.4). As will be recalled from Definition 30.1, the amendment led to a (presumably unanticipated) pronounced downward adjustment in the retirement benefits of the 1917–1921 cohorts.

Critically, the benefit levels of the 1910–1916 cohorts were *grandfathered* and were calculated on the basis of an erroneous formula (introduced in the 1972 Amendment). Because of the revision, it was quite possible that a worker born in 1916 might receive re-

tirement benefits \$200 greater than a worker born a few months later in 1917—even if both of them possessed ostensibly identical work histories.

In a celebrated paper, Krueger and Pischke (1992) exploit this variation to examine the effects of the system on the participation behavior of elderly Americans. Their findings indicate that the growth in retirement benefits have, in point of fact, played a rather modest role in accounting for the decline in the participation rate of elderly American men. Instead, they attribute much of the decline to the growth in private pension plans and the general increase in the wealth of the elderly.

Costa (1995) conducts an interesting study, using historical data, to sort through the conflicting effects of pensions that are present in recent data. Her findings are summarized in Economic Application 30.1.

**Retirement Clustering.** In the United States there is a pronounced spike in the retirement rate at the age of 62 and a smaller one at the age of 65. Perhaps not coincidentally, these correspond to the ages at which workers are, respectively, entitled to early and full retirement benefits under current Social Security arrangements.<sup>14</sup> Understanding the causes for the clustering of retirement around the ages of 62 and 65 is currently of great importance because some policy makers have proposed raising the early retirement age from its current level of 62 in response to the Social Security funding crisis.

The trouble is that nobody is quite sure what will happen to retirement rates if this policy is actually implemented. The reason is that explaining the spike at the age of 62 has been the source of no end to theoretical headaches. The basic issue is that, under current arrangements, the effect to deferring retirement by a year is (slightly) better than actuarially fair: benefits increase in greater proportion than contributions. Why then do so many workers retire at the age of 62 and not some other later age?

## ECONOMIC APPLICATION 30.1

### Union Army Veterans

Much of the research on changes in male labor-force participation rates has focused on behavior post-1960. This period coincides with the ascendancy of the Social Security system and the growth in private pension plans. However, the secular decline in male participation rates is a much older phenomenon. In 1888 some 78% of Americans aged 65 and older were in the labor force. This number had dropped to only 58% by 1930.

To better ascertain the proximate causes of the decline, Costa (1995), in an ingenious study, brings evidence to bear on the issue by using data from the first major pension plan in the United States: that covering Union Army veterans. The Union pension system was established in 1862 by the U.S. Congress. It provided pensions to veterans who became disabled as a direct result of military engagement.

An act passed by Congress in June 1890 witnessed a striking increase in the compass of the pension program; it was made universally available to all (Union) veterans, regardless of whether they worked, and regardless of their current income and past wages. Most important, benefit levels depended only on the individual's current health status and on whether this status was affected by the war. The fact that two equally healthy (or, more precisely, unhealthy) veterans might receive different benefit levels—solely on the basis of whether their injuries were attributable to the war—is important because it is this richness of the data that permits the separate identification of health and wealth effects on retirement behavior.

Hence data on Union Army pensions provide a unique window that can be used to study the size of the income effect on retirement behavior. Costa's evidence uncovers a sizable wealth effect, with a wealth-participation elasticity of 0.73. This elasticity is so large that it implies almost 60% of the decline in the male labor-force participation rate post-1960 can be attributed to the increase in the wealth level over the period as opposed to, say, increases in Social Security benefits. ■

In an interesting study, Gustman and Steinmeier (2005) generate heterogeneous retirement rates by imposing the assumption that workers have varying degrees of impatience. Not surprising, the most impatient choose the early retirement age of 62 and retire with few—if any—savings. The most patient members of the population, however, delay their retirement to accrue the benefits of increased Social Security benefits. Their results suggest that increasing the early retirement age from 62 to 64 would lead to a substantial increase in the average retirement age.

**Private Pensions.** Private pension benefits are predicted to affect retirement behavior in roughly the same way as the Social Security system—with one important caveat. Whereas there has been a secular tendency for the Social Security system

to encourage the continued labor-force participation of elderly Americans, many private-pension schemes have trended in precisely the opposite direction; they have attempted to encourage the early retirement of workers at the age of 55 by offering substantial early retirement bonuses and by imposing substantial penalties on those who retire after the age of 55.

As for the effects of private pensions on the retirement age—just as was the case for Social Security benefits—different studies have reached quite different conclusions.<sup>15</sup> For example, Anderson, Gustman, and Steinmeier (1999) find that the long-run effects of changes in pension plans and Social Security account for only a quarter of the observed reduction in full-time participation by men in their early 60s, and almost none of the reduction by those aged 65. In contrast, Ippolito (1990) finds that the increase in Social Security and private pension benefits account—in roughly equal proportions—for much of the decline in labor-force participation rates of elderly men.<sup>16</sup>

## The Retirement Earnings Test (RET)

The [Social Security] system originally was designed to encourage older Americans to retire by withholding benefits from those 65 and older who worked. . . . The so-called retirement earnings test made some sense in the Great Depression, when the nation was desperate to find jobs for young workers with families, and the unemployment rate in our nation was 25 percent. Conditions today could hardly be more different. . . . Older Americans have the skills and the experience that businesses need. . . . Increasingly, older Americans want to work. . . . And we know . . . that unless they're in terrifically physically draining jobs, that continuing to work may well add not only to the length, but to the quality of their lives.

—President Bill Clinton, April 7, 2000

The original 1935 Social Security Act required that workers be substantially retired before becoming eligible for any retirement benefits.<sup>17</sup> Since that time, the entire philosophy of the retirement aspect of the Social Security system has changed dramatically. More specifically, rather than discouraging work among the elderly, the general thrust of the most recent legislative changes has been one of encouraging seniors to participate in the labor market.

Nowhere is this ethos more clearly exemplified than with the passage of The Senior Citizen's Freedom to Work Act, which was signed into law by President Clinton in April 2000. The act itself eliminated the RET for those aged between 65 and 70.

As already noted in Definition 30.1, in 1997 the RET applied to those seniors aged between 65 (more generally the NRA) and 70. It allowed them to earn up to \$15,500 per annum. Every \$3 of earnings over and above this threshold reduced their retirement benefit levels by \$1. The 2000 act eliminated the RET altogether



**DEFINITION 30.3 Mandatory Retirement**

Under a **mandatory retirement** agreement, a worker is compelled to retire at some preagreed age. Over the past 40 years, however, U.S. law has evolved to protect elderly Americans against unfair *age discrimination*. The most significant piece of legislation is the Age Discrimination in Employment Act of 1967 (ADEA) that

protects individuals who are 40 years of age or older from employment discrimination based on age. . . . Under the ADEA, it is unlawful to discriminate against a person because of his/her age with respect to any term, condition, or privilege of employment, including hiring, firing, promotion, layoff, compensation, benefits, job assignments, and training.

Following its initial passage, a number of amendments have been made that have further strengthened the act. The 1978 Amendment to the ADEA, signed into law by President Carter, raised the mandatory retirement age for most workers from 65 to 70. The 1986 Amendment prohibited (almost) any employer from setting a mandatory retirement age. A special ADEA statute—enacted in 1986—permitted universities and colleges to enforce mandatory retirement for faculty who reached the age of 70. The exemption lasted only 7 years, however, and expired at the end of 1993.

Ashenfelter and Card (2002) examine the effects of changes in mandatory retirement laws on colleges and universities. Their results indicate that the prohibition of mandatory retirement had no effect on retirement rates of faculty under the age of 70. Yet,

[i]n contrast, the law substantially reduced the retirement rates of 70- and 71-year-old professors. In the mandatory era about 75 percent of faculty who reached the age of 70 retired within a year. The retirement rate of 71-year-olds was also over 60 percent. Immediately after the prohibition of mandatory retirement both rates fell to under 30 percent. These reductions have led to a marked increase in the fraction of faculty who continue working into their seventies. While before less than 10 percent of 70-year-old faculty were still working at age 72, after the prohibition close to one-half were still teaching two years later. In addition, our findings indicate that faculty with higher salaries or lower pension wealth are less likely to retire at any given age.<sup>18</sup>

The result is that the age-distribution in U.S. institutions of higher education would appear to be heading for a substantial rightward shift through time (i.e., more gray hairs.) This will have profound consequences for both the finances of these institutions, the market for junior faculty, and even research output.

Source: [www.eeoc.gov/laws/statutes/adea.cfm](http://www.eeoc.gov/laws/statutes/adea.cfm) (accessed May 5, 2010).

for workers in this age group. The primary aim of the act was to encourage labor-force participation among elderly Americans.

**Microeconomic Analysis.** It is possible to analyze the effects of the Freedom to Work Act on individual work incentives using the simple static labor-supply model. For simplicity, assume that the hourly wage is a constant  $\$w$  and that retirement benefits are  $\$B$ . Under the RET this leads to the budget line  $ATRP$  shown in Figure 30.5. At point  $P$ , the worker is a nonparticipant (i.e., completely retired) and receives the full retirement benefit of  $\$B$ . The segment  $RP$  represents a level of earnings below (or equal) to the exempt amount (here  $\$15,500$  per annum). Earnings in excess of this amount—depicted along  $RT$ —trigger the claw-back



excess of \$84 billion. Between 1984 and 2001, the share of the adult population—aged 65 or less—who received disability payments increased by a remarkable 60%. Furthermore, recent estimates predict that the number of DI recipients may grow by as much as 40% over the next decade.<sup>19</sup>

The DI program might be regarded as the poster child of social insurance schemes. After all, it is intended to provide a helping hand to perhaps the most deserving of all: those who can no longer work after either suffering a serious injury or else after falling into ill health. In an ideal world, the merits of the DI system are clear enough to see: it eliminates (or at least reduces) much of the potentially ruinous (income) risk associated with the tragic unfolding of events leading to disability. Yet, there is another darker side to the system because it engenders strong incentives for workers to misrepresent the true extent of their disabilities so as to claim benefits and avoid working.

In recognition of these incentives, the DI system has put in place a tough screening regimen to weed out the undeserving and target benefits toward the truly disabled. Disability certification is carried out by government-picked physicians. There is also a 5-month waiting period, during which time the worker cannot be gainfully employed. Furthermore, certification is done on a temporary basis and periodic medical checkups are conducted to ensure continued eligibility. (For example, in 2002 benefits were terminated for about 479,000 disabled workers.)

**The Quantitative Impact of the DI Program.** Assessing the quantitative effects of the DI program on labor-force participation rates is a notoriously difficult undertaking. In essence, the main obstacles are that everyone faces the same DI program (so there is little or no natural variation in its effects across different worker groups), and benefit levels depend on prior earnings, which themselves affect (and are affected by) labor-supply decisions. Untangling these effects is by no means trivial and there is considerable disagreement among economists concerning the magnitude of the effect of the program on participation rates. Some studies (e.g., Parsons 1980*b*) find that almost all of the observed decline in the male labor-force participation rate stems from DI benefit payments.<sup>20</sup> Autor and Duggan (2003) examine the effects of the DI program on the labor-force participation rates of low-wage workers and find that the increase in DI benefits explains a considerable part of the decline in their labor-force participation rates.<sup>21</sup>

Others, however, have called into question these results. Some work examines the subsequent behavior of those who are rejected by the program (the government rejects about 40% of all claimants).<sup>22</sup> The idea behind this empirical strategy is that if the evaluation procedures accurately detect those who masquerade as being unable to work, then once the game's up (and they are rejected), they would presumably return to work. Yet, the evidence shows that fewer than half of them do so. This suggests that the effect of the DI system on labor-force participation rates may be quite limited since many workers choose not to (are unable to) participate regardless of whether they receive any benefits.

### 30.3 Pensions and Economic Incentives

Before the 1967 Age Discrimination in Employment Act and the subsequent emendations to it (see Definition 30.3) workers were often contractually bound by **mandatory retirement** arrangements to retire at some preprescribed age with 65 being the most common during much of the 20th century.

Nevertheless, explaining why these mandatory retirement arrangements were so common is considerably more difficult than it might appear at first glance. For instance, the most obvious explanation is that workers' productivities decline as they age. Hence (so the argument goes), it is efficient for them to retire and for the firm to replace them with younger and more vigorous new blood. Yet this interpretation—although superficially plausible—perhaps raises more questions than it answers. For example, even if we grant that there is a significant productivity decline by age 65, a worker could presumably always accept a wage cut and continue to work if he or she desires; nevertheless, mandatory retirement arrangements preclude these sorts of agreements. Likewise, it is ridiculous to imagine that workers' productivities decline precipitously on or around their 65th birthdays. Given this, why is it that the more sprightly 65-year-olds are compelled to retire rather than being given the option of continuing to work?

#### Incentives and Imperfect Information

In a series of influential papers, Lazear (1979) and Lazear and Moore (1984) argue that mandatory retirement has little to do with a decrepit old age. Instead, it results from providing work incentives in an environment characterized by imperfect information. The basic gist of their argument is as follows.

Consider a 30-year-old worker who is just commencing employment with a particular employer and who expects to live until he is 80. Assume that the worker has some flexibility in choosing just how hard he works and that he prefers to do as little work as possible (all else equal). Finally, suppose that his employer cannot keep tabs on him during every second of the workday. Instead, it must make do with a rather rudimentary monitoring technology that enables it to detect whether he shirks with some given probability. Given this, can the firm implement an **incentive scheme** that ensures the worker exerts appropriate effort levels over his career?

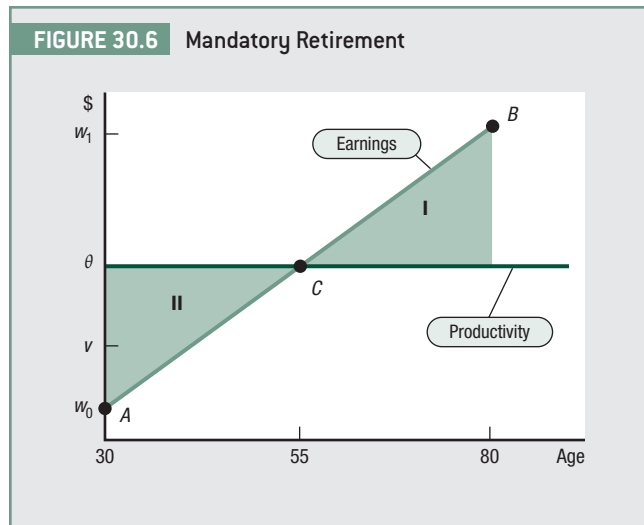
To begin with, suppose that the firm habitually catches the worker shirking in one way or the other (e.g., sleeping on the job, excess coffee breaks, sloppy work, persistent absenteeism, and so on and so forth). In this event, the firm's only real sanction is to discharge him for poor performance. The severity of this sanction depends on two things: the worker's alternative employment options and the value of continued employment at the firm. Suppose that if he is fired, then the worker can (perhaps after a few weeks or so) find employment somewhere

else, earning  $\$v$  per annum. There obviously is little that the firm can do about this outside option. Yet, by carefully crafting its wage package it can make it very costly for the worker to lose his current job. Indeed, it can arrange matters so the prospect of continued employment is so attractive that the worker **chooses** not to shirk (even though he could) because he fears termination and the loss of his current job. This, of course, is nothing more than an application of the idea of using carrots (continued employment) and sticks (termination) to motivate people.

Figure 30.6 shows how the firm can engineer suitable work incentives. For simplicity, the worker's productivity,  $\theta$  is assumed constant. Notice the steep age-earnings profile: the wage is below  $\theta$  when he first joins the firm ( $\$w_0$ ), it equals  $\theta$  when he is 55 years old, and it rises above  $\theta$  after that. Yet, given the very low initial earnings,  $w = \$w_0$  (see point A), it might then seem that he will shirk. After all, he can earn  $\$v$  at another firm if he is fired and  $\$v > w_0$  by assumption. Yet this is not necessarily so. Although his current circumstances are not that great, the steep earning profile implies he has an excellent future and so works hard to keep his job!

Most important, notice that the worker's effort incentives change over time. As his career advances, the higher current wage makes him less inclined to shirk because he fears being fired and earning the low alternative wage  $\$v$ . Yet there is a second effect that makes him more likely to shirk. More specifically, as he progresses through his career, he has less to look forward to from continued employment because most of his wage increases are in the past. For example, (as shown at point B) once he is 80 years old his wage is very high but his future is very limited. By carefully balancing these conflicting forces, however, the firm can ensure that the worker exerts proper effort levels throughout his career.

**A Fly in the Ointment.** The wage-schedule depicted in Figure 30.6 provides the appropriate incentives for the worker to exert proper effort levels throughout his career. There is, however, something a little fishy with the current story because we have focused exclusively on the worker and have completely neglected to see if the scheme creates an incentive for his employer to misbehave. In fact, it is easy to see that there is such an incentive. Consider point B (more generally any point in the region CB in the figure). Although the increasing wage schedule apparently



provides workers with appropriate incentives, there is a problem. In this region, the firm makes a loss from the worker's continued employment because  $w_1 > \theta$ . As a result, it has a strong incentive to be rather sneaky and to fire the worker, claiming he shirked on the job. Because nobody can credibly prove the worker did not shirk, this is presumably precisely what the firm would do.

Now, while sneaky firms are one thing, their effect on worker incentives is quite another. More specifically, workers would (over time) realize that this is how employers behave. Consequently, they would expect to be fired at the age of 55 and recognize that the wage growth depicted along the region *CB* is essentially pie in the sky. Yet in order to provide them with the necessary incentives to work (over the age range 30–55) it is necessary that they believe their wages will increase in the manner illustrated. Yet because they cannot trust the firm, both parties find themselves in a pickle: firms will fire workers once they reach the age of 55 and, in anticipation of this, workers will not exert appropriate levels of effort.

There is, however, a solution to this quandary that was first identified by Lazear (1979). It is for the worker and the firm to agree to a contract that includes a mandatory retirement provision, together with a private pension plan. More specifically, suppose that the wage again increases in the manner shown along region *AC* of the figure. Once the worker reaches the age of 55, however, suppose he is contractually obliged to retire, and he is given a pension that is equal in value to the area **I** in the figure.<sup>23</sup> (If the worker leaves the firm before turning 55, then the size of his pension is reduced accordingly.)

This scheme ensures that the worker exerts appropriate effort levels during his tenure with the firm. The worker will not shirk before reaching the age of 55 because if he is caught and fired his pension is reduced, and he loses the opportunity of enjoying the sharp increase in his earnings along *AC*. What is more, the firm never has an incentive to fire the worker because it turns a positive profit of  $\theta - w > 0$  from his employment. Finally, retirement **must** be mandatory. Everyone knows that if the worker continues his employment after the age of 55, then he will shirk unless he receives a wage greater than  $\theta$  (to provide him with the appropriate incentives). The trouble is that, given such a wage, the firm cannot commit to retain him, for the reasons already described.

The theory of mandatory retirement just presented is predicated on the notion that firms must use delayed payment contracts (i.e., wages are greatest at the end of the worker's career) to motivate workers because they face difficulties in monitoring individual effort levels. Consequently, as first stressed by Hutchens (1987), in jobs where it is easy to monitor effort there should be correspondingly little need for these kinds of incentive schemes. For example, those firms that use piece-rate schemes presumably find it relatively easy to measure output. Hutchens tests this hypothesis using an enormous data set in which he can proxy differences in the ability of firms to monitor effort levels, and he finds strong support for the theory.<sup>24</sup>



**Pension Portability.** There is, of course, a much greater richness to the relationship that forms between a firm and its employees than workers effort levels. One especially salient feature of the relationship concerns the financing of on-the-job training investments. As we saw in Chapter 6, an employer may be reluctant to pay for these investments because it fears that workers will (in the case of general training) use them as leverage to increase their wages, or they will (in the case of specific training) quit and in the process destroy their values.

In this setting, nonvested private pension plans can foster training investments. Recall that under partial vesting arrangements, the worker loses some (or all) of his employer's pension contributions if he quits the firm prematurely. The potential loss of thousands of dollars of pension wealth is a powerful economic adhesive that binds the worker to his employer, which, in turn, encourages the firm to pay for training investments at the margin. There is strong evidence that nonvested pensions do bind workers and employers together. For example, Ippolito (1991) finds that the loss of nonvested pension wealth reduces the number of quits by as much as 20%.<sup>25</sup>

Furthermore, as reported in Dorsey (1995), before the passage of the 1974 Employees' Retirement Security Act (ERISA), almost 40% of private pension agreements did not include vesting provisions. This observation alone is strong prima facie evidence that nonvesting arrangements potentially fulfill an important economic function (such as fostering investments in training); after all, workers and firms could have agreed to vesting schemes if it was mutually advantageous for them to do so. Nevertheless, the passage of the 1974 act mandated greater pension vesting levels, in part, to promote greater labor-market mobility. The trouble is that although these efforts may have accomplished their intended goal of making workers more mobile, they may also have hampered incentives for the two parties to make costly but valuable investments in the employment relationship for the reasons just noted.

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## SUMMARY

- The Social Security Act was signed into law in August 1935. The act (1) called for the collection of contributions from workers and employers in the form of payroll taxes and (2) disbursed benefits to retired workers (aged 65 or older) and to unemployed workers.
- Currently, there are serious concerns about the long-term financial viability of the Social Security system. In 1960, there were 5.1 contributors per beneficiary, but by 2070 this figure is projected to decline to only 1.9.
- The 1935 Social Security Act deemed complete retirement as a precondition for the receipt of any retirement benefits. Complete retirement was codified in the retirement earnings test (RET), which stipulated that a retiree could earn no more than \$15 per month. The RET was all but abolished by the 2000 Senior Citizen's Freedom to Work Act.
- Private pension plans can be classified according to whether they are defined benefit (DB) or defined contribution (DC). Under a DB

scheme, the employer is the sole contributor, and the two parties agree on a formula that subsequently determines the worker's precise benefit entitlements. A DC plan calls for a fixed payment into the worker's retirement fund, and the benefit payments depend on the realized return on the funds that are invested.

- In 1950 almost half of those men aged 65 or older were in the labor force. By 2005, this fig-

ure had declined to 11%. There is a heated debate as to the proximate causes of this decline. Some argue it results from increases in Social Security benefits and in the coverage of the program, but others argue that it is related to fundamental changes in the labor market itself.

- Mandatory retirement agreements may arise as a means of solving significant incentive problems.

## PROBLEMS

**P1.** Why is the intertemporal substitution hypothesis insufficient to explain the observed retirement behavior of men and women?

**P2.** Describe the major changes in the Social Security system since its inception in the 1930s. What are the main factors that threaten its future solvency?

**P3.** President George Bush proposed (with little success), that people should be allowed to put some of their Social Security payments (up to 4 percent) into privately held accounts that would be invested in the stock market. Supporters of the plan say that high stock market returns will help save the system. Are they right, and if so, is this the most effective means of averting the impending crisis in Social Security?

**P4.** Why is it that, following the introduction of the Social Security retirement program, the income and substitution effects work together, leading to an unambiguous predicted reduction in the retirement age?

**P5.** Explain the meanings of the following terms: (a) qualified and nonqualified pension plans,

(b) pension vesting procedures, and (c) defined benefit and defined contribution pension plans.

**P6.** What are the primary difficulties in using cross-sectional or time series data to estimate the effects of the Social Security system on the retirement age?

**P7.** Analyze the effect of eliminating the retirement earnings test (RET) on labor supply.

**P8.** How has the disability insurance (DI) program affected the labor-supply decisions of men? Do the problems inherent in providing disability insurance justify the 5-month-plus waiting time required for enrollment in the program?

**P9.** What role does mandatory retirement play in ensuring that workers exert appropriate effort levels?

**P10.** With the legal demise of mandatory retirement, employers have increasingly sought to gently encourage workers to retire by offering them early retirement bonuses. What might explain this behavior?

**P11.** Explain the economic function of nonvested pension schemes.

## NOTES

1. The participation rates for women over the same period witnessed a striking increase among all age groups—except those aged 55 and older. One possible explanation is that women's retirement behavior would have been similar to that of

men were it not for the countervailing changes in the family described in Chapter 29.

2. Lazear (1986) provides an excellent discussion of the economics of retirement.

3. See [www.socialsecurity.gov/policy/docs/chartbooks/fast\\_facts/](http://www.socialsecurity.gov/policy/docs/chartbooks/fast_facts/) (accessed May 4, 2010).
4. Other plans included the Townsend Movement; the End Poverty in California (EPIC) plan, which was supported by the author Upton Sinclair; the Ham and Eggs movement; the Bigelow Plan; the General Welfare Federation of America; and the Technocracy movement. See [www.ssa.gov/history/history.html](http://www.ssa.gov/history/history.html) for details (accessed May 14, 2010).
5. The following discussion draws from [www.ssa.gov/history/briefhistory3.html](http://www.ssa.gov/history/briefhistory3.html).
6. Cogan and Mitchell (2003) offer a captivating account of the role economics has played in the recent attempts to formulate policies designed to restructure the Social Security system.
7. Presumably, most of us are relieved to live longer than we expected. Nevertheless, this possibility creates a difficult financial planning problem as we save for our golden years. For example, suppose that we expect to live until we are 79. We might accumulate savings that are sufficient to provide for our needs over this period. If we are particularly risk averse, we might even accumulate enough savings to cover us until we are (say) 85. But what happens if we then live to 86 or even 116? A pension annuity payment plan enjoys the decisive advantage of paying out benefits throughout our lifetimes. Bodie (1990) offers an excellent discussion of the insurance role of private pensions.
8. Mark Skertic, *Chicago Tribune*, May 2005. The full report is available at [www.chicagotribune.com/classified/jobs/chi=0505110248may11,0,7035196.story](http://www.chicagotribune.com/classified/jobs/chi=0505110248may11,0,7035196.story) (accessed July 26, 2010).
9. See Papke (1999) for evidence on the growth in the use of 401K plans.
10. Depending on the circumstances, this condition may not in fact hold. Some private pension plans are geared toward encouraging early retirement. This means there can be substantial financial penalties for delaying retirement for a year.
11. In an early study, Hurd and Boskin (1984) find that the rapid (and indeed accelerating) decline in the male labor-force participation rate during the early 1970s was attributable to the striking increases in the real value of retirement benefits over the period. In contrast, after estimating a sophisticated retirement model, Burtless (1986) finds that the increases had but a modest effect on the labor-force participation rates of elderly men. Gruber and Wise (1998) examine the effects of Social Security benefits in an international context. They find that the United States is by no means unique in the large decline in the labor-force attachment of older men. See also Peracchi and Welch (1994), who explore the changes in retirement patterns of men and women. They discover a sharp decrease in participation rates among low-income workers; this finding hints at the possibility that much of the observed changes in male labor-force participation rates might have resulted from increases in wage dispersion.
12. For example, a more or less ideal experiment would (say) randomly select 10,000 20-year-old men. They would then be assigned randomly to two different but equal size groups. One group would be told they are ineligible for future Social Security benefits, and the members of the other group would be told that they are eligible. By comparing the behavior of the two groups, a mere 42 years later we would presumably have a pretty clear idea of the effects of the system on participation rates. For a variety of reasons, experiments like these are infeasible.
13. Another more subtle problem is that the real-value of retirement benefits have trended upward over time. This makes it very difficult to separate their effect from other variables that also trended upward (or downward). Ideally, to isolate the *true effects* of Social Security benefits, one would—statistically speaking—like to see benefit levels go up and down.
14. Ruhm (1996) documents a pronounced increase in retirement rates at the age of 62. This finding suggests that the early retirement provisions of the Social Security Act affect male labor-force participation rates.
15. Gustman, Mitchell, and Steinmeier (1994) offer a nice survey of the literature.

16. See also Stock and Wise (1990), who find sizable effects of private pension plans.
17. According to the 1939 Amendment, a worker was deemed to be completely retired if he or she earned \$15 per month or less. At the time, this represented one quarter of the earnings of someone who worked full-time for the minimum wage.
18. Ashenfelter (2002), p. 958.
19. See [www.ssa.gov/policy/docs/statcomps/supplement/2006/index.html](http://www.ssa.gov/policy/docs/statcomps/supplement/2006/index.html) (accessed May 4, 2010).
20. Gruber and Kubik (1997) and Gruber (2000) also find substantial disincentive effects of the system. Thus Gruber (2000) reports that a 10% increase in DI benefits reduces participation rates by nonelderly workers by as much as 2.8%–3.6%. Using similar data, but different methods, Campolieti (2004) finds much smaller effects. Kreider (1999) finds as much as one third of the decline in the male participation rate is attributable to the program.
21. Parsons (1980a) also finds that the DI program explains a considerable portion of the decline in the observed participation rate of Black men aged 45–62.
22. See Bound (1989); Haveman, Jong, and Wolfe (1991); and Bound and Waidmann (1992).
23. Areas I and II are equal in size, which implies that the firm earns zero profits. This is the outcome consistent with perfect competition. Note the direct comparison of the two areas is valid only if (as assumed here) there is no discounting.
24. More specifically, his evidence is consistent with Lazear's approach and another theoretical approach of Carmichael (1983), which emphasizes specific human-capital accumulation. His evidence is insufficient to differentiate between the two theories.
25. Dorsey (1995) offers a nice review of the literature pertaining to pension portability.

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