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LT Asset Return Study

From the Golden to the Grey Age

Special Report

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Anyone who wants to know the path of financial markets for the remainder of 2010, and even in 2011, might want to stop reading now. This document looks at a long history of returns across major asset classes and makes assumptions on the future based not on short-term history or analysts' immediate forecasts but on the very long-term rhythms and secular structure of returns. This is the third such document published in the last five years and each time we've compiled the research we've hopefully gained crucial new insights into the financial world.

In the first document in November 2005 it was clear that we'd just been through a remarkable 25-year period for returns across virtually all assets. However the risk assets covered in the piece were then at valuations notably above their long-term averages. This suggested a much more sober period ahead for absolute total returns with bonds likely outperforming equities for the rest of the decade.

When we published again in November 2008 we discussed how we could be set for "The Upcoming Decade of Credit Returns". The extreme stress in the cash credit market, with spreads at around historic (100-year) wides, had left the asset class with the most to gain from mean reversion. Double-digit annual returns were the most likely outcome. Equities were also finally approaching long-term average valuations after more than a decade of chronic overvaluation.

So what does our 2010 study find? Unfortunately with where assets are currently priced there are no obvious stand-out mean reversion opportunities in Developed markets. Credit has normalised to broadly average spread valuations, Equities have returned to above average valuations on our methodology with bond yields now looking rich relative to history. The recent trend of certain dividend yields being above corporate bond yields is a welcome return to valuations of old and an opportunity. However the trend is not yet widespread and overall yields in both asset classes are both historically low. Property still looks highly valued with Commodities the asset class with most to lose through mean reversion.

We feel that the 'Golden Era' for returns and growth seen between the early 1980s and mid-2000s was partly demographic led and partly driven by a Globalisation story that may have done more harm than good to the Developed World. The demographic side of this is reversing across the Developed World and while the Developing World continues to have superior demographics it's not immune from the problems.

Overall prepare for more volatility, shorter business cycles, more QE, an aging population and sub-average returns in many asset prices. Buy and hold is probably not the optimal strategy over the next few years. Trading around the more frequent business cycles will likely be crucial. For those preferring a buy and hold approach, the accumulation of a diversified portfolio of Equities where their dividend exceeds their bond yield will probably be very successful over the medium to long-term.

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6 Key Themes from this Report on 1 Page

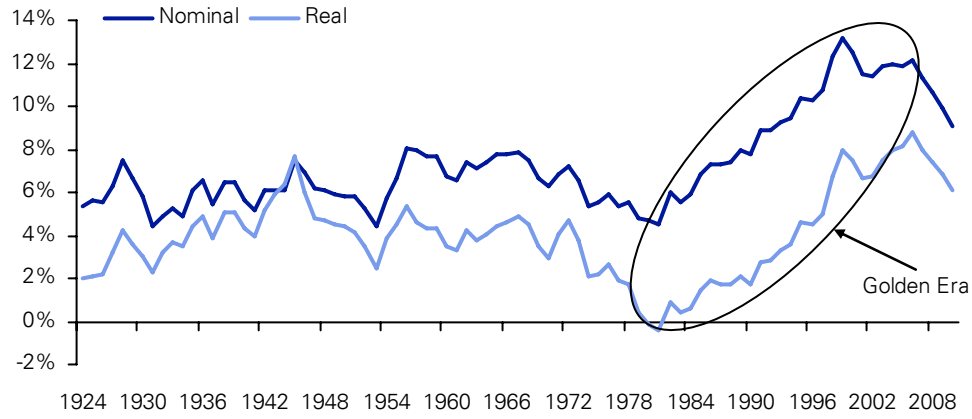
- We still live in the shadow of the 1982-2007 'Golden Age' for developed market investment returns which were driven by demographics and a Globalisation myth that may have caused more harm than good for the Developed World, in our view. We look extensively at the ageing Global population and how demographics have shaped growth and returns historically and how it might shape them going forward. We think it's fair to say the ultra supportive demographics of the past cannot be repeated. De-population is a genuine problem for parts of the Developed World going forward. Indeed on that front Europe is more at risk of repeating Japan's problems than the US. India is the stand-out country demographically, with China facing challenges from the middle of this decade, in our view.
- Returns in Developed Market asset prices have seen a consistent long-term secular rhythm which has not been structurally altered by new paradigms or difficult periods. However there is evidence to suggest a recent slowing of long-term returns in risk assets in Developed markets. Your view on this depends on the net benefits of Globalisation for Developed Markets and on how successful the post 1958 reduction in dividends (and reliance on capital growth) has been. We have doubts on both.
- We think that the 'Great Moderation' period for the Developed World likely ended with the credit crisis. One can actually argue that Globalisation has destabilised the economic environment for the Developed World. Globalisation allowed an unsustainable tolerance of debt at levels that would have been unthinkable a decade or two ago. As a result, policy makers now have their fiscal and monetary hands tied in a manner they didn't during the 'Golden Age'. Expect business cycle length to be more consistent with that seen through long-term history. In the report we show how investors can greatly enhance returns by trading around business cycles.
- Inflation from the early Twentieth Century exploded relative to longer-term history. We argue that uniquely strong global population growth and the increasing use of fiat based currency systems were possibly the main causes. The former is slowing and is reversing across certain parts of the Globe, with the latter showing few signs of changing. So we still live in an 'era of inflation' but one where weaker population growth and the credit crisis will test the resolve of the money printing Central Banks.
- At the top down level, mean reversion suggests that there are no obvious stand-out cheap valuations in Developed markets. Credit has normalised to broadly average spread valuations since we last published, Equities have returned to above average valuations on our methodology with bond yields now looking rich. Property still looks highly valued with Commodities the asset class most to lose if all assets mean revert.
- Sustainable real adjusted price increases in Equity indices have been a phenomenon of recent decades. History is replete with examples of very long periods of flat real equity prices. In these periods high dividends have provided all the incremental real returns. The post 1958 shift favouring capital gains over dividends has arguably locked us into lower total returns. The recent trend of certain dividend yields being above corporate bonds is a welcome return to valuations of old and an opportunity. However the trend is not yet widespread and overall yields in both asset classes are historically low.

Conclusion

Overall prepare for more volatility, shorter business cycles, more QE, an aging population and sub-average returns in many asset prices. Buy and hold is probably not the correct strategy over the next few years. Trading around the more frequent business cycles is likely to be crucial. For those preferring a buy and hold approach, the accumulation of a diversified portfolio of Equities where their dividend exceeds their bond yield will probably be very successful over the medium to long term. This reports screens for a selection of these opportunities in the chapter on dividends.

From the Golden to the Grey Age – Executive Summary and Conclusions

Figure 1: Rolling 25-year Real and Nominal Return of 50/50 Split of US Treasuries and Equities



Source: Deutsche Bank, GFD

Those of us that have started working in financial markets since the early 1980s have truly lived through a Golden era for asset price returns. It may not have felt like it at many points over the last three years, but as Figure 1 shows, the rolling 25 year total returns on a 50/50 US Treasury/Equity portfolio are still high relative to long-term history. Up until the end of 2007, returns on this measure were at extreme levels relative to the past. Indeed 25-year rolling nominal returns were consistently above 10% from 1995 to the end of 2009. The long-term average has been 7.3%. On a real basis, these rolling returns have been (and remain) above 6% since the end of 1998. The long-term average is 4% on this 50/50 split portfolio. Other assets like property and commodities have also seen strong, above average performance in recent times.

Since we first published this report in 2005, our view has been that the period between the early 1980s and the middle of the last decade will go down as a golden age for investing, one that will be difficult to repeat and may indeed reverse in the years ahead.

When we last published in November 2008 in the shadow of the Lehman default, risk assets had sold off to such an extent that above average returns were likely, especially in the credit space. Indeed back then credit was at once in a life time levels in spread terms, with our study indicating that double digit annual returns were likely over the medium-term.

Unfortunately with where assets are today there are no stand-out opportunities in Developed markets. Credit has normalised to average valuations, Equities have arguably returned to above average valuations with bond yields now looking rich relative to history. Property still looks highly valued with Commodities the asset class with most to lose if all assets mean revert.

Part of the explanation for the historically anomalous 'Golden Era' has been the large demographic transition that has occurred across most of the World. Between 1950 and 2000. Over that period, the world's population saw one of its biggest growth spurts in history, with numbers increasing 142%. Most of this growth occurred with baby boomers being born in the earlier part of this 50-year bucket and thus entering their economic prime towards the end of it. This remarkable increase in those in their economic prime relative to those they

have to support led to a very large Global demographic dividend to both growth and asset prices. The latter benefiting from a likely significant increase in demand driven by the bulge in society in their peak earnings years.

These demographics are now in the process of (slowly) reversing in the Developed World and our concern is that the mass increase in baby boomers that have propped up asset prices will subsequently depress them as they sell their earlier investments to help fund their retirement over the next couple of decades. We believe radical political action is required to completely restructure Global pension/healthcare provisions. We fear that elected politicians will find it difficult to be radical enough to deal sufficiently with these issues.

There is hope from the Developing World as the majority of countries in this region are still benefiting from their demographic dividend and are seeing substantial economic growth. This growth has been helped by major economic and political reforms as China, India and Eastern Europe have all embraced Globalisation over the last 30 years, thus ending long periods of Global economic isolation and stagnation.

However most of these countries are aging too and the rate of growth of both their working age population and those in their economic prime will slow down substantially over the next few decades. It will be very difficult to repeat the pattern of the past few decades going forward. In fact, China sees almost identically negative demographics to the Developed World with the only difference being that it has until around 2015 before it starts to see what Japan saw in 1990, the US in 2000 and Europe from 2010. From this point in time those in their economic prime start to decline as a percentage of the young and the old they have to support. China might get old before it gets rich. India on the other hand sees this ratio increase all the way out to 2050. It would not surprise us if India became the new China in years to come and China saw issues similar to the new Developed World.

Overall this key cohort in their 'economic prime', (absolutely and relative to the young and the old) continues to grow at the overall World level all the way out to 2050. However this is weighted by population and not by potential economic impact. Outside of India the very best demographics occur in the very poorest areas of the World. When we weight by potential GDP of the various regions going forward we find that the positive demographic impulse for the World is now behind us.

So whilst Developed countries are probably not going to grow quickly enough to offset the Developed World's problems, we can't deny that Globalisation has led to an increase in Global growth in recent decades and has led to the emergence of new Global powers. The consensus view seems to be that this has benefited the Developed World and will continue to do so. However in this document we challenge this and find little evidence that Globalisation has either benefited overall Developed Market growth or the risk assets in these areas.

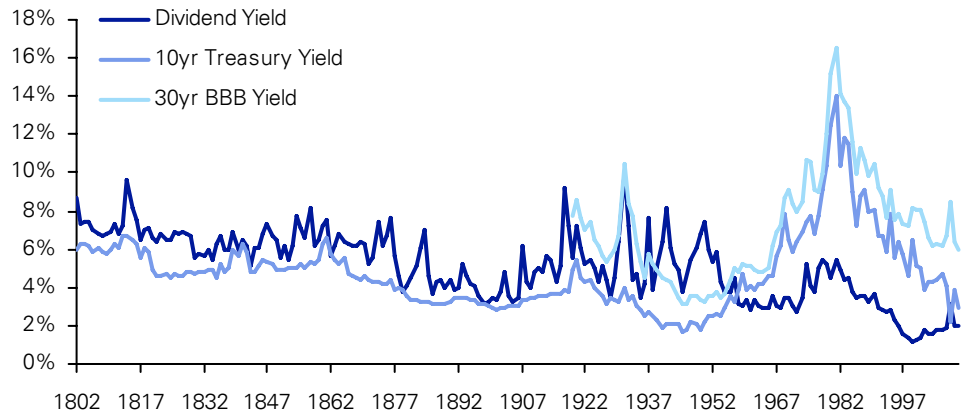
One could actually make the argument that Globalisation has destabilised the economic system for the Developed World. The secular 30 year reduction in inflation and the 'Great Moderation' that have had their roots in Globalisation reduced the number and severity of business cycles in the Developed World during the 'Golden Age'. This arguably led to complacency as investors and policy makers have extrapolated out the extremely benign pre-crisis economic conditions as far as the eye could see. This allowed a tolerance of Debt from investors, consumers and policymakers alike, that would have been unthinkable a decade or two earlier.

This 'Golden Age' period also saw the second (and more extreme) half of a 50 year experiment in equity markets which we think can now be marked as a failure. The great 'Dividend Crossover' period in 1958 marked the point where dividends fell below Government Bond Yields for the first time in observable history. In the US we briefly crossed

back over in 2008 but this has again been subsequently reversed. In Europe we now have dividend yields more consistently above Government Bond yields again. For a variety of reasons that included new paradigm thinking, tax policy, share buybacks, demographics, and a belief companies could invest cash more productively, investors decided to forsake dividends in the hope that capital gains increases would more than offset the decrease in annual payouts. As we see from the long-term charts, this period in history was unique and we think the evidence from our report confirms that it was a failure at overall index levels. We think the market will increasingly remember that returns in equities over the medium to long run are largely driven by dividend and dividend reinvestment. The tortoise will likely prosper over the hare, in our view.

So while the historical evidence suggests that returns on Equities could continue to be sub-standard for a few more years to come, there are signs that the asset class is coming out of a long period of extreme over-valuation, especially relative to Fixed Income. However history again tells us that these valuations have often overshot into extreme territory before they correct. So the worst may not be over. We'd also note that overall yields on equities and fixed income are both extremely low relative to history.

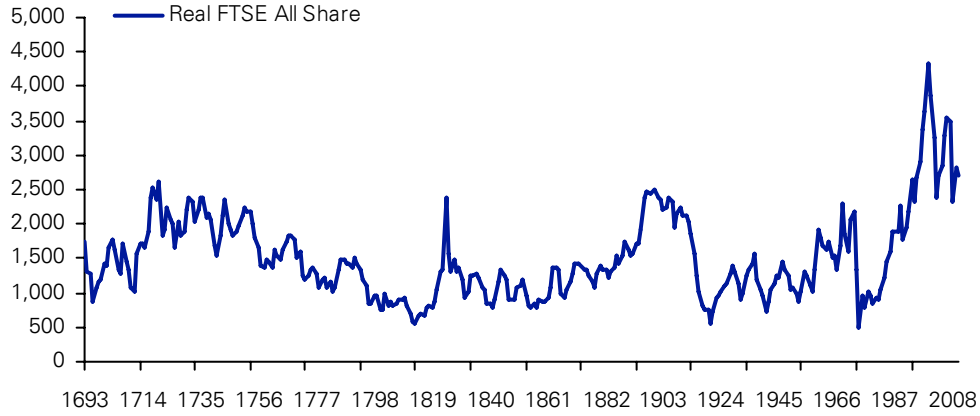
Figure 2: US Treasury and Corporate Bond Yields vs. Equity Dividend Yields



Source: Deutsche Bank, Bloomberg LP, GFD, Moody's

Nevertheless it is a healthy sign that an increasing number of blue chip equities now have a higher dividend yield than both Government bonds, and indeed their own corporate bond yield. This harks back to the pre-1958 era when we always had such an environment. It is worth pointing out that this was the period where Equity returns were far superior (absolute and relative) to the post 1958 world. Prior to this point, the real annual return of equities of just over 6% was typically made up of around 1% real price growth (at best) and a dividend yield of around (and often over) 5%. Real price increases in Equity markets have been a modern day phenomenon.

Figure 3: Real Adjusted UK FTSE All Share Price only Index Through History



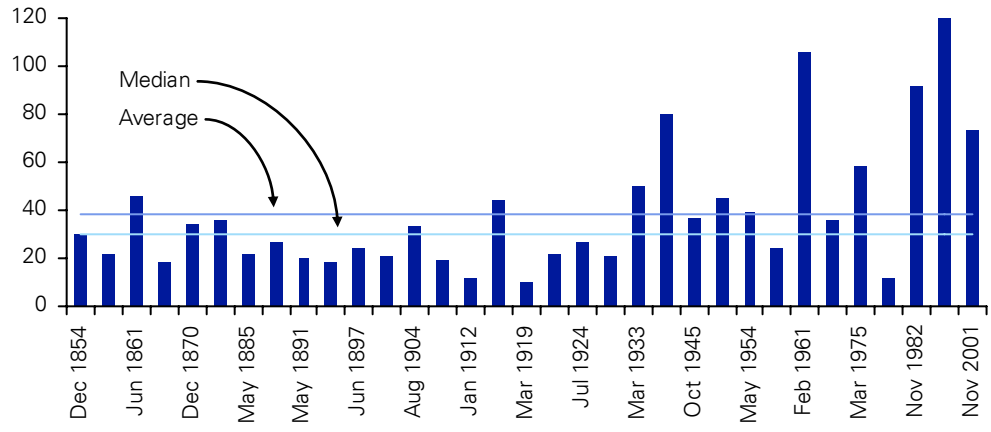
Source: Deutsche Bank, GFD

So rather than suggest that its ludicrous that dividend yields should be higher than bond yields we should see this as a return to a world where it makes more sense to selectively increase equity holdings. We should not expect this to correct the other way but simply be pleased that we are receiving regular and high dividends that we can re-invest at an equally reasonable rate.

When you consider the ageing of the population discussed at length in this report, companies may be forced by investors and by a lack of investing opportunity, to return more cash to shareholders by way of dividends. This is our minds will be healthy.

However it's likely to be a difficult decade. The Global Credit Crisis most probably marked the end of 'The Great Moderation' and could possibly make way for 'The Great Volatility'. The debt burdened Developed World will likely have periodic funding issues as it looks to fund a colossal amount of private and public debt. The high historical levels of public debt will also collectively tie the hands of Governments when attempting to smooth business cycles. We may go back to business cycles more consistent in length to that seen through history, partly due to the Debt overhang in the Developed World.

Figure 4: US Economic Expansion Lengths (months) since 1854

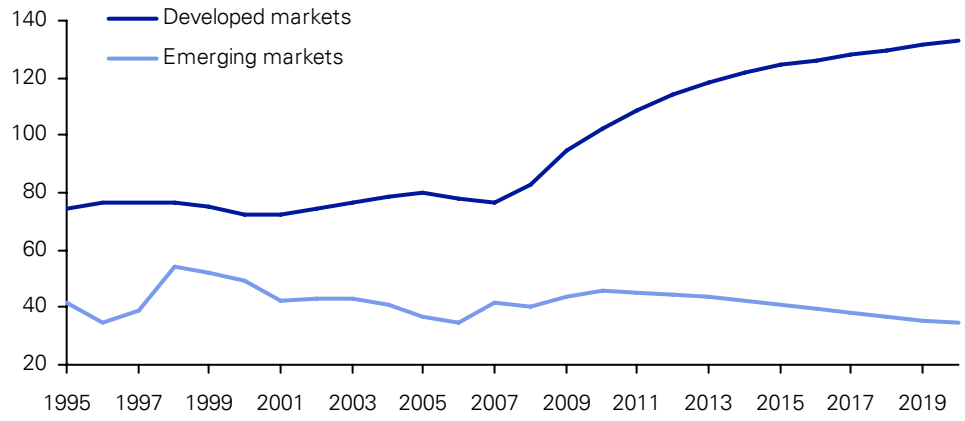


Source: Deutsche Bank, NBER

Prior to the financial crisis, the overall Debt/GDP of the Developed World was hovering around 80%. However, over the course of the financial crisis this has increased and will likely

climb above 100% in 2011. The forecasts are that this ratio then continues to rise over the course of the next decade.

Figure 5: Public Debt as a Percentage of GDP



Source: DB Research

The Developing World will therefore be required to do a lot of heavy lifting going forward. The region is generally blessed with low debt levels and better demographics. However the report suggests that their income levels are unlikely to reach levels sufficiently high enough to offset the West's problems over the next few decades.

In the Developed World there is going to be lots and lots of Government issuance over the next few years and, as such, we are going to need the capital markets to be functioning 24/7 as far as the eye can see. In periods where they don't function for whatever reason, we run the risk of substantial bouts of risk aversion with any regular borrower being vulnerable to re-financing risk. Indeed, there has been academic research suggesting that a Sovereign Debt/GDP level above 90% becomes statistically more dangerous for growth. The famous Sovereign academics, Reinhart and Rogoff, published a paper in January entitled "Growth in a time of Debt" where they examined 44 countries spanning 200 years. The main finding of the report was that "across both advanced countries and emerging markets, high debt/GDP levels (90 percent and above) are associated with notably lower growth outcomes".

It's likely that more aggressive monetary policy will be needed to offset the diminished role of the Government. Given the sensitivities involved, such actions will likely only come when absolutely needed and possibly because of stress in the market. We have published a section looking at returns around business cycles with the conclusion being that business cycles have a very large and predictable impact on returns. If we think that we'll see more business cycles going forward, buy and hold will be unlikely to be the best strategy. If, and it's a big if, one can successfully time business cycles, returns can be greatly enhanced.

Thanks to Dr George Buckley who has contributed a special feature at the end of this document. George examines the UK Housing market in detail and examines where house prices will be in 10 years time if we mean revert standard valuation methods back to their long-run averages. The chapter hopefully provides a deep insight into the main long-term drivers of the residential UK property market.

Mean Reversion Conclusions

In this section we update and enhance the analysis compiled in the two previous reports where we look at what nominal and real returns would be if assets reverted back to their long-term average valuations. We will discuss at length 3 alternative methods for mean reverting equity valuations within the main body of the report. We will only briefly discuss the differences between them in this summary but the full in-depth analysis comes later in the report. For the other asset classes a brief appendix is posted at the back of the document that takes us through our methodology.

The mean reversion exercise is only meant to be a relative value guide. It is possible that with the structure of Developed markets changing post crisis, such analysis will be less appropriate while the excesses of the boom years are worked off. However as we discuss throughout the report, new paradigms and big negative events come and go through history without necessarily altering the long-term tempo of returns. So over longer periods, mean reversion is still probably the best relative value tool one can use.

Figure 6: Potential Annualised Returns Based on Mean Reversion over Different Time Horizons

		Nominal Returns			Real Returns		
		3yr	5yr	10yr	3yr	5yr	10yr
US Assets	Equity (Trend Earnings / Av PE)	-6.0%	-1.4%	2.3%	-8.4%	-3.7%	-0.1%
	Equity (Trend Earnings / Av PE since 1958)	0.7%	2.7%	4.2%	-1.8%	0.3%	1.9%
	Equity (Constant Total Real Return based)	17.6%	13.9%	11.3%	14.6%	11.3%	8.8%
	Treasury (10yr)	-2.0%	0.4%	2.3%	-4.4%	-1.9%	-0.1%
	Treasury (30yr)	-0.5%	1.5%	2.9%	-2.9%	-0.9%	0.6%
	IG Corporate Bond	1.2%	2.9%	4.1%	-1.3%	0.5%	1.8%
	BBB Bond	1.9%	3.5%	4.6%	-0.7%	1.0%	2.3%
	Property	-6.5%	-3.1%	-0.5%	-8.8%	-5.4%	-2.7%
	Gold	-22.2%	-13.2%	-5.8%	-24.1%	-15.3%	-7.9%
	Oil	-19.7%	-11.6%	-4.9%	-21.7%	-13.6%	-7.1%
	All Commodities	-4.6%	-1.9%	0.1%	-7.0%	-4.2%	-2.1%
High Yield	USD High Yield	2.8%	4.4%	5.7%	0.2%	2.0%	3.3%
	Treasury (Duration Matched)	-2.1%	0.3%	2.1%	-4.6%	-2.1%	-0.2%
	EUR HY	2.9%	4.6%	5.9%	0.4%	2.1%	3.5%
	Bund (Duration Matched)	-2.1%	0.1%	1.9%	-4.6%	-2.2%	-0.5%
iBoxx EUR	Corporate Bond	0.8%	2.3%	3.5%	-1.7%	-0.1%	1.1%
	BBB Bond	2.1%	3.2%	4.0%	-0.4%	0.7%	1.6%
	Non-Financial Bond	-0.6%	1.4%	2.9%	-3.0%	-1.0%	0.5%
	Non-Financial BBB Bond	0.5%	2.0%	3.2%	-2.0%	-0.4%	0.9%
	Bund (Duration Matched)	-1.8%	0.4%	2.0%	-4.2%	-2.0%	-0.3%
iBoxx GBP	Corporate Bond	3.4%	4.4%	5.2%	0.2%	1.2%	2.0%
	BBB Bond	6.0%	6.1%	6.1%	2.8%	2.8%	2.8%
	Non-Financial Bond	-0.4%	1.9%	3.7%	-3.5%	-1.2%	0.6%
	Non-Financial BBB Bond	2.3%	3.6%	4.6%	-0.8%	0.4%	1.4%
	Gilt (Duration Matched)	-1.8%	0.7%	2.6%	-4.8%	-2.4%	-0.5%
iBoxx USD	Corporate Bond	1.7%	3.1%	4.2%	-0.9%	0.7%	1.8%
	BBB Bond	3.1%	3.9%	4.6%	0.5%	1.5%	2.2%
	Non-Financial Bond	-0.1%	2.0%	3.5%	-2.6%	-0.4%	1.2%
	Non-Financial BBB Bond	1.5%	3.0%	4.0%	-1.0%	0.5%	1.7%
	Treasury (Duration Matched)	-2.0%	0.4%	2.3%	-4.4%	-1.9%	-0.1%

Source: Deutsche Bank

We've conducted this mean reversion exercise twice before, first back in November 2005 and secondly back in November 2008. The exercise was very instructive to us on both occasions. In 2005 it was clear that after a super charged period for returns over the previous 20-25 years most risk assets were at valuations notably above their long-term averages. Thus the starting point suggested a much more sober period ahead for absolute total returns in risk assets.

The 2008 report was entitled 'The Upcoming Decade of Credit Returns' and concluded that the extreme stress in the cash credit market, with spreads at around historic (100-year) wides, left the asset class with the most to gain from mean reversion. We were left thinking that double-digit annual returns were a realistic possibility over the medium-term. Back then equities also fared reasonably well on the mean reversion exercise as the S&P 500 had dipped into the 800s, thus finally correcting a 15-year period of trading above its long-term average valuation.

As we survey the same exercise here in September 2010 we find it more difficult to highlight an exciting theme. On a mean reversion basis there are few areas where returns going forward are likely to be a lot higher than history. In some cases they could still be sub-standard relative to their long-term average.

For simplicity we have concentrated on US Dollar-Based assets in this report. This also enables us to delve deeper into history to analyse the long-term rhythm of returns. In reading the results, hopefully one will be able to understand the type of returns that a sophisticated Developed Market sees through time.

As discussed earlier we have revised our equity mean reversion calculations to include three different methods. Method 1 looks at mean reverting earnings according to their long-term trend (Figure 49) and PE ratios back to their long-term average (Figure 51). Method 2 recognises that earnings growth may have increased (albeit slightly) post 1958 and uses the trend line of earnings seen since then and the (again slightly higher) average PE ratio seen since. Finally method 3 purely mean reverts according to the long-term real total return series seen repeatedly in this document and first in Figure 18. This method suggests that the real total return should have been constant through time and we then assess how far we are away from the trend based on such analysis. It should be noted that although the full real return series goes back to 1820 we have only used data back to 1871 for mean reversion purposes as this is as far back as we can go in both methods 1 and 2.

Our preference is to use method 1 as we do think the sharp slowdown in Developed market growth over recent decades does not justify us sticking to the long-run trend line of returns that started when the US was an Emerging Market. Clearly increased exposure to Global growth is helping but as we suggest throughout this report we're yet to be convinced that there is evidence to suggest a substantial permanent macro earnings benefit in the Developed World from the period of higher global growth. Our view is that it's simply helping to offset a domestic decline in earnings/dividends that is greater in magnitude.

If we use method 1, nominal US equity returns are positive over the next decade but a quicker bout of mean reversion could still see the market seeing negative returns (over 3-5 years). Real returns on this method also struggle to edge into positive territory over the next decade. The returns are slightly better if you use method 2 (accepting the equity world changed post 1958) but are still sub standard relative to long-term history.

Only if you rely on method 3 which suggests that the very long-term rate of return on US equities is still in tact do you find higher than average returns. On this method, double-digit annual returns are possible over the next decade. To believe this, you have to think that earnings are soon to deviate above their very long-term trend line or that either valuations can

see a permanent shift higher or that dividend payments return closer to their pre-1958 levels over the next decade. All these are possible but we still prefer method 1 until we either see a dramatic change in dividend policy or see evidence that that earnings can permanently (and not just cyclically) break out above their long-term trend line.

In terms of fixed income, the mean reversion exercise suggests that Government bonds are set for an anaemic decade for returns, even without an outcome more extreme than mean reversion. Such an extreme outcome is possible given the Sovereign crisis and associated debt build-up. The low potential for performance is illustrated by likely real returns over the next decade that are slightly negative across the board. If we revert quicker negative real returns of -2% to -6% p.a. could be seen over the next 3-5 years.

In terms of credit, spreads are generally slightly wider than their long-term average which provides a bit of yield cushion to help the asset class fight the historically low underlying Government yield environment. However over the next decade real returns in IG credit will be mostly in the 0-2% p.a. range on the basis of this analysis. A quicker reversion in Government yields would also put real returns in credit in negative territory over the next 3-5 years if it occurred that quickly.

As for HY, an average incident of default going forward and the still above average spread levels leaves it reasonably attractive on a mean reversion basis. Excess returns of 3-4% would be possible under an average outcome. This is higher than the 1-2% excess returns expected in IG. However we discuss in the section on business cycles how volatile HY returns have been around recessions. If we're correct that business cycles will be a more regular feature of markets going forward then we need to be wary on timing in this asset class.

Property on a mean reversion basis appears like it could be at similar nominal levels at the end of this decade than it was at the start. This would mean nearly 3% negative real returns per annum over the period and is a measure of the prior extreme levels of over-valuation relative to history.

The asset class that stands out in this exercise is Commodities. If mean reversion of long-term data was your only guide then Gold and Oil are likely to have poor decades in nominal (-5.8% to -4.9% p.a.) and real (-7.95% to -7.07%) terms. In this piece we show how these asset classes are now significantly above their long-term average valuations. They do however have momentum and our report says nothing about the near-term performance. Over a 5-10 year period though, you would have to bet against history to suggest that the Commodity complex was a good area to invest in, at least on a real basis. Collectively the asset class does not pay a dividend/coupon and would likely need to rely on continued voracious demand from the Developing World to sustain its meteoric performance over the last decade. We admit to having less conviction here but the long-term trends suggest that one has to believe in some kind of new paradigm to think that we'll always be at these real adjusted levels.

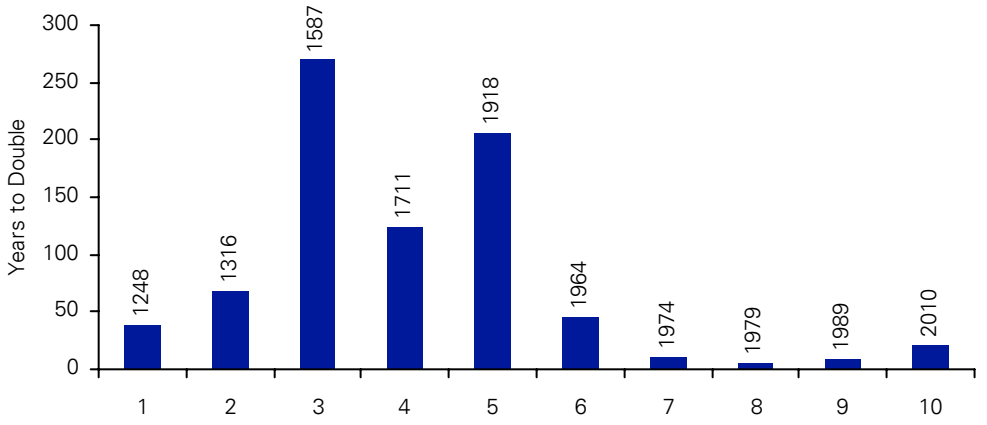
Away from mean reversion, our gut feel is that assets like Gold could easily go a lot higher first before mean reversion sets in. There is enough instability in the system to suggest that demand will hold up or increase in the near-term. However we would suggest beware the long-term charts.

Introduction – The Era of Inflation

Whatever happens over the next few years it's fair to say that all of us alive today have lived through the "Era of Inflation". It may not have necessarily felt like that, especially over the last 20-30 years when Central Bankers have subdued and controlled Consumer Price Inflation, however its fair to say that relative to our forefathers in previous centuries, the past 100 years have been highly inflationary relative to history.

Indeed as way of introduction and as a proxy for historical Global inflation trends, Figure 7 shows how many years it has taken for the overall price level in the UK economy to double since we have data starting in 1209. Over the whole 800 year period, prices have doubled ten times (clearly prices rising by a multiple of 1024 times from its original starting point). However in the 709 years between 1209 and 1918 they only doubled five times with the last of these five doublings taking 206 years. Indeed as we'll see in Figure 10, UK prices on the eve of WWI were only slightly above levels seen in 1650. Nothing in the statistics could have prepared us for the inflation shock seen over the last 90-100 years. Prices doubled due to WWI alone and then have doubled five more times since. Figure 7 shows that the last doubling occurred in April 2010 and took 21 years. The recent era of Central Bank inflation targeting has improved the situation from the 1970s and 1980s where the three doublings of the overall price level only took 10.5, 4.9 and 9.6 years respectively. So although Central banks have controlled inflation over the last 20 years, the rate is still high relative to long-term economic history outside of shocks and one-off events.

Figure 7: Number of Years for UK Price Levels to Double



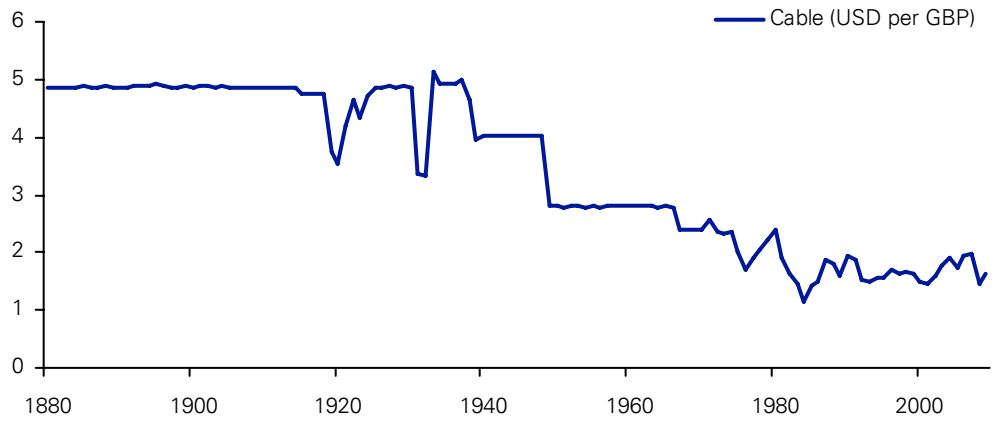
Source: Deutsche Bank, GFD

The impact of twentieth century policy on inflation

The inflation phenomenon of the last 100 years was Global and we will argue in this chapter that some of this may have been linked to the most rapid Global population growth in history during the Twentieth Century. We'll move on to this later in this section but in terms of policy changes, the loosening and eventual abandonment of precious metal backed monetary regimes have also had a big impact on inflation. The Gold Standard's final collapse in August 1971 heralded in a new era of fiat money and credit creation. However we had seen numerous Gold devaluations across the globe in the Twentieth century as the impact of two World Wars and the Depression put strains on many economies. The easiest way of restoring economies to domestic health was to leave the discipline of the Gold standard. The writing had perhaps been on the wall for several decades. To use the UK as an example, membership was suspended between 1914 and 1925, re-established thereafter only to be abandoned again in 1931. In 1940 the UK again linked itself to Gold, only to devalue in 1949

and 1969. The pound then floated from the collapse of the Gold Standard in 1971 to the present day with the exception being the brief flirtation with the ERM in the early 1990s. See Figure 8 below for a graphical representation of this.

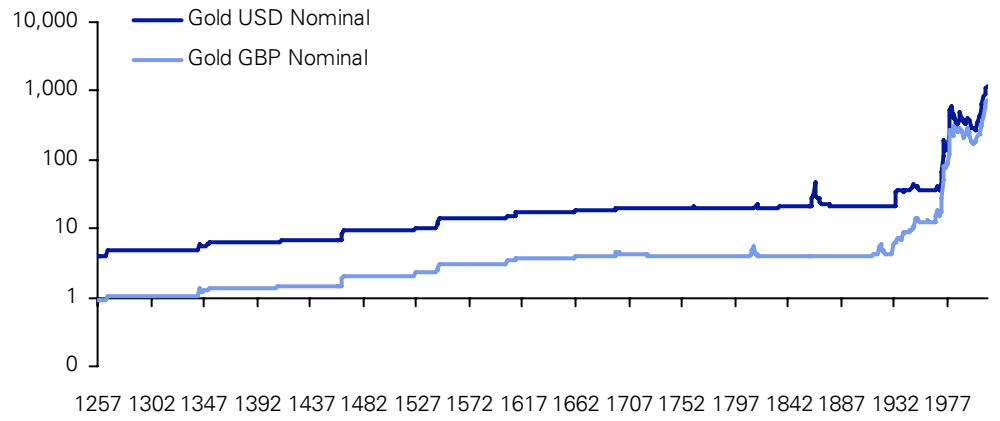
Figure 8: GBP/USD Exchange Rate



Source: Deutsche Bank, GFD

Figure 9 shows the long-term nominal price of Gold denominated in both Dollars and Sterling. We've used a log scale to enable us to see how the rate of growth has exploded during the Twentieth century. The largest surge in the US occurred after the Gold Standard was abandoned in 1971. As discussed above, the UK was devaluing to Gold for a few decades prior to this but it's fair to say that the US kept a tighter reign on monetary policy for longer until this spectacularly ended in 1971. Since then the Dollar price of Gold has increased about 28 times. We truly live in the era of inflation.

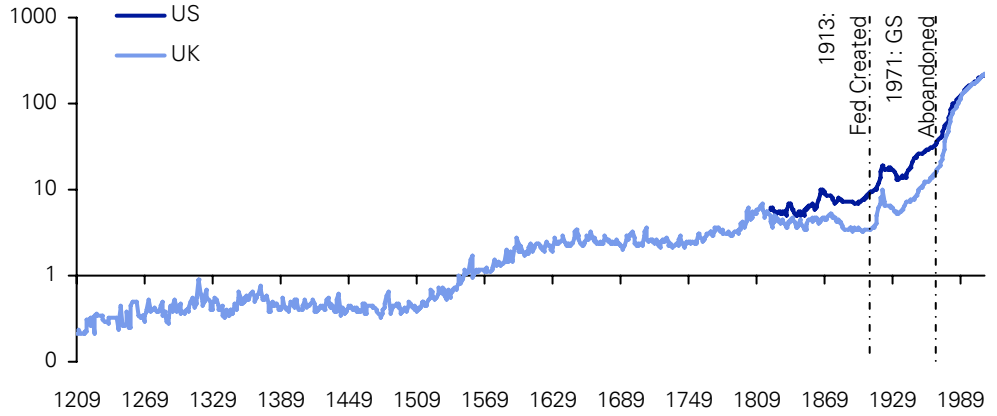
Figure 9: Nominal Gold Price in Dollars and Sterling on a Log Scale



Source: Deutsche Bank, GFD

Figure 10 looks at inflation on a log scale in the UK (back to 1209) and the US (back to 1820) through the centuries.

Figure 10: US and UK Inflation on a Log Scale



Source: Deutsche Bank, GFD

Prior to WWII, UK and US price levels were at similar levels in 1940 (1920 for US) to that seen in 1800. Indeed in the UK the overall price level was unchanged between 1800 and 1938 but has subsequent risen by a stunning multiple of 38 times since this point.

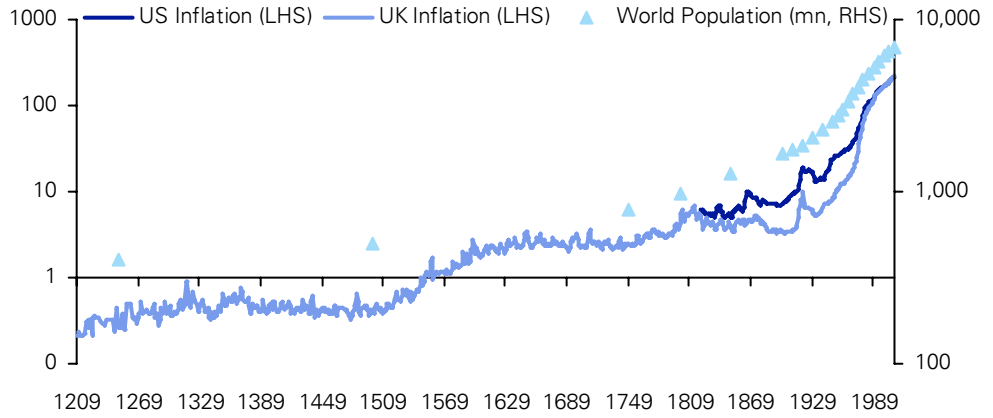
For the US our data starts in 1820 and we find that prices only rose 20% in the 80 years to the end of the nineteenth century and only 61% to the point the Fed was created in 1913. Inflation has since risen over 2000% (price level increased 20 times) in the subsequent 97 years of the Fed's existence.

The Fed was created to reduce the impact of various market panics, in particular the severe 1907 banking panic that saw large runs on banks and a 50% fall in the stock market. The ability to generate an 'elastic currency' in response to market panics could be deemed inflationary as the temptation is always to expand the money supply in bad times with less incentive to see it contract back during good times.

Impact of population growth on inflation

On a sweeping secular basis there is evidence to suggest that population growth has an impact on inflation. Figure 11 repeats Figure 10 but adds World population points on a log basis on the right hand axis. There is evidence to suggest that there is some correlation between the two. Indeed, the twentieth century saw the most dramatic increase in the World's population in observable history going back centuries, if not millennia.

Figure 11: US and UK Inflation and World Population on a Log Scale



Source: Deutsche Bank, GFD, UN

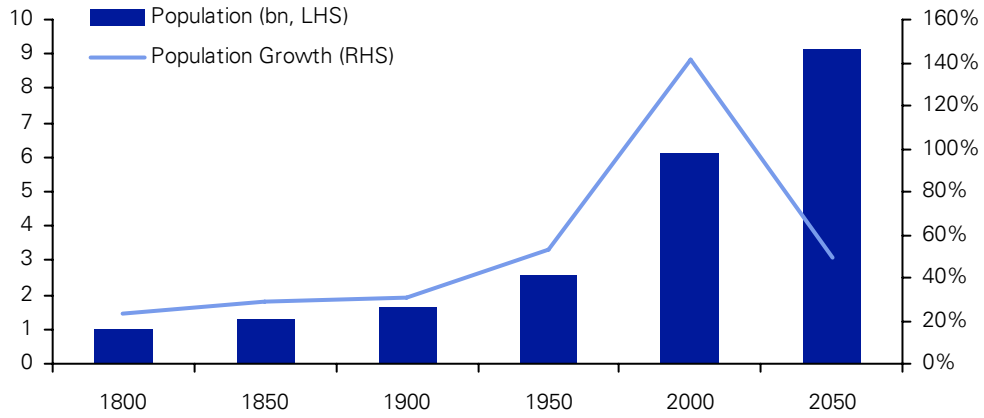
Anecdotally there is also other evidence to suggest a link between the two variables. From the early 1500s to the middle of the 1600s we saw the first observable sustained increase in inflation in which the overall price level increased over 7 times in the UK and also across Europe according to economic history text books. This period has been dubbed the 'price' revolution caused by a large influx of Gold and Silver from the New World, mainly through Spanish endeavours. This was also a period where the history books confirm that the European population dramatically increased after a century of depopulation after the spread of Black Death. The disease has been estimated to have claimed the lives of 30% to 60% of Europe's population, reducing the Global population from an estimated 450 million to between 350 and 375 million in 1400.

So it seems to us that the Twentieth century saw a perfect storm of rapid population growth, Global Wars, more active Central Bank activity and the collapse of precious metal currency systems. While it's beyond the scope of this note to make secular predictions on the outlook for inflation it is worth briefly assessing whether these four factors mentioned as inflationary forces in the Twentieth century will remain with us in the Twenty-First Century.

Brief secular thoughts on the (very) long-term inflation outlook

Firstly as we will see in the chapter on demographics, Global population growth is still expected to be strong out to available forecasts in 2050. However as Figure 12 shows, the growth rate was much stronger between 1950 and 2000 (+142% increase) than it is expected to be in the period 2000-2050 (+50% expected).

Figure 12: World Population and 50yr Bucket Growth Rates



Source: Deutsche Bank, UN

The expected growth rate between 2000 and 2050 is still high relative to the World's history and is similar to the 53% seen between 1900 and 1950. Interestingly inflation rose by 596% (US) and 1902% (UK) in the latter half of the last century and by a less aggressive 236% (US) and 156% (UK) in the first half. In the nineteenth century it only rose 81% over the whole period in the UK. While this is no direct proof of a link between the two variables it could suggest that the population impact on inflation was greater in the latter half of the twentieth century than it will be going forward or it was in earlier periods. However there are significant regional and age variations. The West's population is likely to largely stagnate going forward and is likely to be concentrated on the more elderly who are possibly likely to exert less inflationary pressures than the younger members of society. However on the other hand most of the growth in the global population out to 2050 occurs in the Developing World where the population is younger. The crucial impact on Global inflation will likely revolve around how rapidly the latter develop economically and how integrated the Global economy is going forward. The quicker the economic progress the more the potential pressure on the World's scarce resources there might be. So this could be a source of inflationary pressure going forward. We explore the global demographic situation in a later section of this report. However in terms of the price level, if the Western World was alone on this planet and without money creating Central Banks one could easily conclude that deflation was the most likely option across much of the region.

Moving on to the other factors, we'll skip over the Global Wars part of the equation as at this stage the likelihood of such events are impossible to predict. All we would highlight is that the Globalisation of the early Twentieth Century collapsed spectacularly with WWI, so the fact that Countries were economically dependant on each other was not an impediment to War at this point. This should at least be in the back of our minds as we go through the latest Globalisation wave.

The third and fourth twentieth century inflation contributors – namely more active Central Banks and the collapse of precious metal currency systems - we'll discuss together. There is nothing to suggest that we'll return to currencies backed by precious metals anytime soon. Fiat currencies are here to stay and probably more so in the aftermath of the Global Financial Crisis where Central Banks are keen to keep economies afloat. It's fair to say that without Central Banks we would currently already be in deflation across much of the globe. Although deflation pressures will likely put pressure on economies in the near-term, unless the world's financial market rebel at the prospect, Central banks are likely to be pro-inflationary institutions as far as the eye can see.

So overall, our best guess is that inflation will continue to rise out to 2050 but that the rate of growth will be much slower than the experience seen in the latter half of the Twentieth Century. Over the medium to long term the experiences from the 1900-1950 period may be a decent template, albeit with significant regional variations. Given that there does seem to be a link between population growth and inflation the chapter on demographics could provide insights into the regional variations for future inflation.

Imminent de-population across certain parts of the Developed World and the recent experience of Japan is certainly food for thought with regards to future inflation.

Historic US Asset Returns

We now look at long-term US returns going back to the start of the nineteenth century (where possible). For simplicity we have concentrated on Dollar Based assets in this section of the report. This also enables us to delve deeper into history to analyse the long-term rhythm of returns. In reading the results, hopefully one will be able to understand the type of returns that a sophisticated Developed Market sees through time. The results should be a template for other Developed regions and there may also be some interest for Developing Market investors in the results seen in the early years of this study. This was a period where the US was a rapidly growing Economic powerhouse and catching up and eventually overtaking the mostly European, Global superpowers.

Figure 13 and Figure 14 show why we invest in assets over the medium to long-term. Using data back over 200 years, it is quite clear that history tells us that holding cash on deposit has been a recipe for wealth erosion. We split the data up by nominal and real Return returns through different time periods. We also show returns annualised within each decade and also by 50 year buckets. This hopefully helps us see both cyclical and secular trends.

Over the entire sample period, Equities outperform Corporate Bonds, which outperform Government Bonds, which outperform Cash, which interestingly has outperformed Commodities. Since 1900, where we have data for the widest selection of assets, Equities outperform 30yr Governments by 4.56% p.a., Corporates by 3.54% p.a., Cash by 5.23% p.a., and Commodities by 5.72% p.a. (on a real adjusted basis).

The most fascinating part of the equation is perhaps that regarding Commodities. Over the last 5 and 10 year periods they have generally been the best performing asset classes in our study. However the surprise is that their long-term performance has actually struggled to beat inflation. Over the last 150 years, the overall Commodity index has actually seen negative real returns. Indeed over the last 100, 75, 50 and 25 year periods the returns in this index have been less than 1% on a real annualised basis. A similar outcome is seen for both Gold and Oil. While Gold is up 15.52% p.a. over the last 5 years and 13.02% over the last 10 years (real adjusted), the long-term real performance is actually pretty weak and has only grown by 0.58% p.a. (real) since 1900. Meanwhile equities have returned 6.02% p.a. (real) over the same period. A similar picture is seen for Oil.

Property (US) is an asset class that has only just out-paced inflation (0.3% p.a. real) over the long-term. We would stress that this is a price-only series and doesn't include potential rental yields but it's a reminder that after a significant Global property bubble in recent years that real adjusted capital returns in the asset class can be minimal over longer time periods. This shows the folly of investors using their main residence (which will not produce an income) as an alternative to traditional asset classes when providing for the future.

IG Corporate Bonds have steadily out-performed Government Bonds over all medium-term time periods. The levels of defaults historically seen in IG rarely erode deeply into the additional spread the asset class provides. Periods of under-performance are much more likely to be driven by spread widening. These spread changes tend to be highly cyclical whereas equity and Treasury valuations tend to exhibit a more secular pattern.

HY is a fairly new market, with new issuance (rather than simply fallen angels) only existing from the late 1980s. In this time, we've been through business cycles longer and less frequent than long-term history, but also through two deep default cycles (2000-2003 and 2007-2009), with the former far worse for HY (especially in Europe) than it was for the overall economy. So we would argue that we don't have enough data yet to assess what a likely long-term return number for HY should be. However the excess return of around 1.5% p.a.

over Government Bonds since 1986 is disappointing relative to the risk and to IG credit. Much of this has been obscured by the high total returns in fixed income which has given the asset class a healthy 8.69% p.a. nominal return since 1986. This is relevant as HY investors are more total return biased than the more excess return biased IG investors.

Figure 13: Nominal Returns for US Assets over Different Time Horizons

	Equity	Corp Bond	AAA Bond	BBB Bond	Treasury (10yr)	Treasury (30yr)	HY Bond	Treasury (HY Matched)	Treasury (T-Bills)	Property (Price only)	Gold	Copper	Crude Oil	Wheat	Economist All Commodities
last 5yrs (2006-2010)	-0.56%	6.60%	6.46%	6.58%	6.38%	4.85%	7.52%	6.54%	2.17%	-5.89%	17.91%	8.53%	5.25%	12.61%	7.83%
last 10yrs (2001-2010)	-0.01%	8.99%	8.87%	8.83%	5.97%	6.37%	8.03%	5.45%	2.15%	2.49%	15.59%	14.36%	11.43%	9.17%	7.71%
last 15yrs (1996-2010)	5.76%	7.88%	7.80%	7.86%	6.25%	6.64%	6.82%	5.80%	3.16%	3.75%	7.65%	6.60%	9.75%	0.98%	3.27%
last 25yrs (1986-2010)	9.31%	9.96%	9.64%	10.17%	7.93%	8.77%	8.69%	7.13%	4.16%	3.88%	5.23%	6.69%	4.45%	2.06%	3.26%
last 50yrs (1961-2010)	9.39%	7.66%	7.32%	8.05%	7.16%	6.50%			5.39%	4.51%	7.18%	4.95%	6.78%	2.08%	4.80%
last 75yrs (1936-2010)	10.14%	5.99%	5.65%	6.46%	5.51%	4.92%			3.95%	4.53%	4.79%	4.93%	4.84%	2.31%	4.60%
last 100yrs (1911-2010)	9.43%	5.80%			5.15%	4.88%			3.82%	3.52%	4.12%	3.31%	4.19%	1.88%	3.58%
last 125yrs (1886-2010)	8.83%				4.70%				3.92%		3.28%	2.56%	3.66%	1.57%	3.02%
last 150yrs (1861-2010)	9.18%				4.90%				4.28%		2.73%	1.72%	2.26%	1.39%	2.32%
last 175yrs (1836-2010)	8.43%				4.76%				5.02%		2.33%	1.51%			
last 200yrs (1811-2010)	8.28%				4.92%						2.07%	1.05%			
since 1800	8.26%				5.10%						1.96%	0.82%			
since 1821	8.43%				4.81%						2.18%	1.29%			
since 1900	9.30%	5.65%			4.80%	4.60%			3.91%	3.42%	3.70%	2.60%	3.54%	1.97%	3.41%
since 1920	9.79%	6.13%	5.90%	6.58%	5.41%	5.11%			3.74%	3.61%	4.53%	3.22%	3.08%	0.97%	2.71%
RETURNS BY DECADE															
1800-1809	8.18%				9.12%						0.00%	-3.15%			
1810-1819	4.91%				6.23%						0.00%	-4.63%			
1820-1829	6.94%				5.53%						0.00%	-1.63%			
1830-1839	5.34%				2.75%						0.67%	1.38%			
1840-1849	7.83%				7.47%				8.38%		-0.03%	-2.57%			
1850-1859	1.62%				3.98%				9.07%		0.00%	2.35%		5.70%	
1860-1869	18.34%				6.30%				6.70%		1.81%	1.90%	-12.73%	-1.80%	1.01%
1870-1879	7.73%				3.67%				6.33%		-1.78%	-2.05%	-14.26%	5.23%	-2.04%
1880-1889	5.68%				5.48%				4.74%		0.00%	-1.66%	-0.70%	-5.09%	-0.62%
1890-1899	5.37%				3.93%				3.73%		0.00%	-1.26%	4.88%	-1.21%	-0.63%
1900-1909	9.92%	4.43%			1.63%	2.17%			4.76%	1.97%	0.00%	-3.55%	-1.43%	6.06%	1.66%
1910-1919	4.35%	2.66%			2.52%	2.52%			4.64%	3.15%	0.00%	3.34%	13.33%	7.19%	11.91%
1920-1929	14.97%	6.73%	6.52%	7.27%	5.48%	6.05%			3.88%	0.65%	0.00%	-0.48%	-4.98%	-6.18%	-6.97%
1930-1939	-0.10%	6.51%	7.48%	6.35%	3.95%	5.49%			0.58%	-1.21%	5.41%	-3.51%	-1.81%	-2.22%	0.38%
1940-1949	8.99%	3.93%	2.92%	5.43%	2.70%	2.42%			0.48%	8.12%	1.47%	4.00%	0.28%	7.64%	8.59%
1950-1959	19.26%	0.16%	-0.08%	0.59%	0.39%	-0.50%			2.02%	2.97%	-1.38%	5.96%	1.46%	-0.69%	0.12%
1960-1969	7.76%	0.57%	0.42%	0.89%	2.76%	0.51%			4.06%	1.85%	-0.01%	5.43%	0.78%	-2.96%	2.61%
1970-1979	5.77%	5.34%	5.02%	5.84%	6.08%	3.71%			6.48%	7.99%	30.70%	6.28%	28.04%	11.43%	15.51%
1980-1989	17.47%	13.73%	13.03%	14.43%	12.78%	12.64%			9.13%	6.78%	-2.47%	0.57%	-5.40%	-0.74%	-0.28%
1990-1999	18.21%	9.31%	8.84%	10.00%	7.98%	8.40%	10.59%	7.27%	4.95%	2.69%	-3.12%	-2.12%	1.67%	-6.31%	-1.15%
2000-2009	-0.95%	8.92%	8.91%	8.70%	6.63%	7.03%	6.57%	6.04%	2.74%	3.31%	14.25%	13.96%	11.91%	6.67%	7.75%
RETURNS BY HALF CENTURY															
1800-1849	6.60%				6.20%						0.13%	-2.12%			
1850-1899	7.61%				4.67%				6.10%		0.00%	-0.16%		0.48%	
1900-1949	7.50%	4.84%			3.25%	3.72%			2.85%	2.49%	1.35%	-0.09%	0.89%	2.34%	2.90%
1950-1999	13.55%	5.70%	5.33%	6.22%	5.91%	4.84%			5.30%	4.43%	4.02%	3.17%	4.72%	-0.03%	3.19%
2000-2010	-0.87%	9.24%	9.28%	8.90%	6.93%	7.64%	6.68%	6.19%	2.50%	3.13%	13.50%	12.95%	10.71%	9.68%	6.86%

Note: 2010 Returns are calculated up to 31 July. So for example the last 5 years data is actually for 4 years and 7 months, 10 years for 9 years and 7 months.
Source: Deutsche Bank, Bloomberg LP, GFD, Moody's, NBER, S&P

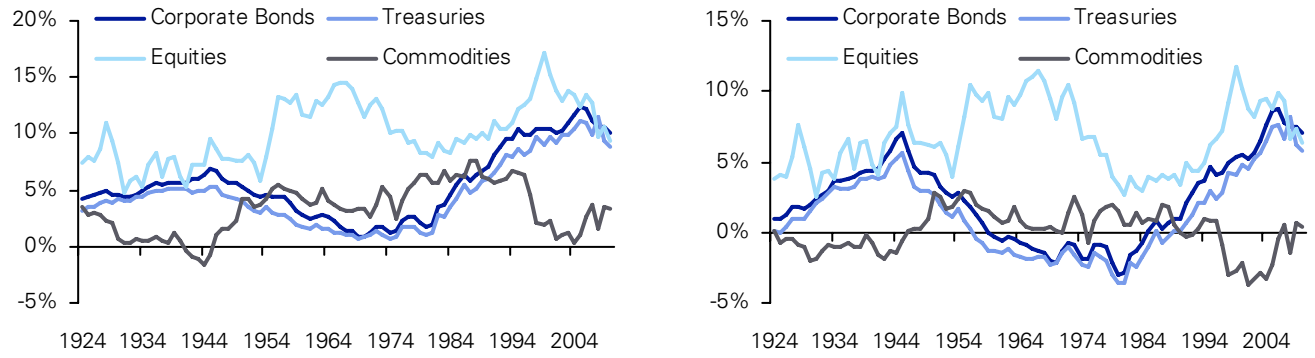
Figure 14: Real Returns for US Assets over Different Time Horizons

	Equity	Corp Bond	AAA Bond	BBB Bond	Treasury (10yr)	Treasury (30yr)	HY Bond	Treasury (HY Matched)	Treasury (T-Bills)	Property (Price only)	Gold	Copper	Crude Oil	Wheat	Economist All Commodities
last 5yrs (2006-2010)	-2.58%	4.44%	4.30%	4.42%	4.22%	2.72%	5.34%	4.39%	0.10%	-7.80%	15.52%	6.34%	3.11%	10.33%	5.64%
last 10yrs (2001-2010)	-2.24%	6.56%	6.44%	6.40%	3.60%	4.00%	5.62%	3.10%	-0.12%	0.21%	13.02%	11.81%	8.94%	6.74%	5.31%
last 15yrs (1996-2010)	3.32%	5.38%	5.31%	5.37%	3.79%	4.17%	4.35%	3.36%	0.77%	1.35%	5.16%	4.14%	7.21%	-1.35%	0.88%
last 25yrs (1986-2010)	6.34%	6.97%	6.65%	7.17%	4.99%	5.81%	5.73%	4.25%	1.32%	1.05%	2.36%	3.79%	1.61%	-0.72%	0.45%
last 50yrs (1961-2010)	5.13%	3.46%	3.13%	3.83%	2.98%	2.35%			1.28%	0.43%	3.00%	0.85%	2.61%	-1.90%	0.71%
last 75yrs (1936-2010)	6.16%	2.16%	1.83%	2.61%	1.70%	1.13%			0.20%	0.75%	1.00%	1.14%	1.06%	-1.38%	0.82%
last 100yrs (1911-2010)	6.03%	2.52%			1.88%	1.63%			0.60%	0.31%	0.89%	0.10%	0.96%	-1.28%	0.36%
last 125yrs (1886-2010)	5.90%				1.88%				1.12%		0.50%	-0.21%	0.86%	-1.17%	0.24%
last 150yrs (1861-2010)	6.58%				2.40%				1.79%		0.28%	-0.71%	-0.18%	-1.03%	-0.12%
last 175yrs (1836-2010)	6.20%				2.60%				2.86%		0.23%	-0.58%			
since 1821	6.42%				2.87%						0.29%	-0.59%			
since 1900	6.02%	2.48%			1.65%	1.46%			0.79%	0.31%	0.58%	-0.48%	0.43%	-1.10%	0.30%
since 1920	6.88%	3.31%	3.09%	3.75%	2.62%	2.32%			0.99%	0.87%	1.76%	0.48%	0.34%	-1.71%	-0.01%
RETURNS BY DECADE															
1820-1829	7.75%				6.46%						1.27%	-1.14%			
1830-1839	3.23%				0.70%						-1.35%	-0.65%			
1840-1849	10.82%				10.45%				11.39%		2.75%	0.13%			
1850-1859	0.07%				2.39%				7.40%		-1.53%	0.79%		4.08%	
1860-1869	13.58%				2.02%				2.40%		-2.29%	-2.20%	-16.24%	-5.75%	-3.06%
1870-1879	10.20%				6.04%				8.76%		0.47%	0.19%	-12.30%	7.64%	0.20%
1880-1889	5.68%				5.48%				4.74%		0.00%	-1.66%	-0.70%	-5.09%	-0.62%
1890-1899	5.23%				3.79%				3.59%		-0.13%	-1.39%	4.74%	-1.34%	-0.77%
1900-1909	7.36%	1.99%			-0.74%	-0.22%			2.31%	-0.41%	-2.34%	-5.80%	-3.73%	3.58%	-0.72%
1910-1919	-2.78%	-4.36%			-4.48%	-4.49%			-2.51%	-3.90%	-6.84%	-3.72%	5.59%	-0.14%	4.26%
1920-1929	16.06%	7.74%	7.53%	8.29%	6.48%	7.06%			4.87%	1.61%	0.95%	0.46%	-4.08%	-5.29%	-6.09%
1930-1939	1.98%	8.73%	9.72%	8.56%	6.11%	7.69%			2.67%	0.85%	7.60%	-1.50%	0.24%	-0.19%	2.47%
1940-1949	3.45%	-1.36%	-2.31%	0.07%	-2.52%	-2.79%			-4.63%	2.62%	-3.69%	-1.29%	-4.83%	2.17%	3.06%
1950-1959	16.67%	-2.02%	-2.25%	-1.60%	-1.80%	-2.67%			-0.20%	0.73%	-3.52%	3.66%	-0.75%	-2.85%	-2.06%
1960-1969	5.11%	-1.90%	-2.05%	-1.59%	0.23%	-1.96%			1.50%	-0.66%	-2.47%	2.84%	-1.70%	-5.34%	0.09%
1970-1979	-1.48%	-1.88%	-2.18%	-1.42%	-1.19%	-3.40%			-0.82%	0.59%	21.74%	-1.00%	19.26%	3.79%	7.59%
1980-1989	11.77%	8.21%	7.55%	8.88%	7.31%	7.18%			3.83%	1.60%	-7.20%	-4.31%	-9.99%	-5.55%	-5.11%
1990-1999	14.85%	6.20%	5.74%	6.87%	4.91%	5.31%	7.45%	4.22%	1.97%	-0.23%	-5.88%	-4.90%	-1.22%	-8.97%	-3.96%
2000-2009	-3.39%	6.24%	6.23%	6.02%	4.01%	4.40%	3.95%	3.43%	0.21%	0.76%	11.44%	11.15%	9.16%	4.04%	5.09%
RETURNS BY HALF CENTURY															
1821-1849	7.20%				5.77%						0.86%	-0.53%			
1850-1899	6.85%				3.93%				5.35%		-0.70%	-0.86%		-0.23%	
1900-1949	5.02%	2.42%			0.87%	1.33%			0.48%	0.13%	-0.98%	-2.40%	-1.44%	-0.02%	0.53%
1950-1999	9.17%	1.62%	1.27%	2.12%	1.83%	0.80%			1.24%	0.40%	0.01%	-0.81%	0.68%	-3.88%	-0.79%
2000-2010	-3.18%	6.70%	6.74%	6.36%	4.45%	5.13%	4.20%	3.72%	0.11%	0.74%	10.86%	10.32%	8.13%	7.13%	4.38%

Note: 2010 Returns are calculated up to 31 July. So for example the last 5 years data is actually for 4 years and 7 months, 10 years for 9 years and 7 months.
Source: Deutsche Bank, Bloomberg LP, GFD, Moody's, NBER, S&P

Taking a slightly longer-term sweeping view of returns we can see from Figure 15 that over the last 25 years corporate bonds have nudged ahead of Equities and Treasuries as the best performing traditional asset class using US data. This is a fairly stunning outcome given that the long-run equity risk premium in Equities is over 4% p.a. against Treasuries and nearer 3% against corporate bonds. Over time, there is clearly a significant variation in these excess returns. A combination of Figure 15 and the decade returns shown in Figure 13 and Figure 14, shows that through the 1950s and 1960s, equities had an annual excess return over Treasuries that exceeded 10% p.a.

Figure 15: Rolling 25 Year Total Returns (Annualised), Nominal (left) and Real (right)



Source: Deutsche Bank, Bloomberg LP, GFD, Moody's, NBER

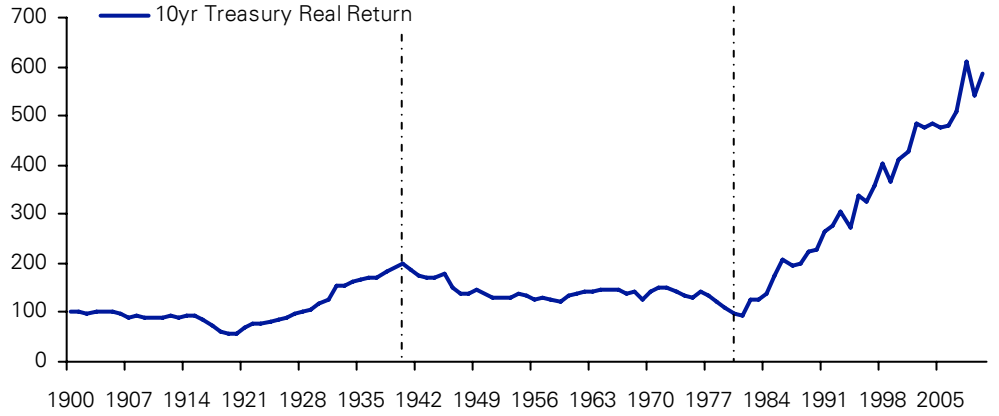
The 25 years which ended in 1999 proved to be the best period for Equity returns, certainly since the start of 1900. We should perhaps see the subsequent declines as a reaction to this period of excessive returns. For Treasuries the best 25-year period ended in 2006. Although Treasuries have performed strongly since, the base effects of the performance in the early 1980s have now dropped out of the series.

With the Commodity rally of the last 5-10 years, 25-year rolling real returns have nudged into positive territory. However Figure 4 serves as a useful reminder that over the long-term, Commodities have struggled to consistently out-pace inflation.

Fixed income – 40 years of pain, 30 years of "hedonism"

Fixed income returns have been on two long secular waves since the end of the 1930s. Between 1940 and 1981, Treasuries lost 53% in real-terms (-1.8% p.a.). The returns by decade in Figure 14 also show that every decade from the 1940s to the 1970s saw negative real returns in the asset class. However since 1981 Treasuries have returned 519% (6.5% p.a.). Indeed Figure 16 shows how different the 1940-79 period was to the one seen since 1980.

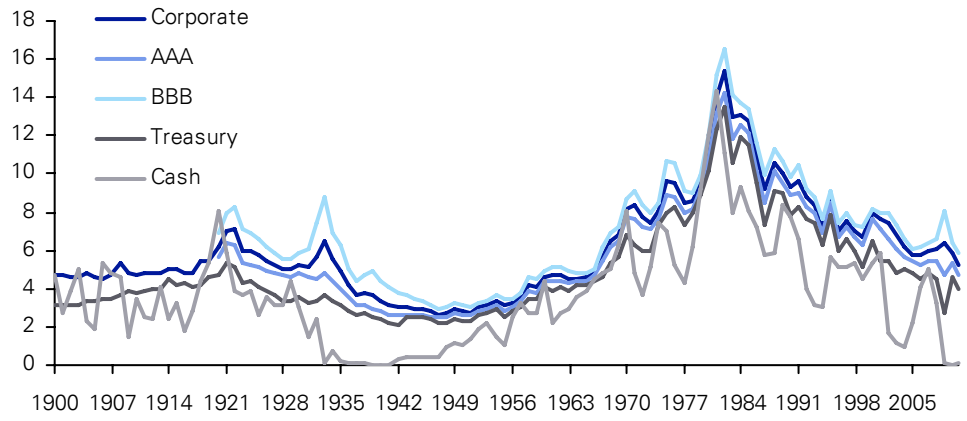
Figure 16: Real Treasury (10yr) Return Series



Source: Deutsche Bank, GFD

Much of this is due to the starting point of yields and the subsequent inflation environment. Figure 17 shows that yields started the 1980s at the highest level on record which clearly caused the prior multi-decade underperformance and facilitated the phenomenal performance since.

Figure 17: US Yield Histories (%)



Source: Deutsche Bank, Bloomberg LP, GFD, Moody's, NBER

Treasury yields are now approaching levels seen in the 1930s or 1940s and only a sustained period of deflation could sustain the returns seen over the last 5-25 years. Any inflation near or above long-term averages will lead to low or negative real returns from this starting point.

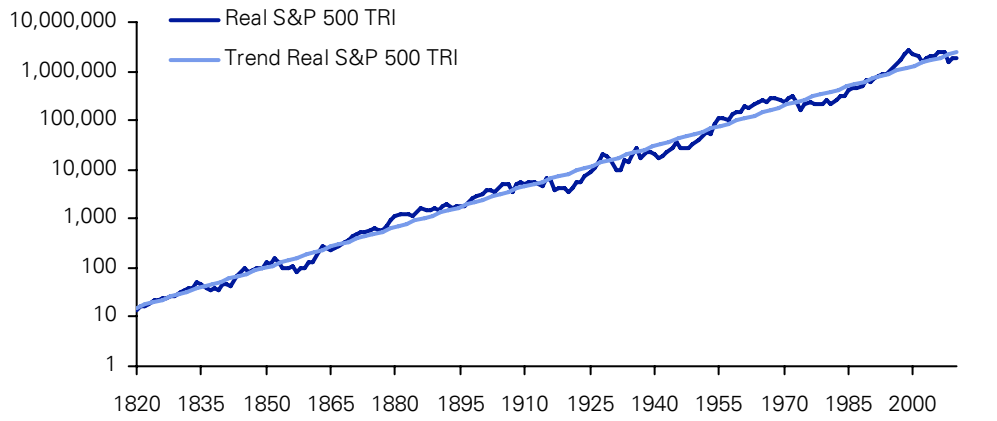
Old Rhythms over New Paradigms

Prior to the Global Financial Crisis starting in 2007 the perennial 'new paradigm' themes were prevalent in financial markets with the belief that more efficient credit markets had allowed to world to operate on a different level to that seen in previous years, decades and even centuries before. Rapid Globalisation and the growth of economic powerhouses in the Emerging World were also thought to have augmented the increased 'efficiencies' in credit markets. Central Banks (and more dubiously Politicians) were also thought to have ushered in a new era of economic stability thus sedating the destabilising peaks and troughs of the business cycle.

In reality the themes surrounding the most recent new paradigm discussions was in many ways just another of the numerous changes that the World has undergone over the last few hundred years. Economic growth, and indeed the progress of mankind, is in many ways reliant on constant change and the introduction of radical new themes and ideas.

In terms of traditional Developed market asset prices, it is not clear to us that any of the 'new paradigm' themes that have shaped thinking over the last 20-30 years were anymore important than those seen in previous generations. As we see in Figure 18, there has been a consistency in real totals returns in US equities since we have real return data back to 1820.

Figure 18: S&P 500 Real Total Return Index and Trend Line on Log Scale



Source: Deutsche Bank, GFD

The log scale perhaps optically understates the volatility around this long-term trend but the purpose of using this chart is to show that there has been a long-term rhythm of returns that has survived both good and bad times. If anything there is evidence to suggest that this rate of growth is slowing down and not speeding up as a result of the recent changes in the World. We discuss this theme later on in the document. For now we highlight that there has been a broad mean-reverting consistency to real returns through a World that's gone through constant upheaval since the real return data starts in 1820.

To name a few key landmark developments, we have seen:

- The nineteenth century Industrial Revolution changing the face of the Western World forever.
- The Global baton of economic power handed from the UK and the British Empire in the late 1800s/early 1900s to the US in the 20th Century. Indeed The 21st Century is likely to

be where the US hands this over to China and possibly India, with other developing countries rising up in economic importance.

- We've had a regime change in inflation. As we saw in the chapter on the 'era of inflation', the overall level of prices in the UK economy was slightly lower at the onset of WWI than it was over one hundred years earlier at the start of 1800. Since the eve of WWI UK inflation is 5690% higher.
- Linked into the above point the Fed was created in 1913. Between 1820 and 1913 US inflation grew by only 61%. From 1913 to the present day it has increased 2080%. There is evidence to suggest that the Fed have been a significant inflationary influence on the US if not the whole world since its inception.
- We've seen a total collapse of precious metal based currency systems in favour of fiat currencies. Indeed as we see throughout this piece, the final collapse of the Gold Standard in 1971 heralded in a complete step change in inflation and the nominal value of virtually all assets classes. However as we'll see, real total returns, especially in equities, haven't really changed since this point. If anything the rate of growth may have slowed relative to its very long-term averages.
- The size of the Global Population has grown beyond all comprehension over the past 200 years without altering the longer-term rhythm of returns. Around 1800, the globe saw its 1 billionth citizen. By 2000 the Globe had expanded to house 6 billion people. By 2050 it is expected to be home to over 9 billion.
- The World has experienced and survived numerous wars, including the first two truly Global Wars seen in the Twentieth Century
- Globalisation has also been a theme that has moved in long waves. The world saw a large Globalisation spurt in the late 1800s/early 1900s. This ended with WWI but its worth noting that we have seen Globalisation before the late twentieth century / early twenty-first. It's not a totally new theme and will likely continue to ebb and flow in importance in the years ahead.
- Having said that the re-emergence of China (from the late 1970s-) and the collapse of the Iron Curtain (1989-1991) have changed the economic landscape and balance of economic power in the world. But have they actually permanently impacted returns on risk assets in the Western World? More on this in the next sub-section.
- Finally it's worth noting just how much computers, technology and communications around the world have changed over the whole period, none more so than over the last two or three decades. However as the dotcom bubble showed, such changes can improve everyone's quality of life without necessarily providing additional returns to stakeholders. We've also been here before. The internet age is akin to the development of canals, the railways, the automobile and radio/television to name but a few major technological and communication advances.

Overall the world keeps changing and the tendency is to believe that the current generation is progressing at a fastest rate than it did through history. There is no doubt that some parts of the world are progressing at a more rapid rate than others but it is not altogether clear how much impact this is having on the Developed World in terms of growth and asset price returns.

The great globalisation myth for Developed World growth and asset prices

It seems to us that the consensus view is that the rapid and spectacular growth of the less Developed World over the last 30-plus years has been a game changer for Developed market prosperity and will as a minimum continue to cushion the blow of the problems associated

with the post-credit crisis world and a now aging population. In this section we challenge this hypothesis by examining the performance of various economic indicators and asset price returns from various points along the timeline of Developing Market successes over recent decades.

First we'll take a brief trip down EM memory lane and highlight the key developments shaping the economic success of countries previous mired in slow growth at best, and economic isolation and repression at worst.

1. China's recent development spurt can perhaps be traced back to Economic market based reforms initiated in December 1978 coinciding with Deng Xiaoping becoming leader. The plan was to transform a stagnant, planned and poverty stricken economy into a market based one thus creating growth and higher prosperity. One of the first and key acts was the "responsibility system" which allowed farmers to choose what crops to grow. All surpluses could be sold at a profit. China also started to encourage foreign trade and investment thus opening up the country for the first time in generations, and even centuries. This was the start of the revolution that continues to this day, some 30 plus years later.
2. The "Revolutions of 1989" led to the over-throwing of communists states across Eastern Europe. A potential trigger point again revolved around China as the Tiananmen Square protests (7 weeks from April 15 1989) seemed to reverberate around the world thus awakening the revolutionaries around Eastern Europe. Poland's Solidarity party made significant inroads in the June 4th 1989 elections and a new non-Communist government was sworn in during September 1989. Over the next two years, Communism in the former Eastern Bloc collapsed with the highlights being; the fall of the Berlin Wall on November 9th 1989, German reunification on October 3rd 1990, and the dissolution of the Soviet Union which took place gradually between January 1990 and December 31st 1991. The Cold War at this point was over, thus heralding in as peaceful a Global climate as we have had for several decades.
3. One can also add to this the economic liberalisation of India that commenced in 1991 after an IMF bailout that saved India from bankruptcy. Prior to this India practised socialist policies after independence in 1947. The IMF package forced reforms on India thus eliminating controls and opening up the economy to trade and investment.

So the period between 1989 and 1991 saw material changes around the world and saw swathes of the Global economy open up and embrace Globalisation. Meanwhile China was continuing with its reforms with evidence of more success stories in Latin America (especially Brazil) than in earlier decades. Added to this we've seen the Oil rich states of the Middle East prosper. Overall it's easy to see how many previously economically closed or low growth areas have been brought into Global Economy. Running parallel to this, this period of development has mirrored the rapid development in technology that has revolutionised Globalisation.

The theory suggests that the West should have, and should be continuing to benefit from the Globalisation dividend. However as we'll show in Figure 19, the jury is out as to whether the economy in the West or returns in Western risky assets have actually benefited. Figure 19 shows asset price returns, US earnings growth and GDP growth across selected regions from key starting points to the present day. We have also included returns/growth over the long-run (last 50 years and since 1900 and 1820) for comparison purposes.

Figure 19: Asset Returns and GDP Growth Rates from Key EM Development Dates and Relative to Long-Term History

	Nominal Returns/Growth						Real Returns/Growth					
	since 1821	since 1900	Last 50yrs	since 1979	since 1989	since 1992	since 1821	since 1900	Last 50yrs	since 1979	since 1989	since 1992
Asset Returns (Annualised)												
Equity	8.4%	9.3%	9.4%	11.1%	8.8%	7.3%	6.4%	6.0%	5.1%	7.1%	5.9%	4.8%
US Equity Earnings		4.6%	6.2%	5.4%	4.8%	7.9%		1.5%	2.1%	1.7%	2.1%	5.3%
Corp Bond		5.7%	7.7%	10.1%	9.6%	9.0%		2.5%	3.5%	6.2%	6.7%	6.4%
BBB Bond			8.0%	10.4%	9.8%	9.1%			3.8%	6.4%	6.9%	6.5%
Treasury (10yr)	4.8%	4.8%	7.2%	8.9%	7.9%	6.8%	2.9%	1.7%	3.0%	5.0%	5.0%	4.3%
Treasury (30yr)		4.6%	6.5%	9.1%	8.6%	7.9%		1.5%	2.3%	5.2%	5.7%	5.3%
Treasury (T-Bills)		3.9%	5.4%	5.5%	3.9%	3.4%		0.8%	1.3%	1.8%	1.1%	0.9%
Gold	2.2%	3.7%	7.2%	5.3%	4.9%	6.5%	0.3%	0.6%	3.0%	1.5%	2.1%	4.0%
Copper	1.3%	2.6%	4.9%	5.0%	3.5%	6.5%	-0.6%	-0.5%	0.9%	1.2%	0.8%	4.0%
Crude Oil		3.5%	6.8%	5.3%	7.2%	7.7%		0.4%	2.6%	1.5%	4.3%	5.2%
Wheat		2.0%	2.1%	1.5%	1.4%	2.5%		-1.1%	-1.9%	-2.1%	-1.3%	0.1%
Economist All Commodities		3.4%	4.8%	2.6%	1.6%	4.1%		0.3%	0.7%	-1.1%	-1.1%	1.6%
GDP Growth (Annualised)												
USA	5.4%	6.3%	6.9%	5.9%	4.9%	4.8%	3.9%	3.3%	3.1%	2.6%	2.5%	2.7%
UK	4.6%	6.1%	8.4%	7.1%	5.3%	4.9%		2.1%	2.4%	2.1%	2.0%	2.2%
Germany			6.0%	4.3%	3.9%	2.5%			2.7%	2.0%	2.0%	1.2%
France	6.4%	10.2%	8.0%	5.7%	3.6%	3.3%			3.0%	1.9%	1.8%	1.6%
Italy		11.8%	10.5%	8.3%	4.7%	3.9%		2.6%	2.9%	1.7%	1.1%	0.9%
Japan		11.8%	7.3%	2.7%	1.1%	0.1%		4.6%	4.3%	2.1%	1.3%	0.7%
China			11.5%	15.7%	16.1%	16.6%						
India			12.7%	13.8%	13.2%	12.9%			4.8%	5.3%	5.6%	5.8%

Source: Deutsche Bank, Bloomberg LP, GFD, Moody's, NBER

Returns since China's economic miracle

If we look at returns since the start of 1979, a period that coincides with China's emergence back into the global economy and the point where their growth rate started to become exponential, it is not altogether clear that the West has seen any benefit. Indeed as we see, US real growth has averaged 2.9% since 1979, a figure lower than the 3.9% seen since 1821 and the 3.3% seen since 1900. Growth in Europe has been plus/minus 2% since 1979 depending on the region.

The annualised real rate of return on US equities has been 7.1%, higher than 6.4% seen since the start of 1821 and 6% since 1900. However we should remember that US equities at the start of 1979 were in the latter stages of a deep secular bear market starting in 1966 and ending in 1981. So a 1% incremental annual return over the long-term average largely reflects an extremely cheap starting point. Indeed if we go back over the entire last 50 years its clear that the returns of 5.1% p.a. are lower than the long-term average. Backing up this low 1979 valuation argument is the PE ratio chart shown elsewhere in the document (Figure 25) and also the fact that real earnings have grown at an only slightly higher than average 2.1% p.a. since this point, significantly lower than the equity performance number

It is noticeable though that Treasury returns seen since 1979 (5% plus p.a. real) have been fairly spectacular relative to history. However this again reflects the starting point as 10- and 30-year yields were 9.2% and 8.9% respectively at this point.

Returns since the collapse of the Iron Curtain

By the time we saw the collapse of the Iron Curtain and the Soviet Empire between 1989 and 1992 we had corrected much of the extremely cheap asset price valuations seen in the late 1970s/early 1980. Returns on Western risk assets and developed market growth since this

point have been disappointing. Real US growth has slipped to around 2.5% p.a. on average with US equities providing real returns of 4.8% to 5.9% depending on whether we start at 1989 or 1992. This is below the long-run rate of return in the asset class and should perhaps be higher given that this was during a recessionary starting point. The impact of the recession perhaps shows up more in Earnings. In 1989 these were at cyclical lows, hence the 5.3% p.a. real growth from then to now. However we can see that much of this excess earnings growth was cyclical given that real Earnings growth since 1992 is a more average 1.5% p.a.. So there are no obvious signs that Globalisation has had a lasting impact on US earnings from where we were in the early 1990s.

Again the returns in fixed income have been spectacular since this point. Treasury returns have been similar to equities over the period with corporate bond returns higher. Again the anti-inflation dividend may have been more substantial than the growth/earnings dividend for the West.

Perhaps one point to make is that returns on commodities since the early 1990s do seem to be higher than their long-term average. Since 1900 commodities have only really managed to keep pace with inflation, however from the early 1990s there seems to have been a higher average growth rate. Gold, Copper and Oil have all seen annual real growth rates of between 4% and 5.2% over this period. Even though these commodities do not pay a dividend their returns have almost kept pace with equities and Treasuries since the early 1990s. It is possible that the development of large parts of the Global economy has increased the demand for the World's scarce resources that in prior decades the West had almost monopolistic access to.

If true this may help explain why profits, growth and Western asset price returns have not benefited as much as expected from the rapid Global growth of the last 30 plus years. The Emergence of new Global powers may have increased costs and actually made the world more competitive for the Developed nations. The declining average growth rates over the period suggest that they are taking a smaller share of an expanding pie.

It's maybe a surprise that net net we haven't seen much evidence of higher earnings over this period of Globalisation. Those of a bullish persuasion would look at analysts profit forecasts over the next two years and conclude that by the end of this period there will be obvious sustained gains that can show that profits are well above their long-term trend and that there has been a structural shift in company's earnings power as a result of Globalisation. The jury is still out on this as the long-run chart of real earnings growth shown later in this report in Figure 49 suggests that the current levels of earnings are around their long-term trend.

One area where Globalisation has almost certainly been beneficial to the West has been through disinflation. China's re-entry into the Global Economy may have marked a point in time where the globalisation theme did help bring down inflation across the Western world, thus creating a secular shift in interest rates. The emergence of other new economic areas has subsequently re-enforced the trend. Increasing Central Bank inflation targeting may have also helped over the same period.

Did globalisation artificially create 'The Great Moderation'?

Whilst there have been the undoubted and obvious benefits of lower inflation and lower yields/interest rates, the 'Great Moderation' period has perversely allowed free markets in the Developed World to pile up mountains of debt and lever up beyond anyone's prior acceptance of normality. Had Globalisation not led to a surge in Global growth, lower inflation, lower bond yields, and less frequent and less severe business cycles, then we probably would not have had the Developed World debt super-cycle and the associated post 2007

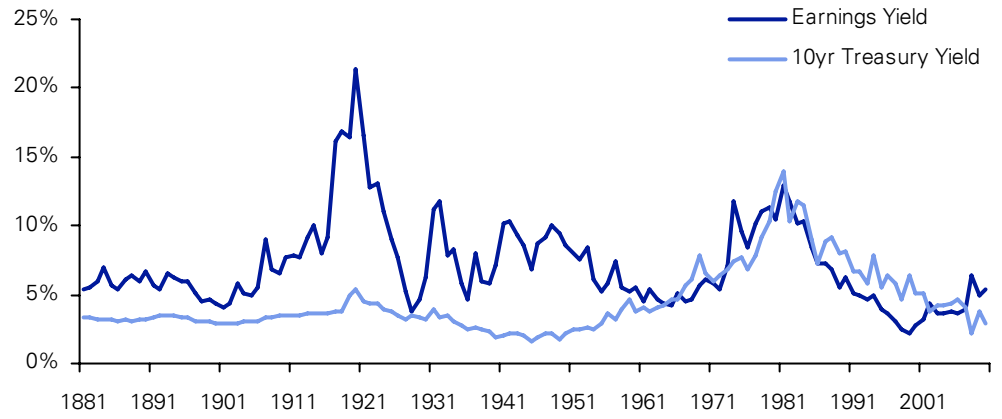
Financial Crisis. Bubbles and unstable environments are often caused by prior long periods of economic stability. Market participants tend to get increasingly confident and complacent the further away they get from a nasty shock to the system. Periodic recessions are often a good control mechanism preventing over exuberance. The rapid Emergence of Developing countries and their above trend growth rates have in a way removed this safety valve in the system.

In the chapter on equity mean reversion we explore whether we should rely on the long-run rate of returns seen over the last couple of centuries or whether we should instead lower our expectations. The answer to this goes some way to help decide whether equities are currently cheap or expensive.

Valuing Equities against Credit and Governments

The market is generally fairly obsessed with valuing equities against Fixed Income and trading off the back of such valuations. However the history of markets suggest that the two asset classes often trade independently of each other leaving a substantial relative value mis-match for many years and in certain circumstances for periods exceeding a decade.

Figure 20: US Earnings Yield (1/Shiller PE) vs 10yr Treasury Yields

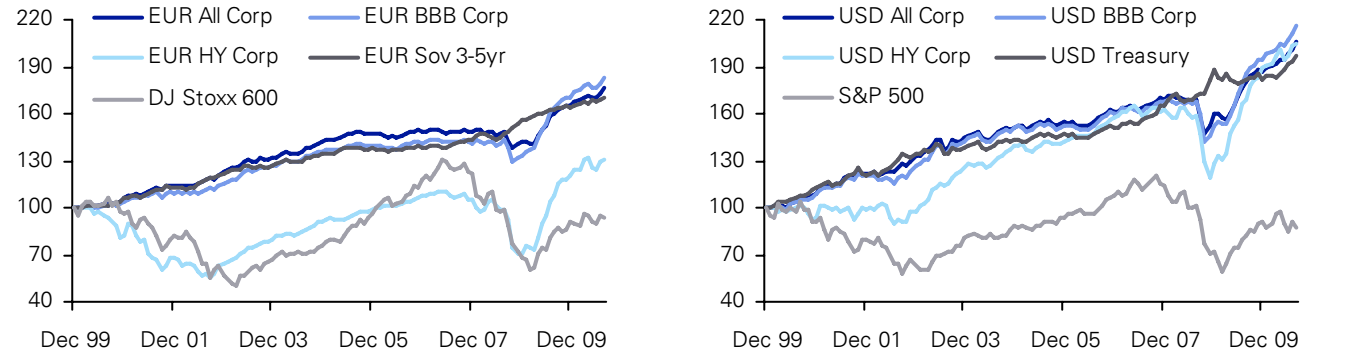


Source: Deutsche Bank, GFD

Figure 20 suggests to us that it's very hard to find a consistent Equities vs Fixed Income valuation relationship through history. There is an argument for saying that the relationship between the two asset classes was fairly strong between the mid-1960s and the mid-1990s. Outside of this period, comparing the Earnings Yield (1/PE) on Equities with the yield on Fixed Income instruments has not been a great guide to near or medium-term performance. However it could be said that the lowest ever Earnings Yield back in 2000 was a signal that Equities were becoming expensive against bonds. However given that we were in a period of a secular reduction in yields, too many investors justified some of the over-valuation for this very reason.

As we show in Figure 21, we are now approaching a (cumulative) decade of Equities under-performing various Fixed Income assets on a total return basis. The reasons are pretty easy to explain given the record over-valuation of Equities in 2000. 10 years on and Equity valuations are back closer to their long-term average valuations through history but are probably starting to look much more attractive against Fixed Income.

Figure 21: Euro (left) and Dollar (right) iBoxx Credit, Government and Equity Total Return Series since 1999

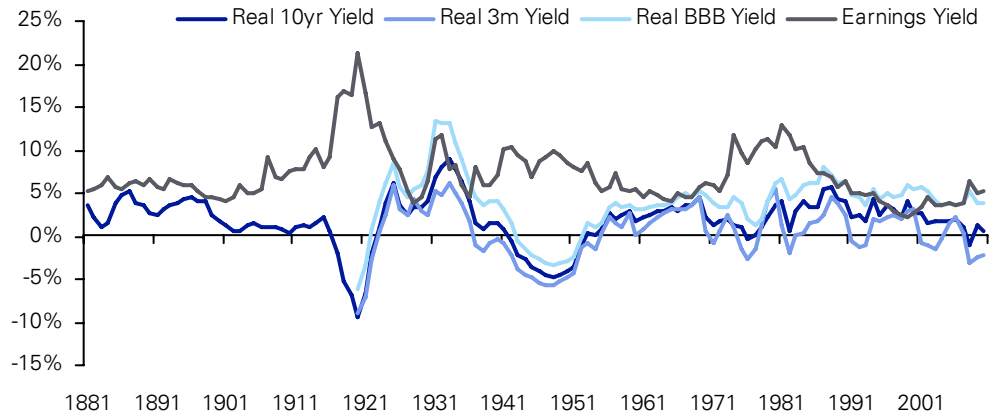


Source: Deutsche Bank, Bloomberg LP

In Figure 22 we take this relative value exercise a step further and real adjust the fixed income data using a rolling 5 year average CPI reading. This allows us to smooth the large annual swings and is probably a decent guide to the market's rolling expectations through time. We have calculated Earnings Yield by using the reciprocal of Shiller cyclically adjusted PE ratio. The Shiller PE ratio number is based on an earnings number which real adjusts the last 10 years of data. This again smoothes out the data across cycles.

To start the discussion we use US data as this allows us to take a very long-term look across asset classes. We then move on to the UK for a European prospective.

Figure 22: US Real Fixed Income Yields and Equity Earnings Yield (%)



Source: Deutsche Bank, Bloomberg LP, GFD, Moody's

Before we analyse the relative value graph it's worth highlighting Figure 23 which shows the current yields against the historic average yields.

Figure 23: US Equity Earnings Yield vs. Real Fixed Income Yields

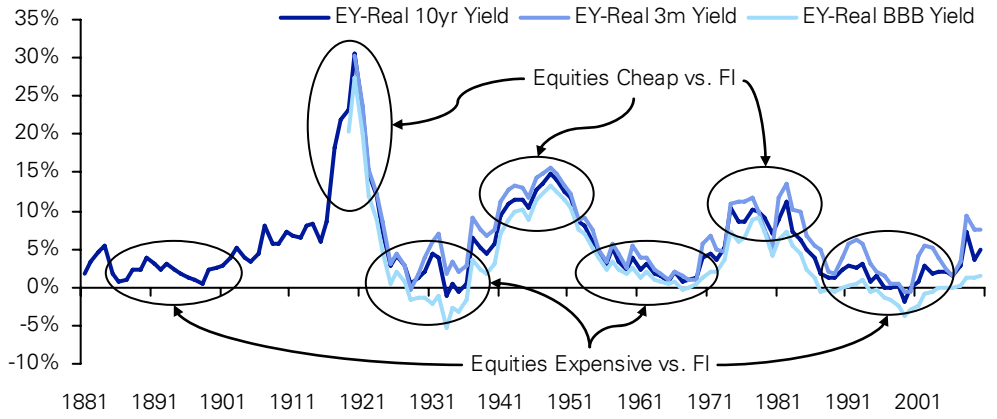
	Average	Current
Equities Earning Yield	7.1%	5.3%
Real 10yr Treasury Yield	1.8%	0.5%
Real 3m Bill Yield	0.4%	-2.3%
Real BBB Corporate Yield	3.9%	3.7%

Source: Deutsche Bank, Bloomberg LP, GFD, Moody's

On this measure the yield on Equities is on average around 3.5% higher than real BBBs, 5.5% higher than Treasuries and nearly 7% higher than cash. However as you can see from

Figure 24, the yield pick-up in Equities has not exceeded the long-run average differential over BBBs and Treasuries for most of the last 20-25 years. Interestingly the yield differential to BBBs has been negative or broadly flat for most of the last 15 years and has only returned to positive territory in the last year or so.

Figure 24: US Equity Earnings Yield vs. Real Fixed Income Yields



Source: Deutsche Bank, Bloomberg LP, GFD, Moody's

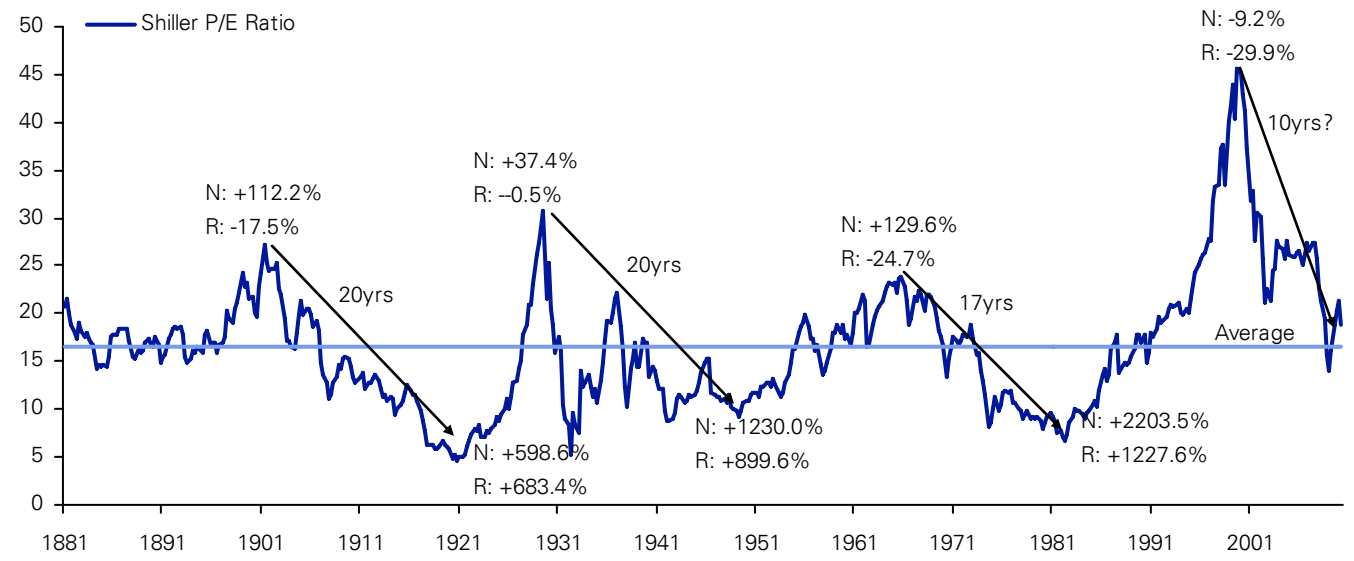
So after years of equities generally looking very expensive relative to Fixed Income, Equities are starting to provide a decent yield pick-up relative to fixed income. Relative to cash one could argue that they are starting to get on the 'cheap' side relative to history.

Secular trends dwarf cyclical trends

The problem with this analysis is that through observable history we have seen clear and separate secular historical trends for Equities and Fixed Income. As Figure 16 showed, yields saw a 20 year secular bull market from the end of WWI to 1940, then saw a 41 year bear market to 1981, and have subsequently been on a near 30 year bull market. These secular moves seem to have had little to do with relative value.

Meanwhile Figure 25 shows that Equities have seen 4 major bull market valuation peaks (1901, 1929, 1966 and 2000) over the last 110 plus years. We also show the extreme differences in total returns (real and nominal) depending on whether we are in a secular bull or bear market.

Figure 25: Shiller PE Ratio and Total Returns in Nominal (N) and Real (R) Terms Covering Structural Bull/Bear Cycles



Source: Deutsche Bank, GFD

After the first three of these peaks, Equities then took 17-20 years before valuations started to consistently rise again. The last of these bull market peaks remains unresolved. Have equity valuations really bottomed out this time after only 10 years and at only long-term averages? This being after what was the biggest over valuation in history seen in 2000. Only time will tell but it's possible that comparing Fixed Income with Equities misses the bigger picture structural trends within both asset classes. The secular peaks and troughs in both asset classes are often independent of each other.

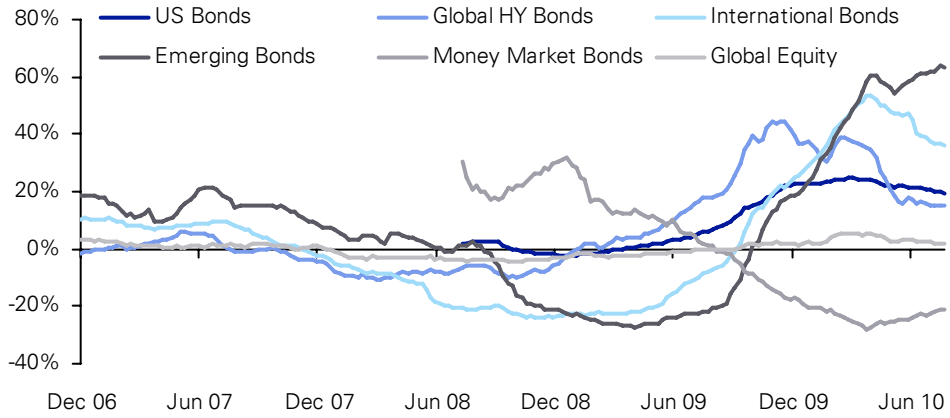
We would stress that if earnings in 2010 and 2011 come through as analysts expect, then all other things being equal, equities will enhance their yield gap over fixed income and will certainly be officially 'cheap' to fixed income for the first time in perhaps more than 25 years. This study tends to use the past to help predict future performance so we are reluctant to put too much trust in forecasts derived from other methods. As we'll see later in the piece, there is little evidence to suggest that earnings at their current level are out of line with history. This seems a fairly neutral place for earnings to be historically.

Overall it's clear that the days of chronic equity over-valuation against Fixed Income are over. We would worry that history repeats itself and that equities eventually have to end up being exceptionally cheap to Fixed Income before they hit their lows. However we'd accept that there is not a compelling relative value argument to favour Fixed Income over equities any more.

So why don't investors increase their allocations into equities?

At the moment the investment flows are still heavily favouring Fixed Income over equities. Figure 26 shows the cumulative flow of funds into various asset classes since December 2008. As can be seen bond flows have been very positive over the last 18-months or so, particularly in HY. Money market funds have unsurprisingly seen outflows with Equity flows fairly flat.

Figure 26: 12-month Rolling Net Flows Relative to NAV



Source: Deutsche Bank, EPFR

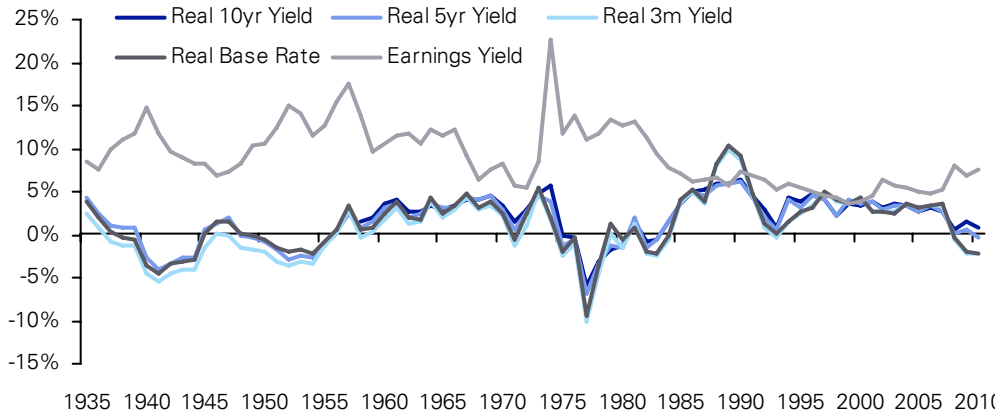
So why have flows into equities been relatively low?

- History tells us that it's possible we could overshoot into extreme cheap territory before this cycle is over (see Figure 25).
- The later chapter on demographics explains that the demand size of the equation continues to be challenging in light of an aging population.
- Although Equities may be cheap relative to Fixed Income and base rates, it could be argued that the rates market in general is being kept at artificially low rates by extraordinary intervention from the authorities. So if the rates market sells off, equities may sell-off too even if the relative performance is decent. With such heavy debt re-financing needed over the next few years (especially Government and the entities it supports) money could be forced into such issuance thus crowding out more risky finance.
- This Earnings Yield analysis spectacularly breaks down if we see Deflation or very low nominal GDP growth. The best example of this has been Japan post 1990. Given that we still haven't escaped the possibility of such an outcome then perhaps investors will require a higher yield premium than normal to invest in equities. Deflation would increase real bond yields and make the asset class more attractive and would likely lead to falling earnings which would lead to a sharp fall in the Earnings yield unless the Equity market fell. So any pro-Equity analysis using Earnings Yields has to assume that Deflation doesn't exist and that Earnings grow over time.

Equivalent results from the UK

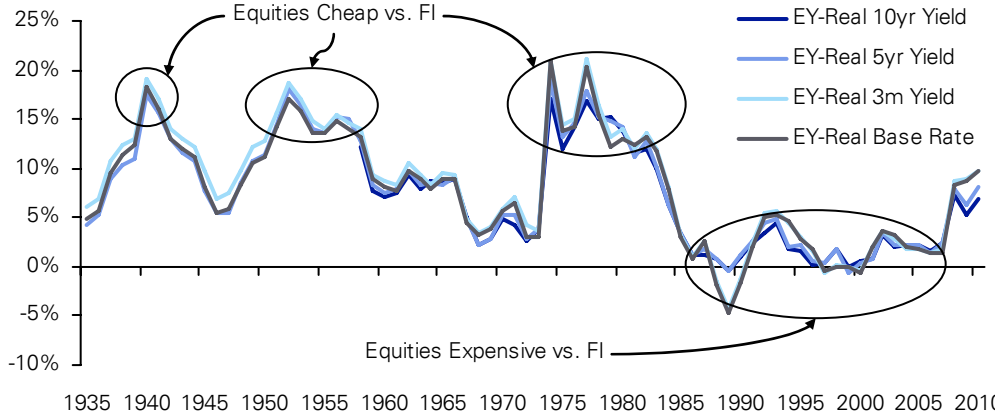
We've set the scene using the long history of US data. For Europe the analysis is complicated by the introduction of the single currency and the wide regional differences that occurred pre-EMU. We also have more difficultly gaining access to anywhere near as long a data history as we do in the US. To enable us to go back through time we use UK data. We don't include credit as we only have data going back just over a decade.

Figure 27: UK Real Fixed Income Yields and Equity Earnings Yield



Source: Deutsche Bank, GFD

Figure 28: UK Equity Earnings Yield vs. Real Fixed Income Yields



Source: Deutsche Bank, GFD

The results show a similar pattern to the US, but one could argue that UK equities are now cheaper relative to fixed income than they are in the US. Although we are starting to get 'cheap', there have been periods in history where we have been cheaper. This is similar to the US example. The risk is again that real fixed income yields rise notably at some point and equities have to adjust lower to compete.

Figure 29: UK Equity Earnings Yield vs. Real Fixed Income Yields

	Average	Current
Equities Earning Yield	9.2%	7.6%
Real 10yr Gilt Yield	2.6%	0.7%
Real 5yr Gilt Yield	1.5%	-0.4%
Real 3m Yield	0.8%	-2.1%
Real Base Rate	1.3%	-2.1%

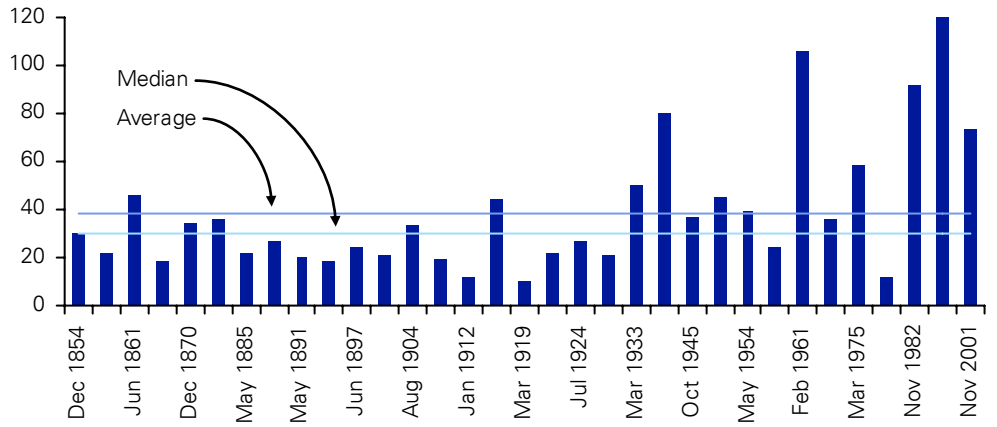
Source: Deutsche Ban, GFD

Timing Business/Credit Cycles is Key to Performance

Economic and credit cycles been around since Biblical days. Every generation seems to believe that they've tamed the business cycle. However the more we collectively believe it's been tamed, the more history suggests that the eventual recession will be even stronger. Indeed by the end of 2007 the US economy had only been in recession for 16 months since November 1982. This equated to just over 5% of the time over a remarkable 25 year period. Over the entire period since the NBER started to define business cycles in 1854, the US economy has actually been in recession 31% of the time. Between 1854 and November 1982 it was in recession 35% of the time.

Figure 30 shows the duration of each economic expansion (i.e. between all US recessions) since the NBER started collating statistics from 1854 onwards.

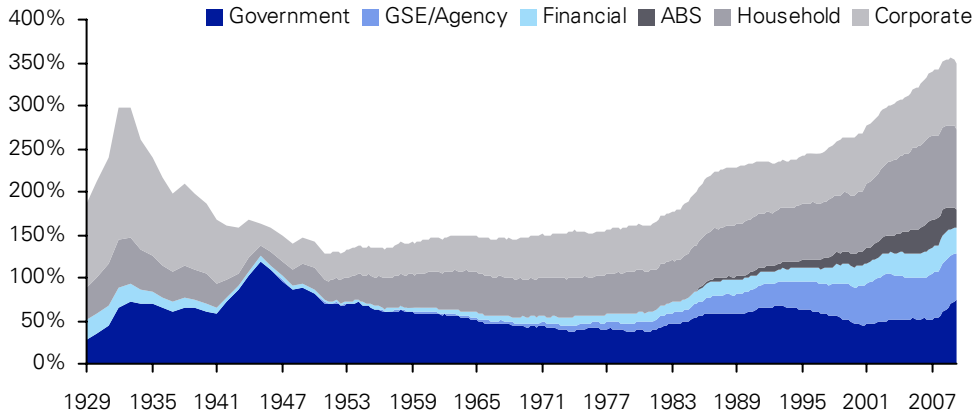
Figure 30: US Economic Expansion Lengths (months) since 1854



Source: Deutsche Bank, NBER

Of the 33 completed expansions seen over the last 156 years, three of the five longest have occurred since November 1982. In previous reports we have suggested that much of this sustained and consistent expansion has been due to the super-cycle of leverage seen since the early 1980s. Figure 31 reminds us of the US Debt/GDP chart going back 80 years.

Figure 31: US Debt to GDP



Source: Deutsche Bank, Bloomberg LP, BEA, Federal Reserve

As can be seen there was a step change in the US economy's indebtedness from the early 1980s onwards and then an additional one in the late 1990s/early 2000s. A similar picture is apparent across most of the Western World. Basically from the early 1980s to the onset of the Global Financial Crisis the economy added on more debt every year and business cycles were extended as a result. Indeed the Fed and Central Banks around the world were afforded the luxury of operating in a secular falling inflation regime (globalisation) that allowed them to cut rates, further allowing the accumulation of debt, every time the economy may have naturally been rolling over into a normal recession consistent with those seen through history. This debt accumulation undoubtedly helped smooth the business cycle and contributed to the period being known as the 'Great Moderation'.

This period came to a spectacular end with the onset of the crisis and it is possible that going forward we will revert to seeing business/credit cycles more like they were prior to the 'Great Moderation'. In this chapter we wanted to explore how credit/economic cycles have looked over the longer sweep of history rather than the generally 'Golden Age' most of have us worked through over the last 20-30 years leading up until the Global Financial Crisis.

In Figure 32 we show a table detailing the average and median length of the 33 business cycles seen since 1854.

Figure 32: Average and Median Lengths of Business Cycles over Different Periods

		Contraction (Peak to Trough) Length (mth)	Expansion (Prev. Trough to Peak) Length (mth)	Total Cycle Length (mth)	Total Cycle Length (yr)	% of Time in Contraction
All	Average	17	39	56	4.7	31%
	Median	14	30	44	3.7	32%
Pre-1982	Average	18	33	51	4.3	35%
	Median	15	27	42	3.5	36%
1982-2007*	Average	8	106	114	9.5	7%
	Median	8	106	114	9.5	7%
Post-1982	Average	11	95	106	8.9	11%
	Median	8	92	100	8.3	8%

*Source: Deutsche Bank, NBER. * - Excludes latest contraction and expansion.*

For the overall period the average cycle from peak to peak (or trough to trough) has lasted 56 months (or 4.7 years). The averages are boosted by the occasional elongated super business cycle and thus the median length is a much smaller 44 months (3.7 years). Such numbers would be alien to those only analysing business cycles over the last 25-30 years. Within these 33 cycles the contraction period lasted 18 months on average or 14 months in terms of

median length. This equated to the economy being in recession 31% or 32% of the time depending on whether you look at the averages or the median numbers.

If we simply look at the period before the "Great Moderation" the average US cycle lasted 5 months less at 51 months (or 4.3 years) with the median at 42 months (3.5 years). Over this period the US economy was in recession 35% and 36% of the time respectively depending on whether you look at averages or the median.

Given all we know about the 'debt supercycle', it is likely that the onset of the Global Financial Crisis ended the "Great Moderation" period. Unless we find a way of continually adding more debt at an aggregate level in the Developed World it is likely that we will see much more macro volatility and more frequent business cycles going forward. Given the fact that Developed World Government balance sheets are under pressure, and given that interest rates around the Western World are close to zero, the post-crisis ability to fine tune the business cycle is extremely limited. We may need to put an immense amount of faith in the experimental force of Quantitative Easing to deliver economic stability. This will be an experiment with little empirical evidence as to how it will turn out. For now the base case must be that we revert more towards business cycles more consistent with the long-term historical data.

When would long-term history suggest the next business cycle will start?

If we look at the average length of cycles since 1854 seen in Figure 32 we could make a rough estimate when the next few US downturns will start. Figure 33 splits the data four ways. We use the average and median length of the business cycles between: 1) 1854 and the present day and 2) between 1854 and 1982 – the point when business cycle length started to decouple from that seen through history.

Figure 33: Potential Recession Start Dates Based on Historical Average/Median Business Cycle Lengths

	All Cycles		Pre-1982 Cycles	
	Average	Median	Average	Median
Last Recession start	Dec 2007	Dec 2007	Dec 2007	Dec 2007
Recession 1 start	Aug 2012	Aug 2011	Mar 2012	Jun 2011
Recession 2 start	Apr 2017	Apr 2015	Jun 2016	Dec 2014
Recession 3 start	Dec 2021	Dec 2018	Sep 2020	Jun 2018

Source: Deutsche Bank, NBER

The best case scenario based on averages is that we will see US downturns starting in August 2012, April 2017 and December 2021. This assumes we use the average length of cycles from 1854 to the present day. If we use the worst case scenario and use the median length of cycles between 1854 and 1982 then the next downturns could start in July 2011, March 2015 and November 2018.

Clearly there is little way we can predict with accuracy when the next business cycle will occur but it's worth being aware that long-term history would suggest that by the end of this decade we could easily be on our third business cycle of the period. These are conditions that most of us in our investment lifetimes have not had to deal with. It would certainly be different to conditions seen during the 'Great Moderation'.

Are business cycles important for asset price returns?

The simple answer is that they are absolutely crucial for returns. However as we all know their timings are extremely difficult to predict. However in this section we wanted to

demonstrate that if you could predict the timing of the business cycle you could see strong out-performance in equities, credit and treasuries and could indeed build an asset allocation model that could switch between them for optimal returns. For us this is important because we think business cycles will be more prevalent over the next decade in the Developed World.

In Figure 34 we show all the business cycles since 1854. We then run an exercise where you stay out of equities and credit / invest in Treasuries for the entire length of the subsequent recession. However as markets tend to move before the official onset of the downturn we then find the optimal starting point in each of these 33 periods to either sell equities or credit, or to buy Treasuries. We have gone back as far as 9 months prior to each downturn when searching for the optimum point to switch. In some cycles there was no turn in performance ahead of the downturn. For these periods we trade 9 months before the subsequent recession. In the 33 business cycles, 29 saw equities fall during the subsequent downturn. On average equity, Treasury and credit returns can be optimised by switching 4.7, 4.2 and 4.3 months respectively before the business cycle peak.

Figure 34: Equity, Treasury and Credit Performance Through Length of Recessions since 1854

			Equities (S&P 500)		Treasuries (10yr)		Credit (BBB)	
Peak	**Trough**	**Contraction Length (mth)**	**Return**	**Month to sell for Peak Performance**	**Return**	**Month to sell for Peak Performance**	**Spread Change**	**Month to sell for Peak Performance**
Jun 1857	Dec 1858	18	-17.65%	-5	6.65%	-5		
Oct 1860	Jun 1861	8	-25.01%	-1	4.38%	-8		
Apr 1865	Dec 1867	32	-4.11%	-8	22.50%	-6		
Jun 1869	Dec 1870	18	8.16%	-1	11.49%	-7		
Oct 1873	Mar 1879	65	-5.92%	-9	15.75%	-9		
Mar 1882	May 1885	38	-17.87%	-4	17.85%	-5		
Mar 1887	Apr 1888	13	-4.91%	-4	4.25%	-9		
Jul 1890	May 1891	10	-11.50%	-2	2.43%	-1		
Jan 1893	Jun 1894	17	-17.91%	-5	4.97%	-2		
Dec 1895	Jun 1897	18	-9.17%	-2	10.89%	-2		
Jun 1899	Dec 1900	18	-4.51%	-3	11.69%	-9		
Sep 1902	Aug 1904	23	-17.85%	-2	6.35%	-2		
May 1907	Jun 1908	13	-33.86%	-7	-0.52%	-9		
Jan 1910	Jan 1912	24	-6.52%	-4	4.78%	-1		
Jan 1913	Dec 1914	23	-24.70%	-2	5.08%	-9		
Aug 1918	Mar 1919	7	5.72%	-6	4.57%	-8	266	-1
Jan 1920	Jul 1921	18	-22.15%	-1	5.18%	-1	115	-3
May 1923	Jul 1924	14	-5.62%	-9	8.69%	-1	88	-8
Oct 1926	Nov 1927	13	15.33%	-9	7.38%	-1	-5	-4
Aug 1929	Mar 1933	43	-77.79%	-9	17.68%	-2	548	-9
May 1937	Jun 1938	13	-49.82%	-3	5.50%	-1	194	-2
Feb 1945	Oct 1945	8	10.85%	-7	5.08%	-4	-10	-9
Nov 1948	Oct 1949	11	-10.31%	-5	5.11%	-1	18	-5
Jul 1953	May 1954	10	-4.63%	-8	9.84%	-1	47	-7
Aug 1957	Apr 1958	8	-11.35%	-2	10.83%	-1	90	-1
Apr 1960	Feb 1961	10	-8.21%	-4	10.52%	-7	82	-7
Dec 1969	Nov 1970	11	-19.07%	-6	7.22%	-3	102	-3
Nov 1973	Mar 1975	16	-36.34%	-6	9.18%	-3	207	-3
Jan 1980	Jul 1980	6	-4.10%	-4	7.11%	-1	124	-3
Jul 1981	Nov 1982	16	-15.24%	-4	43.28%	-1	122	-2
Jul 1990	Mar 1991	8	-6.53%	-7	12.86%	-3	64	-3
Mar 2001	Nov 2001	8	-23.12%	-2	12.81%	-9	18	-1
Dec 2007	Jun 2009	18	-48.30%	-4	33.17%	-6	409	-6
	Average	**17.5**	**-15.27%**	**-4.7**	**10.44%**	**-4.2**	**138**	**-4.3**
	Median	**14**	**-11.35%**	**-4**	**7.38%**	**-3**	**96**	**-3**

Source: Deutsche Bank, GFD, Moody's, NBER

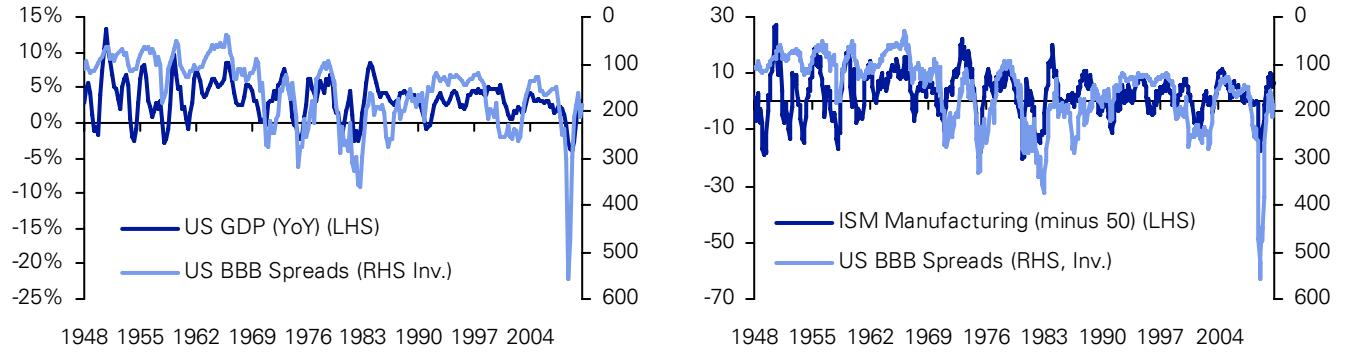
As can be seen from being out of equities for a period of time equivalent to the length of the contraction, but selling a few months before the recession begins, you can save yourself from average recession losses of -15.27%. Given that these contractions have lasted an average of 17.5 months and that the average historical nominal returns over such a period are around 13% then one can see how important timing business cycles are to returns in equities.

If we repeat the same exercise for the Treasury market, we see that Treasury returns have been positive in 32 of the 33 periods identified since 1854 and have averaged a nominal return of 10.4% over the average 17.5 month holding period starting on average 4.2 months prior to the recession.

For BBB spreads we only have data since 1919 which covers the last 18 business cycles. For BBBs the optimum point to reduce exposure is 4.3 months before the downturn, similar to the numbers seen for Equities and Treasuries. From this point spreads then widen by 138bp on average over the holding period. On all but two of these cycles spreads have widened. This again shows the relevance of business cycles for credit market performance.

Indeed Figure 35 looks at US BBB spreads against US GDP and the ISM going back through time. It's further evidence that we shouldn't fight the business cycle. This is relevant firstly because we think they will be more frequent going forward and secondly because there is beginning to be a belief that in a low yield world credit is set to maintain its performance come what may. The reality is that if we see low yields and positive growth then credit should continue to be a decent asset class. However if the low yields are a sign of pending economic weakness then credit is likely to react in a similar manner to how it normally reacts as we enter a downturn. So we would be a little careful in interpreting the spread positive low yield arguments.

Figure 35: US BBB Spreads vs. US Real GDP (left) and ISM Manufacturing (right)



Source: Deutsche Bank, Bloomberg LP, Moody's

How much could overall returns have been enhanced by trading the business cycle?

Figure 36 shows the level of out-performance available if you can perfectly time the business cycle either by simply selling equities or by switching into Treasuries.

Figure 36: Potential Optimal Equity/Credit? Returns Timing Recessions

		Holding Period Return	Annualised Return
Equity Returns	Actual since 1854	62399696%	9.0%
	Perfectly timing every business cycle and earning zero on cash	45908143235%	13.7%
	Perfectly timing every business cycle and buying Treasuries	224689985256%	14.9%
	Selling equities 5 months (average) before business cycle peak and earning zero on cash	2210546263%	11.5%
	Selling equities 5 months (average) before business cycle peak and buying Treasuries	11002962160%	12.6%

Source: Deutsche Bank, GFD, NBER

By switching out of equities at the optimal point ahead of each recession, for a period equal to its eventual length, and either removing cash from markets or by investing into Treasuries, investors can gain an additional 4.7% or 5.9% p.a. over an above the long-term nominal returns on equities of 9.0% p.a.. By switching at a uniform 5 months (average optimal time is 4.7 months) ahead of each recession the annual excess returns are slightly lower at 2.5% and 3.7% respectively. Timing of business cycles is therefore a key tool for out-performance.

The implication of the growth of the HY market during the 'Great Moderation'

The HY market has only been established during the period of elongated business cycles. The market as we know it began in the late 1980s. Prior to this, there were HY bonds but these were invariably issues that had been downgraded from IG. The late 1980s saw the start of the market where companies would specifically issue as HY entities. The worrying thing for the HY market is that as we saw back in Figure 14, excess returns relative to equal duration Treasuries have been fairly weak (1.5%), especially relative to the starting spread. This doesn't seem like a particularly high excess return on a risk reward basis, especially as the vast majority of this 25 year period occurred during the 'Great Moderation'.

The weak excess returns have been masked by a material fixed income rally over the life of the HY market. As most HY investors are total return orientated, such relatively low excess returns are more likely to be tolerated due to the high absolute returns over the period.

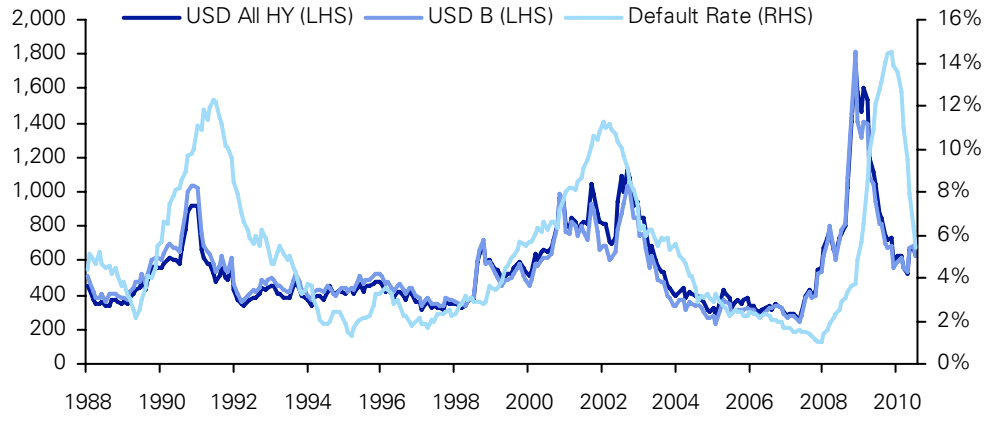
So going forward it could be an interesting decade for the HY market. The market has been one of the star performers from a multi-asset class perspective since risk assets rebounded in March 2009. Indeed the last time we published this document back in November 2008, we felt that HY had the potential to be the best performing mainstream asset class from that starting point. However the reason they've subsequently performed so well was largely due to the extremely negative returns seen during the course of the last recession. A similar but less extreme pattern occurred around the recession in the early 2000s.

There is little doubt that the asset class has value in a portfolio at the right time of the business cycle but we suspect that more frequent business cycles will require investors to be extra careful in the asset class going forward.

Will more frequent business cycles bring higher defaults?

More frequent business cycles may bring more defaults as the correlation between recessions and defaults is strong. Even though we've just been through a severe HY default cycle, it's possible that defaults have generally been sedated over the last 20-30 years by the low incidence of business cycles. Going forward the market may not be shielded as much.

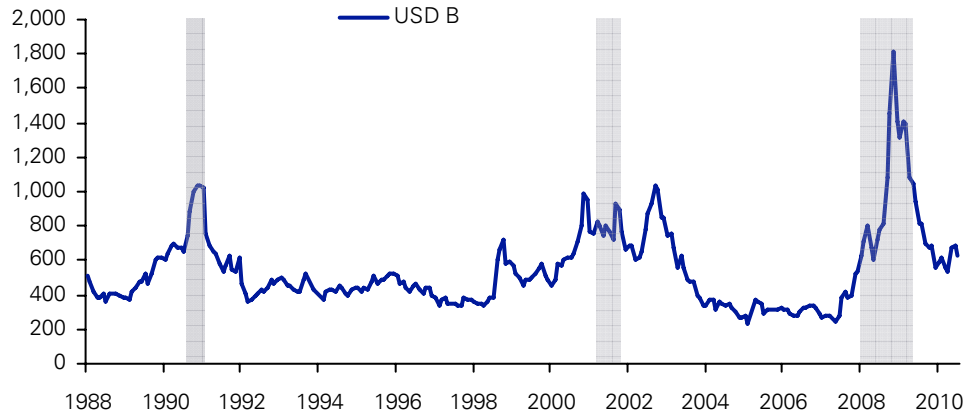
Figure 37: USD HY Spreads and Default Rate



Source: Deutsche Bank, Moody's

Figure 38 shows single-B spreads (since we have data back to 1988) plotted alongside recessionary periods. We have used single-B spreads to help ensure that the credit quality of the index is fairly constant throughout the last 22 years.

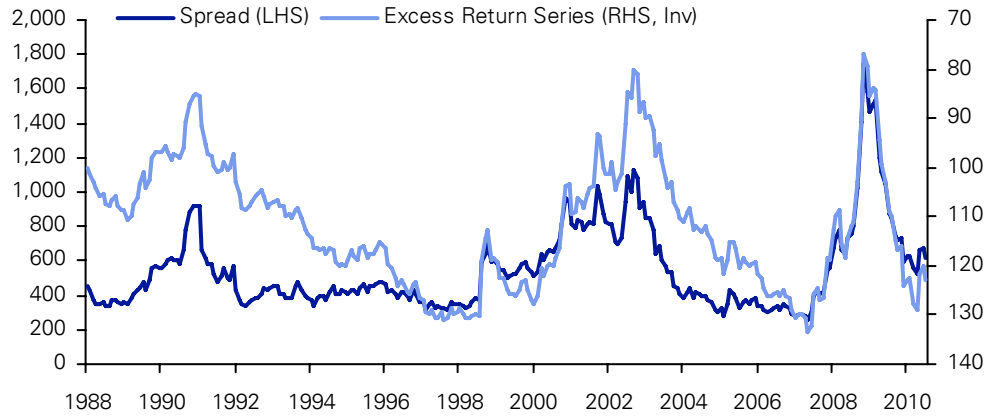
Figure 38: USD HY Spreads with US Recessions shaded



Source: Deutsche Bank, NBER

In the period from the start of our data in 1988 to the start of the 2007 recession, the US economy had only been in recession for 16 months or 6.7% of the time. Even including the deep recent 2007-09 recession, we've only seen 34 months of contraction over the 22 years of our HY data. This equates to 12.5% of the period and is dramatically lower than the 35% of time that the US economy has been in recession since 1854. Figure 39 shows how excess returns in US HY have evolved since the HY market became established in the late 1980s.

Figure 39: USD HY Spreads and Excess Return Series (Rebased at 100 in 1988)



Source: Deutsche Bank, Bloomberg LP

To calculate excess returns we've taken the nominal total returns and subtracted the returns from an equal duration Treasury index. As discussed earlier, over the entire period, excess returns have been relatively weak. However as we can see the range of excess returns around business cycles have been quite extreme with 50-70% swings between peaks and troughs in the cycle.

Indeed looking specifically at HY returns around the three recessions over this period, Figure 40 shows how returns would have been enhanced by an ability to trade with perfect foresight around the business cycle. This is similar analysis to that seen earlier in this chapter for Equities, Treasuries and IG credit.

Figure 40: Rolling HY Excess Returns for the Length of the Recession Starting in the Months Leading up to it

Recession	Jul 90 - Mar 91			Mar 01 - Nov 01			Dec 07 - Jun 09		
Months Before Peak	Start	End	Excess Return	Start	End	Excess Return	Start	End	Excess Return
9	31 Oct 89	30 Jun 90	-0.5%	30 Jun 00	28 Feb 01	-8.8%	31 Mar 07	30 Sep 08	-20.6%
8	30 Nov 89	31 Jul 90	1.1%	31 Jul 00	31 Mar 01	-11.4%	30 Apr 07	31 Oct 08	-31.2%
7	31 Dec 89	31 Aug 90	-1.0%	31 Aug 00	30 Apr 01	-9.8%	31 May 07	30 Nov 08	-42.5%
6	31 Jan 90	30 Sep 90	-6.1%	30 Sep 00	31 May 01	-6.8%	30 Jun 07	31 Dec 08	-40.1%
5	28 Feb 90	31 Oct 90	-8.9%	31 Oct 00	30 Jun 01	-5.6%	31 Jul 07	31 Jan 09	-32.1%
4	31 Mar 90	30 Nov 90	-11.6%	30 Nov 00	31 Jul 01	0.4%	31 Aug 07	28 Feb 09	-32.6%
3	30 Apr 90	31 Dec 90	-13.7%	31 Dec 00	31 Aug 01	0.3%	30 Sep 07	31 Mar 09	-33.6%
2	31 May 90	31 Jan 91	-12.2%	31 Jan 01	30 Sep 01	-15.1%	31 Oct 07	30 Apr 09	-25.2%
1	30 Jun 90	28 Feb 91	-6.1%	28 Feb 01	31 Oct 01	-14.2%	30 Nov 07	31 May 09	-16.2%
0	31 Jul 90	31 Mar 91	-3.0%	31 Mar 01	30 Nov 01	-5.7%	31 Dec 07	30 Jun 09	-13.5%

Source: Deutsche Bank, NBER

Trading out of HY at the optimal point ahead of the business cycle turning, and for the length of the downturn, could have saved HY investors -13.7%, -15.1% and -42.5% respectively over the last three cycles.

Maybe the fact that the HY market has grown up over a period of elongated business cycles can be balanced to some degree by the fact that the 2000-2003 experience was arguably more savage than the actual downturn in the economy suggested it should be. The HY telecom sector boom/bust caused disproportional losses in the asset classes relative to the scale of the recession. We could also argue that the credit crisis recession was deeper than an average one thus adversely impacting overall returns relative to history.

Going forward, the good news is that current spreads are slightly above their long-term average and the market is certainly pricing a degree of economic uncertainty going forward. Figure 41 republishes our often used table of implied default probabilities for 5 year bonds. We are still at spread levels where HY prices in as deep a default cycle as any seen over recent decade. However this is relative to Government bonds so some excess return is required.

Overall there is value in the asset class but the exercise compiled above reminds us that the asset class is extremely vulnerable on a mark-to-market basis from a turn in the business cycle. Given the likely increased frequency of these in our opinion, trading HY will be increasingly crucial to enhancing returns over the next decade.

Figure 41: 5yr Cumulative Spread Implied Default Rates based on Different Recovery Levels for IG Senior Bonds and HY Bonds

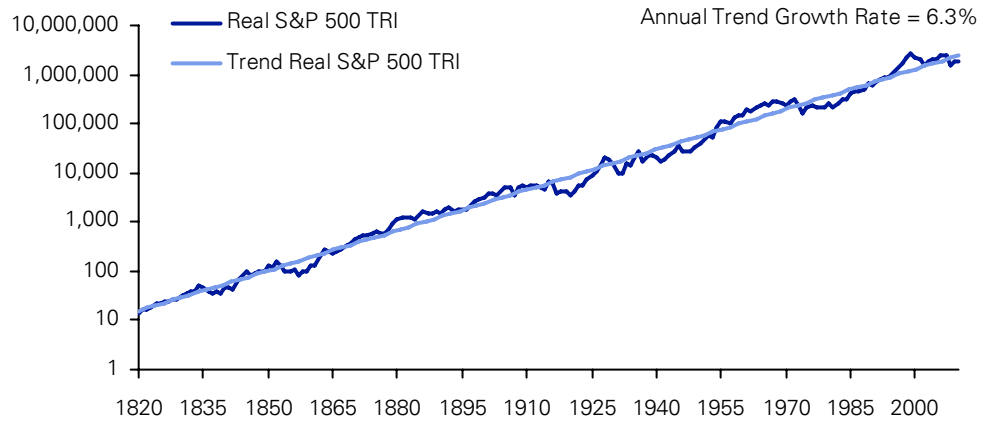
			Spread Implied 5yr Cumulative Default Rate			Actual 5yr Cumulative Default Rates (since 1970)	
		5yr Spread	0% Recovery	20% Recovery	40% Recovery	Worst	Average
EUR	All Corporate	134	5.3%	6.5%	8.3%	2.4%	1.0%
	Non-Financial	118	4.5%	5.5%	7.0%	N/A	N/A
	Financial	164	6.9%	8.4%	10.8%	N/A	N/A
	AA	112	4.6%	5.7%	7.3%	1.8%	0.2%
	A	126	5.0%	6.1%	7.8%	2.6%	0.7%
	BBB	178	6.8%	8.2%	10.4%	5.8%	1.9%
GBP	All Corporate	162	6.5%	7.8%	10.0%	2.4%	1.0%
	Non-Financial	154	5.9%	7.1%	9.0%	N/A	N/A
	Financial	169	7.0%	8.5%	10.9%	N/A	N/A
	AA	137	5.8%	7.1%	9.1%	1.8%	0.2%
	A	163	6.4%	7.8%	9.9%	2.6%	0.7%
	BBB	197	7.6%	9.2%	11.7%	5.8%	1.9%
USD	All Corporate	160	6.4%	7.8%	10.0%	2.4%	1.0%
	Non-Financial	137	5.4%	6.5%	8.3%	N/A	N/A
	Financial	186	7.5%	9.2%	11.9%	N/A	N/A
	AA	106	4.3%	5.2%	6.7%	1.8%	0.2%
	A	161	6.5%	7.9%	10.1%	2.6%	0.7%
	BBB	204	8.0%	9.8%	12.4%	5.8%	1.9%
HY	USD - All	698	30.7%	36.9%	46.3%	31.3%	21.4%
	USD - Non-Fin	701	30.8%	37.1%	46.4%	N/A	N/A
	EUR - All	599	27.8%	33.9%	43.2%	31.3%	21.4%
	EUR - Non-Fin	502	21.3%	25.9%	32.8%	N/A	N/A

Note: Actual default rates based on data since 1970. Prices differing from par have been accounted for when calculating loss rates at different recoveries.
Source: Deutsche Bank, Moody's

Equity Mean Reversion – The Bull and Bear Case

In an earlier section, we showed how returns in different asset classes have tended to exert a certain rhythm that has remained fairly constant through longer periods of time notwithstanding periods of high volatility and longish periods of below and above trend returns. Indeed when looking at equities, Figure 42 (repeated from an earlier section), reminds us that total real returns over time have hugged the long-term trend line that has prevailed since 1800. This trend line is consistent with a real rate of growth on US equities of 6.3% p.a. It's worth reiterating that this 190 year period has involved constant change and material Global events some of which could be described as a reason for structurally higher markets and some could be argued to be structurally negative for markets. These key events were detailed back in an earlier section.

Figure 42: S&P 500 Real Total Return Index and Trend Line on Log Scale



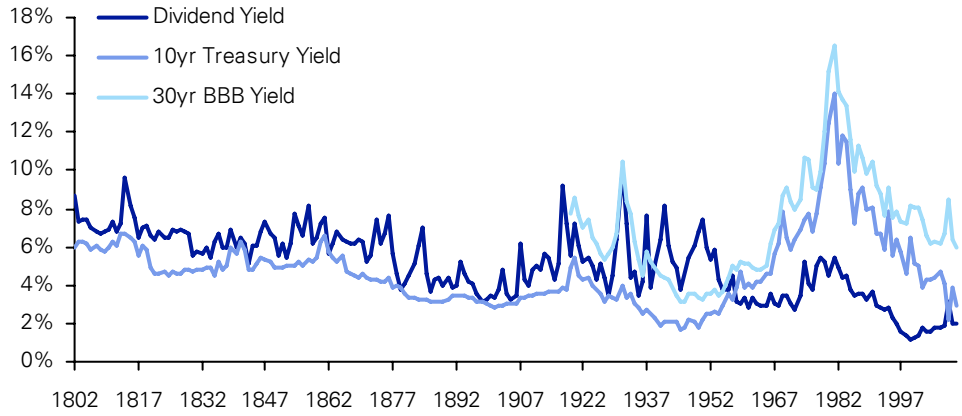
Source: Deutsche Bank, GFD

However there is evidence to suggest that the real rate of returns for US (and with it Developed market) equities has slowed over the last 50 years. It's difficult to truly judge whether this is a genuine slowing in the expected rate of return on equities as the numbers are starting to be heavily influenced by the decade long bear market that commenced in 2000. So although Figure 14 showed that real annualised returns in US equities between 1950-2000 was a stunning 9.17% p.a., real returns over the last 50 years have been only 5.13% p.a. As we showed in the section on de-bunking the Globalisation myth, this has been a period where the perception is that the rapid emergence of EM countries and Globalisation should have structurally boosted returns. So what's happened?

The great dividend crossover of 1958

Interestingly if we go back to near the start of the 50 year period that equity real returns have been sub-par relative to history, we find that it coincided with a big event for market historians. As Figure 43 shows, this was the point where the equity dividend yield fell below Treasury yields for the first time in observable history.

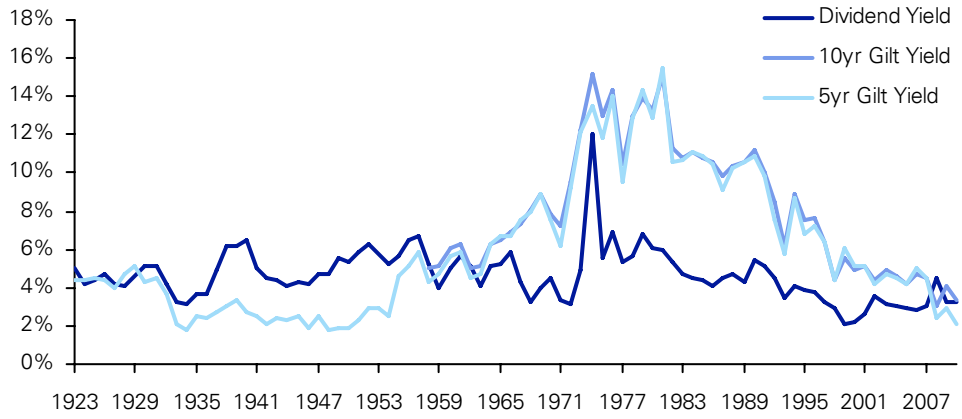
Figure 43: US Treasury and Corporate Bond Yields vs. Equity Dividend Yields



Source: Deutsche Bank, Bloomberg LP, GFD, Moody's,

As Figure 43 shows, prior to 1958 US dividend yields were always above Treasury yields. After this point US dividend yields spent the next 50 years below Treasury yields before briefly rising above them again in November 2008. In Europe dividend yields are more consistently above bond yields, but this is certainly not uniform across the continent. Figure 44 shows the history in the UK market.

Figure 44: UK Gilt Yields vs. Equity Dividend Yields



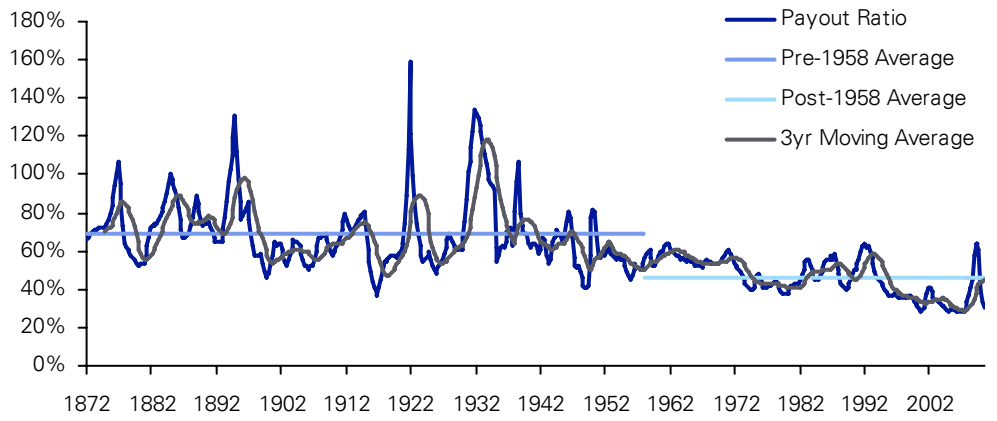
Source: Deutsche Bank, GFD

Some of this change in dividend yield policy post 1958 was due to the belief that because equities had capital gain potential due to future growth and inflation, it was justifiable that their yield should be below Government Bonds as the latter had limited growth potential and was susceptible to inflation. There was also a belief that if you had a well-diversified equity portfolio you could afford to run with a lower dividend yield as total returns would still far exceed Government Bonds. The reality is that these themes were valid but only if you genuinely believe that the equity risk premium should have been lower post 1958 than it was before. If not then paying out lower dividends might lift the price of equities but not the total return.

In more recent decades we've seen a move to tax capital gains more favourably than income (i.e. dividends). This has been given as an additional reason for companies to pay lower dividends and use the proceeds to invest in the business and operate share buy-backs to help drive potential capital gains. We've also lived increasingly through a period where baby boomer investors have preferred the prospect of future capital gains to fund their lifestyle in

later years rather than receive upfront dividends in a period of their life when they haven't needed income. The latter may change going forward as the population ages but it's helped contribute to a perfect storm of reasons for low dividend yields.

Figure 45: S&P 500 12-month Trailing Payout Ratio



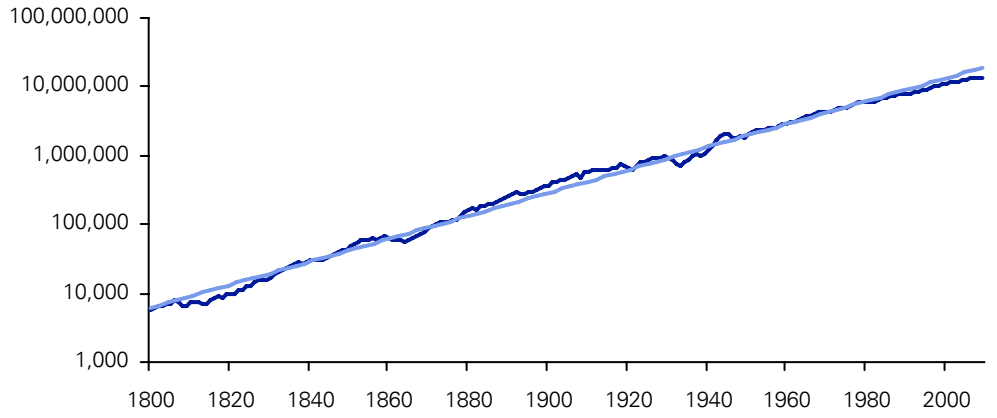
Source: Deutsche Bank, Bloomberg LP, GFD, S&P

So it's becoming clear that real returns since the 'Great Dividend Crossover' have been lower than their long-term average. What is less clear is whether this actually means that equities are now cheap given this real return deficit that has been increasingly opening up. Have investors not realised that more of their return can be in the form of capital gains in a world where the payout ratio is lower? Can we justifiably re-rate equities to a higher average P/E ratio?

Developed World growth has progressively slowed

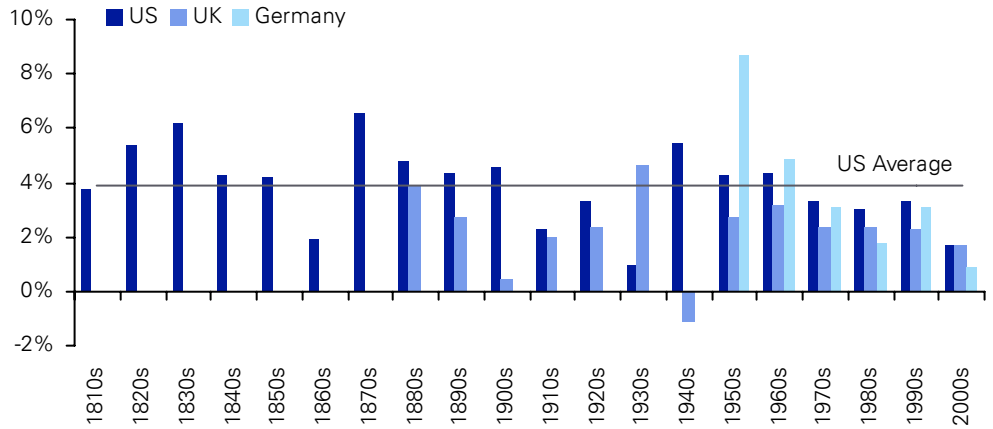
On the negative side there is little doubt that US (and with it Western) growth has been progressively slowing. Figure 46 shows US real growth on a log scale with a long-term trend line and Figure 47 shows the average real growth rate per decade.

Figure 46: US Real GDP on a Log Scale



Source: Deutsche Bank, GFD

Figure 47: US, UK and German Real GDP Growth Rate (Annualised) by Decade



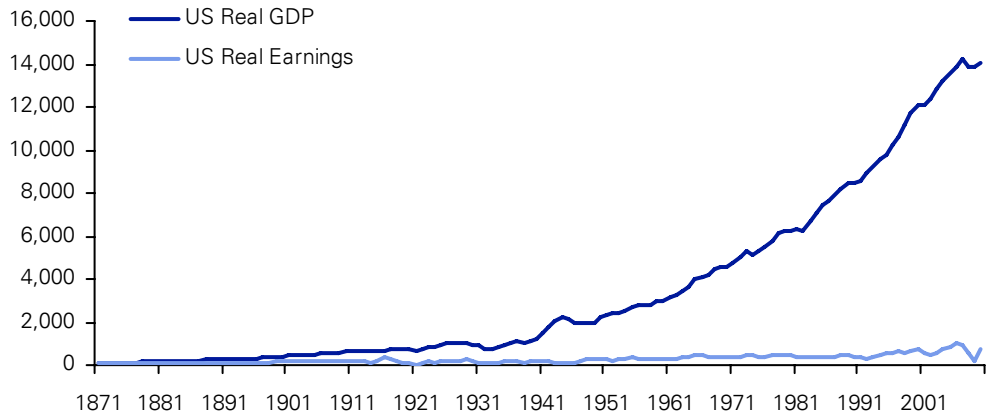
Source: Deutsche Bank, GFD

US and Developed market growth has been progressively slowing with the prospects of a return to the long-term average highly unlikely in the near to medium-term. This is due to a combination of de-leveraging post credit crisis and due to the simple fact that a country like the US has moved from an Emerging nation in the nineteenth century, to the largest economic power on the planet during the Twentieth century and now to one that is heavily indebted and being threatened by the large booming EM nations. In our view, it would be unrealistic to think that growth could be maintained at the rate seen when the country was rapidly developing and at the height of its economic powers.

So can earnings be maintained if growth has obviously slowed?

The first thing to look at is the relationship between GDP growth and S&P 500 earnings over time. It might surprise many to find that over the long-run equity market earnings have lagged considerably behind GDP growth. Figure 48 shows that since 1871, US real GDP has increased by a multiple of around 140 times, with earnings only increasing by a multiple of just over 7 times. On an annualised basis the growth rates over the entire 139 year period are 3.6% p.a. for real GDP and 1.4% p.a. for earnings respectively.

Figure 48: US Real GDP vs. Real Earnings



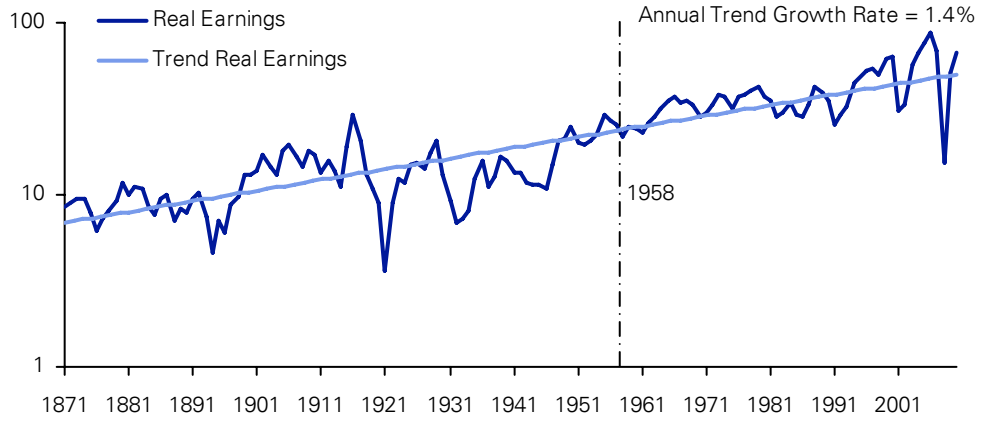
Source: Deutsche Bank, GFD

We deliberately show Figure 48 in this extreme manner to illustrate the point that earnings have significantly lagged GDP growth historically. However this makes sense as equity investors receive a healthy dividend out of earnings that will impact a company's ability to

see their earnings keep pace with GDP. Even though Figure 45 shows that the payout ratio has slowed from an average of 69% pre 1958, to 46% in the subsequent years, this is still a healthy share of profits.

However if post 1958, dividends had been cut purely to enhance a company's ability to generate more profits and hence more capital gains (over dividends) then there should be evidence to support a noticeable increase in earnings from 1958 onwards. Unfortunately there is little evidence to support this. Figure 49 shows the long-term trend rate of earnings since 1871 on a log scale with the 1958 Dividend Crossover period marked.

Figure 49: US Real Earnings on a Log Scale



Source: Deutsche Bank, GFD

By only using one trend line for the whole period it's difficult to assess whether there was any statistical change in the earnings growth numbers since 1958. In Figure 50 we split the two periods out in a table and assess how the relationship between US GDP and Earnings changed at this key point in history.

Figure 50: GDP Growth, Earnings Growth, Dividends Growth and Equity Returns Pre and Post 1958.

	GDP Growth		Earnings Growth		Dividend Growth		Average	Equity Price Returns		Equity Total Returns	
	Nominal	Real	Nominal	Real	Nominal	Real	Dividend Yield	Nominal	Real	Nominal	Real
1872-2010	5.6%	3.6%	3.9%	1.5%	3.2%	0.9%	4.4%	4.0%	1.6%	8.6%	6.1%
1872-1957	4.9%	3.9%	2.7%	1.3%	2.2%	0.7%	5.2%	2.5%	1.1%	7.8%	6.3%
1958-2010	6.7%	3.1%	5.8%	1.8%	5.0%	1.1%	3.2%	6.4%	2.4%	9.8%	5.7%

Source: Deutsche Bank, GFD

The key takeaway from the table is that dividend yields dropped from an average of 5.2% to 3.2% over the two periods (pre and post 1958) even though the latter was a period of much higher inflation. Real earnings growth only increased from 1.3% to 1.8%, with the US economy slowing from 3.9% to 3.1% real growth over the same period with most of the growth slowdown occurring in the most recent years.

So there is some evidence to suggest that US earnings have grown relative to US GDP since the 'Great Dividend Crossover' point. However this has likely been offset by lower domestic economic growth probably leading to a slow down in domestic profit growth. Overall the slight increase in earnings growth post 1958 (in absolute terms) in no way compensates for the lower dividend yield.

But what about globalisation?

It's fair to say that we've been through a strong recent period of globalisation and an era where Global growth has been much higher than growth in US and the rest of the Western World.

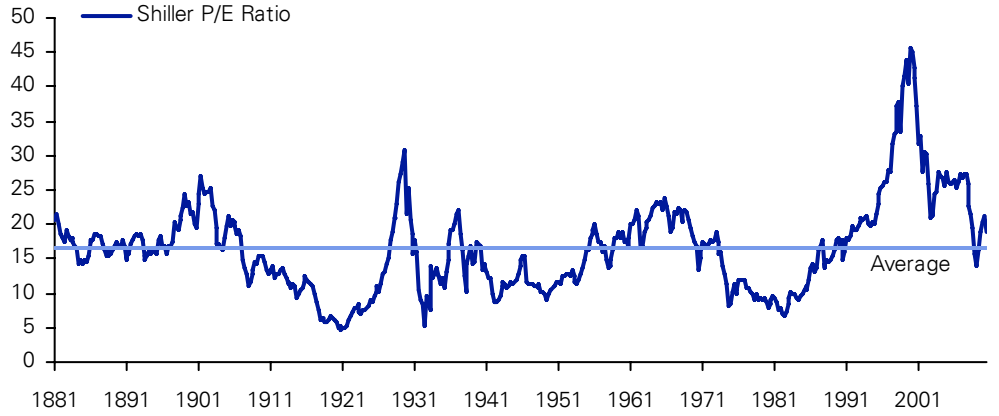
However as we discussed in the section looking at "The Myth of Globalisation", there is little evidence to suggest that earnings or economic growth in the Developed World have been positively impacted by the strong Global growth story. Surely after years of rapid EM growth we should have by now seen an impact on Western growth and earnings if it was going to happen. If anything, Developed market growth has slowed since globalisation. Perhaps we would have seen even lower economic and risk asset performance had globalisation not been a major theme. However it's also possible that things would have been easier for the Developed world without rapid growth elsewhere. It certainly would have likely prevented the large accumulation of debt and a very unstable economic system.

As a minimum it's fair to say that Developed World companies may need globalisation to offset weaker nominal growth in their home markets. It might be that the West is clinging on to morsels of growth from the Developing World rather than structurally benefiting from it. We discussed many of these themes in our earlier section.

So what do you mean revert when forecasting long-term equity returns?

This leaves us with big problems in trying to decide how to mean revert equity valuations when attempting to provide a potential roadmap for the future? Do we simply assess where equities are now against their long-term total return trend line seen in Figure 42, or do we mean revert earnings back to their long-term trend and also the PE ratio back to its long-term average (Figure 51). We've decided to compile the exercise both ways in order to show the different results that each brings.

Figure 51: PE Ratio of the S&P 500



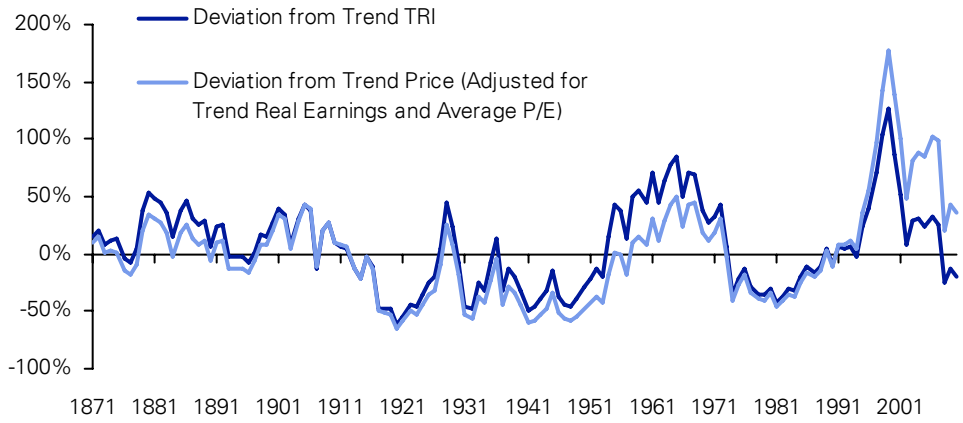
Source: Deutsche Bank, GFD

Results from equity mean reversion

Figure 52 shows how far away US equities are from their long-run trend based on mean reverting using; 1) the long-run total real return index (TRI) or; 2) by simply mean reverting earnings and PE valuations.

If the long-term trend real rate of growth in equities shown in Figure 42 is still a valid guide to future performance, then the asset class is currently undervalued. However if we mean revert earnings and the PE ratio of the market back to their long-term trend (Figure 49) and average (Figure 51), then equities are overvalued still.

Figure 52: Equity Market Historic Deviations from Mean Reversion Trends



Source: Deutsche Bank, GFD

The two lines track each other through much of history with the largest differences between the two series occurring since the mid-1990s. At this point the price of equities decoupled from its long-term average trend line (see Figure 53 below) and dividend yields fell below 2.5% for the first time in observable history as the payout ratio dropped below 40% for the first time on record. By the time the equity bubble burst in 2000 the deviation from trend based on total returns was +126% but was +178% based on mean reverting just earnings and PE ratios. As the market overvaluation has corrected, the gap between the two valuation measures has remained high leaving us nearly 40% overvalued based on mean reverting earnings and PE valuations, and around 20% under-valued on mean reverting for total returns.

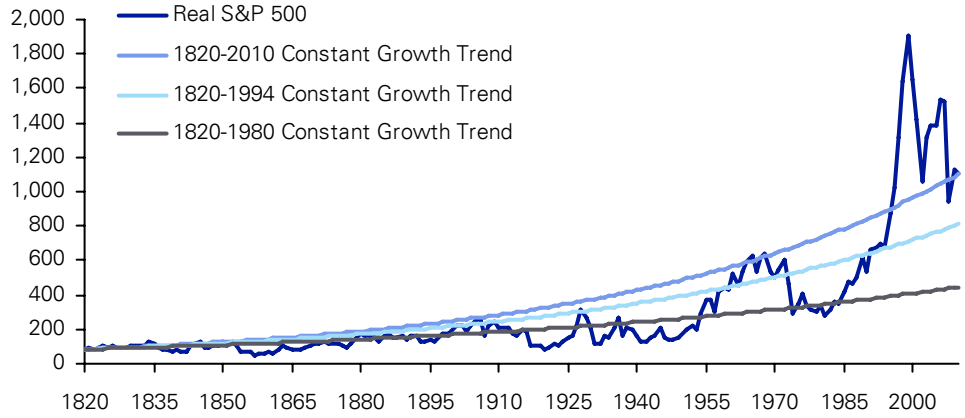
Discussion points around which mean reversion series is most appropriate

If you support the view that the real total return series has remained fairly constant through both good and bad times then you would probably be of the belief that this trend line will survive going forward and that equities are currently around 20% 'cheap' relative to their long-term average. However we should discuss whether there are any problems with this method.

The first we've already alluded to a few pages back. There is little evidence to suggest that the small increase in earnings post 1958 have compensated for the loss in dividends. As such the only way to maintain the pre-1958 total return series is to see higher and higher PE valuations. Indeed as Figure 51 showed this occurred from the mid-1990s onwards. This rise in PEs would have been justified had future earnings then responded but there is limited evidence to suggest that this has occurred on a sustainable basis.

Indeed although earnings have shown no discernable increase from their long-term trend, PEs have risen with prices decoupling from their long-term trend from the mid 1990s onwards. Figure 53 shows the real adjusted price of the S&P 500 since 1820. Prices are real adjusted to today's actual levels.

Figure 53: Real Adjusted S&P 500 Price Through History

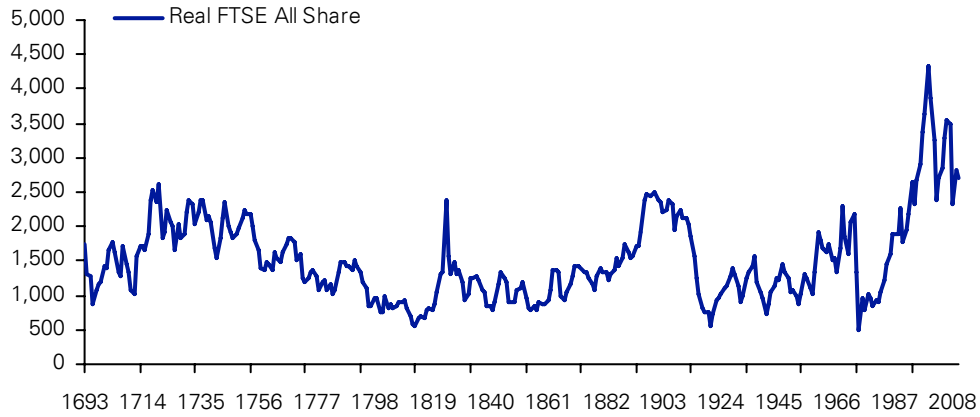


Source: Deutsche Bank, GFD

It's quite clear that prices started to rise at a faster rate than that seen through history from around the end of 1994. If we simply extrapolate out an annualized growth rate from 1820-1994, we can see that the market currently remains higher than this trend line suggests it should be. Interestingly between 1820 and 1994, real prices rose by 1.2% p.a. Also interesting is the fact that in real terms, the price of the index was the same in 1982 as it was at the market peak in 1929. So could we still be at 2000's real price level in 2053?

Thus we note equity markets can see very long periods where real prices are fairly stagnant. Large sustainable annual price rises have been a recent decade phenomenon. Further proof of this is found by looking at the very long-term history of the UK equity market. Figure 54 shows the real adjusted price series of the FTSE All Share Index since 1694.

Figure 54: Real Adjusted UK FTSE All Share Price only Index Through History



Source: Deutsche Bank, GFD

Although one has to be very careful about the material changes in the composition and structure of the market over this long period, it is still remarkable that in real terms the UK equity market was at similar price levels in 1990 as it was in 1694 some 300 years earlier. Over this period real total returns were still 5.3% p.a. and were thus driven by dividends.

The power of dividends is further illustrated by looking at returns between the peak in 1720 (South Sea Bubble) and the low point in this series in 1974. Over the 254 year period, the real prices of UK equities actually fell a stunning 80%. However real total returns were 4.0% p.a. over the period.

Since 1973, real UK equity prices have dramatically increased even including the effects of the 2000 bubble collapsing. However real equity prices from 1694 to the present day have increased only 0.14% p.a. It's striking that the period of aggressive real price increases in equities is a relatively new phenomena.

Does a low dividend payout ratio promote reckless corporate behaviour?

Maybe we have to consider whether the recent low dividend pay-out policy promotes more reckless corporate behaviour than that seen through history as companies chase growth. Indeed in the latter half of the 1990s we saw non-financials embark on reckless behaviour leading up to the equity bubble bursting in 2000. Much of the money that was spent in this period on M&A and over-priced technology (e.g. 3G licences) for example (and much of it leveraged) could have been returned instead to shareholders as dividends. If it had been returned as dividends then the total return series would have captured a genuine return. So while dividends remain so low, an investors' total return in equities is more exposed to the future behaviour of management. In the period leading up to 2000, many companies effectively wasted shareholders potential total returns and one could argue that this money left the system for good. It's difficult to quantify this but intuitively it makes sense that there was perhaps some permanent leakage out of the system.

Equally leading up to the 2007 financial crisis, Developed World financial firms partly used their strong retained and dynamically growing earnings to justify even greater risk. As such financial firms invested in areas where a decent share of the subsequent write downs will likely be lost to shareholders for good. Had the shareholders been paid a suitably high dividend in the period of super normal profits of the early to mid/late 2000s then at least investors would have locked in a higher total return before the crisis permanently robbed them of significant performance. It may have also prevented the crisis from taking on such epic proportions.

The alternative view would clearly be that many companies have invested more sensibly over the period, especially perhaps those that have bought into the faster growing Emerging Market regions. Although there is little evidence at the overall level of earnings to support this view, there have undoubtedly been sectors that have benefited from such a policy.

Maybe the benefits of Globalisation are still to come and that the global financial crisis has distorted Figure 49 (long-run trend earnings) to some extent. Maybe now that the worst impact of the crisis is over, Earnings will continue to climb above the trend line. Indeed equity analysts expect earnings growth to be in double digit territory over the next couple of years. If they are proved correct then there would be some evidence to suggest that the earnings trend, in spite of the noise, was starting to exhibit a higher trend of growth than the long-term average rate.

As a minimum, changing the balance in favour of capital growth over dividends gives equities an even higher beta/duration and perhaps makes them more volatile. Some might argue that this requires a higher equity risk premium than in the days where higher dividend payments reduced the duration of the asset class.

Which side do we come down on?

On balance we think that the loss of dividend payments relative to history is to some extent a loss to total returns. Unless you think that earnings are suddenly going to break out on the upside after years of hugging the trend, then the evidence strongly favours the view that the trend rate of growth in US (and with it Developed World) equities has slowed over the last few decades. On this basis we still consider Developed Equities to be slightly on the rich side relative to history.

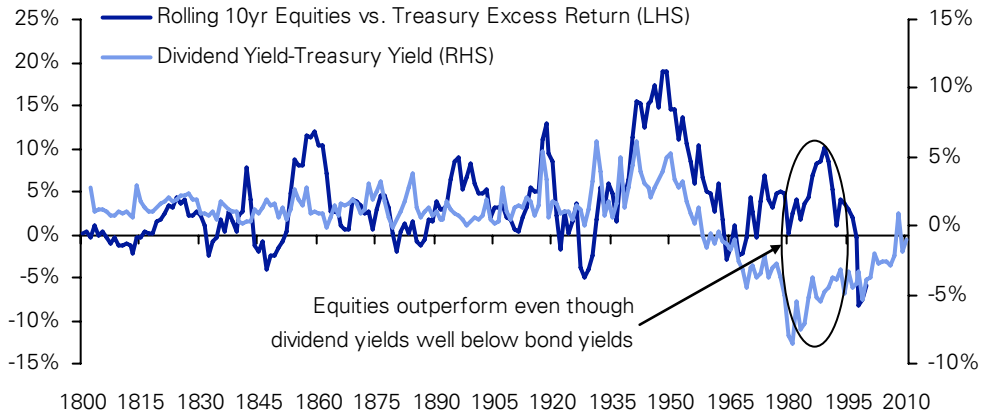
We have a strong preference for dividend stocks.

It has to be Dividends – Time for the Tortoise over the Hare

Everything we have published in this report suggests that Dividends greatly enhance long-term returns in equities. The period between 1982 and 2000 was fairly unique through history with its obsession for capital gains at the expense of all else. Such an obsession is still with us today but is fading as investors continue to fall out of love with equities.

As discussed elsewhere in this note, dividends have been increasingly marginalised, especially in the US, in recent decades. However this low dividend / higher capital gains experiment has shown little sign of success. Figure 55 shows the differential between US Dividend Yields and Treasury Yields against the subsequent 10 year annualised out-performance of Equities over Treasuries.

Figure 55: Spread between Dividend Yield and Treasury Yield vs. Subsequent 10yr Equities vs. Treasury Excess Return



Source: Deutsche Bank, GFD

Clearly the chart is noisy but there is evidence to suggest that equities saw far better and consistent performance relative to Treasuries in an era when dividends were higher than Government yields. In recent years, consistent equity out-performance has been near impossible with such low dividend yields.

As discussed elsewhere in this note, November 2008 briefly saw Dividend Yields exceed Treasury yields for the first time since 1958. We have gone back the other way again but some European indices now consistently have dividend yields above their respective government bond yield. The graph above indicates that equities are starting to return to more reasonable yield valuations relative to bonds. This however says little about the potential absolute returns for both asset classes and we'd note that both yields remain exceptionally low historically.

High dividend blue chips may be a shelter in challenging times?

As investors have allocated away from equities after the 2000 bubble and the associated lost decade of returns, investors have increasingly turned to corporate bonds in their pursuit of both safety and a yield that equities have failed to provide. Such a switch made a lot of sense throughout most of the last decade but there is evidence that it's starting to look like quite a perverse strategy. As shown above, at the top down US index level, dividends are still lagging Treasury yields. However there are increasing opportunities around the Globe to buy

equities that have yields not only above Government bonds but also above their own corporate debt yield.

To try to highlight a selection of Global Equities that are trading above their own corporate bond yields, we've used the Bloomberg LP World (ticker BWORLD) Index to create our potential universe. We then used dividend yields based on the last 12 months of cumulative dividends.

When looking for these companies' corporate bonds we have combined the Dollar, Euro and Sterling Corporate bond indices and worked out the average yield across all bonds and also found the highest yield available. The average yield is perhaps too harsh on corporate bonds as it will include many sub 5 year deals which because of the ultra low short-end Government bond yield environment trade at very low yield levels. The highest yield will likely be a longer dated bond with a duration more akin to that of equities or some kind of subordinated/hybrid bond. The results from both methods are probably worth examining as the fact that short-dated corporate bond yields are so low is relevant on a relative value basis.

In the list below we've highlighted a fairly comprehensive selection of those companies that have a positive dividend yield pick-up over their average corporate bond yield. We've sorted them by market cap, with the number representing their size position within the Bloomberg LP World Equity Index. So the largest name (Exxon Mobile) in the index qualifies, as does the 8th, 10th, 12th, 13th and 15th. This means that the 2nd to 7th, 9th, 11th and 14th have dividend yields lower than their average bond yield.

There are 186 names on this list of which 110 also have a dividend yield above their highest bond yield. Clearly within this list there will be anomalies. We've kept BP in even though we know that its future dividend policy will be compromised by its oil clean-up operation. There are also likely to be others that eventually trim their dividend. This highlights that investors need to be comfortable on name selection after this initial screen. There are also likely to be anomalies where an issuer only has a small number of Dollar, Euro or Sterling bonds in the iBoxx index. Nestle for example only has one but has additional Australian and Swiss bonds outstanding that we haven't covered here. This is highly unlikely to change the overall sentiment of the analysis.

So this list isn't a perfect representation but should be seen as a general guide to a trend that has been emerging and one where potentially interesting opportunities going forward can be examined.

We would remind investors that such an environment is slowly returning us to the old fashioned world where dividends were above bond yields. This is not strange if long-term history is your guide. It does however give selected equities a great platform to see relative returns more consistent with those seen in the overall asset class in the earlier stages of our study. With regards to absolute returns, a relatively high dividend yield should provide some cushion to future performance; however we should note that with overall yields so low this could be more of a relative play especially if Government bond yields climb higher.

Figure 56: Companies with Higher Dividend Yields (DY) (last 12 months) than their Average (and in some case highest) Corporate Bond Yield (BY)

Company	Rank	DY	Avg BY	High BY	# of Bonds	DY-Avg	DY-High	Company	Rank	DY	Avg BY	High BY	# of Bonds	DY-Avg	DY-High
EXXON MOBIL CORP	1	2.8%	2.1%	3.0%	6	0.8%	-0.2%	SINGAPORE TELECOMMUNICATIONS	182	4.6%	2.9%	4.7%	4	1.7%	0.0%
NESTLE SA-REG	8	3.0%	1.2%	1.2%	1	1.7%	1.7%	DANONE	183	2.8%	2.1%	2.2%	2	0.7%	0.6%
PROCTER & GAMBLE CO/THE	10	3.1%	2.9%	4.8%	18	0.2%	-1.7%	UNILEVER PLC	193	4.9%	2.6%	3.0%	2	2.3%	1.9%
JOHNSON & JOHNSON	12	3.5%	3.2%	4.6%	11	0.3%	-1.1%	NOKIA OYJ	197	5.3%	3.9%	5.8%	4	1.4%	-0.5%
AT&T INC	13	6.1%	3.8%	6.4%	41	2.3%	-0.2%	MIZUHO FINANCIAL GROUP INC	198	6.2%	3.0%	3.0%	1	3.2%	3.2%
CHEVRON CORP	15	3.6%	1.8%	3.1%	3	1.8%	0.5%	ZURICH FINANCIAL SERVICES AG	199	6.9%	3.6%	7.4%	7	3.3%	-0.5%
NOVARTIS AG-REG	18	3.9%	2.2%	3.2%	6	1.6%	0.6%	CARREFOUR SA	201	2.9%	2.5%	3.5%	8	0.4%	-0.6%
COCA-COLA CO/THE	21	2.9%	2.5%	3.2%	3	0.5%	-0.2%	HONEYWELL INTERNATIONAL INC	205	2.9%	2.7%	4.8%	7	0.2%	-1.9%
PFIZER INC	22	4.3%	3.1%	4.9%	21	1.2%	-0.7%	TELIASONERA AB	207	4.2%	2.5%	3.5%	5	1.8%	0.7%
VODAFONE GROUP PLC	23	5.8%	3.3%	5.5%	25	2.5%	0.3%	TELSTRA CORP LTD	209	13.9%	2.5%	3.4%	7	11.5%	10.5%
BHP BILLITON LTD	28	3.6%	2.3%	3.7%	10	1.3%	-0.1%	BANK OF MONTREAL	212	4.7%	1.4%	1.4%	1	3.3%	3.3%
BP PLC	29	4.7%	3.6%	5.1%	9	1.0%	-0.4%	VIVENDI	226	7.3%	3.0%	4.2%	9	4.3%	3.1%
TOTAL SA	30	6.0%	2.0%	3.6%	18	3.9%	2.3%	WESFARMERS LTD	230	5.4%	2.6%	2.8%	2	2.8%	2.6%
TELEFONICA SA	36	6.4%	3.6%	5.8%	25	2.8%	0.6%	SOUTHERN CO	231	4.8%	3.3%	5.0%	9	1.6%	-0.2%
PEPSICO INC	37	2.8%	2.5%	4.8%	13	0.3%	-1.9%	REPSOL YPF SA	244	4.6%	2.9%	3.5%	4	1.7%	1.1%
BANCO SANTANDER SA	38	6.3%	5.3%	11.8%	15	1.0%	-5.5%	IMPERIAL TOBACCO GROUP PLC	248	4.6%	3.4%	5.2%	12	1.1%	-0.7%
PHILIP MORRIS INTERNATIONAL	40	4.3%	2.6%	4.9%	9	1.7%	-0.6%	NATIONAL GRID PLC	251	7.6%	3.8%	6.8%	20	3.8%	0.8%
GLAXOSMITHKLINE PLC	41	5.5%	3.2%	5.0%	13	2.3%	0.6%	EXELON CORP	257	5.0%	4.1%	5.6%	9	0.9%	-0.6%
ROYAL DUTCH SHELL PLC-A SHS	42	5.9%	2.4%	4.8%	16	3.5%	1.1%	KIMBERLY-CLARK CORP	263	3.9%	3.1%	4.8%	4	0.8%	-0.9%
ROCHE HOLDING AG-GENUSSCHEIN	43	4.2%	2.9%	5.0%	11	1.3%	-0.8%	PRAXAIR INC	271	2.0%	1.9%	3.4%	4	0.1%	-1.4%
VERIZON COMMUNICATIONS INC	52	6.3%	3.4%	6.1%	28	2.9%	0.2%	CENTRICA PLC	278	4.2%	3.5%	5.2%	7	0.7%	-0.9%
ENI SPA	53	6.2%	2.9%	3.8%	8	3.2%	2.4%	ENDESA SA	280	5.4%	2.4%	2.5%	2	3.0%	2.9%
CONOCOPHILLIPS	56	3.9%	3.7%	5.3%	19	0.3%	-1.4%	VINCI SA	281	4.5%	3.8%	5.7%	7	0.7%	-1.2%
SANOFI-AVENTIS	60	5.1%	2.4%	3.1%	4	2.7%	1.9%	DOMINION RESOURCES INC/VA	283	4.1%	3.7%	5.5%	13	0.4%	-1.4%
ABBOTT LABORATORIES	61	3.3%	3.1%	5.0%	10	0.3%	-1.6%	MUENCHENER RUECKVER AG-REG	296	5.7%	5.5%	7.1%	3	0.2%	-1.4%
CNOOC LTD	62	4.5%	1.5%	1.5%	1	3.0%	3.0%	DBS GROUP HOLDINGS LTD	308	4.0%	3.1%	3.3%	2	0.9%	0.7%
GDF SUEZ	65	5.5%	2.8%	4.9%	10	2.7%	0.7%	SYNGENTA AG-REG	317	2.4%	2.0%	2.3%	3	0.4%	0.1%
ASTRAZENECA PLC	68	5.1%	2.9%	4.9%	6	2.2%	0.2%	GENERAL MILLS INC	318	2.8%	2.5%	4.9%	7	0.3%	-2.1%
COMMONWEALTH BANK OF AUSTRAL	69	8.0%	3.4%	6.5%	13	4.6%	1.5%	KONINKLIJKE KPN NV	319	6.5%	3.3%	5.6%	14	3.2%	0.8%
ROYAL DUTCH SHELL PLC-B SHS	70	6.1%	2.4%	4.8%	16	3.7%	1.3%	ROCHE HOLDING AG-BR	322	4.1%	2.9%	5.0%	11	1.1%	-0.9%
ROYAL BANK OF CANADA	71	3.8%	1.6%	2.2%	5	2.2%	1.6%	DUKE ENERGY CORP	332	5.6%	3.4%	5.1%	13	2.2%	0.5%
BRITISH AMERICAN TOBACCO PLC	72	5.0%	3.7%	5.4%	14	1.3%	-0.4%	GENERAL DYNAMICS CORP	333	2.7%	1.2%	1.4%	2	1.5%	1.3%
SAUDI BASIC INDUSTRIES CORP	74	3.4%	2.7%	2.7%	1	0.7%	0.7%	ILLINOIS TOOL WORKS	336	2.8%	2.6%	3.4%	3	0.2%	-0.6%
BHP BILLITON PLC	83	3.4%	2.3%	3.7%	10	1.1%	-0.3%	OVERSEA-CHINESE BANKING CORP	349	3.3%	2.5%	3.3%	2	0.8%	0.0%
STATOIL ASA	85	4.9%	3.1%	4.9%	10	1.8%	0.1%	HUSKY ENERGY INC	372	4.6%	3.4%	4.3%	2	1.2%	0.4%
OCCIDENTAL PETROLEUM CORP	86	1.9%	1.8%	2.1%	2	0.1%	-0.2%	DEUTSCHE POST AG-REG	376	4.5%	2.2%	2.4%	2	2.4%	2.2%
WESTPAC BANKING CORP	89	7.9%	3.2%	8.6%	17	4.6%	-0.8%	KELLOGG CO	406	3.1%	2.6%	4.8%	5	0.4%	-1.8%
TORONTO-DOMINION BANK	91	3.3%	1.9%	2.2%	2	1.4%	1.1%	CLP HOLDINGS LTD	419	4.1%	3.8%	3.8%	1	0.4%	0.4%
E.ON AG	95	6.4%	2.8%	5.0%	20	3.6%	1.4%	TELECOM ITALIA SPA	421	4.7%	4.6%	7.0%	25	0.0%	-2.3%
3M CO	97	2.5%	1.9%	4.6%	5	0.6%	-2.1%	METRO AG	441	2.8%	2.6%	3.1%	5	0.2%	-0.4%
DEUTSCHE TELEKOM AG-REG	100	7.5%	3.4%	5.9%	29	4.1%	1.7%	PPR	442	3.1%	2.6%	2.8%	3	0.5%	0.3%
AUST AND NZ BANKING GROUP	106	6.6%	3.1%	6.8%	16	3.5%	-0.2%	SVENSKA HANDELSBANKEN-A SHS	457	3.9%	3.8%	7.6%	12	0.1%	-3.7%
FRANCE TELECOM SA	107	8.7%	3.1%	5.2%	21	5.6%	3.5%	BAE SYSTEMS PLC	469	5.5%	3.1%	4.2%	5	2.4%	1.3%
CREDIT SUISSE GROUP AG-REG	108	4.5%	3.7%	7.6%	35	0.7%	-3.1%	ROGERS COMMUNICATIONS INC-B	472	3.3%	3.2%	3.8%	2	0.2%	-0.5%
KRAFT FOODS INC-CLASS A	109	3.8%	3.3%	5.6%	21	0.5%	-1.7%	BT GROUP PLC	474	5.5%	4.5%	7.0%	12	1.0%	-1.5%
BANK OF NOVA SCOTIA	110	3.7%	1.6%	2.0%	3	2.1%	1.7%	REYNOLDS AMERICAN INC	477	6.3%	4.0%	4.9%	3	2.2%	1.3%
BASF SE	114	4.0%	2.2%	3.5%	7	1.8%	0.5%	QBE INSURANCE GROUP LTD	479	7.9%	4.1%	4.1%	2	3.8%	3.7%
ALLIANZ SE-REG	124	5.0%	3.7%	6.2%	8	1.3%	-1.2%	PUBLIC SERVICE ENTERPRISE GP	484	4.2%	3.7%	5.7%	2	0.5%	-1.5%
ALTRIA GROUP INC	129	6.0%	4.2%	6.9%	8	1.8%	-0.9%	SCOTTISH & SOUTHERN ENERGY	490	6.6%	4.2%	5.1%	8	2.4%	1.5%
NATIONAL AUSTRALIA BANK LTD	130	8.8%	3.7%	8.4%	19	5.1%	0.3%	BOUYGUES SA	551	5.0%	3.0%	4.9%	7	2.0%	0.1%
BOEING CO/THE	132	2.6%	2.3%	5.0%	12	0.4%	-2.4%	ALSTOM	555	3.2%	3.2%	3.8%	3	0.1%	-0.6%
UNILEVER NV	134	4.1%	2.5%	4.6%	6	1.7%	-0.5%	HJ HEINZ CO	558	3.7%	2.7%	5.0%	3	1.0%	-1.3%
ENEL SPA	135	6.4%	4.1%	6.1%	18	2.3%	0.3%	GAS NATURAL SDG SA	565	6.6%	4.0%	4.8%	8	2.6%	1.8%
BANCO DO BRASIL SA	136	6.2%	4.0%	4.6%	2	2.2%	1.6%	ERSTE GROUP BANK AG	567	2.3%	2.2%	2.5%	3	0.1%	-0.2%
BRISTOL-MYERS SQUIBB CO	138	4.8%	3.3%	4.9%	6	1.4%	-0.1%	LAFARGE SA	575	5.2%	5.1%	7.6%	17	0.1%	-2.5%
DIAGEO PLC	146	6.2%	2.4%	5.0%	12	3.8%	1.3%	SPECTRA ENERGY CORP	585	4.7%	3.8%	4.7%	3	1.0%	0.0%
TOKYO ELECTRIC POWER CO INC	153	2.4%	2.0%	2.0%	1	0.5%	0.5%	SAMPO OYJ-A SHS	588	5.3%	2.4%	2.4%	1	2.8%	2.8%
ELI LILLY & CO	154	5.7%	2.6%	5.0%	6	3.1%	0.7%	CONSOLIDATED EDISON INC	596	4.9%	3.9%	5.1%	6	1.0%	-0.2%
IBERDROLA SA	158	5.9%	3.6%	5.9%	15	2.3%	0.0%	PPL CORPORATION	608	5.1%	4.4%	5.3%	5	0.7%	-0.3%
DU PONT (E.I.) DE NEMOURS	165	3.9%	2.3%	3.4%	9	1.6%	0.5%	AVON PRODUCTS INC	618	2.9%	1.8%	1.8%	1	1.1%	1.1%
NORDEA BANK AB	169	3.7%	3.6%	7.0%	16	0.1%	-3.4%	AKZO NOBEL	620	3.1%	2.8%	3.7%	4	0.3%	-0.6%
RWE AG	179	6.5%	3.2%	5.1%	16	3.3%	1.4%	VEOLIA ENVIRONNEMENT	643	6.1%	3.3%	5.2%	15	2.8%	0.9%

Source: Deutsche Bank, Bloomberg LP

Figure 57: Companies with Higher Dividend Yields (DV) (last 12 months) than their Average (and in some case highest) Corporate Bond Yield (BY)

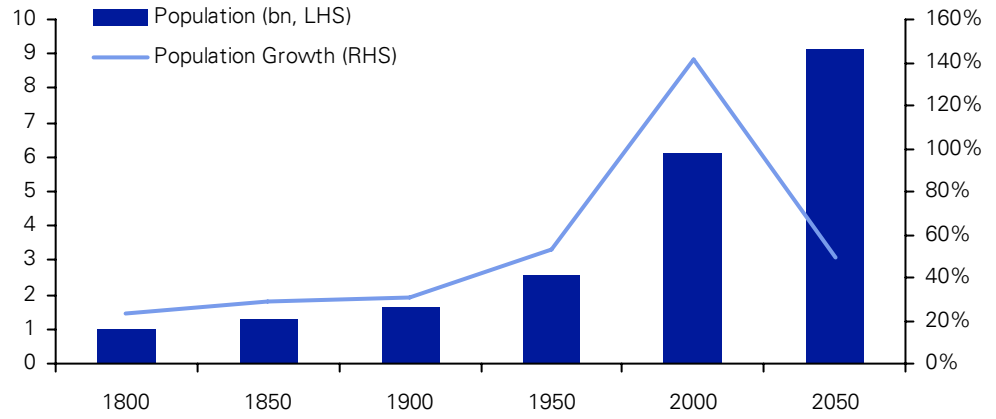
Company	Rank	DY	Avg BY	High BY	# of Bonds	DY-Avg	DY-High	Company	Rank	DY	Avg BY	High BY	# of Bonds	DY-Avg	DY-High
PROGRESS ENERGY INC	650	5.7%	4.1%	5.3%	7	1.6%	0.4%	TELEFONOS DE MEXICO SAB SER	1167	9.4%	3.7%	4.3%	2	5.7%	5.0%
PEARSON PLC	658	4.1%	3.5%	4.2%	3	0.6%	-0.1%	CENTERPOINT ENERGY INC	1239	5.1%	1.9%	1.9%	1	3.2%	3.2%
DEUTSCHE BOERSE AG	661	4.3%	3.7%	5.2%	2	0.7%	-0.9%	BANCO ESP CREDITO (BANESTO)	1244	6.4%	3.0%	3.0%	1	3.4%	3.4%
CRH PLC	663	4.7%	3.6%	5.3%	7	1.2%	-0.6%	MAN GROUP PLC	1272	14.4%	5.1%	5.1%	1	9.2%	9.2%
TYCO ELECTRONICS LTD	696	3.1%	3.1%	4.0%	2	0.0%	-0.9%	FINMECCANICA SPA	1273	4.9%	4.4%	5.7%	7	0.5%	-0.8%
ATLANTIA SPA	699	4.7%	3.8%	5.1%	4	0.9%	-0.4%	UNITED UTILITIES GROUP PLC	1284	6.4%	4.3%	5.2%	6	2.1%	1.2%
PPG INDUSTRIES INC	711	3.2%	2.8%	3.7%	2	0.4%	-0.5%	RED ELECTRICA CORPORACION SA	1333	4.3%	2.4%	2.4%	1	1.9%	1.9%
EDP-ENERGIAS DE PORTUGAL SA	721	6.4%	3.9%	5.8%	11	2.5%	0.6%	WOLTERS KLUWER	1334	4.4%	3.0%	3.5%	2	1.4%	0.9%
ENBW ENERGIE BADEN-WUERTTEMB	726	4.2%	2.8%	4.3%	7	1.3%	-0.2%	NISOURCE INC	1485	5.2%	4.1%	5.0%	7	1.1%	0.3%
CENTURYLINK INC	761	8.0%	5.6%	8.0%	4	2.3%	0.0%	SEVERN TRENT PLC	1511	5.9%	3.9%	4.9%	5	2.0%	1.0%
XCEL ENERGY INC	780	4.3%	2.9%	3.7%	3	1.4%	0.6%	WESFARMERS LTD-PPS	1558	5.3%	2.6%	2.8%	2	2.7%	2.6%
PORTUGAL TELECOM SGPS SA-REG	782	6.2%	4.1%	5.7%	5	2.1%	0.5%	A2A SPA	1576	6.2%	3.0%	3.6%	3	3.1%	2.5%
QWEST COMMUNICATIONS INTL	816	5.5%	4.5%	7.3%	6	1.0%	-1.8%	TRANSALTA CORP	1581	5.4%	3.7%	4.5%	2	1.7%	0.9%
REED ELSEVIER PLC	817	4.2%	3.4%	4.3%	5	0.8%	-0.1%	PINNACLE WEST CAPITAL	1606	5.1%	4.6%	4.6%	1	0.5%	0.5%
CONAGRA FOODS INC	846	3.7%	2.9%	3.9%	2	0.7%	-0.2%	ENAGAS	1611	5.1%	2.4%	2.7%	2	2.8%	2.4%
CASINO GUICHARD PERRACHON	849	3.9%	2.8%	3.7%	6	1.0%	0.1%	H&R BLOCK INC	1636	4.8%	3.6%	3.6%	1	1.2%	1.2%
KT CORP	852	4.7%	3.1%	3.1%	1	1.7%	1.7%	REXAM PLC	1651	4.3%	2.1%	2.7%	2	2.2%	1.6%
SARA LEE CORP	861	3.1%	2.9%	5.7%	3	0.2%	-2.6%	ROGERS COMMUNICATI-CL A CONV	1665	3.3%	3.2%	3.8%	2	0.1%	-0.5%
SODEXO	873	2.7%	2.5%	2.6%	2	0.2%	0.1%	PEPCO HOLDINGS INC	1688	5.9%	5.0%	5.0%	1	0.9%	0.9%
CLOROX COMPANY	876	3.1%	1.8%	2.3%	2	1.3%	0.8%	BRISA-AUTO-ESTRADAS PORTUGAL	1753	6.3%	4.2%	4.5%	2	2.1%	1.8%
CHEUNG KONG INFRASTRUCTURE	922	4.0%	3.7%	5.2%	14	0.3%	-1.2%	TELECOMUNICACOES DE SAO PAOL	1835	9.2%	3.6%	5.8%	25	5.6%	3.4%
MARKS & SPENCER GROUP PLC	931	4.7%	3.8%	5.0%	6	0.9%	-0.4%	RR DONNELLEY & SONS CO	1938	6.4%	4.8%	5.6%	3	1.5%	0.7%
PUBLICIS GROUPE	959	1.7%	1.7%	1.7%	1	0.0%	0.0%	SECURITAS AB-B SHS	1951	4.3%	2.3%	2.3%	1	2.0%	2.0%
SUEZ ENVIRONNEMENT CO	972	4.9%	3.1%	3.7%	4	1.7%	1.2%	TATE & LYLE PLC	2063	5.6%	3.9%	5.1%	3	1.7%	0.4%
SOLVAY SA	991	3.9%	3.5%	5.4%	4	0.5%	-1.5%	ATMOS ENERGY CORP	2252	4.7%	2.8%	2.8%	1	1.9%	1.9%
TERNA SPA	998	6.0%	3.2%	3.9%	3	2.8%	2.1%	FIRSTGROUP PLC	2274	6.4%	4.8%	5.7%	5	1.6%	0.7%
KONINKLIJKE DSM NV	1010	3.5%	2.5%	2.9%	3	0.9%	0.6%	PROVIDENT FINANCIAL PLC	2879	8.3%	7.0%	7.0%	1	1.2%	1.2%
SHERWIN-WILLIAMS CO/THE	1043	2.0%	1.8%	1.8%	1	0.2%	0.2%	CLOSE BROTHERS GROUP PLC	3164	6.5%	5.5%	5.5%	1	1.0%	1.0%
NYSE EURONEXT	1050	4.1%	2.5%	3.3%	2	1.7%	0.9%	HOLCIM MAROC SA	3490	5.3%	4.0%	5.3%	5	1.3%	0.0%
ACCOR SA	1099	4.2%	3.2%	3.3%	2	1.0%	0.9%	SVENSKA HANDELSBANKEN-B SHS	4695	4.0%	3.8%	7.6%	12	0.1%	-3.6%
TELEKOMUNIKACJA POLSKA SA	1139	9.0%	2.8%	2.8%	1	6.2%	6.2%	TELEFONOS DE MEXICO SAB-SER	4708	9.5%	3.7%	4.3%	2	5.8%	5.1%

Source: Deutsche Bank, Bloomberg LP

Global Demographics – From Golden to Grey

There is evidence to suggest that the first humans date back around 200,000 years. However it wasn't until just after 1800 that the World's population hit one billion. It then took another 120 plus years for the population to hit two billion in around 1927. By 1960 we'd reached the three billion point and ever since we've added an extra billion every 10-15 years. The World's population is expected to pass through seven billion in late 2011 and eight in 2025. Interestingly the ninth billion won't be reached until sometime between 2045 and 2050 so it's clear that population growth is starting to slow after an incredible, unparalleled period of growth in the latter half of the Twentieth Century. Figure 58 reprints a chart we used earlier showing the World's population in 50-year intervals from 1800 through to the UN's prediction for 2050. It also shows the growth rate in percentage terms over the preceding 50-year period.

Figure 58: World Population and 50yr Growth



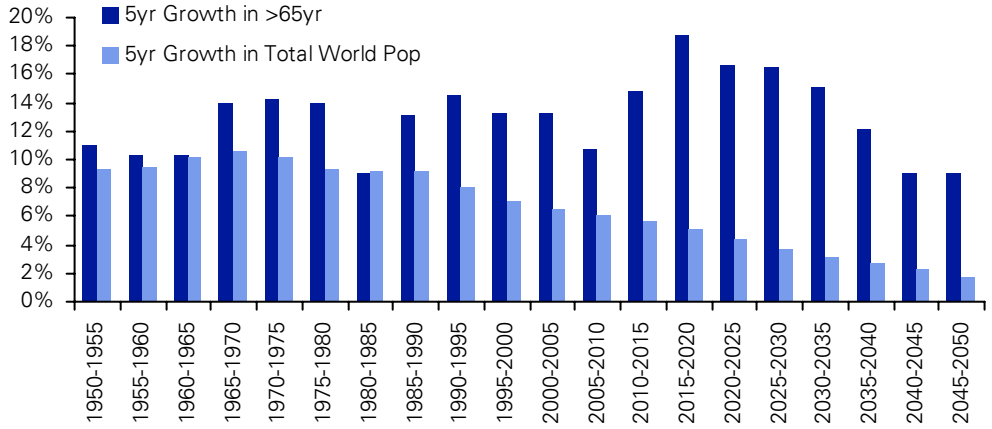
Source: Deutsche Bank, UN

When looking at asset returns and economic growth we should remember that the period between 1950 and 2000 saw a Global population explosion never previously seen in history. The global population grew 142% over this period. It wasn't simply a response to re-populating after the Wars as the period between 1900 and 1950 also saw strong population growth. However the 53% growth rate in 1900-1950 was dwarfed by that seen between 1950 and 2000.

Going forward we will likely start to see a slowdown in Global population growth albeit at still high historical growth rates and with significant regional variations. The period between 2000 and 2050 is expected to see growth of around 50%, slightly lower than that seen between 1900 and 1950.

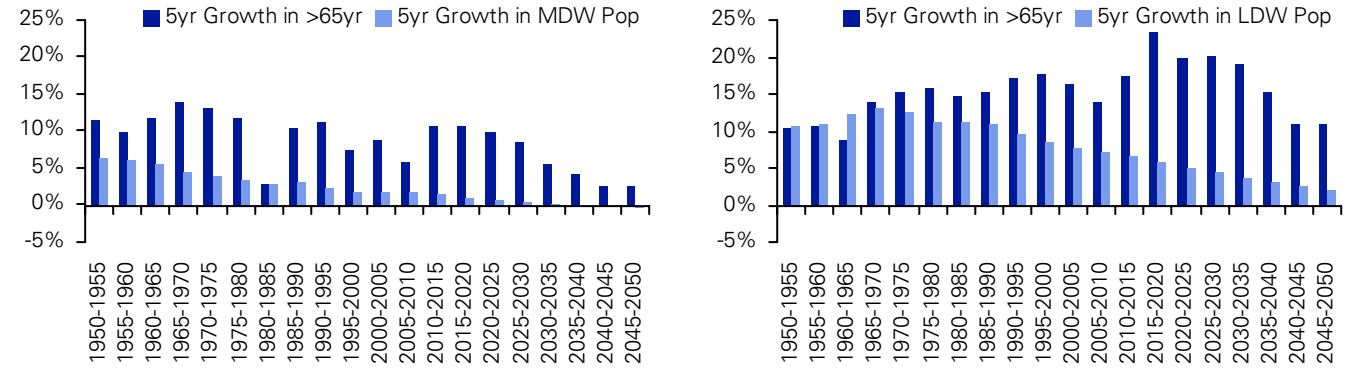
Figure 59 shows the 5-year percentage growth in the World's population between 1950 and 2050 also with the growth rate of the over 65-year olds. Figure 60 then shows this split by the More Developed (MDW) and Less Developed World (LDW)

Figure 59: World Total and Over 65yr Population Growth



Source: Deutsche Bank, UN Population Division

Figure 60: More Developed World (MDW) and Less Developed World (LDW) Total and Over 65yr Population Growth



Source: Deutsche Bank, UN Population Division

Overall the growth rate of the World's population has been slowing since it reached its peak rate during the 1970s. The growth rate of the over 65 year olds will remain elevated now for the next 20-30 years.

Regionally, population growth in the Developed World is slowing dramatically and there will only be around 3% more people in this area in 2050 than in 2010 (1.275bn vs 1.237bn today). However the over 65 year olds in the MDW will increase 69% over the same period (0.197bn today to 0.334bn in 2050). This regional variation is a theme we will revert back to repeated in this section and indeed in the report.

So the LDW is where virtually all of the population growth from here until 2050 occurs. The population is set to grow around 39% over the next 40 years and add 2.203bn people to the planet from this region alone (7.874bn vs 5.671bn today). The LDW is not immune from the aging phenomena though as the over 65 year olds in their population will increase a remarkable 253% over the same period (0.326bn today to 1.153bn in 2050).

Depopulation across parts of the West

Although the World Population will grow by 2.241bn to 9.149bn from 2010 to 2050 we have seen above how the MDW will only make up a paltry 38mn of this growth. To put this in context this is approximately the equivalent of the current population of say Argentina or Spain. The LDW will add the equivalent of 1.6 China's current population over the same period.

However the MDW's stagnation is not going to be split evenly. Three of the G-7 (Japan, Germany and Italy) will see their population decline over the next few decades. Russia and South Korea will also see depopulation. Figure 61 below shows these stats over time for the G20 countries (plus Spain instead of the EU) and then the change over the past and next 40 years in absolute numbers and in percentage terms. In the table we've used the G-20 to show some of the most important nations economically. This therefore includes China, India and Brazil that are also in the LDW section. The table also collates the data from all the continents and also by economic development status. The shaded boxes represent a fall in population. We have ordered the table by largest predicted percentage reduction in population between 2010 and 2050.

Figure 61: Total Population (mn) by G-20 Country, Continent and Economic Region

												1970-2010		2010-2050	
	1950	1970	1990	2000	2005	2010	2015	2020	2030	2040	2050	Change	% Change	Change	% Change
Countries															
Japan	82.8	104.4	123.2	126.7	127.4	127.0	125.8	123.7	117.4	109.8	101.7	22.5	27%	-25.3	-20%
Russia	102.7	130.4	148.1	146.7	143.2	140.4	138.0	135.4	128.9	122.1	116.1	10.0	10%	-24.3	-17%
Germany	68.4	78.2	79.4	82.1	82.4	82.1	81.3	80.4	77.9	74.4	70.5	3.9	6%	-11.6	-14%
South Korea	19.2	31.4	43.0	46.4	47.6	48.5	49.2	49.5	49.1	47.3	44.1	17.1	89%	-4.4	-9%
Italy	46.4	53.4	57.0	57.1	58.6	60.1	60.6	60.4	59.6	58.5	57.1	6.7	15%	-3.0	-5%
China	545.0	816.0	1,142.1	1,267.0	1,312.3	1,354.1	1,396.0	1,431.2	1,462.5	1,455.1	1,417.0	538.2	99%	62.9	5%
France	41.8	50.8	56.8	59.1	61.0	62.6	63.9	64.9	66.5	67.5	67.7	11.9	28%	5.0	8%
Brazil	54.0	96.0	149.6	174.2	186.1	195.4	202.9	209.1	217.1	220.1	218.5	99.4	184%	23.1	12%
South Africa	13.7	22.5	36.7	44.9	48.1	50.5	51.7	52.7	54.7	56.0	56.8	28.0	205%	6.3	12%
Spain	28.0	33.8	38.8	40.3	43.1	45.3	47.2	48.6	49.8	50.8	51.3	11.5	41%	5.9	13%
Mexico	27.7	51.9	83.4	99.5	105.3	110.6	115.5	119.7	126.5	129.9	129.0	58.7	212%	18.3	17%
UK	50.6	55.7	57.2	58.9	60.3	61.9	63.5	65.1	68.0	70.2	72.4	6.2	12%	10.5	17%
Indonesia	77.2	116.9	177.4	205.3	219.2	232.5	244.2	254.2	271.5	283.5	288.1	115.6	150%	55.6	24%
Argentina	17.2	24.0	32.5	36.9	38.7	40.7	42.5	44.3	47.3	49.4	50.9	16.7	97%	10.3	25%
USA	157.8	209.5	254.9	287.8	302.7	317.6	332.3	346.2	370.0	388.9	403.9	108.2	69%	86.3	27%
Turkey	21.5	36.2	56.1	66.5	71.2	75.7	80.0	83.9	90.4	94.9	97.4	39.5	184%	21.7	29%
Canada	13.7	21.7	27.7	30.7	32.3	33.9	35.5	37.1	40.1	42.5	44.4	12.2	89%	10.5	31%
India	371.9	553.0	862.2	1,042.6	1,130.6	1,214.5	1,294.2	1,367.2	1,484.6	1,564.8	1,613.8	661.5	178%	399.3	33%
Australia	8.2	12.7	17.1	19.2	20.4	21.5	22.6	23.7	25.7	27.3	28.7	8.8	107%	7.2	34%
Saudi Arabia	3.2	5.7	16.3	20.8	23.6	26.2	28.9	31.6	36.5	40.5	43.7	20.5	640%	17.4	66%
Continents															
World	2,529.3	3,685.8	5,290.5	6,115.4	6,512.3	6,908.7	7,302.2	7,674.8	8,308.9	8,801.2	9,150.0	3,222.9	127%	2,241.3	32%
Europe	547.5	656.2	721.0	726.6	729.4	732.8	734.0	733.0	723.4	708.5	691.1	76.6	14%	-41.7	-6%
Latin America and the Caribbean	167.3	286.5	442.3	521.2	556.5	588.6	618.5	645.5	689.9	718.0	729.2	302.2	181%	140.5	24%
Asia	1,402.9	2,125.4	3,178.8	3,698.3	3,936.5	4,166.7	4,390.6	4,596.3	4,916.7	5,125.3	5,231.5	2,041.4	146%	1,064.7	26%
Northern America	171.6	231.3	282.7	318.7	335.2	351.7	368.0	383.4	410.2	431.5	448.5	120.4	70%	96.8	28%
Oceania	12.8	19.6	26.9	31.2	33.6	35.8	38.1	40.3	44.6	48.2	51.3	16.2	126%	15.5	43%
Africa	227.3	366.8	638.7	819.5	921.1	1,033.0	1,153.0	1,276.4	1,524.2	1,769.6	1,998.5	666.2	293%	965.4	93%
Economic Regions															
More developed regions	812.0	1,007.5	1,147.3	1,195.0	1,216.5	1,237.2	1,254.8	1,268.3	1,281.6	1,282.3	1,275.2	229.8	28%	38.0	3%
Less developed regions, excluding least developed countries	1,516.9	2,363.5	3,618.3	4,243.5	4,533.9	4,816.8	5,092.4	5,347.0	5,755.6	6,039.5	6,202.3	2,453.3	162%	1,385.6	29%
Less developed regions	1,717.3	2,678.3	4,143.1	4,920.4	5,295.7	5,671.5	6,047.3	6,406.5	7,027.3	7,518.9	7,874.7	2,993.2	174%	2,203.3	39%
Less developed regions, excluding China	1,170.2	1,858.2	2,994.9	3,646.3	3,976.1	4,309.7	4,643.4	4,967.0	5,556.0	6,054.8	6,448.5	2,451.5	209%	2,138.8	50%
Least developed countries	200.5	314.8	524.8	676.9	761.8	854.7	954.9	1,059.5	1,271.6	1,479.4	1,672.4	539.9	269%	817.7	96%

Note: Shaded values indicate a decline from the previous period.
Source: Deutsche Bank, UN Population Division

Japan sees the largest percentage reduction of its population in the G-20 over the next 40 years with Russia, Germany, South Korea and Italy joining the de-population trend. Interestingly China and Brazil are 6th and 8th on the worst to best list with their populations only growing 5% and 12% respectively out to 2050 after growing 99% and 184% in the preceding 40 years. However as we'll see later, China is ageing far more rapidly than Brazil.

At the other end India is likely to add 661.5mn to its population by 2050 – a 33% increase. This is around 37% of all the population growth of the G20 over the period. India truly has some wonderful opportunities and challenges over this period.

In terms of continents it's no surprise to see Europe at the bottom of the pile and the only continent expected to see its population shrink out to 2050. In terms of economic regions we have already discussed how most of the population growth will be in the developing world. This table shows that within this universe it's the very poorest regions that will see the highest rate of growth.

The grey age – the global increase in over 65 year olds.

Figure 62 looks at the same group of countries and repeats the above exercise for the over 65 year old population alone. As can be seen every country sees a fairly dramatic increase. Even bottom of the list Japan will see a 34% increase over the next 40 years. Note that four of the five de-populating countries over the period (Japan, Germany, Russia and Italy) have the lowest rate of growth in this sub-group mostly because they already have an aging population to different degrees. Generally it's the developing area that sees the faster rate of growth, mainly because their large population is currently younger with more potential to age, especially if mortality rates continue to improve as expected.

Figure 62: Over 65yr Population (mn) by Country, Continent and Economic Region

												1970-2010		2010-2050	
	1950	1970	1990	2000	2005	2010	2015	2020	2030	2040	2050	Change	% Change	Change	% Change
Countries															
Saudi Arabia	0.1	0.2	0.4	0.6	0.7	0.8	1.0	1.3	2.5	4.2	5.9	0.6	330%	5.1	653%
Turkey	0.7	1.6	2.3	3.5	4.0	4.5	5.3	6.3	9.4	13.6	17.9	3.0	191%	13.4	297%
Mexico	1.0	1.9	3.6	5.2	6.1	7.3	8.6	10.7	15.7	23.0	28.6	5.3	277%	21.3	294%
Indonesia	3.1	3.6	6.8	10.0	12.1	14.1	16.1	19.1	29.0	41.6	53.6	10.5	290%	39.5	279%
India	11.7	18.0	33.0	44.3	51.9	59.7	69.6	86.5	124.6	167.7	221.8	41.7	232%	162.1	271%
Brazil	1.6	3.5	6.6	9.6	11.5	13.5	16.3	20.0	29.6	38.9	49.2	10.0	285%	35.8	265%
China	24.4	35.2	62.8	86.1	99.3	111.4	131.9	166.9	232.7	316.6	330.6	76.3	217%	219.1	197%
South Korea	0.6	1.0	2.1	3.4	4.4	5.3	6.4	7.6	11.4	14.3	15.1	4.3	415%	9.7	182%
South Africa	0.5	0.8	1.2	1.6	1.9	2.3	2.8	3.3	4.3	4.8	5.6	1.6	201%	3.3	140%
Canada	1.1	1.7	3.1	3.9	4.2	4.8	5.7	6.7	9.1	10.4	11.3	3.1	179%	6.6	137%
Australia	0.7	1.1	1.9	2.4	2.6	3.0	3.5	4.1	5.3	6.3	6.8	1.9	182%	3.8	128%
Argentina	0.7	1.7	3.0	3.7	4.0	4.3	4.8	5.3	6.5	7.8	9.7	2.6	153%	5.4	124%
USA	13.0	20.6	31.4	35.6	37.5	41.2	47.6	55.7	73.1	81.6	87.1	20.6	100%	46.0	112%
Spain	2.0	3.3	5.3	6.8	7.2	7.8	8.4	9.1	11.3	14.3	16.3	4.5	135%	8.5	110%
France	4.8	6.6	8.1	9.5	10.0	10.6	12.2	13.6	16.1	17.9	18.2	4.1	62%	7.6	71%
UK	5.4	7.3	9.0	9.4	9.7	10.3	11.4	12.1	14.2	15.9	16.6	3.0	41%	6.3	61%
Italy	3.8	6.0	8.7	10.5	11.5	12.3	13.2	13.9	15.9	18.6	19.0	6.3	106%	6.7	54%
Russia	6.4	10.0	14.9	18.1	19.7	18.1	18.8	20.9	25.0	25.0	27.2	8.1	81%	9.1	50%
Germany	6.6	10.7	11.9	13.4	15.5	16.8	17.4	18.5	22.0	23.6	22.9	6.1	57%	6.1	36%
Japan	4.1	7.3	14.7	21.8	25.4	28.7	33.1	35.3	36.2	38.6	38.5	21.3	291%	9.8	34%
Continents															
World	130.5	200.9	321.9	417.2	472.6	523.5	601.2	713.9	969.4	1,251.8	1,486.9	322.6	161%	963.4	184%
Africa	7.4	11.5	19.7	26.7	30.9	35.5	41.6	49.3	69.3	96.6	141.5	24.0	209%	106.1	299%
Latin America and the Caribbean	5.9	11.7	21.7	30.0	35.0	40.8	48.4	58.7	84.7	113.4	142.1	29.0	247%	101.3	249%
Asia	57.3	85.1	151.6	210.6	245.5	278.3	325.3	399.0	562.5	761.7	906.1	193.2	227%	627.8	226%
Oceania	0.9	1.4	2.5	3.1	3.4	3.9	4.6	5.3	7.1	8.6	9.6	2.5	177%	5.7	148%
Northern America	14.1	22.3	34.6	39.5	41.7	46.0	53.3	62.5	82.2	92.0	98.5	23.6	106%	52.5	114%
Europe	44.9	68.9	91.9	107.3	116.1	119.1	128.0	139.1	163.6	179.5	189.1	50.2	73%	70.0	59%
Economic Regions															
Least developed countries	6.2	9.5	16.0	21.3	24.5	28.3	33.1	39.8	57.6	84.0	123.9	18.8	198%	95.6	337%
Less developed regions, excluding China	42.1	65.7	115.1	158.9	186.1	213.8	249.6	303.8	446.1	614.8	819.1	148.1	225%	605.3	283%
Less developed regions	66.6	101.1	178.4	245.7	286.2	326.2	382.6	472.1	681.1	934.3	1,152.7	225.1	223%	826.5	253%
Less developed regions, excluding least developed countries	60.4	91.6	162.4	224.4	261.7	297.8	349.5	432.4	623.5	850.3	1,028.8	206.3	225%	730.9	245%
More developed regions	63.9	99.8	143.5	171.5	186.3	197.3	218.6	241.7	288.4	317.5	334.2	97.5	98%	136.9	69%

Note: Shaded values indicate a decline from the previous period.
Source: Deutsche Bank, UN Population Division

Next we examine the size of the economically active population going forward. We have decided to use the 15-64 year old cohort for this analysis although different timings of

education and retirement around the world distort this to some degree. It shouldn't obscure from the overall trend though.

From economically active to economically inactive

Figure 63: 15-64yr Population (mn) by Country, Continent and Economic Region

												1970-2010		2010-2050	
	1950	1970	1990	2000	2005	2010	2015	2020	2030	2040	2050	Change	% Change	Change	% Change
Countries															
Japan	49.4	72.0	85.9	86.4	84.5	81.6	77.1	74.0	68.5	59.1	51.8	9.6	13%	-29.8	-37%
South Korea	10.5	17.2	29.8	33.3	34.1	35.3	35.9	35.2	31.6	27.4	24.0	18.1	106%	-11.3	-32%
Russia	66.7	85.7	99.1	101.8	101.8	101.2	96.8	91.9	84.2	79.1	70.1	15.5	18%	-31.2	-31%
Germany	45.9	49.3	54.8	55.8	55.1	54.3	53.7	52.0	46.2	41.6	38.7	5.0	10%	-15.6	-29%
Italy	30.2	34.3	39.0	38.4	38.8	39.3	38.9	38.4	36.3	32.4	30.4	5.0	15%	-8.9	-23%
Spain	18.4	21.0	25.9	27.5	29.6	30.8	31.4	31.9	31.5	29.4	27.4	9.7	46%	-3.4	-11%
China	337.8	456.6	755.1	855.1	924.2	973.3	998.2	996.0	983.2	916.1	870.1	516.7	113%	-103.2	-11%
France	27.6	31.6	37.4	38.4	39.7	40.5	40.2	40.0	39.4	38.6	38.5	8.9	28%	-2.0	-5%
Brazil	29.9	51.8	90.2	113.1	123.3	132.2	140.4	147.1	150.6	147.5	137.2	80.4	155%	5.0	4%
UK	33.9	35.0	37.4	38.4	39.7	40.9	41.2	41.7	42.1	42.8	43.9	5.9	17%	3.0	7%
Mexico	15.0	25.8	47.6	61.4	66.9	72.5	77.6	81.4	85.8	83.6	79.5	46.7	181%	7.0	10%
Canada	8.6	13.5	18.8	21.0	22.4	23.6	24.2	24.5	24.6	25.5	26.1	10.1	75%	2.6	11%
USA	102.2	129.5	168.1	190.2	202.2	212.3	219.0	223.7	230.4	240.2	247.9	82.8	64%	35.7	17%
South Africa	7.9	12.3	21.3	28.2	30.9	32.9	33.6	34.3	36.1	37.6	38.4	20.6	168%	5.5	17%
Indonesia	43.9	63.7	107.1	133.0	144.9	156.4	167.2	176.9	188.1	188.7	184.3	92.6	145%	27.9	18%
Australia	5.4	8.0	11.4	12.8	13.7	14.5	14.9	15.3	15.8	16.4	17.1	6.5	81%	2.7	18%
Turkey	12.2	19.6	33.5	42.6	46.9	51.2	55.2	58.2	62.5	63.7	62.4	31.6	161%	11.2	22%
Argentina	11.2	15.3	19.6	23.0	24.6	26.2	27.6	28.8	31.0	32.4	32.2	11.0	72%	6.0	23%
India	220.8	308.6	502.8	633.0	704.6	780.6	852.9	916.3	1,021.7	1,088.4	1,098.0	472.0	153%	317.4	41%
Saudi Arabia	1.8	3.0	9.1	12.3	14.8	17.1	19.3	21.5	25.1	27.8	29.5	14.1	468%	12.4	73%
Continents															
World	1,536.0	2,106.4	3,229.9	3,843.5	4,192.2	4,523.7	4,803.8	5,038.8	5,454.8	5,723.3	5,865.8	2,417.3	115%	1,342.1	30%
Europe	359.1	421.1	481.4	491.7	497.5	500.8	491.8	479.7	453.2	426.9	398.2	79.7	19%	-102.6	-20%
Northern America	110.8	143.0	187.0	211.2	224.7	235.9	243.2	248.3	255.0	265.7	274.1	92.9	65%	38.2	16%
Latin America and the Caribbean	94.1	153.0	260.6	325.5	355.9	385.1	412.4	435.2	463.5	472.0	462.8	232.1	152%	77.7	20%
Asia	838.8	1,185.5	1,949.9	2,349.6	2,581.3	2,796.8	2,973.3	3,106.2	3,318.0	3,394.0	3,388.0	1,611.4	136%	591.2	21%
Oceania	8.0	11.9	17.3	20.0	21.7	23.3	24.6	25.8	27.9	30.0	32.0	11.4	96%	8.7	37%
Africa	125.1	191.9	333.7	445.5	511.1	581.7	658.4	743.7	937.2	1,134.7	1,310.7	389.8	203%	729.0	125%
Economic Regions															
More developed regions	525.9	645.8	767.9	804.7	823.1	835.7	830.1	820.3	795.7	771.3	744.5	189.9	29%	-91.2	-11%
Less developed regions, excluding least developed countries	898.0	1,294.3	2,186.7	2,671.0	2,945.9	3,202.5	3,419.7	3,591.5	3,873.2	4,001.9	4,024.8	1,908.2	147%	822.3	26%
Less developed regions	1,010.1	1,460.6	2,462.0	3,038.9	3,369.1	3,688.0	3,973.8	4,218.5	4,659.1	4,952.0	5,121.3	2,227.4	153%	1,433.3	39%
Less developed regions, excluding China	670.8	1,001.5	1,702.6	2,178.7	2,439.5	2,709.0	2,969.6	3,216.6	3,670.4	4,030.5	4,246.1	1,707.4	170%	1,537.1	57%
Least developed countries	112.0	166.3	275.3	367.9	423.2	485.6	554.1	627.1	785.9	950.0	1,096.6	319.3	192%	611.0	126%

Note: Shaded values indicate a decline from the previous period.
Source: Deutsche Bank, UN Population Division

It's no surprise to see the serial 'agers' (Japan, South Korea, Russia, Germany and Italy) at the top of the pile in terms of shrinking working age populations over the next 40 years. It's remarkable to see that Japan and Germany will see their economically active population shrink by 29.9mn (-37%) and 15.6mn (-29%) respectively over the next 40 years.

Spain, China and France are the other countries in the G20 exhibiting shrinking 'working' age populations over the same period. With regards to Europe, one can see why at an economic level, the community may wish to stay together and expand as much as possible. The stagnant and aging population of its core members is a worry going forward. Perhaps demographic self-protection is part of the reason why politicians are seemingly so committed to maintaining and expanding the EU project. Germany seems to be in a great position today and many seem to doubt its future commitment to the EU cause. However its woeful demographics may be a reason for it to continue to push for a healthy and enlarged EU.

The remaining countries continue to see growth of this 'economically active population' albeit with only India and the relatively small Saudi Arabia seeing growth exceeding 22%. Overall, the rate of growth of this group between 2010 and 2050 is in sharp contrast to the growth rate seen between 1970 and 2010. We should bear this in mind when we think about economic growth and asset price returns, past and present and in the future. The world has been blessed by a surge in the number of economically active individuals over the last few decades. A blessing that will not be repeated going forward.

The key group – the economically prime 35-54 year olds

There is a generally accepted wisdom in academic work that there is a "life cycle hypothesis". This suggests that the population's financial behaviour changes depending on age. In terms of adult life, those in their twenties and early thirties tend to be net borrowers as they are relatively low earners at the same time as they look to buy housing, expensive durables and fund their burgeoning families. At some point around middle-age this group then tends to move from being net borrowers to net investors as they move into their economic prime and accumulate financial assets to hopefully fund their retirement. As they approach retirement this group then start to shed the financial assets they've been accumulating to fund their nonworking days.

We have chosen the group aged between 35-54 years old as our key investor cohort throughout most of the remainder of this chapter as their size seems to correlate best to asset price returns (more on this later). We accept that maybe a 35-54 year old in the Developed World may have different levels of relative wealth (past, present and future) to those in the Developing World but for simplicity we have kept this cohort consistent for analysis across all regions.

Figure 64: 35-54yr Population (mn) by Country, Continent and Economic Region

												1970-2010		2010-2050	
	1950	1970	1990	2000	2005	2010	2015	2020	2030	2040	2050	Change	% Change	Change	% Change
Countries															
South Korea	3.6	5.6	9.8	13.5	15.1	16.3	16.0	15.5	13.7	11.9	9.8	10.7	190%	-6.5	-40%
Germany	20.7	17.9	21.9	24.0	25.9	25.4	24.0	21.9	19.7	18.1	15.8	7.5	42%	-9.6	-38%
Japan	16.9	26.3	36.8	35.4	33.3	34.2	34.9	34.4	28.8	24.6	22.1	7.9	30%	-12.0	-35%
Russia	25.3	32.3	38.2	44.4	43.3	41.1	39.0	39.4	39.9	31.5	27.7	8.8	27%	-13.4	-33%
Italy	11.9	13.3	14.7	16.0	17.2	18.5	18.8	17.8	14.7	13.3	13.2	5.2	39%	-5.3	-29%
Spain	6.7	8.5	9.1	11.0	12.4	14.0	15.3	15.5	13.4	11.0	11.5	5.5	64%	-2.5	-18%
China	119.3	154.7	243.9	328.3	386.3	417.1	426.0	422.4	408.4	393.5	345.9	262.5	170%	-71.3	-17%
France	11.7	11.9	14.3	16.9	17.1	17.1	16.7	16.3	15.5	15.6	15.9	5.2	43%	-1.2	-7%
UK	14.5	13.4	14.4	16.5	17.0	17.4	17.3	17.0	17.3	17.7	17.7	4.0	30%	0.2	1%
Canada	3.2	4.8	7.2	9.7	10.1	10.2	10.1	10.0	10.7	10.7	10.4	5.3	110%	0.3	3%
Australia	2.1	3.0	4.4	5.5	5.8	6.1	6.2	6.2	6.5	6.8	7.0	3.1	106%	0.9	14%
USA	39.4	47.8	64.4	84.1	87.6	87.9	86.7	86.6	93.5	98.7	101.6	40.1	84%	13.7	16%
Brazil	9.6	16.1	28.6	40.3	45.5	49.9	54.5	59.0	64.1	64.6	60.2	33.8	210%	10.3	21%
Mexico	4.8	7.8	13.7	19.5	23.2	27.5	30.9	33.2	34.7	35.3	33.7	19.6	250%	6.3	23%
Indonesia	13.9	20.8	32.6	44.1	52.1	59.9	66.6	72.2	77.4	78.0	77.0	39.0	187%	17.1	29%
Turkey	4.2	6.4	10.0	14.1	16.6	19.3	21.9	24.1	26.0	26.1	25.9	12.9	203%	6.6	34%
South Africa	2.7	3.9	6.6	9.3	10.3	10.8	11.0	11.6	13.0	14.0	14.7	6.9	177%	3.9	36%
Argentina	4.1	5.8	7.2	8.4	8.8	9.5	10.5	11.3	12.8	13.1	13.2	3.6	63%	3.8	40%
India	73.9	102.1	161.0	215.6	245.9	272.0	302.5	336.1	406.4	452.8	465.1	169.9	166%	193.1	71%
Saudi Arabia	0.6	0.9	2.6	4.0	5.2	6.3	7.4	8.2	9.9	11.3	12.2	5.4	584%	5.9	94%
Continents															
World	548.5	720.0	1,066.7	1,390.6	1,564.5	1,703.8	1,821.5	1,938.1	2,161.3	2,294.0	2,349.2	983.8	137%	645.4	38%
Europe	145.1	159.1	185.9	208.9	213.3	213.5	210.6	208.0	198.2	173.9	161.5	54.4	34%	-52.0	-24%
Northern America	42.6	52.7	71.7	93.8	97.7	98.1	96.8	96.7	104.3	109.4	112.1	45.5	86%	13.9	14%
Asia	287.2	395.5	623.5	835.7	966.6	1,068.7	1,148.5	1,220.3	1,345.0	1,406.0	1,382.1	673.2	170%	313.4	29%
Latin America and the Caribbean	31.0	48.4	81.1	112.1	127.8	142.3	156.5	168.9	188.2	197.3	193.9	93.9	194%	51.6	36%
Oceania	3.0	4.2	6.2	8.2	8.8	9.4	9.6	9.9	10.9	12.0	12.9	5.1	120%	3.5	38%
Africa	39.6	60.1	98.3	132.0	150.4	171.8	199.6	234.3	314.7	395.4	486.9	111.7	186%	315.0	183%
Economic Regions															
More developed regions	207.1	241.6	299.5	344.7	351.3	353.1	349.6	346.5	339.0	316.0	303.9	111.5	46%	-49.2	-14%
Less developed regions, excluding least developed countries	305.6	426.1	686.8	937.4	1,087.3	1,204.2	1,300.1	1,389.7	1,553.0	1,639.8	1,637.3	778.1	183%	433.1	36%
Less developed regions	341.4	478.5	767.2	1,045.9	1,213.2	1,350.7	1,471.9	1,591.6	1,822.3	1,978.0	2,045.3	872.2	182%	694.6	51%
Less developed regions, excluding China	221.7	322.9	521.8	715.1	824.3	930.8	1,043.3	1,166.6	1,411.3	1,582.1	1,697.3	608.0	188%	766.5	82%
Least developed countries	35.8	52.4	80.4	108.5	125.8	146.5	171.8	201.9	269.3	338.1	408.0	94.1	180%	261.5	179%

Note: Shaded values indicate a decline from the previous period.
Source: Deutsche Bank, UN Population Division

8 of the G20 (including Spain) countries will see this sub-group of the population decline in absolute terms over the next 40 years with the growth everywhere aggressively lower to that seen in the 40 years between 1970-2010. The MDW sees this important group shrink for the first time between 2010 and 2015 and shrinks by 14% out to 2050. Europe (-24%) is the main culprit.

The good news is that the World still sees this sub-group grow at 38% over the next 40 years, albeit at a slower rate than the 137% seen between 1970-2010. However the vast majority of this growth comes from the poor, 'less developed World minus China' (+82%). Interestingly, China actually loses people (-17%) from this bucket over the period. This is contrast to the 170% increase in this bucket in China between 1970 and 2010.

Figure 65 breaks this data down again by the individual G-20 countries, the Continents and economic regions of the World.

Figure 65: Productivity Ratios (35-54yr vs. 0-24yr & >65yr) by Country, Continent and Economic Region

												% Change	
	1950	1970	1990	2000	2005	2010	2015	2020	2030	2040	2050	1970-2010	2010-2050
Countries													
South Korea	0.30	0.28	0.45	0.65	0.74	0.82	0.81	0.78	0.62	0.49	0.41	191%	-50.3%
Spain	0.46	0.47	0.46	0.59	0.66	0.73	0.75	0.73	0.57	0.42	0.40	53%	-44.8%
Italy	0.49	0.50	0.55	0.63	0.66	0.69	0.68	0.64	0.51	0.43	0.41	40%	-40.2%
Germany	0.64	0.46	0.62	0.68	0.70	0.69	0.67	0.61	0.51	0.46	0.41	49%	-39.8%
Japan	0.34	0.50	0.66	0.63	0.58	0.59	0.57	0.56	0.49	0.41	0.38	18%	-35.3%
Canada	0.44	0.39	0.56	0.70	0.70	0.68	0.64	0.60	0.54	0.49	0.45	74%	-33.9%
Russia	0.44	0.48	0.56	0.65	0.66	0.69	0.70	0.69	0.66	0.55	0.48	43%	-30.9%
China	0.39	0.30	0.38	0.54	0.63	0.68	0.71	0.69	0.62	0.56	0.50	128%	-27.3%
France	0.57	0.43	0.51	0.60	0.59	0.57	0.53	0.50	0.44	0.43	0.43	32%	-24.8%
Australia	0.52	0.43	0.52	0.62	0.62	0.61	0.58	0.55	0.50	0.48	0.47	43%	-23.8%
UK	0.61	0.47	0.51	0.59	0.60	0.60	0.57	0.55	0.51	0.50	0.48	28%	-19.5%
USA	0.50	0.41	0.52	0.61	0.61	0.59	0.55	0.52	0.50	0.50	0.50	42%	-14.7%
Indonesia	0.29	0.28	0.30	0.39	0.45	0.51	0.57	0.61	0.63	0.60	0.55	81%	8.1%
Turkey	0.31	0.27	0.29	0.38	0.44	0.51	0.57	0.62	0.64	0.60	0.55	87%	8.1%
Mexico	0.26	0.22	0.25	0.33	0.40	0.47	0.53	0.58	0.59	0.57	0.53	116%	11.2%
Brazil	0.28	0.26	0.32	0.42	0.46	0.51	0.57	0.61	0.67	0.66	0.58	101%	12.3%
Argentina	0.45	0.45	0.40	0.41	0.43	0.45	0.48	0.51	0.56	0.55	0.53	-2%	18.6%
South Africa	0.32	0.27	0.29	0.36	0.38	0.39	0.39	0.41	0.45	0.50	0.53	45%	36.7%
Saudi Arabia	0.28	0.24	0.26	0.32	0.39	0.44	0.50	0.53	0.57	0.61	0.61	84%	37.5%
India	0.33	0.29	0.31	0.35	0.38	0.41	0.44	0.48	0.58	0.64	0.64	39%	58.2%
Continents													
World	0.38	0.32	0.35	0.41	0.45	0.47	0.49	0.50	0.53	0.53	0.52	47%	10.6%
Europe	0.51	0.47	0.54	0.62	0.64	0.66	0.65	0.63	0.57	0.49	0.45	40%	-32.2%
Northern America	0.49	0.41	0.52	0.62	0.62	0.59	0.56	0.52	0.50	0.50	0.49	45%	-16.8%
Oceania	0.45	0.38	0.44	0.51	0.52	0.52	0.50	0.48	0.47	0.48	0.49	38%	-4.8%
Asia	0.35	0.30	0.33	0.41	0.46	0.50	0.53	0.55	0.58	0.58	0.56	70%	10.5%
Latin America and the Caribbean	0.30	0.26	0.30	0.38	0.42	0.46	0.50	0.53	0.58	0.58	0.55	78%	19.0%
Africa	0.27	0.25	0.23	0.24	0.25	0.26	0.28	0.30	0.35	0.41	0.47	5%	80.6%
Economic Regions													
More developed regions	0.49	0.46	0.55	0.62	0.63	0.63	0.61	0.59	0.54	0.49	0.46	38%	-27.5%
Less developed regions, excluding least developed countries	0.34	0.28	0.32	0.40	0.45	0.48	0.51	0.53	0.56	0.57	0.55	71%	14.7%
Less developed regions	0.33	0.28	0.31	0.37	0.41	0.44	0.47	0.49	0.52	0.54	0.53	59%	20.4%
Less developed regions, excluding China	0.31	0.27	0.28	0.33	0.36	0.38	0.41	0.44	0.50	0.53	0.54	42%	41.7%
Least developed countries	0.28	0.25	0.23	0.24	0.25	0.27	0.29	0.32	0.37	0.42	0.47	7%	74.7%

Note: Shaded values indicate a decline from the previous period.
Source: Deutsche Bank, UN Population Division

Again we can see the worrying declines in this 'economically prime' cohort relative to the economically inactive (including the less active for those aged 15-24). The MDW (-27.5%) and Europe (-32.2%) in particular see big percentage declines in this ratio between 2010 and 2050. Indeed across large parts of the West this decline has already begun.

This data looks even scarier when you look just at the 35-54 year olds relative to those over 65 years old past, present and future. This ratio is falling across almost every country/region around the world. This is relevant economically as the cost of supporting an over 65 year old is likely to be greater than that of supporting someone below working age.

Figure 66: Productivity Ratios (35-54yr vs. >65yr) by Country, Continent and Economic Region

												% Change	
	1950	1970	1990	2000	2005	2010	2015	2020	2030	2040	2050	1970-2010	2010-2050
Countries													
UK	2.66	1.85	1.59	1.76	1.75	1.70	1.52	1.41	1.22	1.12	1.07	-8%	-37%
Argentina	5.73	3.39	2.39	2.25	2.21	2.18	2.18	2.12	1.97	1.68	1.36	-36%	-38%
South Africa	5.41	5.05	5.66	5.63	5.27	4.65	3.99	3.50	3.03	2.93	2.64	-8%	-43%
USA	3.02	2.32	2.05	2.36	2.34	2.14	1.82	1.55	1.28	1.21	1.17	-8%	-45%
France	2.46	1.82	1.77	1.77	1.70	1.61	1.37	1.20	0.96	0.87	0.87	-11%	-46%
Australia	3.16	2.80	2.28	2.31	2.21	2.04	1.74	1.52	1.22	1.08	1.02	-27%	-50%
Japan	4.13	3.59	2.50	1.62	1.31	1.19	1.05	0.97	0.79	0.64	0.58	-67%	-52%
Italy	3.16	2.23	1.70	1.52	1.49	1.51	1.42	1.28	0.92	0.71	0.69	-32%	-54%
India	6.34	5.67	4.89	4.86	4.74	4.55	4.34	3.88	3.26	2.70	2.10	-20%	-54%
Germany	3.12	1.67	1.84	1.79	1.66	1.51	1.38	1.19	0.89	0.76	0.69	-10%	-54%
Russia	3.97	3.22	2.56	2.45	2.19	2.27	2.07	1.88	1.60	1.26	1.02	-30%	-55%
Canada	3.03	2.82	2.32	2.50	2.38	2.12	1.78	1.49	1.18	1.03	0.92	-25%	-57%
Spain	3.29	2.57	1.71	1.62	1.72	1.80	1.81	1.70	1.18	0.77	0.70	-30%	-61%
Indonesia	4.55	5.76	4.82	4.40	4.30	4.24	4.15	3.78	2.66	1.88	1.44	-26%	-66%
Turkey	6.14	4.12	4.38	4.05	4.11	4.27	4.16	3.82	2.76	1.92	1.44	4%	-66%
Brazil	5.95	4.59	4.32	4.21	3.97	3.70	3.35	2.95	2.16	1.66	1.22	-19%	-67%
Mexico	4.95	4.07	3.78	3.73	3.82	3.79	3.59	3.11	2.21	1.53	1.18	-7%	-69%
China	4.89	4.40	3.88	3.81	3.89	3.74	3.23	2.53	1.76	1.24	1.05	-15%	-72%
Saudi Arabia	5.34	5.07	7.06	7.03	7.83	8.07	7.67	6.34	4.02	2.71	2.08	59%	-74%
South Korea	6.45	5.42	4.60	3.98	3.41	3.05	2.51	2.03	1.20	0.83	0.65	-44%	-79%
Continents													
World	4.20	3.58	3.31	3.33	3.31	3.25	3.03	2.71	2.23	1.83	1.58	-9%	-51%
Africa	5.36	5.24	5.00	4.95	4.87	4.84	4.80	4.75	4.54	4.09	3.44	-8%	-29%
Oceania	3.25	3.04	2.53	2.64	2.58	2.42	2.10	1.85	1.53	1.41	1.34	-21%	-44%
Northern America	3.02	2.36	2.07	2.37	2.34	2.14	1.82	1.55	1.27	1.19	1.14	-9%	-47%
Europe	3.23	2.31	2.02	1.95	1.84	1.79	1.65	1.50	1.21	0.97	0.85	-22%	-52%
Asia	5.01	4.65	4.11	3.97	3.94	3.84	3.53	3.06	2.39	1.85	1.53	-17%	-60%
Latin America and the Caribbean	5.27	4.13	3.73	3.73	3.66	3.49	3.23	2.88	2.22	1.74	1.36	-15%	-61%
Economic Regions													
Least developed countries	5.77	5.51	5.03	5.08	5.14	5.17	5.19	5.08	4.68	4.03	3.29	-6%	-36%
More developed regions	3.24	2.42	2.09	2.01	1.89	1.79	1.60	1.43	1.18	1.00	0.91	-26%	-49%
Less developed regions, excluding China	5.26	4.91	4.53	4.50	4.43	4.35	4.18	3.84	3.16	2.57	2.07	-11%	-52%
Less developed regions	5.13	4.73	4.30	4.26	4.24	4.14	3.85	3.37	2.68	2.12	1.77	-13%	-57%
Less developed regions, excluding least developed countries	5.06	4.65	4.23	4.18	4.15	4.04	3.72	3.21	2.49	1.93	1.59	-13%	-61%

Note: Shaded values indicate a decline from the previous period.
Source: Deutsche Bank, UN Population Division

Across the Globe the number of the 'super economically active' 35-54 years olds relative to those aged over 65 will reduce from 3.25 to 1 to a lowly 1.58 in 2050. In percentage terms we were actually quite pleased to see the UK seeing the smallest reduction in the ratio over the period (-37%). However compare the absolute numbers in the UK (from 1.70 to 1.07) to that of say India (from an extremely high 4.55 to a still higher than most 2.10).

The scary numbers arguably come from those who'll have more people aged over 65 years old than between 35-54 by the time we reach 2050. Those in this category are from worst to best, Japan (1.19 to 0.58 over the period), South Korea (a dramatic fall from 3.05 to 0.65), Italy (1.28 to 0.69), Germany (1.19 to 0.69), Spain (1.80 to 0.70), France (1.61 to 0.87) and Canada (2.12 to 0.92).

So unless pension age increases markedly over the next few years, there will be more retirees than those in their economic prime across large swathes of the Western World as we approach 2050.

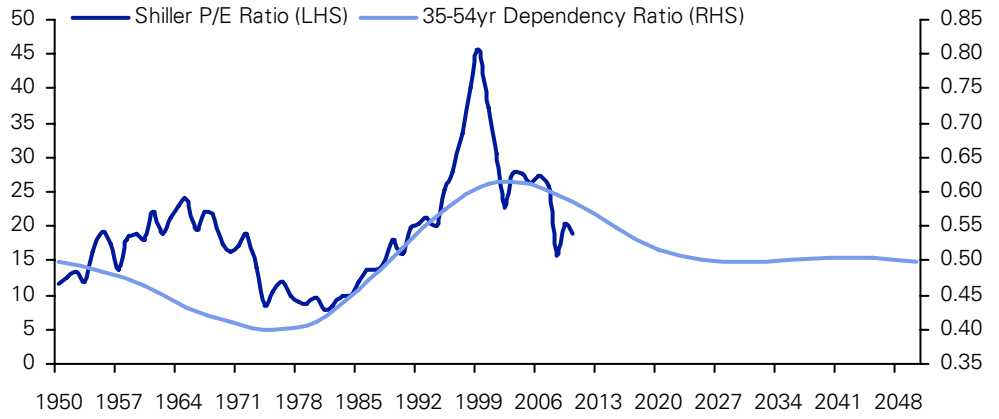
From the golden to the grey age for asset prices?

We have previously found good longer-term correlations between various risk asset prices and those aged between 35-54 years relative to those above 65 and under 24 years old. In

theory this group are the economies' main income producers and their ability to drive the economy and invest in assets may depend on the amount of economically inactive they have to support either personally or through taxation. In a period where those economically inactive are high, this creates a burden on those economically active and would perhaps reduce their own pool of money to invest. So this 'Productivity Ratio' should be a measure of the power of the net accumulators of assets in the economy to influence asset prices.

This some evidence to suggest that both Japan and the Developed World potentially share a similar demographic/asset price connection, albeit one separated by a lag of 10-20 years. Figure 67 shows the S&P 500 P/E ratio against the 35-54 year old Productivity ratio (i.e. relative to those above 65 and under 24 years old.)

Figure 67: S&P 500 Shiller P/E Ratio vs. US 35-54yr Productivity Ratio



Source: Deutsche Bank, GFD, UN Population Division

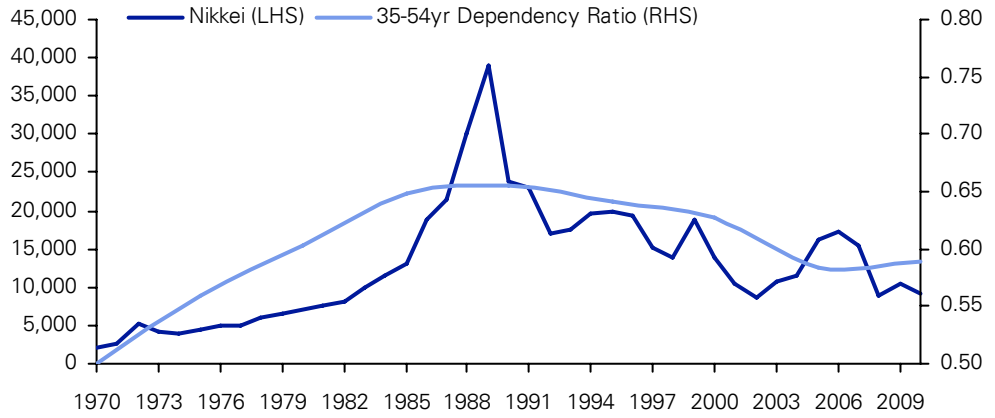
One can argue that bubbles or chronic overvaluations require a captive audience of investors. The favourable demographic in US leading up to 2000 provided the perfect foil to the other drivers of this once in a lifetime equity market bubble. The opposite was true at the time of the depressed market valuations of the 1970s. There were relatively few people in this key demographic cohort and thus the equity market may have been starved of demand. Although the US is by no means the worst Developed market in this study in terms of demographics, the looming aging of the baby boomers relative to the size of the rest of the economy will continue to be a theme for the next decade or so.

A warning from Japan

Japan provides a stark warning to the rest of the Developed World as to what can happen as a sizeable hump in the population goes through a large lifetime journey. If you accept this 'life cycle hypothesis' that we discussed earlier in the chapter, then Japan becomes a fascinating test case for what many countries are about to go through. The real root of this debate can be traced to the Great Depression and World War II. These events led to a dramatic reduction in the Global birth rate as families first couldn't afford and secondly were not together enough to start a family. As the 1940s progressed the subsequent baby boom first started in Japan and then spread through the Western world and continued (US first and then through Europe) until the advent of mass birth control techniques seen from the mid-1960s.

It is statistically difficult to prove whether the bursting of the Nikkei bubble at the end of 1989 and the bursting of the dot.com bubble in 2000 had anything to do with demographics but it does seem that markets can be prone to bubbles if the pool of potential investors grows. Figure 68 plots the Japanese 35-54 year Productivity cohort against the Nikkei.

Figure 68: Japanese 35-54yr Productivity Ratio vs. the Nikkei



Source: Deutsche Bank, Bloomberg LP, UN Population Division

The Nikkei peak was hit at the same time as this key group was at their most significant relative to the dependants in the economy. That the Nikkei has spent 19 years failing to show any meaningful recovery could have much to do with the continuing aging of the population and a diminishing pool of natural investors and people in their economic prime. The Japanese experience is also a warning to those that will suffer imminent de-population.

We will come back to assess whether the Developing World will mirror the Japanese experience. First Figure 69 to Figure 80 look at the key 35-54 year group relative to the over 65 and under 24 year olds across different continents and economic regions. We then break this down within the G-20 again. The dotted line shows where we are in 2010.

Figure 69: Europe 35-54 yr Productivity Ratio

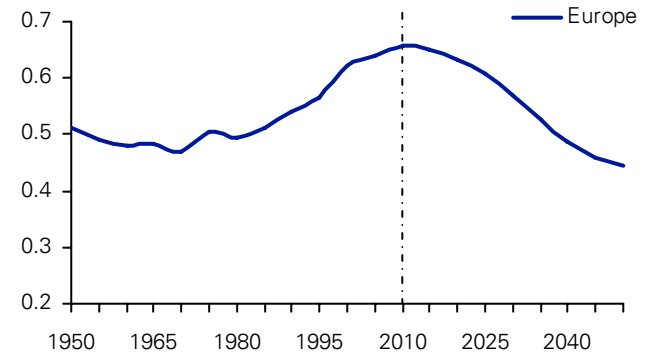


Figure 70: Northern America 35-54 yr Productivity Ratio

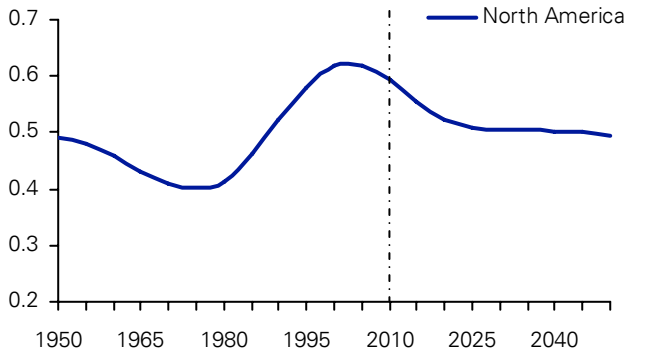


Figure 71: Latin America and Caribbean 35-54 yr Productivity Ratio

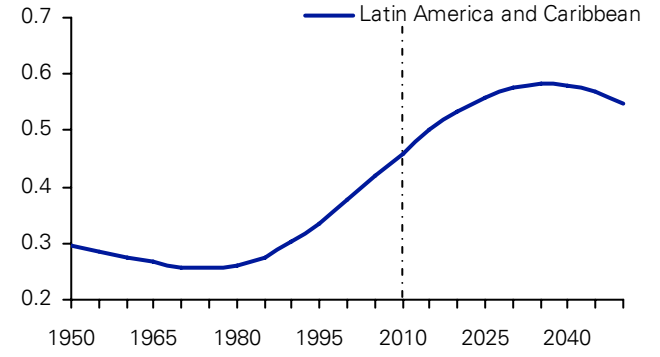


Figure 72: Africa 35-54 yr Productivity Ratio

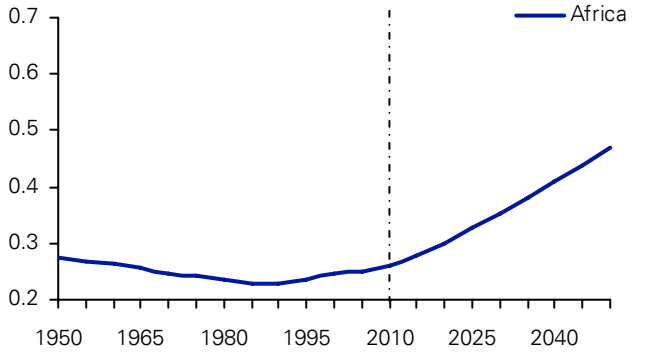


Figure 73: Asia 35-54 yr Productivity Ratio

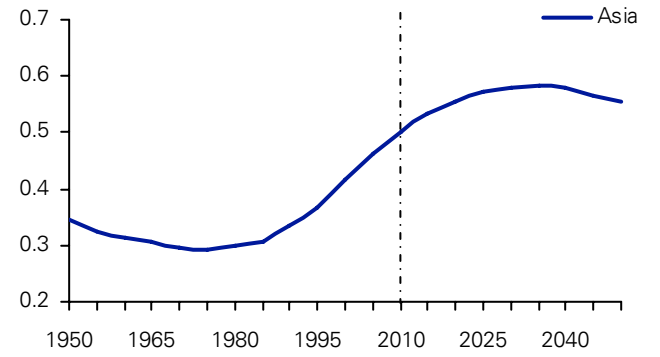
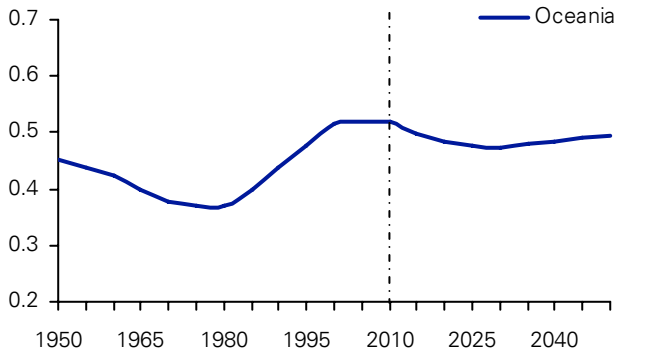


Figure 74: Oceania 35-54 yr Productivity Ratio



Source: Deutsche Bank, UN Population Division

Figure 75: World 35-54 yr Productivity Ratio

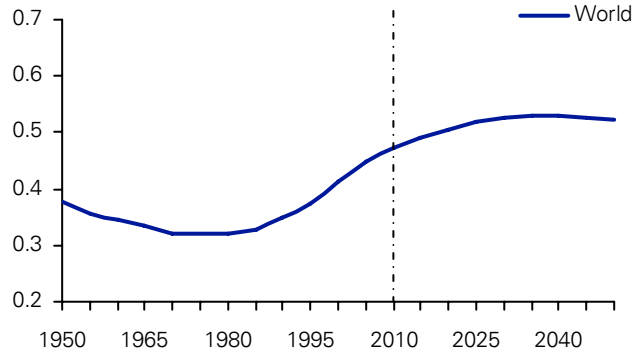


Figure 76: More Developed Regions 35-54 yr Productivity Ratio

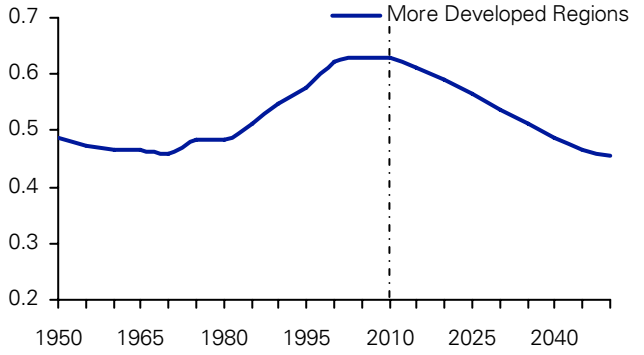


Figure 77: Less Developed Regions 35-54 yr Productivity Ratio

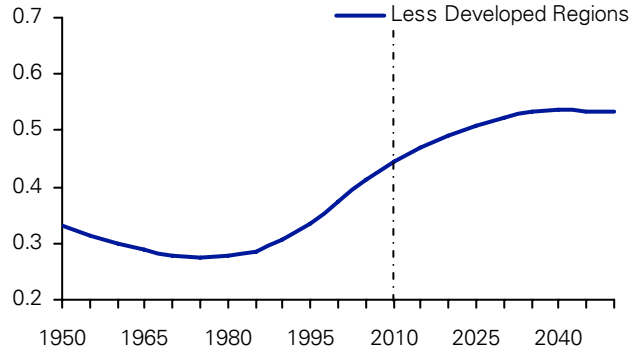


Figure 78: Least Developed Countries 35-54 yr Productivity Ratio

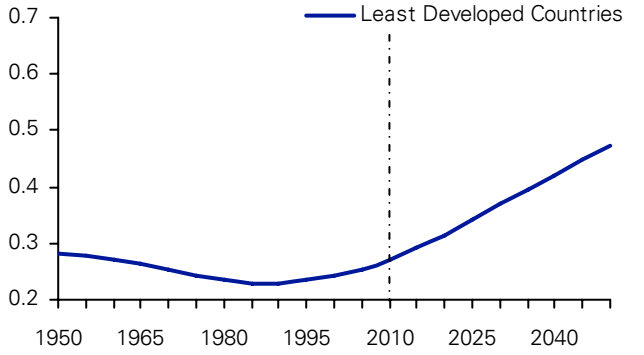


Figure 79: Less Developed Regions ex Least Developed Countries 35-54 yr Productivity Ratio

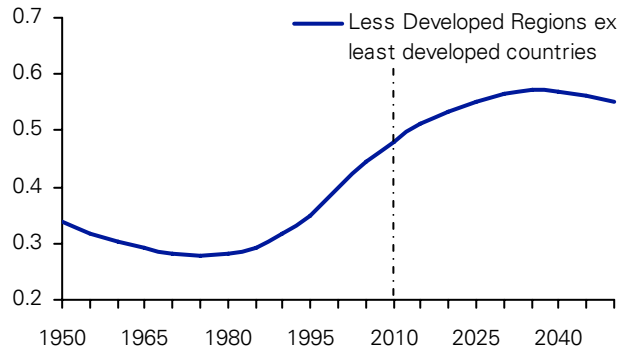
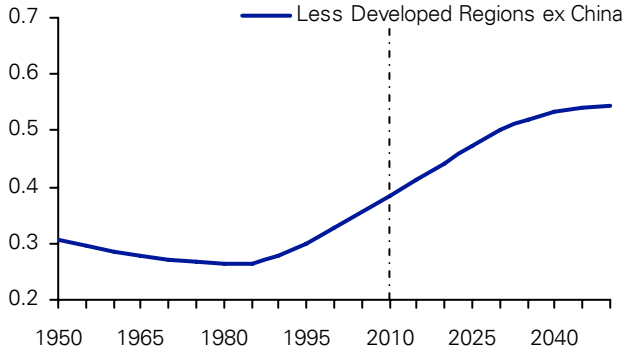


Figure 80: Less Developed Regions ex China 35-54 yr Productivity Ratio



Source: Deutsche Bank, UN Population Division

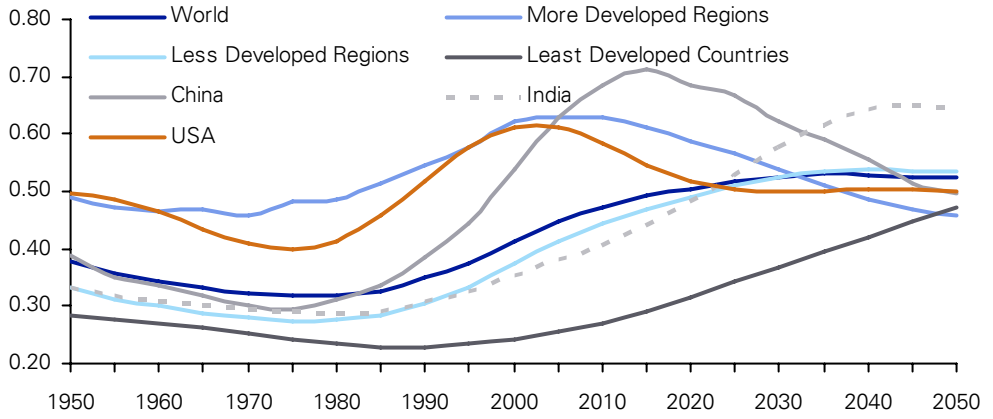
The charts confirm that this key ratio has peaked in the US and is now peaking in Europe. As we now know this ratio peaked in 1990 in Japan. So combined its no surprise to see the MDW Productivity ratio in Figure 76 plateau between 2000 and 2010 and then drop away after this point.

The World still has a favourable productivity ratio (Figure 75) but there is a bias towards the Least Developed Countries which clearly have a significantly lower economic impact.

Can the developing world save the developed world from demographic disaster?

Over recent years there has been much talk of an increasingly globalised financial system where opportunities and investors are global and not regional. As previously discussed in this chapter there is little doubt that the Emerging World has better demographics than the West. However the best of this appears in the very least developed part of the world where incomes are a fraction of that of the West. Figure 81 shows the 35-54 year Productivity Ratio for the MDW, LDW, the Least DW, the World overall and with the US, China and India separately for context.

Figure 81: 35-54yr Productivity Ratios for Different Global Regions



Source: Deutsche Bank, UN Population Division

We also show in Figure 82, the percentage of the World's population these areas make up in 2010 and what they are predicted to make up in 2050.

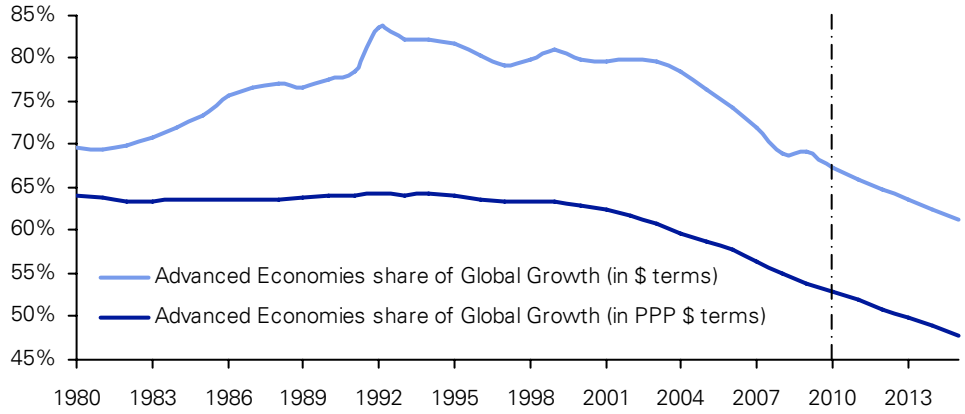
Figure 82: Percentage of Global Population by Region and Country in 2010 and 2050

	2010	2050
More Developed World	17.9%	13.9%
Less Developed World	82.1%	86.1%
Least Developed World	12.4%	18.3%
India	17.6%	17.6%
China	19.6%	15.5%
USA	4.6%	4.4%
Brazil	2.8%	2.4%

Source: Deutsche Bank, UN Population Division

Economically the MDW currently accounts for 17.9% of the World's population but around 67% of its wealth in Dollar terms or 53% in PPP terms.

Figure 83: Advanced Economies Share of Global GDP (%)

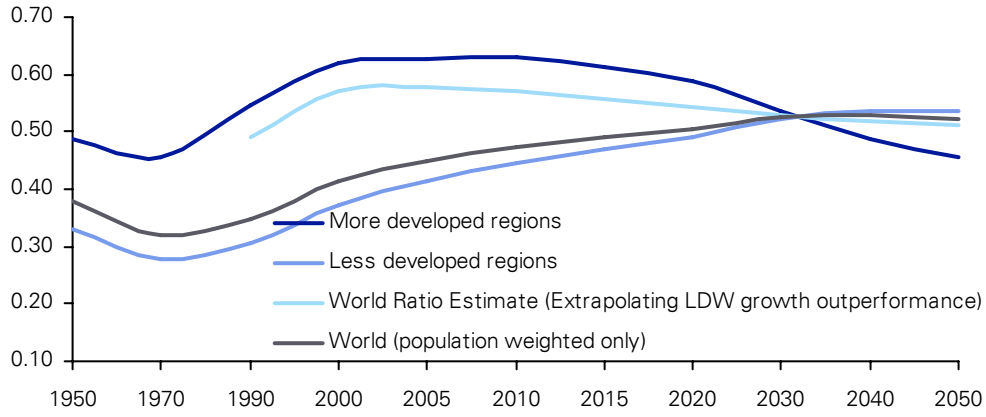


Source: Deutsche Bank, IMF

Figure 83 shows that this relative economic decline of the Developed World relative to the Developing has been accelerating over the last 10 years. The graph also shows that this is expected to continue out to the IMF's end forecasting period of 2015.

In actual Dollar terms the Developed World still makes up 67% of the World's GDP. This is expected to fall to 61% by 2015. If we extrapolate this rate of change out further (a significant assumption), the Developed World will still have just over 50% of the World's Dollar wealth in 2025 even though it will only house around 16% of the World's population. In Figure 84 we try to create an economically weighted Global 35-54 year old Productivity Ratio. We keep the heroic assumption that the IMF's forecasts for the relative out-performance of Developing Countries from 2010 to 2015 continues in a linear manner out to 2050. On this basis, by 2050 the (now) Developed World will only make up around 32% of the World's wealth (81.7% of the population), with the now Developing World the dominant Economic force (68% of wealth). The graph also repeats the unweighted Global Productivity ratio for comparisons sake.

Figure 84: GDP Weighted World 35-54yr Productivity Ratio with Population Weighted Numbers For Comparison



Source: Deutsche Bank, IMF, UN Population Division

The results show that the sheer economic might of the Developed World remains a dominant factor when economically weighting this key 'economically prime' group. The global picture looks much less favourable when you weight by expected Economic growth than when you purely look at population numbers alone. It's not a disaster though. The graph shows that on

a weighted basis there has been a gentle Global decline from 2005 in this key ratio. This gentle decline is set to continue over the next few decades.

So there is hope that if the Developing World continues to grow as rapidly over the next few decades as it has over the last few years then the impact of the ticking Demographic time bomb of the Developed World can at least be eased.

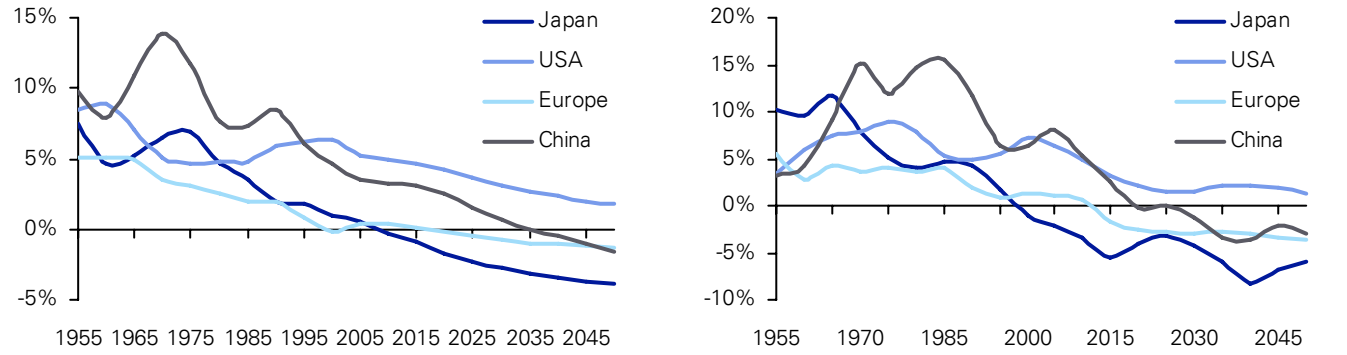
However the Developed World needs to ensure that globalisation survives this recent financial crisis. They need to be happy to accept a smaller share of a bigger pie. Historically this is fairly alien to many of the imperial powers that make up the Developed World. They are used to setting the agenda and at times bullying the rest of the World into their way of thinking. Those days have to be over for the Developed World to continue to prosper economically.

We would note that these assumptions for continued super-charged Developing World growth relative to the Developed World are pretty heroic. If we don't see such high growth rates, the Developed World may be more resigned to its woeful demographics. It's also fair to say that the previously healthy Developing World demographic environment didn't help Japan during its troubles. It is difficult to work out whether this was because of Japan's population stagnation and the fact that it has historically been a more insular economic entity than the rest of its Developed peers in terms of trade and immigration. Would highly open economies help the West deal with the problem better than Japan did or is Japan a warning that better trends globally can't arrest domestic problems?

Why US might not be the next Japan but Europe might be

For many years we've feared that the woeful demographics of Japan and the associated lost two decades of growth and poor risk asset price returns could be a worrying template for the rest of the Developing World. However as we have refined our analysis its clear that while the US and Europe have demographic similarities to that Japan has faced for the last two decades, the US does have one key area which could help it escape the fate seen in Japan. This is the simple fact that its population is growing and looks set to continue as far as the eye can see. As the left hand chart of Figure 85 shows, Japan's population is now falling after broadly stagnating for 20 years. Europe's population has also been stagnating for at least a decade and will continue to do so for the next decade before declining as far as the eye can see, albeit at a slower pace than Japan will continue to do. In contrast the US population continues to grow over the period, with the slowdown in growth quite gentle. A similar picture is seen in the right hand chart of Figure 85 where we show the percentage change in the 'economically active' 15-64 year old group. Europe is about to start losing people in this age group as Japan has been doing for the last decade. Meanwhile the US continues to see additions in this group albeit at a slower rate. We've added China to these charts for comparison sake and we will move on to discuss China at the end of this section.

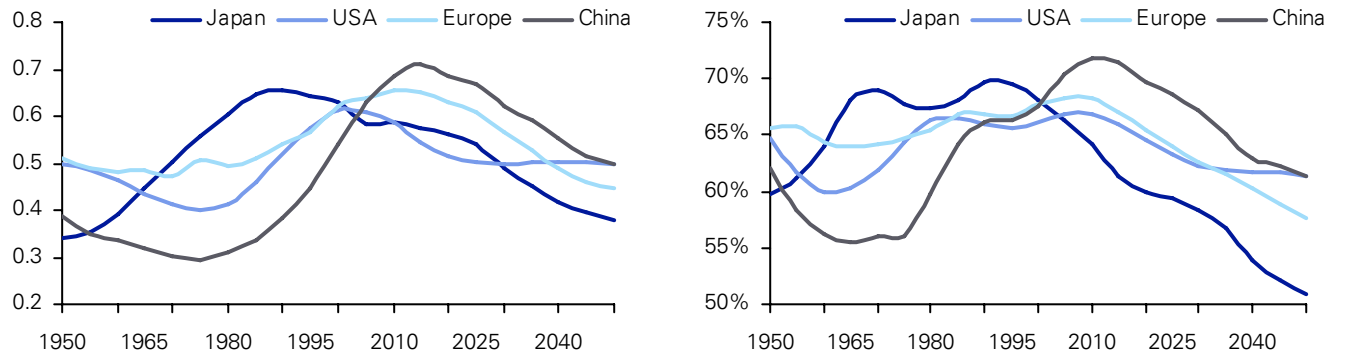
Figure 85: % Change in the Overall Population (left) and'Economically Active' 15-64 Year Old Group (right)



Source: Deutsche Bank, UN Population Division

So if you believe that sustaining a growing population (especially those in their working age) is a key component of growth then you would have to say that Europe has much more risk of an eventual Japan like outcome than the US. However before we become too optimistic on the US it is worth comparing productivity ratios. Figure 86 looks at our key 'economically prime' ratio, (the 35-54 year olds relative to the over 65s and under 24s), and then the percentage of the population aged between 15-64 years.

Figure 86: 35-54yr Productivity Ratio (left) and % of the Population Aged between 15-64 years (right)



Source: Deutsche Bank, UN Population Division

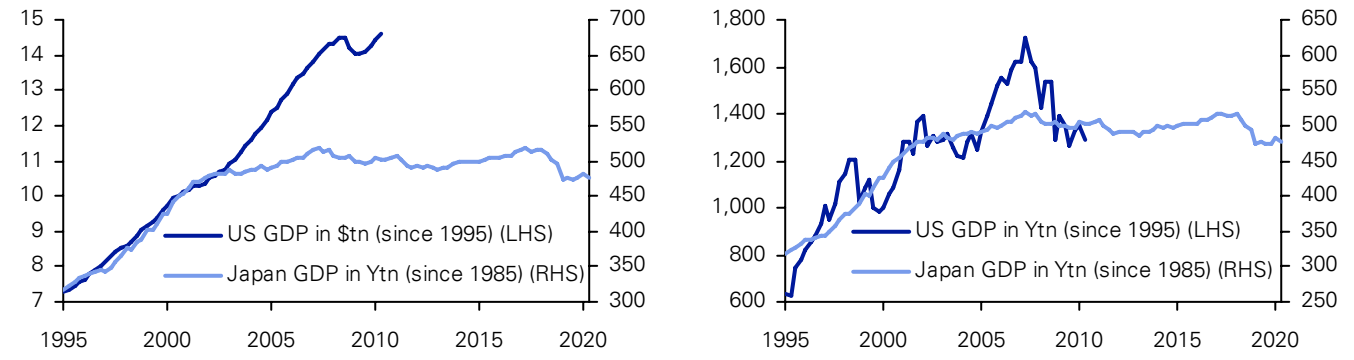
On our key 35-54 year old Productivity ratio, the US has a less obvious advantage over Europe over the next decade or so and will follow a similar path to Japan 1990-2010 over the 2000-2020 period. So the US is suffering a decline in its 'economically prime' group in a similar way to Japan did and Europe will. The difference is that Europe continues to see this ratio decline in a similar manner to Japan as far as the eye can see. This ratio stabilises in the US from 2025 onwards. A similar picture emerges when looking at the 15-64 years old relative to the overall population. The US suffers a similar decline to Europe out to 2030 and then stabilises while Europe continues to decline. Japan's decline is even more rapid beyond this point.

So it strikes us that the US is facing significant demographic challenges, especially in some of its key Productivity ratios. However if population growth matters then it should escape the near terminal decline that Japan has found itself in. Europe may eventually not be so lucky.

What we would say is that Japan suffered a triple hit as in addition to poor 'economically prime' ratios and a stagnating population from the late 1980s/early 1990s, it has experienced an incredibly strong currency over these lost two decades, thus not allowing adjustments to be made externally. Figure 87 looks at Nominal GDP of Japan since 1985 compared to the

nominal GDP of the US since 1995, which represents the decade gap in the peak of their equity market bubbles and the key 35-54 year old Productivity ratio cohort. The left hand chart shows this picture in domestic currency terms with the right hand chart denominating everything back into Yen.

Figure 87: US GDP since 1995 in Dollars (left) and Yen (right) vs Japan GDP since 1985 in Yen



Source: Deutsche Bank, Bloomberg LP

On a simplistic basis and in domestic growth terms, it's clear that the US economy faired far better post the bursting of their respective bubbles. However could much of this be due to the Dollar's secular depreciation since? Had they kept a strong currency throughout the 'Noughties' would they have suffered a similar growth fate to Japan since 1990. The right hand chart suggests that in Yen terms, the US economy is not much different in size to where it was around the bursting of the dotcom bubble. The US has adjusted externally far more than Japan ever did. So currency adjustments can potentially ease demographic problems. However this is a zero sum game and as we now know, and this aging problem is becoming a global phenomenon

Moving onto China, it is facing the exact same demographic challenges that the regions/countries discussed above are facing but pushed slightly more into the future. However by 2015 many of the demographic problems facing the Developed World start to kick-in. It could be that the favourable demographics that have contributed to China's recent economic miracle will in the future constrain its development and cast doubts on its ability to maintain its seemingly unstoppable economic rise. Will China get old before it gets truly rich? Only time will tell and this will have big implications for the whole of the globe. In the next section we'll explore this in a bit more detail and contrast China's upcoming problems with that of India.

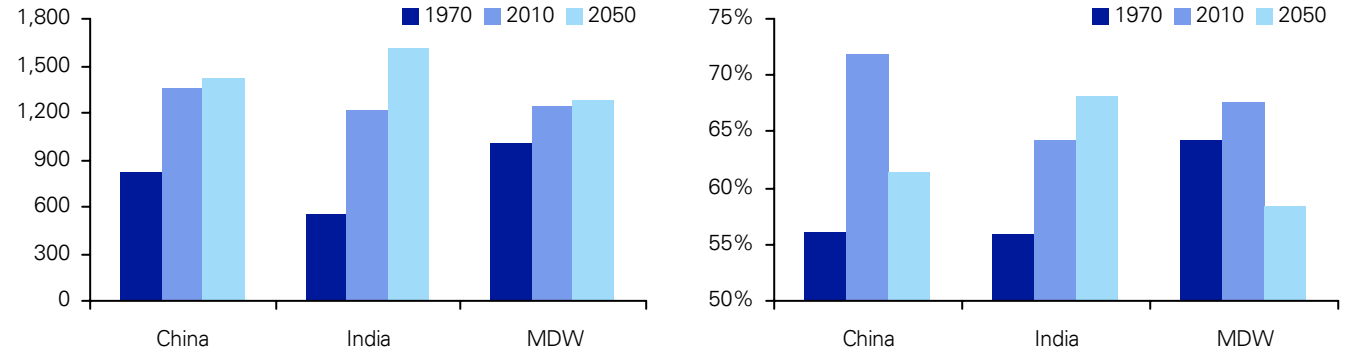
Is India the new China? Is China resigned to the developed world's fate?

Most of the Globalisation discussion centres around China. The consensus view is that China will become the main Global economic powerhouse over the next few decades. Clearly there's much going for such an argument and the success that China has had since it opened up its economy to the outside World some 30 plus years ago is breathtaking. This success will likely continue but in this short section we want to highlight the fact that China is going to have to face a much more difficult demographic landscape going forward than it has done in its development to date. We would also like to compare this to the slightly less discussed India. India still has fabulous demographics going forward.

This is an incredibly relevant discussion as in 2010 China (1.35bn), India (1.21bn) and the Developed World (1.28bn) in total have similar starting populations. The left hand chart of Figure 88 looks at how this has evolved since 1970 and how it is likely to evolve out to 2050.

The right hand chart of Figure 88 then shows the percentage of the population in the economically active 15-64 year old population.

Figure 88: Absolute Population in Millions (left) and % of the Population in the 'Economically Active' 15-64 year old Group (right)



Source: Deutsche Bank, UN Population Division

We've already discussed these themes but when you compare these three large regions on the same graph you first realise what an incredible increase China and India have seen between 1970 and 2010 in both their population and 15-64 year olds. The growth has dwarfed that of the Developed World. However from here China looks very similar to the West because of its poor demographics. We also saw in Figure 86 that China's productivity ratio starts to decline around 2015 and then mirrors the Developed World. India on the other hand powers ahead on all measures out to 2050.

What's not covered here is the hope that China can see strong internal demographics where migration between rural and urban areas can more than offset the overall demographic problems. Further analysis of this is beyond the scope of this report but it's clear that from 2015 the natural demographics turn more negative. China will likely have to make even more effort to sustain anywhere near the same level of growth.

How the whole world and not just China, copes with this will be crucial for the Global economy over the medium to long-term. India seems the stand-out country demographically to us. It has enough size and critical economic mass to have opportunities over the next few decades that are practically unparalleled across the Globe.

What can save us from demographic disaster in the developed world?

The further you look out into the future the more you are hostage to events changing the course of future history. The thesis laid out in this chapter is partly to explain the remarkable period of economic growth and asset price returns seen in the 25 years up to the middle-end of the last decade. Our concern is that such returns are not repeatable, especially in the Developed World, with risks that there could be some very lean times ahead if the future demographic evolution is anything to go by. However what are the things that we need to be aware of when at least accepting that there may be an alternative outcome?

Politics

The simplest way of dealing with the World's demographic problems would be a radical shake up of retirement and pension/healthcare entitlement around the World. Current policy is a legacy from an era where life expectancy and the cost of aging was significantly lower. There are moves to do this but politically it is certainly not a vote winner, especially as the benefits of such moves are beyond most electoral cycles.

2010's global austerity drive has seen the retirement age pushed up across many countries. However the move has pushed the pensionable age up by between one and three years across most of those countries that have so far acted. These changes are also tiered to come in over several decades. Given the themes discussed in this chapter so far, it does seem that an increase in the retirement age of a year or two spread over a few decades will not be enough to ease the problems highlighted.

However going forward, a more dramatic move cannot be ruled out across the Globe. This would leave people working (and investing) for longer and also leave less dependants in the economy than current forecasts suggest. If this does happen, it's likely to only take place in an emergency situation. It's unlikely that any elected Government will have the ability to be radical on this topic, preferring to slowly adjust retirement age. So the themes discussed above are likely to put pressure on public finances and financial markets prior to their being a more aggressive policy response and potential solution.

In addition to changes in the retirement age, we could see political moves to change immigration and birth policies. Both can change the future demography of a country and help (or hinder) the situation. However immigration is a zero sum game. What we really need is mass migration from the Developing World to the Developed World over the next few years. However this would be a political minefield. The real the danger is that the Developed World is becoming more anti-migration in the higher unemployment aftermath of the post credit crisis World.

Acceptance of the aged

Our society may have to see increased acceptance of the economic value of older employees. Individuals may have to work beyond standard, defined retirement ages. Employers may have to be forced to provide more meaningful employment to people of an age that have previously been retired off or given lower intensity work. This will likely happen but whether it occurs on a large enough scale is something to watch over the coming years.

Conclusion

So Developed countries probably need to do a combination of things to save themselves from their demographic ticking time-bomb. They need to open their economies to foreign capital and immigration. They also need to ensure diplomacy is used where possible to defuse potential tensions with those areas of the world that have the capital the West may need access to in order to ease their future burdens.

It seems likely that if Globalisation continues there will be tensions between the Developed and Developing World. The very same Developing World that is hoped to be coming to the rescue will be increasingly competing for the World's scarce resources. This could be a negative drag for the economies of the Developed World but ultimately it is could be a small price to pay for them to 'stay in the game'.

The biggest challenge the Developed World may face going forward is accepting a diminished role in the Globe. If their collective egos can withstand such challenges then the future is less negative than if they try to fight an inevitable trend.

They also need to raise the retirement age and they need to ensure that birth rates stay high enough to ease the future burdens. The economic merits of inward migration will have to be balanced with the social cost of such a policy in times of higher economic certainty.

There is a belief that as countries age, the population and countries will adapt. Many feel that increased longevity will encourage people to work longer with improvements in health helping the process. This would means that an analysis of past demographic trends will be less relevant going forward. While we accept that there's an element of truth to this, we do think that changes to policy and thinking need to be made quickly. In our view, we are collectively burying our head in the sand to the extent and scale of the problem

Japan is perhaps proof that a sophisticated, healthy economy with increased longevity can fail to deal with the problems of aging.

Japan should therefore be a lesson to all in the Developed World, especially those areas that are facing de-population.

UK Housing: A Long-Run View

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1. Introduction

In this article we aim to give a long-run perspective on house prices, looking at how prices (both in nominal and real terms) have developed over the past fifty years in the UK and what mean reversion would mean for prices going forward.

Section 2 discusses past long-run trends in UK house prices relative to both international developments and movements in some other asset classes. Sections 3 and 4 then look at the drivers of demand and supply in the housing market and how they might interact to influence house prices going forward. Both demographics and interest rates could have a negative impact on real house prices in the long-run, but the timing and scale of this effect is highly uncertain.

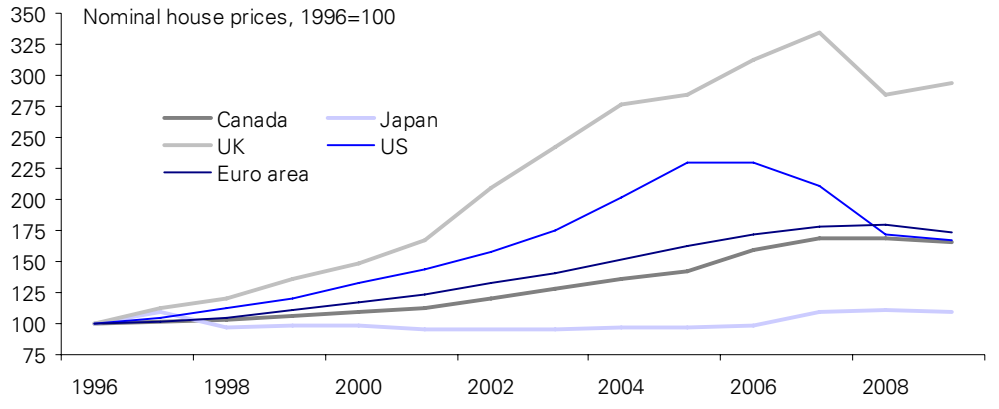
In Section 5 we take a closer look at affordability and ask the question: "If the various measures of affordability were to revert back to their equilibrium levels, what would this imply for house prices over the next decade?" Our answer is that nominal price growth would need to be substantially less than in the past, with real prices actually falling.

To begin with, we take a look at the history of the UK market and where house prices currently stand[1].

2. Long-run trends in house prices

The decade in the run up to the global credit crisis was a good one for house prices globally – and particularly so in the UK. Between Bank of England independence in 1997 and the onset of the credit crunch in 2007, UK nominal house prices rose on average by over 10% per year, a pace that outstripped that of all other G7 economies.

Figure 89: UK house prices have outstripped all other G7 countries since the mid-1990s

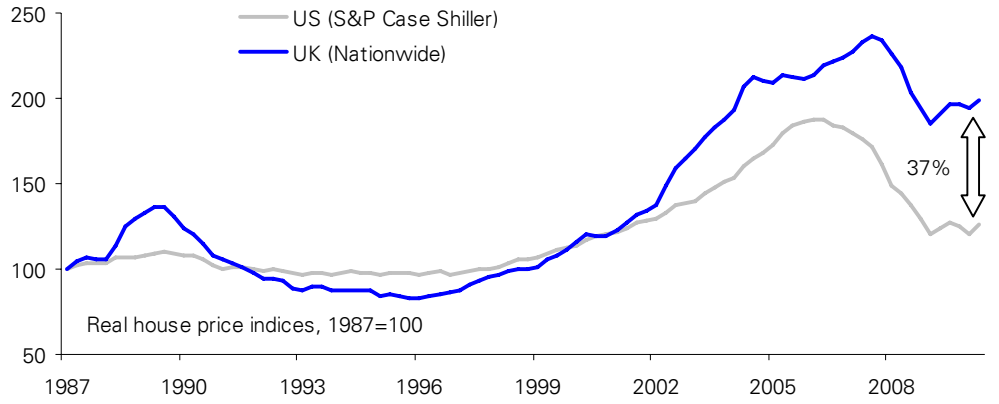


Source: Deutsche Bank, Haver Analytics

[1] In what follows we use a combination of the Nationwide's long-run house price series (which dates back to the early 1950s) and the official measure published by the Department of Communities and Local Government (DCLG) which is available from the late 1960s onwards.

The two series that stand out in the chart above more than any others are Japan, where nominal prices have hardly moved since the mid-1990s following the deflating of the housing bubble from the start of that decade, and the UK where prices broadly tripled in the decade up to the middle of 2007.

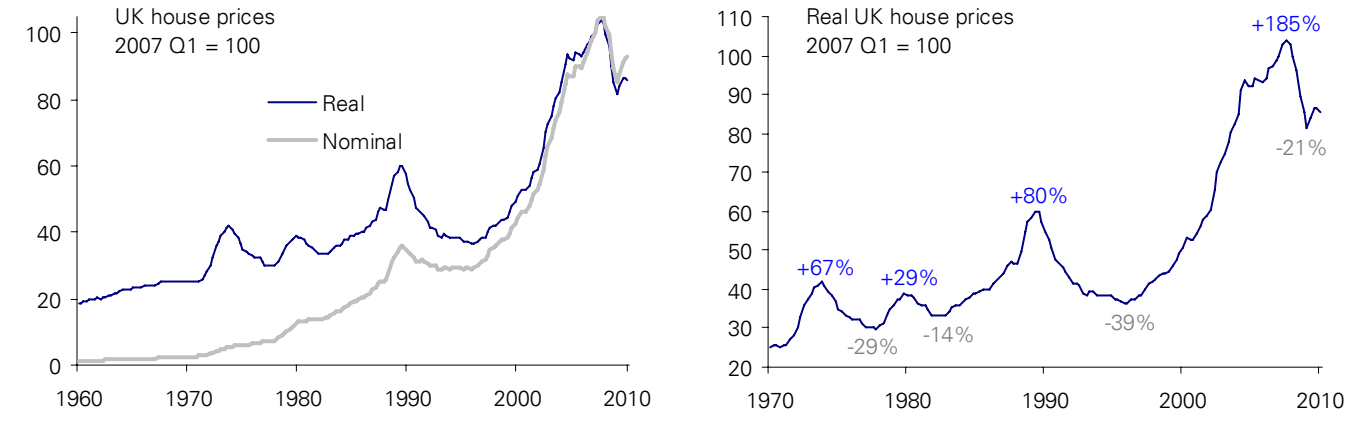
Figure 90: UK versus US real house prices



Source: Deutsche Bank, Haver Analytics

Figure 90 above shows how real UK house prices compare with those in the US. The UK property bubble of the late 1980s was not matched by a similarly sharp rise in real house prices in the US, and in the subsequent UK downturn prices fell back to below US levels in the mid-1990s (we have set the real indices in both countries to be the same as each other in 1987). Since that trough UK house prices rose much more sharply than US prices in real terms, and at present a correction of over a third in real UK house prices would be required to bring them back in line with those of the US (the same conclusion is reached if we adjust for currency movements too).

Figure 91: Real house prices look high, and have failed to correct sharply after a sizeable increase since the mid-1990s

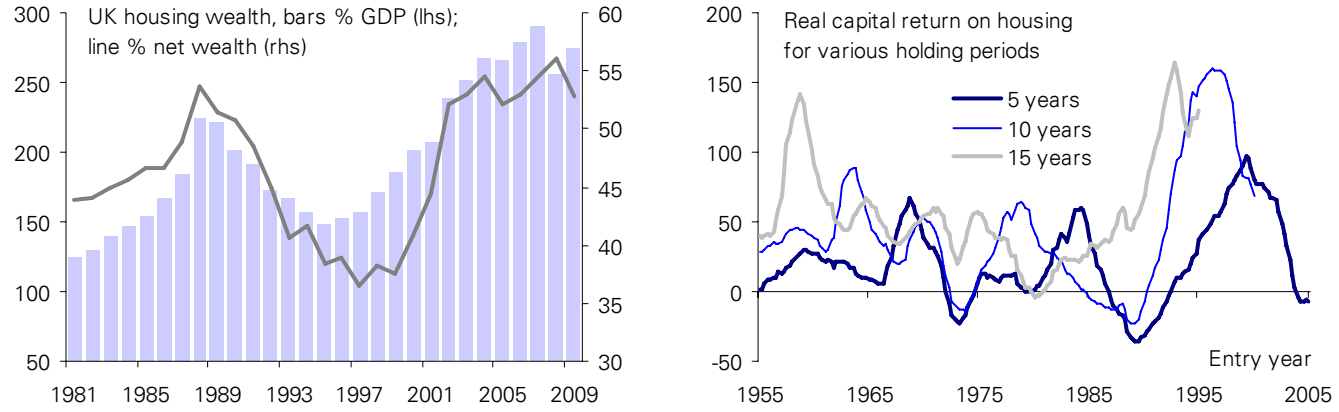


Source: Deutsche Bank, Nationwide, ONS

Before looking at some of the long-run drivers of house prices in the following two sections we take a closer look at how house prices have performed in the UK over the past few decades. The chart above left shows how prices have evolved both in nominal and real terms from the 1960s. Since then, there have been four clearly identifiable spikes (and subsequent declines) in real house prices as the chart above right shows – the early 1970s, the early 1980s, the late 1980s/early 1990s, and more recently from 2007 to 2009. In the

latest boom, real house prices rose by some 185% between 1996 and 2007, but the correction has thus far been only modest – a fall of just 20%.

Figure 92: Housing wealth and capital returns at various entry points

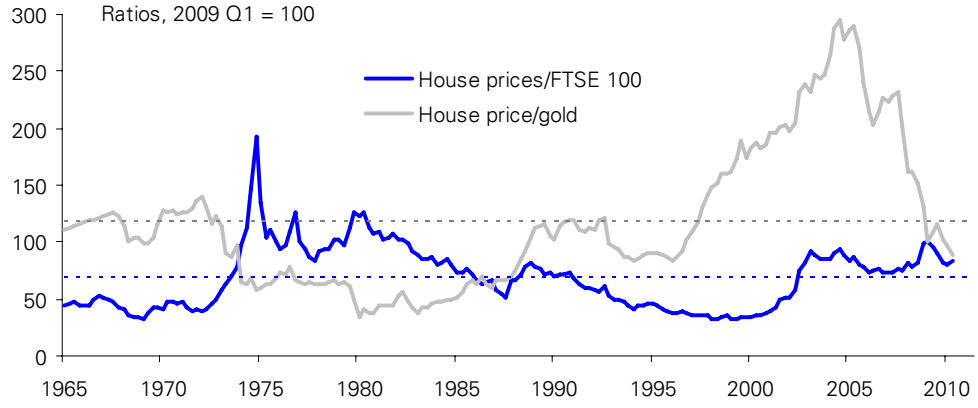


Source: Deutsche Bank, ONS, Nationwide

The chart above left shows the value of housing wealth in the UK relative to the size of the economy. The impact of the fall in house prices during 2008 can be clearly seen, followed by the recovery in 2009. While this adjustment was the sharpest yearly decline since the series began in 1981, it is still much less than the aggregate decline in wealth seen during the early 1990s recession. In sum, wealth fell by 75pp of GDP in the 1990s adjustment, compared to a fall of half that in 2008. Following the rise in prices during 2009 housing wealth now stands only 15pp off its 2007 peak.

How would you have fared had you purchased housing at various points in the past and held on to it until today? The chart above right shows the real capital return on housing for various different holding periods (5, 10 and 15 years) depending on the entry point into the market. Obviously, the longer the holding period the fewer entry points there will be where the house buyer would have made a real capital loss. Over a 15-year holding period a very modest capital loss (in real terms) would only have been made on one occasion in the past (for purchases made in 1979/1980). Over 10 years, losses would have been made on two occasions: from 1985 to 1990, and from 1972 to 1974. With a five year holding period real capital losses would have been made from 2004 onwards, between 1986 and 1992 and between 1972 and 1974.

Figure 93: House prices not overvalued relative to other asset classes (equities/gold)



Source: Deutsche Bank, Nationwide, Haver Analytics

Finally, we can look at how house prices have performed relative to other asset classes – for example, equities and gold – which is shown in Figure 93 above. While house prices may look high in real terms, relative to the price of gold and equities UK housing does not appear overvalued. In fact, relative to the FTSE 100 index house prices are only modestly above the average of the last fifty years, while relative to gold they are a little below their long-run average.

3. The demand for housing

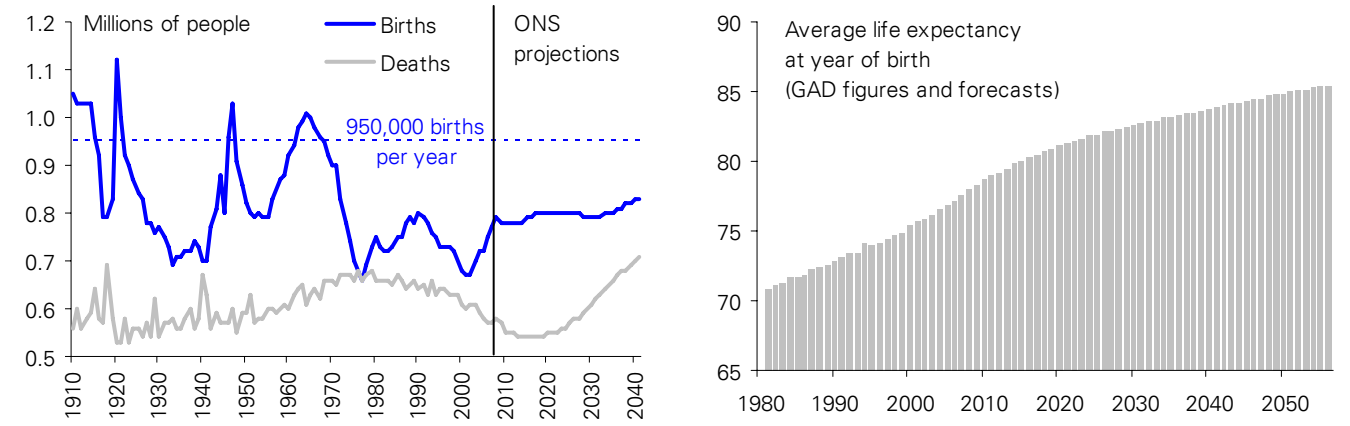
Our aim in this and the following section is to look at the long run drivers of house prices, with particular focus on demographic influences and interest rates. As with the price of anything, basic economics tells us that the price of housing should be driven by demand and supply – and there is no shortage of academic articles examining how the interaction of demand and supply in the housing market influence prices.

The main drivers of housing demand are typically seen as being: i) demographics (both the size of the population and its composition), ii) real (and nominal) interest rates, iii) general price inflation, iv) real incomes, v) expectations of future capital appreciation and confidence, vi) credit availability, vii) the tax regime, and viii) the level of the currency. In this section we take a look at these in turn with a long-run perspective.

A. Demographics

Both the size and the composition of the population will be important in influencing the demand for housing and thereby house prices. And in this respect there are expected to be some important changes over the coming decades in many developed economies, not least in the UK.

Figure 94: The post-war baby boom and longevity

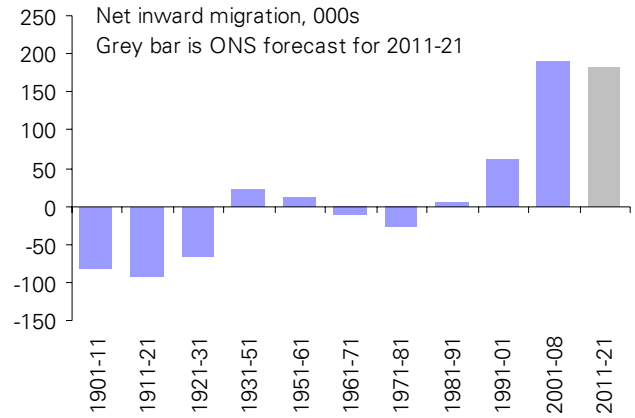


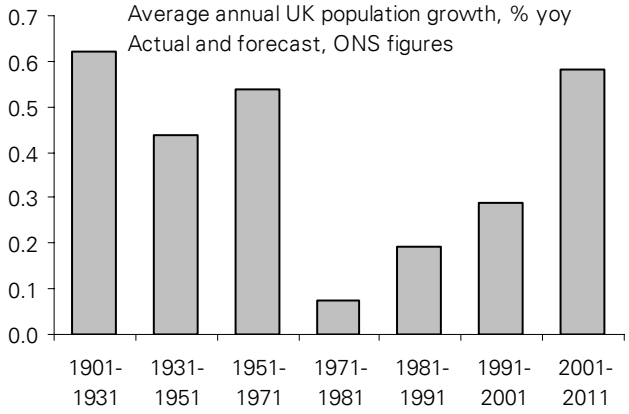
Source: Deutsche Bank, ONS, GAD

We begin with the *total population*. Population is influenced by three major issues: i) the birth rate, ii) the death rate and longevity (together these will define the natural growth rate of the resident population), and iii) inward migration.

The left hand chart of Figure 94 shows the well-documented baby booms in the aftermath of the Second World War. Combined with rapidly increasing longevity (Figure 94 right) and inward migration (Figure 95 left) this led to an acceleration in the growth rate of the UK population from a low point in the 1970s to its highest in 50 years over the past decade. This is shown in the right hand chart of Figure 95, and has likely been a key factor in supporting the boom in house prices between the mid-1990s and just before the onset of the credit crisis.

Figure 95: Inward migration and overall population growth



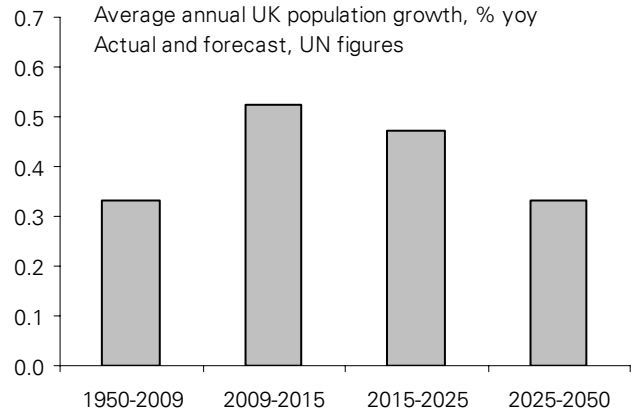


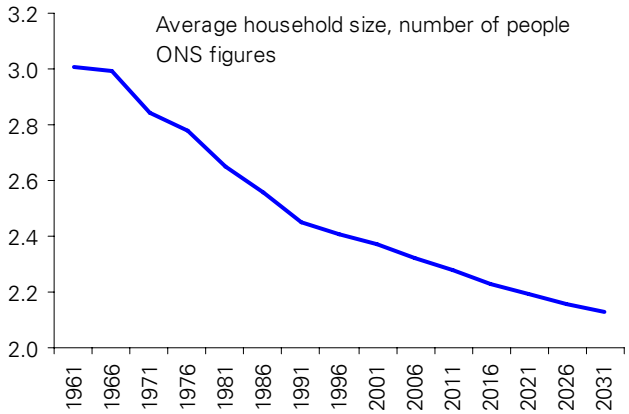
Source: Deutsche Bank, ONS

However, future trends in the total population may not be as positive for the housing market as in the past. First, over recent decades the birth rate has declined sharply to reach a record low at the turn of this century. Second, while we are likely to see continued improvements in longevity going forward, the right hand chart of Figure 94 suggests that it will not be as dramatic as over the past thirty years. Third, while the Government Actuary's Department (GAD) forecasts continued inward migration over the coming decade, the risks here might be to the downside. Slower economic growth than in the NICE (Non-Inflationary Consistently-Expansionary) decade (or Great Moderation), the weakening in the currency since 2007, and new policies to restrict migration could all make the UK look less attractive to potential inward migrants.

As a result, UK population growth looks set to slow over the course of the coming decades, as the UN data presented in the left hand chart of Figure 96 shows. This should act as a brake on housing demand and thereby house prices in the long-run.

Figure 96: Population projections and household size



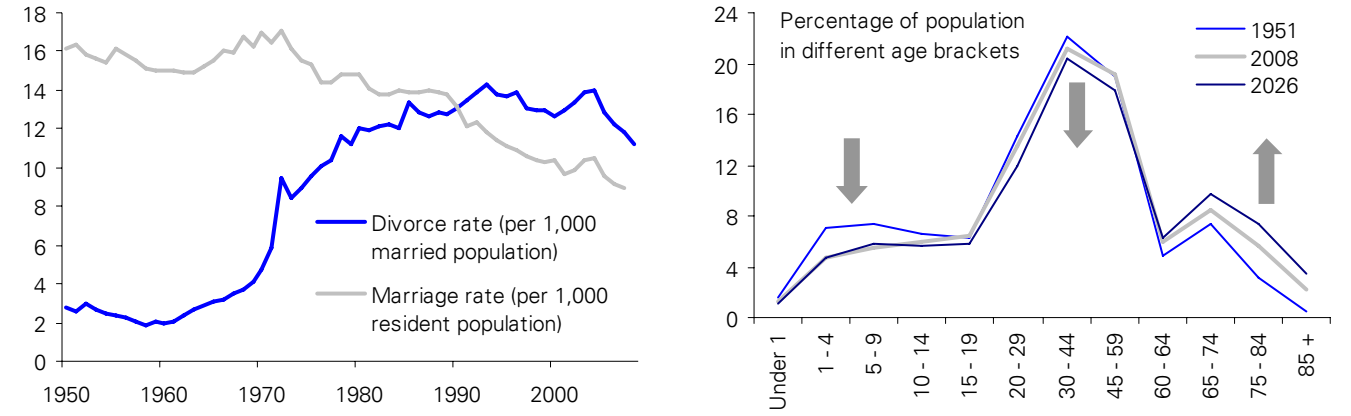


Source: Deutsche Bank, UN, ONS

Now let us turn from total population to *household numbers*. For any given population size, the larger the number of households (i.e. the smaller the average household size) the greater should be the demand for housing units. Household size has been falling for the past half century and is projected by the ONS to continue to do so over the next twenty years (at similar pace to the past twenty years but not as quickly as the thirty years prior to that – see Figure 96 right). Falling household size has been partially the result of lower marriage and higher divorce rates, as the left hand chart of Figure 97 shows. Marriage rates continue to

fall but divorce rates have also begun to decline modestly over recent years. As a result, household sizes may not fall as quickly as they have done in the past, which for any given population level will not be as positive for housing demand going forward.

Figure 97: The factors behind falling household size



Source: Deutsche Bank, ONS

So far we've looked at trends in the *total population* and *household numbers*, and their possible impact on housing demand and prices. But perhaps just as important will be the impact that *population composition* could have on the housing market going forward.

Certain age groups within the population are likely to demand more housing services than others. It used to be the case that those aged in their mid-to-late 20s were of prime first-time-buyer age, although with house prices having risen so sharply over the past 15 years and with people typically getting married later in life (the two of course are related) this has probably risen to the early- to mid-30s. It seems reasonable to assume that housing demand reaches its highest in middle age, while later in life households' demand for housing generally tapers off (as people move into smaller houses and retirement homes).

At this point it is worth taking another look at the left hand chart of Figure 94. Note that there were two peaks in the birth rate occurring in 1946/1947 and from 1962 to 1967 (the baby boom here being defined as a rise in births to over 950,000 per year), the latter period representing a more sustained increase in the birth rate. Assuming that first time buyers became active in the housing market from their mid-20s that demand for housing services begins to fall from around 60 years old, then this suggests house prices should have been supported by the baby boomers from:

- between the early 1970s to the middle of the past decade for the first wave of baby boomers (i.e. the 1946-47 wave)
- from the late 1980s/early 1990s through to the mid-2020s for the second wave of baby boomers (i.e. the 1962-67 wave)

This suggests that it may be another 15 years before the negative impact of demographics on house prices is fully felt. In that context, it is worth looking at the right hand chart of Figure 97 above. This shows how the percentage of the population in various age brackets has changed over the past 60 years, and how it is likely to change over the coming 15 years (according to ONS estimates). As the baby boomers age and longevity continues to improve the population bulges that passed through prime house buying age between the 1970s and the 2020s will eventually move into age brackets where their housing demand is tapering off.

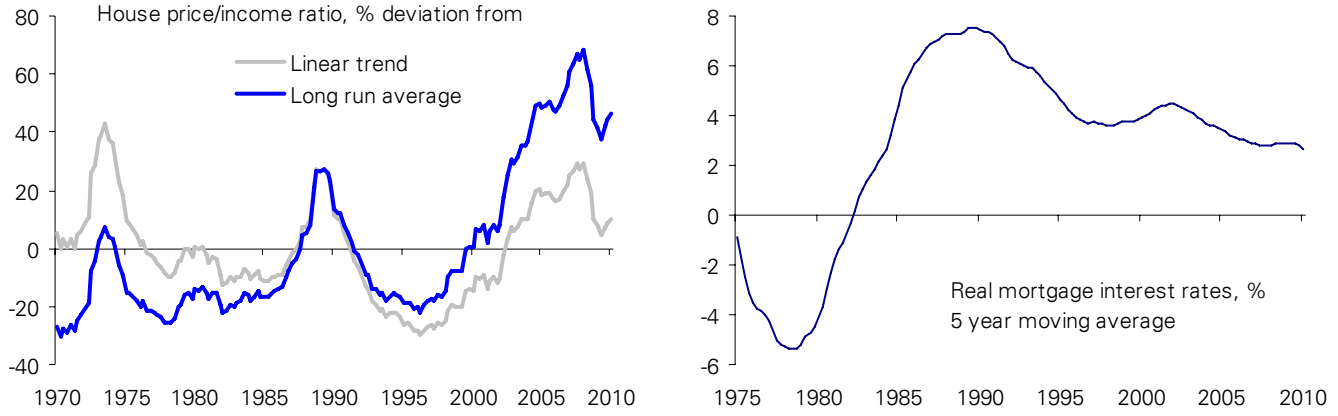
In summary, demographics could well prove challenging for UK housing demand in the long term (although the full effect may not be felt for another decade or so). Population growth is likely to slow, the size of the average household is unlikely to fall as quickly as it did in the past, and the composition of the population may well be negative for demand too as the relatively wealthy baby boomers liquidate some of their housing assets to use in retirement.

However, we should be wary of the conclusions we draw about the impact of demographics on house prices. Increased longevity may support the demand for housing later in life for the baby boomers, which has probably raised the prime house buying age range relative to where it was in the past. By way of illustrating the risk of using demographics to predict house prices, Mankiw and Weil back in the late 1980s concluded that real house prices in the US would fall substantially during the course of the following 20 years based on the entry of the baby bust generation into the house buying age. In the event, between their paper being written (December 1988) and the end of 2006 real US prices rose by around 60%.

B. Real and nominal interest rates – affordability

There is typically much focus in the housing market on the house price/income ratio. With housing typically being the most important purchase that many households will ever make, it seems natural to expect that prices should move in line with household income (or some measure of 'permanent income') over time.

Figure 98: The house price/income ratio and real mortgage interest rates over time



Source: Deutsche Bank, DCLG, ONS, CML

The house price/income ratio is shown in the left hand chart of Figure 98. If we fit a linear (upward sloping) trend to the ratio over the past forty years then house prices do not appear excessively overvalued right now. However, using a long-run rising trend may not be reasonable, as it makes the implicit assumption that the underlying trend will continue to rise indefinitely. To this extent, we may be underestimating the extent of overvaluation in the housing market.

On the other hand, the house price/income ratio seems excessively high relative to its long-run average. Again, just as fitting an upwardly sloping trend line through the ratio is wrong, so too it might be to assume an inter-temporally constant long-run average. Indeed, it seems likely that there has been some upward shift in the equilibrium house price/income ratio over time, so comparing the ratio to a time-invariant average would probably serve to overestimate the extent to which housing is overpriced.

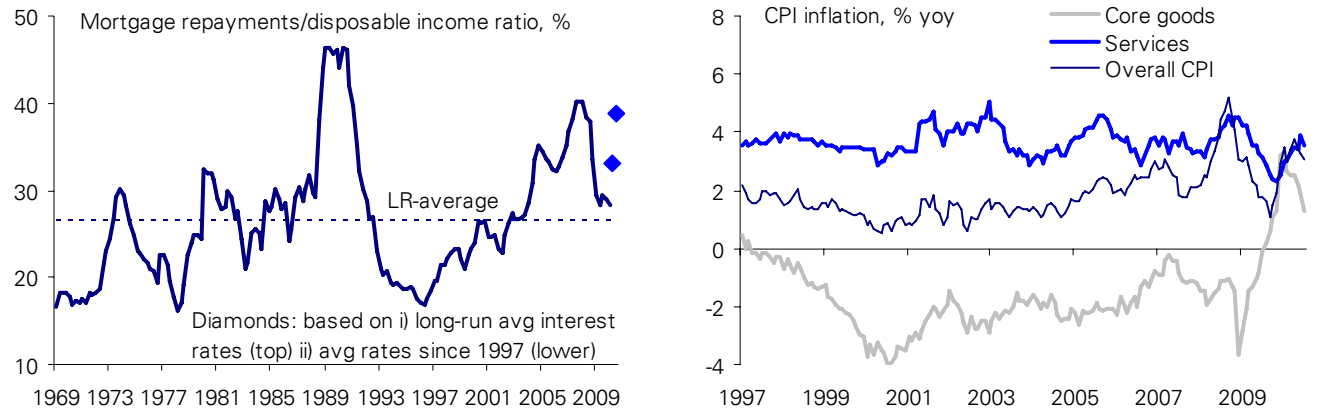
Perhaps the most important reason that the equilibrium house price/income ratio might have risen relates to interest rates. Over the past twenty years there has been a significant shift downwards in the level of real interest rates. The five year moving average (see Figure 98

right) of real mortgage rates has fallen from around 7.5% at the end of the 1980s to about 2.5% now. While some of the recent decline is the result of the economic cycle (nominal rates being cut sharply during the recession), real rates have been generally trending lower over quite some time.

To the extent that real rates remain low in the future, then the equilibrium level of the house price/income ratio *should* be higher now than it was in the past. This is what has been termed the "recapitalisation effect" – to keep affordability (i.e. the repayment/income ratio) the same following a permanent decline in real interest rates we need to see a rise in the equilibrium house price/income ratio.

This is why – when judging the appropriate level of house prices – a better metric to focus attention on is the repayment/income ratio, as this takes into consideration the effect of permanent changes in interest rates. In short, it is a far better measure of affordability as it tells us what households can afford to pay in debt interest on an ongoing basis. The chart below left shows the repayment/income ratio over the past forty years. Despite the elevated level of house prices relative to incomes, this metric is close to its long run average. However, this is partly because of the fact that interest rates are currently at exceptionally low levels.

Figure 99: The repayment/income ratio is around its long run average, but only because of exceptionally low rates



Source: Deutsche Bank, DCLG, ONS, CML

Consider the blue diamonds in the repayment/income chart. These show what affordability would currently look like were interest rates at their average levels (the two diamonds representing average rates since 1997 and over the past forty years). Clearly affordability would be a lot worse if mortgage rates were to return to 'normal'. In this article we are thinking about where house prices might settle in the long-run, so the important question here relates to where equilibrium interest rates might end up. Certainly it seems reasonable to conclude that they will be higher than where they are right now – but by how much?

To answer this question, we need to think about the interaction between economic growth, inflation and interest rates. Consider the right hand chart of Figure 99. This shows the performance of inflation since 1997 when the Bank of England was made independent. As a result of a strong currency and a rapid pace of globalisation (importing a greater portion of goods from low cost emerging economies), core goods prices (i.e. stripping out food, alcohol, tobacco and energy) were deflating for the entire period from the end of 1997 to the start of 2009. Over that period the price of core goods – which make up over a third of the total CPI basket – fell by close to a quarter, equating to an average rate of decline of around 2% per year.

With a third of the basket deflating, and the Bank having to target overall inflation at 2%, the MPC was left with only one option – run the domestic economy quicker than normal by lowering real interest rates in order to produce an offsetting rise in service sector inflation. The chart above right shows that this is exactly what happened during the NICE decade.

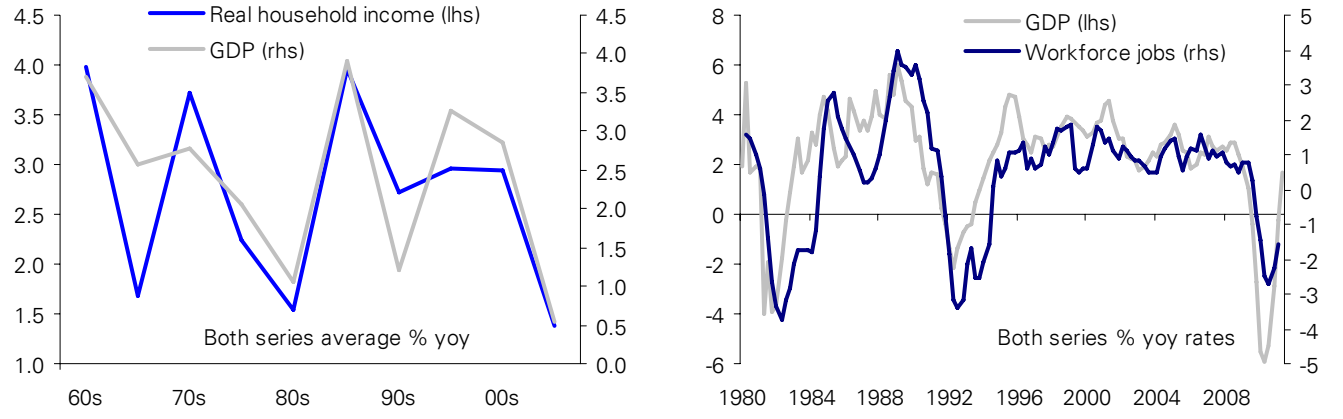
The future looks less encouraging, however. Imagine that goods price inflation remains above zero going forward, perhaps because of a slower pace of globalisation thereby limiting future declines in average import prices. Assuming that the Bank of England retains its credibility and the government makes no changes to the 2% inflation target, then it seems reasonable to believe that, on average, the Bank will meet its target. Following the current period during which service sector inflation should be limited by the margin of spare capacity, the Bank will eventually have to set policy rates higher in the future in order to curtail service sector growth and inflation given that goods prices will no longer be deflating. In other words, the combination of interest rates and economic growth required to achieve the 2% inflation target in the future will likely be worse (higher rates, lower domestic growth) than it has been in the past.

When it comes to the housing market, higher real mortgage rates will have the opposite effect of recapitalisation, assuming that house prices in the past had been bid up by households believing that lower real interest rates were here to stay. In the event that we are right and real rates eventually rise over the long run, then the equilibrium house price/income ratio could fall.

C. Incomes

As we discussed above, household incomes tend to have an important bearing on house prices, but what is the outlook for incomes over the long-run? There is a close link, as one might imagine, between the growth rate of real GDP and that of real household incomes, as the chart below left shows. And, as we argued in the previous section, economic growth could well prove somewhat weaker in the future than has been the case in the NICE decade, assuming the inflation target continues to be met.

Figure 100: GDP and household income are closely linked – but the employment response is not always the same



Source: Deutsche Bank, ONS,

Of course there is more to household income growth than simply GDP. For example, consider in the right hand chart of Figure 100 how different the employment response has been to recessions in the past relative to what has happened during the latest recession. Incomes will therefore depend to a large extent on how employment levels respond to weaker GDP levels going forward. In the near term, the combination of spare capacity and tighter fiscal policy could well lead to weak private and public sector employment over the coming few years. Looking further ahead, we suspect that a slower trend rate of GDP

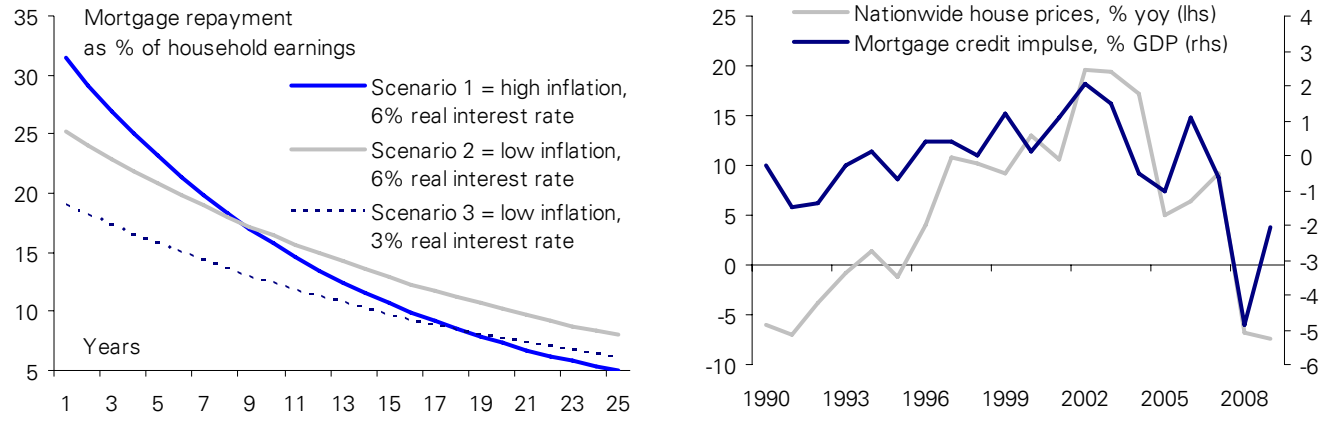
growth will limit the speed at which real incomes can grow, and thereby the growth rate of house prices.

D. Other factors

There are a number of other important factors that can influence housing demand and therefore prices which are either more difficult to take a long-run view on or might be expected to have a lesser impact on our long-run forecasts, but should be considered nonetheless.

- *Inflation/nominal interest rates*. Aside from their influence on real interest rates, inflation and nominal mortgage rates can themselves have an important bearing on housing demand. The way that inflation and nominal rates independently impact the ability of household to afford housing is via the 'tilt' or 'front-loading' effect. Figure 101 left shows that, for any given real interest rate, when inflation is high real repayments tend to be skewed towards the start of the mortgage, making it more difficult for first time buyers to afford to get on the housing ladder. However, with inflation expected to remain anchored around its current target (reflecting no change in government policy nor a loss of central bank credibility) there is no reason to think that inflation will be materially different over the coming decades as it has been over the past 20 years. One of the reasons that house prices rose in the NICE decade was because of the improved credibility of the Bank of England and the assumption that inflation would be maintained at low levels relative to the past. This supported house prices through the NICE decade but will not continue to do so – if inflation is maintained at 2% then the front-loading issue should have no additional beneficial impact on house prices going forward.

Figure 101: Front-loading has become less of an issue, while mortgage lending may impart a smaller impulse



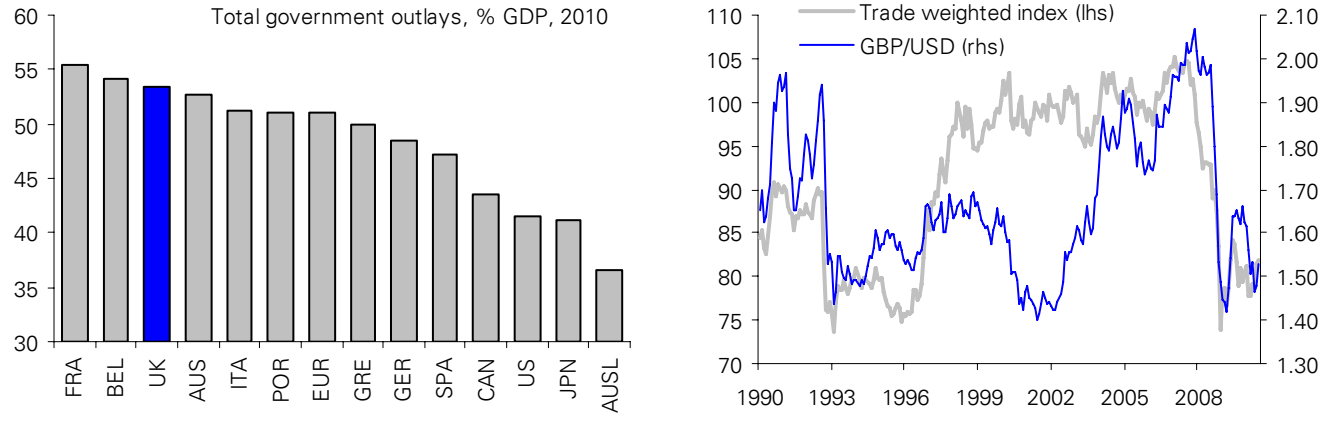
Source: Deutsche Bank, ONS,, Nationwide, Bank of England

- *Expectations of future capital appreciation*. The demand for housing depends in part on what people expect to happen to house prices in the future. If sizable capital gains are expected, then this may increase the demand for housing today, meaning that house price changes can be self-reinforcing. Modeling house price expectations is especially challenging, particularly over the long run, but it seems reasonable to assume that with house prices having already risen significantly over the past ten to fifteen years and currently looking overvalued on a number of measures that expectations of further real price appreciation must be more limited now than it was when the Bank of England became independent.
- *Credit availability*. One of the reasons housing demand was so strong in the early part of the last decade was due to low returns among other asset classes. Housing was still relatively affordable at the time and the advent of the buy-to-let mortgage provided investors desperately searching for higher yield an entry point into the UK housing

market. This relied in no small part on the availability of new finance, helped by financial institutions' access to the securitisation markets. This means of finance has been severely curtailed following the credit crunch, which together with the Bank of England beginning to restrict mortgage lending through its new macro prudential powers could have negative repercussions for housing demand. Offsetting this in the near term, however, is the fact that mortgage lending is currently at exceptionally low levels; according to our credit impulse analysis any improvement here could therefore put a floor under house prices.

- *The tax regime*. Housing taxes also influence demand. In particular, the recent rise (in the Emergency Budget) in capital gains tax for top rate payers may limit the attractiveness of housing as an investment asset going forward. Over the course of the next parliament the desire of the coalition government to address the deficit by spending cuts rather than tax increases may limit the risk of a further rise in the tax burden (spending is already at internationally high levels, as the chart below left shows). Still, one of the key Liberal Democrat policies in their pre-election manifesto was a "Mansion Tax"; while this has been dropped in the coalition agreement, there is a risk it may be revived in the future (with at least one Labour leadership candidate publicly in support of the idea).
- *Sterling*. The currency was strong for all of the NICE decade. Since 2007, however, the currency has depreciated notably, making UK housing more attractive for international investors. Anecdotal evidence has suggested that high net worth investors have been entering into the London property market, which has been partly responsible for pushing London house prices up by more than in any other region since their recent trough. Over the next year our official forecasts are for sterling to rally against both the euro and the US dollar, which could act to deter foreign demand. However, our FX Research team believes that sterling's trade weighted index is currently not far from its fair value.

Figure 102: Sterling has fallen sharply both against the US dollar and a basket of other currencies



Source: Deutsche Bank, Haver Analytics, Bank of England, OECD

To summarise this section on housing demand, many of the factors that supported demand during the NICE decade may be in the process of reversing. At the very least they may no longer prove positive for housing demand in the long-run, and at worst they may impart a negative influence on demand. Putting a value on the effect of this turnaround in long-term demand conditions is of course extremely difficult (we attempt to do that via a mean-reversion analysis in section 5 below).

Figure 103: The impact of demand factors on house prices in the past and the future

	NICE decade	Going forward
Demographics		
- Population growth	Positive	Less positive
- Migration	Positive	Less positive
- Household growth	Less positive	Moderately positive
- Household composition	Positive	Negative
Interest rates	Positive	Negative
Income growth	Positive	Negative
Other		
- Inflation/nominal rates	Positive	Less positive
- House price expectations	Positive	Negative
- Credit availability	Positive	Less positive
- Taxes	Neutral	Less positive
- Sterling	Generally negative	Positive

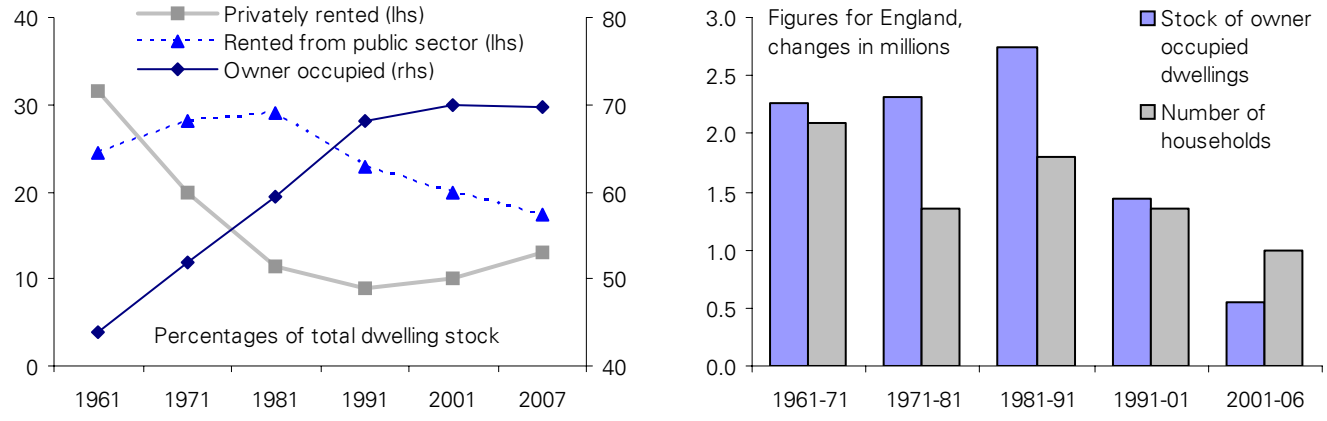
Source: DB Global Markets Research

In the meantime, the table above shows the impact we believe the various influences on demand will have on prices over the long-run.

4. Housing supply

The supply of owner occupied housing can be an important determinant of house prices. In most analysis of the housing market there is typically less discussion about housing supply on account of the fact it is usually assumed static in over short periods of time. Indeed, the stock of owner occupied housing tends to be slow to change, being limited by planning restrictions and ultimately the availability of land.

Figure 104: The evolution of the owner occupied housing stock relative to the number of households



Source: Deutsche Bank, DCLG

Over the long run, however, housing supply can and does change. And even in the short-run it can have a sizable influence on prices to the extent that the number of properties *coming up for sale at any one time* (and not necessarily the *overall stock*) is the important supply variable.

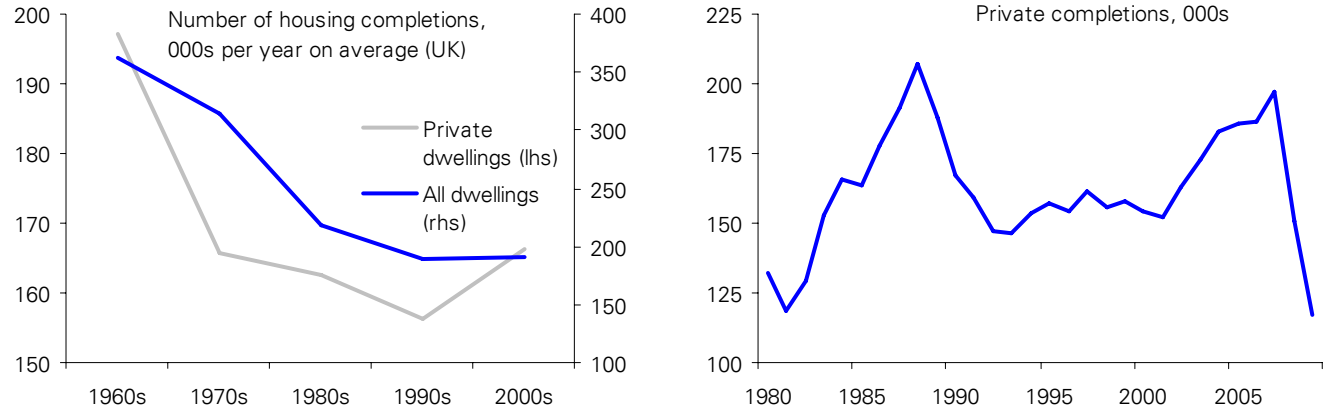
First let's take a look at housing stocks. Figure 104 left shows how stocks of various types of housing have changed over the past few decades. While the population and number of

households have continued to grow, the proportion of owner occupied housing stocks has remained broadly unchanged over almost the past twenty years (after having risen sharply in the three decades up to the early 1990s). On the rentals side, private rentals have risen at the expense of rentals from public sector bodies (which include local authorities and residential social landlords), with rentals in total having remained broadly static as a percentage of the total housing stock. This does not imply by itself that there is a mismatch in owner occupied housing demand and supply – rather it could simply reflect household preferences having not continued to shift away from rented property and towards owner occupation over recent years.

In Figure 104 right we show how the number of households has changed through time relative to changes in the stock of owner occupied dwellings. During each decade from 1961 through to 2001, the owner occupied housing stock has risen at a faster rate than that of the number of households in the country. However, in the period since 2001 (for which we only have five years of data at present), the rise in the number of households has outstripped the increase in the owner occupied stock close to twofold. This limited increase in supply probably helped contribute to the sharp rise in house prices during the period.

How can we expect the owner occupied housing stock to change going forward? The left hand chart of Figure 105 shows the evolution of house building over the past fifty years. Private completions did recover a little during the past decade but total house building (which includes public sector) has remained low. Looking at more recent trends, private completions had been very weak in the decade up to the early 2000s, but grew more rapidly from 2002 to 2007. Relative to the size of the housing stock these changes are relatively small, and since the onset of the credit crisis completions turned down sharply (they are currently in the process of recovering but are still especially weak).

Figure 105: Long-run and more recent trends in house building

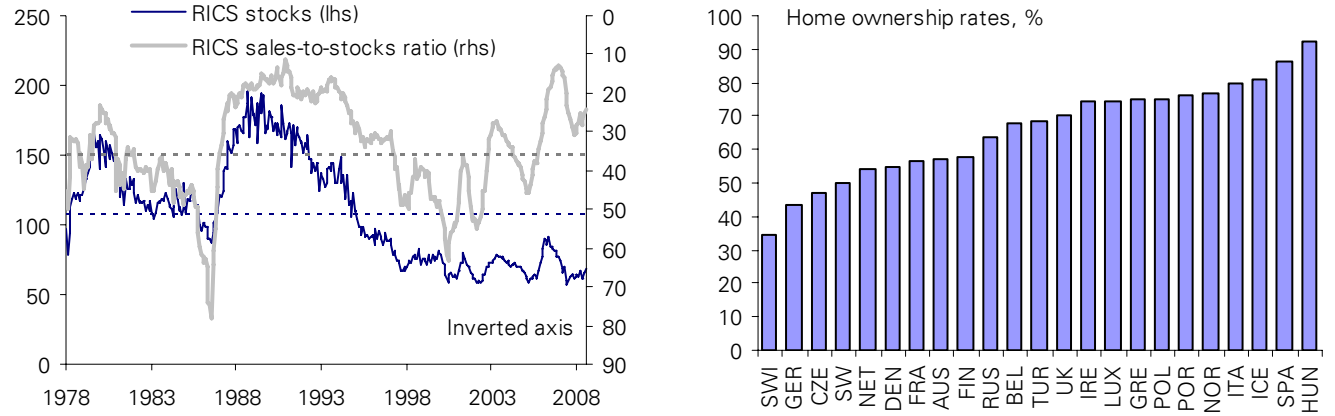


Source: Deutsche Bank, DCLG

While the stock of owner occupied housing in the economy is indeed largely fixed over the short-term, the number of properties being offered for sale relative to the stock is more variable. The stock may be a more useful indicator of supply over the long term, while the flow of existing homes into the sales market might be a better indicator of short term supply.

As the left hand chart of Figure 106 shows, the RICS stocks balance has remained below its long run average since the middle of the 1990s, indicating that estate agents have relatively few (compared to past history) houses on their books and available for sale. The sales-to-stocks ratio is shown on an inverted axis – while this has been below average recently it has been driven by lower numbers of sales during the recent housing market adjustment.

Figure 106: Shorter term measures of housing supply



Source: Deutsche Bank, RICS

The Housing page of the Communities and Local Government website begins with the following statement: "There is a large gap between the supply of, and demand for, new homes. For decades, the housing market hasn't kept up with the needs of our growing population". Tight planning permission and a limited availability of new plots (unlike in North America, for example) have helped drive house prices higher in the UK over recent decades as demand considerations have dominated supply (new home building has been relatively unresponsive to price changes). Even with policies aimed at raising house building it will take a long time until the stock of housing responds materially.

As a result, we see limited housing supply remaining a positive for real house prices going forward. However, we expect this to be offset by the negative demand issues we considered previously. In the following final section we take a look at how prices would need to move in order to restore the various affordability ratios we monitor back to equilibrium. The weak rates of nominal house price growth (and real price declines in some cases) that this analysis produces supports our view that, over the long term, weaker housing demand could have a larger impact in limiting house price growth than limited supply should support it.

5. Moving back to equilibrium

In the discussion above we mention a number of affordability ratios that can be used to judge the extent of any over- (or under-) valuation in the housing market. One way in which we can think about how house prices might evolve going forward is as follows: assuming that all other components of these affordability measures (such as general prices, incomes, interest rates, and rents) revert to their long-run averages, what would have to happen to nominal house prices in order that affordability returns to some notion of equilibrium?

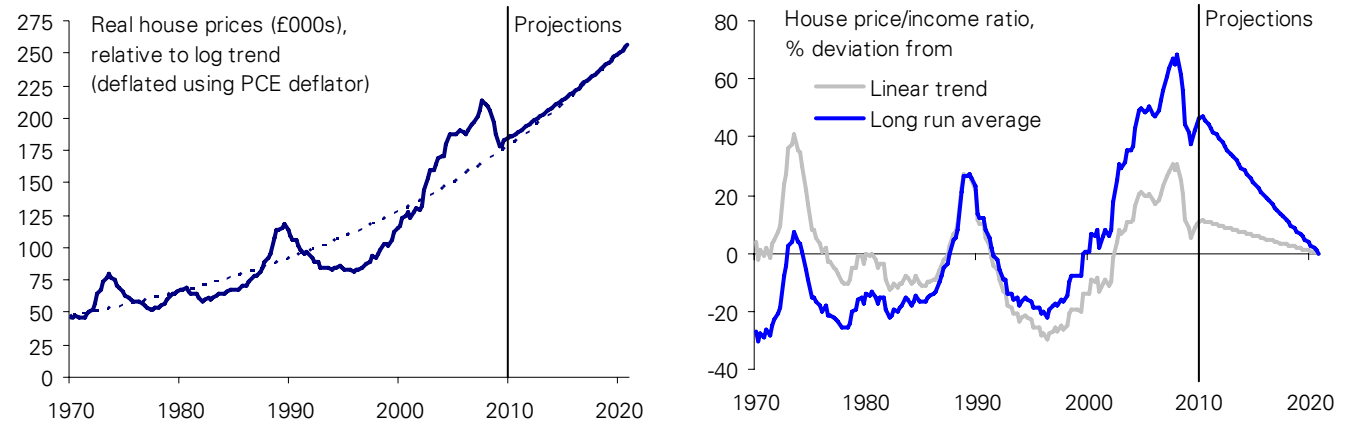
We take a look at this question below, making the assumption that equilibrium is achieved over a (somewhat arbitrary) ten year horizon, i.e. by 2020. We consider each affordability measure in turn, and summarise our findings in Figure 109 below.

- House prices relative to general prices (i.e. real house prices)

We assume that the consumers' expenditure deflator (which we use to deflate real house prices) runs at the same average rate going forward as it has since Bank of England independence in 1997 (roughly 2.2% annualised). We also assume that the logarithmic trend (dotted) line shown in the left hand side of Figure 107 below persists throughout the forecast period. In order for house prices to be "on-trend" in ten years' time nominal prices would need to grow at a rate of 5.4% per year (a 3.2% real annualised rate of growth). This

relatively strong growth rate reflects the fact that, following their decline between 2007 and 2009, real house prices are currently not that far away from their long-run "equilibrium" (logarithmic) level.

Figure 107: Equilibration of real house prices and the house price/income ratio over the next ten years



Source: Deutsche Bank, DCLG, ONS

- The house price/income ratio

Here again we assume that the denominator of this affordability measure – nominal household income – grows throughout the forecast horizon (i.e. out to 2020) at an annual rate equal to the average since Bank of England independence. We established earlier in this article that the house price/income ratio suggested house prices were modestly overvalued against a *linear trend*, but much more overvalued relative to their lower *long-run average*. Using the former as the future trend would suggest that nominal house prices should grow at 3.4% per year going forward to get back to equilibrium by 2020 (+1.2% yoy real terms), while prices would have to fall by 0.4% per year in nominal terms (a 2.6% yoy drop in real terms) for the next ten years in order to restore the price/income ratio to its long run average.

- The mortgage repayment/income ratio

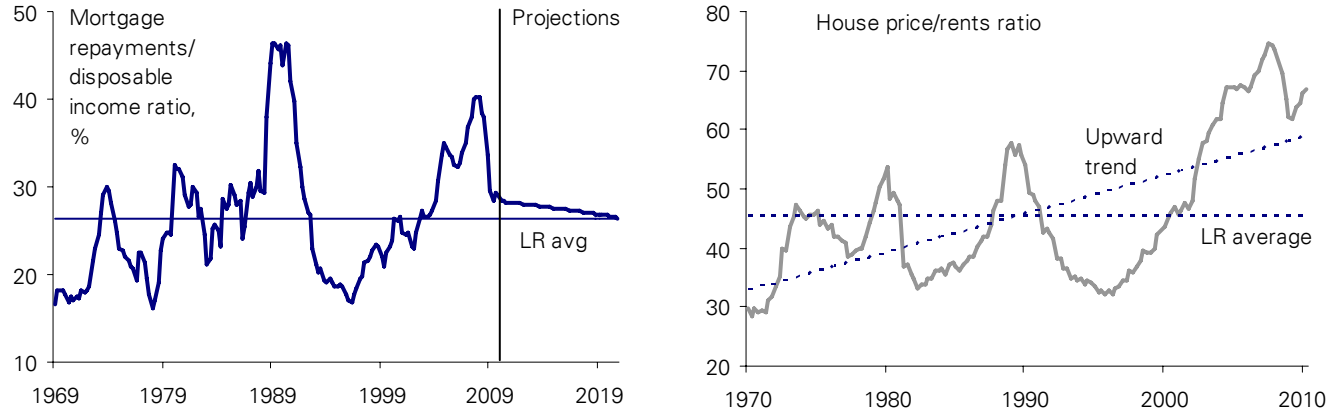
Aside from the assumption that incomes grow at the same average rate they have done since 1997, we need to take a view on where mortgage interest rates will settle in order to determine how house prices need to move to restore the repayment/income ratio back to its long run average. The chart in the left hand side of Figure 99 shows that the repayment/income ratio has averaged about 26.5% on our measure over the past forty years, while nominal mortgage rates have averaged 7% over that period (and 5.3% since 1997).

Assuming that mortgage rates return to their long-run average (7%) then this would require an annual average fall in nominal house prices of 0.4% (a real drop of 2.6% per year) to return the repayment/income ratio back to its equilibrium (a static long-run average in this case – see left hand chart of Figure 108 below). If instead we were to assume that mortgage rates rise to their (lower) average level since Bank of England independence in 1997 then that would require annualised nominal house price growth of 1.1% yoy over the next ten years, or a 1.1% real annual fall over that period.

- The ratio of house prices to rents

Finally, we consider the ratio of house prices to rental payments (Figure 108 right). We make the assumption that going forward rental payments rise at the same average rate they have done since 1997 (i.e. around 2.75% annualised).

Figure 108: Equilibration of the repayment/income and the house price/rents ratios over the next ten years



Source: Deutsche Bank, DCLG, ONS, CML

This house price/rents series is upwardly trended over time, but it is questionable whether we should assume that this trend continues into the future. As such, we conduct this analysis by looking at how house prices would have to move in order to bring the house price/rents ratio back to both its long-run average and also its upward trend over the next ten years.

In order to get back to the long-run average, nominal house prices would need to fall by about 1% per year, which equates to around a 3.2% yearly fall in real house prices. Alternatively, if we assume the trend in house prices/rents persists then to get back to this trend in ten years' time nominal house prices would need to grow at a rate of 2.6% per year between now and then, or by around 0.4% yoy in real terms.

As a summary, the Figure 109 shows how both nominal and real house prices would need to move over the coming decade in order to achieve some notion of equilibrium on the various affordability ratios.

Our favoured measure of affordability in the table is the repayment/income ratio as it tells us something about the ability of households to service their mortgage debt – which we would argue is the most appropriate basis for judging where house prices should settle. As we doubt that nominal mortgage interest rates are likely to rise to their *long-run average* any time soon (after all, the average since 1969 covers a period of exceptionally high inflation) our focus is on this ratio using *average interest rates since 1997*.

Figure 109: Average annual house price growth required to produce equilibrium in 2020

	Trend type	Mortgage interest rate assumption	Annual nom. growth	Annual real growth
1. Real house prices	Log	n/a	+5.4% yoy	+3.2% yoy
2. House price/income ratio	Linear	n/a	+3.4% yoy	+1.2% yoy
	LR avg	n/a	-0.4% yoy	-2.6% yoy
3. Mortgage repayment/income ratio	LR avg	Avg rates since 1969	-0.4% yoy	-2.6% yoy
	LR avg	**Avg rate since 1997**	**+1.1% yoy**	**-1.1% yoy**
4. House price/rents ratio	Linear	n/a	+2.6% yoy	+0.4% yoy
	LR avg	n/a	-1.0% yoy	-3.2% yoy
Note: Averages 1997 to 2007	n/a	n/a	*+10.9% yoy*	*+8.9% yoy*
Note: Averages 1997 to current	n/a	n/a	*+8.4% yoy*	*+6.2% yoy*

Source: DB Global Markets Research

This suggests that in order to restore equilibrium nominal house prices would need to grow at a much slower pace than has been the case over the past decade (1.1% versus over 8% in nominal terms). This would imply a real fall in house prices of around 1% per year for the next decade in order to get back to the long run average repayment/income ratio. That would produce a cumulative rise in nominal house prices of around 12.5% by the end of 2020, and a cumulative fall in real prices of about 10% over the same time horizon.

This analysis lends support to our view that a further correction in house prices will be required (see *UK Review & Outlook: A second wave down for housing* in Focus Europe, 3 September 2010, and *UK Economic Focus: Housing Market Update*, 19 July 2010) but that a sizeable portion of it will occur via a fall in real house prices.

6. Conclusions

In conclusion, in this article we've looked at how demand and supply factors might act to influence house prices over the coming decades. In particular, worsening demographics (from the perspective of housing demand at least) and the need for higher interest rates are likely to be negative influences on demand and house prices, although the timing and scale of these effects is highly uncertain.

Using an affordability mean-reversion model, nominal house prices would need to rise much more slowly in the future (and in some cases actually fall) than was the case during the Great Moderation period in order for equilibrium to be restored to our key affordability measures.

These conclusions fit with our view that, following a period of nominal decline in house prices next year (-5%, the result of higher short term policy interest rates), real house prices will correct via a potentially prolonged period of broadly static nominal prices.

Appendix - Mean Reversion Assumptions

We've already explained in detail our various methodologies for mean reverting equities in order to assess potential future returns. In this section we outline the variables that we have mean reverted in order to calculate potential returns for the various other asset classes discussed in this study.

Inflation
The starting point, which is essential for calculating possible future returns across all asset classes (including equities), is to get a future CPI time series. For this we have just reverted the YoY growth in CPI to its long-term average (around 3.2%).

Treasury/Government bond mean reversion
For Treasuries and other Government bond series we have reverted to the long-term average real yield which has been calculated by subtracting YoY CPI from the nominal bond yield. We can then use these yields to calculate prospective returns.

Corporate bond mean reversion (IG and HY)
For corporate bonds we mean revert credit spreads to their long-term average level. These spreads coupled with the already calculated Treasury/Government bond yields give us an overall corporate bond yield that can be used to calculate possible future returns. We have used appropriate duration matched Treasury/Government yields for the various different corporate bond series.

For the iBoxx indices, which only have data back to 1999, we have created a longer-term spread series by regressing the iBoxx spread data against the Moody's long-term spread series. The results of the regression can be used to calculate a longer-term spread series, which can be used to calculate the long-term average level that is then used for mean reversion purposes.

For further details on how we have calculated bond returns (both Government and corporate) please refer to the previous version of this report (100 Year of Corporate Bond Returns Revisited, 5th November 2008).

US property and commodity mean reversion
For both US property and the various commodity series we have calculated a real adjusted price series and simply mean reverted to the long-term average level of this series.

Appendix 1

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