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Montana's High School Dropouts
Examining the Fiscal Consequences

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Executive Summary

This report analyzes the economic and social costs of the high school dropout problem in Montana from the perspective of a state taxpayer. The majority of our analysis considers the consequences of this problem in terms of labor market, tax revenue, and public service costs. In quantifying these costs, we seek to inform public policy, estimate the benefits of addressing the problem, and engage state citizenry in the problem's remedy.

The individual and societal costs associated with dropping out of high school in Montana are profound, with particular implications for the state's American Indian student population. That said, the potential benefits from reducing the dropout rate are equally profound. Our analysis of these costs and benefits reveals the following findings.

Key findings include:

- According to the Montana Office of Public Instruction (MOPI), 1,989 students, or 16.1% of the entire class of 2008, dropped out of high school. The state's dropout and graduation rates have not improved since 2002-03.
- Dropout statistics for Montana's American Indian students are alarming. Only 63% of American Indians in the class of 2008 graduated high school on time.
- On average, Montana high school dropouts work close to eight fewer weeks per year than those whose highest degree is a high school diploma or GED. Almost 30% of high school dropouts in the state meet the federal definition of low-income, which is twice the rate of high school graduates. Our wage equation finds that Montana high school graduates on average earn 22% more than high school dropouts after controlling for differences in age, gender, and race. Those with some college earn 27% more and those with a bachelor's degree or higher earn 66% more.
- In extrapolating the annual costs of dropouts to Montana's economy, we estimate that the average high school dropout is earning $5,868 less per year than they would if they had graduated. The total cost to Montana's economy that results from these reduced taxable earnings amounts to $216 million annually. To put this figure in perspective, the state's total personal income generated by its Agriculture, Forestry, and Fishing industries in 2008 was $317 million.
- When comparing the average Medicaid subsidies of a high school dropout to the average of an expected high school graduate, we arrive at an estimated increase in annual costs of $616 per dropout. Accordingly, the total annual Medicaid fiscal impact of Montana's dropouts amounts to approximately $23 million. Over the course of a lifetime, dropouts will require close to $25,000 in present value Medicaid subsidies.

- Using the findings of a prior econometric study on the causal relationship of high school graduation to the likelihood of incarceration, we estimate the average annual incarceration costs of Montana's 36,788 dropouts would decline by $268 per person had they graduated from high school. This represents a potential cost savings of $9.85 million.

- We estimate that each prevented dropout will result in $32,402 benefits to the state over that individual's lifetime. By permanently cutting the dropout rate in half, each class of new high school graduates will yield over $32 million in direct gross economic benefits to the state. By completely eliminating dropouts, the state stands to save $65 million annually.

Introduction

An Economic Perspective on High School Dropouts

The consequences of dropping out of high school to an individual's economic and social well-being are profound. Social scientists have repeatedly demonstrated that dropouts earn less income, suffer more joblessness, and tend more to criminality, poor health, and public dependency than high school graduates.[1] Our nation's minorities continue to bear these costs at a disproportionate rate. As economic globalization continues to shrink the supply of unskilled jobs available to dropouts, we can expect these trends to grow more severe.

In addition to the private costs incurred by individuals, inadequately educated individuals are a major fiscal burden to local, state, and national economies. They contribute less tax revenue while also commanding more public assistance and criminal justice resources.[2] Levin and colleagues estimate that a 50 percent reduction in the current cohort of approximately 700,000 20-year-old dropouts would enable the federal government to recover $45 billion in tax revenues and reduced costs associated with public health, crime and justice, and welfare.[3] These alarming statistics make it clear that addressing the dropout crisis promises not only to improve the well-being of our fellow citizens, but also to improve economic productivity and reduce government costs.

This report focuses on the economic costs of Montana's high school dropouts from the perspective of a Montana state taxpayer. We center our analysis on the consequences of high school dropouts that directly or indirectly affect the state's labor market, tax revenue, and public service costs. Quantifying the economic costs of high school dropouts is useful for several reasons. It provides an important financial context to current education policymaking. It lays out the potential economic benefits that stand to be gained by aggressively combating the dropout problem as well as the real costs that taxpayers will continue to bear by maintaining the status quo. These are important data for policymakers to consider when weighing the economic and political costs of various education reforms. Additionally, illustrating that every additional Montana dropout has an indirect economic impact on all Montana residents may be an effective way to engage more citizens in reform.

Organization of the Report

The remainder of this report is devoted to estimating the economic and social costs of the dropout problem in Montana. The next section describes the data and methods used to illustrate Montana's dropout rates and its economic consequences. We then report on trends in Montana's dropout rate, compare these trends to regional and national averages, and examine differences in these trends by race. Thereafter we estimate the economic costs of high school dropouts to individuals and the state in terms of personal income, state tax revenue, public health, and incarceration.

Data and Methods

Estimating the relationship of education to economic outcomes

The methods and data sources used in this report are informed by the extensive work of economists Henry M. Levin, Clive Belfield, and Cecilia Rouse.[4] 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 due to their levels of schooling, and not to other factors, such as innate ability or family background. While 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 suggests it provides 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."[5]

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

The 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 over 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. The majority of our analysis is limited to annual samples of approximately 1,000 Montana 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 to 2009, which reflect the financial earnings of the prior fiscal years (2005 to 2008, respectively). We employ four years of data for two principal reasons. First, the CPS sample of Montana residents in a given year is small (approximately 1,500 respondents in 900 households); therefore, its relevant statistics are vulnerable to sampling error. By averaging across multiple years we provide more stable estimates of the economic and demographic characteristics of Montana's population. Second, using data from 2006 to 2009 allows better estimates of the economic costs of dropouts in non-recessionary periods, while also speaking to the nation's present economic conditions. Like all states, Montana's economy has felt the effects of the national and global recessions that began in December 2007. Montana's unemployment rate rose 76% from March 2006 to March 2009, moving from 3.3% to 5.8%.[6] The loss of over 13,000 jobs during this period along with the general economic slowdown certainly altered the differences in annual wages and unemployment that one would expect during non-recessionary periods.[7]

Methodological limitations

Readers should consider a few methodological limitations of this 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 might expect 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 provides an argument as to why these general equilibrium effects may not be strong.[8] He notes that new graduates represent a small fraction of the total labor market. Consequently, a long period of time would have to elapse before the effects of increased

schooling would exert a meaningful impact on the composition of the labor market. Moreover, Belfield points to historical evidence that the income benefits to U.S. high school graduates have risen even though overall education levels 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 increased.

A second limitation is that the March CPS data are drawn from a restricted statistical sample of Montana's population that may not reflect the true number of dropouts in the state. The CPS excludes military and institutionalized individuals—two groups that have disproportionately higher dropout rates. Moreover, it is expected that high school dropouts are under-represented in the sampling frame because they are more likely to be inaccessible for data collection or less likely to answer questions on their financial situation. The under-reporting of dropouts within the sample implies that our estimates of their economic impact are conservative.

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

Dropouts in Montana

Table 1 displays the high school graduation rates for Montana's class of 2008. Following federal recommendations, the Montana Office of Public Instruction (MOPI) defines the graduation rate as "the percentage of students who graduate from secondary school with a regular diploma in the standard number of years."[9] According to the MOPI, the official Adequate Yearly Progress (AYP) graduation rate for the class of 2008 was 82.6%, which means 17.4% of the 12,385 students in the class of 2008 failed to graduate high school on time.[10] Of those who did not graduate on time, 1,989 students, or 16.1% of the entire 2008 class, were high school dropouts.

The Montana Office of Public Instruction reports that over 17% of public school students fail to graduate high school.

Table 1

Statewide graduation rates for the Class of 2008

	DROPOUTS					GRADUATES 2007-08		
	Grade 9 (2004-05)	Grade 10 (2005-06)	Grade 11 (2006-07)	Grade 12 (2007-08)	4-yr Dropout Total	Not On-time or GED	On-time	AYP Graduation Rate
All Students Combined	**334**	**417**	**512**	**726**	**1,989**	**165**	**10,231**	**82.6%**
Subgroups								
American Indian	124	107	91	137	459	52	852	62.5%
Asian	<10	<10	<10	<10	<10	4	114	90.5%
Hispanic	12	14	26	18	70	6	185	70.9%
Black	<10	<10	<10	<10	15	3	50	73.5%
Pacific Islander	<10	<10	<10	<10	<10	0	15	83.3%
White	195	290	388	561	1,434	100	9,015	85.5%

Source: Montana Office of Public Instruction (2010).

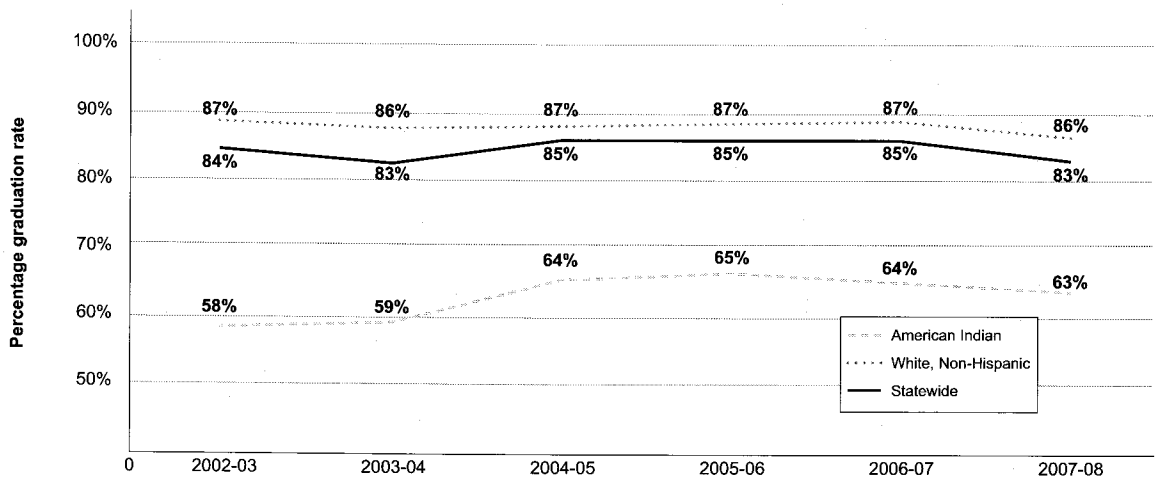
The high dropout rate of American Indian students is an enduring problem that has persisted throughout the 20th and early 21st centuries.[11] Given Montana's seven American Indian reservations and one landless tribe, the American Indian community represents the largest minority student subgroup in the state, and therefore a critical concern for state policymakers. Figure 1 reveals there has not been a discernable improvement in Montana's graduate rate since 2002-03. It also reveals a large persistent gap in the graduation rates between American Indian students and others. Only 63% of American Indian students in the 2008 class graduated high school on time.[11] These findings corroborate with national statistics, which show American Indian and Alaska Native students are 117% more likely to drop out of high school than White students.[12] In school year 2007-08, Montana's student population was largely comprised of White (85%) and American Indian (11%) students.

It is likely however that these graduation statistics understate the true extent to which Montana students are earning high school degrees. Independent researchers have reviewed the federal and state definitions of dropouts and concluded that many underestimate dropouts and overestimate graduate rates. For example, 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.[13] Figure 2 illustrates that Montana's graduation rate may be lower than what is reported by the government. It compares the 2004-05 graduation rates (most recent year available for all organizations) reported by the MOPI and U.S. Department of Education's National Center (NCES) for Education Statistics to those calculated using The Urban Institute's Cumulative Promotion Index (CPI).[14]

Montana's graduation rate did not improve from 2003 to 2008, and a wide gap between the graduation rate of American Indians and others persists.

Figure 1

Montana high school graduation rates (2003 to 2008) by race/ethnicity

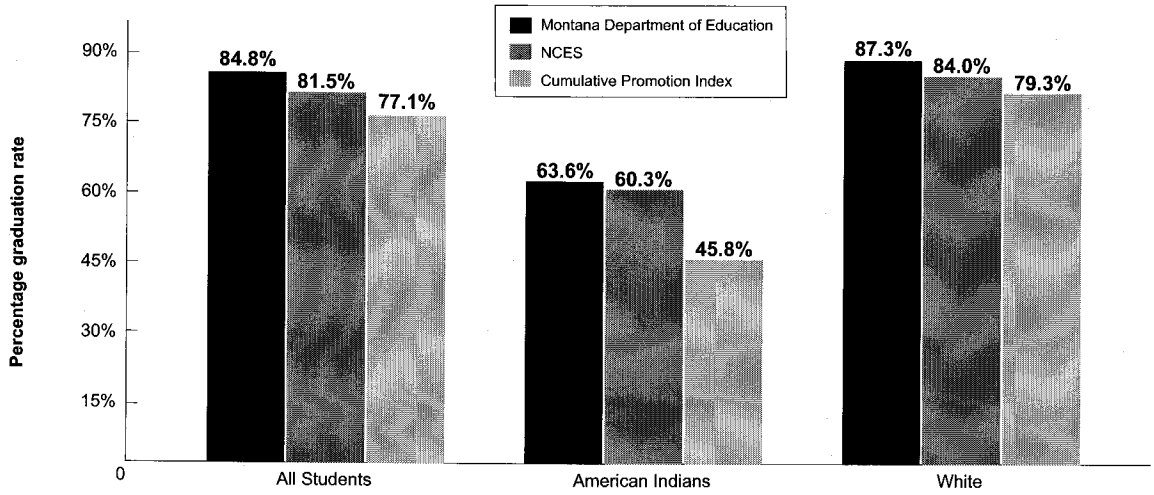


Source: Montana Office of Public Instruction (2010)

Montana's graduation rate may be lower than what is reported by state and federal agencies.

Figure 2

Statewide high school graduation rates by reporting organization (2005)



Source: Authors' calculations. Montana Department of Education; U.S. Department of Education's National Center for Education Statistics.

Educational attainment of Montana's citizens

Table 2 uses the CPS data to decompose Montana's working-age population by educational attainment and compare it to regional and national averages. The CPS data indicate that 6.4% (roughly 37,000) of the Montana population between the ages of 20 and 65 are high school dropouts, a proportion which is close to half the national average of 11.9%. Sixty-three percent of Montana's population holds a high school diploma but no college degree, suggesting a significant migration of college graduates from the state. Indeed, the U.S. Census Bureau's 2005 American Community Survey ranked Montana's retention rate of college graduates 42nd out of 51 states (36%).

Notice the discrepancy between the low CPS dropout rate of 6.4% and the double-digit dropout rates reported by the state (see Figure 2). Researchers have pinpointed a number of factors that are responsible for the consistently lower estimates found in CPS data, including: (1) CPS survey respondents' misstatements about their children's educational attainment (i.e., indicating they graduated when they did not); (2) the CPS includes private and homeschooled individuals, whereas the state reports do not; (3) the CPS excludes military personnel and prisoners.[15] Given methods used in this report rely on the lower dropout estimates found in the CPS data, readers are reminded these findings are expected to be conservative estimates of the true fiscal impact of dropouts.

Current Population Survey data show 6% (roughly 37,000) of the population, between the ages of 20 and 65, are high school dropouts. Table 2

	Montana	Federal Region VIII	U.S.
Dropout	6.4%	8.5%	11.9%
HS Graduate	27.7%	27.1%	30.6%
Some College	35.0%	32.4%	28.4%
BA Degree or Higher	31.0%	32.0%	29.1%
Estimated Population	**576,510**	**5,695,962**	**179,000,000**

Note: Sample limited to adults 20 to 65 years of age, non-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 Montana's dropouts are substantial. Table 3 arrays Montana's population by educational attainment and labor market outcomes. The data indicate Montana drop-

outs are less likely to be in the labor market and those that do actively seek jobs are less likely to find willing employers. On average, dropouts worked close to eight fewer weeks per year than those whose highest degree was a high school diploma or GED.

High school dropouts have lower annual earnings, in part due to their higher levels of joblessness and under-employment. The average annual personal income of a high school dropout in our sample was $20,590, which was close to $7,000 less than that of high school graduates. Almost 30% of high school dropouts in the state meet the federal definition of low-income, which is twice the rate of high school graduates.

The average annual personal income of a dropout is nearly $7,000 less than that of graduates. Table 3

Average labor market outcomes by educational attainment

	Dropout	High School Graduate	Some College	BA or Higher
Employment				
Unemployed	5.4%	3.8%	4.5%	1.6%
Not in Labor Force	38.7%	26.7%	21.5%	15.7%
Discouraged Worker	1.5%	1.5%	1.3%	0.9%
Number of weeks worked last year	29.9	37.5	39.7	42.9
Personal Income				
Annual Personal Income	$20,590	$27,956	$28,385	$46,945
Low-Income	28.7%	14.6%	12.8%	5.0%
Population Estimate	**36,788**	**178,754**	**201,538**	**159,431**

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 Montana.

Estimation of wage differences

We conducted a regression analysis to estimate the effects of education on income while accounting for differences in the sample that may impact wages independent of education, namely gender, race, and age.[16] The results of the wage equation are presented in Table 4. The coefficients for the three education levels shown in Table 4 are interpreted as the percentage difference in personal income relative to high school dropouts. The wage equation finds that high school graduates on average earn 22% more than high school dropouts after controlling for differences in age, gender, and race. Those with some college earn 27% more and those with a bachelor's degree or higher earn 66% more.

Results of a regression model estimate high school graduates earn 22% more than dropouts, after controlling for differences in age, gender, and race. Those with some college earn 27% more than dropouts, and those with a bachelor's degree or higher earn 66% more.

Table 4

Regression of log wages on education level, gender, and age

	Log Annual Personal Income
Graduate	0.221**
	(0.114)
Some College	0.272**
	(0.13)
Bachelor's or Higher	0.656***
	(0.172)
Male	0.568***
	(0.049)
Age	0.058***
	(0.01)
Age Squared	-0.001***
	(0.00)
American Indian	-0.252***
	(0.075)
Unweighted Observations (N)	**4288**

*** Significant at .10 level** **** Significant at .05 level** ***** Significant at .01 level**

Note: Model includes Heckman's selection correction for marriage and children.
Source: U.S. Census Bureau, *Current Population Survey (March 2006-2009)*, data for Montana.

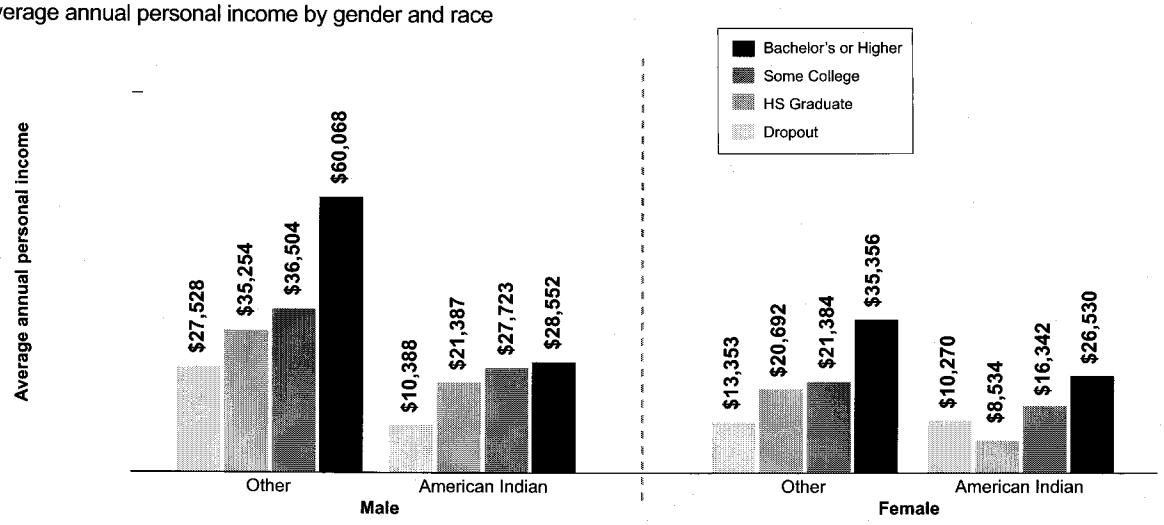
Figure 3 displays average annual personal income by gender and race. The data reveal significant differences in personal income between American Indian and others. American Indians on average earn 25% less after controlling for sample differences in age, sex, and educational attainment. The averages shown below suggest the return to education for American Indians is different than the return for other residents; however, a test of this hypothesis via the wage regression did not find a statistically significant difference. Therefore, the rest of the paper assumes that the relationship of education to income is the same for American Indians and non-American Indians. Put differently, we assume all individuals would experience the same proportional increase in annual income as a result of additional schooling.

Figure 3 also reveals that males at each level of educational attainment earn significantly more than females. After controlling for differences in age, race, and educational attainment, Montana males earn on average 57% more than females. The regression analysis did not reveal a statistically significant difference in the return of education for males and females; therefore, we assume their return of education is the same.

Males at each level of educational attainment earn significantly more than females. American Indians earn 25% less than other residents on average.

Figure 3

Average annual personal income by gender and race



Notes: Sample limited to adults 20 to 65 years of age, non-college students; average incomes for American Indian subgroups should be interpreted with caution because the standard errors were large – ranging from 1,227 to 55,5557.
Source: U.S. Census Bureau, Current Population Survey (March 2006 -2009), data for Montana.

These differences in personal income and unemployment rates have major implications for Montana's economy. Lower personal incomes depress the state's economic productivity and reduce state tax contributions. To extrapolate the annual costs of dropouts to Montana's economy, we compare the average earnings of Montana's economy to estimates of their earnings had all 37,000 dropouts graduated from high school. We follow the approach used in prior studies and compare high school dropouts to the outcomes of an "expected high school graduate", who according to national probabilities has an 80% likelihood of terminating education after high school, 15% likelihood of attending some college, and a 5% chance of completing at least a bachelor's degree.[17] This exercise uses the predicted average annual incomes when race, gender, and age are held at their means via the regression model.

After adjusting for differences in age, race, and gender, we estimate that the average high school dropout is earning $5,868 less per year than they would if they had graduated. The total cost to Montana's economy that results from these reduced taxable earnings amounts to $216 million annually. This figure assumes Montana's 37,000 high school dropouts obtained a high school degree, with some going on to additional schooling. To put this figure in perspective, consider that the state's total per-

sonal income generated by its Agriculture, Forestry, and Fishing industries in 2008 was $317 million.[18] As such, even a small reduction in Montana's high school dropout rate would demonstrably impact the state's economy.

Dropouts reduce Montana's tax revenue by $16 million per year. Table 5

Fiscal impact of Montana's dropouts on personal income and state tax revenue

	Population	Annual Personal Income	Annual State Income Tax Contribution
Dropout	36,788	$20,590	$510
HS Graduate	178,754	$27,956	$1,007
Some College	201,538	$28,385	$1,037
Bachelor's or Higher	159,431	$46,945	$2,249
	Average Fiscal Impact	**-$5,868**	**-$442**
	x Dropouts (36,788)		
	Total Fiscal Impact	**-$215,871,984**	**-$16,260,296**

Notes: Sample limited to adults 20 to 65 years of age, non-college students; Average annual cost per dropout is calculated while holding age, gender, and race at means. State tax liabilities calculated assuming all individuals were heads of household with no dependents.
Source: Authors' Calculations. U.S. Census Bureau, *Current Population Survey (March 2006-2009)*; TAXSIM.

The lost wages of high school dropouts lead to lower state tax contributions. 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 regression-adjusted average personal income of each education group.[19] Using this approach, we estimate that Montana dropouts on average contribute $442 less per year than they would have had they graduated from high school. This lost revenue amounts to approximately $16.3 million annually due to the lower wages of high school dropouts.

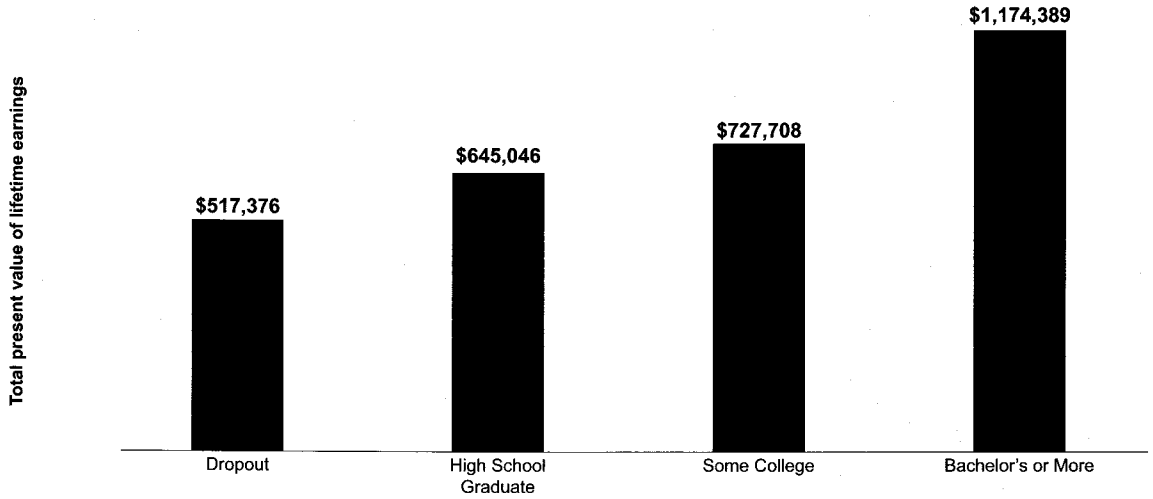
Lifetime personal income and state tax contributions

In addition to examining the current fiscal impact of dropouts, we also consider the cumulative economic consequences over an individual's lifetime. Figures 4 and 5 respectively compare estimates of the total present value of lifetime earnings and state tax contributions by educational attainment. We estimate that over the course of a lifetime, a 20-year-old expected high school graduate, who has a 15% probability of attending some college and a 5% probability of completing a four-year degree, will earn $198,298 more in present value dollars than a high school dropout. In addition, they will contribute $12,526 more tax dollars than a high school dropout over a 45-year career.

Over the course of a lifetime, a 20-year-old expected high school graduate in Montana will earn $198,000 more in present value dollars than a high school dropout.

Figure 4

Estimated total present value of lifetime earnings by educational attainment

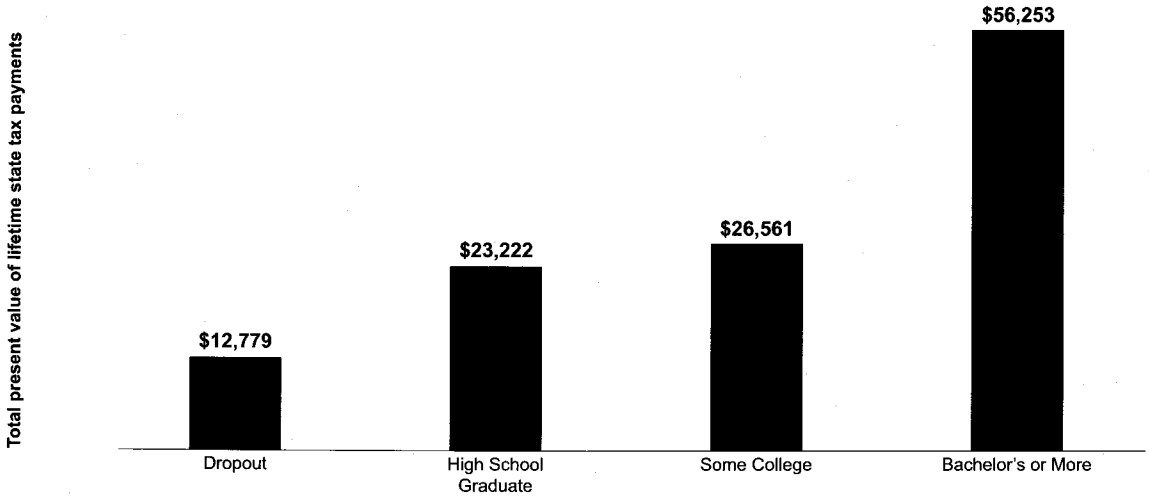


Notes: Sample limited to adults 20 to 65 years of age, non-college students. Values are in present 2008 dollars, using a 3.5% discount rate and assuming 1.5% in annual productivity growth.
Source: Authors' Calculations. U.S. Census Bureau, *Current Population Survey* (March 2006-2009), data for Montana.

A 20-year-old expected high school graduate in Montana will contribute approximately $12,526 more tax dollars than a high school dropout over a 45-year career.

Figure 5

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.
Source: Authors' Calculations. U.S. Census Bureau, *Current Population Survey* (March 2006-2009), data for Montana.

Impact on Health Status and Expenditures

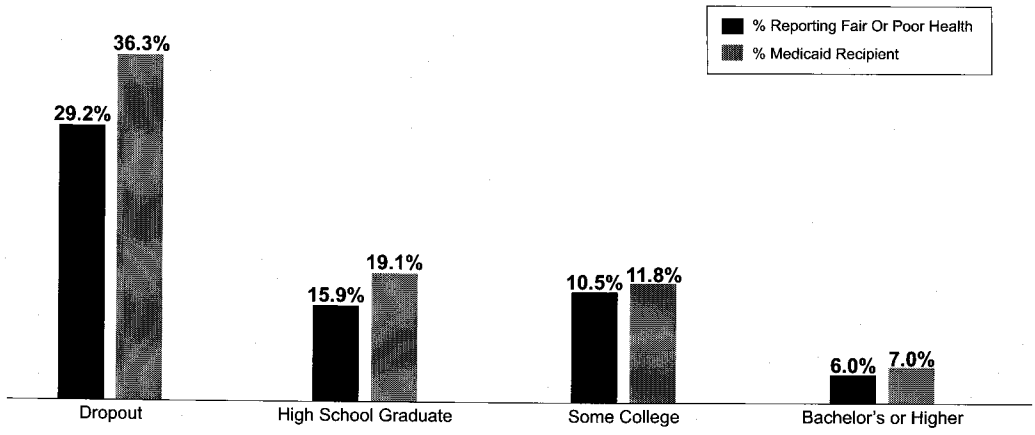
In addition to earnings, inadequate education has a profound impact on health. Prior studies have identified a highly positive correlation between educational attainment and health, even after controlling for socioeconomic status and regardless of how health is measured (e.g., morbidity rates or other measures).[20] Similarly, other studies have found negative relationships between education and mortality.[21]

Figure 6 reports the percentage of individuals at each education level that report fair or poor health as well as the percentage that receive Medicaid assistance (either for themselves or for their children). High school dropouts are almost twice as likely to report "fair" or "poor health" than high school graduates. They also are almost twice as likely to receive Medicaid subsidies, a statistic that aligns with national statistics.[22] Taken together, these findings imply that high school dropouts are likely to require more health services and be more reliant on the state to cover the related expenses.

Montana's high school dropouts are almost twice as likely to report "fair" or "poor" health than graduates. Dropouts are also almost twice as likely to receive Medicaid subsidies.

Figure 6

Self-reported quality of health and Medicaid participation by educational attainment



Note: Sample limited to adults 25 to 65 years of age, non-college students.
Source: Authors' Calculations. U.S. Census Bureau, *Current Population Survey (March 2006-2009)*, data for Montana.

Table 6 compares the average state Medicaid subsidies of each educational attainment group. High school dropouts on average receive over $1,000 in state Medicaid subsidies, or double that of high school

graduates. When we compare the average Medicaid subsidies of a high school dropout to the average of an expected high school graduate who has a 15% probability of attending some college and a 5% probability of completing a four-year degree, we arrive at an annual cost estimate of $616. Accordingly, we find the total annual Medicaid fiscal impact of Montana's dropouts to be approximately $23 million. As shown in Figure 7, we estimate that over the course of a lifetime, dropouts will require close to $25,000 in present value Medicaid subsidies, which is twice that of high school graduates.

Higher Medicaid use by dropouts costs Montana nearly $23 million per year. Table 6

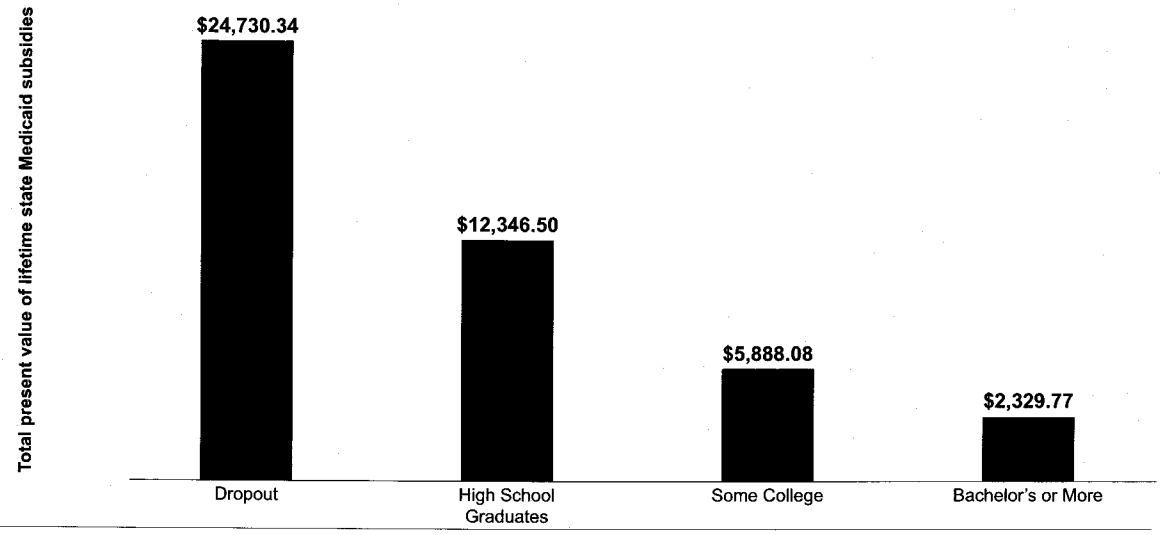
Fiscal impact of Montana's dropouts on state Medicaid expenses

	Population	Average State Medicaid Expense
Dropout	36,788	$1,099
HS Graduate	178,754	$549
Some College	201,538	$262
B.A. or College	159,431	$104
	Average Fiscal Impact	**-$616**
	x Dropouts (36,788)	
	Total Fiscal Impact	**-$22,661,408**

Source : Authors' calculations. U.S. Census Bureau, *Current Population Survey (March 2006-2009)*, data for Montana.

Over the course of a lifetime, dropouts will require close to $25,000 in present value Medicaid subsidies. Figure 7

Estimated total present value of lifetime state Medicaid subsidies by educational attainment



Note: Sample limited to adults 25 to 65 years of age, non-college students.
Source: Authors' Calculations. U.S. Census Bureau, *Current Population Survey* (March 2006-2009), data for Montana.

Impact on State Incarceration Costs

Empirical studies have repeatedly found an association between educational attainment and criminal behavior.[23] Given that more educated individuals garner higher wages, they have less economic incentive to commit crimes and greater opportunity costs associated for time spent committing crimes and in prison.[24] Sum and colleagues found that the incidence of institutionalization among young high school dropouts (ages 16 to 24) was more than 63 times greater than among young four-year college graduates.[25] The authors estimate that "nearly 1 of every 10 young male dropouts were institutionalized on a given day in 2006-2007 versus fewer than 1 of 33 high school graduates".[26]

Reducing dropout rates presents great opportunity to reduce public expenditures on crime. The economic costs of criminal behavior include expenditures related to additional police and court services, incarceration, state-funded victim compensation, and government crime prevention programs.[27] Levin and colleagues estimate the total present value lifetime cost-savings from reduced criminal activity due to high school graduation average $26,600 nationally.[28] Other researchers estimate that after accounting for the incarceration costs imposed by dropouts, the net fiscal contribution of high school dropouts to society is negative ($5,200), while the average high school graduate generates a lifetime net fiscal contribution of $287,000.[29] One econometric study estimated that a 1 percent increase in male high school graduation rates would save as much as $1.4 billion in criminal justice costs.[30]

The total annual fiscal impact of dropouts on the state's incarceration costs is almost $10 million. Table 7

Potential annual savings of high school graduation to state incarceration costs

Dropout Population	36,788
Percent of Dropouts Incarcerated	3.4%
Number of Incarcerated Dropouts	1,239
Average Incarceration Cost Per Dropout	$1,186
Expected Incarcerations without Dropouts	959
Expected Average Incarceration Cost	$919
Average Fiscal Impact	**-$268**
x Dropouts (36,788)	
Total Fiscal Impact	**-$9,859,184**

Notes: Lochner and Moretti estimate that White high school graduates have a 0.76 percentage point lower probability of incarceration; their sample is limited to males ages 20-60, so our calculation assumes the effect is constant across gender.
Source : Authors' calculations. Montana Department of Corrections, *Bi-Annual Report (2009)*; Lochner and Moretti, 2004.

Our analysis focuses exclusively on dropouts' impact on Montana's state-funded incarceration costs. In 2005, Montana's total state expenditures on criminal justice were estimated to be $219 million, of which $124 million was spent on incarceration.[31] This represents a 43% rise in costs from 2000, to which high school dropouts are an important contributor. Using statistics from the Montana Department of Corrections, we estimate that one in 30 Montana dropouts is incarcerated, which is more than eight times the incarceration rate of high school graduates.

According to the Montana Department of Corrections, the average incarceration cost per inmate in 2008 was $33,580 for men and $44,165 for women. As shown in Table 7, we estimate Montana currently spends $1,186 on incarceration for each high school dropout, compared to only $146 for high school graduates. Each dropout costs the state $6,023 over an individual's lifetime, edue to higher incarceration rates than their more-educated peers.

Using 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 lead to a 0.76 percentage point decrease in state incarceration rates. Therefore, we estimate the average annual incarceration costs of Montana's 36,788 dropouts would decline by $268 per person had they graduated from high school, representing potential cost savings of $9.85 million.

Conclusion

The Economic Benefit of Reducing Montana's Dropout Rate

While it is useful to understand the current negative fiscal impact of dropouts on Montana's economy, it is more proactive to forecast the benefits that would result if the state successfully reduced the dropout rate. Based on the number of dropouts in the 2008 class (as reported by the MOPI), we can assume that approximately 2,000 new dropouts enter the state's labor market each year. As shown in Table 8, we estimate that each prevented dropout will result in a present value lifetime benefit of $32,402.[32] By permanently cutting the dropout rate in half, each class of new high school graduates will yield over $32 million in direct gross economic benefits to the state. Completely eliminating the

dropout problem will save the state $65 million annually. Given the projected drop in state revenues over the next few years, policymakers cannot afford to ignore this economic opportunity.

By permanently cutting the dropout rate in half, each cohort of new graduates would yield over $32 million in direct gross economic benefits to the state. Table 8

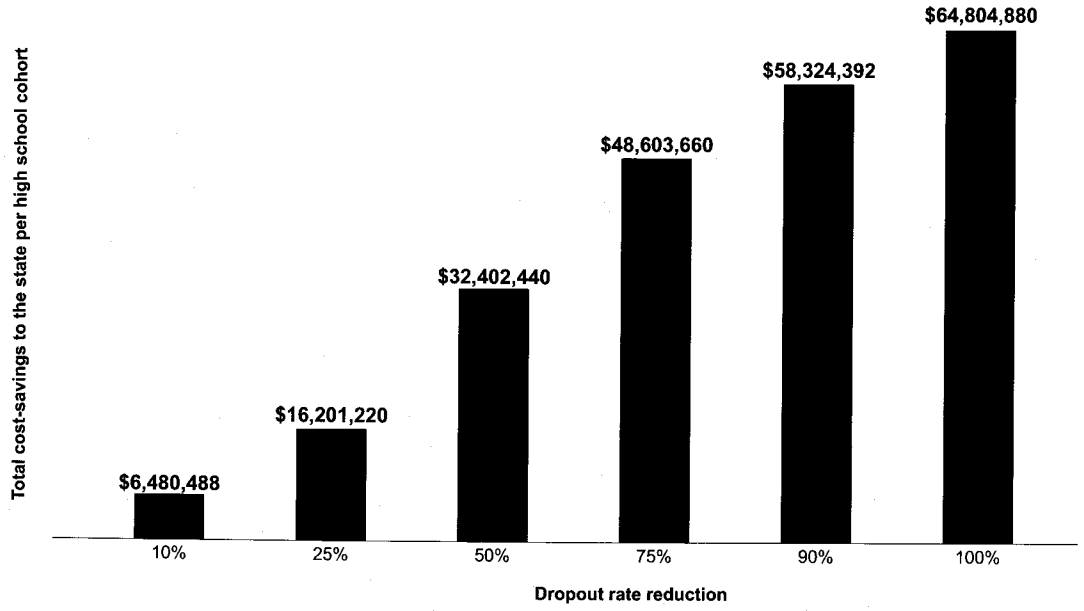
Present value lifetime cost-savings to the state per expected high school graduate

	Lifetime Benefits
Additional State Tax Payments	$12,526
Reduced State Medicaid Subsidies	$13,853
Reduced State Incarceration Expenditures	$6,023
Total Lifetime Cost-Savings to the State for each additional expected High School Graduate	$32,402
Total Lifetime Cost-Savings Per Cohort for 50% Reduction in Dropouts	$32.4 million
Total Lifetime Cost-Savings Per Graduating Class for 100% Reduction in Dropouts	$64.8 million

Source : Authors' calculations.

By permanently cutting the dropout rate by 75%, each cohort of new graduates would yield nearly $50 million in direct gross economic benefits to the state. Figure 8

Total cost-savings to the state per high school cohort by reduction in dropout rate



Note: Sample limited to adults 25 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.
Source: Authors' Calculations. U.S. Census Bureau, *Current Population Survey* (March 2006-2009), data for Montana.

Notes

[1] 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.

[2] 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); Clive R. Belfield and Henry Levin, *The Price We Pay. The Economic and Social Consequences of Inadequate Education* (Washington: Brookings Institution Press, 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).

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

[4] 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). Available: http://www.accessednetwork.org/resource_center/research/CADropout-Research1.pdf; 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 Levin 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).

[5] 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.

[6] Data provided by United States Department of Labor, Bureau of Labor Statistics. Available: http://data.bls.gov/PDQ/servlet/SurveyOutputServlet?data_tool=latest_numbers&series_id=LASST30000003.

[7] Montana's economy has been less impacted by the recession than its neighbors, which suggests the inclusion of recessionary periods in our analysis should not prevent the generalization of these findings to non-recessionary periods. See: Susan Ockert, "Montana's Economy," Montana Department of Commerce, Census and Economic Information Center (2009). Available: http://ceic.mt.gov/Publications/Highlights/highlights_bea_gdp_0609.pdf.

[8] 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).

[9] The Montana Office of Public Instruction, "Statewide Dropout and Graduate Report: 2007-08 School Year," The Montana Office of Public Instruction, Measurement & Accountability Unit (2009).

[10] The Montana Office of Public Instruction, "Statewide Dropout and Graduate Report: 2007-08 School Year," The Montana Office of Public Instruction, Measurement & Accountability Unit (2009).

[11] Susan C. Faircloth and John W. Tippeconnic, III, "The Dropout/Graduation Crisis Among American Indian and Alaska Native Students: Failure to Respond Places the Future of Native Peoples at Risk," The Civil Rights Project/Proyecto Derechos Civiles at UCLA, The Pennsylvania State University Center for the Study of Leadership in American Indian Education (2010). Available: http://www.civilrightsproject.ucla.edu/research/dropouts/faircloth-tippeconnic-native-american-dropouts-2010.pdf.

[12] Christopher D. Lohse, "Striving to achieve: Helping Native American students succeed," National Caucus of Native American State Legislators, Education Committee of the National Caucus of Native American State Legislators (2008). Available: http://www.ncsl.org/print/statetribe/strivingtoachieve.pdf

[13] 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.

[14] According to Orfield et al. (2004): "The CPI statistically examines changes in enrollment and likelihood of graduating with a high school diploma by combining the average success of groups of students moving from ninth grade to tenth grade, from tenth grade to the junior year, from junior to senior year, and from senior year to graduation, at the district and state level. This method allows comparisons across years, districts, and states using a common metric treatment and a constant statistical treatment." (p. 9). 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.

[15] 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.

[16] This analysis follows the approach used by Belfield (2008). Given the small CPS samples in Montana, it is impossible to observe a complete picture of the distribution of personal income over the Montana population ages 20 to 65. Even though we used the CPS sample in years 2006 to 2009, there were either no data or insufficient amount of data to estimate the average personal income for each gender and racial subgroup at each age from 20 to 65. Since we could not observe the full wage distributions in the sample, the wage equation is used to estimate it. This approach allows us to calculate average personal

incomes while adjusting for constant differences in earnings between males and females and Indians and non-Indians. We use a Heckman correction to account for differences in labor market participation that are independent of earnings, namely marriage and number of children. See: 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] 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).

[18] Montana's total personal income in 2008 was estimated to be $33.5 Billion (Bureau of Economic Analysis, 2010), which implies dropouts have a gross effect of 0.6% on the total economy. See: Governor's Office of Budget and Program Planning, "Volume 2 – Governor's Budget – Revenue Estimates: Economic Overview," State of Montana, Governor's Office of Budget and Program Planning (2006). Available: http://budget.mt.gov/content/execbudgets/2009_budget/2_-_EconOverview_2007_Bien.pdf.

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

[20] 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).

[21] 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).

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

[23] 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.

[24] Lance Lochner, "Education, Work, and Crime: A Human Capital Approach," International Economic Review 45 no. 3 (2004), 811-843.

[25] 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).

[26] 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.

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

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

[29] 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).

[30] 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.

[31] Data provided by United States Department of Justice's Office of Justice Programs' Bureau of Justice Statistics. Available: http://bjs.ojp.usdoj.gov/dataonline/Search/EandE/state_exp.cfm.

[32] 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.

About the Authors

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