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Editorial

# "Introduction" for special issue of *Journal of the Economics of Aging* titled "The demographic dividend and population aging in Asia and the Pacific"

East Asia's early and steep fertility decline helped drive its spectacular economic growth, encouraging many other developing countries to follow the same path. But how, exactly, did demographic change in East Asia promote economic growth? The first and second demographic dividends offer a coherent framework for organizing the exploration of this question, and for discussing the papers brought together in this volume. Here we will first discuss the transition and the dividends, and then turn to the individual contributions.

## The demographic transition and demographic dividends in Asia

What is special about the transition in East Asia? The general features of the demographic transition in the region are well-known. East Asia experienced an early, rapid and deep fertility decline, and is already beginning to undergo population aging, and not only in Japan, which is the world leader in population aging. While some other Asian countries outside of East Asia such as Thailand also experienced early and rapid declines, for the most part fertility decline has been later, slower, and shallower in South and Southeast Asia, generating smaller dividends that will continue over a longer period. In addition East Asia stands out for the strength of its family support system for the elderly and for familial investments in the human capital of children. At the same time, public sector programs for elder support and human capital investment are relatively modest. Because the family has a larger role in funding children's education, the private cost to the family of raising a child is greater in East Asia, which may help explain the low fertility and early fertility transition in the region, although the direction of causality is not certain. In addition, saving rates in the region have been very high, as they have been in China. This may be due in part to the forces of the second dividend as will be discussed below, and in part to the particularities of culture and policy.

Before the transition, fertility and mortality are high and there are many children and few elderly. Typically, mortality begins to decline decades before fertility does, resulting in rapid population growth and a rising proportion of children. Eventually fertility begins to decline as well. In developing countries, fertility decline often started in the 1960s or 1970s. Shortly after initiation of fertility decline, the share of children in the population drops over the course of many decades, and at the same time the share in the working ages rises. This rising share of workers boosts the growth rate of per capita income in a mechanical way by raising the numerator of per capita income but not the denominator, giving rise to the first demographic dividend. The cumulated effect of the first dividend raises per capita income by 30% or 40% spread over at least four decades and often longer.

Inevitably, fertility stops falling, and the population in working ages begins to grow more slowly, while the share of elderly begins to increase rapidly and the population ages. The stagnating and then declining share in the working ages brings an end to the first demographic dividend, and the gains of the dividend are largely reversed by growing old age dependency. The first demographic dividend and population aging are different phases of the same process.

If people funded their old age consumption themselves, either by continuing to work or out of accumulated assets, then population aging would to the rest of the population only through its effects on market prices, at least from an economic point of view. However, the reality is that in most countries the elderly are supported at least in part by transfers from the working age population. These transfers come either in the form of private support from their families, as is often the case in East Asia, or in public support through various programs such as pensions, public health care and long term care. With population aging, the costs per worker of this transfer support rises. Increasingly, the costs of elder support are shifted from the family to the public sector, where they may become more visible and explicit. A number of the papers in this special issue discuss this transition to public transfers and the various problems to which it gives rise as the population ages.

Although the first demographic dividend is transitory and its gains are lost through population aging, the demographic transition leads to an intensified accumulation of human and physical capital that raises productivity and income permanently. We call this the "second demographic dividend". The first demographic dividend arises through the rising proportion of workers in the population and shrinking share of dependents. The second demographic dividend arises through processes that raise the productivity of workers.

First consider human capital and the transition. There is a well-established empirical association between low or declining fertility and high or rising spending per child (Lee and Mason, 2010), a relationship central to the Quantity–Quality fertility theory of Becker and Lewis (1973) and Willis (1973). The causality underlying the empirical relationship probably flows in both directions. For present purposes what matters is that declining fertility over the transition is associated with increased investment per child, which

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leads to higher quality workers who are more productive. In addition, the dramatic increases in length of life raise the payback period for investments in human capital which raises incentives for such investment by both parents and the children themselves. The increase in human capital investment per child is an important component of the second dividend, and one that has been much discussed in the context of the East Asian demographic transition.

The other component of the second dividend is a tendency for the asset or capital intensity of the economy (the ratio of assets or capital to total units of labor) to rise over the course of the transition, including during the phase of population aging. The lower fertility and longer life that drive the transition may also motivate individuals to save more and to accumulate more assets at each age to prepare for a longer period of retirement. In addition, there is a simple mechanical effect that occurs for any given age pattern of per capita asset holdings. Because they accumulate savings and inheritance over the course of their earlier years, the elderly in any economy hold more assets than younger adults. For this reason, as the share of elderly in the population rises, and the ratio of elderly to working age people rises, the ratio of assets to workers rises as well. This is also an important source of rising asset intensity. Working in the opposite direction, longer lives may dilute accumulated asset holdings which must more frequently be shared with a longer lived spouse, and diminish these holdings through spenddown to some extent. Overall, however, rising assets per worker in the national economy will both generate additional asset income and also raise the productivity of labor to the extent that the assets are invested in domestic capital.

The focus in this discussion has been on the stock of assets in relation to labor, rather than on the aggregate saving rate. It is important to realize that assets per worker can rise even if the aggregate saving rate stays constant or falls, since labor growth decelerates during the transition. With slower labor force growth, less saving is needed to achieve and maintain any level of assets per worker. This is a standard result in neoclassical growth theory.

So far, we have not considered the health status of the population at different ages, but of course that is very important as well. Workers are heterogeneous by age, education, and health, among other important dimensions. As mortality falls over the course of the transition, health status typically improves and disability rates fall. When this happens, adults become physically able to continue to work until older ages than before, and might need less support from younger family members and tax payers. In that case, population aging would potentially be a less serious problem than otherwise – "potentially" because if elders continue to retire at younger and younger ages, the problem of supporting their consumption remains and intensifies as the population ages. But we cannot assume that health improves and disability declines uniformly in all countries and in all periods. For example, it appears that in the US, disability rates of elderly people stopped declining around the year 2000, and in some adult age groups in the US disability is rising due to rising obesity and diabetes. For working ages, ill health and disability reduces labor supply, while for the elderly it means more costly health care and a greater demand for long term care from nursing homes or the family. The Chen et al. paper, discussed later, investigates these trends in Japan.

Support ratios are often used to quantify the first demographic dividend, which is measured as the proportional rate of change of the support ratio. The support ratio is simply the ratio of producers in the population to consumers. Most basically, this may be calculated by treating the whole population as consumers and people aged 20 through 64 as producers. Then the support ratio is simply the population share in the working ages, and the dividend is simply the rate of change of this ratio. Likewise, the economic impact of population aging can be measured as the decline in the support ratio after the dividend ends. More elaborate measures of support ratios can be calculated in many ways, but one is to use empirically estimated age profiles of labor income and of consumption to form the numerator and the denominator. Then these age profiles are assumed to remain constant in the future while the population age distribution varies according to some given projection.

We know, of course, that these age specific patterns will not stay constant in the future, so why are they held constant? The purpose is to isolate the pure effect of demographic change. But if a projection for the future is needed for some other purpose such as realistic budgetary planning, then holding age profiles of production and dependency would not be the way to go. Instead, we would need to project changes in these age profiles taking into account expected future costs of health care, changing age at retirement, trends in health and disability status of the population, changing educational attainment and time spent in school, and so on. In particular, projections of the impacts of different policy changes are of great interest, and some are discussed in the papers below.

## Exploring demographic dividends in Asia

The paper by Chomik, McDonald, and Piggot considers what support ratio measures to use, and compares the implied outcomes under each assumption. A variety have been proposed and used in past literatures, mostly in the context of the rich nations, and different measures can give dramatically different results. Chomik et al. takes us on a tour of alternative measures as applied to eight Asian countries plus Australia. These nine countries covering a range of national circumstances from moderate to significant aging and from emerging to advanced economies. On one dimension, these measures progress from simple schematic ones, such as standard dependency ratios, to more complex and realistic ones such as those based on functional status. On another dimension, the measures anticipate to varying degrees future changes in health and economic activity. With projected changes in health and disability status, population aging appears much less threatening. With hypothetical increases in labor supply at older ages, the outlook also improves.

The national population age distributions and support ratios we discuss and analyze are actually averages of what can be highly heterogeneous subgroups. The study of the Philippines by Racelis, Abrigo, Salas, and Herrin disaggregates the population into three groups by income and two groups by urban versus rural residence, for a total of six subgroups. These subgroups are found to have different population age distributions, resulting from different fertility and mortality, and differential selection by age into the subgroups. They also have different economic life cycles. For example, in the lowest income group the surplus age is reached later and the old age deficit age is reached earlier, than in other groups, so the surplus age span is shorter. Combining the different demographic patterns with the different economic life cycle patterns yields quite different support ratios. The authors carryout these estimates for three different time periods, 1991, 1999, and 2011. Here, the age profiles of labor income and consumption change according to the empirical measures from year to year, and are not held constant in the usual way while the population age distribution varied, so this is a different kind of comparison. Over this twenty year span, the support ratios for the subgroups changed in different ways, despite the generally decreasing level of fertility. In particular, the ratios dropped from 1991 to 1999 for the rural lowest and highest thirds of the income distribution. In general, the authors conclude that the dividend is better realized under more favorable macroeconomic conditions such as pertained from 1999 to 2011 than under the less favorable conditions of 1991–1999.

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