

ECONOMICS OF THE ACHIEVEMENT GAP OREGON AND THE PORTLAND AREA

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INTRODUCTION

Achievement and attainment gaps are bad for the individuals who lag behind, and they are bad for the economy. Gaps in achievement and attainment between whites and minority groups suggest the presence of untapped human potential and human capital that Oregon could harness for the benefit of both individuals and society. The academic literature documents many ways that education improves individual outcomes. Increases in the amount and quality of education generate higher incomes, reduce unemployment, and improve health outcomes for individuals.¹ The academic literature also suggests that education improves regional economic outcomes. A more educated population may increase local economic growth, increase regional incomes, improve quality of life, and reduce crime.²

A 2013 Secretary of State audit of efforts to close the achievement gap established that achievement gaps are significant and consistent in Oregon.³ On average, the audit found that Hispanic, black, and Native American 8th graders were typically at least one year behind grade level in math and reading.

In this policy brief, we describe the results of a rough calculation designed to estimate the impact of Oregon's achievement and attainment gaps on Oregon's economy.⁴ For simplicity, we refer to both the achievement and educational attainment gaps as the "achievement gap" throughout most of this report. We rely on published research and Oregon-specific data to estimate of the benefits that eliminating achievement gaps in the Portland metropolitan area and the state as a whole could produce. We base our key findings on two calculation methods—one forward looking and one backward looking. The backward-looking method addresses the question, "How much has Oregon's historical achievement gap cost our economy today?" The forward-looking method addresses the question, "How much could Oregon gain by eliminating today's achievement gap?"

This brief is an update to our October 2010 report, entitled "The Economic Impacts of Oregon's Student Achievement Gap."

THE ACHIEVEMENT GAP

Since the completion of our 2008 analysis, overall achievement gaps have closed slightly, but they remain significant. Gaps in OAKs 8th grade reading scores are similar to those in 2008. The most recent data indicate that the average RIT score of nonwhite students falling from 4.3 to 5.3 points lower than their white peers across the state (see Figure 1). Achievement gaps in the three-county area are even greater than the state average.

Attainment gap indicators, including the percent of the adult population with a bachelor's degree, have improved for each major minority group compared to those in our 2010 report, although the overall patterns have not changed greatly. Figure 2 profiles a few key indicators of achievement and attainment indicators for major minority groups in Oregon.



FIGURE I. OAKS 8TH GRADE READING RIT SCORE GAP, 2010-2013

Source: Oregon Department of Education; ECONorthwest

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These gaps become relatively more important as Oregon's minority populations increase relative to the white population. The Hispanic and black adult working population (age 25 to 64) increased 10 and 13 percent (9.9 percent and 1.7 percent of the total population, respectively), compared to figures published in our 2010 report.

FIGURE 2. SELECTED ACHIEVEMENT AND ATTAINMENT GAPS IN OREGON

	Black- White	Hispanic- White	Native American- White	Asian- White				
Achievement Gaps (differences in standard deviation)								
OAKS 8th Grade Reading (2010-2012)	-0.60	-0.57	-0.49	-0.05				
NAEP 8th Grade Reading (2011)	-0.67	-0.60	-0.42	-0.19				
Attainment Gaps								
Percent differences in share of OR residents aged 25-64 with at least a bachelor's degree (2012)	-9%	-21%	-20%	12%				
Differences in average years of schooling 25-64 (2012)	-0.52	-3.16	-1.15	0.20				

Source: Oregon Department of Education; National Center for Education Statistics; U.S. Census Bureau, American Community Survey (2012, 3-year data); ECONorthwest

METHODOLOGY FOR ESTIMATING COSTS

Three factors determine the economic impact of achievement gaps: the magnitude of the achievement gaps, the size of the population affected by them, and the relationship between education levels and economic outcomes. Multiplying the change in the achievement gap by the share of the population affected by this change yields the marginal change in Oregon's education level resulting from closing the gap. Multiplying the marginal change in education level by the measure of the relationship between education and the economy produces our estimate of the total impact of the achievement gap on Oregon's economy.

Figure 3 illustrates our basic calculations and results for the elimination of the achievement gap in Oregon. The same methodology was applied when calculating impacts in Oregon of the elimination of the achievement gap in the Portland-metro area.

Our basic assumptions include:

- The assumed share of the adult population affected by the change in the achievement gap ranges from the share of Oregon's current adult population born in Oregon (low) to the entire adult population (high) in each of the major minority groups. The low estimate is a more conservative estimate than we used in our 2010 report, so we have also calculated a mid-point impact for illustrative purposes.
- The economic growth impact of increased test scores is based on more current research (Hanushek, 2010) by the same authors of the research cited in our prior report. The new research found a 1.86 percentage point impact for every one standard deviation in the achievement gap.
- To better reflect the existing research on the impacts of increases in education levels, we have used OAKs 8th grade reading scores to calculate the impacts of eliminating the gap, rather than math scores, as used in our prior report.

Equation 1	Achievement Gap	X	Share of adult population affected by change	=	Change in education levels
Backward	0.52 s.d.	Х	2.7 - 15.0%	=	0.01-0.08 s.d.
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Forward looking	0.49 s.d.	Х	4.4 - 25.1%	=	0.02-0.12 s.d.
Equation 2	Change in education levels	X	Impact of education on economic growth	=	Impact of achievement gap
Backward	0.01-0.08 s.d.	Х	1.86 percentage points per s.d.	=	Additional 0.02-0.15 percentage points
looking					of growth per year
Forward looking	0.02-0.12 s.d.	Х	1.86 percentage points per s.d.	=	Additional 0.04-0.22 percentage points
					of growth per year

FIGURE 3. SUMMARY OF CALCULATIONS AND RESULTS (OREGON ACHIEVEMENT GAPS)

FINDINGS

The backwards-looking analysis indicates that if the achievement gap for Oregon's adult population had been eliminated by 2003, the increase in economic activity in Oregon would have been \$1.9 billion higher in 2013. If only the achievement gap for adult population of the three-county, Portland area had been eliminated in 2002, the increase in economic activity in Oregon would have been between \$900 million in 2013. Figure 4 illustrates this range the mid-point calculations, as well as the range of calculated impacts.

This reflects an increase in the gross state product per capita of \$487, bringing the total gross state product per capita up to \$54,237. This would have eliminated more than half of the gap between Oregon and Washington's gross state product per capita.

FIGURE 4. 2013 GROSS STATE PRODUCT WITH ELIMINATION OF ACHIEVEMENT GAP IN 2003, BILLIONS



Source: ECONorthwest

FIGURE 5. IMPACTS OF OREGON ACHIEVEMENT GAP ELIMINATION ON OREGON GROSS STATE PRODUCT PER CAPITA, 2013



Source: U.S. Dept. of Commerce, Bureau of Economic Analysis; ECONorthwest

Our forward-looking analysis indicates that if the achievement gap apparent in Oregon's school system were eliminated over the next 10 years, Oregon's economy would be 0.8 larger by 2035 and 3.6 percent larger in 2060. If the achievement gap were eliminated in Portland area schools over the same time period, the state's economy would be 0.4 percent larger in 2035 and 1.6 percent larger on 2060. This growth projection, as well as the range of calculated impacts on gross state product growth, is illustrated in Figure 6.

FIGURE 6. INCREASED GROSS STATE PRODUCT GROWTH WITH ELIMINATION OF ACHIEVEMENT GAP IN OREGON BY 2023



Source: ECONorthwest

CONCLUSION

Figure 7 summarizes our findings. As the figure makes clear, persistent achievement gaps impose significant economic costs on the state.

Closing the gap will require deliberate action on the part of districts and schools. The 2013 Secretary of State audit indicates that this work has begun, identifying five key practices that have helped some Oregon middle school begin to close the gap. We conclude with a list of these practices, and recommend building off of this foundation in developing policy responses to the still large achievement gaps in Oregon:

- 1. Creating a safe and positive school environment.
- 2. Setting high expectations for student improvement and behavior coupled with high levels of support.
- 3. Encourage high levels of collaboration between teachers.
- 4. Use of data to improve instruction and student placement.
- 5. Establishing principals as strong leaders within the school, directing effective practices.

FIGURE 7. SUMMARY OF ACHIEVEMENT GAP IMPACT FINDINGS

	Elimi	nating the gap in	า 2003	Forward looking through 2060			
	Low	High	Midpoint	Low	High	Midpoint	
Oregon	\$526 million	\$3,311 million	\$1,919 million	0.9 percentage point increase	6.4 percentage point increase	3.6 percentage point increase	
Portland, three-county area	\$207 million	\$1,515 million	\$861 million	0.3 percentage point increase	2.9 percentage point increase	1.6 percentage point increase	

CASE STUDY: BENEFITS OF 90% BENCHMARK ATTAINMENT IN 3RD GRADE READING

One way to close the gap significantly is to make sure that all students read at grade level. Below, we summarize additional analysis of some of the benefits to students of achieving a more modest goal—that 90% of students read at grade level.⁵ Specifically, we estimated the improvements in grade retention, on-time high school graduation, and earnings through age 28 that would accrue to Oregon's 2013-14 class of 3rd graders, had 90% reached the state reading benchmark on the OAKS (compared to actual benchmark attainment of 68%, a 22 percentage point gap).⁶ Thus, unlike our larger analysis on economic impacts to multiple student cohorts, these projected benefits reflect improvements for a single cohort of students. Maintaining similar gains over time would multiply the total benefits accruing to the state's K-12 system and students.⁷

SUMMARY OF FINDINGS

Earnings through age 28: We find that 90% benchmark attainment in 3rd grade reading would increase the present value of earnings through age 28 for the cohort by between \$34.4 million and \$154.5 million in 2014 dollars. This translates to between \$831 and \$3,731 for each student in the cohort or, alternatively, between \$3,735 and \$16,776 per student meeting benchmark that would not have without the modeled improvements. We reached these estimates by applying research findings that link differences in teacher quality to long-term outcomes, including earnings.⁸

Grade retention: We find that 90% benchmark attainment in 3rd grade reading would have reduced the share of students in the cohort that repeated at least one grade by between 0.5 percentage points and 2.1 percentage points. For comparison, 12 percent of the 2003-04 3rd grade cohort repeated at least one grade by 2012-13. Thus, the improvements resulting from 90% benchmark attainment in 3rd grade represents a reduction in grade retention of between 4 and 18 percent.⁹

On-time graduation: We find that 90% benchmark attainment in 3rd grade reading would have increased on-time graduation rate by between 1.1 percentage points and 3.9 percentage points.

FIGURE 8: INCREASE IN PRESENT VALUE OF TOTAL COHORT EARNINGS THROUGH AGE 28 (MILLIONS OF 2014 \$)



Source: Oregon Department of Education data; ECONorthwest analysis

FIGURE 9: PER-STUDENT INCREASE IN PRESENT VALUE OF TOTAL COHORT EARNINGS THROUGH AGE 28 (MILLIONS OF 2014 \$)



Source: Oregon Department of Education data; ECONorthwest analysis

Sources and Methodology

¹Philip Oreopoulos & Kjell G. Salvanes, 2009. "How large are returns to schooling? Hint: Philip Oreopoulos & Kjell G. Salvanes, 2009. "How large are returns to schooling? Hint: Money isn't everything," NBER Working Papers 15339.

²Moretti, Enrico, 2004a. "Human capital externalities in cities," Handbook of Regional and Urban Economics, in: J. V. Henderson & J. F. Thisse (ed.), Handbook of Regional and Urban Economics, edition 1, volume 4, chapter 51, pages 2243-2291; Lange, Fabian & Topel, Robert, 2006. "The Social Value of Education and Human Capital," Handbook of the Economics of Education, Elsevier; Shapiro, Jesse M. "Smart Cities: Quality Of Life, Productivity, And The Growth Effects Of Human Capital," Review of Economics and Statistics, 2006, v88(2,May), 324-335; Moretti, Enrico, 2004b. "Estimating the social return to higher education: evidence from longitudinal and repeated cross-sectional data," Journal of Economic Review, American Economic Review, American Economic Review, American Economic Association, vol. 94(1), pages 155-189, March; Daron Acemoglu & Joshua Angrist, 1999. "How Large are the Social Returns to Education? Evidence from Compulsory Schooling Laws," NBER Working Papers 7444; Hanushek, E.A. and L. Woessmann, 2007a Education quality and economic growth. Washington: World Bank; Hanushek, E.A. and Woessmann, L. 2010. "How much do Educational Outcomes Matter in OECD Countries?" National Bureau of Economic Research, November.

³Secretary of State Audit Report. April 2014. "Oregon Department of Education: Efforts to Close Achievement Gaps." Report Number 2013-10.

⁴We describe our calculation as "back of the envelope" in order to acknowledge the imprecision of our estimates. While our estimates rely on the best available data and research, we cannot estimate the precise impact of the achievement and attainment gaps on Oregon's economy given the data and empirical methods currently available. The elimination of the achievement gap (and the dramatic changes to Oregon's schools and workforce that would accompany it) would prompt a chain reaction that would ripple throughout the economy in thousands of ways. Accounting for all of these different ripples is impossible. Thus, the only way to envision Oregon's economy without achievement (or attainment) gaps is to make a series of assumptions and hope that the natural evolution of the economy and the process of eliminating these gaps does not render these assumptions invalid.

⁵We analyzed two scenarios. Scenario 1 embodies a more conservative set of assumptions, while Scenario 2 embodies a more optimistic set of assumptions. In Scenario 1, we assume that reading RIT scores for students that actually met the 3rd grade benchmark do not change. We assume that scores improve for the 22 percent of the cohort closest to achieving the benchmark just enough for these students to reach the cut point. In Scenario 2, we assume that reading RIT scores improve for all students by an amount equal to the average improvement of the 22 percent with higher scores in Scenario 1.

⁶The findings presented below require two caveats. First, we rely primarily on observed correlations between 3rd grade reading performance and subsequent academic outcomes. Specifically, we examine the academic trajectory of Oregon's 2003-04, 3rd grade class (with on-time graduation in 2012-13). Even if Oregon successfully improves 3rd grade reading, the nature of the specific interventions implemented to do so will affect the realized long-term benefits. Second, we examine only a small subset of potential benefits. Significantly improving 3rd grade reading would likely benefit students and the system in ways not directly captured by these outcomes.

⁷These benefits should not be added to those found earlier in this report, as many of these benefits are likely already counted in the larger impacts to the local economy.

⁸We rely on results presented in results in Chetty, Friedman, and Rockoff (2014), "Measuring the Impacts of Teachers II: Teacher Value-Added and Student Outcomes in Adulthood," American Economic Review. The Chetty, et al research links differences in teacher value-added to long-term outcomes. In this analysis, we assume achieving 90% benchmark attainment is equivalent to having teachers with value-added sufficiently higher to reach 90%.

⁹Based on per-student spending, we estimate that the reduction in grade retention could free between \$1.5 million and \$7.8 million annually if all enrolled cohorts had improved by a similar amount in 3rd grade.