Chapter 1
Demographic Change and Economic Growth

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Abstract In this chapter we discuss the relationship between changes in a country’s age structure and its economic growth and productivity. We summarize the recent literature on the impact of a country’s age structure on economic growth and relate the results to our own empirical findings. Our results indicate a positive impact of the age group 50–64 on economic growth. Moreover, a high proportion of people in the age group 15–29 facilitate technology absorption. The use of matched employer–employee data sets allows us to estimate age-productivity profiles at the firm level. Considering all firms in the data set reveals a negative productivity effect of the share of older workers (50+). Considering only large firms reveals no impact of the age structure in the mining and manufacturing industries and a negative impact of the share of younger workers for the non-manufacturing sector.

Introduction

During recent years there has been an increasing awareness of a direct influence of population age structure on macro-economy. The theoretical foundations of the reduced form models applied in econometric studies are: (1) the life cycle model of savings and investment, and (2) age-specific variations in labor productivity. Because people’s economic behavior and needs vary at different stages of life, changes in a country’s age structure can have significant effects on its economic performance. While young people require investment in health and education, prime-age adults supply labor and savings, and the aged require health care and retirement income.

Several studies explain that a falling youth dependency ratio (the population below working age divided by the population of working age) contributed to the economic growth miracle in East Asia. More general, recent evidence suggests that falling youth dependency ratios in developing countries can create an opportunity for economic growth, provided that policies (openness to trade, labor-market
flexibility, etc.) to take advantage of the “demographic dividend” are in place. Regarding Bloom and Canning [6] “... the combined effect of this large working-age population and health, family, labor, financial, and human capital policies can effect virtuous cycles of wealth creation.” On the other hand, if a large share of the population is constituted by the elderly (as projected for Europe and most industrialized countries during the next decades, and for all other world regions except Africa until the middle of the twenty-first century), the effects may be similar to those of a very young population. In this case, a large share of the population depends on the output produced by a shrinking productive working-age population and might constitute a “demographic burden.”

It needs to be said that age structure is only one of several relevant factors that determine economic growth and this is equally relevant for the EU where the role of R&D and human capital formation are particularly relevant. R&D expenditures need to go hand in hand with other measures, such as human capital development, to increase the absorptive capacity of a country (i.e., the ability to absorb and take advantage of technologies initially developed abroad) and to facilitate international technological spillover. Demographic changes will intervene with these other forces of growth and in particular the foreseen aging of the European population requires intensified and longer utilization of existing human capital.

In this chapter, we first review empirical evidence at the macro level that relates demographic structure to economic growth (section “Empirical Studies on Population Structure and Economic Growth”), and will introduce the concept of the first and second demographic dividend (section “Demographic Transition and the First and Second Demographic Dividend”). In the second part of the paper (sections “Demographic Structure and Economic Productivity at the Micro and Firm Level” and “Firm Productivity, Workforce Age and Educational Structure in Austrian Mining and Manufacturing in 2001”) we briefly review studies on age-productivity profiles estimated at the firm level using linked employer–employee data sets. Our exposition is based on two recent reports [15, 16] for the European Commission.

**Demographic Transition and the First and Second Demographic Dividend**

Since World War II developing countries have passed through a demographic transition at varying rates and times [12]. During the standard demographic transition scenario, infant mortality declines and fertility falls with a lag only after the mortality decline has begun. As a consequence, a demographic transition leads first to a demographic “burden” because population growth is faster than the growth of the working-age population. Later, as fertility declines, the demographic transition leads to a demographic “dividend” because the growth of the working-age population is faster than the growth of the total population [8]. In addition, as argued in [14], the working-age population also increases due to lower mortality. However, as soon as the further decline of mortality happens only at higher ages and fertility stays at