CHAPTER ONE

Introduction

The Problem

Policymakers in most states face a fundamental challenge—motivating taxpayers to provide the funds required to meet the mounting educational needs of the nation's population. This challenge is driven by major economic and social waves shaping the nation. The level of education that an individual needs to be competitive in the workplace has been increasing for the past 20 years.[1] The high-paying industrial jobs that used to be available to people who lacked even a high school diploma have largely disappeared. The service-related jobs taking their place require a level of knowledge and skill that require a high school diploma at a minimum. And many jobs can be obtained only after completing programs offered at colleges and universities. High school graduation and preferably some postsecondary education have effectively become minimum requirements for rewarding employment.

At the same time, significant and growing segments of the U.S. population have traditionally experienced relatively low levels of educational attainment. If current trends continue, an increasing fraction of the population will lack the education needed to succeed in the labor market.

K–12 public school spending as a percentage of personal income has declined since the mid-1970s (Carroll et al., 2005). And studies have suggested that higher education systems also face mounting fiscal challenges (Benjamin and Carroll, 1997). K–12 schools and postsecondary institutions across the country face budgetary restrictions.

Meeting anticipated demands and expanding educational attainment will be expensive. Quite reasonably, taxpayers and their representatives ask why they should contribute more to the support of educational institutions. Shouldn't those who directly benefit from more schooling pay their own way? And if they choose not to invest in their own education, isn't that their problem? Until good answers can be provided to such questions, it will be difficult to convince federal, state, and local policymakers that they should make the investments necessary to increase students' educational attainment.

[1] See, for example, Johnson and Reed, 2007.

Research Objective

Discussions of programs and policies that can affect students' educational attainment often focus on the consequences for students and for society as a whole. We do not question the relevance of those perspectives. However, taxpayers who do not have children in school or who do not see their well-being as tightly linked to the quality of the labor force may object to supporting programs and policies that do not benefit them directly. Our objective is to demonstrate that programs and policies that result in increased educational attainment provide benefits to all taxpayers, even those who do not have children in school. We show that, totally aside from the benefits that accrue to individuals who increase their educational attainment, taxpayers reap significant benefits from other people's increases in educational attainment.[2] These benefits should be considered in discussions of public investments in education.

We do not suggest that policies and programs ought to be adopted or rejected solely because of their effects on taxpayers. But we do suggest that taxpayers will realize some benefits from programs and policies that increase students' education levels and should, consequently, take account of these benefits in considering policy options.

The Costs of Providing Education Versus the Overall Costs of Increasing Educational Attainment

In Chapter Seven, we provide estimates of the benefits that increases in educational attainment have for taxpayers, net of the cost of providing the additional education (we discuss such costs in Chapter Six). However, programs and policies that seek to increase students' educational attainment must not just *provide* the additional education, but also *motivate* students to pursues and complete the additional education. An important limit on the scope of our study is that we do not consider either the kinds of programs or policies that would be needed to induce individuals to stay in school longer or the costs of such programs or policies. We consider only the benefits to taxpayers when an individual's education is increased.

Because we do not account for the costs of programs that induce individuals to pursue higher levels of education, our study is not a cost-benefit analysis. We do not suggest that benefits to taxpayers of such programs will necessarily exceed their costs, and it is certainly possible that they may not. A cost-benefit analysis of a program aimed at increasing educational attainment would have to consider several complexities. One such complexity is that the program would not be perfectly effective: Some program

[2] In the context of cost-savings or cost-benefit analysis, our objective is the equivalent of calculating the "shadow price," or the economic value (positive or negative) for taxpayers of increasing an individual's educational attainment. In this case, we focus on the shadow price solely from the perspective of taxpayers, as would be the case in a cost-savings analysis, rather than the full economic value to society, as would be estimated in a cost-benefit analysis. For further discussion of shadow prices in the context of cost-savings and cost-benefit analysis of social programs, see Karoly (2008).

participants will not attain a higher level of education despite their participation. As an example, a program aimed at increasing the likelihood that students will achieve a high school diploma rather than dropping out may involve both students who would have completed high school had they not participated in the program and students who drop out despite their participation. Any cost-benefit analysis would have to recognize that only those participants whose education level is affected by the program will generate additional benefits to taxpayers, whereas all participants will engender costs. A second complexity is that a cost-benefit analysis would have to consider the benefits to program participants and other nonparticipants, such as participants' parents, and to society as a whole as well as benefits to taxpayers.

Again, our objective is to examine one part of that broader calculation: the existence and magnitude of taxpayer benefits when an individual's education is increased. We leave to others the comparison of the costs of a specific program to its benefits for all stakeholders. Moreover, we do not offer a position on state support for education. We seek only to estimate the benefits that taxpayers—even those who do not have children in school—realize from increases in educational attainment.

Research Questions

In this study, we explore the benefits of increased educational attainment for taxpayers. We recognize that the greatest gains accrue to those whose education levels are improved and that increases in educational attainment also provide numerous types of noneconomic benefits in addition to economic benefits. However, we concentrate on three types of economic benefits to those who would have to pay the costs of policies and programs aimed at raising educational attainment. Specifically, we estimate the extent to which increased education results in

- increases in federal, state, and local tax revenues and in contributions to social support and insurance programs such as Social Security and Medicare
- reductions in public expenditures on social support and insurance programs
- reductions in public expenditures on incarceration—the costs of building and operating state prisons and county and municipal jails.

We use national data to estimate the relationships between an individual's increased educational attainment and his or her contributions to public revenues, expenditures, and incarceration costs. We then use these estimates to compute the discounted present value of the effects that the increase in an individual's educational attainment has on the public budget—effects that would be incurred over the individual's lifetime—to estimate the benefits to taxpayers of the increase in the individual's educational attainment.

We discount all dollar values to age 18. That is, we calculate the discounted present value, in 2002 dollars, of the estimated streams of contributions to and draws on the public budget at age 18 for an individual given his or her level of schooling and demographic group. We assume the appropriate discount rate is 3 percent per year.

Different segments of the population participate at different rates in social support programs. For example, some social support programs, such as Temporary Assistance to Needy Families and the Supplemental Nutrition Assistance Program,[3] have traditionally served low-income women with young children. Consequently, an increase in the education of a woman will, on average, more greatly reduce welfare payments than will an equal increase in the education of a man. In contrast, the effect of education on incarceration rates and consequent costs is more marked for men because very few women, regardless of education level, are incarcerated. Therefore, we conducted separate analyses for eight different population groups distinguished by gender and race/ethnicity—African-American (black), Asian, Hispanic, and non-Hispanic white (white).

To generate our estimates, we use data from the Survey of Income and Program Participation (SIPP) (U.S. Census Bureau, 2005a, 2005b, 2005c), which provides, for each individual, his or her education level and place of birth (U.S.-born or immigrant). However, the SIPP data do not indicate an immigrant's age (or year) of arrival, where an immigrant was educated, or an immigrant's English-language proficiency. Thus, it is not possible with the SIPP data to estimate the effect of increased education for immigrants young enough to obtain additional U.S.-based education at the high school or post-secondary level on such outcomes as taxes paid, benefits received, and incarceration costs. For that reason, we focus our report on results for U.S.-born individuals.

However, we did include immigrants in our sample, and we estimated models to differentiate between U.S.- and foreign-born individuals. While not definitive, estimates for immigrants comparable to those we present here for the native-born suggest that the benefits from increased education for immigrants will be of a similar order of magnitude. However, more-precise estimates of the effects of additional schooling for immigrants will require data as rich as the SIPP but with information on where an immigrant was educated and his or her English-language proficiency.

The SIPP includes a nationally representative sample of the U.S. population. It includes some, but very few, Native Americans. Because we want the empirical estimates to reflect the relationships between education level and government revenues and costs for the U.S. population as a whole, we include Native Americans in the estimates. However, because there are so few Native Americans in the sample, we cannot be sure that the specific results for that group accurately reflect the experience of Native Americans. Accordingly, we do not present estimates of the effects of increased edu-

[3] As of October 1, 2008, this is the new name for the federal Food Stamps Program.

cation among Native Americans' on their contributions to government revenues and costs.

Our analytic approach as it relates to the specific research questions is described in more detail in subsequent chapters of this report.

Illustrative Examples

The following examples illustrate the ways in which the results presented here might bear on policy decisions. The examples are hypothetical, but they are based on analyses of actual educational programs and policies.

First, consider a one-year preschool program that serves disadvantaged children and costs the government $5,000 per child. Suppose a rigorous evaluation of the program demonstrates that it results in a number of positive outcomes, one of which is a 10-percentage-point increase in participants' high school graduation rate. (Many of the children in the program would have completed high school even if they had not been involved in the program. And some of the children in the program drop out of high school despite their participation in the program.) The issue is how to place a monetary value to taxpayers on that outcome.

We could estimate the present value of the difference in the taxes paid by a high school graduate versus a high school dropout over his or her lifetime. We could similarly estimate the present value of the lifetime differences in expenditures by social support programs and in incarceration costs between a high school graduate and a high school dropout. However, we would also need to account for the fact that when a student stays in school rather than dropping out, taxpayers would have to pay for the additional years of schooling, and we would have to subtract the cost of those additional years of schooling from the benefits that accrue from higher educational attainment.

Let's say that the resulting estimate of the present value to taxpayers of a high school graduate over a high school dropout is $80,000. Suppose $5,000 is spent on every child in the preschool program. Because the program causes only 10 percent of the children to reach the higher education level, the present value benefit to taxpayers of the program is $8,000 per child included in the program compared with the program cost of $5,000 per child.

Second, consider a program at the high school level emphasizing small learning communities, long-term student-teacher relationships, and a rigorous curriculum. Suppose such a program were found to increase high school graduation rates 16 percentage points at a cost of $6,000 per child. The effects on the public budget resulting from inducing a student to complete high school rather than dropping out is the same, an increase of $80,000, present value. In this hypothetical example, because the high school–based program caused 16 percent of the children to reach the higher educa-

tion level, the present value benefit to taxpayers of the program is $12,800 per child included in the program compared with the program cost of $6,000 per child.

Note that we do not consider other benefits to taxpayers that might result from either example program. For example, a preschool program might reduce the rate of grade repetition or the use of special education, saving the associated costs to the schools and, consequently, to the taxpayers. A rigorous high school program might reduce substance abuse among participants, reducing public health and police costs. We omit these benefits to taxpayers because they are unique to the particular intervention and would not apply to alternatives.

However, notwithstanding the benefits to taxpayers that are unique to either example, many of the principal effects of increasing a student's education are the same for both. More generally, there are a large number of possible programs and policies that might affect students' educational attainment. Our objective is not to focus on any particular policy or program, but, rather, to note that taxpayers will benefit from a successful policy or program and, therefore, taxpayers should consider the merits of proposals even if they do not have children in school.

Note, also, that these examples do not require that we value, as would be the case in a cost-benefit analysis, the private benefits to participants in either program, such as higher lifetime earnings or other benefits that accrue from greater educational attainment. Nor must we value the private benefits to nonparticipants from the improved outcomes of participants, such as lower rates of crime and the reductions in the associated pecuniary and nonpecuniary crime victim costs.

Third, consider an example focused on the effects of a proposed decrease in school funding. Governor Arnold Schwarzenegger of California has proposed a budget for fiscal 2009 that would cut state higher education funding by roughly $300 million. This cut in higher education funding, coupled with planned increases in student fees, could deny access to more than 9,000 students at the University of California (UC) and more than 18,000 students at California State University (CSU). Some of those denied access to the state's public four-year colleges and universities will attend private schools or community colleges, which cannot restrict the enrollment of eligible students. However, community colleges also face significant funding cuts under the proposed budget. Funding cuts, coupled with increased enrollments by students who would otherwise have enrolled in UC or CSU, will result in significant reductions in the classes and support services available to students in community colleges and, consequently, in both the proportion of community college entrants who complete a two-year program and in the proportion of students who continue on to a bachelor's degree. Suppose the budget cuts were enacted and, as a result 5,000 fewer students completed some college and 5,000 fewer students completed a bachelor's degree. If the present-value benefits to taxpayers of some college are and a bachelor's degree are $40,000 and $75,000 per student, respectively, the proposed budget cuts would save

taxpayers about $300 million, but cost taxpayers future benefits of which the present value is about $575 million.

Here too, we do not value, as would be the case in a cost-benefit analysis, reductions in private benefits to students whose education levels would be reduced by the budget cuts, such as higher lifetime earnings or other benefits that accrue from greater educational attainment, nor do we value the costs to society resulting from a less well-educated labor force. Rather, we note that taxpayers who do not have children likely to attend college and who feel that the students who benefit from increased education ought to bear the costs of those increases will still lose benefits when budgets are cut and students' access to education is consequently reduced.

Previous Research

There have been numerous analyses of programs aimed at improving some aspect of the quality of education. Some of these programs are designed to increase students' education levels. Others are designed to improve some other aspect of the quality of education, but they also affect students' education levels. However, these analyses generally focus on the effects that the program being evaluated has on the students involved, including increases in their educational attainment and, sometimes, on their families and the society more generally. Such analyses generally do not examine the programs' effects on taxpayers in detail.

Also, analyses focused on the benefits of increased education to the students or to society as a whole generally view public assistance costs as transfer payments. An increase in a student's education reduces the likelihood that he or she will participate in social support programs and, consequently, reduces social support program costs. From the perspective of society as a whole, this simply means that fewer funds are transferred from taxpayers to beneficiaries. The only consequent savings from this perspective are reductions in the administrative costs of social support programs. But, from the perspective of taxpayers, who provide the funds that social support program distribute to participants, the reductions in the costs of social support programs resulting from increased education are a benefit.

Krop (1998) conducted analyses similar to ours. However, his specific results are not directly comparable with ours, for two reasons. First, because his objective was to estimate the effects of increasing black and Hispanic education levels to that of whites, he reported the aggregate effects of increasing black and Hispanic education levels on government costs and revenues for the entire U.S. population of blacks and Hispanics born in 1990. He did not report the effects of increases in education on an individual's contributions to and draws on public budgets. Second, Krop examined the effects of increased education on the costs of the social support programs in effect in 1991. The 1996 Personal Responsibility and Work Opportunity Reconciliation Act and the 1997

Balanced Budget Act dramatically restructured the social support system, eliminating some programs, introducing some new programs, and imposing more-stringent eligibility rules and lifetime-total and one-time caps on participation in the income-support programs that were continued.

Although Krop's empirical results cannot be directly compared with ours, his general findings are suggestive. He found that increases in education yield substantial increases in tax revenues and in contributions to social support programs and substantial reductions in public spending for social support programs and incarceration.

Belfield and Levin (2007) estimate the effects of graduating from high school rather than dropping out on public revenues and costs, focusing on California. They distinguish between men and women by race/ethnicity for whites, blacks, and Hispanics. They do not consider place of birth. They assume that students who are induced to graduate from high school rather than dropping out will continue on to college at a rate equal to the national average rate of college continuation by those in the lowest quartile of academic achievement, and the researchers compare estimates for high school dropouts with those for high school graduates without differentiating level of education above high school. Consequently, their results are not directly comparable with our estimates.

Belfield and Levin estimate the effects of completing high school on the present value of lifetime federal and California state and local tax revenues. Their estimate of the present value, in 2005 dollars, of the additional federal state and local tax payments resulting from high school graduation rather than dropping out is about $101,000. The increase in tax payments resulting from high school graduation ranges from about $49,000 for black women to about $182,000 for white men.

Belfield and Levin examine the effects of high school completion on federal, state, and local (California) spending on three welfare programs and on the costs of crime, including spending on the criminal justice system, corrections, crime prevention, and publicly provided health care. Because they do not consider seven of the ten social support programs that we examine, their estimates of the effects of completing high school on social support program costs are not comparable with ours. And, because we consider only the effects of increased educational attainment on incarceration costs and do not consider the other types of crime-related costs to taxpayers that Belfield and Levin include in their analysis, their estimates of the effects of completing high school on crime-related costs are not comparable with ours.

Rouse (2005) estimates the effects of graduating from high school, rather than dropping out, on federal and national average state income tax payments and Social Security payments. She compares total tax payments by high school dropouts with tax payments for high school graduates and with tax payments by individuals who have a high school diploma or greater level of education. She presents estimates for each of three different assumptions regarding future annual earnings growth and for each of

three different discount rates. However, she does not distinguish among gender, race/ethnicity, or place of birth.

Assuming 0 percent annual growth in earnings and a 3.5 percent discount rate, Rouse estimates that the effect of completing high school, rather than dropping out, on the discounted present value (2004 dollars) of federal and state income taxes paid is about $42,000 and that the effect on total income and Social Security taxes paid is about $70,000. The corresponding estimates for high school graduate or more schooling are about $104,000 in federal and state income taxes and about $155,000 for total income and Social Security taxes.

In addition to these studies focusing specifically on the economic value of raising educational attainment, efforts have been made, in various cost-benefit studies of social programs, to attach an overall value to raising an individual's level of education, either in terms of benefits to taxpayers or to society as a whole. For example, Masse and Barnett (2002), Reynolds et al. (2002), and Karoly and Bigelow (2005) estimate the economic value of the higher educational attainment, measured for participants in various high-quality preschool programs relative to program nonparticipants.

Aos et al. (2004) also estimate the value of higher educational attainment in their cost-benefit analysis of an array of early intervention and prevention programs for children and youth. In terms of taxpayer benefits, these studies account primarily for the effect of increased years of schooling on income and payroll taxes, a more limited set of benefits than we account for in this study. Moreover, these studies typically do not report the estimated economic values associated with raising education levels that they employ in their cost-benefit analyses.

Definition of Terms

Research has traditionally measured education in terms of years of schooling completed. However, in this study, we concentrate on the level of education received by an individual instead of years completed. The levels we consider are as follows:

- **Less than high school education.** Because federal law requires that young people go to school until they are 16 years old, most individuals who choose to end their schooling before high school graduation have completed at least their sophomore year. On the other hand, some may complete most of their senior year before leaving high school. For this study, a high school dropout is any individual who does not earn a high school diploma or a General Educational Development credential (GED).
- **High school graduate.** An individual of any age who earns a high school diploma or a GED but does not go on to college is a high school graduate.

- **Some college.** An individual who earns some college credits but does not earn a (typically four-year) bachelor's degree. Individuals with some college may have earned a (typically two-year) associate's degree.
- **College graduate.** An individual who earns a bachelor's degree or more.

We chose to concentrate on levels of education rather than years of schooling for several reasons. First, beginning in the 1980s, the Census Bureau adopted a degree-based system for the Census and the Current Population Survey (CPS). Our use of a level-of-education approach will enhance the comparability of our study with research that uses Census and CPS data. Second, we believe that today's labor market places greater value on degrees than it does on the underlying number of years of education. In an economy in which clerical tasks are increasingly automated and delegated to computers and in which many, or even most, new jobs are created in technology sectors, receiving a college degree matters much more than making the jump from 15 years of schooling to 16—even if they amount to the same thing. Our key data source, the SIPP, collects education data by level of education and degrees obtained as well as years of education.

We use the terms *educational attainment* and *education level* to refer to the level of schooling that an individual completes. This study is not about "better" education in the sense of schools doing a better job. In our analysis, we treat all benefits as incremental and relative to the respective baseline of the increase in attainment. For instance, if we want to assess the benefit to taxpayers of a student earning a high school diploma rather than dropping out, the benefit is the difference in expected tax payments, social program costs, and the costs of incarceration between the average high school graduate and the average high school dropout, and not simply the expected values for high school graduates *per se*. We apply a similar logic to all costs and benefits.

We use the term *benefits to taxpayers* to refer to the benefits that taxpayers gain when an individual completes a higher level of schooling. In this study, we focus on benefits to taxpayers; we do not consider either the direct, or private, benefits from educational attainment that students obtain from an increase in their education, nor do we consider either the private or social benefits that accrue to the society as a whole when an individual completes a higher level of schooling.

Organization of the Report

This report is organized as follows. Chapter Two outlines our approach to the analyses. Chapter Three examines the relationships between educational attainment and tax revenues and contributions to social support and insurance programs. Chapter Four examines the relationships between educational attainment and spending on social support and insurance programs. Chapter Five examines the relationships between

educational attainment and spending for prisons and jails. Chapter Six presents estimates of the costs of providing additional education. Chapter Seven calculates the benefits to taxpayers from increases in educational attainment. Chapter Eight summarizes our findings.

We also include several appendixes. Appendix A describes the data used in the analyses. Appendix B presents the empirical analyses used to estimate the effects of increased educational attainment on tax payments. Appendix C presents the empirical analyses used to estimate the effects of increased educational attainment on participation in social programs and the resulting costs. Appendix D presents the empirical analyses used to estimate the effects of increased educational attainment on incarceration and the resulting costs.