

ISSUE 002
FEBRUARY 2017

STRATEGY NOTE

INVESTMENT
IMPLICATIONS OF
GLOBAL
DEMOGRAPHIC SHIFTS

NBK CAPITAL
INVESTMENT STRATEGY & ADVISORY

FEBRUARY 2017

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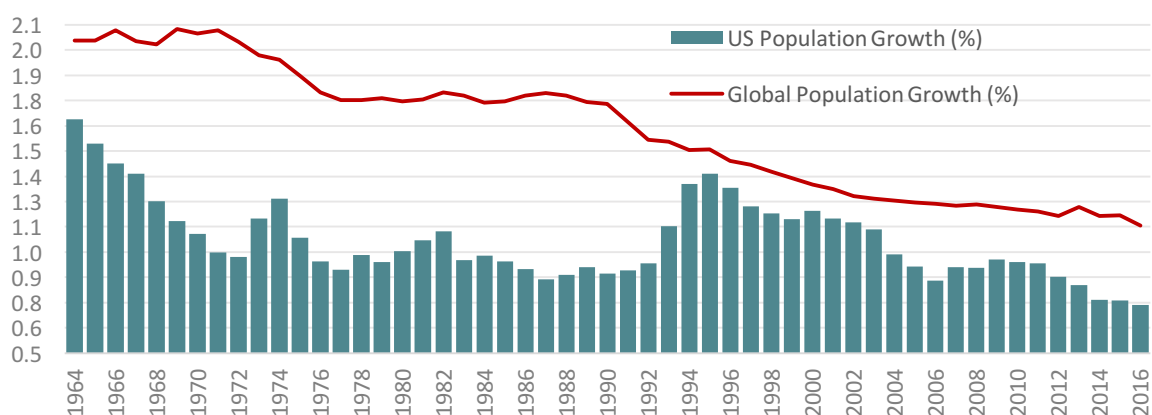
HIGHLIGHTS

- World population growth is slowing down, fertility rates across the globe are dropping and people are living longer. This is causing a **major shift in the composition of the world population** as older cohorts are forming an increasingly higher percentage of the total.
- With fertility rates in the EU at 1.5, the United States at 1.9 and China at 1.6, **the largest global economies are already below the long term average maintenance rate of 2.1.**
- **An aging population combined with a low birthrate present serious pressures on governments and household finances** as they struggle to secure appropriate healthcare and elderly care services expenses and keep pensions funded.
- The implications of such shifts are wide reaching. There is mounting evidence that an **aging population is impacting levels of productivity, spending and saving behaviors, inflation levels and ultimately general economic growth.**
- Long term trends of economic indicators seem to be pointing to a structural paradigm shift. **Inflation and Interest rates have been on a declining trend for more than 3 decades.**
- The global economy has been registering low single-digit growth rates for the past 5 years and is currently expected to stay around these levels for at least another 5 years.
- Going forward, **economic growth would be driven more by increases in productivity and less by leverage**, hence reducing the volatility of GDP growth rates in addition to smoothening and extending economic cycles.

WORLD POPULATION GROWTH IS SLOWING DOWN

The size of the world population and its composition are key variables in determining patterns of economic growth and levels of productivity and consumption. The tremendous growth rate witnessed by the world population since the industrial revolution helped propel economic growth across the globe. It took humanity all of its history to reach the one billion mark around the year 1800. We achieved the second billion in only 130 years, the third billion in 30 years, and the fourth and the fifth in 15 years (1974) and 13 years (1987), respectively. The world population today is close to 7.5 billion, with the largest two countries in terms of population, China and India, accounting for 36% of the total, with around 1.4 billion each.

Chart 1. Global & US Population Historical Growth Rates



Source: World Bank

The explosive growth in world population, however, seems to be tapering down. As illustrated in Chart 1 above, the global population growth rate almost halved over the past 50 years. It declined from around 2.1% in the mid-1960s to a little over 1% currently.

Along with the slowdown in global population growth rates, a fundamental shift in the structure of the demographic composition appears to be underway; societies around the world are aging and the world is getting older.

People are living longer and having less children than their parents and grandparents. Since the beginning of the second half of the twentieth century, the world started to witness a significant shift in its demographic composition. A combination of advances in the medical field, improvement in living standards, better nutritional habits, and lifestyle changes have made it possible to live longer. Longevity, or life expectancy, is improving across the world. Although this improvement is more obvious in advanced and high-income countries, increasing longevity is a worldwide phenomenon, albeit in varying degrees among developed and developing nations.

Chart 2. Life Expectancy

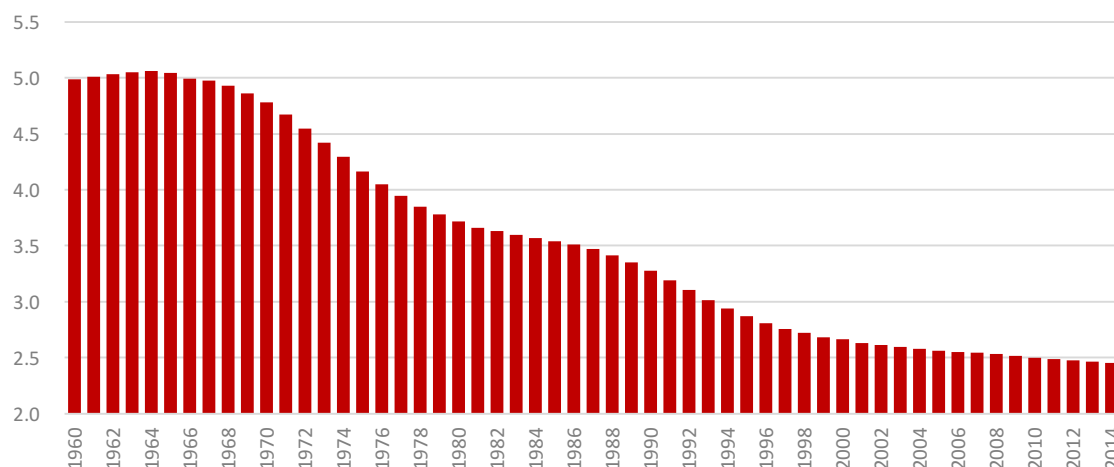


Source: World Bank

On average, people born in low-income countries as recently as the 1980s were expected to live up to their late 40s. The average life expectancy for the same country group is now slightly over 60 years. Over the same period, life expectancy for OECD member countries increased from 72 to 81 years.

Along with increasing longevity, we are seeing fertility rates dropping. Fertility, defined as the total number of children born to a woman over her lifetime, is dropping across the world. The global average fertility rate currently stands at around 2.45 down from 3.28 as recently as 1990 and 4.80 in 1970.

Chart 3. Historical Global Fertility Rate



Source: World Bank

SHIFTING COMPOSITION

With an increasing longevity and a declining fertility, societies across the globe are aging. The cohort of older people that have retired or are about to retire (aged 64+) is increasing much faster than the young cohort (aged 0-15) which are supposed to replace the retirees to preserve a balance in the workforce. More importantly, and given that the current declining trend in fertility is unlikely to reverse in the near future, it seems that the world population is undergoing a structural transformation that is both irreversible and far reaching in terms of its impact on macroeconomic outcomes. Such changes will alter macroeconomic variables through channels such as savings and investment behavior, spending patterns, ability and willingness to take investment risks and labor force productivity.

Chart 4. Historical Age Group Distribution - World

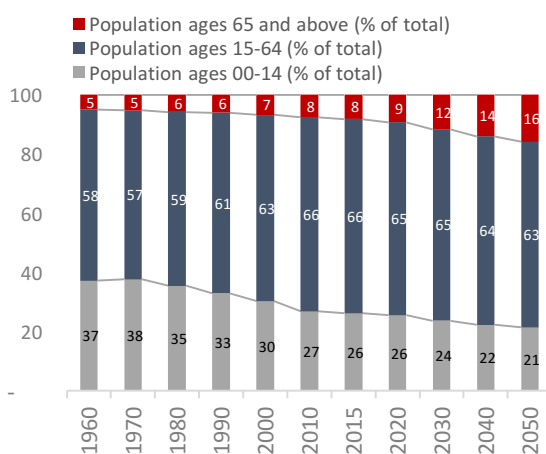
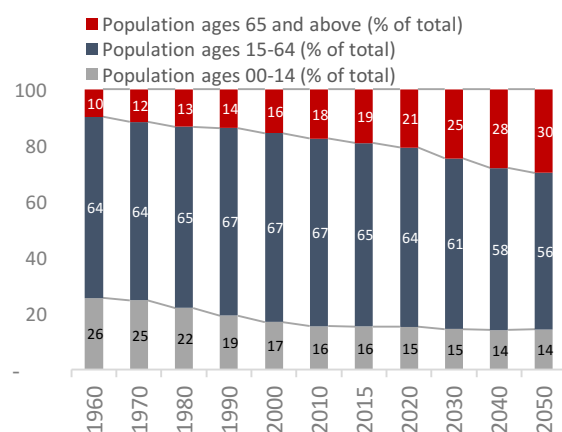


Chart 5. Historical Age Group Distribution - EU



Source: World Bank

The first direct impact of increasing longevity that is combined with a declining fertility rate is a shift in the composition of population. Typically, this leads to an increase in the share of the older cohort (65+) at the expense of the younger cohort (0-14). Older groups in the population are becoming an increasingly more significant portion of the total.

In the European Union for example, the percentage of the population that is above 65 years of age has practically doubled in the past 50 years or so. It has increased from 10% of the total population in 1970 to 19% currently and it is on track to reach 30% by 2050. Over the same period, the segment of the population aged 0-14 has declined from 26% to 16%. Looking at the global figures, the picture and the trend remains identical: older cohorts have almost doubled from 5% to 9% between 1960 and 2020, while the younger constituents' share of the total has declined from 37% to around 26%. Although this trend is much more severe in richer and more developed nations, it is obvious that it is quickly catching up in the rest of the world. (See the appendix for more detailed charts on different economic blocks and income groups).

In both groups, and in much of the developed world countries, the share of the working age population is on the decline. OECD figures show that the share of the working age group

reached a maximum of 67% and started to decline since then. This trend will accelerate in the coming decades to reach 58% by 2050.

The most direct consequence of this shift in composition is the increase in old-age dependency ratio, defined as the total number of people aged 65 and above divided by the total number of people of working age or 15-64. In Japan, which has been regarded as an exception in terms of aging population and sluggish economic growth, the old age dependency ratio has doubled from 13% in 1980 to around 25% in 2000 and is on track to double again to 48% by 2020. According to current data, Japan is no longer an exception. Germany and France are catching up, with dependency ratios projected to reach 35% and 34% respectively by 2020.

As one would expect, this phenomenon is not restricted to the developed world. Lower income and developing countries are following the same upward trend but it is still in early stages. On a global level, the old age dependency ratio increased from 11% in 1980 to 14% in 2000 and it is heading towards 22% by 2020.

Chart 6. Old Age Dependency – Large Economies

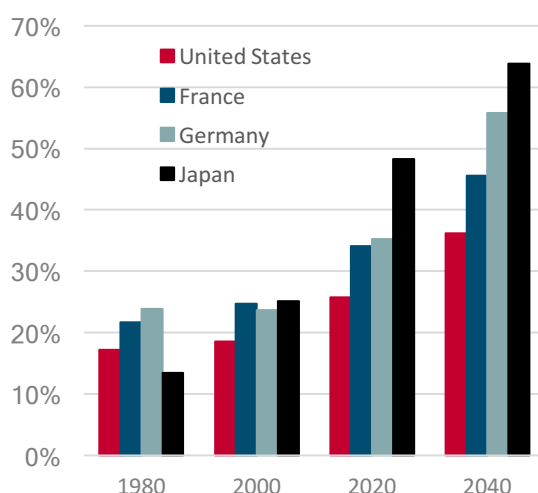
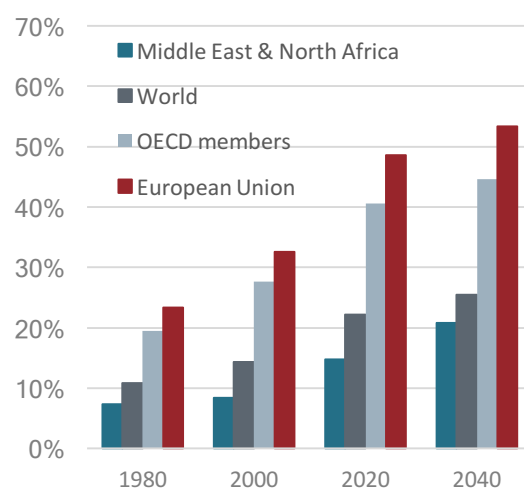


Chart 7. Old Age Dependency – Major Economic Blocks



Source: World Bank

WHAT DOES THAT MEAN FOR THE WORLD ECONOMY?

Demographic changes are usually considered longer-term phenomena that may or may not materialize at some point in the future, while economic policy discussions and mainstream media seem to have largely dismissed such trends. Whenever subjects such as aging population, low fertility, and longevity are discussed, the attention shifts to Japan and South Korea, where this phenomenon has been going on for quite some time. There are indications, however, that this phenomenon has already started to shape the globe, and not only in developed countries, but in less developed and low-income countries, albeit to a lesser extent.

Some research seem to indicate that not only will these demographic shifts have serious economic consequences, but that such consequences have already started to reshape the global economy and have the potential to explain much of what is being observed today such as generally low inflation, low interest rates, less effective monetary policy, and relatively lower economic growth across the world.

A multitude of IMF working papers, articles in the Financial Analysts Journal (FAJ) and the CFA Institute Magazine, have discussed and studied the effects of demographic changes on financial markets and the economy, on monetary policy effectiveness, and on the outlook for inflation and long term economic growth. For the purposes of this discussion, we will not go into the details of such academic and technical analysis. Instead, we will try to employ a logical approach in discussing the implications of such demographic shifts on the global economy and the investment environment while keeping the supporting conclusions of the aforementioned studies in the background.

INFLATION

Population growth was found to affect inflation positively. The fast population growth of the 1960s had the effect of moving aggregate demand higher and faster than the aggregate supply could catch up. The markets needed to clear, or to balance, which was achieved through an increase in prices, leading to inflation during the following decades fueled by the baby boomers. When the opposite happens, it is only logical to conclude that it will be deflationary. Today's picture is radically different from that of the mid-20th century. Baby boomers are now retiring and population growth is slowing down, and more importantly, the composition of the population is drastically changing.

Chart 8. US Long Term Consumer Price Index- All Urban Consumers (Y/Y)



Source: U.S. Bureau of Labor Statistics, retrieved from FRED, Federal Reserve Bank of St. Louis

On a global level, we have moved from a population where 37% of people are below the age of 15 and 5% are above 65 in 1960 to a population where 10% are retirees and only 26% are below the age of 15. This picture is more pronounced in large industrialized countries such as Germany, France, the UK, and the US where the share of the elderly has doubled between 1960 to 2015 while the share of those below 15 declined by around 40% on average.

This has significant implications on the spending patterns of the general population. Younger cohorts are generally net borrowers and their consumption patterns tend to be more inflationary. They borrow to finance their education, residence, cars, furniture...etc. As they grow older, their income starts to improve and they start paying down debt, accumulating assets and saving for retirement. They become net savers, they invest, and they have the ability and willingness to take investment risk hoping that it will pay off in higher return when they retire. By the time they reach retirement they would have paid down their mortgage, or even sold their house and moved to a smaller one. They start spending from their savings and pension and spend more on healthcare and recreational activities such as travel and experiences rather than material things. Their consumption trends become, therefore, deflationary.

ECONOMIC GROWTH & LABOR PRODUCTIVITY

Productivity and the size of the labor force are two of the major drivers of economic growth. In today's digital economy and with an aging population, two forces seems to be pulling in opposite directions on economic growth. On one hand, labor force is shrinking, with the declining fertility and increasing longevity which, when taken in isolation, would translate into lower economic growth. On the other hand, technology and automation is displacing low-skilled workers and reducing the need for human labor in general and making production much more efficient and less labor intensive, which is conducive to positive growth.

Reality, however, is not that straightforward. The social and economic costs of technological advancement are significant. Technological advancement is completely transforming the labor market through changes in the learning curve. In traditional manufacturing and service industries, a maturing labor force would ideally translate into more experienced laborers which would lead to more efficiencies and ultimately increased productivity. Add technology to the mix and this logic is turned upside down. A significant challenge in today's job market is to keep up with technological advancement. Traditionally, formal education and training are front loaded into one's career. Formal school education followed by job-specific training early on in the career constituted the bulk of the training an employee receives over his or her professional life. In today's job market, a maturing labor force is finding it increasingly difficult to keep up with technological advancement.

Costly lifelong training is being advocated as a prerequisite to maintaining productivity levels throughout one's career. This phenomenon has, according to some studies, reduced the peak performance in some industries to the mid-40s which is roughly half way through the conventional working age of 15-64 years. This goes against the advocates of policies of extending the retirement age beyond the age of 65 aimed at reducing the burden of pension providers, which will be discussed in the next sections.

Chart 9. Civilian Unemployment Rate



Source: U.S. Bureau of Labor Statistics, retrieved from FRED, Federal Reserve Bank of St. Louis

There is a big debate today in the United States about the “real” unemployment rate. Is the current unemployment of 4.7% really representative of the job market picture? What about the participation rate? According to a recent analysis by Bloomberg discussing the new US administration’s views on unemployment, adding back people who dropped out of the labor force since 2007 and those who are working part-time but would like to work full time, the unemployment rate would be around 16.7%! However, when taking into account that significant factors contributing to the drop in labor force participation are an aging population and people dropping out of the workforce simply because their skills are no longer compatible with the requirements of the job market, these numbers seem debatable.

Chart 10. Labor Force Participation (age 25-54)

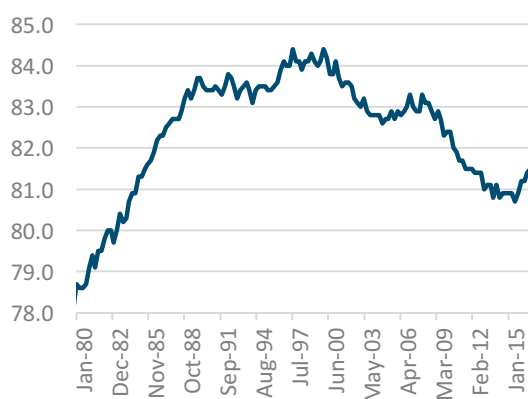


Chart 11. Labor Force Participation (All)



Source: U.S. Bureau of Labor Statistics, retrieved from FRED, Federal Reserve Bank of St. Louis

The effect of population aging is illustrated in charts 10 and 11. Total participation reached a peak of a little over 67% in the year 2000 and has been dropping ever since. It currently stands at 62.7% registering a decline of over 7%. However, looking at the participation rate for the age group between 25 and 54 years, the decline wasn’t that steep. Participation went down

from a peak of 84.4% in January 2000 to a low of 80.7% in mid-2015 and has been recovering steadily to around 81.5% currently.

INTEREST RATES & RETURNS

After the financial crisis of 2008 central banks around the globe embarked on massive monetary easing measures to shore up the global economy. Now, more than eight years after the onset of the crisis, most major economies are still employing some form of monetary easing and interest rate levels are still at record lows. The US Federal reserve is the only major central bank that started to reverse its easing policy. It has been increasing rates very gradually while relying on the unraveling condition of the economy to take appropriate action towards fulfilling its dual mandate of maximizing employment and stabilizing prices.

The first rate increase in the current cycle was in December 2015. Expectations were for up to four rate increases in 2016 only one of which materialized in December.

Chart 12. Effective Federal Funds Rate (%)



Source: Board of Governors of the Federal Reserve System (US), retrieved from FRED, Federal Reserve Bank of St. Louis

Looking at the Fed's dot plots, expectations are for three rate increases this year to bring the target to 1.375% then another three in 2018 to 2.125%. The target is to reach a long term level of 3.0% by 2020. Even if the dot plots expectations materialize, or even if the long term target level was brought forward as a result of more aggressive tightening, interest rate levels will still be on the low side when compared to historical levels.

In fact, interest rates have been on a declining secular trend for more than three decades as shown on chart 13 below, which depicts the 10-Year treasury constant maturity rate since 1980. There has been some economic cycle related ups and downs that sometimes lasted for years, but the overall long term trend is clearly downwards.

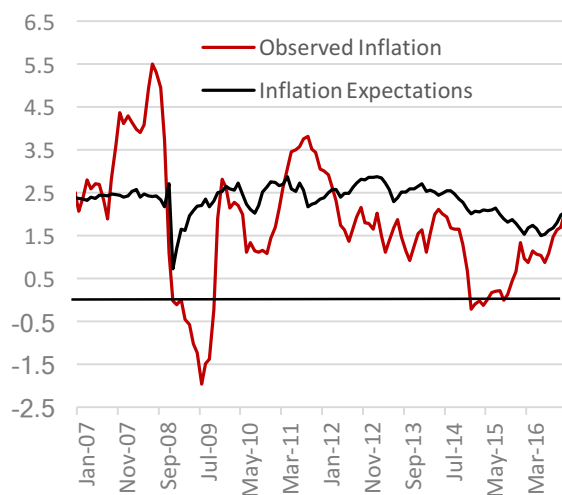
Chart 13. 10-Year Treasury Constant Maturity Rate (%)



Source: Board of Governors of the Federal Reserve System (US), retrieved from FRED, Federal Reserve Bank of St. Louis

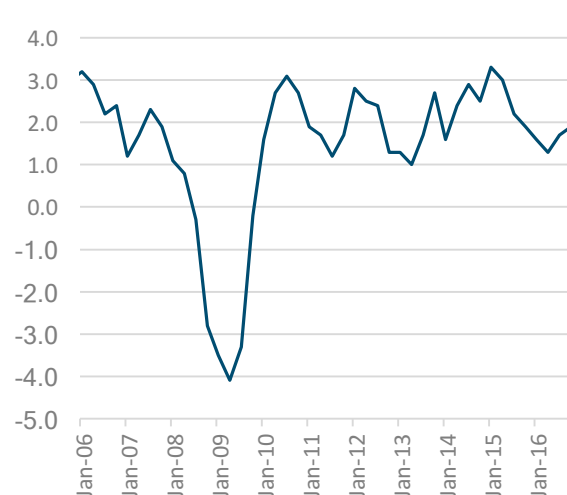
Under the Fed's dual mandate of maximizing employment and stabilizing prices, the former seems to have been largely achieved with unemployment dropping down to 4.7% from over 10% at the onset of the financial crisis. The latter, however, is proving to be a little trickier. With interest rate levels at historic lows and the economy doing relatively fine, inflation has been declining since mid-2011 after witnessing some volatility around the financial crisis.

Chart 14. Inflation vs. Inflation Expectations



Source: U.S. Bureau of Labor Statistics, retrieved from FRED, Federal Reserve Bank of St. Louis

Chart 15. US Real GDP Growth



Source: U.S. Bureau of Economic Analysis, retrieved from FRED, Federal Reserve Bank of St. Louis

To measure expected inflation as depicted in chart 14 above, we used the 5-year breakeven inflation rate, which is derived from 5-year treasury constant maturity securities and 5-year treasury inflation-indexed constant maturity securities. Actual inflation didn't catch up with the expectations until December 2016 when it reached 2.1% up from 1.7% the previous month. Even though inflation has been on the rise since the beginning of 2015, the concern

has recently been about deflation rather than an overshoot in inflation. It was only in the past few months that this risk seems to have subsided as signs of inflation started to show across the world.

Inflation could either be imported or homegrown. A strong home currency would mean cheaper imports and is therefore deflationary. This is the case for the United States currently. The US dollar index has increased by more than 25% since the middle of 2014 on the back of a diverging monetary policy with the rest of the world and a more stable economy. The opposite is happening now in Europe and the UK as inflation in both seems to be picking up at least partly due to weakness in the Euro and British Pound.

Homegrown inflation, on the other hand, results from pressures on resources. It is the “too many dollars chasing too few goods” principle. By the same token, the relationship between inflation and money supply is demand driven. If inflation was driven by the supply of money it would have been straight forward to reflate. However, inflation is driven by the demand for money, which makes it a demographic issue.

A combination of factors worked against inflation post financial crisis. There was a transfer of debt from the private sector to the public sector while central banks’ balance sheet ballooned and households deleveraged. Add high unemployment and an aging population, which by nature is reluctant to borrow money, and demand for money will plummet. The price one pays to borrow money becomes irrelevant. Taking these factors into consideration along with the fact that the money multiplier, or velocity of money, has been on a downtrend since the early 1980s, monetary policy alone becomes increasingly ineffective in reflating the economy.

Chart 16. Velocity of Money Supply (M2M)



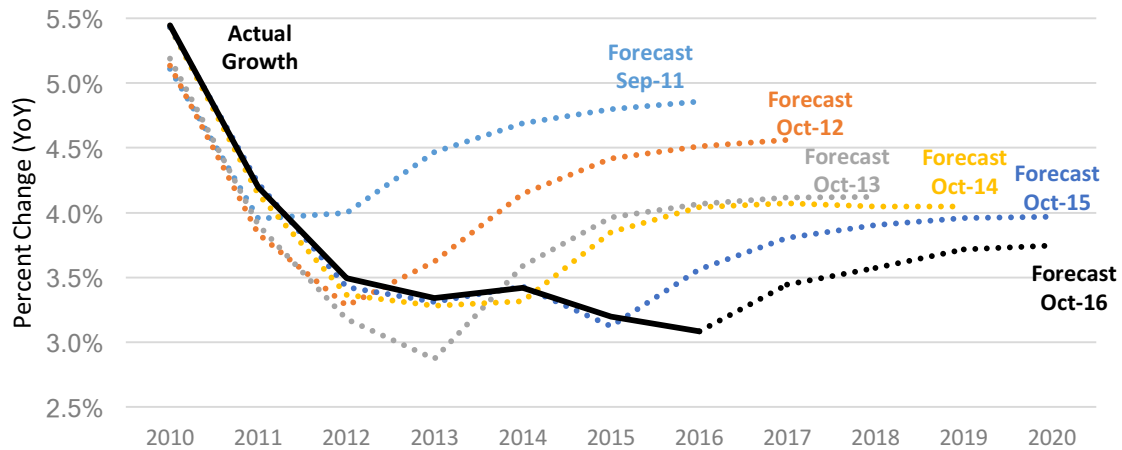
Source: Federal Reserve Bank of St. Louis, retrieved from FRED, Federal Reserve Bank of St. Louis

Note: M2M (money with zero maturity) is the broadest component and consists of the supply of financial assets redeemable at par on demand: notes and coins in circulation, traveler’s checks (non-bank issuers), demand deposits, other checkable deposits, savings deposits, and all money market funds

During previous economic downturns, when interest rate policy was more effective, reducing the interest level in an economy would induce investment and consumption through leverage. The massive deleveraging which happened post 2008 rendered such causal relationship less effective. Changing economic dynamics and an aging population seem to

have the effect of smoothing and elongating economic cycles. Economic growth will have to be driven more by productivity and less by leverage.

Chart 17. IMF World Real GDP Growth Forecast, 2010-2020



Source: International Monetary Fund

High single digit growth for the global economy seems to have been long gone. The IMF in its annual forecast has consistently adjusted its estimates for global GDP growth downwards for the past six years. Chart 17 depicts the path of estimated GDP growth at the time of the forecast since 2011 versus the actual realized growth in world GDP. We've been trending down between from 3.5% to around 3.0% for the past few years, and, even according to IMF estimates, world economic growth will not reach 3.75% until 2020.

FINAL THOUGHTS

An aging global population and dropping fertility rates are reshaping the world economy through a shrinking labor force, changing productivity, and are altering consumer behavior and savings and investment trends.

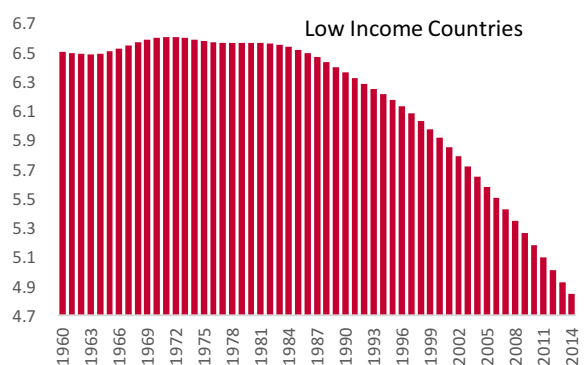
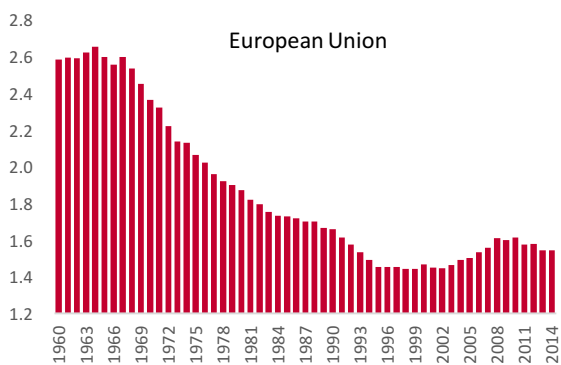
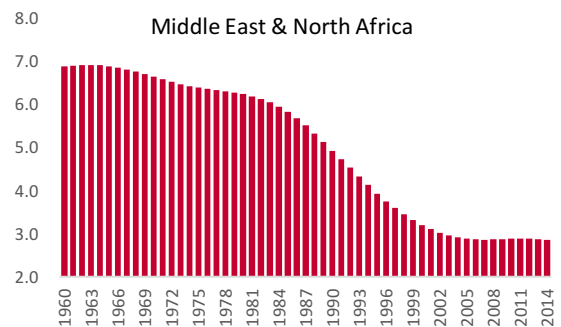
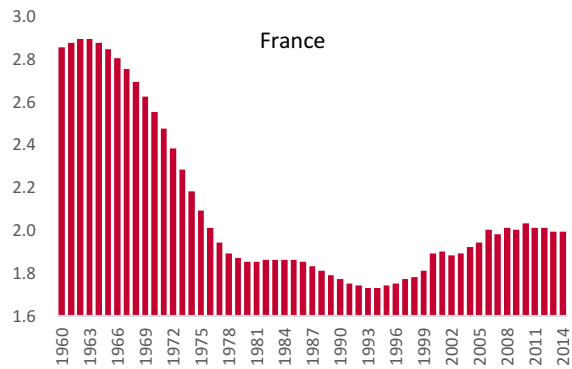
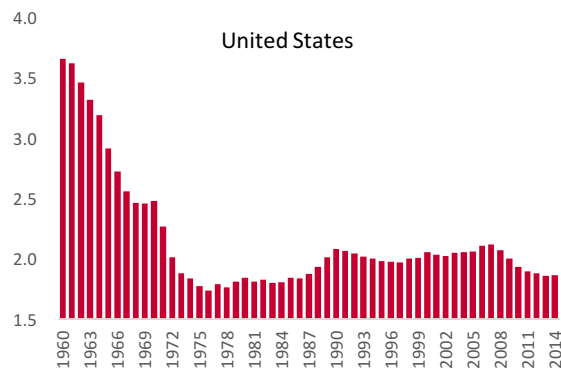
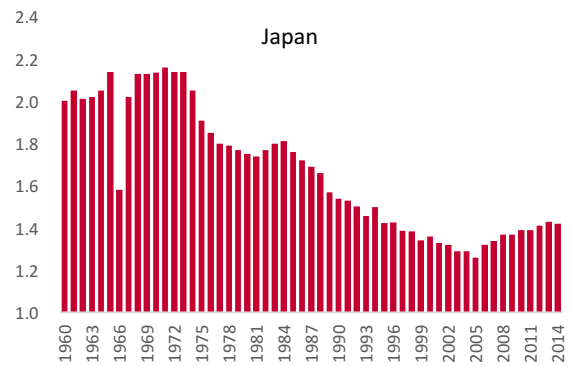
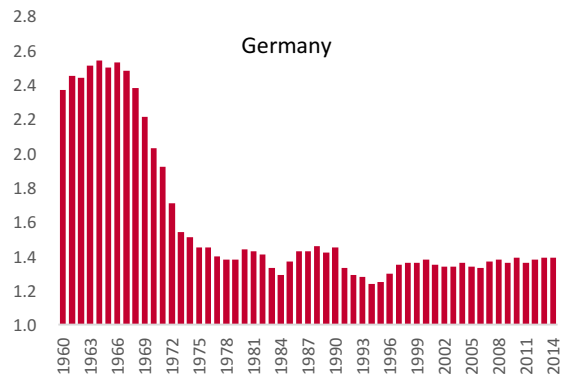
The global financial crisis of 2008 was unique in many ways; it acted as a catalyst that accelerated and magnified the effects of demographic shifts. It coincided with the retirement of baby boomers putting additional downward pressure on consumption and productivity. The crisis caused a significant amount of wealth destruction. According to a study by the Federal Reserve median household wealth in the US declined by 40% in just three years between 2007 and 2010. This destruction of wealth caused people to become more concerned about financial stability and led to an acceleration in deleveraging at the household level.

The combination of these factors contributed to causing an expansionary monetary policy to become less effective in restarting the engines of the economy. The steady improvement in the unemployment rate was partly due to continued declines in the participation rates, while inflation continued to decline for the better part of the past ten years.

One of the most direct consequences of the global financial crisis and the ongoing demographic shifts is the change in the structure of the labor market. An aging population is changing the age profile of the labor pool at a time when technological advancement is making it more challenging for workers to keep up with the skills required by the job market. Therefore it became very difficult for skilled employees who left the job market during the financial crisis to come back years later, because their skillset was already outdated and because they were replaced by a younger group.

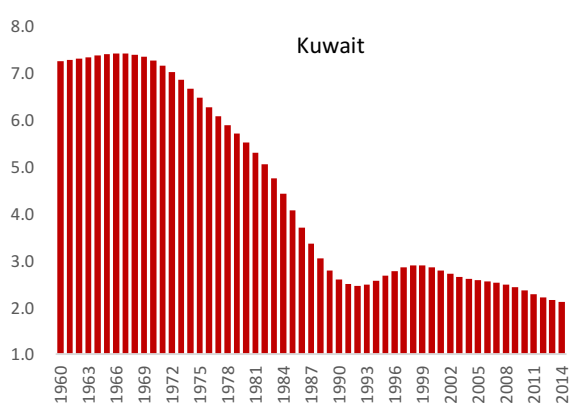
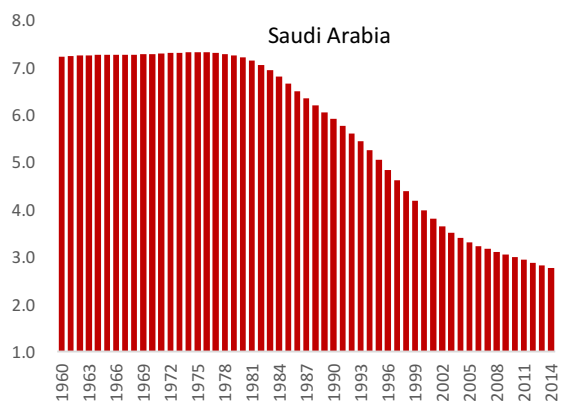
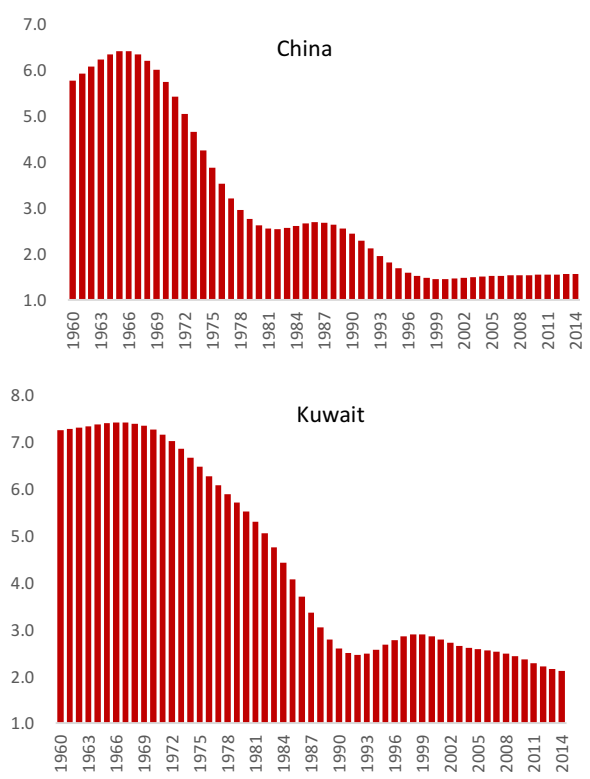
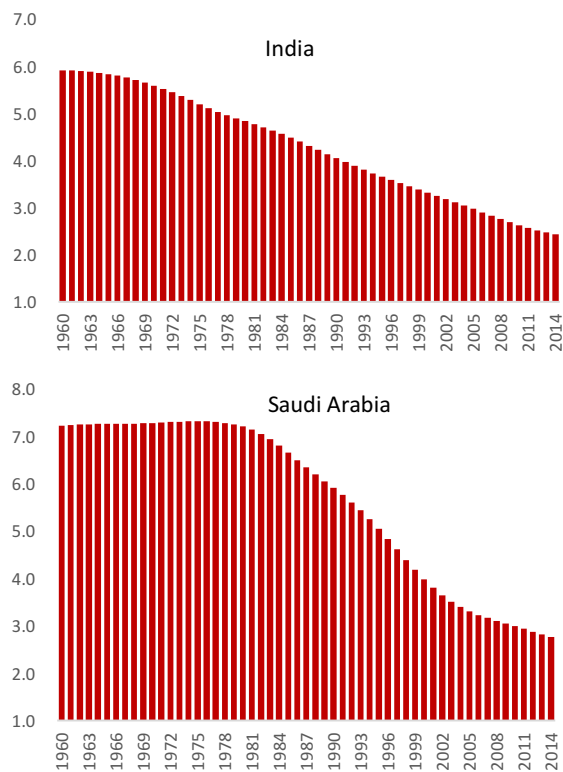
In such an environment of moderating economic growth, low leverage and historically low interest rate levels and inflation, it becomes increasingly difficult to conceive of high returns for traditional asset classes. Fixed income returns are at all-time lows, dividend yield for the S&P 500 currently stands at around 2.1% compared to 5.5% in 1980, and equity markets are at all-time highs. Add to this a multitude of political factors and events unfolding in the US and Europe and it becomes extremely challenging to conceive of an asset allocation from a traditional menu of asset classes that would result in a reasonable risk adjusted return. It follows that non-traditional asset classes such as alternatives, private debt and illiquid strategies in general are increasingly gaining investors' interest in their quest to capture the extra return offered by these instruments.

APPENDIX – FERTILITY RATES:



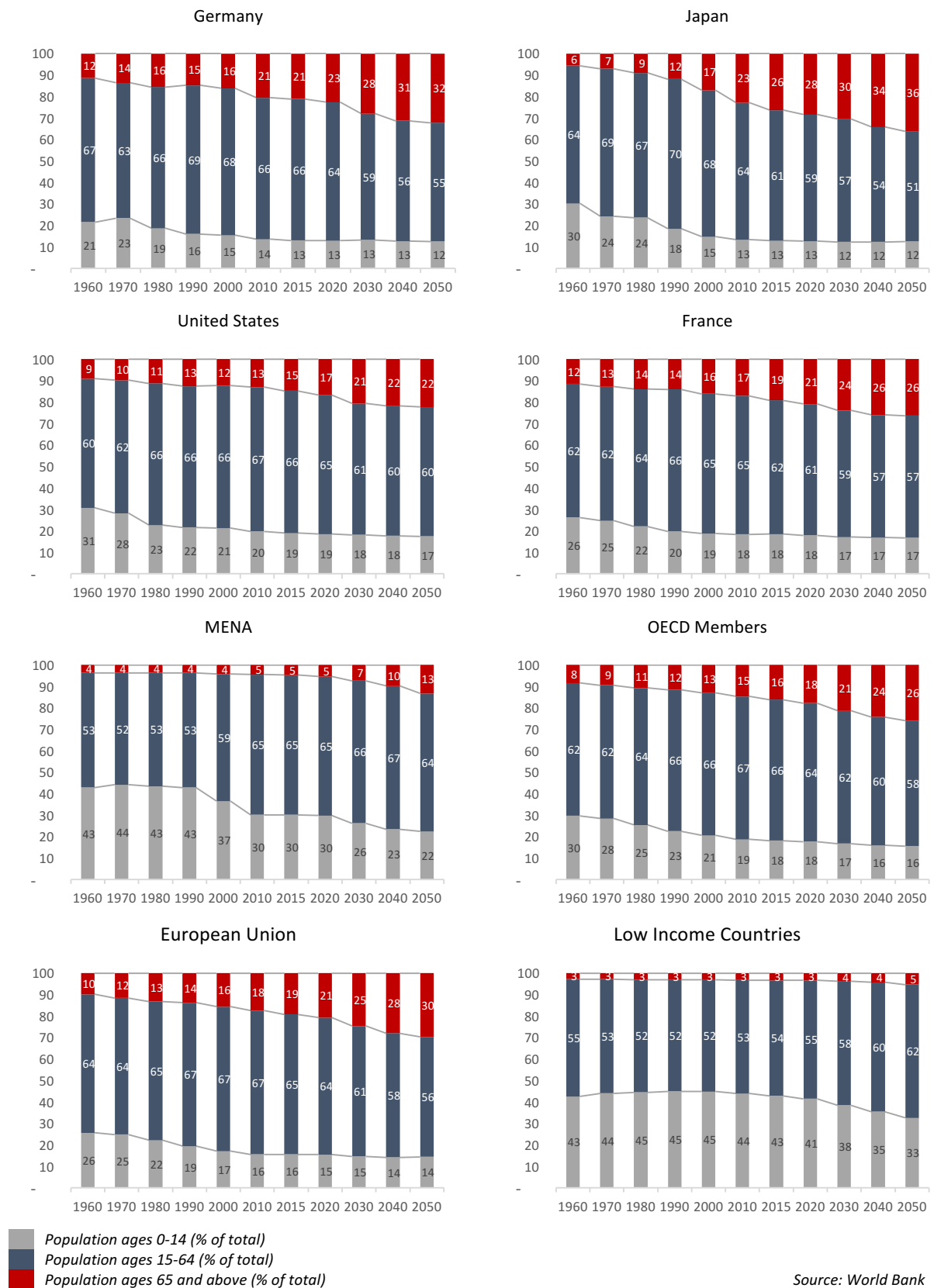
Source: World Bank

APPENDIX – FERTILITY RATES:



Source: World Bank

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