Box 2.1:

Population Aging and Economic Growth: Stocktaking Evidence

The impact of aging on economic growth has been the subject of numerous studies. Most of the existing literature tends to focus on developed economies, since many are already in advanced stages of the demographic transition. The general agreement in the findings is that population aging has a dampening effect on economic growth, and several studies have attempted to quantify this impact. A study by Maestas, Mullen, and Powell (2023) suggests that a 10 percent increase in the population share of those aged 60 and above results in a 5.5 percent decrease in per capita GDP growth in the United States (US). Similarly, Cylus and Al Tayara (2021)—in a global study across 180 countries—found that a 1 percentage point rise in the share of the ages 55 to 69 demographic is associated with a 0.67 percentage point reduction in real GDP per capita growth. Focusing specifically on Asian economies, Otsu and Shibayama (2016) estimated that population aging would reduce annual GDP per capita growth rates by 0.21 percentage points between 2015 and 2050, compared to a benchmark model without demographic effects.

In general, the negative consequences on growth can manifest through several channels, but primarily through (1) lower productivity growth, (2) a contracting labor supply, and (3) decreased savings.

Lower productivity

The predominant view is that population aging affects output growth by lowering productivity. Maestas, Mullen and Powell (2023) found that two-thirds of the slowdown in US GDP growth between 1980 and 2010 was driven by slower growth in labor productivity. The IMF (2017a), in a study of 32 Asian and European economies, found that a higher share of older workers is associated with a significant slowdown in labor productivity, which they then attribute to lower growth in total factor productivity (TFP). In the Asia sample, an aging workforce could lower TFP growth by as much as 0.3 percentage points annually. In line with this finding, Lee and Shin (2021) highlighted the reduced TFP growth as the most significant channel through which the negative effects of aging operate. Linking population age structure and TFP growth, Feyrer (2007, 2008) identified a hump-shaped relationship between both variables. TFP growth appears to peak for workers aged 40 to 49, and a 5 percentage point increase in the share of this age group (to total population) over a decade is linked to a 1–2 percentage point increase in productivity growth in each year. Similarly, Werding (2008) found that age-related contributions to TFP growth peak for workers in their forties.

One possible mechanism in which an aging population could result in lower productivity growth is through lower innovation. Derrien, Kecskés, and Nguyen (2018) found a strong negative relationship between age and innovation in a US study: a younger labor force tends to produce more innovation. Their study showed that a 1 standard deviation decrease in mean age is associated with a 5 percent to 11 percent increase in the number of patents and a 2 percent increase in productivity. Aksoy and others (2019) similarly estimated that aging may lead to a 15 percent to 30 percent drop in per capita patent applications among OECD countries in the next two decades.

Lower supply of labor

In addition to lowering productivity, aging affects an economy's labor supply. As individuals surpass working age (typically up to 64), many choose to retire and the workforce could contract if the number of retirees exceeds the number of new labor force entrants. Even within the working-age population, labor force participation rates (LFPRs) across the world are lower for older individuals, compounding the effects of a shrinking workforce. In their 2023 study, Maestas, Mullen and Powell estimated that one-third of the slowdown in US GDP growth was due to the slower labor force growth. Specifically, a 10 percent increase in the share of population aged 60 and above leads to a 1.7 percentage point decrease in the growth rate of workers per capita. For OECD countries, Kotschy

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and Bloom (2023) estimate that income per capita will grow at 2.5 percent annually between 2020 and 2050, if working-age shares were fixed at their 2015 levels. After accounting for the fall in working-age shares due to retirement, growth of income per capita will be lowered to 1.7 percent annually. Zooming into Asia, Park and Shin (2011) estimated that over 40 percent of the aging-induced decline in the growth of Singapore's GDP per capita between 2021 and 2030 can be explained by the decline in the ratio of workers to total population. Singapore exhibited the largest slowdown in GDP per capita in their sample.

However, aging's drag on labor supply can be partially compensated for by an increase in old-age LFPR. LFPRs for older individuals in high-income economies have increased substantially over the past two decades. Looking at OECD countries, Lee and Shin (2021) found that the slower growth in the share of the working population—due to the increase in the number of seniors—can be more than offset by the increase in the LFPR. In 13 Asian economies, a 6 percentage points increase in the LFPR could boost annual GDP growth by as much as 0.3 percentage points, as highlighted by the IMF (2017a).

Lower savings

Aging also affects economic growth by reducing saving and investment rates. The life cycle hypothesis, put forward by Modigliani and Brumberg (1954), posits that individuals attempt to maintain the same level of consumption throughout their lives. As such, they increase their savings when their earnings are high to finance their consumption during retirement, when their incomes are low. Consequently, as a population ages, aggregate savings will also fall as individuals save less in their senior years.

The savings rate has been shown to be significantly correlated with an economy's age composition. Bosworth and Chodorow-Reich (2006) and Higgins (1998), for example, find that increases in youth and old-age dependency ratios are associated with lower saving rates. More crucially, the lower rate of saving leads to less capital accumulation and investment.[1] This then weighs on economic growth, as highlighted by Park and Shin (2011) in their study of 12 Asian economies. For example, nearly 30 percent of the projected aging-induced decline in Korea's GDP per capita—between 2021 and 2030—is due to reduced savings, which then translate into a decline in the economy's capital intensity. In a broader sample covering OECD countries, Aksoy and others (2019) project that demographic changes will, on average, reduce savings by 3 percentage points of GDP and investment by 2 percentage points, ultimately cutting output growth by 1.25 percentage points of GDP across the sample by 2030, when compared to initial growth in 2010.

1/ Aging's impact on national savings-investment patterns will also have bearing on economies' capital flows and current account positions. This is discussed in detail in IMF (2019), which point out that an economy that is experiencing a slower rate of aging relative to the rest of the world could expect its current account balance to deteriorate as they receive more capital from economies that are aging more rapidly (and thus saving more). This, of course, carries its own distributional effects within the recipient economy. See, for example, Krueger and Ludwig (2007).