



# THE FISCAL RETURN ON EDUCATION

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HOW EDUCATIONAL ATTAINMENT DRIVES  
PUBLIC FINANCE IN OREGON

A Report to OBC/E<sup>3</sup>

BY

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# THE FISCAL RETURN ON EDUCATION

## HOW EDUCATIONAL ATTAINMENT DRIVES PUBLIC FINANCE IN OREGON

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### EXECUTIVE SUMMARY

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Oregon's system of public finance is profoundly shaped by the educational attainment of its population. The state gets the bulk of its revenues from people who have completed a four-year college degree, and spends a disproportionate share of its budget providing services to those with just a high school diploma or less education.

The close relationship between educational attainment and state revenues and expenses means that the Oregon budget has a huge stake in improving the educational attainment of the state's population. There is a large "fiscal return" on the state's investment in improving education—higher educational attainment both increases state revenues and drives down the cost of key state programs.

*Revenue.* Oregon income tax revenues, the principal source of revenue for the state's General Fund, come disproportionately from well-educated Oregonians. Better educated persons have higher incomes: In Oregon, in 2008, the average household headed by a person with at least a four-year degree had an income 70 percent higher than the average household headed by a person with just a high school diploma. Better educated households had both more income, and paid a higher personal income tax rate than less well educated households. In 2008, households headed by a person with a four-year degree constituted 36% of all households, but paid more than 53% of all state income taxes.

Increasing educational attainment is likely to translate into higher state tax revenues: Given the current relationship between education and state income taxes, each household headed by a just a high school graduate that could be raised up in educational attainment to four-year degree completion would be associated with an annual gain in state personal income tax revenues of \$1,300.

*Expenditure.* The demand for many of the largest items of state expenditure is driven by the relative lack of education of some state residents. The participants in the Oregon Health Plan, recipients of welfare and unemployment insurance, and persons institutionalized in correctional and mental health facilities are disproportionately the least educated Oregonians. Persons with just a high school diploma or less education make up 37% of the state's population, but 54% of those participating in the Oregon Health Plan, 63% of those receiving welfare payments, and 46% of those drawing unemployment insurance benefits and 63% of the inmates of state correction facilities.

*A thought experiment:* If we were to move 10,000 Oregon adults from having just a high school diploma to completing a four-year college degree, we would expect state income tax receipts to rise by \$8 million annually, and the cost of four key public service programs (welfare, the Oregon Health Plan, unemployment insurance and corrections) to decline by about \$9 million annually—a substantial fiscal return on education for Oregon.

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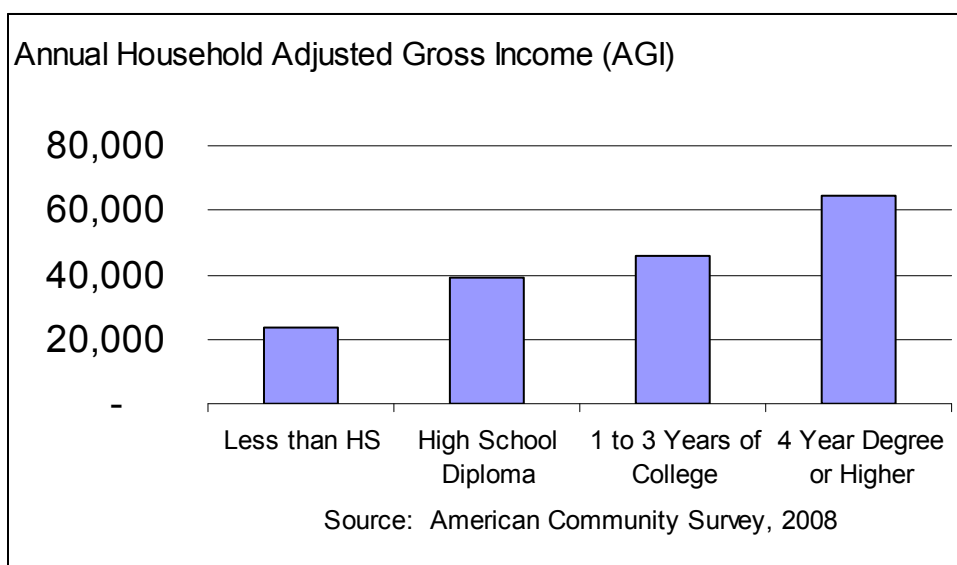
## EDUCATIONAL ATTAINMENT AND REVENUES

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In today's knowledge based economy, education is the single most important determinant of personal and regional economic success. There is a very strong correlation between educational attainment and personal income. In Oregon—as nationally—those with the highest levels of educational attainment earn the most income. In Oregon, households headed by adults with a four-year college degree, on average, earn about 70 percent more than households headed by persons with just a high school diploma.

What is true for individuals is true for states and regions as well. States with higher levels of educational attainment—as measured by the fraction of the adult population that has completed a four-year college degree—have higher average levels of per capita personal income. This relationship is statistically robust, and has grown more so over the past several decades.

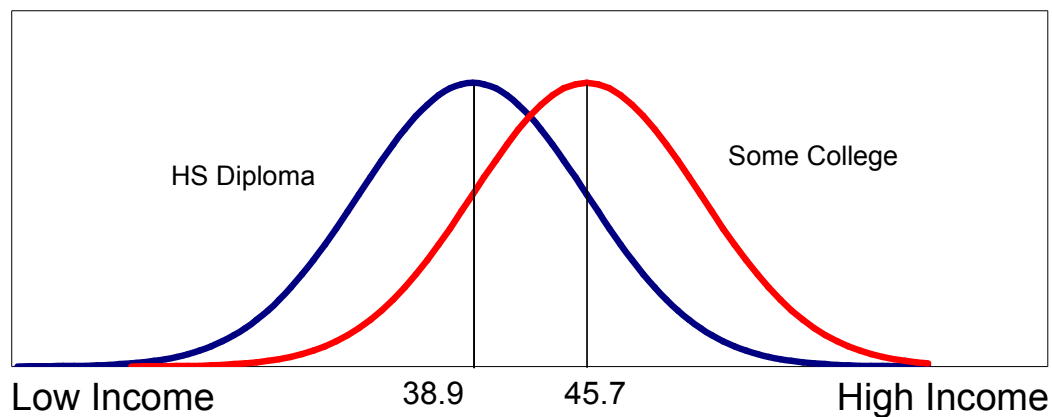
There is strong evidence for a “talent dividend” at the metropolitan level. The correlation between educational attainment and metropolitan per capita income implies that increasing the fraction of the adult population with a four-year degree would pay significant economic benefits. Improving the aggregate level of educational attainment, as measured by increasing the four-year college attainment rate by one percentage point in each of the nation's fifty-one largest metropolitan areas would be associated with an increase in personal income of more than \$120 billion annually (Cortright 2008).



Median adjusted gross income of Oregon households, by education of household head, 2008, for all household heads aged 25 to 64 years of age. Data from American Community Survey, computed from micro sample data (Ruggles, Sobek et al, 2009).

While income is strongly correlated with educational attainment, that doesn't mean that every person with a college education, for example, has a higher level of income than every person with a college degree. On average, people with a higher level of education have higher incomes, but some people with a college education have low incomes, while some people with only a high school diploma have high incomes. The following diagram illustrates this phenomenon. As a group, those persons with some college education (the right hand red line) have a higher average income, a median of \$45,700 compared to a median of \$38,900 for those with just a high school diploma (the left hand blue line). Notice that some people with a high school diploma have incomes over \$45,700, and some people with a some college education have incomes below \$38,900.

Our analysis looks at the gains we might expect from moving people from the median income level enjoyed by one group, to the median income level enjoyed by a more highly educated group. Again, while these averages are reflective of the change we would expect from moving a typical person from one group to another (i.e. improving their educational attainment), that doesn't necessarily mean that such a change would be true for each and every person who got a higher level of education.



Households headed by persons with at least a four-year college degree earn more income, and pay higher state income taxes. Although they account for a little more than a third of all households, those headed by a person with at least a four-year degree account for a majority of state personal income tax revenues.

Educational Level of Household Head	Percent of Households	Percent of Income Taxes
Less than HS	5.5%	1.8%
High School Diploma	24.5%	15.7%
1 to 3 Years of College	34.0%	29.0%
4 Year Degree or Higher	36.0%	53.4%

Percent of Oregon personal income taxes paid by educational attainment of household head. Estimated from American Community Survey 2008 and Oregon Personal Income Tax Statistics 2007.

Because they earn more income, and because Oregon has a progressive income tax structure, well educated households pay higher taxes and a higher tax rate than less well educated households, on average. The typical household headed by a person with just a high school diploma has an adjusted gross income of slightly less than \$40,000 a year, and pays a tax rate of about 4.5 percent or about \$1,800 per year in state personal income taxes. The typical household headed by a person with at least a four-year degree earns almost \$65,000 per year, and pays about a 4.8 percent tax rate or about \$3,100 per year in state personal income taxes.

Educational Level of Household Head	Median AGI	Tax Rate	Annual state income tax
Less than HS	23,500	4.1	1,000
High School Diploma	38,900	4.5	1,800
1 to 3 Years of College	45,700	4.6	2,100
4 Year Degree or Higher	64,800	4.8	3,100

Median level of household adjusted gross income by educational attainment of household heads aged 25 to 64 in 2008. Tax rates and annual state income tax estimated based on values for full-year residents in 2007. Data from American Community Survey 2008 and Oregon Personal Income Tax Statistics 2007.

The relationship between education, income and taxes is more complex than painted by these statistics. Because taxes are collected from households, some of the effect of education is reflected in the different household composition of households headed by less well educated persons compared to better educated households. For example, those with just a high school diploma are more likely to be single heads of households, and those headed by a person with a four-year degree are more likely to have two working spouses. And our analysis is truncated at the four-year degree level and does not reflect any added gains that are associated with graduate education—and national data suggest that further education produces additional income gains. As a result, these estimates should be taken as a rough guide to the impact of education on tax revenues.

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## EDUCATIONAL ATTAINMENT AND EXPENDITURES

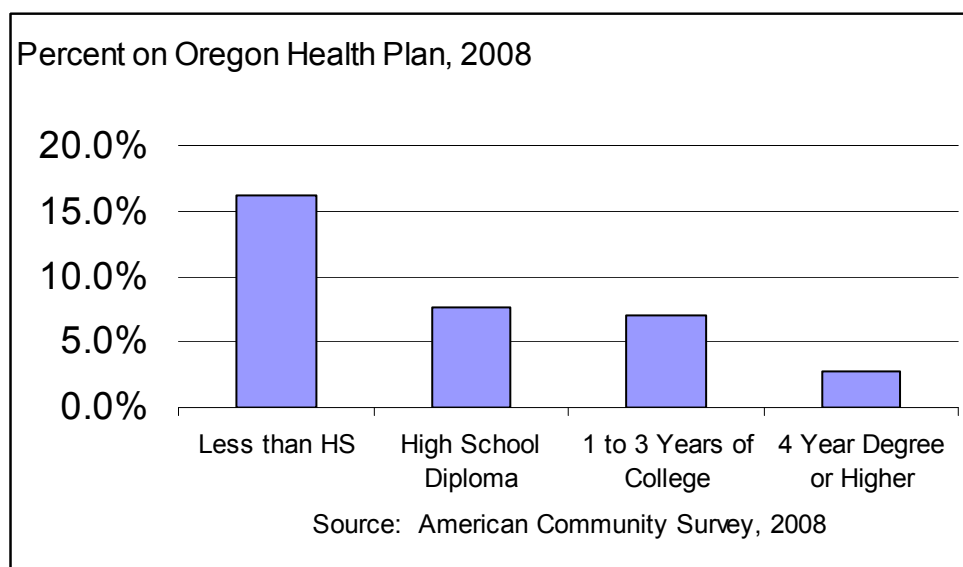
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Educational attainment—more specifically, the lack of educational attainment—is a key driver of participation in state social service programs. Persons who receive benefits from welfare, from the Oregon health plan, and from the state unemployment insurance system are disproportionately those with the lowest levels of education.

### Oregon Health Plan

Excluding public education, the cost of health and social services provided by the Oregon Department of Human Resources is the single biggest item in the state budget, accounting for more than \$3 billion of the state's \$14.2 billion general fund budget in 2009-11 (Legislative Fiscal Office, 2009). The largest components of this agency's budget are the Oregon Health Plan and the provision of income support and social services for needy children, adults and families. The participants in all these programs are disproportionately the least well-educated Oregonians.

The Oregon Health Plan provides medical insurance to 475,000 low income Oregonians. The average cost of providing insurance is about \$430 per month per person, or about \$5,000 per person per year (PriceWaterhouseCoopers 2008).



Percentage of Oregonians aged 25 to 64 receiving Medicaid benefits, by educational attainment, 2008. Data from American Community Survey, computed from micro sample data (Ruggles, Sobek et al, 2009).

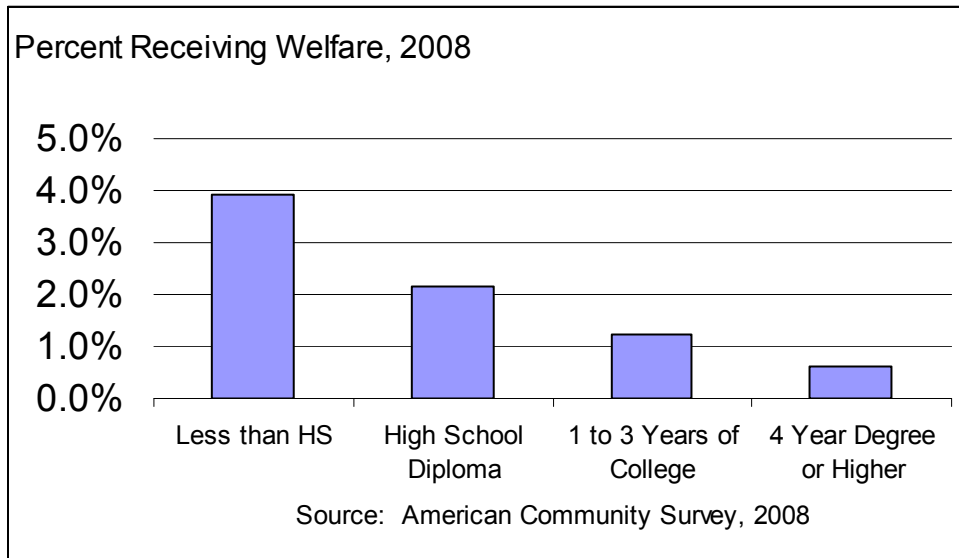
Indeed, educational attainment is one of the best predictors of employer provided health care coverage. Nearly 90 percent of those with at least a four year degree have employer provided health care coverage, compared to only about one-third of high school dropouts, and about two-thirds of those with just a high school diploma. As a result of their lower levels of employer-provided care, those with just a high school diploma and high school

dropouts are three to five times more likely than college graduates to enroll in the Oregon Health Plan.

## Welfare

The state provides income support and social services to low income families throughout the state. The biggest direct income support program operated by the state is the Temporary Assistance for Needy Families (TANF) program which provides benefits to more than 25,000 households statewide. In 2008, total TANF benefit payments were approximately \$170 million. Based on an approximate caseload of 20,000 cases that year, the average cost per case was about \$8,500.

There is a strong negative relationship between education and welfare participation. Those with the lowest levels of educational attainment are more likely to receive welfare benefits. Among adults 25 to 64, about four percent of high school dropouts reported receiving some income from welfare in 2008, compared to about one half of one percent of those who had completed a four-year college degree.

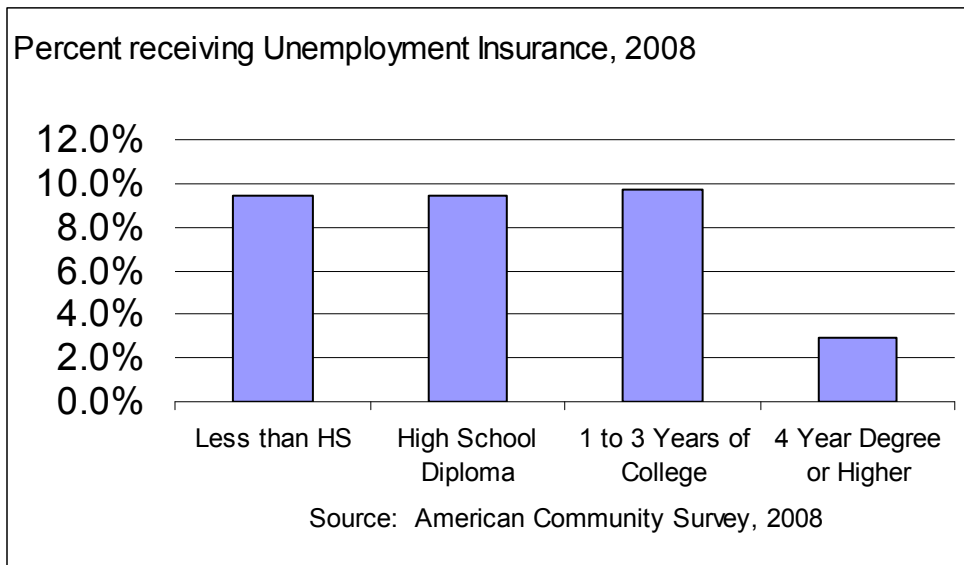


Percentage of Oregonians aged 25 to 64 receiving welfare benefits, by educational attainment, 2008. Data from American Community Survey, computed from micro sample data (Ruggles, Sobek et al, 2009).

## Unemployment Insurance

In 2008, Oregonians collected approximately \$850 million in unemployment insurance benefits (Bureau of Economic Analysis 2009). In the 2009-11 biennium, Oregon expects to pay over \$2 billion in unemployment benefits, a number far greater than in previous (or typical biennia) because of the severity of the recent recession (Legislative Fiscal Office 2009).

Persons with lower levels of education are more likely to have drawn unemployment benefits in the last year, according to Census Bureau data. The difference in drawing benefits is chiefly between those with a four-year degree, and all other Oregonians. Roughly 9 percent of all adults between 25 and 34 with less than a four-year degree reported drawing unemployment benefits at some point during 2008. Fewer than 3 percent of those with a college degree reported any unemployment insurance income. There was little difference in UI recipiency between high school dropouts, high school graduates and those with some college—probably because many of those with the lowest levels of education have dropped out of the workforce entirely, or have work histories that do not qualify them for unemployment insurance benefits.



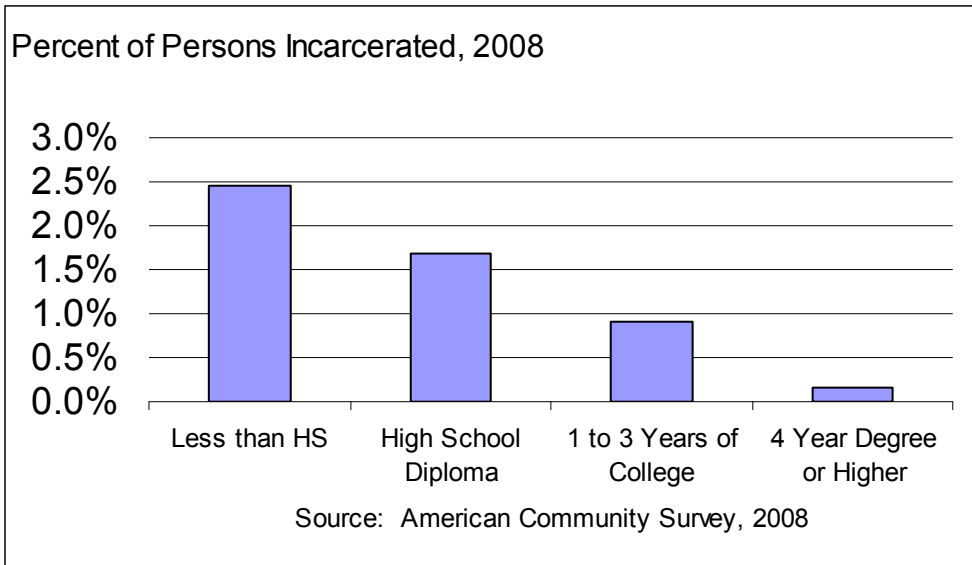
Percentage of Oregonians aged 25 to 64 receiving unemployment insurance benefits, by educational attainment, 2008. Data from American Community Survey, computed from micro sample data (Ruggles, Sobek et al, 2009).

## Corrections

The corrections budget has been one of the fastest growing components of the Oregon budget over the past decade. In the 2009-11 biennium, the Legislature allocated more than \$1.2 billion in general funds for the operation of the state corrections department (Legislative Fiscal Office 2009). The estimated cost of providing incarceration in state correctional facilities is more than \$80 per inmate per day, or about \$28,800 per year.

Nationally, we know that 68 percent of the persons in state correctional facilities have not completed a high school diploma (Bureau of Justice Statistics 2009).

There is a very strong negative relationship between education and incarceration: the more education you have the less likely you are to be incarcerated. About 2.5 percent of high school dropouts are incarcerated compared to less than one-fourth of one percent of those with a four year college degree.



Percentage of Oregonians aged 25 to 64 incarcerated in correctional institutions, by educational attainment, 2008. Data from American Community Survey, computed from micro sample data (Ruggles, Sobek et al, 2009).

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## A THOUGHT EXPERIMENT

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To illustrate the effects of increasing Oregon’s level of educational attainment on public finance, it is worth considering the following “thought experiment”: what would be the effect of public revenues and expenditures of giving 10,000 adults who today have only a high school diploma a four-year college degree?

Our revenue analysis suggests that each household headed by a person with at least a four year college degree earns \$64,800 and pays \$3,100 annually in state personal income taxes. In contrast, a household headed by a person with just a high school diploma earns an average of \$38,900, and pays \$1,800 annually in state personal income taxes. For a high school diploma holder that got a four-year degree we would expect an increase in personal income of more than \$25,000 and additional state income tax payments of \$1,300. Because the average working age household in Oregon has more than one adult, we assume that each additional adult educated is equal to about 60% of a household’s income gain, for a net state income tax gain per additional adult educated of about \$800. Multiplied by 10,000 persons, this would be an annual gain in state revenue of \$8 million annually.

Our expenditure analysis suggests that adults with just a high school degree, are on average about four times more likely to be on welfare, two and a half times more likely to be

on the Oregon health plan, three times more likely to draw unemployment insurance benefits and ten times more likely to be incarcerated as a person with a four-year college degree. Consequently, over time, we would expect improving educational attainment to lower the number of persons claiming welfare benefits, enrolling in the Oregon health plan, drawing unemployment insurance benefits and being incarcerated.

Based on the difference in the likelihood that persons with four-year degrees will participate in such programs compared to those with just a high school diploma, and the average cost of program participation, we can estimate how much less the state would have to spend for health care, welfare, corrections and unemployment insurance, if there were to be an improvement in educational attainment.

For our thought experiment, let's estimate how many fewer persons would participate in such programs if a given population of 10,000 adults had a four-year degree compared to a high school diploma. For each of the programs considered here (welfare, Oregon Health Plan, Unemployment Insurance and Corrections), participation rates are lower for college graduates than for those with just a high school diploma. As a result, we would expect lower numbers of participants in each of these programs from a population with a higher level of educational attainment. We use the difference in the participation rates to change in participation associated with a higher attainment level. For example, shifting 10,000 persons from a high school diploma to a four year degree would be associated with 1.6% fewer persons on welfare, or a decline of 160 persons on welfare.

We estimated the average cost per participant in each program from state program cost data, and summarized the cost savings as follows. In these four program areas, moving 10,000 persons from high school completion to four-year college degree attainment would be associated with about a \$9 million annual decline in program costs.

Program	Participation Rate			Change in Participation	Cost per Participant	Aggregate Savings
	High School Graduate	4 Year Degree	Difference			
Welfare	0.6%	2.2%	-1.6%	-160	8,500	1,360,000
Oregon Health Plan	2.8%	7.7%	-4.9%	-490	5,000	2,450,000
UI	2.9%	9.5%	-6.6%	-660	4,250	2,805,000
Corrections	0.2%	1.7%	-1.5%	-151	17,000	2,567,000
<b>Total</b>						<b>9,182,000</b>

UI: Unemployment Insurance. How to read this table: This table shows participation rates for four key programs based on the educational attainment of the Oregon adult population, aged 25 to 64. Cost per participant is estimated by dividing total program expenditures by the average number of persons served per year. Savings are calculated by multiplying average cost per participant by our estimated change in participation rates, based on moving 10,000 persons from the high school graduate to the four year degree category.

The real world is more complex than our thought experiment allows for: average program costs vary substantially across program participants, and those who might be best positioned to advance from a high school diploma to a four-year college degree might not be those who were the most likely to participate in each of these programs, and even when they did participate, they might be less costly than the average program participant.

Educational Attainment of Adults Aged 25 to 64 by program participation, 2008

	Population	Welfare	Oregon Health Plan	UI	Incarcerated
<i>Percent of Population</i>					
Less than HS	8%	24%	13%	10%	21%
High School Diploma	29%	39%	41%	36%	42%
1 to 3 Years of College	33%	27%	42%	42%	33%
4 Year Degree or Higher	30%	10%	17%	12%	5%
<i>Relative Likelihood</i>					
Less than HS		3.0	1.7	1.2	2.6
High School Diploma		1.4	1.4	1.3	1.5
1 to 3 Years of College		0.8	1.3	1.3	1.0
4 Year Degree or Higher		0.3	0.5	0.4	0.1
4 Year to HS Ratio		0.24	0.38	0.31	0.10

UI: Unemployment Insurance. How to read this table: This table shows the percentage of the population aged 25 to 64 years of age by educational attainment, and share of participants in each program area (Welfare, etc) accounted for by each educational attainment grouping). For example, 8 percent of Oregonians aged 25 to 64 have completed less than a high school diploma, and 24 percent of those on welfare have this level of educational attainment. The relative likelihood is the ratio of the likelihood that a person will participate in such each program relative to the entire Oregon adult population. For example, high school dropouts account for 24% of welfare recipients and 8% of the population, meaning they are three times as likely as the overall population to be welfare recipients. The Four-year to High School ratio is the likelihood that a person with a four year degree will participate in a program relative to a person with just a high school diploma. For example, a person with a college degree is about 75% less likely to get welfare benefits, on average, than a person with just a high school diploma.

*Data sources for this report: Data for this report comes from the Census Bureau's American Community Survey, 2008, and from data on personal income tax collections reported by the Oregon Department of Revenue.*

*Definitions: Personal income taxes are assessed on households, rather than on individuals, so we use data on the educational attainment of the head of household as collected by the Census Bureau as part of the American Community Survey. Program participation (Oregon Health Plan, welfare, and unemployment insurance and incarceration) is determined on a per individual basis. For purposes of this study, we focused on working age populations, defined as those persons 25 to 64 years of age.*

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## OTHER ANALYSES OF FISCAL RETURNS

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The connection between education levels, income, and public revenue and expense has been known for some time. Several studies have attempted to estimate the social and public sector returns to improvements in educational attainment. Although different in methodology, geographic scope and program coverage than this study, they produce findings that are broadly similar to those presented here.

In a 2007 study prepared by the Federal Reserve Bank of Boston, Trostel estimated the lifetime federal, state and local taxes paid by college graduates compared to non-graduates, and compared these to estimated costs of providing services to the two groups. This analysis is based on regional data for New England states drawn from the Current Population Survey and Survey of Income and Program Participation. Because costs and benefits are incurred over the lifetime of citizens (with many expenditures, particularly for education, occurring early in life, and earnings and taxes being spread out over working years, Trostel computes the discounted present value of both revenues and expenditures over a typical lifetime. He finds that, even after allowing for the public cost of additional education, total public expenditures are lower for those with a college degree.

Belfield and Levin (2007) estimate the costs associated with dropouts in California. They examine general tax revenues from income and sales taxes, the cost education, welfare, health care and corrections. They conclude that each additional high school graduate produces a net fiscal gain for the total public sector during the lifetime of the graduate of about \$169,000. Of this \$115,000 is net gain to the federal government and the remainder, about \$54,000 is for state and local governments.

Carol and Erkut (2009) develop a comprehensive model of the revenues and costs associated with persons of different educational attainment levels, disaggregated by key demographic factors. Their analysis is based on national data from 40,000 persons included in the 2002 Survey of Income and Program Participation. Their cost modeling includes welfare, health care, corrections, housing, social services. Net of the cost of providing additional education, they estimate that compared to the lifetime costs and revenues associated with a high school dropout, each additional high school graduate produces a net fiscal gain of about \$85,000 for federal, state and local governments over that person's lifetime.

Krop (1998) estimates the amount of additional education that would be needed to eliminate the attainment gap between non-Hispanic whites, Hispanics and African-Americans. His study examines the costs associated with additional education, and the cost-savings in welfare, Supplemental Security Income, social security, Medicare, Medicaid, unemployment insurance benefits, food stamps and corrections. He concludes that the fiscal benefits to federal state and local governments from higher attainment for these groups would be approximately two to three times larger than the cost of the additional education.

Levin, et al (2007) estimate the fiscal benefits associated with five different interventions aimed at improving high school graduation rates, ranging from reduced class sizes, to

specific programs such as “First Things First.” Their analysis considers both the additional costs of these interventions, and the net benefits associated with higher incomes and lower public service costs due to higher graduation rates resulting from the interventions. Part of their analysis is an examination of public finance impacts of higher high school graduation rates. They estimate that for individuals, high school graduation for persons who would otherwise dropout is associated with a net fiscal gain about \$210,000 per person, which is the exact amount of gain varying by gender, race and ethnicity. They estimate that in the aggregate, reducing the high school dropout rate by 50 percent from its current level for a single cohort of persons turning 20 years of age would produce total lifetime fiscal gains (higher tax revenues and lower costs) with a net present value of about \$74 billion

Lochner and Moretti (2004) study the relationship between education and incarceration. They estimate that differences in educational attainment explain about 23 percent of the difference in incarceration rates between African Americans and whites. They estimate that the total social benefit associated with each additional male high school graduate is about \$2,100, including both incarceration costs and the social costs associated with crime. In the aggregate, they estimate that each 1 percentage point increase in male high school graduation rates would be associated with total economic benefits of about \$1.3 billion.

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