

# Decomposing Skill Change among Young Adults in Norway

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| <div>1. Aim</div> <div>I. Can higher <b>skills</b> among <b>16–19-year-olds</b> be explained by higher <b>rates of participation in upper secondary education</b>?</div> <div>II. Can higher <b>skills</b> among <b>20–24-year-olds</b> be explained by higher <b>rates of upper secondary education completion</b>?</div>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | <div>2. Background</div> <div><div><div>• Relatively large <b>gains</b> in average <b>reading</b> (+14) and <b>numeracy</b> (+17) skill among young adults in Norway</div><div>• <b>Higher participation and completion rates</b> (7 pp) in non-compulsory education, and...</div><div>• ... <b>equal or higher average level skills</b> at all educational levels.</div><div>• Knowledge about the <b>relative importance</b> of compositional changes <b>can inform educational policymaking</b></div></div><div><div>Educational composition, by cycle and age group</div></div></div> |
| <div>3. Data</div> <div><div>• PIAAC1 &amp; PIAAC2 SUF-files (SSB)</div><div>• <b>Sample:</b> 16–24 years-old participants<ul style="list-style-type: none"><li><math>n_1 = 957</math>; <math>n_2 = 629</math></li><li><math>\hat{N}_1 = 585\,000</math>; <math>\hat{N}_2 = 595\,000</math></li></ul></div><div>• <b>Variables:</b><ul style="list-style-type: none"><li>All <b>plausible values</b>, and <b>population and replication weights</b> to account for survey design</li><li><b>Highest and current educational level</b> (trend variables) → Educational states</li><li>Socioeconomic and demographic covariates</li></ul></div></div>                                                                                                                                                                                                                                                                                                                         | <div>Oaxaca-Blinder Decomposition of Differences in Reading and Numeracy Skills</div> <div><div><div>Total Explained and Unexplained Differences in Reading and Numeracy Skills</div></div><div><div>Explained Contribution of Explanatory Variables to Differences in Average Reading (left) and Numeracy (right) Skills</div></div></div>                                                                                                                                                                                                                                               |
| <div>4. Methods</div> <div><div>• <b>Oaxaca-Blinder Decomposition</b> (model-based)<math display="block">\text{Skill}_i^c = \beta_0^c + \beta_k^c \text{Education}_{ki} + \beta_{\delta}^c X_{\delta i}^c + \epsilon_i^c</math></div><div>• <b>Kitagawa Decomposition</b> (non-parametric)<math display="block">\Delta = \hat{Y}^2 - \hat{Y}^1 = \underbrace{\sum_k \bar{Skill}_k^1 (\hat{p}_k^2 - \hat{p}_k^1)}_{\text{Composition component}} + \underbrace{\sum_k \hat{p}_k^2 (\bar{Skill}_k^2 - \bar{Skill}_k^1)}_{\text{Rate component}}</math></div><div>• <b>Groups:</b> Young adults + 16–19 &amp; 20–24 subsamples</div><div>• <b>Robustness:</b> Kitagawa vs. Oaxaca-Blinder</div><div>• <b>Limits:</b><ul style="list-style-type: none"><li>Common OB limitations (e.g., potential misspecification) → <i>model dependent estimates</i></li><li>Small subsamples + Different replication methods → Conservative SE (<i>Taylor approx.</i>)</li></ul></div></div> |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |

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| <div>5. Results</div> <div><div>Kitagawa decomposition</div><div>I. <b>Educational composition changes</b> account for about <b>one-fifth of the increase in average skills</b> among young adults in Norway<ul style="list-style-type: none"><li>22% of the reading increase (14 points) &amp; 20% of the numeracy increase (17 points)</li></ul></div><div>II. <b>Composition effects are stronger among 20–24 years-old</b> than 16–19 years-old</div><div>III. <b>Main drivers</b> are more <b>16–19 years-old pursuing and attaining upper secondary education or above</b> and more <b>20–24 years-old pursuing and attaining tertiary education</b></div><div>Oaxaca-Blinder Decomposition</div><div>I. Accounting for correlation between education and other potential explanatory variables adds <b>nuance to Kitagawa estimates</b><ul style="list-style-type: none"><li><b>16% of the reading gain is explained by education &amp; 15% of the numeracy gain is explained by education.</b></li></ul></div><div>II. <b>OB results are consistent with those from Kitagawa decompositions:</b><ul style="list-style-type: none"><li>The explained contribution of education is larger among 20–24 years-old than 16–19 years-old</li><li>Key drivers are increased participation in upper secondary education among 16-19-year-olds and in tertiary education among 20-24-year-olds</li></ul></div></div> | <div><div>References:</div><div><div>• Norway’s PIAAC 2 report (Voksnes ferdigheter i leseforståelse, tallforståelse og adaptiv problemløsning, 2024)</div><div>• Skill change among young adults from PIAAC1 to PIAAC2 (forthcoming)</div></div><div><div>Funding:</div><div><div>• Norwegian Ministry of Education and Research</div></div></div></div> |
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| <div>Key findings</div> <div><div>1. The <b>unexplained part</b> (structural differences) <b>dominates</b> the change in average reading and numeracy skills in <b>OB decompositions</b>.</div><div>2. The <b>explained contributions of different potential explanatory variables</b> (compositional differences) generally <b>cancel each other</b>.</div><div>3. The <b>higher share of young adults pursuing and attaining higher levels of education in PIAAC2</b> explains 2 of the 14 score points increase in average reading skills (16 %), and 3 of the 17 score points increase in average numeracy skills (15 %).</div></div> |
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