

CHAPTER 11

Education



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Questions to keep in mind

- Why and how should the government be involved in the provision of education?
 - What is the proper role of competition in education markets?
 - What is the current role of the government in the provision of higher education, and should that be changed?
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In the United States, education is the single largest expenditure item for state and local governments: they spend 32% of their budgets to provide their citizens with this service.¹ In fact, the United States spends more money per pupil on education than nearly every other nation on Earth. Yet U.S. students perform only around the international average on tests of reading, math, and science ability. Even worse, U.S. eighth graders are less proficient in math and science than students in much less wealthy countries, such as Hungary, Lithuania, and Slovenia, which have a *combined* gross domestic product (GDP) that is 2.5% of the U.S. GDP.² [Figure 11-1](#) compares the United States with other nations in terms of money spent per pupil

and the resulting educational outcomes in mathematics for eighth graders. This comparison reveals that the United States spends much more per student to achieve outcomes that are generally worse than those in these other nations.



FIGURE 11-1 Education Spending and Outcomes Around the World • The United States spends more money per pupil than nearly every country on Earth, but its educational outcomes are only average.

Spending data from: [National Center for Education Statistics \(2018\)](#). [Organization for Economic Cooperation and Development \(2018\)](#).



While there is widespread agreement on the problematic state of education in the United States today, there is much less agreement about the causes of or solutions to its shortcomings. In 2009, President Obama appointed as his new secretary of education Arne Duncan, who, as chief executive officer (CEO) of the Chicago public school system, had earned a strong reputation as an educational reformer, including controversial closings of underperforming schools.³ Duncan developed a plan to substantially broaden the federal role in local primary and secondary education through tougher requirements on students and teachers, intensified efforts to assist failing schools, and a growing focus on alternatives to the traditional public school model such as *charter schools*, which provide free public education but are not bound by many of the regulatory restrictions (and union obligations) of traditional public schools.

The first step in this action plan was taken as part of the stimulus bill passed in early 2009. This legislation sent almost \$54 billion to states over a two-year period to prevent layoffs, create jobs, and modernize school buildings and sent another \$25 billion to promote the education of disadvantaged students. To receive this aid, however, states had to meet a number of new requirements, including ensuring that the state's most talented teachers were assigned equitably to both rich and poor

students; building sophisticated data systems that linked teachers to students and test scores, thus allowing authorities to measure teacher effectiveness; taking vigorous action to assist failing schools; and embracing charter schools as an educational alternative.

In addition, the bill set aside a \$4.4 billion Race to the Top fund that Duncan could use to reward states for educational innovations such as collaboration across schools or between schools and non-profit organizations. States could also use this reward money for teacher pay-for-performance programs. In the first round of this program, 40 states applied and 2 (Delaware and Tennessee) won; in the second round, 47 states applied and 10 won. Over the course of phases one and two, 35 states and Washington, D.C., adopted new reading and math standards, and 34 states “changed laws or policies to improve education.”⁴

To supporters, these changes and Duncan's larger plan represent a needed first step toward fundamental educational reform. Representative George Miller, Democrat from California, then chair of the House Education Committee, said, “This is a very serious amount of money ... both the President and the Secretary do not want to lose a year or two in the efforts to achieve reforms that are necessary to create a modern, effective school system throughout this country.”⁵ To critics, these aspects of the stimulus bill represented overreaching by the federal government into an area

traditionally regulated by state and local governments. Particularly criticized were the aspects of the bill that favored charter schools. One such sticking point was the rule that states that did not embrace charter schools (often derided by the traditional public schools with which they compete) would not be eligible for any Race to the Top funds. Gerald Bracey, an associate at the High/Scope Educational Research Foundation, said, “[Duncan is] blackmailing states, saying you either have to have charters ... or your stimulus money will be at risk. There's no evidence out there [about the benefit of charter schools] to justify it.”⁶



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Another controversy over education reform pertains to the 2008 introduction of the Common Core of educational standards, the federal government's plan to improve the achievement levels of students across the country. The Common Core is a set of national academic standards that outline what children in grades K-12 ought to know about math and English language arts at the end of each grade.

When the Common Core was initially presented to states, it was fairly uncontroversial. During a 2009 Chicago meeting with governors and school chief officers, many agreed that it was the right thing to do.

The implementation of the Common Core was rough, however, partly because these national standards (which emphasize depth of knowledge and critical thinking) were more rigorous than standards that were already in place in a number of states. A number of states reacted negatively to their apparent worsening of scores with this new standard. In New York, for example, fewer than one-third of students were found to be up to Common Core English Language Arts standards in the 2012–2013 school year—down from 55% on non-Core standardized tests the previous year.⁷ While 46 states adopted the Common Core under the Obama administration, Alaska, Texas, Nebraska, and Virginia originally rejected the Common Core and states such as Florida, South Carolina, Indiana, Oklahoma, and Arizona abandoned it after attempting to implement it. Twenty-four states have opposed the standards, in their original form.⁸

Opposition to the Common Core was a centerpiece of President Trump's administration and a focus of his Education Secretary, Betsy DeVos, who in January 2018 said, "I agree—and have always agreed—with President Trump on this: 'Common Core is a disaster.' And at the U.S. Department of Education, Common Core is dead."⁹

So was the approach pursued by Duncan and Obama the right one? Should we move to a more competitive and accountable education system? Or could educational improvement be achieved simply by investing more money in our existing system?

In this chapter, we review the public finance issues involved in providing education. We begin with the first question of public finance: Why should the government be involved in education at all? We discuss a number of rationales for public involvement and their implications for the second question of public finance: How should the government be involved? We address this question in two steps. First, we consider the structure of government involvement, showing that public provision of

a fixed level of education can crowd out private education. This result implies that efficiency may be increased with vouchers that can be used at either public or private schools. We extensively review the debate over school choice and school vouchers, discuss the theoretical arguments for and against vouchers, and look at the limited empirical evidence available on this debate.

The second step of our analysis is to ask, for a given structure, how much should the government spend on education. A central determinant in answering the question is the return provided by this investment. We review the existing evidence on the returns to education and what they imply for government involvement. Finally, we turn to a discussion of higher education, a market that appears to work much better in the United States than elsewhere in the world but that still raises many difficult policy issues.

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11.1 Why Should the Government Be Involved in Education?

In the United States, 90% of elementary and secondary students are in public educational institutions instead of privately financed institutions. Should the public sector be so dominant in the provision of education? What failure in the private education market justifies government's dominant role? Education is not a pure public good because it does not meet the conditions of non-rivalry (that my consumption of the good does not reduce your enjoyment of the good) and non-excludability (I cannot deny you the opportunity to consume or access the good). Education is clearly a rival good: having more children in a classroom may lower the quality of classroom instruction. Education is clearly also to some extent excludable: private schools can decide which students to accept.

At the same time, there are a number of public benefits (positive externalities) to education that might justify a government role in its provision.

Productivity

The first potential externality from education is productivity. If more education makes a person a more productive worker, then society can benefit from education in terms of the higher standard of living that comes with increased productivity. As discussed in [Chapter 6](#), however, this higher standard of living is not an externality if the worker is the only one who reaps the benefits from his or her higher productivity. For example, if more education raises Sofia's marginal product of labor, but the increase is fully reflected in her receiving a higher wage from her employer, then there is no positive externality to society from Sofia's education.

Social benefits from higher productivity occur through one of two channels. The first is "spillovers" to other workers: Sofia's increased productivity could raise the productivity of her coworkers, thus raising their wages and well-being. Because Sofia herself is unlikely to be fully compensated for the rise in her coworkers' wages, this is a positive externality to her coworkers from her education. The second is through taxes: if Sofia's higher productivity is reflected in higher pay, then the government collects more tax revenues as a result.

Citizenship

Public education may improve the quality of life in the United States in indirect ways as well. Education may make citizens more informed and active voters, which will have positive benefits for other citizens through improving the quality of the democratic process. Education may also reduce the likelihood that people turn to a life of crime, an outcome that has positive benefits for other citizens by improving their safety and reducing the public costs of policing. More generally, education may play a role in enabling immigrants, who are some of the most productive members of U.S. society, to establish themselves in the United States. These arguments are fairly compelling for public intervention in basic education such as elementary school, but they provide less rationale for public financing of secondary and especially higher education.

Credit Market Failures

Another market failure that may justify government intervention is the inability of families to borrow to finance education. In a world without government involvement, families would have to provide the money to buy their children's education from private schools. Suppose, in this private-education-only world, there is a low-income family with a talented child, and this child could earn a comfortable living as an adult if properly educated. It would be socially optimal for this child to be educated, yet the family cannot afford the costs of education.

In principle, the family could borrow against the child's future labor earnings to finance the education. Yet, in practice, banks and other lenders are unlikely to make such loans because there is no source of collateral (assets owned by a person that the bank can claim if the person doesn't pay back the loan). If the family takes a loan to finance a home purchase (a mortgage), the collateral is their house; if they don't repay the loan, the bank can claim their house to offset its losses. Because the bank cannot claim the family's child if they don't repay the loan, banks may be unwilling to lend for education; after all, despite the family's claims, the bank can't really tell if their child is a good investment or not. This situation is an **educational credit market failure**: the credit market has failed to make a loan that would raise total social surplus by financing productive education.

educational credit market failure

The failure of the credit market to make loans that would raise total social surplus by financing productive education.

The government can address this credit market failure by making loans available to families to finance education. Yet the government in the United States and the

governments of most industrialized nations do not play this role except in financing higher education (discussed later in the chapter). Instead of providing loans to finance elementary and secondary education, the government directly provides a fixed level of publicly funded education.

Failure to Maximize Family Utility

The reason governments may feel that loans are not a satisfactory solution to credit market failures is that they are concerned that parents would still not choose appropriate levels of education for their children. In a world with well-functioning credit markets (or with government loans available), private education would probably still involve some sacrifice on the part of parents, such as paying the cost of schooling not covered by loans or making interest payments on the loans. Even if total family utility would rise with a more highly educated child, some parents may not be willing to reduce their consumption to finance their children's education because they care more about their own consumption than their children's future income. (As noted in [Chapter 6](#), evidence suggests that parents are not maximizing the utility of their entire family.) Children can be harmed by the unwillingness of their parents to finance their education, and making loans available to parents cannot solve that problem. In this case, public provision of education is a better alternative. Otherwise, smart children would be penalized for having selfish parents.

Redistribution

A final justification for government involvement is redistribution. In a privately financed education model, as long as education is a normal good (demand for which rises with income), higher income families would provide more education for their children than would lower income families. Because more education translates to higher incomes later in life (as we show later in this chapter), this situation would limit income mobility because children of high-income parents would have the best opportunities. *Income mobility*, whereby low-income people have a chance to raise their incomes, has long been a stated goal for most democratic societies, and public education provides a level playing field that promotes income mobility.

In summary, then, there are various reasons for government involvement in education: potential productivity spillovers, more informed and less criminally inclined citizens, failures in credit markets, failures of family utility maximization,

and redistribution. We next turn to the question of how governments are involved in education and what effects their involvement has on educational attainment.

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11.2 How Is the Government Involved in Education?

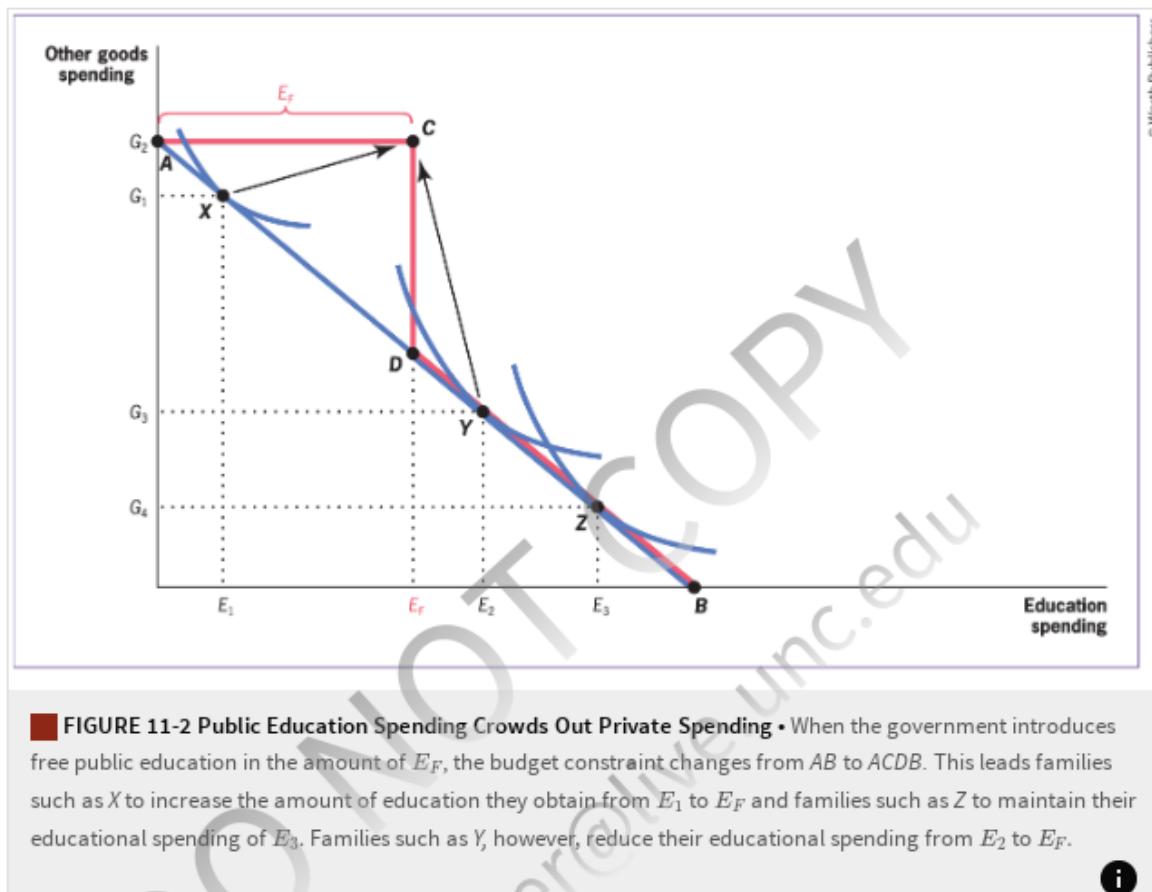
In [Chapter 5](#), we discussed two alternative means for governments to deal with positive externalities: the price mechanism and the quantity mechanism. In the context of education, the price mechanism approach is to offer discounts on private educational costs to students, and the quantity mechanism approach is to mandate that individuals obtain a certain level of education. In practice, the governments of most developed nations pursue neither of these approaches, and instead they provide a fixed level of education for no cost. In this section, we discuss the effects of providing free public education on the level of *educational attainment* (the amount and quality of education received by individuals) in society.

Free Public Education and Crowding Out

We can model public education using the same approach we used to model the provision of a public good (fireworks) in [Chapter 7](#): education is a public good that is provided to some extent by the private sector. As such, an important problem with the system of public education provision is that it may *crowd out* private education provision. Indeed, as economist Sam Peltzman argued in 1973, it is possible that providing a fixed amount of public education can actually *lower* educational attainment in society through inducing choice of lower quality public schools over higher quality private schools.¹⁰

In Peltzman's model, individuals are choosing how much to spend on their children's education. He assumes that the more individuals spend, the higher quality education they can buy for their children (later in the chapter, we review the evidence for the strength of this spending-quality link). The public sector provides some fixed level of expenditure and thus of quality. If parents want higher quality education than that provided by the public sector, then they must send their children to private school.¹¹ By sending their children to private school, however, parents forgo their entitlement to free public education for their children. As a result, some parents who might desire higher quality education for their children decide not to use private schools; they reduce their desired education to take advantage of free public education. For this group, free public schools have, therefore, lowered the quality of education they "purchase" for their children.

Figure 11-2 illustrates the choice families face between spending on education and spending on all other goods. Before there is any provision of public education, families face the budget constraint AB , with a slope that is dictated by the relative prices of private education and other goods. Any money that is spent on a child's education reduces the family's budget for purchasing other goods.



The government then provides free public education of a quality that costs E_F . For now, we ignore the financing of this educational expenditure (because all the policy alternatives we discuss involve financing as well, we discuss financing separately later in the chapter). The provision of free public education means that individuals can spend their full budget on other goods and still get educational spending of E_F (at point C). To spend more than E_F on education, however, the family would have to entirely forgo the free public education; although the public education is free, it can be used only up to amount E_F . Thus, the new budget constraint runs from A to C (because education is free to a spending-quality level of E_F), then drops down to point D , after which it is the same segment DB as the original budget constraint. What does the provision of free public education do to educational spending (and thus quality) choices?

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The Costs of Special Education

In the type of voucher system described here, each child would be worth a voucher amount that represents the average cost of educating a child in that town in that grade, but all children do not cost the same to educate. Children with diagnosed disabilities, for example, have much higher costs associated with their need for **special education**, and programs for educating children with disabilities require extra resources (such as trained teachers, smaller classes, or special equipment). In the United States, 6.43 million students aged 3–21 are provided with special education services, and the average student with a disability costs about \$12,700 a year to educate, more than twice the cost of educating a student without a disability. The United States spends about \$50 billion a year on special education or 14% of total elementary and secondary education spending.^{[17](#)}

special education

Programs to educate children with disabilities.

The higher cost of special education students raises problems in the context of a voucher system because schools will have an incentive to avoid students with disabilities. These students bring vouchers of the same amount, yet they cost much more to educate. Schools will want to take only the students who can be educated effectively for the voucher amount and will shun the students who cost the most to educate. This student selection by schools will reduce the options available to students with disabilities. In principle, the government could use antidiscrimination regulations to deal with this problem, but, in practice, schools may have many subtle ways of deterring applications from such students. They might, for example, institute a very low-quality special education program that would deter students with disabilities from applying.

The government could address this problem by making the voucher amount for any child match the cost of educating that child. Children who cost more to educate could receive larger voucher amounts to offset the extra costs associated with educating them. Because it is very hard to adjust voucher amounts for the specific educational needs of each child, however, this potential problem with vouchers will remain.

11.3 Evidence on Competition in Education Markets

In the previous section, we discussed the theory of how vouchers may or may not improve the efficiency with which education markets function in the United States. There is substantial uncertainty about the ultimate effects of vouchers. In this section, we review the evidence on the effects of competition in education markets in an effort to understand what impact the widespread use of vouchers might have in the United States and other nations.

Direct Experience with Vouchers

Several small-scale voucher programs have been put in place in the United States in recent years, with mixed evidence on their effectiveness, as reviewed in the Empirical Evidence box. Studies of larger scale voucher programs in other nations have suggested more positive effects. These effects might be much larger with widespread adoption of vouchers, which would put competitive pressure on all schools to improve their performance.¹⁸

Experience with Public School Choice

Some school districts have not offered vouchers for private schools but have instead allowed students to choose freely among public schools. In some cases, students are allowed to choose any local school, not just the one nearest them. Evidence on these programs comes from the fact that the best schools are oversubscribed when there is choice, so they must use a lottery to allocate slots. This process allows researchers to assess differences in outcomes between comparable lottery winners (who attend better schools) and lottery losers (who are otherwise identical but do not get to attend such schools). Results from these programs are mixed, suggesting that the effects may vary depending on the nature of the local public school geography and quality differences.¹⁹

Other possible choices for public school include **magnet schools**, special public schools set up to attract talented students or students interested in a particular subject or teaching style, and **charter schools**, small, independent public schools that are not subject to many of the regulations imposed on traditional public schools, including restrictions on teacher qualifications. A larger literature has emerged suggesting that charter schools in particular may be effective at improving student performance in both New York City ([Dobbie and Fryer, 2013](#); [Hoxby and](#)

[Murarka, 2009](#)) and Massachusetts ([Angrist et al., 2013](#)). This literature suggests that the two key features distinguishing particularly successful schools are rigorous standards and the provision of intensive tutoring ([Chabrier et al., 2016](#)).

magnet schools

Special public schools set up to attract talented students or students interested in a particular subject or teaching style.

charter schools

Small, independent public schools that are not subject to many of the regulations imposed on traditional public schools, including restrictions on teacher qualifications.

Experience with Public School Incentives

Although the United States has limited experience with vouchers and school choice, it has a lot of experience with another aspect of educational reform: school accountability. Any move to an increase in school choice in the United States would bring with it an increased use of testing to ensure that schools are held accountable for meeting educational standards. As of 2002, 25 states explicitly linked student promotion or graduation to performance on state or local assessment tests, 18 states rewarded teachers and administrators on the basis of successful student performance on exams, and 20 states penalized teachers and administrators on the basis of subpar student exam performance. This approach to school accountability was codified in federal law through the No Child Left Behind Act of 2001.

Making schools accountable for student performance can provide incentives for schools to increase the quality of the education they offer. By some measures, accountability requirements have had this intended effect. Several studies have found that implementing strong accountability programs has led to improvements in test scores. [Deming et al. \(2016\)](#) used a long-run follow-up of Texas students to show that students in schools at risk of facing sanctions for low performance were more likely to have attended and completed college and to have obtained a four-year degree.

EMPIRICAL EVIDENCE

Estimating the Effects of Voucher Programs

A number of studies, both in the United States and abroad, have attempted to estimate the impact of voucher programs on student achievement. The earliest studies focused on a voucher program in Wisconsin. Starting in 1990, the state allowed families with income no more than 175% of the poverty line to apply for a voucher worth about \$3,200 that could be used for tuition at any nonsectarian (not religiously affiliated) private school.

[Rouse \(1998\)](#) studied the effect of this voucher program in the city of Milwaukee on the achievement of students who used their vouchers to finance a move to private schools.²⁰ She noted that one cannot directly compare students who do and do not use vouchers because they may differ along many dimensions; for example, students who take advantage of a voucher program may be more motivated than those who do not. This selective use of vouchers would bias any comparison between the groups. An important feature of the Milwaukee program, however, is that participating private schools had to accept all students who applied unless the school was oversubscribed (too many applicants for the available slots). Oversubscribed schools had to select randomly from all applicants, using a lottery.

This administrative solution has the benefit of approximating the type of randomized trial that is the gold standard in empirical research. The randomized lottery allowed Rouse to form a control group (students who applied to oversubscribed schools but were randomly rejected) and a treatment group (students who applied to the same schools and were randomly accepted). These groups should be comparable, except that the treatments go to the private schools rather than remaining in the public schools like the controls. Rouse found that the treatment group saw an increase in academic performance: there was a rise in math test scores of 1 to 2% per year relative to the control group, although there was no difference in reading scores across the two groups. A series of follow on studies of similar small scale voucher programs in New York, Washington, D.C., and Dayton, Ohio, found generally positive but small effects as well.²¹

Another study by [Abdulkadiroglu et al. \(2015\)](#) found very different effects for a new voucher program in the state of Louisiana. The authors used the same randomized acceptance approach that Rouse used in Milwaukee, but they found a sizeable reduction in academic outcomes for winners compared to losers. Particularly notable is the contrast with evidence on successful public school choice mechanisms in New Orleans.²² In addition, a series of other recent studies have shown negative effects of school choice programs ([Carey, 2017a](#)). These negative recent results may reflect the fact that public school choice and accountability have lowered the achievement gap between private and public schools, or the fact that private schools can decide whether or not to join the voucher program; in Louisiana, the schools that opted into the voucher program had declining enrollment before opting in, consistent with their being the lowest-quality private schools.

In the United States, about 10% of students are enrolled in private schools, a proportion that doubles or triples in the low-income developing world, where public schools may be of particularly low quality. Introducing a voucher program may, therefore, have a great effect in developing countries, where private schools are a closer substitute for public schools, than in developed countries. [Angrist et al. \(2002\)](#) studied a Colombian voucher program called PACES that gave more than 125,000 pupils vouchers that covered somewhat more than half the costs of private secondary school. Many of the vouchers were distributed by lottery, thus allowing Angrist and colleagues to compare the randomly selected lottery winners (the treatment group that received vouchers) and losers (the control group that did not receive vouchers).

The study found that students who won vouchers were 10% more likely than lottery losers to finish eighth grade, primarily because they didn't repeat as many grades before the age of school leaving. The study also found that lottery winners scored significantly higher on standardized achievement tests than did losers. Winners were also less likely to be married or cohabiting and worked 1.2 fewer hours per week, suggesting an increased focus on schooling among lottery winners. The study concluded that the vouchers cost the government \$24 per winner, yet the improved schooling attainment and quality increased the wages earned by this group by between \$36 and \$300 per year, making this an enormously successful program.

Results from other nations support this view. [Neilson \(2013\)](#) studied the effects of a widespread voucher program in Chile and also found very large positive effects for poor children who had access to this program; he estimated that school vouchers reduced the achievement gap between low-income and high-income students by about one-third. More recently, Chile reformed this program to provide larger vouchers to disadvantaged students, which appears to have lowered the test score gap between advantaged and disadvantaged students by about one-third ([Murnane et al., 2017](#)).²³ In addition, [Muralidharan and Sundararaman \(2015\)](#) studied the lottery-based allocation of students to private schools in India and found modest improvements in test scores at much lower educational cost.

At the same time, accountability programs can have two unintended effects. First, they can lead schools and teachers to “teach to the test”—that is, to narrowly focus their teaching on enabling students to perform well on the test that determines school accountability, not on a broadly improved education. [Jacob \(2005\)](#) and [Dee and Jacob \(2011\)](#) found evidence of students performing better on accountability tests per se than on broader measures of student ability. More generally, [Reback et al. \(2014\)](#) found that schools distort their resources toward specialists and targeted teachers and away from whole-class instruction, leading to less satisfied teachers, but still resulting in higher test scores, even on more general examinations. Indeed, targeting resources toward the students who need the most help on the test may hurt other students. [Deming et al. \(2016\)](#) found that the positive effects of accountability in the long run is concentrated among worst-performing students and that better-performing students may even see a negative long-run effect.

A second unintended effect of accountability programs is that schools can manipulate the pool of test takers and the conditions under which they take tests to maximize success. For example, [Jacob \(2005\)](#) and [Figlio and Getzler \(2002\)](#) found that the introduction of accountability in Chicago and Florida led schools to reclassify low-skilled students as special education or disabled students (and thus exempt from testing) to raise average school scores. [Figlio and Winicki \(2005\)](#) found that schools even manipulated their cafeteria menus around testing time, increasing calories to improve student energy levels and test scores! Teachers may even cheat to improve test scores; [Jacob and Levitt \(2003\)](#) found that a teacher is more likely to provide the answers to standardized tests to students if the teacher has more at stake (through accountability regimes).

Bottom Line on Vouchers and School Choice

While the evidence reviewed in this section is mixed, it suggests that an increase in school accountability, in school choice (in particular, through charter schools), and

in the use of vouchers may improve student outcomes. Yet voucher systems raise serious concerns about equitable treatment of the students who might get left behind as their higher ability, higher motivation friends move on to better schools. Some sort of guarantee of educational access must be provided to ensure that every student has the option of at least one educational alternative, even if this reduces the pressure of competition on schools that will not be allowed to fail.

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11.4 Measuring the Returns to Education

Whether education is public or private, the government must still make some decision about the share of its budget to devote to education. The decision about how much to invest in education involves the type of cost-benefit analysis we discussed in [Chapter 8](#). Measuring the costs associated with education is fairly straightforward by using the techniques of opportunity cost introduced in [Chapter 8](#). Measuring the benefits, however, is much trickier. There is an enormous economics literature devoted to measuring the [returns to education](#), that is, the benefits that accrue to society when individuals get more schooling or when they get schooling from a higher quality environment (such as one with better-qualified teachers or smaller class sizes).

returns to education

The benefits that accrue to society when students get more schooling or when they get schooling from a higher-quality environment.

Effects of Education Levels on Productivity

The topic that has received the most attention from economists studying education is the effect of education on worker productivity. In a competitive labor market, workers' wages equal their marginal product, so wages are typically used as a proxy for productivity. The idea of these studies is to let the market reveal whether education has raised productivity: if individuals are more productive as a result of being more highly educated, then firms should be willing to pay more to employ them.

There is a large literature that shows that more education leads to higher wages in the labor market. A typical estimate, which comes from comparing the earnings of those with more and less education, is that each year of education raises earnings by about 7%. There is little controversy over the question of whether those with more education earn more. There is substantial controversy, however, over the implications of this correlation. Two very different interpretations have been offered for this result.

Education as Human Capital Accumulation

The typical view of education is that it raises productivity by improving worker skills. Just as firms invest in physical capital, education is the individual's means of

investing in **human capital**. More education raises a worker's stock of skills and allows the individual to earn more in the labor market.

human capital

A person's stock of skills, which may be increased by further education.

Education as a Screening Device

An alternative view is also consistent with the correlation between higher levels of education and higher levels of earnings. In the **screening** model, education acts only to provide a means of separating high-ability people from low-ability people and does not actually improve skills. In this model, more highly educated workers would be more productive and have higher wages, but it would not be because education has improved their human capital. Rather, it would be because only those who turn out to be the most productive workers have the *ability* to pursue higher levels of education, so the very fact of having more education has signaled their high ability (and productivity). The school system in this model is not adding any value in terms of raising productivity; its only value is in screening for the most able and productive workers, who can obtain the most education.

screening

A model that suggests that education provides only a means of separating high-ability individuals from low-ability individuals and does not actually improve skills.

Thus, in the screening model, employers pay more to more highly educated workers *not* because education has raised their productivity, but because education is serving as a signal of underlying motivation by screening out unmotivated workers. In the human capital model, more educated workers earn more because education has raised their marginal product; in the screening model, more educated workers earn more because their education has signaled high ability.

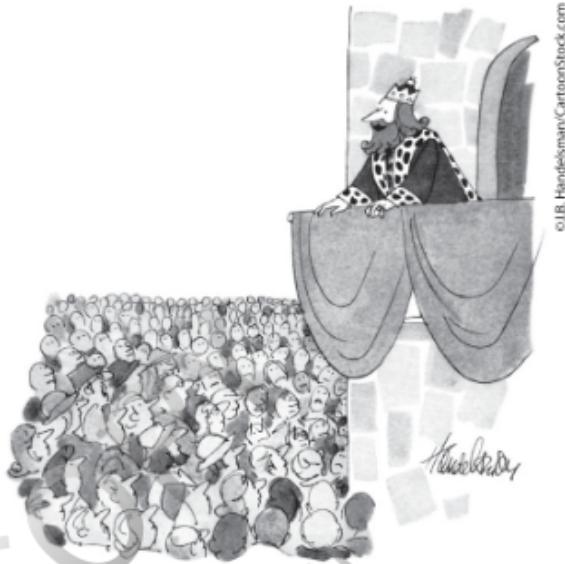
Policy Implications

The human capital and screening models may have the same prediction for the correlation between wages and education, but they result in very different recommendations for government policy. Under the human capital model, government would want to support education or at least provide loans to individuals so that they can get more education and raise their productivity. Under the screening model, however, the government would *not* want to support more education for any given individual. In this model, the returns to education are purely private, not social. Higher education serves as a signal that a person is more

productive, but it does not improve social productivity at all. In fact, by getting more education, a given worker exerts a negative externality on all other educated workers by lowering the value of their education in the labor market. In the accompanying cartoon, the King's declaration would lower the signaling ability of a degree because all of the productive workers who worked hard to actually earn a degree would suffer when unproductive workers were able to raise their education level.

At the same time, education does play a valuable social role as a screening device in the screening model, allowing the labor market to recognize and reward the most able workers.

Thus, the appropriate government policy in this model would be to support the establishment of educational institutions, if they are the best screening device, but not to subsidize an individual to get the education because this has no social return and simply lowers the value of education to others.



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"It is my wish that this be the most educated country in the world, and toward that end I hereby ordain that each and every one of my people be given a different diploma."

"It is my wish that this be the most educated country in the world, and toward that end I hereby ordain that each and every one of my people be given a different diploma."

Differentiating the Theories

While these theories have radically different policy prescriptions, in practice, it is hard to tell the theories apart. An enormous literature in labor economics has proposed a wide variety of approaches to differentiating the theories, and the conclusion is very clear: most of the returns to education reflect accumulation of human capital, although there may be some screening values to obtaining a high school or higher education degree. The details of these studies are reviewed in the Empirical Evidence box.

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Studies of effective charter schools have suggested looking beyond measures such as class size. In particular, analyses of what makes charter schools most effective suggest that the keys to more successful schools include longer school days and a longer school year, teachers who receive frequent feedback, and instruction driven by data on student performance. [Fryer \(2011\)](#) discusses recent attempts to take these lessons to traditional public schools in Houston with promising first-year results. Other studies have suggested additional ways to improve educational quality. For example, [Collins and Gan \(2013\)](#) studied variation across schools in student “tracking” (sorting by ability) and found that schools that sort students more aggressively improve the test scores of both high- and low-performing students.

EMPIRICAL EVIDENCE

Estimating the Effects of School Quality

A major focus of research in labor economics is estimating the impact of school quality on student outcomes. Studies in this area have recognized that we cannot simply compare school districts with better and worse schools and look at the resulting implications for students. Districts with better schools (the treatments) differ in many ways from districts with worse schools (the controls). For example, residents in the treatment districts are likely to be the ones who provide a better home environment for their children. Therefore, it is necessary to find an approach that allows researchers to identify the effects of school quality alone on educational outcomes.

Two approaches have been used to address this issue. The first is using experimental data. The state of Tennessee implemented Project STAR in 1985–1986, randomly assigning 11,000 students (grades K–3) to small classes (13–17 students), regular classes (22–25 students), or regular classes with teacher’s aides. [Krueger \(1999\)](#) analyzed the data from this experiment and found that there was a large improvement on standardized test scores for the first year and a slight improvement for each year thereafter in a small class. These effects were largest for low-income and minority students. [Krueger and Whitmore \(2001\)](#) found that small class size effects persisted later in life; that is, being in a small class for those four years increased test scores in middle school and increased the likelihood of taking a college entrance exam. Overall, their estimates imply that the real rate of return to smaller class sizes (doing a standard cost-benefit analysis of the experiment) is roughly 5.5% per year.

The other approach is a quasi-experimental analysis of changes in school resources. An interesting example is California, which by the mid-1990s had the largest class sizes in the nation (29 students per class on average). The California state government in 1996 provided strong financial incentives for schools to reduce their class size to 20 students per class in grades K–3, at a cost of more than \$1 billion per year. [Bohrnstedt and Stecher \(2002\)](#) reviewed the evidence on the impacts of this major reform, using variation across schools in the rate at which they implemented smaller class sizes. Schools that implemented smaller class sizes quickly were the treatment group, while schools that went more slowly were the controls. They found that there was little beneficial impact of smaller classes on student outcomes, perhaps because the state hired underqualified teachers to fill the extra classes or perhaps because the state was forced into educationally unproductive approaches such as

combining different grades in one class. Thus, there remains some controversy about the returns to increased public-sector investments in school inputs.

Jackson et al. (2018) provide a more direct estimate of the impact of school spending on student outcomes by looking at the result of school district spending cuts due to the fiscal pressures of the Great Recession. They find that much of the spending cuts induced by the economic downturn was to “non-core” operations like administration, but that the core spending on instruction fell as well. This drop in spending resulted in both lower test scores and lower graduation rates, further illustrating that school spending does matter.

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11.5 The Role of the Government in Higher Education

The focus of our discussion thus far has primarily been on elementary and secondary education, yet there is an enormous higher education sector in the United States, 3,011 four-year colleges, and 1,616 two-year degree-granting institutions. Institutions of higher education spend about \$559 billion per year, almost 43% of total educational spending.²⁶ Interestingly, in contrast to other levels of education, the higher education system in the United States is viewed as an enormous success. U.S. research universities are consistently rated as the best in the world. The clear market evidence for the success of higher education in the United States is the vast inflow of foreign students to U.S. institutions of higher education: 1.21 million foreign students each year spend more than \$39 billion to enroll in American colleges and universities. The number of foreign students studying here has risen by almost 200% in the past 20 years and now represents 5.9% of all higher education enrollment in the United States. This compares to only 60,292 American students who are pursuing full degrees abroad.²⁷

The major difference between higher education and primary/secondary education in the United States is the degree of private provision and competition. Only 10% of students are enrolled in private elementary/secondary schools, and public schools typically have a local monopoly.²⁸ In higher education, 39% of students attend private institutions, and students have free choice over the entire nation of where to go to college.²⁹ The relative success of higher education, where the United States is the world leader, and primary/secondary education, where the United States performs relatively poorly, provides some evidence for the power of competition to improve educational performance. As noted in our discussion of privatization, even with a minority of students enrolled in private schools, the competition from the private schools can lead to efficiency in the public sector.

Current Government Role

The U.S. government currently intervenes in the higher education sector through four channels.

State Provision

The primary form of government financing of higher education is direct provision of higher education through locally and state-supported colleges and universities.

These institutions offer subsidized low tuition for in-state students and somewhat less subsidized costs for out-of-state students. Currently, state and local governments spend about \$94.5 billion per year on their institutions of higher education.³⁰

Pell Grants

The Pell Grant program is a subsidy to higher education administered by the federal government that provides grants to low-income families to pay for their educational expenditures. For a student from a family with annual income below \$15,000, the Pell Grant program provides a grant of \$5,775. For a somewhat higher-income student, the grant amount is reduced according to parental income and assets and student income and assets. The Pell Grant program currently provides \$30 billion per year in grants to about 7 million students.

Loans

The federal government also makes loans available to students for higher education expenditures through the [direct student loan](#) program. For students who qualify on income and asset grounds, the government subsidizes the loan cost to students by (1) guaranteeing a low interest rate (the 2018–2019 rate for the 10-year loan was 5.05%, compared to 15-year home mortgage rates, the cost to the private sector of borrowing, of about 4.12% over that period) and (2) allowing students to defer repayment of the loan until they have graduated. Students who do not qualify can still receive loans at the same low interest rate but must start repaying them immediately rather than deferring them until their education is complete. A dependent undergraduate can borrow up to \$31,000 (\$23,000 in subsidized loans) per degree program, an independent undergraduate can borrow up to \$57,500 (\$23,000 in subsidized loans), and a graduate or professional student up to \$138,500 (\$65,500 subsidized). The total amount of loans made each year under the direct loan program is \$94.9 billion.³¹

direct student loans

Loans taken directly from the U.S. Department of Education.

Tax Relief

The final way in which the government finances higher education is through a series of tax breaks for college-goers and their families. The largest of these are the Lifetime Learning Tax Credit (LLTC), put into place in 1998, and the American Opportunity Tax Credit (AOTC), an expansion of the HOPE credit since 2009. The

Opportunity Tax Credit (AOTC), an expansion of the Hope Credit since 2009. The LLTC provides tax credits to low- and middle-income families of up to \$2,000 per year per person for the costs of higher education, and the AOTC provides a credit of up to \$2,500. Alternatively, individuals can deduct from their taxable income up to \$4,000 per year in higher education expenses. Interest paid on student loans is also tax deductible, as is some scholarship and fellowship income, and there are tax-free savings accounts for higher education as well. These tax breaks add up to about \$19.5 billion per year in forgone government revenue.

What Is the Market Failure, and How Should It Be Addressed?

The arguments discussed earlier to motivate public intervention in education markets, such as provision of a common set of values, apply much less strongly in the context of higher education. The major arguments for government intervention in higher education are twofold. The first is public returns. There is significant evidence of public returns from higher education; many of the studies cited above about positive returns to education apply to higher as well as lower educational attainment (such as studies of improved health or productivity spillovers). And there is a large literature showing that the publicly financed research that is carried out at universities is critical for innovation and economic growth.³²

The second is failures in the credit market for student loans. As noted at the start of this chapter, it is much harder to get a loan to finance education than it is to obtain a loan to finance the purchase of a car or a home because there is no collateral for banks to repossess if the loan is not repaid. As a result, in the absence of government intervention, banks may be unwilling to loan money to finance higher education. Government intervention is motivated by the need to ensure credit to students for higher education so that they can obtain higher education if it is productive for them to do so. [Sun and Yannelis \(2016\)](#) found that financial deregulation in the United States, which made it easier to get bank loans, significantly increased college attendance and completion. And [Marx and Turner \(2017\)](#) showed that notifying students of loan eligibility significantly increased their odds of going to college. The major source of government expenditure on higher education is not through loans (see [Figure 11-4](#)), however. Are these other types of spending justified? For example, the work by [Marx and Turner \(2015\)](#) suggested that Pell Grants largely crowd out borrowing for college so that on net there is a little increase in funding available to pay for education.

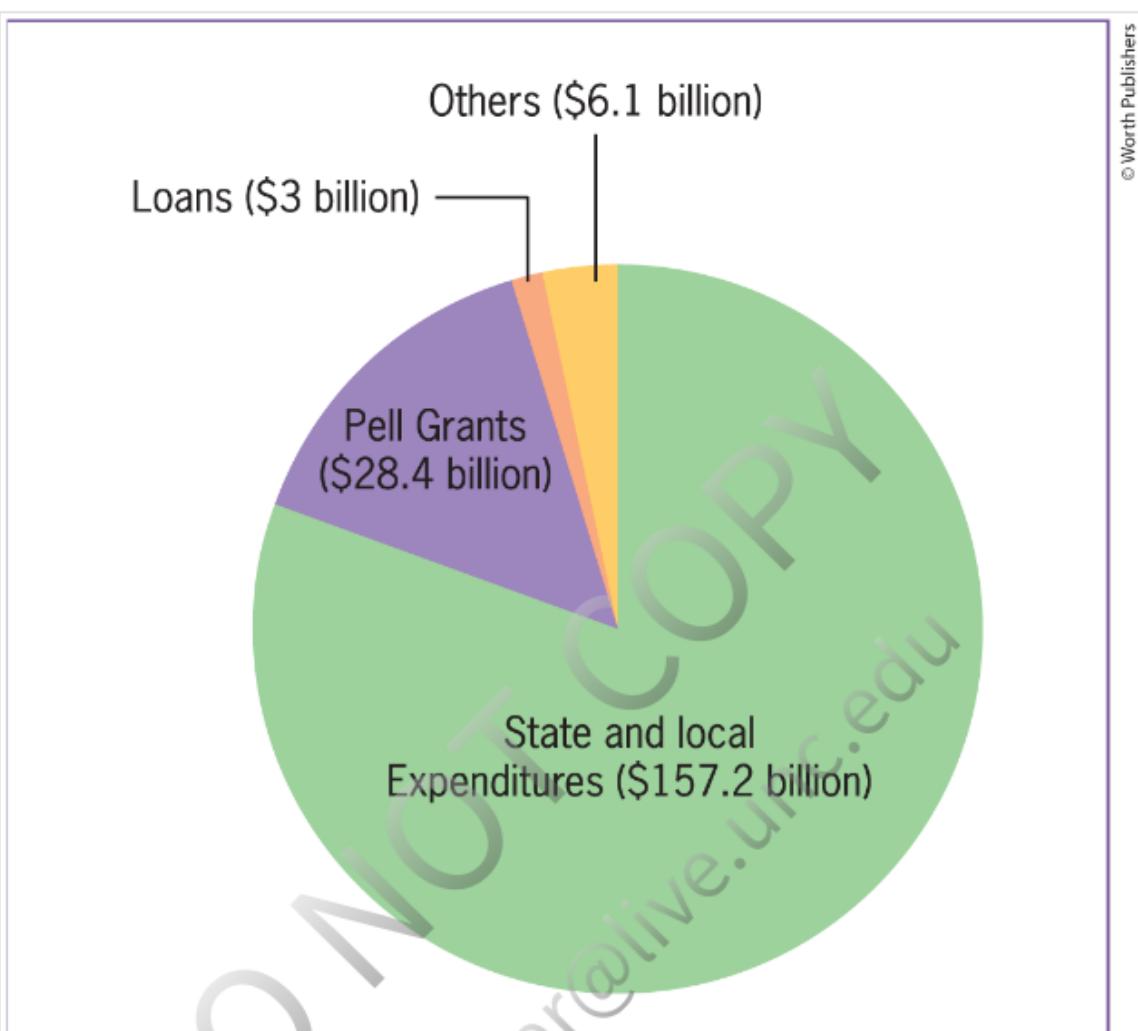


FIGURE 11-4 Government Spending on Higher Education, 2017 • Of the nearly \$200 billion the government spends annually on higher education, 81% is in the form of state and local expenditures. The remainder is primarily in the form of Pell Grants; student loans, while large in volume, do not have a large net cost to the government. Note that foregone revenue from tax breaks is not included in expenditures.

Data from: [Bureau of Economic Analysis \(2021\)](#) and [Congressional Budget Office \(2021\)](#).



At the same time, other studies have found that having grants rather than loans can affect the nature of education. For example, [Field \(2006\)](#) studied a program at New York University law school where admitted students were randomly assigned either loans or grants of the same financial value. Students who were randomly assigned grants were twice as likely to enroll at that university as those assigned loans, and students assigned grants were also about 40% more likely to take low-paying public interest jobs after graduation rather than higher paid private-sector legal work. Another study of a selective undergraduate institution that replaced loans with grants found that students were more likely to turn down higher salaried jobs in

favor of low-paid “public interest” jobs ([Rothstein and Rouse, 2007](#)). These findings suggest that moving from grants to loans can have real effects on behavior.

There is no real rationale for providing subsidies only to the higher income individuals who benefit from tax deductions. Indeed, [Bulman and Hoxby \(2015\)](#) found little effect of these tax credits on actual college attendance.

What about the largest source of spending on higher education, public state universities? Presumably, states provide public education to improve the skill level of their workforce. This goal is undercut, however, by the mobility of college graduates to other states. A study by [Bound et al. \(2004\)](#) found that for every ten students educated by state schools, only three of the state school graduates remained in the state in the long run. Given that the major market failure for higher education is in credit markets, shifting state resources away from direct provision and toward loans or grants may improve efficiency. In addition, cuts in public education financing over the past two decades have led to an ever-growing burden of student interest debt, as discussed in the application.

APPLICATION

Addressing Student Loan Debt in the United States



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A second approach is to more fully embrace the “income-contingent” loan repayment option used in many other nations such as the United Kingdom and Australia, where student loans remain unpaid until earning reaches a minimum threshold. At that point, repayment becomes a function of earned income. This approach would protect students against errors in estimating their ability to repay their student loans. It might also reduce the effect of loans on decisions to shift out of lower paying but potentially socially valuable jobs. The United States does have such a program option, but it is optional rather than mandatory and is used by only about 25% of college attendees.⁴¹ Rather than expand this option, the Trump administration moved in a different direction, proposing to end loan forgiveness for students who enter low-paying public service jobs. The administration also drafted proposals to alter the repayment schemes for contingent repayment programs and end the program that pays the interest on loans taken out by low-income students while they are in school. In sum, these policies amounted to \$200 billion in cuts to student financial aid.⁴²

Third, and finally, is a proposal on the part of some politicians to make college education free or reduce the cost significantly. In March 2018, Sen. Brian Schatz (Dem- Hawaii) introduced a bill to make public two-year and four-year universities free for all students by covering not only tuition but also housing, meal plans, and books for financially qualified students, thereby eliminating the potential for debt. His bill proposes the creation of voluntary partnerships between states and the federal government, with a dollar-for-dollar match of funds that each state designates for public colleges and universities.⁴³

Any of these plans would go a long way toward addressing the student loan debt problem, but each would come at a high price tag. For example, the Schatz plan is estimated to cost the government \$80 billion in the first year, rising to almost \$100 billion per year. ■

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11.6 Conclusion

The provision of education, an impure public good, is one of the most important governmental functions in the United States and in countries around the world. Because of external returns, market failures, or redistribution, governments have traditionally decided to be the majority providers of educational services. In this chapter, we learned that one cost of the government role can be a reduction in the level of educational attainment of children. Voucher systems can address this problem, but they raise a host of additional issues about segregation and the feasibility of private educational markets. The optimal amount of government intervention in education markets depends on the extent of market failures in private provision of education and on the public returns to education. A large literature suggests sizeable private returns to education, with some evidence of public returns as well.

HIGHLIGHTS

- Education is primarily provided by state and local governments in the United States, and only a small share of students go to private schools.
- The rationales for public intervention in education include positive externalities, failures in credit markets, failures of family utility maximization, and redistribution.
- Publicly provided free education may crowd out the educational attainment of those who want to choose higher levels of education but don't want to forgo the free public good.
- Vouchers might solve this crowd-out problem by allowing people to choose the optimal level of education for themselves, as well as interjecting competition into the education market.
- At the same time, vouchers may lead to increased educational stratification, and the education market may face difficulties in implementing competition.
- Existing evidence suggests that private school choice through vouchers can move students to better schools, but a much richer evaluation of the total social effects of vouchers is needed before policy conclusions can be drawn.
- There is a sizeable private return to additional schooling that appears to reflect increased human capital accumulation rather than screening. There is also some evidence of public returns in terms of outcomes such as increased voting and better health.
- The government supports higher education through direct spending, grants, loans, and tax breaks.

QUESTIONS AND PROBLEMS

1. State and federal governments actively support education at the primary, secondary, and collegiate levels. But they *mandate* education at the primary and secondary levels, while merely providing subsidies and loan guarantees at the collegiate level. Of the key rationales for public provision of education described in [Section 11.1](#) of the text, which do you think underpins this differential treatment?
2. Consider two metropolitan areas, one that has many small school districts and one that has only a few large school districts. How are the efficiency and equity effects of introducing a voucher system likely to differ across these two areas?

3. Some have argued that introducing a voucher system would be particularly beneficial for two groups of students: those who are the worst off under the current system, and many of the students who are the best off under the current system. Why might this be the case?
4. In an environment in which all education is privately provided, suppose that a family with one child has \$20,000 per year to spend on private goods and education. Draw this family's budget constraint. Suppose now that an option of free public education with spending of \$4,000 per pupil is introduced to this family. Draw three different indifference curves corresponding to the following three situations: (a) a free public education would increase the amount of money that is spent on the child's education; (b) a free public education would decrease the amount of money that is spent on the child's education; (c) a free public education would not affect the amount of money spent on the child's education.
5. A study by [Harris and Larsen \(2015\)](#) examined decision making by New Orleans parents selecting schools for their children. In New Orleans, all parents sending their children to public schools are required to rank schools in order of preference as a part of a centralized matching system. The researchers found that while academic quality is important in parental choice, just as important in decision making is the distance of the school from the family home. Parents were willing to sacrifice an entire school "letter grade" (the measure of school quality in New Orleans) in order to have their child attend a school three-quarters of a mile closer to home. In other words, they would prefer their child to attend a C- school across the street instead of a B- school less than a mile away. The importance of logistics relative to academic performance was highest for low-income families. How might these findings inform the policy debate over school choice, especially the debate over vouchers and charter schools?
6. **E** Empirical evidence suggests that highly educated adults donate more to charity than adults with similar income levels but who have fewer years of schooling. Why might this evidence justify public subsidization of education? What potential biases might make it difficult to interpret this empirical relationship?
7. Several researchers have found evidence of sheepskin effects, in which the labor market return to twelfth grade is higher than the return to eleventh grade and the return to the fourth year of college is higher than the return to the third year of college. Why does this evidence of

- sheepskin effects bolster the screening explanation for the relationship between education and earnings?
8. **E** What are the advantages of comparing twins to investigate the relationship between education and earnings? What are the drawbacks of doing so?
 9. **E** Suppose you want to evaluate the effectiveness of vouchers in improving educational attainment by offering a voucher to any student in a particular town who asks for one. What is wrong with simply comparing the educational performance of the students receiving vouchers with those who do not receive vouchers? What would be a better way to study the effectiveness of vouchers?
 10. **E** [Abdulkadiroglu et al. \(2011\)](#) studied the effectiveness of charter schools in the Boston area using a clever research strategy. They utilized the fact that many charter schools in the area are oversubscribed and thus must assign enrollment slots to students using a randomized lottery. The researchers compared winners and losers of the lottery to estimate the effect of charter school attendance on student achievement, finding large and significant score gains for charter students compared to their peers who lost the lottery.

Based on the results of this experiment, one policy maker has argued that all schools in the state of Massachusetts should be replaced by charter schools. In what ways does the experiment support this policy maker's proposal? Now, considering the other side of the debate, what are some specific reasons for proceeding with caution when applying the results of the experiment to this proposal?
 11. **E** The U.S. Department of Education publishes the biannual "Nation's Report Card," also called the National Assessment of Educational Progress, which monitors and reports on nationwide student achievement in mathematics and reading, and in other subject areas. The Report Card produces estimates of overall national achievement and conducts demographic subgroup analysis by state, gender, socioeconomic status, and race/ethnicity, by administering one- to two-hour tests to randomly selected students from randomly selected schools nationally. Navigate to the Nation's Report Card Data Explorer, which can be found at <https://www.nationsreportcard.gov/nudecore/xplore/nde>. Consider the eighth grade mathematics assessment to respond to these questions.
 - a. In the most recent year for which data are available, in which state was White students' eighth grade mathematics achievement the lowest?

- The highest? In which state was Black students' eighth grade mathematics achievement the lowest? The highest? Provide mean scores for each case.
- b. In the most recent year for which data are available, in which state was girls' achievement the lowest? The highest? What about for boys? Provide the mean scores for each case.
- c. Nationally, what is the achievement gap between White and Black students? What is the achievement gap between male and female students?
12. Consider school accountability reforms like the "Common Core" and "No Child Left Behind" in the context of the results found by [Deming et al. \(2016\)](#), discussed in the chapter. How might Deming's results explain the high level of political controversy surrounding these two reforms?

ADVANCED QUESTIONS

13. [Epple and Romano \(2008\)](#) describe theoretical evidence that school vouchers will lead to "cream-skimming," where private schools will pick off the better students and leave public schools with lower-ability average students. They propose targeted vouchers, in which different-sized vouchers go to different groups of students, to combat this potential concern. How would you design a targeted voucher system that would lead to a reduced level of cream-skimming?
14. The town of Greenville has three families, each with one child, and each of which earns \$20,000 per year (pre-tax). Each family is taxed \$4,000 per year to finance the public school system in the town, which any family can then freely attend. Education spending is \$6,000 per student in the public schools. The three families differ in their preferences for education. Though both families A and B send their children to the public school, family B places a greater value on education than family A. Family C places the greatest relative value on education and sends their child to private school.
- a. Graph the budget constraints facing each of the three families and draw a possible indifference curve, which could correspond to the choice each family makes.

The town is considering replacing its current system with a voucher system. Under the new system, each family would receive a \$6,000

system. Under the new system, each family would receive a \$6,000 voucher for education, and families would still be able to send their children to the same public school. Since this would be more costly than the current system, they would also raise taxes to \$6,000 per household to pay for it.

- b. Draw the budget constraint the families would face under this system.

Suppose that, when the new system is introduced, family A continues to send their child to public school, but family B now sends their child to private school (along with family C's child).

- c. Explain how you know that family C is made better off and family A is made worse off by the voucher policy.
- d. Using a diagram, show that family B could be made better or worse off by the voucher policy.
15.  Suppose you are a researcher designing a study on the returns to education using an education bill passed by your state legislature in 1985. The bill, once law, substantially increased education funding for all elementary schools. Your treatment group will be children born between 1981 and 1991, and your control group will be children born from 1965 to 1975. You will study both groups' wages as adults, which you have obtained from your state's Department of Revenue.
- a. What *economic* rationale for government involvement in the provision of education might undermine your research design?
- b. Consider [Duflo \(2004\)](#), discussed in the chapter. How might you draw inspiration from the design of that study to improve your own research design?
16. One way to structure a student loan repayment plan is to make it income-contingent—that is, to relate the amount that a student would have to repay in any given month to how much income he or she earns. How might the existence of such a plan alter a student's choice of college major? Would such a repayment system be socially efficient?

The  icon indicates a question that requires students to apply the empirical economics principles discussed in [Chapter 3](#) and the Empirical Evidence boxes.

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CHAPTER 12

Social Insurance: The New Function of Government



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12.1 What Is Insurance and Why Do Individuals Value It?

12.2 Why Have Social Insurance? Asymmetric Information and Adverse Selection

12.3 Other Reasons for Government Intervention in Insurance Markets

12.4 Social Insurance Versus Self-Insurance: How Much Consumption Smoothing?

12.5 The Problem with Insurance: Moral Hazard

12.6 Putting It All Together: Optimal Social Insurance

12.7 Conclusion

APPENDIX TO CHAPTER 12

Mathematical Models of Expected Utility

Questions to keep in mind

- What market failures justify the provision of public social insurance?
 - Do individuals always need public social insurance to smooth their consumption?
 - What is the moral hazard cost of social insurance, and why is it economically important?
-

In the preamble to the U.S. Constitution, the framers wrote that they were uniting the states in order to “establish justice, insure domestic tranquility, provide for the common defense, promote the general welfare, and secure the blessings of liberty

to ourselves and our posterity.” For most of the country’s history, one of those goals, “common defense,” was the federal government’s clear spending priority. In 1953, for example, 69¢ of each dollar of federal government spending went to fund national defense ([Figure 12-1](#)). Another 4¢ went to pay for Social Security, a 17-year-old program that provided only 18% of the income of the typical elderly household. Only 0.4¢ out of each dollar of federal government spending was devoted to providing health care to U.S. citizens, and less than 5% was spent on benefits for unemployment or disability.

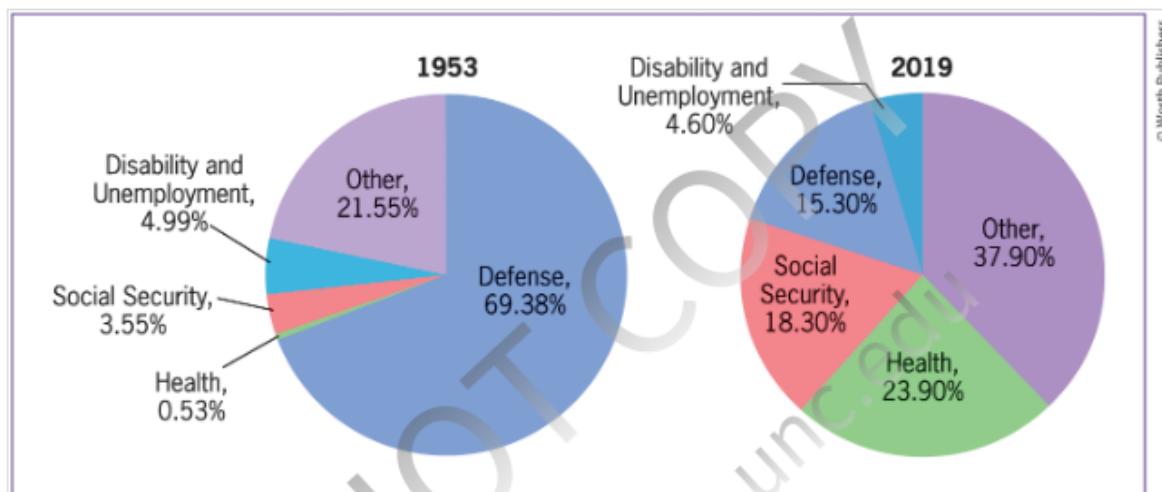


FIGURE 12-1 Government Spending by Function, 1953 and 2019 • Government today devotes a much larger portion of its budget to social insurance than it did nearly 70 years ago.

Data from: [Office of Management and Budget \(2014\)](#); [Bureau of Economic Analysis \(2021\)](#), Table 3.16.



Since then, the government’s spending priorities have shifted dramatically, away from “common defense” and toward promoting “the general welfare.”¹ By 2019, only 15¢ of each dollar of federal government spending went to fund national defense (second panel of [Figure 12-1](#)), and 19¢ paid for Social Security, which now represents 30% of the income of the typical elderly household.² Another 24¢ was devoted to health care spending, primarily on two programs that did not exist in 1953: the Medicare program, which provides universal health insurance coverage to older adults, and the Medicaid program, which provides free health insurance to many low-income people and people with disabilities. The dramatic shift in spending led economist Paul Krugman to observe that “loosely speaking, the post-cold-war federal government is a big pension fund that also happens to have an army.”³

This radical change in the nature and scope of government spending is one of the most fundamental changes in public policy in the United States over the past 68

years. The programs that have grown are labeled collectively as **social insurance programs**, government interventions to provide insurance against adverse events. In this chapter, we discuss social insurance programs in the United States in general terms. The following chapters focus on specific social insurance programs, such as:

- *Social Security*, which provides insurance against earnings loss due to death or retirement.
- *Unemployment insurance*, which provides insurance against job loss.
- *Disability insurance*, which provides insurance against career-ending disability.
- *Workers' compensation*, which provides insurance against on-the-job accidents.
- *Medicare*, which provides insurance against medical expenditures in old age.

social insurance programs

Government interventions in the provision of insurance against adverse events.

Social insurance programs have several common features. Workers participate by “buying” insurance through payroll taxes or through mandatory contributions that they or their employers make. These contributions make them eligible to receive benefits if some measurable event occurs, such as disability or on-the-job injury. Program eligibility is conditioned only on making contributions and on the occurrence of the adverse event. Eligibility is typically not **means-tested**; that is, eligibility does not depend on one’s current means, the level of one’s current income or assets.

means-tested

Refers to programs in which eligibility depends on the level of one’s current income or assets.

Throughout the next several chapters, we discuss particular social insurance programs, but before we get into the details of these programs, we need to understand the general economics of insurance markets. This chapter begins by explaining the nature of insurance and why it is a product that is valued by consumers. We then discuss the potential failures in the private insurance market that might warrant government intervention. Foremost among these is the problem of *adverse selection*: the fact that the insured individual knows more about their risk level than does the insurer might cause insurance markets to fail. As we have discussed throughout this book, market failures potentially warrant government intervention.

The value of government intervention is mitigated, however, by the availability to individuals of *self-insurance*: to the extent that individuals can insure themselves

against risks (e.g., by saving or borrowing), government intervention may not have large benefits and may serve only to *crowd out* that self-insurance. Moreover, social (or any type of) insurance carries with it the important problem of *moral hazard*: when you insure individuals against adverse events, you can encourage adverse behavior. If individuals are insured against on-the-job accidents, they might be somewhat less careful on the job; if individuals are insured against long unemployment spells, they might not work very hard to find new jobs; if individuals are insured for their medical costs, they might overuse their doctors.

Moral hazard problems will occur naturally whenever individuals are insured against adverse events. Thus, in this chapter, we lay out the *central trade-off with social insurance programs*: governments can improve efficiency by intervening when insurance markets fail (due, e.g., to adverse selection) and individuals are not self-insured against such risks, but those interventions themselves have offsetting efficiency costs (moral hazards) that undercut their goals.

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12.1 What Is Insurance and Why Do Individuals Value It?

Any discussion of government insurance provision must start with an understanding of what insurance is and why it is so valuable to consumers.

What Is Insurance?

Insurance is provided for a wide variety of different circumstances, but it has a common structure. Individuals, or those acting on their behalf (e.g., their employers or their parents), pay money to an insurer, which can be a private firm or the government. These payments are called **insurance premiums**. The insurer, in return, promises to make some payment to the insured party, or to others providing services to the insured party (such as physicians or auto repair shops). These payments are conditioned on a particular event or series of events (e.g., an accident or a doctor's visit).

insurance premiums

Money that is paid to an insurer so that an individual will be insured against adverse events.

This broad definition covers the wide variety of private insurance products that exist in the United States. A sampling includes:⁴

- *Health insurance:* Individuals and employers pay \$1,120 billion of premiums each year to insure against health problems and the medical bills associated with them.
- *Auto insurance:* Drivers pay \$247 billion in premiums each year to insure against the cost and physical damage of auto accidents and theft.
- *Life insurance:* Individuals and employers pay \$157 billion in premiums each year to provide income to the heirs of those who die.
- *Casualty and property insurance:* Individuals and businesses pay \$638 billion in premiums each year to insure their homes, cars, and other properties and possessions against fire, natural disasters, accidents, and theft.

Why Do Individuals Value Insurance?

Insurance is valuable to individuals because of the principle of *diminishing marginal utility* discussed in [Chapter 2](#). Recall that we typically assume that the marginal utility derived from consumption falls as the level of consumption rises: the first

pizza means a lot more to you than the fifth. This intuitive assumption means that, given the choice between (1) two years of average consumption and (2) one year of excessive consumption and one year of starvation, individuals would prefer the former. Individuals prefer two years of average consumption because the excessive consumption doesn't raise their utility as much as the starvation lowers it.

For example, given the utility functions that we typically use in economics, having consumption of \$30,000 in both year one and year two delivers a higher utility level than having consumption of \$50,000 in year one and \$10,000 in year two. The gain in utility from raising consumption from \$30,000 to \$50,000 in year one is much smaller than the loss in utility from lowering consumption from \$30,000 to \$10,000 in year two. Thus, individuals desire **consumption smoothing**: they want to transfer consumption from periods when it is high (so that it has a low marginal utility) to periods when it is low (so that it has a high marginal utility).

consumption smoothing

The transfer of consumption from periods when consumption is high, and thus has low marginal utility, to periods when consumption is low, and thus has high marginal utility.

When outcomes are uncertain, people want to smooth their consumption over possible outcomes, or **states of the world**, just as they want to smooth their consumption over time. And, just as utility is maximized by having the same consumption in year one and year two in the previous example, utility is maximized by having the same consumption regardless of the outcome of some uncertain event.

states of the world

The set of outcomes that are possible in an uncertain future.

Imagine that, over the next year, there is some chance that you will get hit by a car, and as a result, you will have high medical expenses. There are two possibilities, or states of the world, for the next year: you get hit by a car or you don't get hit by a car. Your goal is to make a choice today that determines your consumption tomorrow in each of these states of the world, so that your utility across the two states of the world (accident, no accident) is maximized.

Individuals choose across consumption in states of the world by using some of their income today to *buy insurance against an adverse outcome tomorrow*. By buying insurance, individuals commit to make a payment regardless of the state of the world in return for getting a benefit if the uncertain outcome is negative (an

accident). The larger the payment to the insurer (the insurance premium), the larger the benefit in the negative outcome case (the insurance payout). Thus, by varying the amount of insurance they buy, individuals can shift their consumption from one state of the world to another. For example, by buying a lot of insurance, an individual shifts consumption from the positive outcome state of the world (when they only pay premiums) to the negative outcome state of the world (when they also get benefits).

The fundamental result of basic insurance theory is that individuals will demand full insurance in order to fully smooth their consumption across states of the world. That is, in a perfectly functioning insurance market, individuals will want to buy insurance so that they have the same level of consumption regardless of whether the adverse event (such as getting hit by a car) happens or not. Given diminishing marginal utility, this course of action gives individuals a higher level of utility than does allowing the accident to lower their consumption. The intuition is the same as the example over time at the start of this section: it is better to have constant consumption in all states of the world than to have consumption that is high in one state and low in another.

Formalizing This Intuition: Expected Utility Model

To better understand this difficult intuitive point, it is useful to turn to the standard mechanism that economists use for modeling choices under uncertainty: the [expected utility model](#). This model is similar to the consumer choice model that we introduced in [Chapter 2](#), but it allows individuals to maximize utility across states of the world rather than across bundles of goods. In particular, suppose that there is an uncertain outcome, with some probability p of an adverse event. Then expected utility is written as follows:

$$EU = (1 - p) \times U(\text{consumption with no adverse event}) + p \times U(\text{consumption with adverse event})$$

expected utility model

The weighted sum of utilities across states of the world, where the weights are the probabilities of each state occurring.

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12.2 Why Have Social Insurance? Asymmetric Information and Adverse Selection

If the world functioned as described in [Section 12.1](#), there would be no need for government intervention in insurance markets: individuals would insure themselves fully in the private market at actuarially fair prices. Yet such government intervention is enormous and growing. In this section, we review the most common motivation suggested by economists for government intervention in insurance markets: asymmetric information between insured and insurer, which leads to the problem of *adverse selection*.

Asymmetric Information

Insurance markets may be marked by [information asymmetry](#), which is the difference in information that is available to sellers and to purchasers in a market. Information asymmetry can arise in insurance markets when individuals know more about their underlying level of risk than do insurers. This asymmetry can cause the failure of competitive markets.

information asymmetry

The difference in information that is available to sellers and to purchasers in a market.

The intuition of the market failure caused by information asymmetry is best illustrated using the market for used cars, the example used by Nobel Prize-winning economist George Akerlof in 1970.² Sellers of used cars know their vehicles' problems, while potential buyers may not. Individuals selling a car may be doing so because they have a "lemon," a car that has major, serious defects. Buyers of cars don't know whether they are getting a lemon, and they can't necessarily trust the information provided by sellers because sellers will want to dump their lemons on unsuspecting buyers. Therefore, buyers might avoid the used car market altogether. As a result, overall demand in the used car market is low, and sellers of used cars on average receive less for their cars than they are worth. Even if you have a car in excellent condition, and even if you are willing to attest to that fact, buyers will not pay enough for it because they can't be sure that you are being honest. You may be

unwilling to sell your high-quality used car for a low price, so the used car sale may not be completed.

This outcome is a market failure because some trades that are valued by both parties may not be made due to the asymmetry of information. Buyers might be perfectly happy to pay a high price for a high-quality used car, and sellers might be perfectly happy to sell at that high price. The fact that buyers are wary of getting a lemon, however, stops that trade from happening.

In the used car market, the asymmetry arises from the fact that sellers know more than buyers, making buyers wary of the market. In insurance markets, the information asymmetry is reversed: the purchasers of insurance may know more about their insurable risks than the seller (insurer) does. In this case, the insurer will be reluctant to sell insurance because they will be worried that only those with the insured-against problems will demand insurance; the insurer will worry that only the sick demand health insurance, for example, or only those about to lose their job will demand unemployment insurance. As a result, insurers will charge higher than actuarially fair premiums, or they may not sell insurance at all if they are particularly suspicious about someone's risk status. In the next sections, we will use a health insurance market example to formalize this intuition.

Example with Perfect Information

Imagine that there are two groups, each with 100 persons. One group is careless and absentminded and doesn't pay attention when crossing the street. As a result, members of this group have a 5% chance of being hit by a car each year. The other group is careful and always looks both ways before crossing the street. Members of this group have only a 0.5% chance of being hit by a car each year. What effect would the existence of these two different types of pedestrians have on the insurance market? The effect depends on what we assume about the relative information available to the individuals and to the insurance company.

For example, suppose that the insurance company and the street crossers have perfect information about who is careful and who is not. In this case, the insurance company would charge different actuarially fair prices to the careless and careful groups. The people in the careless group would each pay 5¢ per dollar of insurance coverage, while those in the careful group would each pay only 0.5¢ per dollar of insurance coverage. At these actuarially fair prices, individuals in both groups would choose to be fully insured (as proved in [Section 12.1](#)), with the careless paying

$\$30,000 \times 0.05 = \$1,500$ per year in premiums and the careful paying

$\$30,000 \times 0.005 = \150 per year in premiums. The insurance company would earn zero profit, and the society would achieve the optimal outcome (each group is fully insured).

The first row of [Table 12-2](#) illustrates the perfect information example, with separate prices for the two groups of consumers. At these premiums, the 100 careful people pay a total of \$15,000 in premiums, and the 100 careless people pay a total of \$150,000. Total premiums paid are \$165,000. The insurer expects to have 0.5 accidents among the 100 careful consumers, for a payout of \$15,000 ($0.5 \times \$30,000$ cost per accident), and 5 accidents among the careless consumers, for a payout of \$150,000 ($5 \times \$30,000$). So the total expected insurance payout is \$165,000, and the insurance company will break even.

TABLE 12-2 Insurance Pricing with Separate Groups of Consumers

Information	Pricing Approach	Premium per Careless (100 people)	Premium per Careful (100 people)	Total Premiums Paid	Total Benefits Paid Out	Net Profits to Insurers
Full	Separate	\$1,500	\$150	$\$165,000(100 \times \$1,500 + 100 \times \$150)$	\$165,000	0
Asymmetric	Separate	\$1,500	\$150	$\$30,000(0 \times \$1,500 + 200 \times \$150)$	\$165,000	-\$135,000
Asymmetric	Average	\$825	\$825	$\$82,500(100 \times \$825 + 0 \times \$825)$	\$150,000	-\$67,500

If the insurer has perfect information about whether insurance purchasers are careful or careless (first row), then he will charge \$1,500 to the careless and \$150 to the careful, making a net profit of zero. If the insured know whether they are careless or careful, and the insurer does not, then the insurer may try setting separate premiums for the groups (second row) or one common premium for all individuals (third row). In either case, the insurer loses money due to adverse selection, so the insurer will not offer insurance, leading to market failure.

Example with Asymmetric Information

Now suppose that the insurance company knows that there are 100 careless consumers and 100 careful consumers, but it doesn't know in which category any given individual belongs. In this case, the insurance company could do one of two things.

First, the insurance company could ask individuals if they are careful or careless, and then offer insurance at separate premiums, as in the second row of [Table 12-2](#): the premium would be only \$150 if you say you are careful when you cross the street

and \$1,500 if you say you are careless. In this case, however, *all consumers* will say that they are careful so that they can buy insurance for \$150 per year: Why voluntarily pay ten times as much for insurance? From the consumers' perspective, this is a fine outcome because everyone is fully insured and paying a low premium. But what about the insurer? The company is collecting \$30,000 in total premium payments ($200 \text{ persons} \times \150 per person). It is, however, expecting to pay out 5 claims to the careless and 0.5 claims to the careful, for a total cost of $5.5 \times 30,000$, or \$165,000. So the insurance company, in this example, loses \$135,000 per year. Companies will clearly not offer any insurance under these conditions. Thus, the *market will fail*: consumers will not be able to obtain the optimal amount of insurance because the insurance will not be offered for sale. This outcome is summarized in the second row of [Table 12-2](#).

Alternatively, the insurance company could admit that it has no idea who is careful and who is not, and then offer insurance at a *pooled*, or average, cost. That is, on average, the insurer knows that there are 100 careless and 100 careful consumers, so that on average in any year, the insurer will pay out \$165,000 in claims. If it charges each of those 200 persons \$825 per year, then, in theory, the insurance company will break even.

Or will it? Consider the careful consumers, who are faced with the decision to buy insurance at a cost of \$825 or to not buy insurance at all. Careful consumers would view this as a bad deal, given that they have only a 0.5% chance of being hit. So they would not buy insurance. Meanwhile, however, all of the careless consumers view this as a great deal, and they would all buy insurance. The insurance company ends up collecting \$82,500 in premium payments (from the 100 careless customers), but paying out $\$30,000 \times 5 = \$150,000$ in benefits to those careless customers. So the insurance company again loses money. Moreover, half the consumers (the careful ones), who would ideally choose to insure themselves fully against getting hit by a car, end up with no insurance. Once again, the *market has failed* to provide the optimal amount of insurance to both types of consumers. This outcome is shown in the third row of [Table 12-2](#).

The Problem of Adverse Selection

The careful/careless pedestrian example in the previous section is an example of an asymmetric information problem that plagues insurance markets, the problem of **adverse selection**: the fact that insured individuals know more about their risk level than does the insurer might cause those most likely to have the adverse outcome to

select insurance, leading insurers to lose money if they offer insurance. The general operation of the adverse selection problem is illustrated by our example. Only those for whom the insurance is a fair deal will buy that insurance. With one price that averages the high- and low-expense groups, only those in the high-expense group will find the insurance to be a fair deal. (For them, it's actually better than a fair deal.) If only the high-expense (highest risk of adverse outcome) group buys (selects) the insurance, the insurance company loses money because it charges the average price but has to pay out the high expected expenses of careless individuals. If the insurance company knows that it will lose money when it offers insurance, it won't offer that insurance. As a result, in this case, no insurance will be available to consumers of any type.

adverse selection

The fact that insured individuals know more about their risk level than does the insurer might cause those most likely to have the adverse outcome to select insurance, leading insurers to lose money if they offer insurance.

Adverse selection can, therefore, lead to failure in the insurance market, and perhaps the eventual collapse of the market. This might occur because it may not be in the interest of any individual company to offer insurance at a single, pooled price, so that no companies offer the insurance. For example, in the 1980s, the California health insurer HealthAmerica Corporation was rejecting all applicants to its individual health insurance enrollment program who lived in San Francisco on the belief that AIDS was too prevalent there. According to the San Francisco district attorney, HealthAmerica would pretend to review San Franciscans' applications but would actually place them in a drawer for several weeks before sending them rejection letters.⁸

This is a market failure because, with perfect information, individuals from San Francisco were likely to buy insurance at the actuarially fair premium, even if that premium was higher due to the risk of AIDS.

Does Asymmetric Information Necessarily Lead to Market Failure?

Are insurance companies destined to fail whenever there is asymmetric information? Not necessarily. First of all, most individuals are fairly risk averse. Risk-averse individuals so value being insured against bad outcomes that they are willing to pay *more* than the actuarially fair premium to buy insurance: they are willing to pay a **risk premium** above and beyond the actuarially fair premium. In

willing to pay a risk premium above and beyond the actuarially fair premium. In

our example, it is possible that the careful individuals are so risk averse, and therefore so afraid of being uninsured, that they are willing to buy insurance even at the average price. That is, even if the actuarially fair price for the careful is \$150, and the market is charging \$825, so that their risk premium is $\$675 (\$825 - \$150)$, they will still buy insurance. This situation is technically called a pooling equilibrium, a market equilibrium in which all types buy full insurance even though it is not fairly priced to all individuals. The pooling equilibrium is an efficient outcome: both types are fully insured, and the insurer is willing to provide insurance.

risk premium

The amount that risk-averse individuals will pay for insurance above and beyond the actuarially fair price.

pooling equilibrium

A market equilibrium in which all types of people buy full insurance even though it is not fairly priced to all individuals.

Even if there is no pooling equilibrium, the insurance company can address adverse selection by offering *separate products at separate prices*. Think about the source of the adverse selection problem in our example: careless individuals are pretending to be careful in order to get cheap insurance. The insurance company would like to get individuals to reveal their true types (careless or careful), but the company faces the type of preference revelation problem we saw with public goods. Even if individuals aren't willing to voluntarily reveal their types, however, they might make choices that involuntarily reveal their types.

Suppose that the insurance company offered two policies: full coverage for the \$30,000 of medical costs associated with accidents, at \$1,500 (the actuarially fair price for the careless), and coverage of up to \$10,000 of medical expenses, at a price of \$50 (the actuarially fair price for that level of coverage for the careful). If these two products were offered, it is possible that the careless would purchase the more expensive coverage and the careful would purchase the less expensive coverage. This outcome occurs because the careless don't want to bear the risk of having only \$10,000 of coverage, given their relatively high odds of having an accident; they would rather pay a high price to make sure they have full coverage. The careful can take that risk, however, because of their very low odds of having an accident. By offering different products at different prices, the insurance company has caused consumers to reveal their true types. This market equilibrium is called a separating equilibrium.

separating equilibrium

A market equilibrium in which different types of people buy different kinds of insurance products designed to reveal their true types.

Sound far-fetched? Consider what happened in health insurance markets 30 years ago. At that time, insurance companies were offering very generous insurance to all consumers at one high price. As health insurance costs began to escalate, however, companies could no longer make profits with this strategy. In response to the higher costs they faced, insurance companies began to offer two products: a traditional insurance plan and a new product called the health maintenance organization (HMO). HMOs offered care that was much more tightly monitored, typically featuring much less access to medical specialists, for example. But HMOs also had a much lower premium. The result was a major shift by largely healthy consumers to this new, relatively low-cost/low-benefit option: a classic separating equilibrium.

Unlike the pooling equilibrium, however, the separating equilibrium still *represents a market failure*. The careless are getting what they would get in a model of perfect information: full coverage at a high price, which they are willing to pay. The careful are not getting their first choice, however, which would be full coverage at a lower, actuarially fair price. To address this market failure, insurers have forced the careful to choose between full coverage at a very high price and partial coverage at a lower price. Because many of the careful will choose the partial coverage, this is not the optimal solution: the optimum is full coverage for both groups, at different prices that reflect each group's relative risks of injury. Thus, even with separate products, adverse selection can still impede markets from achieving the efficient outcome.

APPLICATION

Adverse Selection and Health Insurance “Death Spirals”



A particularly compelling example of the damage done by adverse selection in health insurance markets comes from a study of Harvard University by [Cutler and Reber \(1998\)](#). Harvard offered its employees a wide variety of health insurance plans, some much more generous than others (e.g., covering more expensive procedures). The prices charged to the university by the insurance companies for these plans were a function of how much each plan's enrollees made use of the medical care paid for by the plan. If a plan had many sick enrollees, for example, then its costs were higher, and the insurance companies would charge the university higher premiums. Such a pricing system is called **experience rating**: charging a price for insurance that is a function of realized outcomes. This is the “ex post” equivalent of actuarial adjustments: while actuarial adjustment

charges a price based on *expected* experience, experience rating charges a price based on *actual* or *realized* experience.

experience rating

Charging a price for insurance that is a function of realized outcomes.

Health insurance plan costs were shared by Harvard University and its employees. Traditionally, the university shielded its employees from the fact that some plans were more expensive than others by paying a larger share of the more generous, more expensive health insurance plans and leaving employees with similar costs, whichever plan they chose. Thus, from the employees' perspective, there was relatively little penalty for choosing a more expensive, more generous insurance plan. In 1995, however, Harvard moved to a system in which the university paid the same amount for each plan, regardless of the plan's cost, so that employees had to pay more for the more generous and expensive health plans.

Cutler and Reber found that this new system greatly increased the extent of adverse selection across Harvard health insurance plans. Before 1995, many healthy individuals would choose the generous and expensive plan because prices were so similar—there was a *pooling equilibrium*, with both sick and healthy choosing generous (full) insurance. When employees had to pay much more for the generous plan, however, some healthy enrollees chose cheaper plans, and the less healthy employees continued to choose the more generous plans; that is, the insurance group moved to a *separating equilibrium*, with the healthy getting less generous insurance at cheaper prices and the less healthy getting more generous insurance at high prices.

Because these less healthy employees used much more medical care, however, the experience-rated premiums (which reflect the average medical utilization of enrollees) of the more generous plans increased substantially. Given Harvard's new system (the university picked up a flat amount of costs, regardless of the total cost of the plan), the rising costs of these generous plans were borne completely by plan enrollees, which caused even more healthy employees to leave the generous plans for ones that were more affordable. This led to a spiral of higher premiums, causing the healthy to give up the generous plan, leading to even higher costs for that plan (because the remaining enrollees were sicker on average), which led to even more of the healthy leaving the plan. This spiral continued until, by 1998, the most generous plan had gotten so expensive that it was no longer offered. Adverse selection had led to what economists call a "death spiral" for this plan.

This was clearly an inefficient outcome because individuals who wanted very generous insurance could no longer buy it at *any* price. The insurance market had failed for Harvard employees; a product that was demanded at (or above) its cost of production was no longer available. This case study illustrates how adverse selection can produce market failure. ■

How Does the Government Address Adverse Selection?

There are many potential government interventions that can address this problem of adverse selection. Suppose that, in the careful/careless pedestrian example, the government mandated that everyone buy full insurance at the average price of \$825

per year. This plan would lead to the efficient outcome, with both types of pedestrians having full insurance. This would not be a very attractive plan to careful consumers, however, who could view themselves as essentially being taxed in order to support this market, by paying higher premiums than they should based on their risk. That is, at a premium of \$825, many careful consumers would prefer to be uninsured rather than being mandated to buy full insurance, so the government is making them worse off.

Another option is public provision: the government could just provide full insurance to both types of consumers so that all consumers have the optimal full insurance level. Alternatively, the government could offer everyone subsidies toward the private purchase of full insurance to try to induce (optimal) full coverage. These government interventions would have to be financed, however. If the interventions were financed by charging all consumers equally, then the situation would be the same as that with the mandate: careful consumers would be paying more than they would voluntarily choose to pay for the full insurance (now in the form of tax bills rather than insurance premiums). Thus, the government can address adverse selection and improve market efficiency in a number of ways, but they all involve redistribution from the healthy to the sick, which may be quite unpopular.

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12.3 Other Reasons for Government Intervention in Insurance Markets

Adverse selection is the most common but far from the only reason offered for government intervention in insurance markets. Other rationales include the following.

Externalities

A classic case for government intervention in insurance markets is the negative externalities imposed on others through underinsurance. As discussed in [Chapter 1](#), your lack of insurance can be a cause of illness for me, thereby exerting a negative physical externality. Alternatively, if you don't have auto insurance, and you injure me in an auto crash, then my insurer and I bear the cost of my injury, a negative financial externality. Just as the government intervened to solve externalities in [Chapters 5](#) and [6](#), it can do so in insurance markets as well by subsidizing, providing, or mandating insurance coverage.

Administrative Costs

The administrative costs for Medicare, the government-run national insurance program for older adults, are around 2% of claims paid. Administrative costs for private insurance, on the other hand, average about 12.4% of claims paid.⁹ Why does this matter? Return to the case of perfect information, where the insurance company can appropriately price insurance for the careless and careful consumers. As we noted, the insurance company in this case would charge \$150 to the careful consumer and \$1,500 to the careless consumer, and at those prices, all consumers would insure themselves fully against injury. If the insurance company has administrative expenses of 15% of premiums, however, it would have to charge \$172.50 to the careful consumer ($\$150 \times 1.15 = \172.50) and \$1,725 to the careless consumer ($\$1,500 \times 1.15 = \$1,725$) in order to break even. At those higher (actuarially unfair) prices, some not-very-risk-averse consumers may decide against buying insurance. In this way, administrative inefficiencies can lead to market failure because not all people will be fully insured.

Redistribution

With full information, the optimal outcome is for the careless consumer to pay ten times as much for his insurance as the careful consumer. This outcome may not be

very satisfactory to many societies from a distributional point of view. Governments may want to intervene in insurance markets, perhaps by taxing the low-risk individuals and using the revenues to subsidize the premiums paid by high-risk individuals, thereby achieving a more even distribution of insurance costs.

Interestingly, technologies that make private insurance markets work better are also the ones that worsen the redistribution problem. Genetic testing, for example, may ultimately allow insurers to remove many problems of asymmetric information via the testing of individuals to predict their health costs accurately. Such testing has the implication, however, that those who are genetically prone to certain illnesses will pay much higher prices for insurance than those who are genetically healthy. Will modern societies tolerate an insurance market that charges many times more for insurance to individuals who happen to have been born with the wrong genes?

Paternalism

Paternalism is another major motivation for all social insurance programs. Governments may simply feel that individuals will not appropriately insure themselves against risks if the government does not force them to do so. This motivation for intervention has nothing to do with market failures. Instead, it has to do with the failure of individuals to maximize their own utility. Thus, governments may insist on providing social insurance for individuals' own good, even if the individuals would choose not to do so themselves in a well-functioning private insurance market.

APPLICATION

Flood Insurance and the Samaritan's Dilemma



Another social insurance rationale goes by the name of the *samaritan's dilemma*. Compassionate governments find it difficult to ignore individuals who have suffered adverse events, especially when the events are not the fault of the individual. When a disaster hits, the government will transfer resources to help those affected to get back on their feet. Because individuals know that the government will bail them out if things go badly, they will not take precautions against things going badly (leading to the moral hazard problem that we will learn about shortly). As a result, the Good Samaritan government foots the bill for individuals' risky behavior.

Insurance against flood damage to homes is an example of the samaritan's dilemma. There should be, in principle, a well-functioning market for flood insurance: because insurers know as much if not more

than homeowners about the flood risks that each household faces, adverse selection would not be a major concern in this market. Yet, until the late 1960s, few homeowners had flood insurance for their homes, even in the most dangerous, flood-prone areas. Because individuals and businesses knew they would receive federal disaster assistance if they were flooded, there was no reason for them to insure themselves against that eventuality. This government safety net, therefore, encouraged the development of residential communities in areas at high risk for flooding and other natural disasters.

To reduce taxpayer-funded federal expenditures on flood control and disaster assistance and to shift some of the burden onto the beneficiaries themselves, the federal government established the National Flood Insurance Program (NFIP) in 1968.¹⁰ Under the NFIP, the Federal Emergency Management Agency (FEMA) maps areas along floodplains across the United States that are known as special flood hazard areas (SFHAs)—areas with a 1% chance of flooding in any given year. Communities located in SFHAs are given the option of buying flood insurance through the program, but only if they adopt and enforce federal floodplain management regulations. If a community agrees to enroll in the NFIP, the responsibility then falls upon individual homeowners and business owners in the community to assess their own risk and to determine whether or not to buy a flood insurance policy. Most policies are written by major property insurance companies, which collect the premiums and return them, minus the fee paid for their involvement in the program, to the National Flood Insurance Fund. The financial responsibilities of NFIP are met using these premium revenues; in emergency situations, however, the NFIP is also allowed to borrow from the U.S. Treasury.¹¹

Since 1969, FEMA asserts that the NFIP has paid out over \$50 billion in losses that otherwise would have been paid through taxpayer-funded disaster assistance or borne directly by the victims themselves. In addition, they claim that NFIP floodplain management regulations have significantly reduced the frequency and severity of flood-related damages: structures built according to NFIP criteria generally experience 80% less damage, and these building restrictions are estimated to save \$1.2 billion per year.¹²

However, the myriad failures of the NFIP following Hurricane Katrina in 2005 have made it clear that the program has failed to deliver on many of its original goals. In the weeks after the hurricane, it was revealed that nearly half of the victims did not have flood insurance. Moreover, the \$25 billion of claims from those who did have flood insurance bankrupted the NFIP, which brings in a mere \$2.2 billion in premiums each year. In the end, FEMA was forced to borrow \$17.5 billion from the Treasury to cover its obligations.¹³

The failures of the NFIP have many sources. First among these is that even within communities who are members of the NFIP, many individuals opt out of paying for insurance.¹⁴ According to Linda Mackey, flood program manager at the Independent Insurance Agents and Brokers Association, "After every catastrophic event, we see more requests to quote flood insurance. Typically, they finally see that they could be at risk and buy coverage only to let it lapse again until the next disaster and they rush to buy it again."¹⁵ This is a classic example of the samaritan's dilemma in practice: If the government is going to continue to help individuals in disasters, and people are not required by law to buy flood insurance, then why buy it? Indeed, the federal government continues to repair coastal infrastructure along hurricane-prone areas, among which are Louisiana, New Jersey, Florida, and Massachusetts.¹⁶

As a result of the failures of this program to meet the needs of the victims of Hurricane Katrina, Congress passed the Flood Insurance Reform and Modernization Act of 2007. This bill forgave the debt that FEMA owed to the Treasury and allowed FEMA to increase flood insurance premiums by up to 25%, including higher premiums in higher risk areas. While this legislation moved government policy in a more sensible direction, the fundamental problem of only partial participation by homeowners

IN A MORE SENSIBLE DIRECTION, THE FUNDAMENTAL PROBLEM OF ONLY PARTIAL PARTICIPATION BY HOMEOWNERS

remains (and could worsen with higher premiums). As [Evans \(2007\)](#) wrote, “so far, Congress has done little more than raise the program’s borrowing limit, essentially handing taxpayers a series of shaky IOU’s.”

In the summer of 2012, Congress passed the Biggert-Waters Flood Act, with bipartisan support. This legislation sought to repair the problems to the NFIP after Hurricane Katrina bankrupted the program and its many flaws were exposed. Homes that were considered to be “repetitive loss properties” (those that flooded repeatedly) saw higher insurance premiums, and a Technical Mapping Advisory Council was formed to more accurately conduct floodplain mapping. Many praised the legislation as a way to shift the burden of costs away from taxpayers to the private market, cut government spending, and accurately assess the costs of climate change and rising sea levels. Others were concerned, however, by the rise in flood insurance premiums, which would disadvantage homeowners in targeted areas and might cause them to avoid purchase altogether. As a result, the Homeowners Flood Insurance Affordability Act (HFIAA) was passed by Congress less than two years later in March 2014. This law repealed various aspects of the Biggert-Waters Flood Act. It lowered some previous rate increases, while providing a refund from the repealed ones. Rates may still go up, but incrementally as opposed to immediate full increases.

The ongoing problems with our flood insurance program were manifested in the wake of Hurricane Harvey, which hit Houston and southeast Texas in 2017, causing \$125 billion in damage—often to properties at obvious risk of flooding. Indeed, in one zip code alone, consisting of 71 homes, at least 5 floods since 2001 have cost FEMA more than \$12 million.¹⁷ Proposals to address this problem have ranged from introducing more competition into flood insurance markets, to government buy-back of properties in flood prone areas.¹⁸

Clearly, the debate over flood insurance is far from over and will continue to revolve around the goals of protecting the federal costs of flood bailouts against the high costs that would be imposed in flood plain areas with fairly priced insurance. ■

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12.4 Social Insurance Versus Self-Insurance: How Much Consumption Smoothing?

The arguments just presented suggest a number of reasons private insurance markets may not make it possible for a risk-averse individual to satisfy his or her desire for consumption smoothing. Yet they do not suggest that consumption smoothing is completely unavailable because individuals may have other private means to smooth consumption: their own savings, the labor supply of family members, using credit or borrowing from friends, and so on. The justification for social insurance depends on the extent to which social insurance is necessary, given consumers' use of private forms of consumption smoothing. For ease of exposition, we call these other forms of consumption smoothing **self-insurance**, although most of these forms are not actually insurance. If people have extensive self-insurance against adverse risk, the benefits of social insurance will be reduced.

self-insurance

The private means of smoothing consumption over adverse events, such as through one's own savings, the labor supply of family members, using credit, or borrowing from friends.

Example: Unemployment Insurance

To better understand how self-insurance might work, let's consider the case of unemployment insurance (UI), which provides income to workers who have lost their jobs. Individuals do not generally have a private form of unemployment insurance upon which they can draw, but they do have other potential means to smooth their consumption (self-insurance) across unemployment spells:

- They can draw on their own savings.
- They can borrow, either in *collateralized* forms (such as borrowing against the equity they have in their homes) or in *uncollateralized* forms (e.g., on their credit card).
- Other family members can increase their labor earnings.
- They can receive transfers from their extended family, friends, or charitable organizations.

The importance of social insurance programs as a source of consumption smoothing depends on the availability of self-insurance. If there is no self-insurance, then social insurance will provide an important source of consumption smoothing. Once

we allow for private forms of consumption smoothing through self-insurance, we have a problem similar to that raised in [Chapter 7](#) in the context of public goods: public intervention (social insurance) can crowd out private provision (self-insurance). If social insurance simply crowds out self-insurance, there may be no net consumption-smoothing gain to social insurance. Given that there is an efficiency cost to raising government revenues (see [Chapter 20](#)), government insurance market interventions that do not provide consumption-smoothing gains (that simply crowd out private sources of support) are harder to justify.

For example, imagine three different scenarios for someone who loses their job. At one extreme, they have no self-insurance when they lose their job—no savings, no credit cards, and no friends to loan them money. With no unemployment insurance, this person's consumption will drop to zero. Each dollar of unemployment insurance raises their consumption by \$1. In this case, UI plays a full consumption-smoothing role: there is no crowd-out of self-insurance (because there is no self-insurance); each dollar of UI goes directly to reducing the decline in consumption from unemployment.

At the other extreme is someone who has complete self-insurance. There might be, for example, a private unemployment insurance product sold at an actuarially fair price, or the unemployed worker might have rich parents who would happily lend them as much money as they needed. We know from the insurance theory explained earlier in the chapter that individuals, in the absence of government intervention, will choose full insurance if it is available. This implies that the individual will choose to fully smooth their consumption when they become unemployed, either from private sources if there is no public insurance or from public insurance if it is available. In this case, even with a zero replacement rate (no UI), the unemployed worker's consumption does not fall at all when they become unemployed; self-insurance allows them to fully maintain their desired consumption. Each dollar of additional UI would not change consumption smoothing because it is already at its desired level. (At any level of UI generosity, the change in consumption is always zero.) Rather, the only effect of increases in UI benefits is a reduction in the extent to which the individual purchases private insurance or borrows from their parents. In this situation, UI plays no consumption-smoothing role and plays only a crowd-out role: each dollar of UI simply means that there is one less dollar of self-insurance.

This example, while hypothetical, is not implausible. My wife's aunt worked for a large midwestern manufacturing company that closed its operations every summer

but essentially promised to hire its workers back the following fall. During the year, she saved for this event out of her earnings and was pleased to spend her summers as a state champion softball pitcher! As UI generosity increased over time in her state, she simply saved less, maintaining her desired level of consumption smoothing. UI did nothing to help her smooth her consumption; it only reduced (crowded out) the amount of saving that she needed to do during the year to ensure constant consumption throughout the year.

Finally, consider a third individual who has “imperfect” or “partial” self-insurance. For example, they can borrow money, but only at a higher interest rate, or they have parents who will loan them money, but the more money they borrow, the more guilty their parents will make them feel. In the absence of UI, this person will only use some of their self-insurance because it is imperfect. Thus, they will be able to smooth consumption to some extent, but not fully (as they would with perfect self-insurance), because this self-insurance is costly. In this case, what happens as UI increases? The unemployed worker would use part of each dollar of UI to increase consumption smoothing. But part of each dollar would be used to reduce this imperfect self-insurance. There will be crowd-out of self-insurance, but only partial. The mix between using the next dollar of UI to smooth consumption, versus reducing self-insurance, will depend on the relative value of consumption versus the cost of self-insurance.

To summarize, the effect of UI on both consumption smoothing and crowd-out depends on the extent of self-insurance. If there is no self-insurance, UI plays a 100% consumption-smoothing role: each dollar of UI translates directly into a dollar of consumption. Likewise, with no self-insurance, UI does no crowding out, because there is nothing to be crowded out by the government program. As self-insurance grows, the amount of consumption smoothing provided by UI falls, because individuals have self-insurance they can rely on instead.

Thus, the availability of self-insurance determines the value of social insurance to individuals suffering adverse events. If self-insurance is incomplete or very costly, then social insurance is valuable, providing extensive consumption smoothing. If self-insurance is nearly complete and not very costly, then social insurance is less valuable, because it serves to crowd out that self-insurance.¹⁹

Lessons for Consumption-Smoothing Role of Social Insurance

While the example we used was specific to unemployment insurance, the lessons are general for all of the social insurance programs we look at in the next few chapters. For example, as we discuss in [Chapter 13](#), an important source of self-insurance for retirement is one's own savings. To what extent does the Social Security program, which provides retirement income, simply crowd out savings that individuals would do on their own for retirement, and to what extent does it provide consumption smoothing across the years between working and retirement? We deal with these specific issues in the next chapter.

In general, the importance of social insurance for consumption smoothing will depend on two factors:

- *Predictability of the event:* Social insurance plays a smaller consumption-smoothing role for predictable events because individuals can prepare themselves for predictable events through other channels (such as savings). Thus, the benefits of social insurance are highest when events are not predictable.
- *Cost of the event:* Savings and borrowing are possible channels of consumption smoothing for a few weeks of unemployment, but may be much less feasible when a person is out of work for years due to a long-term or permanent disability. Thus, the benefits of social insurance are highest when events are most costly.

Understanding the extent of consumption smoothing provided by any social insurance program is important for evaluating the central trade-off mentioned in the introduction to this chapter. The benefits of social insurance are measured by the amount of consumption smoothing provided by the program. Next, we turn to measuring the costs.

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12.5 The Problem with Insurance: Moral Hazard

When we discussed externalities in [Chapter 5](#), the analysis was straightforward: there was a failure in the market and, in principle, the government could achieve efficiency by forcing the relevant actors to internalize the external costs (or benefits) that they were imposing. When governments intervene in insurance markets, however, the analysis is one step more complicated because of another asymmetric information problem called **moral hazard**, which is the adverse behavior that is encouraged by insuring against an adverse event. Moral hazard is a central feature of insurance markets: if a driver has collision insurance, they might drive more recklessly; if individuals have health insurance, they may be less likely to take precautions against getting ill; if workers have unemployment insurance, they may be less likely to search hard for a new job; and if a student has insurance on their new iPhone, they may be less inclined to bother with a protective case. As Shakespeare wrote in Act III, Scene 5 of *Timon of Athens*, “Nothing emboldens sin so much as mercy.”

moral hazard

Adverse actions taken by individuals or producers in response to insurance against adverse outcomes.

The existence of moral hazard means that it may not be optimal for the government to provide the full insurance that is demanded by risk-averse consumers. Consider the example of workers' compensation insurance, a \$63 billion program that insures workers against injury on the job (discussed in detail in [Chapter 14](#)).²⁰ Clearly, getting injured on the job is a bad thing, and individuals would like to insure against it. There is a big problem with workers' compensation insurance, however: it is difficult to determine whether individuals are really injured and whether their injuries occurred as a result of their work. Many injuries are impossible to diagnose precisely, particularly chronic problems like back pain or repetitive stress injuries, and it is hard to tell whether injuries, particularly chronic injuries, have occurred on the job or are the result of leisure time activities, like sports and exercise.

The difficulty of assessing injuries is a problem because it can be quite attractive to qualify for the workers' compensation program. Workers' compensation benefits include payment of the medical costs of treating an injury and cash compensation for lost wages, which can amount to two-thirds or more of a worker's pre-injury wages. Recall that in standard economic models we assume that leisure is a normal good and that, all else equal, individuals would rather be home than at work. If you

can claim that you have an on-the-job injury, even if you really don't, you can stay home from work and continue to take home two-thirds of what you earned when working. Thus, the existence of this program may actually encourage individuals to feign an injury or fraudulently claim that an injury or condition is job-related.

By trying to insure against an adverse event (true injury), the insurer may encourage individuals to pretend that the adverse event has happened to them when it actually hasn't. This scenario is a primary example of moral hazard. Imagine how bad this problem would be if, as in the Social Security systems of some European countries we study in the next chapter, you actually receive as much (or more) money from staying home than you do from working!

APPLICATION

The Problems with Assessing Workers' Compensation Injuries



Excellent examples of the difficulties in assessing whether a worker is truly injured come from stories of workers who are collecting workers' compensation when they are clearly not injured:

- Paul Hebert began collecting workers' compensation in 2010. A third-generation tuna fisherman, he filed for Social Security, claiming that he could not work at any job due to physical disability and that he lived alone and had no financial resources. But two years later, Hebert began starring in National Geographic's reality TV show *Wicked Tuna*, captaining his boat and reeling, spearing, and lifting bluefin tuna (which can weigh up to 2,000 pounds!). In July 2015, he was indicted on four counts of fraud, allegedly having accepted more than \$44,000 in Social Security payments between 2010 and 2014.
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12.6 Putting It All Together: Optimal Social Insurance

There are four basic lessons from the discussion in this chapter. First, individuals value insurance because they would ideally like to smooth their consumption across states of the world. That is, they would like to have the same consumption whether or not an adverse event such as unemployment or injury befalls them. Second, there are a number of reasons the market may fail to provide such insurance, most notably adverse selection. Third, even if the market fails to provide such insurance, the justification for social insurance depends on whether other private consumption-smoothing mechanisms are available. The key question is the extent to which the social insurance provides new consumption smoothing versus just crowding out existing self-insurance. Fourth, expanding insurance coverage has a moral hazard cost in terms of encouraging adverse behavior.

These lessons have a clear policy implication: optimal social insurance systems should partially, but not completely, insure individuals against adverse events. As with all government policies in this book, the appropriate role for the government in providing social insurance reflects the trade-off between the benefits and costs of such intervention. The benefit of social insurance is the amount of consumption smoothing provided by social insurance programs. If individuals become injured on the job and the government smooths their consumption by insuring that injury, social efficiency rises because a market failure has been fixed. If, on the other hand, people are fully self-insured and the government provides no consumption smoothing with social insurance, there is less benefit to the intervention (although perhaps some benefit if self-insurance was itself inefficient).

The cost of social insurance is the moral hazard caused by insuring against adverse events. If individuals join a workers' compensation program even when they are not in fact injured, social efficiency falls for two reasons. First, these individuals are not employed, so social product is smaller than is efficient. Second, the government must raise more tax revenues to pay for their workers' compensation benefits, and higher taxes also lower social efficiency.

Thus, higher social insurance improves social efficiency by fixing a market failure but reduces social efficiency by reducing production and raising taxes. As with most

trade-offs in economics, the resolution of this full insurance–adverse behavior trade-off will generally be somewhere in the middle, optimally providing some insurance against adverse events, but not full insurance.

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12.7 Conclusion

Asymmetric information in insurance markets has two important implications. First, it can cause *adverse selection*, which makes it difficult for insurance markets to provide actuarially fair insurance to those who would demand it if it were available to them. Second, it can cause *moral hazard*, whereby the provision of insurance encourages adverse behavior in those purchasing the insurance. The ironic feature of asymmetric information, therefore, is that it simultaneously motivates *and* undercuts the rationale for government intervention through social insurance.

In the remainder of this section of the book, we investigate the role of the government in insuring several major life events: unemployment, on-the-job injury, career-ending disability, retirement, and illness. In each case, we see that there is a trade-off between the benefits of completing imperfect insurance markets and the costs of encouraging adverse behavior. The extent of this trade-off will vary with the nature of the adverse events being insured. The purpose of these chapters will be to assess how the extensive literature on these social programs can inform policy makers of appropriate reforms to the programs.

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HIGHLIGHTS

- The largest and fastest-growing function of the government is the provision of social insurance against adverse events such as retirement, unemployment, injury, or illness. Social insurance programs are mandatory, contribution-based systems that tie the payout of benefits to the occurrence of a measurable event.
- Insurance is demanded because it allows individuals to smooth their consumption across various states of the world; with actuarially fair premiums, the optimal outcome is for individuals to insure themselves fully against adverse events.
- The major motivation for government-provided social insurance is the failure in private insurance markets caused by adverse selection. Adverse selection causes insurance markets to fail because imperfect information leads insurers to be unable to offer full insurance to different types of consumers.
- Other motivations for social insurance include externalities, administrative inefficiencies in the private insurance market, the desire for redistribution, and paternalism.
- The consumption-smoothing benefits of social insurance are determined by the ability of individuals to use other forms of self-insurance to smooth their consumption.
- Moral hazard is an offsetting cost to the benefits of social insurance. By insuring individuals against adverse events, we may increase the incidence of these events among the insured.
- Full insurance is unlikely to be optimal: the optimal social insurance benefit level trades off moral hazard costs against consumption-smoothing benefits.

QUESTIONS AND PROBLEMS

1. A number of websites, such as <https://www.fidelity.com/life-insurance/term-life-insurance/overview>, offer instant quotes for term life insurance. Use one such website to compare monthly premiums for a \$1 million, 20-year, term life insurance policy for a 45-year-old man and a 45-year-old woman. Assume each is in excellent health and does not use tobacco. Explain the difference in quotes for the man and the woman. Suppose that the U.S. government were to pass a nondiscrimination law requiring insurers to offer the same prices for men and women. What

- effect would you expect this law to have on prices and insurance coverage?
2. What is consumption smoothing? How does insurance help people smooth consumption?
 3. Suppose that you have a job paying \$50,000 per year. With a 5% probability, next year your wage will be reduced to \$20,000 for the year.
 - a. What is your expected income next year?
 - b. Suppose that you could insure yourself against the risk of reduced consumption next year. What would the actuarially fair insurance premium be?
 4. Small companies typically find it more expensive, on a per-employee basis, to buy health insurance for their workers, as compared with larger companies. Similarly, it is usually less expensive to obtain health insurance through an employer-provided plan than purchasing it directly from an insurance company—even if your employer requires you to pay the entire premium. Use the ideas from this chapter to explain these observations.
 5. The problem of adverse selection in insurance markets means that it is generally a bad deal for companies to offer insurance at the same price for all potential customers. Why then do we observe some insurance companies (such as those selling “trip insurance” that refunds money to people who purchase trips that they are unable to take) doing exactly this?
 6. Why might government provision of insurance lead to a larger number of insurance claims than private provision of insurance would?
 7. Why does the government mandate individuals to purchase their own insurance in some cases—such as automobile liability insurance—but directly provide insurance to people in other situations—such as health insurance?
 8. Your professor is paid only nine months out of the year (really!!). Suppose that they were fired each spring and rehired each fall, and thereby was eligible for unemployment insurance benefits. (After all, all those students going away for the summer creates economic hardship for your university!) Do you think that would affect their consumption smoothing over the year, relative to what they do right now, when they are not fired annually? Explain your answer.
 9. Currently, in order to receive workers' compensation, a claimant's injury claims must be verified by a physician of the claimant's choosing. Suppose that the workers' compensation policy changed so that only government-

assigned physicians could verify injury claims. What is likely to happen to the rate of reported on-the-job injury? Explain.

10. Describe the dimensions along which moral hazard can exist. Can you think of ways in which the government can reduce the prevalence of moral hazard along each dimension?

ADVANCED QUESTIONS

11. **E** Suppose you think that less-educated families are less able to smooth consumption in the absence of unemployment insurance than are more-educated families. How would you empirically test this supposition? What types of data would you want to use?
12. There are two types of drivers on the road today. Speed Racers have a 5% chance of causing an accident per year, while Low Riders have a 1% chance of causing an accident per year. There are twice as many Speed Racers as there are Low Riders. The cost of an accident is \$12,000.
- Suppose an insurance company knows with certainty each driver's type. What premium would the insurance company charge each type of driver?
 - Now suppose that there is asymmetric information, so the insurance company does not know with certainty each driver's type. Would insurance be sold if:
 - Drivers self-reported their types to the insurance company?
 - No information at all is known about individual driver's types?

If you are uncertain whether insurance would be sold, explain why.

13. Your utility function is $U = \sqrt{C}$, where C is the amount of consumption that you have in any given period. Your income is \$40,000 per year, and there is a 2% chance that you will be involved in a catastrophic accident that will cost you \$30,000 next year.
- What is your expected utility?
 - Calculate an actuarially fair insurance premium. What would your expected utility be were you to purchase the actuarially fair insurance premium?
 - What is the most that you would be willing to pay for insurance, given your utility function?
14. Hayden has utility of $U = \log(C)$, while Pat has utility of $U = \sqrt{C}$. Which person is more risk averse? Which person would pay the higher insurance

premium to smooth consumption?

15. Chimnesia has two equal-sized groups of people: smokers and nonsmokers. Both types of people have utility $U = \sqrt{C}$, where C is the amount of consumption that people have in any period. So long as they are healthy, individuals will consume their entire income of \$16,000. If they need medical attention (and have no insurance), they will have to spend \$12,000 to get healthy again, leaving them with only \$4,000 to consume. Smokers have a 10% chance of requiring major medical attention, while nonsmokers have a 2% chance.

Insurance companies in Chimnesia can sell two types of policies. The “low-deductible” (L-) policy covers all medical costs above \$2,000, while the “high-deductible” (H-) policy covers only medical costs above \$10,000.

- What is the actuarially fair premium for each type of policy and for each group?
- If insurance companies can tell who is a smoker and who is a nonsmoker and charge the actuarially fair premiums for each policy and group, show that both groups will purchase the L-policy.

Suppose that smoking status represents *asymmetric information*: each individual knows if they are a smoker, but the insurance company does not.

- Explain why it is impossible, at any price, for both groups to purchase L-policies in this setting. Which groups, if any, do you expect to buy L-policies, and at what price?
- Show that it is possible for both groups to purchase insurance, with one group buying L-policies and one group buying H-policies.

- 16.

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APPENDIX TO CHAPTER 12: Mathematical Models of Expected Utility



James Andrew/SYGMA/Getty Images

This appendix presents the mathematical model of expected utility that underlies the discussion in [Chapter 12](#). This model illustrates the consequences of adverse selection in insurance markets.

Expected Utility Model

The model is described by the following parameters:

- You are hit by the car with some probability p .
- Your income is W , regardless of whether you get hit or not.
- However, if you get hit, you incur medical costs δ .
- You can buy insurance, with premium m per dollar of insurance.
- That insurance will pay you b if you are hit by the car.

In this case, we can write your expected utility (EU) as follows:

$$EU = (1 - p) \times U(W - mb) + p \times U(W - \delta - mb + b)$$

The problem with this expression is that we have one equation, with two unknowns (m and b). To solve this equation, we need to add one more condition: that insurance is priced in an actuarially fair manner, so that insurance companies make zero expected profits (we assume, for now, zero administrative costs). In that case, the zero expected profit ($E\pi$) condition for the insurer is

$$E\pi = m \times b - p \times b = 0$$

The expected profit of the insurer, which equals premiums received minus expected benefits paid out, equals zero. This, in turn, implies that the premium equals

$$m = p$$

That is, if the risk is 10%, then $m = 10\text{¢}$ per dollar of insurance. We can now go back and maximize expected utility by plugging in b from this equation. As in the example in the text, we assume that utility is of the form $U = \sqrt{C}$. So

$$\text{Maximize } EU = (1 - p) \times \sqrt{(W - b \times p)} + p \times \sqrt{(W - \delta - bp + b)}$$

Maximizing this equation with respect to b , we obtain

$$-(1 - p) \times p / \sqrt{(W - bp)} + p \times (1 - p) / \sqrt{(W - \delta - bp + b)}$$

Setting this equal to zero and solving for the optimal level of insurance benefits (b^*), we get $b^* = \delta$. That is, individuals should buy enough insurance so that if they have the adverse outcome, their benefits exactly offset their costs: individuals should buy *full insurance* to smooth their consumption across states. Another way to see this is to plug the optimal benefit level ($b^* = \delta$) back into the utility function:

$$\begin{aligned} EU &= p\sqrt{(W - p\delta)} + (1 - p)\sqrt{(W - \delta - p\delta + \delta)} \\ &= p\sqrt{(W - p\delta)} + (1 - p)\sqrt{(W - p\delta)} \end{aligned}$$

That is, we obtain the result that *consumption is equalized* (at $W - p\delta$) in both states of the world. This result motivates the key conclusion of this chapter: facing actuarially fair insurance markets, individuals will want to insure themselves fully against risk.

Adverse Selection

To understand more formally the implications of adverse selection, we now consider two groups, the careful and the careless, where the probability of accident for the careful is p_c , and the probability of accident for the careless is $p_a > p_c$.

As discussed in this chapter, if there is full information, then the insurance company charges prices such that $m_a = b \times p_a$ for the careless, and $m_c = b \times p_c$ for the careful. The former premium is higher, since $p_a > p_c$; those who are more likely to have an accident have to pay more for insurance.

But if there isn't full information, so that insurance companies know only the proportions of types in the population, then there are two possible pricing strategies. One is to assume that individuals are honest and charge them according to their reported types. As discussed in the chapter, however, this strategy will lead all individuals to claim that they are careful. In this world, the profits earned on the careful are: $E\pi = m_c - b \times p_c = b \times p_c - b \times p_c = 0$; that is, the insurance company breaks even on the share of the population that is careful. However, the profits earned on the careless are $E\pi = m_c - b \times p_a = b \times p_c - b \times p_a < 0$, since $p_a > p_c$ profits are negative overall and insurance is not offered.

The other strategy considered in this chapter was to offer insurance at an average price, m_v , that is based on the average of the accident probabilities $p_a > p_v > p_c$. At this price, insurance is a good deal for the careless but a bad deal for the careful and may be bought only by the careless. In that case, the expected profits of the insurer are again negative:

$$E\pi = m_v - b \times p_a = b \times p_v - b \times p_a < 0, \text{ since } p_a > p_v$$

It is possible, however, that the careful still would buy full insurance (the pooling equilibrium). For example, they would buy insurance if expected utility with insurance (at the unfair price) is still higher than expected utility without insurance; that is, if

$$\begin{aligned} EU(\text{with insurance}) &= (1 - p_c) \times U(W - p_v\delta) + p_c \times U(W - p_v\delta) > \\ EU(\text{no insurance}) &= (1 - p_c) \times U(W) + p_c \times U(W - \delta) \end{aligned}$$

Whether this inequality holds or not will depend on two things: the extent of risk aversion of the careful individuals and the relationship between p_c and p_a . If the careful individuals are more risk averse, they will be more willing to buy insurance (even at an unfair premium) to guard against the odds of being left with low consumption. And the closer the average risk is to the risk faced by the careful, the

closer the premium is to being actuarially fair, and the more likely it is that the careful individuals will buy the insurance.

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CHAPTER 13

Social Security



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13.1 What Is Social Security, and How Does It Work?

13.2 Consumption-Smoothing Benefits of Social Security

13.3 Social Security and Retirement

13.4 Social Security Reform

13.5 Conclusion

Questions to keep in mind

- How does Social Security work, and how does it end up redistributing income across society?
 - What effect does Social Security have on consumption smoothing and early retirement?
 - How might we reform Social Security to address its budget shortfall?
-

Over the next several decades, the aging of the huge “baby boom” cohort that was born in the United States in the wake of World War II will lead to a large rise in the number of retired older adults relative to the number of workers. That demographic shift has serious ramifications for the federal government’s **Social Security** program, which taxes workers to provide income support to people aged 62 or older. Because there will be more older adults to be supported by fewer workers, the Social Security program faces a stark financing problem: over the next 75 years, the program has promised \$19.8 trillion more in benefit payments than it plans to collect in taxes from workers.¹

A federal program that taxes workers to provide income support to the elderly.

Concerns about the program were highlighted during the 2016 Republican presidential primaries. At one debate, Senator Ted Cruz called the Social Security program “irresponsible,” claiming that it was “careening towards insolvency.” Similarly, Senator Marco Rubio criticized the current structure of the program, saying that in its current state, Social Security would “go bankrupt” and would “bankrupt the country with it.” Both candidates proposed limiting benefits for younger workers by raising the retirement age, reducing the growth of benefits to match inflation, and allowing workers to put Social Security taxes into personal savings accounts.² Candidate Donald Trump stood in stark contrast to Senators Cruz and Rubio, declaring that he would “do everything in [his] power not to touch Social Security.” Trump opposed raising the retirement age and cutting benefits and instead proposed relying on a stronger economy to remove the need for Social Security reform, claiming that he would “make our country rich again so we can afford [Social Security].”³ Whether or not the eventual winner of the debate and the 2016 presidential race increased the country’s wealth may be up for debate, but he did keep his word not to make changes to the existing program.

Five years later, President Joe Biden’s proposed plan for Social Security reform involved *increasing*, rather than reducing, Social Security benefits. Biden proposed guaranteeing a minimum benefit amount equal to 125% of the poverty line for eligible workers and increasing monthly benefits by 20% for widows and widowers. To offset these increased costs, Biden’s proposal would apply the Social Security payroll tax (the main source of funding for Social Security, and currently only applied to earnings up to \$142,800 annually) to earnings above \$400,000, with plans to eventually expand this tax to also include earnings between \$142,800 and \$400,000.⁴

This ongoing debate highlights the challenges facing potential reforms to Social Security, our nation’s largest social insurance program. On the one hand, Social Security is the largest single source of income for the elderly population in the United States. Roughly half of beneficiaries derive more than 50% of their income from Social Security, and almost a quarter of all recipients rely on it for at least 90% of their income.⁵ Any reform that is perceived as reducing the generosity of this program is therefore subject to withering political attack. On the other hand, the program faces a long run shortfall in financing that, if not addressed through cutting benefits, will likely require a raise in taxes that is also politically unpopular.

In this chapter, we use the tools from [Chapter 12](#) to analyze the costs and benefits of this key social insurance program. We begin with a review of the institutional features of Social Security and then turn to a discussion of why the government would want to intervene to provide income security to older adults. Following our discussion in the previous chapter, we then discuss the ability of individuals to self-insure through savings against income loss in retirement and the extent to which Social Security crowds out that self-insurance. We then examine the cost of providing such income security, and the possibility that it might encourage adverse behavior in terms of early retirement, and review the theory of and evidence for this moral hazard. Finally, we look at possible reforms for Social Security, including options that propose changes to the existing program and options that change the nature of the program itself.



"Forget about me—save Social Security."

"Forget about me—save Social Security."

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13.1 What Is Social Security, and How Does It Work?

In this section, we discuss the basic structure of Social Security.⁶ This program began in 1935, at the height of the Great Depression, during which asset values had plunged, wiping out the lifetime savings of many older adults. One major motivation for the establishment of Social Security was to provide a means of income support for this unfortunate generation.

The basic operation of the program is straightforward. Workers pay a tax on their earnings, and the money from this tax is deposited into a trust fund that is invested in government bonds. Checks written on this trust fund are paid to those who enroll in the Social Security program, which is open to most people over age 62. Checks are paid until the recipient dies, and, if there is a surviving spouse, they receive a payment until their own death.

Program Details

There are a variety of details on how the Social Security program operates in practice. Descriptions of some of the most important details follow. Note that all numbers and eligibility requirements described in this section reflect the Social Security program in place in 2021⁷.

How Is Social Security Financed?

Almost all workers in the United States pay the Federal Insurance Contributions Act (FICA) tax on their earnings. This tax is currently 6.2%. In addition, their employers (or the workers themselves, if they are self-employed) pay a 6.2% tax on these same earnings, for a total tax burden of 12.4%. This tax is levied only on the first \$142,800 of earnings.

Who Is Eligible to Receive Social Security?

To be eligible to collect Social Security benefits, a person must have worked and paid this payroll tax for 40 quarters over their lifetime (the equivalent of 10 years) and must be age 62 or older.

How Are Social Security Benefits Calculated?

When eligible, the Social Security claimant receives an **annuity payment**, that is, a payment that lasts until the recipient's death. The amount of this annuity payment is a function of the recipient's average lifetime earnings, where each month's earnings are expressed in today's dollars by inflating their value for increases in the wage level since the earnings occurred. In particular, the government averages a person's earnings over the person's 35 highest earning years. If a person has worked for fewer than 35 years—say, for 30 years—the formula just treats those missing years as years of zero earnings, so the benefit would be based on averaging 30 years of earnings and 5 years of zeros. If a person has worked for more than 35 years, the lowest earnings years are thrown out when computing the average. This 35-year average of real monthly earnings is called the *Average Indexed Monthly Earnings* or *AIME*. Benefits are then calculated as a *redistributive function of past earnings*, whereby low earnings are more strongly translated to higher benefits than are high earnings. This point is illustrated in [Figure 13-1](#), which shows the formula for translating the AIME into the monthly benefit, also known as the *Primary Insurance Amount (PIA)*. Workers who have an AIME of \$996 or less per month receive \$0.90 in benefits for every dollar of AIME. For \$996 to \$6,002 of AIME, workers receive only \$0.32 in benefits for every dollar of AIME. Beyond an AIME of \$6,002, they receive only an additional \$0.15 in benefits for each dollar of AIME. The result of these two criteria is that (1) workers who earn more get higher benefits, but (2) benefits do not rise nearly as fast as earnings. This is what is meant by a *redistributive function of past earnings*: past earnings are translated to increased benefits at a slower rate as earnings rise.

annuity payment

A payment that lasts until the recipient's death.

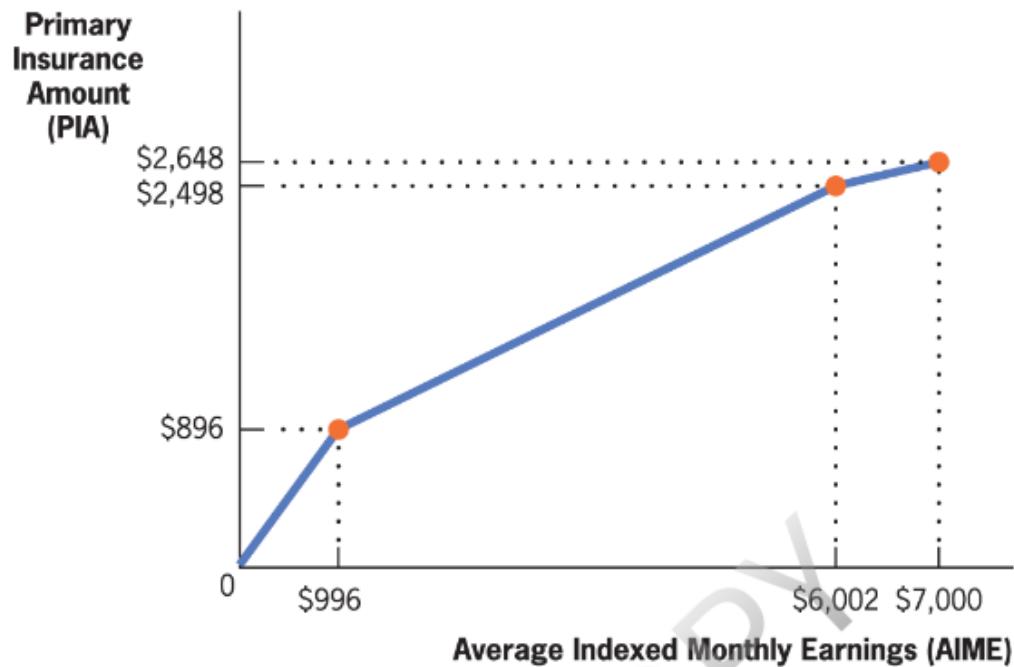


FIGURE 13-1 Social Security Benefits as a Function of Earnings • Social Security's Primary Insurance Amount (PIA) is a redistributive function of Average Indexed Monthly Earnings (AIME). Figures in bold show the benefits increment per dollar of AIME in that range of AIME. For example, if your AIME is between \$996 and \$6,002, you receive \$0.32 in additional benefits for each additional dollar of AIME.

Data from: [Social Security Administration \(2021\)](#).



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Married couples have more SSW than single people: spouses of workers are automatically entitled to 50% of the workers' benefits, and surviving spouses receive 100% of the workers' benefits. So a married worker who pays Social Security tax is purchasing not only their own benefits but those for a spouse as well, which provides a higher return.

- Single-earner couples have more SSW than two-earner couples: a couple in which only one person has worked gets 150% of the earner's benefit, even though the nonworking spouse has paid no taxes. Both earners of a two-earner couple have to pay taxes on their full earnings, even though they may not get much more in benefits than the single-earner couple.¹⁶
- The gains to low-income people relative to the rich from Social Security are overstated because the length of life rises with income so that the rich generally receive their benefits for more years than the poor. While sizeable, this effect is not large enough to overturn the basic conclusion that the poor gain and the rich lose from the current Social Security system.

13.2 Consumption-Smoothing Benefits of Social Security

The fundamental motivation for Social Security is the notion that older adults will not have sufficient income to support themselves in retirement or to support their dependents when they die. Evidence on this front is reviewed by [Poterba \(2014\)](#), who shows, for example, that for those in the bottom half of the income distribution there is little source of retirement support other than Social Security. As a result, the government needs to force workers to provide for their retirement years by paying taxes when working that entitle them to benefits when retired.

Rationales for Social Security

Given that retirement is an anticipated event that is largely the decision of the individual, why does the government need to be involved in providing retirement income? What is the argument for social insurance when the event is highly predictable?

There are basically two rationales offered for Social Security, along the lines of our discussion in [Chapter 12](#). The first rationale is that there are market failures in the *annuities market*. A pure annuity is a contract whereby a person pays some amount of money up front to an insurance company, and in return, the insurance company pays the person a fixed payment until they die. Annuities should be valued by consumers facing an uncertain date of death because they facilitate the type of consumption smoothing we described in [Chapter 12](#).¹⁷ That is, they allow people facing an uncertain date of death to smooth their consumption over their remaining years, solving the problem of saving too little (and therefore going hungry in old age) or too much (and therefore not fully enjoying their wealth).¹⁸

Yet adverse selection can lead the annuities market to fail. Recall that adverse selection can cause insurance market failure when the insured party has an informational advantage over the insurer. This is clearly the case with annuities because individuals know more about their potential life expectancy than do insurers: they know more about their family's health history (did all their ancestors live to be over 100?) and about outside behaviors they engage in that are likely to result in a particularly short or long life (do they follow a healthy diet and never drive over the speed limit?). The longer a person lives, the less money the insurer makes from an annuity contract. Insurance companies will therefore be reluctant to sell annuities for fear that they will be purchased only by the longest lived

individuals (adverse selection). This reluctance could lead to such a high price for annuities that most potential buyers would not want to buy them.¹⁹ By providing public annuities, Social Security can solve this market failure.²⁰

Although annuities market failure is the classic economic rationale for Social Security, the true reason that most policy makers favor the program is *paternalism*; that is, they are concerned that people won't save enough for their own retirement. A study by [Hurd and Rohwedder \(2012\)](#) used preretirement consumption to assess whether individuals aged 66 to 69 are adequately prepared to maintain their standard of living into retirement. They found that most individuals are adequately prepared, but that a substantial minority is not. For example, 80% of married couples and 89% of college graduates are prepared, but only 55% of singles and 70% of those without a high school diploma are prepared.

Does Social Security Smooth Consumption?

Regardless of the reason, market failure in the annuities market or paternalism, Social Security's existence is motivated by the notion that individuals are not appropriately protected for their retirement consumption. Whether this leads to a failure of consumption smoothing, and thus a need for government intervention, is an open question. On the one hand, once workers retire, they have many years of consumption to finance. On the other hand, retirement is generally a very predictable event for which most workers can readily prepare. So it is not clear how important Social Security is for smoothing consumption across the working life and retirement years. In particular, all that Social Security may be doing is crowding out the savings that individuals would otherwise set aside for their retirement. The important question of the extent to which Social Security provides real insurance, as opposed to just crowding out savings, has been the subject of many studies in two different areas.

Social Security and Private Savings

The major form of self-insurance for retirement is private savings. In a world without Social Security, people would have to rely on their own savings (either as individuals or through firm pension plans) to finance their retirement. Social Security might crowd out that private savings by allowing people to count on a government transfer to support their income in old age. The larger this crowd-out is, the less consumption smoothing Social Security provides for retired individuals.

Existing research suggests that each dollar of Social Security wealth crowds out \$0.30 to \$0.40 of private savings, so that crowd-out exists, but it is partial.

EMPIRICAL EVIDENCE

Measuring the Crowd-Out Effect of Social Security on Savings

The effect of Social Security on private savings has been the subject of a large number of studies over the past 45 years. [Feldstein \(1974\)](#) used a time series analysis of Social Security Wealth and private savings to suggest that Social Security was lowering the private savings rate in the United States by 50%; however, subsequent analyses found flaws in this approach and have produced mixed results. Moreover, this application is a classic example of the difficulties of time series analysis. Movements in national savings over time are driven by a number of factors, of which Social Security is only one. With few distinct changes in Social Security at a particular point in time, it is difficult to tease out any effects on savings from time series alone.

Another approach to modeling the impact of Social Security on savings is cross-sectional regression analysis of the type discussed in [Chapter 3](#). A number of articles have looked at whether people who are entitled to higher Social Security benefits in the future save less today. Such articles typically find some reduction in savings from higher Social Security benefits, although the reduction is much less than one for one.

But recall the key issue raised in [Chapter 3](#): results of empirical analyses can be biased by the inability to find comparable treatment and control groups. To get a valid measure of the impact of Social Security on savings from econometric analysis, there must be a way to compare people with different levels of Social Security benefits who are otherwise identical. Social Security benefits are largely determined by individual characteristics: average lifetime earnings, marital status, age, and retirement age. Thus, any two people with different benefits are also likely to differ along some or all of these dimensions. Because factors such as earnings and age are likely to be correlated with individual tastes for savings, it is difficult to assume that any association between Social Security benefits and savings is due to the program itself.

To answer this question requires some type of quasi-experiment that allows us to compare people with similar characteristics but very different levels of Social Security benefits. Such a quasi-experiment has proven hard to find in the United States because Social Security is a national program that applies to almost all workers; very similar people usually have very similar benefits. However, three studies have provided quasi-experimental evidence on the impact of Social Security-like programs on private savings in Italy, Poland, and the United Kingdom.²¹ Each study focused on reforms to the social security systems that changed the SSW of some types of workers, but not others.

In Italy, for example, reforms in 1992 substantially reduced the benefits, and thus future SSW, for younger workers in the public sector, while reducing much less the benefits of older workers and those in the private sector. This change set up a natural quasi-experimental analysis in which the researchers could assess whether the savings of younger workers in the public sector rose to offset the fall in future SSW. The authors compared the change in savings of young public-sector workers (the treatment group) before and after the reforms to the change in savings of older public-sector and private-sector workers (the control groups) at the same time. This allowed the authors to remove any bias arising from other time series changes in savings (the “difference-in-difference” estimate of

[Chapter 3](#)). According to the authors' estimate, 30 to 40% of the reduction in SSW was offset by higher private savings.

The results of studies from the United Kingdom (which also compared employment groups) and Poland (which compared those born in different years who saw radically different changes in SSW) were similar. That is, social security did crowd out private savings to some extent, but not fully.

This change corresponds closely to the evolution of the Social Security system; the steepest reductions in poverty were during the 1960s and 1970s, when the program grew the fastest. Indeed, [Engelhardt and Gruber \(2006\)](#) analyzed how poverty fell for birth cohorts that particularly benefited from expansion of Social Security, relative to those that did not, and concluded that the expansion of Social Security can explain the entire reduction in poverty among older adults over this period. That Social Security's growth had such a dramatic effect on elderly poverty suggests that individuals were not, in fact, protecting themselves appropriately for their retirement so that there were large consumption-smoothing benefits to the program. Taken together, both pieces of evidence point to only very partial crowd-out of private savings by the Social Security program.

Evidence from Mexico in [Galiani et al. \(2016\)](#) further supports the important consumption smoothing role of Social Security. They studied a cash transfer program to rural elderly in Mexico and found that there was a large increase in consumption expenditures for elders receiving the transfers, with little evidence of anticipatory reductions in self-insurance. And research by [Slavov et al. \(2017\)](#) showed little effect of U.S. changes to Social Security parameters on savings decisions.

Living Standards of Older Adults

The other piece of evidence on Social Security and consumption smoothing comes from examining the living standards of older adults. [Figure 13-2](#) shows the poverty rate of people over 65 from 1959 through 2019. The poverty rate is the percentage of a population whose income is below the poverty level, which is the amount of income required to buy a "minimum acceptable" bundle of food, housing, and other goods (this concept is defined in more detail in [Chapter 17](#)). For a family of four, the poverty level in 2020 was \$26,200. The elderly poverty rate is graphed against the size of the Social Security system, as a share of GDP. In 1959, 35% of the elderly lived in poverty (compared to only 21% of the non-elderly); by 2019, only 8.9% of the elderly were living in poverty (compared to 10.8% of the non-elderly).

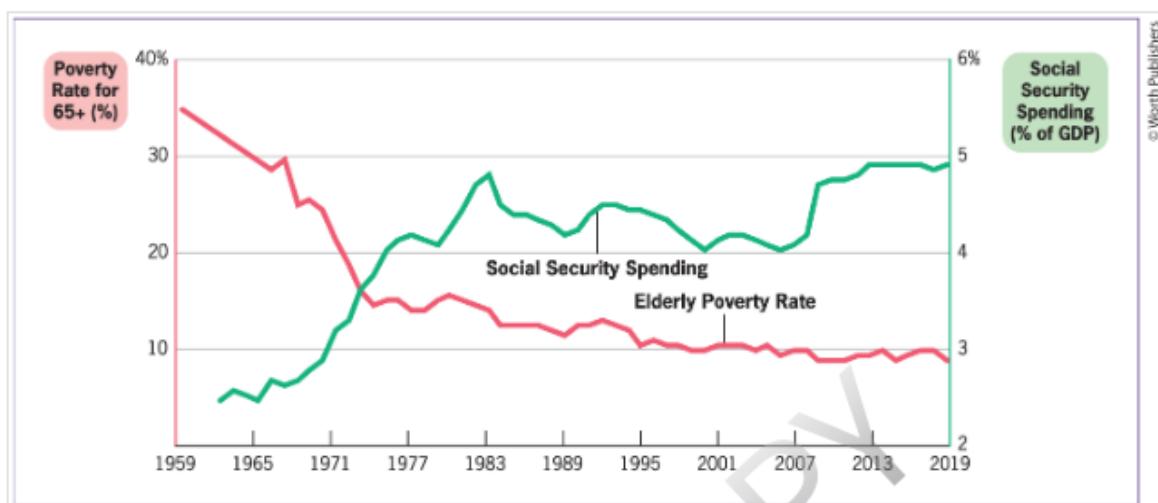


FIGURE 13-2 Elderly Poverty and Social Security, 1959–2019 • There is a striking negative correspondence over time between the poverty rates of adults over 65 (which have fallen) and the size of the Social Security program (which has risen).

Data from: [U.S. Bureau of the Census \(2021\)](#), Table 3, and [Office of Management and Budget \(2021\)](#), Tables 1.2 and 3.2.



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The other piece of evidence on Social Security and consumption smoothing comes from examining the living standards of older adults. [Figure 13-2](#) shows the poverty rate of people over 65 from 1959 through 2019. The poverty rate is the percentage of a population whose income is below the poverty level, which is the amount of income required to buy a “minimum acceptable” bundle of food, housing, and other goods (this concept is defined in more detail in [Chapter 17](#)). For a family of four, the poverty level in 2020 was \$26,200. The elderly poverty rate is graphed against the size of the Social Security system, as a share of GDP. In 1959, 35% of the elderly lived in poverty (compared to only 21% of the non-elderly); by 2019, only 8.9% of the elderly were living in poverty (compared to 10.8% of the non-elderly).

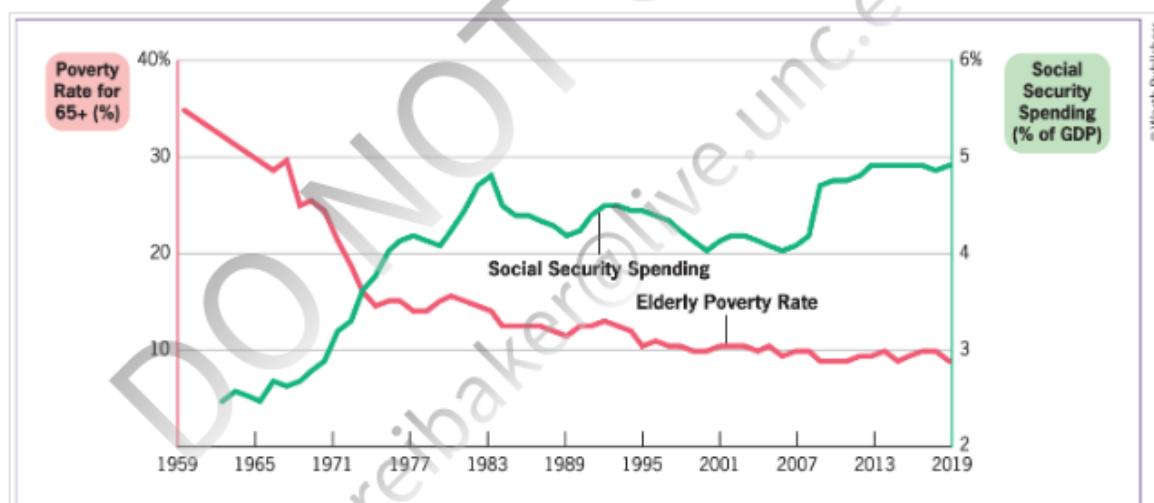


FIGURE 13-2 Elderly Poverty and Social Security, 1959–2019 • There is a striking negative correspondence over time between the poverty rates of adults over 65 (which have fallen) and the size of the Social Security program (which has risen).

Data from: [U.S. Bureau of the Census \(2021\)](#), Table 3, and [Office of Management and Budget \(2021\)](#), Tables 1.2 and 3.2.



13.3 Social Security and Retirement

The fundamental goal of Social Security is to insure against the adverse events of dying or being too old to work by providing income support to those who are retired or to the survivors of deceased workers. This goal leads to a natural moral hazard problem: workers may retire early to start collecting their benefits. As noted earlier, there is no need to retire at an early age to start collecting benefits in the United States: you can keep working, have your benefits reduced by the earnings test, and receive those benefits back (with actuarial adjustment) when you do fully retire. Yet almost all people (wrongly) perceive the earnings test as a tax on their earnings and feel that benefits collection must be associated with full retirement. Thus, as with the moral hazard examples discussed in [Chapter 12](#), insuring against the adverse event of retirement may encourage that adverse event, which lowers social efficiency and raises program costs (and associated taxes).

Theory

In theory, there are two effects of Social Security on retirement decisions. The first is the *implicit taxation* that Social Security may levy on work at older ages by reducing the value of Social Security benefits if retirement is delayed. [Gruber and Wise \(1999\)](#) define the implicit tax rate from Social Security as the reduction in SSW (the expected present discounted value of Social Security benefits received minus the expected present discounted benefits of taxes paid) if one continues working another year relative to the wage that could be earned by working that year. The numerator for this variable is calculated by computing the SSW at a possible age of retirement and then measuring how it changes if the person works another year. Consider, for example, a 62-year-old worker. If this individual works until 63, instead of retiring at 62 and claiming their Social Security benefit, four things happen through the Social Security system:

- The worker pays an extra year of payroll taxes on their earnings.
- The worker receives one year less of Social Security benefits.
- The worker gets a higher Social Security benefit level through the actuarial adjustment.
- Earnings generally rise with age, so the worker gets to replace a low-earnings year with a high-earnings year in the 35-year benefits average.

The first two factors reduce the return to working that extra year, and the second two increase the return. If the first two factors dominate (as we will show in the next section to be the case in most countries), there will be an implicit tax on work and

thus more retirement. The system designed to protect individuals from income loss in retirement will actually be inducing them to retire.

The second effect of Social Security on retirement is through the redistribution discussed earlier. This system results in some groups becoming richer over their life and others becoming poorer. These changes in wealth will have income effects on retirement as the groups that are richer use some of their wealth to buy themselves more retirement and the groups that are poorer work longer.

Evidence

Three types of evidence suggest that Social Security is a powerful determinant of retirement decisions. The first piece of evidence is time series evidence, as illustrated in [Figure 13-3](#). The Social Security program grew rapidly through the 1960s and 1970s, with a corresponding reduction in elderly labor force participation (LFP) rates, the percentage of the elderly population that is either working or looking for work. Then, when program growth flattened out in the mid-1980s, LFP flattened out as well (although with a several year lag). On its own, however, this evidence is not fully convincing because many other factors were changing over this period, and these other factors could explain the changes in elderly LFP. Moreover, in the most recent years, both Social Security spending and LFP are rising for older adults, highlighting the difficulty of interpreting this kind of time series evidence.

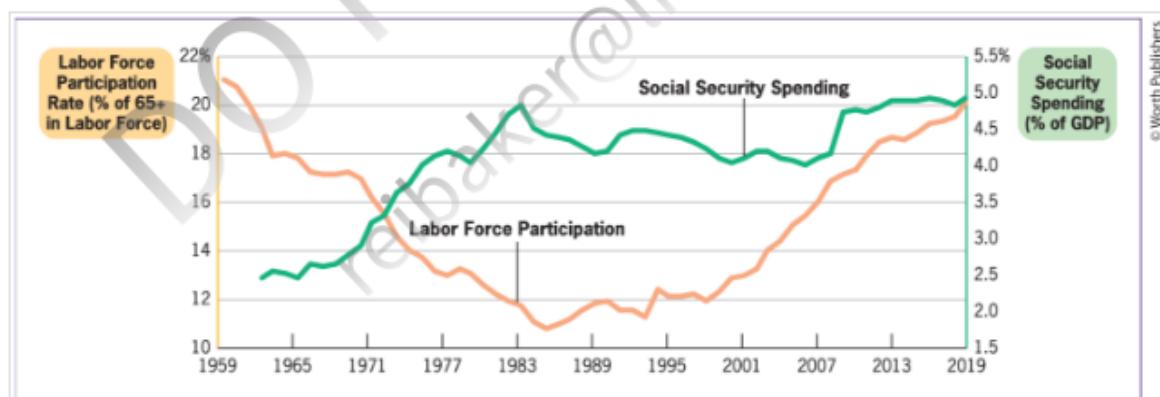


FIGURE 13-3 Elderly Work and Social Security, 1959–2019 • There is a striking negative correspondence over time between the labor force participation (LFP) rates of adults over 65 (which have fallen) and the size of the Social Security program (which has risen).

Data from: [U.S. Bureau of Labor Statistics \(2021\)](#).



The second piece of evidence that Social Security matters for retirement behavior comes from examining the age pattern of retirement in the United States. [Figure 13-](#)

Figure 13-4 shows the **retirement hazard rate**, the rate at which workers of a certain age retire. The retirement hazard rate rises slowly until age 62, at which point it jumps up and then rapidly falls back down. At age 61, 10% of workers retire, and at age 63, only about 8% retire; but at age 62, the retirement rate is 25%. Recall that age 62 is the Early Entitlement Age (EEA), the age at which benefits can first be claimed. There is then another spike at age 65, the Full Retirement Age (FRA) for the program at the time. That workers happen to retire in large numbers at these particular ages is not evidence that Social Security *caused* this behavior; people may have other reasons for choosing these ages to retire. As [Gruber and Wise \(1999\)](#) show, however, there was no such spike at age 62 in 1960, before the EEA was introduced. The spike emerged slowly, with a small spike in 1970, and a larger one by 1980. This pattern suggests that it was the introduction of the EEA in 1963 that led to the evolution of this spike. More recently, [Behaghel and Blau \(2012\)](#) showed that the spike in retirement at age 65 has been diminished by the rise in the FRA. Most interestingly, they find that a new spike has emerged at the new FRA for those with higher cognitive skills (i.e., a larger capacity for learning and remembering) but that those with lower cognitive skills do not appear to have adjusted as quickly to the new FRA in their retirement behavior.

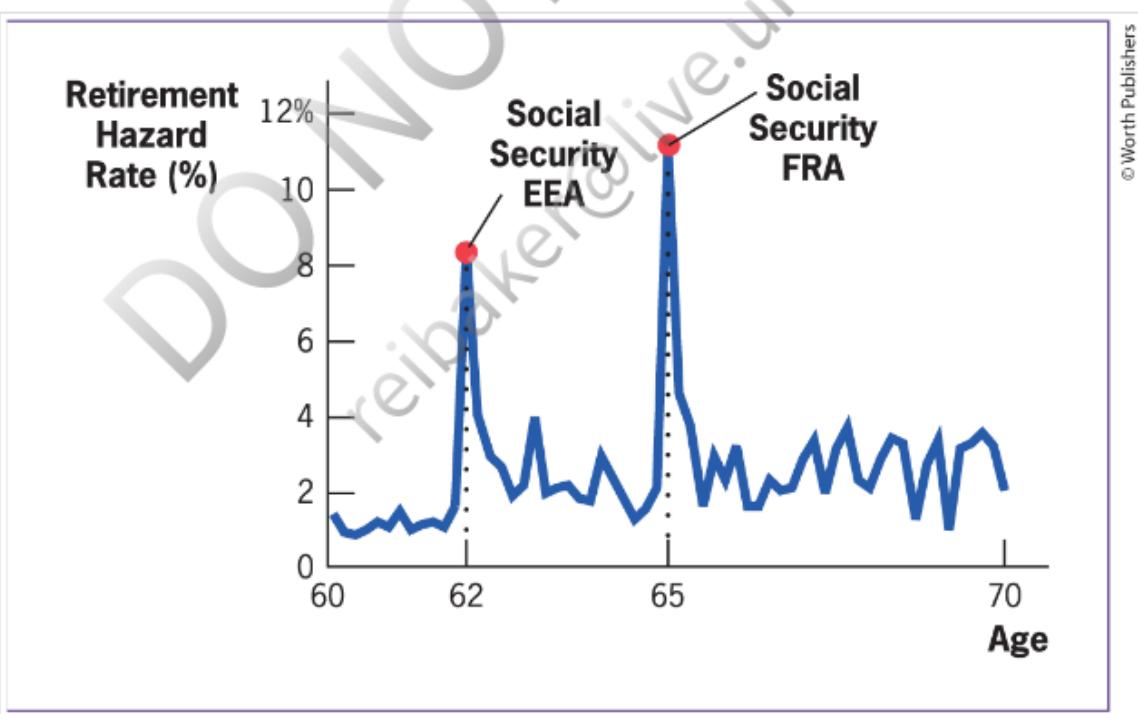


FIGURE 13-4 Hazard Rate of Retirement in the United States • The hazard rate, or exit rate at each age given that a person has worked to that age, has a distinct spike at age 62 (the Early Entitlement Age, EEA) and 65 (the previous Full Retirement Age, FRA), which are key ages for the Social Security system.

Data Source: Data kindly provided by Anil Kumar and Gary Englehardt.

retirement hazard rate

The percentage of workers retiring at a certain age.

The third, and most compelling, type of evidence that Social Security matters for retirement decisions comes from international comparisons. There are enormous spikes in other countries at their early and normal retirement ages that mirror closely what we see in the United States. The papers in [Gruber and Wise \(1999\)](#) and in [Borsch-Supan and Coile \(2019\)](#) show numerous examples of both spikes and the evolution of those spikes with Social Security reforms. The application box shows how the international evidence can be combined to demonstrate the impact of Social Security programs on retirement.

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This evidence suggests that it is potentially very costly to design Social Security systems that penalize additional work beyond the retirement age. Systems such as those in Europe that do not increase benefits for additional years of work appear to have led to a mass exodus from the labor force by older workers. Adjusting systems to more fairly reward work at old ages can mitigate much of the moral hazard effect of Social Security.

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13.4 Social Security Reform

Social Security is currently facing a major fiscal imbalance. In the United States in 1950, there were 12 people over the age of 65 for every 100 people of working age. By 2060, as [Figure 13-6](#) shows, it is projected that there will be almost 42 people over the age of 65 for every 100 working-age people. This rise is due to the aging of the enormous baby boom generation that was born in the wake of World War II. These numbers may seem abstract, but think of them this way: by the year 2030, the share of elderly people in the United States will be larger than it is in Florida today! As noted earlier, over the next 75 years, the present discounted value of the program's obligations exceeds the present discounted value of the taxes it will collect by \$17.8 trillion.²⁴

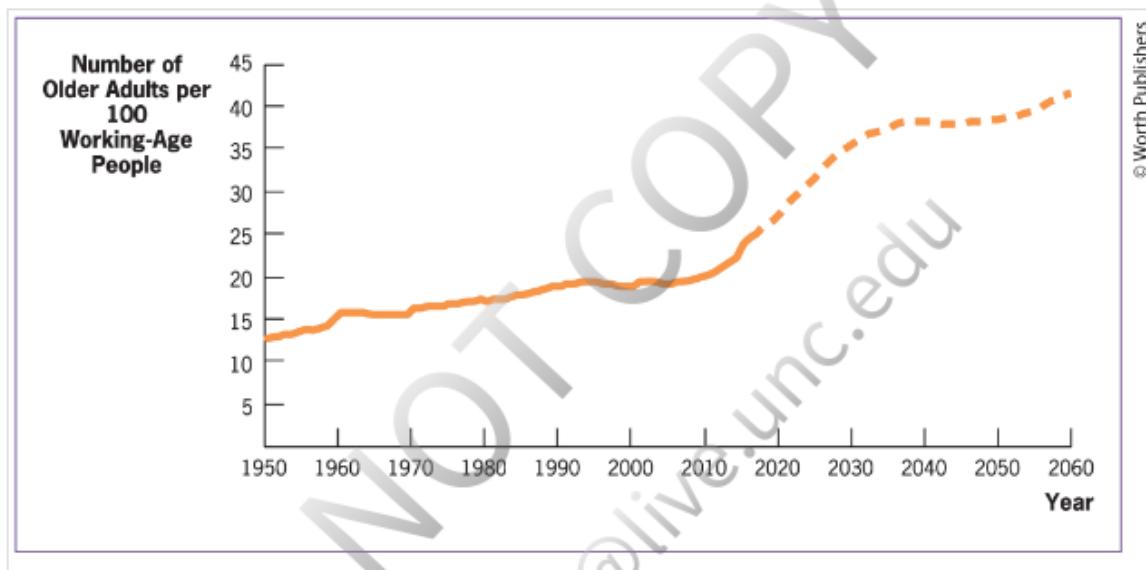


FIGURE 13-6 Ratio of Older Adults to Working-Age Population, 1950–2060 • The number of persons over age 65 per working-age person age 15 to 64 more than triples over the century, from 13 per 100 in 1950 to 42 per 100 in 2060.

Data from: [U.S. Bureau of the Census \(2017\)](#), Table 1.



Three factors are coming together to cause this fiscal imbalance. The first factor is the dramatic improvement in life expectancy that was ongoing throughout the twentieth century, which means that older adults receive a larger number of years of benefits. The second factor is a reduction in birthrates so that there are fewer workers to support the increased number of retirees. Finally, the growth in wages has slowed dramatically. Thus, returning to our discussion of [Table 13-1](#), we have promised benefits to retirees based on a high rate of wage and population growth, so the slower actual rates of growth leave us unable to meet that promise. In

addition, the Social Security system continues to carry the “legacy debt” that was built up by our unfunded payments to the first generation of Social Security recipients, which adds a major component to the long-run fiscal imbalance of the system. The problem of Social Security underfunding is not just a problem of the baby boomer cohorts retiring but instead a much long-run problem due to those factors previously listed. The Social Security Administration projects that Social Security will run a deficit equivalent to 1.2% of the GDP by 2095.²⁵



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“Abuelito, I had another nightmare about social security.”

“Abuelito, I had another nightmare about social security.”

Reform First Steps: The Greenspan Commission

The United States first faced up to this Social Security financing problem in 1983, when it was projected that the Social Security trust fund would run out of money to pay its claims in July of that same year. The government established the Greenspan Commission, headed by then- Council of Economic Advisors chair (and future Federal Reserve Chairman) Alan Greenspan.²⁶ The commission’s primary recommendation was that the Social Security system should move away from an unfunded system to some extent and that the government should accumulate savings in the Social Security trust fund so that when the baby boomers retired and there were fewer workers to support them, there would be enough money to pay their benefits. To increase the trust fund, the Greenspan Commission made a number of changes, including speeding up increases in payroll taxes that were scheduled for the future and cutting benefits.

APPLICATION

The Social Security Trust Fund and National Savings



In theory, one benefit of the partial funding of Social Security through the buildup of the trust fund is an increase in national savings, with the associated benefits for the capital stock and productivity

growth highlighted in [Chapter 4](#). In practice, however, the trust fund may not actually add to national savings. This trust fund is, by law, “off budget,” meaning that the government is supposed to consider its other revenue and spending obligations distinct from the trust fund. But this has not traditionally been the case. When the government reports its budget deficit or surplus for each year, it typically reports the “unified budget,” which incorporates off-budget categories. For example, for 2019, the federal government reported a deficit of \$984 billion. This number reflects an on-budget deficit of \$992 billion and an off-budget *surplus* of about \$8 billion, meaning that the true deficit (\$992 billion) is about 1% more than that popularly reported.²⁷

Suppose, as seems to be the case, that the government ignores the distinction between on-budget and off-budget and just pays attention to the unified deficit. Suppose further that the government, and the public to which it is accountable, has some budget target, such as a balanced budget. By allowing policy makers to hide deficits in other areas, the Social Security trust fund is displacing other government savings. That is, in the absence of the trust fund, to get the budget to balance, policy makers would have to save more, which would require either tax increases or spending cuts, neither of which are very popular.

By hiding the deficit, the trust fund allows policy makers to avoid these tough decisions—but the bill is coming due. As the baby boomers retire, the trust fund is starting to get drawn down, and this is starting to contribute to our large budget deficit. Thus, if policy makers only pay attention to the unified budget, then the trust fund is not new savings—it just displaces other government savings. The trust fund isn’t necessarily increasing national savings by \$8 billion in 2019; it may simply be enabling the government to avoid tough decisions that would raise national savings by this amount.²⁸

Potential Next Steps: Incremental Reforms

While the 1983 commission staved off Social Security’s financing problems to some extent, these financial problems will come back with a vengeance as the baby boomers age. What can we do to move beyond the 1983 reforms and deal with the long-term funding problem? There are several approaches. In this section, we review approaches that build on the existing structure of the system, before turning to more fundamental changes in the nature of the program.

Raise Taxes Further

While the problems of financing Social Security are large, they are not insurmountable. Increasing the payroll tax by 3.14% points, from 12.4 to 15.54%, is projected to solve the financing problem for the next 75 years, and raising it by 4.7% points is projected to solve the financing problem forever.²⁹

Extend the Base of Taxable Wages

Another tactic would be to try to delay the pain by extending the base of wages that can be taxed by Social Security to finance retirement benefits. Because the problem is that the number of older adults is growing rapidly relative to the number of young, we could try to increase the number of young who pay into the system. For example, many state and local government workers are now excluded from Social Security (because they were given the option to enroll instead in their state or local pension plans); we could mandate that they come into the system. Or we could ease immigration restrictions for young workers. These expansions improve the finances of the system in two ways. First, they raise the base on which payroll taxes can be collected in the short run. Second, the system now is charging workers, on average, more in payroll taxes than they will ultimately expect to collect in benefits. So new workers who can be pulled into the system represent a net gain in the financial position of the program (and a net loss for the workers).

Another means of extending the base of taxable wages is to increase the maximum income on which the payroll tax that finances Social Security is paid. In 2021, workers pay the payroll tax on income up to \$142,800 per year. Because the system is progressive, such a change would once again improve the finances of the system both in the short run and the long run. We will discuss how to evaluate such tax changes in Chapters 20 and 21.

Raise the Retirement Age

Relative to life expectancy, the Social Security Full Retirement Age has been falling. In 1950, men who were age 65 could expect to live 12.7 more years on average; today, that figure is 18.9 years. For women, life expectancy at age 65 has risen from 15 years in 1950 to 21.5 years today.³⁰ It seems sensible that, as people live longer, they should work longer as well so that they don't have an increasingly long retirement to finance. Yet the FRA remained fixed for many years at 65 and has only slowly moved to age 67 for those born after 1960. Expenditures on the Social Security program could be significantly reduced by either speeding up or increasing the rise in the FRA.

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13.5 Conclusion

Social Security is the largest social insurance program in the United States and the largest single expenditure item of the federal government. Not surprisingly, this program has major implications for the standard of living of older adults as well as for the younger workers who pay the taxes to support this program. Social Security faces a long-run financing problem to which there are no easy solutions. The question of how to resolve this problem will be one of the most contentious sources of political debate in the years to come.

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HIGHLIGHTS

- Social Security is the largest social insurance program in the United States.
- Social Security is financed by a tax on earnings and pays benefits to retired workers. These benefits are a redistributive function of the workers' average lifetime earnings.
- Social Security is an unfunded system that has paid excessive returns to early generations. As a result, Social Security has a "legacy debt" that must be paid back.
- The government provides Social Security to remedy failures in private annuity markets and to paternalistically ensure that workers are saving appropriate amounts for their retirement.
- The Social Security program crowds out savings to some extent, but the consumption-smoothing value of this program to retirees is shown by the dramatic reduction in elderly poverty rates over the past 60 years.
- At the same time, Social Security has been shown to significantly increase retirement rates in the United States and other nations.
- The system faces a major shortfall over the next 75 years because people are living longer, birthrates are falling, wages are growing more slowly, and payroll taxes are not scheduled to rise.
- There are a variety of options for reforming the Social Security program to move it to more sound financial footing, ranging from the basic (raising payroll taxes further) to the radical (privatizing the system).

QUESTIONS AND PROBLEMS

1. The government of Westlovakia has just reformed its social security system. This reform changed two aspects of the system: (1) it abolished its actuarial reduction for early retirement, and (2) it reduced the payroll tax by half for workers who continued to work beyond the early retirement age. Will the average retirement age for Weslovakian workers increase or decrease in response to these two changes, or can't you tell? Explain your answer.
2. A member of Congress has proposed a bill that would increase the number of years of earnings counted when computing the Social Security Average Indexed Monthly Earnings amount from 35 to 40. What would be the effects of this policy change on the retirement behavior of workers? Would the Social Security trust fund balance increase or decrease? Why?

3. Suppose the Social Security payroll tax was increased today to 16.4% to solve the 75-year fiscal imbalance in the program. Explain the effect of this change on the value of the Social Security program for people of different ages, earning levels, and sexes.
4. Senator Deal proposes to offer a choice to future retirees: if you retire before age 70, the benefits are calculated on the last 35 years of income; if you retire at age 73, however, you receive benefits calculated on only the last 15 years of income. Which option will high-income workers likely choose? Low-income workers? Why?
- 5.

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