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Demographic Change and Development

A Global Typology

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Abstract

Demographic change can be a positive contributor to development at any stage of demographic transition. This paper revisits the literature on the determinants and economic impacts of demographic change, and presents a new global typology that classifies countries into four categories based on demographic characteristics and future development potential. In the first group are high-fertility, low-income countries that are lagging in many human development indicators. In the second group are mostly low- and lower-middle-income countries where fertility rates have started falling recently and where changes in age structure offer tremendous opportunity for growth in the near future. The third group comprises mostly upper-middle-income countries that experienced rapid fertility declines in the 1960s, and where working age people will be a shrinking share of the population in the coming decade. The last group is made up of mostly high-income countries that have some of the highest shares of elderly in the world, and below-replacement fertility rates since at least the 1980s. The typology helps identify development policy priorities for countries in different stages of demographic transition, and opportunities through globalization due to demographic differences between countries.

Demographic Change and Development: A Global Typology

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1. Introduction

Demographic change and development is a two-way relationship. Demographic change affects key intermediate outcomes of development, such as the pace of economic growth per capita, savings and human capital, and these intermediate outcomes in turn influence demographic change. The three fundamental factors driving changing population size and age structure - mortality, fertility, and migration across and within countries - are closely tied to development progress. Concomitantly, changes in the age structure of the population also affect the ratio of potential workers per potential consumers, with direct implications for per capita growth, savings, and poverty.

This relationship between demography and development is important as the world's population is growing more slowly and aging. Between 1950 and 2015, the global population grew by 191 percent, from 2.5 billion to almost 7.3 billion.[2] Population growth was the fastest from the mid-1950s through the mid-1970s, causing development policy discussions to be marked by concerns about unfettered population growth and a perceived need to control the "population bomb" popularized by Ehrlich (1968) and revisited in Ehrlich and Ehrlich (2009). The implication of these demographic trends were alarming enough that they received substantial attention in policy discussions, as illustrated by population change and development being the theme of the World Development Report 1984 (World Bank 1984). Then, in the 1990s, population growth started to fall: by 2020 the average annual growth rate is expected to fall below 1 percent, down from more than 2 percent in the late 1960s. These new demographic trends renewed the attention of the development community towards this topic, now focusing on global challenges and opportunities due to disparities on demographic change across countries (Bussolo, Koettl, and Sinnott 2015; Caning, Raja and Yazbeck 2015; World Bank 2015a, 2015b, 2015c).

In addition, global demographic trends are at a turning point: the proportion of people ages 15 to 64 – a practical definition of the working age population for international comparison - rose till reaching a peak in 2012 and is now starting to fall again. The rise in the number of dependents per person of working age is driven mainly by an increase in the elderly as a share of the population. This shift in the pace of population growth and age structure has also shifted the policy discussion on the links between development and demography towards concerns regarding the economic effects of a shrinking working age population.

However, global trends mask wide differences at the country level both in their current demographic profiles and in the direction and pace of future change. Many of today's high-income countries have had decades of low fertility rates and high life expectancies. In contrast, many developing countries have seen declines in their fertility rates only more recently, with some of

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[2] Based on data from the World Population Prospects 2015 Revision (United Nations 2015). All population data reported in this paper are from UN (2015), unless otherwise specified.

the poorest countries still experiencing persistently high fertility. As a result, half of the world's population will be in countries that will experience slowdowns in population growth with rising shares of the elderly over the coming decades (albeit at different paces). The other half will live in countries with relatively young populations, whose high fertility is driving global population growth.

This paper revisits the main findings of the literature on the determinants and economic impacts of demographic change, and presents a new global typology that classifies countries into four categories based on the concept of demographic dividends. It then discusses the economic and development challenges facing the countries in each of the four groups. The analysis illustrates how development progress varies with key demographic characteristics. The paper also provides insights into development policy priorities for countries based on their demographic characteristics, built on summarizing key pieces from the literature discussing policy implications on demographic change and development. In a departure from the policy discussions of demographic change and development in the literature, this paper also identifies how countries can take advantage of demographic disparities across countries through trade, migration, the cross-border flow of short- and long-term capital investment.

The next section summarizes the main findings of the literature on the drivers of demographic change and its economic effects. Section 3 discusses how the new global typology is constructed and provides the distribution of countries in a global map based on the new typology. Section 4 discusses the patterns that emerge when this typology is applied to viewing development challenges and opportunities by taking into account their demographic characteristics. Section 5 discusses how countries can take advantage of disparities in demographic change to boost development through facilitating trade, migration, and capital flows. Section 6 concludes and provide some caveats to use of the typology.

2. Development and demographic change: What do we know about this relationship?

This section reviews the main findings of the literature on development and demographic change, starting with a review of the main drivers of demographic change. It will present evidence on how the relationship between demographic change and development suggests that changes in income, public health, and education are key drivers of demographic change. The path of birth and death rates determines the natural growth of a population. But population growth is also affected by migration (both international and internal), as it influences age structure directly as people move and indirectly by impacting fertility in both the migrant-sending and migrant-receiving countries. Mortality, fertility, and migration also have direct effects on age structure, which defines the share of children, elderly, and working age people in the total population, affecting countries' capacity to produce, save and invest.

2.1 Main drivers of demographic change

A first key driver of demographic change is the mortality rate. The initial decline in mortality that occurs as part of the demographic transition is associated with the start of an epidemiological transition. A reduction in the mortality rate of a population is normally accompanied by a decline in the incidence of infectious and contagious diseases, particularly among children under age five. This decline, in turn, increases the share of the population dying from chronic and degenerative diseases. Increased use of vaccinations against fatal diseases, together with improved hygiene and sanitation and better access to clean water, typically contribute to the initial declines in mortality rates, as was first observed in Europe in the 1700s (Bloom and Williamson 1998; Cutler, Deaton, and Lleras-Muney 2006). Mortality began to decline only relatively recently in developing countries and remains high in low-income countries. In low-income countries, it is still driven by infectious diseases and neonatal complications (figure 1). Neonatal disorders, diarrhea, lower respiratory infections and other infections are the cause of more than half of deaths in children under age six. In Sub-Saharan African countries, neglected tropical diseases (NTDs), malaria, HIV, and tuberculosis represented about 50 percent of deaths between 1990 and 2010.[3]

Mortality rates across countries are strongly influenced by access to and supply of public health services. Different from other vital events that are subject to individual choice, death can be a consequence of several factors that are not under an individual's control (Soares 2005). For example, East Asia experienced a particularly fast decline in child mortality, and indeed mortality at all ages, which led to an increase in life expectancy from 61.5 to 76.6 years between 1960 and 1992 (World Bank, 2015c). Among the possible explanations for this achievement is widespread access to new public health programs and medical knowledge and technologies (Bloom and Williamson 1998). Although there is a clear association between individuals' income and mortality outcomes, the access to new technologies and public health improvements played a key role in reducing mortality rates. Improving nutrition, public health quality and access, urbanization, vaccination, and medical treatments are among the main sources of reduction in infectious diseases and child mortality (Fogel 1997; Cutler Deaton, and Lleras-Munry 2006; Chaturvedi, De Costa and Ravem 2015).

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[3] NTDs are a group of diseases that thrive mainly among the poorest populations (WHO 2015).

**Figure 1 The causes of death vary dramatically across development level**

a. Child deaths account for the vast majority of deaths in low-income countries

Number of deaths in low-income countries in 2010, millions
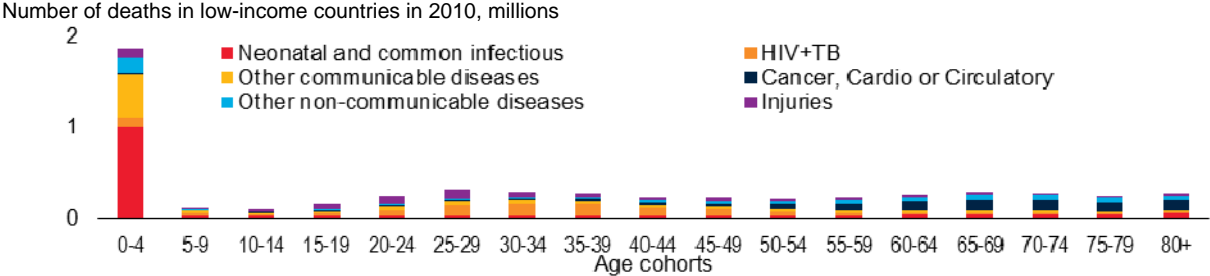
b. Almost all deaths in high-income countries are due to cancer, cardio or circulatory diseases or other non-communicable diseases among the elderly

Number of deaths in high-income countries in 2010, millions
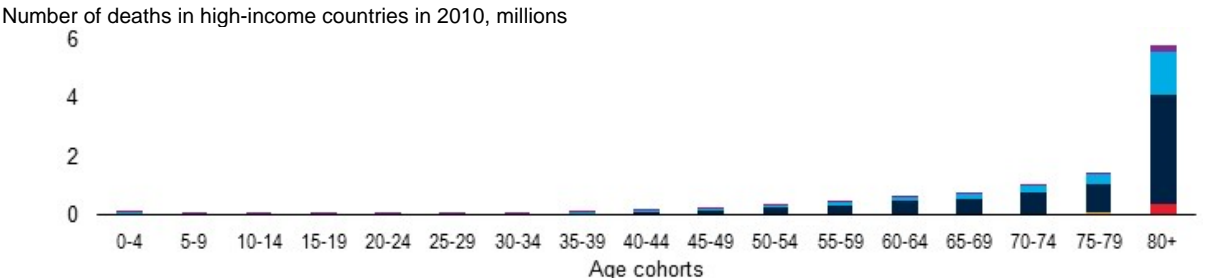
Source: World Bank staff, based on data from The Global Burden of Disease (GBD) Study 2010 Mortality Results, 2010, both sexes, available for 179 countries and documented in Wang and others (2013).

As countries move to the later stages of demographic transition and average life expectancies rise, chronic and degenerative diseases become the primary causes of death. The epidemiological transition thus continues. While non-communicable diseases are challenges for countries across the development spectrum, high-income country populations aged 64 or more accounted for 79 percent of deaths in 2010. These deaths occurred almost entirely from cancer, cardiovascular issues, and other chronic conditions, and these countries accounted for about 43 percent of global deaths among individuals above 80 years old. Thus, to improve life expectancy, high-income countries must focus on improving health at older ages. Addressing the chronic diseases most commonly responsible for morbidity at older ages is much costlier than addressing the infectious and contagious diseases that afflict young children in low-income countries, however, especially considering the impact on life expectancy.

A second key driver of demographic change is the fertility rate. Declining infant mortality rates and increasing educational attainment, life expectancy, and income are all associated with a reduction in total fertility. A reduction in infant mortality rates generally has a lagged effect on reducing fertility, however, largely because of reproductive decisions that are based on "replacement" of deceased children and the "insurance" of having children in case some do not

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survive to adulthood.[4] Improvements in child health may thus be a precursor to lower rates of fertility. In contrast, education (especially of females) and household income are negatively correlated with fertility. Reher (2011), Soares (2005), and Acemoglu and Johnson (2007) discuss the importance of infant mortality for fertility. However, the empirical literature testing the suggested three main determinants of long-term demographic transition does not converge in its conclusions. Murtin (2013) finds that education is more robust than infant mortality, income, and other variables in determining a fertility transition. Herzer, Strulik, and Vollmer (2012), on the other hand, suggest that mortality changes and income growth are the most important drivers of changes in fertility rate, while Angeles (2010) suggests that reductions in fertility rate are driven mostly by reductions in mortality rate.

There are two potential income-related mechanisms that underlie the "quality" versus "quantity" trade-off that parents face. First, as parents' educational attainment rises—particularly that of women—the opportunity cost of having children rises. That alone could encourage parents to have fewer children or to delay having children (Galor 1999; Galor and Weil 2000). Second, as incomes rise, parents could choose to have more children and also invest more in the human capital of their children. Empirical evidence suggests however, that as incomes rise, families choose to have fewer but more highly educated children. This behavior would suggest that parent's elasticity of demand for quality is higher than for quantity.[5]

The labor market implications of rising levels of education, particularly for women, influence fertility. Bloom et al. (2009) suggest that high fertility rates may limit female education and labor force participation and a single birth may reduce a woman's labor supply by almost two years during her reproductive life. As women become more educated, the opportunity cost of not participating in the labor market rises, leading to either fewer or later births, although the presence or absence of gender empowerment also plays a role in the participation of women in the labor force. While higher educational attainment (especially of females) and higher household income are both associated with declines in fertility, the importance of education (particularly primary education) in affecting fertility seems to be more robust in analyses that aim to identify a causal relationship between fertility and education.

A third key driver of demographic change is migration across and within countries. Migration can change age structure and population growth substantially and is driven by a range of "push" and "pull" factors. Push factors include incentives that encourage migration away from a given place (be it a country or subnational region), while pull factors are those that encourage migration to a given place. Push and pull factors include economic inequalities (differences in wages,

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[4] The intuition is that with their children more likely to survive infancy and childhood, parents will reduce their number of births to maintain the same net number of children.
[5] There is a broad literature on this topic, although Becker (1960) and Becker and Lewis (1973) are among the best-known studies.

employment prospects, or access to services) and inequalities defined more broadly (such as differences regarding security from physical harm, violation of human rights, and limitations on religious or personal freedoms) (Hansen and Spilimbergo 1999; Harris and Todaro 1970; Mayda 2010; Molho 1986).

As migrant-sending countries develop and inequality within recipient countries declines, the economic incentives for migration could become less pronounced. High-income countries tend to be the most popular destinations for migrants, and most migrants come from developing countries (Ahmed, Go, and Willenbockel 2016).[6] The broader impact of development on migration, however, depends on the patterns of growth. If economic development does not promote employment growth, then it has the potential to exacerbate the push factors to migrate out.[7] Massey (1988) provides examples of how economic development characterized by rapid structural transformation has the potential to create unemployment in rural—primarily agriculture-dependent—areas, increasing the incentives to migrate. If, on the other hand, growth in a country is on a path of eventual convergence with incomes in the high-income countries, there may be a reduction in the pull factors. In parallel, as fertility rates fall and working age population growth slows in developing countries, push pressures for emigration might also decline. Conflict presents another major driver of internal and international migration, with the number of forced migrants now at the highest level since World War II: 65.3 million people were displaced in 2015, up from 59.5 million in the previous year (UNHCR 2016).

2.2 Effects of demographic change on development outcomes

Changes in age structure have been recognized as potentially having a significant feedback effect on income per capita growth, savings, and poverty reduction.[8] Most famously, demographic transition in East Asia has been credited with facilitating the region's rapid income growth since the 1960s (Bloom and Williamson 1998; Bloom et al. 2000; Higgins and Williamson 1997). At the same time, countries that are still early in the transition process, as is the case for many high-fertility African countries, are considered to have tremendous potential in accelerating income per capita growth in coming decades as fertility rates fall (Eastwood and Lipton 2011; Ahmed et al. 2016). More recently, Cruz and Ahmed (2016) estimate that a 1 percentage point change in the working age population share of a country can increase GDP per capita growth by 1.5 percentage points and the savings share of GDP by 0.8 percentage points, while reducing poverty headcount rates by 0.76 percentage points, on average.

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[6] Recent evidence from Artuc et al. (2015) suggests that there may be some recent shifts in the trends in migration from developing countries to developed countries, with non-OECD destinations accounting for a third of skilled migration destinations.

[7] Massey (1988) provides examples of how economic development characterized by rapid structural transformation has the potential to create unemployment in rural areas, increasing the incentives to migrate.

[8] This is an extensive literature which includes, among others, Bloom and Canning (2004), Higgins and Williamson (1997), Kelley and Schmidt (1995, 2005, 2007), and World Bank (2013a).

Examinations of the development implications of demographic transition are not restricted to countries early in the transition process however. In contrast to the potential to boost economic growth in many developing countries, demographic change has been found to be a potential drag to economic growth in aging – and generally richer – economies. McKibbin (2006) conducts an analysis for several economies and finds that demographic change can lead to lower GDP for many high-income countries. For example, Japan's GDP in 2050 is projected to be 28 percent smaller than it was in 1985. In these aging economies, the policy issues arising from demographics are thus fundamentally different from those of countries that are relatively younger, and tend to focus on issues like potentially slower labor supply growth, weakening economic dynamism, fiscal sustainability of old-age support systems, and long-term care, *inter alia*. Aging in advanced economies is also expected to be a drag on global growth through international spillover effects (IMF 2015). Manyika et al. (2015) consider the impact of demographic change on growth for a longer time horizon and estimate that the declining working age population share could reduce the global average income per capita by 20 percent over 2015-65.

Lee and Mason (2006) linked demography and development together through the concepts of the first and second demographic dividends, which can be realized at different stages of demographic transition. These concepts are related to the demographic transition model (DTM), which describes the transition of populations from high to low fertility and mortality rates. This transition generally parallels the economic development of a country (Szreter 1993). The model consists of at least four distinct phases, with countries effectively moving from high fertility and low life expectancy to low fertility and high life expectancy as they move through the demographic transition. At the same time, they go from high proportions of children and few elderly to low proportions of children and more elderly. Fertility rates and mortality rates are both high in the first stage, where the population tends to be younger and population growth stable but low. If mortality rates fall but fertility rates remain high, as in the second phase, then population growth accelerates, with growing numbers of young and rising youth dependency. In the third stage, fertility rates also begin to decline, and population growth slows. After a long period of lower fertility, the growth rate of the working age population slows and the aged dependency ratio begins to rise. When fertility rates and mortality rates reach low levels, population growth also stabilizes at a low rate, in the fourth stage of the DTM.

The first demographic dividend may be realized when countries are transitioning through the early stages when their working age population shares are rising and their child and aged dependency ratios are low. The rising working age population shares suggest that even if employment rates are constant, the proportion of income-earners will rise relative to the total number of consumers in the economy. The declining dependency ratios will also mean that there will be more resources available to be spent on consumption and investment. All of these will almost immediately boost aggregate growth, consumption, and subsequently poverty reduction. Mason and Kinugasa (2007)

suggest that the contribution of the first demographic dividend explains between 9.2 to 15.5 percent of per capita economic growth over the 1960–2000 period for a wide sample of countries. Looking forward, Ashraf, Weil and Wilde (2013) use simulation methods to show for the case of Nigeria that differences in fertility rates exemplified by the United Nations' World Population Prospects' (UN WPP) medium- and low-fertility variants can mean a difference in output per capita of 5.6 percent at a 20-year horizon and 11.9 percent at a 50-year horizon. With a global simulation model, Ahmed et al. (2016) show that the demographic dividend could account for 11–15% of gross domestic product (GDP) volume growth by 2030 for Sub-Saharan Africa as a whole.

The second demographic dividend arises and can continue as countries enter the later stages of the demographic transition. When working age populations were rising and high, and dependency ratios are low, there is scope for economies to potentially save more, and invest more in both physical and human capital. For example, Loayza, Schmitt-Hevel and Serven (2000) found that an increase of 1 point in the old-age dependency would lead to a reduction of 0.66 percentage point in the ratio between gross private savings and gross private disposable income. An increase of 1 point in the young dependency ratio would lead to reduction of 0.3 percentage point, using a similar specification. There have been many studies finding that lower child dependency leads to higher saving rates (Mason 1987; Kelley and Schmidt 2005; Higgins and Williamson 1997; and Kinugasa and Mason 2005). However, there is less consensus on the effect of the aged dependency ratio on savings. Since people expect to live longer, they may save more during the economically active portion of their lives (Kinugasa and Mason 2007; Attanasio and Szekely 2000, and Mason et al. 2011). Lower fertility rates leading to lower child dependency ratios, are also associated with more investment in human capital (Becker, 1960; Soares, 2005). These additional investments on physical and human capital can lead to a permanent increase in productivity which can persist long after the working age population shares have begun to decline and populations begin to age.

The realization of these demographic dividends is not automatic. Given the potential for demographic change to boost development progress, the literature has extensively explored the policy and institutional conditions necessary for countries to take advantage of demographic transition from a period of high to low fertility (Bloom, Canning and Sevilla 2003). Recent analyses from the World Bank have examined how Sub-Saharan African economies can take advantage of their large and growing working age populations (Ahmed and Cruz 2016; Canning Raja, and Yazbeck 2015; World Bank 2015b, 2016). For example, in a scenario analysis, Ahmed and Cruz (2016) finds that 35 to 75 percent of poverty reduction in those Southern African economies between 2015 and 2050 could be attributed to changes in age-structure in those economies, without any improvements in policy outcomes like employment rates. However, the magnitude of the demographic dividends could be greater if countries are able to achieve policy outcomes in the areas of education, savings- investment, and employment. The paper finds that different policy outcomes interacting with the shifting age structures in different ways suggest quantitatively different economic impacts despite qualitatively similar policies.

3. A new typology of demographic change and development

Demographic dividends thus provide a powerful conceptual framework to delineate the mechanisms by which a country's demographic patterns and trends affect economic outcomes. This section describes a global classification of countries on the basis of their demographic characteristics with a starting point of Lee and Mason's (2006) conception of the first demographic dividend.

The first broad group of the new typology includes countries where potential for the first demographic dividend has either already past or is currently passing. This is determined by assessing if a country's working age population shares are expected to contract between 2015 and 2030.[9] To distinguish these countries where the first demographic dividend has already passed or is just passing, the fertility rate from 30 years ago is used to identify how far along countries are in the final phase of demographic transition. Thirty years describes the approximate length of time that defines a "generation": from the birth of a parent to the birth of their child, although the exact length would of course vary by country and across time. If the fertility rate in 1985 was below replacement, then countries are most likely to be the furthest along in their demographic transition, with the first demographic dividend in their past. These are classified as *post-dividend* countries. If the fertility rate in 1985 was at or above replacement levels, then it is likely that they entered the final phase of demographic transition more recently, and are still reaping the first demographic (if they were able to reap it), but are at the tail end of that window. These are classified as *late-dividend* countries.

The second broad group includes countries where the working age population shares are expected to grow till 2030, and where the potential window for the first demographic dividend occurred recently or will occur in the future. To distinguish between these two sub-groups, the current total fertility rate is considered. If it is below four births per woman, then it is likely that the country has been progressing through the demographic transition model and will be experiencing rapid reductions in the population share of its youth. These are the *early-dividend* countries. If current fertility rates are four births per woman or higher, then it suggests that countries are still in the midst of demographic transition and has yet to experience the lower child population share associated with the first demographic dividend. These are the *pre-dividend* countries. The four births per woman cut-off threshold is about twice the replacement level, making it unlikely that fertility rates in these countries would be below replacement level by 2030, as from the data for WPP's medium scenario's projections.

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[9] The 2015 to 2030 time period is a relatively brief period in demographic terms. However, it is the timeframe of the 2030 Sustainable Development Agenda which has been agreed to by 193 countries, and is used to anchor national and multilateral development policy discussions.

Table 1 Criteria for Typology

Growth of Working Age Population Share, 2015-30	Total Fertility Rate, 1985		Total Fertility Rate, 2015	
	<2.1	>=2.1	<4	>=4
<= 0	Post-dividend	Late-dividend		
>0			Early-dividend	Pre-dividend

Note: The working age population is defined as the share of the population aged between 15 and 64 years. Total fertility rate is the average number of births per woman in her lifetime.

Figure 1 World through the lens of the demographic typology
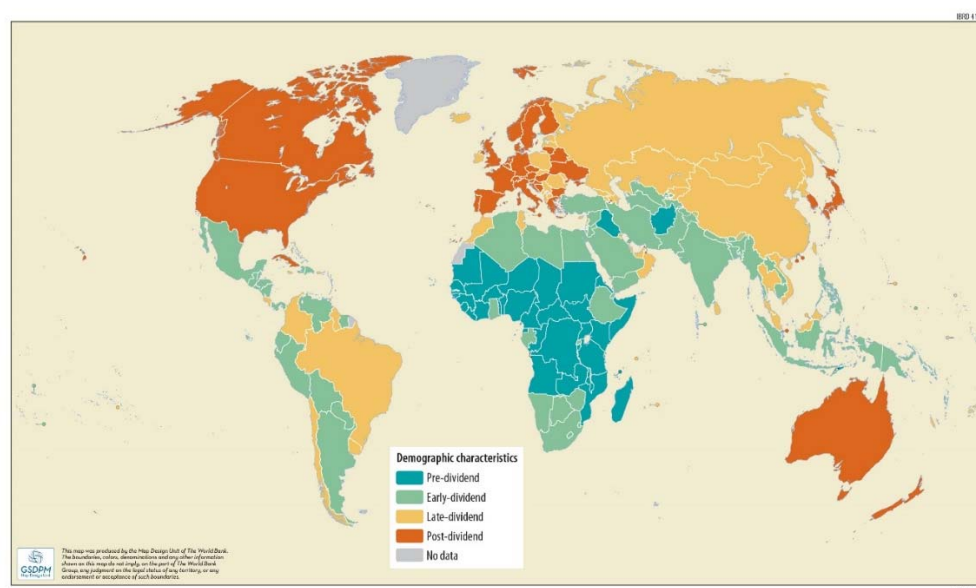
Source: World Bank staff based on data from UN (2015).

A few criteria are thus used to identify whether the potential for a first demographic dividend is in its past, present, or future. These criteria – summarized in Table 1 – are then applied to 191 economies covered by both the United Nations World Population Projections 2015 Revision (UN 2015) and the World Development Indicators, to yield the typology illustrated in Figure 1.[10] The population data from 1950-2015 are the historical estimates of the World Population Projections (WPP). The population data from 2015 onwards are from the WPP's medium-fertility scenario.

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[10] Table A1 in the Annex provides the fertility rate and working-age population changes that were estimated from the UN WPP for all countries considered in this paper.

Figure 2 The different demographic country types correspond to countries in different stages of demographic transition
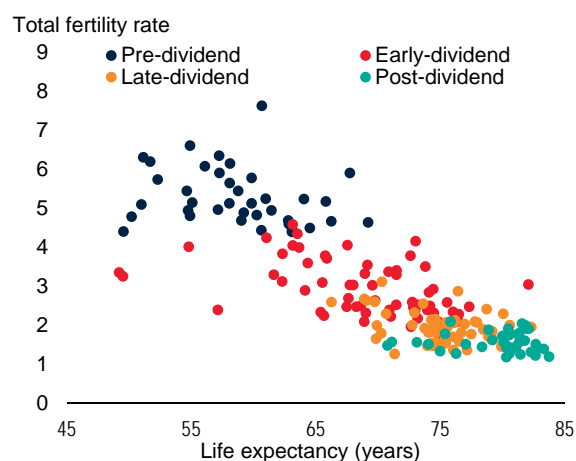
This demographic typology reflects the different stages of demographic transition. The first demographic indicator considered in the typology—the fertility rate—is a main determinant of demographic transition. At the start of demographic transition, countries typically have high fertility and mortality rates. As transition proceeds, the mortality rate begins to decline while the fertility rate remains high, resulting in rising life expectancy. Later, the birth rate begins to decline as well, until finally fertility and mortality rates both level off at low rates. Indeed, the pre-dividend countries have the low life expectancy and high fertility rates of countries in the early stages of demographic transition, post-dividend countries have the high life expectancy and low fertility of countries in the final stages of demographic transition, and early- and late-dividend countries lie somewhere in between (Figure 2). The second indicator considered in the demographic typology - the working age population share - is an outcome of demographic transition and the conceptual basis of the demographic dividend model.

A number of patterns emerge when global development progress is viewed through the lens of the new typology. More than half of the global population lives in pre- and early-dividend countries and more than a third lives in late-dividend countries (Figure 3). Most of the early-dividend population lives in lower-middle-income countries, in part because Bangladesh and India are lower-middle-income countries. Similarly, most of the late-dividend population lives in upper-middle-income countries, which include China. Pre-dividend countries, which account for less than 11 percent of the global population, are mostly low-income countries and are mostly in Sub-Saharan Africa. Post-dividend countries, accounting for another 11 percent of the global population, are predominantly high-income countries, mostly in North America, Western Europe, and Oceania.

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Figure 3 Income level is correlated with the stage of demographic transition

a. 70 percent of the global population lives in early- and late-dividend countries
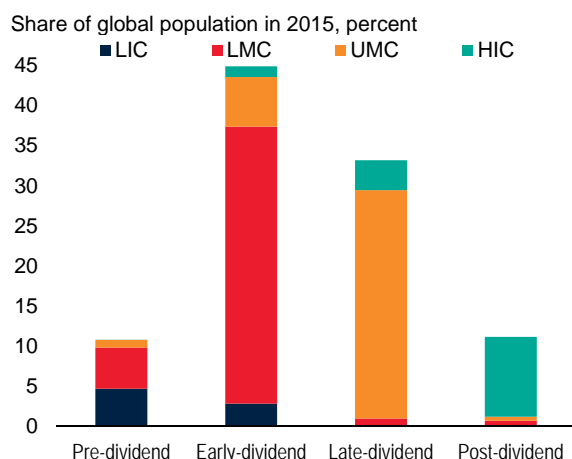
b. Most low-income countries are pre-dividend while most high-income countries are post-dividend

Share of global population in 2015, percent

■ LIC　■ LMC　■ UMC　■ HIC

Number of countries in 2015

■ LIC　■ LMC　■ UMC　■ HIC
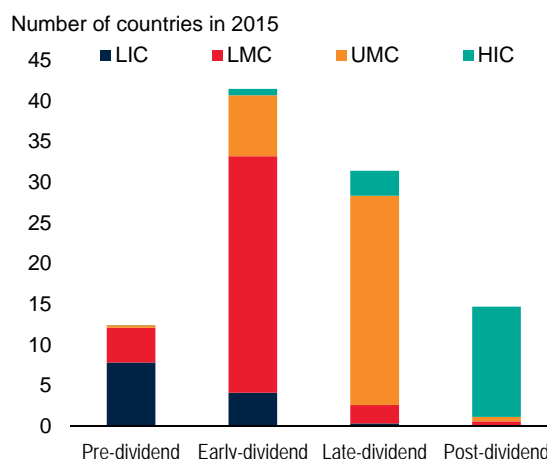
Source: World Bank staff, based on data from UN (2015). LIC is low-income countries, LMC is lower-middle-income countries, UMC is upper-middle-income countries, and HIC is high-income countries.

Pre-dividend countries are projected to account for most of the global population growth through 2050. The fertility rates of pre-dividend countries is expected to remain above replacement for several decades, leading to rapid population growth and slower age structure changes. The total fertility rate of pre-dividend countries—currently above four—is falling only slowly in the countries in this group and their younger age cohorts will continue to swell in the coming decades. As a result, the population of this group of countries will grow by 49 percent (or 413 million people) by 2030 and by 132 percent (or 1.1 billion people) by 2050. Children as a share of the population will remain above 40 percent until 2030, and above 34 percent until 2050.

4. Development policy through the lens of the new typology

4.1 Persistent poverty in pre- and early-dividend countries

More than 90 percent of the world's poor live in pre- and early-dividend countries (Figure 4). Pre-dividend countries, where 44 percent of the population lives below the poverty line on average, account for 38 percent of the global poor. Early-dividend countries have a much lower poverty rate of 17 percent but account for 49 percent of the global poor, largely because this group includes Bangladesh and India, which together are home to 33 percent of the world's poor. The late-dividend group of countries has an average poverty headcount of only 4 percent, but one member of this group, China, accounts for 10 percent of global poverty.

Figure 4 Pre- and early-dividend countries account for most of global poverty

Average poverty headcount rate and share of global poverty, percent
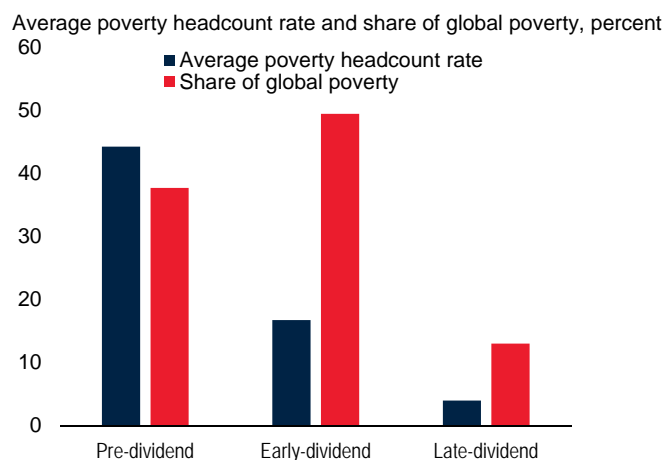
Source: Cruz et al. (2016)
Note: Data are for 2012 and are based on a $1.90/day poverty line from Povcalnet. The average poverty headcount rate is the unweighted average across countries in a given group. The sample of countries included 31 pre-dividend countries, 48 early-dividend countries, 34 late-dividend countries, and 4 post-dividend countries.

The pre- and early-dividend countries with the highest poverty rates also continue to face fast population growth, with populations expected to double in coming decades. The five countries expected to have the most rapid population growth between 2015 and 2050 are all pre-dividend in Sub-Saharan Africa: Angola, Mali, Niger, Uganda, and Zambia. These countries are very poor, with 2012 poverty rates that ranged from 29 to 62 percent (Cruz et. al., 2016). Without improvements in their poverty headcount rates, these countries will experience even greater concentrations of poverty in the future.

Early- and late-dividend countries, where much of the global poverty reduction over the past two decades occurred, also experienced a fertility transition over this period. Between 1990 and 2012, the global poverty headcount rate fell from 37.1 percent to 12.8 percent, representing a reduction in the number of global poor by more than 1.04 billion. By virtue of their large populations and high poverty headcount rates, China and India accounted for much of the reduction in global poverty. These countries now not only have lower poverty headcounts but also lower population growth rates, having lowered their fertility rates over time. Bangladesh and Indonesia, which together accounted for another 10 percent of global poverty in 2012, also have experienced slowing population growth rates. Poverty reduction successes in these countries would thus have a diminishing impact on global poverty reduction.

Figure 5 Early-dividend countries are urbanizing rapidly

Share of population living in urban areas, percent
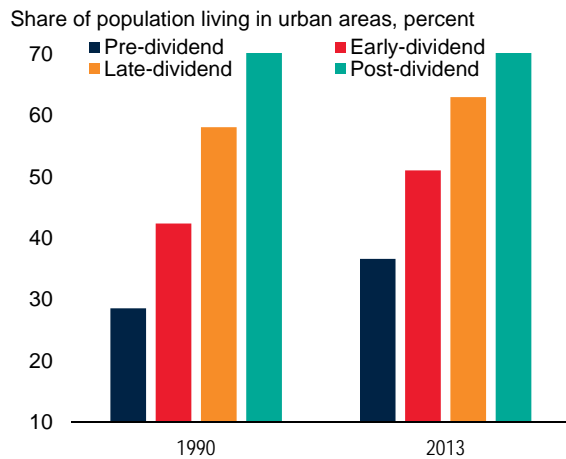
Figure 6 A large share of the population of early- and late-dividend countries still live in slums

Share of urban population living in slums, percent
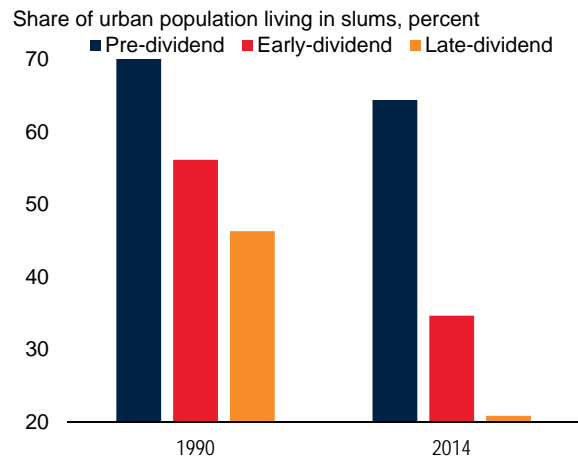
Source: World Bank staff based on World Bank World Development Indicators, Millennium Development Goals database, and UN 2015.

Note: Data reflect unweighted averages for the different country groups.

About 90 percent of countries that met the MDG target of halving poverty rates were early- and late-dividend countries.[11] As of 2012, around 40 percent of early-dividend and 68 percent of late-dividend countries were able to halve their poverty headcount rates from their 1990 levels. In contrast, only 2 percent of pre-dividend countries were able to achieve similar reductions in their poverty rates. Given that pre-dividend countries also typically have faster population growth rates than countries at a more advanced stage of demographic transition, and large reductions in poverty headcount rates may also not provide a complete perspective on poverty reduction (Herrmann 2015). For example, Mali reduced its poverty headcount rate by a third between 1990 and 2012, but due to its high population growth, the number of poor still rose by 13 percent. The countries that have had the most success in reducing poverty are those where the working age share of the population has peaked or is close to peaking and where population growth has decelerated in parallel to improvements in life expectancy, infant mortality, and fertility.

As more and more people live in urban areas, progress in reducing the shares of urban populations living in slums has been modest. Overall, the shares of populations in pre-, late-, and post-dividend countries living in urban areas stayed relatively stable between 1990 and 2013 (Figure 5). However, early-dividend countries have seen rapid urbanization over this period, a shift that is driving global urbanization trends. Rising urbanization has been paralleled by an increase in the number of those living in slums (Figure 6). Large cities in developing countries, such as Baghdad,

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[11] Based on the $1.90/day poverty line data from Povcalnet. The sample of countries included 31 pre-dividend countries, 48 early-dividend countries, 34 late-dividend countries, and 4 post-dividend countries.

Figure 7 Education expenditure per capita is negatively correlated with child dependency ratio
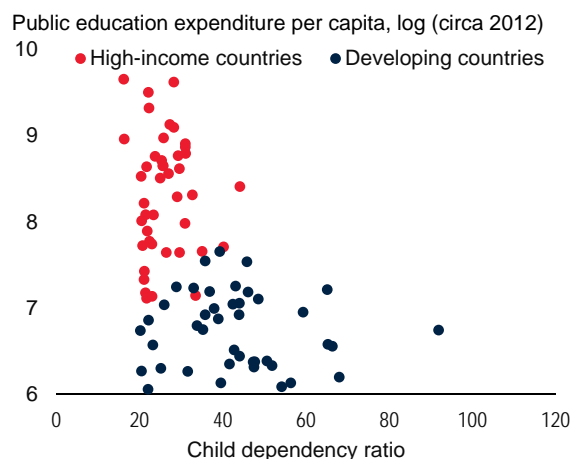
Public education expenditure per capita, log (circa 2012)

● High-income countries ● Developing countries

Child dependency ratio

Source: World Bank staff based on data from UN 2015 and World Bank World Development Indicators.

Caracas, Johannesburg, Karachi, Lagos, Lima, Mumbai, Nairobi, and Rio de Janeiro have large slums, some of them with estimated populations of more than 500,000. Lack of access to public services in these slums has the potential to lead new generations of urban slum residents into poverty traps (Marx, Stoker, and Suri 2013).

Low educational attainment in pre-dividend countries has implications for the future global supply of labor. In pre-dividend countries, just 35 percent of whom completed lower-secondary education, compared with 72 percent in early-dividend countries and 90 percent in late-dividend countries.[12] These pre-dividend countries will account for most of the global growth in the working age population over the next few decades; if their education attainment rates do not improve, the global average skill level of the working age population will grow only slowly.[13]

Pre- and early-dividend countries present a high demand for services for children, including education. Education is a critical component of early childhood development, with long-term implications for not just human capital accumulation and future income, but also socialization and health (Heckman, Pinto and Savelyev 2013). However, low- and middle-income countries generally have lower public spending per capita on education, while having substantially greater child dependency ratios than high-income countries (Figure 7). These countries thus face the challenge both of increasing the quality of their education through improvements in per capita spending and expanding their spending to accommodate a larger child population in the near

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[12] These are based on data for 191 countries from World Development Indicators. The data are for the latest year available between 2011 and 2012.

[13] This is equivalent to the constant enrollment rate assumption in the most pessimistic education projection scenarios of KC et al. (2010).

future. In pre-dividend countries, in particular, children as a share of the population are projected to stay almost the same (or rise in some cases) for several decades.

Policy action focused on human development may help pre-dividend countries progress to the next stage in the demographic transition. There is a relationship between fertility rates and policies that improve maternal and child health services; expand education coverage (particularly to girls); and empower women in the household and in the labor force (Bloom et al. 2009; Soares and Falcao 2008; Canning, Raja, and Yazbeck 2015). Priority services areas include immunization programs, enhanced growth monitoring of children, and services targeted at women during pregnancy and after giving birth. Several multilateral initiatives embrace a multi-pronged approach, as illustrated by the multilateral African Road Map for reducing maternal and newborn mortality. A number of countries are strengthening the newborn components in pre-existing child health plans as part of the World Health Organization's Every Newborn Action Plan (WHO and UNICEF 2015). Generally, policies that facilitate gender empowerment and reproductive health also empower households to make their own decisions regarding number of children. Relevant policies include strengthening reproductive rights, and improving access to reproductive health services (UN 2014). Successful interventions often include the whole community, changing gender norms and support the sexual health and rights of girls and women (Klugman and others 2014; Azevedo and others 2012).

The policy priorities for early-dividend countries would differ from that of pre-dividend countries in that they may need to focus on interventions to realize and maximize demographic dividends. For the first dividend, this means creating productive jobs at a rate that exceeds the rate of population growth. Such job creation may be sped up by progress in several areas: investments in human capital (including vocational and technical training), maintenance of macroeconomic stability, financial inclusion, and labor market policies that allow all socioeconomic groups to benefit from favorable population dynamics (Fox and Sohnesen 2012; Lee and Mason 2006; Troiano 2015). In many countries, persistent low female labor force participation is an obstacle to the realization of the first demographic dividend. Gender gaps in labor force participation have generally remained persistent, especially in some demographic types and in some regions. In the Middle East and North Africa region, for example, the average female participation rate is 25 percent, and several countries have rates below 20 percent, including Algeria, Islamic Republic of Iran, Iraq, and Jordan.[14] Facilitating the access of females to the labor market has simultaneous effects on demography, human capital, and growth, and is needed to realize the first demographic dividend (Galor 2012).

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[14] Based on data from the World Development Indicators 2016.

4.2 Weakening economic dynamism in late- and post-dividend countries

Late-dividend countries have experienced demographic change at a much faster pace than many post-dividend countries did. By the 1940s most post-dividend countries already had low fertility rates, which briefly rose in the post-war period but then fell and generally remained low. In the 1950s, late-dividend countries had almost double the fertility rates of post-dividend countries, and average life expectancies were shorter by nine years (Figures 8 and 9). However, late-dividend countries have since made substantial improvements in these metrics, with extremely rapid improvements in life expectancy. Several factors fed into this faster pace of improvement, all having to do with the importance of these countries in the global economy. As a result, late-dividend countries are expected to have the same age structure as post-divided countries by 2050 (Figure 10).

At the same time, late-dividend countries accounted for 36 percent of global GDP growth in 2000-14 (Figure 11). Growth in many of these countries was rapid. Brazil and China alone, for example, contributed a quarter of global growth over the period. Brazil and China grew at high average annual real GDP growth rates, at 3.5 and 10 percent, respectively over this period. However, the working age populations and working age population shares of late-dividend countries will contract over the next few decades, suggesting demographic change is likely to dampen their contribution to global growth going forward.

Figure 8 Fertility rates in late-dividend countries have converged to those of post-dividend countries since the 1950s

Total fertility rates
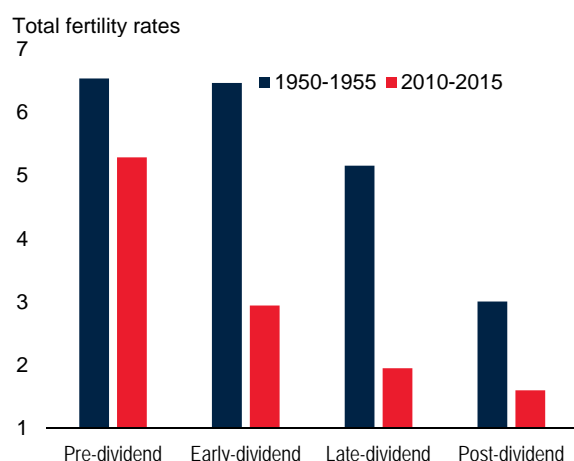
Figure 9 Differences in life expectancy across typologies of countries have narrowed

Life expectancy, years
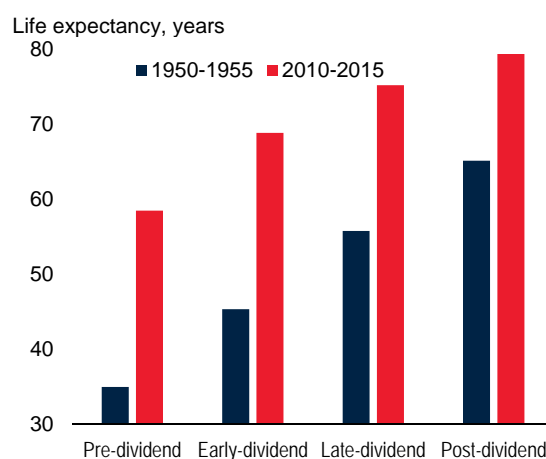
Source: World Bank staff based on data from World Bank World Development Indicators, Millennium Development Goals database, and UN (2015).
Note: Data reflect unweighted averages for the different country groups. The total fertility rate is the average number of births per woman.

Figure 10 Late-dividend countries are aging rapidly

Share in population of age 65+, percent

Figure 11 Aging countries account for most of global growth, 2000-14

Contributions to global GDP growth, percent
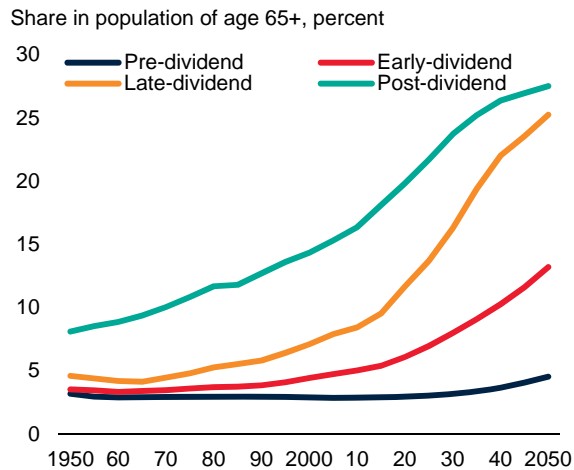
Source: World Bank staff based on UN 2015 and World Bank World Development Indicators.
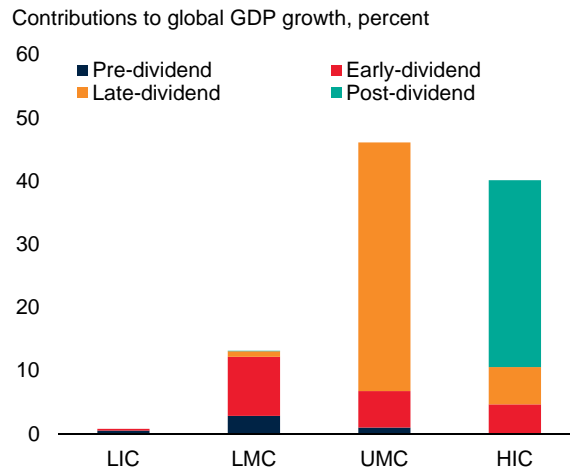
Post-dividend countries' contributions to global growth have been slowing down, with potential spillovers for other countries (IMF 2015). These countries account for 59.8 percent of global economic activity in 2014, and 42 percent of global GDP growth. Post-dividend economies are also the major export destinations for pre- and early-dividend countries and account for two-thirds of global import demand. While other post-dividend countries or late-dividend countries meet most of this demand, the post-dividend countries are the pre-eminent markets for exports from pre- and early-dividend countries, mainly textiles, clothing and other light manufactures as well as commodities. If growth in post-dividend countries slows, early- and pre-dividend countries will need to find alternative export markets. In addition, as post-dividend economies age, their national savings rate is expected to fall, leading to a possible slowdown in capital flows to the rest of the world.[15]

In some late- and post-dividend countries, pension systems are increasingly stressed as the number of beneficiaries rises relative to the numbers the systems were designed to support (Bogetic et al. 2015). Late- and post-dividend countries will have a combination of shrinking share of working age population combined with an increase in the share of aged people, potential candidates for public pension (Bonoli and Shinkawa 2005). As populations age, pension systems need to adapt to demographic and occupational changes to avoid generosities and incentives that encourage early retirement and thus long retirement periods (Bussolo, Koettl, and Sinnott 2015; World Bank 2015c). In 2012, one-quarter of the European Union's population—130 million people—received at least one pension. The European Union spent about €1.71 billion on pensions in 2012, which represents about 13.3 percent of its GDP.

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[15] Börsch-Supan, Ludwig and Winter (2002) and the World Bank (2013b) suggest that capital flows from fast-aging economies to younger economies could be substantial in the future.

Figure 12 Health expenditure per capita is positively correlated with aged dependency ratio
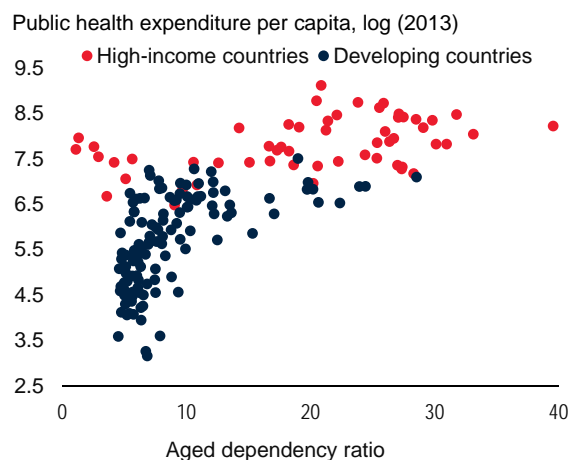
Source: World Bank staff based on data from UN 2015 and World Bank World Development Indicators

Some high-income countries are experiencing a rapid rise in health care costs as they age (Figure 12). Health care spending generally increases with age, with a notable jump in spending between the ages of 55 and 60, reflecting changes in morbidity (EC 2015). In OECD countries, health care spending on those 65 and older is expected to jump from 40 percent in 2010 to 60 percent by 2060 (De la Maisonneuve and Martins 2013). In the United States, health spending is expected to rise faster than GDP and account for 19.6 percent of GDP by 2024, up from 17.4 percent in 2013 (CMS 2015a). The cost of Medicare (the public health insurance for people 65 or older) is expected to increase substantially, moving from $256.5 billion in 2002 to $489.4 billion in 2010 (CMS 2015b). The aging of baby boomers in the coming years will lead to an unprecedented increase in the size and composition of the elderly population in the program (Lassman et al. 2014).

For post-dividend countries, characterized by a large share of the population aged 65 or older, the challenge is to adapt to aging so that living standards can be maintained and improved. The welfare system should aim to ensure that no one is left behind throughout the different stages of the life cycle: provision of child care to reconcile work and parenthood; education at different stages of life; health care; long-term care complementing the care provided by families, pensions and a social safety net that catches those that otherwise would risk falling into poverty (OECD 2013). Policies will also need to help raise employment rates also beyond today's typical retirement ages and encourage savings channeled to productive physical investments, as argued by Bussolo, Koettl and Sinnot (2015). Public policy may also help raise low fertility rates by making it easier to combine child-rearing and labor market engagement and reducing financial burdens of having children. In Europe, countries with the highest female labor force participation and employment rates also have high fertility rates, demonstrating that it is possible to reconcile parenthood with work (Myrskylä et al. 2009).

Late-dividend countries can view the experiences of post-dividend and draw some lessons on challenges around the corner. For example, for late-dividend countries it may be particularly important to ensure that rules for pension systems are consistent with working at an older age as life expectancy increases (World Bank 2015c). Given that the share of the elderly still is relatively small, the short-run repercussions of the specific policy choices in this area are relatively limited. However, given that the share of the old will grow, the initial design of policies in this area is extremely important considering their fiscal consequences and the difficulty of changing behavioral and institutional patterns. Design of sustainable old-age support systems could also have important synergies with other interventions that late-dividend countries may need to consider. For example, carefully designed pension systems could create the supportive incentives that will allow older and healthier workers to continue to work, if they chose.

5. Leveraging demographic differences between country-types

Countries in all phases of the demographic transition can leverage differences in demographic patterns and trends across countries through cross-border capital flows, migration, and trade for their domestic development objectives. Differences between the demographic country-types are producing important spillovers across countries, contributing to changes in comparative advantage underpinning trade, and the returns earned by labor and capital (World Trade Organization 2013). These changes require the implementation of policies to support enhanced trade in goods and services, as well as greater factor mobility. This may encourage labor-intensive production to shift from aging countries to younger societies, or migration from countries with growing working age populations to countries where the number of workers is falling, thereby delivering non-tradable services such as care for the elderly (World Bank 2015c). International cooperation - in addition to domestic measures - is thus needed on trade facilitation, legal migration, and capital flows to take advantage of the demographic differences between countries in a global setting.

First, in coming decades, global trade flows are projected to continue shifting toward countries earlier in their demographic transition, possibly yielding substantial benefits for poorer countries (Maliszewska et. al. 2016). Differences in demographic change may lead to comparative advantages that influence trade patterns. Countries with slower population growth tend to become more capital-abundant over time, while countries with faster population growth become more labor-abundant (Figure 13). Trade can potentially reduce poverty through faster growth, more economic diversification, and greater macroeconomic stability. Maliszewska et. al. (2016) suggests that lower trade costs could result in additional income gains in pre- and early-dividend countries, amounting, respectively, to 3.6 percent and 2.5 percent of GDP by 2030. Moreover, the benefits from trade facilitation could lift an additional 13 million people out of poverty. It can also facilitate technology transfers through knowledge embodied in goods and services production,

Figure 13 Early-dividend countries are more specialized in labor-intensive exports

Export shares by sectors, percent (2015)

■ High-skilled services ■ Low-skilled services
■ High-skilled manufacturing ■ Low-skilled manufacturing
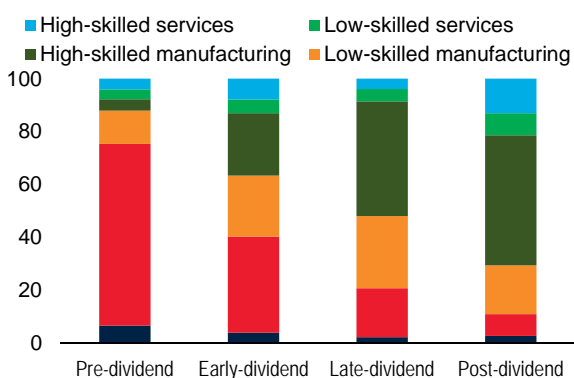
Figure 14 Post-dividend countries tend to receive the most migrants

Migrant stock by destination in 2013, millions

■ From pre-dividend ■ From early-dividend
■ From late-dividend ■ From post-dividend
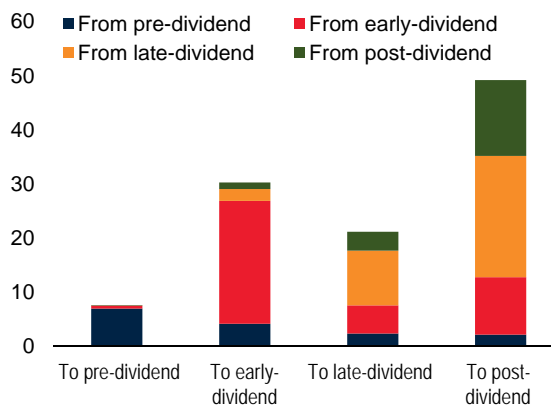
Source: World Bank staff estimates.
Note: Migrant stock share by destination is calculated as share of world migrant stock in 1960 and 2000.

boosting exports, productivity and growth. Amiti and Konings (2007) and Topalova and Khandelwal (2011) provide evidence from Indonesia and India, that lower input and output tariffs can increase firm-level productivity by inducing tougher import competition, promoting learning, and providing access to further variety and high- quality inputs. Bas (2012) and Cruz and Bussolo (2015) respectively show that the probability of entering and surviving in the export market is higher for firms producing in industries that have experienced greater tariff reductions on their intermediate goods.

Trade policy measures can be important tools in enabling countries to adapt to the opportunities and challenges in demographic change. Agricultural trade is still distorted by high tariffs, export subsidies, and domestic support in such a way that harms poor, rural producers (Anderson, Ivanic, and Martin 2013; WTO 2014). Although average tariffs on manufactured goods have been declining over the years, substantial tariff and nontariff barriers still affect the free flow of goods between countries (UNCTAD 2013; WTO 2012). Reductions in those barriers, coupled with improving trade facilitation, could encourage firms to relocate production to relatively more labor-abundant countries and allow developing countries to take full advantage of their growing labor forces. In pre- and early-dividend countries, additional trade facilitation measures may add to their comparative advantage in labor-intensive products and help create jobs. Trade can also help meet the demand for health services in aging countries and the demand for education services in young countries. Both health care and education are traded only lightly across borders due to high barriers, so liberalizing trade in those areas could potentially yield substantial benefits (Blouin, Drager, and Smith 2006; Smith, Chanda, and Tangcharoensathien 2009).

Second, the potential gains from expanding legal migration are large, especially given the generally high level of restrictions on the movement of people across borders (World Bank 2006; Tyers and Shi 2007; Walmsley, Winters, and Ahmed 2007; Borgy et al. 2010; Clemens 2011). Demographic disparities can amplify those gains. While South-South migration flows have grown rapidly, substantial migration takes place from younger developing countries to aging high-income countries (Figure 14). International migration flows can mitigate the decline in working age population shares in aging countries. Younger immigrants can help ease the pressures of aging populations in late- and post-dividend countries, improve the growth prospects, and ensure the sustainability of public finances in destination countries. But the impact of migration on both origin and destination countries depends on the skills of migrants, and socio-political challenges must be managed.

A wide range of policies could potentially foster legal migration, with benefits to both sending and receiving countries. In the past 10 years, many countries revised their migration laws in response to changes in demography, labor market conditions, and political contexts. Pre-departure orientation and training, protecting the rights and preventing the abuse of migrants, lowering remittance costs, and removing regulatory and bureaucratic barriers to return migration are all actions that can enhance the net development benefits (OECD 2013). Migration benefits sending countries through remittances, but also presents challenges, such as brain drains and *Dutch disease* effects (Beine et. al. 2001, 2008, 2015) that can be actively managed.

Third, different trajectories of demographic change have important implications for capital flows. Countries early in their demographic transition need to boost investment, and those later in their transition seek higher returns than may be available domestically. Aksoy et. al. (2015) shows that population ageing may contribute to reduced output growth and significantly lower real interest rates across the economies of OECD countries. So global demographic disparities can augment the impetus for international capital flows. However, low institutional quality seems to lead the explanation for the lack of capital flows from rich countries (in advanced stage of demographic transition) towards poor countries (in early stages of demographic transition) over the 1970-2000 period (Alfaro et. al., 2008).

Improving institutional quality and developing the financial sector could attract capital flows to pre- and early-dividend countries. Facilitation of international capital flows could allow young, labor-abundant countries to attract much-needed capital. In the initial stages of the demographic transition, investment demand exceeds savings, stimulating current account deficits. The opposite tends to be true for countries in later stages of demographic transition. Capital flows could generate an increase in labor productivity and wages, contributing to faster growth in young, labor-abundant countries. For capital sending countries, increasing investment in young economies can provide opportunities to raise capital returns and diversify investment portfolios, especially if labor-abundant countries create favorable investment climates, ensure macroeconomic stability, deepen

their financial sectors, and strengthen governance. Countries early in their demographic transition can promote foreign direct investment by reducing investment barriers, such as caps on foreign ownership and requirements for joint ventures (World Bank 2013). Yet, minimum levels of financial and institutional development are needed to reduce the riskiness of financial liberalization (Sahay et al. 2015). Moreover, countries should proceed cautiously, in an incremental and sequenced manner as they embrace financial globalization (Obstfeld, 2008).

6. Conclusion

For the purposes of analysis and identifying policy priorities, the world can be considered to have four types of countries when viewed through the lens of demography. Although demography is by no means the only force that shapes the economy, it has direct effects on the availability of key resources for development and, at the same time, impacts the demand for public services.

Pre-dividend countries lag in key human development indicators and have fertility rates greater than four births per woman. Their high dependency ratios are expected to decline as the fertility transition proceeds. Early-dividend countries have progressed further in the fertility transition, with fertility rates below four births per woman and the working age share in the population likely to rise considerably in the future. Realizing the first demographic dividend should be priority for these countries, as well as laying the groundwork for the second dividend. Late-dividend countries have shrinking working age shares, but their overall age structures are still favorable for the first demographic dividend. However, they may experience rapid aging in coming decades so realizing the second dividend is key. Finally, post-dividend countries are where fertility transitioned below replacement levels three decades ago, and have shrinking working age population shares and high shares of elderly. They are too late in the transition to gain additional benefits from the first demographic dividend, but could still be realizing the second dividend.

One key value-added of this typology is how it is able to link a long-run process, i.e. demographic change, to current policy discussions by identifying potential challenges and opportunities, including those arising from demographic disparities across countries. Alternative approaches to build systematic links between demographic change and economic policy are less cogent. For example, UN (2004) introduced the idea of the demographic window of opportunity of a country – a 30 to 40-year period when a country's working age population share is greatest, starting when a country has the potential to achieve demographic dividends from the time when the population share of children 15 years and younger is less than 30 percent and the proportion of people 65 years and older is still below 15 percent. The intuition behind the demographic window concept is thus also based on the size of the working age population share, but it provides no additional information that could be used to determine its progress through the window, and is thus limited in its ability to inform policy.

Another key value-added of the typology presented in this paper is that it connects the demographic differences between countries and to opportunities for greater development through international cooperation. Regional and country analyses of demographics, such as those referred to in this paper, tend to focus on demographically-informed interventions at the country level. For the purposes of spurring dialogue with policy makers, this is a practical approach since many interventions are in the realm of domestic policy. However, in an increasingly interconnected world with diverging demographic trends, the complementary channels of international trade, migration, and capital flows offer a set of mechanisms that countries at different stages of demographic transition - and hence with different opportunities and challenges - can use to reach mutual beneficial arrangements. These could take the form of trade in labor-intensive goods from younger, developing countries to older countries that have moved up the value chain, migration from labor-abundant pre- and early-dividend countries to late and post-dividend countries with slower labor supply growth, or capital flows from aging economies seeking higher returns from investments in younger, emerging economies. The demographically-informed typology allows for identification of these possible flows, and also helps countries recognize the potential gains of greater openness.

While the typology is ultimately a useful device in linking demographics to development challenges, opportunities and policies, four points need to be kept in mind when considering its application to single-country analyses. First is that the classification of a country into a specific type is sensitive to the data used and the thresholds presented in Table 1, and when considering the policy implications of a specific country, their status vis-a-vis other country-types should be taken into account. For example, Russia's TFR in 1985 was 2.12, but it was 2.04 in 1980 and 1.55 in 1990, suggesting that a period average or a different year would have defined Russia as a post-dividend country. Second, population projections differ across alternative databases and scenarios, so the typology of countries may vary depending on the source of the projections. An example of this is Ethiopia, which can be classified as an early-dividend country using WPP 2015 Revision data, but which would have been a pre-dividend country if WPP 2012 Revision data had been used instead. Third, the central concept of the working age is defined as being from 15 to 64 years, for ease of international comparison. However, there is evidence that in aging economies, the definitions of working age and dependents may be changing and the standard definition of the working age population may not apply to rural, informal, or poor workers who often have to work beyond age 64 (Sanderson and Scherbov 2010; World Bank 2015c). Finally, a global typology at the country level may mask important disparities in demography across regions within countries.

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Table A1 Economies by World Bank Group Classification and Demographic Typology[16]

Name	World Bank Group income classification	Demographic type	Percent change in working-population share, 2015-30	Total fertility rate, 1985	Total fertility rate, 2015
Afghanistan	LIC	Pre-dividend	17.53	7.47	4.25
Albania	UMC	Late-dividend	-10.69	3.15	1.78
Algeria	UMC	Early-dividend	0.99	5.3	2.62
Angola	UMC	Pre-dividend	6.56	7.25	5.79
Antigua and Barbuda	HIC	Post dividend	-2.78	2.07	2.03
Argentina	HIC	Early-dividend	1.13	3.05	2.27
Armenia	LMC	Late-dividend	-8.09	2.58	1.51
Aruba	HIC	Late-dividend	-8.13	2.3	1.62
Australia	HIC	Post dividend	-6.42	1.86	1.86
Austria	HIC	Post dividend	-9.17	1.45	1.53
Azerbaijan	UMC	Late-dividend	-7.88	2.95	2.22
Bahamas, The	HIC	Late-dividend	-6.78	2.65	1.83
Bahrain	HIC	Early-dividend	1.45	4.08	1.98
Bangladesh	LMC	Early-dividend	6.15	4.98	2.08
Barbados	HIC	Post dividend	-8.53	1.77	1.8
Belarus	UMC	Post dividend	-8.41	2	1.64
Belgium	HIC	Post dividend	-6.77	1.56	1.83
Belize	UMC	Early-dividend	4.65	4.7	2.46
Benin	LIC	Pre-dividend	7.6	6.88	4.5
Bhutan	LMC	Early-dividend	4.47	6.11	1.93
Bolivia	LMC	Early-dividend	4.99	5.09	2.83
Bosnia and Herzegovina	UMC	Post dividend	-9.86	1.91	1.23
Botswana	UMC	Early-dividend	4.39	5.11	2.67

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[16] The World Bank Group income classifications for 2014 were used, so the list does not reflect countries that may have changed income status. LIC is low-income countries, LMC is lower-middle-income countries, UMC is upper-middle-income countries, and HIC is high-income countries.

Name	World Bank Group income classification	Demographic type	Percent change in working-population share, 2015-30	Total fertility rate, 1985	Total fertility rate, 2015
Brazil	UMC	Late-dividend	-1.41	3.1	1.74
Brunei Darussalam	HIC	Late-dividend	-3.21	3.72	1.82
Bulgaria	UMC	Post dividend	-4.91	1.95	1.6
Burkina Faso	LIC	Pre-dividend	8.18	7.07	5.23
Burundi	LIC	Pre-dividend	3.67	7.59	5.66
Cabo Verde	LMC	Early-dividend	4.3	5.63	2.19
Cambodia	LIC	Early-dividend	2.39	5.99	2.53
Cameroon	LMC	Pre-dividend	8.25	6.6	4.46
Canada	HIC	Post dividend	-10.27	1.62	1.56
Central African Republic	LIC	Pre-dividend	7.15	5.9	4.02
Chad	LIC	Pre-dividend	7.99	7.21	5.79
Chile	HIC	Late-dividend	-4.98	2.6	1.73
China	UMC	Late-dividend	-7.12	2.75	1.59
Colombia	UMC	Late-dividend	-0.93	3.18	1.83
Comoros	LIC	Pre-dividend	6.34	6.7	4.23
Congo, Dem. Rep.	LIC	Pre-dividend	7.15	6.98	5.66
Congo, Rep.	LMC	Pre-dividend	6.23	5.55	4.64
Costa Rica	UMC	Late-dividend	-2.89	3.31	1.76
Côte d'Ivoire	LMC	Pre-dividend	4.49	6.85	4.77
Croatia	HIC	Post dividend	-6.58	1.72	1.48
Cuba	UMC	Post dividend	-9.04	1.85	1.58
Cyprus	HIC	Late-dividend	-5.01	2.43	1.42
Czech Republic	HIC	Post dividend	-5.85	1.9	1.54
Denmark	HIC	Post dividend	-5.12	1.54	1.76
Djibouti	LMC	Early-dividend	4.93	6.18	2.99
Dominican Republic	UMC	Early-dividend	2.71	3.65	2.38
Ecuador	UMC	Early-dividend	1.28	4	2.44
Egypt, Arab Rep.	LMC	Early-dividend	3.29	5.15	3.16

Name	World Bank Group income classification	Demographic type	Percent change in working-population share, 2015-30	Total fertility rate, 1985	Total fertility rate, 2015
El Salvador	LMC	Early-dividend	2.51	4.17	1.87
Equatorial Guinea	HIC	Pre-dividend	1.32	5.89	4.52
Eritrea	LIC	Pre-dividend	12.43	6.51	4.02
Estonia	HIC	Late-dividend	-5.97	2.2	1.66
Ethiopia	LIC	Early-dividend	12.05	7.37	3.99
Fiji	UMC	Late-dividend	-0.28	3.47	2.48
Finland	HIC	Post dividend	-7.05	1.66	1.77
France	HIC	Post dividend	-5.44	1.81	1.99
French Polynesia	HIC	Late-dividend	-5.51	3.64	1.99
Gabon	UMC	Early-dividend	7.18	5.58	3.68
Gambia, The	LIC	Pre-dividend	6.25	6.14	5.53
Georgia	LMC	Late-dividend	-7.19	2.26	1.82
Germany	HIC	Post dividend	-10.74	1.43	1.44
Ghana	LMC	Early-dividend	6.42	5.88	3.95
Greece	HIC	Post dividend	-2.46	1.53	1.3
Grenada	UMC	Early-dividend	0.92	4.14	2.08
Guam	HIC	Late-dividend	-4.48	3.14	2.32
Guatemala	LMC	Early-dividend	8.1	5.5	3.03
Guinea	LIC	Pre-dividend	6.57	6.63	4.73
Guinea-Bissau	LIC	Pre-dividend	6.01	6.68	4.56
Guyana	LMC	Late-dividend	-3.02	3.77	2.47
Haiti	LIC	Early-dividend	6.11	5.7	2.85
Honduras	LMC	Early-dividend	7.02	5.37	2.25
Hong Kong SAR, China	HIC	Post dividend	-17.53	1.36	1.3
Hungary	HIC	Post dividend	-4.48	1.86	1.4
Iceland	HIC	Late-dividend	-6.25	2.12	1.9
India	LMC	Early-dividend	3.11	4.27	2.34
Indonesia	LMC	Early-dividend	1.4	3.4	2.36

Name	World Bank Group income classification	Demographic type	Percent change in working-population share, 2015-30	Total fertility rate, 1985	Total fertility rate, 2015
Iran, Islamic Rep.	UMC	Early-dividend	1.48	5.62	1.62
Iraq	UMC	Pre-dividend	5.1	6.09	4.35
Ireland	HIC	Late-dividend	-1.78	2.18	2
Israel	HIC	Early-dividend	0.27	3.07	2.93
Italy	HIC	Post dividend	-7.83	1.35	1.49
Jamaica	UMC	Late-dividend	-3.36	3.1	1.99
Japan	HIC	Post dividend	-5.68	1.66	1.46
Jordan	UMC	Early-dividend	7.74	6.02	3.2
Kazakhstan	UMC	Late-dividend	-2.03	3.03	2.53
Kenya	LMC	Pre-dividend	8.34	6.54	4.1
Kiribati	LMC	Early-dividend	2.21	4.8	3.58
Korea, Dem. People's Rep.	LIC	Late-dividend	-1.47	2.36	1.94
Korea, People's Rep.	HIC	Post dividend	-13.45	1.6	1.33
Kuwait	HIC	Late-dividend	-2	3.15	2.04
Kyrgyz Republic	LMC	Late-dividend	-0.74	4.02	2.93
Lao PDR	LMC	Early-dividend	6.81	6.27	2.77
Latvia	HIC	Late-dividend	-5.61	2.13	1.55
Lebanon	UMC	Late-dividend	-1.84	3.23	1.71
Lesotho	LMC	Early-dividend	4.97	5.14	3.01
Liberia	LIC	Pre-dividend	7.82	6.72	4.47
Libya	UMC	Early-dividend	7.1	5.71	2.32
Lithuania	HIC	Post dividend	-7.62	2.06	1.63
Luxembourg	HIC	Post dividend	-6.68	1.47	1.61
Macao SAR, China	HIC	Post dividend	-16.77	1.94	1.34
Macedonia, FYR	UMC	Late-dividend	-6.94	2.27	1.55
Madagascar	LIC	Pre-dividend	4.74	6.3	4.21
Malawi	LIC	Pre-dividend	9.24	7.3	4.88
Malaysia	UMC	Late-dividend	-1.75	3.59	1.9

Name	World Bank Group income classification	Demographic type	Percent change in working-population share, 2015-30	Total fertility rate, 1985	Total fertility rate, 2015
Maldives	UMC	Early-dividend	3.66	6.66	1.98
Mali	LIC	Pre-dividend	8.38	7.15	5.92
Malta	HIC	Post dividend	-7.59	2.01	1.49
Mauritania	LMC	Pre-dividend	5.82	6.09	4.39
Mauritius	UMC	Late-dividend	-5.64	2.31	1.44
Mexico	UMC	Early-dividend	2.42	3.75	2.14
Micronesia, Fed. Sts.	LMC	Early-dividend	1.22	5.2	3.08
Moldova	LMC	Late-dividend	-7.08	2.64	1.23
Mongolia	UMC	Late-dividend	-1.48	4.84	2.54
Montenegro	UMC	Late-dividend	-4.46	2.11	1.65
Morocco	LMC	Late-dividend	-0.95	4.45	2.38
Mozambique	LIC	Pre-dividend	7.28	6.33	5.12
Myanmar	LMC	Early-dividend	3.22	3.8	2.13
Namibia	UMC	Early-dividend	4.45	5.55	3.31
Nepal	LIC	Early-dividend	10.01	5.33	2.09
Netherlands	HIC	Post dividend	-8.89	1.55	1.77
New Caledonia	HIC	Late-dividend	-2.95	3.03	2.04
New Zealand	HIC	Post dividend	-6.56	2.03	1.99
Nicaragua	LMC	Early-dividend	4.7	5	2.16
Niger	LIC	Pre-dividend	1.75	7.69	7.46
Nigeria	LMC	Pre-dividend	6.15	6.6	5.41
Norway	HIC	Post dividend	-5.43	1.8	1.81
Oman	HIC	Late-dividend	-4.18	7.85	2.51
Pakistan	LMC	Early-dividend	5.51	6.3	3.38
Panama	UMC	Early-dividend	0.27	3.24	2.36
Papua New Guinea	LMC	Early-dividend	6.18	4.97	3.58
Paraguay	UMC	Early-dividend	2.65	4.77	2.45
Peru	UMC	Early-dividend	1.69	4.1	2.35
Philippines	LMC	Early-dividend	2.4	4.53	2.87

Name	World Bank Group income classification	Demographic type	Percent change in working-population share, 2015-30	Total fertility rate, 1985	Total fertility rate, 2015
Poland	HIC	Late-dividend	-8.38	2.16	1.33
Portugal	HIC	Post dividend	-5.92	1.62	1.24
Puerto Rico	HIC	Late-dividend	-3.09	2.26	1.59
Qatar	HIC	Late-dividend	-2.27	4.41	1.95
Romania	UMC	Late-dividend	-3.79	2.22	1.53
Russian Federation	HIC	Late-dividend	-8.6	2.12	1.72
Rwanda	LIC	Early-dividend	11.47	7.99	3.62
Samoa	LMC	Early-dividend	3.99	5.35	3.9
Saudi Arabia	HIC	Early-dividend	3.09	6.22	2.59
Senegal	LMC	Pre-dividend	7.23	6.88	4.83
Serbia	UMC	Late-dividend	-4.38	2.23	1.59
Seychelles	HIC	Late-dividend	-2.97	2.94	2.21
Sierra Leone	LIC	Pre-dividend	10.04	6.66	4.28
Singapore	HIC	Post dividend	-12.12	1.7	1.26
Slovak Republic	HIC	Late-dividend	-8.71	2.15	1.44
Slovenia	HIC	Post dividend	-10.57	1.65	1.65
Solomon Islands	LMC	Early-dividend	9.87	6.13	3.76
Somalia	LIC	Pre-dividend	4.81	7.26	6.12
South Africa	UMC	Early-dividend	2.73	4	2.28
South Sudan	LIC	Pre-dividend	6.75	6.83	4.73
Spain	HIC	Post dividend	-6.41	1.46	1.38
Sri Lanka	LMC	Late-dividend	-1.84	2.64	2.03
St. Lucia	UMC	Late-dividend	-0.91	3.65	1.82
St. Vincent and the Grenadines	UMC	Late-dividend	-1.32	3.1	1.9
Sudan	LMC	Pre-dividend	7.27	6.3	4.13
Suriname	UMC	Early-dividend	0.37	3.42	2.28
Swaziland	LMC	Early-dividend	5.15	6.13	3.06
Sweden	HIC	Post dividend	-4.42	1.91	1.93

Name	World Bank Group income classification	Demographic type	Percent change in working-population share, 2015-30	Total fertility rate, 1985	Total fertility rate, 2015
Switzerland	HIC	Post dividend	-8.81	1.55	1.57
Syrian Arab Republic	LMC	Early-dividend	11.32	5.87	2.77
Tajikistan	LMC	Early-dividend	0.33	5.41	3.32
Tanzania	LIC	Pre-dividend	6.7	6.36	4.92
Thailand	UMC	Late-dividend	-7.29	2.3	1.46
Timor-Leste	LMC	Pre-dividend	7.27	5.21	5.33
Togo	LIC	Pre-dividend	7.63	6.62	4.35
Tonga	UMC	Early-dividend	7.86	4.74	3.58
Trinidad and Tobago	HIC	Late-dividend	-2.76	2.75	1.73
Tunisia	UMC	Late-dividend	-3.5	4	2.07
Turkey	UMC	Early-dividend	0.9	3.35	2.01
Turkmenistan	UMC	Early-dividend	1.49	4.55	2.22
Uganda	LIC	Pre-dividend	10.18	7.1	5.46
Ukraine	LMC	Post dividend	-7.37	1.9	1.56
United Arab Emirates	HIC	Late-dividend	-4.19	4.83	1.73
United Kingdom	HIC	Post dividend	-5.18	1.84	1.91
United States	HIC	Post dividend	-7.77	1.91	1.9
Uruguay	HIC	Late-dividend	-0.61	2.53	1.98
Uzbekistan	LMC	Early-dividend	1.46	4.4	2.33
Vanuatu	LMC	Early-dividend	4.95	5.04	3.22
Venezuela, RB	HIC	Early-dividend	0.78	3.65	2.28
Vietnam	LMC	Late-dividend	-3.84	3.85	1.95
Virgin Islands (U.S.)	HIC	Late-dividend	-10.79	3.02	2.18
West Bank and Gaza	LMC	Early-dividend	6.24	6.76	3.95
Yemen, Rep.	LMC	Early-dividend	10.13	8.8	3.79
Zambia	LMC	Pre-dividend	7.43	6.68	5.14
Zimbabwe	LIC	Early-dividend	10.51	5.66	3.65