

# Demographics

## A Credit Suisse Megatrend

Daniel Kurz, Thematic Strategist, CIO Office

Let us start off with a definition. Demographics examines the statistical characteristics of human populations such as income, spending patterns, lifestyle, growth, and aging. In year 1 A.D., the human population was some 300m strong. It took 1800 years to reach the first billion people, a compound average growth rate (CAGR) of 0.07%. Over the next 200 years, on the back of rapidly expanding fossil fuel exploitation in agriculture and medical advancement, the population grew by 5.1bn to reach 6.1bn by 2000, a CAGR of 0.9% (UN and Population Reference Bureau). Within this 200-year period, population growth accelerated markedly beginning in 1950 (population base 2.5bn) to a CAGR of 1.8%. Now, humans number an estimated 6.8bn (<http://math.berkeley.edu/~galen/popclk.html>).

Our global population growth rate, currently at 1.4% p.a., is ebbing. The declining rate is the result of a sharp drop in the total fertility rate (comprised of age-specific fertility rates of women in their child-bearing years), offset by a pronounced increase in life expectancy (see chart 1). As a result, the world's population is aging (see chart 2). This aging will substantially impact numerous arenas, from

spending patterns to labor's bargaining power to government finances to potentially even monetary policy. The impact of an aging population is also likely to affect asset allocations and valuations. It is these aspects of demographics that are examined below.

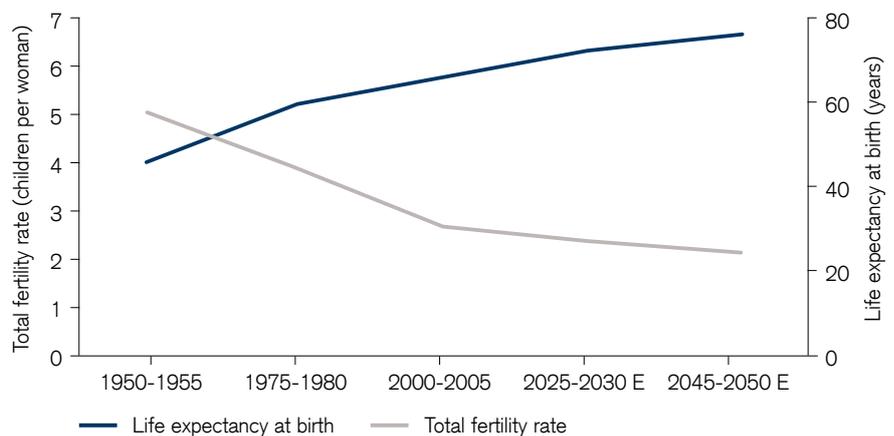
### A closer look at aging

The world's "retired ranks" (as per current retirement age conventions, see chart 6) are set to account for a steadily increasing percentage of the total population, namely from 7.6% in 2010 to 16.2% in 2050 (see chart 3). Perhaps surprising to some: less developed or emerging

market regions are projected to manifest this aging trend the most. The ranks of emerging market senior citizens over the next 40 years are expected to increase by over 180%, easily outdistancing the nearly 70% increase of the same cohort in more developed regions.

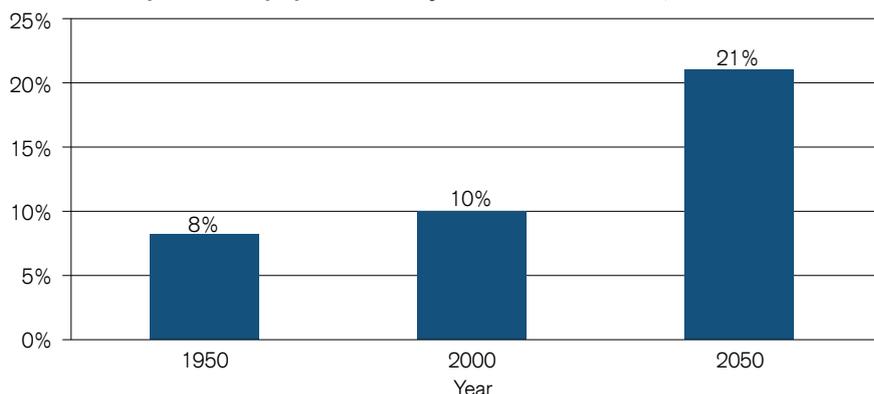
With globally aging populations, so-called dependency (population aged 65 plus relative to population aged 15 – 64 years) ratios are also on the rise (see chart 4). Consistent with the less developed region aging trends, less developed region dependency ratios should also pace the upward trajectory of old-age dependency ratios. In this regard, we would be remiss

Chart 1: Total fertility rate and life expectancy at birth: world, 1950-2050



Source: UN, Population Division

**Chart 2: Proportion of population 60 years or older: world, 1950-2050**



Source: UN, Population Division

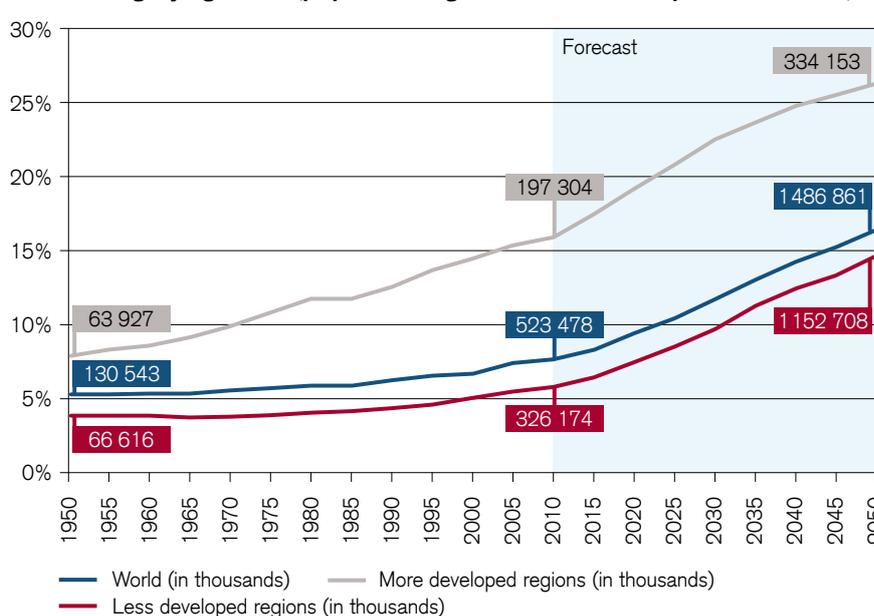
if we didn't highlight China, with its 1.3bn population, and its accordingly disproportionately large impact on rising old-age dependency ratios in both less developed regions and the world at large. Specifically, China's old-age dependency is set to rocket from 11% in 2010 to 38% by 2050. No doubt Beijing's 32-year old one-child policy, written into the Chinese Constitution in 1978, is having its impact; Chinese officials claim that 400m births were thus prevented (The Christian Science Monitor, December 17th, 2009).

**The consequences of aging societies**

Why does global aging cast such a large shadow? Unsurprisingly, it has a lot to do with "societal affordability" associated with rising dependency ratios. A brief historical recap is appropriate. Defined-benefit (adequate capital provisioning and payment onus on providers instead of on plan beneficiaries) pension and retirement health-care coverage schemes were increasingly rolled out and expanded in the post World War II period by both the public and the private sector. At that time, life expectancy was considerably shorter than today. As a result, the same well-intentioned social safety net promises made by politicians and the private sector alike (thanks largely to rising union collective bargaining power clout into the late '70s) were initially made in an era when A) life expectancy was considerably shorter than it is today and B) fertility rates were much higher (see chart 5).

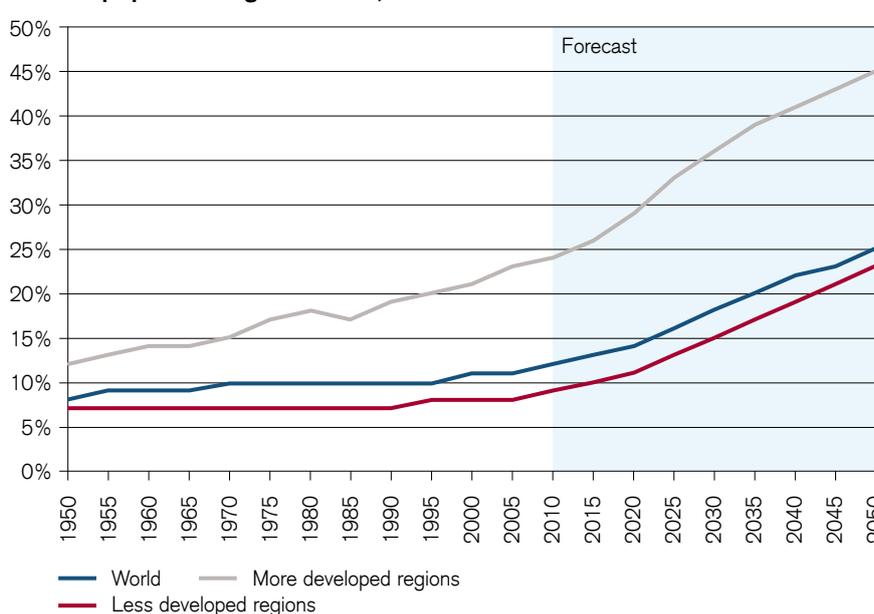
Commensurately, from both an actuarial and common sense perspective, financing for future retirement benefits three and even two generations (60 and 40 years, respectively) ago was much more robust. Ironically, this stout demographic

**Chart 3: A greying world (population aged 65 or over as a percent of total)**



Source: UN, Population Division, medium variant estimate

**Chart 4: Old-age dependency ratios, in percent (population aged 65 or over/population aged 15 – 64)**



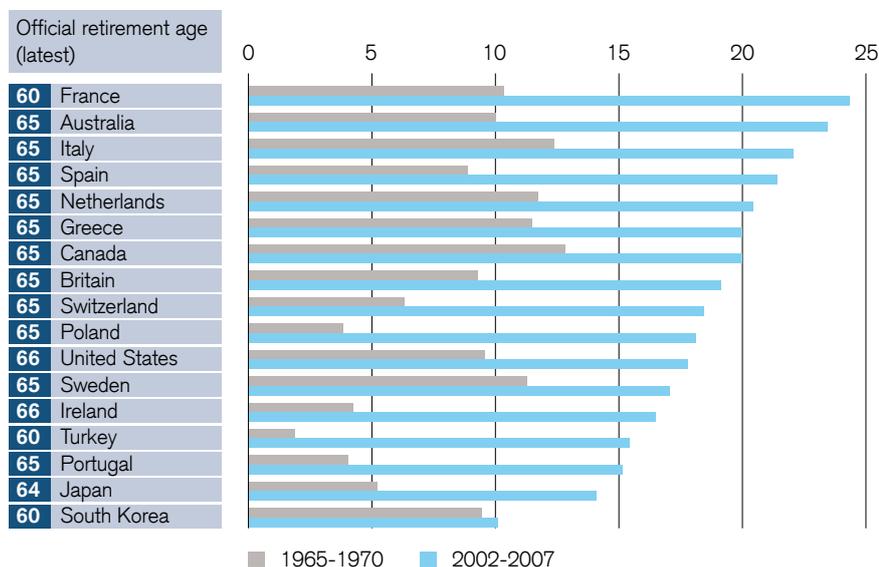
Source: World Population Prospects, UN, 2009

**Chart 5: Life expectancy and total fertility rates decomposed**

	Life expectancy (years)			Total fertility rate (children per woman) <sup>a</sup>		
	1950-1955	2000-2005	2045-2050	1950-1955	2000-2005	2045-2050
<b>World</b>	47	65	75	5.0	2.6	2.0
<b>Developed countries</b>	67	78	84	2.8	1.6	1.8
Europe	66	78	83	2.5	1.4	1.8
Japan	64	82	88	2.8	1.3	1.9
United States	69	77	82	3.4	2.0	1.9
Canada, Australia, New Zealand	69	80	85	3.5	1.6	1.9
<b>Economies in transition</b>	63	65	74	3.1	1.6	1.8
Commonwealth of independent States	63	65	74	3.1	1.6	1.8
South-eastern Europe	57	74	80	3.7	1.6	1.8
<b>Developing countries</b>	41	63	74	6.2	2.9	2.1
Latin America and the Caribbean	51	72	79	5.9	2.5	1.9
East Asia and the Pacific	41	70	78	6.1	1.9	1.9
South Asia	39	63	75	6.1	3.2	1.9
Western Asia	43	68	78	7.0	3.5	2.0
Africa	38	49	65	6.7	5.0	2.5

<sup>a</sup>) Women between the ages of 15 and 49

Source: UN 2005

**Chart 6: Years in retirement (life expectancy from actual retirement, men, in years)**

Source: OECD, The Economist

snapshot in time proved fleeting in nature. In fact, with markedly rising life expectancy thanks to medical and nutritional advances coupled with the onset of “birth control-induced” fertility reductions, a tidal shift in societal age distribution towards an older population was soon a foregone conclusion.

As such, bulging retirement-age life expectancy – a joyous thing for humanity, however difficult to finance – is not a big surprise (see Chart 6).

### The impact of aging on government finances and more

The convergence of stouter retirement benefits, falling fertility rates, increasing life expectancy, and aging populations has resulted in daunting liabilities for Advanced G-20 Governments (see Chart 7). The IMF (International Monetary Fund) drew much needed attention to this societal challenge a year ago by discounting the projected government-funded retirement payment obligations back to net present value (NPV) terms. It then compared the size of this (funding) deficit with the Advanced G-20 Country deficits incurred as a result of (in response to) the 2008/09 global credit crisis. The comparison makes for sobering reading. On average, the IMF projected a fiscal deficit equivalent to over 400% of Advanced G-20 GDP, or nearly 15 times as large as the deficit related to the recent credit crisis (see chart 7).

If we take a closer look at these huge, de facto off-balance sheet liabilities, we inevitably need to contemplate government revenue and expense trajectories. Quickly, the size of successive generations comes to the fore. The US situation is illustrative. There are five living genera-

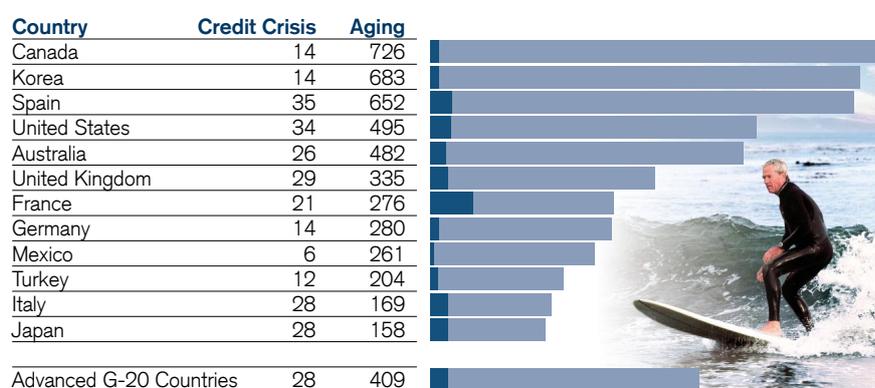
tions (usually 20 years per generation) in existence today:

- The 70m strong so-called “GI Generation” born between 1904 – 1924; only 5m left in 2008. Current age: 86 – 104 (oldest documented American is presently 104).
- The 53m strong (“hardly any immigration” impact) “Silent Generation” born between 1925 – 1944. Current age: 66 – 85.
- The 78m strong (“glad that the war is over” impact) “Baby Boomer Generation” born between 1945 – 1964. Current age: 46 – 65.
- The 69m strong (“birth control” – both pill and 1973 Roe vs. Wade legalized abortion ruling – impacts) “Generation Xers” born between 1965 – 1984. Current age: 26 – 45.
- The 100m strong 2010 (“Mexican immigration” impact) “Generation Yers” born between 1985 – 2010. Current age: 0 – 25 (“The Age Curve,” by Kenneth W. Gronbach).  
(Note that in contrast to other developed countries and developing countries such as Russia and China, higher US fertility rates bode relatively well for longer-term demographic developments.)

Next, let us look at US income generation segmented along age lines (see chart 8).

The biggest US earning generation, the Baby Boomers, is currently 46 – 65 years of age. As the Boomers move increasingly out of peak earning years into the lower-spending retired ranks over the next 10 to 19 years, the 9m smaller Generation X cohort (the 12% smaller generation currently 26 – 45 years of age) is increasingly moving into peak earn-

**Chart 7: Net Present Value (NPV) of impact on fiscal deficit of credit crisis and age-related spending (in percent of GDP)**

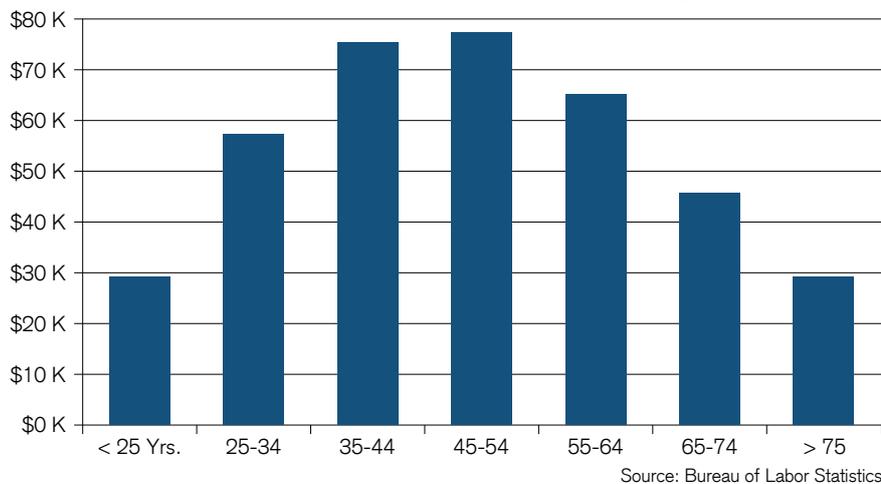


Source: IMF staff estimates. Table reports NPV of the impact on fiscal balance of crisis, and of age-related spending (primarily healthcare and pensions) liabilities. The discount rate is 1% p.a. in excess of the projected real GDP growth for each country. Overall, real growth is expected to average 3% p.a. For years after 2050, the calculation assumes the impact is the same as in 2050. Remaining Advanced G-20 Countries: Argentina, Brazil, China, India, Indonesia, Russia, Saudi Arabia, and South Africa. Note that governments' age-related spending liabilities are not tabulated as accrued obligations as mandated in the so-called accrual-based financial statement reporting required by numerous governments of public companies.

ings and family formation-related spending years. Commensurately, at the GDP level, big ticket item purchases such as cars, furniture, and house purchases should settle in at lower Generation X group levels, and this for the next one to two decades. Aggregate taxable income too will come under substantial pressure even as government transfer payments (to the retiring Baby Boomers) are set to soar. How so? Courtesy of A) lengthened retirement age life expectancies (see chart 6) and B) very expensive life-prolonging medical advances. In this context, it is revealing that next to premature births, the biggest medical expense is dying. Most US citizens will spend more on healthcare in their last 72 hours than they spend during their entire lifetimes (“The Age Curve,” by Kenneth W. Gronbach).

Staying within the corridor of US actuarial experience, an insightful review by the US Agency for Healthcare Research and Quality in 2000 drew attention to precisely this financing dilemma:

One of the most pressing concerns for retiring Baby Boomers is access to health insurance. Because the prevalence of poor health and chronic disease rises with age, older individuals have higher expected medical expenses than younger cohorts. For instance, average annual health care expenditures for persons aged 50 – 64 are more than double that for persons aged 18 – 49 (\$4,200 compared to \$1,970), while spending by those aged 65 and older is almost four times that of those aged 18 – 49.

**Chart 8: Average annual US pretax household income by age in 2004**

In a nutshell, it is precisely this generational size dynamic of ebbing taxable income and higher government social spending that is being reflected in IMF's aging-related Advanced G-20 Countries' deficit forecast in Chart 7. Speaking of deficits, it is government spending beyond income (in essence, taxes collected) that leads to debt formation. In this case, projected Advanced G-20 Country debt levels soar as a percent of GDP (see chart 9).

### The wonder – or nightmare – of compound interest

Compound interest has been called the eighth wonder of the world. Over 83 years to 2009, Swiss equities provided a CAGR of 7.7%. At that compounding rate, a shareholder's 1,000 CHF would have grown into 1,426 CHF in five years, 2,044 CHF in 10 years, 2,940 CHF in 15 years, 4,237 CHF in 20 years, and 6,117 CHF in 25 years. Compound interest is also hard at work on the debtor side, as the trajectory of public sector

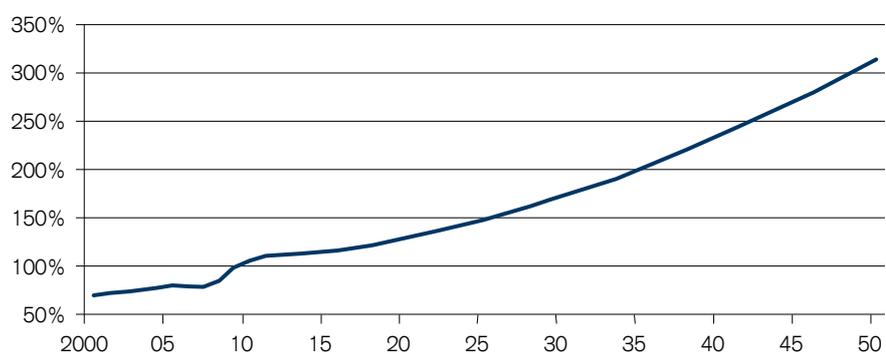
debt growth as depicted (predicted) in Chart 9 by the WEO readily shows. Only here, the implications are very corrosive to the wealth of nations. In fact, if such outsized government debt growth is sustained, it will be ruinous to the future of the global economy.

National debt growth beyond GDP growth can continue for decades – as in Japan and to a lesser degree, in Italy – assuming low enough initial indebtedness, adequate domestic savings, and low enough interest rates. That said, eventually even such accommodative metrics will be outweighed by excessive public sector debt growth. At some point, investors will demand higher sovereign debt default insurance risk premiums for countries, such as Greece, that can't monetize debt ("print money" to pay back debt) or higher interest rates for countries, such as the UK and the US, that can monetize government debt and thus markedly raise long-term inflation risks.

In any event, countries with large budget deficits and elevated debt relative to GDP will eventually face higher interest rates, often quite suddenly. Higher borrowing costs can unleash the nightmare of compound interest by materially raising heavily indebted countries' total spending, i.e., debt servicing costs. While such developments hasten the demise of impacted countries' non-interest paying (primary) deficit spending status quo, they make it even harder for the same countries to regain balanced budgets and thus financial stability. Professors Ken Rogoff of Harvard and Carmen Reinhart of the University of Maryland have studied the impact of high levels of national debt on economic growth in the US and around the world over the last two centuries. In a "Growth in a Time of Debt" study presented in January 2010 at the annual meeting of the American Economic Association in Atlanta, they concluded:

...the relationship between government debt and real GDP growth is weak for debt/GDP below 90% of GDP. We find that the threshold for public debt is similar in advanced and emerging economies. Above 90%, average economic growth rates fall by considerably more than one percent. The likely causes are expectations of much higher taxes, uncertainty over resolution of the unsustainable deficits, and higher interest rates curtailing capital investment.

Discouragingly, and in sync with early-year WEO government debt to GDP projections in Chart 9, the Obama budget takes the publicly held debt from 70% of US GDP in 2008 to 107% by 2015 while assuming long-run real GDP growth potential of 2.5% p.a. (an optimistic Office

**Chart 9: Advanced G-20 Countries: government debt (in percent of GDP)**

Sources: April 2009 World Economic Outlook (WEO) projections

of Management and Budget projection). Encouragingly, “sovereign debt growth unsustainability” has finally been getting more attention. In fact, thanks to ballooning government deficits and government bond yields near historic lows, investors are becoming increasingly interested in and concerned with sovereign debt risks (default or inflation).

#### Potential government measures to mitigate aging-based sovereign debt risks

Although beyond the scope of this article, suffice it to say that A) some politically tough measures will have to be taken, and B) investors will be paying attention. We say “politically tough” for a simple reason: aging OECD Baby Boomers represent a powerful voting block. This holds true both as concerns generational size and, arguably even more important, the propensity of older voters to vote. In US political campaigns, the rule of thumb is 80% of eligible elderly voters cast ballots and only 20% of newly eligible (young) voters do. With the globally swelling ranks of actively voting senior citizens on offer, politicians may find it rather difficult to get

elected or re-elected by promising material reductions in benefits to that same cohort. Nevertheless, in due course this will be the only road for over-indebted, demographically-challenged governments to travel. Food for thought concerning containing aging-based government expense growth:

- Governments need to raise retirement ages as the Netherlands has already done – from 65 years to 67 years – and the US is in the process of doing (to 66 years currently).
- Governments need to increasingly impose means-based social security and government healthcare benefits. Those individuals with high net worth and high relative income generation will have to increasingly tap into their own nest eggs to fund their retirement years for the benefit of societal equity and stability.
- Analogous to property & casualty insurance practices, governments could increasingly impose higher self-pay healthcare requirements, regardless of age, on individuals with willfully risky health profiles. In short, personal responsibility for risky – and costly – be-

havior needs to be revisited for the ultimate reasons: lacking affordability and societal equity.

- Last but not least, governments could actively promulgate laws and regulations supportive of higher “mother labor participation flexibility” (the Swedish model) to stimulate the higher fertility rates needed to regain long-term generational balance and funding.

#### How can strategic investors incorporate growing demographically-based sovereign debt risks into asset allocations?

Traditional assets (bonds and stocks) account for roughly 70 – 80% of typical asset allocations. Both stock and traditional (non inflation-linked) bond valuations are in essence NPV calculations where projected income or dividend streams are discounted to the present at an appropriate interest (discount) rate. Discount rates – typically keyed off 10-year AAA-rated government bonds with a risk premium for non-government bonds – are currently near generational lows.

As investment grade government bondholders have virtually zero risk of default (governments can increase taxes to pay bondholders’ interest and, in many instances, they can print the money to repay the debt), and investment grade corporate bondholders have first claims on pretax income, traditional bond valuations are mainly determined by shifts in discount rates. Longer duration investments are especially vulnerable. For example, 10-year UK government bonds issued on 09/07/2009 with a 3.75% coupon and a current yield of 3.97% would decline in price from 98.27 to 83.46 – a loss of 15% – if the long bond interest rate increased 200 BPs to 5.97%.

Excess stockholder returns, meanwhile, are strongly determined by earnings multiple (P/E) expansions; long-term equity returns are inevitably the equivalent of long-term nominal GDP growth, or roughly 6 – 8%. Higher earnings valuations, in turn, ultimately reflect lower discount rates. If interest rates and inflation rates stand at a generational low inflection point, then earnings valuations and hence stock prices – much like their bond brethren – are not optimally positioned for excess or possibly even pedestrian returns (in the “Stagflation ’70s,” when US interest and inflation rates moved into double-digit territory, P/Es eventually fell into single digits). For example, the NPV of a stock with a projected EPS CAGR of 11% over ten years (and considerably less thereafter) would fall 32% if the discount rate went from 7% to 9%. Moreover, underlying corporate earnings themselves have, in the post World War II period, also provided less than stellar inflation protection for a variety of “return on equity decomposition reasons:” <http://www.valueinvesting.de/en/inflation-equity-investor-by-warren-buffett.htm>.

This brings us full circle back to the potential strategic asset valuation fallout stemming from rising sovereign debt risks which, by definition, imply higher interest rates:

- Strategic investors from pension funds to defined contribution participants to retirees are already suffering from widespread investment-grade government bond “yield deprivation,” with 2-year Governments yielding 1% and Eurozone and US 10-year Governments offering less than 4% yield. Rising rates, while very welcome and necessary from a fresh money stand-

point, make long-duration traditional assets very susceptible to sizable capital losses.

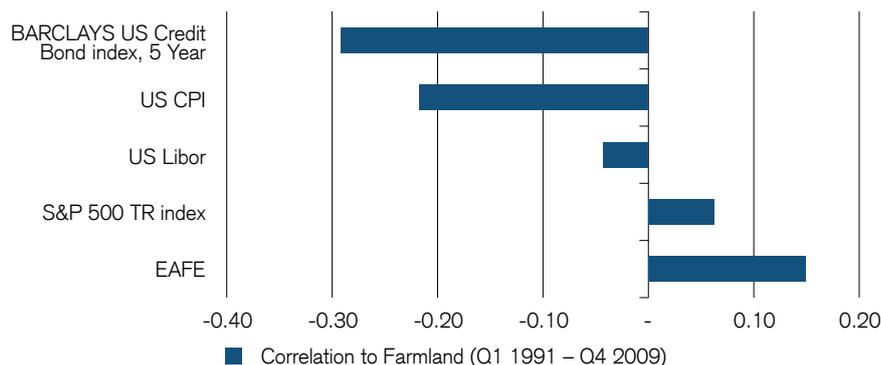
- While debt excesses, statistically low capacity utilization rates, and generationally-based spending reductions strongly imply much more deflation than inflation risk, higher secular inflation – and thus higher interest rates – may yet again be in the offing thanks to:
  1. The monetary expansion on the back of the crisis-driven rescue operations, which has certainly increased inflation risks – in fact, inflation may overshoot currently expected levels. However, central banks are aware of these risks. Moreover, based on Bloomberg data, year-over-year M2 growth has fallen from approximately 8% in 2009 in the US and 5% in the Eurozone to 2% in both regions currently.
  2. The increasing socialization of OECD economies, which bodes ill for both constructive asset allocation and productivity gains.
  3. Baby Boomer aging/retirement, which should constrain the supply of trained employees, could well boost

labor’s bargaining power over time (wage inflation, revisited).

4. Globalization and cost-cutting outsourcing could easily cease to spread or even lead to selective “re-localization” and greater vertical integration, which would reverse a multi-decade inflation-reducing trend.
5. Rising EM currencies and cost structures, which could boost OECD import prices.
6. Rising energy and food prices, instead of falling resource prices over much of the past generation, which could further fan inflation.
7. Last but not least, an unwelcome “blast from the past” otherwise known as the “Stagflation ’70s,” may again be in the offing. Interestingly, in that decade, both low capacity utilization rates and high unemployment rates were supposed to assure a benign inflationary environment. Then again, we were facing rising energy prices and accommodative central banks. Sound strangely familiar?

So how should vigilant strategic investors hedge their asset allocation bets?

**Chart 10: Farmland correlation to other asset classes**



Sources: NCREIF, Bloomberg, Datastream, Credit Suisse

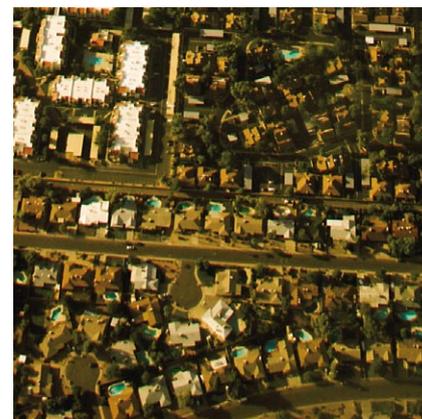
By considering assets that offer low or negative correlations to traditional asset classes, tangible assets such as farmland included (see chart 10).

In aggregate, our portfolio allocations should reflect multi asset class solutions:

- Scarce commodity assets such as oil, coal, and farmland that stand to rise in value both based on constructive supply/demand dynamics as well as due to the fact that such supply-constrained assets will become increasingly valuable in a fiat money world that will likely continue to be defined by above real GDP growth in the global money supply.
- Physical gold deposited in safe jurisdictions, as gold over time has maintained purchasing power and even offered growth in purchasing power during inflationary periods.
- Established infrastructure assets with sound inflation protection clauses and high earnings payout ratios and thus low durations on the one hand and “greenfield” infrastructure assets featuring substantial capital gains potential, higher enterprise risk, and long term inflation protection in developing regions on the other hand.
- High dividend yield Blue Chips featuring yield starvation relief and low durations thanks to high earnings payout ratios – which should reduce their valuation reduction exposure if we face higher interest and inflation rates.
- Inflation-linked, AAA-rated government bonds.

### Conclusion

One could argue that the traditional assets comprising 70 - 80% of portfolios are already valued for constructive growth and



benign inflation developments. The “fair weather scenario” thus appears amply allocated. Yet both creditors (investors) and debtors (especially governments) will be increasingly challenged to achieve their primary mandates given aging societies. Inevitably, creditors have the upper hand, for it is up to them to finance deficit spending, most particularly including the rapidly increasing aging-related variety. Creditors’ mounting vigilance could easily turn into elevated government borrowing costs as reflected by higher interest rates. Materially higher interest rates would place great pressure on traditional asset valuations. It thus behooves strategic investors to consider allocating funds to assets better positioned to perform relatively and absolutely well both at and beyond inflation and interest rate inflection points. Meanwhile, it is worth recalling that in an era of heightened sovereign default risk, assets featuring low default risks will also be sought after.

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