Chapter Seven

EDUCATION

The foundation of every state is the education of its youth.

—DIOGENES LAERTIUS

The previous chapters have presented the approach that economists use to determine when government intervention is justified in the market economy. We now put this approach into action by applying it to the area of education. In addition to being an excellent case study for the application of the tools of public finance, education is of independent interest if for no other reason than the enormous amount of money that governments spend on it. In the United States, the combined spending of local, state, and federal governments on elementary and secondary education exceeds $471 billion [US Bureau of the Census, 2006b, p. 155].[1] As Table 7.1 indicates, since 1980, real per-pupil expenditures on elementary and secondary education have increased by about 68 percent. Nevertheless, for many years Americans have considered the nation's public schools to be operating at a substandard level [Phil Delta Kappa/Gallup, 2005]. These facts underscore the importance of carefully evaluating education policy using the public finance skills we have acquired.

Table 7.1 **Real annual expenditure per pupil in public elementary and secondary schools** *(selected years)*

School Year	Expenditure per Pupil (2004 dollars)
1980	$4,917
1985	$5,687
1990	$6,746
1995	$6,849
2000	$7,574
2003	$8,242
2004	$8,248

Source: US Bureau of the Census [2006, p. 155].

Real per-pupil expenditures on elementary and secondary public education have increased by 68 percent since 1980.

[1] Chapter 22 examines the rationale for the division of education spending across the different levels of government.

▸ JUSTIFYING GOVERNMENT INTERVENTION IN EDUCATION

The framework of welfare economics suggests that we begin with a fundamental question: Why should the government involve itself so extensively in education, rather than leave its provision to the market? As we saw in the previous chapters, markets fail to provide a good efficiently when it is a public good or when it gives rise to externalities, so we consider whether education falls into either of these categories.

Is Education a Public Good?

Recall that a public good is nonrival and nonexcludable. Education does not fit either of these criteria. It is rival in consumption, at least to some extent, because as the number of students in a classroom increases past some point, each student receives less individualized attention from the teacher, the classroom becomes more congested, and there are other strains on educational resources. Unlike a nonrival good, adding another "consumer" of education imposes a cost on other consumers. Education is excludable because one can easily prevent a student from obtaining the services provided by a school. In short, education is primarily a private good, improving students' welfare by enhancing their ability to earn a living and, more generally, to deal with life.

Does Education Generate Positive Externalities?

Even though education is primarily a private good, many argue that educating a child provides some benefits to other people in society.

One possible positive externality provided by education is that it serves as a powerful force for socialization. As the Greek historian Plutarch wrote in his *Morals,* "The very spring and root of honesty and virtue lie in good education." And in democratic governments, education gives voters background and perspective on which to base their political choices. As George Washington wrote, "In proportion as the structure of a government gives force to public opinion, it is essential that public opinion should be enlightened." Both of these views suggest that education helps to make an informed and cohesive citizenry, which serves an especially important function within a democracy. Indeed, Dee [2004] found that additional schooling leads to greater voter participation, more frequent newspaper readership, and more tolerance for free speech.

However, there have recently been some challenges to this conventional wisdom. Acemoglu et al. [2005] consider how years of education are correlated with democracy across countries. (The extent of democracy is measured by a numerical index based on a checklist of questions, including items such as whether the country has fair elections, whether those who are elected actually govern, whether there are competitive political parties, and so on.) As one might expect, they find that there is a positive correlation—countries with higher average years of schooling also are more democratic. They note, however, that countries vary so much in their cultures, histories, and social institutions that it would be misleading to ascribe a causal relationship to this cross-sectional correlation. Therefore, they focus on how *changes* in years of education *within* a country change the index of democracy. In effect, by focusing on changes within countries, they control for

the differences in characteristics across countries that are difficult or impossible to measure. Their analysis of the data suggests that once one looks within countries, the correlation between education and democracy disappears. Their controversial conclusion is that the evidence does not support the notion that increases in education make a country more democratic. One must be cautious about this finding. It might be because other things were changing within various countries, and these changes masked the impact of education. In any case, this study reminds us that many propositions that we take for granted can be very difficult to verify empirically.

The Case of Higher Education The magnitude of the external benefits of education likely varies by education level. For example, if the socialization benefits of education exhibit diminishing marginal returns, then elementary and secondary schooling generate higher external benefits than higher education, suggesting that government should intervene less in higher education than in earlier levels.

Indeed, the federal government subsidizes higher education less than primary and secondary education. Nonetheless, the federal government has been supporting higher education on a large scale since the mid-1960s.[2] In 2005, the federal government spent approximately $15.1 billion on direct grants and work-study programs for college students. Student federal aid also came in the form of $58.0 billion worth of loans. More than 21 million awards of federal grants or loans were made in 2005 [US Bureau of the Census, 2006b, p. 182]. In addition, several subsidies for higher education are included in the personal income tax system. These include the HOPE tax credit and the Lifetime Learning tax credit (which in 2005 amounted to a $6 billion government subsidy) and the deductibility of interest on student loans, some educational expenses, and scholarship and fellowship income (which in 2005 cost the Treasury $4 billion).[3]

Some argue that college education should be subsidized because it increases productivity. That college increases productivity may be true, but *as long as the earnings of college graduates reflect their higher productivity, there is no externality.* We will examine later the question of whether education does in fact lead to higher earnings. For now, the key point is that for the externality argument to be convincing, one must show that there are productivity gains due to higher education that do not increase the student's future earnings.

Even if higher education provides positive externalities, this would not provide an efficiency justification for current government programs, which subsidize all eligible students at the same rate. Are the external benefits of all kinds of college training equal? Do art history, accounting, and premedical courses all produce the same externalities? If not, efficiency requires that they be subsidized differentially.

Proponents of subsidies argue that if they were removed, fewer people would attend college. This is probably true, because removing the subsidies would increase private costs for individuals. However, by itself this observation does not justify the subsidies. If subsidies were granted to young people who wanted to

[2] For further details, see Kane [1998]. There is also substantial support for higher education from local and state government, currently amounting to over $150 billion annually [US Department of Education, 2004a].
[3] See US Office of Management and Budget [2006, p. 288].

open auto repair shops and these were cut, then the number of auto repair shops would also decline. Why should a potential car mechanic be treated differently from a potential classicist?

Some argue that this argument is invalid because it ignores imperfections in the private sector market for loans. It is very difficult to provide collateral for loans for **human capital**—investments that people make in themselves to increase their productivity—so these lending markets might not materialize. In that case, some students for whom the benefits of higher education exceed the costs might nevertheless not go to college due to a lack of funds, which is an inefficient outcome. One possible remedy for this market failure is for the government to make loans available to any student at the market rate of interest. What about the problem of paying back the debt after graduation? As one commentator noted, "The prospect of heavy debt after graduation would no doubt discourage some students from borrowing. But that may be the wisest form of restraint. Someone finally has to pay the bill, and it is hard to see why that should be the taxpayers rather than the direct beneficiary of the schooling" [Passell, 1985].

human capital

The investments that individuals make in education, training, and health care that raise their productive capacity.

Is the Education Market Inequitable?

The preceding arguments about government intervention focus primarily on economic efficiency. As we discussed in Chapter 3, welfare economics suggests that equity must also be considered, and here, too, arguments can be made for public education and for subsidized higher education.

Recall from Chapter 4 the notion of commodity egalitarianism, which suggests that fairness requires that some goods be available to everyone. If education is a normal good, then we would expect a free market for education to lead to different levels of education for different income classes, with some lower-income people perhaps winding up with little or no education. The commodity egalitarianism view suggests that it should be made available to all citizens regardless of the benefits and costs. This view is especially prevalent with respect to elementary and secondary education.

But does the equity argument also justify government subsidies for higher education? Subsidies for college students represent a transfer from taxpayers as a whole to college goers. Looking at the student as part of the family he or she has grown up in, it seems that educational aid programs do indeed enhance income equality. The likelihood of receiving federal aid decreases as family income increases. Remember, though, that most college students are individuals about to form their own households, and the lifetime incomes of college graduates are higher than those of the population as a whole. Such a transfer policy, by subsidizing individuals with college educations, could actually lead to greater inequality in the income distribution. Now, to the extent that the loan recipients would not otherwise have gone to college, the program may increase income equality. However, this argument is premised on the assumption that the reason why students from low-income families are less likely to attend college is that they don't have enough cash to cover tuition and that there are no markets for college loans. A contrary view, expressed by Cameron and Heckman [1999], is that family income in itself does not affect college attendance. Rather, income is a measure of the long-term environment in which children are raised. When measures of ability are included in their statistical analyses of college enrollment, tuition and family income diminish greatly in importance.

▸ WHAT CAN GOVERNMENT INTERVENTION IN EDUCATION ACCOMPLISH?

If education produces positive externalities, it follows that government should subsidize it. We go beyond subsidization, however, when we make public elementary and secondary education both free (taxpayer financed) and compulsory. Such a system, which is common in many countries, cannot be rationalized on efficiency grounds alone because efficient policy would subsidize education only to the degree that it provided positive externalities. Because students obtain private benefits of education, efficient policy would suggest that they pay part of their education costs. However, the system of compulsory and free education might be justified under the commodity egalitarianism view that everyone should be provided a certain level of education, without regard to cost.

Another feature of our system is that in addition to financing education, government produces it as well. Why should this be the case? One theory is that government needs to produce education in order for society to obtain certain positive externalities. Education improves productivity and makes one a more informed and socialized citizen. The productivity gains are likely taken into account in the decision to get an education, because they lead to higher wages. However, the private benefits of being a more informed citizen are relatively small to each individual student. According to this theory, if the government funded but did not produce education, then private schools in competition for students would devote all their resources to teaching productivity-enhancing skills, not citizenry skills. The conclusion is that the development of a common commitment to established democratic processes is more easily carried out in a system of public schools protected from private competition. The validity of this theory, however, is very difficult to assess.

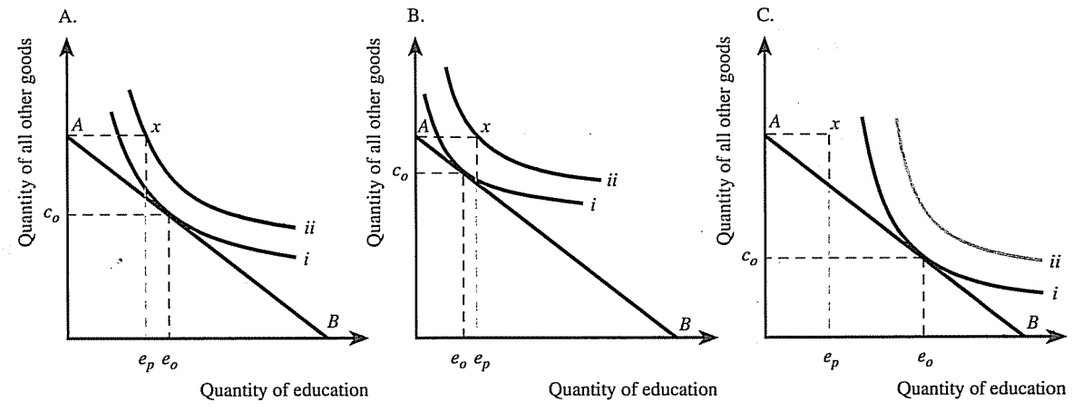
Does Government Intervention Crowd Out Private Education?

Whatever the rationale for providing free public schools, a surprising result of economic theory is that such a system does not necessarily induce everyone to consume more schooling than they would have in a private market. Consider the case of Gepetto, who is deciding how much education his son Pinocchio should consume. In Figure 7.1A, the amount of education is measured on the horizontal axis, and the quantity of all other goods consumed by the family on the vertical. (For simplicity, think of the amount of education as hours spent in the classroom. A more complicated model would also include aspects of the education that enhance its quality.) In the absence of a public school system, Gepetto can purchase as much education in the private market as he chooses at the going price, and his options are summarized by budget constraint AB. Subject to this constraint, he purchases e_o hours of education for Pinocchio; c_o is left over for expenditure on other goods.

Now suppose a public school opens. Gepetto can send Pinocchio to the public school for e_p hours per week at no cost to himself.[4] This option is represented not by

[4] We realistically assume Gepetto's tax payments are independent of whether he has children enrolled in public school.

Figure 7.1 Does public education crowd out private education?
In Panel A, the introduction of free public schooling leads to less education. In Panel B, it leads to more. And in Panel C, the amount of education is unchanged. e



a line but by the single point x, where education consumption is e_p and Gepetto can spend his entire income on all other goods. Because indifference curve ii, which passes through x, is higher than indifference curve i, Gepetto takes Pinocchio out of private school and enrolls him in the public system. Importantly, e_p is less than e_o. Pinocchio's consumption of education falls. Intuitively, the existence of public education leads to a large increase in the opportunity cost of private education, inducing Gepetto to opt out of the private system, reducing Pinocchio's consumption of education as he does so. In this way, the public school system **crowds out** education. Note, however, that Figure 7.1A views public schooling as a "take-it-or-leave-it" option. To the extent that the amount of education offered through public schools can be supplemented by private lessons, it is less likely that public schooling will crowd out education consumed.

crowd out

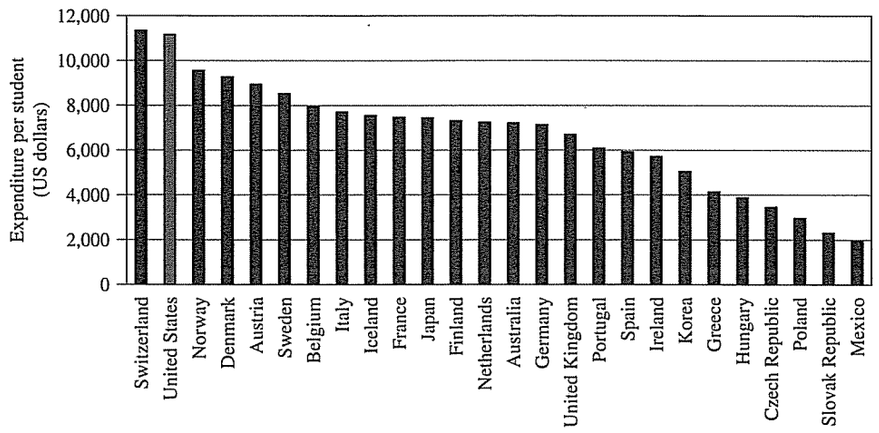
When public provision of a good (in this case, education) substitutes for private provision of the good. In the presence of crowd out, when the government increases public education, the net change in the amount of education is less than the amount provided by the government.

Of course, for a different set of indifference curves, public education could have induced Gepetto to increase his household's consumption of education. This is shown in Figure 7.1B, where the opening of the public school increases Pinocchio's consumption of education from e_o to e_p. Figure 7.1C shows a set of indifference curves in which there is no change in consumption of education after the introduction of public school. This analysis demonstrates that one cannot take for granted that the government provision of free education (or any other commodity, for that matter) leads to an increase in its consumption.

Does Government Spending Improve Educational Outcomes?

Suppose that we accept the arguments in favor of government intervention in education, and in particular, that the government should run public schools. This leaves open the question of whether higher expenditures actually lead to better education. This is inherently a difficult question because it is not clear exactly how to determine just what a "better education" is. Education has many goals, including improving

Figure 7.2 Real annual expenditures on public and private schools per student, all levels of education, selected countries (2002)
The United States spends more per pupil on public and private schooling than almost all other countries.



Source: Organization for Economic Cooperation and Development [2005a, Table B1.1].

students' cognitive skills, teaching them responsibility and how to get along with others, helping them become informed and well-adjusted citizens, and improving the quality of their lives from both economic and social perspectives. It is hard to quantify any of these things, let alone summarize them all in a single, precise measure. Therefore, most studies instead focus on a narrow set of outcome measures that at least have the virtue of being measurable. These include test scores, attendance records, dropout rates, continuation rates to higher levels of schooling, and earnings. Let's start by taking a look at test scores.

Figure 7.2 shows that the United States spends more per pupil than almost all other developed nations. Yet the test scores of US students are far from the top of this group. For example, in a test given to 15-year-olds in 29 developed nations, the United States placed fifteenth in reading literacy, nineteenth in science literacy, and twenty-fourth in mathematics literacy [Organization for Economic Cooperation and Development, 2004]. Numbers such as these have convinced some observers that increased spending has little impact on test scores. We now examine the empirical literature related to this issue.

EMPIRICAL EVIDENCE

Does Spending on Education Improve Student Test Scores?

Attempts to evaluate the effect of expenditures on student outcomes started with the Coleman Report [Coleman et al., 1966], which found that family background and peer effects—not the amount of public funding of schooling—explain student performance. However, this was an observational study and, as stressed in Chapter 2, such an approach makes it very difficult to assess causal effects. For example, if more educational resources were devoted to remedial classes, then there could be a negative correlation between expenditures and student outcomes even if expenditures helped students.

A better approach would be to run an experiment that randomly assigns students into high- and low-spending school districts, and then measure the differences in test outcomes. While a few randomized studies have been done (we discuss some later), they are difficult to conduct and are therefore rare.

Several recent studies instead use quasi-experiments that take advantage of changes in state laws that have increased funding to some school districts relative to others. Because public education has traditionally been financed by local taxes, wealthier school districts tend to spend more than other school districts. In order to equalize spending, some states started giving larger grants for education to low-income jurisdictions than to high-income jurisdictions. Massachusetts implemented such an approach in the early 1990s. By isolating the component of the funding changes due to the redistribution plan, Guryan [2003] found that increases in per-pupil spending led to significant increases in math, reading, science, and social studies test scores for 4th and 8th grade students.

Nonetheless, the issue is not settled. Hanushek [2002] surveyed a large number of previous studies and found that in most cases the data do not support a relationship between student expenditure and student performance. One contentious question regarding this claim is how to account for expenditures on a relatively small group of disabled students—should the expenditure numbers be corrected so that only money spent on "regular" students is taken into account? Without such a correction, a cross-sectional analysis of the relationship between expenditures and student outcomes could be misleading if schools spend more money on low-performing remedial or disabled students.

Even if we grant that expenditures have little effect on achievement, the implications are not clear. As Hanushek [2002, p. 46] notes, "The evidence does not say that money and resources never matter. Nor does it say that money and resources could not matter. . . . Indeed, a plausible interpretation of the evidence is that some schools in fact use resources effectively but that these schools are counterbalanced by others that do not." This gives rise to the question of whether some types of educational expenditures have a bigger impact on educational quality than others.

Public Spending and the Quality of Education

Ultimately, the goal is not to increase educational expenditures per se; rather, it is to improve students' academic performance. Therefore, it is important to evaluate the efficacy of various kinds of spending. For example, is it more effective to reduce the student-to-teacher ratio, hire teachers with greater levels of teacher experience and education, increase teacher salaries, or provide newer books and facilities? Using the jargon of economics, which inputs have the greatest marginal effect on educational output? A number of studies have estimated the contributions of various inputs to educational outcomes.[5] We will focus on one popular policy option, which is to reduce class size.

[5] For example, Aaronson, Barrow, and Sander [2003] and Hanushek, Rivkin, and Kain [2005] find that teacher quality affects student outcomes. However, the research literature is less clear about what policy tools can improve teacher quality.

EMPIRICAL EVIDENCE

Does Reducing Class Size Improve Student Test Scores?

Reducing class sizes involves both costs and benefits. The costs arise because the goal can be achieved only by hiring more teachers and by providing more classrooms. These costs are relatively straightforward to measure: For the United States overall, the cost per pupil of lowering class size by 10 percent would be about $615 [Hoxby, 2002a, p. 23]. Unfortunately, measuring the benefits is rather difficult because it is complicated to estimate the causal relationship between class size and student outcomes. Observational studies of the impact of class size are biased if students in smaller classes are different from students in larger classes, and if these differences contribute to differences in test scores. For example, if wealthier families locate in school districts with smaller classes and children from such families tend to get better test grades in any case, then we would overestimate the independent effect of smaller classes. On the other hand, the bias might be in the other direction if school districts provide smaller classes for remedial and special needs students.

A random experiment provides a better chance of assessing the causal relationship. The best known such study is of the Tennessee Student/Teacher Achievement Ratio experiment (known as Project STAR), which randomly assigned kindergarten students to small classes (13 to 17 students per teacher) and larger classes (22 to 25 students per teacher). Krueger [1999] found that students in the smaller classes tested higher than students in the larger classes. In a follow-up study, Krueger and Whitmore [2001] concluded that the students who were assigned to the smaller classes were more likely to take a college entrance exam and that this effect was greater for African-American students.

But other careful studies have found mixed or contrary results. Angrist and Lavy [1999] took advantage of a law in Israel that caps classroom size in public schools at 40 students. Because of this law, a school with 39 students in a particular grade will have one class, but a school with 41 students will require two (much smaller) classes. Recall from Chapter 2 the discussion of regression-discontinuity analyses, which use strict cut-off criteria to compare people in the treatment group to similar people in a control group. In this example, there should be no systematic differences between students enrolled in a school with 39 students in a particular grade compared to students enrolled in a school with 41 students in a particular grade, yet due to the law they are in very different class sizes. Angrist and Lavy compared their test scores and found that being in a smaller class had a positive impact for fourth and fifth graders, but not third graders. In another study (discussed in Chapter 2), Hoxby [2000] relied on random fluctuations in the timings of births in a given school area to test the effect of class size on kindergarten students. She found that class size had no discernible effect on test scores.

Despite the fact that the empirical literature has produced mixed results, policymakers are by and large convinced of the virtues of class size reductions. The results of Project STAR reinforced policymakers' beliefs that class size reductions are a good thing. However, as we stressed in Chapter 2, one must be careful about assuming that the results of an experiment in one setting will hold in another setting. California presents a clear lesson in the dangers of ignoring this dictum. Partly on the basis of the Project STAR experiment in Tennessee, California passed a law in 1996 that reduced class sizes by roughly 10 students per class. So far, so good. But to accomplish this goal, the law required California schools to hire more teachers. Such an expansion in the teaching force was not a component of the Project STAR experiment, because the experiment did not involve a statewide reduction in class size. The only way for California to increase substantially the number of teachers was to hire teachers with relatively less experience and fewer credentials. Thus, the average quality of the teaching force fell. Remarkably, Jepsen and Rivkin [2002] found that the advantages of the smaller classes were offset by the deterioration of teacher quality. Thus, the reductions in class size have not improved the quality of education for children in California.

Does Education Increase Earnings?

Although the impact of school expenditures and school quality on test scores is an important and interesting question, it doesn't give us direct evidence on another critical variable—future earnings. Even if high educational expenditures do not increase test scores, we may not be very concerned if they increase people's earnings as adults. Likewise, if high educational expenditures increase test scores but have no effect on earnings, then we might question whether this is public money well spent.

It might seem obvious that more money spent on education leads to higher future earnings. If spending improves the quality of education, then the students will become more productive workers in the future. This increase in their "human capital" should translate into higher wages. However, given the previously discussed ambiguity about whether more spending actually improves educational outcomes (as least as represented by test outcomes), one should not take for granted that such spending will increase future incomes. For elementary and secondary education, it appears that increases on the margin in educational expenditure have little impact on subsequent earnings. The most optimistic estimates suggest that a 10 percent increase in educational expenditures generates increases of only about 1 or 2 percent in subsequent earnings [Heckman, 1999]. However, the efficacy of expenditures on education depends on the age and economic status of the students involved. In particular, the studies surveyed by Heckman [1999] suggest that educational investments made in early childhood to disadvantaged children have the highest returns.

Note also that this finding relates to spending *on the margin*. In other words, while another dollar spent on education might not affect future earnings much, this does not imply that earnings would be the same if we spent nothing on education and no one went to school. Indeed, a substantial empirical literature suggests that by augmenting human capital, additional schooling has substantially increased subsequent earnings.[6] Labor economists estimate each year of schooling increases annual earnings between 5 and 11 percent.

[6] However, another theory is that additional years of education (especially at the college level) serve primarily as a screening device that identifies for prospective employers those individuals with high ability. According to this theory, someone who is highly productive needs to signal this characteristic to prospective employers, and he or she can accomplish this by withstanding the rigors of the college admissions process and by obtaining a degree. The implication is that it isn't education per se that leads to higher productivity and thus higher wages; rather, education only serves as a signal of preexisting ability.

▸ NEW DIRECTIONS FOR PUBLIC EDUCATION

The American public school system has been accused of producing a rising tide of mediocrity that puts our nation at economic and social risk. Like so much else in the area of education policy, this assertion is controversial. While SAT scores have been falling since the 1960s, this may be because the composition of the students taking the exam has changed over time—as college has grown more popular, more students toward the lower end of the ability distribution have been taking the test. The National Assessment of Educational Progress, administered by the US Department of Education, is less subject to such composition biases because it consistently tests a representative sample of US students. The results from this test suggest that over the past 30 years, math and reading scores for 4th, 8th, and 12th graders have improved slightly [US Department of Education 2004b, 2004c]. Such modest increases do not mollify critics, who believe that there has not been enough improvement given the large increases in real per-pupil spending over time (see Table 7.1). Many of these critics believe that major structural changes in public education are needed. We now discuss a few options.

Charter Schools

If increasing spending on education is not the answer, are there other ways to improve the situation? Economists are generally quick to consider whether any market in trouble might benefit from an infusion of competition. This is true in the debate over education policy. Some economists are convinced schools would improve if they were forced to compete with one another to attract students. This is part of the motivation for **charter schools,** which are public schools that operate under government charters that hold them to state standards, but have freedom to experiment and some independence in making their spending and hiring decisions. Forty-one states currently have laws that support charter schools. By making regular public schools compete for students with the charter schools, the hope is that the public schools will rethink their educational strategies and provide a higher-quality experience for their students.

charter schools

Public schools that operate under special state government charters. Within limits established by their charters, these schools can experiment with a variety of approaches to education and have some independence in making spending and hiring decisions.

Anecdotal evidence from states like Arizona, which has the nation's most liberal charter law, suggests that charter schools increase diversity of choice. Some Arizona charter schools take a "back-to-basics" approach, some focus on the performing arts, some cater to pregnant students, and so on. Do these diverse options lead to improved student performance? Determining the causal relationship between attendance at a charter school and educational outcomes is difficult, because families choose whether to send their children to charter schools, so it is likely that family differences drive differences in student outcomes.

However, some quasi-experimental research suggests that charter schools improve student outcomes. Hoxby and Rockoff [2004] examined the impact of attending a charter school on math and reading scores. They focused on data from Chicago, where any charter school that is oversubscribed uses a lottery to determine which students will attend the charter school. In effect, this process sets up an experiment in which students who randomly draw into a particular charter school can be compared to students who do not. Hoxby and Rockoff found that students who attended charter schools starting in elementary grades scored higher in both math and reading tests.

In a different study, Hoxby [2002b] examined what happened to regular public schools in Michigan when they were exposed to competition from the introduction of charter schools. She used a difference-in-difference strategy of the kind described in Chapter 2. Her analysis compared the change in student test scores for public schools located in districts that faced high competition from charter schools to the change in student test scores for public schools located in districts that faced little such competition. Hoxby found that regular public schools that faced competition from charters increased their students' achievement test scores relative to regular public schools that did not face such competition. And the schools appear to have done it without increasing spending per pupil.

Vouchers

Recently, much attention has been paid to plans to improve public school quality by increasing dramatically the scope of choice through a **school voucher** system. The basic approach is to provide financial support to students rather than directly to schools. Each student could be given a tuition voucher, for example, that could be redeemed at whatever qualified private school suited the student's family best. Proponents of school vouchers believe that the effects of competition from private schools would be as salutary in the education market as they are in other markets. Terrible public schools that do not reform would lose enrollees and be forced to close. According to this view, parents' and students' perceptions of teacher quality, which are more or less ignored by the public school system, would become the basis for punishing bad teachers and poorly run public schools. Further, the availability of tuition monies would prompt entrepreneurs to establish new private schools in areas where the existing schools are poor. This is a plausible scenario. A for-profit company, Edison Project, already manages 149 schools with 84,000 students, generally under contract with public school boards.

school voucher

A voucher given to a family to help the family pay for tuition at any qualified school. The school redeems the voucher for cash.

Critics of market-oriented schemes offer a number of objections:

- Consumers in the education market may not be well informed, so the competitive outcome would be far from satisfactory. Supporters of this view point to the proliferation of vocational schools of dubious value that prey on students eligible for federal student loans and grants.
- Moving children to private schools might reduce the positive externalities of education. Greater competition among schools could lead them to focus on improving the private benefits to the students (such as increasing their wage-earning potential), while ignoring aspects of education that yield societal benefits (such as building a shared sense of national identity).
- Relatively good students might use vouchers to escape poorly performing public schools, leaving the weaker students behind. Because the quality of a student's education depends, in part, on the quality of his or her peers, the result would be an even worse education for the poor students than before the introduction of the vouchers. When Chile introduced a voucher system several years ago, it appears that the higher-ability students did in fact opt out of the public schools in disproportionately high numbers [Ladd, 2002, p. 19].
- A voucher system might be inequitable. The goal of the voucher system is to provide the opportunity for families to choose a private school should they wish. However, some families would opt for a private school even

without a voucher, so providing them with a voucher would serve only to increase their incomes. To the extent such families have higher than average incomes, the end result would be to accentuate inequalities in the distribution of income.

Voucher enthusiasts argue that most of these objections can be dealt with by properly designing the program. For example, equity concerns could be addressed by targeting the vouchers primarily at low-income families. In any case, the debate focuses our attention on the importance of detailed design questions that would have to be addressed in implementing a national voucher system. How much latitude can schools have in designing their curricula? Can schools hire teachers who are not credentialed? What criteria can oversubscribed schools use to choose which students will be enrolled? Can church-run schools be included in the program? Can parents donate extra resources to the schools of their choice, or would this violate standards of equal education? How will students' families be informed about the different schooling choices available to them?

A number of communities have recently begun experimenting with voucher programs. In Milwaukee, for example, in 1990 about 1,000 low-income students began attending private schools using state-aid vouchers worth about $3,200 each. Rouse [1998] conducted an analysis of the results and found that students who attended the private schools had higher scores on mathematics achievement tests and about the same scores on reading tests. Further, Hoxby [2004] found evidence that the greater competition engendered by the Milwaukee voucher program led to test score improvements in public schools.

More recent studies have evaluated privately funded voucher systems in Dayton, Ohio; Washington, DC; and New York City. These programs are attractive from a research standpoint because they randomly assigned the vouchers to eligible low-income families. Howell and Peterson [2002] evaluated the first three years of these programs and found that attending private school had no effect on the test scores of whites and Hispanics, but they did find positive math and reading test effects for African-American children.[7] The results of the Milwaukee program and the other experimental programs should help inform future debates over competition in the market for education.

School Accountability

school accountability

A system of monitoring the performance of schools through standardized tests and either issuing "report cards" on the schools' test performances or linking financial incentives to the test outcomes.

In the 1990s, some states started experimenting with a different type of school reform known as **school accountability.** In order to make schools accountable for their performance, these states began requiring students to take standardized tests to monitor academic performance. While some states simply issued "report cards" on the performance of the schools, other states linked specific rewards and sanctions to the outcomes of the tests. By 2000, thirty-nine states had accountability systems, although there was great variation in the tests and the performance-based rewards and sanctions. For example, some states financially reward teachers in schools that test well, some states penalize teachers in schools that perform poorly, and other states allow school choice for students attending low-performing schools.

[7] Subsequent studies have called into question the robustness of these results. See, for example, Krueger and Zhu [2004].

In 2002, President Bush signed the No Child Left Behind Act of 2001 (NCLB), which expanded school accountability to all states. NCLB mandates each state to introduce annual testing of all students from third through eighth grade, and it requires schools to issue report cards comparing their scores to those of other schools.[8] Schools that fail to show adequate progress for two years in a row must let students transfer to other public schools. Schools whose scores continue to stagnate or decline for three years must pay for tutoring or remedial classes for low-income students. After four years without progress, schools can be forced to replace certain staff or implement a new curriculum.

Proponents of school accountability believe that it provides an incentive for school administrators and teachers to reduce bureaucracy and to focus on providing core educational skills to students. Hanushek and Raymond [2005] examined the introduction of school accountability in various states in the 1990s and concluded that it increased student achievement. Importantly, they found that the positive impacts occur only if the schools receive either rewards or sanctions that are tied to their performance. Issuing report cards on school performance by itself does not provide a sufficient incentive for improvement.

The most common criticism of school accountability is that detrimental effects arise from focusing too much on standardized tests. The concern is that teachers don't have any incentive to foster creativity, problem-solving, and socialization skills, and instead focus on "teaching to the test." Jacob [2005] found that school accountability in Chicago did lead teachers to focus on skills emphasized on the tests that were tied to accountability. Interestingly, very similar concerns have been raised in some foreign countries whose students do much better on standardized tests than Americans. Specifically, some observers in such countries fear that their educational systems rely excessively on test performance, making them too regimented and neglectful of social and emotional development, creativity, and individuality [Lee, 2001].

Critics also contend that school accountability leads to strategic gaming that does not help students. For example, Jacob [2005] found evidence that school accountability in Chicago led some teachers to exclude low-ability students from the test-taking pool by placing them in special education. Figlio's [2005] research indicated that schools assign long suspensions to low-performing students subject to disciplinary action near the test-taking period. Jacob and Levitt [2003] found evidence that school accountability actually led some teachers in Chicago to cheat by changing answers to their students' standardized tests.

The economic literature demonstrates the clear trade-offs involved with designing a policy of school accountability. Tying rewards and sanctions to explicit performance standards provides incentives for schools to change; however, it also provides incentives for unintended behavior such as gaming the system and even cheating. This illustrates a more general proposition that arises again and again in public finance: people respond to incentives, and unless this fact is taken into account, even well-intentioned public policies may have unintended negative consequences.

[8] NCLB allows states to design the tests and cut-off standards used to calculate whether students are making progress.

Summary

- Real per-pupil government expenditures on elementary and secondary education in the United States have increased by about 68 percent since 1980.
- Although education is generally publicly provided, it is not a public good. However, many argue that education generates positive externalities.
- The presence of positive externalities does not justify the current structure of government programs for higher education, which subsidize all eligible students at the same rate.
- Equity concerns are often used to rationalize government subsidies for education. In the spirit of commodity egalitarianism, some suggest that education should be provided to everyone, regardless of their preferences.
- Public provision of education might crowd out private provision.
- The evidence on whether increasing expenditures on public education improves average test scores is mixed.
- The evidence suggests that marginal increases in education expenditures have very little impact on future earnings. The estimated effect is relatively large for additional spending on younger, disadvantaged children.
- Some economists argue that public schools would improve if they were subjected to competition. One proposal in this spirit is the use of charter schools, which are public schools that have greater freedom to experiment in their spending and hiring decisions.
- Another proposal is the introduction of school vouchers, under which financial support for education goes to the family of the student, not directly to the school. The voucher can then be redeemed at whatever qualified school the family prefers.
- A recent reform effort is school accountability, which is a system of monitoring the performance of schools through standardized tests. The government then either issues "report cards" on performance or links financial incentives to the test outcomes.

Discussion Questions

1. What are the different rationales given for government provision of education? Explain whether the rationales have different implications for government provision of higher education versus primary and secondary education.
2. The analysis surrounding Figure 7.1 assumes that public schooling is a "take-it-or-leave-it" option. That is, individuals are not allowed to supplement public education with private lessons. Show how the diagram must be modified if, to the contrary, parents can purchase additional hours of education for their children who are enrolled in public school. Another assumption behind the model is that public education is "free" in the sense that parents do not pay any taxes for it. Show how the model must be modified if public school is financed by taxes levied on parents.
3. A deeply held belief in Europe is that university education should be financed almost entirely by the government. In France, undergraduates pay about $400 per year in tuition; in Germany, federal law explicitly forbids public universities to charge tuition. However, European governments typically don't provide much money for universities, leading to problems with maintaining quality. In response, some observers want to start charging students substantial amounts of tuition. One German official responded that "one of the prime rights of humanity is to have a free university education." In the same way, a Labor member of the British parliament argued that "Introducing a market into higher education is something the Labor Party should not be doing" [Lyall, 2003, p. A3]. Discuss the efficiency and equity consequences of a system of taxpayer-financed higher education.

4. Suppose a family (with only one child) earns $50,000 per year and lives in a community without publicly provided education.
   a. Draw the family's budget constraint showing the trade-off between quantity of education for the child and all other goods.
   b. Suppose now that an option of free public education worth $8,000 per student is introduced. Show how this changes the family's budget constraint.
   c. The family reduces its consumption of education after the introduction of free public education. Using part b, draw a set of indifference curves consistent with this outcome.
   d. Now show how a school voucher redeemable for $8,000 worth of education changes the family's budget constraint. What happens to the amount of education the family purchases for the child?
5. Suppose a state is considering whether to require that all public school teachers have a master's degree. Currently, only 40 percent of the teachers in the state have such a degree.
   a. A researcher conducts a cross-sectional analysis that compares test scores of students in the state whose teachers have master's degrees to the test scores of students in the state whose teachers do not. The researcher finds that students whose teachers have master's degrees score significantly higher on the standardized tests. Why might such a study be biased?
   b. Now suppose another state conducted an experiment in which 500 students were randomly selected to be either in a class taught by a teacher with a master's degree (treatment group) or a class with a teacher without a master's degree (control group). This experiment found that the treatment group scored significantly better than the control group. How useful is this experiment in informing the state's decision about whether to have a master's degree requirement?