

Mind the Skill Gap: Relationship between Economic Growth and Human Capital

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Abstract

A substantial literature in economics links cross-country differences in long-run economic growth to variation in the stock of human capital, particularly cognitive skills. While traditional growth models emphasized schooling attainment, starting in the 90s schooling attainment was replaced by a different measure, average score on standardized international assessments. Researchers have argued that cognitive skill quality, measured through international student assessments such as PISA, TIMSS, and PIRLS, is a strong predictor of long-run GDP growth. A set of studies by Hanushek and co-authors (e.g., Hanushek & Kimko 2000; Hanushek & Woessmann 2008, 2012) demonstrated a robust positive association between national test scores and long-run GDP growth. These findings have been influential in framing cognitive skill development as a central policy lever for economic prosperity. Yet this evidence relies almost exclusively on student-based test scores, raising questions about whether similar relationships emerge when human capital is measured among adults.

In this study, we revisit the economic growth–human capital relationship using adult skill data from the Programme for the International Assessment of Adult Competencies (PIAAC). PIAAC assesses literacy and numeracy among working-age adults (16–65), providing a potentially more direct measure of the human capital embodied in the labor force. However, the dataset includes only 30 predominantly high-income OECD countries, offering a more homogeneous sample than global student assessments.

We assembled a cross-country dataset linking PIAAC mean literacy and numeracy scores with long-run economic growth measures constructed from a macro panel spanning 1980–2024. For each country, we computed 3-year and 5-year moving averages of annual real GDP growth and then averaged these country-level moving average over 1995–2024, smoothing business-cycle volatility while still capturing medium-run growth dynamics. The empirical specification follows Hanushek’s growth framework, regressing long-run growth on cognitive skill levels with controls for initial GDP per capita (1995). Additional robustness checks include alternative growth windows (1980–2024) and exclusion of small states.

Across all specifications, we find no systematic relationship between adult cognitive skills and long-run GDP growth. Coefficients on both literacy and numeracy are small in magnitude and statistically insignificant. Including log initial GDP per capita does not meaningfully change the results. Effect sizes are extremely modest: a 10-point increase in mean adult literacy or numeracy predicts effectively zero change in average annual growth. Robustness checks - expanding the growth window, using alternative smoothing methods, or excluding small states - yield qualitatively identical null findings.

These results contrast with earlier studies using student assessments, which often find strong positive relationships. The discrepancy likely reflects sample characteristics rather than contradictions in theory. PIAAC covers a narrow set of advanced economies with limited variation in both skill levels and growth rates, creating unfavorable conditions for detecting macro-level relationships. Further, adult skills reflect cumulative labor-market experiences, migration flows, and lifelong learning opportunities, complicating causal interpretation relative to student assessments that capture early-life cognitive skills. The findings therefore highlight boundary conditions for the human capital–growth link and underscore how measurement choices influence macro-level inference.

This study contributes to the literature by testing the generalizability of conventional student-based human capital measures using adult competencies. The absence of a detectable association in this OECD-only sample suggests that cross-country variation in adult skills may not be a major source of growth differences among developed economies, even if cognitive skills matter more broadly across the global skill distribution. Future work will incorporate adult skill percentile measures, explore cohort-aligned growth windows, and investigate mechanisms that may link adult competencies to productivity in ways not captured by aggregate long-run growth statistics.

Keywords: economic growth, human capital