Quality-Adjusted Educational Attainment Distribution

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Introduction

When assessing the state of education across countries, researchers have historically mainly focused on quantitative measures of education whether it was about the stocks (e.g. years of schooling) or the flows (e.g. enrolment) of education. However, a growing number of large-scale cross-national tests of cognitive skills (during schooling or later in life) allows research on the qualitative elements of education. Yet, research and development initiatives too often assess the quantitative and qualitative dimension separately, while formal education itself does not guarantee the acquisition of cognitive skills (see e.g. Pritchett, 2013, Hanushek and Woessmann, 2012) and a comprehensive acquisition of cognitive skills by those in school clearly does not guarantee universal access to education. Both are important complementary indicators to evaluate the success of education systems but might lead to biased assessments when looked at separately.

Efforts to merge qualitative and quantitative aspects when measuring the state of education are so far very rare and have only covered a limited number of countries (Michaelowa, 2001; Filmer et al., 2006; Hanushek and Woessmann, 2008; Spaull and Taylor, 2015). In this research, we aim at deriving quality-adjusted educational attainment distributions for as many countries as possible, which will be key to explain differences in socio-economic development across countries.

Data and Methods

The research will make use of three different kinds of sources:

1) The global database on levels of educational attainment by age and sex developed at the Wittgenstein Centre for Demography and Global Human Capital (2018). Particularly relevant for this research are the reconstructed data from 1950 to 2015, which is available for 185 countries of the world (see Speringer et al., 2019).
2) The database on harmonized learning outcomes developed by the World Bank based on schooling scores (Altinok, Angrist, & Patrinos, 2018). The database includes 163 countries and regions between 1965 and 2015 for both primary and secondary education. By means of multiple methods (e.g. mean and percentile linking methods) different international and regional assessments are linked, resulting in globally comparable mean scores and achievement distributions.
3) The many surveys assessing numeracy and literacy skills in adults on an international level including the Adult Literacy and Lifeskills Survey (ALL), the International Adult Literacy Survey (IALS) and the OECD's Programme for the International Assessment of Adult Competencies (PIAAC) as well as Demographic and Health Survey (DHS) data.

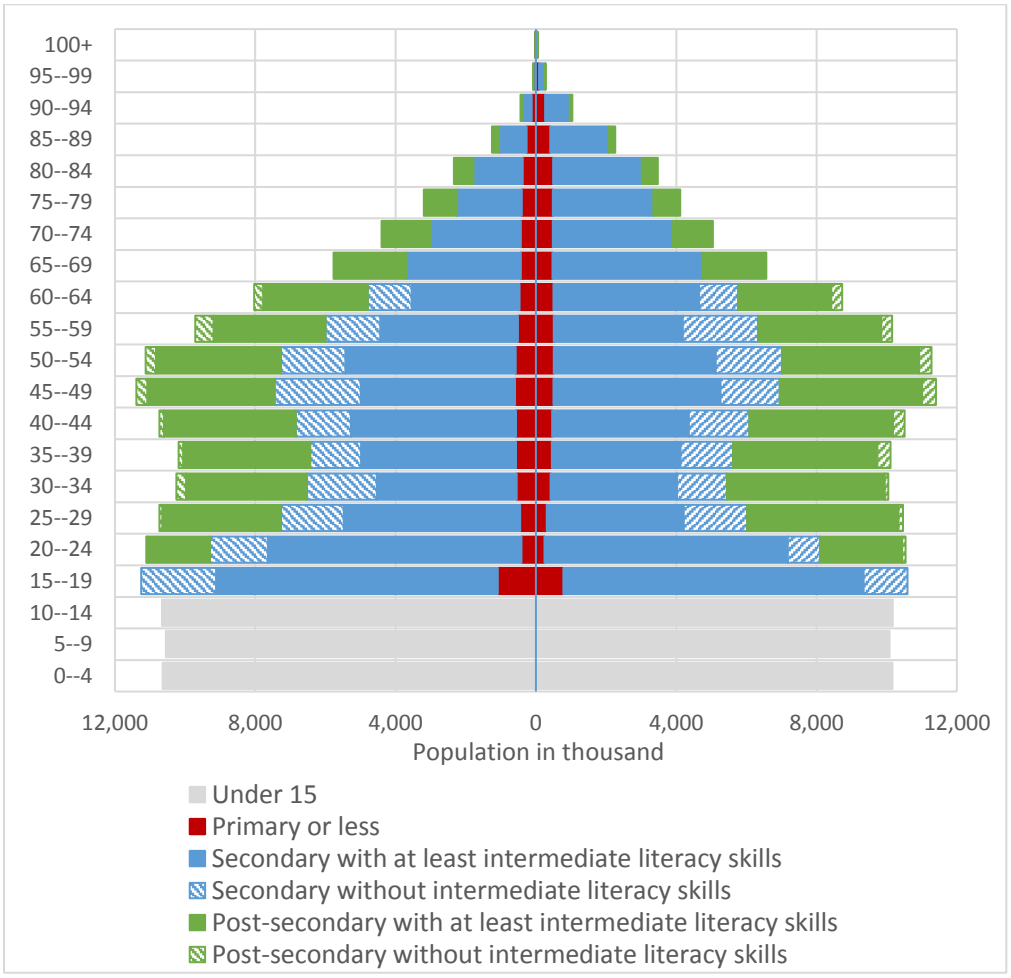
Given the aim of this research to add a quality dimension to educational attainment for as many countries of the world as possible, harmonized tested literacy and numeracy scores need to be merged with the educational attainment distributions by age and sex. As regards

scholastic tests, one approach is to use harmonized mean scores as adjustment factors (e.g. weighting factors between 0 and 1, where 1 represents the benchmark score). In addition, achievement distributions might be integrated into the attainment distributions (e.g. from a% of the population having attained primary education, x% have acquired basic numeracy and literacy skills, y% have acquired intermediate numeracy and literacy skills, and z% have acquired advanced numeracy and literacy skills).

Timing is crucial in this regard. Since there is little value in inferring from test scores of 15-year-olds in secondary school today to the cognitive skills of today's 55-year-olds who hold a secondary education degree, respective testing scores need to date back to the year when education was actually attained to account for changes in school systems, enrolment rates etc. Beyond that, age-specific and quality-adjusted educational attainment needs to consider changes over the life course (also beyond the age when formal education is usually attained) to account for possibilities of life-long learning as well as for potential depreciation of human capital when people do not regularly need their cognitive skills. This underpins the relevance of including adult test results as complementary extension to the model.

We will present first results (and issues) for a limited number of countries, as well as provide the strategy for extending the work to more countries and settings. Figure 1 shows the example of a population pyramid by age, sex, and quality-adjusted educational attainment for the United States in 2010.

Figure 1. Population by age, sex and quality-adjusted educational attainment, USA, 2010



Source: Wittgenstein Centre (2018) and OECD (2019)

Notes:

The quality adjustment in this preliminary example is solely based on the OECD 2012 Programme for International Assessment of Adult Competencies (PIAAC). Due to very small PIAAC sample sizes for specific sub-populations, quality-adjusted educational attainment is only applied to 15-64 year-olds with at least secondary education.

"Intermediate literacy skills" are defined as following proficiency: "At this level, the medium of texts may be digital or printed, and texts may comprise continuous, non-continuous, or mixed types. Tasks at this level require respondents to make matches between the text and information, and may require paraphrasing or low-level inferences. Some competing pieces of information may be present. Some tasks require the respondent to cycle through or integrate two or more pieces of information based on criteria, compare and contrast or reason about information requested in the question, or navigate within digital texts to access and identify information from various parts of a document." (OECD, 2016, p. 40)

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