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The dynamics of social inequalities in cognitive-related competencies along the early life course – A comparative study

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ABSTRACT

This paper investigates the development of social inequalities in cognitive-related competencies (mathematics and reading) from primary school to young adulthood among 15 OECD countries and examines whether patterns of development vary among countries and school tracking regimes. We use a pseudo-cohort approach by comparing data on individuals of approximately the same birth cohorts in primary school (TIMSS, PIRLS), secondary school (PISA) and young adulthood (PIAAC).

We found that children from lower social background perform less well already in primary education (particularly in reading). Overall, social inequalities in competencies tend to persist (reading) or increase (mathematics) over the early life-course. Finally, we detected only some weak evidence of higher growth of social inequalities over the early life-course among highly tracked systems.

1. Introduction

Cognitive competencies are beneficial not only for individuals' educational and labour market outcomes but also for participation in the civil society, consumption, and health-related behaviour (Heckman, Stixrud, & Urzua, 2006). The citizens' level of cognitive competencies can also produce higher order benefits and foster the economic, political, and social well-being of countries (Marks, 2005; Rindermann & Ceci, 2009). Although a major goal of educational systems is to promote equal educational opportunities for all children, research consistently shows a positive relationship between family socio-economic background and academic achievement (Hattie, 2013; Sirin, 2005). Programs aimed at reducing social inequalities in educational opportunities such as the Sure Start Program in the UK (Belsky et al., 2007) exist already, testifying the endeavour of policymakers to reduce disadvantages of lower background students.

While there is abundant cross-national evidence on the role of social background for pupils' competencies at specific point in time, there is less empirical evidence on how social inequalities develop over the stages of the early life course in different countries (see Bradbury, Corak, Waldfogel, & Washbrook, 2015 for a recent exception). Understanding the dynamics of social inequalities along the early (educational) career is crucial for both academic scholars and policy makers, because it can offer insights into how and when inequalities are (re)produced and could be altered over the life course (Caro, McDonald, & Douglas, 2009).

Inspired by a life course approach (Giele & Elder, 1998; Mayer, 2009), the first aim of the article is to provide a comprehensive description of how social inequalities in cognitive-related competencies evolve from primary school to secondary school and from secondary school to young adulthood across 15 economically developed countries. We look at how social inequalities in cognitive-

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related skills change in different phases of the early life course by considering that individuals move across various contexts, from elementary school to secondary education, and subsequently to university and the labour market. All these different environments have specific characteristics that provide a set of opportunities and constraints to youths, which may contribute to narrow or exacerbate the importance of parents' resources for young individuals' outcomes. We ask: Is the association between social background and cognitive-related competencies in reading and mathematics, on average, stable, increasing or decreasing along the early life course? Are the dynamics of social inequalities in cognitive-related outcomes similar across industrialized countries?

The second aim of the article consists in relating the dynamics of social inequalities in cognitive-related competencies to one characteristic of educational systems that has been found to be an important predictor of pupils' academic success and inequalities (Hanushek & Woessmann, 2006; Jakubowski, 2010 Waldinger, 2007), namely (school) tracking. Tracking, as used in this work, refers to the practice of allocating students in different school streams at some point in their educational career; countries differ in the age at which this allocation takes place and also in the rules at the basis of sorting. Previous research suggests that countries with more rigid tracking have higher levels of social inequalities in secondary school (Duru-Bellat & Suchaut, 2005; Hanushek & Woessmann, 2006; Le Donné, 2014). We ask: Is this pattern replicated when looking at inequalities with a longitudinal perspective? Do tracking regimes exhibit different patterns of social inequalities along the three key stages of the early life course?

Unfortunately, currently cross-national panel data on children's and youths' competencies over the early life course do not exist. Therefore, previous comparative studies used assessment tests measuring cognitive skills in a cross-sectional way at different ages (Jakubowski & Pokropek, 2010; Jerrim & Choi, 2013; Schubert & Becker, 2010). Building on this empirical literature and extending it, we developed a pseudo-cohort approach by comparing cross-sectional data spanning the early life course and focusing on individuals of approximately the same birth cohorts. In particular, we analyse pupils' cognitive-related competencies assessed in primary education, secondary school and young adulthood, by relying on strategically-chosen editions of four international educational datasets: Progress in International Reading Literacy Study [PIRLS], Trends in International Mathematics and Science Study [TIMSS]), Programme for International Student Assessment [PISA], and Programme for the International Assessment of Adult Competencies [PIAAC].

2. Existing research: inequalities in cognitive-related competencies

Our work is informed by several streams of research on social inequalities in contemporary education systems. The first set of studies refers to cross-sectional research on educational inequalities using international (pre-harmonized) large scale surveys on students' competencies. These studies have examined how students perform in standardized assessments at a certain point in their educational careers and to which extent social origin is associated with their competencies' level (Van de Werfhorst, 2015). The main finding is that socio-economic background positively affects pupils' literacy in various subjects (reading, mathematics, science), but that the strength of this relationship differs among countries (OECD, 2011).

To explain this country variation, various characteristics of the educational systems have been examined, including formal external tracking, privatization, vocational orientation, standardization and centralisation of exams (see Blossfeld et al., 2016; Hanushek & Woessmann, 2014; Van de Werfhorst & Mijs, 2010 for extensive literature reviews), but the results of these studies are not always easy to compare since they use different sets of countries, years, measures of social inequality, and control variables.

Tracking is often considered the most important institutional characteristic of educational systems that could have repercussions on both short-term and longer-term students' outcomes (Brunello & Checchi, 2007; Lavrijsen, 2013). Larger social inequalities were found in countries with more rigid tracking, namely in systems with younger age of first sorting (Le Donné, 2014), larger number of tracks (Horn, 2009; Marks, 2005) and shorter length of a common core curricular (Duru-Bellat & Suchaut, 2005).

The second stream of research refers to studies that aim to isolate the causal effect of tracking at the country level by using a difference-in-difference design to control for all time-invariant macro-institutional features of countries. In their seminal work, Hanushek and Woessmann (2006) exploited the fact that only some countries track students between primary (PIRLS) and secondary education (PISA). They demonstrate that compared to 'comprehensive systems', countries with early tracking have systematically higher levels of inequality. Despite this study was highly influential, the robustness of its main finding has been questioned. For instance, both Waldinger (2007) and Jakubowski (2010) applied similar designs to check the association between pupils' performance and family background by tracking systems and did not confirm Hanushek and Woessmann's result. Furthermore, these studies usually ignore the complex designs used by the international surveys and this could have led to biased results (Jerrim, Lopez-Agudo, Marcenaro-Gutierrez, & Shure, 2017).

A third research stream examines the development of competencies and related social inequalities between primary and secondary school by acknowledging the methodological challenges when comparing scores of competencies tests for different age groups and how to make them comparable (Jakubowski & Pokropek, 2010; Jerrim & Choi, 2013). We profit from insights provided by these contributions when designing our analytical strategy. More information on the challenges that arise when comparing test scores from different surveys is provided in the methods section.

As evident from the overview of existing cross-national studies, there is a lack of empirical evidence on the development of social inequalities in competencies between secondary school and young adulthood and, consequently, of studies embracing a time-frame spanning from childhood to young adulthood (see Lundetrae, Sulkunen, & Gabrielsen, 2014 for an exception). Since tracking in different school streams occurs in several countries only at age 14 or later, the examination of students around this age alone (which is usually done with PISA data) might not allow a proper evaluation of the consequences of tracking for social inequalities, unless it has an immediate effect (Brunello & Checchi, 2007; Pfeffer, 2015). We begin filling this gap by investigating the development of social inequalities in competencies from primary school to young adulthood across countries and tracking regimes.