

**WDA Forum**

Kornhausstrasse 18,  
9001 St. Gallen  
Switzerland

[www.wdaforum.org](http://www.wdaforum.org)

[info@wdaforum.org](mailto:info@wdaforum.org)

+41 71 222 79 79

## **Demography and Economic Growth: A policy-dependent relationship**

**Vincent Barras and Hans Groth**

**World Demographic & Ageing Forum (WDA Forum), St. Gallen, Switzerland**

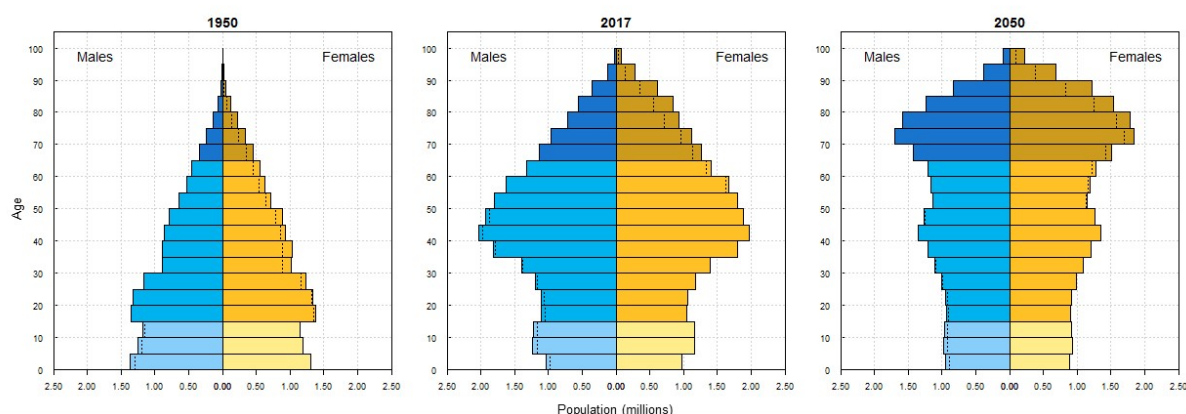
Demographic dynamics, together with other megatrends such as globalization, urbanization, industrialization, and the rise of technology, are shaping the future of our societies and economies. Unfortunately, descriptions of megatrends often lack the required granularity to provide actionable insights to policy makers and business planners. This article bridges this gap by highlighting how demographic dynamics influence economic growth. It also puts forward action levers to improve countries' demographic fitness and economic competitiveness.

In a first stage, we introduce the field of demography and the fundamental concepts of demographic transition and demographic dividend. Further, we summarize the impact of demography on economic growth to establish the hypothesis that growth-inducing policies are the key drivers of economic development, whereas population size and structure play an enabling secondary role.

We then analyze how population, social, and economic policies can help manage two main challenges posed by demographic dynamics globally. On the one hand, the more developed countries need to find a way of maintaining wealth and welfare and of prospering with a shrinking and ageing workforce. On the other hand, the less developed countries need to build societies that offer employment and opportunities to their young in order to avoid social unrest. In our conclusion, we explain why and how international cooperation is key to address emerging global demographic imbalances. We also highlight that when it comes to managing demographic transitions at a national and transnational level, failure is not an option.

## An introduction to demography

Demography, in its narrowest sense, is the statistical study of the changing structure of human populations. Demographic change within a country results from the combined effects of fertility, mortality, and migration flows. The development of these three variables determines a nation's age composition and population size, as typically depicted by population pyramids.



*Population pyramids for Spain over a 100 year time period (1950-2050): An example of conversion to an ageing nation with low fertility and a shrinking workforce. The dotted line indicates the excess male or female population in certain age groups. The 2050 numbers are based on the UNPD medium variant scenario<sup>1</sup>.*

The demographic transition is a long-term phenomenon that follows a gradual shift from high fertility and mortality rates to lower degrees. In a first step, there is an advantageous shift to fewer dependent people relative to working-age individuals, which is statistically measured with the total dependency ratio. During this process, countries can take advantage of the drop in their total dependency ratio, also known as the demographic window of opportunity, to boost their national output with the help of favorable social and economic policies, hence capturing an economic benefit referred to as the demographic dividend. Across the world, North America, Australia, New Zealand, and Europe have already reached the post-demographic dividend phase. Countries in Latin America and the Asia Pacific are largely acknowledged to be in the early or late demographic dividend phases. Most African countries are still in the pre- or early demographic dividend phases<sup>2</sup>.

As the demographic transition continues its course, the dependency ratio begins to increase again, driven by population ageing which is essentially the long-term result of fertility decrease combined with increasing longevity. This phenomenon is often accompanied by the decreasing size of a given country's population, and in particular of its working age population. This late stage of the demographic transition is in the process of affecting many of the more developed nations, making them the first ones to learn how to manage the consequences of longevity and to set good practices for other nations to follow. On a macro-level, unless people adopt their life plans towards a longer working life, population ageing typically puts a strain on the financial sustainability of public pension systems, healthcare

<sup>1</sup> United Nations, Department of Economic and Social Affairs, Population Division (2017). World Population Prospects: The 2017 Revision ([link](#))

<sup>2</sup> World Bank. Global Monitoring Report 2015/2016: Development Goals in an Era of Demographic Change ([link](#))

schemes, and social services. This represents a daunting challenge, especially when immigration is not significant enough to offset those effects, such as in the case of Japan in recent years.

When taking a global snapshot with a demographic lens, we see that in 2017, the world counted 7.6 billion human beings (compared to approximately 1.8 billion 100 years earlier in 1917), with 258 million living outside their countries of birth. Women had an average of 2.5 children and 54% of the world population lived in urban areas. In the same year, the global infant mortality rate reached an all-time low of 32 cases per 1000 live births, and life expectancy averaged 72 years, with 70 years in less developed countries and 79 years in the more developed ones. It is worth noting that these statistics diverge rather significantly between more and less developed countries. This applies not only in the case of life expectancy, but for all other metrics as well<sup>3</sup>.

Some of the most reliable and trusted sources for global statistics are the United Nations Population Division (UNPD), the World Bank, the United States Census Bureau, and the Population Reference Bureau. As most people globally still live in countries that do not yet have complete and accurate vital registration systems, there remains an inescapable margin of error in current world population estimates. In case of poor data quality, demographic experts will triangulate data sets and combine multiple estimation methods, to increase the accuracy of the published statistics. As part of this process, it is not uncommon for old estimates to be revised based on newly available data. In the case of the forward-looking projections published by the United Nations Population Division, a number of different variants are made available to highlight the effect of assumption changes on the model outcomes. In recent years, probabilistic projection methods have also been used to enhance the models, to better account for the uncertainty of future trends.

### **Demography and economic growth**

Over the last century, researchers have been arguing back and forth on whether demography has any strong effects on economic growth, which is most commonly measured as the growth of GDP per capita. As mentioned in the introduction, no deterministic relationship between demographic variables and economic growth has been found yet that could put an end to this debate. In fact, population growth by itself does not appear to be significantly associated with the pace of economic growth. However, a population's age structure has been shown to have predictive power, and it can be used statistically to explain a significant portion of economic growth. In the absence of a linear relationship, the economic outcomes from demographic change appear to depend on enabling social and economic policies. A favorable age structure is therefore very unlikely to turn into a demographic dividend and to produce favorable economic results on its own.

The relatively weak evidence base regarding the economic effects of demography can be tied back to the fact that as countries develop, their population growth changes endogenously, leaving us with a chicken and egg problem. In this context, tying the lagging effects of fertility changes back to economic growth proves to be rather challenging, especially as changes in policies, institutions and culture need to be accounted for as well. Nonetheless, there is a broad consensus that policy-induced changes in demographic and

---

<sup>3</sup> United Nations, Department of Economic and Social Affairs, Population Division (2017). World Population Prospects: The 2017 Revision ([link](#)); People Reference Bureau. 2017 World Population Data Sheet ([link](#))

economic variables can promote a virtuous cycle of cumulative causation in which economics and demographics interact in a mutually reinforcing way<sup>4</sup>.

Commonly cited demography-related factors affecting economic growth can be categorized as driven either by population size and structure or by human behavior and decisions. The former category includes the congestion of fixed factors, such as the limited growth pace of arable land and food supply, capital shallowing, which is defined as the decreasing amount of capital per worker, and changes in the ratio of workers to dependents, also known as the dependency effect. The latter category includes changes in the labor supply of working-age adults, changes in the average level of schooling, as well as changes in the saving rates and the introduction of technological or institutional changes<sup>5</sup>.

### **Population, social, and economic policies**

Population policies are defined as the actions taken explicitly or implicitly by public authorities to prevent, delay or address imbalances between demographic changes and social, economic and political goals<sup>6</sup>. On the one hand, interventions to reduce mortality (e.g. immunization or improved public health) benefit from a broad consensus. On the other hand, interventions affecting fertility (e.g. family planning) and migration (e.g. quotas or screening criteria) are much more polarizing. Many countries do not have an explicit population policy, but often address population dynamics indirectly, whether intentionally or unintentionally, via socioeconomic regulations affecting the drivers of demographic change. For example, policies affecting education, urbanization, or women's empowerment have also been shown to have an impact on a country's fertility rate.

To capture a demographic dividend, public policies must focus not only on population structure and composition, but also on the drivers of social and economic welfare. For these policies to have their desired effects, they need to be embedded in an enabling environment which can count on institutionalized standards in the fields of education, access to healthcare, gender, macroeconomics and good governance.

Sub-Saharan Africa provides a good case analysis, as it encompasses most of the remaining pre-demographic dividend countries and the world's highest fertility rates with an average of five children per woman in 2017 (i.e. twice the global average). The first and perhaps most important obstacle to accelerating the fertility transition in sub-Saharan Africa is the lack of commitment toward a significant fertility decline on the part of African leaders, policymakers, and other important societal stakeholders. Important actions to be undertaken in this regard include extending family planning coverage, further lowering infant and child mortality levels, improving female literacy and education, and increasing the participation of women to the labor force<sup>7</sup>. The Human Development Index, one of the most widely used indicators of desirable social and economic progress published by the United Nations, consists of three components to measure progress in education, health, and material well-being. Empirical evidence shows that education, especially when made available to women,

---

<sup>4</sup> Bloom D.E., Canning D., Malaney P.N (1999). Demographic Change and Economic Growth in Asia. Working Paper No. 15. Center for International Development at Harvard University ([link](#))

<sup>5</sup> Ashraf, Q.H., et al. (2013). The Effect of Fertility Reduction on Economic Growth. *Population and Development Review*, vol. 39, no. 1, pp. 97–130. JSTOR ([link](#))

<sup>6</sup> May J.F. (2012). *World Population Policies: Their Origin, Evolution, and Impact*. Springer ([link](#))

<sup>7</sup> May J.F. (2017). The Politics of Family Planning Policies and Programs in Sub-Saharan Africa. *Population and Development Review* (Suppl. to Vol. 43): 308-329 ([link](#))

appears to drive the two other components. This confirms the importance of education from the perspective of both fertility decline and economic development overall<sup>8</sup>.

Once the demographic window of opportunity opens, social and economic policies need to be in place in order for a given country to benefit from its demographic dividend. In the case of sub-Saharan Africa, those policies would have to drastically improve the low absorptive capacity of the labor markets, the low level of salaries, especially in the informal sector, and the lack of social protection of the dependents as well as of the working poor. The size of the challenge for sub-Saharan Africa stems from the fact that for many countries, the above-mentioned population, social, and economic policies have not yet been put in place. This leads to a rather pessimistic outlook for these countries<sup>9</sup>.

### **Nigeria: a pre-dividend country with an open window of demographic opportunity**

Nigeria is Africa's most populous nation. It has an estimated population of more than 180 million, which has grown at around 3% annually for the last decades. By 2050, Nigeria will have a projected population of almost 400 million, and it will be the fourth most populous country in the world. With a gross national income of over USD 400 billion in PPP terms, it is the second largest economy in sub-Saharan Africa after South Africa. It is growing economically on a per capita basis at over 3.5% per annum. Despite Nigeria being home to some of the wealthiest families in the region, 60% of the Nigerian population is estimated to be living on one dollar or less a day. Nigeria is ethnically, religiously, and linguistically diverse with some 250 ethnic groups, over 500 languages spoken, and roughly equal numbers of Muslims and Christians, the former living mostly in the Northern areas, the latter concentrated in the South.

With an economy that is still heavily dependent on natural resource rents from the oil industry, cultural and economic marginalization remain key factors in explaining the high rate of population growth. When excluding migration, this growth correlates notably with the incidence and distribution of poverty. Given its beneficial age structure and in order to be able to seize a potential demographic dividend, Nigeria now faces the challenge of embarking on policies that will develop its work force and that will ensure its economic productivity. An additional challenge consists in the fact that policies must be shaped so as to be consistent with the varying realities of Nigeria's highly diverse regions.

The need for government action becomes increasingly urgent because as fertility declines, the population starts to age, thereby slowly closing the demographic window of opportunity<sup>10</sup>. Government action is required in particular to create an enabling environment, to expand the income-earning opportunities of its working-age population through sound economic management and investments, and to build the skills of that population, especially its young workers, so that it can take advantage of those opportunities. An important factor to keep in mind in the case of Nigeria and other African countries aiming to industrialize their economies is the decreasing dependency of the more developed nations on cheaper labor force to manufacture goods for their consumption. While export-oriented manufacturing has been the engine behind the astounding growth of the economies in

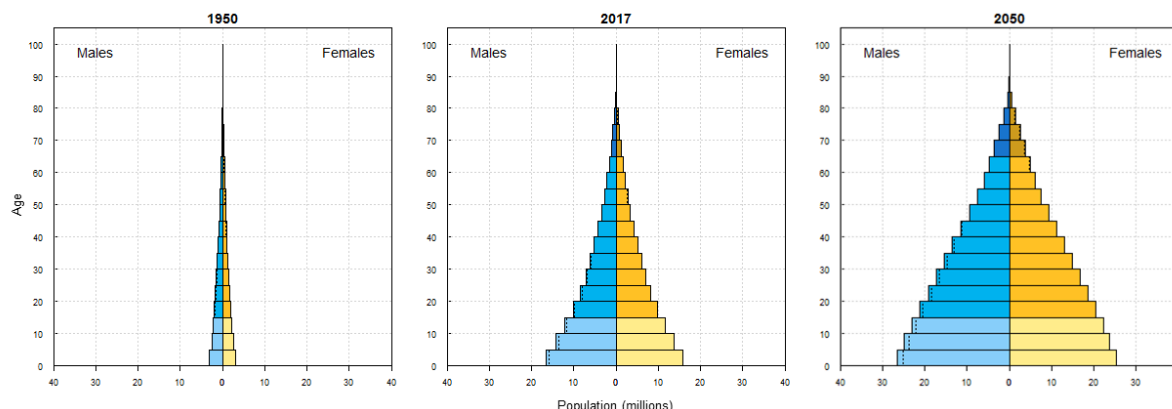
---

<sup>8</sup> Groth H. May J.F. Turbat V. (2017). Policies Needed to Capture a Demographic Dividend in Sub-Saharan Africa. Conference Paper. IUSSP 2017 International Population Conference ([link](#))

<sup>9</sup> Groth H. May J.F. (2017). Africa's Population: In Search of a Demographic Dividend. Springer ([link](#))

<sup>10</sup> Jimenez E. Pate M.A. (2017). Reaping a Demographic Dividend in Africa's Largest Country: Nigeria. In: Groth H. May J.F. (eds). Africa's Population: In Search of a Demographic Dividend. Springer ([link](#))

China, Japan, and South Korea during the 20<sup>th</sup> century, automation is likely to limit the possibilities available to countries like Nigeria aiming to create extraordinary high numbers of jobs for their growing populations.



*The population pyramids for Nigeria over a time period of 100 years (1950 – 2050) are expected to keep their broad-based triangular shape, driven by high birth rates with a current total fertility rate of 5.5 children per woman. The dotted line indicates the excess male or female population in certain age groups. The 2050 numbers are based on the UNPD medium variant scenario<sup>11</sup>.*

### China: a country having passed the peak of its demographic dividend

With 1.4 billion inhabitants, China is currently the most populous country in the world. Over the last four decades, China reaped the benefits of low dependency ratios combined with decisive and sometimes also controversial economic and social policies. A successful export-oriented growth strategy produced enough jobs to absorb the rapidly growing workforce, a stable macroeconomic environment was attractive to investment, and large-scale pay-as-you-go pension programs that undermine saving and work incentives were avoided. Since the beginning of its market reforms in 1978, China has lifted more than 800 million people out of poverty, an achievement of a magnitude never seen before in the history of humankind and which is often referred to as China’s economic miracle.

At the same time, the Chinese population is experiencing a growing elderly segment, which is expected to more than double between 2017 and 2050, increasing from 230 to 480 million people aged 60 and older. Roughly a quarter of this population segment is currently estimated to live under the poverty line<sup>12</sup>. The increase in numbers of the elderly will drive a support ratio drop from 4.3 working-age adults per person aged 60 and older in 2015 to 1.5 in 2050<sup>13</sup>. The 4-2-1 problem showcases how after almost four decades of one-child policy, one adult child now supports two parents and four grandparents. Further increasing the level of challenge, studies have suggested that single children – the result of the one child policy – tend to be more self-centered, less optimistic, and less risk taking than children with siblings. If the economic prospects of this one adult child are poor, this leaves the oldest and

<sup>11</sup> United Nations, Department of Economic and Social Affairs, Population Division (2017). World Population Prospects: The 2017 Revision ([link](#))

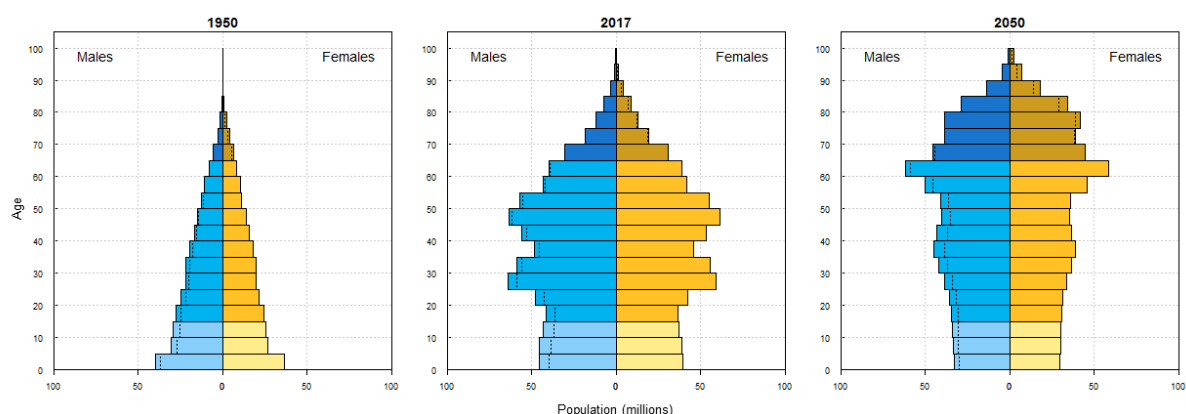
<sup>12</sup> United Nations, Department of Economic and Social Affairs, Population Division (2017): World Population Ageing ([link](#))

<sup>13</sup> United Nations Population Division, World Population Prospects: The 2017 Revision ([link](#))

most vulnerable generation with increased dependency on retirement funds, the state, or charity for support.

The demographic dividend can have a lasting effect on economic growth if the gains in per capita income are used to create human capital by investing in health and education, to accumulate physical capital, to support technological innovation, and to create growth-inducing institutions. Those levers have all been activated by China over the last decades. Since 2008, the country has also extended social security coverage from 250 million people (23 percent of the population aged 15 and above) to 850 million people in 2013 (75 percent of the population aged 15 and above) by combining contributory schemes and non-contributory social pensions<sup>14</sup>. At this stage, China's pension system is rather thin on the ground and remains chronically underfinanced, making this one of the key focus areas for additional reforms by the Chinese government in coming years.

If China stays on course, the size of its economy could surpass that of the USA within a decade. However, China's growth deceleration after a long period of intensive industrialization and its challenges around demographic sustainability will become increasingly preoccupying as it joins the late-demographic dividend countries.



*Population pyramids for China over a 100 year time period (1950-2050): The population pyramid for China is expected to evolve from its current bee-hive shape to an inverted pyramid shape, driven by rapid population ageing and low birth rates. The dotted line indicates the excess male or female population in certain age groups. 2050 numbers are based on the UNPD medium variant scenario<sup>15</sup>.*

### Switzerland: a post-dividend country and a leader in longevity

Globally, the population aged 60 and older is the fastest growing cohort, with a yearly growth rate of 3%. In 2015, the world counted 962 million people aged 60 or more, which accounted for 13% of the global population. Europe is the region most concerned by this development, with 25% of the population already having reached an age of 60 years and older.

Switzerland, with a population of 8.5 million, a below replacement level fertility rate of 1.55 children per woman, and a world-class life expectancy of almost 84 years, is already heavily impacted by population ageing. In fact, in 2010, already 19.5 percent of working aged adults

<sup>14</sup> United Nations, Department of Economic and Social Affairs, Asia-Pacific Human Development Report (2016): Shaping the Future: How changing demographics can power human development ([link](#))

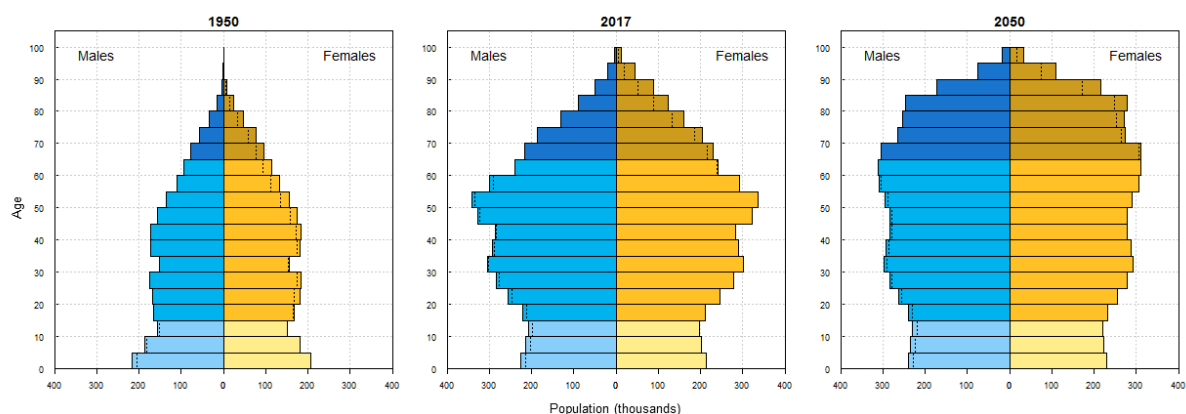
<sup>15</sup> United Nations, Department of Economic and Social Affairs, Population Division (2017). World Population Prospects: The 2017 Revision ([link](#))

between 20 and 64 were 55 or older. This percentage is expected to increase by more than four additional percentage points until 2030<sup>16</sup>.

On the upside, the ageing population structure can produce a second demographic dividend when older cohorts accumulate capital to finance consumption for their longer lives. If capital accumulation is significant despite the transfer of wealth mechanisms put in place by governments (e.g. via pay-as-you-go pension schemes), this can have a lasting pro-growth effect thanks to investments in infrastructure, technology, and human capital.

On the downside, the phenomenon of secular stagnation refers to a long-term decline in economic growth, which is not driven by short term business fluctuations, but by changing fundamental values such as unfavorable demographic dynamics. The challenge in the long run, consists in offsetting the forceful effects of population ageing on the national economic output with the help of female labor force participation, longer work hours, later retirements, human capital investments, infrastructure investments and the adoption of automation technologies. In the case of Switzerland, foreign labor, which constitutes more than 30% of the workforce, also plays an important role for the economy. Overall, thanks to a positive net migration over the last decades, foreigners amount to 25% of the total population, one of the highest percentages in Europe. Foreigners also boost the Swiss fertility rate with an average of 1.91 children per foreign woman living in Switzerland<sup>17</sup>.

Looking forward, Switzerland is currently experiencing a slightly decreasing trend in net migration. Human capital development prospects cannot be expected to deliver an economic boost of the same magnitude as witnessed in the 20<sup>th</sup> century, and the impacts of technology developments on productivity remain uncertain. In view of this, the country will have to focus on two key areas to manage the effects of population ageing and the related increasing number of retirement years. On the one hand, the female labor participation rate, which currently stands at 63%, can be further increased. On the other hand, work life plans will have to shift towards longer professionally active lives with older cohorts continuing to produce income and wealth to finance consumption for their longer lives.



*Population pyramids for Switzerland over a 100 year time period (1950-2050). The country's population pyramids are expected to evolve from its current bee-hive shape to a rectangular shape, driven by a long average life-expectancy. Continuous in-bound migration of young age cohorts partly prevents shrinkage of working age cohorts. The dotted line indicates the*

<sup>16</sup> United Nations Department of Economic and Social Affairs, Population Division (2017). World Population Prospects: The 2017 Revision ([link](#))

<sup>17</sup> Swiss Confederation, Federal Statistical Office (2017). Statistical Data on Switzerland 2017 ([link](#))



*excess male or female population in certain age groups. The 2050 numbers are based on the UNPD medium variant scenario<sup>18</sup>.*

## **Conclusion**

Demographic dynamics can be summarized as a key factor altering the realms of the possible for national welfare and economic growth, thereby having a deep effect on countries' social stability and geopolitical prospects.

Demographic change poses a dual challenge to the world. The more developed countries will have to figure out how to maintain wealth and prosper with a shrinking workforce and increasing dependency ratios due to longevity and low birth rates. The less developed countries will have to create societies that offer employment and opportunities to their young to avoid social unrest and capture the demographic dividend. Currently, more than 90 percent of poverty is concentrated in pre- and early-demographic dividend countries, while over 85 percent of global economic activity and 78 percent of global growth arises in late- and post-demographic dividend countries marked by population ageing<sup>19</sup>. In both cases, public policies will make a critical difference in how countries manage their demographic change as well as the impact of this change on economic growth. What is important to keep in mind is that a growing population with a favorable structure cannot by itself be expected to lead to economic growth, whereas a shrinking population does not have to halt economic growth either. Looking forward, freer capital flows, migration, and trade can help respond to growing demographic imbalances globally. Mutual benefits can be realized via capital flows to rising consumer markets, legal immigration to countries with older population structures, and the production of labor-intensive products in younger countries.

To manage these multiple challenges, a global dialogue between concerned parties and international cooperation will be key. Failing to address these imbalances could lead to potentially disastrous consequences, both for less developed and more developed countries.

---

### *About the authors:*

*Dr. med. Hans Groth is the Chairman of the Board of the World Demographic & Ageing Forum (WDA Forum). The Forum's vision is: "Population dynamics as well as ageing and generational issues are among the key challenges of the 21st century but also a untapped source of unprecedented opportunities". The WDA Forum was established in 2002 and is based in St. Gallen, Switzerland.*

*Vincent Barras is a Senior Research Fellow at the WDA Forum. He graduated from the University of St. Gallen in 2014 where he wrote his Master thesis on "Demography meets strategic planning: The rationale behind a demographic risk indicator at industry level". He works as a management consultant and has been collaborating with the WDA Forum on multiple projects over the last years.*

---

<sup>18</sup> United Nations, Department of Economic and Social Affairs, Population Division (2017). World Population Prospects: The 2017 Revision ([link](#))

<sup>19</sup> World Bank. Global Monitoring Report 2015/2016: Development Goals in an Era of Demographic Change ([link](#))

*Additional information: [www.wdaforum.org](http://www.wdaforum.org)*

*Population trends as well as ageing and generational issues are among the key challenges of the 21st century, but also a source of unique opportunities. With a vision of maintaining and enhancing welfare and prosperity in the future, the WDA Forum aims to address and research these demographic issues and their impact on the social, economic and political environment in the international context. To this end, it has defined five areas of action: work life, retirement plans, financial markets, health and digital ageing. As a think tank, the WDA Forum works closely with the Institute of Insurance Economics at the University of St. Gallen as well as other educational and research institutions including the Harvard T.H. Chan School of Public Health in Boston, Stanford University in California, and Fudan University in Shanghai. The WDA Forum was established in 2002 and is based in St. Gallen, Switzerland.*