California's High School Dropouts
Examining the Fiscal Consequences

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Our authors take full responsibility for research design, data collection, analysis, content and charts, and any unintentional errors or misrepresentations. They welcome any and all questions related to methods and findings.

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Executive Summary

This report analyzes the economic and social costs of the high school dropout problem in California from the perspective of a state taxpayer. Our analysis considers the consequences of this problem in terms of labor market, tax revenue, public health, and incarceration costs. Our quantification of these costs reveals the sizeable taxpayer benefits that stand to be gained by aggressively combating the state's dropout problem. Our analysis reveals the following findings.

Key findings include:

- According to the California Department of Education, 98,420 public high school students dropped out of school in 2007-08, suggesting 19 percent of California high school students in any ninth-grade class will drop out over a four-year period. Hispanic and African American students drop out at an estimated rate of 24 percent and 33 percent respectively.

- California dropouts experience difficulty in the labor market. They are more likely to be unemployed or out of the labor force and twice as likely to be living in poverty. Based on data from the Census Bureau's *Current Population Survey*, we estimate that the average California high school dropout earns $14,226 less per year than we would expect had they graduated high school. Over a lifetime, high school dropouts will earn $412,000 less than a high school graduate (in 2008 dollars).

- The lower earnings of high school dropouts cost the state more than $54 billion per year in lost taxable personal income. California high school dropouts on average contribute $252 less per year in state taxes than they would have had they graduated from high school. This lost state tax revenue adds up to $958 million annually.

- Dropouts report worse health than graduates and require more public health resources. Close to 20 percent of California high school dropouts report fair or poor health and close to half receive Medicaid. We estimate the average Medicaid costs to the state per high school dropout are $283 per year, which results in over $1 billion in added expenses for the state's 3.8 million high school dropouts.

- Dropouts drive up the state's incarceration costs. Over a lifetime, a dropout costs the state $8,484 because of higher incarceration rates than higher-educated peers. We estimate the average annual incarceration costs of California's 3.8 million dropouts would decline by $374 per person had those dropouts graduated from high school, representing potential cost savings of more than $1.4 billion.

- California's economy will benefit tremendously by reducing dropouts. We estimate that each prevented dropout will result in a present value lifetime benefit of $28,227.[1] By permanently cutting the dropout rate in half, each new graduating class of high school students would yield more than $1.4 billion in direct gross economic benefits to the state. Completely eliminating the dropout problem would save the state $2.8 billion annually, or approximately 14 percent of its present budget deficit.

Introduction

A Fiscal Perspective on High School Dropouts

The high school dropout rate in California is alarming. In 2007-08, the California Department of Education estimated that 98,420 public high school students dropped out of school.[2] **These data suggest that about 19 percent of California high school students in any ninth-grade class will drop out over a four-year period.[3] The dropout rate is particularly acute among the state's largest minority stu**dent populations. An estimated 33 percent of African Americans and 24 percent of Hispanics will drop **out over a four-year period.[4]**

The economic and social consequences of the dropout crisis are profound, particularly in those **minority communities whose children drop out of high school at disproportionately higher rates. Re**search demonstrates that dropouts suffer more joblessness, earn less income, and tend more to criminality, public dependency, and poor health than high school graduates.[5] **The 2008 employment rate of** the nation's population of 16- to 24-year-old high school dropouts was 22 percentage points below that of peers with a high school diploma, 33 percentage points below that of peers with one to three years of post-secondary schooling, and 41 percentage points below that of peers with a four-year college **degree.[6]** On average, these dropouts earned only $8,358 per year, whereas high school graduates with a four-year college degree earned approximately $24,800, or three times the earnings of dropouts.[7]

These disparities in educational attainment also lead to tragic differences in life outcomes. In 2006-07, the national rate of imprisonment of 16- to 24-year-old high school dropouts was more than six times that of peers with a high school diploma, and more than 63 times that of peers with a four-**year college degree.[8]** Moreover, 16- to 24-year-old high school dropouts were twice as likely as peers with a high school diploma, and more than four times as likely as peers with a college degree, to live in families dependent on state and federal support such as food stamps, rental subsidies, Medicaid, **and federal and state earned income tax credits.[9]** Finally, previous research shows that lower levels of educational attainment are associated with heart conditions, strokes, hypertension, high cholesterol, depression, diabetes, and other adverse health outcomes, as well as the behaviors that might lead to **these outcomes.[10]**

Beyond these individual economic and social consequences, high school dropouts place a substantial fiscal burden on local, state, and national economies. This fiscal burden results from lost tax revenue because of dropouts' lower incomes, and elevated government expenses stemming from crime, welfare, and poor health. Andrew Sum and colleagues estimate that the average high school dropout will cost taxpayers more than $292,000 (compared to the average high school graduate) in reduced tax revenue, higher governmental support payments, and higher incarceration costs.[11] In analyzing California specifically, Henry Levin and colleagues conservatively estimate that converting each potential dropout to a high school graduate would result in fiscal gains of $115,000 to the federal government and $54,000 to local and state governments.[12] Levin and colleagues estimate that a 30 percent reduction in California's high school dropout rate would yield total fiscal savings of more than $3 billion to the federal government and almost $2 billion to local and state governments.[13]

In light of these realities, this study considers the consequences of California's high school dropouts from the perspective of a state taxpayer. We frame our analysis of these consequences in terms of the state's labor market, tax revenue, and public service costs. By quantifying these effects, we seek to provide education policymakers with financial context, highlight the potential economic benefits from aggressively combating the dropout problem, identify key data and assumptions to consider when weighing the economic and political costs of various education reforms, and engender citizen interest in addressing California's high school dropout crisis given the substantial costs of maintaining the status quo.

Organization of the Report

This report provides the results of our study analyzing the fiscal consequences of the dropout crisis in California. In the next section, we describe the data and methods we use in measuring California's dropout rates and estimating its economic consequences. We then report on trends in California's dropout and graduation rates, compare these trends to national averages, and examine differences in these trends by race. We then estimate the fiscal costs of high school dropouts both for the individuals themselves and for the state in terms of personal income, state tax revenue, public health, and incarceration. We conclude by estimating the gross fiscal benefits that would accrue to the state by permanently reducing the high school dropout rate in California.

Data and Methods

Estimating the Relationship of Education to Economic Outcomes

The methods and data sources used in this report build upon the extensive work of economists Henry M. Levin, Clive Belfield, and Cecilia Rouse.[14] Their standard methodological approach to estimating the relationship of schooling to earnings (and other economic outcomes) employs cross-sectional national survey data. Specifically, they compare the distribution of earnings over age groups with different levels of education and then use these differences in earnings to approximate the lifetime benefits accrued by additional schooling or high school graduation. This approach assumes that differences in earnings between high school graduates and dropouts are because of their respective levels of schooling, and not to other factors, such as innate ability or family background. Although there is no guarantee this simple method yields unbiased estimates of the causal effect of schooling on economic outcomes, a substantial body of empirical evidence from leading economists suggests the method does provide a reasonable approximation. Rouse conducted a comprehensive review of the economic literature on the causal effect of schooling, and concluded: "This literature has led many to believe that the overall cross-sectional estimate of the economic value of education is likely quite close to the estimate one would generate from the ideal experiment."[15]

U.S. Census Bureau's Current Population Survey – March Supplement (2006 to 2009)

Data used in this report are drawn from the U.S. Census Bureau's *Current Population Survey* (CPS), particularly the CPS March supplement. The CPS is administered monthly by the U.S. Census Bureau to more than 50,000 U.S. households. CPS respondents are asked questions about their employment, earnings, educational attainment, and demographic characteristics (e.g., age, sex, and race). The CPS March supplement includes information on individuals' total labor market earnings for the previous calendar year, which is essential for estimating annual costs and benefits associated with educational attainment. Most of the analysis is limited to annual samples of approximately 11,000 California residents between the ages 20 and 65 who are not full-time students. Individual responses are weighted using the final sample weights provided by the U.S. Census Bureau, which allow the sample estimates to generalize to national and state populations.

We use data from 2006-09, which reflect the financial earnings of the prior fiscal years (2005-08, respectively). We employ four years of data for two principal reasons. First, by averaging across multiple years we provide more stable estimates of the economic and demographic characteristics of California's population. Second, using data from 2006-09 provides better estimates of the economic costs of dropouts in non-recessionary periods, while also speaking to the nation's present economic conditions.

Methodological Limitations

Readers should consider a few methodological limitations in our analysis. First, in our attempt to estimate the economic costs of dropouts we do not address the general equilibrium effects of increasing educational attainment. One could argue that an increase in the supply of high school graduates entering the labor market would devalue the return of a high school diploma given an increase in competition for skilled jobs. Belfield, however, notes that new graduates represent a small fraction of the total labor market.[16] Consequently, the effects of increased schooling would only exert a meaningful impact on the composition of the labor market after an extended period of time. Moreover, there is historical evidence that the income benefits to U.S. high school graduates have risen even though overall education levels have increased, suggesting that the economic return of the high school diploma has endured even as the supply of high school graduates in the labor force has grown.[17]

Second, the CPS does not distinguish between high school diplomas and General Equivalency Diplomas (GED). This limitation requires us to assume that the economic return to these degrees is the same, which may not be the case. Generally speaking, high school diplomas provide more career and education advancement opportunities than high school equivalency degrees.

Third, prior studies suggest the CPS data consistently underestimate the true number of public school dropouts in the population. Researchers offer a number of explanations for the lower CPS figures. For one, the CPS data are drawn from a restricted statistical sample that excludes military and institutionalized individuals, both of which are characterized by disproportionately higher high school dropout rates. In addition, high school dropouts may be underrepresented in the sampling frame because they are less accessible for data collection or less likely to answer questions regarding their

financial situation. Another explanation is that CPS survey respondents misreport their children's education levels — i.e. indicating they graduated when they did not. Finally, the CPS includes private school attendees, who have a higher likelihood of completing high school, whereas the state reports are limited to public school students.[18] In light of this evidence, these findings are expected to be conservative estimates of the true fiscal impact of dropouts.

Dropouts in California

Table 1 reports the number and rate of high school dropouts in California public schools for school year 2007-08. Based on these data, the California Department of Education estimates that 19 percent of students in a ninth-grade class (i.e. cohort) will drop out over a four-year period. The state's two largest populations of minority students drop out at markedly higher rates. Specifically, the state estimates that Hispanic and African American students will drop out of public high school at a rate of 24 percent and 33 percent respectively.

Nineteen percent of high school students will drop out in four years.							Table 1

Statewide Dropout Rates for 2007-08

	Grade 9	Grade 10	Grade 11	Grade 12	Grade 9-12	Adjusted Grade 9-12 Dropout Total	Adjusted Grade 9-12 Four-Year Dropout Rate
All Students Combined	**9,737**	**10,995**	**14,657**	**42,794**	**78,369**	**98,420**	**18.9%**
Native American	113	120	173	465	872	1,083	**24.1%**
Asian	317	345	424	1,882	2,973	3,488	**7.9%**
Pacific Islander	59	65	111	366	602	749	**21.3%**
Filipino	110	122	190	648	1,070	1,235	**8.6%**
Hispanic/Latino	5,570	6,303	8,078	23,069	43,126	54,998	**23.8%**
African American	1,427	1,498	1,950	6,084	10,982	14,516	**32.9%**
White	1,747	2,131	3,242	9,148	16,315	19,458	**11.7%**
Multi/Unknown	394	411	489	1,132	2,429	2,893	**23.3%**

Notes: The grade 9-12 dropout totals and rates include a small number of ungraded students. The adjusted grade 9-12 dropout rates account for students initially reported as dropouts but subsequently found to be enrolled in another California public school district, as well as students reported as having transferred to another California public school but not found enrolled in another California public school.
Source: California Department of Education (2010)

Figure 1 compares California's four-year freshman graduation rate to the national average, as reported by the National Center for Education Statistics (NCES).[19] According to NCES, California's graduation rate was 71 percent in 2007-08, lagging the national average by four percentage points. Using a different calculation method, The Editorial Projects in Education Research Center ranked California's 2006-07 graduation rate 41st in the nation.[20] **Graduation rates have shown little improvement in the past six years; year after year, roughly 30 percent of students failed to graduate on time.**

California's graduation rate has trailed the national average since 2005-06.	Figure 1

California and National High School Graduation Rates (2002-03 to 2007-08)
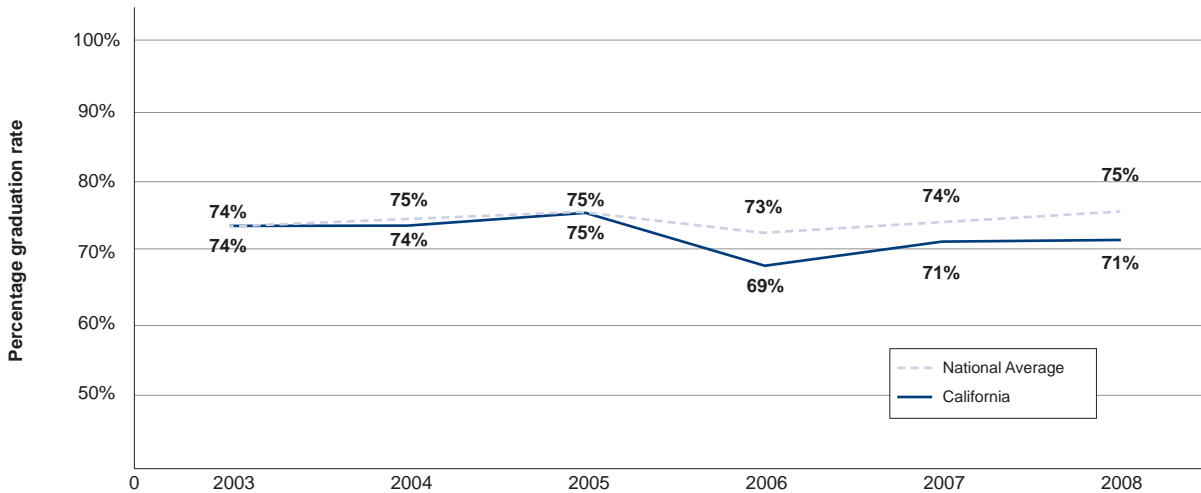
Notes: The California and national high school graduation rates represent the National Center for Education Statistics' estimates of the percentage of an entering freshman class graduating in 4 years. For example, in school year 2006-07, this estimate equals the total number of diploma recipients in school year 2006-07 divided by the average membership of the 8th-grade class in 2002-03, the 9th-grade class in 2003-04, and the 10th-grade class in 2004-05.
Source: National Center for Education Statistics (2010).

Certain student groups are more at risk of dropping out than others. Figure 2 breaks down the 2006-07 statewide graduation rates by ethnicity and gender.[21] **Asians have the highest average graduation rate, with 9 out of 10 students graduating on time. The graduation rate for Whites exceeds 80 percent. At the other end of the spectrum are African American and Hispanics, with graduation rates lagging more than 20 percentage points behind Whites.** Males in all ethnic groups are less likely

to graduate than females. African American and Hispanic males have the most alarming graduation rates, with 54 percent and 55 percent graduating on time respectively.

Only about 60% of African American and Hispanic students graduate.

Figure 2

California High School Graduation Rates by Ethnicity and Gender (2006-07)

Legend: Female / Male

Total: Female 75.8%, Male 67.3%
African American: Female 64.7%, Male 54.3%
Asian: Female 94.5%, Male 88.9%
Hispanic: Female 65.7%, Male 55.1%
White: Female 82.9%, Male 76.6%
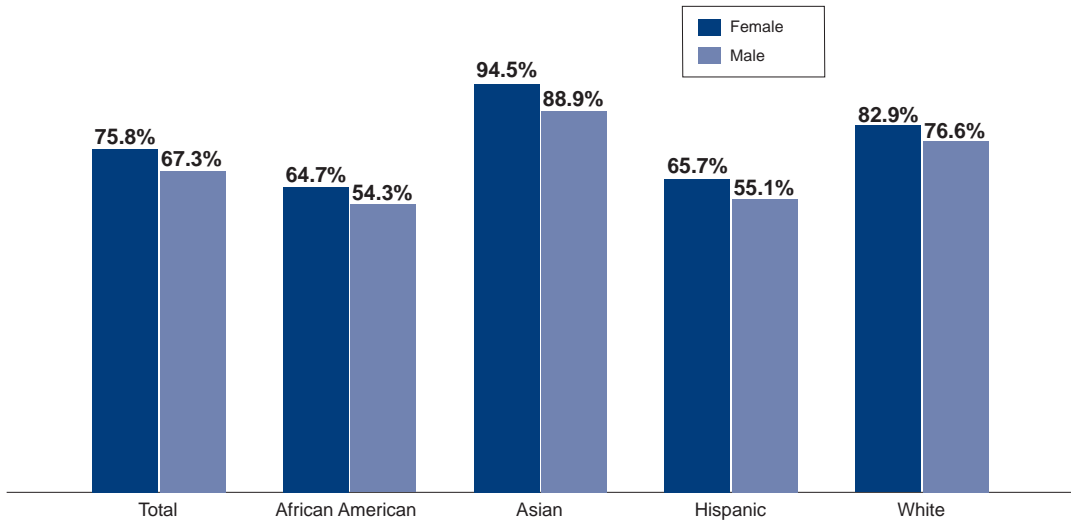
Source: California Dropout Research Project (CDRP)

The graduation statistics reported by state and federal sources may underestimate the true extent to which California students are earning high school degrees. There is no consensus among research-ers on how best to measure high school graduation rates, and differences in calculation methods can dramatically alter the picture. Independent researchers have reviewed the federal and state defini-tions of dropouts and concluded that many underestimate dropouts and overestimate graduate rates. For example, Gary Orfield and colleagues found many students are counted as transfers even though they never end up receiving a degree, while others who fail to graduate are not counted as dropouts because they are over the mandatory attendance age.[22]

Figure 3 illustrates these discrepancies by comparing the 2006-07 graduation rates (most recent

year available for all organizations) reported by the California Department of Education and U.S. Department of Education to those calculated using the Editorial Projects in Education's Cumulative Promotion Index (CPI).[23] The range of estimates produced by these four methods spans 18 percentage points. The state reported a graduation rate of 81 percent using the method required by the U.S. Department of Education for No Child Left Behind's accountability provision, whereas the CPI method arrived at 63 percent.

California's graduation rate may be lower than reported by the government	Figure 3

Statewide High School Graduation Rates by Reporting Organization (2006-07)
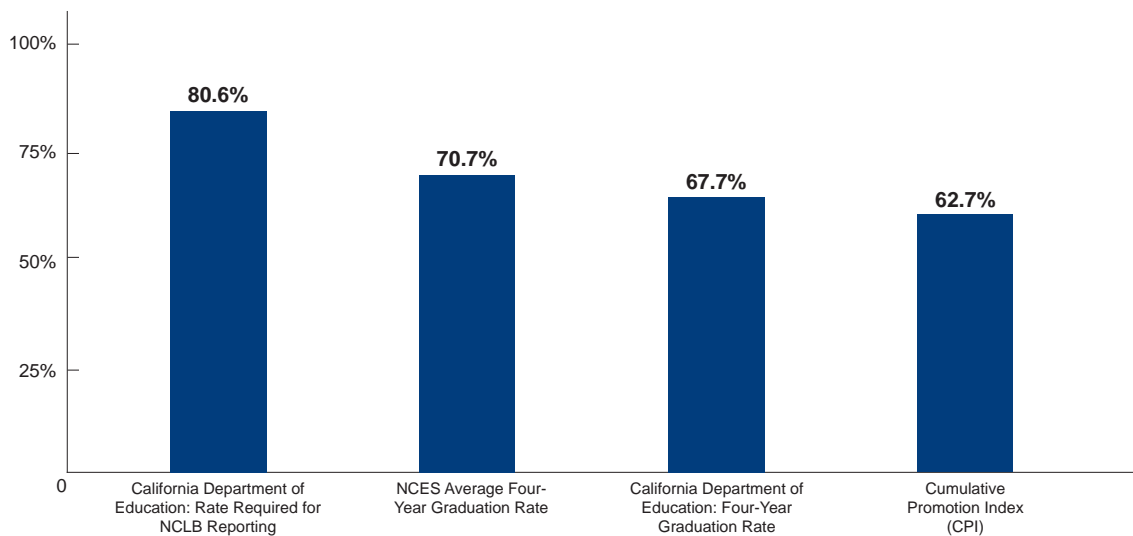
Source: California Department of Education, National Center for Education Statistics, Editorial Projects in Education

Educational Attainment of California Residents

Table 2 displays estimates of the educational attainment of California's working-age residents, based on CPS data averaged over 2006-09. Within the CPS samples, 17.5 percent of adults ages 20 to 65 were high school dropouts, which is almost six percentage points above the national average.

Table
2

Nearly 18 percent of the population ages 20 to 65 are dropouts.

	California	U.S.
Dropout	17.5%	11.9%
HS Graduate	23.2%	30.6%
Some College	29.0%	28.4%
B.A. Degree or Higher	30.3%	29.1%
Estimated Population	**21.7 million**	**179 million**

Note: The sample limited to adults 20 to 65 years of age who are not full-time students.
Source: U.S. Census Bureau, *Current Population Survey (March 2006-2009)*

Impact on Personal Income and State Tax Revenue

The economic consequences of California's high dropout rate are profound. Table 3 shows estimates of the employment status and average personal income of California residents. California high school dropouts earn roughly $11,000 less per year than high school graduates with no postsecondary education, and nearly $20,000 less than residents with some college education. These dropouts tend to be unemployed, no longer in the labor force, or not actively seeking employment (i.e., "discouraged" workers) at higher rates than high school graduates. In addition, they are nearly twice as likely as high school graduates to fall below the Census Bureau's poverty threshold.

Table
3

California dropouts make $11,000 less than graduates with no postsecondary education.

Average Labor Market Outcomes by Educational Attainment

	Dropout	High School Graduate	Some College	B.A. or Higher
Employment				
Unemployed	8.4%	6.2%	4.5%	3.2%
Not in Labor Force	41.1%	32.2%	24.1%	17.7%
Discouraged Worker	2.8%	1.8%	1.1%	1.0%
Number of weeks worked last year	31.0	35.3	38.8	41.9
Personal Income				
Annual Personal Income	$16,700	$27,406	$36,596	$70,224
Low-Income	24.8%	13.0%	8.6%	4.4%

Notes: Sample limited to adults 20 to 65 years of age, non-full time students; table adapted from Rouse (2007) Table 5-1; all data in 2008 dollars; annual personal income includes individuals with zero wages.
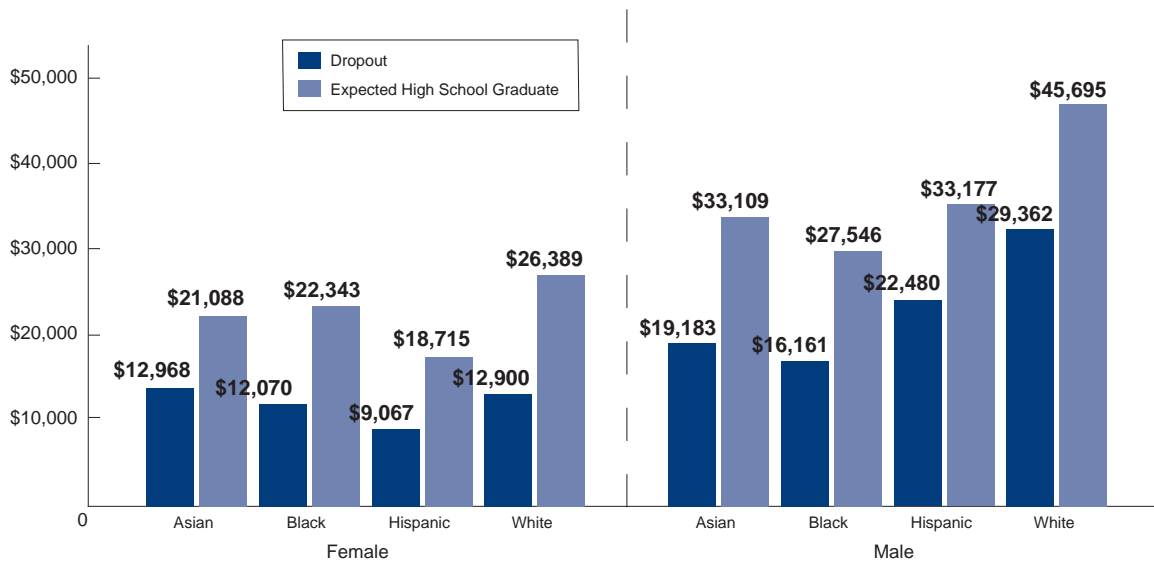Source: U.S. Census Bureau, *Current Population Survey (March 2006 - 2009)*, data for California.

Figure 4 compares the average personal income (in 2008 dollars) of high school dropouts to the averages of "expected high school graduates" who have an 80 percent probability of terminating education after high school, 15 percent probability of attending some college, and 5 percent probability of completing at least a bachelor's degree.[24] The data reveal significant differences in personal income between high school dropouts and graduates of all ethnic groups. On average, high school dropouts earn approximately $14,000 less than one would expect had they graduated from high school. There are sizeable differences in annual wages across ethnic groups. White residents earn considerably more than other ethnic groups. Annual wages are lowest for Black and Hispanic females, averaging $12,070 and $9,067 respectively. Figure 4 also shows that males at each level of educational attainment earn significantly more than females.

Dropouts earn $8,000 to $16,000 less than graduates.	Figure 4

Average Annual Personal Income of California High School Dropouts Relative to Graduates by Gender and Race

Note: The sample is limited to adults 20 to 65 years of age who are not college students.
Source: U.S. Census Bureau, *Current Population Survey (March 2006 -2009)*, data for California

Table 4 displays our estimates of the fiscal impact of California high school dropouts in terms of lost personal income and state tax revenue. Based on the CPS data, we estimate that the average Cali-

fornia high school dropout earns $14,226 less per year than we would expect had that dropout graduated (and had a 15 percent probability of attending some college and 5 percent probability of completing a bachelor's degree). Assuming the state's 3.8 million high school dropouts obtained a high school degree, with some going on to additional schooling, the total cost to California's economy resulting from this reduction in earnings is more than $54 billion annually.

Using the National Bureau of Economic Research's income tax simulation program (TAXSIM), we calculated the average state income tax liability in 2008 for the average personal income of each education group.[25] That is, we estimate the extent to which the lost wages of high school dropouts lead to lower state tax contributions. We find that California high school dropouts on average contribute $252 less per year than they would have had they graduated from high school. This lost state tax revenue adds up to $958 million annually. Taken together, the lost personal income and state tax revenue resulting from California's dropouts amounts to $55 billion per year. The magnitudes of these estimates suggest that even a minor reduction in California's high school dropout rate would benefit the state's economy tremendously.

Dropouts reduce California's tax revenue by almost $1 billion per year.			Table 4

Fiscal Impact of California's Dropouts on Personal Income and State Tax Revenue

	Population	Annual Personal Income	Annual State Income Tax Contribution
Dropout	3,800,000	$16,700	$33
HS Graduate	5,025,000	$27,406	$158
Some College	6,300,000	$36,596	$342
Bachelor's or Higher	6,575,000	$70,224	$2,145
Fiscal Impact per Dropout		**($14,226)**	**($252)**
x 3.8 million Dropouts			
Total Fiscal Impact		**($54.1 billion)**	**($958 million)**

Notes: The sample is limited to adults 20 to 65 years of age who are not college students. State tax liabilities are calculated assuming all individuals were heads of household with no dependents in 2009.The fiscal impact estimate is calculated as the difference between the average state income tax contributions of high school dropouts and expected high school graduates. According to national probabilities, these expected graduates have a 5% chance of completing a B.A., a 15% chance of completing some college, and an 80% chance of terminating education after high school.
Source: Authors' Calculations. U.S. Census Bureau, *Current Population Survey (March 2006-2009)*; TAXSIM.

Lifetime personal income and state tax contributions

In addition to estimating the annual fiscal impact of California's high school dropouts, we also estimate the cumulative economic impact of dropping out over an individual's lifetime. Figures 5 and 6 compare the cumulative lifetime earnings and state tax contributions (in 2008 dollars) of high school dropouts and others. To account for differences in value over time, we report these figures in "present value dollars," which indicate the number of dollars we would need to have today to provide value equal to the dollars spread out over time in our analysis. We estimate that a high school graduate will earn $412,000 more in present value dollars than a dropout over a 45-year career, and contribute $13,328 more in tax dollars.

Over a lifetime, a California graduate will earn $412,000 more than a dropout.	Figure 5

Estimated Total Present Value of Lifetime Earnings by Educational Attainment
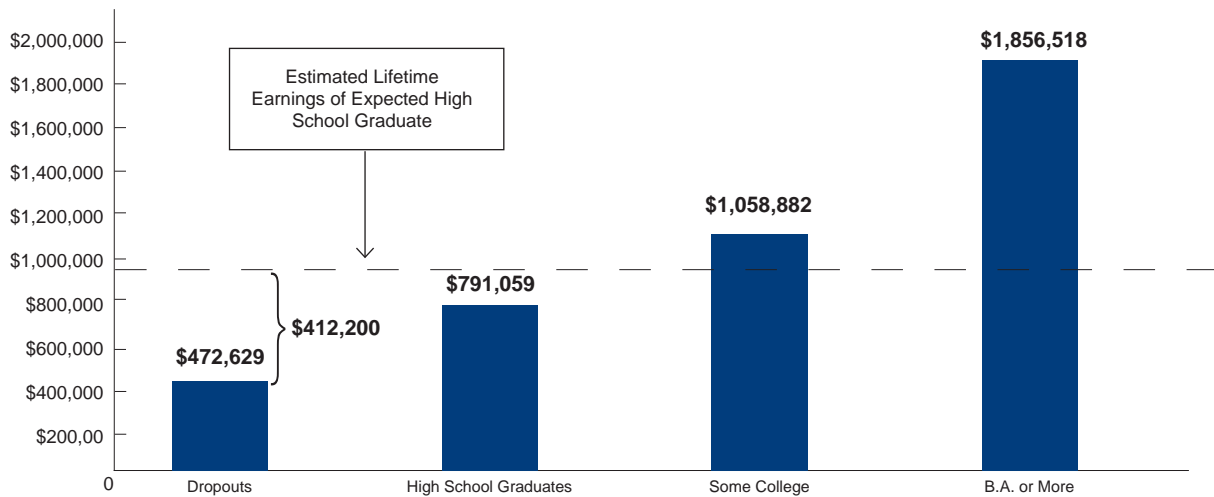
Notes: The sample is limited to adults 20 to 65 years of age who are not college students. Values are in present 2008 dollars, using a 3.5% discount rate and assuming 1.5% in annual productivity growth. The dotted line indicates the average lifetime income of a high school graduate, who has an 80% probability of terminating education after high school, a 15% probability of completing some college, and a 5% probability of completing a four-year degree.
Source: Authors' Calculations. U.S. Census Bureau, *Current Population Survey (March 2006-2009)*, data for California

Figure 6

Over a lifetime, a California graduate will contribute $13,328 more state tax dollars than a dropout.
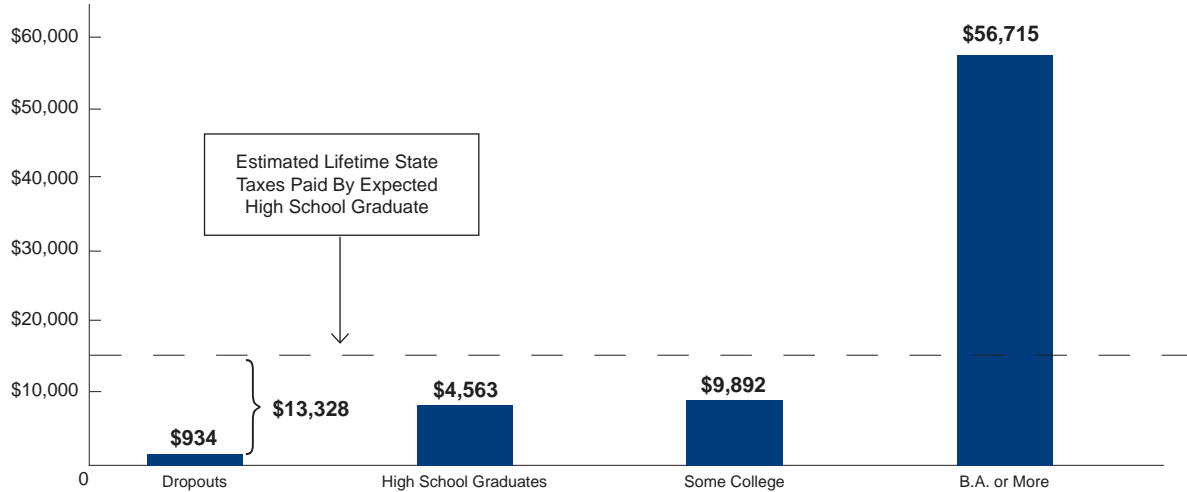
Estimated Total Present Value of Lifetime State Tax Payments

Notes: Sample limited to adults 20 to 65 years of age, non-college students. Values are in present 2008 dollars, using a 3.5% discount rate and assuming 1.5% in annual productivity growth. The dotted line indicates the average state tax payments of an expected high school graduate, who has an 80% probability of terminating education after high school, a 15% probability of completing some college, and a 5% probability of completing a four-year degree.
Source: Authors' Calculations. U.S. Census Bureau, *Current Population Survey (March 2006-2009)*, data for California

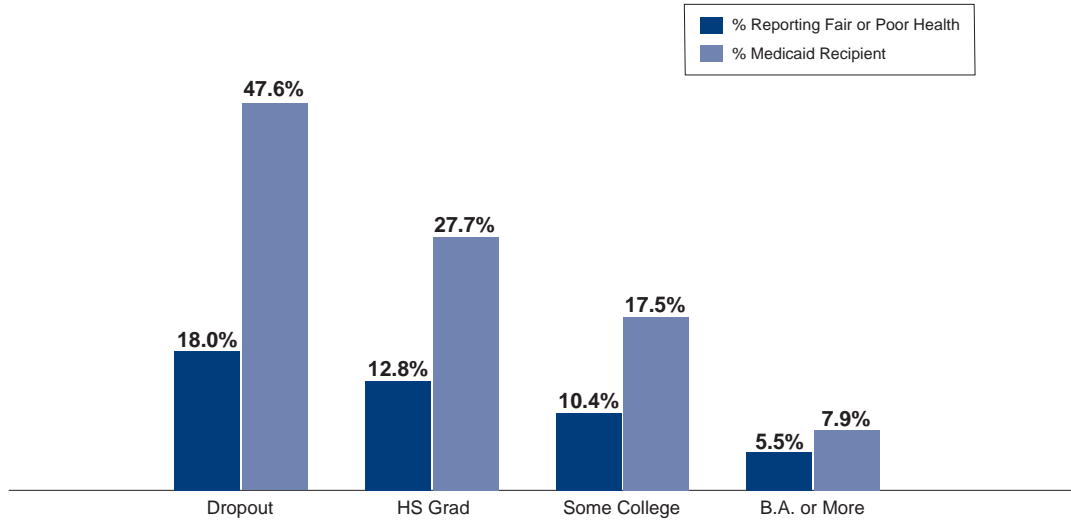## Impact on Health Status and Expenditures

Beyond lost personal income and state tax revenue, inadequate education is connected to profound health-related costs for the individual and society. Prior studies have identified a highly positive correlation between educational attainment and health, even after controlling for socioeconomic status, regardless of how health is measured (i.e., morbidity rates or other measures).[26] **Lower levels of educational attainment are associated with poor health outcomes such as heart conditions, strokes, hypertension, high cholesterol, depression, and diabetes, as well as the behaviors that might lead to these outcomes.[27] Other studies have found relationships between higher educational attainment and lower mortality rates.[28]**

Figure 7 compares the percentage of California individuals at each level of educational attainment who report that their health is only fair or poor, as well as the percentage of these individuals who receive Medicaid assistance either for themselves or for their children. Close to 20 percent of California high school dropouts report fair or poor health. Moreover, roughly half the state's dropouts receive Medicaid, a rate of assistance almost twice that of graduates with no college and six times greater than that of Californians with a four-year college degree or higher.

California's dropouts report worse health and higher reliance on Medicaid.

Figure 7

Self-Reported Quality of Health and Medicaid Participation by Educational Attainment

Legend:
- ■ % Reporting Fair or Poor Health
- ■ % Medicaid Recipient

Data points:
- Dropout: 18.0% / 47.6%
- HS Grad: 12.8% / 27.7%
- Some College: 10.4% / 17.5%
- B.A. or More: 5.5% / 7.9%

Notes: The sample is limited to adults 25 to 65 years of age who are not college students.
Source: Authors' calculations. U.S. Census Bureau, *Current Population Survey (March 2006-2009)*, data for California

Higher Medicaid use by dropouts costs California more than $1 billion per year.

Table 5

Fiscal Impact of California's Dropouts on State Medicaid Expenses

	Population	% on Medicaid	Average State Medicaid Expense Per Person
Dropout	3,800,000	47.6	$774
HS Graduate	5,025,000	27.7	$550
Some College	6,300,000	17.5	$311
Bachelor's or Higher	6,575,000	7.9	$98
Fiscal Impact per Dropout			**($283)**
x 3.8 million Dropouts			
Total Fiscal Impact			**($1.07 billion)**

Notes: The sample is limited to adults 25 to 65 years of age who are not college students.   The fiscal impact estimate is calculated as the difference in the average Medicaid expense of high school dropouts and graduates. According to national probabilities, graduates have a 5% chance of completing a B.A., a 15% chance of completing some college, and an 80% **chance of terminating education after high school.**
Source: Authors' calculations. U.S. Census Bureau, *Current Population Survey (March 2006-2009)*, data for California.

Table 5 displays our estimates of the fiscal impact of California high school dropouts on Medicaid spending. We estimate that the average California dropout receives $774 in state Medicaid subsidies,

which is 1.4 times as much as graduates with no college and almost eight times that of Californians with a four-year college degree or higher. When comparing the average Medicaid subsidies of a high school dropout to those of a graduate with a 15 percent probability of attending some college and 5 percent probability of completing a four-year degree, we estimate the average Medicaid costs to the state per high school dropout are $283 per year. Extrapolating this estimate to the state's 3.8 million high school dropouts, we find total annual Medicaid costs to California of approximately $1 billion.

We also examine the cumulative impact of California dropouts on state Medicaid subsidies over each individual's lifetime. Figure 8 compares estimates by educational attainment of the total present value (in 2008 dollars) of an average individual's lifetime Medicaid assistance. We estimate that over a lifetime each California dropout will require more than $17,500 in Medicaid subsidies. This estimate again is 1.4 times that of high school graduates with no college and almost eight times that of Californians with a four-year college degree or higher.

Over a lifetime, California dropouts will require over $17,500 in Medicaid subsidies.	Figure 8

Estimated Total Present Value of Lifetime State Medicaid Subsidies by Educational Attainment
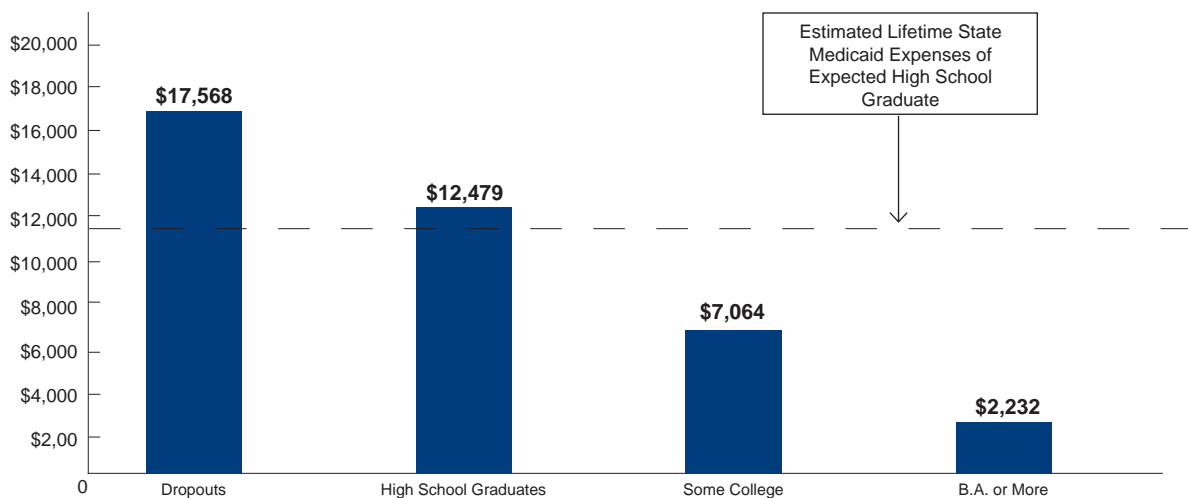
Note: The sample is limited to adults 25 to 65 years of age who are non-college students.
Source: Authors' Calculations. U.S. Census Bureau, *Current Population Survey (March 2006-2009)*, data for California.

Impact on State Incarceration Costs

Given the well-documented association between educational attainment and criminal behavior, **reducing the dropout rate is a great opportunity to reduce public expenditures related to crime.**[29] The taxpayer costs of dropouts' criminal activity include spending on additional police and court services, incarceration, state-funded victim compensation, and government crime prevention programs.[30] Levin and colleagues estimate that each additional high school graduate yields $26,600 in cost-savings because of reduced criminal activity.[31] **Other researchers estimate that the average dropout imposes a net taxpayer burden of $5,200 over a lifetime from criminal justice costs, compared with a net positive fiscal contribution of $287,000 for the average high school graduate.**[32] **According to a recent econometric study, increasing male high school graduation rates by one percentage point would save as much as $1.4 billion in criminal justice costs.**[33]

Our analysis is restricted to the impact of high school dropouts on California's state-funded incarceration costs. Dropouts are known to have much higher rates of incarceration. Wolf Harlow found that more than 50 percent of all U.S. inmates are high school dropouts. In analyzing recent national CPS data, Sum and colleagues find that the incidence of incarceration among 16- to 24-year-old high **school dropouts is more than 63 times greater than that of comparably aged four-year college graduates.**[34] According to their estimates, on any given day in 2006-07, nearly one out of every 10 male dropouts in this age bracket was incarcerated.[35]

Given these statistics, reducing the dropout rate is expected to drive down the California's incarceration costs. In fiscal year 2007-08, the California Department of Corrections had a budget of almost **$10 billion.**[36] The average cost of incarceration per inmate in 2008-09 was $48,536.[37] **As shown in Table 6, we estimate California spends $863 on incarceration for each high school dropout, compared to $489 for graduates.**[38] Over a lifetime, a dropout costs the state $8,484 because of higher incarceration rates than higher-educated peers.**

Relying on the findings of a prior econometric study on the causal relationship of high school graduation to the likelihood of incarceration, we assume that high school graduation would result in a 0.77 percentage point decrease in state incarceration rates for White dropouts and a 3.39 percentage point decrease for Black dropouts. Accordingly, we estimate the average annual incarceration costs

of California's 3.8 million dropouts would decline by $374 per person had those dropouts graduated from high school, representing potential cost savings of more than $1.4 billion.

Each California dropout increases incarceration costs by $374. The total annual impact is $1.4 billion.	Table 6

Potential Annual Savings of High School Graduation to State Incarceration Costs

Dropout Population	3,800,000
Percent of Dropouts Incarcerated	1.8%
Number of Incarcerated Dropouts	67,562
Average Correctional Cost Per Dropout	$863
Expected Incarcerations without Dropouts	38,302
Expected Average Incarceration Cost	$489
Average Fiscal Impact	**($374)**
X 3.8 million High School Dropouts	
Total Fiscal Impact	**($1.42 billion)**

Notes: Lochner and Moretti estimate that White high school graduates have a 0.77 percentage point lower probability of incarceration and Black high school graduates have a 3.39 lower probability of incarceration. Their sample is limited to males ages 20-60, so our calculation assumes the effect is constant across gender.
Source: Author's calculations. California Department of Corrections; Lochner & Moretti (2004)

Conclusion

The Economic Benefit of Reducing California's Dropout Rate

More than 2 million students are enrolled in California's public high schools, representing 13 percent of the nation's total public high school enrollment.[39] Given the size of the state's dropout population, California would benefit tremendously from improving its high school graduation rates. Based on the state's reported number of dropouts in 2007-08, we assume that approximately 98,420 new dropouts enter California's labor market each year. As shown in Table 7, we estimate that each prevented dropout will result in a present value lifetime benefit of $28,227.[40] By permanently cutting the dropout rate in half, each new graduating class of high school students would yield more than $1.4 billion in direct gross economic benefits to the state. Completely eliminating the dropout problem would save the state $2.8 billion annually, or approximately 14 percent of its present budget deficit. This is an economic opportunity California cannot afford to ignore.

<table>
<tr><td colspan="2">If California cut its dropout rate in half, each new class would yield at least $1.4 billion in direct gross economic benefits to the state.</td><td>Table 7</td></tr>
</table>

Present Value Lifetime Cost-Savings to the State Per Expected High School Graduate

	Lifetime Benefits
Additional State Tax Payments	$13,328
Reduced State Medicaid Subsidies	$6,414
Reduced State Incarceration Expenditures	$8,484
Total Lifetime Cost-Savings to the State for Each Additional High School Graduate	$28,227
Total Lifetime Cost-Savings Per Graduating Class for 50% Reduction in Dropouts	+ $1.39 billion
Total Lifetime Cost-Savings Per Graduating Class for 100% Reduction in Dropouts	+ $2.78 billion

Note: The sample is limited to adults 25 to 65 years of age who are non-college students. Values are in present 2008 dollars, using a 3.5% discount rate and assuming 1.5% in annual **productivity growth.**
Source: Author's calculations. U.S. Census Bureau, *Current Population Survey (March 2006-2009)*, data for California.

<table>
<tr><td colspan="2">If California cut its dropout rate in half, each new class would yield at least $1.4 billion in direct gross economic benefits to the state.</td><td>Figure 9</td></tr>
</table>

Total Cost-Savings to the State Per High School Cohort by Reduction in Dropout Rate (in billions)
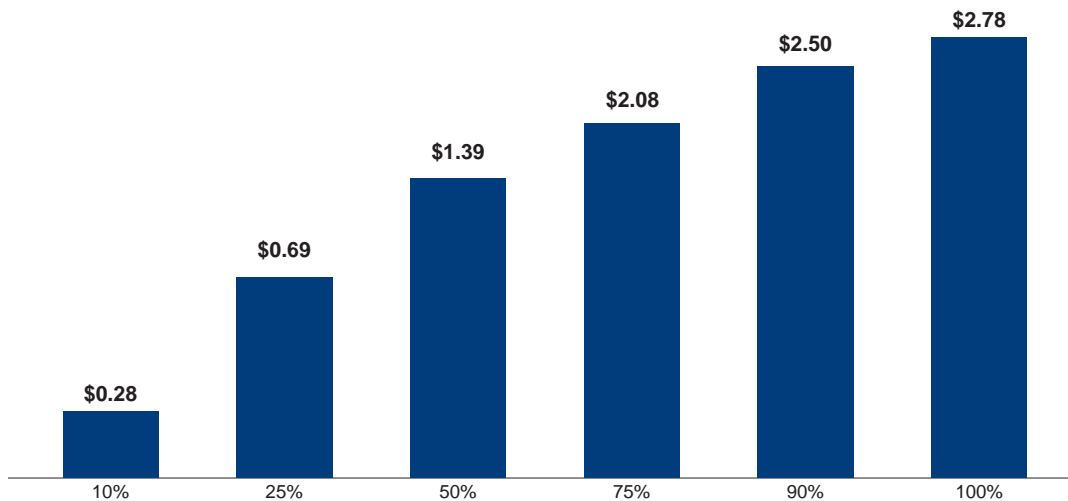
10%	25%	50%	75%	90%	100%
$0.28	$0.69	$1.39	$2.08	$2.50	$2.78

Note: The sample is limited to adults 25 to 65 years of age who are not college students. Values are in present 2008 dollars, using a 3.5% discount rate and assuming 1.5% in annual **productivity growth.**
Source: Authors' Calculations. U.S. Census Bureau, *Current Population Survey (March 2006-2009)*, data for California.

Notes

[1] These are direct benefits and do not account for indirect economic benefits associated with increased personal income and lower unemployment. Furthermore, these estimates are gross and do not account for any public costs associated with educational interventions to lower the dropout rate.

[2] Data provided by California Department of Education's Educational Demographics Office. Available: http://data1.cde.ca.gov/dataquest/DropoutReporting/GradeEth.aspx?cDistrictName=State&cCountyCode=00&cDistrictCode=0000000&cSchoolCode=0000000&Level=State&TheReport=GradeEth&ProgramName=All&cYear=2007-08&cAggSum=StTotGrade&cGender=B.

[3] Data provided by California Department of Education's Educational Demographics Office. Available: http://data1.cde.ca.gov/dataquest/DropoutReporting/GradeEth.aspx?cDistrictName=State&cCountyCode=00&cDistrictCode=0000000&cSchoolCode=0000000&Level=State&TheReport=GradeEth&ProgramName=All&cYear=2007-08&cAggSum=StTotGrade&cGender=B.

[4] Data provided by California Department of Education's Educational Demographics Office. Available: http://data1.cde.ca.gov/dataquest/DropoutReporting/GradeEth.aspx?cDistrictName=State&cCountyCode=00&cDistrictCode=0000000&cSchoolCode=0000000&Level=State&TheReport=GradeEth&ProgramName=All&cYear=2007-08&cAggSum=StTotGrade&cGender=B.

[5] See: John M. Bridgeland, John J. DiIulio Jr., and Karen Burke Morison, "The Silent Epidemic: Perspectives of High School Dropouts," Report by Civic Enterprises (2006). Available: http://www.civicenterprises.net/pdfs/thesilentepidemic3-06.pdf; Henry Levin et al., "The Costs and Benefits of an Excellent Education for All of America's Children," Teachers College, Columbia University (2007). Available: http://www.cbcse.org/media/download_gallery/Leeds_Report_Final_Jan2007.pdf; Cecilia Elena Rouse, "The Labor Market Consequences of an Inadequate Education," in *The Price We Pay: The Economic and Political Consequences of Inadequate Education*, ed. Clive Belfield and Henry M. Levin (Washington: Brookings Institution Press, 2007); Clive R. Belfield, "The Economic Consequences of Inadequate Education for the Puerto Rican Population in the United States," Centro de Estudios Puertorriquenos, Hunter College, Queens College, CUNY (2008). Available: http://www.centropr.org/documents/working_papers/PREducation(v6).pdf.

[6] Andrew Sum et al., "The Consequences of Dropping Out of High School: Joblessness and Jailing for High School Dropouts and the High Cost for Taxpayers," Center for Labor Market Studies, Northeastern University (2009).

[7] Andrew Sum et al., "The Consequences of Dropping Out of High School: Joblessness and Jailing for High School Dropouts and the High Cost for Taxpayers," Center for Labor Market Studies, Northeastern University (2009).

[8] Andrew Sum et al., "The Consequences of Dropping Out of High School: Joblessness and Jailing for High School Dropouts and the High Cost for Taxpayers," Center for Labor Market Studies, Northeastern University (2009).

[9] Andrew Sum et al., "The Consequences of Dropping Out of High School: Joblessness and Jailing for High School Dropouts and the High Cost for Taxpayers," Center for Labor Market Studies, Northeastern University (2009).

[10] See: David M. Cutler and Adriana Lleras-Muney, "Education and Health: Evaluating Theories and Evidence", NBER Working Paper No. 12352, National Bureau of Economic Research (2006); Michael Grossman and Robert Kaestner, "Effects of education on health", in The Social Benefits of Education, ed. Jere R. Behrman and Nevzer Stacey (Ann Arbor: University of Michigan Press, 1997); Clive R. Belfield and Henry M. Levin, "The Economic Losses from High School Dropouts: California Dropout Research Project #1," California Dropout Research Project, University of California Linguistic Minority Research Institute, UC Santa Barbara, Gevirtz Graduate School of Education (2007). Available: http://www.accessednetwork.org/resource_center/research/CADropout-Research1.pdf.

[11] Andrew Sum et al., "The Consequences of Dropping Out of High School: Joblessness and Jailing for High School Dropouts and the High Cost for Taxpayers," Center for Labor Market Studies, Northeastern University (2009).

[12] Clive R. Belfield and Henry M. Levin, "The Economic Losses from High School Dropouts: California Dropout Research Project #1," California Dropout Research Project, University of California Linguistic Minority Research Institute, UC Santa Barbara, Gevirtz Graduate School of Education (2007).

[13] Clive R. Belfield and Henry M. Levin, "The Economic Losses from High School Dropouts: California Dropout Research Project #1," California Dropout Research Project, University of California Linguistic Minority Research Institute, UC Santa Barbara, Gevirtz Graduate School of Education (2007).

[14] See: Clive R. Belfield and Henry M. Levin, "The Economic Losses from High School Dropouts: California Dropout Research Project #1," California Dropout Research Project, University of California Linguistic Minority Research Institute, UC Santa Barbara, Gevirtz Graduate School of Education (2007); Clive R. Belfield and Henry Levin, *The Price We Pay. The Economic and Social Consequences of Inadequate Education (Washington, DC: Brookings Institution Press, 2007); Henry Lev*in et al., "The Costs and Benefits of an Excellent Education for All of America's Children," Teachers College, Columbia University (2007); Cecilia Elena Rouse, "The Labor Market Consequences of an Inadequate Education," in *The Price We Pay: The Economic and Political Consequences of Inadequate Education*, ed. Clive Belfield and Henry M. Levin (Washington: Brookings Institution Press, 2007); Clive R. Belfield, "The Economic Consequences of Inadequate Education for the Puerto Rican Population in the United States," Centro de Estudios Puertorriquenos, Hunter College, Queens College, CUNY (2008).

[15] Cecilia Elena Rouse, "The Labor Market Consequences of an Inadequate Education," in *The Price We Pay: The Economic and Political Consequences of Inadequate Education*, ed. Clive Belfield and Henry M. Levin (Washington: Brookings Institution Press, 2007), 106.

[16] Clive R. Belfield, "The Economic Consequences of Inadequate Education for the Puerto Rican Population in the United States," Centro de Estudios Puertorriquenos, Hunter College, Queens College, CUNY (2008).

[17] Clive R. Belfield, "The Economic Consequences of Inadequate Education for the Puerto Rican Population in the United States," Centro de Estudios Puertorriquenos, Hunter College, Queens College, CUNY (2008).

[18] See: John Robert Warren and Andrew Halpern-Manners, "Is the Glass Emptying or Filling Up? Reconciling Divergent Trends in High School Completion and Dropout." *Educational Researcher* ,36 (2007) 335-43.

[19] **Data provided by The United States Department of Education's National Center for Education Statistics' Common Core of Data** (CCD), " Public School Graduates and Dropouts from the Common Core of Data: School Year 2007–08" Available: http://nces.ed.gov/pubs2010/graduates/tables.asp

[20] Editorial Projects in Education Research Center, "Diplomas Count 2010 State Graduation Report: California." Available: http://www.edweek.org/apps/gmap/

[21] Graduation statistics in figure 2 come from the California Dropout Research Project's Statistical Brief 11, Ethnic and Gender Differences in California High School Graduation Rates. Available: http://cdrp.ucsb.edu/dropouts/pubs_statbriefs.htm).

[22] Gary G. Orfield et al., "Losing Our Future: How Minority Youth are Being Left Behind by the Graduation Rate Crisis," The Civil Rights Project at Harvard University, The Urban Institute, Advocates for Children of New York, The Civil Society Institute. Available: http://www.americanprogress.org/atf/cf/%7BE9245FE4-9A2B-43C7-A521-5D6FF2E06E03%7D/losingourfuture_report.pdf.

[23] **For details on the two graduation rates reported by** the California Department of Education see: http://dq.cde.ca.gov/dataquest/CompletionRate/comprate1.asp?cChoice=StGradRate&cYear=2006-07&level=State; for details on the NCES four year graduation rate see: http://nces.ed.gov/pubs2010/graduates/appendix_a.asp; for details on the Cumulative Promotion Index see: Gary G. Orfield et al., "Losing Our Future: How Minority Youth are Being Left Behind by the Graduation Rate Crisis," The Civil Rights Project at Harvard University, The Urban Institute, Advocates for Children of New York, The Civil **Society Institute.**

[24] Belfield and Levin (2007), Levin et al. (2007), and Belfield **(2008) use the 1988 National Educational Longitudinal Survey** and the 1996 Beginning Postsecondary Survey to calculate these **transition rates using students in the lowest quartile of reading** achievement nationally. See: Clive R. Belfield and Henry M. Levin, "The Economic Losses from High School Dropouts: California Dropout Research Project #1," California Dropout Research Project, University of California Linguistic Minority Research Institute, UC Santa Barbara, Gevirtz Graduate School of Education (2007); Henry Levin et al., "The Costs and Benefits of an Excellent Education for All of America's Children," Teachers College, Columbia University (2007); Clive R. Belfield, "The Economic Consequences **of Inadequate Education for the Puerto Rican Population in the** United States," Centro de Estudios Puertorriquenos, Hunter College, Queens College, CUNY (2008).

[25] Data provided by National Bureau of Economic Research's TAXSIM. Available: http://www.nber.org/~taxsim/.

[26] Michael Grossman and Robert Kaestner, "Effects of education on health", in The Social Benefits of Education, ed. Jere R. Behrman and Nevzer Stacey (Ann Arbor: University of Michigan Press, 1997).

[27] See: David M. Cutler and Adriana Lleras-Muney, "Education and Health: Evaluating Theories and Evidence", NBER Working Paper No. 12352, National Bureau of Economic Research (2006); Michael Grossman and Robert Kaestner, "Effects of education on health", in The Social Benefits of Education, ed. Jere R. Behrman

and Nevzer Stacey (Ann Arbor: University of Michigan Press, 1997); Clive R. Belfield and Henry M. Levin, "The Economic Losses from High School Dropouts: California Dropout Research Project #1," California Dropout Research Project, University of California Linguistic Minority Research Institute, UC Santa Barbara, Gevirtz Graduate School of Education (2007). Available: http://www.accessednetwork.org/resource_center/research/CADropout-**Research1.pdf.**

[28] See: Evelyn Mae Kitagawa and Philip Morris Hauser, *Differential Mortality in the United States: A Study in Socioeconomic Epidemiology* (Cambridge: Harvard University Press, 1973); Bruce A. Christenson and Nan E. Johnson, "Educational Inequality in Adult Mortality: An Assessment with Death Certificate Data from Michigan," *Demography 32* no. 2 (1995): 215-229; Angus Deaton and Christina Paxson, "Mortality, education, income and inequality among American cohorts," in *Themes in the Economics of Aging,* ed. David A. Wise (Chicago: University of Chicago Press for NBER, 2001).

[29] See: Lance Lochner, "Education, Work, and Crime: A Human Capital Approach," International Economic Review 45 no. 3 (2004), 811-843; Lance Lochner and Enrico Moretti, "The Effect of Education on Crime: Evidence from Prison Inmates, Arrests, and Self-Reports," American Economic Review 94 no. 1 (2004), 155-189; Lance Lochner, "Individual Perceptions of the Criminal Justice System," American Economic Review, 97 no. 1 (2007) 444-460.

[30] Henry Levin et al., "The Costs and Benefits of an Excellent Education for All of America's Children," Teachers College, Columbia **University (2007).**

[31] Henry Levin et al., "The Costs and Benefits of an Excellent Education for All of America's Children," Teachers College, Columbia **University (2007).**

[32] Andrew Sum et al., "The Consequences of Dropping Out of High School: Joblessness and Jailing for High School Dropouts and the High Cost for Taxpayers," Center for Labor Market Studies, North**eastern University (2009).**

[33] Lance Lochner and Enrico Moretti, "The Effect of Education on Crime: Evidence from Prison Inmates, Arrests, and Self-Reports," American Economic Review 94 no. 1 (2004), 155-189.

[34] Andrew Sum et al., "The Consequences of Dropping Out of High School: Joblessness and Jailing for High School Dropouts and the High Cost for Taxpayers," Center for Labor Market Studies, North**eastern University (2009).**

[35] Andrew Sum et al., "The Consequences of Dropping Out of High School: Joblessness and Jailing for High School Dropouts and the High Cost for Taxpayers," Center for Labor Market Studies, Northeastern University (2009), 10.

[36] **Data provided by the California Department of Corrections and** Rehabilitation. Available: http://www.cdcr.ca.gov/Budget/Budget_Overview.html

[37] **Data provided by the California Department of Corrections and** Rehabilitation. Available: http://www.cdcr.ca.gov/News/2009_Press_Releases/docs/CDCR_Annual_Report.pdf

[38] Using results of Wolf Harlow (2003), we assume conservatively **that 39.7% of inmates are high school dropouts**

[39] **Data provided by The United States Department of Education's National Center for Education Statistics' Common Core of Data**

(CCD), "Public Elementary/Secondary School Universe Survey" , 2007-08 v.1a. Available: http://nces.ed.gov/ccd/bat/index.asp.

[40] These are direct benefits and do not account for indirect economic benefits associated with increased personal income and lower unemployment. Furthermore, these estimates are gross and **do not account for any public costs associated with educational interventions to lower the dropout rate.**

Appendix Tables

Graduation Rates of California's 10 Largest School Districts	Table A-1

School District	Total Enrollment	CDE Graduation Rate Required for NCLB Reporting	Average Freshman Graduation Rate (AFGR)	Manhattan Institute	CPI
Statewide	**6,343,471**	**80.2%**	**68.20%**	**62.80%**	**--**
Los Angeles Unified	693,680	72.4%	50.7%	45.2%	44.6%
San Diego Unified	131,577	84.3%	63.4%	52.4%	57.3%
Long Beach Unified	88,186	79.0%	65.4%	61.1%	61.8%
Fresno Unified	76,460	69.1%	58.1%	57.2%	56.8%
Elk Grove Unified	62,294	87.1%	82.1%	65.1%	71.4%
Santa Ana Unified	57,061	84.5%	52.4%	50.9%	61.9%
San Bernardino City Unified	56,727	72.0%	46.8%	44.0%	36.8%
San Francisco Unified	55,069	84.0%	77.7%	70.0%	53.2%
Capistrano Unified	52,390	96.0%	86.2%	71.2%	95.5%
Corona-Norco Unified	51,322	94.0%	85.9%	69.5%	92.0%

Sources: The United States Department of Education's National Center for Education Statistics' Common Core of Data (CCD). Available: http://nces.ed.gov/ccd
California Department of Education. Available: http://dq.cde.ca.gov/dataquest/CompletionRate/comprate1.asp?cChoice=StGradRate&cYear=2007-08&level=State
Education Trust West's "Raising the Roof" Database. Available: http://rtr.edtrustwest.org/grad_rates.php

Calculating Graduation Rates by Methods

Calculation Method	Description
CDE Graduation Rate Required for NCLB Reporting	This method is designed to measure the percentage of students in a given cohort that leave high school with a regular diploma versus dropping out. This is estimated by the total number of graduates in a given year and the cblesumulative number of dropouts in the past four years. Specifically, it is the number of graduates in Year 4 divided by the sum of the total number of graduates in Year 4, the number of 12th grade dropouts in Year 4, the number of 11th grade dropouts in Year 3, the number of 10th grade dropouts in Year 2, and the number of 9th grade dropouts in Year 1. States are required to report figures from this calculation to the U.S. Department of Education for use in the No Child Left Behind accountability framework. Typically these estimates are higher than those from other methods because they rely on the reported dropout rates, which may under-estimate the actual number of students leaving school prior to graduation because of inaccurate accounting for transfer students and students over the mandatory attendance age.
Average Freshman Graduation Rate (AFGR)	This method is designed to measure the percentage of first-time freshmen (cohort) that graduate on time with a regular diploma. The formula compares the number of on-time graduates in a given class (cohort) to the number of students enrolled in 9th grade four years earlier. To account for the fact that 9th grade enrollment levels are often inflated due to high retention rates, the formula uses the average enrollment of the class in 8th, 9th, and 10th grade. Specifically, the AFGR is the number of graduates in Year 4 divided by the average enrollment of grades 8,9, and 10 reported 5,4, and 3 years earlier, respectively. For example, the 2007-08 AFGR is equal to the number of graduates in 2007-08 divided by the average of the: 10th grade enrollment in 2005-06, 9th grade enrollment in 2004-05, and 8th grade enrollment in 2003-04.
Manhattan Institute	This method is similar to the AFGR in that compares the number of on-time graduates in a given class to the number enrolled in 9th grade four years earlier, where 9th grade enrollment is also estimated as the average enrollment of the class in 8th, 9th, and 10th grades. The "smoothed" estimate of the class' 9th grade enrollment is done to adjust for inflated 9th grade enrollment levels due to high retention rates. Unlike the AFGR, this method attempts to account for changes in enrollment due to students moving in and out of the state rather than dropping out. This is done by adjusting the class' estimated 9th grade enrollment by the % change in the state's total enrollment over the four-year time period; if the state experiences an increase in total enrollment over the four year period, the class' 9th grade enrollment would be increased by the percent change in total enrollment, and vice versa
Cumulative Promotion Index (CPI)	The CPI is designed to measure the likelihood that a 9th grade student will complete high school on time with a regular diploma. It differs from the other measures in that it uses the grade-to-grade promotion rates of four different cohorts of students in the same time period, whereas other methods follow a single cohort over four years. This approach is designed to evaluate educational systems current performance, whereas other methods rely on historical trends. For each of the four high school cohorts (9-12) in given year, the CPI method estimates the proportion of students that were promoted to the next grade in the following year using state enrollment data. The 9th grade cohort's "promotion ratio" is found as the 10th grade enrollment in Year 2 divided by the 9th grade enrollment in Year 1. The same calculation is done for the 10th and 11th grade cohorts. The 12th grade promotion ratio is found by dividing the number of students receiving a high school diploma at the end of 12th grade by the number of 12th graders enrolled at the start of the year. The product of these four ratios is the graduation rate.

Sources: See the National Center for Education Statistics for more details on this approach. Available: http://nces.ed.gov/pubs2010/graduates/appendix_a.asp
See Greene & Winters (2002) for more details on this approach. Available: http://www.manhattan-institute.org/html/cr_31.htm
See Swanson (2003) for more details on the CPI. Available: http://www.urban.org/UploadedPDF/410843_keeping_count.pdf

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