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# HOW DEMOGRAPHICS DRIVE LONG-TERM RETURNS

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**W**hat will outperform over the next ten years? The answer lies in the DNA of the economy, the demographics. Ultimately, we believe asset class, equity style and sector returns are a function of demographics, as it is the demographic structure and change in demography that drives both the overall growth of the economy as well as demand across and within asset classes.

How does this work? The Production Function holds that growth is a function of labour, capital and productivity. Of course in practice these variables are interdependent, as increases in the size and age of the labour force are likely to lead to increases in capital and improvements in productivity. As a consequence, understanding the demography of an economy, its trading partners and potential investors allows us to assess both the likely growth of the economy as well as the demand across asset classes.

In a high growth environment, risky asset classes such as equities are likely to outperform as earnings growth rates are pushed higher and risk premia fall; whilst in a low growth environment, defensive asset classes such as government bonds are likely to outperform as growth rates fall and risk premia rise.

However, the second driver of returns is demand. Specifically, each demographic cohort has a different demand profile across asset classes. As a consequence, the relative size and change in size of each cohort affects demand across and within asset classes. This is further complicated through international investment, as a small open economy such as Australia, with a relatively high dividend yield for example, becomes an attractive proposition for international investors seeking income.

Where to from here? Developed world populations are ageing, fertility rates are declining, longevity is increasing, and most importantly the 'Baby Boomers' are retiring. In this environment our models suggest that demographic shifts are likely to provide a headwind to

economic growth for fifteen years to come.

**What does this mean for asset classes?** In a slow growth environment low growth is normally offset by higher yields. However, with policy makers likely to hold cash rates down in an effort to stimulate growth the yield differential across asset classes is likely to prevent an 'asset meltdown'. We do, however, expect yields and risk premia to rise.

**From a style perspective,** risk factors such as value and small caps tend to outperform in a high growth environment where investors' risk appetite is increasing. However, in a low growth environment where growth rates are low, risk premia are rising and investors require income, high quality, large cap, high dividend yielding companies are likely to outperform.

**From a sector perspective,** outperformance is likely to come from: defensive sectors such as utilities and consumer staples, sectors that cater directly to an ageing demographic such as healthcare; and finally, sectors that drive productivity enhancements such as information technology.

## What drives growth?

The Production Function and hence growth is a function of labour, capital and productivity. In this note we focus on demographics and highlight that ultimately the demographic structure of a nation is a core driver of growth and hence returns across asset classes.

$$Y = A \alpha (K, L)$$

Y: is output (real GDP)

K: is the stock of capital

L: labour

A: measure of productivity

Of course these variables are interdependent. Increases in the size and age of the labour force are likely to lead to increases in capital and improvements in productivity. An increasing and ageing labour force (N) is likely to drive up demand for capital (K) which will in turn drive up the price assuming supply remains constant.

However, as the population ages and the workforce shrinks (relative to the total population), the demand for capital is likely to fall causing the price to fall. Correspondingly, changes in the aggregate age of the workforce are significantly correlated with changes in aggregate productivity (A) (Freyrer, 2005).

As a consequence, understanding the demography of an economy, its trading partners and potential investors allows us to assess both the likely growth of the economy as well as the demand across asset classes.

In both Australia and the United States, the change in the Working age population relative to the Dependant population has been particularly accurate in describing growth in nominal GDP over the past fifty years. The post WW2 period 1945 to 1971 is the one exception to this relationship. The departure from the demographic model is most likely due to post WW2 policy, namely the adoption of Keynesian economic policy as well as free market reforms and deregulation, and in Australia, the effects of the commodity boom and migration.

The key point here is that whilst demographics seem to be the primary driver of growth, there can be significant departures from the demography suggested growth rate through policy changes.

In conclusion, absent significant policy shift, the demographic model suggests that both Australia and the United States are likely to enter a world of below average nominal economic growth for the next fifteen years.

### Demographic demand determines returns across asset classes

Which cohort matters most depends on which asset class we are assessing. The reason for this is that each demographic cohort has its own demand function across asset classes. As a result modelling the returns and yields across asset classes is an exercise in understanding both the absolute size as well as the demand from each cohort.

### Understanding cohort demand

#### Establishing cohorts:

For the purposes of this analysis we break the population into the following cohorts:

Children (age 0-14) are consumers of the savings of Young Adults.

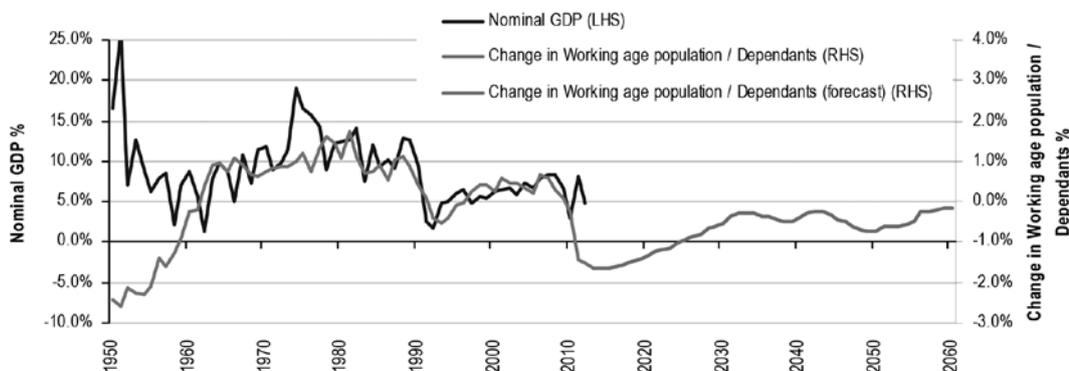
Young Adults (age 15-39) at the start of their working lives are increasing their earning potential and are likely to invest initially in residential property, however, are unlikely to contribute significantly to investments across equities or bonds.



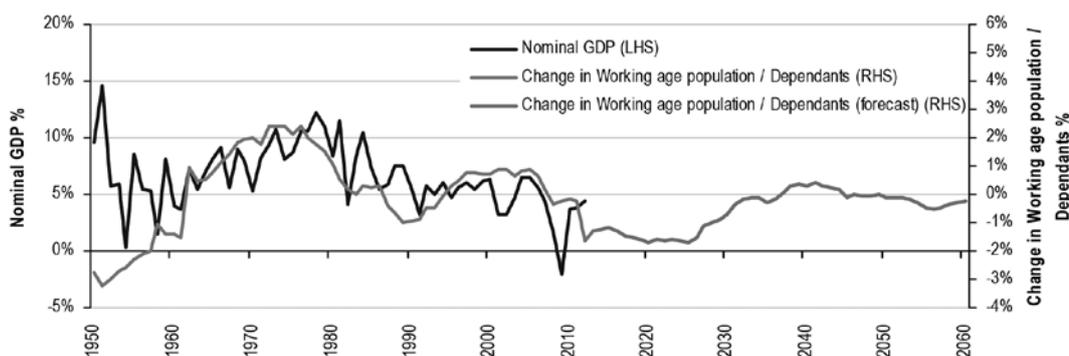
#### The quote

*Demographics drive style returns. Risk factors such as small caps and value have enjoyed a tailwind from the 'demographic dividend' and the accompanying credit bubble over the past 30 years.*

**Chart 1: Australia: Change in Working age population / Dependents is a key driver of economic growth**



**Chart 2: United States: Change in Working age population / Dependents is a key driver of economic growth**



Primary Savers (age 40 – 64) are hitting their peak earning potential and are likely to be saving for retirement. This cohort is likely to invest in equities initially and subsequently in bonds as they approach retirement. They are also likely to reduce the risk of their holdings by rotating out of growth assets and into less volatile income producing assets. Within equities they are likely to rotate out of risky styles and into low risk, dividend yielding stocks to fund their retirement income.

Retirees (age 65+) are likely to live off current income to the extent that they can. Otherwise they are likely to sell assets to fund retirement.

Working age population (15 – 65) is the population available to work. We don't adjust this for participation or unemployment as we do not have sufficient data historically to do so.

Dependants (0 – 15 and 65+) we define these cohorts as being dependent on the Working age population for support.

Baby Boomers (born 1943 - 1960) whilst the U.S. Census Bureau defines this cohort as being born between 1946 and 1964, we find that empirically the pick up in births post the Great Depression started in 1943 and lasted until 1960. This is in line with Langdon Jones in his book 'Great Expectations: America and the Baby Boom Generation' (1980), and is also the definition used in Australia.

## The Baby Boomers

The birth rate through time creates the demographic profile of a nation. Across the developed world there have been three events that have had a significant impact on demography. Firstly, the Great Depression which began in 1929 and lasted until 1938 saw birth rates fall significantly. This was followed by World War Two which triggered a pickup in economic growth and was accompanied by an increase in the birth rate. And finally, post WW2 veterans returned home, consumption picked up and was accompanied by a housing and baby boom.

The net effect of the Great Depression followed by the Baby Boom, has resulted in a 'Shockwave' through time as Baby Boomers have driven economic growth – the so-called 'demographic dividend'. Furthermore, they have invested in housing initially, followed by equities, then bonds, and finally rotating into higher yielding, income producing assets as they retire.

## Understanding demand:

In an effort to model demand, we first look at income distribution by cohort. There are two key observations: firstly, incomes start at a low level and increase until individuals approach their peak earning potential at around age 40. After this point, income growth slows until age 54 and subsequently declines.

This exacerbates the 'Shockwave' effect of the Baby Boomers ageing. If we make the assumption that income is a reflection of productivity, as Baby Boomers hit their peak earning potential this will mean that not only is there a large contribution to the supply of labour, but there is also an increase in productivity. This falls in line with the research conducted by Freyrer (2005). Furthermore, as they retire, we are likely to witness both a shrinking of the labour force as well as a decline in productivity as the average age of the workforce declines.

Taking this a step further, we assess the correlation coefficient of stock market earnings growth against the demographic share of the popu-

lation of each cohort. The chart below reinforces the theory that it is the 40 – 65 year old cohort that is the significant driver of the earnings growth rate.

## Current demographics

The Baby Boomer generation began in 1943, as a result those that were going to retire at age 65 did so in 2008. This demographic shift of Baby Boomers moving into retirement is likely to continue until 2025 when the last of the Baby Boomers retire, assuming they retire at age 65.

There are three key demographic drivers that are affecting the developed world: an ageing population, increasing longevity, and declining fertility.

**Population ageing:** This is a positive driver whilst the Baby Boomers are part of the workforce as ageing populations are positively correlated with improving productivity. However, as they retire this is likely to become a drag on both the supply of labour as well as productivity. Across the developed world we are witnessing an increasing dependency ratio. Specifically, we assess the ratio of Working age population to Retirees (an inverse dependency ratio) and find that they have begun to fall. The decline will be most noticeable over the next fifteen years as the Baby Boomers retire.

**Longevity increasing:** This is a negative driver as increases in longevity are associated with increases in social security and health-care costs. This combined with an increasing dependency ratio will provide a significant burden on public finances.

**Declining fertility:** This is another negative driver as decreases in successive age cohorts will further increase the dependency ratio in the future.

**These forces taken together with the retirement of the Baby Boomers has led to the introduction of the Asset Meltdown Hypothesis.**

## Asset Meltdown Hypothesis

The Asset Meltdown Hypothesis (AMH), originally suggested by Reisen (2004), holds that as investors retire they sell assets in order to fund their retirement. As a consequence of a significantly large cohort retiring at the same time i.e. the Baby Boomers, the theory suggests that there is likely to be an asset price 'meltdown' as the number of sellers dramatically outweighs the number of buyers.

There are two preconditions for the AMH to hold. Firstly, the supply of assets must outweigh demand, and secondly, the supply needs to be time constrained. There are a number of factors to consider: supply of assets, demand for assets and finally, timing.

## Asset supply:

In order to determine likely supply it is necessary to understand who holds the assets, and whether they are likely to sell them. In Australia, the concentration of assets is relatively high with 56% of assets held within the top quintile of the population. In the United States it is even higher, with around 85% of wealth held within the top quintile of the population. As a consequence, it is unlikely that asset owners would be in a position where they needed to liquidate holdings to finance their retirement. No doubt there will be an increase in asset disposal at the margin, however, it is more likely that asset owners rotate out of risky assets and into less risky income producing assets as suggested by the Behavioural Lifecycle Hypothesis (see next section).

### Asset demand:

Asset demand depends largely on whether the demand base is heterogeneous or homogenous. In the case of assets with heterogeneous demand bases such as listed assets (equities and bonds) international demand from younger generations in regions with strong growth may decide to invest in listed equities or bonds from countries with lower growth if they sense they are able to pick up the asset cheaply as an older investor needing to fund their retirement disposes of the asset.

However, the same international investor is unlikely to be interested in residential real estate in a city with an ageing population. As a consequence, assets which are heterogeneous in the source of demand i.e. are attractive to international investors with differing investment durations, strategies and risk tolerances, such as equities and bonds, are likely to fare relatively better than assets, such as residential real estate, with homogenous demand bases where the demand is likely to fall at roughly the same time with the now retiring Baby Boomers.

### Timing:

Finally, given increases in longevity Baby Boomers are aware of the requirement for their retirement savings to last into the future. The life expectancy of an Australian is now 81.85 years (American 78.64). As a result, asset owners are less likely to sell down assets unless they have to. This is in line with research conducted by Poterba (2001) in which he found that whilst age-wealth profiles increase rapidly when households are in their 30's and 40's, they decline slowly when households are in their retirement years. As a consequence, assets are likely to demonstrate a significant positive beta to increases in the working age population; however, they are likely to demonstrate a weaker negative beta to increases in the retired population.

**In conclusion, the Asset Meltdown Hypothesis is unlikely to occur as originally suggested. However, we do expect a headwind to growth over the next 15 years as Baby Boomers retire and expect assets classes with heterogeneous demand to fare relatively better than those with homogenous demand.**

### The Behavioural Lifecycle Hypothesis

The Behavioural Lifecycle Hypothesis (BLC) (Shefrin & Thaler 1988) follows on from Modigliani and Brumberg's lifecycle theory of saving in 1954, and holds that households think of components of their wealth as non-fungible.

Wealth is assumed to be split into three mental accounts: current assets, current income, and future income. The propensity to spend money is assumed to be greatest from current income and least from future income.

They further postulate that the marginal propensity to consume dividend income is greater than the marginal propensity to consume increases in the value of stock holdings (prediction 10).

Assuming the BLC theory holds true, it's more likely that investors rotate out of risk assets and into more defensive, income yielding assets as they retire. Furthermore, as long as the assets can generate sufficient income for investors to live off, there is no requirement for them to sell them.

As a result, assets are only likely to be sold once the individual has passed away. However, given the distribution of life expectancy, the redistribution of assets is likely to occur over many years, not at a

point in time as the Asset Meltdown Hypothesis suggests.

**If the BLC theory holds, there should be a significant out-performance of income strategies as investors approach retirement.**

### What could change the outcome?

Whilst demographics are a significant driver of investment across and within asset classes, there are a number of factors that can change the path that developed markets are currently on, namely:

- Lower interest rates
- Fiscal stimulus packages
- Migration, by encouraging young, educated people to immigrate
- Birth rates, by implementing policy to encourage people to have more children
- Participation rates, by encouraging more people into the workforce
- Extending retirement ages, by encouraging older workers to remain in the workforce for longer, and finally
- Improvements in productivity, through significant investment in human capital (education), technology, and incentives to develop industries that cater to globally ageing populations such as healthcare, and industries that improve productivity such as information technology. **FS**

*This article draws on material from UBS Global Equity Research Paper, "The Demographic Shockwave... Is a long term driver of returns" dated 5 September 2013, by Paul Winter, Vyas Balasubramian, Oliver Antrobus and Luke Brown, distributed by UBS AG (Holder of AFSL No. 231087) and/or UBS Securities Australia Ltd (Holder of AFSL No. 231098). The information in this document has been published for information purposes only and has been prepared without taking into account any investor's objectives, financial situation or needs and should not be relied on in making an investment decision. Investors should, before acting on any information, consider the appropriateness of the information, having regard to their objectives, financial situation and needs and in particular, seek personal investment advice from their financial advisor. If the information contained in this document relates to the acquisition, or potential acquisition of a particular financial product by a 'Retail' client as defined by section 761G of the Corporations Act 2001 where a Product Disclosure Statement would be required, the retail client should obtain and consider the Product Disclosure Statement relating to the product before making any decision about whether to acquire the product. UBS accepts no liability over the content of the article. It is published solely for information only and is not to be construed as a solicitation or an offer to buy or sell any securities or related financial instruments. The accuracy and completeness of this document is not guaranteed and opinions and assumptions on which the content is based may change without notice and such opinions may differ from opinions or recommendations expressed by other business areas of UBS. UBS and its affiliates and employees may maintain long or short positions, trade as principal and buy and sell in instruments or commodities referred to. Unless stated otherwise, this is not a recommendation, offer or solicitation to buy or sell and any prices or quotations are indicative only. UBS may provide investment banking and other services to, and/or its employees may be directors of, companies referred to. To the extent permitted by law, UBS does not accept any liability arising from the use of this communication.*