

Demographic change

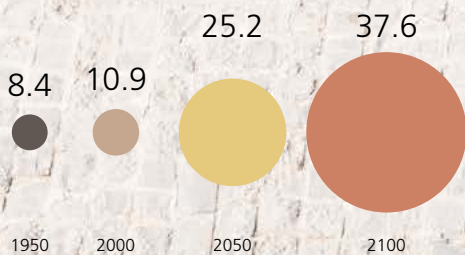
It's time to **face up** to the implications



Population aging is leading to a dramatic shift in the population structure; it is now taking center stage as the economic, social, and political impact of more people living longer starts to emerge.

Global old age dependency ratio

People aged over 64 per 100 people aged 15-64



Source: UN World Population Prospects, UBS 2017

Editorial

Dear readers,

Demographic change is upon us. That's not news. People are staying healthier and living longer. The old sepia photos of previous generations stashed away in attics showed off many more offspring than the digital snapshots of today's young families stored on smartphones. Longer lives and smaller families inevitably change overall population structures. Zooming in on individual countries we see that current snapshots of their ongoing development stretch across a wide spectrum, as the balance between young and old shifts. Demographic change is as asynchronous as the flashes from the cameras recording it worldwide.

These trends are barely perceived by most individuals. From a societal perspective they warrant a close-up view. The most obvious threat they pose is to the social contract – the code that one generation raises a younger one, which in return expresses gratitude for its upbringing by taking care of the older generation when it retires. This is an integral part of most societies, organized implicitly among family members or explicitly by governments, which tax the working-age population to finance the social security systems on which the retired rely.

The failure of societies to adequately respond so far to the demographic challenge leads one to wonder whether the reports about it and the accompanying photos of society's changing face, have traveled far and fast enough. Little will change until politicians, institutions, and most importantly the public at large get the picture and act, rather than hoping they can magically touch it up with editing software.

We hope this publication inspires a fresh view on the challenges demographic change poses to pension systems, economic growth, and long-term investing, and how we can turn these challenges into opportunities for our common and personal benefit, right now.



Sergio P. Ermotti
Group Chief Executive Officer

A handwritten signature in black ink, appearing to read 'S. Ermotti'.



Mark Haefele
Chief Investment Officer
Global Wealth Management

A handwritten signature in black ink, appearing to read 'Mark Haefele'.

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Demographic change

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Demographic change at a glance

Population pyramid

Significantly more young people than old



Cause

- Better hygiene and medical treatment decrease mortality, in particular child mortality

Population effect

- Rapid population growth

Population challenges

- Growing number of people represents a resource challenge
- Risk of a demographic trap, with sustained high fertility if living standards don't rise

Population candle

The "sweet spot" provides a demographic dividend as the working age population is largest and dependency ratio lowest



Cause

- Rising living standards lead to lower birth rates as families depend less on offspring for their livelihood

Population effect

- Working age population large but total population growth slows

Population challenges

- Future aging challenge becomes visible

Population diamond

Population aging becomes apparent and the dependency ratio starts to rise



Cause

- Fertility rate below reproduction rate with women increasingly participating in labor markets and postponing child birth
- Greater life expectancy

Population effect

- Population growth slowing and population aging

Population challenges

- Aging begins

Population urn

The "sour spot" leads to a demographic drag as the working age population stagnates and the 65+ population rises



Cause

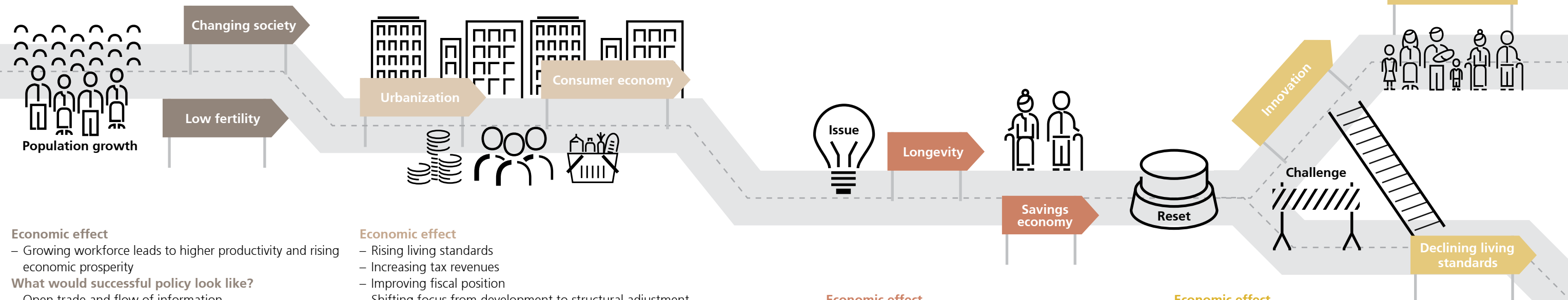
- A combination of all mentioned factors
- Rising longevity

Population effect

- Population decline
- Older population groups increasingly dominate

Population challenges

- Aging is in full swing



Economic effect

- Growing workforce leads to higher productivity and rising economic prosperity

What would successful policy look like?

- Open trade and flow of information
- Little bureaucracy
- Investment in education and skills
- Establishment of basic social security
- Family planning support to avoid the demographic trap

What would policy failure look like?

- Corruption, nepotism, lack of economic freedom, and opportunity
- Red tape leading to inefficiencies and large trade barriers

Economic effect

- Rising living standards
- Increasing tax revenues
- Improving fiscal position
- Shifting focus from development to structural adjustment

What would successful policy look like?

- Fiscal surpluses used to improve future productivity
- Limited expansion of social security
- Family-friendly labor and migration policies to slow aging process
- Future pension age set to stabilize dependency ratios or to rise with greater life expectancy

What would policy failure look like?

- Reckless spending of fiscal surplus
- Not anticipating aging population
- Unsustainable social benefit promises

Economic effect

- Size of workforce starts to stagnate or shrink
- Labor shortages emerge in some sectors
- Industries adjust to changing supply and demand patterns
- Social security less generously funded
- Economic growth slows without remedial action

What would successful policy look like?

- Reform and investment to raise productivity
- Establish flexible working models and labor markets
- Reforms make pension systems resilient in the future
- Public opinion values contribution of older generation

What would policy failure look like?

- Vested interests prevent reforms
- Fiscal and social security deficits mount if pension age and benefits not dynamically adjusted
- Political pandering to 50+ generation

Economic effect

- Adjustment to needs and preferences of older population
- Risk of declining living standards as large group of economically inactive people reduce growth potential
- Risk of rising fiscal deficits and underfunded social security systems

What would successful policy look like?

- Keeping older workforce integrated and productive, valuing strengths and skills of older workforce
- Dynamic pension age and longer working lives with flexible and part-time arrangements
- Increased personal financial responsibility

What would policy failure look like?

- Maintaining the status quo
- Failure to adapt labor and social policies will increase the demographic drag
- Declining tax income and rising government debt

What does demographic change mean for me?

I will try to stay fit, healthy and work longer.

I will carefully look at my long-term financial situation.

I will plan my short-term spending with the long term in mind.

I will start to save and invest early in anticipation of my longer life expectancy.

I will be financially literate to better prepare my old-age security.

I will plan my legacy and ensure that I contribute my share to the social contract.

Conclusion

Only with a reset in the way we think about social security in general and pension systems in particular, and with changes in personal attitude that reflect the new realities, can living standards be maintained.

Demography shapes the face of the planet

A few hundred thousand years ago, when homo sapiens emerged, life was nasty, brutish, and short¹. It was dedicated to survival. Exposed to the elements and wild beasts, living off a meager diet of nuts, berries, and the occasional mastodon, early humans struggled to fulfill their most basic needs. Only few survived into adulthood.

¹ Thomas Hobbs

By the time modern calendars started counting around 2000 years ago, humans had evolved remarkably. They had long since learned to walk tall, cultivate crops, and construct buildings so sturdy that some still endure today. The challenges were now of a different order, with power struggles and epidemics requiring new skills for survival. Life expectancy remained low, probably between 25 and 35 years. Those that survived the scourge of disease in youth often died in war or childbirth.

Fast forward to today and again we look back at a stunning evolution. Technological progress – from medical advances to ingenious inventions – has merged with the relative peace that large segments of humanity have enjoyed since the 1950s to make life much longer and more comfortable, and to dramatically improve our prospects. In spite of modern complacency and having lost most basic survival instincts, we can expect to live up to 100 years today. But exactly this poses a unique challenge for the future – as the size and structure of the human population is again shifting.



Hadrian's Wall, Hexham, United Kingdom. Toa Heftiba, Unsplash

... This fastest expansion of the human race ever has shaped societies as we know them.



Tel Aviv, Israel. Blake Campbell, Unsplash.

Ever more and ever older

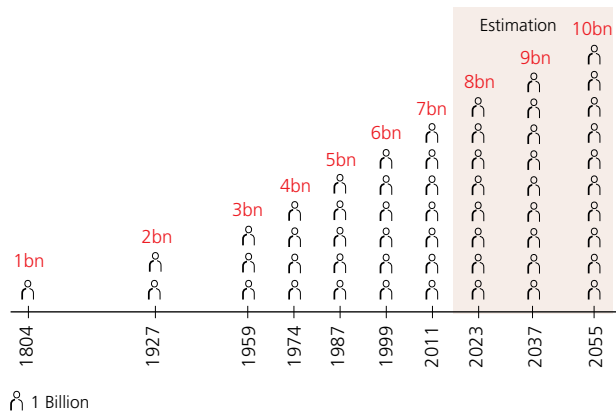
For millennia the human population remained below one billion in number (Fig. 1). Its natural balance was maintained as high mortality offset high fertility. Only with the onset of the industrial revolution did living conditions improve markedly thanks to better hygiene and nutrition, enhanced medical standards and innovations, disease control, prevention, and eradication. Subsequently, mortality rates fell across the age spectrum and life expectancy started to rise. Combined with still-high fertility rates, population growth gained momentum, and culminated in the postwar baby boom of the 1950s and '60s. By then the world's population had grown to three billion; it doubled again before the turn of the last millennium. This fastest expansion of the human race ever has shaped societies as we know them. The number of people in a given country or geographical area, their age distribution, and their lifestyles drive politics, culture, wealth creation, and much more.

In parts of the world the “demographic dividend,” the economic benefit a relative increase in the working age population brings, has increased as the share of young, productive people grew faster than the elderly. After the 1960s, birth rates followed the course of mortality rates and went into reverse (Fig. 2), originally due to increased choice (contraception) and later because women joined the workforce and postponed childbirth in vast numbers. Also, economic reliance on children declined with the introduction of social security.

Fig. 1

Billions of people, and the number continues to rise

Time needed to add another billion to world population is at a low point



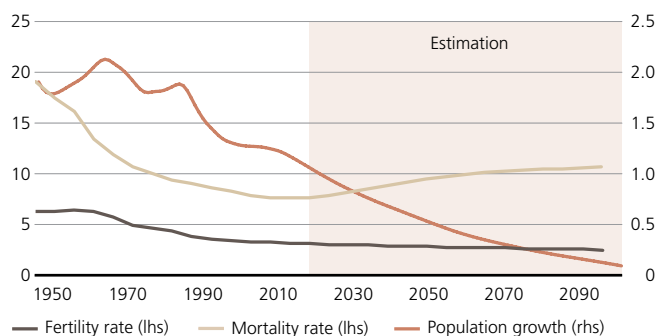
1 Billion

Source: UN World Population Prospects, UBS 2017

Fig. 2

Peak population growth was followed by a rapidly declining fertility rate

Global fertility rate in children per women, global mortality rate per 1,000 people, global population growth rate in %



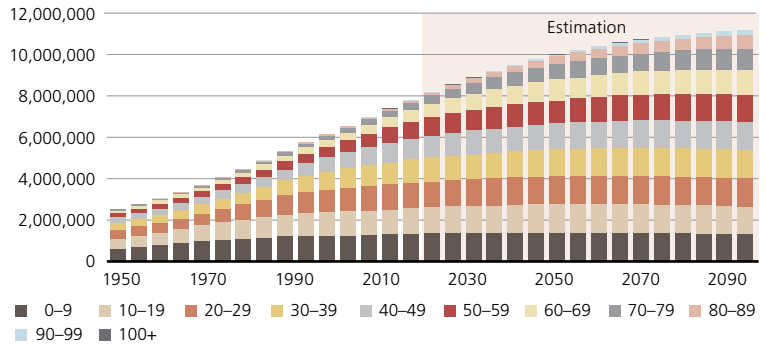
Source: UN World Population Prospects, UBS 2017

Currently Japan, Germany and Italy are among the oldest societies, with a median age of over 40. By contrast, the median age in central African countries is only around 15.

Fig. 3

Population momentum ensures our species continues to grow

Global population in number by age brackets



Source: UN World Population Prospects, UBS 2017

Fig. 4

Currently only Europe has a declining population

Average rate of change in the population, in %

	1950–2000	2000–2050	2050–2100
Africa	2.55	2.26	1.14
Asia	1.96	0.69	-0.19
Europe	0.56	-0.03	-0.18
Latin America and the Caribbean	2.27	0.79	-0.18
Northern America	1.19	0.66	0.28
Oceania	1.81	1.21	0.46

■ High population growth ■ Low population growth ■ Population decline

Source: UN World Population Prospects, UBS 2017

The 1970s marked the peak in the global population growth rate, but the absolute number of people is not declining. The UN projects it to reach nearly 10 billion by 2050 (Fig. 3). Further growth, albeit at a slower rate, stems from “population momentum” – the relationship between the different age cohort sizes. As long as the population consists of more people of reproductive age, total population growth can be sustained even with a fertility rate equal to the replacement rate. The world population will expand in the decades ahead but growth trends will vary sharply by region (Fig. 4). Africa and Europe stand out as the two extremes. Africa’s population growth rate will remain high overall while Europe is expected to see an outright decline in its population relative to today (Fig. 5).

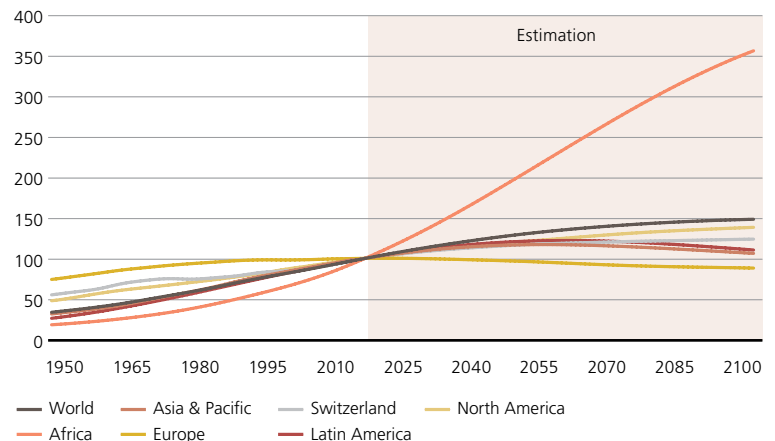
Current trends provide a window into the future

The demographic landscape varies for different countries, but common trends exist. Overall the world population is still growing (Fig. 6), but at unequal speed, one that ranges from the Middle East’s rate of 6% to 7% per annum to -0.5% to -1.0% in several Eastern European countries. Likewise, not all countries are aging (yet). Currently Japan, Germany, and Italy are among the oldest societies, with a median age of over 40. By contrast, the median age in central African countries is only around 15. In 2050 Japan will be joined by China and South Korea in the club of countries with a median age of over 50. African countries will still have the youngest populations. They are expected to have aged only three to five years by this time.

Fig. 5

Africa will experience higher population growth than other areas

Change in population relative to 2018 (index, 2018=2010)

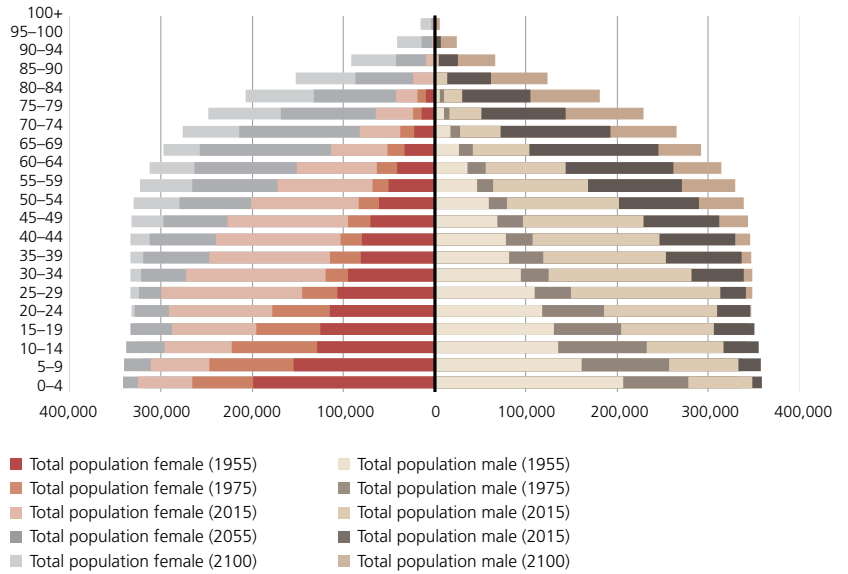


Source: UN World Population Prospects, UBS 2017

Fig. 6

The global population structure is changing

Global population structure by gender and age, in thousands



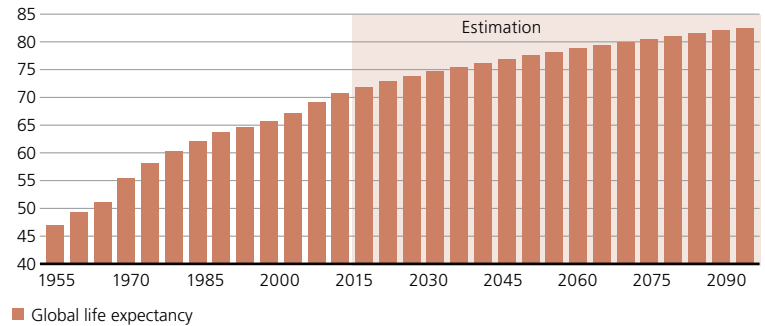
Source: UN World Population Prospects, UBS 2017

The fall in fertility rates started in high-income countries in the 1960s. The number of children per woman declined from three to a low of just below 1.7 in the early 2000s and is still trending around this number today. It is expected to stabilize in the long run around 1.8. Middle-income countries had steady birth rates with more than five children per woman until the 1970s. Here the decline in fertility was the steepest, more than halving to 2.3 and expected to level out at two children per woman over this century. Most low-income countries are still experiencing rapid population growth, in particular those in Africa. Here, the fertility rate has only recently started its decline from a peak of 6.3, and is expected to continue its downward trend, reaching only one-third of the current birth rate by 2100.

Fig. 7

Life expectancy has been rising steadily

Global median life expectancy at birth in years



Source: UN World Population Prospects, UBS 2017

Mortality rates fell first in high-income countries and are in steeper decline now in less-developed ones. A rule of thumb we observe is that the higher a country's average income, the lower its population growth rate. So aging and longevity are more advanced and more pressing issues in the developed world. Life expectancy has risen from its modern-day lows of 27–28 years in Mali and Sudan in the 1950s to its peak today of around 83–84 in Switzerland, Spain, and Japan, among other nations (Fig. 7). By 2100 life expectancy is forecast to reach 94–95 years in several Asian countries (Japan, South Korea, Singapore, China). The dependency ratio is a useful measure when estimating the magnitude of the impact of these demographic trends (Fig. 8) on the economy.

Dependency ratios and their meaning

(Total) Dependency ratio indicates the relative number of people above and below working age versus those of working age. Conventionally, working age is defined as 15–64 years of age. The ratio is expressed as the number of dependent people per 100 people of working age.

Old-age dependency ratio shows the relative number of people above working age versus those of working age. Conventionally, working age is defined as 15–64 years; those beyond it are aged 65+. The ratio is expressed as the number of people above working age per 100 people of working age.

Example: The world has an old-age dependency ratio of about 14 at the moment, meaning there are 14 people above the age of 65 per 100 people of working age globally at present. This ratio is expected to rise to 25 by 2050.

Fig. 8

Dependency ratio is a good indicator for demographic dividend or demographic drag

Expected change in dependency ratios for selected countries between 2000 and 2050

North America

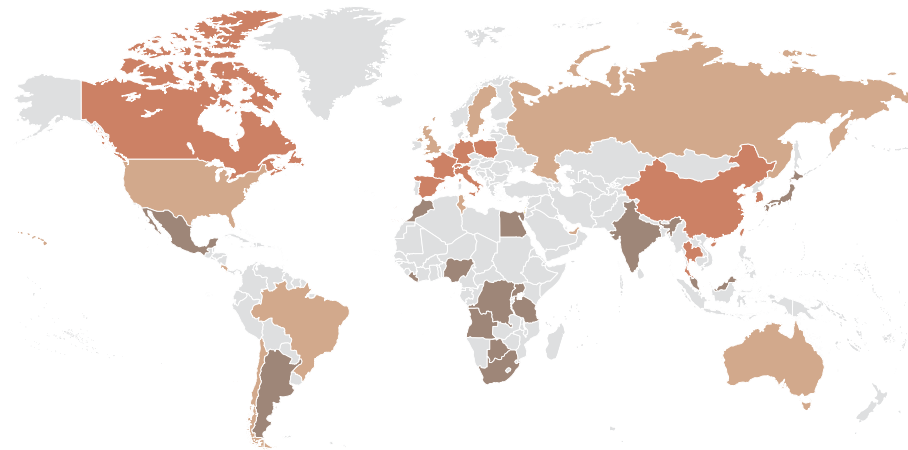
Canada	US
22.6	13.2

Europe

Spain	Italy	Germany	Switzerland
50.1	43.1	29.8	25.6
France	Sweden	UK	
23.2	14.1	17.7	

Eastern Europe and Middle East

Poland	Russian Federation
31.9	21.0
Israel	United Arab Emirates
4.2	2.4



Asia Pacific

Republic of Korea	Japan
49.5	49.2
Singapore	Thailand
39.9	28.5
China	Australia
21.3	5.8
Malaysia	India
-9.6	-16.6

Latin America

Chile	Brazil	Costa Rica
11.1	5.9	5.2
Argentina	Mexico	
-2.4	-9.2	

Africa

Tunisia	Morocco	South Africa	Egypt	Botswana	Nigeria
3.3	-5.5	-12.8	-14.5	-19.7	-21.4
United Republic of Tanzania	Liberia	Democratic Republic of the Congo	Angola	Uganda	
-23.7	-25.5	-27.9	-28.5	-43.3	

- Dependency ratio declining
- Dependency ratio rising slowly
- Dependency ratio rising rapidly

Source: UN World Population Prospects, UBS 2017

Dependency ratios start to rise initially when child mortality declines and a baby boom leads to more children and thus a broadening base of the pyramid. For dependency ratios to fall in an initially youthful population with high fertility, the “demographic trap” must be overcome. This trap occurs when economic progress fails to compensate for the burden of more young dependents, leading to a decline in living standards. Fertility rates can then even increase further as impoverished parents seek economic security by having more children, leading to a negative spiral of low or falling living standards and sustained high fertility. Most frontier and developing countries should be able to avoid this trap by harnessing the benefits of gains in productivity and better governance. But they cannot afford to stand idle on the sidelines.

Frontier and developing countries need to ensure that the right policies and institutions are in place to enable their youthful masses to lead productive working lives. To the extent that this succeeds, they can harvest the fruits of the decline in their dependency ratios.



US-Mexico border fence, Arizona Desert. Getty Images.

Historically, migration, the movement of people across borders, has also heavily influenced population structures. More developed countries in particular have benefited from a net inflow of people (Fig. 9). On average, more higher-skilled young people have flocked into advanced economies in search of job opportunities than the other way around. But shifts are observable as net migration flows continuously adapt to economic, political, and social realities.

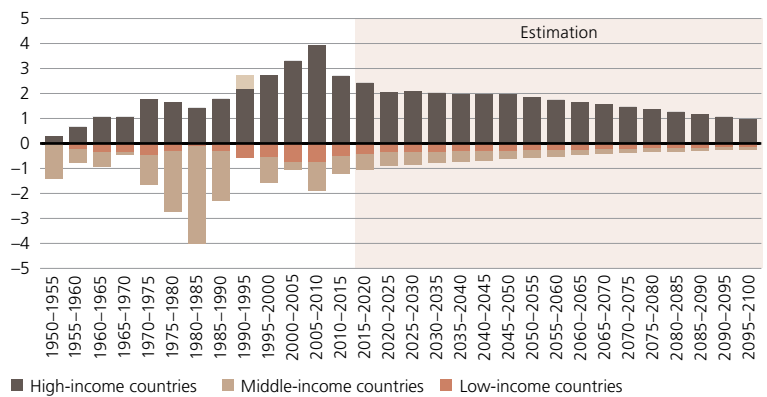
Migration is likely to continue to affect many countries' population structure. But technological and economic progress, as well as generally higher living standards worldwide, mean that flows will adjust. Whether receiving countries can harness migrants' potential to their benefit or whether migration strains social security systems and heightens political tensions will depend on many "soft" cultural (such as openness and popular opinion) and "hard" economic (such as education and labor market integration) factors.

Within countries people are on the move as well. Urbanization rates have risen around the world alongside the population increase (Fig. 10). Economic opportunities clustered near industrial centers have contributed to greater productivity and economic prosperity. Already today, more than half the world's population lives in congested urban areas. And this proportion will likely increase. In fact, in terms of number of people, almost all population growth is expected to occur in cities.

Fig. 9

Net migration is ebbing as economic development and prosperity spread

Net migration streams by income bracket, number per 1,000 people

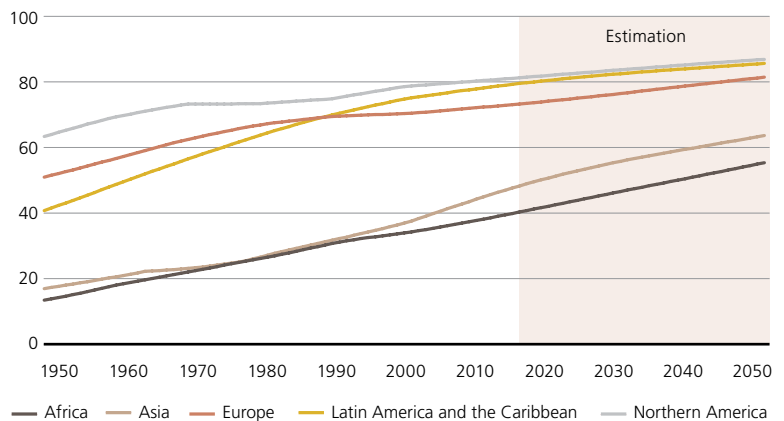


Source: UN World Population Prospects, UBS 2017

Fig. 10

Urbanization is progressing globally

Percentage of population in urban areas



Source: UN World Population Prospects, UBS 2017

Size is not all that matters

The rapid population growth of the last 75 years has generated various resource and environmental challenges. But in recent decades a challenge of a different kind has emerged. Population aging is leading to a dramatic shift in the structure of populations (Fig. 11); it is now taking center stage as the economic, social, and political impact of more people living longer starts to emerge.

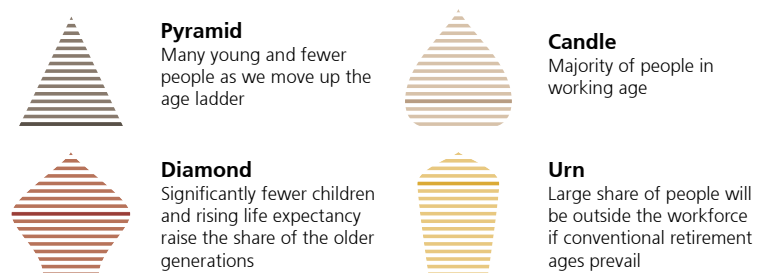
We are moving away from the traditional “population pyramid”, a structure that has existed for the better part of demographic history. While lower mortality among children initially widens the base of the population pyramid, lower fertility rates soon narrow it. Lower mortality also means that more young people reach middle age. We call this next stage in the structure the “population candle”. It takes shape when the working age population is largest and the dependency ratio lowest, providing a demographic dividend: the fruits of labor of a large working age population are distributed to relatively few others who do not work. The populations of Brazil or the US currently display this shape. At this point population aging is not yet a challenge, but the trends that will lead to an aging society are already visible.

Only when fertility rates linger below two children per woman for a sustained period of time and life expectancy continues to creep up does the population structure evolve into what we call the “population diamond”. Countries such as Germany, Poland and Singapore have developed this structure: their ever larger number of older working age and elderly people relative to those in prime working age means that demography, instead of providing an economic dividend, starts to become a drag on the economy. Over the next four decades, the old-age dependency ratio will continue to rise rapidly in many countries, and in some countries the economically dependent will equal the working age population, Japan being the prominent example. This is when the “population urn” emerges and population momentum wanes, causing the total population to begin shrinking.

Countries transition from one stage to the other – from pyramid all the way to urn – at their own pace. A stable urn structure is maintained only if a country can attract migrants to fill the ranks of

the young. Otherwise, assuming that fertility remains below two children per women and life expectancy goes on rising, the urn shape turns ever narrower and taller.

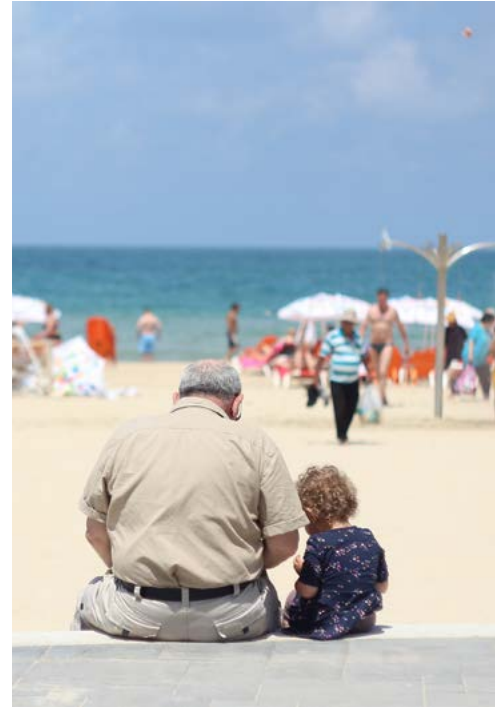
Fig. 11
Demographic change comes in different shapes
Different countries and continents are at different stages, with individual implications



Source: UN World Population Prospects, UBS 2017



Behzad Ghaffarian, Unsplash.



Tel Aviv, Israel. Mary Blackwey, Unsplash.

Of pyramids and urns

Urbanization used to be a product of youth. But city dwellers are aging, too, changing the relative size of the generational cohorts in cities. In rural areas aging is even more rapid. These shifts in a population’s generational structure have economic and societal implications. Labor supply and consumer demand patterns vary by age group. The size of cohorts can boost or weigh on economic growth, depending on which groups dominate the population structure. Politicians tend to pander to the largest generational groups above voting age, and these groups are getting increasingly older.

Figure 12 illustrates the generational population distribution today. Generations A and Z – i.e. children and teenagers up to 20 years of age – make up on average over 50% of the population in low-income countries. In Nigeria, for instance, the population pyramid remains intact. Its relative supply of future workers is much larger than in high-income countries, whose population consists of just 25% of young people. Many high-income countries such as the US and the UK are slowly transitioning from the candle to the diamond shape. Some, such as Germany, Switzerland, and Italy, are already in an advanced diamond shape.

The Silent and the Baby Boomer generations – the oldest cohorts – represent 35% of the population in high-income countries, compared to only 10% in the emerging markets. Generations X and Y, whose members are between the ages of 20 and 50 – make up almost 45% in higher-income regions. In contrast, only 36% of the population in developing countries is in prime working age, again underlining the latter’s upcoming demographic dividend.

Politicians tend to pander to the largest generational groups above voting age, and these groups are getting increasingly older.

Fig. 12

Older generations dominate more in high-income than in low-income countries

Population divided by generations (year of birth), 2017



Source: UN World Population Prospect, UBS 2017



Valencia, Spain. Cristina Gottardi, Unsplash.



Ha Tinh, Vietnam. Danh Vo, Unsplash.



Skiathos, Greece. Nick Karvounis, Unsplash.

Bottleneck: pension systems

Population growth, population aging, and urbanization are not new phenomena, but the world seems ill-prepared for their far-reaching consequences. Pension systems in particular seem woefully unequipped for the coming demographic shifts. Historically, the idea behind pensions was to encourage solidarity among generations. This can be seen in the defined benefit and unfunded public pension plans that constitute the basis of many pension systems in traditionally collective societies today. This setup worked well as long as populations were growing and old-age dependency ratios were low (Fig. 13). Now, as many societies age, those social security systems are losing their funding base and seeing their expenses soar, especially as large generations that had few children enter retirement.

The consequences of this shift are rising government debt and greater societal imbalances, particularly in places where politics cannot overcome popular opinion to change pension regulation and attitudes. On the economic side, aging turns the demographic dividend into a demographic drag as productivity growth cannot always compensate for the relatively smaller workforce. So pension pots shrink and either pensioners will become poorer in the future or the working age population will have to cough up the difference. Either way, something has to give.

This is the main reason for the shift to funded, defined contribution plans. Each individual saves for his/her own retirement during his/her working life, and bears the investment and longevity risk. In addition, the current low-return environ-

ment and potentially greater financial market volatility challenge investment returns, and old-age financial security.

Demographics is neither doom nor destiny. Instead it is a decisive factor with implications for economic growth, investment returns and financial security in old age. It offers unique opportunities but also requires key policy changes, particularly when it comes to pension systems. The sooner they are made, the more confident coming generations can be of their future.

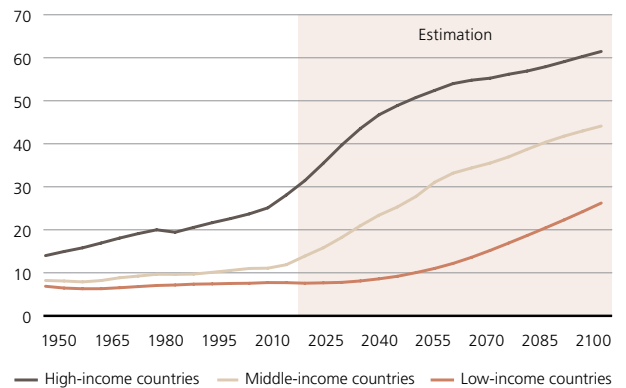
Pension systems in particular seem woefully unequipped for the coming demographic shifts.

Demographics is neither doom nor destiny.

Fig. 13

Number of people dependent on 100 working age people is rising rapidly

Old-age dependency ratio by income bracket



Source: UN World Population Prospects, UBS 2017

Rethinking the social contract

For centuries the social contract has been a cornerstone of human cohabitation. It stipulates that parents raise and care for their children until they reach adulthood. The children gain qualifications, find a job, start a family, and raise children of their own. In return for their upbringing, they care for their parents in old age – either directly by providing them with food, shelter, and assistance; or indirectly by funding pay-as-you-go (PAYG) social security plans or tax-funded systems that provide pensions and healthcare for their parents' retirement.

Sometimes history repeats itself; in this case it will certainly not. With fertility rates now below the reproduction rate in many advanced countries, the first part of the social contract no longer holds the way it once did. The second part is also unlikely to endure much longer. There are too few children to take care of too many adults who can expect to live ever longer. In Japan, Germany, Italy, and Spain this transformation is visible already in the diamond shape of their populations. But even in countries like the United Arab Emirates, India, and South Africa

where the demographic imbalance is not yet obvious, we can predict what shape will prevail.

Population dynamics are like large oil tankers. They move predictably, forcefully, and change direction only slowly. To secure acceptable living standards for all generations, we need to break free of old reference points and expectations and actively shape the future of retirement worldwide. In particular, we need to adjust our social security systems and individual attitudes.



Maybe, in the future, the concept of “a retiree” will no longer exist.



The new old or the old new

The average statutory retirement age worldwide is 65, so current retirees were born between the 1920s and the mid-1950s, at a pivotal juncture in contemporary history. This was also the time when most modern pension systems were created. Future retirees, born in the 1960s and later, were raised in a different era, dominated by technological innovation – from television to artificial intelligence – that has changed life from being mostly private and self-contained to an all-out open affair played out on social media. But they still grew up believing in the social security systems of their parents (where they existed), which today’s demographics will not be able to sustain. Their thinking on retirement is not yet as modern as their lives.

Retirement used to be synonymous with being old, and living to 100 was wishful thinking. Today, a young woman in Switzerland or Japan can expect to live over 90 years – and longevity continues to rise in most countries. “Old” might not feel or even be so old anymore, given longer life expectancy, technological advances and the conveniences of modern life. Future retirees will be more active and more forceful in shaping social norms and economic trends: 80 is indeed the new 60.

The concept of work today remains something with a “best before” label.

Demography may trump digitization

Digitization is foreseen as the major economic driver in the coming decade. It is expected to boost productivity and GDP by replacing the human workforce with robots and computers. At the same time it may lead to mass unemployment. This outlook has just one flaw: it’s not taking place. Economic growth in industrial nations has moderated in the last decade while job creation picked up. This in no way implies that digitization will not change the economy. Rather it shows that other factors are influencing growth along

with digitalization, not least demography and, specifically, the aging of society. This process will weigh on labor supply growth and conceivably even reduce it, or it may shift overall economic demand over the next several decades toward healthcare and social services. According to experts, digitization will play only a very minor role in healthcare and social services employment as these jobs require a high degree of social interactions. Demography therefore may trump digitization.

From the moment we join the workforce after finishing school we work toward a last, predefined day. Maybe, in the future, the concept of “a retiree” will no longer exist. With higher life expectancy, retiring at 65 seems limiting, both personally and from a societal perspective. Working longer but also differently would enable us to finance lifestyles we have become accustomed to with the rise in living standards that demography and innovation have brought about.

To sustain this positive development, we cannot rely on the demographic by-product anymore but need to actively facilitate it in two ways. First, old-age

dependency ratios should ideally be stabilized around current levels. While this would go a long way to improving the situation, the OECD² calculates that we would need to work on average 8.4 years longer in the future to achieve this. This is a lot and would be difficult to implement in most countries.

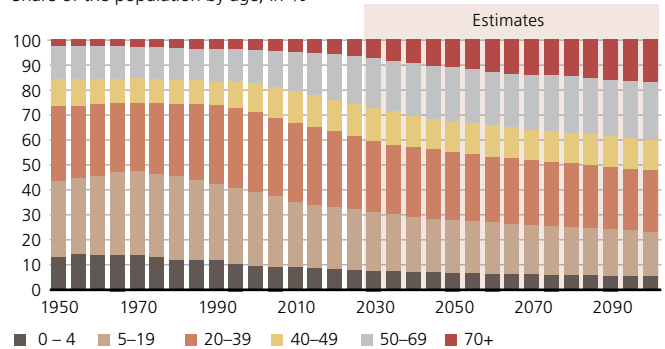
The second measure would be to increase productivity by better equipping the workforce with automation technology and knowledge. Life-long learning is a key ingredient. This type

² OECD, Population ageing: Pension policies alone will not prevent the decline in the relative size of the labour force; <https://voxeu.org/article/effect-population-ageing-pensions>

Fig. 14

Older generations are becoming more dominant

Share of the population by age, in %



Source: UN World Population Prospects, UBS 2017

of continuous learning on and off the job can become a fountain of youth for older workers, and an important skill to master during a longer life. Research shows that keeping the mind active also keeps the body in better shape for longer and vice versa, thus making the later years more pleasant and livable.

Potentially the so-called “rainbow career,” where one does not stay at the top of the career ladder until retirement but slowly scales back roles and responsibilities, while working to a higher age, is an option. For this to happen laws not only have to change but attitudes too. Currently it can be hard to demote people or apply pay cuts. But employers and employees need to fundamentally rethink their approach to work – wages and ranks should not only reflect seniority but represent a worker’s contribution – through the different stages of life. The difficulty will be in providing proper protection against age discrimination when people work into their 70s.

Generation 65+ is a force for change

The over-65s represent an ever-growing share of the population and they are here to stay. Globally, those of conventional retirement age make up less than 10% of it today, but the percentage will more than double over the course of this century (Fig. 14). This will shift power from the “young and wild” to the “old and wise,” whether retirement ages stay rigid or not.

From the 1950’s, it was the young that stood out. They are loud and colorful; they provoke and push boundaries, bringing change and innovation.

When they were young, the Baby Boomers were a particularly rowdy group. Not only were there so many of them – the result of the postwar fertility boom – but they changed society with their 1968 revolts, Woodstock and their widespread use of the pill. Despite their numbers, they produced few children of their own and created an exceptional demographic in many developed countries: a huge generation followed by a tiny one.

As a result they are frequently portrayed as the culprits of the pension funding crisis in PAYG systems. But low fertility and ever-extending life expectancies are here to stay and will dominate population trends long after the Boomer generation dies out. While the Boomers’ existence and reproductive behavior will accelerate aging in the coming two decades in many countries, more youthful populations are unlikely to return. So, societies cannot sit out this situation and hope for better times. Developing economies have a chance to learn from the Baby Boom experience and act early to prepare for their own, predictable aging.

Silver generation dominance

Soon the 65+ population will dominate some economies with their spending, as the Baby Boomers are the richest (retirement) generation ever. These “silver spenders” will reshape demand and supply patterns. Research shows that, already today, demand for personal care and beauty products, healthcare, financial planning, and retirement housing is rising in the 50+ age group. Thus older generations have the power to transform the economy, a fact that offers new investment opportunities.

For investment implications go to chapter 4 (Page 40)

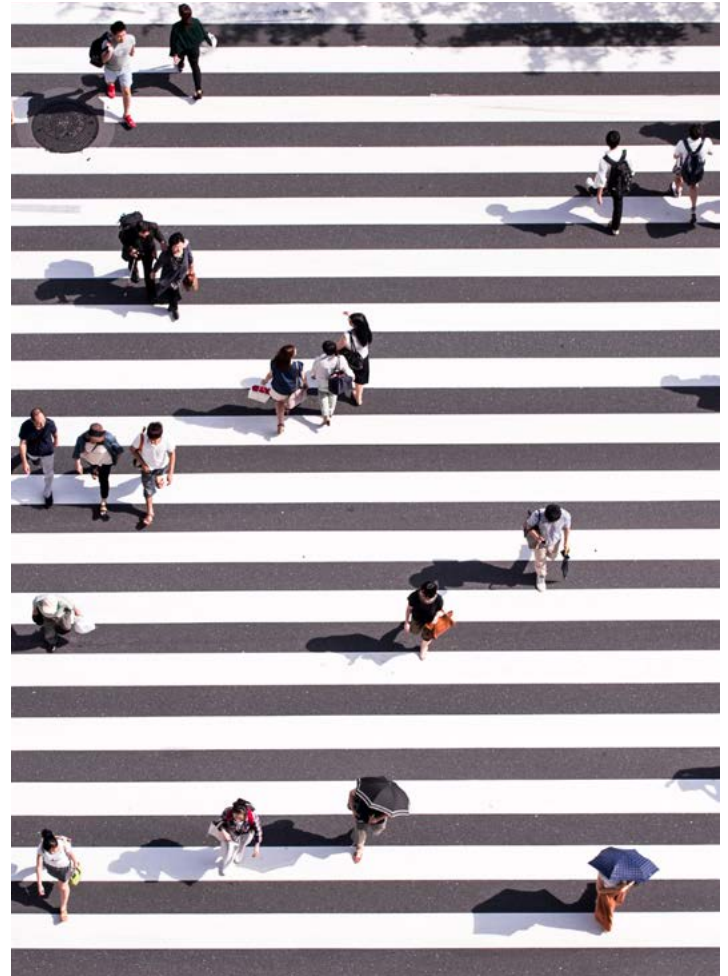
In the more distant future, post-boom seniors will have less to spend per capita, but their presence will be felt publicly through their large voice. Their political views will determine public opinion, including on pension reform. This will become most obvious through the burden the silver generations place on younger ones and on social security systems. The implications cannot be precisely predicted: the best-case scenario is that society gets off cheaply, with higher public debt remaining manageable and economic growth staying robust. In the worst case government finances collapse and the high burden of taxes and social security spark social unrest.

Governments have realized the problem – it is too obvious to ignore – but the dominance of 50+ voters leaves them impotent in many ways. While coverage ratios in pension and social security systems have improved worldwide in recent decades, most systems are still unsustainably funded. It's possible promised pensions will not be paid. So there is a need to improve public awareness about personal responsibility and financial literacy, especially among the less well off.

Financial planning is a powerful tool that lends itself well to informing people about their long-term financial needs and retirement situation. The technology we have at our disposal today should ensure progress in this area. Honesty in politics about the need for higher retirement ages and cuts to particularly generous benefit systems would help too. But in the world's current state – with demographic change rapidly advancing and many pension systems structured in an unsustainable way – these factors are only mitigating ones and will not suffice.

Mitigation is not enough – innovation is needed

Pension systems play an important role in society, not only for the old but for the young as well. To achieve financial security for all generations we don't need more systems, we need better ones. What would the best pension system look like? There is no single perfect approach. Each society, depending on its age structure, fertility and mortality rates, and migration patterns, requires different specifications. But there are general aspects that need to be considered soon to prevent the perfect storm.

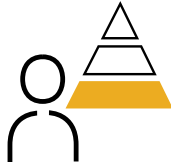


Kowloon, Hong Kong. Adam morse. Unsplash.

Two features stand out as beneficial for any pension system. One is a dynamic rules-based approach rather than one that applies rigid, predefined thresholds. This means, for example, not setting the retirement age at 65 once and for all, but adjusting it dynamically based on key factors, such as the number of children born to and the life expectancy of each respective cohort. In contrast, many social security schemes today are held hostage by political ideologies and so denied the ability to change with the times. Adjusting existing thresholds is unpopular with voters close to or in retirement. But reforms that can secure pensions require short-term pain for long-term gain.

The second factor is a multi-tier approach. To reduce dependence on a single source of income, two or even three pension tiers are advisable. The following presents a non-exhaustive list of options, and suggestions about the design of each tier, including its social and economic policy implications, which could inspire rethinking the social contract.

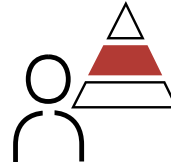
⋮ To achieve financial security for all generations we don't need more systems, we need better ones.



Tier one for survival

The first tier of a pension system should aim to ensure a minimum survival income for the population above retirement age. As segments of the population will be unable to save enough over the course of their lives to fund even basic survival in retirement, it makes sense to finance the first tier mainly via a mandatory state-administered PAYG system, or via taxes. Long-term viability should be a priority. That can only be ensured, as the population structure changes from the pyramid to the urn, if in- and outflows are automatically balanced.

One such option would be to let the retirement age automatically rise to stabilize dependency ratios and/or total system in- and outflows. The more children a generation has and the shorter its life expectancy, the earlier it could retire, and vice versa. If fertility rates drop so low that the required rise in the pension age seems likely to become unmanageable, then generations that have few children and spend less on raising and educating them could be obliged to pay into an additional, separate, funded system to provide a funded fill-up once they reach pension age to ensure that first-tier pensions can maintain subsistence levels.

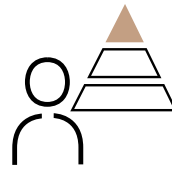


Tier two raises pensioners' living standards

The second mandatory tier of a pension system should seek to raise pension income above subsistence levels. Commonly it is organized through occupational pension funds. However, limiting the individual to the pension fund of an employer is unnecessary and, in the context of massive underfunding of occupational pension funds worldwide, can be detrimental to an individual's pension adequacy and security. Free choice regarding pension funds on the other hand can increase transparency about the realistic pension level one can expect to receive and the challenges that demand a sustainable setup.

Mandatory contributions based on income should be freely invested in funds with a vast range of options and providers. They could also offer income protection insurance in the case of disability or death, for example. An individual investment approach would enable individuals to consider their specific situation – in particular their age, financial preferences, and capacity to bear risk. Younger workers have more time to digest losses and could choose a riskier strategy that promises higher returns.

While administering personal accounts in this manner rather than in collective schemes transfers investment risk to the individual, it also brings opportunities. It fosters financial responsibility and literacy. Once a person decides to retire or starts working part-time – above an age threshold defined in relation to pension age – the funds either can be withdrawn in a lump sum to spend as the individual sees fit or invested in an annuity or other related financial products. If the first tier of the pension system can reliably ensure a minimum subsistence level for all pensioners, the choice of how to use capital from the second tier can be left to the individual. Separating the pay-in and pay-out phase,



and allowing maximum flexibility to move between providers and products during each phase would foster competition and innovation.

One such innovation is the rather new idea of pension bonds³. It interestingly links the pay-in and pay-out phase within one financial product. Workers – or even the unemployed to the degree they can afford it – would pay regular installments into a bond issued by a government or supranational institution (the credit risk can be spread internationally, too). This bond would not, as is conventionally the case, pay regular interest and return the principle sum at a later stage. Instead it would make deferred interest or “annuity” payments from a certain predefined date for a predefined period (e.g. from the expected retirement age). Payments could also be linked to inflation.

The money, until paid out, could be used to fund government or social projects. The returns from these projects would help the issuer to fund the annuity-type payments to the retirees. Insuring longevity risk is the crucial component, so the payout could be determined based not only on contributions paid into the bond but on investment performance and life expectancy, for instance.

Given that most governments face deteriorating public finances as aging progresses, their ability to fund the annuities during the payout phase is likely to deteriorate, potentially leaving retirees without the promised income. Thus, while pension bonds can be attractive in some situations, people already depending on government pensions financed by taxes or wage deductions should be wary of increasing their exposure to government credit risk.

³ EDHEC Risk Institute “Applying Goal-Based Investing Principles to the Retirement Problem”

Tax-incentivized tier three

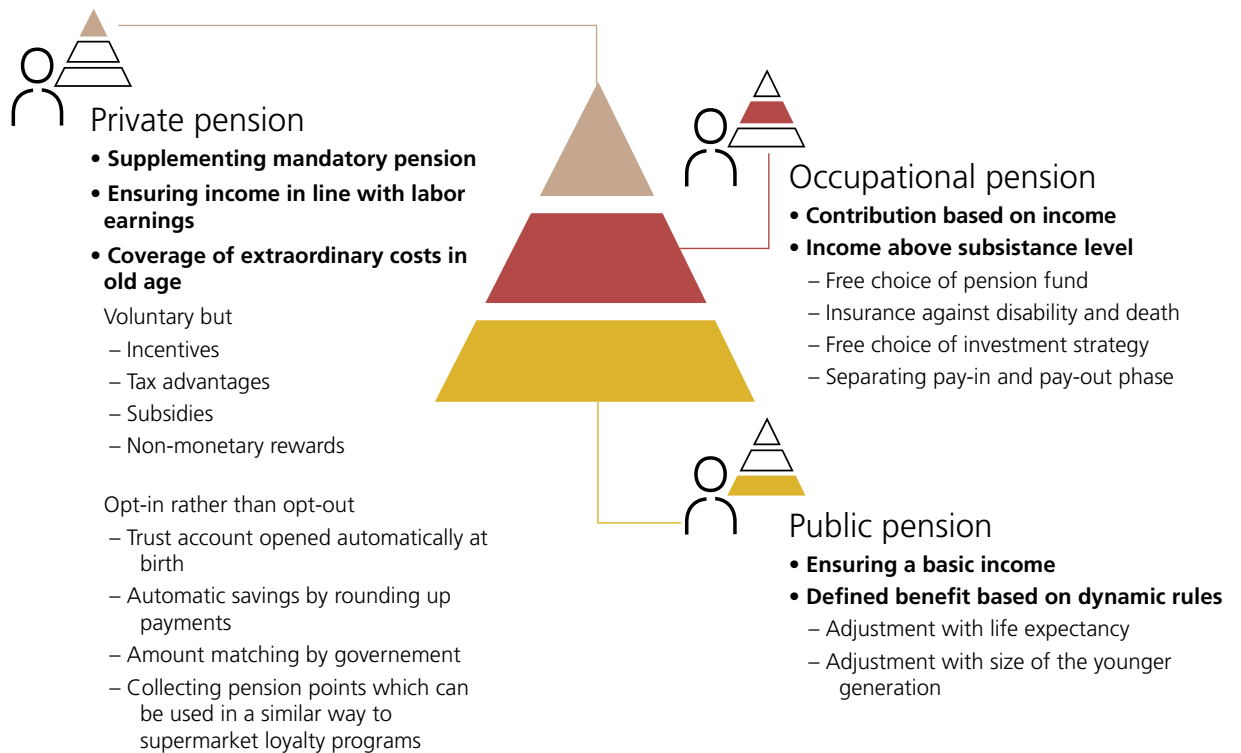
Even a well-designed first and second tier retirement system, might not succeed in lifting low-wage workers and those that were not always employed, much above the poverty line. Especially if such benefits become less generous, as is likely. So personal responsibility will become ever more important to ensuring financial security in old age. The original impetus behind welfare systems, including pension systems, was for government to stand in only for those in dire need of assistance, not for it to relieve the individual of personal responsibility for his/her retirement, as *The Economist* writes. Voluntary schemes have proven most effective when accompanied by the right incentives, such as tax savings, subsidies, and non-monetary rewards. Behavioral studies have shown that opt-out rather than opt-in programs are more effective. And making maximum use of the compound interest earned over a long investment horizon means that starting early makes all the difference.

An optimal structure for third tier pension savings could include a retirement savings account automatically opened for each child at birth, with a nominal jumpstart amount funded by the government. In this way everyone – whether working or not – would have a personal retirement savings account. Beyond “dollar-for-dollar” matching by the government up to a certain limit, or tax deductions, these accounts could offer a variety of other savings mechanisms. For example, debit and credit card payments could be rounded up to the next highest full currency unit, with the difference paid into the retirement account. If, at the end of the month, the money in a savings account surpasses a certain threshold, the amount exceeding it could automatically be transferred into the retirement account. Employers looking to differentiate themselves might of-

Fig. 15

Pension systems need innovation

Components of different pillars to improve pension system sustainability



fer to match payments into third-tier accounts up to a certain threshold. Health insurance could credit healthy behavior by contributing to retirement funds or customer loyalty programs might offer to pay out loyalty points converted into money, much like they make donations to charities today.

Some of these options already exist in some form, but we need the courage to embrace change and scale them up. The components used would depend on the specific country's preconditions, and no solutions will be perfect forever. As long as society exists a social contract is an integral part of it. But as societies evolve, this social contract and the framework that guides it have to adjust to the new environment. Only a continuously adapting pension system stands a chance of defying the demographic challenge. One thing is certain – future genera-

tions will not be able to rely on the generous pension systems their forebears often enjoyed. Personal responsibility will be a key determinant of old-age financial security in the future. But governments can do their part by informing citizens, being transparent about the changes needed and swiftly and efficiently implementing reforms. Not just pension reform, but labor market reform and a transformation in how society perceives age and work will be crucial. Only then can we make the most of demographic dividends and mitigate demographic drags to ensure continued economic prosperity.

Only a continuously adapting pension system stands a chance of defying the demographic challenge.

Economic implications of demographic change

An economy is more than a collection of humans and their machines. While economic outcomes depend on the resources available – in particular human capital and technology – it is the blend that finally counts. So the impact of demographics on an economy is at once decisive and uncertain. In this section we describe the demographics that influence an economy while recognizing the uncertainty about what results.

Population growth does not translate one-to-one into economic growth

The size and productivity of the workforce are the central – but not sole – determinants of an economy's production capacity. A growing working age population, all else being equal, will raise production capacity and economic growth rates, and a shrinking active population will decrease it. But simultaneous changes in the shape of the population due to aging mean that workforce size does not necessarily develop in parallel with the total population. In Switzerland, for example, the total population is expected to rise from 8.6 million today to about 10 million in 50 years' time. But this increase will consist almost exclusively of persons aged 65 and over, with the number of people of traditional working age (15 to 64) barely budging (Fig. 16).

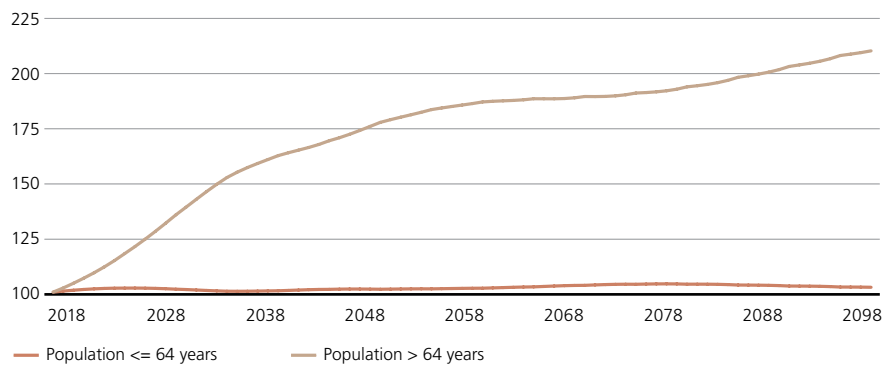




Fig. 16

Working age population will stagnate while share of pensioners increases

Expected population development of over- and under-64 in Switzerland, relative to 2018 (index, 2018=100)



Source: UN World Population Prospect, UBS 2017

While the size of the working age population helps determine the size of the economy as a whole, GDP per capita depends much more on the structure of the population. The former is important for investors and firms, while the latter measures average wealth per person. If population increases consist mainly of the dependent young or old (rising dependency ratio), GDP per capita will be diluted and average wealth will decline. Taking population growth and aging into account within the context of the demographic evolution from pyramid to urn, one can expect:

- A boost to the **size of the working age cohort** starting with the transition from the pyramid to the candle stage, during the candle stage, and until the population structure reaches the diamond stage. From the late diamond stage on and particularly in the urn stage this age group will decline.
- An initial rise in the **dependency ratio** in the pyramid shape as its base widens with falling child mortality, followed by a fall starting with the transition to the candle stage up until the diamond stage. The diamond and urn stages are characterized by a sustained rise in the dependency ratio.
- A boost to **productivity growth** for the overall active population in the candle stage, up until the transition to the diamond stage is complete. This is when the share of 30-to-50-year-olds, traditionally considered the most productive contributors to the economy, is highest.
- An **overall demographic dividend** for the economy stemming from a relatively larger and more productive working age population in the transition from the pyramid to the candle stage, which is reinforced by productivity gains and falling dependency ratios during the candle stage. However, the dividend starts to wane and may become a drag in the diamond and urn stage.

: Today's approach to productivity measurement assumes that an individual's productivity falls to zero at retirement. The capacity for continued productivity, however, extends for a good number of years.



Productivity depends on more than just age

There is reason to believe that the demographic drag from aging expected from the diamond stage can be much less pronounced than previously estimated. First, today's approach to productivity measurement assumes that an individual's productivity falls to zero at retirement. The capacity for continued productivity, however, extends for a good number of years. Second, flexible working arrangements, part-time jobs, turning to employment in a different field after a traditional career, mean that work-life around the age of 65 will take on a more fluid meaning. Untapped productivity potential can be realized if the concept of a retirement age is abandoned altogether or if, for example, it is defined as a percentage of life expectancy, individually for each generation, as it already is today in the Netherlands and Denmark. According to our estimates for a broad range of 38 countries, GDP growth would be between 0.1–0.8 percentage points higher if retirement ages were increased from 65 to 75 over the next 25 years.

Additionally, productivity across age groups is changing. First, today's larger ratio of intellectual to physical jobs means that more people can work productively for longer. Future generations of over-65s will also be more tech-savvy than current retirees. Their productivity will be increased more by technological progress. In areas where accumulated experience increases productivity, older workers can be the most productive of all. Second, capital and technology will increase the productivity of older workers in physical jobs as well, e.g. builders and care workers might wear exoskeletons that can hoist heavy loads, while workplace health policies can substantially extend

working lives in physically demanding jobs.

Apart from the workforce, two institutions have significant influence on the economy: the government and the central bank. Governments influence economic outcomes through their regulatory frameworks, investments and expenditures, tax regimes, and the fiscal position that results. Central banks affect the inflation-growth mix and inflation expectations in the economy. Both have the capacity to mitigate or, in some cases, even reverse the economic impact of demographic change, e.g. by raising the retirement age or adjusting interest rates.

This means that demographics need not be destiny. The various economic actors have substantial freedom in how they deal with demographic change. One route countries can take is to pool their resources to substitute for each other's demographic limitations. Trade between countries, and open markets for capital, goods, services, and labor, can help offset demographic constraints. Investing retirement savings across borders in countries with younger generations and rising productivity can provide attractive returns and sorely needed capital to growing markets. In digital and tech-driven economies, the concept of a limited "home economy" quickly fades. So while a country's economy can be limited by its population, it can choose to become part of an even larger interconnected web of neighbors and trading partners. The various choices of governments, central banks, and finally of society will affect future generations, as per capita wealth and debt of one generation will largely determine the next generation's quality of education, infrastructure, tax burden, and overall standard of living.



Thailand.

Inflation, exchange rates, and demographics

Demographics affects inflation via two main channels: the supply of and demand for goods and services on the one hand, and the supply of capital (savings) and demand for capital (investments and debt-funded consumption), on the other. The resulting market outcome in terms of prices and interest rates is also influenced by other factors, in particular the strength of cyclical growth momentum, the government’s fiscal program and the central bank’s monetary policies, including the exchange rate regime. A central bank might be able to maintain inflation within a range of the inflation target in spite of changing demographics. However, depending on the constellations of demand and supply for goods, services, and capital, this might imply maintaining interest rates above or below their historical averages.

Not all inflation is created equal

Inflation is a measure of the change in the level of prices, often compared to the previous year. It is usually measured by observing the price changes of a representative basket of goods and services. A bit of inflation is generally considered to be unproblematic. A lot of inflation erodes the purchasing power of savings. Today, most central banks pursue a price stability target of low inflation around 2 percent per annum.

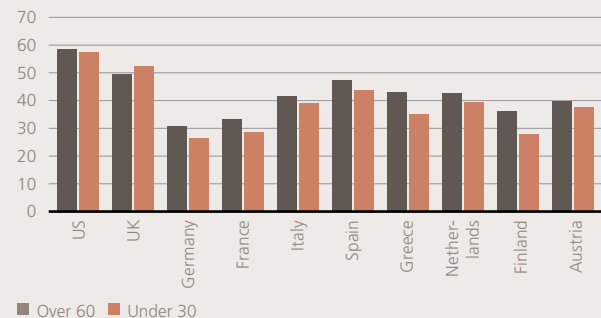
Since people of different ages have different needs and consumption patterns, their actual consumption baskets, and thus the inflation rate that effectively concerns them can differ (Fig. 17). One example is health care, older people require disproportionately more health care services and more expensive drugs and treatments than younger people (the UK stands out in the chart below as the National Health Service (NHS) covers the majority of health care costs for its citizens). Going forward, a sharply rising number of pensioners will additionally increase demand for certain products and services, e.g. retirement homes, golf club memberships, walking frames, potentially pushing their prices higher, while

smaller generations of children and the working age will likely put downward pressure on prices of goods and services specific to these age groups, such as large family homes, children’s clothes and toys. These changing economy-wide demand patterns will likely reinforce the higher overall inflation rates experienced by older population groups in the decades ahead.

Fig. 17

Inflation can differ across age groups

Cumulative growth in prices from 2000 to 2018 for under 30- and over 60-year-olds, in %



Source: Haver, UBS 2018

: A booming workforce
: also requires a func-
: tioning economic envi-
: ronment. Having the
: right policies and insti-
: tutions in place to en-
: hance competitiveness
: is crucial.



Hong Kong, China.

Life expectancy and population aging: no one-way street

While increasing life expectancy and population aging are challenges for most societies today, it is not universally true that we are all living longer in ever older societies. Certain groups of people have seen a reversal of these trends, for different and partially unexplained reasons. Other groups may live unusually long lives. If only specific groups or minorities are affected, the impact on the longevity of the country as a whole is not necessarily statistically visible. However, some larger health issues and countrywide policies can be seen in national statistics.

White men and the opioid crisis: Analysis in the US has found that mortality among white non-Hispanic men has increased since the new millennium. This is mainly attributable to increased drug and alcohol abuse, higher suicide rates and chronic disease. Increased self-reported health issues such as physical and psychological pain have been observed among this group. The increase in prescription painkillers has further aggravated the problem and has led to an opioid epidemic, according to the Proceedings of the National Academy of Sciences. However, the group is not large enough to reverse the gains in life expectancy for the country as a whole. Nonetheless, life expectancy is expected to rise less rapidly in future.

Family planning: Specific social planning policies can have an impact on a country's demographic development. For example, China pursued the One-Child-Policy for around 30 years before officially abandoning it in 2015. This is far below the reproduction rate and has shaped the development of China's population structure. However, in China as in many other developing countries worldwide, fertility rates started their decline in response to economic development and a decreasing dependence on children. Thus the policy was only one of several factors that impacted fertility and the speed of population aging.

Government policy: Research in the UK has recently found that life expectancy at birth has declined after years of progress. Since smoking and other unhealthy

behaviors have decreased at the same time, the development is attributed to the government's austerity program and cuts to social and healthcare benefits, which affects the 80+ age-group disproportionately.

Conflicts: Due to conflicts large groups of people are displaced and often flee to a country that is close and similar in culture and language. A town in Turkey – Gaziantep – has reached its predicted 2030 level in the number of inhabitants 15 years earlier, due to the Syrian refugee crisis. While this has implications for infrastructure, healthcare and development in this particular region, including lowering average life expectancy, it has no impact on the country's overall demographic projections.

LGBT: Currently, a 45-year-old opposite-sex couple in the US has a median joint life expectancy of 88.5 years, compared to 90.5 years and 87 years for same-sex female and male couples, respectively. Median life expectancy, the point at which half of the population will have died and half will still be living, can hide the full effect of longevity risk. US data suggests that around 25% of female couples should expect to have one partner or spouse live to 95 years of age, and 5% can expect one partner or spouse to live to 100. Same-sex female couples have a 50% greater likelihood of having one partner or spouse live past the age of 100 than opposite-sex couples. And same-sex female couples are two to three times more likely to have one 100-year-old partner or spouse than same-sex male couples.

Demographic transition from fixed to floating exchange rates

Emerging countries with pyramid-shaped populations are likelier to have a fixed exchange rate regime governed by a currency board. Exchange rate stability builds trust in young institutions and capital markets that are frequently underdeveloped – among foreign investors and domestic consumers alike. When a nation moving to a candle-shaped population structure also develops economically and gains institutional stability, a switch to a more flexible exchange rate system is common.

Flexible regimes are preferred when the need for more open financial markets arises. In that case the central bank desires more leeway for setting interest rates and stabilizing the financial system. China represents the most prominent instance of a country undergoing this transformation. It moved from a largely fixed regime of steering the CNYUSD exchange rate to managing its cur-

rency against a basket of other currencies. It currently has plans to adopt a totally independent market-driven regime.

In a flexible exchange rate regime, central banks can guide inflation rates, with markets defining the exchange rate according to inflation and interest rate differentials. Countries with appealing investment opportunities, rising productivity (courtesy usually of populations in the candle stage) and an economy integrating more into the global economy tend to have trend appreciation of their currencies. Also on the winning side of the currency balance are countries with a large savings surplus and a diamond-shaped population, e.g. certain Eurozone nations, Japan and Switzerland. In contrast, a currency is hurt when a country runs a structural current account deficit or suffers from low productivity, which could occur during the urn stage of the demographic cycle.

Baby boomers and the age of the “pension run”

The baby boomers have begun retiring, with millions more preparing for it. The uncertainty about the stability of pension systems is rising as a greater share of the population is about to start receiving pensions and cease contributing to them. So persons of working age see a pressing need to save. In some countries the risk of a savings trap in the form of a “pension run” is emerging. This expected run for pension savings is a failure of the system, analogous to a bank run: the plummeting trust in the finances of the retirement system incites people to remove their money from the formal pension system, which brings the financing deficits of the pension systems to the fore even faster.

The population increases its personal savings to mitigate the risks of not receiving promised

pensions. The savings trap describes the situation where households increase their savings drastically at the cost of consumption, with shrinking consumption throttling economic growth. This is the signal for entrepreneurs and companies to reduce investments in the economy. The result is a vicious circle as rising personal savings and shrinking financial investment opportunities lead to slower growth and lower investment returns. The fact that the two regions most advanced in terms of demographic aging, Japan and Europe, have found it hardest to fight deflation and weak growth with monetary policy measures can be viewed through the lens of an approaching pension run.

Fig. 18 shows in stylized scenarios how economies and policy makers might react to prevailing demographic trends. These reactions are likely a more important driver of inflation and exchange rates than the demographic stages in themselves. Thus, inflation and currency outcomes can vary even across economies displaying similar demographic trends.

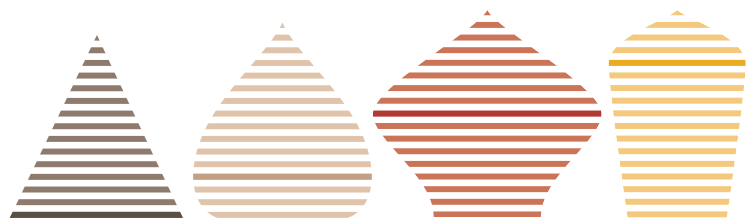


















































Fig. 18

Stylized scenarios of inflation and currency trends in different demographic contexts

	Supply of goods and services	Demand for goods and services	Supply of capital	Demand for capital
 Pyramid Initially large generation of children starts to reach working age Example: Nigeria	 →  Share of working age population increases in transition to candle	   High population growth and fiscal spending to provide infrastructure to growing population	 Very limited savings Very little capital supply from population	   Economic growth and fiscal spending accelerate
	 Supply growth < demand growth Inflationary pressure		 Supply growth < demand growth Upward pressure on nominal interest rates	
	 Central bank Trade-off between continued high inflation and negative effects of further increasing already high interest rates			
	 Currency In floating-rate regime currency devalues versus those of countries with lower real rates (interest – inflation)			
 Candle 1 Rising productivity Culture of savings and investment benefiting from demographic dividend Example: China early 2000s	   Large working age population Trade agreements and FDI raise production	 Growing population and disposable incomes High savings rate limits consumption	 →    Savings increase as large, active population starts to save for retirement	 Economic growth partly fueled by credit to equip large workforce with physical capital
	 Supply growth > demand growth Deflationary pressure and trade surplus		 Supply growth > demand growth Downward pressure on nominal interest rates	
	 Central bank Comfortably low inflation and interest rate environment leaving room to adjust interest rates to cyclical price pressures			
	 Currency In floating-rate regime currency would strengthen			
 Candle 2 Limited productivity growth Culture of consumption benefiting from demographic dividend Example: South Africa	 Large working age population Weak productivity growth Limited rise in production	   Growing population Availability of credit boosts private demand	 Very limited savings Very little capital supply from population	   Economic growth and consumption fueled by credit
	 Supply growth < demand growth Inflationary pressure and trade deficit		 Supply growth < demand growth Upward pressure on nominal interest rates	
	 Central bank Trade-off between high inflation and negative effects of raising interest rates			
	 Currency In floating-rate regime currency will weaken			

-  neutral
-  positive (number of icons indicating strength)
-  negative (number of icons indicating strength)

 <h3>Diamond 1</h3> <p>Substantial pension savings Rising pension age Stable productivity growth</p> <p>Examples: Netherlands, Germany, Switzerland</p>	<p>Supply of goods and services</p> <p>++ Working age population stagnates or declines Pension age and productivity rise</p>	<p>Demand for goods and services</p> <p>+ Overall population stagnates or rises only slowly Increasing share of pensioners implies slow demand</p>	<p>Supply of capital</p> <p>++ Pension savings still clearly outweigh dissaving from pensioners</p>	<p>Demand for capital</p> <p>≈ Limited credit demand as economic growth moderates</p>
<p>Supply growth > demand growth Deflationary pressure and trade surplus</p>		<p>Supply growth > demand growth Downward pressure on nominal interest rates</p>		
<p>Central bank Lowers interest rates (potentially into negative territory) to raise inflation back toward target</p>				
<p>Currency Structurally strong currency likely weakened by central bank policy of lowering rates</p>				
 <h3>Diamond 2</h3> <p>Limited pension savings Limited scope for fiscal spending Limited productivity growth</p> <p>Example: Italy</p>	<p>≈/+ Working age population stagnates Very limited productivity gains</p>	<p>≈ Overall population rises only slowly Higher share of pensioners with lower purchasing power Limited fiscal spending supports demand</p>	<p>≈ Limited savings of working age population balanced relative to dissaving of pensioners</p>	<p>+ Increased fiscal spending offsets limited credit demand in slow-growing economy</p>
<p>Supply growth ~ demand growth Mostly balanced price pressures and trade balance</p>		<p>Supply growth > demand growth Slight upward pressure on nominal interest rates</p>		
<p>Central bank Adjusts interest rates depending on cyclical price pressures</p>				
<p>Currency Limited structural currency impact</p>				
 <h3>Urn 1</h3> <p>Substantial pension savings Limited productivity growth Scope for fiscal spending</p> <p>Example: Potentially UK in app. 50 years</p>	<p>--- Share of working age population at its lowest Limited productivity growth</p>	<p>≈ Pensioners with substantial purchasing power Fiscal spending can maintain demand in spite of shrinking population</p>	<p>--- Large group of pensioners dissaving</p>	<p>++ Substantial fiscal spending as economic growth slows</p>
<p>Supply growth < demand growth Inflationary pressure and trade deficit</p>		<p>Supply growth < demand growth Upward pressure on nominal interest rates</p>		
<p>Central bank Raises rates to rein in inflation but economic growth further weakened (stagflation)</p>				
<p>Currency Structural deterioration of exchange rate due to inflation, but central bank raises interest rates, which stabilizes currency at the cost of weaker growth</p>				
 <h3>Urn 2</h3> <p>Limited scope for fiscal spending Rising pension age Strong productivity growth</p> <p>Example: Japan</p>	<p>+ Working age population stagnates or declines Pension age and productivity rise</p>	<p>-- Overall population declines Large share of pensioners has little purchasing power</p>	<p>≈ Limited dissaving by pensioners offset by savings of working age population</p>	<p>--- Slowing economic growth Low credit demand</p>
<p>Supply growth > demand growth Deflationary pressure and trade surplus</p>		<p>Supply growth > demand growth Downward pressure on nominal interest rates</p>		
<p>Central bank Lower interest rate bound limits the effectiveness of its policies to raise inflation back toward target by lowering interest rates (potentially into negative territory); low rates support economic growth and credit demand</p>				
<p>Currency Structurally strong currency likely weakened by central bank policy of lowering rates</p>				

Regional perspective

Vastly different rates of population growth – from continued high growth in Africa to population declines in Europe and Japan – mean that the demographic experience will vary widely worldwide in the decades ahead. Aging, too, will continue rapidly in some regions, while others are still in the early stages of a much less pronounced aging process.

The dependency ratio captures both the impact of aging and of changes in population growth (including migration) for economies. In places where dependency ratios are falling, such as Africa and Latin America, demographic change offers a unique opportunity in the form of the demographic dividend. These populations will remain relatively young for many years to come, with the largest share of their population in working age. But a booming workforce also requires a functioning economic environment. Having the right policies and institutions in place to enhance competitiveness is crucial.

Developed countries often boast more stable institutions and a more competitive business environment. Many face sharply rising dependency

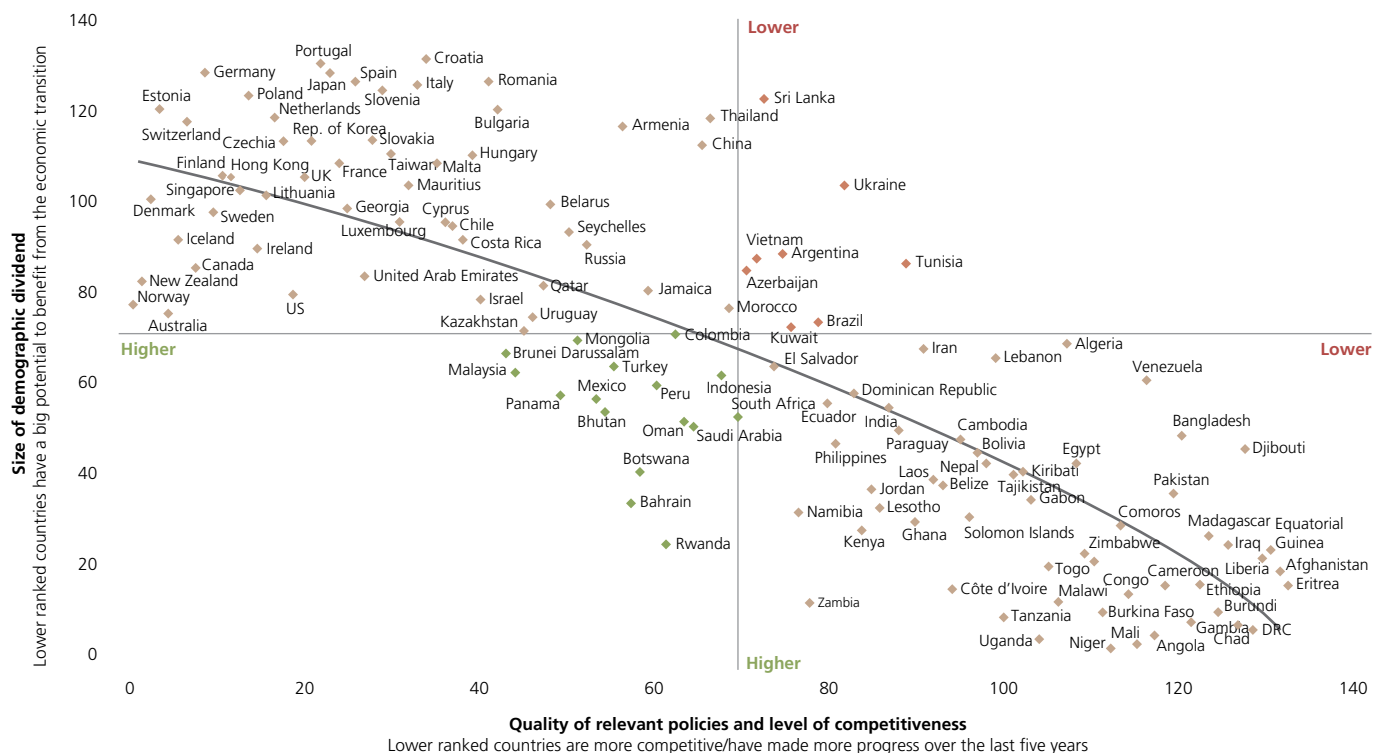
ratios, however. Vested interests in them may prevent social security systems from being prepared for the demographic challenges so they risk falling behind. Only by having the right policies in place and, importantly, adjusting them (e.g. the retirement age) to demographic realities can economies sustain their competitiveness and maintain living standards even if demography becomes a drag.

We compare a country’s demographic potential, measured as the magnitude and pace of the decline in its dependency ratio, and its population growth rate between 2017 and 2050 against its competitiveness, which is proxied by a country’s rank on the UN Development Program’s Human Development Indicator, as well as the World Bank’s Ease of Doing Business and Governance Standards. The lower a country is ranked on both scales, the better positioned it is to benefit. No country can boast exceptionally low ratings on both axes. However, those in the bottom left quadrant are the most promising, including Mexico, Malaysia, and Peru. Most developed countries slot into the upper left quadrant. Here the demographic impact is already a drag. Countries to the top right such as Thailand, Vietnam, Brazil, and Kuwait face a difficult mix of rising dependency ratios and need for institutional reform.

Fig. 19

Seizing the demographic opportunity with the right set of policies

Demographic dividend and quality of policies for selected countries



Source: World Bank, UN World Population Prospects, UBS 2017

Eurozone – will migration solve the problem of the aging union?

The Eurozone's population is expected to peak at around 337 million in 2030 and decline to 1990 levels of about 304 million by the end of the century. This stems from one of the world's lowest birth rates. Its old-age dependency ratio is expected to vault from an already high 31.8 today to over 56 by mid-century, according to the UN.

Average life expectancy is 82 years at present and will likely increase another five years by 2050. Absent countermeasures, these developments will drag on the currency bloc's prosperity and could drop economic trend growth below today's 1% in the coming decades. What can be done to address these demographic and economic headwinds?

Migration is often cited. In 2015, when the refugee wave made its way from crisis-hit countries such as Syria and Iraq to Europe, net migration peaked. The benefits of it will only be realized if migrants can rapidly be integrated and equipped with the skills required to join the workforce.

In recent European elections, however, populist tendencies have pushed against immigration. In Germany, the right-wing Alternative für Deutschland

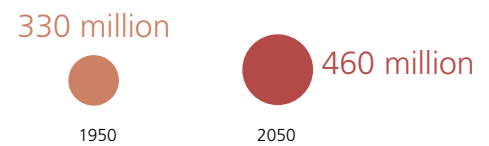
(AfD) exceeded the five-percent vote hurdle needed to enter parliament. Populist movements have similarly gained ground in other member states as well. Even if the public views highly qualified immigrants differently than refugees, the current crisis has illustrated the EU's limited political capacity to absorb foreigners today, despite an economy that is performing well. This is unfortunate from an economic point of view, as Europe will require manpower across the full spectrum of qualifications, including in labor-intensive sectors such as health-care and care for the elderly.

A more substantial contribution could come from effective structural reforms, which reduce the burden of an aging society on younger generations and support acceptable living standards for the retired population. Reduced labor market segmentation, more flexible retirement programs backed-up by incentives to work longer, the elimination of hurdles that make launching businesses difficult and growth-enhancing reforms are some examples. A rise in the retirement age would enlarge the labor supply and moderate the negative effect of aging on growth. If it rose to 70 from today's Eurozone average of 65 years, we think potential growth could increase by as much as 0.3 of a percentage point per annum in the subsequent 10 years.

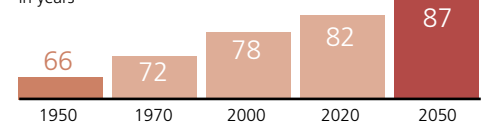
Demographic change will also affect government debt sustainability. Euro-



Population in Europe



Life expectancy in Europe
in years



zone government debt averaged 87% of GDP in 2017, with some countries significantly exceeding this figure. Given the risk of market dislocations in a government debt crisis, adherence to the European Stability and Growth Pact will become increasingly important amid rising demographic headwinds. While some Eurozone governments have already put reforms in place to face the demographic drag, there is still a long way to go. Only strong governance combined with the right structural reforms can prevent trend growth from declining.

Author: Ricardo Garcia

Europe	1950	1970	2000	2020	2050
Population, in million	330	380	423	450	460
Population growth rate, in %	0.60	0.60	0.30	0.20	-0.10
Fertility rate, children per woman	2.50	2.20	1.60	1.70	1.80
Age at childbirth	28.50	27.30	29.50	31.10	31.50
Net-migration rate, per 1,000 people	-0.80	1.20	3.50	1.70	1.80
Old-age-dependency ratio	14.20	18.50	23.90	32.70	53.10

Data estimates rounded and only approximately fitting the geographic area to give a trend indication.

Source: UN World Population Prospects, UBS 2017

Switzerland – one of the highest life expectancies requires rethink

Switzerland has one of the longest life expectancies in the world. It also has one of the fastest-aging populations. Its old-age dependency ratio will nearly double in the next few decades. This challenges Switzerland's pension system, particularly since the retirement age of 65 (64 for women) is relatively low given the country's high life expectancy.

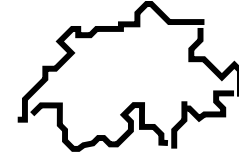
The pension system is not alone in feeling the burden. The aging population may also slow long-term economic growth by 0.4 of a percentage point annually in the coming years, in our view. So Switzerland needs to think about stabilizing its old-age dependency ratio as age-related outlays will become increasingly difficult to finance. Several options to improve the ratio exist: First, increasing the participation rate. Second, attracting more foreign workers. And third, raising the retirement age.

The Swiss labor force participation rate in the age bracket 15 to 64 years was 84% in 2017, one of the highest in the developed world. It would need to climb by about 8 percentage points to offset the workforce's aging-related stagnation. But the Swiss labor market seems nearly exhausted, and raising the participation rate further is diffi-

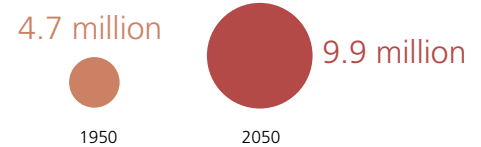
cult. However, a substantial share of people, mainly women, work part-time. Swiss authorities could try to promote more full-time employment to raise the number of hours they work, but this might discourage women with small children, an important group of part-time workers, from working at all. A more promising strategy would be to incentivize women to increase their part-time workloads again after their children have grown up. Today their labor market participation is well below average in their age bracket.

The inflow of immigrants over the past 15 years has enlarged the labor force by nearly 1% per year. But it is unlikely that the inflow will continue at this pace. European labor markets, from which most skilled immigrants come, are improving rapidly, and the labor supply growth in other European countries will also slow as aging takes hold there, too. Additionally, the marked inflow of immigrants has led to political resistance. Attracting skilled labor from abroad has historically enhanced Switzerland's economic success, but this strategy may become more challenging.

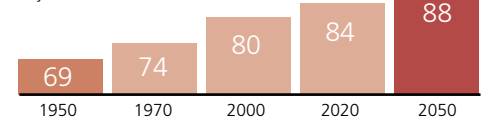
Raising the retirement age could boost the supply of labor and dampen the negative effect of aging on trend growth. The retirement age needs to be increased to 70 over the next five years to sustain current growth potential according to our estimates. Pension reforms to increase the retirement age



Population in Switzerland



Life expectancy in years



have repeatedly been rejected in public votes, however. This may change once the aging burden on society becomes more evident. In the meantime authorities could try to keep employees on the job over the statutory retirement age by setting appropriate financial incentives. Today only 12% of retirees work on a part or full-time basis.

Author: Alessandro Bee

Switzerland	1950	1970	2000	2020	2050
Population, in million	4.7	6.2	7.2	8.7	9.9
Population growth rate, in %	1.25	0.89	0.40	0.72	0.26
Fertility rate, children per woman	2.30	1.90	1.40	1.60	1.70
Age at childbirth	29.40	27.60	30.20	32.10	32.50
Net-migration rate, per 1,000 people	5.50	0.80	5.10	4.50	3.80
Old-age-dependency ratio	14.10	17.30	22.70	29.0	50.0

Data estimates rounded and only approximately fitting the geographic area to give a trend indication.

Source: UN World Population Prospects, UBS 2017

UK – unfunded pensions and healthcare create a double-whammy

The UK has historically been open to immigration, and has reaped the benefits of large inflows of young, skilled workers. Migration has enlarged the population and, crucially, the number of working age adults. Overall, the UK is one of the few developed market economies that enjoys relatively benign demographics. But challenges still lie ahead.

Like those in most developed market economies, the UK population is aging. At the turn of the millennium, the proportion of the working age population stood at 65%, and has dropped a couple of percentage points since. As a share of the total population, it is forecast to fall to around 58% by 2050. So the burden on taxpayers to finance the UK’s PAYG state pension system will soar. This problem is likely to be compounded by the UK’s model of unfunded healthcare, where spending is likely to rise as the population ages.

Demographic trends, in particular an increase in the working age population, also play an important role in determining a country’s long-term growth prospects. Fortunately for the UK, the trends do not look as bad as in other developed nations. Without reforms the trend rate of growth could average 2% annually. Lifting the retire-

ment age would slow the pace of workforce decline and raise the potential growth rate for the economy by 0.3–0.5 of a percentage point per year over the next decade, in our view.

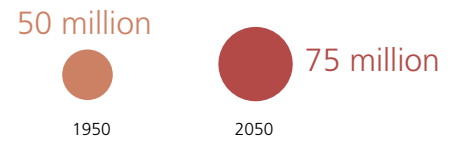
The UK government is well aware of these trends. It has already begun the process of raising the retirement age, or more precisely the age at which citizens are entitled to receive a state pension. The first steps occurred in 2011 when the government legislated making the pension age of women equal to that of men. By the end of this year, all UK citizens will be eligible for a state pension when they reach age 65. The next steps will increase the state pension age in steps to 68 by 2046. This legislation has already been revised to make the adjustments sooner.

Economic growth, it should be remembered, isn’t all about demographics. Productivity growth is even more important, especially in an economy like the UK’s that already has one of the highest employment ratios in the world, with little labor market slack left to increase hiring from the existing working age population. Enhancing productivity growth through investment and innovation could theoretically more than offset the impact of the demographic trends that the UK is likely to experience in the years ahead.

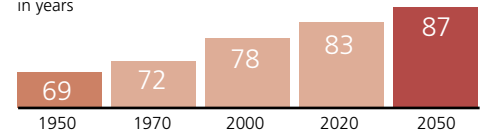
Author: Dean Turner



Population in the UK



Life expectancy in years



UK	1950	1970	2000	2020	2050
Population, in million	50	55	59	67	75
Population growth rate, in %	0.00	0.40	0.40	0.60	0.30
Fertility rate, children per woman	2.20	2.00	1.70	1.90	1.90
Age at childbirth	25.90	26.50	28.80	30.50	30.50
Net-migration rate, per 1,000 people	-1.4	0.4	3.2	2.5	2.1
Old-age-dependency ratio	16.2	20.8	24.4	30.1	43.6

Data estimates rounded and only approximately fitting the geographic area to give a trend indication. Source: UN World Population Prospects, UBS 2017

CEEMEA – reforms key for reaping benefits from demographic transition

Many countries in Central and Eastern Europe, Middle East, and Africa (CEEMEA) have a very young population. Their dependency ratios should plunge in the coming years, which, with the right policies in place, could provide a significant tailwind for economic growth.

In Africa, countries including Nigeria, Egypt, Côte d'Ivoire, Kenya, and even South Africa should benefit most from this demographic trend. The conditions in the Middle East are equally promising, although challenged by energy prices likely to be structurally lower in the years ahead. Greater economic diversification will be key in countries that rely on commodity exports. Reforms that abet this process and increase both competitiveness and the ease of doing business would provide a big economic boost and address the threat from high youth unemployment, which is common to both regions.

Many Middle East countries have social security and pension systems, although participation in them is often (partly) voluntary. Lower revenues from energy exports will require them to be built up more comprehensively. Most countries have sufficient time to adjust their policies accordingly, given their favorable demographics and large fiscal buffers.

In Africa, the emergence of national pension systems is a more recent phe-

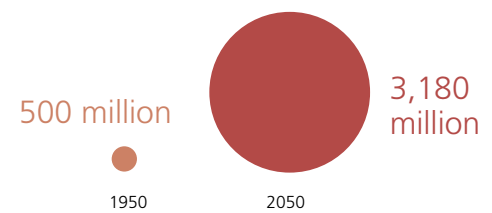
nomenon. The vast majority of countries now have mandatory schemes with a defined benefit funded on a pay-as-you-go basis. Surpluses are common, with comparatively low fiscal costs, as the share of eligible beneficiaries is low and the years they spend in retirement is much lower than their OECD counterparts. A challenge arises from the large number of people active in the informal economy. Several countries have developed means-tested old-age grants, typically paid out of public funds.

Russia is an exception to the rule. Its economic potential is vast given its population of 144 million well-educated, highly skilled residents and its large resource endowment. But its long-term growth potential is limited by structural bottlenecks and demographic trends unlikely to ride to the rescue. The country faces challenges from a shrinking labor force and an aging population. This burdens retirement funding and requires transfers from the federal government.

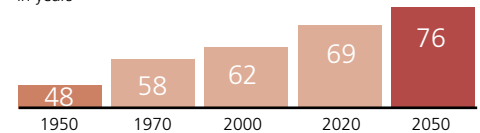
According to Rosstat, the country's working age population is expected to shrink by 5% in the next 15 years; its dependency ratio is set to rise from 43% in 2015 to 62% by 2050, according to UN estimates. That said, some measures are being adopted to head off a crisis: the retirement age for men and women has been raised to 65 years and 60 years, respectively (from 60 and 55), though this change has recently been challenged by President Vladimir Putin, and efforts to increase female workforce participation rates



Population in CEEMEA



Life expectancy in years



should help alleviate pressure on public finances. Putin highlighted naturally increasing the population and raising life expectancy for it (Russian men live on average 66.5 years versus an OECD average of 77.9 years) as key objectives.

Dependency ratios are also less favorable in the rest of Central Europe, including Poland, Hungary, and the Czech Republic, although there are again important differences among these countries.

Author: Michael Bolliger

CEEMEA	1950	1970	2000	2020	2050
Population, in million	500	730	1,300	1,930	3,180
Population growth rate, in %	1.80	1.90	1.70	1.90	1.50
Fertility rate, children per woman	5.00	4.60	3.20	2.90	2.40
Age at childbirth	29.10	28.10	28.00	29.30	29.80
Net-migration rate, per 1,000 people	-0.20	-0.50	0.20	0.10	0.10
Old-age-dependency ratio	7.40	9.20	11.90	15.00	25.00

Data estimates rounded and only approximately fitting the geographic area to give a trend indication.

Source: UN World Population Prospects, UBS 2017

APAC – different stages, same direction: Learn from one another

Asia Pacific is at different stages of the aging process. While its population is still growing, albeit more slowly, old-age dependency ratios will increase dramatically in the next 30 years.

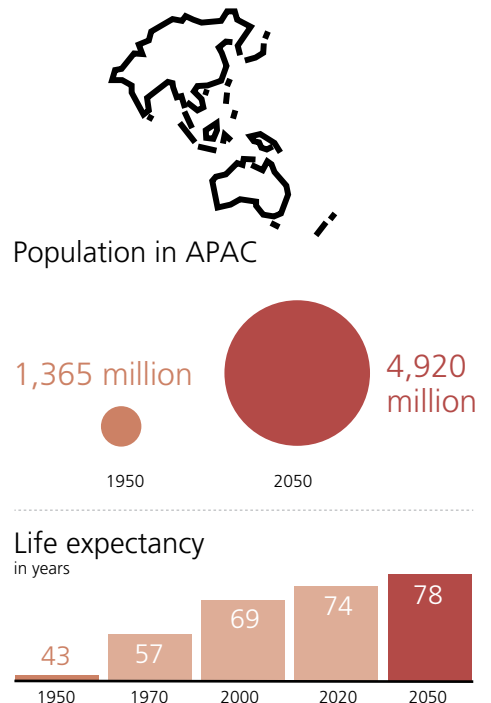
Japan is already at an advanced stage in the demographic cycle: its old-age dependency ratio is 46 today and projected to hit 70 in only 30 years. Its pension system has already been reformed somewhat. Other countries are less advanced. Korean and Chinese dependency ratios are expected to rise from 20 to 63 and from 15 to 42 over the same time period, respectively, and their pension systems are in need of reform. China is not only aging fast but its citizens have relatively low average incomes, so its reform is more pressing. For these countries the working population and the number of young are set to decline in absolute terms.

Over the same period, the old-age dependency ratio in less developed Asia will leap too, though it will remain significantly behind the “elders”: India’s ratio will rise from 10 to 20 and Vietnam’s from 10 to 32. Parts of Southeast Asia and India are still in the early stages of the aging processes and will enjoy relatively higher trend growth.

Aging weighs on real economic growth, which in trend terms may fall by more than half over the next 30 years. The impact of aging can be mitigated by such factors as raising the retirement age (already in force in Japan and Korea, and being evaluated in Singapore), higher female labor participation and increased migration, all of which would enlarge the labor pool.

Other things equal, we think raising the retirement age by five years, to 70, could reduce the growth slowdown over the next quarter-century by 0.25 to 0.40 of a percentage point annually in Japan, Korea, and China. The impact would be less for the “younger,” faster-growing economies. But such a one-time increase only delays the inevitable. Moreover, the rundown in accumulated savings for social and healthcare services accelerates when people pass age 75. This spending tends to be in lower productivity sectors, thus depressing economic growth further.

Higher life expectancies will strain pension systems based largely on a defined-benefit format, particularly in Japan, Korea, China, Thailand, and Vietnam. The IMF estimates that most Asian economies will need to substantially raise and, in some places, even double their fiscal pension spending before 2050. Reforms can limit the build-up of imbalances in these PAYG state-run pension schemes. They would not stop the



aging process per se, but they would help rebalance the relationship between total contributions and retirement payouts.

Other Asian economies such as Hong Kong, Singapore, Malaysia, and Indonesia rely more on defined-contribution schemes where funding is inherently more stable. For them, adjustments should aim to encourage workers to delay retirement in exchange for higher payouts.

Author: Phil Wyatt

APAC	1950	1970	2000	2020	2050
Population, in million	1,365	2,070	3,580	4,385	4,920
Population growth rate, in %	2.20	2.50%	1.20	0.80	0.10
Fertility rate, children per woman	5.80	5.00	2.40	2.10	1.90
Age at childbirth	29.60	29.10	27.10	27.70	28.80
Net-migration rate, per 1,000 people	0.04	-0.10	-0.50	-0.30	-0.30
Old-age-dependency ratio	6.80	6.80	9.20	13.40	28.00

Data estimates rounded and only approximately fitting the geographic area to give a trend indication.

Source: UN World Population Prospects, UBS 2017

US – unsustainable outlook recently worsened

Relative to most developed countries, the US has favorable demographics. It has been the top destination for international migrants for decades, with New York City alone home to more than three million foreign-born residents. Those migrants also have had higher fertility rates than the native population, helping to keep the population relatively youthful and growing.

While the UN projects that the US population will increase through the end of the century, recent developments could alter that outlook. First, the number of children born per woman has plunged in recent years, hitting a 30-year low last year, with an especially large drop in birth rates among immigrant women. Second, the Trump administration has proposed changes to immigration policy that could slash the number of migrants coming to the US.

The old-age dependency ratio has soared in recent years as the Baby Boomers, born between 1946 and 1964, began reaching retirement age. This trend is stressing the social security system, which is already paying out more in benefits than it collects in contributions. Based on current projec-

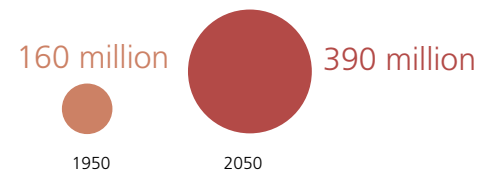
tions, the trust funds built up in previous decades under more favorable demographics and financial market performance will be exhausted by 2034. Similarly, the Medicare program, which provides medical coverage to the elderly, is underfunded. Its Hospital Insurance Trust Fund is projected to be depleted by 2029.

On top of these trends, recent tax cuts and budget increases have worsened the outlook for public finances more broadly. Gross government debt is more than 100% of GDP, higher than in most developed countries, and even under vibrant economic conditions the budget deficit will exceed 5% of GDP in 2019, by our projections. All of this suggests that the current situation is unsustainable. Significant adjustments will have to occur at some point in the years ahead, which could slow economic growth.

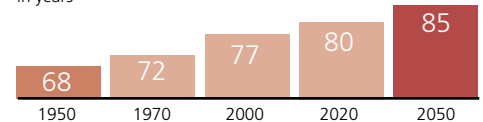
Fortunately, certain factors could help offset some of the trends noted above. More people over the age of 65 have been staying in the workforce, lifting the employment rate for the group by around 7 percentage points over the past three decades. While overall gains in US life expectancy have stalled recently, it is reasonable to assume that a higher percentage of older people will be capable of working in the future. If social security benefits are reduced, the average retirement age would likely rise further, which could boost GDP by 0.2 to 0.4 of a percentage point per year over the next two decades, in our view.



Population in the US



Life expectancy in years



Also, as a percentage of GDP, the US spends about twice as much on healthcare than other developed countries do. If policy reforms can reduce this gap, they could go a long way toward limiting the impact of population aging on public finances.

Author: Brian Rose

US	1950	1970	2000	2020	2050
Population, in million	160	209	280	330	390
Population growth rate, in %	1.30	0.90	1.10	0.70	0.40
Fertility rate, children per woman	3.30	2.00	2.00	1.90	1.90
Age at childbirth	26.6	26.0	27.7	30.5	30.5
Net-migration rate, per 1,000 people	1.20	2.70	3.60	2.80	2.40
Old-age-dependency ratio	12.6	16.3	18.7	25.7	36.4

Data estimates rounded and only approximately fitting the geographic area to give a trend indication.

Source: UN World Population Prospects, UBS 2017

LATAM – smart choices needed to benefit from low dependency ratios

Latin America can expect one of the highest working age population growth rates in the world over the next decade. Combined with declining total dependency ratios, a consequence of the region's falling fertility rates and the only gradual rise of older age groups, the demographic trend is favorable in the coming years.

This demographic dividend, if accompanied by adequate investment in education, healthcare, and infrastructure, should boost economic growth through an increased supply of skilled labor. Otherwise, a growing pool of young people lacking proper training or unable to become productive could burden society and put pressure on the social contract. Although the region invests adequately in healthcare and education, the outcomes in these areas leave a lot to be desired. And infrastructure investment in Latin America is inadequate.

Dependency ratios in Mexico and Peru have plummeted in the last decade, and the positive momentum will likely persist in the years ahead. These countries also have proportions of their populations in the "sweet spot" of the 15–24 age range well above regional and global averages. To harness the economic upside, Mexico and Peru will need to pour funds into education.

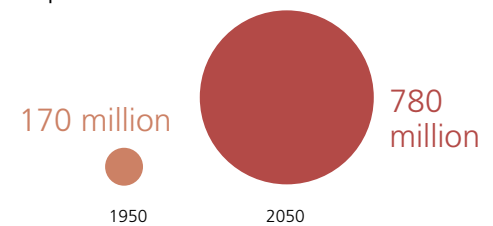
Mexico remains one of the OECD countries with the highest rates of youth neither employed nor in school. In Peru, government spending on education as a percentage of GDP is one of the lowest in the region.

Since the early 1980s, a number of Latin American countries, among them Chile, Mexico, Peru, Colombia, and (temporarily) Argentina, introduced individual-account, defined-contribution pension systems, sometimes working in parallel with PAYG pillars for segments of the population. These models have enabled the region to better prepare itself for demographic changes, led to a deepening of capital markets and improved fiscal sustainability. But more progress is needed: replacement rates and overall pension-system coverage for the population remain low. While there is no one-size-fits-all solution, pension reform must come to the forefront of the region's policy agenda.

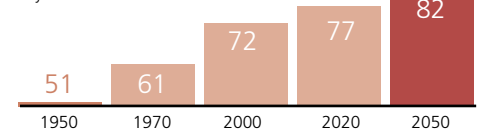
The first mover in terms of pension-system transformation was Chile. In 1981, it switched to a defined-contribution system administered by the private sector. This was complemented in 2008 by a publicly funded solidarity pillar that provides minimum pensions. Because of low mandatory contribution rates and short contribution periods, Chile's replacement rates are very low. The challenges to the country's pension system will remain large as its old-age dependency ratio will double from 15 to 30 by 2035. Continued improve-



Population in LATAM



Life expectancy in years



ments will be needed to keep the system on a sustainable track.

For Brazil and Argentina, the challenges are linked to the sustainability of their PAYG systems. The proportions of their populations above the age of 65 are expected to reach a non-negligible 15% of the total population by 2035. More importantly, their spending on pensions as a share of GDP is projected to balloon unless reforms are introduced. Any further delay is a risk they can ill afford.

Author: Alejo Czerwonko

LATAM	1950	1970	2000	2020	2050
Population, in million	170	290	525	665	780
Population growth rate, in %	2.70	2.50	1.50	0.90	0.20
Fertility rate, children per woman	5.90	5.00	2.50	2.00	1.80
Age at childbirth	29.50	29.20	27.10	27.40	28.80
Net-migration rate, per 1,000 people	-0.20	-1.50	-2.10	-0.40	-0.30
Old-age-dependency ratio	6.30	7.40	8.90	13.10	30.50

Data estimates rounded and only approximately fitting the geographic area to give a trend indication.

Source: UN World Population Prospects, UBS 2017

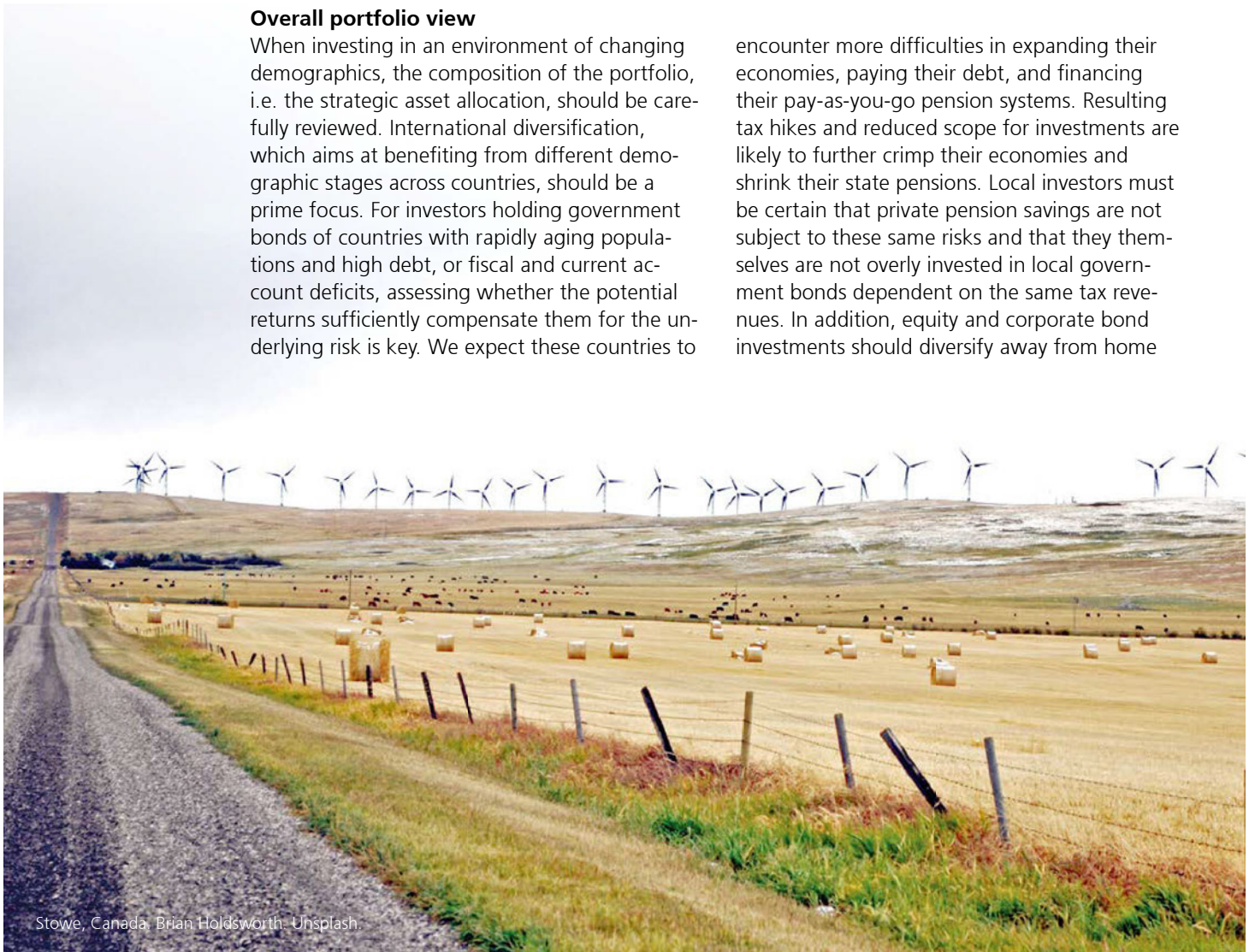
Investing in a changing demographic environment

Population growth, aging, and urbanization are robust and predictable long-term trends. They will persist through economic cycles and periods of political uncertainty alike. While in some areas the impact of these trends is foreseeable – no one doubts that healthcare services will be in high demand in aging populations – in other areas the exact economic and financial market impact will depend on how policymakers, central banks, and societies as a whole respond to these challenges. Given these uncertainties, demographics should influence but not dominate long-term investment decisions. The primary concern for investors is to diversify their portfolios across locations and asset classes while remembering that a dynamically changing economic environment will always offer investment opportunities.

Overall portfolio view

When investing in an environment of changing demographics, the composition of the portfolio, i.e. the strategic asset allocation, should be carefully reviewed. International diversification, which aims at benefiting from different demographic stages across countries, should be a prime focus. For investors holding government bonds of countries with rapidly aging populations and high debt, or fiscal and current account deficits, assessing whether the potential returns sufficiently compensate them for the underlying risk is key. We expect these countries to

encounter more difficulties in expanding their economies, paying their debt, and financing their pay-as-you-go pension systems. Resulting tax hikes and reduced scope for investments are likely to further crimp their economies and shrink their state pensions. Local investors must be certain that private pension savings are not subject to these same risks and that they themselves are not overly invested in local government bonds dependent on the same tax revenues. In addition, equity and corporate bond investments should diversify away from home



markets into regions with younger populations and healthy state finances, those where key sectors are expanding thanks to favorable demographic trends. Alternative investments can play a role, too, especially when a long investment horizon makes investing in less liquid markets a viable and appealing option.

Interest rates and bond investments

Interest rates have declined steadily in recent decades. Demographics might have been a structural driver of this development in some parts of the world. But financial deregulation, global economic and financial integration, and the accompanying international capital flows have contributed as well. Demographics will remain one of many factors that affect rates. Economies and institutions in countries around the world differ, and as these countries pass through demographic phases at different times and at varying speeds, the impact of demographic trends must be assessed individually for each one. To add to the complexity, different elements of a demographic phase may exert opposing pressures on the key drivers of real interest rates – the supply of and demand for capital and the compensation for credit risk.

Downward pressure on interest rates typically stems from the higher private savings volumes (capital supply) of large pre-retirement generations (e.g. in the candle and diamond stage) that set aside income for consumption in retirement. When government coffers are full and tax revenues are high (i.e. the dependency ratio is low, as in the candle stage), healthy government finances (low credit risk) and low bond issuance (low demand for capital) both push rates down. On the corporate side, demand for capital for investments is likely to fall in societies whose workforce size or productivity is declining (the late diamond and urn stages), as average expected investment returns trend lower.

By contrast, high investment returns and spending needs in an economy with a young and growing workforce (the late pyramid and early

candle stage) will push up both corporate and government demand for capital, putting upward pressure on rates. Later in the demographic cycle higher government spending on the state pension system, combined with lower tax revenues (e.g. late diamond and urn stage), will have an upward effect on rates. On the one hand, the government will issue relatively more bonds (higher capital supply) to fund its deficits, and on the other its credit risk will rise as the health of its finances deteriorates. Finally, dissaving by large generations of retirees who sell assets to finance consumption (e.g. the urn stage) will put upward pressure on rates as the supply of capital falls.

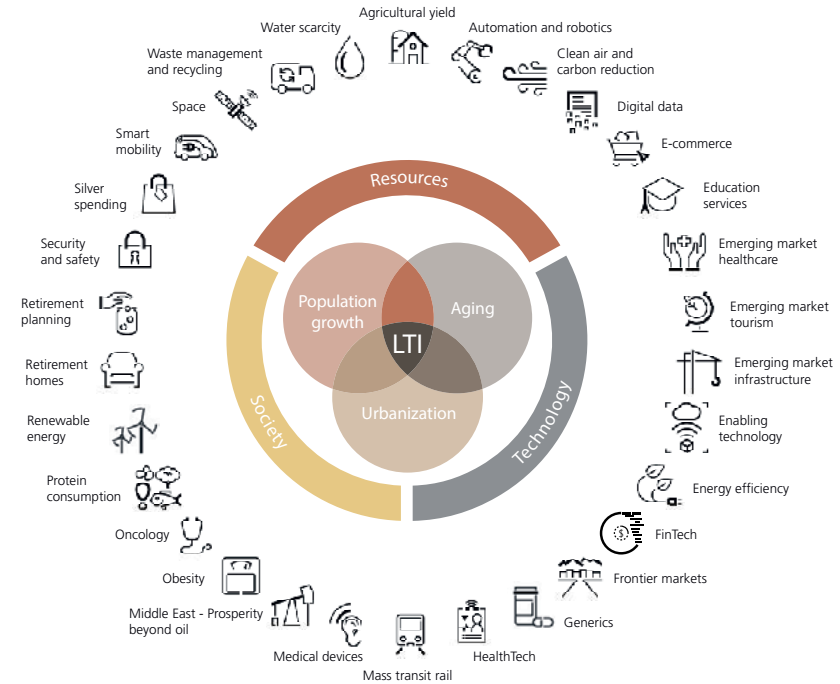
Thus, demographics have complex implications for interest rates. For example, in aging societies, many of which will be moving from the diamond to the urn stage in the coming decades, their falling pools of savings suggest that real interest rates will rise, while the lower investment by firms points in the opposite direction. So the overall direction of interest rates becomes highly uncertain. This means, for those investing in longer term fixed income instruments, that they need to consider the specific characteristics of the instruments they wish to buy and not only the general rates environment.

Has an emerging market created sound institutions and programs that will enable it to seize the advantages of its upcoming demographic dividend? Or has a country with high debt made unfunded pension promises that will be hard to service? Will a company benefit from changing demographics because its products are bought by a population group increasing in size? Or are growth prospects for a product weak, with its client base contracting as baby boomers retire? In some cases interest rates and spreads may initially seem attractive, but they may not sufficiently reflect upcoming demographic trends. Additional risk should be carefully considered in the context of an investor's diversified overall portfolio and personal financial dependencies, e.g. on government pension or health provision.

Interest rates have declined steadily in recent decades. Demographics might have been a structural driver of this development in some parts of the world.

Fig. 20

Demographic trends offer long-term investment opportunities



Source: UBS 2018

Equities

We recommend investing in equity markets that benefit from the growth of younger populations or the transition to the consumer economy. But it is not the demographics of the company’s country of domicile that matters; it’s the demographics of the markets the company serves. Multinational companies often invest in younger markets and markets with rising purchasing power, in pursuit of continued growth, even as the home country ages. As long as there are (enough) expanding markets, the growth of these firms will outpace that of their domestic markets. In countries with aging populations we prefer companies that benefit from a rising share of elderly citizens and those that operate where fiscal and current accounts are in surplus, as consumers are less likely to be squeezed by increased taxation. Companies and industries that innovate in the eye of current demographic challenges could well become tomorrow’s winners, providing diversified, long-term investment opportunities, through investment themes ⁴ (Fig. 20).

Retirement planning offers opportunities for financial innovators

Financial service providers should benefit from the rising need for careful retirement planning and substantial retirement savings. Companies with retirement savings exposure and innovative products to counter investment and longevity risk can expect to benefit from aging populations.

More older people, more healthcare demand

We expect the number of people aged over 65, who already account for the largest share of healthcare spending, to more than double by 2050. Diseases such as cancer are directly tied to aging, since the genetic and environmental factors that lead to cell mutations accumulate over time. Companies developing medical devices and treatments for age-related diseases (including oncology, Fig. 21) will benefit from increasing demand.

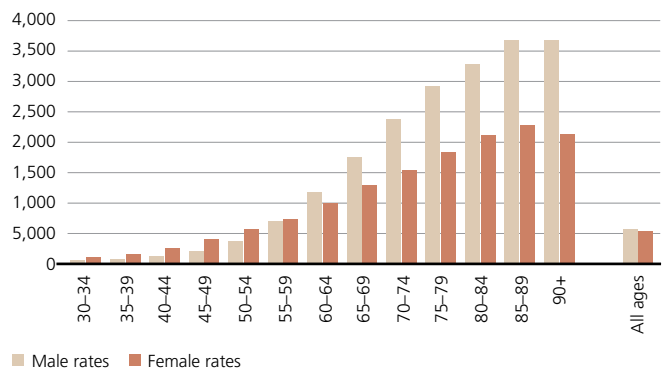
Companies and industries that innovate in the eye of current demographic challenges could well become tomorrow’s winners, providing long-term investment opportunities.

However, healthcare budgets are feeling the pinch of aging and population growth. Value-for-money is becoming increasingly important in healthcare provision. Greater pressure on drug prices, government incentives for wider use of generic medications in Europe, Japan, and

Fig. 21

An aging society requires care and medical innovation

Number of cancer incidents per 100,000 people



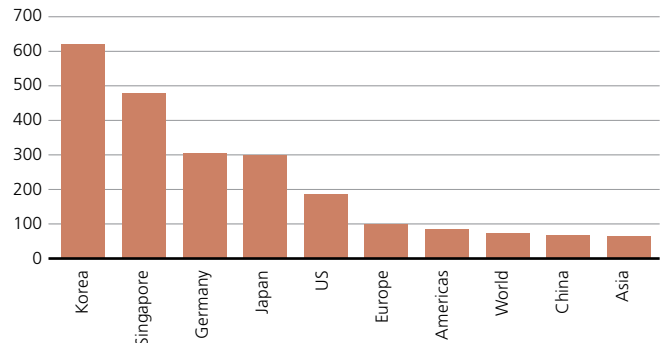
Source: Cancer Reserach UK, UBS 2017

⁴ See www.ubs.com/lti for more information

Fig. 22

Emerging markets have still catch-up potential

Robot density in manufacturing industry (all industries) by country/region, 2016 (Robots per 10,000 employees)



Source: UN World Population Prospects, UBS 2017

China, and shifting approaches to reimbursement that emphasize prevention and population health over simply incentivizing higher treatment volumes are trends likely to endure. “Health-Tech,” including telemedicine and robot surgery, will fuel this shift to value-based treatments both for older generations and for larger, still youthful ones that have previously lacked access to these technologies.

More people, more energy demand

According to the International Energy Agency’s (IEA) base scenario, the world’s energy demand is expected to increase about 25% by 2040. Global demand for electricity is anticipated to rise even more by then, by 60–70%, in our view. Continued global economic growth, an increase in world population and growing mobility, including more automobile and air traffic, are behind this accelerating energy/electricity demand. Investors should not invest in energy utilities blindly, but finite, traditional fossil fuels such as oil and gas and less environmentally damaging alternative energy sources are likely to offer appealing opportunities in the coming decades.

Mobile comfort paves the way for auto industry

Sports utility vehicles (SUVs) are the fastest-growing auto segment. They are easy to get into and out of so they cater nicely to the needs of an aging society. With autonomous driving features becoming the norm in vehicles (e.g. automated parking, distance control), the

auto industry already offers great safety and comfort to aging drivers, who are thus a structural growth driver for the industry.

Younger, growing urban populations will benefit from robotaxis that should reduce the cost of car ownership by around 70%, according to UBS research, and from car sharing that gives mobility to those unable or unwilling to buy their own car. The automobile industry is already investing heavily in and/or cooperating with car-sharing ventures as it considers them a multi-billion dollar annual sales opportunity.

From human to robot

Slower workforce growth in many countries will likely push wages up, boost investment in automation equipment and increase the use of emerging technologies such as robotics, artificial intelligence, and the virtual economy. In emerging markets including China, robotics use still lags that of developed countries (Fig. 22), but these countries’ rising wages, the size of their manufacturing sectors, and their need to raise productivity should lead them to adopt equipment automation more avidly. The rising digitalization of the manufacturing sector (industrial software) and industrial equipment becoming increasingly interconnected and linked, which improves collaboration among people and enhances productivity, will also fuel this trend. Companies with sales targeted to this Industrial Internet of Things (IIoT) segment should enjoy above-average growth rates.

People on the move – moves investment opportunities

City dwellers choose primarily to remain where they are when they retire, and continue to be joined by the urbanizing young. In fact, economic development has nearly always been accompanied by the gravitational pull of towns and cities. With fewer people left in the countryside (Fig. 23), agriculture is forced to become more labor efficient, reinforcing the loss of farming jobs, and compelling rural workers to move to cities in search of work. Urbanization is more concentrated in emerging than in developed nations, and urban populations in the former are expected to rise 78% by 2050. Investment in waste management and mass transit rail infrastructure, for example, can exploit this ongoing trend.

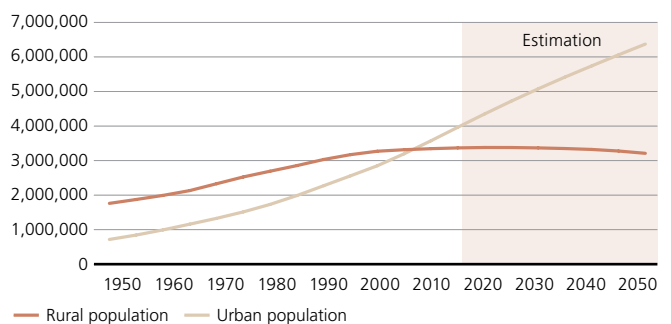
Commodities

According to historical data, demand for commodities (particularly steel) rises when per capita income moves into a USD 5,000–12,000 range, as urbanization takes off. From USD 12,000 up, commodity demand still grows in line with incomes but is linked more to manufacturing, consumer goods and transportation than to housing or basic infrastructure. Incremental demand for commodities from high-income economies has already slowed and could decline further in coming decades, with China joining this trend at a later stage in 5–10 years. But other populous countries such as India, Indonesia, and Nigeria, with nearly 2 billion people among them, are urbanizing rapidly and will likely fill the gap. Their current GDP per capita is still below the sweet spot for commodity demand, but as it rises they will likely support commodity upcycles in the decades ahead.

Fig. 23

Urbanization increases while the rural population is declining

Number of people in rural and urban areas



Source: UN World Population Prospects, UBS 2017



Iron Ores. Tianjin Municipality, China.



São Paulo, Brazil.

Non-traditional assets

As the structure of the economy in various countries changes, we expect investors to investigate return potential in alternative investments. Skill-based investments like hedge funds and private markets should become more valued by investors comfortable with these asset classes.

Investing with impact and sustainably

The relevance of demographics to sustainable and impact investing is twofold. On the demand side, current demographic trends point toward millennials and women exerting greater influence as investment decision-makers. Numerous surveys have shown that, compared to previous generations of investors, they are far more inclined to focus on sustainable and impact investing. This is particularly relevant in view of the fact that millennials will benefit from one of the largest wealth transfers in history – USD 24 trillion of global assets will be owned by millennials by 2020 – over the coming decades, according to Deloitte. Women too are projected to control an increasing share of global wealth.

On the supply side, sustainable and impact investing can help address the challenges that result from a growing population with a changing age structure. In this sense, demographic trends open up opportunities to invest in assets generating products and services that address pressing issues such as affordable access to healthcare services, clean water, energy efficiency and access to finance, among other topics.

Real estate

Changing demographics affect real estate markets markedly as housing demand depends on the age structure of a society and on residential population trends. As residents age, average household size shrinks so more apartments are needed per capita. The number of households is then on a path to grow faster than the total population. Additionally, demand for small and senior citizen-appropriate apartments then soars.

On the other hand, the drop in demand for large apartments and houses will be striking in some areas, particularly in rural regions. These trends will be amplified if properties have to be sold to fund their owners' retirement. The worst circumstance for housing markets is a shrinking population, as empty buildings are typically not pulled down. In countries without population growth, average land values will gradually come under pressure, but construction activity usually adjusts to the slower demand growth and limits the impact of demographics on prices.

In countries with a pyramid structure, cities will grow disproportionately as a result of the urbanization trend. This should benefit land values in city centers. The need for urban housing offers opportunities for real estate developers. However, in the long run, economic output and income in strongly growing economies will rise faster than real estate prices and thus warrant a diversified investment approach.

Outlook



Humanity has always faced challenges, some self-inflicted, others imposed on it. Yet our drive to overcome a harsh, hostile environment that too often made our lives nasty, brutish, and short has prevailed. One of today's biggest challenges is both a blessing and a curse at once: a hitherto unimaginably long life that requires a rethink of our traditional social and family models. But societies and governments seem paralyzed by the enormity of it.

Mastering it is as much science as art. The science involves breaking down the complex social circumstances that exhibit different characteristics in different regions of the world. So careful analysis and balanced, forward-looking, rule-based solutions are needed in each case, ones dynamic enough to apply not only to this but to coming upheavals.

The art part comes in when addressing the challenge within the challenge: each solution requires sacrifice. Politicians will not find it easy to appease voters and persuade them about the long-term benefits of reforms whose positive impact will not be felt by everyone right away. So any proposed solution will face pushback and obstacles.

What if there is no solution? The storm clouds of demographic change will gather strength, no doubt. After the high winds have wreaked havoc by sweeping away the comfortable certainties of the postwar world, they will eventually abate. But they will leave a landscape of falling living standards and rising indebtedness, of disappointment and hardship, in their wake.

It would be a shame if we responded to the threat easily visible on the horizon today with only reactionary instead of precautionary measures. There are enough options to try. The focus needs to shift from the present to the future, and the discussion needs to center on the world we want not only for ourselves but for future generations.

Glossary

Baby Boomer generation: The generation born between the mid-1940s and the mid-1960s. This demographic cohort stands out as it is large compared to previous and subsequent generations and is having an outsized impact on the pension system.

Defined benefit (DB) plan: A pension plan in which an employer/sponsor promises a specified pension payment, lump sum or combination thereof on retirement. This benefit is usually predetermined by a formula based on the employee's earnings history, tenure of service and age, rather than depending directly on individual wage contributions and investment returns. The financial risk lies primarily with the employer/sponsor of the scheme.

Defined contribution (DC) plan:

A type of retirement plan in which the employer, employee or both make contributions (deducted from the employee's gross wages) to a registered retirement account on a regular basis. Regular or lump sum pension payments are then made from the cumulated savings and the returns on them during retirement. As these payments depend on the investment performance of the funds in the account, a DC fund provides much less income security for the employee, and a more limited obligation for the employer, than a defined benefit pension plan, i.e. the employee bears the investment and longevity risk.

Demographic change: Demographics describes the statistical study of populations. The transition of the population structure due to birth, death, migration and longevity is called demographic change.

Demographic dividend: The economic and social benefit a relative increase in the working age population brings. It rises if the share of younger and economically productive people rises faster than the share of older people. The magnitude of the demographic dividend depends on factors such as the speed and scale of the transition, but also on having an adequate economic policy framework to ensure that additional re-

sources (capital, labor) can be effectively integrated into the economy.

Demographic trap: Occurs when economic progress doesn't sufficiently compensate for the burden of more young dependents, leading to a decline in living standards. It may even lead to fertility rates increasing further as impoverished parents seek economic security by having more children, creating a negative spiral of low or falling living standards and sustained high fertility.

Dependency ratio: The ratio of people of people aged 65+ and -15 to individuals aged 15-64.

Funded system: Description of pension system with sufficient assets to cover all accrued benefits.

Generation A: The youngest generation, born after the mid-2010s, also named Generation Alpha.

Generation X: The generation following the Baby Boomers, born between the mid-1960s and the early 1980s.

Generation Y: Also known as Millennials, the generation born between the early 1980s and the early 2000s. They tend to be the children of Baby Boomers, but their own boom is far less pronounced due to structurally lower birth rates.

Generation Z: The one born between the early 2000s until the mid-2010s.

Life expectancy: The statistical measure of the average lifetime of a specified set of people grouped by age, usually measured as life expectancy at birth. For this report we take life expectancy at age 50 from the specific mortality tables.

Lump-sum payment: A one-time payment of total or partial retirement benefits.

Mandatory pension system: A country's prevailing pension scheme that citizens and residents are legally obliged to participate in and from which they can expect a pension payment in the future.

Old-age dependency ratio: The ratio of people aged 65+ to individuals aged 15-64.

Working age population: The population cohort between 15-64 years of age.

Pay-as-you-go pension system: In an unfunded defined benefit pension, no assets are set aside and the benefits are paid for by the employer or other pension sponsor as and when they are paid. Pension arrangements provided by the state in most countries in the world are unfunded, with benefits paid directly from current workers' wage contributions and taxes.

Pension annuity: A stream of payments over a defined period or until death of the recipient.

Pension gap: The difference between pension income and cost of living in retirement, usually negative.

Population momentum: The relationship between the different age cohort sizes. As long as the population consists of more people of reproductive age, total population growth can be sustained even with a fertility rate equal or below the replacement rate.

Replacement rate: The ratio of first net-retirement income and last net-working income.

Risk premium: The return exceeding the risk-free rate that is expected of an asset. It compensates the investor for the extra risk taken above that of the risk-free asset, which is usually a short-term US Treasury or other government bond.

Silent Generation: The generation born between the mid-1920s and the mid-1940s.

Voluntary retirement savings schemes: Along with mandatory retirement schemes in which workers are mandated to contribute by law, voluntary options exist. They are provided by government agencies, companies or private third parties. Some offer tax incentives.

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