The Economic Losses from High School Dropouts in California

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Abstract:

This paper calculates the fiscal and social burdens from high school dropouts in California. We map educational attainment in California for current cohorts of students and young adults. This reveals in stark terms the low levels of educational attainment across the state. Next, the amount of government spending in California is catalogued; this shows how much is spent on various services and by which levels of government. Our main focus is on the economic consequences of inadequate education on earnings, on tax revenues, and on spending on health, crime, and welfare (net of the resources required to provide additional education). For each of these four domains the effect of education has been assessed statistically. This effect is then multiplied by the respective economic burden from each cohort of 20-year olds who fail to graduate in order to get an overall total cost. Using a consistent accounting framework, these costs generate a figure of what is being lost by failing to ensure that all students graduate from high school. The economic magnitudes are substantial.

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1. INTRODUCTION

Increasingly, a good education is becoming critical for individuals to prosper and to participate as productive citizens. Social science research has compellingly shown that an individual's income is strongly influenced by their schooling; it has also established that this influence is not simply coincidental or explained by other attributes, such as ability or family background. In addition, evidence is accumulating that persons with more education are healthier, they are less likely to be involved in criminal activities, and they are less likely to be on welfare. These private advantages from education comprise strong incentives to complete high school and to advance to college.

However, these private gains also entail a public benefit. Better educated persons pay more in taxes and they alleviate the pressure for government spending on health, crime, and welfare. These benefits are much greater than the costs of public education. Thus, there is a fiscal benefit to the taxpayer from each new high school and college graduate. In addition, education may also generate positive spillover benefits for the local economy and community. Voting and civic participation are strongly correlated with education, and growth models typically presume that economies with more human capital grow faster (Krueger and Lindahl, 2001). Box 1 summarizes the key relationships.

It is therefore in a state's best interests to ensure that all children receive an adequate education. Yet, in California – as in many other states across the U.S. – large factions of high school students leave school without graduating. Recent data show that, for current cohorts of young adults in California, more than three out of ten public school students fail to graduate on time. These individuals are missing out on the private

benefits of education, and the state is losing revenues while spending more on public services. The result is a fiscal burden on taxpayers and a heavier cost for the broader society. This general argument is agreed upon by most economists (Carneiro and Heckman, 2002). At issue is the size of the burden and the optimal amount of public funding to be provided by the state to alleviate it. Such an inquiry is particularly pertinent for California, because the funding formula is such that it is primarily state policymakers who determine the amount of aid for each school (Duncombe and Yinger, 2007).

However, specific estimates regarding the size of the economic burden as a result of low education levels are not readily available at the state level. There are some estimates at the national level (Baum and Payea, 2006; Levin et al., 2007). Gottlob (2007) has undertaken an analysis for Texas, and Brady et al. (2005) examine the economic consequences of changing the distribution of education in California.[1] Karoly and Bigelow (2005) calculate the returns to investments in universal pre-school in California. Each analysis finds that there are likely to be big pay-offs from raising education levels. Aos et al. (2004) calculate cost-benefit ratios for a wide range of investments specifically for youth in Washington state.[2] Yet, for California it is not known to what extent public funding for education is sub-optimal and that raising it would have a substantial payoff.

This paper calculates these fiscal and social burdens and the payoffs to investing in higher rates of secondary school graduation. (In a companion paper, Belfield and

[1] The Alliance for Excellent Education estimates the earnings losses for each state (www.all4ed.org/publications/HighCost.pdf).

[2] Aos et al. (2004) cover more interventions than here, including policy areas other than education. However, there is less attention to the quality of the students, to the direct and consistent measurement of benefits, and to an independent analysis of costs.

Levin (2007) review educational interventions that may effect such change). Specifically, we calculate the fiscal and social costs arising from a failure to ensure that all the citizens of California graduate from high school. The first task is to map educational attainment in California for current cohorts of students and young adults. This reveals in stark terms the low levels of educational attainment across the state. Next, the amount of government spending in California is catalogued; this shows how much is spent on various services and by which levels of government. It also provides a necessary context for analysis of the economic burden of inadequate education. In the main portion of this paper the economic consequences of inadequate education on earnings, on tax revenues, and on spending on health, crime, and welfare are calculated. For each of these four domains a reliable effect of education has been assessed statistically and can be reasonably inferred. This effect is then multiplied by the respective economic burden to get an overall total cost. From this, the resources required to provide additional education (beyond 10^{th} grade) must be subtracted. Using a consistent accounting framework, these costs can be added up to generate a figure of what is being lost by failing to ensure that all students graduate from high school. The benefits of improved education to the taxpayer are the additional tax revenues and the savings in public expenditures for social services that are effected through the educational gains.

2. EDUCATION IN CALIFORNIA

Attainment across the population

Educational attainment across the adult population in California is depicted in Figure 1. Across the 21.9 million adults in the state, 2.19 million males and 1.96 million females are dropouts, i.e. 20% of the labor force. (These numbers include persons who have passed the General Educational Development (GED) test as high school graduates). The remainder, those who have graduated from high school, divide approximately equally into three groups: those whose terminal qualification is a high school diploma; those who attended college for some duration; and those who attended and completed a four-year degree. Thus, although more than half of all persons have some higher education, a significant proportion has not completed high school.

High school graduation

The primary focus of the present analysis will be on the rate of high school graduation in California for current cohorts of students. Extensive investigations into the best way to calculate the high school graduation rate has produced eleven independent measures available at the national level (varying, for example, in how they treat special education, migration, and private school enrollment). However, the methodological debates should not obscure the basic conclusion that there is reasonable agreement on the approximate rate of high school graduation. A systematic review of the different measures reports very strong correlations across the estimates (with weakest correlation at 0.5 and the highest at 0.8, Seastrom et al., 2006). More importantly, there is little dispute that the rate of graduation is disappointingly low.

Table 1 shows the rate of high school graduation in California can be reasonably counted at 73%, with a margin of error of only a few percentage points. (The higher estimates tend to be those from official reports which often fail to adjust for demographic

factors and are typically the most prone to overstatement). Table 1 also shows the variation in the rate of graduation by sex and race/ethnicity. The average freshman graduation rate, which is the most preferable, is not available by sex and race so two proximate measures are reported. These two measures underestimate the graduation rate according to our preferred measure, but they are used only to illustrate subgroup differences. As for almost all other states, graduation rates are lower for males than for females, and significantly lower for Hispanics and Blacks than for Whites and Asians (Holzman, 2004). Again, the figures are consistent across measurement methods: roughly seven out of ten White students, but only five or six of ten minority students graduate on time. Many students may drop out even earlier, such as before 9th grade.

Despite its state ranking of 16th in median income of families, California's high school graduation rate ranks 31st across the nation. Moreover, educational attainment in California is unlikely to trend upward significantly (Tienda, 2007). In the last two decades, the state has received very large numbers of immigrants: by 2004, one quarter of the state's population was foreign-born; and the foreign-born are twice as likely to lack a high school degree as native-born Californians (Brady et al., 2005, 54). Not only do immigrants have relatively low levels of education, but they may also face particular challenges of limited English proficiency or from attending schools in their countries of origin with relatively few educational resources. This conflux – high numbers of young immigrants who are poorly educated – has been dubbed the 'perfect storm' (Kirsch et al., 2007).

Predictions of educational attainment over the next few decades indicate that the proportion of high school dropouts will experience only a slight decline, with a modest

increase in average attainment overall arising from higher rates of completion of baccalaureate degrees (Brady et al., 2005, 52). Thus any increases in the stock of human capital are arising because persons who are already graduates are accumulating more years of college, not because dropouts are becoming graduates.

There are many reasons why individuals may not attain high school graduation. Family pressures, limited English proficiency, and the need to earn income can impose obstacles to educational success (Rumberger, 2004). Overwhelmingly, family background circumstances are the most important determinant in children's educational attainment. Some students may have low expectations that they can meet graduation requirements or may feel pressures to contribute to family income in their teenage years; others may find schooling boring or unpleasant; and others may fail to understand the future consequences of low education. Also, many immigrants will not have attended U.S. schools throughout their childhood or have dropped out in their countries of origin and, therefore, may not have been adequately prepared to succeed in high school. Further, limited English is also a handicap to school progress.

Regardless of these factors, it is strongly plausible to suggest that if the quality of schooling these students received was improved to meet their unique needs, the rate of graduation would increase. Indeed, recent work for the *Getting Down to Facts* series on California's education system affirms that for some children school quality is far below what is needed (Loeb et al., 2007). Reich (2007, p.24) concludes that "the conditions in which some of California's children attempt to learn are so far below a level of decency that we could never call these schools adequate". Duncombe and Yinger (2007, p.4) link this situation to funding, as "districts with a relatively high concentration of

disadvantaged students and those that operate in a relatively high-wage environment do not currently receive enough state support to reach even a modest student-performance target". Improving school quality through greater investments therefore appears as a desirable public policy on the basis of fairness, and is especially vindicated if the economic benefits are large enough. Specific interventions that might raise the graduation rate are discussed in a companion paper (Levin and Belfield, 2007).

Attainment for one age cohort

To calculate the fiscal and social burden, it is necessary to focus the analysis on a specific age group: persons aged 20 in 2005. This age cohort is chosen for analysis because it allows adequate time for individuals to graduate late from high school but still with most of their working life ahead of them.

Table 2 shows the educational attainment of this cohort of individuals, derived from Census data. There are 554,098 persons, of which the largest ethnic group is Hispanic. Over 90% of the cohort attended public school.[3] Most of the students graduated from high school on time, with an additional fraction graduating late (ages 18-20). The final columns of Table 2 report the numbers who will graduate from high school either on time or by age 20. Of the total cohort, by age 20 there will be only 435,602 high school graduates.

Table 3 reports on the terminal education for the cohort aged 20 in 2005. Of the 554,098 persons in the cohort, 130,681 will have high school graduation as their terminal education level, a further 156,817 will progress on to attend college for some duration, and another 148,105 will complete a degree. This leaves 118,496 persons who will be

[3] This head count of public school students of 498,690 is very close to California Department of Education estimates of the 9th grade population in 2001 (at 499,510).

high school dropouts.[4] This figure is composed of 65,282 males and 53,214 females, of which 61% are Hispanic and a further 11% are Black African American. It is 23% of all males and 20% of all females.

But these are not the only persons whose education is inadequate. There is strong economic evidence that, even though the GED itself benefits some recipients, the typical GED-holder does not have the same human capital as a person who graduated with a high school diploma; as such, GED-holders are unlikely to reach the same levels of economic well-being (Tyler, 2004; Cameron and Heckman, 1993; Murnane et al., 2000). Therefore, it is reasonable to think of GED-holders as closer to dropouts than graduates and so to add them to the group of persons with 'inadequate education'. The number of dropouts now rises to 161,800; i.e., 31% of males and 28% of females.

Lost opportunities for college attainment

Importantly, the full measure of lost educational attainment should account for the likelihood that a high school graduate, once completing secondary education, would continue on to post-secondary study. Being a high school graduate offers the opportunity to enroll in college and to further one's education. The costs and benefits for an additional high school completer are calculated by creating an 'expected high school graduate', i.e. someone who becomes a high school graduate with the potential to progress on to college and complete an associate's or bachelor's degree. Levin *et al*. (2007) have calculated the likelihood of college progression based on the 1988 National Education Longitudinal Survey and the 1996/2001 Beginning Postsecondary Students

[4] An alternative calculation based on California Department of Education data (retrieved October 29, 2006) yields only 62,870 dropouts for the 2001 cohort. However, this cohort was significantly smaller than the 2005 cohort. Also, official estimates are generally recognized to undercount dropouts.

Longitudinal Study.[5] These calculations assume that a new high school graduate would not progress on to college at the average rate, but at a rate equal to those in the lowest category of academic achievement. Specifically, new high school graduates are expected to attend college only at the same rate as those in the lowest quartile in reading nationally, since it is assumed that those failing to graduate under normal circumstances do not have the achievement and other advantages of more typical high school graduates, i.e. only education levels are being increased, not family income or the other attributes correlated with college attendance.

On average, for every 100 new high school graduates across the state, approximately 80 are expected to terminate their education after high school, 15 would continue on and obtain an associate's degree (or 'some college') and 5 would go on to obtain at least a bachelor's degree. This progression rate is conservative but it is important to include lost opportunities to go to college because of the additional benefits that would be likely to occur for each additional graduate. On the other side of the balance sheet, it is important to include the public resources required to support this higher education.

Resources required for each new graduate

For each new graduate it is necessary to take account of any additional costs for providing the education that is likely to lead to graduation. These costs include not only those of any additional educational intervention, but also the cost of additional years of schooling required to graduate. Each additional graduate obtains more years of high

[5] The progression rates are calculated by sex and race for termination after high school, after 'some college', and after a B.A. The rates, in percentages, for males are 80/12/8 (White), 75/17/8 (Black), and 77/18/5 (Hispanic). The rates for females are 81/14/5 (White), 83/11/6 (Black), and 85/11/4 (Hispanic). Rates for progression into the California higher education system are reported in Brady et al. (2005).

school than a dropout does. Here, it is assumed that each new graduate spends two more years in high school than a dropout does, and that this must be paid for by the taxpayer (this is conservative, because dropouts may attend school regularly but simply not complete the academic tasks). In addition, these new graduates will progress on to college which entails further public support. Those who obtain 'some college' are assumed to be in two year colleges for two years, and those who obtain a B.A. degree are assumed to be in a four year college. To be consistent with the other calculations below, these educational attainment costs are expressed as present values from the perspective of an individual aged 20, using a 3.5% interest rate (Moore et al., 2004).[6]

Table 4 shows the costs of extra attainment, divided into federal and state/local responsibilities. These costs are from the *Digest of Education Statistics* of the National Center for Education Statistics of the U.S. Department of Education (NCES, 2005). Two extra years of public schooling will have a present value (at age 20) cost of $19,600; 90% of this is paid by state/local agencies. Public expenditures per year in two-year and four-year colleges are $20,000 and $38,000 respectively (Brady et al., 2005), but only a fraction of new graduates will enroll (see probabilities above). In present values, the additional costs of college per additional high school graduate are less than $8,000 annually; 83% of this is paid by state/local agencies.

[6] Present value refers to the fact that a benefit received in the future has less value than one received at present. Therefore future benefits are discounted by a rate of interest to obtain a comparable present value. This is precisely why a lottery winner of $ 1,000,000 can get annual payments of $50,000 for 20 years adding to one million dollars in future payments or can elect to get a flat amount immediately that is more on the order of $650,000, the present value of a stream of $50,000 a year for 20 years. That is, the lottery winner can ask for the present value of the future payout. Bear in mind that if $ 650,000 is invested at an appropriate interest rate for 20 years, it will add up to $1,000,000. What we have done is converted future benefits received over many years to their present value to society for each person at age 20. For a more detailed explanation on present value, see Levin & McEwan (2001), pp. 88-94.

In total, a new high school graduate will be allocated between $3,400 and $4,300 of additional present value federal spending on education. However, the state spending is significantly more, reflecting the predominant role that the state occupies in the funding of education. California will incur an additional taxpayer expense of $24,700 to $29,010 in high school and college education for new graduates.

These costs are incomplete in one important respect in that they only include the costs of additional years of schooling for additional graduates: they do not count the cost of the educational interventions that are required to transform a high school dropout into a graduate. Here, the goal is to calculate the net present value of cost to the taxpayer and the state to produce a new graduate from among those who would have dropped out. How that transformation might take place and what it would cost is not included here; these are tasks undertaken in a companion paper (Levin and Belfield, 2007). Yet, regardless of the intervention required to become a high school graduate, these additional attainment costs will be incurred and so they should be factored into a full accounting.

3. GOVERNMENT SPENDING IN CALIFORNIA

The consequences of inadequate education are partly revealed by examining the allocation of government revenues in California. Specifically, the state must spend large amounts to provide health care, to combat crime, and to ensure basic living standards through the welfare system. Local governments also spend significant amounts. In addition, there are transfers that address these services from the federal government to California. Below, these federal components are separated out (although it should be

noted that California is one of the states whose residents and businesses pay more to the federal treasury than the state receives back).

Government spending for all persons in California is reported in Table 5. The figures are illustrative of the scale of spending and of how different levels of government contribute to providing public services. Total state spending in California in FY2004 was $147.5 billion (this figure is from the state Comptroller's budget, but not all of the items in Table 5 are fully covered because they are not entirely state-funded). Of this total, $62.0 billion was spent by the Health and Human Services department, with $34.5 billion offset by program revenues (including federal transfers). Importantly, over half of this spending was on Medicaid ($34 billion), of which just over half is covered by federal transfers, and most of the remainder allocated from state funds. Spending on crime can be separated into three components: police, the judiciary, and corrections. Just under half of all government spending to combat crime is for policing (46%) and just over one-fifth is for the judicial system (22%). Together, annual spending in California on these two components is $20.8 billion. For corrections, the annual budget of the California Department of Corrections is $9.8 billion. Across all spending on crime, the largest burden is placed on county and state governments: only 18% of total criminal justice system spending is funded at the federal level. Finally, the California Department of Social Services spends $24.3 billion annually (much of this support is for children, not adults). Just under half of this spending is derived from the federal government and just over half from state and local treasuries.

County-level governments in particular bear a heavy burden in terms of spending on crime and welfare. County-level spending in California in FY2003 was $12.7 billion.

Just under one-third was on public protection (including judicial services, police protection, and incarceration) and almost exactly one-third was on public assistance (welfare, social services, and general relief). Health and sanitation absorbed a further one-fifth. In total, county-level spending on health, crime, and welfare exceeds $10 billion annually. In contrast, total county-level expenditures on education were about $360 million, or less than 1% of total spending.

In the aggregate, the contrast is clear: across all government levels, $53.2 billion was allocated to education (with only $8.8 billion offset by revenues from educational services); this is an amount significantly below expenditures on health, crime, and welfare. Although the comparison is not precise, it is possible to suggest that more is being spent on addressing the consequences of inadequate education than on its alleviation. Thus, these aggregate figures suggest that the costs of inadequate education are potentially very high or that the benefits of overcoming inadequate education might be substantial.

4. THE EARNINGS AND TAX BENEFITS OF EDUCATION

The effect of education on earnings

Persons with higher levels of education are more productive in labor markets, earn more, and pay more taxes. The education-to-earnings relationship has been evaluated repeatedly in labor economics (Rouse, 2005). Research studies support the view that education causes higher earnings rather than simply being correlated with them or being

confounded with other attributes such as family background or ability.[7] Consequently, when individuals are not adequately educated, the state is losing potential economic income and tax revenues.

Earnings data on California residents are drawn from the Current Population Survey (CPS).[8] The CPS is the best available data, but it is not perfect. First, it only includes the civilian non-institutionalized population, so persons in prison are not counted. Because dropouts are more likely to be incarcerated with incomes of zero, their exclusion from the CPS means that the average income of non-incarcerated dropouts overstates the average income of all dropouts, a bias that is greater for dropouts than for graduates. The lifetime estimates reported here adjust for differences in incarceration rates by sex and race, although it turns out that this adjustment does not substantially influence the results. Also, the CPS does not separately identify persons with GEDs from high school graduates. This biases downward the benefits of education, because as noted above GED-holders do not have the same labor market success as high school graduates. Finally, the CPS methodology tends to under-count high school dropouts; For example, Schmitt and Baker (2006) found that the CPS undercounts the poorest members of society, particularly minorities with low education levels. This too introduces a conservative bias because these "hidden" or excluded persons are likely to have lower incomes than those who are identified in the survey.

Table 6 shows the differences in labor market status by sex across education

[7] These tests for causality have used many methods such as statistical controls for other influences as well as studies of twins and siblings who have obtained different levels of education, but share genetic endowments and upbringing. See Rouse (2005) for a summary.

[8] Data from 2003 and 2004 are combined to ensure a sufficient sample size. The sample only includes those who completed at least 9th grade for the estimates of income and tax revenue losses. All figures are weighted using the sampling weights provided by the Bureau of Labor Statistics, and all monetary figures are inflated to 2004 dollars using the Consumer Price Index for Urban Consumers. Data were provided by Professor Cecilia E. Rouse, Princeton University.

levels for California residents, as of 2003-04. These cross-sectional figures are for all persons, including those who are not working. As anticipated, high school and college graduates reap sizeable advantages in the labor market. Compared to high school dropouts, graduates are more likely to be working (68% versus 58% for males; 50% versus 28% for females) and to be employed in jobs with health insurance and pension plans (by an additional 18-20 percentage points for each benefit). Graduates also earn much more: including persons who report no earnings, average annual incomes for male dropouts in California are $11,860; in comparison, high school graduates earn $28,910 and college graduates earn $47,590. The pattern of earnings is similar for females, but the effects of education are smaller because of lower labor force participation rates, lower hourly earnings, and fewer hours of work for those in work. Nevertheless, whereas female dropouts have average annual incomes of $5,260, a high school graduate will earn $15,210 and a college graduate will earn $22,530. Finally, the standard deviations of annual earnings (measures of dispersion from their averages) show that, although some dropouts may earn more than graduates, the distributions of earnings do not overlap significantly.

Lifetime earnings advantages from education

These annual differences persist over the life course, leading to significant lifetime advantages for high school graduates.[9] Table 7 reports the lifetime incomes in terms of their present values across four education levels, by sex and race in California for a person who is aged 20 in 2004. Lifetime incomes are projected based on the entire age distribution of earnings as of 2003-04. These lifetime incomes are expressed in present

[9] Differences in youth earnings up to age 20 are not counted. These earnings are typically low, sporadic, and interrupted by school and college commitments. For high school dropouts, the CPS shows very high proportions are not in the labor force.

values at age 20, using a 3.5% discount rate (Moore et al., 2004). These are simple differences by education level, not controlling for endogeneity biases (other influences) on the grounds that such controls do not appear to markedly change the earnings premium (Card, 1999). Productivity growth of 1.5% per annum is assumed (the U.S. Treasury forecast uses 1.6% as its middle-range rate). All individuals are assumed to retire at age 65. Implicitly, these lifetime calculations assume that the current distribution of income by age persists for this cohort as it matures. For example, as White male graduates aged 40 now earn double that of White male dropouts aged 40, then this ratio will hold for the 2004 cohort when they reach 40 (in 2024). This assumption is probably conservative: in recent decades, dropouts have been losing ground to high school graduates (and even more compared to college graduates), such that the ratio will probably grow.

The top panel of Table 7 gives the absolute total lifetime incomes by sex and race. For each subgroup, the advantage of education is significant. For example, at aged 20 a White male dropout will expect to earn the equivalent in present value of $586,660 over his lifetime. A high school graduate's expected earnings are $1,089,380. Those who go to college will earn even more: those with 'some college' will earn $1,374,170 and those with a B.A. or above will earn $2,137,880. Although minority males earn less than White males, the effect of education is similarly strong. Females also reap proportionately similar advantages from high school graduation and college enrollment.

The middle panel of Table 7 shows the net lifetime gain over a high school dropout. These lifetime gains are substantial. A White male high school graduate will expect to earn $402,720 more than a dropout; a Black male will earn $260,230 more, and

an Hispanic male will earn $227,220 more. The differentials increase substantially as educational attainment increases, such that the lifetime earnings gain for a college graduate over a dropout is well in excess of $1 million. The absolute gains for females are also large: White female graduates earn $227,210 more than dropouts, Black females will earn $81,510 more, and Hispanic females will earn $112,170 more. For those who complete college, the lifetime income advantage over a high school dropout ranges between $633,090 and $705,310.

Finally, the bottom panel of Table 7 translates these earnings gains for high school graduates, for those with some college, and for college graduates into a single figure: the income gain per 'expected high school graduate' over a dropout (see Table Notes). Each additional White male 'expected high school graduate' will earn $520,770 more than a dropout; each Black male $447,180; and each Hispanic male $295,200. For each female 'expected high school graduate' the earnings gain ranges between $139,150 and $268,710. These amounts represent lost economic activity in California by failing to ensure each person is educated so that they can graduate from high school.[10]

The fiscal benefits of additional tax payments

The income gains for graduates are used to estimate the amount of extra tax they pay. Income tax payments are estimated using TAXSIM (version 7) derived by the National Bureau of Economic Research. TAXSIM simulates an individual's U.S. federal and state income taxes (excluding rents or expenses).[11] We follow the same method as for the

[10] This figure assumes that all persons remain in-state or that persons migrating in are offset by persons migrating out.

[11] Zero values are inserted for: dependent exemptions; taxpayers over 65; dividend income; taxable pensions; other property income; child care expenses; property taxes; and capital losses. These insertions should bias downward the gains from education. Also, as the tax code is (somewhat) progressive, and these incomes are averages for all persons, tax payments by those with more education may be further understated. But this may be offset because TAXSIM does not fully adjust for deductions (Rouse, 2005).

earnings gains: we estimate total lifetime tax contributions by education level; then we calculate the extra payments over dropouts; and then we combine these to estimate the extra payment per expected high school dropout.

The calculation of tax liabilities is complicated by two factors. First, when a family files their taxes it is not possible to extract the liability due to each individual (some of the tax code is specific to the family unit). Family filings will therefore be an imprecise indicator of who incurred what liability. Therefore, we generate two estimates of tax contributions. One assumes all individuals do not live in families and are "single"; the other assumes that if there is a male present, he is the head of the household. We take the average of these two estimates of tax payments.

Table 8 shows the additional tax contributions per expected high school graduate over the contributions of a high school dropout. Column 1 shows that additional federal income tax payments range between $76,750 and $135,400 for males, and $36,180 to $69,870 for females. Column 2 shows the extra state income tax payments; these range up to $26,040 for males and $13,440 for females.

Finally, column 3 reports the additional payments in state sales, excise and corporate taxes.[12] These are calculated as a function of state income tax payments, based on the proportions of revenues that each tax represents. Implicitly, this calculation assumes that persons contribute to sales and excise taxes to the same extent as they pay their state income taxes; this assumption may lead to overstatement for some taxes and understatement for others. Conservatively, it is assumed that only 75% of sales and excise taxes are paid by California residents. For California, the distribution of tax

[12] Local property tax payments are excluded. Rouse (2005) estimates that the differences in payments by education level are probably small, although the main reason for exclusion is that there is no available evidence on how property tax payments vary by education level.

revenues is as follows: 46% of revenues are from income taxes; 29% from sales taxes; 7% from selective excise taxes; 9% from corporate tax; and 7% from other taxes. Therefore, state sales, excise and corporate taxes paid by California residents are 0.78 times as large as state income tax revenues.[13] These tax amounts range from $5,450 to $20,380.

Overall, the federal government loses the most in tax revenues from inadequate education, but the state government also faces significant losses. The full loss in tax revenues is the sum of these three columns.

5. THE HEALTH BENEFITS OF EDUCATION

The effect of education on health

More education is associated with changes in health behaviors and better health. Cutler and Lleras-Muney (2006) offer an exhaustive empirical review of the link between education and over 30 separate measures of health, controlling for background characteristics. They find that more education is strongly and negatively associated with almost all conditions of poor health (including heart conditions, strokes, hypertension, high cholesterol, depression, and diabetes) as well as with a range of behaviors that might lead to ill health (such as smoking). A careful literature survey by Grossman (2006, pp.599-624) demonstrates with strong evidence that higher education levels are associated with healthier behaviors. Effects estimated by ordinary least squares specifications tend to be lower than those estimated using instrumental variables,

[13] Calculation of (29+9)*.75+9 divided by 46. Tax rates from www.taxadmin.org.

especially for those with low levels of education.[14] Unsurprisingly, these differences in health translate into significant disparities in mortality by education level (Wong et al., 2002).

Health improvements associated with education should reduce the fiscal pressure on government-supported programs and care. Further, the very low incomes of high school dropouts mean that they must depend heavily on health care programs funded by the taxpayer, such as Medicaid and Medicare.

The largest government health programs for working age adults are Medicaid (known as Medi-Cal in California) and Medicare for those who qualify for Social Security Disability Income (SSDI). Medi-Cal eligibility is means-tested, so increased education – simply through its effect on increasing earnings – reduces eligibility,. Similarly, Medicare via receipt of SSDI is less common among high school graduates than dropouts (as the latter represent one-quarter of all recipients, SSI, 2004).

Health status and government spending in California

California is close to the middle in most state rankings of health. For example, it has 13% of its children aged 0-17 who are overweight and 19% of infants who are not immunized; for adults, California has asthma rates of 13.2%, diabetes rates of 7.3%, a heart disease fatality rate of 0.032%, and a stroke fatality rate of 0.0056%. All these rates are very close to the national average. California does have one of the lowest reported rates of smoking, but the rate is nonetheless one-in-seven adults across the state (Kaiser Health Facts, 2007).

[14] In addition, there are strong effects of parental education on children's health (a benefit which is not estimated in the calculations included in this analysis). Thus, the relationships applied here are likely to understate the actual economic gain.

In absolute terms, the total spent on health care is 11% of Gross State Product and the government burden of providing health care for California is substantial. Annual Medicaid spending in California is $33.8 billion, and only half of this is financed by the federal government (considerably below the national norm, which is federal coverage of over 60%). Of this Medicaid spending, only 14% is spent on adults aged 18-64; 27% is for persons aged over 65, 39% is for the disabled, and 18% is spent on children. For each group it is possible to claim that the incidence is higher for those with low education. However, to ensure conservative estimates, the focus here is on adults on Medi-Cal aged under 65.

Across all California adults aged 19-64 in 2005, 2.2 million (10%) are on Medi-Cal and another 0.39 million (2%) on other public health insurance programs. In addition, Medi-Cal participation rates are much higher for poor adults: 27% are on Medi-Cal. Moreover, only two-thirds of adults are insured either privately or through their employer; this leaves 5.16 million who are uninsured. For poor adults, only 22% have private insurance. The uninsured often use expensive emergency services for treatments that would otherwise be provided through a regular medical procedure (Dismuke and Kunz, 2004). Finally, there are 595,000 persons aged 18-64 who are SSDI beneficiaries, which is 2.6% of the California population (and just over half of all SSDI beneficiaries).

As well, families with low education are likely to draw on more government health resources for their children. In 2005 there were 239,000 Medi-Cal births in California—45% of all births in the state. There were also 861,000 children enrolled in the State Children's Health Insurance Program (SCHIP), which receives state funding of $620 milliion and federal funding of $1.2 billion annually. However, there is no reliable

data on the causal link between education and receipt of these services. In omitting these within-family benefits of education and focussing only on individuals, the fiscal savings from education are likely to be understated.

The effect of education on Medicaid and Medicare enrollments

Although governments might value improvements in health *per se*, the focus here is primarily on how improvements in educational attainments translate into reduced expenditures on publicly provided health programs of Medi-Cal and Medicare. In fact, the latter relationship is heavily driven by incomes, for which (as documented above) there is very strong evidence of education's impact.

National figures show Medicaid enrollment rates are significantly lower for those with more education (Muennig, 2005). Whereas 15% of White male dropouts are enrolled, the rate is 5% for high school graduates, 3% for those with some college, and less than 1% for college graduates. The effects are even stronger for groups who enroll at high rates: for example, 51% of African American female dropouts are on Medi-Cal, compared to 22% of high school graduates and 3% of college graduates. Medicare coverage rates for SSDI are similarly stratified by education level. Annually, 8% of dropouts are covered, compared to 4% of high school graduates and 1% of those with a college degree. The percentage reductions in Medicaid and Medicare enrollments between a high school dropout and graduate are given in Table 9. The reductions are dramatic: rates for high school graduates are between half and one-third those of dropouts.

The fiscal benefits of lower Medicaid and Medicare enrollments

Raising the rate of high school graduation should reduce public expenditures on health programs. The estimates reported below are derived from Muennig (2005), weighted for California health costs.[15]

Table 10 shows the lifetime health savings per additional high school graduate for California. The savings can be divided into those accruing to federal, state, and local agencies. Muennig (2005) does not include local health expenditures, so these are added on to his estimates based on the proportion of health spending that is funded by local government (8%, see Section 2 above and Table 5). The total lifetime savings per high school graduate are significant: federal savings range from $20,120 to $44,970; state savings range from $17,130 to $38,280; local savings range from $3,110 to $6,960.

6. THE EFFECT OF EDUCATION ON CRIME AND CRIMINAL JUSTICE SYSTEM EXPENDITURES

The effect of education on crime

High school dropouts commit crimes at higher rates than high school graduates. Persons with more education may be motivated to undertake fewer criminal acts, but because they earn more they also have less incentive to commit crime; Farrington (2003) provides a recent review of the theory and evidence. Thus, raising the high school graduation rate should reduce crime.

Correspondingly, more education should reduce the rate of incarceration. Inmates in prisons and jails are disproportionately comprised of dropouts: over half of all inmates

[15] This analysis excludes the effect of education on changing rates of private health insurance enrollments and on longevity. Also, it does not account for how education increases usage of the public health system for a given health condition.

do not have a high school diploma on entry (Wolf Harlow, 2003). Importantly, minority male dropouts are incarcerated at extremely high rates. Using data for California, Raphael (2004) finds that over the early lifetime up to age 35 a Black male dropout is almost certain to have been incarcerated at some point. Using national data, Pettit and Western (2004) estimate the probability for incarceration of Black male dropouts is at least 60%. This rate is three times higher than for a Black male graduate, and 6-8 times higher than for a White male dropout. Hispanic males are also incarcerated at high rates.

Crime rates and criminal justice system spending in California

High rates of crime and incarceration impose a significant social and fiscal burden. Victims bear the largest cost in terms of lost property and impaired quality of life, and all citizens incur costs to avoid being the victim of a crime (Anderson, 1999). Taxpayers also incur costs for: the criminal justice system; corrections; crime prevention (such as the Department of Homeland Security); restitution for victims; and for publicly-provided medical care. Tax revenues are also lost when victims are unable to work and when criminals are not participating in the formal labor market (Holzer et al., 2004). Nationally, Ludwig (2006) estimates the total social and fiscal cost of crime at over $2 trillion (or 17% of annual GDP).

Criminal activity in California is reported in Table 11. Annually, there are 1.2 million property crimes as well as high numbers of larceny-theft, motor vehicle theft, burglary, and property crime. From an economic perspective, most crimes are misdemeanors, which generally do not impose large costs per crime. The more burdensome crimes are murder, sexual assault, other violent crimes, and property crimes; drug-offenses are also significant because they are so numerous (and are often associated

with other crimes such as assault). Per 100,000 persons in the state there are 526 violent crimes, over 1,920 property crimes, 7 murders, and 26 rapes per year. These crimes translate into arrests, of which the most common are for drug abuse violations, larceny-theft, and DWI offenses. Annually, the number of arrests is substantial, as shown in column 3 of Table 10. The fiscal cost of this criminal activity is $22 billion annually for California in policing and judiciary expenditures (see Table 5).

This criminal activity means high numbers of persons under the supervision of the California Department of Corrections (CDC). As of 2005, there are 168,100 persons incarcerated within the state, and a further 115,000 persons on parole (Harrison and Beck, 2006; CDCR, 2006). As shown in Table 12, most of the incarcerated are males, of which 38% are Hispanics and another 29% are African American. The CDC annual spending in 2005 was $9.8 billion, with annual costs per inmate of $34,150 (PSP, 2006). Although these numbers appear high, the rate of incarceration in California is just below the national average.

The fiscal benefits of lower criminal activity

Of the entire set of criminal activities, almost half (48%) involve individuals who have less than high school education (Wolf Harlow, 2003). Increasing the rate of high school graduation should therefore reduce crime for this group, in part, by increasing labor market opportunities. Lochner and Moretti (2004) identify the effect of high school graduation on reduced criminal activity using pooled 1960-80 Census and FBI data and changes in compulsory schooling laws (they find similar results using the National Longitudinal Survey of Youth with controls for background characteristics). Based on their estimates and accounting for further progression onto college, we calculate that

education reduces crimes by 20% for murder, rape, and other violent crimes; by 11% for property crime; and by 12% for drugs-related offenses. These reductions generate corresponding reductions on the duration of incarceration and parole.

Each additional high school graduate would therefore generate significant savings over their lifetime. However, calculating the effect from age 20 is overly conservative because it excludes all juvenile crime, which is roughly one-third of all crimes (although many juvenile crimes are misdemeanors which do not result in a prison sentence). The fiscal costs are derived from estimates developed nationally by Levin *et al*. (2007), adjusted for incarceration costs in California.[16] These estimates are also conservative: they are considerably below those derived from research based on how much people are willing to pay for a lower crime rate (Cohen *et al*., 2004).

Table 13 shows the cost saving per expected high school graduate, divided according to federal and state/local government funding sources (see Table 5). The federal savings are significant, ranging from $13,060 to $24,020 for males and approximately $3,500 for females. However, state and local governments bear a heavier burden: savings range from $26,690 to $49,090 for males, and just under $7,000 for females. There are significant differences in gender and race, with females imposing a considerably smaller burden than males. These differences arise because of variations in criminal activity, in arrests, and in the effect of education on crime. As noted above, they are probably conservative estimates of the savings that would actually be realized.

[16] Separate costs per arrest and per crime are calculated for the five types of crime. Crime is assumed to decay with age. Costs include policing, trials and sentencing, and incarceration (adapted from Belfield et al., 2006; BJS, 2005). They also include: costs to the government in payments to victims, based on the National Crime Victimization Survey; costs estimated by Cohen (2005) of payments from the Crime Victims Fund; costs to federal agencies committed to reducing crime (notably for the "war on drugs"); and costs estimated by MacMillan (2000) on the annual loss of tax revenues because victims are unable to work.

7. THE EFFECT OF EDUCATION ON WELFARE EXPENDITURES

The effects of education on welfare take-up

Persons with more education are less likely to be on welfare or other forms of public assistance payments or supports. Education directly reduces the probability of attributes and characteristics which raise welfare eligibility, such as single motherhood; and because it also boosts earnings, education reduces an individual's eligibility for means-tested programs (Jayakody et al., 2000).[17]

Welfare caseloads are predominantly female (approximately by a factor of ten), in part because many programs are tied to families with children; Black and other minority groups are also disproportionately represented. Although immigrants may face barriers to receiving welfare, the rates for immigrants are only 10% lower than the national average, and the rates for non-citizens 20% lower (controlling for income, Ratcliffe et al., 2007). Welfare spending is significant such that reductions in welfare incidence should result in taxpayer savings.

Welfare receipt in California

Large numbers of California residents receive some form of welfare. In California there are 1.12 million TANF (Temporary Aid for Needy Families) recipients in 454,000 families, with federal TANF spending at $1.8 billion (2002 data). There are 2.0 million persons receiving food stamps, with spending of over $2.5 billion annually (2006 data). The state also provides housing assistance through the Department of Housing and

[17] Higher attainment among those who meet eligibility requirements increases the probability of receiving such payments because more educated persons are better able to navigate the welfare system and claim benefits to which they are entitled. This navigation effect offsets somewhat the gains from reduced welfare entitlement (see Osborne Daponte et al., 1999).

Community Development. Its annual spending is $560 million, with 30% being derived from federal funding (HCD, 2006). In addition, there are state-funded welfare supports, e.g. CalWorks which supports 1.18 million adults annually. As reported in Table 5, these absorb significant amounts of taxpayer dollars.

Welfare savings from education

There are three welfare programs where the effect of low education has been demonstrated in the research literature: receipt of TANF cash assistance; housing assistance; and food stamps.[18] College graduates use these programs at very low rates. For example, fewer than 4% of TANF recipients, and fewer than 2% of housing assistance welfare recipients have some college education (DHSS, 2004; Barrett and Poikolainen, 2006). In contrast, dropouts use them intensively: more than two-thirds of all high school dropouts will use food stamps during their working life (Rank and Hirschl, 2005). Moreover, the effects are greater for subgroups where welfare use is most intensive. Looking only at females, and controlling for a significant array of background characteristics, Grogger (2004) estimates that, compared to a dropout, high school graduates are 68% less likely, and college graduates are 91% less likely, to be on any welfare program.

Using the CPS, Waldfogel *et al*. (2005) estimate welfare receipt by education level, controlling for other factors including personal characteristics and local conditions. These effects of education are reported in Table 14 across the three programs. Relative to a high school dropout, a high school graduate is 40% less likely, and a college graduate is

[18] There is no published research on the effect of education on other federal means-tested programs (such as education, services, job training, and energy aid). For TANF, less than half of expenditures are directly allocated to cash assistance. Economically important programs include the Earned Income Tax Credit, Supplemental Security Income, and nutrition programs (national spending on these is $84bn).

62% less likely, to receive TANF. Similarly, high school graduates are 1% less likely, and college graduates are 35% less likely, to receive housing assistance. For food stamps, the respective probabilities are 19% and 54% lower (Rank and Hirschl, 2005). These estimates are applied here, but with the caution that they are based on OLS regressions with control variables; there is no available evidence from experimental studies or instrumental variables techniques.

These impacts can be combined with the unit costs of welfare in California (based on national data with a state-level price weight). For TANF, the average annual benefit is $5,540 (DHHS, 2004). For food stamps, the average annual benefit is $1,325 (Barrett and Poikolainen, 2006). For housing assistance, average annual spending per household is $8,080 (CRS, 2004, 235). State-level welfare payments are counted as a proportion of these federal payments based on the ratio reported in Table 5, i.e. states spend 0.93 times the amount the federal government does on welfare.[19] Total lifetime costs are calculated as the impact times the present value unit cost each year. Eligibility for these three programs is not based on age, although younger families with children are more likely to qualify, and in the case of TANF, receipt is time-limited. Therefore, once the cohort reaches the age of 40, receipts are assumed to fall to zero.

The fiscal welfare savings per expected high school graduate are reported in Table 15. The amounts are split between federal and state/local government according to which agency funds each welfare program (see Table Notes). Reductions in TANF payments generate the largest savings, but there are also significant state-sourced savings. In the aggregate, an additional male expected high school graduate will save $3,000-$4,500

[19] This calculation is in fact conservative because only three federal spending items are being considered. Also, 30% of housing assistance payments are assumed to be sourced federally (DHCD website).

over the lifetime; for females, the savings are at least double, ranging up to $15,840 for those most reliant on welfare supports.

Compared to the other domains of health and crime, the savings from having more high school graduates are low. There are many reasons for this. Welfare is time-limited. Children and the elderly receive high proportions of welfare funds, but the effect of education on these persons is not counted. Males do not receive much welfare but they are a large proportion of all dropouts. Lastly, benefits for other federal welfare programs are not included because there is insufficient evidence on how education affects receipt. Nevertheless, the cost savings are not trivial, particularly for female dropouts.

8. THE TOTAL EFFECTS OF INADEQUATE EDUCATION

Each of the separate effects of education on earnings, health, crime, and welfare is economically important. In the aggregate, they suggest that there would be significant economic returns to ensuring that all California residents are adequately educated.

Fiscal savings to the government

Table 16 shows the total fiscal savings to the federal government if a high school dropout were, instead, to graduate from high school. On average, taking account of the population in each group, the present value benefits to the federal government are $119,140 per new graduate. If the costs of providing education during high school and college for those who progress on to higher education are added, the present value benefit is $115,300. For each additional male high school graduate, the lifetime federal savings would be $118,700-$174,240. Most of this saving comes from higher earnings and tax revenues resulting from more education. For each additional female graduate, the

lifetime savings are between $80,200 and $101,400. The amounts vary by sex and race, but they are substantial for each group.

Table 17 reports the equivalent fiscal savings for state and local governments. These savings are smaller than for the federal government, reflecting the latter's more dominant role in dependence on income taxes. Nonetheless, these savings are still large. Considering only the benefits in taxes and lower expenditures, the present value fiscal benefit is $80,240. However, state and local governments will incur costs in providing education; once these costs are accounted for the average present value fiscal saving to state and local governments for each new high school graduate is $53,580. This figure is still substantial and ranges between $61,980 and $99,610 for males and $35,620 and $45,450 for females. These magnitudes may be thought of as the amount of money that government agencies could invest in the education of a 20-year old and still break even.

Social gains for the state of California

Taxpayers are not the only ones who would reap economic benefits from increases in educational attainment: the entire state would benefit. The social gains to the state include the savings to the taxpayer, but there are three additional components.

First, there is the increase in private income earned by each new graduate. This increase in net income can be calculated as the change in gross income (Table 7) minus the tax payments (Table 8). Second, there are savings to society from reductions in crime. The fiscal consequences of inadequate education are a function of the budgets for the criminal justice system, but clearly the victims of crime bear the largest burden in terms of reduced quality of life and monetary losses (e.g. time off work). Moreover, all persons make private expenditures for insurance and other protections to prevent being

the victim of crime or to cushion is financial impact. These costs are much harder than fiscal costs to estimate with precision: Ludwig (2006) estimates these social costs are 4.5 times larger than the fiscal costs; data reported by Miller et al. (1996) yields a factor that is closer to 2.5. Following convention, the more conservative ratio is applied here.

Finally, there are externalities from education on economic growth: workers with more human capital might also make their co-workers' more productive and attract investment into the state. Reviewing the literature, McMahon (2006) estimates these externalities to be worth 37-61% of the total market returns to education. So, if the net private earnings advantage is $1,000; the externality is (conservatively) $370. In an extensive review of the cross-country evidence, Pritchett (2006) suggests that the effect is quite small and possibly zero. However, this evidence draws upon many countries with very different economic structures from the U.S. Nevertheless, to be conservative, the social gains are reported with and without any gains from externalities. Also, it should be noted that improvements in health (separate from their impact on health spending) are not included as a social gain.

Table 18 reports the social gains for California from increases in attainment. The first column reproduces the anticipated fiscal benefits to state and local governments. The second column reports the net earnings accrued by each new graduate. The third column gives the savings to victims of crime derived as a proportion of the fiscal crime savings. The fourth column is the total gain, assuming there are no externalities to economic growth. The final column of Table 18 is the total gain, assuming there are externalities of $0.37 cents per $1.00 of additional income. The present value gain to California per additional high school graduate is $322,100 (if there are no externalities)

or $391,910 (assuming a conservative value for externalities). The amounts vary by race, but remain substantial for each group.

These are very large numbers, reflecting the facts that the primary beneficiary of additional education is the individual, and that the main burden of crime is on the victim and not the taxpayer. Interpretation of the figures by sex and race should be cautiously performed (for example, the externalities are reaped by all workers). However, most victims of crime are the same race as the perpetrators, so reporting these social costs by race has a broader implication for social justice.

Aggregate effects of inadequate education per age cohort

The aggregate consequences of inadequate education can be calculated as the amount per graduate multiplied by the number of potential graduates. Table 19 reports the aggregate amounts along with some comparable aggregate statistics for California.

Of the cohort of persons aged 20, there are 118,496 dropouts (Table 3). To get an aggregate amount, it is necessary to postulate a potential reduction in the dropout rate. The assumption here is that 30% of the current cohort of dropouts might become graduates. This assumption – that the dropout rate could be reduced by 30% – serves primarily as an illustration and is open to debate. One-third of dropouts do not complete 10^{th} grade and so would need early and sustained interventions before high school. Moreover, the research literature on which interventions are effective is far from compelling. However, as noted in *Getting Down to Facts*, a sizeable proportion of children in California are being educated in schools that do not have adequate resources. Hence, a 30% reduction in the dropout rate may be feasible, if high quality educational interventions were offered to students most at-risk of failure. An upper bound estimate

might be a 50% reduction in the dropout rate. To emphasize, these figures are presented simply to show the aggregate consequences if policies could be implemented to effect such change.

A fall in the dropout rate by 30% for one cohort of students in California would yield total fiscal savings to the state/local government of $1.90 billion; if the dropout rate was halved, the fiscal savings would be $3.17 billion. Total fiscal savings to the federal government in California would be $4.10 billion or $6.83 billion, respectively. Keep in mind that these savings are for a single age cohort. These amounts can be understood as an annual 'investment fund' which will be cumulative over successive age groups: the next year's age cohort will generate the same amount of savings. The federal government benefits more than the state government for two simple reasons: the fiscal benefits of education accrue disproportionately more to the federal government, and the fiscal costs accrue disproportionately less. Finally, Table 19 shows the social gains for all citizens of California if the dropout rate was cut significantly: these gains would amount to $11.45-$13.93 billion or $19.08-$23.22 billion (depending on whether externalities are included). These social gains are the sum of the fiscal benefits to the state and the gains to all residents within the state. In absolute terms, these are significant economic effects of education.

Two comparison figures are reported in Table 19. These numbers are given for illustration of the economic consequences if policies could be implemented. First, total annual state spending in California is $147.5 billion. Therefore, a 30% fall in the dropout rate would yield fiscal savings which would equate to 1.3% of the state budget. Second, annual gross state product in California is $1.6 trillion. Similarly, reducing the dropout

rate by 30% would yield social gains for the state equivalent to 0.9% of Gross State Product. The effects from reducing the dropout rate by 50% are proportionately larger.

Finally, the absolute burden across all dropouts is depicted in Figures 2-4. These show the amount in millions of present value dollars for the age cohort currently aged 20. Figure 2 shows the federal losses. Figure 3 shows the state and local government losses. Figure 4 shows the total losses to the citizens of California. In each case, the economic magnitudes are very large.

9. SENSITIVITY ANALYSIS

The economic benefits of investments to raise high school graduation rates in California are very large. Of course, the exact magnitudes depend on the assumptions applied in each domain. Throughout this report, conservative rather than optimistic effects of education have been applied, along with lower bound estimates of unit costs. At least for the federal fiscal savings and the social gains, it is very unlikely that any change in the assumptions would alter the overall conclusions.

Direct sensitivity tests on the state benefits indicate that these figures are robust to alternative assumptions and further refinements. Indeed, it is more probable that the economic benefits are understated because of the trends in the impact of education. Health care costs are rising faster than inflation (Glied, 2003). More recent estimates of the economic burden of crime are higher than prior estimates (Ludwig, 2006). Demographic change is also working in the same direction, as the 'perfect storm' of under-educated younger persons combines with the exit of the baby boom generation

from the labor market and onto Social Security rolls (Tienda, 2007).[20] Even the largest single financial benefit of education – the increase in earnings – is possibly understated. The education-earnings premium is probably rising (Goldin and Katz, 2007); it is certainly not falling (Barrow and Rouse, 2006). In the absence of an increased demand for high school graduates it is possible that the additional earnings for an expanded supply of graduates could fall, but this scenario does not seem to reflect the present reality. The demand for skilled labor appears to be rising even faster.[21]

Sensitivity models for state/local savings

For the state/local fiscal savings, Table 20 summarizes a set of sensitivity tests. These are comparable to the 'best estimate' baseline figure of $53,580, and are based on alternative models using different assumptions.

Sensitivity test (1) includes additional benefits of education in terms of reduced juvenile crime and lower rates of teenage pregnancy. These were not included in the baseline model because they accrue before the age of 20, which is the initial threshold age for comparison. Nevertheless, there is evidence that higher levels of educational success will yield benefits in both areas. Savings from juvenile crime are included, based on the savings in adult crime; savings in teenage pregnancy are also counted (Maynard,

[20] Benefits may be greater if statistical discrimination is included. Minorities who are high school graduates find it harder to get jobs in part because they are perceived only to have the (lower) skills of the average for their group. Hence, in regions with more unemployed African Americans, even high-skilled African Americans are less likely to be employed (Pager, 2003). Changing education levels may help change perceptions about employability of minority groups and so reduce statistical discrimination.

[21] As well, new high school graduates would only be a fraction of the total workforce aged 21-65 in the California labor market. Any new flow would take decades to change the total stock of the graduate workforce (potentially reducing the wage premium for graduates).

1997).[22] These additions raise the total economic consequences by 3%, to $55,190 per new high school graduate.

Test (2) includes an adjustment for the cost of collecting government revenues to pay for health, crime, and welfare expenditures, i.e. the 'deadweight loss' of taxation. Fullerton (1991) estimates this deadweight loss at 7-25 cents per dollar of tax revenue raised; Allgood and Snow (1998) estimate it at 13-28 cents. Taking the average of these estimates, the fiscal benefit may be plausibly raised by 13% to $60,550.

Test (3) assumes that any new high school graduates will not obtain any more education beyond high school. This is unlikely because a sizeable proportion of even the most disadvantaged groups attend college for at least some duration. If no progression onto higher education is assumed, the fiscal benefits would be 25% lower than the 'best estimate'.

Test (4) assumes that any future benefits of education are valued at a lower rate (i.e., discounted more heavily). The discount rate applied is 5%, which is significantly above the rate recommended by Moore et al. (2004). The use of an arbitrarily higher discount rate reduces the fiscal savings by 20%, but they remain substantial at $42,920.

A final consideration is how these estimates might be affected by recent immigration patterns in California. The main concern is over the differences in the formation of human capital between immigrants and natives. Not only are many residents foreign-born, but also almost half of young children have a parent who is foreign-born: the 'educational pipeline' will be predominantly composed of first- and

[22] Juvenile crime is estimated at one-third of the total amount of crime (Levitt and Lochner, 2001) but it rarely leads to incarceration. Therefore, only one-third of the policing costs are added but no justice and incarceration costs are included (i.e., juvenile incarceration rate is assumed zero). Maynard (1997) calculates the cost in 1996 dollars of $13,500 per teenage pregnancy. A ten percent reduction in teenage pregnancy is assumed and the costs are adjusted into 2005 dollars.

second-generation Californians (Karoly and Bigelow, 2005). Immigrants participate in public services such as schools and the criminal justice system (but not welfare programs) at higher rates than natives; and this effect is partly driven by family size and dependents' ages. Immigrants also have lower educational attainment and attend schools characterized by fewer resources. Thus, the returns to graduation might be even greater for immigrants. However, immigrants' wages are significantly below those of natives, between 27-35% below for males and 6-28% below for females (Bratsberg et al., 2006). But the focus here is on the differentials across education, i.e. whether immigrants benefit more or less than natives from high school graduation. The returns to education are strong for immigrants in California and male immigrant-native wage differentials do not vary with education levels (Chowdhury and Pedace, 2007). Moreover, there appears to be significant assimilation for immigrants: after two decades, immigrant-native wage differentials are halved and the children of immigrants accumulate more education than natives (Chiswick and DebBurman, 2004; Bratsberg et al., 2006).

However, there is an additional concern in that this economic model assumes that California is a 'closed economy' in terms of human capital flows. It is assumed that the new graduates will not leave the state at relatively high rates. This assumption may be plausible: U.S. migration has tended toward the coastal states and educated migrants tend to cluster together (suggesting that a more educated state may attract more human capital).

Therefore the final sensitivity test applies a very conservative assumption of wages that are 30% lower for immigrants, but no change in public service usage and no

differences in immigration by education level. As shown in the final row of Table 20, the state/local savings fall by 10%.

In summary, it seems unlikely that sensitivity tests using alternative assumptions would overturn the fundamental conclusion of this analysis – that the federal and state/local savings from raising the high school graduation rate would be very high.

10. CONCLUSIONS

There are substantial economic benefits from raising the rate of high school graduation in California. These benefits accrue to private individuals, to taxpayers, and to residents across the state. They are reported here as present values that summarize a lifetime of such transaction and so can be compared to the value of an investment today that would yield these results over a lifetime. Conservatively, per each additional graduate, the fiscal or taxpayer gains are $115,000 to the federal government and $54,000 to state and local governments in California. The total social gains are $392,000.

Thus, there appear to be strong efficiency gains from ensuring that more individuals graduate from high school in the sense that investment costs to provide additional graduates are substantially less than these potential benefits. Additional investments might also be motivated by concerns over the fairness of the education system. There are significant differences across racial groups: Hispanic and African American students graduate at rates considerably below their White peers; they earn considerably less than Whites at all education levels and are incarcerated at much higher rates. Educational investments would not only satisfy equity goals, but also efficiency goals in terms of fiscal and social savings.

Of course it is necessary to find interventions that would raise the rate of high school graduation and to calculate their costs (Belfield & Levin 2007). Policy issues must also be considered, such as whether investments should be targeted to particular schools and students or how any additional investments in public education should be financed. However, the results reported here do suggest that the search for effective interventions should be wide-ranging across an array of programs. Some of these programs need not be directly education, but serve as a way to help families support their offsprings' education. For example, the Children's Advocacy Institute proposes child care compensation, improvements in the TANF safety net, improved pay for foster care workers, and enhanced programs targeted at delinquent parents (CAI, 2004). As well these results stress the imperative to hold schools accountable for their high school graduation rates (on the feasibility of this, see Rumberger and Palardy, 2005). But the economic case for raising the high school graduation rate appears compelling.

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Box 1
Key relationships between education and outcomes

Perspective	Benefits from additional educational attainment	Evidence of impact (selected studies)
Private individual	+ Gain in net earnings	Rouse (2005)
	+ Improved health status	Cutler and Lleras-Muney (2006), Grossman (2006)
Fiscal or government agency (state/local and federal)	+ Increased tax payments	Rouse (2005)
	+ Lower reliance on Medi-Cal and Medicare	Muennig (2005)
	+ Reduced expenditures on criminal justice	Lochner and Moretti (2004), Cohen (2005)
	+ Lower reliance on welfare	Grogger (2004), Waldfogel et al. (2005)
	- Additional costs of secondary and higher education	
Social	Private + Fiscal	
	+ Productivity externalities	McMahon (2006)
	+ Benefits to victims of crime	Ludwig (2006)

Table 1
On-time graduation rates for public high school students in California from three sources

	{1} AFGR	{2} On-time MI	{3} On-time CPI
Overall	**72.7%**	**65%**	**69%**
Range	**68.5%–86.7%**		
Male			
White	..	71%	71%
Black	..	50%	51%
Hispanic	..	51%	53%
Female			
White	..	76%	80%
Black	..	62%	59%
Hispanic	..	61%	61%

Notes: Data from 2004. {1} Averaged freshman graduation rate, Seastrom et al. (2006). The range covers all the published estimates in Seastrom et al. (2006). {2} Greene and Winters (2006); {3} Swanson (2006); .. denotes not available.

Table 2
Enrollments and Graduates in the Cohort aged 20 in California (2005)

	Total persons in age cohort	Public school enrollment [a]	Private school enrollment	On-time high school graduation [b]	High school graduation by age 20 [c]
Male	**281,981**	**253,783**	**28,198**	**190,348**	**216,699**
White	101,513	89,332	12,182	78,399	87,637
Black	21,149	19,668	1,480	11,975	13,979
Hispanic	119,278	112,956	6,322	69,083	80,536
Asian/other	40,041	35,397	4,645	30,892	34,547
Female	**272,117**	**244,905**	**27,212**	**205,891**	**218,903**
White	97,962	86,207	11,755	83,831	88,435
Black	20,409	18,980	1,429	13,156	14,141
Hispanic	115,105	109,005	6,101	75,854	81,457
Asian/other	38,641	34,158	4,482	33,050	34,870
Total	**554,098**				**435,602**

Notes: [a] Public/private school enrollment rates from Census (S0902) and Brougham and Swaim (2006): 11.6% for Whites/Asians/others, 7% for Blacks, 5.3% for Hispanics. [b] Public school rate from Seashore et al. (2007) adjusted for race/gender using proportions reported in Swanson (2006); private school rate assumed at 95%. [c] Assumes additional 10% [2.5%] of public [private] school cohort graduates between ages 18-20.

Table 3
Educational Attainment for the Cohort aged 20 in California (2005)

	Terminal education for cohort aged 20 [a]				Percentage of age cohort	
	High school graduate	**Some college**	**BA or above**	**Dropouts[b]**	**Dropouts**	**Dropouts incl. GED-holders [c]**
Male	**65,010**	**78,012**	**73,678**	**65,282**	**23%**	**31%**
White	26,291	31,549	29,796	13,876	14%	20%
Black	4,194	5,032	4,753	7,170	34%	43%
Hispanic	24,161	28,993	27,382	38,742	32%	42%
Asian/other	10,364	12,437	11,746	5,494	14%	20%
Female	**65,671**	**78,805**	**74,427**	**53,214**	**20%**	**28%**
White	26,531	31,837	30,068	9,527	10%	16%
Black	4,242	5,091	4,808	6,268	31%	40%
Hispanic	24,437	29,324	27,695	33,649	29%	39%
Asian/other	10,461	12,553	11,856	3,770	10%	16%
	130,681	**156,817**	**148,105**	**118,496**		
Cohort total	**554,098**					

Notes: Cohort total from Table 2. [a] ACS (2005). [b] Total age cohort minus high school graduation cohort by age 20. This column does not include GED-holders as dropouts. [c] Calculated as column 4 dropouts plus the proportion of column 1 who are GED-holders. Race-specific adjustments for GED receipt are from Rumberger's (2004) analysis of NELS (2000): of all graduates, 15% of Blacks and Hispanics and 8% of Whites are GED-holders.

Table 4
Public Costs for Additional Years of Attainment per High School Graduate in California

	Federal costs	State and local costs
Male		
White	$4,290	$29,010
Black	$3,950	$27,350
Hispanic	$4,000	$27,630
Female		
White	$3,780	$26,530
Black	$3,820	$26,710
Hispanic	$3,410	$24,700
Average	$3,840	$26,840

Notes: Costs are expressed as present values at age 20. Costs include costs of two years of secondary schooling and college attendance based on expected enrollment probabilities by race and gender.

Table 5
Annual State and Federal Spending in California (FY2004)

	$ billions
Total state spending	**$147.5**
Medicaid spending [a]	**$34.0**
Federal funds	$17.8
General state funds	$12.7
Other state funds	$3.5
Other Health and Human Services spending	**$28.0**
Criminal justice spending (police, judiciary) [b]	**$20.8**
CA Dept of Corrections [c]	**$9.8**
Federal funds	$5.2
State/local funds	$25.1
CA Dept of Social Services spending [d]	**$24.3**
Federal funds	$11.1
State/local funds	$10.3
Other	$2.9
Education spending (K-12 and higher)	**$53.2**

Notes: Unless indicated, items are from the CA Office of State Comptroller Budgets. [a] Other state funds include local government matching funds for Disproportionate Share Hospitals, Medi-Cal Administrative Activities, and other selected items. *Source***:** Table 28, 2004 State Expenditure Report, www.nasbo.org. [b] BJS (2003). [c] CDCR (2006). [d] www.dss.cahwnet.gov/localassistanceest/May07/02Tables.pdf.

Table 6
Labor Market Status: All Persons aged 21-64 in California (2003-04)

	Dropout	High School Graduate	Some college or above
Male:			
Employed	50%	68%	72%
Unemployed	7%	8%	5%
Not in labor force	43%	24%	23%
Weeks worked per year	25	35	37
Pension plan	21%	39%	53%
Health insurance	19%	39%	51%
Annual earnings: Mean	$ 11,860	$ 28,910	$ 47,590
Annual earnings: SD	$ 690	$ 1,530	$ 1,440
Female:			
Employed	28%	50%	60%
Unemployed	6%	5%	4%
Not in labor force	66%	45%	36%
Weeks worked p.a.	13	26	30
Pension plan	21%	41%	55%
Health insurance	11%	29%	39%
Annual earnings: Mean	$ 5,260	$ 15,210	$ 22,530
Annual earnings: SD	$ 1,150	$ 840	$ 700

Sources: Current Population Survey, 2003-04.
Notes: Calculations for earnings include all persons, employed or not. Pension plan and health insurance rates are for employed persons only.

Table 7
Lifetime Income: Present Value for All Persons in California Aged 20

	Dropout	High School Graduate	Some college	BA or above
Absolute totals:				
Male				
White	$686,660	$1,089,380	$1,374,170	$2,137,880
Black	$371,420	$731,640	$1,058,370	$1,575,900
Hispanic	$598,170	$825,390	$974,890	$1,646,840
Female				
White	$295,300	$522,510	$673,960	$928,400
Black	$377,370	$458,870	$642,650	$1,082,670
Hispanic	$341,880	$454,050	$622,850	$1,024,490
Advantage over dropout:				
Male				
White	--	$402,720	$687,510	$1,451,220
Black	--	$360,230	$686,960	$1,204,490
Hispanic	--	$227,220	$376,720	$1,048,670
Female				
White	--	$227,210	$378,650	$633,090
Black	--	$81,510	$265,280	$705,310
Hispanic	--	$112,170	$280,960	$682,600

	Income gain per expected high school graduate over dropout
Male	
White	$520,770
Black	$447,180
Hispanic	$295,200
Female	
White	$268,710
Black	$139,150
Hispanic	$153,550
Average	**$289,820**

Notes: 3.5% discount rate; 1.5% productivity growth; adjusted for incarceration rates by education level. An 'expected high school graduate' assumes that some graduates will progress on to obtain some college education and others will complete college. The progression rates vary by sex and race/ethnicity and are taken from Levin et al. (2007). The average is weighted for the size of each sex and race/ethnic group.

Table 8
Lifetime Additional Tax Payments: Present Values per Expected High School Graduate in California at Aged 20

	Income tax payments: Federal	Income tax payments: State	Sales and excise tax payments: State
Male			
White	$135,400	$26,040	$20,380
Black	$116,270	$22,360	$17,500
Hispanic	$76,750	$14,760	$11,550
Female			
White	$69,870	$13,440	$10,520
Black	$36,180	$6,960	$5,450
Hispanic	$39,920	$7,680	$6,010
Average	$75,350	$14,490	$11,340

Notes: 3.5% discount rate; 1.5% productivity growth. Income tax payments calculated based on Table 6 and TAXSIM. Income tax payments are the average of tax liabilities assuming the person is the head of household and the person is single. Federal payments include income taxes and social security payments. Column 3 is based on the proportion of total state revenues accrued from sales and excise taxes (www.taxadmin.org/fta/rate/05taxdis.htm). The average is weighted for the size of each sex and race/ethnic group.

Table 9
Reduction in Medi-Cal and Medicare (SSDI) enrollments from high school graduation in California

	Percentage fall in rate after high school graduation	
	Medi-Cal	**Medicare (SSDI)**
Male		
White	-69%	-50%
Black	-65%	-49%
Hispanic	-68%	-51%
Female		
White	-66%	-51%
Black	-57%	-50%
Hispanic	-63%	-51%

Notes: Figures derived from Muennig (2005).

Table 10
Lifetime Health Savings per Expected High School Graduate in California

	Health savings: Federal	Health savings: State	Health savings: Local
Male			
White	$20,120	$17,130	$3,110
Black	$35,670	$30,360	$5,520
Hispanic	$27,090	$23,060	$4,190
Female			
White	$28,420	$24,180	$4,400
Black	$44,970	$38,280	$6,960
Hispanic	$33,350	$28,380	$5,160
Average	$29,340	$24,970	$4,540

Notes: Figures derived from Muennig (2007) using California health costs. The average is weighted for the size of each sex and race/ethnic group.

Table 11
Criminal Activity in 2005 in California

	Number of crimes	*Crimes per 100,000 persons in California*	*Numbers of arrests*
Property crime	1,200,531	3322.6	173,561
Larceny-theft	692,467	1916.5	89,779
Motor vehicle theft	257,543	712.8	30,967
Burglary	250,521	693.3	51,086
Violent crime	190,178	526.3	122,875
Aggravated assault	114,661	317.3	100,677
Murder	2,503	6.9	1,953
Forcible rape	9,392	26.0	2,095
Robbery	63,622	176.1	18,150
DWI	..	..	181,243
Drug abuse violations	..	..	305,745
Other assaults	..	..	86,613

Source: FBI Uniform Crime Report (2005, Tables 4 and 69).
Notes: .. denotes not available.

Table 12
Institutional Population in California

	Number	%
Male		
White	42,880	26
Black	44,970	27
Hispanic	59,690	36
Other	9,060	5
Female		
White	4,440	3
Black	3,290	2
Hispanic	3,170	2
Other	570	<1
Total	168,080	100

Notes: This includes all institutions under the jurisdiction of the CDC.

Table 13
Lifetime Fiscal Crime Savings per Expected High School Graduate in California

	Federal savings	State and local savings
Male		
White	$13,060	$26,690
Black	$24,020	$49,090
Hispanic	$16,590	$33,870
Female		
White	$3,470	$6,580
Black	$3,590	$6,810
Hispanic	$3,480	$6,580
Average	$10,580	$21,370

Notes: Adapted from Levin et al. (2007) and California crime rates and expenditures (BJS, 2005; PSP, 2006). The average is weighted for the size of each sex and race/ethnic group.

Table 14
The effects of education on welfare receipt in California

	TANF	Housing assistance	Food stamps
Welfare receipt relative to a high school dropout:			
High school graduate	-40%	-1%	-19%
College graduate	-62%	-35%	-54%

Sources: Waldfogel *et al.* (2005) and Rank and Hirschl (2005).

Table 15
Lifetime Fiscal Welfare Savings per Expected High School Graduate in California

	Federal savings	State and local savings
Male		
White	$1,410	$1,390
Black	$2,230	$2,140
Hispanic	$2,270	$2,180
Female		
White	$3,430	$3,300
Black	$8,120	$7,720
Hispanic	$6,860	$6,520
Average	$3,870	$3,700

Sources: TANF Annual Report (DHHS, 2005); Barrett and Poikolainen (2006). *Notes:* Federal savings are from reductions in TANF, food stamp expenditures and housing assistance (30%). State and local savings are from reductions in housing assistance (70%) and other state/local welfare services applied as a proportion of federal spending. The average is weighted for the size of each sex and race/ethnic group.

Table 16
Lifetime Fiscal Savings per Expected High School Graduate in California: Federal Government

	Education expenditures	*Tax payments*	*Health expenditures*	*Crime expenditures*	*Welfare expenditures*	*Total savings*
Male						
White	($4,290)	$135,400	$20,120	$13,060	$1,410	$165,710
Black	($3,950)	$116,270	$35,670	$24,020	$2,230	$174,240
Hispanic	($4,000)	$76,750	$27,090	$16,590	$2,270	$118,700
Female						
White	($3,780)	$69,870	$28,420	$3,470	$3,430	$101,400
Black	($3,820)	$36,180	$44,970	$3,590	$8,120	$89,050
Hispanic	($3,410)	$39,920	$33,350	$3,480	$6,860	$80,200
Average	**($3,840)**	**$75,350**	**$29,340**	**$10,580**	**$3,870**	**$115,300**

Notes: Lifetime values based on a 3.5% discount rate. Average savings are weighted for population in each group (see Table 3), with racial group 'other' assumed to have the same economic status as Whites. The average is weighted for the size of each sex and race/ethnic group.

Table 17
Total Lifetime Fiscal Savings per Expected High School Graduate in California: State and Local Government

	Education expenditures	*Tax payments*	*Health expenditures*	*Crime expenditures*	*Welfare expenditures*	*Total Savings*
Male						
White	($29,010)	$46,420	$20,240	$26,690	$1,390	$65,730
Black	($27,350)	$39,860	$35,880	$49,090	$2,140	$99,610
Hispanic	($27,630)	$26,310	$27,250	$33,870	$2,180	$61,980
Female						
White	($26,530)	$23,960	$28,580	$6,580	$3,300	$35,880
Black	($26,710)	$12,410	$45,230	$6,810	$7,720	$45,450
Hispanic	($24,700)	$13,690	$33,540	$6,580	$6,520	$35,620
Average	**($26,840)**	**$25,840**	**$29,510**	**$21,370**	**$3,700**	**$53,580**

Notes: Lifetime values based on a 3.5% discount rate. Average savings are weighted for population in each group. Racial group 'other' assumed to have the same economic status as Whites.

Table 18
Total Lifetime Social Gains per Expected High School Graduate to the state of California

	Fiscal savings to state and local government	*Earnings (Net of all taxes)*	*Crime (Victim costs)*	*Total Gains (no externalities)*	*Total Gains (with externalities)*
Male					
White	$65,730	$338,950	$99,380	$504,060	$629,470
Black	$99,610	$291,060	$182,780	$573,440	$681,130
Hispanic	$61,980	$192,140	$126,150	$380,270	$451,360
Female					
White	$35,880	$174,900	$25,130	$235,900	$300,610
Black	$45,450	$90,570	$26,000	$162,020	$195,530
Hispanic	$35,620	$99,940	$25,150	$160,710	$197,690
Average	**$53,580**	**$188,640**	**$79,890**	**$322,100**	**$391,910**

Sources: For column 1, Table 17. For column 2, Tables 6 and 15. For column 3, Miller et al. (1996). For column 4, McMahon (2006). Average savings are weighted for population in each group. Racial group 'other' assumed to have the same economic status as Whites.

Table 19
Total Lifetime Savings per Cohort of Persons Aged 20 in California: State and Local Government

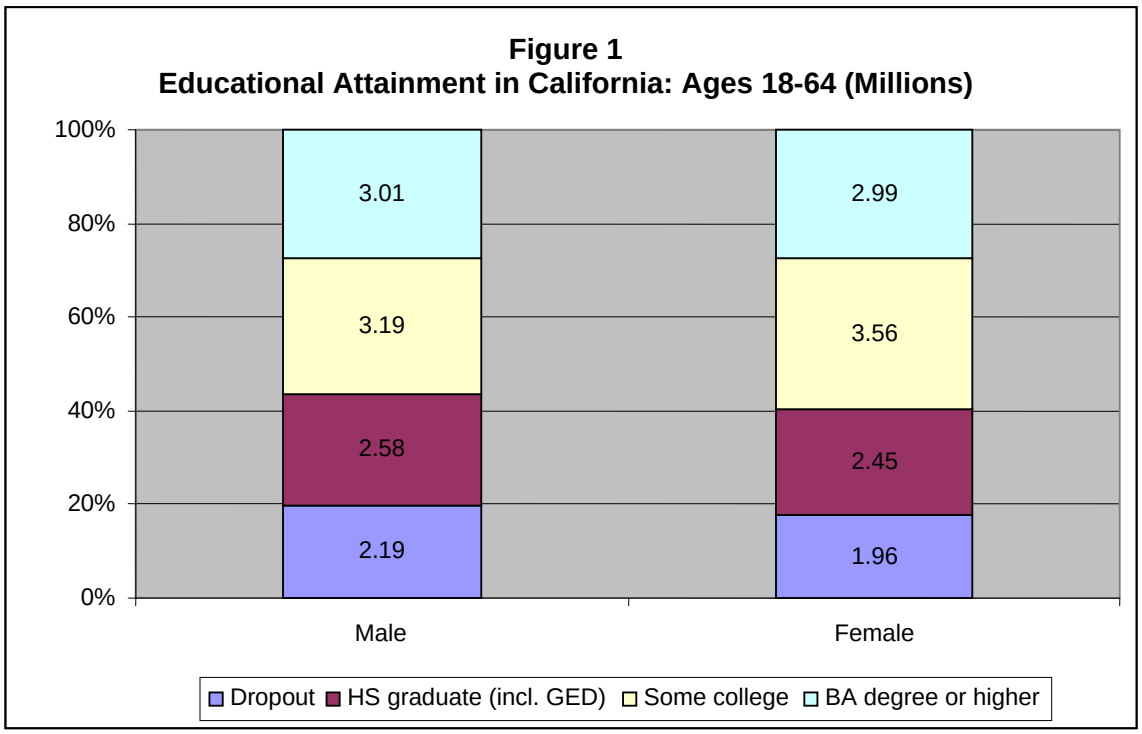
High school dropouts per age cohort	**118,496**
Total if 30% of dropouts graduate:	
Fiscal saving to California state/local governments	**$1.90 billion**
Fiscal saving to the federal government	**$4.10 billion**
Social gains for California (with no externalities)	**$11.45 billion**
Social gains for California (with externalities)	**$13.93 billion**
Total if 50% of dropouts graduate:	
Fiscal saving to California state/local governments	**$3.17 billion**
Fiscal saving to the federal government	**$6.83 billion**
Social gains for California (with no externalities)	**$19.08 billion**
Social gains for California (with externalities)	**$23.22 billion**
Total state spending (2004)	**$147.50 billion**
Annual Gross State Product (2005)	**$1,616.35 billion**

Notes: See Tables 3, 4, 15-17. Bureau of Economic Analysis.

Table 20
Sensitivity Tests on the Fiscal Benefits of High School Graduation in California

	State/local fiscal benefits per expected high school graduate	
	Amount	**% change over best estimate**
Best estimate of the fiscal effect	$53,580	
Estimate using alternative assumptions:		
) Inclusion of benefits from lower rates of juvenile crime and teenage pregnancy	$55,190	3%
) Higher taxes to support added costs of dropouts impose an economic distortion (deadweight loss) on taxpayers	$60,550	13%
) Any new high school graduate does not attend or complete college	$40,190	-25%
) Future benefits are valued at a lower rate (discounted at 5% per year rather than 3.5%)	$42,920	-20%
) Immigrant wages are 30% lower than natives	$48,270	-10%

Notes: The best estimate is taken from Table 17.



Source: American Community Survey, U.S. Census, 2005.

Figure 2
Losses to the Federal Government
Per Age Cohort of Dropouts
($ millions)

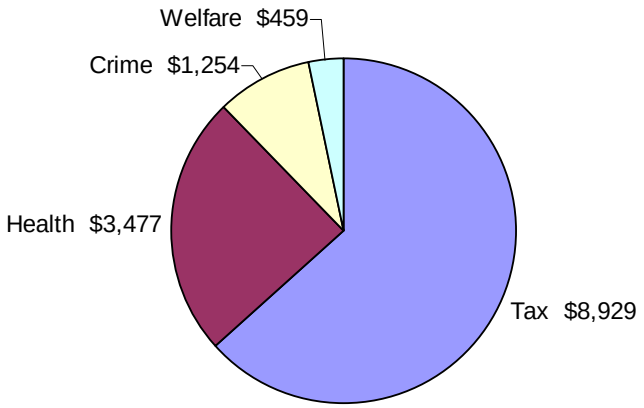


Figure 3
Losses to the State/local Government of California
Per Age Cohort of Dropouts
($ millions)

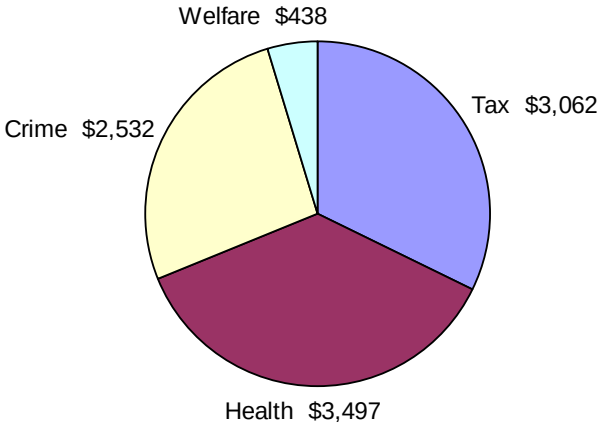


Figure 4
Losses to the State of California Per Age Cohort of High School Dropouts
($ millions)