The Demographic Dividend Is More Than an Education Dividend

Supplementary Results

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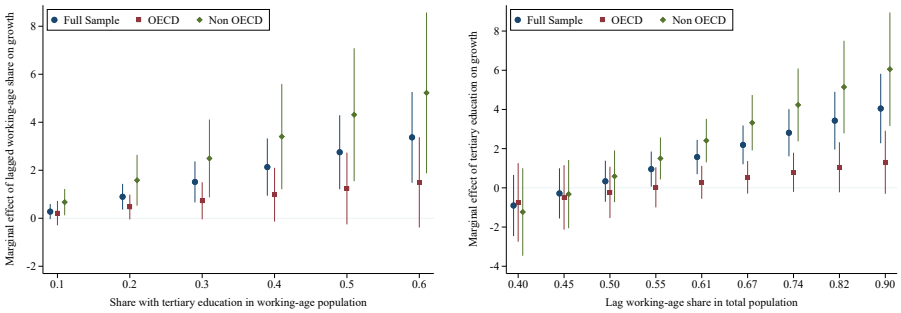
Abstract

This file contains additional results that complement the findings presented in the published article. In particular, the results refer to the remarks about the robustness of the results with respect to alternative measures of education, estimates for shorter sample periods and with additional control variables, and to statements about heterogeneity in the effects along the development process.

Alternative Measures of Human Capital

Tertiary Education. In addition to the results presented in the main paper, we replicated the analysis using a more exclusive measure of higher education in terms of the share of working-age individuals with tertiary education. The results are shown in Figure S1 and reveal very similar patterns compared to the results obtained with post-primary education in the Report. Quantitatively, the marginal effects are even larger than for post-primary education.

FIGURE S1 — Robustness Figure 1: Population Share with Tertiary Education

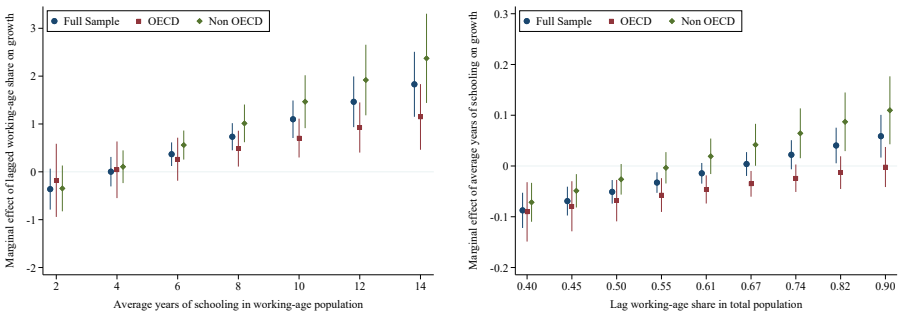


(a) Effect of Age Structure (b) Effect of Education

Note: The results in Panels (a) and (b) are based on the empirical estimates of a similar specification as in Table 1 with the share of the population aged 15–64 with tertiary education as measure of human capital. Panel (a) depicts the marginal effect on growth of the working-age population share, conditional on different levels of tertiary education among the working-age population. Panel (b) depicts the marginal effect on growth of tertiary education among the working-age population, conditional on different levels of the working-age population share.

Years of Schooling. We also conducted the same analysis for average years of schooling, see Figure S2, with similar qualitative results. Importantly, the results from these alternative measures also confirm the overall smaller growth effects of demography and education for the group of OECD countries compared to non-OECD countries. Hence, the qualitative conclusions of our paper do not hinge on the type of education considered.

FIGURE S2 — Robustness Figure 1: Average Years of Schooling



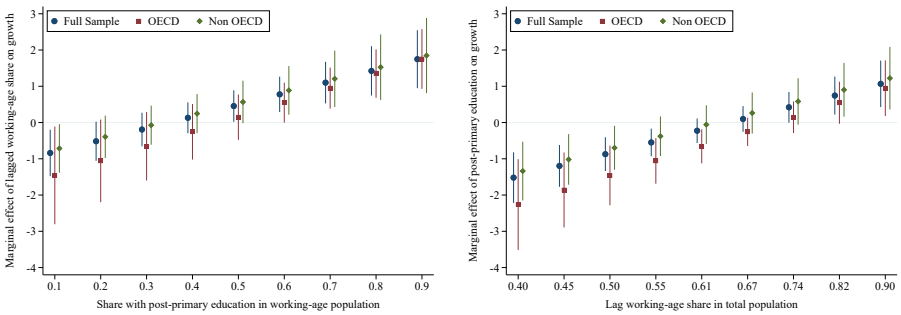
(a) Effect of Age Structure (b) Effect of Education

Note: The results in Panels (a) and (b) are based on the empirical estimates of a similar specification as in Table 1 with average years of schooling among the working-age population as measure for human capital. Panel (a) depicts the marginal effect on growth of the working-age population share, conditional on different levels of years of schooling among the working-age population. Panel (b) depicts the marginal effect on growth of years of schooling among the working-age population, conditional on different levels of the working-age population share.

Restricted Estimation Sample

To assess the robustness of our results, we replicated the analysis for the shorter time period 1980–2015. The results indicate that the overall pattern is robust, with qualitatively similar and quantitatively even slightly larger results (see Table S3).

FIGURE S3 — Robustness Figure 1: Sample Restricted to Period 1980–2015



(a) Effect of Age Structure (b) Effect of Education

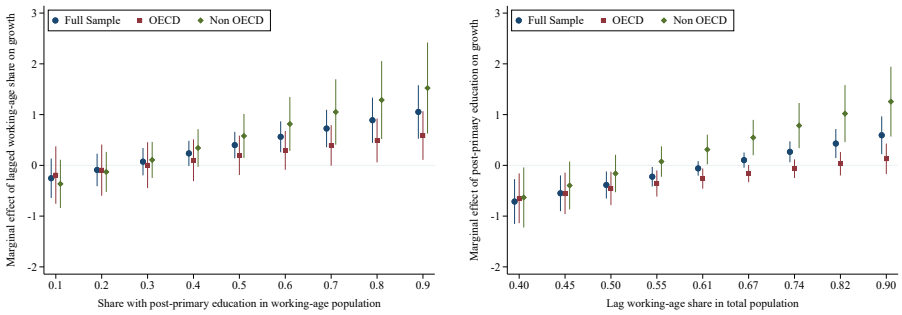
Note: The results in Panels (a) and (b) are based on the empirical estimates of the same specification as in Table 1 with the sample restricted to the period 1980–2015 as in Cuaresma, Lutz et al (2019). Panel (a) depicts the marginal effect on growth of the working-age population share, conditional on different levels of post-primary education among the working-age population. Panel (b) depicts the marginal effect on growth of post-primary education among the working-age population, conditional on different levels of the working-age population share.

Additional Controls for Institutions and Policy

The baseline specification of the empirical model includes controls for lagged income, which accounts for convergence, country-fixed effects, which effectively account for country-specific growth trends, and year-fixed effects. Capital accumulation is accounted for by controlling for the growth of capital per worker. Differences in time-invariant factors such as geography are accounted for by the fixed-effects specification.

To assess the robustness of the results with respect to other factors related to infrastructure, quality of institutions, and quality of economic policy management, we replicated the analysis controlling for the quality of political institutions (as measured by the Polity-V index) and of economic institutions (as measured by the Economic Freedom index). The results are shown in Figure S4 and confirm the patterns shown in Figure 1 in the paper.

FIGURE S4 — Robustness Figure 1: Extended Specification (Additional Controls)



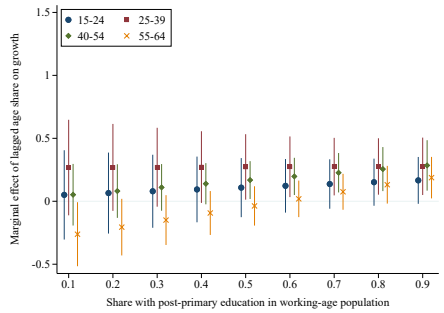
(a) Effect of Age Structure (b) Effect of Education

Note: The results in Panels (a) and (b) are based on the empirical estimates of an extended version of the specification as in Table 1 with controls for the quality of political institutions (Polity V) and economic institutions (Economic Freedom Index). Panel (a) depicts the marginal effect on growth of the working-age population share, conditional on different levels of post-primary education among the working-age population. Panel (b) depicts the marginal effect on growth of post-primary education among the working-age population, conditional on different levels of the working-age population share.

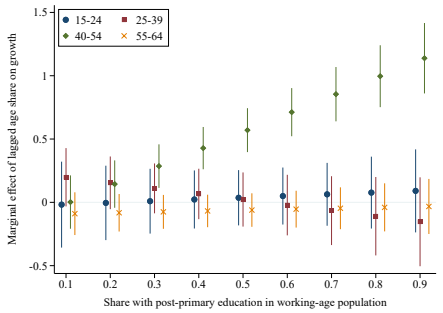
Heterogeneity: OCED vs. Non-OECD Countries

In order to shed light on the question why the results differ for the groups of OECD and non-OECD countries, we also replicated Figure 2 separately for OECD and non-OECD countries. Here, we find that the results confirm the qualitative patterns for both sub-samples and corroborate the finding of more pronounced effects for non-OECD countries (see Table S5). Moreover, the results reveal interesting differences (e.g., the significantly positive effect of the size of older population shares in countries with a high education share in the overall population). We view this as an overall confirmation of the main point of the paper. Because the discussion about the demographic dividend is mainly about less developed countries, we consider our findings as an important contribution against an unduly uni-dimensional focus on education.

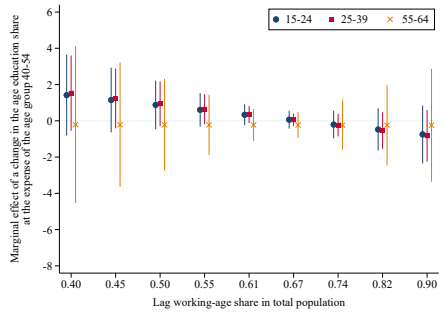
FIGURE S5 — Robustness Figure 2: Heterogeneity in OECD vs. Non-OECD Countries



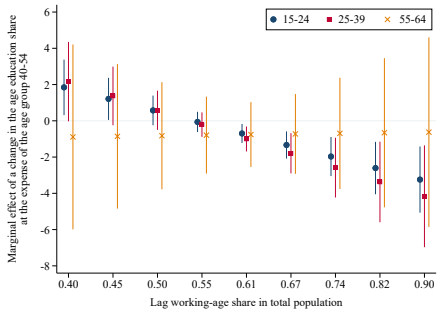
(a) 2(a): Heterogeneity Across Age Structure: OECD Countries



(b) 2(a): Heterogeneity Across Age Structure: Non-OECD Countries



(c) 2(b): Effect of Age Structure of Human Capital: OECD Countries



(d) 2(b): Effect of Age Structure of Human Capital: Non-OECD Countries

Note: The empirical model underlying the results in Panels (a) and (b) is given by more flexible specifications of the baseline model estimated in Table 1. The empirical model underlying Panel (a) accounts for potential heterogeneity in the coefficients related to the population shares of different age groups relative to the total population, replacing W_{it} in the baseline specification by $\sum_{k=1}^{4} W_{it}^{k}$ with $k = 1, 2, 3, 4$ reflecting age groups 15–24, 25–39, 40–54, 55–64, and expanding the corresponding set of estimated coefficients. The empirical model underlying Panel (b) accounts for potential heterogeneity in the coefficients related to education attainment by different age groups relative to the age group 40–54, replacing H_{it} in the baseline specification by $\sum_{m=1}^{3} H_{it}^{m}$ with $m = 1, 2, 3$ reflecting the education attainment in terms of post-primary education of age groups 15–24, 25–39, 55–64, with the age group 40–54 as reference group, and expanding the corresponding set of estimated coefficients.