Equity Gilt Study 2011

BARCLAYS

"People almost invariably arrive at their beliefs not on the basis of proof but on the basis of what they find attractive"

Blaise Pascal, *The Art of Persuasion*

"History has not dealt kindly with the aftermath of protracted periods of low risk premiums"

Alan Greenspan

"Inflation is the one form of taxation that can be imposed without legislation"

Milton Friedman

"Markets can remain irrational longer than you can remain solvent"

John Maynard Keynes

"If history repeats itself, and the unexpected always happens, how incapable must Man be of learning from experience"

George Bernard Shaw

"The greater our knowledge increases the greater our ignorance unfolds"

John F Kennedy

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EQUITY GILT STUDY 2011

56th Edition

The *Equity Gilt Study* has been published continuously since 1956, providing data, analysis and commentary on long-term asset returns in the UK and US. This publication is unique not only for its longevity, but also for its focus on the medium and long term. The UK data base goes back to 1899, while the US data – provided by the Centre for Research in Security Prices at the University of Chicago – begins in 1925.

We use this opportunity also to focus our essays on longer-term issues. Chapter 1 makes the case that current policy settings are extraordinarily easy and, if left in place for too long, will result in destabilizing imbalances and stretched asset valuations. The focus of policymakers on short-term results suggests that markets and economies are likely to continue to exhibit a high degree of volatility, reminiscent more of the 1970s and 2000s than the 1980s or 1990s. In Chapter 2, we focus on emerging markets as an asset class, and assess whether the outperformance of returns relative to developed markets seen in the last decade can reasonably be expected to continue. A thorough investigation of the fundamentals suggests that the answer is yes, although the bulk of this outperformance is expected to occur in equities. We also present an independent rating of EM risk by country and region. Chapter 3 examines commodity prices and inflation, and concludes that the disinflationary impact of low cost producers such as China and India is transitioning into an inflationary influence. As a result, the disinflationary trend of the past 30 or so years appears to be turning. Chapter 4 considers optimal investment strategies in a more volatile investment climate – a natural follow-up to Chapter 1. The recommended approach does not require investors to time cyclical inflexion points and allows them to tailor their portfolios to their appetite for risk. Chapter 5 re-examines the influence of demographics on asset returns that has been a theme in previous issues of the *Equity Gilt Study*. Using more robust testing methods, it re-affirms that aging populations are likely to lower returns on both equities and debt, and that equities are still likely to outperform bonds over the next decade, although less so than we had previously thought.

We sincerely hope that you find both the essays and the data useful inputs into your investment decisions.

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Dismal demographics and asset returns revisited 78

The 2005 edition of the *Equity Gilt Study* contended that demographics are a powerful driver of medium- to long-term trends in bond and equity markets. In this edition, we re-examine the issue of demographics and asset returns more formally in order to address criticisms of past attempts at quantifying potential linkages between them. We find that demographics matter, though perhaps not quite as much as our earlier work had suggested. Accordingly, our original findings that demographics would reduce both stock and bond returns over the medium- to long-term remain unchanged, and we still expect equities to outperform bonds over the next decade. However, we now conclude that the equity risk premium may be 1% lower than the historical average, whereas we formerly reckoned that it would be 1% higher.

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This chapter presents the real returns of the major asset classes in the UK. Financial markets faced a volatile year in 2010, yet equities managed to end the year in positive territory. The FTSE all share price index had fallen 12% year-to-date by July, but managed to rally 23% for the remainder of the year. Equities were the worst performing asset over the decade, producing a meagre inflation-adjusted return of just 0.6%, although this is a marginal improvement over the negative 10-year returns produced over the past two years. Gilts continued to outperform equities over the 10-year horizon and the annual performance in 2010 was a marked improvement from the negative returns during 2009.

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This is the 11th year in which we have incorporated US asset return data. US asset returns followed a similar trend to those of the UK. Equities were the best performing asset, despite periods of intense volatility. US equities followed European stocks lower as the sovereign debt crisis unravelled in the spring. The turbulence continued into the summer as weaker domestic economic data triggered fears of a deflationary spiral back into recession. Treasuries and TIPS performed well, as the flight-to-quality trend dominated during the spring and summer months. The Fed's announcement of a second round of quantitative easing helped fuel a recovery in global equities into year-end. Over the decade, equities underperformed all assets aside from cash.

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CHAPTER 1

Easy policies today, rude awakening tomorrow

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Extraordinarily expansionary policies played a critical role in pulling the world out of the financial crisis and severe recession of 2008-09. However, there are significant risks associated with leaving extremely expansionary policies in place for too long. Such policies, if not removed, are likely to cause significant economic imbalances and asset mispricing, making markets excessively vulnerable to damaging corrections and leaving economies with limited ability to cope with future shocks. This would not be the first time that policy has been too easy: in the 1970s, and again in the past decade, easy monetary policies left in place for too long led first to market instability and then to economic volatility. This time, the situation is exacerbated by overextended fiscal policies.

The global easing and its aftermath

The fight to avoid a Great Depression united policymakers …

Most of the world responded with very loose fiscal and monetary policy following the biggest global recession since the Great Depression. Many of the largest and systemically more important emerging markets were able to join the countercyclical policies as well – in contrast to past crises, when EM economies typically had to tighten policies, thus exacerbating their own cycles.

…resulting in massive policy easing globally…

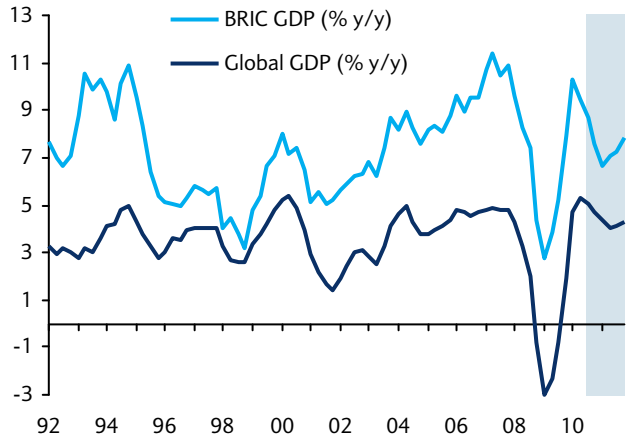
Extremely easy conditions clearly succeeded in averting a depression-like period and causing the global economy to bounce back rapidly (Figure 1). However, behavior has not been symmetric: as growth has resumed, countries have been significantly slower to withdraw stimulus than they were to implement it. Many policymakers appear to be particularly focused on short-term economic outcomes at the cost of potential deterioration of medium-term fundamentals. There is certainly much lower tolerance for slow economic growth, low employment, and deflationary risks, and much more tolerance for the risk of high inflation than most observers would have anticipated not too long ago.

…and a postponement of concerns about inflation and fiscal sustainability

US extreme policy easing stands out

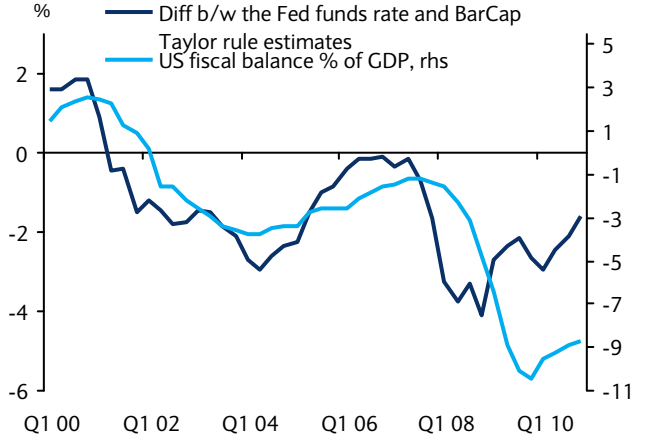
The clearest example is the US, where fiscal and monetary policies and overall lending standards are currently more expansionary than they have ever been, adjusted for the level of growth and inflation. The federal funds rate is well below where a Taylor rule based on Barclays Capital estimates would suggest (Figure 2), especially when accounting for the implicit interest rate effect from quantitative easing (QE). A similar differential arose in the early to mid-2000s and was eventually associated with the emergence of a housing and credit bubble. In parallel, the budget deficit surged to levels not seen since the Second World War.

Figure 1: Global recovery was V-shaped…



Source: Datastream, Barclays Capital

Figure 2: … because the policy response was massive



Note: The Fed funds rate is adjusted for the estimated effect of QE.
Source: Haver, Barclays Capital

Europe has its own set of issues: the periphery debt crisis and banking system concerns

European policies have generally been less expansionary than in the US. This is in part because of a somewhat more patient approach to policymaking; but it also reflects the ECB's narrower mandate (unlike the US Fed, it does not include a reference to employment) and larger built-in automatic fiscal stabilizers (for example, unemployment schemes), which reduce the need for discretionary policies. However, Europe has its own problems. The challenging debt dynamics in peripheral Europe require unprecedented fiscal adjustments. Failure could make debt restructurings necessary within the next few years. Similarly, an uneven economic recovery highlights the limitations of a "one size fits all" monetary policy, increasing inflationary risks as the ECB is constrained by problems facing the periphery.

The UK stands out in its fiscal adjustment effort…

…while Japan has a flat policy stance

The UK is as an exception within the G7: it has begun to reverse its fiscal course determinedly with a strong plan for consolidation. The UK also resisted the idea of QE2; nevertheless, recent higher-than-expected headline inflation prints have raised concerns that monetary policy may not be sufficiently in control of price developments. Japan looks relatively stable in its policy stance: on the one hand, its engagement in quantitative easing remained minimal in the fall of 2010 (but it has had a zero interest rate policy for some time); on the other hand, it plans to reduce its large fiscal deficits only very gradually. On a broad aggregate it seems fair to say that most advanced economies will likely experience bloated public finances – compared with recent historical standard – and very loose monetary policy for quite some time.

EM economies are maintaining policies too loose for their cyclical position

Emerging market economies are also running fiscal and monetary policies that seem too loose for the current high levels of growth and accelerating inflation. These pressures are exacerbated by the financial spillovers from advanced economies' accommodative monetary policies, possibly leading again to goods and asset price inflation if not brought under control. Efforts to limit inflationary pressures have generally been timid, in particular because of the widespread reluctance to allow further currency appreciation – a likely outcome if domestic interest rates are raised in a world where G3 policy rates are close to zero. EM governments have started to experiment with administrative measures to control price developments and used FX intervention and macro-prudential measures (including capital controls) to find a way out of their dilemma. However, these are unlikely to be sustainable solutions if the underlying fundamental pressures persist.

Past experience and ongoing deflation fears may explain the hesitation to withdraw stimulus …

There are valid grounds for hesitating to withdraw global stimulus. The recovery among advanced economies thus far has remained weaker than would have been expected based on past recoveries. Moreover, the experiences of Japan in recent decades and the Great Depression of the 1930s are a reminder of the costs associated with tightening policies prematurely. Moreover, cyclical unemployment that lasts too long can become structural if workers start to lose their skills. Continued easy policy in advanced economies can thus be justified as significantly reducing the important tail risk of deflation and/or depression. This is what QE2 seems to have done in the US.

…but leaving policies loose for too long raises the risk of inflation, debt defaults and asset bubbles

However, we believe the costs of super-easy policy may outweigh their benefits. First, current fiscal and monetary policies are not only extremely accommodative, but there is also a generalized perception that they will remain so in the immediate (and not so immediate) future. This significantly increases the risk of bubbles in certain asset prices as investors become too self-assured: they extrapolate recent past performance into the future and, *ex post*, justify bubbly valuations by ascribing them to improved fundamentals. As Rajan (2010)[1] has mentioned, there are good reasons to believe that the Fed's policy of targeting unrealistic unemployment objectives prior to 2007 fuelled the housing bubble.

Two bubble candidates: EM and commodities

Emerging markets and commodities are two clear bubble candidates. There are strong reasons to justify the tighter valuations of these two asset classes (see Chapter 2, 'Navigating the new EM landscape: Where to find the best returns' and Chapter 3, 'A return to scarcity: The disinflation trend is over'). However, in this easy policy environment, investors may get

[1] Rajan , Raghuram G., "Fault Lines: How Hidden Fractures Still Threaten the World Economy", Princeton University Press 2010.

carried away, leading prices to surge well beyond what the underlying growth prospects or global demand-supply shifts would warrant. In turn, this could have negative feedback effects on growth (as a result of higher commodity prices, including oil) and, overall, would almost certainly create a global environment of elevated volatility.

Risk of exacerbated cycles and higher volatility

Second, the serious deterioration in medium-term fundamentals, in particular the worsening of fiscal dynamics in advanced economies and the possible loss of inflation credibility across the world, have made many economies vulnerable to sudden shifts in investor sentiment (as the recent peripheral European debt problems attest). Many policymakers in developed economies (particularly in Japan and the US) are acting as if the chances of a switch in market sentiment are nil. The recent reduction of Japan's long-term sovereign credit rating from Standard & Poor's suggests that such perception may not be correct. Not only are countries more vulnerable, but worsening fundamentals also limit their ability to undertake counter-cyclical policies in case of negative sentiment shifts. This would most likely result in future policy-exacerbated cycles.

Some tightening today could prevent more aggressive actions later

Third, some tightening (if moderate) would be unlikely to derail the economy as it would still leave the world with very accommodative policy. Even if central banks around the world were to start hiking policy rates and fiscal spending was cut, policies would still be relatively loose. And some tightening today would likely reduce the probability of much more aggressive tightening down the road.

Policy toolkits in EM and advanced economies may not be appropriate

Fourth, there may be a problem with the policy toolkit. EM countries that hesitate to raise interest rates more aggressively and/or intervene in the exchange rate out of – at times justified – fears of FX overshooting, often seem unwilling to accept that such measures also need to be complemented by tighter fiscal policies to reduce inflationary pressures. Likewise, policymakers in advanced economies seem to be unwilling to accept that some of the structural problems facing their economies require more targeted measures than simply a loose monetary and/or fiscal stance.

Risks of undue delays in policy adjustments are real

Concerns about this apparent short-sightedness do not strike us as overdone. From a political economy perspective, politicians are likely to find it much easier to increase spending – even more so if they are given the green light by the international community – than to rein in budget deficits. But also from an academic perspective, the answers in this post-crisis stage seem less clear-cut than they appeared when the crisis broke out. The abundant studies of the Great Depression and Japan's crisis of the 1990s state clearly what not to do (policy tightening in response to crisis, trade wars) and what to do (determined loosening of fiscal and monetary policies, saving the banking system). However, the literature on how best to exit from such anti-depression policies after they have been implemented is less developed. Against this backdrop, leaving aggressive expansionary polices in place may appear as the most palatable choice for many policymakers.

Yet, in our view, the opposite of this attitude is needed: facing a potentially unstable environment, policymakers need to become more forward-looking and more averse to the risks emanating from loose policies. An immediate effort to regain sustainability in advanced economies is vital. Central bankers must not exacerbate instability by remaining behind the curve and failing to withdraw extreme stimulus that threatens to generate goods and assets inflation. In EM, this means more aggressive tightening. In several major advanced economies, it means that central banks will need to shift to tightening within months, not years.

Fiscal challenges in advanced economies

Government debt paths in a number of advanced economies could become explosive

Government gross debt-to-GDP ratios in most developed countries have been increasing consistently over the past decade, reaching, on average, just below 60% on the eve of the crisis (end-2007). GDP contractions and large fiscal deficits as a result of the global crisis, and the ensuing policy response, caused the average ratio to jump to 75% by end-2009; the IMF forecasts a further increase to 85% by end-2015.[2] In many advanced economies, government debt dynamics have become alarming, even when measured on a net basis (Figure 3 and Figure 4). For example, the Congressional Budget Office's (CBO) June 2010 Long-Term Budget Outlook presents a scenario in which, under tax cuts smaller than those recently approved, adding demographics-related expenditure and leaving all other policies unchanged, US debt would rise to almost 950% of GDP by 2084.[3] Similarly, the EU in 2009 prepared a joint long-term sustainability analysis for 27 countries, according to which unchanged policies would lead 20 out of the 27 EU countries to have (clearly unfeasible) debt ratios above 300% by 2060.[4]

Necessary fiscal adjustments are massive

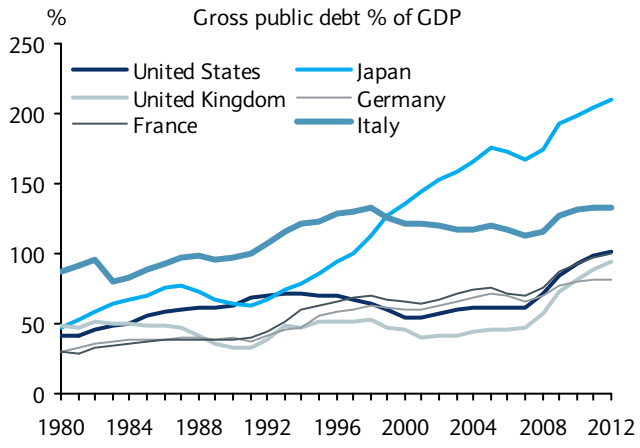
Large primary fiscal balance adjustments are needed in the coming years just to stabilize debt ratios

The fiscal adjustments needed in the main advanced economies in the coming years are massive. In Figure 5, we estimate the 'primary' (ie, excluding interest payments) fiscal balance adjustments between now and 2015 that a number of advanced economies will need to make to stabilize their debt-to-GDP ratios.[5] Our calculations are based on the countries' 'underlying' primary balances, netting out cyclical factors and one-off capital expenses. We then add the expected increase in aging-related expenditures from 2010 until 2060 (mainly pension, health care, and long-term care) to obtain the total primary fiscal balance adjustment needed.

The US and Japan stand out in terms of their adjustment needs

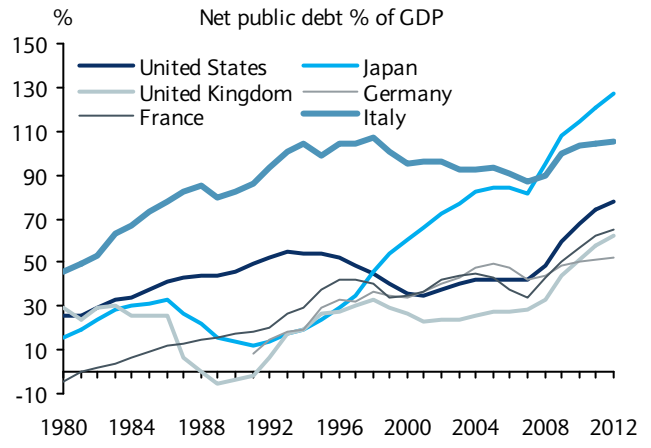
The US and Japan stand out among the largest economies in need of adjustments. Based on our calculations, the US will need to improve the structural primary balance by 8.4% of GDP between 2010 and 2015. On the same basis, Japan's effort will need to amount to 7.8% of GDP. Among the other G7 economies, the UK has the largest adjustment need (5.9%), followed by France (4.1%) and Germany (2.1%), which faces heavy aging-related liabilities but starts from a very low structural deficit. Italy is in a better position because it had run primary surpluses before the crisis, implemented only a moderate fiscal stimulus during the crisis, and had undertaken major pension reforms over the past decade.

Figure 3: Gross public debt has been trailing higher…



Source: OECD, Haver, Barclays Capital

Figure 4: … as has net debt



Source: OECD, Haver, Barclays Capital

[2] IMF Staff position note, September 2010, SPN/10/11: Fiscal Space – Ostry, Ghosh, Kim, Qureshi.
[3] *http://www.cbo.gov/doc.cfm?index=11579*, alternative scenario.
[4] *http://ec.europa.eu/economy_finance/publications/publication15998_en.pdf*
[5] We calculate the adjustment required by 2015, assuming it takes place gradually over the next five years. Assumptions related to growth, interest rates, and demographic-related expenditures over the 2010-2060 horizon are mainly based on information from national authorities and the EU. Details available upon request.

Figure 5: Required fiscal adjustment in selected advanced economies

	Net debt/GDP in 2010 (OECD)	Underlying primary balance in 2010 (OECD)	Required primary balance in 2015 to stabilize debt	Required adjustment from 2010-15 to stabilize debt	Additional adjustment due to demographic-related expenditures	Total required adjustment from 2010-15	Total required primary balance in 2015	Barclays forecast for primary balance improvement from 2010 to 2011
Belgium	82.4	1.3	0.8	-0.5	1.1	**0.6**	2.0	0.1
France	57.1	-3.2	0.6	3.8	0.4	**4.2**	1.0	1.6
Germany	50.5	-0.7	0.5	1.2	0.9	**2.1**	1.4	1.3
Greece	97.3	-0.3	1.0	1.3	1.2	**2.5**	2.2	2.3
Ireland	61.5	-5.5	1.1	6.6	1.0	**7.6**	2.1	2.6
Italy	103.3	2.0	1.5	-0.5	0.3	**-0.1**	1.9	0.3
Japan	114.0	-5.5	1.2	6.7	1.0	**7.8**	2.2	0.8
Spain	43.4	-4.7	0.5	5.2	0.9	**6.1**	1.4	3.2
UK	51.3	-5.0	0.3	5.3	0.6	**5.9**	0.9	2.0
US	67.8	-7.0	0.4	7.4	1.0	**8.4**	1.4	1.1

Source: EU, Haver, OECD, Barclays Capital

Figure 6: Our assumptions on interest-growth differential compared to historical estimates

	Interest rate – growth differential	BarCap assumptions
	1998-2007 average	
Belgium	1.2	1.5
France	0.8	1
Germany	2.6	1
Greece	-1.5	1.5
Ireland	-5.8	1.5
Italy	1.4	1.5
Japan	2	1
Spain	-2.4	1.5
UK	0.4	0.5
US	0.3	0.5

Note: 1998-2007 average is based on the implied interest rate on public debt, taken from Table 2 from the IMF Staff Position Note: "Fiscal Space", 1 September 2010. Source: IMF WEO, Barclays Capital

Future growth and interest rates likely to be worse than in the past

Debt sustainability scenarios do not appear unduly pessimistic

A crucial input in our calculation is the differential between the interest paid on debt and countries' nominal growth rates. Roughly speaking, when assessing the evolution of the debt-to-GDP ratio, the nominal interest rate is a key input on how fast the numerator grows and nominal growth determines how fast the denominator grows[6]. We have used what we consider to be relatively conservative assumptions in our exercise.[7] In particular, the benchmark calculations use a gap between interest and growth rates ranging from 0.5% for the UK and the US, to 1.5% for most other countries.

The interest rate-growth differential in the past decade was favorable

These numbers are not far away from those prevailing in the decade before the crisis, except for those countries where adoption of the euro had created the unusually benign situation of significantly negative interest rate-growth differentials on the back of sharp interest rate reductions and increases in growth. However, even for the other countries, several factors suggest higher interest rates and lower growth forward in the future.

[6] The primary balance plus other debt-creating items not included in fiscal account are other key determinants of nominal debt growth.

[7] The use of net debt (as opposed to gross debt) is likely to be quite appropriate, especially in countries with significant asset positions like Japan. In practice, however, not all government assets can be easily liquidated. Also, we neglect demographic related expenditures beyond 2060: given the small gap between interest rate and growth, considering fiscal burden beyond this horizon would significantly increase the required primary balance (this explains why our calculation are generally below the ones prepared by the EU in 2009).

Interest rates could be higher

Interest rates could be driven higher in advanced economies, simply because elevated debt levels push investors to charge a higher risk premium. In addition, longer-term shifts in global investment and saving patterns, driven by demographics and developments in EM economies, are likely to increase real interest rates worldwide (see Chapters 2 and 3).[8]

Growth could be lower

Similarly, a number of factors are likely to weigh on growth in advanced economies. First, the enormous fiscal consolidation effort needed will weigh on near-term growth. The IMF estimates that a fiscal consolidation effort of 1% reduces GDP by 0.5% within two years and raises unemployment by 0.3 pp. Over the longer term, however, debt reduction is likely to be beneficial to growth.[9] Second, these economies are shrinking some of the sectors that were the fastest growing in pre-crisis times, such as finance, retail and, in some cases, construction. While the re-allocation of resources into different sectors takes place, growth is likely to be lower. Third, not only is population growth slowing, but the growth of the labor force is slowing even more or even entering negative territory; indeed in many advanced countries it is projected to decline (for more details, see Appendix 1: Long-term growth prospects).

Larger interest rate-growth differentials imply a larger fiscal adjustment need

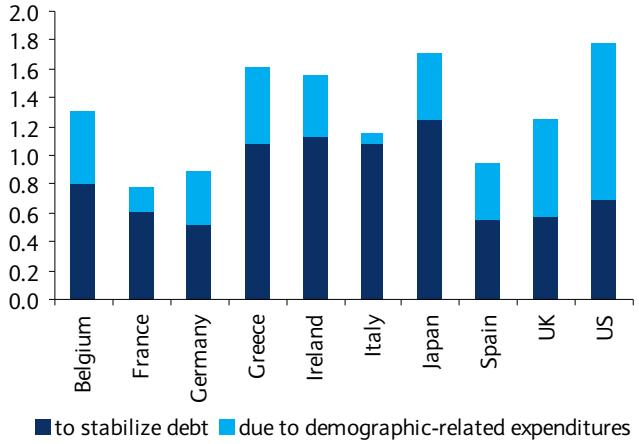
A combination of higher interest rates and lower growth could significantly worsen debt dynamics. For example, a 100bp increase in the gap would raise the total required primary balance adjustment since 2010 by 1-2 percentage points of GDP (Figure 7).

Fiscal tightening to the rescue?

Large debt reductions in the past were often driven by high growth, and fiscal tightening tended to be expenditure-based

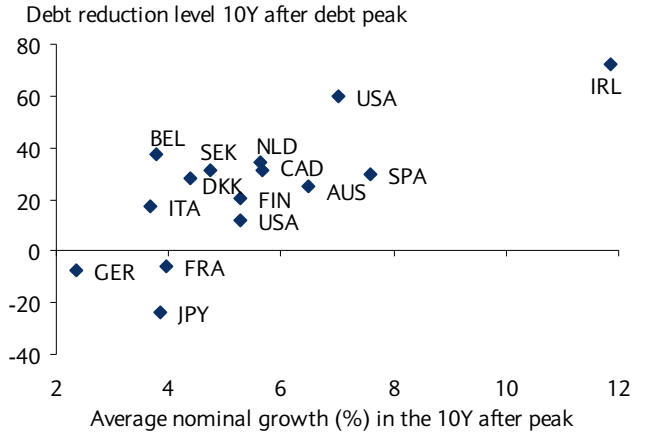
Past debt reductions offer some lessons. First, large debt reductions were generally aided by large nominal GDP growth (Figure 8). Second, fiscal adjustments that relied on expenditure cuts tended to be more successful than tax-based adjustments. Third, most of the successful expenditure-based adjustments relied on cutting transfers, social benefits, subsidies and wages. And fourth, front-loaded adjustments helped restore credibility where needed.

Figure 7: Additional fiscal adjustment*: higher interest rates (or lower growth) by 100bp



Note: * Additional fiscal adjustments required relative to Figure 5.
Source: EU, Haver, OECD, Barclays Capital, author's calculations

Figure 8: Large debt reduction assisted by high growth



Source: EU, Haver, OECD, Barclays Capital, author's calculations. Note: The peak years are: US: 1993, 1946; France: 1998, 1921 (for both the earlier peak year is represented by the higher dot), Ireland: 1991; Australia: 1995; Spain: 1996; Sweden: 1996; Netherlands: 1993; Denmark: 1993; Finland: 1996; Canada: 1996; Belgium: 1993; Italy: 1998; Germany: 1998; Japan: 1987.
Source: IMF, OECD, Barclays Capital

[8] For example, large EM economies such as China and India reduce their aggregate savings in order to finance high investment expenditure, contributing to higher global interest rates. See for example a recent McKinsey report: *http://www.mckinsey.com/mgi/publications/farewell_cheap_capital/pdfs/MGI_Farewell_to_cheap_capital_full_report.pdf*
[9] See, "World Economic Outlook", IMF October 2010.

Future adjustment will require fiscal focus, including on revenues

Given that high growth is unlikely to make the contribution to debt reduction that it did in the past, fiscal consolidation will have to play a much more prominent role. The exact composition will depend on country-specific circumstances. Consistent with historical evidence, countries that start with low expenditure levels may also need to rely on tax increases (Figure 9).

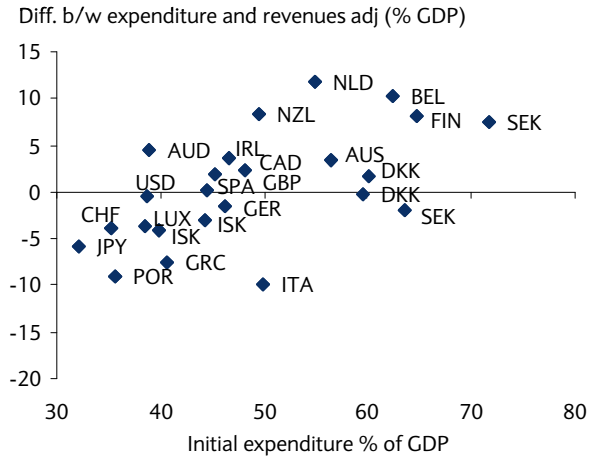
The UK fiscal adjustment seems timely and balanced

The UK's fiscal consolidation plan seems to fit textbook advice. The adjustment planned over the next five years should bring both revenues and expenditure to about 40% of GDP – close to the UK historical average. This should offset the main source of the deterioration in the fiscal balance over the pre-crisis period (from 0.7% in 2001 to -2.8% of GDP in 2007, according to the OECD), which was an increase in expenditure (from 40% to 44% of GDP). To boost confidence, the adjustment is also relatively front-loaded: the bulk of the adjustment occurs in 2011-12, when monetary policy is expected to remain accommodative. The authorities expect the fiscal consolidation plan to bring the primary balance to 1.8% of GDP by 2015-16, which will be sufficient, according to both our and the authorities' calculations, to place debt-to-GDP ratios on a declining path. A strong and frontloaded fiscal consolidation surely helped avoid any possible association of UK public finances with those of peripheral Europe. However, the position of the economy in the cycle (recovery still on its way but high inflation) may have warranted a more balanced policy mix, rather than a very tight fiscal policy and a very loose monetary policy

The US has limited room to maneuver

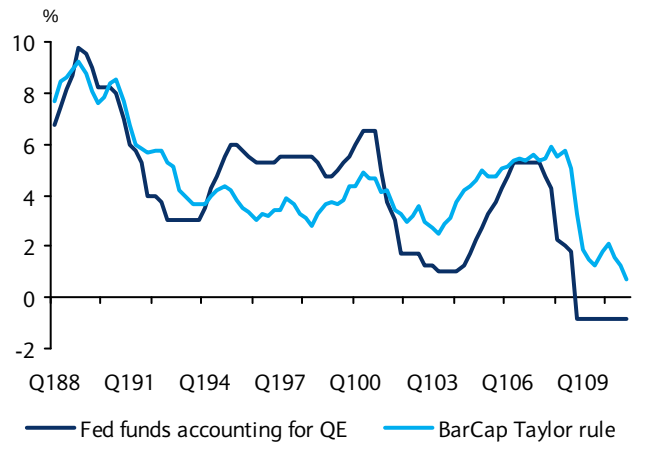
In the US, the fiscal deterioration in the years prior to the crisis stemmed not only from an increase in expenditures (mainly in health and military spending, which both grew by about 1% of GDP between 2000 and 2007), but also from a decline in revenues associated with tax cuts (which has been estimated at about 1.7% of GDP).[10] However, room for manoeuvre is limited, as federal revenues and primary expenditures (both at 18.5% of GDP in 2007, according to the CBO) are less than two-thirds of national levels (respectively, 33.9% and 34.9% of GDP in 2007, according to the OECD). The difference is mainly accounted for by state and local authorities, which are required to balance their budgets every year, and hence are unlikely to contribute to the fiscal adjustment. If anything, they could add to the country's overall fiscal burden as they are lagging in setting aside savings to cope with future pension and health liabilities (the net present value of the gap between assets and liabilities for state authorities has been estimated at about $1trn for 2008[11]).

Figure 9: Expenditure adjustment after high expenditure



Note: The calculations for the chart are based on columns 3 and 4 of Table 5.a from: "Strategies for Fiscal Consolidation in the Post-Crisis World" by the IMF (see: http://www.imf.org/external/np/pp/eng/2010/020410a.pdf) and OECD fiscal data for expenditures. For every given consolidation episode, the gap between the expenditure reduction and the revenue increase was plotted against the expenditure-to-GDP ratio in the starting year of the consolidation.
Source: IMF, Barclays Capital

Figure 10: Effective Fed funds vs optimal (Taylor rule) level



Source: Haver, Barclays Capital

[10] See Table 2 in Tempalski (2006) "Revenue Effects of Major Tax Bills" US Office of Tax Analysis Working Paper No. 81, *http://treas.tpaq.treasury.gov/offices/tax-policy/library/ota81.pdf*
[11] See report from the PEW center *http://downloads.pewcenteronthestates.org/The_Trillion_Dollar_Gap_final.pdf*

Reforms in the US will need to focus on health and social security expenditures

Considering the demographic changes and existing spending patterns on old age, it seems that much of the adjustment will eventually come from pension and health care reform. Health and social security expenditures account for almost half of federal primary expenditures (at 8.7% of GDP in 2007). The main emphasis will need to be on health reforms, which are particularly unsustainable in light of the likely demographic pattern (CBO projections show health expenditures doubling from their 2007 level of 4.5% of GDP by 2028 and tripling by 2050, while social security outlays should grow from 4.2% to 5.8% by 2028 and then remain reasonably stable).

However, such reforms are unlikely to be enough. Even if health and pension expenditures can be kept constant at the average 2002-07 level (8.3% of GDP), the projected federal primary balance in 2015 will go from -3.2% to -0.7% of GDP (on the basis of CBO projections for other budgetary items), hence about 2.3% of GDP lower than the target we suggested in Figure 5.[12] Therefore, it seems likely that an increase in taxes, or possibly a reduction in other expenditures, will also be needed.

Japan's adjustment so far has not been ambitious…

Japan implemented relatively large fiscal stimuli, estimated at 2.8% and 2.2% of GDP in 2009 and 2010, respectively; even for 2011, about 1% of GDP stimulus is expected. This has driven the fiscal deficit to more than 10% of GDP in 2009 and it was still at 9.5% in 2010. So far, efforts to reduce these deficits seem modest. We project the headline deficit to decline gradually to 7.5% of GDP by 2012. This mainly reflects the expiration of the stimulus, which generates savings of 1.5-2.0% of GDP, and implies further increases in the debt-to-GDP ratio.

… as funding risks still appear limited

So far, the government's near-term funding risks have been reduced by the large share of public debt held domestically (95%), which is itself a reflection of large household savings and current account surpluses. However, the market's capacity to continue to absorb the necessary net issuance of government bonds is likely to diminish gradually as an aging population reduces its saving. Notably, Standard & Poor's recently downgraded Japan's long-term sovereign credit rating from AA to AA-.

Additional measures will likely have to include pension entitlements…

As a result, Japan will likely have to do more fiscal adjustment soon. The IMF estimates that containing public spending growth and reforming pension entitlements in line with rising life expectancy could generate additional savings of around 3-4% of GDP over the next decade. However, in general, the scope for expenditure reductions in Japan is more limited than in other advanced economies, given that general government expenditure (including social security) was already only 33% of GDP in 2007 (pre-crisis), the lowest among G7 economies with the exception of the US. At the same time, Japan's overall tax revenue of 18% is small by international standards, suggesting the need for a more revenue-based adjustment. Given the distinct tax structure – a consumption tax rate of 5% but a corporate tax rate of 40% – this may have to be combined with relative adjustments between the different tax rates, in particular an increase in consumption taxes.

…but may have to be more revenue-based than elsewhere

Fiscal adjustment will require health and pension reforms that are difficult to implement with an aging median voter

Overall, the most advanced economies – in particular the two largest, the US and Japan – face daunting debt dynamics. With real growth likely lower than in the past decade and future interest rates higher, debt stabilization would have to rely on primary balance adjustments. Health care and pension reform will have to play an important role in the adjustments in coming years. However, at the same time, such changes are the most difficult to implement by governments in democracies where the median voter is aging.

[12] The primary balance in the January 2011 CBO alternative scenario is about -3.2% of GDP (see *http://www.cbo.gov/doc.cfm?index=12039*). The health and pension calculation are based on the August 2010 revision of the CBO outlook, Figure A1.

Easy money and inflation

Could inflation be used by public policymakers to cope with an increasing real debt burden?

Large fiscal deficits in advanced economies have been accompanied by loose monetary policy, particularly by the Fed. Expansionary monetary policy by itself raises concerns about future inflationary developments, but there is an added twist given the backdrop of the rising public debt ratios: could inflation be used by public policymakers to cope with a rising real debt burden? On the one hand, this could make central bankers' pledge to maintain price stability less credible. On the other hand, it raises the question of how successful a strategy to use inflation as a means to deal with the debt burden could actually be.

Potential inflation surprises, expectations, and central bank credibility

Deflation fears and high unemployment led to the extensive monetary loosening since 2008

The risk of deflation, coupled with high unemployment, has been the threat that has led to the radical monetary loosening since 2008. Indeed, monetary policy errors – pro-cyclical policies and/or the premature reversal of accommodative monetary policies – are typically blamed for the seriousness of the Great Depression and also the languishing of the Japanese economy. However, the longer expansionary policies remain in place, the higher the risk of potential upside surprises on inflation. In other words, the marginal reduction of the deflation risk is paid for with an additional risk of higher-than-expected inflation.

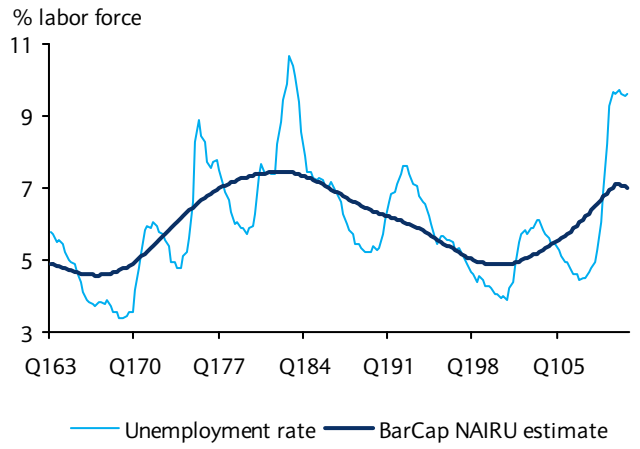
Policy might be too easy already, as demonstrated by the gap between the effective Fed funds rate and the optimal level

But is monetary policy already too easy? We start with the prime candidate, the US, where monetary policy has been most aggressive. Figure 10 shows the effective Fed funds (adjusted by the effects of QE) and the optimal Taylor-rule-implied level (given current levels of US unemployment, output gap, and inflation). The current gap is almost 2% and this does not consider the fact that fiscal policy is extremely expansionary. Our Taylor rule calculations are affected by our estimates that the natural rate of unemployment has recently risen to 7% (Figure 11), significantly above the January 2011 CBO estimate of 5.2%. The reasons why NAIRU may have increased mostly relate to the fact that higher (particularly long-term) unemployment in manufacturing and construction will prove to be structural (Figure 12).[13]

US disinflation has reached a trough

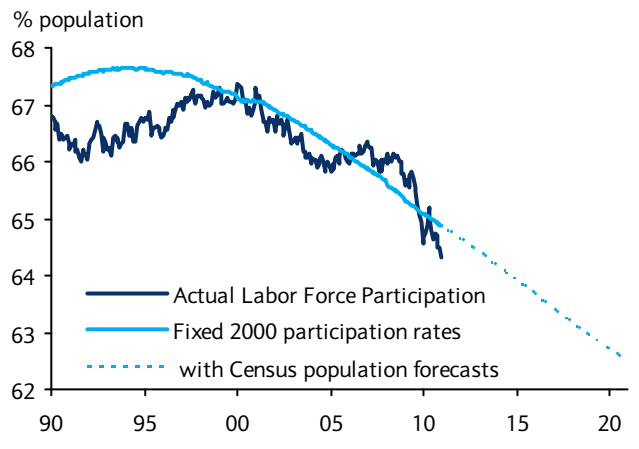
But our view is not related solely to a smaller output gap. Much of the disinflation in the US has been related to shelter costs, which appear to have troughed (Figure 13 and Figure 14). In addition, the evidence suggests that many components of core inflation are unrelated to the output gap and that for those goods whose inflation is affected by the output gap, it is not only the level, but also the direction, of the output gap that matters.

Figure 11: Unemployment and the NAIRU



Source: BLS, Haver, Barclays Capital

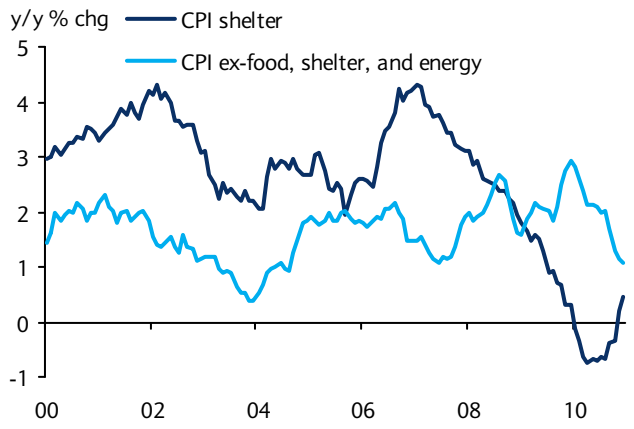
Figure 12: Labor force participation rate



Source: BLS, Census Bureau, Haver, Barclays Capital

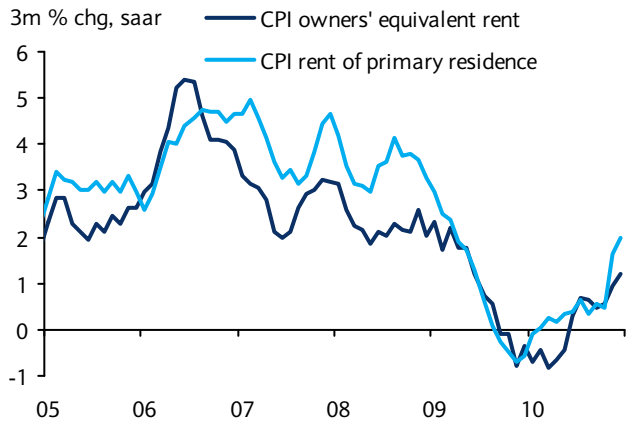
[13] Please see *Beyond the cycle: Weaker growth, higher unemployment*, 15 December 2010 and *Hires and Fires: accounting for the rise in Nairu*, 21 January 2011).

Figure 13: Core disinflation has been focused on shelter



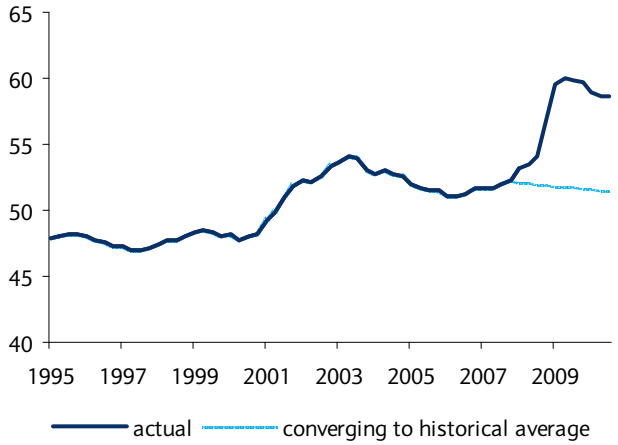
Source: BLS, Haver Analytics

Figure 14: CPI shelter costs are rising



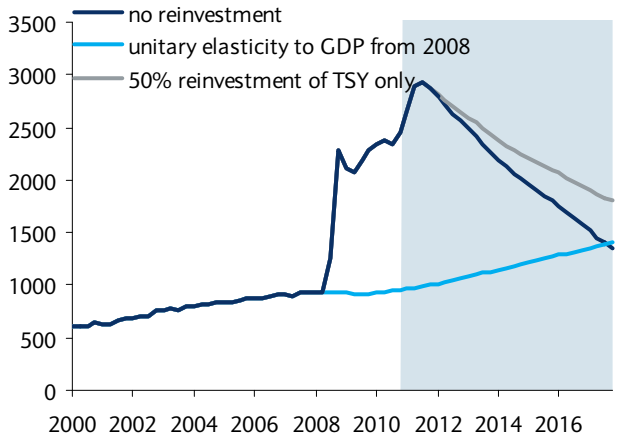
Source: BLS, Haver Analytics

Figure 15: US M2 (% GDP)



Source: Haver, Barclays Capital

Figure 16: Fed balance sheet projection ($bn)



Source: Haver, Barclays Capital

The expansion of monetary aggregates corroborates extremely easy policy

The expansion of monetary aggregates corroborates extremely easy policy: the ratio of M2 to US GDP in 2009 was at its highest in two decades, about 60%, compared with the pre-crisis mean of 50% during 1994-2007 (Figure 15). The Fed accumulated about $2.5trn of assets on its balance sheet and is set to accumulate a few hundred billions more until June. Even if the Fed subsequently stopped implementing additional quantitative easing, it is unlikely to dispose of its assets quickly. Certainly, the normal amortizations will allow the Fed to run down its balance sheet over time, but such a gradual reduction may not be fast enough if a monetary contraction is needed soon. Indeed, even in the absence of reinvestment of maturing assets, the Fed's balance sheet may remain very high with respect to historical ratios to GDP (about 7.5% over the 1994-2007 period) for several years to come (Figure 16)[14]. If credit starts to pick up, the increase in the bank multiplier compounds the increase in the money base, possibly creating inflationary pressures more rapidly than is currently anticipated.

Other measures also suggest that credit constraints are no longer an aggregate phenomenon

Other measures also suggest super-loose liquidity. US banks are maintaining very large excess reserves, on the order of USD 1trn (Figure 17). This partly reflects the mechanics of Fed QE interventions and the fact that it recently started paying interest on reserves; it does not necessarily imply the ineffectiveness of targeted interventions during the first round of QE.

[14] The FED balance sheet projections with no reinvestment assume the FED continues to pursue QE2 until June 2011 and then let treasuries, MBS, and agency asset expire at their maturity. The FED balance sheet projections with partial reinvestment assumes that after June 2011 the FED reinvests 50% of Treasuries at their expiration (no reinvestment for MBS and agency assets).

However, banks could increase lending as a result of the elevated level of reserves, once adequate lending opportunities arise. In addition, corporates are awash with cash and are able to find funding by tapping the bond market (Figure 18 and Figure 19). Overall, this suggests that credit constraints are no longer an aggregate phenomenon.

Latent liquidity in the system will require the Fed to plan ahead, as quick withdrawal is tricky

The crucial question is how confident the Fed can be that it will be able to withdraw such volumes of liquidity quickly when the demand for credit picks up. Bernanke says: "100%". However, the sheer size of the potential lending that could result from the elevated level of bank reserves implies that keeping credit growth in check could require large, and fast, interest rate hikes. At the same time, central banks, trying to prevent stop-and-go patterns, have good reason to prefer more gradual rate policies. In other words, this latent liquidity in the system will require the Fed to be more timely (and possibly more forward-looking) than in the past.

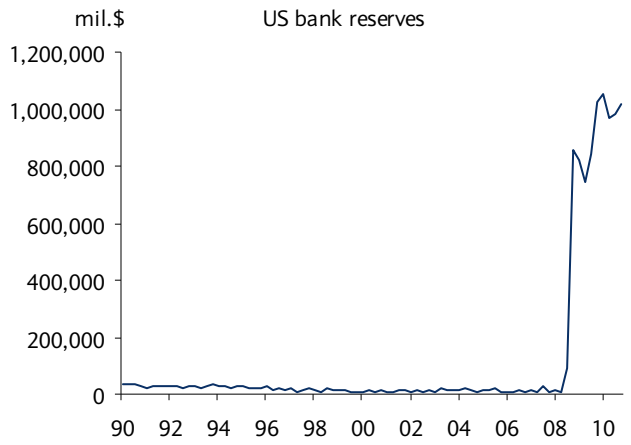
Inflation credibility is also relevant in the UK and euro area, where excessive liquidity continues

Although the US may be the most exposed, the inflation credibility issue is also relevant in the UK and the euro area. Monetary policy conditions have been kept loose in the euro area, where the ECB has provided unlimited access to cheap liquidity for banks through its non-standard liquidity operations, and policy interest rates have been kept at historic lows. Moreover, reflecting excessive liquidity in the interbank market, the EONIA overnight interest rate was fixed substantially below the ECB policy rate throughout last year, although it has normalized lately. Lingering uncertainty about the outlook for euro area liquidity conditions, coupled with more hawkish ECB rhetoric in light of rising inflationary pressures, is likely to keep short-end rates elevated relative to last year. We estimate that this adjustment alone, if maintained, would be the equivalent of a rate increase of about 50bp.

The ECB faces pressures to raise interest rates while constrained by the periphery problems

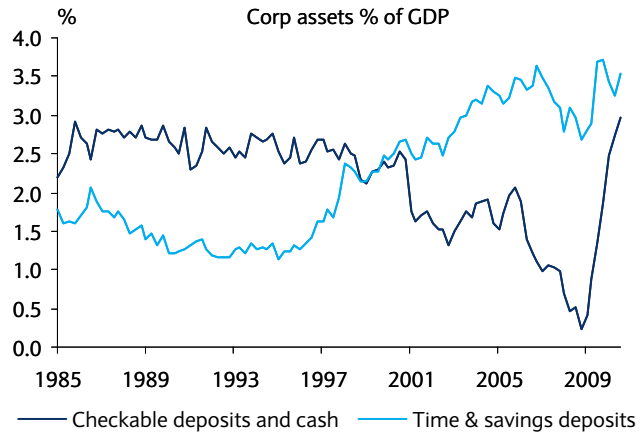
Nevertheless, we believe the ECB still faces pressures to raise interest rates. Monetary data suggest that private sector credit growth and M3 growth have bounced from the lows in the early spring of last year, implying that credit constraints should ease. Moreover, price pressures have been building as a result of commodity price dynamics, but also increasingly because of domestic core goods prices. In addition, as the economic recovery in the euro area has been uneven across member countries, the "one-size-fits-all" monetary policy stance of the ECB might prove increasingly ineffective. For instance, for most periphery countries, which need to pursue further substantial deleveraging in the private and public sector in the short to medium term, we believe low interest rates are needed. At the same time, the ECB's refinancing rate is, in our view, already too low for some core euro area countries (most notably Germany), which have rebounded quickly from the 2009 slump and are likely to run into capacity constraints as early as next year. Overall, this could generate a situation where euro area inflation continues to surprise on the upside, while the ECB might still feel constrained by the fiscal and financing problems faced by peripheral countries.

Figure 17: US bank reserves



Source: Haver, Barclays Capital

Figure 18: US corporates are awash with cash



Source: Haver, Barclays Capital

We expect UK inflation to breach 4% in early 2011

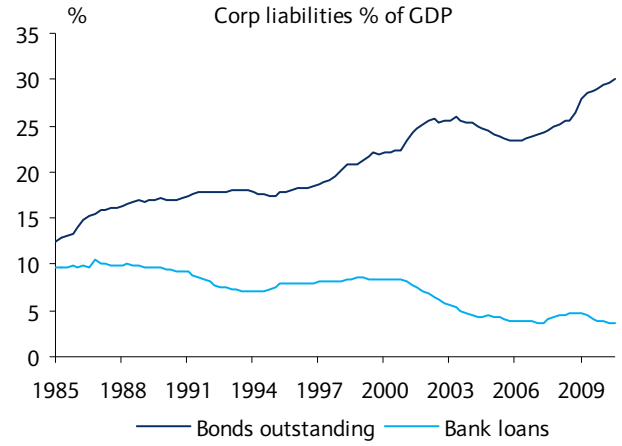
UK inflation was 1pp or more above the government's 2% target throughout 2010, and we expect it to breach 4% in the early part of 2011 (Figure 20). BoE Governor Mervyn King had to write four letters last year explaining why inflation was so far above target. Surveys of the general public show rising inflation expectations (Figure 21), although financial market-based measures have been less worrying. So far, above-target UK inflation can be largely attributed to stronger import price inflation, partly driven by the fall in sterling since 2007, and increases in VAT. The majority of MPC members still believe that domestic inflationary pressures are weak, as demonstrated by subdued pay growth and high unemployment, and that inflation will fall below target in 2012. The large drag on activity from the government's aggressive fiscal consolidation plan makes it difficult to envisage an overheating of the domestic economy. Thus, while the relatively open UK economy may suffer from the effects of elevated global inflation, it is unlikely to be a source of inflation itself.

However, most MPC members still believe it is mostly imported

The gap between headline and core inflation in the largest economies is not all commodity-driven

Central banks tend to point to core inflation rates, which have remained relatively tame. In addition to tax increases (in the UK and Europe, although not in the US), the gap between core and headline inflation has been driven by a rise in commodity prices, which is generally seen as an 'exogenous shock'. While this 'exogeneity' may be true for most central banks, it is less so for the largest economies, whose policies, at least in aggregate, have significant influence on global liquidity. Indeed, liquidity conditions created by G4 central banks have fuelled 'asset allocations' into commodities. This adds to the rising long-term price trends created by global real demand-supply dynamics for commodities. This is where the circle closes: the shocks driving headline inflation above core may be much less 'exogenous' than could be claimed under more normal circumstances.

Figure 19: US corporates find funding via bond issuances

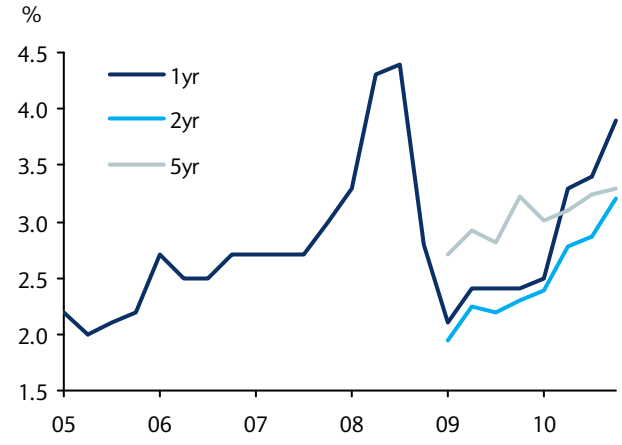


Source: Haver, Barclays Capital

Figure 20: UK Inflation

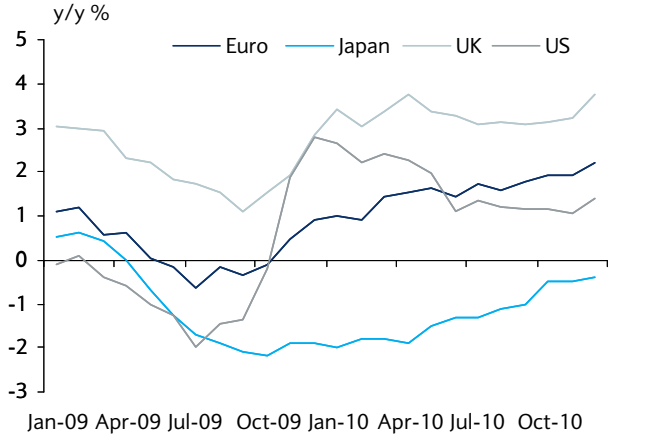
Source: Haver, Barclays Capital

Figure 21: UK general public's inflation expectations



Source: Bank of England

Figure 22: G4 Inflation has been picking up



Source: Haver Analytics, Barclays Capital

Using inflation to reduce debt burdens 'by stealth'?

Could advanced economies 'inflate away' their debt?

Could higher inflation not at least help in dealing with growing debt burdens – particularly given how difficult the fiscal adjustments seem to be? Put differently, could advanced countries not simply 'inflate away' their debt? Theoretically, debt can be partly diluted by generating inflation above expectations – that is, before the interest rates demanded by creditors can adjust. Hence, the effectiveness of inflation depends on both the size of the surprise and on the maturity structure of the debt, which determines how quickly higher marginal interest rates pass into the average interest rate paid on the debt.

Except for Japan and maybe Italy, the potential to dilute debt by generating an inflation shock is limited

To illustrate, we calculate for selected countries the potential impact of a persistent rise in inflation of 2% – ie, as shown in Figure 23, annual inflation turns out 200bp higher than expected, and this is immediately reflected in higher interest rates on new issuance (but not on existing fixed rate debt). Japan – which has a debt stock with long maturity – would gain the most from generating an inflation surprise; the US, given the short maturity of its debt, would gain less. Interestingly, the UK, despite the highest duration, would not have the largest effect, given its large share of inflation-linked bonds. In any case, the calculations seem to suggest that, with the possible exception of Japan and maybe Italy, the help from debt dilution remains limited. For the US, the achieved reduction of the debt-to-GDP ratio by 7pp would be only about 11% of the debt stock and come at the price of increasing inflation by 2pp, a price most policymakers would probably avoid unless the alternative was default. [15]

The mere fear of inflation could imply higher interest rates

The risk is that the mere fear of higher inflation could make investors demand a higher inflation-risk premium before the inflation actually occurred. This would leave policymakers in the worst of both worlds: an even higher debt adjustment burden without the help from surprise inflation. It adds further weight to the question: do the marginal benefits of keeping easy policies in place still outweigh the potential costs of withdrawing them too late?

Do the benefits of easy policy still outweigh the potential costs?

A cost-benefit analysis of the wisdom of withdrawing fiscal and monetary stimulus needs to consider the costs of tightening too early vis-à-vis the costs of leaving the economies vulnerable to undesirable outcomes in which large and abrupt fiscal adjustments are forced by markets (akin to what happened to peripheral European countries in 2010).

Deflation seems unlikely

The costs of tightening too early are most obviously related to the possibility of a double dip in economic activity and/or deflation. The negative effects of a deflationary phase have been well known since the work of Irving Fischer.[16] But deflation looks very unlikely for any of the major countries excluding Japan. Indeed, G4 inflation has recently picked up (Figure 22) and, if anything, QE2 and loose policy globally have made inflation (not deflation) a

Figure 23: Debt dilution via inflation shock of 2% is non-negligible, but not enough

	Modified duration	Net debt to GDP 2010	Inflation linkers market value % of GDP	Expected change in debt to GDP	Expected % change in debt to GDP
Belgium	5.6	82.4	0.0	-9.6	-11.7
France	6.8	57.1	8.3	-7.6	-13.2
Germany	6.3	50.5	1.8	-6.6	-13.0
Greece	4.5	97.3	3.6	-8.7	-9.0
Ireland	5.1	61.5	0.0	-6.5	-10.6
Italy	6.3	103.3	6.7	-12.9	-12.5
Japan	7.3	114.0	1.0	-17.6	-15.4
Spain	6.0	43.4	0.0	-5.5	-12.7
UK	8.8	51.3	16.7	-8.1	-15.9
US	5.3	67.8	4.4	-7.1	-10.5

Source: OECD, Barclays Capital

more likely theme in 2011.[17] In the US in particular, and as we mentioned previously, disinflationary pressures appear to have reached a trough and the risks looks to be for inflation to move higher, not lower.

More likely, some of the cyclical unemployment could become structural if unemployment stays high for too long…

More likely, in our view, is the possibility that some of the cyclical unemployment becomes structural or that, in general, output capacity is lost if unemployment stays high for too long (Ball 2009).[18] The magnitude of the problem depends on the size of the current unemployment rate relative to its natural level and on the probability that the start of the tightening cycle derails the recovery. We calculate that most of the unemployment is structural (Figure 24), although there is 1-2pp of cyclical unemployment in G4 economies.

…though the existence of cyclical unemployment does not imply that it would not continue to come down in the face of tightening

The existence of cyclical unemployment does not imply, however, that it would not continue to come down in the face of some tightening. Following the recessions of 1991 and 2001, the unemployment rate (UR) peaked on average 17 months after the NBER business cycle trough and the Fed started the tightening cycle, on average, 16 months after this peak in the UR. These were already exceptions, as in the six recessions prior to 1991, the UR typically peaked a few months after the trough and the Fed started to tighten a few months later. In the current situation, if the Fed were to tighten in August of 2012 (our call), this would put the lag between the peak of the UR and the start of the tightening cycle at *34 months*. Our Taylor-rule calculation (based on our expectations with regard to unemployment and inflation) suggests that, by then, optimal rates would already be 2.6%.

The risks and costs of extending easy policy are intrinsically related to the fiscal vulnerability of advanced economies

Although the costs of moderate tightening appear modest, the costs of maintaining the status quo do not. The risks of keeping easy policy longer are intrinsically related to how fiscally vulnerable advanced economies have become and to the related increase in inflation expectations. The deterioration of fiscal fundamentals in many advanced economies may bring them close to a tipping point where they may be vulnerable to a sudden switch in market sentiment and undesirable outcomes. The experience of peripheral euro area countries this year is a reminder of how rapidly markets can move from a good equilibrium of low rates and apparently "manageable" debt dynamics to a bad one of high funding costs and explosive debt dynamics (Figure 25).

A small change in sentiment can trigger sharp reactions in the markets

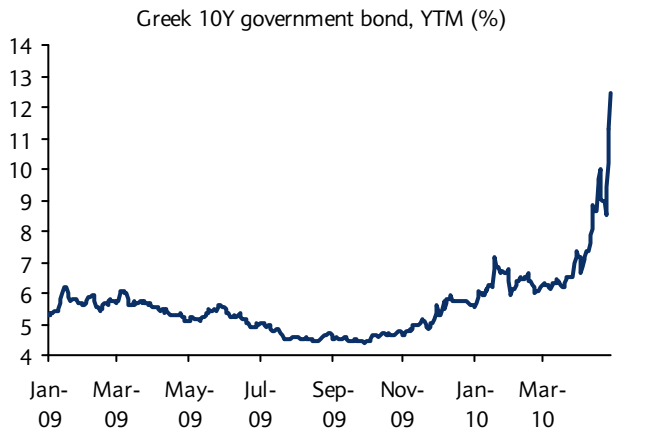
Triggers of changes in sentiment can vary: it may be a shift in global appetite for risk; a default/restructuring in one country that focuses investor attention on possible contagion; or failure to take necessary actions to bring countries back to sustainable debt paths. It is impossible to pin down exact triggers and timing.[19] But once it happens, the changes in

Figure 24: Cyclical unemployment and NAIRU

	Unemployment (latest)	NAIRU	Cyclical unemployment
US	9.0%	7.0%	2.0%
Japan	5.1%	4.2%	0.9%
Euro Area	10.0%	8.4%	1.6%
UK	7.9%	6.9%	1.0%

Note: At the end of January, 2011. Source: Barclays Capital

Figure 25: Changes in market sentiment can be abrupt



Source: Bloomberg

[17] In our most recent *Global Macro Survey* only 6% of respondents thought deflation was a likely theme in 2011.
[18] See Laurence M. Ball, *Hysteresis in Unemployment: Old and New Evidence, NBER Working Paper No. 14818, March 2009.*
[19] This fear is in our view behind the recent fiscal adjustment packages in the UK and France

yields/spreads can be severe: relatively small changes in default probabilities can result in yield increases that worsen debt dynamics and in turn increase the risk of default, exacerbating the increase in yields. Once in motion, markets do not naturally stabilize: external factors, such as a credible fiscal adjustment and public sector funding (often a combination of both) are necessary to halt the vicious dynamics.

The US and Japan will eventually have to restore fiscal sustainability

Paradoxically, two of the countries with the worst debt dynamics have some of the lowest yields: the US and Japan. The former benefits from the "exorbitant privilege" of issuing the world's currency, the latter from a strong domestic bid resulting from a large base of local investors. These factors can buy time and may postpone the day of reckoning, but there is no alternative to the eventual restoration of fiscal sustainability. And lack of market discipline may actually be counterproductive if the problem is left unresolved for too long as debt stock rises exponentially. Indeed, one could argue that the reason that the unsustainable dynamics in some (not all) of the peripheral countries were not tackled earlier was, at least in part ,the prolonged market (mis)perception that their credit risk was similar to that of Germany..

Easy policy is also reflected in increased inflation expectations

The costs of easy policy are also manifest in increased inflationary expectations (Figure 26). Either because of fears of inflating the debt away or because of fears of excessively easy monetary conditions, inflation expectations have increased globally, particularly after QE2. Increases in inflation expectations once deflation is a risk are clearly welcome, but if they move beyond central banks' comfort zones they become problematic as they may require aggressive tightening as central banks play catch-up.

Goods inflation itself is bad enough. But the risk of falling behind the curve increases when easy policies result in asset price inflation as well. Asset markets booms (and busts) have historically exacerbated economic cycles through a number of well understood channels, in particular when related to real estate prices. Recent rallies in asset prices can in part be justified by the strengthening of the global recovery, but it is not by chance that the rise in risky asset prices stepped up significantly after QE2 was telegraphed to the market. The combination of super easy policies (and the expectation of their continuation in the future), the global economic recovery, and the perception that there have been structural changes meriting improved valuations in certain assets (commodities and EM are prime candidates), could become a recipe for future asset price overshooting, and eventual bubbles, as these factors will tend to reinforce themselves.

Our analysis favors modest tightening over easy policy

Our analysis suggests that a modest tightening is a superior alternative to the continuation of easy policies in advanced economies. But how to tighten policies? We have argued that because of the stage of the business cycle, both fiscal and monetary policies need to be tightened. But our concerns about debt dynamics in advanced economies suggest that fiscal contraction is doubly guaranteed. Indeed, if fiscal policy is tightened, monetary policy may be tightened at a much more modest pace and hence remain loose for longer. However, outside a few countries, aggressive and frontloaded fiscal contraction does not appear to be forthcoming as the political economy of many of the advanced economies (and certainly of the US and Japan) makes fiscal tightening very complicated. This suggests that over-tightening on the monetary front may be necessary.

Risks from easy policies in emerging markets

EM also face challenges related to their dovish policies and abundant global liquidity

EM economies also face challenges: their dovish policies, even if they originate from a different dynamic, may likewise result in problems down the road. Most emerging markets faced the financial crisis from a position of strength: the accumulation of reserves, strong fiscal conditions, tight banking regulation and overall strong fundamentals allowed them to bounce back rapidly. However, the potential sizable capital inflows associated with abundant global liquidity, spurred by G4 central banks, and the newly found attractiveness of emerging markets have generated domestic inflationary pressures. These are manifest in food inflation, boosted by commodity price increases, but also in assets such as real estate and stock markets.

Capital inflows generate policy dilemmas

Capital inflows put upward pressure on currencies. This generates policy dilemmas as measures to restrain inflation (via interest rate increases) may result in the currency appreciation that most EM policy authorities want to avoid.

Intervention in FX markets has increased

Although it is difficult to generalize, we think it is fair to say that most EM countries appear to favor a weak exchange rate at the risk of potentially higher inflation. Intervention in FX markets has certainly increased (Figure 27). In Asia, policies continue to be mostly 'leaning against the wind'; in Latin America, there appears to be a growing focus on shoring up competitiveness; and EM EMEA offers a range of preferences among policymakers.

Intervention tools vary, but the scale of intervention remains modest

Intervention tools are diverse. Some countries have turned to currency-unfriendly monetary, tax and regulatory policies; however, with few exceptions, the scale of intervention remains modest. Chile is an outlier in the magnitude of the shift in FX-intervention policy; it has gone from doing very little to committing to buy USD12bn (roughly 6% of GDP) in the coming year. Brazil is arguably also an outlier in the investor-unfriendliness of the policies it has adopted to discourage capital inflows and weaken its currency. A recent policy shift in Turkey that combines a further reduction of policy interest rates with hikes in banks' reserve requirements sparked a debate about the future course of monetary policy. South Africa also presents an interesting case: in late 2010, changes in legislation limiting outflows from locals were loosened in an apparent effort to encourage more domestic money to head offshore and thus weaken the currency without directly affecting foreign investors.

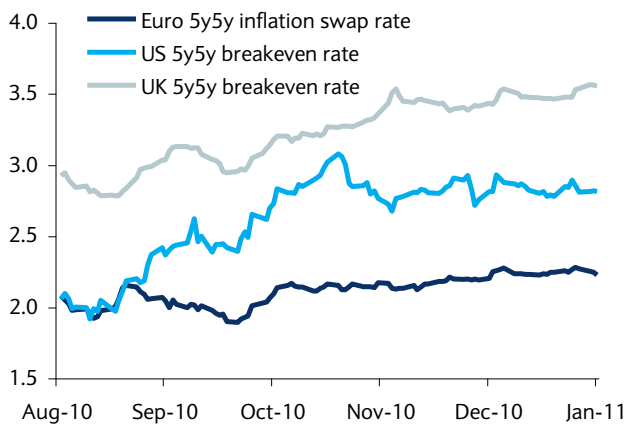
To some extent, we think government limitations on capital inflows should be viewed positively by investors…

Market participants tend to be suspicious of government attempts to affect the exchange rate, believing it distorts relative prices and resource allocation. However, things are more complex than that. The exchange rate is both an asset price and the relative price between domestic and foreign goods; as such, it is subject to market sentiment that can move rapidly from euphoria to depression. Policymakers are probably right to seek to limit appreciation pressures beyond what is justified by medium-term fundamentals. To the extent that these measures reduce the tendency for capital inflows to translate into a domestic asset-market boom (and eventual bust), we think they should be viewed positively by investors. However, in some cases, reluctance to allow currency appreciation may reflect a mercantilist approach: policymakers are using the exchange rate as the main tool to enhance (export-driven) growth instead of implementing more targeted measures to enhance productivity.

…however, the combination of FX intervention and easy monetary policy is risky

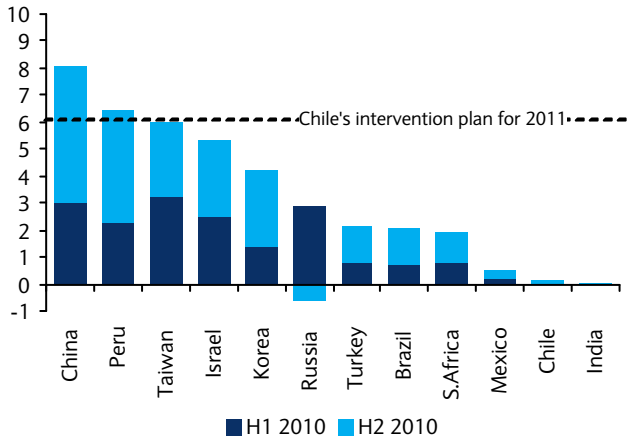
We have some sympathy with the desire to limit excessive currency appreciation. However, the policy combination of FX intervention with easy domestic monetary policy is risky. At a global level, there is a lack of policy coordination. Although many EM policymakers appear determined not to be recipients of flows that have been deflected from other countries, the result is that monetary policy remains too easy on a global scale.

Figure 26: Inflation expectations have increased



Source: Barclays Capital

Figure 27: EMFX intervention (% GDP) has increased



Source: Bloomberg, Haver, national sources, Barclays Capital

Aggressive currency control can lead to inflation

Currency policy alone is not likely to address the deterioration in trade balances or the stresses that may be associated with them. Generally speaking, economics tells us that external adjustment requires both exchange rate (expenditure-switching) and demand-management (expenditure-reducing) policies. If the demand-management (ie, fiscal policy) component of the policy effort is not ambitious enough, aggressive policies to weaken the exchange rate can lead to inflation. And, in the current environment of quasi-pegged exchange rates, fiscal policy is particularly powerful.

Central banks appear to have been distracted from their inflation responsibility

More generally, central banks appear to have been distracted from their core responsibility to control inflation. Although core and headline inflation in many EM economies have yet to approach levels that challenge official targets, they are almost everywhere on the rise. The average inflation breakeven levels in China, Brazil, Chile, Colombia, Israel and Korea are at (or close to) their 12-month highs and the momentum suggests that global inflationary pressures will remain on the rise. The risk of being distracted from inflation responsibility could lead to monetary policy being forced to play catch-up (with sharp hikes and ultimately disruption for the economic recovery).

A more volatile world

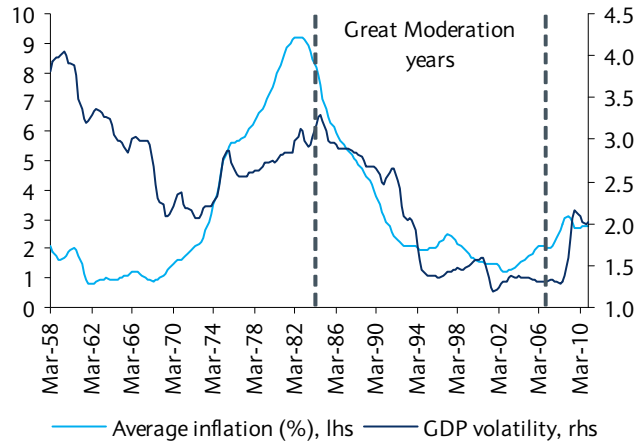
A world of higher volatility than pre-2007 is possible

Since 2007, the global economy has experienced continual shocks. Although we should not extrapolate the recent past into the future, a world of higher volatility than pre-2007 would not be surprising. After all, the so-called "Great Moderation" years of the 1990s and the beginning of the last decade stand out as an exception in terms of lengths of economic recessions, low inflation and relatively stable growth. The 1950s and early 1960s also experienced low inflation but, even if declining, output volatility was much higher than during the Great Moderation (Figure 28).

The Great Moderation was the result of three factors: better policy; structural changes; and good luck

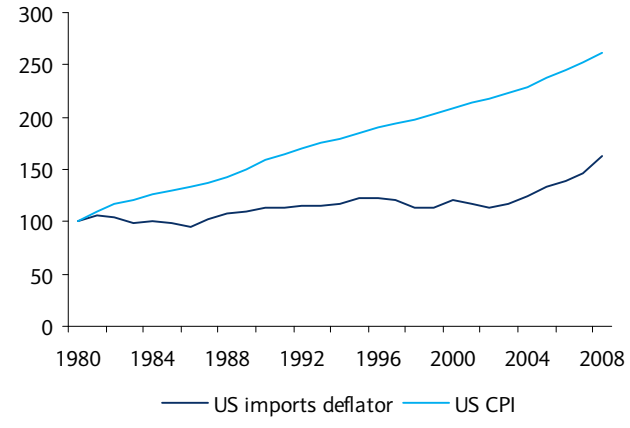
Even if they disagree on their relative contribution, economists believe that the Great Moderation was the result of three factors: better policy, structural changes, and good luck. In reverse order, the 'good luck' factor contends that the reduction in macroeconomic volatility described as the Great Moderation was mostly a reflection of smaller and more infrequent exogenous shocks hitting the economy. Explanations focusing on 'structural change' pointed to changes in technology, business practices and other features that boosted economies' ability to absorb shocks: technology-driven improvements in inventory management, deregulation in many industries, a shift away from manufacturing toward services, increased openness to trade (and the related cost improvements), and freer and more sophisticated financial markets.

Figure 28: The "Great Moderation" was an exception



Note: Each quarter is calculated for the decade before, on a 3-months rolling basis.
Source: Haver, Barclays Capital

Figure 29: Disinflationary pressures turning upside down



Note: Indexed to 1980=100
Source: Haver, Barclays Capital

Finally, the 'better policy' argument builds on the general agreement that monetary policy played a large part in stabilizing inflation since the early 1980s. The late 1960s and 1970s were fraught with policy mistakes. Central banks tried to exploit short-term trade-offs between unemployment and inflation (move along the 'Phillips curve') and claimed that inflationary factors were to the result of supply-side shocks and hence beyond their control. These policies failed. After those stop-go failures, policymakers moved from short-sighted behaviour to a more intermediate term view, exemplified by Fed Chairman Paul Volcker's anti-inflationary measures in the late 1970s and early 1980s, Alan Greenspan's anticipatory tightening and the widespread move to inflationary targeting across the globe since 1990.

Analysis of these factors suggests the Great Moderation will be partly reversed

An analysis of the likely evolution of these factors suggests that the Great Moderation will be partly reversed. We can start with 'structural' or simply 'good luck' factors. The disinflationary pressures from the emerging world that contributed to the observed reduction in inflation appear to have diminished (Figure 29). This process started before 2007, even if it was obscured by the financial crisis (Chapter 3). The trade liberalization in the 1990s by the world's most populous countries, coupled with their strong productivity growth, put downward pressure on global manufacturing prices. China's domestic inflationary pressure makes it apparent that the country has entered a "Lewisian" turning point or (most likely) the phase where wage pressures reflect the diminishing excess labor from the rural sector. If anything, the emergence of other economies, in particular of the increasingly prominent role played by India, is likely to push global demand more than global supply (something that is already evident in commodity prices) and hence generate inflationary, not disinflationary, pressures.

Inflationary pressures have replaced disinflation fears

The 'good luck' factor seems to have turned the other way

It is also unlikely that good luck factors associated with smaller and less frequent shocks will continue. The magnitude and frequency of shocks of the last 3.5 years suggest that, if anything, the luck factor has turned the other way; there are serious candidates for destabilising an inherently more unstable global economy. We are not going to make an exhaustive list of potential risks. But, as we argued earlier, perhaps the biggest challenge relates to public sector debt dynamics in advanced economies. A persistent increase in inflation is also likely. The combination of easy policy in advanced economies, strong growth in emerging economies and reluctance to let EM currencies appreciate appear conducive to global inflationary pressures. Advanced economies may have to start to live with lower growth and higher inflation than in the past decade.

The fading of those factors puts a greater burden on policies

The fading help from structural factors and 'good luck' puts even more of a burden on policy. Yet we see at least two reasons why policy is unlikely to be as helpful as in the past. First, policymakers have largely used up their ammunition. High public debt burdens and extremely low policy rates (combined with bloated central bank balance sheets) leave little room for stabilization. A shock of Lehman Brothers proportions almost certainly could not be fought with the same vigour, but if current unsustainable policies continue, even smaller shocks will be difficult to offset. Aggressive action could even increase, not reduce, uncertainty.

Easy policy generated a false sense of stability and led to excessive risk-taking, which eventually led to the 2007 crisis

Second, with the benefit of hindsight, we can now see that the monetary policy towards the end of the Great Moderation years was actually unsustainable. "Observed" volatility benefited from extremely easy Fed policy: by acting very aggressively during downturns, the Fed reduced the amplitude of recessions. But easy policy generated a false sense of stability, encouraging increased risk-taking and leverage that effectively increased the probability of "events" and led to dotcom bubble and later to the housing bubble that preceded the 2007 crisis. Hyman Minsky[20] has already shown that it is precisely during apparently tranquil times that decisions that eventually lead to a bust are taken.

Overconfidence impaired the quality of policymaking in the late 1990s

Indeed, we think the quality of policymaking began to deteriorate in the late 1990s as policymakers grew overconfident: Alan Greenspan first resisted tightening (1997) and then eased into what was already a late-cycle boom. Indeed, some of the short-sightedness of

[20] Minsky, Hyman, "Stabilizing an unstable economy", Mc Graw Hill 2008.

monetary policy in the 1960s and 1970s, as reflected in Bernanke's Great Moderation speech (2004)[21], can also be perceived in the policies of the late 1990s and the early part of the last decade:

"The output optimism of the late 1960s and the 1970s had several aspects. First, at least during the early part of that period, many economists and policymakers held the view that policy could exploit a permanent trade-off between inflation and unemployment, as described by a simple Phillips curve relationship. The idea of a permanent trade-off opened up the beguiling possibility that, in return for accepting just a bit more inflation, policymakers could deliver a permanently low rate of unemployment. This view is now discredited, of course, on both theoretical and empirical grounds. Second, estimates of the rate of unemployment that could be sustained without igniting inflation were typically unrealistically low, with a long-term unemployment rate of 4 percent or less often being characterized as a modest and easily attainable objective. Third, economists of the time may have been unduly optimistic about the ability of fiscal and monetary policymakers to eliminate short-term fluctuations in output and employment, that is, to 'fine-tune' the economy. "

An immediate and sustained focus on regaining fiscal sustainability is required, and central banks need to start withdrawing the extreme stimulus

Where does this leave us in terms of economic policy? Facing a potentially unstable environment and with fewer available options than has been the case for a long time, we believe policymakers need to be more humble, risk averse, and, importantly, forward-looking. An immediate and sustained focus on regaining fiscal sustainability is certainly needed. Equally importantly however, central bankers must avoid introducing additional instability by getting behind the curve and failing to start withdrawing the extreme stimulus. The risk of goods inflation is very real, but asset price inflation (and eventual bubbles) is as likely and potentially more dangerous given its well known effects of amplifying economic cycles. In emerging economies, this means more aggressive tightening than currently appears to be in prospect. For the US, it means that if the Fed does not want to fall behind the curve, it will need to begin to shift to tightening in a matter of months, not years.

[21] Bernanke, Ben, "The Great Moderation", Remarks at the meetings of the Eastern Economic Association, Washington, DC February 20, 2004.

Appendix 1: Long-term growth prospects

Growth prospects may not be particularly bright

A number of structural factors suggest that medium-term growth in advanced economies may be below pre-2007 levels. This is particularly important because a significant part of the risk-to-debt sustainability comes from such a possible slowdown, as detailed below. As is well known, growth depends on increases in factors of production (such as labor and capital) and productivity improvements that may come from enhancements in the quality of education, technological advances, better policies, and changes in political and socio-economic institutions. The reallocation of economic activity across sectors can also slow growth by affecting the employment of factors, but only temporarily.

Demographic trends may take a toll on overall growth…

One key factor with a persistently negative effect on growth arises from demographic trends. Although advanced economies are unlikely to experience a particular deepening in capital accumulation, in light of their stage of development, labor supply may change. Indeed, their population growth is expected to decline significantly over the coming decades. In addition, the aging population structure implies that growth in the labor force will be even slower than population growth, reversing the pattern of the past few decades, as baby boomers enter retirement (Figure 30 and Figure 31).

… not only in advanced economies

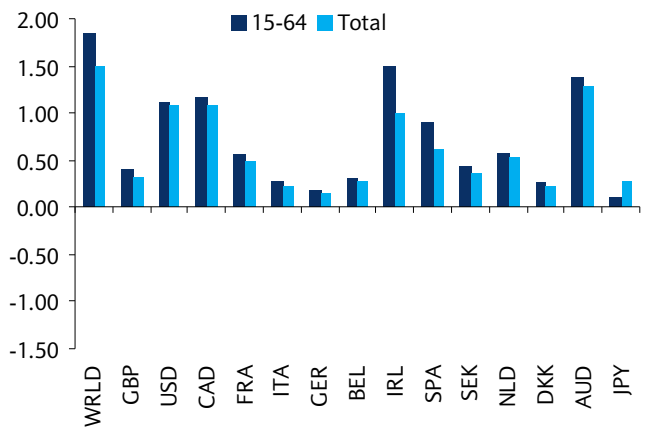
This demographic change is not unique to advanced economies. A decline in population growth, and an even stronger decline in the working age population, is actually more visible in developing countries than in advanced economies (Figure 32 and Figure 33). Most interestingly, the pattern is driven not only by China, with its single child policy, but is also common across a wide spectrum of countries across all regions.

Productivity may offer only a partial offset

This pattern is likely to reduce employment growth significantly in the absence of offsetting factors, such as immigration, changes in the natural rate of unemployment, changes in female participation, and other socio-demographic effects. In turn, this will slow overall economic growth, although part of the effect is likely to be offset by productivity gains driven by the fact that scarcer availability of labor will be an incentive for firms to accumulate more capital and innovate. Some academic studies have even estimated that in the US, changes in labor productivity associated with changes in working age population growth are generally large enough to offset the latter, leaving overall growth unchanged.[22] However, a full offset is unlikely. Indeed, such a result would suggest that the internet revolution of the 1990s was spurred by demographic factors rather than by past military investments, and that the growth slowdown of the 1970s stemmed from demographic factors rather than the oil shock (which can be only partly attributed to larger global demand related to the baby boom).[23] Moreover, even if one espouses the idea that oil price movements are generally driven by the effect of population growth on global demand, a major repercussion from oil prices on GDP growth (similar to that of the 1970s) is unlikely. Indeed, the oil dependence of economic systems is on a declining trend even in countries such as China and India, which implies a declining effect on growth from oil prices, as demonstrated by the small effect on growth of the large oil price increase of the past decade.[24]

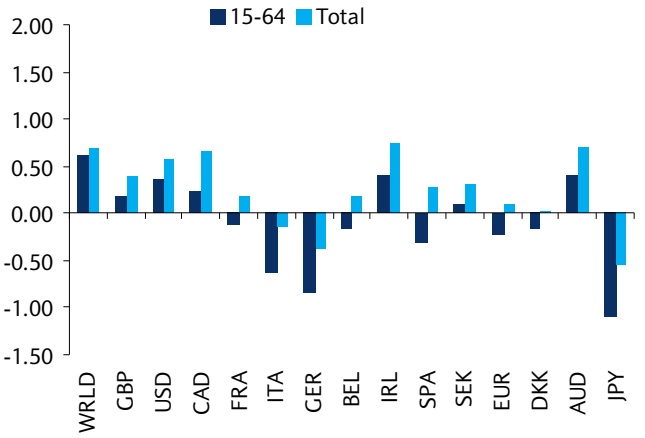
[22] See for example, *http://www.bos.frb.org/economic/conf/conf46/conf46e1.pdf*, and references therein.
[23] Big historical events can generate a spurious correlation in the above results about productivity and demographics. Indeed, cross-sectional analyses (which are good at capturing the long-run effects and are immune from these time patterns) indicate no particular relation between per capita growth and population growth (see, for example, Ross Levine and David Renelt (1992) "A Sensitivity Analysis of Cross-Country Growth Regressions," *The American Economic Review*, Vol. 82, No. 4, pp. 942-963).
[24] See slide 12 in the 2011 British Petroleum Energy Outlook
http://www.bp.com/liveassets/bp_internet/globalbp/globalbp_uk_english/reports_and_publications/statistical_energy_review_2008/STAGING/local_assets/2010_downloads/2030_energy_outlook_booklet.pdf

Figure 30: Growth in working age (15-64) and total population – 1980-2010 (%)



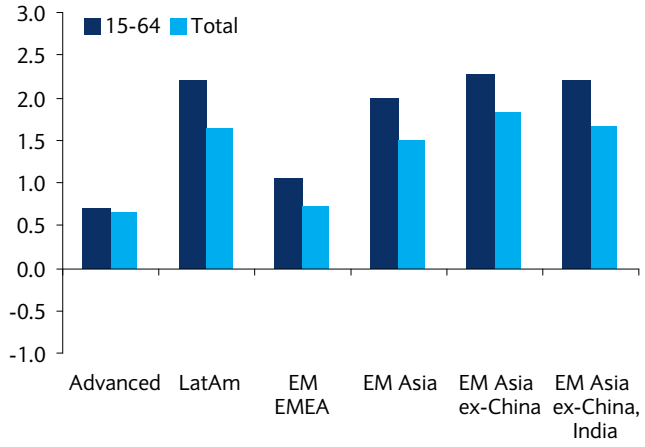
Source: UN Population data

Figure 31: Growth in working age (15-64) and total population – 2011-2040 (%)



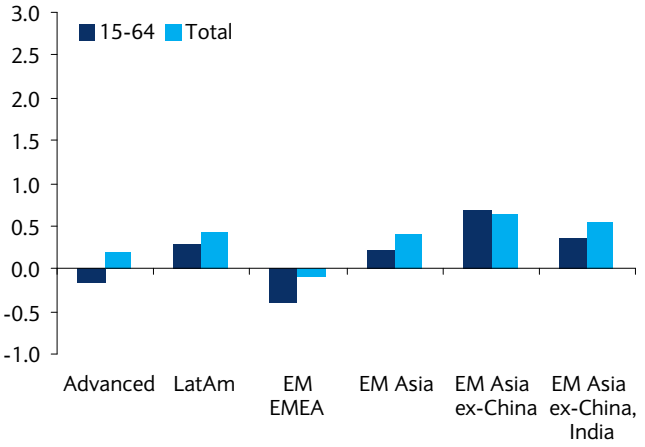
Source: UN Population data

Figure 32: Growth in working age (15-64) and total population – 1980-2010 (%)



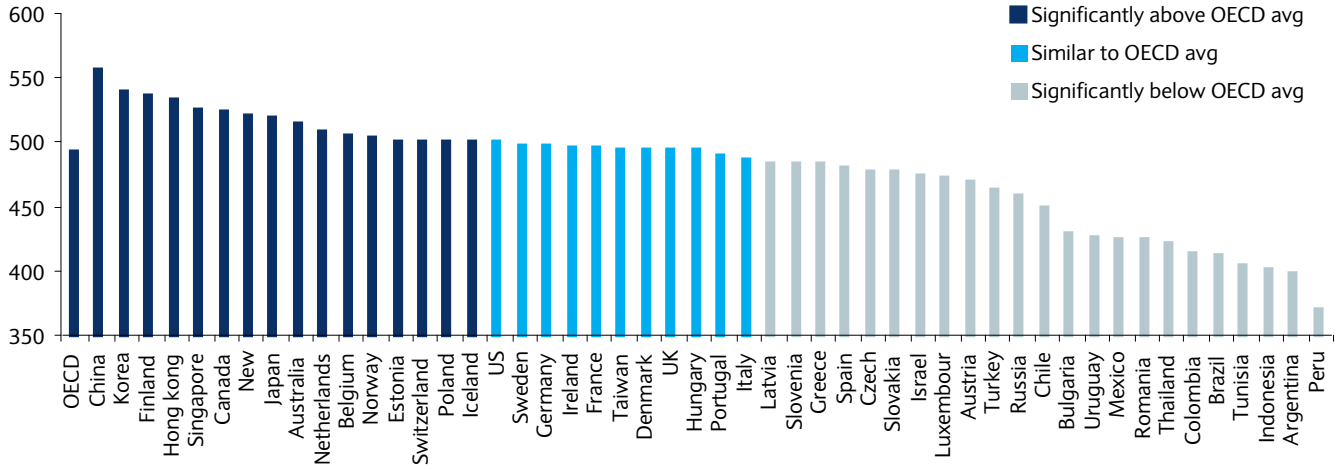
Source: UN Population data

Figure 33: Growth in working age (15-64) and total population – 2011-2040 (%)



Source: UN Population data

Figure 34: Overall score of school achievement (PISA 2009)



Source: OECD PISA, 2009

Education will be among the most important growth factors in decades to come

A second key factor likely to drive growth is the quality of education. This will most likely appear quite prominently on policymakers' agendas. Extensive research has shown that academic achievement, as measured, for example, by test scores in math, science, and literacy, is much more indicative of the potential for growth than school presence, as measured, for example, by number of hours of schooling.[25] Not all advanced economies rank highly. Of the 64 countries tested for the 2009 PISA indicators (Program for International Student Assessment, OECD), 17 performed above the OECD average, four of which (China, Korea, Hong Kong, Singapore) were in emerging Asia. The US, Germany, and France, are not among the 17: they are close to the OECD average. Italy, Spain, and Greece perform below the OECD average, and Portugal is just barely above it (Figure 34). Adequate investment in education will be crucial to raising countries' living standards and ensuring an adequate position in the global rankings. It has been shown that the distance in the quality of education between the US and China (Shanghai) may explain as much as two percentage points of annual per capita GDP growth differential, after all other factors have been considered.[26]. And even just reaching a growth rate of this magnitude is more than most advanced economies can dream of, let alone achieving it just from education attainments.

The education gap between the US and China may explain up to 2pp of the per capita growth differential

Sectoral reallocation of resources may slow growth temporarily…

Third, it is important to consider temporary factors that may pertain to the near future. Growth may slow in some of the fast-expanding sectors that contributed significantly to the overall economic expansion of the past few years. The associated sectoral reallocation would imply a temporary deceleration in overall growth until the required reallocation of resources across sectors had occurred. For example, in several advanced economies, growth in the financial sector in 1995-2007 was 20-80% larger than overall GDP growth (Figure 35 and Figure 40). This was generally associated with robust employment growth, but in some countries (notably the US and UK) also with higher value added per worker, likely as a result of financial innovation. It is possible that deleveraging and the more limited use of derivatives, coupled with tighter regulation, will bring growth in this sector more in line with the rest of the economy. The retail sector had an impressive performance, particularly in the US, in part because of low import prices from China and innovation in the distribution sector (eg, Wal-Mart). To the extent that wage and cost pressures in China push towards higher real exchange rate appreciation, expansion in the retail sector in advanced economies may slow. Contrary to popular belief, the construction sector has experienced positive growth in only a few countries, notably Ireland, Spain, and Greece, and not in the US or the UK (note, however, that official records do not reflect activities in the informal sector, which are likely to be significant in construction, so growth in this sector may be significantly underestimated).

… as some sectors (such as finance and retail) may not continue to grow as fast as before

…and expenditure shifts from young to old become more relevant

A fourth effect may result from the reallocation of resources across sectors demanded by an aging society in the presence of different spending patterns across age groups. This effect will be more relevant for countries with limited labor market flexibility, as in Europe. Overall, it is likely to be small, as the spending changes will likely be gradual and, in part, anticipated.

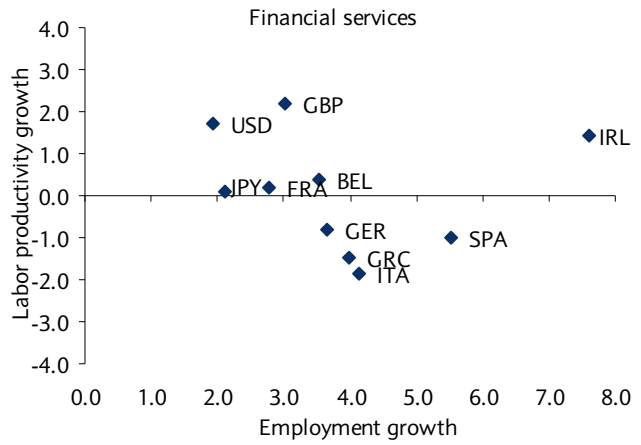
Fiscal consolidation may also take a temporary toll on growth, but the effect should be positive in the long run

Finally, fiscal consolidation should contribute to lower growth in the initial phase via a lower negative effect on aggregate demand. [27] As public finances improve, a decline in domestic interest rates is to be expected. This would, in turn, stimulate capital accumulation and growth.

[25] *http://edpro.stanford.edu/hanushek/admin/pages/files/uploads/Edu_Quality_Economic_Growth-1.pdf*
[26] ibid.
[27] See the strong evidence in this direction offered by the October 2010 IMF World Economic Outlook http://www.imf.org/external/pubs/ft/weo/2010/02/pdf/c3.pdf

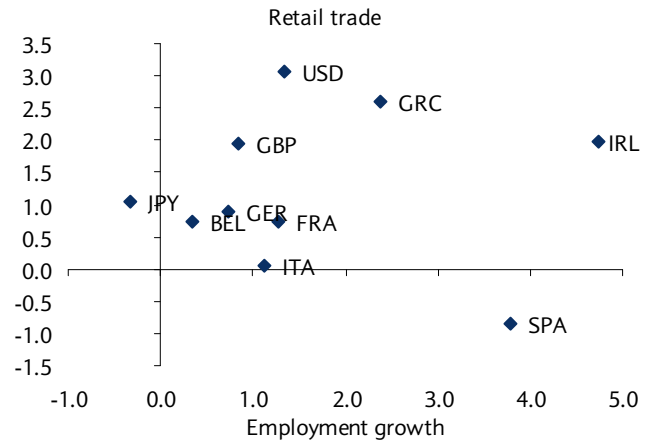
Contribution to real GDP growth from growth in employment and in output per worker (1995-2007 average*)

Figure 35: Financial services (%)



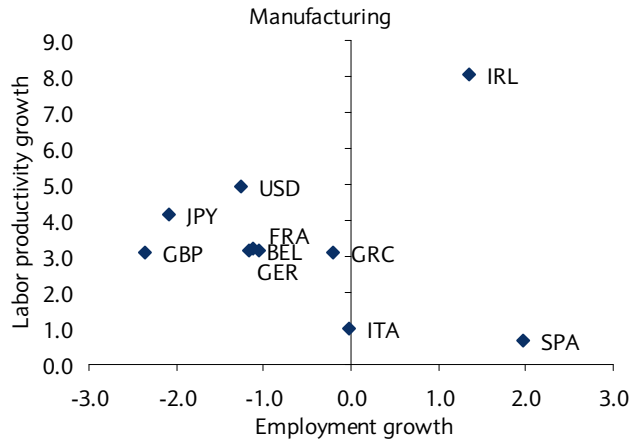
Source: OECD, Barclays Capital

Figure 36: Retail trade (%)



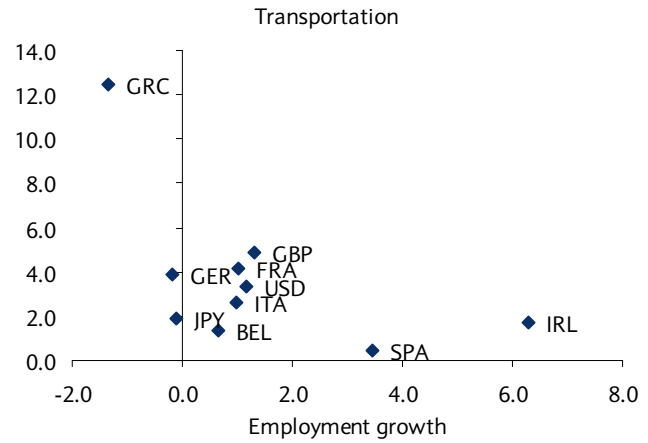
Source: OECD, Barclays Capital

Figure 37: Manufacturing (%)



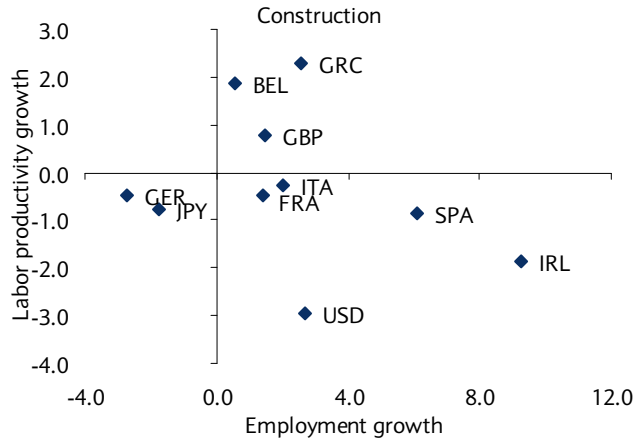
Source: OECD, Barclays Capital

Figure 38: Transportation (%)



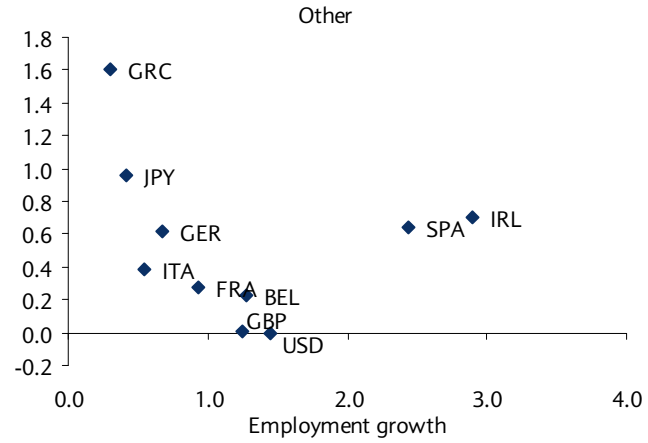
Source: OECD, Barclays Capital

Figure 39: Construction (%)



Source: OECD, Barclays Capital

Figure 40: Other sectors (%)



Source: OECD, Barclays Capital

Note: total real GDP growth for the respective sector is approximately the sum of the employment growth and the labor productivity growth.
* For Japan the data is 1995-2006 average.

Appendix 2: Learning from past debt reductions

High nominal growth assisted large debt reductions

The recent history of debt-to-GDP reductions and fiscal consolidation in advanced economies offers a few indicative lessons.[28] First, large debt reductions were assisted by high nominal growth. Figure 41 and Figure 42 show debt ratios at major peaks and 10 years later, as well as the average nominal and real GDP growth, inflation, interest rates, and fiscal performance during the 10 years of the adjustment. Significant reductions in debt ratios have rarely occurred with nominal growth lower than 5-6% and real growth lower than 3%. For example, US debt-to-GDP rose from about 50% in 1940 to about 122% in 1946; it subsequently declined to about 62% by 1956, during a period when nominal GDP grew at about 7% and real GDP at 4%. High inflationary periods, such as post-WWII in Italy, are associated with the most impressive debt ratio reductions. But high real growth was also quite effective, as in Ireland, where 7% real growth in the 1990s helped cut debt by two-thirds, and Spain, which posted 4% real growth after debt peaked in 1996. Lethargic growth, as in Italy over the past two decades, has been associated with a limited reduction in debt.

Fiscal consolidation played a role mainly in Europe, not the US

Second, especially in the more relevant recent history, fiscal consolidation efforts via expenditure cuts or tax increases have played a significant role in bringing down debt ratios, mainly in European countries (Belgium, Ireland, Spain and Sweden) and Canada, where the underlying primary balance improved by more than 3% of GDP with respect to the 10-year average pre-debt peak. But how are such fiscal consolidations implemented?

Figure 41: Historical cases of debt reduction from peak (1960-2005)

1960-2005		Gross public debt		Nominal GDP	Real GDP	Inflation	Interest rates	Underlying primary balance
	Peak year	% GDP at peak	% reduction after 10 years	Average annual % change in the 10 years after debt peak			At end of 10 year period	% of GPD, difference b/w 10Y averages pre- and post-peak
Ireland	1991	110	66	12	7	3	…	5
Australia	1995	41	61	6	4	2	5	2
Spain	1996	76	39	8	4	3	…	3
Norway	1978	54	39	10	3	8	0	0
Sweden	1996	84	37	5	3	1	4	3
Netherlands	1993	96	36	6	3	2	…	1
Denmark	1993	85	33	4	2	2	4	-1
Finland	1996	66	31	5	4	1	0	0
Canada	1996	102	31	6	3	2	4	5
Belgium	1993	141	27	4	2	2	4	4
United States	1993	72	16	5	3	1	3	2
Italy	1998	133	13	4	1	2	4	1
France	1998	70	-8	4	2	2	4	1
*Germany	1998	62	-12	2	2	2	4	1
*Japan	1987	77	-31	4	3	1	1	0

Note: Germany primary balance is averaged six years back (not 10). Japan primary balance is averaged seven years back.
Source: OECD, Haver, IMF, Barclays Capital

[28] For recent references, see for example October 2010 IMF World Economic Outlook *http://www.imf.org/external/pubs/ft/weo/2010/02/pdf/c3.pdf*; Alesina Alberto and Silvia Ardagna, 2009, "Large Changes in Fiscal Policy: Taxes versus Spending," NBER Working Paper No. 15438. *http://www.nber.org/tmp/16867-w15438.pdf*

Figure 42: Three cases of debt reduction from peak (1900-1960)

		Gross public debt		Nominal GDP	Real GDP
	Peak year	% GDP at peak	% reduction after 10 years	Average annual % change in the 10 years after debt peak	
Italy	1943	103	68	41	4
United States	1946	122	49	7	4
United Kingdom	1946	270	47	8	2

Source: Haver, IMF, Barclays Capital

Expenditure-based consolidations have been found to be more successful…

Research suggests that fiscal adjustments that rely mainly on expenditure reduction have tended to be more successful than tax-based adjustments in persistently improving the debt ratios and primary balance, and lowering spreads (see Figure 43 for examples of large fiscal consolidations in past decades). Additionally, most of the successful expenditure-based adjustments relied on cutting transfers, social benefits, subsidies, and wages. Stronger credibility also tended to help front-loaded adjustments.

… but they are also more necessary in countries with large expenditure to GDP ratios.

However, the expenditure focus was needed mainly where the fiscal imbalances were driven by surges in public expenditures in the first place (Figure 9). Indeed, most expenditure-based adjustments were in Europe, where, historically, expenditure to GDP is high. In the US, where the size of the government was already lower than in other advanced economies, the adjustment was mainly via higher revenues, although part of such revenue increases may have simply been spurred by high growth (see Box 1, *Our Measure of Fiscal Vulnerability: A systematic global approach*, 9 September 2010).

Figure 43: Large fiscal consolidations

Country	End-year	Starting year	Size	Of which: Revenue increase	Of which: Primary expenditure reduction	Average nominal growth during adjustment period
Ireland	1989	1978	20.0	8.1	11.8	13.0
Sweden	2000	1993	13.3	3.0	10.4	4.8
Finland	2000	1993	13.3	2.6	10.7	6.0
Sweden	1987	1980	12.5	7.2	5.3	10.5
Denmark	1986	1982	12.3	6.3	6.0	10.2
Greece	1995	1989	12.1	9.9	2.3	16.7
Belgium	1998	1983	11.1	0.4	10.7	5.2
Canada	1999	1985	10.4	4.0	6.4	5.4
United Kingdom	2000	1993	8.3	3.2	5.1	5.8
Japan	1990	1978	8.1	7.0	1.1	6.8
Italy	1993	1985	7.9	8.9	-1.0	9.0
Portugal	1985	1981	7.5	8.3	-0.8	22.9
Luxembourg	2001	1991	6.7	5.2	1.6	7.3
Iceland	2006	2002	6.3	4.6	1.6	8.7
Netherlands	2000	1990	6.3	-2.8	9.0	5.6
Denmark	2005	1994	5.9	2.1	3.8	4.5
Australia	1988	1984	5.8	0.7	5.1	11.7
New Zealand	1995	1991	5.8	-1.3	7.1	4.9
Austria	2001	1995	5.8	1.1	4.6	3.5
Iceland	2000	1994	5.7	4.9	0.7	7.5
United States	2000	1992	5.7	3.0	2.6	5.8
Germany	2000	1991	5.3	3.4	1.9	5.4
Switzerland	2000	1993	5.2	4.6	0.6	2.3
Spain	2006	1995	5.2	2.5	2.7	7.5

Source: Table 5a. from *Strategies for Fiscal Consolidation in the Post-Crisis World*, by the IMF (see: *http://www.imf.org/external/np/pp/eng/2010/020410a.pdf*), OECD, Barclays Capital

CHAPTER 2

Navigating the new EM landscape: Where to find the best returns

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- **In the six years since this series last took up emerging markets, much has changed. Global influence has moved from the slow-growing G7 to booming China, contributing to EM growth outperformance. EM also weathered the 2008 credit crisis remarkably well, despite some initial scepticism, due predominantly to robust policy frameworks tempered in earlier booms and busts. We think investors should expect EM economies to deliver higher growth and lower volatility than in the past, improving economic Sharpe ratios relative to the lagging G4.**
- **Six years ago, it seemed natural to focus on external sovereign debt, and that was not a bad call. In the six years through 2010, EM external debt returned an average of nearly 9% per year, outperforming US Treasuries (by some 400bp per year), USD high-grade (roughly 350bp per year) and USD high-yield (by nearly 100bp per year). It underperformed developed-market equities by only about 100bp per year, with about half the volatility.**
- **EM external debt is unlikely to be where the investment action will be. The asset class is shrinking in quantitative significance, and returns are constrained by high valuations that reflect the much lower credit risks. Local debt markets are more interesting but provide limited exposure to the emerging market growth engine that is likely to be the dominant economic and market theme of the coming 5-10 years.**
- **Although EM growth outperformance is part of the received market wisdom, we think it is not fully priced in to today's equity markets. We forecast EM equity market returns of more than 10% (in USD, adjusted for US inflation), in line with the past decade's strong performance. In absolute and volatility-adjusted terms, the most promising equity markets are those where we expect highest growth; six of the 10 most promising are in Asia.**

The economic landscape – a macro roadmap[1]

Greater growth

Emerging markets: the world's new growth engine

The spectacular growth of emerging market economies in the past decade has been an economic, market and geopolitical game-changer of tectonic proportions. In the past 10 years, emerging markets have grown from less than 20% to more than 30% of world GDP; by 2012, we expect emerging markets to account for well over one-third of world GDP at market exchange rates, and more than half at PPP exchange rates. In 2011, we estimate that emerging Asia, the engine-room of the emerging markets growth locomotive, will account for half of global GDP growth.

Growth in the regional giants of Asia is being driven by globalization and urbanization

The nature and magnitude of the emerging economies' growth story varies across and within regions. A common theme is success in capturing gains from globalization created by technological changes and trade-policy liberalization of the past two decades. In China, explosive growth in trade-related industries has been multiplied by the breakneck pace of urbanization that has accompanied rapid industrialization. China's urbanization is far from complete, while India's is, in our opinion, on the cusp of making itself felt as a global driver comparable to China's (*India – The next commodities powerhouse*, 9 November 2010). Not only will urbanization transform India into a commodities-market participant of the first

[1] This section draws heavily upon *Advanced Emerging Markets: The Road to Graduation*, by Piero Ghezzi, Eduardo Levy-Yeyati, and Christian Broda, 5 October 2010.

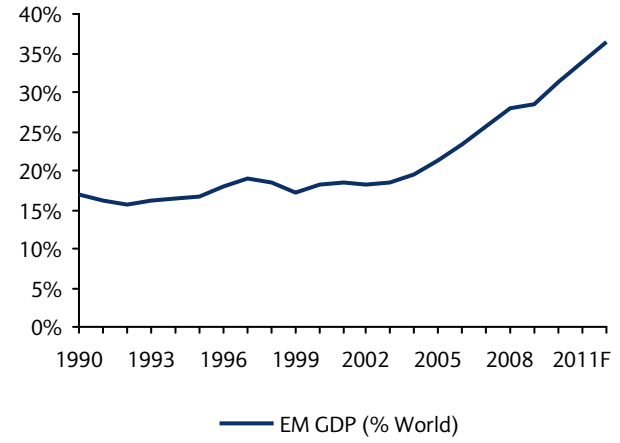
rank, it will launch India on the self-reinforcing process of urbanization and demand growth that is playing out in China.

In both China and India, the forces that lay behind the ongoing growth episodes are powerful and, in important respects, self-reinforcing. Rapid growth in manufacturing (China) and services (India) is creating employment and raising living standards in the urban sector, thus increasing the demand for urban space and the associated amenities; places to live, places to shop, roads to get people from one place to the other, communication infrastructure, all the things that make a modern city, all being built at a breakneck pace and on a huge scale. And of course, the people who are doing all of this building are themselves earning income that further contributes to the demand for urbanization.

The Asian growth explosion creates opportunities, and some challenges, for other emerging market economies

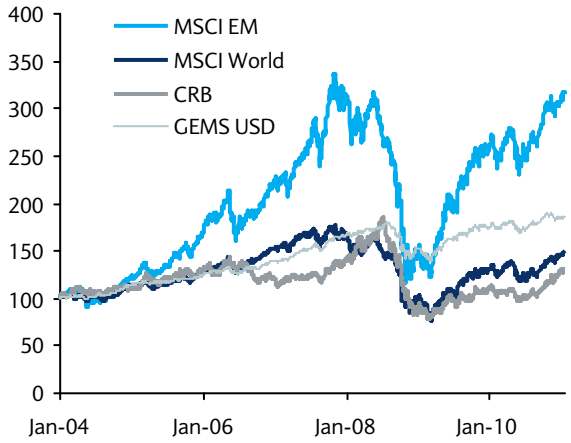
The Asian growth explosion has created enormous opportunities, and some challenges, for emerging market economies elsewhere. Other emerging Asia economies have found new opportunities in supplying rapidly growing Chinese demand and taking their place in the export production chain. Commodity-producing economies have benefited from booming demand for their exports. But unlike commodity cycles of the past, we think this one is grounded in an Asian development process that will be in place for a decade or more, not a few calendar quarters. And the development opportunities provided by high commodity prices are only part of the story; much of the emerging world stands to benefit from still-favourable demographic fundamentals, and in many cases development opportunities created by still-recent economic and financial reforms. One need only see the transformation of housing finance in countries

Figure 1: EM growth outperformance…



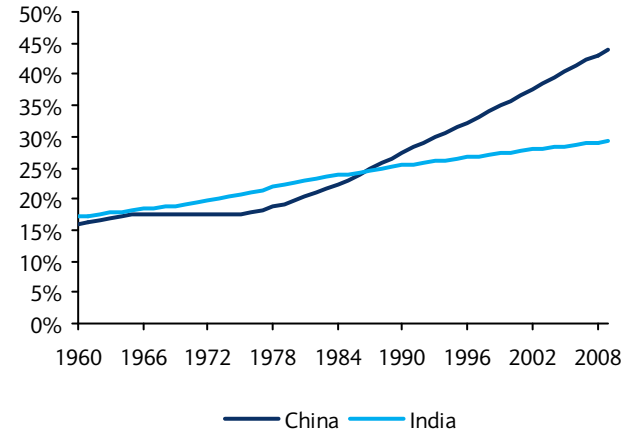
Source: Haver Analytics, Barclays Capital

Figure 2: … reflected in market outperformance



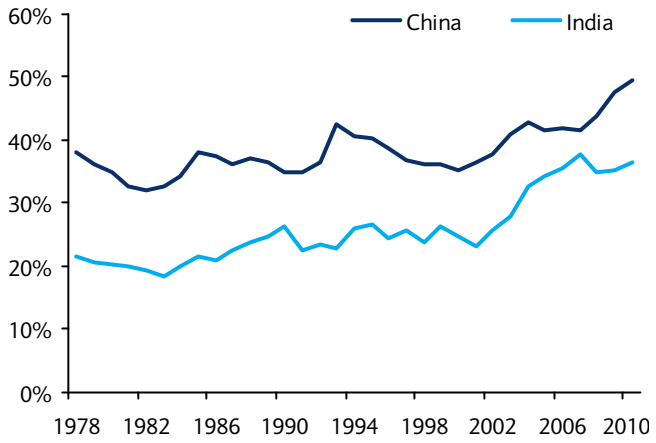
Source: Bloomberg, Barclays Capital

Figure 3: Urbanization – China and India



Source: World Bank

Figure 4: Investment/GDP – China and India



Source: Haver Analytics, Barclays Capital

such as Brazil and Turkey, where it was historically stunted by financial instability, to appreciate the scope for economic growth that has been created by stabilization and reform, long after financial markets have learned to take stability for granted.

To be sure, booming commodity sectors pose challenges as well as opportunities for commodity economies worried that more employment-intensive manufacturing production may be crowded out by the commodities boom. Some emerging manufacturers, such as Mexico, have found themselves in a difficult competitive relationship with China's export juggernaut, rather than the more complementary relationship that many other economies enjoy.

Challenges and risks to the EM growth story

While we believe that the drivers of Chinese and Indian growth are powerful and long-lasting, each economy faces challenges and risks. The sheer scale of China's penetration of global markets means that, in many sectors, there is limited scope to grow by capturing additional global market share; over time, China will need to rely increasingly on domestic demand and new, more technology- and innovation-intensive sectors. These pressures are compounded by a gradual exhaustion of the grievously under-employed rural workforce that was previously willing to come to the cities for very low wages; a 'Lewis moment' that will likely be compounded in the near future by a remarkably abrupt demographic transition[2]. India will need to find ways more adequately to supply its dynamic private sector with the public infrastructure that it requires to continue to grow. Other emerging market economies face their own challenges and risks, and some will occasionally stumble in the years to come. On balance, though, to the extent that one can generalize about emerging markets, we think the next decade holds more opportunities to deepen and broaden their growth story than threats that it will end, a diagnosis that stands in sharp contrast to the more clouded outlook for major industrial economies.

Reduced risk

The ability of EM to weather the recent crisis changes the nature of the asset class dramatically

The transformation of the emerging market economic space from problem children on the periphery to engines of world economic growth is generally accepted by most investors. However, the ability of many EM countries (primarily in EM Asia and Latin America) to weather the most severe financial crisis in seventy years illustrates another less well-appreciated transformation – one that changes dramatically, in our view, the nature of this asset class. In particular, the passing of such a demanding test suggests that as developed economies recover from the financial crisis, which could take years, the *relative* ex-ante Sharpe ratios of a subset of EM assets should be more attractive than at any time in the recent past. That is, EM-Asia and LatAm have been able to reduce their economic "betas" to G7 countries without having to give up much of their "alphas" – the opposite of what has happened in most developed countries.

Three critical changes: macroeconomic stability, reduced dependence upon external finance, and the rise of China as an EM growth driver

This view is predicated on three critical (and, in our view, long-lasting) changes.

- After the hard lessons of chronic inflation in the 1980s and financial stress and crises of the 1990s, local political systems embraced macroeconomic stability (notably through fiscal responsibility and independent central banks) as a pre-condition for prosperity.
- Financial stability facilitated the elimination of structural "amplifiers" of external shocks, most notably the dependence on external finance and the associated currency mismatches. As the political economy incentives behind pro-cyclical good-times policies were partially controlled, the proceeds of the bonanza were saved (in the form of deleveraging, de-dollarization of public liabilities and accumulation of foreign assets). The successful response to the global financial crisis confirmed the effectiveness of these large liquid war chests, as well as the absence of skeletons in the books of EM Asian and Latin American corporates and governments.

[2] See Arthur Lewis (1954) "Economic Development with Unlimited Supplies of Labor," *Manchester School of Economics and Social Studies*, Vol. 22, pp 139-91. At an early stage of development, the growing sectors of the economy face an unlimited supply of labor as they absorb labor from the "subsistence" sector.

- Last but not least, we believe China has emerged as a potent driver of other EM economies, creating an element of economic diversification for economies that had previously been highly dependent upon advanced-economy growth. Moreover, we believe that it can sustain high levels of growth in the coming five years (*China's global significance: Economy vs markets*, 27 September 2009).

Credible monetary policies, paired with fiscal discipline and reserve accumulation, reduced the exposure to the global crisis

While exceptions can be found, emerging market economies responded to the turbulent 1990s by enacting stability-oriented policy frameworks. Monetary policy credibility improved dramatically after the chronic inflation of the 1980s (Figure 5), and fiscal discipline and the accumulation of reserves in good times allowed for an unprecedented policy autonomy during the crisis, which helped reduce the depth and length of recessions by limiting the scope for second-round effects. The credibility of these policies paved the way for counter-cyclical fiscal and monetary packages when necessary.

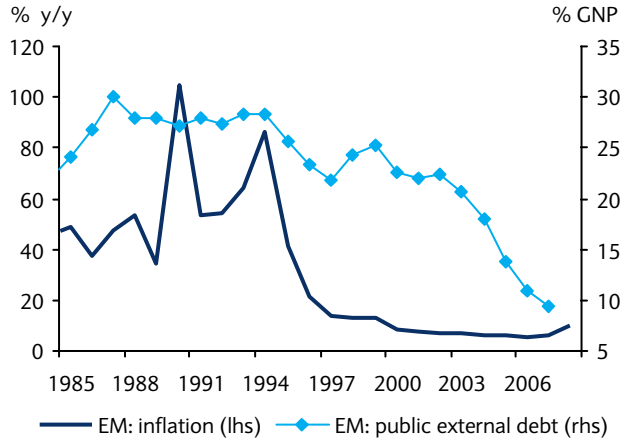
Progress on the policy and financial dependence front evolved very differently in each of the EM regions

Such credibility also facilitated a strategy of debt de-dollarization and de-leveraging (including through reserve accumulation) that improved net debt ratios and liquidity coverage dramatically.[3] Leaning-against-the-wind intervention, coupled with conservative liability management, were (and remain) the mark of EM central bank policy in the 2000s (see Kiguel, A. and E. Levy Yeyati, "Fear of appreciation in emerging economies," *Vox EU*, 29 August 2009). As a result, the currency mismatches that had been such disruptive 'shock amplifiers' are virtually gone in Asia or Latin America and, with them, the pernicious balance sheet effects associated with depreciation of the local currency. The elimination of these vicious-circle dynamics has allowed countries to exploit exchange rate flexibility as a countercyclical shock absorber, further reducing cyclical output volatility, particularly in the downturn.

The dependence of EM countries on global growth has shifted toward China, away from G7

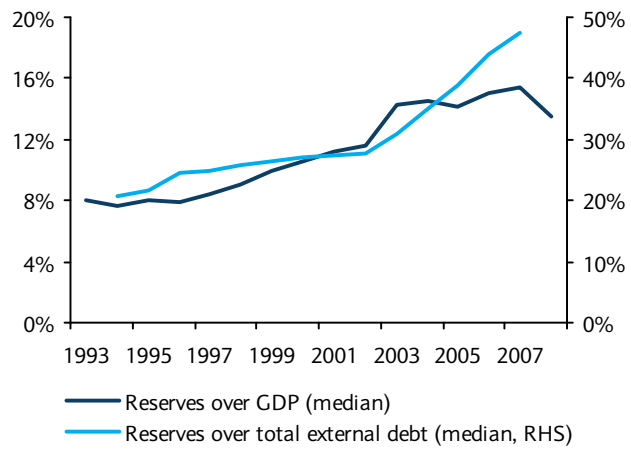
A final structural change of fundamental importance is the growth of economic linkages between China and other emerging market economies, which has made China an important driver of EM growth, over both secular and cyclical time-frames. In previous work (*Advanced Emerging Markets,* Part I: A reassessment of an asset class, 5 October 2010), we conducted a simple statistical analysis to quantify this realignment. This showed that EM GDP betas to the G7 are high and reasonably stable since 1994, but when China is added as a driver of the EM cycle, the estimated importance of China grows significantly in the post-2000 period, while the G7's role declines dramatically – especially for emerging Asian and commodity-exporting economies. Of course, this introduces a source of risk for emerging economies, which are much more exposed to developments in China than they were 10 years ago. But it also introduces an important element of diversification, which paid off handsomely in the aftermath of the 2008 financial crisis.

Figure 5: Low inflation and better fiscal (debt/GDP) ratios



Source: World Bank, Barclays Capital

Figure 6: Saving the bonanza – building the liquidity war chest



Source: BIS, Barclays Capital

[3] In Asia, where sovereign debt ratios remain small or non-existent, the precautionary motive for reserve accumulation could be seen as a hedge for private foreign liabilities (in fact the triggers of the Asian financial crises of the 1990s).

Higher economic Sharpe ratios

This allowed EM to undertake countercyclical policies for the first time

By diversifying the external risks that face them and providing many EM countries with the capacity to enact countercyclical policies in bad times, these structural improvements have allowed many EM countries to become less sensitive to growth in developed countries without having to reduce their average growth rates significantly. Figure 7 shows this basic concept. The relative risk-adjusted average growth (the "economic" Sharpe ratio) between EM and developed economies has more than doubled. It went from 0.75 = 1.16/1.54 prior to 2001, to 1.79 = 1.22/0.68 since then.

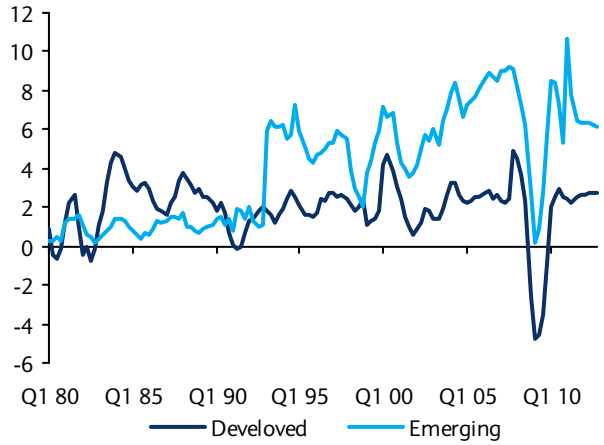
Partly for these reasons, the economic damage associated with the global financial crisis of 2008 was short-lived in most emerging market economies, and negligible in a number of them. EM financial assets sold off along with their industrial-country counterparts, but not disproportionately. Figure 9 shows that the sell-off in emerging market sovereign debt was comparable to that of the US high-grade market, both of them outperforming US high-yield dramatically.

Figure 7: The end result – a better relative "growth Sharpe"…

	Growth rate			
	(EM median)		G7 median	
Period	Early	Late	Early	Late
Mean	4.20%	3.68%	2.10%	1.20%
Vol.	3.77%	3.17%	1.30%	2.24%
Skew	-0.99	-0.64	-0.71	-1.92
Kurtosis	0.60	-0.20	0.68	4.19
Sharpe Ratio	**1.16**	**1.22**	**1.54**	**0.68**
Poverty headcount (at 2$ PPP)	28%	24%	n.a.	n.a.
Income share of the lower quintile	6.9%	7.5%	7.6%	7.9%

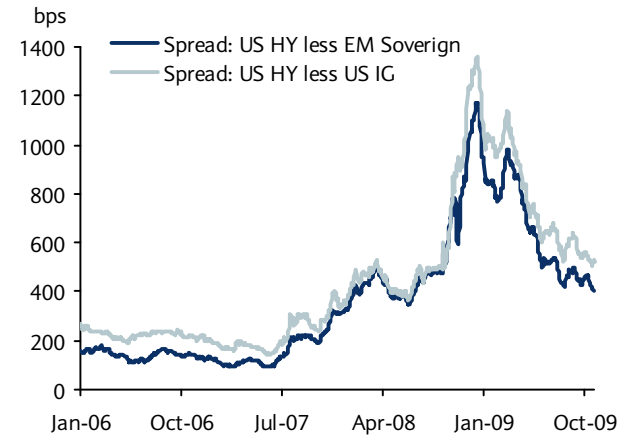
Source: Barclays Capital

Figure 8: …that is expected to persist



Source: Haver Analytics, Barclays Capital

Figure 9: The crisis brought no skeletons…



Source: Barclays Capital

Figure 10: … and no intra-EM contagion

Source: Barclays Capital

The decline of EM-to-EM contagion

EM-to-EM contagion continues to decline

This is all the more noteworthy because the 2008 crisis did lead to financial crisis in several countries in EMEA, which included old-fashioned capital flight and currency collapses. This highlights the fact that other EM economies were spared, not by some magical virtue of their EM status, but because their economic structures and policy frameworks rendered them less vulnerable. It also highlights the decline in EM-to-EM contagion, which was so intense during the Asian financial crisis and the Russian default, faded dramatically in the 2001 Argentine default and Brazil's 2002 'Lula' panic, and was largely absent in 2008. Although EM economies and assets remain 'coupled' to the world economy and financial markets, and are likely to remain so for the foreseeable future, we think the days are gone in which EM assets are confronted with indiscriminate selling because some faraway EM economy found itself in trouble.

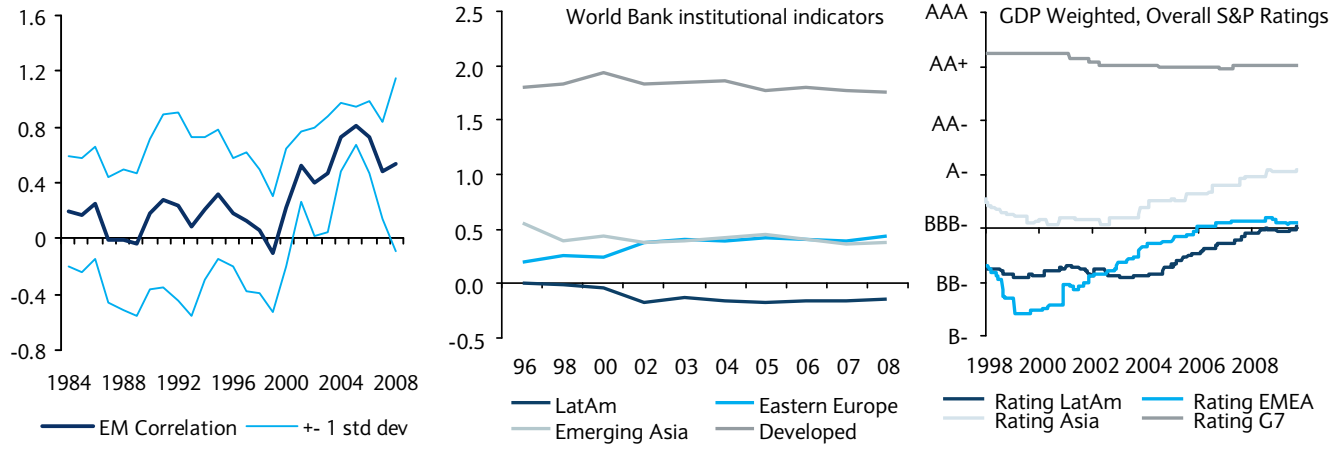
In short, we take issue with those who regard the pre-2008 EM boom as a fluke of the Great Moderation and the commodity boom. It is true that favourable terms of trade have benefited commodity exporters, and played some role in the post-crash recoveries of commodity exporters. But emerging market economies have been strengthened by a decade or more of reform and economic transformation. We think it is the lasting, structural evolution in economic policies and local markets that explains the resilience of most emerging economies to the global financial crisis.

Some fine print

Risks of policy backsliding seem limited to us

That is, of course, a very sweeping statement and all such statements deserve qualification. The first is that, as the disclaimer says; past performance does not guarantee future results. It is certainly possible that some well-run EM economy could become poorly-run in the years to come. As investment strategists it is our job, in part, to keep a sharp eye out for such things. But for now, the risks seem limited. In general, the social consensus in favour of careful economic policies was created in response to economic crises that have not been forgotten, and the temptation to indulge in policy adventures is correspondingly attenuated in most emerging economies. And for any EM policymaker tempted to get adventurous, the excruciating consequences of policy mistakes now on display in so many industrial economies provide a vivid object lesson in the virtues of cautious, stability-oriented economic policies that is unlikely soon to be forgotten.

Figure 11: Why global investors could be skeptics: No decoupling (five-year rolling average correlation between EM and world GDP); little improvement from rating agencies; and the same institutional divide as always



Source: IMF, World Bank, Barclays Capital

Note: Average of World Bank's estimated institutional quality indicators, weighted by the inverse of their standard error.
Source: World Bank, Barclays Capital

Source: S&P, Barclays Capital

Does all this imply that (at least some) EM countries have already graduated to the developed world? Well, no. Many EM economies still preserve incomplete convertibility, which many would identify as a characteristic of an emerging economy, as the recent Tobin tax on capital inflows introduced in Brazil reminded the enthusiastic investor. Moreover, the institutional indicators compiled by the World Bank record little progress in recent years (and reveal a substantial gap vis-à-vis the G7), and income distribution and poverty indicators still lag the G7 economies – which may help explain why, aside from the inertial nature of rating agencies, EM credit ratings remain below industrial economies'.

But not all emerging market economies are alike

We also need to acknowledge the heterogeneity of the emerging world, which we have so far suppressed in order to characterize positive changes in the norm. In reality, of course, the 'emerging market' label lumps together some of the most sophisticated and competitive economies in the world (Hong Kong, Singapore, the Czech Republic) with some of the poorest and least competitive. It lumps together one of the largest economies in the world with a great many of the tiniest. It contains economies with state-of-the-art policy frameworks, and others where it is hard to discern the existence of any policy framework at all. Generalizations are possible, as long as one recognizes that there are glaring exceptions to the rule, small though these exceptions generally are, in the overall market. Any real investor decision needs to account for the distinctive features of individual markets as well as commonalities.

The market landscape – who makes up the market?

Having acknowledged that there are exceptions to the norm, we feel that we should quantify the importance of those exceptions in the overall investment landscape. In Figure 12 we provide a rough characterization of the economies that figure in emerging debt or equity markets, and divide them into three groups. The first is the group of 'Advanced Emerging Market economies' that we recently highlighted for their exceptional promise in terms of high and stable growth. (See *Advanced Emerging Markets: The Road to Graduation*, 5 October 2010, for an extended discussion and explanation of the ranking process that lies behind this breakdown.) The second is a group of economies that did not make this list, but where the policy framework is solid, and the outlook for economic growth is promising. For each of these economies, we feel that the positive economic trends described above fully apply. Last, there is a list of economies where question marks about the economic structure and/or policy frameworks leave room for doubt about the medium-term economic and financial outlook, doubts of the sort that were once considered the norm in emerging markets. In the table we characterize the importance of these countries and groups of countries in terms of economic size (GDP) and market significance (market capitalization of the MSCI for equity markets, the Barclays Capital EM sovereign for external (USD) debt, and the Barclays Capital EM Local Debt index for local bond markets).

Of course any such grouping is, to some extent, arbitrary in weightings applied to the different characteristics and the cut-offs selected; in reality, country performance is multidimensional and more continuous than categorical. Moreover, the list is not immutable; we fully expect the group of 'Advanced Emerging Economies' to grow over time. And one might view the recent history of EM as, in substantial part, a 'graduation' of the majority of economies from the 'traditional EM' category to something more promising; no law of nature prevents the remaining countries in that category from following the same trajectory.

The 'traditional EM' category is small in most respects, but a significant presence in the external debt market…

A couple of points emerge clearly from the table. First, while the list of countries that we have placed in the 'Traditional EM' category is fairly long, they are a small minority of the overall EM universe, accounting for only 16% of GDP, 2.5% of the MSCI equity market capitalization, and just above 5% of the Barclays Capital EM local debt index. They are, however, a significant part of the external debt market, accounting for roughly 30% of the Barclays Capital index, with the majority of this due to four large issuers: Russia, Argentina, Venezuela, and Hungary.

It makes perfect sense, of course, that 'Traditional EM' economies would be under-represented in equity and local debt markets, but over-represented in 'old-fashioned'

external debt markets, since these countries have in most cases not established the policy track record that would permit them to issue on a large scale in local currency, nor the track record for economic growth that would make them an appealing equity market. The major exceptions here are Russia, whose equity market is roughly 7.5% of the EM total, and Hungary. Hungary is a recently 'fallen angel' in global debt markets, whose relatively large and deep domestic debt market is a legacy of years when the country's policy framework inspired more confidence than it does now.

Figure 12: The market landscape – Who is who?

		USD GDP	MSCI	External debt	Local debt	CDS
Advanced emerging economies		**11,269**	**5,844**	**115.5**	**1,221**	**99**
Asia	China	5,866	1,390		486	76
	Hong Kong	230	592			46
	Korea	1,010	859	7.7	351	98
	Singapore	227	335			
	Taiwan	432	642			
EEMEA	Czech	225	38		44	91
	Israel	218	124		45	115
	Poland	487	132	48.6	114	155
	South Africa	363	440	10.7	71	127
LATAM	Brazil	2,007	1,107	48.3	105	106
	Chile	204	185		4	80
Other well-managed EM		**5,779**	**2,536**	**196.4**	**852**	**123**
Asia	India	1,570	913		399	
	Indonesia	720	215	20.6	42	139
	Malaysia	240	278		76	79
	Philippines	189	64	27.5	26	129
	Thailand	310	190		60	106
EEMEA	Abu Dhabi (UAE)	240	53	4.5		94
	Bulgaria	49	1	2.4		257
	Morocco	92	31	2.0		154
	Qatar	127	90	13.1		86
	Turkey	735	185	49.7	67	142
LATAM	Colombia	291	136	13.5	49	108
	Mexico	1,035	315	38.0	106	109
	Panama	27		8.9		95
	Peru	155	64	10.3	27	105
	Uruguay*	40		6.0		117
Traditional EM		**3,311**	**864**	**135.3**	**117**	**516**
Asia	Pakistan	175	23	1.1		797
	Vietnam	102	16	1.8		329
EEMEA	Egypt	248	41	1.5	25	269
	Hungary	127	24	15.4	34	370
	Ivory Coast*	61		0.9		1,200
	Lebanon	39	8	9.9		317
	Lithuania	35	1	10.5		254
	Romania	185	11	6.3		295
	Russia	1,506	718	34.6	57	141
	Ukraine	135	12	6.8		465
LATAM	Argentina	432	11	23.5	0	534
	Ecuador*	62		0.6		750
	Venezuela	204		22.4		984
Total		**20,359**	**9,244**	**447.2**	**2,189**	

Note: * Our measure of sovereign credit risk is derived from the following bonds: Ecuador 2015, Ivory Coast 2032 and Uruguay 2015. GDP and market cap are measured in billion USD, CDS in basis points as of January 14, 2011.
Source: Haver Analytics, Bloomberg, Barclays Capital

…where they tend to attract higher credit risk premia

Because the ranking in Figure 12 is designed to assess the outlook for rapid growth with stability, it captures more than pure country-risk concerns. As a result, the 'traditional EM' category is not solely occupied by weak sovereign credits, but also includes some countries (notably Russia) where sovereign credit risk (as measured by 5-year CDS spreads) is relatively low, despite an institutional and policy framework that raises some doubts about the outlook for strong and sustained economic growth. In general, though, the 'traditional EM' economies are viewed as more precarious sovereign credits, with an average CDS spread of over 500bp, compared with 123bp in the intermediate category and 99bp in the AEM category.

But in other markets, 'traditional EM' economies are a small part of the landscape

By most measures, then, we feel justified in treating the countries that still exhibit 'traditional EM' weaknesses as unrepresentative of the countries that make up the asset class. That does not mean that they are uninteresting from an investment perspective. Arguably, there is much more upside potential in countries that have yet to establish solid, pro-growth policy frameworks. However, these countries are best treated as an idiosyncratic and diverse collection of stories, rather than anything resembling an asset class.

The market landscape – A decade of outperformance

"Past performance does not guarantee future results" – but it does establish the initial conditions. It also conditions expectations, rightly or wrongly. While the past is surely an incomplete guide to the future, it would be a mistake to ignore entirely past performance, since markets rarely exhibit complete discontinuities with previous behaviour. So before turning to the outlook, it makes some sense to take a critical review of the markets' history.

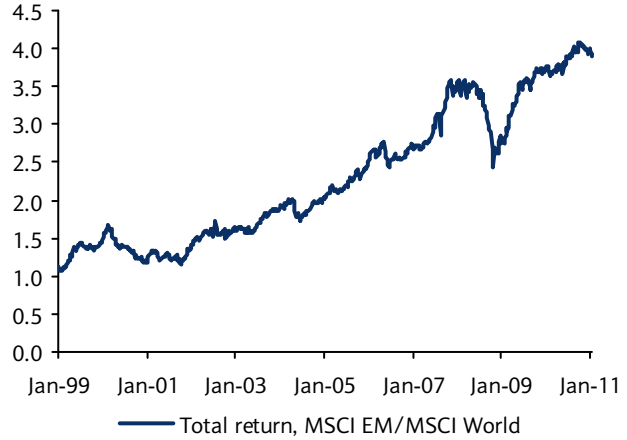
A decade of EM asset-market outperformance

The most salient element of that history is, in our view, the long-run outperformance exhibited by major emerging markets, and the most important question that we intend to address below is how much of that outperformance is likely to continue in coming years.

EM equities have delivered the largest outperformance

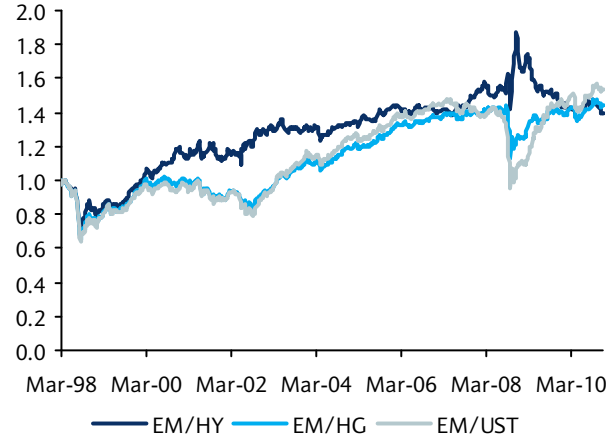
EM equity markets have exhibited the most dramatic outperformance, benefiting as they have from strong economic growth (relative to the industrial economies and, we suspect, relative to investors' expectations in the early part of the decade), currency appreciation, and a positive re-rating of EM assets. In the 12 years since early 1999, the total return on the MSCI EM benchmark has delivered nearly four times the cumulative return in developed-market equities, an average outperformance of over 10% per year. Granted, this

Figure 13: EM equities – A decade of strong outperformance



Source: MSCI, Barclays Capital

Figure 14: External debt market performance – Converging to developed-market norms



Note: Cumulative returns on BarCap EM sovereign index relative to those of the high-yield, high-grade, and US Treasury indices. Source: Barclays Capital

was not an outstanding decade for developed-market equities, but the total return on emerging market equities of over 12% per year stands out in absolute, as well as relative terms. EM equities suffered disproportionately, though briefly, during the 2008 global financial crisis, but have shown little evidence of slowing their trend appreciation since then.

But old-fashioned EM debt also performed very strongly in the past decade….

External debt markets have also outperformed their industrial-country counterparts, though debt markets being what they are, the scope for outperformance has of course been quantitatively more limited. EM debt markets underperformed US Treasury markets and high-grade credit markets in the early part of the 2000s, burdened as EM markets were by traumatic emerging market crises including the Argentine default and the panic surrounding the 2002 election of Lula as President of Brazil (Figure 14). After 2002, EM debt entered an extended period of outperformance against US Treasuries, high-grade, and high-yield credit markets, as investors re-rated emerging sovereign credits in response to the improving policy and economic trends discussed above.

…with the magnitude of the outperformance trending down in recent years

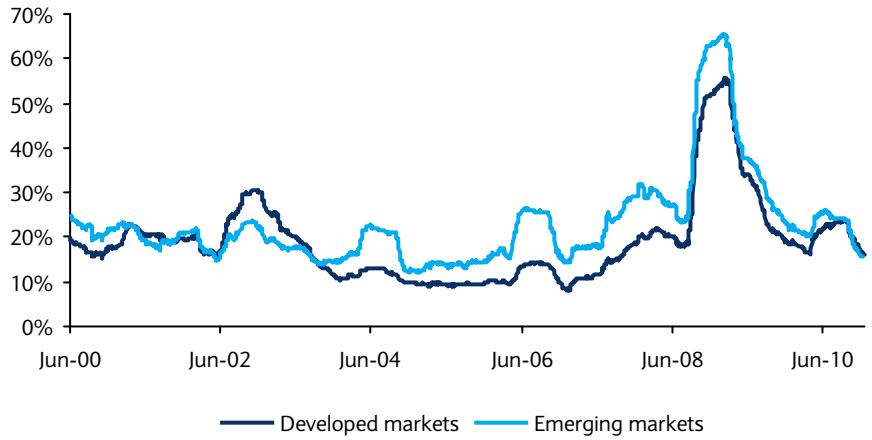
Since its rebound from the global credit crisis, EM bond markets have outperformed US treasuries at a modest pace, treaded water against US high-grade, and have recently modestly underperformed US high-yield credit markets. As we discuss below, this reflects the fact that the re-rating of EM sovereign credit is well advanced, and while further re-rating is possible, we see the scope for continued external debt outperformance of the magnitude observed during the asset class's 'golden years' 2002-07 as limited.

EM equity volatility is no longer significantly higher than in advanced markets

The high ex-post return on EM equities came with some risk for investors, though the realized risks were probably substantially lower than investors' subjective assessments in the early years of the last decade. For much of the past decade, EM equities exhibited higher volatility than developed markets, though in the past several years the gap has closed substantially.

As we have noted, EM equities were also hit much harder during the 2008 financial collapse, although they recovered very quickly and have since resumed their earlier outperformance. It remains an open question whether the intensity of the 2008-09 sell-off of EM assets reflects an ongoing sensitivity of EM asset markets to global financial disorder, for which investors should be compensated, or a historical mistake by investors who underestimated the resilience of EM economies. Our own view is mainly the latter, and if there is another realization of global tail risks such as the one we experienced in 2008, we doubt that EM asset markets will sell off in such an exaggerated way.

Figure 15: Volatility has been higher in EM equity markets, but the gap is closing



Note: 6-month historical volatility of total returns for MSCI EM and World indexes, computed using daily data.
Source: Bloomberg, Barclay Capital

It's not the beta, it's the alpha

Market betas remain high

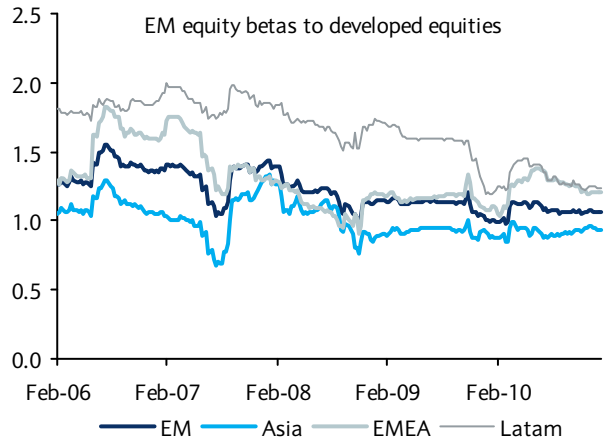
That said, emerging asset markets are as integrated into global asset markets as their economies are integrated into the world economic system. In financial markets, this integration is reflected in correlations to the broader global markets within which they are embedded. As Figure 16 and Figure 18 illustrate, betas of EM markets are fairly high to their advanced-economy counterparts, and have shown no strong tendency to decline over time (although the very high sensitivity of Latin equity markets has declined substantially over the past decade).

But alphas are more interesting

Emerging asset markets should be interesting, not so much for low betas, as for their alphas. Figures 17 and 19 provide estimates of beta-adjusted returns on EM equity and external debt markets in recent years. Setting aside the short-lived market spasm in 2008, EM outperformance has been the norm.

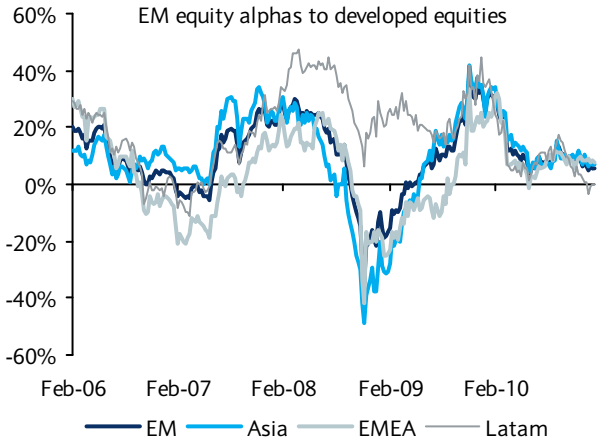
On a beta-adjusted basis, EM equity markets have recently been outperforming developed equity markets at an annual rate of roughly 500bp. Latin America is the outlier here, reflecting what we consider a temporary and cyclical underperformance of the Brazilian equities that dominate the Latin index. EM sovereign debt has been outperforming US treasuries and high-grade credit, at a declining rate, while slightly underperforming high-yield credit, as that asset class continues to normalize from its extraordinary sell-off in the global financial crisis.

Figure 16: EM equities – High beta to global markets…



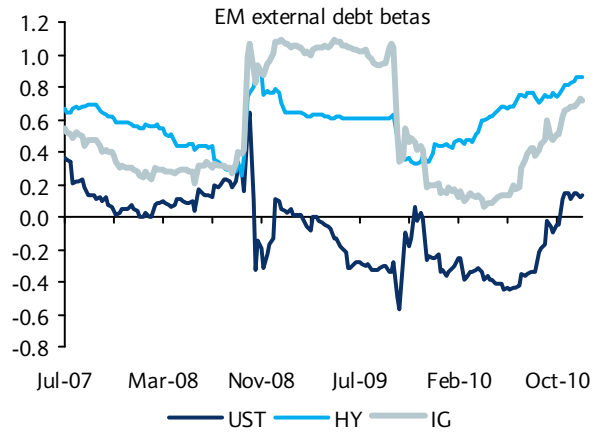
Source: MSCI, Barclays Capital

Figure 17: … but the alpha is more interesting



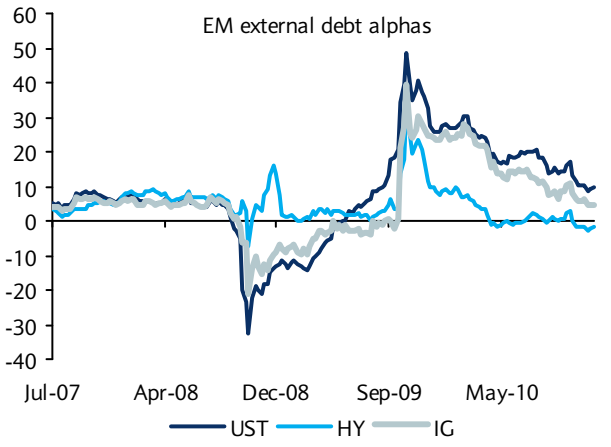
Source: MSCI, Barclays Capital

Figure 18: EM debt market betas are high and rising…



Source: Barclays Capital

Figure 19: … while outperformance is fading



Source: Barclays Capital

Dissecting market performance

What are the drivers of historical outperformance?

We need one last look backward before we'll feel comfortable looking ahead. When thinking about the degree to which emerging asset markets can continue to perform in the years to come, it pays to have a look at the drivers of past performance.

In external debt markets, this is about as straightforward as it gets; outperformance is a matter of carry and spread compression. As Figure 20 illustrates, both have been important: during the past decade, EM carry has been higher than high-grade carry, while the convergence of spread levels from high-yield to high-grade levels has been a hugely important driver of total returns. Although spreads on the Barclays index remain well above those of the US high-grade index, it is notable that re-rating of the index has been uneven; a small number of riskier credits (such as Argentina, Venezuela, and Ukraine) elevate the index spread, while a substantial majority of countries in the index now trade very close to investment-grade levels. This will be important to bear in mind when we assess the market outlook, below.

In equity markets, re-rating is part of the story…

In equity markets, too, re-rating has been an important driver of market outperformance. Less than a decade ago, EM price-earnings ratios were about half those of developed markets (Figure 22). Since then, EM PEs have risen while advanced-economy markets have de-rated; now, developing and developed market PEs trade within about a percentage point of one another.

But this re-rating is not the end of the story; equity market history is more complicated and interesting than that. Suppose we decompose equity market performance into three main components, as follows:

(Q/P*) = (Q/E)*(ES/P)*(P/SP*)

Where:

Q = equity price in a common numeraire (since we are using the MSCI, the USD)

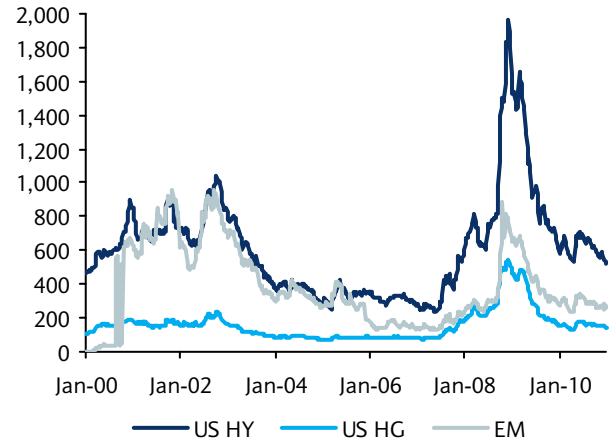
P* = The price level used to deflate the USD quantities (for example, the US CPI)

E = Earnings in USD (as they are reported by the MSCI. In what follows, we consistently use trailing earnings rather than forward estimates)

S = The exchange rate, expressed as local currency per USD

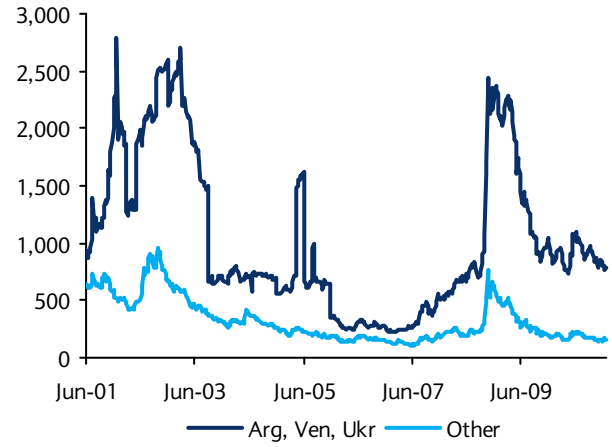
P = The domestic price level for the equity market in question

Figure 20: External debt driven by high carry and spread compression from high-yield to high-grade levels



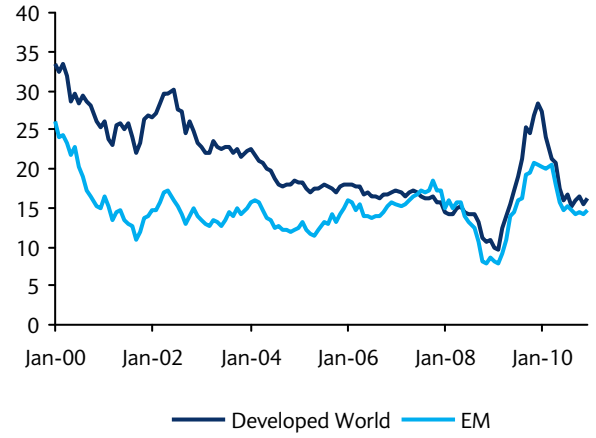
Source: Barclays Capital

Figure 21: Carry on the overall index reflects a small number of high-yielding credits



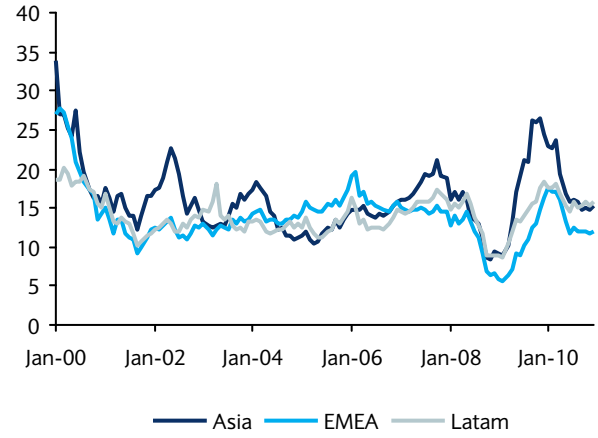
Source: Barclays Capital

Figure 22: Equity market performance has been driven in part by a re-rating toward developed-market PEs



Source: MSCI

Figure 23: EMEA equity-market valuations have lagged Latin America and Asia



Source: MSCI

The first term on the right side is the PE ratio, reflecting the discount that markets place on equity market earnings. The second term is real earnings in local currency, and the third term is the real exchange rate. A given equity market can thus outperform another either because the market is re-rated, because earnings grow more rapidly than the other market, or because the currency strengthens.

It's useful to understand which of these factors have been responsible for historical equity-market outperformance because it bears on the sustainability of the performance going forward. In particular, if equity market outperformance were predominantly due to a large re-rating of emerging asset markets or an abrupt appreciation of the real exchange rate, it may plausibly be regarded as a 'one-off' with limited staying power. If, on the other hand, it reflects rapid earnings growth that may plausibly be sustained in a high-growth economy, then the case for sustainability is reinforced.

…but earnings growth and real exchange rate appreciation have been more important

In Figure 24 we decompose emerging and developed equity market performance along these lines, using the past 10 years. Ten years is a nice round number, and as good a definition of 'long-run' as we know, although this particular decade has the disadvantage that it captures the height of the 1990s technology and equity-market bubble, and subsequent bust. We nevertheless consider the results informative, so long as they are not extrapolated naively into the future.

Over this period EM equity prices rose almost 7% per year more than the US CPI, outperforming developed-market equities by more than 10%. EM PEs have also fallen from 2000 – the equity bubble of the late 1990s was a global phenomenon – but they fell proportionately less than in developed markets, as investors gradually re-rated EM assets relative to developed-market assets. But the bigger story of the past decade lies in the other drivers of equity market performance. Real earnings growth and exchange-rate appreciation contributed more than 9% to real equity appreciation, with real earnings growth contributing a large majority of the total. (Assuming an average dividend payout of roughly 2.5%, this would translate into a total annualized return of almost 12% over the decade.)

Figure 24: Drivers of equity price performance, 2000-10

	Emerging	Developed	Difference
Real equity price (USD index/US CPI)	6.8%	-3.6%	10.4%
Price-earnings ratio	-2.2%	-4.6%	2.4%
Real earnings	6.7%	1.2%	5.5%
Real exchange rate	2.5%	----	2.5%

Source: MSCI, Barclays Capital

We read these results like this. During the past 10 years, the relative performance of emerging market equities has been abetted by a convergence of EM equity PEs toward advanced economy levels. However, the rapid rise in real earnings and appreciation of the EM real exchange rate were quantitatively much more important drivers of EM equity-market returns. Actually, the role of growth is very likely even higher than in the decomposition shown in Figure 24, in that an upward revision of investors' expectation of EM growth – along with a decline in the perceived riskiness of EM assets – is probably an important reason for the compression of EM PEs toward industrial-country levels. This highlights the importance of economic growth and exchange rates for long-run asset-market performance. We therefore begin our assessment of the outlook with some thoughts on these topics.

Is that all there is? Emerging asset market outlook

As we have seen, markets have re-rated emerging market equity and debt markets, responding to the positive economic developments that we have described above. The question naturally arises, is the good news fully priced in? What is the scope for EM asset market outperformance? To address this question we need to turn back to economics – though with a forward-looking angle rather than the retrospective focus with which we introduced this note.

In the beginning, there was economics

Our market outlook is based on a growth forecast that is consistent with consensus views…

Economic forecasting is a hazardous business, and long-run forecasting even more so. But it is hard to imagine a coherent discussion of the secular outlook for asset markets that does not contain some forecast of the outlook for growth and exchange rates – even if the risks surrounding that forecast are at least as important as the base case itself. What we care about most are economic growth and trends in the real exchange rate over a medium term of 5-10 years. Our forecasts of these by region and for the larger emerging economies are presented in Figure 25. The broad outlines of the growth forecasts are at least qualitatively in line with consensus, and should be broadly familiar to investors. Emerging market economies are expected to continue to grow meaningfully faster than advanced economies for the foreseeable future. Asia is expected to remain the growth leader, propelled by near double-digit growth in China and India.

Figure 25: Medium-term economic projections

	Real GDP growth (%)	Real exchange rate appreciation (%)
Emerging markets	**5.6**	**1.8**
Latin America	**4.3**	**-0.8**
Brazil	4.5	-1.6
Mexico	3.0	-0.6
EMEA	**4.5**	**0.2**
Poland	3.8	1.0
Russia	4.2	1.0
South Africa	4.8	-0.4
Turkey	3.8	-1.5
Asia	**6.4**	**3.2**
China	9.0	3.5
India	8.5	5.0
Korea	4.4	2.1
Taiwan	4.8	4.0

Note: Regional aggregates are weighted by MSCI equity-market capitalization. Source: Barclays Capital

…and an approach to exchange rates that emphasizes the role of growth and long-run convergence to 'equilibrium' valuations

As we have seen, we also need a view on the medium-term outlook for exchange rates. Our approach to this issue is designed to capture two elements of the problem that we consider central to the long-run investment problem facing investors. First, wealthier, more productive economies tend to have stronger real exchange rates than poorer countries (and, therefore, more rapidly growing economies tend, other things equal, to have more rapid real exchange-rate appreciation). This is the famous Balassa-Samuelson finding. Second, countries with undervalued exchange rates, in a sense that we'll define more fully in a moment, tend to see more appreciation over relatively long periods of time than countries that begin the period with over-valued currencies. This point is highly relevant because different emerging market economies are positioned so differently in this respect, with currency valuations quite stretched in countries like Brazil and Turkey, much less so in countries like Korea, Poland, and Mexico.

In a nutshell, we first estimate the relationship between income and the real exchange rate in a large cross-section of countries, using 2010 data, and again using data collected in 2000. (Figure 26 illustrates the relationship in the 2010 data.) Deviations from the trend line provide us with a measure of real exchange-rate over- or under-valuation. We then compare the 2000 deviations with those in 2010 to see whether there is in fact a tendency for initially overvalued currencies to decline toward the Balassa-Samuelson norm. In fact, there is, and we can use the data to estimate a typical speed of adjustment. (The estimated speed of adjustment implies that roughly half of a measured over- or under-valuation tends to be unwound over the course of a decade.) We combine our medium-term growth forecasts to define the rate at which the 'equilibrium' exchange rate is changing, and the estimated speed of adjustment to define the rate at which the exchange rate should converge toward this equilibrium. (For more a more detailed explanation of the approach, see *FX Valuation and Outlook: An absolute approach,* 2 February 2011.)

The approach points to trend exchange rate appreciation in Asia, not so much in EMEA and Latin America

The results make good sense, in our view, though they are quantitatively starker than we may have thought. In all regions, rapid future growth suggests that 'equilibrium' real exchange rates will be rising over time. But in both Latin America and EMEA, exchange rates have already appreciated enough so that only limited additional appreciation is likely over the medium term of the next 5-10 years. The result for Latin America is heavily influenced by Brazil, where our estimates suggest that the currency has overshot to the point that a modest pace of real exchange-rate depreciation is more likely than appreciation, over the medium term. The same is true for Turkey.

In Asia, on the other hand, the expected rapid growth and generally less stretched FX valuations point toward considerably more medium-term upside potential for real exchange rates, especially for China and India, where our estimates point toward real appreciation of roughly 5-6% per year over the coming 5-10 years. In much of Asia, of course, exchange-rate performance is heavily conditioned by activist currency policies that seek to prevent rapid appreciation. While these policies have been successful in many countries, which helps explain the generally favourable currency valuations, we believe that over the 5-10 year medium term that concerns us here, economic fundamentals will eventually prevail.

External debt – A tale of two markets

External debt markets – the average is misleading

With those economic preliminaries behind us, we turn now to the outlook for EM asset markets, beginning with external debt. Barclays' EM sovereign external debt index is currently (19 January 2011) priced at an average spread of just over 250bp. This would seem an appealing rate of carry, in light of the generally positive economic and credit story that we have argued is the norm in emerging markets, and would suggest plenty of room for further spread compression. However, in this case the average is a misleading statistic that fails to convey the skewed and even bifurcated nature of today's EM external debt market, and the risks and potential rewards contained therein.

The higher-quality majority of the index trades at relatively low spreads…

Roughly 75% of the index carries a spread lower than the index average; in fact, more than 70% of the index is squeezed in a narrow range between the minimum (116bp for Brazil) and 190bp (Russia). This large majority of the index comprises mainly countries that fit our stylized description of a well-run, credit-worthy economy with solid growth prospects. At the other end of the spectrum, 20% of the index carries an average spread of about 650bp, but this comprises countries like Venezuela, Pakistan, Argentina, Hungary, Ukraine, and Vietnam, where policy frameworks are still works in progress, and credit improvement of the sort that drove the EM debt market in its 'golden years' is far from assured.

… and with a high correlation to global credit markets

Right now, the credits in the high-quality majority of the index trade with a very high correlation among themselves, and with the broader credit markets. From a high-frequency, mark-to-market perspective, they currently offer limited scope for diversification.

But it is a small asset class with broad appeal and should remain well supported, if unexciting, in the years to come

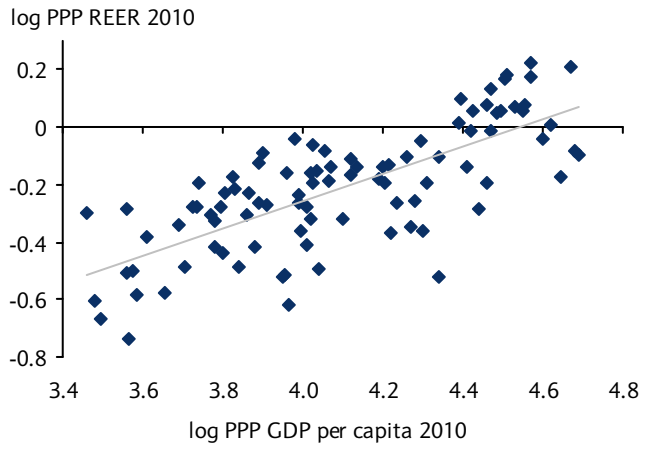
That said, we are not pessimistic about the outlook for the high-grade majority of the EM sovereign debt market, as long as one is realistic about the magnitude of the further outperformance that can be expected. Investors will likely earn the carry that is on offer, and we think there is room for further spread compression over time. There is no law of nature that requires EM sovereigns to trade at triple-digit spreads to US Treasuries; several have traded meaningfully tighter in the not-so-distant past. As of this writing, in CDS markets some six sovereigns (including Hong Kong, which we include among emerging markets though it does not enter the external debt indexes) and 25 of 125 corporates in IDX.NA.IG now trade inside the United States government. Moreover, while high-quality EM sovereign credits now offer limited diversification from a high-frequency, mark-to-market perspective, they do provide longer-run diversification of corporate-credit specific risks such as a trend toward shareholder-friendly re-leveraging, or adverse regulatory developments in the advanced economies.

Moreover, this is a very small set of assets that fits naturally into the mandate of some very large investors; the outlook for the asset class thus seems positive even if, looking forward, we're likely to be measuring its outperformance in basis points, not percentage points. But it is not the asset class that will capture the upside potential in the emerging market growth explosion.

EM high-yielders offer more upside potential, but also higher risk

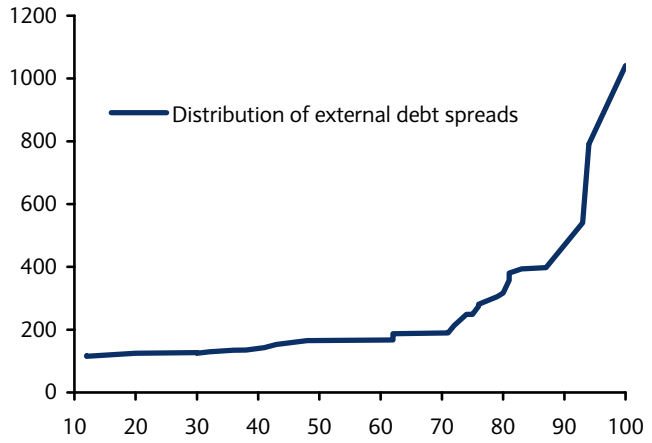
The high-yielding fringe of the external debt market certainly presents more potential upside, with correspondingly higher risks, but in our view these credits should not be considered a homogeneous asset class but instead, like Tolstoy's unhappy families, a collection of societies with idiosyncratic challenges and very diverse prospects. Investors who play in this sandbox should probably invest on the basis of these idiosyncrasies, rather than adopting a broad thematic approach. Moreover, exciting though these assets may

Figure 26: Higher income, stronger real exchange rate



Source: World Bank, Barclays Capital

Figure 27: External debt spreads are highly skewed



Source: Barclays Capital

occasionally be for those who follow them, we have to recognize that we are speaking here about a sliver of an asset class that is itself a small and shrinking fraction of global fixed-income markets. This is not the stuff of which global investment themes are made.

Local debt markets – Joining the mainstream

Local bond markets are more promising…

The past six years witnessed a revolution in EM sovereign finance, as international investors' acceptance of local bond markets grew from the adventurous fringe to the mainstream of emerging fixed-income asset markets. A more promising asset class in many ways than 'old-fashioned' external debt, local sovereign markets are significantly larger and faster-growing than the external bond market, and offer an appealing way to diversify exposure to the dollars, yen, and euros that most investors have up to their eyebrows. They exhibit a lower beta to global asset markets and, for active investors, a correspondingly greater potential to tease alpha out of the differentiated monetary and FX stories that comprise the asset class (see "Going Local", part IV of *Advanced Emerging Markets: The Road to Graduation,* 5 October 2010).

… and can capture some elements of the positive EM outlook…

Local bond markets also offer some forms of exposure to the relatively upbeat outlook for EM economies. Through local markets, investors can benefit from consolidation of inflation, where such consolidation is not yet accomplished or fully priced in to local yield curves. Local yield curves should also provide exposure to EM sovereign credit fundamentals that are generally substantially more benign than in the advanced economies. Investors can also gain exposure to the real exchange-rate appreciation that tends to come with rapid economic growth, at least if that appreciation is via the exchange rate rather than domestic inflation, or if investors have access to inflation-linked instruments that exist in several EM bond markets.

… but this is not the asset class best placed to benefit from EM growth

We are as supportive of this asset class as anybody we know (for some recent thoughts, see for example, *EM and inflation-linked bonds: Keeping it Real*, 10 November 2010, and *Local vs external debt under a new norm,* 25 October 2010). But if, as we think, the secular driver of asset markets going forward is likely to be growth, rather than an economic stabilization that is already largely accomplished and to a large extent priced in to markets, we think that neither external nor local fixed income is likely to be the investment story of the coming 5-10 years.

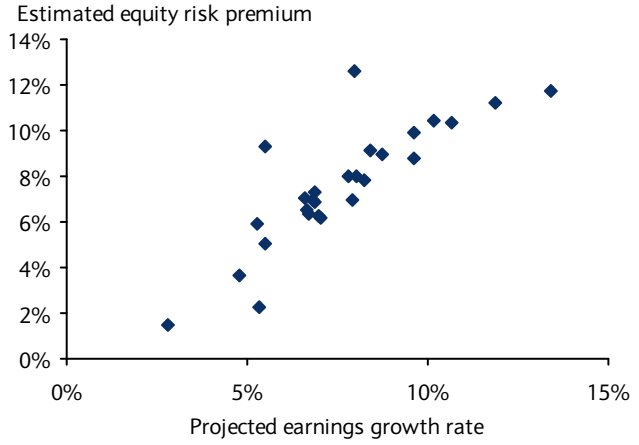
EM equities – Is all the good news priced in?

As the largest asset class by far, and the one most directly linked to economic growth, equity markets are the natural place to seek opportunities to gain exposure to the emerging market growth theme. Other people have, of course, already had this thought and acted upon it, and the question that arises is the degree to which the likely economic

Figure 28: PEs are not highly correlated with growth forecasts

Source: MSCI, Barclays Capital

Figure 29: As a result, estimated excess returns are positively correlated with growth forecasts



Source: Barclays Capital

outperformance is reflected in current markets. Is all the good news priced in and all the value squeezed out of EM equity markets?

A conventional dividend-discount model

We approach the question in a conventional manner. We begin with the assumption that equity prices are the present value of expected future dividends, which results in the following simplified relationship:

$$(P/E) = div*(1+g)/(r + rho - g)$$

Where: (P/E) is the equity market's (trailing) price-earnings ratio

div = dividend payout ratio (dividends/earnings)

g = medium-term real earnings growth rate

r = real return on a 'safe' asset, usually sovereign debt

rho = the 'equity risk premium', or equivalently, the expected return in excess of the yield (r) on a safer asset, that is implied by market pricing of the expected future stream of earnings and dividends.

The theory is straightforward, even primitive; the difficult part is coming up with forward-looking estimates of div, g, and r which allow us to compute the implied excess return, rho. We explain our approach in the appendix to this chapter and list the main inputs and results in Figure 30. The main conclusions are as follows.

Figure 30: Projected equity-market returns

	MSCI mkt cap		PE	ROE	div	g	R	ERP	H vol	Sharpe
Emerging markets	**9,362,990**	**100.0%**	**16.1**	**15.48**	**0.378**	**8.0%**	**2.53%**	**7.99%**	**13.1%**	0.611
Latin America	**1,820,347**	**19.4%**	**17.2**	**16.98**	**0.384**	**6.9%**	**2.57%**	**6.84%**	**17.9%**	**0.382**
Brazil	1,119,021	61.5%	13.8	17.90	0.385	6.6%	2.56%	7.01%	21.0%	0.334
Chile	174,384	9.6%	21.4	10.77	0.379	10.6%	2.22%	10.37%	16.9%	0.613
Colombia	137,654	7.6%	23.5	9.74	0.494	6.7%	2.60%	6.37%	23.8%	0.267
Mexico	318,128	17.5%	23.9	18.07	0.347	4.8%	2.64%	3.66%	15.4%	0.237
Peru	59,989	3.3%	21.0	28.28	0.351	11.9%	2.56%	11.21%	23.6%	0.476
EMEA	**1,956,965**	**20.9%**	**12.6**	**16.44**	**0.315**	**7.0%**	**2.89%**	**6.25%**	**17.2%**	**0.364**
Czech Republic	40,918	2.1%	9.9	15.51	0.632	8.0%	2.28%	12.61%	14.4%	0.877
Egypt	40,946	2.1%	17.4	22.24	0.531	2.8%	4.48%	1.46%	15.3%	0.096
Hungary	24,818	1.3%	12.2	20.35	0.212	5.3%	4.89%	2.28%	21.7%	0.105
Israel	125,533	6.4%	15.2	13.66	0.387	7.8%	2.56%	8.02%	17.3%	0.463
Poland	131,721	6.7%	14.1	15.08	0.411	6.8%	2.99%	6.93%	14.9%	0.466
Russia	756,119	38.6%	8.3	15.43	0.152	7.9%	2.91%	6.98%	19.5%	0.358
South Africa	423,331	21.6%	18.9	18.07	0.428	5.5%	2.82%	5.08%	12.6%	0.403
Turkey	187,399	9.6%	10.8	16.73	0.292	6.6%	3.01%	6.52%	19.8%	0.328
Asia	**5,585,678**	**59.7%**	**16.9**	**14.65**	**0.397**	**8.8%**	**2.39%**	**8.95%**	**13.7%**	**0.654**
China	1,445,411	25.9%	14.6	15.62	0.333	10.2%	2.27%	10.39%	16.0%	0.648
Hong Kong	626,199	11.2%	22.9	9.62	0.533	5.3%	1.81%	5.94%	14.3%	0.414
India	847,811	15.2%	22.4	19.79	0.212	13.4%	2.74%	11.72%	16.7%	0.700
Indonesia	202,801	3.6%	19.0	24.92	0.408	9.6%	3.22%	8.75%	22.8%	0.384
Korea	893,804	16.0%	12.1	12.86	0.172	7.0%	2.42%	6.15%	13.2%	0.464
Malaysia	290,077	5.2%	18.1	12.79	0.420	9.6%	2.25%	9.90%	8.5%	1.171
Philippines	62,871	1.1%	17.5	14.67	0.414	8.2%	2.97%	7.83%	19.4%	0.404
Singapore	339,108	6.1%	16.0	12.75	0.433	8.4%	2.25%	9.10%	11.1%	0.821
Taiwan	643,400	11.5%	16.1	10.70	0.922	5.5%	2.25%	9.27%	12.4%	0.745
Thailand	189,226	3.4%	14.8	16.76	0.412	6.9%	2.53%	7.34%	19.1%	0.385

Note: H vol is historical volatility computed with daily data over a six-month window. 'g' refers to earnings growth measured in US dollars and deflated with the US CPI. R is the real return on a USD-denominated government obligation. ROE and div are the estimated return-on-equity and dividend-payout ratio, averaged over the past five years. Market capitalization and PEs are December 2010 values.
Source: MSCI, Barclays Capital

Our growth forecasts imply strong EM equity outperformance

Weak correlation between projected earnings growth and PEs…

First, there is only a weak correlation between our projection of growth and PEs in the main EM equity markets (Figure 28); at least by this measure, equity markets do not appear to be pricing the growth outlook very aggressively, or if they are, they are using quite different growth estimates than ours. It follows almost necessarily from this that there is a strong correlation between our estimates of excess equity returns and our forecasts of economic growth (Figure 29).

…points toward a positive relation between projected growth and estimated future excess returns

Second, it does not appear to us that the scope for equity-market performance is much reduced by comparison with the past decade's strong record. For EM as a whole, we estimate an equity risk premium of roughly 8%, which implies a total expected return (above inflation) of about 10.5% over the long term. For Asia, our estimate of the risk premium is nearly 9%, and the projected total return 11.3%.

Estimated returns are comparable to the past decade's returns…

In a world of much-diminished return expectations, and in light of the re-rating of EM equity markets that has already taken place over the past decade, these estimates look very high indeed. So before we delve into the details, we think we should put them in historical perspective, and illustrate more clearly what one needs to believe about the future to accept this as a plausible forecast. We do so with the help of Figure 31, which compares the past 10 years with our outlook for 2010.

Figure 31: Deconstructing MSCI EM total returns – Past and projected

	2000-10 (%)	Projection (%)
Total returns (after inflation)	9.3	10.5
Dividends	2.5	2.5
Capital gains	6.8	8.0
Re-rating (P/E)	-2.2	---
Local currency earnings	6.7	6.2
Real exchange rate	2.5	1.8

Source: Barclays Capital

…reflecting an outlook for growth that is comparable

In 2000-10, EM equity markets earned a total return of 9.3% after inflation.[4] This comprised dividend income (assumed to be re-invested) of 2.5% and real capital gains of 6.8%. Assuming dividend income remains about 2.5% (reflecting a dividend payout ratio of just over 40% and a price/earnings ratio of about 17), our 10.5% total return projection is consistent with real capital gains of about 8% per year. Our economists tell us to expect real exchange rate appreciation of about 1.8% per year in the medium term, which requires real earnings to grow about 6.2% per year in local currency terms.

We have a couple of benchmarks against which to measure this 6.2% projection of real earnings growth. One is history: real earnings grew more rapidly than that in the past decade, and even more so in the past five years. Another model of earnings growth is given by the return on investment multiplied by the earnings retention rate (on the presumption that retained earnings are invested and earn the ROE): g = ROE*(1-div). Over the past five years, MSCI data put the EM ROE at 15.5% and the dividend payout ratio at 40%, suggesting real earnings growth on the order of 9.3% – well above the 6.2% that we have assumed for the future. Finally, the 6.2% earnings growth is fully consistent with the roughly 5.6% trend real GDP growth that our economists tell us to expect.

Startling though the projections at first appear, we have a hard time avoiding the conclusion that, if our positive assessment of the outlook for emerging market growth is on the mark, emerging market equities are still cheap and should provide very solid returns over the medium term.

[4] As always, in this document, real returns are measured as US dollar returns deflated by the US consumer price inflation.

Ten most promising markets

Within EM, higher growth is not fully reflected in valuations

A last theme that emerges from Figure 28 and Figure 29 is that within emerging equity markets, investors do not seem to be pricing the differences in growth outlooks that we are forecasting. On both an absolute and a volatility-adjusted basis, the markets that look most promising to us are almost all where growth is expected to be relatively high (and, secondarily, the outlook for further currency appreciation is more positive). If we rank markets on the basis of volatility-adjusted excess returns, the 10 most promising are (in order) Malaysia, the Czech Republic, Singapore, Taiwan, India, China, Chile, Peru, Poland, and Korea. Six of these are Asian, and two of the non-Asian standouts (Peru and Czech) are very small by global standards (less than one percent of EM market capitalization).

Advanced emerging markets score well

It is interesting to note, as well, that seven of the top 10 markets (and nine of the top 12) are advanced emerging markets, as defined by our earlier research, which supports the view that the structural, institutional and policy markers that defined that ranking do seem correlated with other forward-looking assessments of high, stable growth.

One member of both the AEM and the BRIC clubs that does not make our top 10 is Brazil, which may be surprising in light of that market's relatively appealing valuation, as measured by PE. This is largely because volatility is high; on an absolute basis, the expected return for Brazil is only marginally below our estimate of the EM average.

EM asset allocation – Go for the growth

The decline of 'country risk' is largely priced into markets, so 'traditional' external debt markets offer much more limited scope for outperformance in the years to come

During the past decade, and more specifically since the 2002 'Lula scare', emerging market external debt has been an outstanding investment story, delivering out-sized returns as EM economies benefited from improved policy frameworks and a more EM-friendly global environment, and investors re-priced EM sovereign risk in light of those improvements. This re-pricing is largely behind us, at least in the mainstream of the emerging debt market, and there is limited scope for a repeat of such performance in the half-decade to come. For example, even under the somewhat optimistic assumption that the average spread on the high-quality 80% of the external sovereign market were to fall over the next five years from roughly 150bp to 75bp, this high-quality segment of the debt market would outperform US Treasuries by about 250bp; not a bad performance given the relatively low-risk nature of the underlying credits, but a far cry from the past decade's performance. Something closer to 175-200bp per year seems more plausible to us. The riskier segment of the external debt market can perform much better, if the sovereigns in question establish policy frameworks and track records of the sort that have become the emerging market norm, but this is not assured, and in any event, this is a small slice of an asset class that is itself a very small slice of the global fixed-income pie.

Go for the growth

But while stability and credit-worthiness seem to be priced in to EM debt markets, we find that the EM growth story is not fully priced in emerging equity markets. Equity-like returns come along with equity-scale volatility and risk, but if the conventional wisdom about emerging markets growth actually materializes during the coming 5-10 years, EM equity markets should deliver returns comparable to the past 10 years' very strong returns, even if there is no continued re-rating of EM earnings streams. While other considerations may play an important role over shorter and more tactical investment horizons, thematically, we think investors should expect to be rewarded for their exposure to rapidly-growing emerging market economies. Go for the growth!

Appendix: The dividend-discount model

Theory

We adopt a standard approach to equity valuation, which begins with the assumption that the equity price is equal to the present value of future dividends, discounted at a discount rate equal to a 'safe' interest rate, r, plus an equity risk premium, rho. In theory, the equity risk premium is the excess return (in excess, that is, of the 'safe' interest rate, r) that is demanded by investors to own the risky cash flows from the equity. It is also a prediction of the excess return that will be realized over time if the forecast of cash flows is, in fact, realized. We will therefore be using the terms 'equity risk premium' and 'excess return' interchangeably.

If we assume that key parameters are constant, then the present-value relationship can be simplified to:

1) $(P/E) = div*(1+g)/(r + rho - g)$

Where: (P/E) is the equity market's (trailing) price-earnings ratio

div = dividend payout ratio (dividends/earnings)

g = medium-term real earnings growth rate

r = real return on a 'safe' asset, usually sovereign debt

rho = the 'equity risk premium' or, equivalently, the expected return in excess of the yield (r) on a safer asset that is implied by market pricing of the expected future stream of earnings and dividends.

Of course, the parameters div, g, r, and rho are not constant in the real world, and we should interpret the terms in equation (1) as averages of the parameters that we expect over the long run. Equation (1) is, thus, only approximately true, but the approximation captures the essential aspects of the valuation problem. Our objective to estimate rho, using observed (P/E) and estimated (r, g, div) parameters.

Data

We use MSCI data on emerging equity markets. These data are denominated in US dollars, which we adopt as our common numeraire. Except where specifically noted, 'real' quantities are defined as the USD quantity, deflated using the US CPI.

The 'safe' interest rate 'r'

Since cash flows are in USD, the discount factor must also be in USD. This leaves us with the option of using the interest rate on a relevant dollar-denominated instrument, or translating a local interest rate into a USD equivalent, using forecasts of the exchange rate. For most countries, the choice is not material, but in some (most notably Brazil), local real interest rates are much higher than the rate on external, USD obligations. However, in such cases, local interest rates are of limited relevance for international equity investors because of tax, regulatory, and other costs associated with accessing local debt markets. We have therefore chosen to measure the 'safe' interest rate as the rate of return on a 10y USD-denominated government obligation. Where a cash instrument is not available, we combine 10y CDS and the US Treasury rate to estimate the rate. In a few cases (for example, India and Hong Kong) where CDS is not available, we construct our own estimate based upon an assessment. We translate nominal USD rates into a real interest using an inflation forecast derived from the TIPS market, roughly 2.2% at present.

Note that the choice of 'the interest rate' is largely semantic, in the sense that it merely answers the question 'return in excess of *what*'. In particular, our estimate of total return (r+rho) is unaffected by the choice of 'r'. Moreover, aside from unusual cases like Brazil, different approaches to estimating 'r' would lead to differences that are fairly minor compared with other drivers of equity returns.

The dividend payout ratio 'div'

The MSCI dataset contains historical data on dividend payments, from which the dividend payout ratio may be computed. The decision we face here is whether to use a long historical average for the series, or a recent value. Examination of the data suggested that the series are persistent, but appeared stationary, which suggests that there is information about the future both in the long-term average and more recent observations. We therefore used a simple average of the most recent (December 2010) observation and a 5-year average. For most countries, the differences between December 2010 and the longer-run average are fairly minor.

Figure 32: Dividend payout ratios

	5-year average	December 2010	Average
Emerging markets	41.9%	33.7%	37.8%
Emerging Asia	45.0%	34.0%	39.5%
EMEA	34.0%	29.0%	31.5%
Latin America	37.0%	39.8%	38.4%

Source: MSCI, Barclays Capital. Note: Regional averages are weighted by equity market capitalization.

However, in Asia, dividend payout ratios have recently been meaningfully lower than the 5-year historical average. Our assumption that they gradually converge toward the historical average tends to raise estimated equity-market returns, compared with the assumption that they remain at the low, relatively depressed level.

The dividend growth rate 'g'

This is, of course, the central driver of our results, and thus requires careful attention. As a reminder, we have formulated the analysis so that the relevant measure of earnings is USD earnings, deflated with the US CPI. This is equivalent to real earnings in local currency multiplied by the real exchange rate (if we adopt the convention that an increase in the real exchange rate signifies an exchange rate appreciation). In terms of growth rates, this means that our measure of earnings growth 'g' is equal to the growth rate of real local currency earnings plus the rate of real exchange rate appreciation.

We can think of three approaches to forecasting trend earnings growth. An obvious benchmark is historical experience; we present the annualized growth rate in 2006-10 in Figure 33.

Figure 33: Indicators of real earnings growth

	Historical	ROE*(1-div)	Macro
Emerging markets	9.9%	9.5%	9.9%
Emerging Asia	7.3%	9.5%	9.7%
EMEA	10.1%	10.6%	4.9%
Latin America	17.2%	8.6%	3.6%

Source: MSCI, Barclays Capital

A second approach is to extrapolate 'organic' or 'fundamental' earnings growth associated with earnings re-investment; a conventional estimate is given by the historical return on

equity multiplied by the earnings retention rate (1-div). A third approach is the 'top-down' macro approach, which associates long-term earnings growth with growth in the size of the economy, in this case, the sum of real GDP growth and the forecasted trend in the real exchange rate. (We made one arbitrary adjustment to the 'macro' forecasts. Motivated by the Chinese government's stated intention to raise household income and expenditure relative to national income, we reduced our estimate of Chinese earnings growth by 2 pp per year below the rate of economic growth. Over 10 years, this would reduce the share of corporate profits in GDP by about 10 pp, which is in line with the government's desired increase in household consumption.)

In our view, it is ultimately an empirical question which of these indicators provides the best signal about future earnings growth. Our empirical work to date suggests that the 'macro' drivers provide a stronger signal than the corporate 'fundamental' estimate, but that both are informative. We therefore use as our estimate of 'g' a weighted average of the three indicators, with (somewhat subjectively chosen) weights of 60% on the 'macro' driver, 25% on the corporate 'fundamental' driver ROE*(1-div), and 15% on historical earnings growth.

For emerging markets as a whole, these weights do not matter much because the three estimates of future earnings growth are very close to one another. The same is roughly true for Asia. However, our macro-derived forecast of earnings growth is substantially below both history and the corporate 'fundamental' measures for EMEA and Latin America; the relatively high weight that we attach to the macro-derived forecast thus reduces forward-looking return estimates for those regions compared with forecasts that lean more heavily on either history or the corporate 'fundamental' approach to forecasting earnings growth.

CHAPTER 3

A return to scarcity: The disinflation trend is over

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Malthus argued that population growth would eventually exhaust global resources. Boserup said our ability to find more resources and use them more efficiently might grow even faster. But then China enters the picture…

Over the past decades, globalization has brought sleeping giants to the global goods and labor market. This, coupled with technological advances in commodity production, helped generate disinflationary pressures globally. However, the impressive growth of China and India is increasing demand for commodities at a rapid pace, making it difficult for technological advances to allow production to catch up with demand. This is creating inflationary pressures on commodity prices (Figure 1), making them more vulnerable to shocks and, hence, more volatile (Figure 2). In turn, policymakers face deeper challenges, as central banks of commodity-importing countries have to fight these imported inflationary pressures and respond to more volatile price fluctuations.

Malthus, Boserup, and globalization

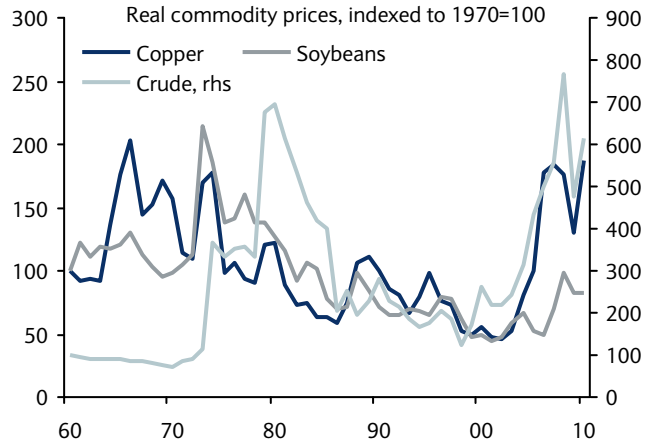
Population growth implies ever growing demand for natural resources

Since its publication in 1798, a little tract entitled *Essay on the Principle of Population* has profoundly affected the way people think about population and other demographic, economic, and, more recently, commodity and environmental issues. Written by the Anglican clergyman Thomas Robert Malthus in the midst of Victorian England's Industrial Revolution, *The Principle of Population* set out a vision of the relationship between population growth and what he termed 'subsistence.' Malthus argued that population expands 'geometrically,' whereas 'subsistence increases only at an arithmetic ratio.' He believed that man's ability to increase his food supply was constrained in three ways: through land scarcity, the limited production capacity of cultivated land, and the law of diminishing returns. This idea was riveting in that it posited a scenario in which population growth would outstrip subsistence – be it food, land, jobs, or any of the various components in Malthus' definition of subsistence.

But technology expands our access to natural resources and the production we can derive from them

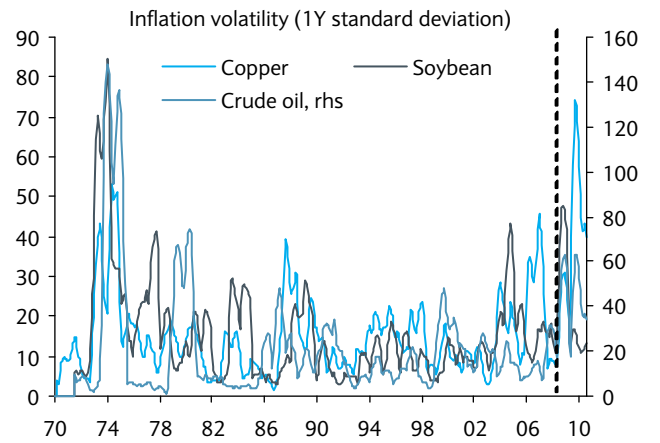
Almost 200 years later, a Danish economist, Ester Boserup, asserted that an increase in population would not only increase demand for food but also spur technologists to find ways to increase food production. Indeed, the exclusion of technology from Malthus' theory is a major drawback. Importantly, Boserup's argument has a much broader application than just food. Better technologies expand the usable set of natural resources (for example by reaching deeper oil fields), and increase our ability to produce goods with a given amount

Figure 1: Commodity prices have surged in the past decade



Source: EcoWin, Barclays Capital

Figure 2: And so has volatility of commodity inflation



Source: EcoWin, Barclays Capital

of natural resources. Following the final phases of peak OECD commodity consumption in and around the 1970s, global commodity demand had been waning. Technological innovation spurred by sustained high prices resulted in ample slack in the supply chain and a multi-year downward trajectory for prices. Boserup appeared to have been right.

And globalization affects the interplay of demographics and technology…

Only the long run will adjudge the competition between Malthus and Boserup. In this chapter we discuss the deflationary and inflationary pressures of our own era, adding a third dimension to the interplay between demographics and technology: globalization. Roughly speaking, the entrance into the global market of India and China was a major shock to global supply of labor at first, and subsequently to global demand for goods. As these countries opened up to trade, global production for the integrated world market had access to a much vaster pool of labor. And as these countries benefited from trade and progressively adopted western technologies, the size of their economies grew and they are now contributing substantially to global demand for goods, including commodities.

…through both supply and demand effect

Globalization and the large supply of labor in China and India generated deflationary pressures globally

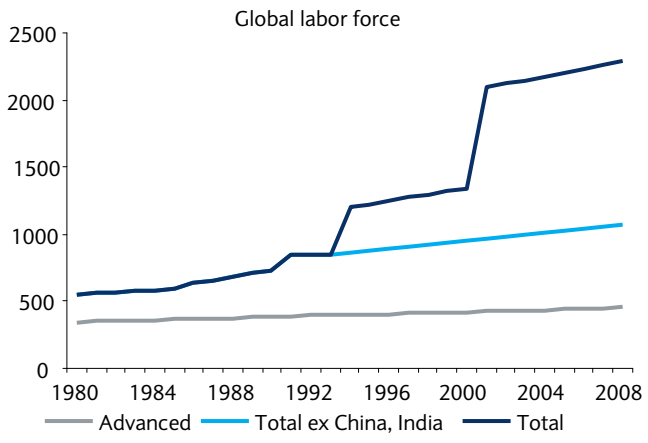
The effect from labor supply combined with globalization has contributed to the global disinflationary process of recent decades. The growth in population in the developing world, coupled with its progressive integration into global markets, has generated extensive changes in the relative supply of factors of production, affecting relative prices and wages globally. Figure 3 shows estimates for the increase in labour supply of the integrated global market, which has been rising fast with trade liberalization in the developing world, notably China and India, but also Eastern Europe.[1] This in turn has lowered the wage of unskilled workers relative to the wage of skilled workers, thereby lowering the price of goods that use predominantly unskilled workers (relative to other goods). This process made it easier for central banks to engineer a disinflationary process in the past decades (as discussed more in details below).

But recently commodity demand in emerging markets has increased sharply …

… reverting the previous trend…

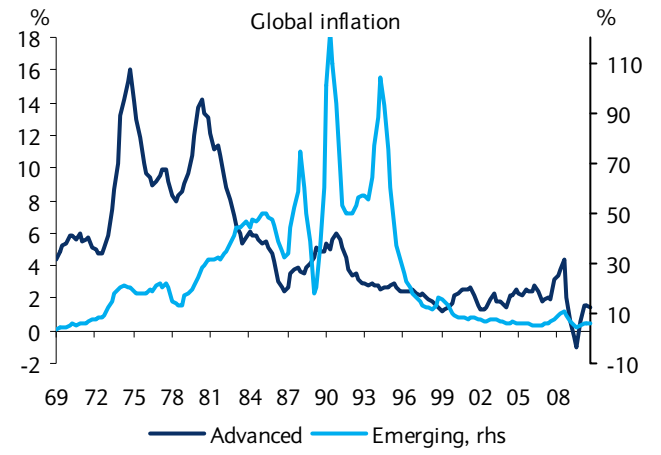
In recent years, this process has reversed. The demand effect from fast growing EM is now contributing to an inflationary process. As a result of the marked changes in emerging market economies, commodity demand has surged in the new millennium. Indeed, EM countries' share of global commodity trade has risen sharply, putting pressure on prices. The rise of India and China has completely altered the face of the global economy. These economies have accounted for virtually all of the demand growth in the past few years, reflecting the greater commodity intensity of their economies relative to advanced economies. At the same time, linkages between food and fuel are increasing, with half of the rise in global corn consumption in recent years tied to ethanol production. In an environment of sustained demand growth, the supply response has been rather sluggish. Capacity

Figure 3: Labor force of global market (millions)



Source: World Bank, Barclays Capital

Figure 4: Global inflation on a declining trend



Source: Haver, Barclays Capital

[1] Trade liberalization is proxied via the index constructed by Sachs Jeffrey and Andrew Warner (1995), "Economic Reform and the Process of Global Integration", Brookings Papers on Economic Activity, No. 1, pp. 1-118, and updated by Wacziarg, Romain and Karen Horn Welch (2003), "Trade Liberalization and Growth: New Evidence," NBER Working Paper No. 10152 (December). For China liberalization is associated with the entrance in the WTO, ie,, 2001. The sample covers 80% of world population and 91% of world GDP.

expansion has been held back by escalating costs, reflecting geological and technological constraints as well as infrastructure bottlenecks that have boosted the average cost of production in marginal fields and projects. In addition, policy-related restrictions – including sharply higher royalties and taxes – have limited production growth, while shortages in skilled labour and specialized equipment have raised investment costs. As a result, commodity prices have risen sharply in recent years (Figure 1).

…due to a shift in the balance of economic power

The shifting balance of power in the global economy has far-reaching consequences. This change is not just an emerging market story – new markets have always emerged over time. The change underlines the resurgence of sleeping giants in the global market as well as economic and industrial catch-up and a historic shift in wealth creation from west to east that is bringing profound changes to the economic and financial landscape. For much of the 20th century, the US was the undisputed economic heavyweight with key relationships in the world market defined on this basis. But with the advent of China and India on the periphery, these relationships have started to change.

The share of investment and GDP in emerging countries is highly commodity intensive

With the quest for urbanisation and growing population in emerging markets, savings rates in these economies have started to decline. The large external surpluses in these countries are effectively symptoms of deeper domestic structural imbalances, in particular a growing gap between savings and investment. This has started changing quite rapidly recently. Global investment rates started to rise in 2002, coinciding with the surge in investment in China and India. With rapid industrialisation requiring vast amounts of investment in infrastructure, global investment rates rose from 20.8% of GDP to 23.7% in 2008 (McKinsey). China is now investing at higher rates than peak rates in Japan (39.7% in 1970) and South Korea (39.9% in 1991), while India's investment rate climbed by 16 percentage points between 2000 and 2008.

The higher demand for investment is commodity intensive

This investment, in turn, is extremely commodity-intensive. Emerging markets, particularly China, currently account for the bulk of global commodity trade. China's percentage of global consumption has been increased across the commodity spectrum, and while the contribution of emerging markets to global GDP is rising, their GDP itself is becoming more commodity intensive (see section below). The rapid industrialization of some of the world's most populous nations has had some serious repercussions on the commodity markets. As incomes rise in the earlier stages of industrialization, so does per capita energy and food consumption. However, with the most easily accessible resources already exploited, the demands of a wealthier China and India alone have started to press up against the limits of commodity supplies. The effect has been higher prices, which have played a crucial role in relieving some of the stresses on the supply side. Economic cycles do introduce fluctuations in prices but the speed of adjustment in the current cycle has been far faster than in previous cycles. The recovery in demand from the nadir has been striking as the epicenter of global demand has shifted eastwards. As a result, commodity prices have risen substantially to balance the market. Lower savings rates and higher commodity prices are, in our view, a potent combination for higher inflationary pressures in the future, with emerging markets the key drivers.

Resource scarcity is set to be a dominant theme in the future

Thus, despite some rapid technological breakthroughs over the past century, it would be difficult to discount Malthus' theory completely. Indeed, resource scarcity is a crucial social, political and economic factor of our era and will likely remain so for the foreseeable future. We are depleting the global stock of natural resources, ie, commodities in the broadest sense of that term, at an accelerating pace, with the rise in per capita commodity consumption vastly accelerated by rising prosperity in the developing economies. Increasingly, future demand will be met only by utilising the less productive and marginal stocks. But, given the pace of economic growth in the developing world, if technological advances disappoint, the resource balance will become even more precarious. Relative resource scarcity is already wreaking significant changes on global growth and inflation. The era of deflationary effects from emerging markets seems to be coming to an end, driven by the commodity-price-stoking desire to urbanise.

Monetary policy will need to react to these external factors

These movements in demand for commodities and in factor supplies associated with demographic trends generate pressure for large relative price adjustments at the global level (ie, relative wages and prices across countries, or relative prices of commodities versus other goods and services). However, there are differences in the effects across countries. At the country level, international relative price adjustments feeding through via external trade can constitute a large and persistent source of deflation/inflation (if not fully offset by exchange rate changes) that may require extensive monetary policy adjustment to keep inflation near target.

The limited room between demand and supply will exacerbate volatility

At the same time, the limited room between demand and supply will exacerbate commodity price volatility. As demand will increase at a rapid pace placing upward pressure on prices, this in turn will stimulate technological advances to increase production in order to meet that demand. However, as production continues to place catch-up, scenarios of excess supply will remain limited, making commodity prices extremely susceptible to small shocks. Weather changes, geo-political factors, disruption of production (such as the BP spill), and other factors would thus create large price fluctuations, exposing countries to significant swings in production and consumption costs.

In sum, going forward, the demand from growing EM is likely to create rising and more volatile commodity prices, thus complicating the tasks of policymakers

In sum, countries like China and India have historically had a deflationary impact on the world economy, but this may be turning around. Indeed, while the disinflationary effects coming via EM supply of factors are likely to decline, inflationary effects coming via EM demand for commodities are likely to rise. Indeed, over the past decades, high productivity and low wages, coupled with managed exchange rate regimes, contributed to low export prices. However, wage and real exchange rate pressures in EM countries are likely to be stronger. Moreover, and perhaps more importantly, EM demand for commodities will significantly affect world prices given that EM's share of global GDP is increasing. (For a discussion of potential inflationary pressures arising from fiscal and monetary pressures in the developed world, see Chapter 1). Volatility of commodity prices is also likely to increase, as the small gap between available production and demand makes prices more susceptible to shocks.

The historical disinflation trend via EM supply effects

There are many reasons behind the global disinflation trend

The disinflation process over the past three decades has affected every corner of the globe (Figure 4). There are many domestic and external reasons for this. Less expansionary monetary and fiscal policy, strengthening productivity, enhanced deregulation, increasing globalization, and declining commodity prices.

Surely better monetary policy institutions and fiscal discipline are the main ones

Among the domestic factors, improved monetary policy institutions are certainly a key one. Deeper central bank independence, stricter commitment to anti-inflationary goals, the adoption of inflation-targeting regimes (explicitly or implicitly), better communication with the public and better forecasting models have spread not only throughout advanced economies, but also to most emerging market and many low-income countries. Such advances are in part due to stronger fiscal discipline: As public finances have improved, fiscal authorities have had less need to exert political pressure on monetary authorities to generate inflation in order to finance fiscal imbalances and have thus been more willing to allow central bank independence.

Productivity, deregulation, and competition are also important

Other factors also exerted downward pressure on prices, thus allowing central banks to maintain easier monetary policy while keeping inflation in check. Growth in productivity, deregulation, and the resulting increase in competition are important factors, although progress on these fronts has been very uneven across countries.[2]

[2] The theoretical revolution in monetary policy over the past decade has highlighted that higher competition reduces the monetary authorities' incentives to generate surprise inflation as it reduces the effectiveness of surprise inflation in boosting employment and output. This outcome also increases central banks credibility.

But foreign factors were also crucial, by making the job of the central banks easier

While domestic factors are clearly important, the increase in globalization meant foreign productivity and other external factors started to matter more. The reason is that importing low foreign inflation makes the job of central banks much easier. Indeed, disinflationary processes are hard to implement, as there is generally strong inflation inertia from domestic wage and price settings, and inflation expectations are hard to change. To lower the level of inflation in an economy, central banks typically have to engineer a temporary decline in economic growth via monetary tightening; the economic slowdown drives inflation expectations down and domestic price-setting converges towards the lower inflation target. Hence, the disinflation process normally comes at a cost: the foregone output necessary to bring the inflation rate down by 1pp is called "the sacrifice ratio".

Normally disinflation requires sacrificing some output

But if imported inflation is lower than the target, central banks can afford to have inflation on the domestically produced goods higher than the target

When import prices grow at a slower rate than domestic prices, consumer inflation (weighted average of imported goods inflation and domestically produced goods inflation) declines. This relieves the monetary authorities of the need to contract domestic demand and output in order to achieve an equivalent disinflation. Alternatively, central banks can maintain a looser monetary policy than they otherwise would, in order to keep inflation unchanged; in other words, they can afford to have inflation on the domestically produced component higher than target, if imported inflation is lower than target.

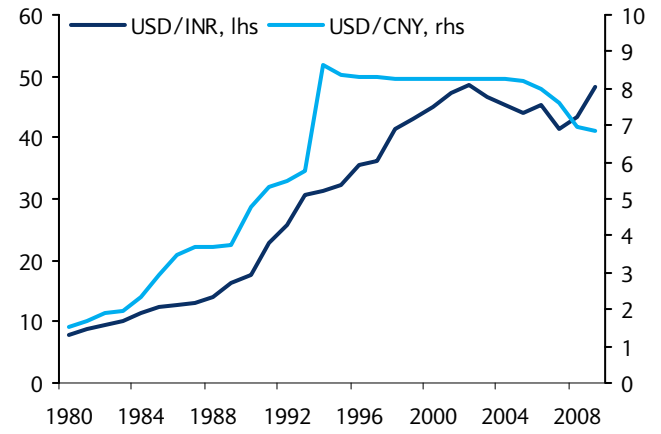
The two key external factors were the fall in import prices due to declining commodity prices…

Two key factors have offered an external source of relief from inflationary pressures for most countries. The first was a decline in commodity prices, which were on a downward trend for decades until the end of the last century (Figure 1). As the world emerged from the two oil shocks, efficiency gains in the oil industry were widespread. Furthermore, with the industrialised world's move towards a greater share of service sector in its GDP, there was enough slack in the supply chain to meet less rapidly rising demand for oil (the industrialization of large emerging markets is currently changing this picture, as we discuss below). Technological advances were also behind the large decline in food prices. Overall, the effect on CPI of changing commodity prices is highly heterogeneous across countries, with advanced economies more affected by energy prices than food prices, while the opposite holds true for EM (see *Easy money is not easy for all EM*, 19 January 2010).

…and to the entrance in the global market of large countries with growing productivity

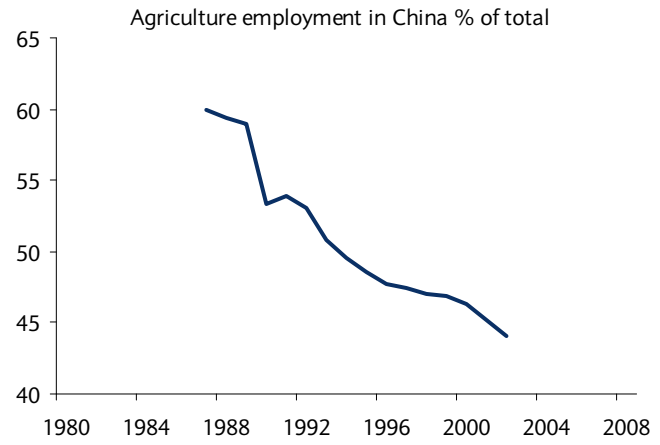
The second factor was a combination of globalization and regional differences in labor supply and productivity. Indeed, recent decades have been characterized by the entrance into the global market of many developing countries, some of which had large and rapidly-growing labor forces and were reaping fast productivity gains. The wave of trade liberalization was thus in practice associated with a sharp rise in the labor supply of the global market, particularly in the availability of unskilled labor for producing tradable goods globally (Figure 3). Moreover, some of these countries were reaping productivity gains from leapfrogging on the technologies of advanced economies, while globalization created more competition.

Figure 5: Chinese currency stable since mid-1990s



Source: Haver, Barclays Capital

Figure 6: China progressively employing more workers in tradables



Source: Haver, Barclays Capital

The country size and the managed exchange rate allowed these countries to influence the international price of their exports

These were deflationary forces. If these countries had been small, trade liberalization would have resulted in a rapid real exchange rate appreciation of their currency (either via an increase in domestic wages in excess of productivity or via exchange rate appreciation) and prices would have adjusted to international levels. But the size of the countries was large enough that they could influence world prices. At the same time, some countries, notably China, kept a stable currency against the US dollar (the currency in which most transactions – about 85% – are executed) for most of the period, so that the international price of Chinese exports would not increase faster than the domestic price of Chinese exports (Figure 5).

So Chinese export prices did not increase much…

Focusing on China, the massive size of the domestic labor force and the progressive reallocation of labor from the agricultural sector towards the production of main exportables (such as manufacturing in China and manufacturing and services in India) kept wage pressures down, especially for unskilled labor (Figure 6 and Figure 7). In turn, the limited wage cost increases and the massive productivity gains implied low inflation in exports (Figure 8). This, coupled with the pegged exchange rate regime that prevented the adjustment from occurring via an appreciation of the currency (Figure 5), induced a massive and progressive increase in Chinese exports of goods and services (Figure 9). At the same time, China exported a deflationary effect in other countries, as the inflation of its exports was lower than the inflation rate of most other countries, even when converted in their local currency.

…but its exports did

This implied imported inflation lower than CPI in the US

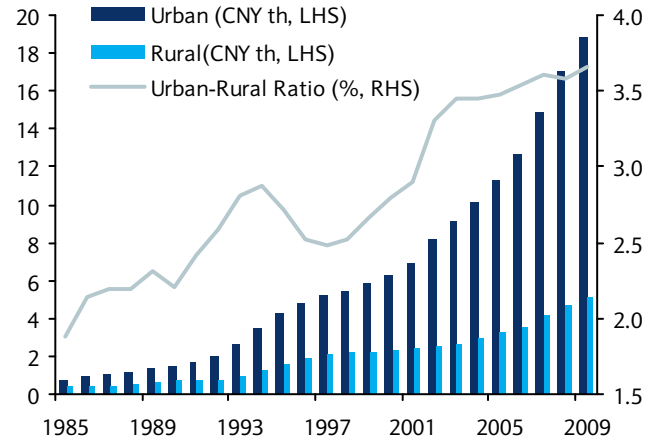
The international transmission via trade linkages was very large given the size of the country (Figure 10) and was deeply felt in advanced economies. In the US, for example, import deflators were flat until recently and flatter than CPI (Figure 11). As CPI is a weighted average of import prices and domestic prices, the pattern of flatter import prices strongly contributed to keeping CPI inflation low in the US.[3] The effects were felt even in the cost of factors of production of advanced economies, as unskilled wages in the US grew more slowly than skilled wages until recently because of indirect competition from abroad, and then the trend reversed (Figure 12).

Will the trend continue?

Some factors are not likely to change much: the policy commitment, globalization, competition, and deregulation

The key question now is: will the trend continue? In our view, the driving factors are permanent, not temporary. In other words, if fiscal and monetary commitment and credibility, regulatory and competition regimes, commodity price inflation, and Chinese inflationary pressures remain unchanged, inflation is likely to remain low. Hence, the question becomes: will these factors change? In our view, most of them will not. The unprecedented fiscal expansion in advanced economies, coupled with a projected increase in aging-related spending, is potentially worrisome. However, Chapter 1 argues that it is very unlikely that this will lead authorities to drop their low inflation commitment (though this is always a possibility

Figure 7: Wage inflation catching up in rural areas



Source: CEIC, Barclays Capital

Figure 8: China exporting disinflation until recently

Source: Haver, Barclays Capital

[3] the same pattern arises even when netting out the effect of the change in the $ value versus an international basket, indicating that the pattern is due, at least in part, to the export price of trading partners, and not (or not just) to the movement if the $ against trading partners.

if things do turn sour). Deregulation is likely to continue in Europe, especially in peripheral Europe, as part of the overall policy reform package, constituting a moderate form of deflation in these countries. Globalization looks set to continue unless the need for fiscal adjustment escalates a currency war into a trade war.

However, China is approaching the Lewisian turning point

However, China seems likely to be less and less of a disinflationary force on the global stage. Domestic factors are driving Chinese wages higher. Indeed, as the cushioning effect of a large agricultural sector is diminishing (as a result of the massive reallocation of labor across sectors that has already occurred, and the one-child policy), wage rates in urban and rural areas are starting to converge. At the same time, international pressure on Chinese authorities for nominal and real exchange rate appreciation is likely to strengthen, especially as advanced economies need external demand to fill the vacuum resulting from fiscal consolidation (see Chapter 1).

And commodity prices are reversing trend

Finally, global demand for commodities is rapidly increasing, reversing the trend in place since the 1970s. We now focus on this issue more in detail.

Looking ahead: Inflation pressure from EM commodity demand

The urbanization needs of China and India are very positive for commodity demand

China and India have both emerged as significant economic players, with commensurate demands on resource markets. Across virtually the entire range of hard and soft commodity markets, inflation-adjusted prices have risen abruptly, in a handful of cases above the peaks of the 1970s. The surge in raw material and energy prices is a clear sign that demand is pressing up against the limits of current supply. In the same vein, the rapid industrialisation of the developing economies has been a very influential factor in shaping the metals and agricultural markets debate. The rise of the developing economies is certainly the single most critical factor in the discussion of resource sustainability. The McKinsey Global Institute Research papers 'Preparing for China's urban billion' (March 2009) and 'India's urban awakening' (April 2010) estimated that to keep up with the pace of urban population growth, China would have to add 40bn sq m of residential and commercial floor spacing by 2030 and India between 800-900mn sq m each year over the next two decades *and* pave some 2.5bn sq m of roads. These projections entail some serious commodity demand.

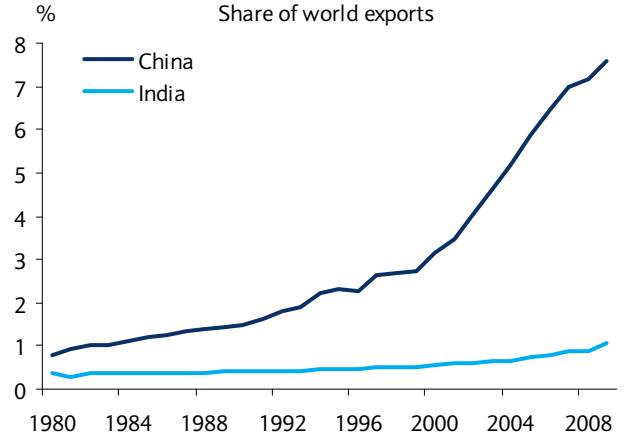
China's share of global commodity demand is rising fast

Thus, the process of rebalancing global consumption levels between the industrialised and emerging markets is likely to be extremely positive for commodities demand in general and has put significant upward pressure on prices. The early stages of this process are already evident in some of the huge changes in patterns of commodity demand seen in the past decade (Figure 13). Between 2000 and 2009, the share of China, Brazil, India and the Middle East in global coal demand grew from 36% to 55%, while

Figure 9: China's fast growth in exports

Source: Haver, Barclays Capital

Figure 10: The global importance of China (and India) is rising



Source: Haver, Barclays Capital

their share of global GDP in dollar terms increased from 7.8% to 14.1%. In soybeans, the share of this group rose from 33% to 44% and in copper from 17% to 44%. China's share of global copper demand, at 38%, is now almost twice that of the US. And although the US still dominates consumption in some markets, such as crude oil (with a 20% share of the global demand), it is emerging markets that are driving almost all of the additional consumption growth. Of the 2.9 mb/d of global consumption growth witnessed by the global oil market just in 2010, almost 85% came from non-OECD countries, with China alone contributing almost 1 mb/d of that growth.

Global trade flows are changing with EM Asia attracting a larger proportion of global commodity trade

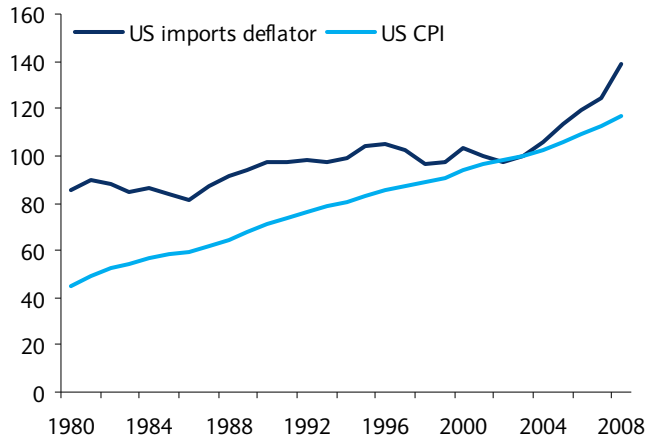
As a result of this sea change, global trade flows have also been changing, with emerging markets (particularly China), accounting for the bulk of current global imports. Take oil, for example. Commensurate with the ongoing shift in oil demand growth from west to east, there has been a shift in oil trade flows (Figure 14). The US share of Saudi exports reached around 20% in 2001, from 15% five years earlier, over the period when US oil demand rose by a cumulative 1.4 mb/d, contributing 22% of the overall rise in global oil demand. However, over the last decade, although the pace of growth in global oil demand picked up, it slowed in the US, where the contribution to global oil demand growth halved to 11%. The US share of Saudi exports began to shrink, effectively reversing a substantial portion of the gains made through the late 1990s. The sharp fall in US oil demand in 2008 and 2009 dramatically intensified the reconfiguration already at work in Saudi trade flows, with the US share of Saudi exports falling to their lowest levels in more than 30 years. At the same time, even in the face of the greatest global downturn since the 1930s, China's crude oil imports rose by 14% y/y in 2009. Moreover, Chinese imports from Saudi Arabia rose even faster, reaching record highs and overtaking the US and Japan as the single largest destination of Saudi crude for various months in 2010. Saudi Arabia already supplies nearly 25% of India's oil needs, having increased exports to India sevenfold between 2000 and 2008, and has recently agreed to increase crude shipments to India from about 0.5 mb/d currently to 0.8 mb/d. Indeed, in 2009, 70% of Middle Eastern oil was exported to the Asia-Pacific, with only 30% making its way across the Atlantic.

Global intensity of the use for most commodities fell until the start of the last decade

Aluminiun is a key example

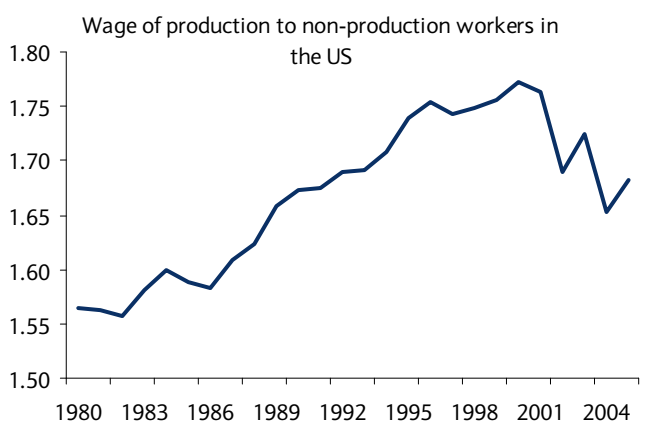
The impact of this emerging market growth can be seen at the global level, with long-term declines in the global intensity of use of a wide range of commodities either reversing or slowing substantially in the last decade (as Figure 15 and Figure 16 show). Aluminium is a particularly good example of this. Between 1980 and 2000, the amount of aluminium used per unit of global GDP fell at an average annual rate of 1.1% pa. Although aluminium was capturing market share in end-use applications such as packaging and transport over this period, other factors, including more efficient usage, higher recycling and a move in the industrialised world towards a greater share of service sector in its GDP, more than offset

Figure 11: US imported inflation is changing trend



Note: Indexed to 2003=100
Source: Haver, Barclays Capital

Figure 12: US relative wage of skilled to unskilled workers



Note: As proxied by the relative wage of production to non-production manufacturing workers. Source: NBER– CES manufacturing industry database

these trends so that the growth in aluminium demand expanded less rapidly than overall global growth. In the past decade, however, aluminium's intensity-of- use trends have altered markedly. This is mainly because emerging markets now account for a much larger share of global growth and their current development phase is highly aluminium-intensive owing to its use in infrastructure, consumer durables and other industrial end-uses.

But the global intensity of the use of oil remains on a declining trend as the share of demand from advanced economies is large

The same pattern of increase or reversal of decline in the intensity of use is visible across many other commodities, and its extent is generally related to the importance of demand in advanced economies. For example, in oil, the slowdown was small because the bias of OECD countries in total oil demand was considerably large. This too, has started changing: the watershed for the emergence of non-OECD countries as the dominant marginal consumer was reached only in 2010. As Figure 15 shows, the downtrend in global intensity of use of oil has started to flatline. While non-OECD energy consumption exceeded that of the OECD back in 2008, it was primarily due to continued rapid coal consumption growth, which constitutes about 70% of energy consumption in these countries. Indeed, between 1980 and 2000, the global intensity of use in coal had been falling at an annual rate of 2.4%, but since 2000, that has reversed to 1%, with 2010 seeing an even higher usage. Thus, the long-term trends in global commodity intensity use have started to change significantly owing to the changing patterns of demand in emerging markets (Figure 16).

Sur la table

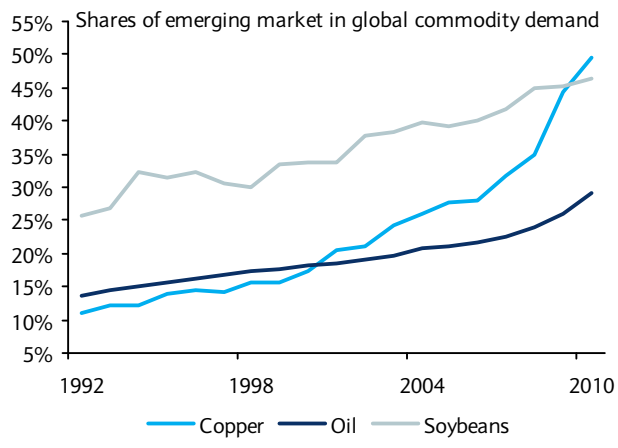
Meat consumption in Asia has increased by 320% over two decades

As countries grow wealthier, per capita consumption of resources increases sharply, not only for those related to metals or energy consumption, but also to agricultural products. Consider something as simple as the change in diet driven by increasing wealth. In 1990, Asia consumed 16.7kg/person of meat per year. By 2002, meat consumption had increased 66% to 27.8kg/person. By the end of the decade, this had risen to 70kg/person, a phenomenal increase of 320% over two decades. With per capita meat consumption in developed nations far from falling, the changing dietary patterns in developing countries have been among the key factors behind the surge in agricultural prices, particularly of grains (Figure 17).

China alone will demand a large increase in feed production

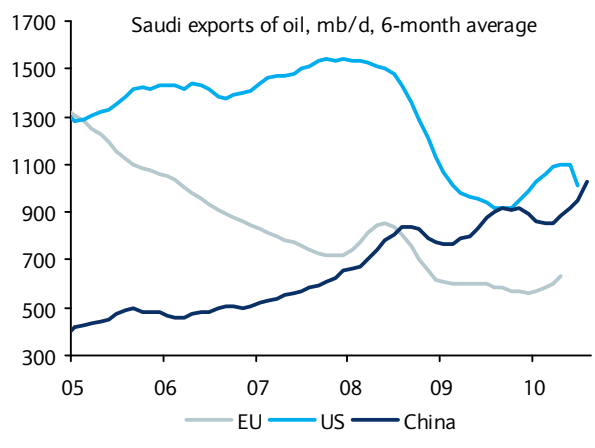
The rise in per capita agricultural resource consumption is most intense in China. As the country's population has grown wealthier and adopted a more meat-based diet, consumption of feed crops like soybeans and corn have soared. Indeed, rising meat consumption since the 1980s has drawn more of China's land into production of feed crops and created robust demand for imported soybeans and fishmeal that add protein to feed for poultry, hogs, and cattle. Over the past decade, the US Department of

Figure 13: The share of EM in commodities has risen steadily



Note: EM includes Brazil, China, India, Middle East Source: BP statistical review, Brook Hunt, USDA, Barclays Capital

Figure 14: Trade flows also capture that shift



Source: DOE, China Customs, Eurostat, Barclays Capital

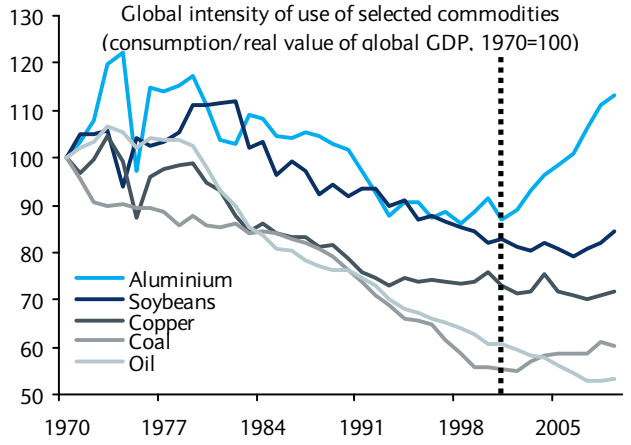
Agriculture (USDA) estimates per capita meat consumption to have increased by 8.2kg in China to above 50kg. It is estimated that the feed required to produce 20kg per capita of extra meat for China's 1.5bn people in 2030 will represent an extra 320mt of feed over the next 20 years, requiring global feed production to reach 1,300mt (Lyons, 2007).

As a whole, Asia in 2015 will account for more than 60% of the global population, more than 70% of global pork consumption, and more than 35% of global chicken consumption, requiring an additional 391mt of pig and poultry feed by then. Even if the largest producers of grains, including Brazil, Argentina, the United States and Ukraine could double their grain production, there would still be insufficient feed available to deliver the extra 20kg per capita of meat to China, let alone to meet the needs of Asia as a whole.

China accounts for 60% of global soybean imports and has switched into a net corn importer too

Currently, China alone is responsible for 60% of global soybean imports (Figure 18). Chinese dependence on soybeans has increased more than twofold over the past decade and remains the key demand-side dynamic of the market. More recently, China, which has traditionally been self-sufficient in corn and even exported a surplus to the global market, has turned into a net importer of that grain. In the last seven months of 2010, China imported more corn than it exported, adding further pressure to a market where a significant part of the crop is diverted for the production of fuel ethanol in the US.

Figure 15: Long-term declines in intensity of use slowed or reversed for many commodities in the last decade



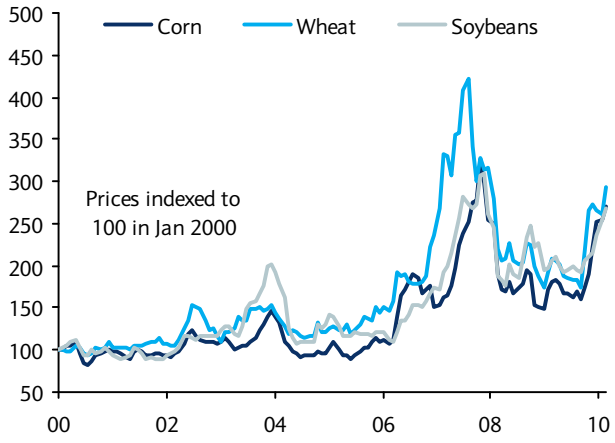
Source: BP database, USDA, Brook Hunt, Barclays Capital

Figure 16: Long-term trends in global intensity of use for selected commodities

Market	1980-2000	2000-2008
Intensity of use increasing		
Aluminium	-1.1%	2.7%
Coal	-2.4%	1.0%
Soybeans	1.3%	0.7%
Corn	-1.7%	0.3%
Intensity of use falling less quickly		
Lead	n.a.	-0.1%
Engy. exc.oil	-1.4%	-0.1%
Hydro	-1.4%	-0.6%
Carbon	-2.3%	-0.6%
Copper	-1.2%	-0.7%
Gas	-1.0%	-0.7%
Zinc	-1.5%	-1.3%
Wheat	-2.3%	-1.8%
Nickel	n.a.	-2.0%
Oil	-2.6%	-2.0%
Intessity of use falling more quickly		
Nuclear	4.8%	-2.5%
Gold	2.5%	-6.2%

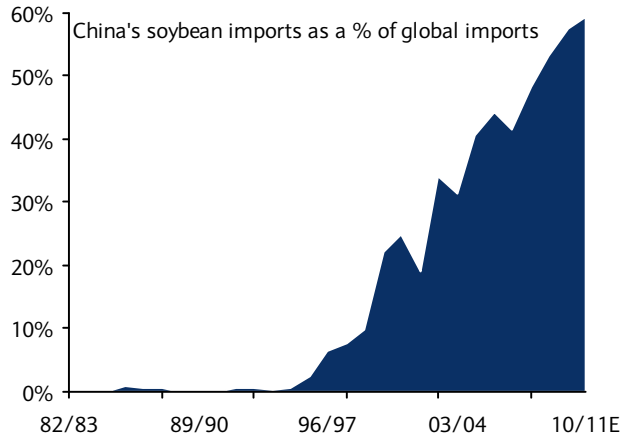
Source: BP database, USDA, Brook Hunt, Barclays Capital

Figure 17: Food prices have risen steadily over past decade



Source: EcoWin, Barclays Capital

Figure 18: China takes over 60% of global soybean imports



Source: USDA, Barclays Capital

The tight excess supply pushes up prices and makes them susceptible to higher volatility

One of the main consequences of the resource shortages is price volatility. While changing weather patterns have no doubt exacerbated price increases and volatility, weather has always been and will always remain the wildcard in agricultural prices. However, within that seasonal volatility, what stands out in agricultural markets is the overwhelming change in demand patterns from the emerging markets in the span of just a few years. Thus, when

such extreme weather conditions are unleashed on markets with thinning inventory cover, rapidly rising prices are almost inevitable.

Technological advances will be significant but may not be enough to calm prices.

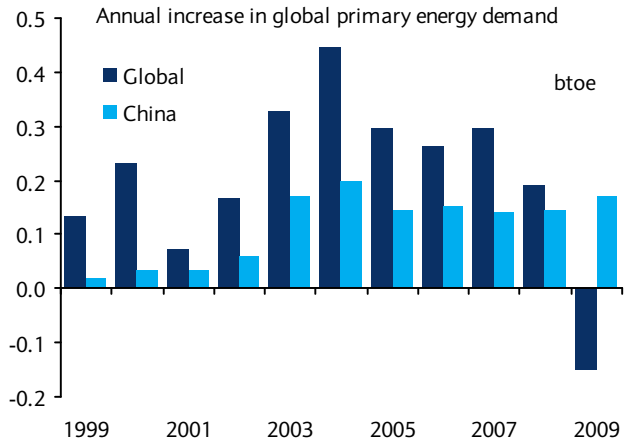
This is not to suggest that agricultural supplies are shrinking. In fact, productivity has risen sharply over the past few years as vast amounts of land have been diverted to agriculture. Moreover, the mechanisation of agriculture has led to significant efficiency gains and, rising from a low base, could revolutionise farming even further. However, given the time lags involved and the rapid pace of demand growth, the stresses and strains on the supply side are likely to persist, at least in the short term. Indeed, this is the crux of the theory that underlines the difference between Malthus and Boserup. While Malthus did not account for technological innovation, what Boserup's theory fails to explicitly highlight is the time lag taken for these changes to come through. Further, and perhaps more importantly, the potential negative feedback generated by unrestrained growth are now widely acknowledged, something we would highlight as a caveat to Boserup's arguments. Natural resource scarcity is a genuine problem, the onset of which has been quickened by rapid industrialisation in China and also by the linked acceleration in economic development in other emerging markets. For agricultural commodities in particular, the encouragement of biofuels as a substitute for oil has collided with the immovable logic of a fixed supply of agriculturally productive land, the net results being a displacement of food crops and increased food prices. Increasingly, the inability of the market system to price – and, thus, regulate – negative externalities and the unintended consequences of market transactions is becoming a central concern of both economic policymakers and electorates.

Black gold

OECD countries still account for the bulk of oil demand, but growth is coming from non-OECD countries now

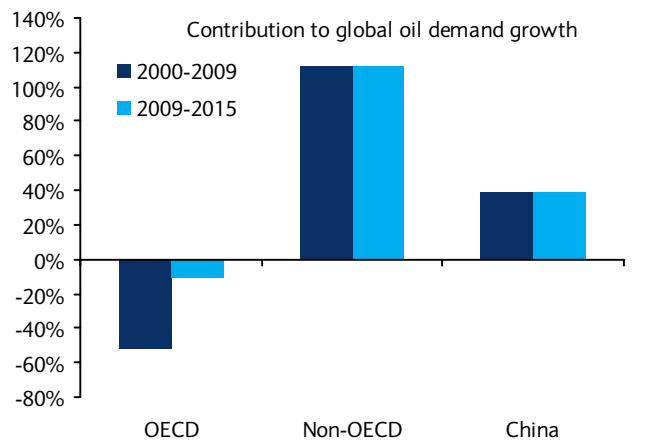
In the same vein, industrialisation and rising income levels drive an increase in per capita energy demand. In the last decade, an 86% increase in Chinese income per capita levels has prompted a 50% increase in Chinese per capita energy demand. Indeed, since the turn of the millennium, China alone has been responsible for close to 55% of the global increase in primary energy demand (Figure 19). In the oil market specifically, the contribution of China alone has been tremendous. Since the late 1990s, OECD oil demand growth had flattened and then tailed off markedly since 2004. Between 2000 and 2010, the cumulative increase in oil demand amounted to 11 mb/d, with China's share at an eye-catching 46%. In fact,

Figure 19: Relative increase of China's energy demand



Source: BP statistical review, Barclays Capital

Figure 20: World oil demand growth is biased towards China



Source: IEA, BP statistical review, Barclays Capital

since 2000 the contribution of non-OECD countries to global demand has been growing steadily, and since 2005 non-OECD oil demand growth has averaged 1.3 mb/d, just as OECD growth has gone into negative territory, averaging -0.5 mb/d. Thus, by the end of the last decade, the transit of non-OECD nations to the margin of the oil market was very much complete (Figure 20). Rapidly rising living standards generating strong growth in automobile sales, rising internal trade creating a surge in commercial freight traffic and the orientation of several emerging economies towards energy-intensive industries, including the mechanization of agriculture, have resulted in a structural shift in oil demand towards countries with low price elasticity and high income elasticity of demand.

According to Dargay and Gately[4], economists long associated with oil demand analysis, after last decade's price quintupling, demand reduction in the OECD has been far less (3% per capita in 1998-2008) compared to the 1970-80s, when the same figure stood at 19% (between 1973-84). Their analysis reveals that non-OECD per-capita oil demand grew slightly faster in 1998-2008 (23% vs. 20% in 1973-84), due primarily to much faster income growth. World oil per-capita demand, instead of dropping 13% in 1973-84, actually grew in 1998-2008 (4%), albeit at a slower pace than in the non-OECD itself, as income grew more than twice as much in 1998-2008 as in 1973-84. The lessened demand response in 1998-08 was due to faster non-OECD income growth, a larger non-OECD share of Total World Oil (37% in 1998 vs. 27% in 1973), and most importantly, the fact that OECD fuel oil – the most price-responsive product in the most price-responsive region (as Dargey and Gately's econometric results demonstrate) – comprised 33% of total world oil in 1973 but only 14% in 1998.

Demand: voracious appetite

Should Chinese and Indian per capita oil consumption reach that of the US, oil reserves would last for just 18 years

Consensus projections are equally striking and would lead us to believe that an increase in developing world per capita consumption of some resources, such as oil, to developed world levels is simply impossible. For instance, the International Energy Agency (IEA) estimates that by 2015, Chinese oil demand will have increased some 40% from 2009 levels, contributing a similar level to global oil demand growth. While this is an impressive figure, it is nothing compared with what may be coming over the next decades. Let us assume the Solow-Swan neoclassical growth model and take its key prediction that the income levels of poor countries will tend to catch up with or converge towards the income levels of rich countries as long as they have similar characteristics. For Chinese and Indian per capita oil consumption to reach that of the US, the former has to rise by nine times and the latter by 23 times. That would require an additional 170 mb/d of oil supplies, almost double the current global total. Such an increase would push total world oil demand to 260 mb/d, assuming flat growth in other emerging market nations (a highly implausible assumption in the first place). Such an increase in demand would deplete proven reserves in just 18 years, even if we used comparatively generous estimates of total reserves, including Canadian oil sands, heavy oil in Venezuela and the recent upward revisions to Iraqi and Iranian reserves.

The potential increase in gasoline demand from emerging markets is significant and can be more than three-fold

Even considering oil demand resulting only from projections of gasoline consumption (one of the many component of oil demand) delivers striking numbers. In 2009, Chinese passenger car sales soared to 10.3mn, with y/y growth in vehicle sales amounting to 49%, partly boosted by government stimulus packages. In 2010, while the y/y growth moderated, it still amounted to a 40% y/y increase for the year through Q3, despite some of those incentives having been partially phased out. Indeed, to assume that China's auto demand was purely or primarily a function of that stimulus would be a huge mistake, and the continued momentum this year cements the view that the vehicle fleet will continue to grow as income levels rise. Even assuming an average annual growth rate significantly below current levels, eg, 9% pa from next year (in line with GDP forecasts), the total number of cars on the road would reach around 180mn by 2020 (accounting for a 10-year scrappage cycle). This would roughly

[4] http://www.econ.nyu.edu/user/nyarkoy/OilDemand_DargayGately_Feb2010.pdf

double the amount of gasoline demand by 2020 to more than 3.2 mb/d (assuming 0.4 elasticity between car sales and gasoline demand, as in the pre-2008 era), adding an additional 1.7 mb/d to oil demand from gasoline alone (note: gasoline is a far smaller component of Chinese oil demand than diesel and petrochemical demand, which remains more leveraged to industrialisation). Should auto sales continue to rise at the recent pace, then the demand for gasoline could rise six fold by 2020.

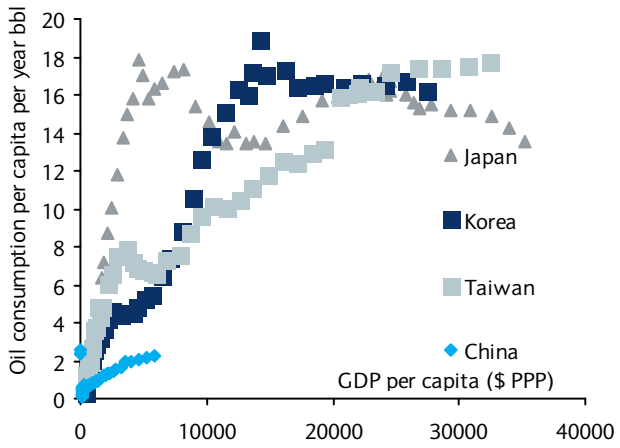
Current consensus estimates are underestimating future oil demand, factoring in significantly higher oil prices in the process

Benchmark estimates tend to work on the hypothesis that the relationship between the number of cars per capita and rising wealth in emerging markets will follow a different, flatter trajectory compared to that tracked by the OECD nations at their time of development. The IEA, in its latest World Energy Outlook, notes that a 1% higher rate of car sales in China compared to the global benchmark of 1.8% would result by 2020 in 95mn more cars and 0.8 mb/d of additional oil demand. Replicated for all of the non-OECD countries, this would create an additional 3.6 mb/d of global oil demand. Given the current rate of auto sales in just India and China, the IEA's projections once again strike us as far too conservative. Nonetheless, even on the basis of its cautious estimates, the IEA does forecast that significantly higher oil prices will be required to curtail demand growth, a key variable likely to put a ceiling on the growth of gasoline in emerging countries. As a paper by Marcos Chamon, Paolo Mauro, and Yohei Okawa[5] finds, an increase in fuel taxes – while a promising avenue to stem the increase in greenhouse gases and reduce congestion, and most definitely better than doing nothing – is unlikely to be able to avert a massive increase in the undesirable by-products of car ownership and use. Dargay and Gately[6] also find that the relationship between the growth of vehicle ownership and per-capita income is highly non-linear. Historically, vehicle ownership has grown relatively slowly at the lowest levels of per capita income, about twice as fast at the middle-income levels (from $3,000 to $10,000 per capita) and finally about as fast at higher income levels before reaching saturation. Thus the potential for growth in per capita oil demand from Asian economies is huge (Figure 22).

Diesel and industrial uses constitute the bulk of oil demand in non-OECD countries and it is rising very strongly

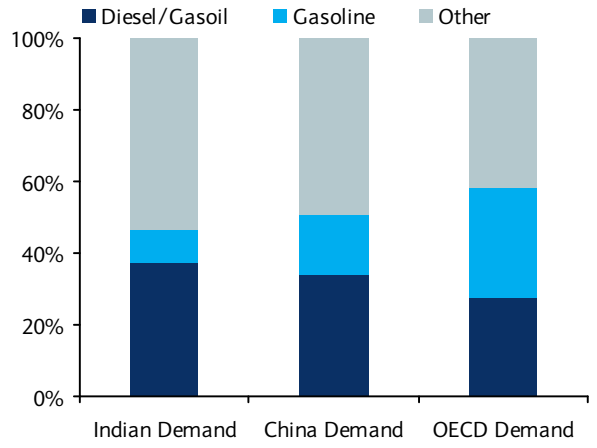
Oil demand growth in the future could be higher still, due to the bias of diesel in non-OECD countries. Although gasoline is employed almost exclusively in passenger cars and the potential for its increased use is immense, considering the bias of demand growth towards Asia, and then the bias of Asian demand growth towards diesel, incremental oil demand through rising diesel consumption is likely to be higher still. Together with the anti-gasoline bias in Europe, the transit of non-OECD nations to the margin of the oil market has been a key factor in biasing global oil demand growth towards middle distillates. A crucial reason for this is the different oil demand structure of developing and developed nations, with the

Figure 22: Per capita oil consumption in China is far lower than the developed Asian economies



Source: BP statistical review, Barclays Capital

Figure 23: Composition of total oil demand in EM countries is biased towards diesel



Source: IEA, Barclays Capital

[5] http://papers.ssrn.com/sol3/papers.cfm?abstract_id=1108502##
[6] http://www.econ.nyu.edu/user/nyarkoy/OilDemand_DargayGately_Feb2010.pdf

former being much more dependent on diesel than the latter. As of 2010, the share of distillates demand in China was more than twice that of gasoline and in India this ratio stood at 4:1, compared to a broadly even split between gasoline and distillates in the OECD (Figure 23). The difference in the structure of oil consumption is primarily attributable to stages of economic development.

Diesel's dominant position in the commercial freight traffic has made it a fast-growing demand component in countries characterized by large distances in internal trade and by strong underlying economic growth. In China, significant government investment in the road system and a mandate in 2000 that all trucks should run on diesel by 2010, are also facilitating the rapid expansion of domestic diesel demand. Beyond road transport, diesel also continues to be the primary fuel employed in China's rail system and is also a major fuel for several significant types of marine transport. A similar picture can be painted for India, where diesel makes up 70% of road fuel use because of the intensity of truck and bus fuel consumption as well as the increasing penetration of diesel in the light duty truck segment. Moreover, the orientation of several emerging economies towards energy-intensive heavy industries (which often heavily utilize diesel-powered equipment), as well as the continuing mechanization of the agricultural sector, has further supported diesel consumption, notwithstanding the use of diesel as the marginal source of power supplies in these countries during periods of power rationing.

Independent forecasts indicate much higher future oil demand than agency forecasts

Indeed, Dargay and Gately, in another paper[7], recently argued that the elasticity estimates with long-run demand forecasts made by the OPEC Secretariat, IEA and the EIA appear to be too low. Using the estimated elasticities from a 1971-2008 data sample, Dargay and Gately produce a reference forecast for 2030 of global oil demand of 134 mb/d, which is some 28 mb/d higher than the consensus of the agency forecasts. To get down to the consensus forecasts would require radically higher price elasticities and lower income elasticities than they have estimated. The implication is that to be anywhere near correct, the main long-run agency forecasts (IEA expects only 8.9 mb/d of incremental oil demand between now and 2030, while the EIA expect 16.2 mb/d) would need a baked-in assumption of sharply higher prices to generate such subdued long-term demand levels in comparison to both our analysis of convergence of per-capita oil usage and Dargay and Gately's projections – and, once again, this would likely be inflationary in nature.

Non-OECD countries have far higher price elasticity and lower income elasticity

The reality is that actual demand growth potential is likely to be significantly higher than is conventionally assumed, as benchmark forecasts perhaps incorporate excessively optimistic gains in energy efficiency for emerging economies (akin to those achievable in an already industrialised nation through higher oil prices). In these growing economies, oil demand has a far higher income elasticity but a substantially lower price responsiveness, as is true for any region at a stage of rapid growth and industrialisation (Figure 24). This all raises the recurring question of whether the world can support the growth of China and other emerging markets without facing significant inflationary pressures in the coming years.

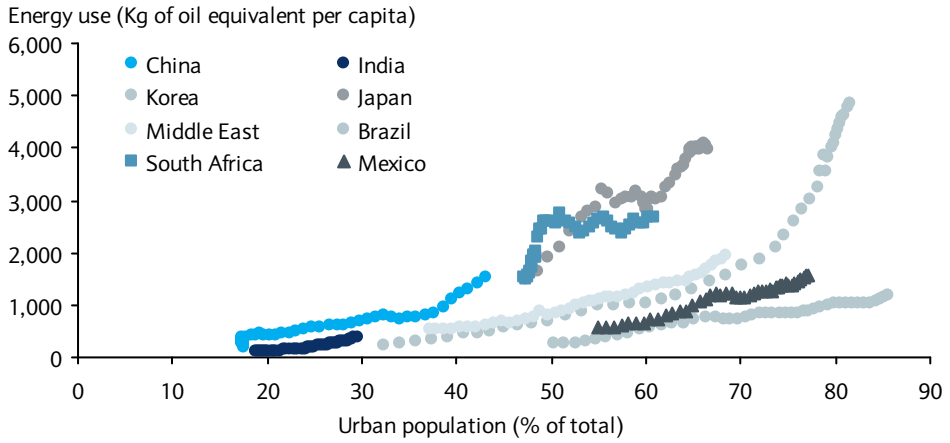
Supply: Failing to catch up

Against the backdrop of rampant demand, supply is struggling to keep pace

The problem in commodities is compounded by the issue of a rapidly declining accessible reserve base across a host of commodities. Despite higher prices, growth in production capacity has been limited. This is due to the fact that the rate of increase in production capacity is relatively insensitive to price, as net capacity additions are constrained by the steep decline in output from existing fields, particularly in non-OPEC countries. Thus, even though companies have increased their exploration and production spending through these years (see *The Original Oil Service & Drilling Monthly*, December 23, 2010), the success rate of large finds or, more importantly, translating it into actual output has been limited.

[7] http://www.econ.nyu.edu/dept/courses/gately/DGS_Vehicle%20Ownership_2007.pdf

Figure 24: China and India already consume more energy for similar urbanization rates



Source: BP Statistical Review of World Energy, 2010, Barclays Capital

Spending is required simply to maintain output due to the decline rates, with matters made worse by problems of access to undeveloped resources and logistical constraints.

The oil industry may need to invest $8trn over the next 25 years…

For instance, the IEA calculates that the oil industry needs to invest $8trn (constant 2009 prices) between now and 2035 (the annual value of the oil market is roughly $2trn, equating this to four years' worth of global production), with the global energy sector as a whole requiring a staggering $33trn in cumulative investment to be able to meet incremental demand. Effectively, this investment should enable the replacement of reserves and production facilities that are retired, as well as the expansion of production and transport capacity to meet demand growth. Of the $8trn required for oil, 85% is required for the upstream oil activities. Note that the IEA projects such alarming figures despite projecting a fall in global oil demand growth between 2010 and 2030 due to higher prices and technological efficiencies. Given that we see the agency to be underestimating future oil demand, these investment figures may need to be substantially higher in reality. With the bulk of non-OPEC traditional oil production mostly in decline (Figure 25) and overall non-OPEC supply presumed to hold up only on the basis of substantial increases in expensive unconventional production, virtually all the increase in supply is expected to be generated by OPEC members, keeping prices aligned with their domestic interests.

… and this is likely to be an underestimate

Decline rates are very high in oil fields and investments required to meet incremental demand is huge

Production from existing fields has entered a steep decline stemming from years of under-investment, and costs have escalated in recent years. Some estimates of decline rates are well above 6-7%. With many large oilfields already in the decline phase, the speed of bringing on new supply to offset the declines has become increasingly important. Indeed, almost half of the increase in proven reserves in recent years has come from revisions to estimates of reserves in fields already in production, rather than new discoveries. Although discoveries have picked up in recent years with increased exploration activity (prompted by higher oil prices), they continue to lag production by a considerable margin: in 2000-09, discoveries replaced only one out of every two barrels produced (IEA) – slightly less than in the 1990s (even though the amount of oil found increased marginally) – the reverse of what happened in the 1960s and 1970s, when discoveries far exceeded production. The contribution of offshore discoveries, including deepwater, has increased significantly since the early 1990s. Since 2000, more than half of all the oil that has been discovered is in deep water. Although some giant fields have been found, the average size of fields being discovered has continued to fall.

Incidents like Macondo complicate matters further

Moreover, with events like the BP's Macondo oil spill bringing the upstream process and its technology into regulatory focus, costs for oil production could increase further. The spill dealt a severe blow to the reputation of the industry, and raises questions about the technology that is key to the development of the deep- and ultra-deep-water fields that represent the frontier for non-OPEC production. Development plans will be subject to intense

scrutiny, with safety features requiring extensive examination and various back-ups. The impact has not been restricted to the US alone – various other countries, including Norway and, to some extent, China, have become far more concerned about the environmental impacts of their offshore projects since the BP disaster. We would go further, saying that a broader redefinition of the industry's parameters is potentially the most important aspect of Macondo. Indeed, the impact may well spill over to onshore production techniques, which are highly energy intensive and environmentally contentious, with very little margin for error across a wide range of such activities now.

The recent recession has provided little respite from the imminent supply crunch related to the demand shock…

The global recession did not change the big picture. For instance, 2010 started with a comfortable buffer for the oil market, following the downturn in demand in 2009. The market was plush with inventories, while OPEC had stepped in to cut production in order to shore up prices. Further, OPEC also expanded further capacity during the time frame, envisaging oil demand growth in the future. As a result, we had 5.5 mb/d of spare capacity in the market, along with total offshore and onshore excess inventory amounting to some 300 mb. Moreover, despite a stronger-than-expected outcome in non-OPEC supply, the demand shock was such that the inventory overhang is all but gone and the effective spare capacity has reduced from 5.5 mb/d to just under 5 mb/d currently.

… as strong EM growth brings oil demand to an all-time high

The primary reason for this has been the sharp growth in non-OECD oil demand. Consensus estimates for demand in 2010 were revised higher throughout last year, as were medium-term demand prospects. In the IEA's latest Medium Term Oil Market Report, global oil demand for 2014 was revised up by an enormous 3.3 mb/d over just 18 months. Last year, the IEA did not expect global oil demand to surpass its 2008 peak until 2012, and some placed that milestone even further into the decade. In reality, it has arrived already, with 2010 setting a new record annual average for demand and surpassing the previous peak by almost 1.4 mb/d. What looked set to be a rather long haul back to pre-crisis levels just a year ago has arrived with something of a swagger just 18 months into the worst financial crisis since the 1930s, with emerging market nations at the peak of that change.

And OPEC spare capacity has started to come off

Equally, the sweep of market expectations at the start of the year factored in, at best, a flat profile through the year, and many were looking for a further move up. In our view, spare capacity of 5.5 mb/d was not particularly large in the first place, especially in a market that is moving swiftly upwards towards the 90 mb/d mark, but such has been the strength of emerging market demand that OPEC spare capacity effectively ended the year below where it began. The recession of the early 1980s almost completely removed fears of longer-term oil market tightness, and it took 25 years for those concerns to become widespread again. In sharp contrast, the last two years of economic down-cycle have not removed fears of impending supply tightness. If anything, those concerns have intensified and the likely scale of the perceived crunch has grown in terms of consensus expectations. In retrospect, it appears that the global economic crisis has postponed, but not cancelled, a crunch that otherwise would have been starting to bite pretty much now.

The limited excess of supply will likely drive price volatility up

So, the rapid increase in developing economy energy demands during the current cycle has already eroded the margin of comfort in the oil market, to the point where the successful and timely completion of single projects becomes essential for market stability. Any moderately significant supply interruption or project delay could leave supply falling short of demand. The oil market has reached a juncture at which the supply-demand balance is starting to teeter on the brink of a crunch.

The potential for non-conventional oil is large, but requires a higher price

This is not, we would note, because the world has actually run out of oil. Quite the contrary – unconventional oil is set to play an increasingly important role in world oil supply, with both the IEA and BP's latest medium-term report forecasting 7.2 mb/d (8% of current global oil production) and 11 mb/d (13% of current global oil output) of incremental production from such oil plays. Canadian oil sands, biofuels and Venezuelan extra-heavy oil dominate the mix, but coal-to-liquids, gas-to-liquids and, to a lesser extent, oil shales are also likely to make a growing contribution. Unconventional oil resources are thought to be

huge – several times larger than conventional oil resources. Nor is the narrowing margin of comfort attributable to lacklustre investment. To take the US as an example, GDP data show nominal investment flows into mining exploration, shafts and wells rising from $27bn in 2000 to $121bn in 2007, a rise of some 440%. Yet in real terms, investment into this sector has not even doubled, as capital costs and labour rates soared during that period. While the recent downturn help alleviate some of those cost pressures, the swift recovery cycle is once again putting these issues back in the limelight (Figure 26).

But the problem, again, is access and costs

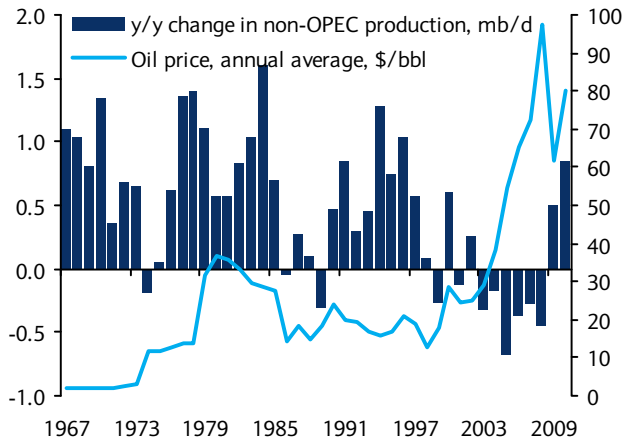
The basic problem is not a shortage of oil *per se*, but a shortage of easily and cheaply accessible oil outside OPEC, combined with a rampant shortage of capital equipment and skilled labour. The rate at which these unconventional reserves are exploited will be determined by economic and environmental considerations, including the price of oil and the costs of mitigating their environmental impact, which in some cases, are extremely high. Moreover, the key problem here is that unconventional sources of oil are among the more expensive available: they require large upfront capital investment, which is typically paid back over long periods.

In short, surging per capita income levels in the developing world, primarily in China, have delivered an energy demand shock. Despite a rise in inflation-adjusted oil prices above their 1970s peak, and despite a commensurate increase in nominal investment, the supply-demand balance has moved into progressively more precarious territory (Figure 27). In other words, relative to other sectors of economic activity, oil has become scarce, implying a need to divert ever larger shares of total economic resources into the exploration and recovery of oil. As a result, the incremental cost of each barrel of oil is rising and will likely continue to rise in the absence of a drastic drop in demand.

Technological innovations can alter the shape of the demand and supply profile, but currently don't seem to be in the near-term horizon

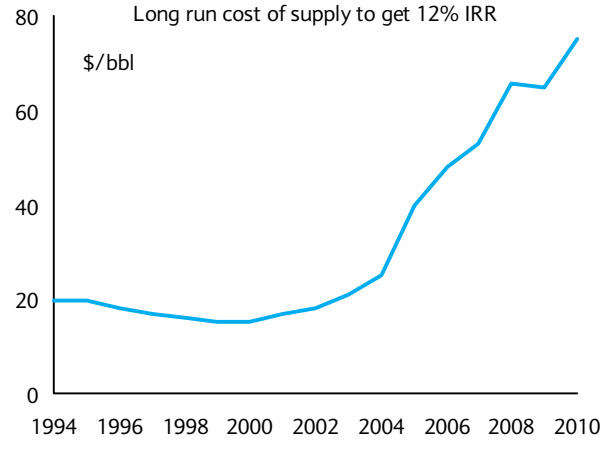
Of course, this is not to rule out technological innovations and the impact it can have on altering the supply-demand dynamics of commodity markets and, hence, prices. There are some notable exceptions to the persistence of significant supply concerns. The most important is US natural gas, where the pricing shift at the margin from the economics of conventional gas to the economics of shale gas had been happening for a few months before the intensification of the financial crisis in September 2008. A strong technological shift (using horizontal drilling and hydraulic fracturing) has taken the dominant mindset from one of structural deficit to one of structural surplus. Supply growth has outperformed demand growth for several years and is likely to continue to do so for the foreseeable future. That has led to a market in which technological perceptions are playing a heightened role, particularly as the exact parameters of the economics of scale in terms of the tail-end behaviour of reservoirs, are to some extent still being revealed through experience. The change in the

Figure 25: Non-OPEC supply growth has faltered even though prices have increased steadily



Source: BP statistical review, Barclays Capital

Figure 26: The cost of production, especially outside OPEC, has soared



Note: IRR=Internal rate of return. Source: Barclays Capital Equity Research

perceived net import profile for the US, together with the prospect of the spread of shale technology, have also helped to soften perceptions on a global basis. From being the first major market to show a pronounced shift up in prices all along the curve, the gas market has also been the first to experience a significant lessening of concern, albeit one that has left longer-term prices significantly above historical levels. Thus, with oil, too, significant technological advances in the alternative energy space could alter the demand profile. Technological breakthroughs could also ease production problems in challenging oilfields over time. However, for now, the alternatives on the demand-side are the more expensive transportation options. On the supply side, incidents such as Macondo have effectively taken the oil industry backwards in terms of technology. Thus, sustained higher prices will be required to encourage both (on the demand and supply side) to the mainstream, in our view.

Once again, the recent developments in the energy natural resources space highlight the shortcomings of applying Boserup's idea to the oil and gas industry. While technological innovations have no doubt helped to alleviate extreme short-term tightness in a variety of markets at times, and have so far, broadly, been able to absorb the rising demand needs from the planet, the depletion of natural reserves has not been avoided. The current hydrocarbon dependency is not a feasible path if per capita energy consumption in the developing world continues to rise. Pressing a business-as-usual model much beyond its current levels would start to produce negative economic feedback in the shape of spiralling oil prices and climatic deterioration, which would eventually overwhelm the primary trend of rising prosperity.

Metals – the story continues

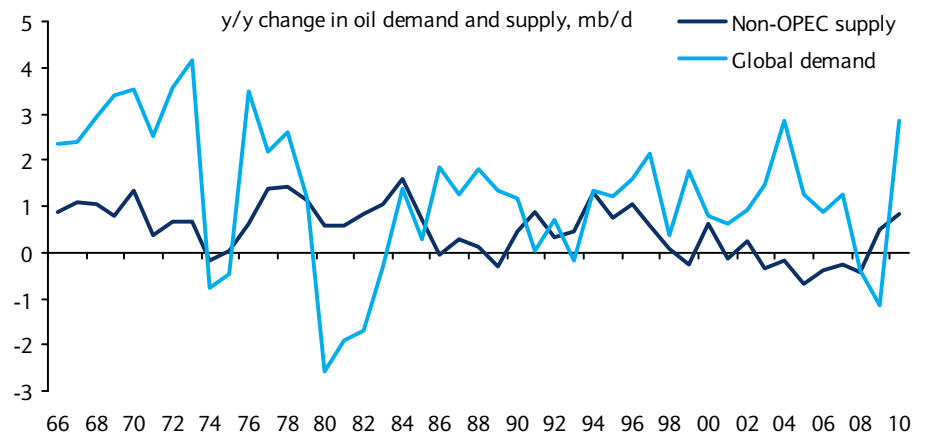
Higher metals prices can also be inflationary as a result of rising capital equipment costs

The problems do not end with agricultural and energy markets. The familiar combination of soaring developing economy per capita consumption, allied to increasingly sticky supplies, is beginning to delineate the outlines of supply boundaries of most commodity markets. Metals are no exception. The rise in prices here and the potential for further rises should not be underestimated; the metal-intensive nature of current investment has a significant knock-on impact on capital costs. With China the dominant buyer in the bulk of the metals market, when considering demand against the existing reserve base, the problems of scarcity are equally apparent.

China already accounts for 40% of global copper demand

Similar to oil, a rise in Chinese metal consumption per capita to developed economy levels does not look plausible. Currently, Chinese demand constitutes about 40% of global copper demand, despite per capita copper consumption being some 10 years away from the average level in other developed Asian economies. Should China reach those levels (ceteris paribus), the projected level of Chinese demand alone would grow to over 20mt from the current 7.5mt and would actually be higher than current global mine production of about 16mt. This

Figure 27: The disparity between demand and supply is growing in the oil market



Source: BP Statistical Review of World Energy, 2010, Barclays Capital

outcome would imply that total copper output would need to more than double, even if demand in the rest of the world, and in particular, in other emerging giants, like India, remained static.

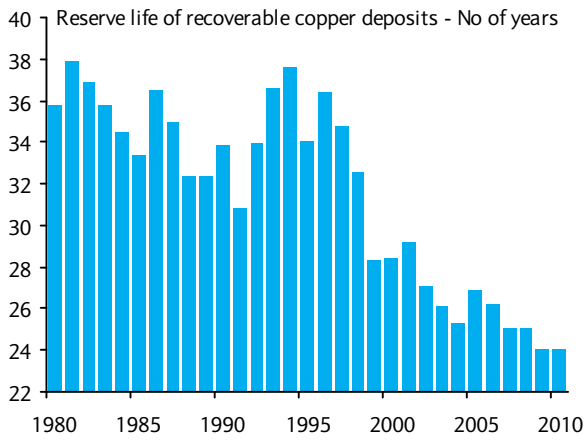
And copper supply faces decreasing returns

On the supply side, copper faces a similar situation that we see in the energy markets, where the increasing share of oil reserves consists of deepwater fields or tar sands, deposits that are much more difficult and expensive to exploit than traditional fields. Although the increase in global copper ore reserves over the past decade is similar to that of the prior decade, the fresh reserves are of lower quality. As a result, the increase in the estimated stock of recoverable copper reserves in the 10 years to the end of 2010 was exactly half the increase between 1990 and 2000. In combination with the growth in demand, the net effect has been to shorten the lifespan of known recoverable copper resources by a third (Figure 28). Thus, an increase in Chinese per capita copper demand alone to meet the levels in other Asian developed countries would require a level of output that would run down the reserve base fairly swiftly. Further, copper supply would be obtainable only from deposits that are currently merely hypothetical. No wonder that copper prices have increased swiftly (Figure 29).

Higher prices are a necessity to bring on marginal production in commodity markets and to moderate growth rates, thereby curbing inflation

Thus, higher prices have been needed to bring the more marginally productive raw material supplies into the market and to regulate – rather unsuccessfully – the growth in demand stemming from highly differing elasticities. The return to multi-year price highs in a variety of commodities, despite such a sharp recession, suggests to us that demand growth is clearly pressing against the walls of available supply and that resource depletion is an issue. Indeed, the cyclical trough in raw material prices during the latest downturn has been more akin to the price highs of previous cycles (ie, it remained notably high relative to historical levels). Equally, while recent inflation pressures in EM countries have proven strong enough to persuade policymakers in most regions to apply the brakes, we see no reason to doubt the longer-run commitment to rising levels of prosperity in the developing world and to achieving the maximum sustainable growth in developed economies. In our view, the most rational conclusion to draw is that a continuing rise in global living standards in the long run will continue to press real resources prices steadily higher. This is a necessary precondition for an expansion of the stressed capacity and as a stimulus for successful technological enhancement to natural resource productivity. Equally, higher real prices are required to promote an alteration in the pattern of demand towards less resource-intensive per capita levels of consumption. Thus, the rise in resource intensity in the developing world has altered the long-term balance of risks for inflation. As China and other populous developing economies pass the income threshold beyond which per capita resource consumption starts to accelerate sharply, each incremental increase in global GDP is likely to produce a more sizeable increase in resource prices than has been the case since the 1970s.

Figure 28: The quality of copper reserves has deteriorated…



Source: Brook Hunt, Barclays Capital

Figure 29: …while copper prices have soared to record highs

Source: EcoWin, Barclays Capital

Conclusion: Malthus revisited?

Overall, this chapter suggests that the historical demographic deflationary pressures from commodity prices and expanding labour supply may vanish, while inflationary pressure stemming from stronger demand for commodities may pick up. The persistent inflationary pressures from natural resource markets will require a relative price adjustment between the prices of commodities and other goods and services. The result will be imported inflation for most countries that rely on commodities either as inputs (such as oil and metals) or as consumption goods (such as food). The former would constitute a negative supply shock, increasing the costs of production and, ultimately, of final goods. The latter will increase the price of consumption goods directly. Overall, this would make the tasks of central banks more challenging. All else equal, in order to maintain an unchanged inflation target, monetary authorities would have to tighten monetary policy more than they would in the absence of such terms-of-trade shocks. This would depress economic growth and prices in the other sectors of the economy.

The effect would not be limited to inflation. With excess supply running always thin, commodity prices would be subject to large fluctuations even for relatively small shocks. Weather changes, political instability in resource-rich countries, natural disasters, technical problems, disruption of production, may all turn out to continuously inflict large commodity price fluctuations. This would have severe repercussions on inflation volatility and on the economic activities employing commodities as key inputs, in addition to making it more difficult for policymakers to stabilize their economy.

In the absence of compensating technological improvements, the constraint from limited natural resources may bite hard in the future. The very fast rate of growth in some large emerging markets would then support the Malthusian prediction across a broad spectrum of commodities. Clearly, development patterns and structural change in the global economy are moving at a sharp enough pace to necessitate some severe changes in relative prices, and most directly in the price of commodities relative to other goods and assets, in our view. Indeed, urbanization, a massive expansion in the size of the global middle classes and the rise of new economic superpowers and super-regions mean that some key commodities sit right on top of the most dynamic of the long-cycle fault-lines. It would be the equivalent of entering diminishing returns to scale at a global level because of the limited supply of key inputs of production: commodities. It may even soften the rate of the global economic expansion. Of course, the effects would be highly heterogeneous across countries, potentially exacerbating political tensions related to the control of commodity sourcing.

In sum, commodity demand may increase faster than supply can catch up, with negative consequence for inflation, growth, and volatility. Malthus may turn out to be right, but with broader implications than he may have imagined.

CHAPTER 4

Simple strategies for extraordinary times

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The past decade has been a rollercoaster ride for investors. In the past 12 months alone, investors have been buffeted by deficit concerns in Europe, deflationary fears in the US, and, most recently, expectations of rising inflationary pressures. Furthermore, the response from policymakers has been unprecedented, with central banks embarking on a mission to ease monetary policy via quantitative easing and governments under pressure to tighten fiscal policy and tackle growing deficits once and for all. We present simple strategies to help navigate the volatile waters of today's investment environment: by extending the humble diversification process and focusing on risk- rather than return-based allocation strategies, we believe investors can protect portfolio returns without worrying about forecasting future returns or timing the next big correction.

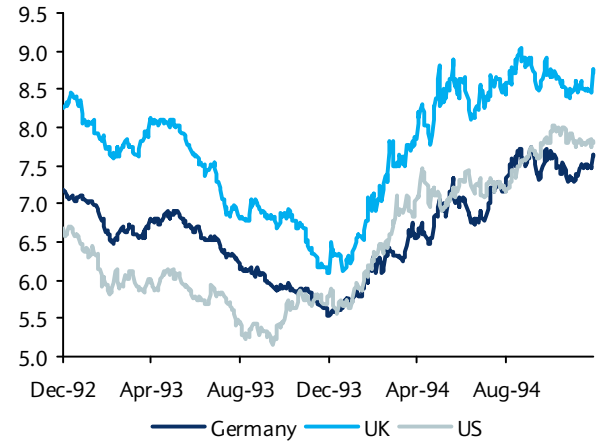
Waiting for a rally to give way to a bust

The two rounds of monetary stimulus in the wake of the 2007 credit crunch have helped fuel a very strong rally in cyclical assets. With global equity markets having risen by more than 70% in response, the key questions posed by investors are: How long will the party last? How sharp will the next correction be? And what is the best way to position for the coming inflexion point?

Past extended periods of loose monetary policy may provide some lessons. In 1993, the Federal Reserve lowered rates to 3% and maintained loose monetary policy for 17 months. Simultaneously, the BoJ, BoE and Bundesbank also embarked on monetary easing. The US Treasury curve bull-flattened and bond yields in the other countries declined by some 200bp. The injection of global liquidity fuelled a sharp rally in emerging market equities, particularly in Eastern Europe. Global equity valuations moved into bubble territory. However, as Figures 1 and 2 reveal, the policy-led bubble proved temporary. As the Fed started to hike rates and remove stimulus in 1994, there was a complete reversal of fortune: global bond yields rose rapidly and equity valuations fell back to pre-bubble levels.

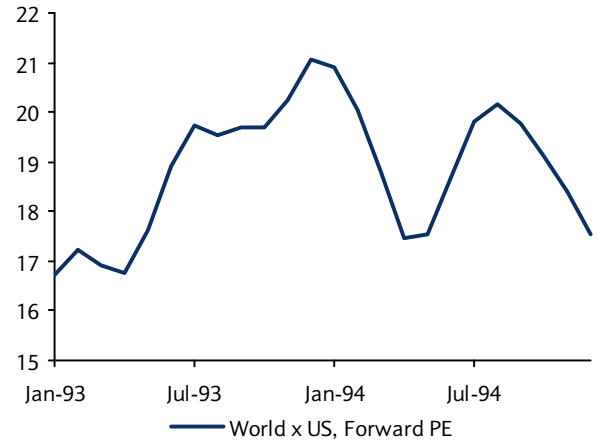
Another example of a liquidity-driven bubble turning sour is 2003, when the Fed left rates at 1% for an extended period as fears of deflation and a double-dip recession led to bearish sentiment. This extra liquidity was later blamed for fuelling the housing bubble and the subsequent securitisation trend, as the low-yield environment spurred risk appetite and the

Figure 1: 10y bond yields – Removal of stimulus preceded the great bond rout of 1994



Source: Ecowin

Figure 2: Equity valuations ended below pre-monetary stimulus levels



Source: Factset

hunt for yield. However, the removal of monetary stimulus alone was not enough to prick the bubble, as US Treasury yields remained low amid increased demand from foreign investors, including Asian reserve managers. Timing the risk asset correction via a Taylor rule would have been useless in this case, despite the similarities with 1993 in terms of the conditions that initially drove the boom. Given that it is no easier to predict the exact time and size of the next correction in today's environment, the real question most investors face is simply how best to position for uncertainty.

Diversifying for uncertainty

The power of diversification across asset classes, strategies, and even investment horizons is widely recognised. One of the simplest possible approaches to diversification for a boom –and-bust scenario combines risky and safe assets in a way such that performances offset each other and risk is stabilized. This seems straightforward in principle, but requires insight into risks and performance over the economic cycle.

For a historical perspective, we examine asset behaviour across various economic environments. Figure 3 outlines average real annual returns across the business cycle for US assets since 1925 and commodity returns since the1970s. The four stages of high and low growth and inflation are calculated as above or below trend. The analysis highlights how the best equity and bond returns are achieved during low growth and low inflation. As demonstrated in 2009, the sharpest stage of the rally occurs during the initial stages of a recovery, when bonds benefit from a combination of a flight to quality and a low yield environment. Equity returns remain strong as the economy moves out of recession, but these returns are eroded as inflationary pressures pick up and commodities take over as the asset class of choice. A traditional benchmark portfolio, which is dominated by equities, would have suffered under the high inflation scenarios, despite the strong performance of commodities. These differences in asset behaviour over time create opportunities for diversification.

Figure 3: Real annual returns across the business cycle (US data 1925-2010)

	Equities	Bonds	Tbills	GSCI*
Low GDP, Low CPI	12.2%	8.8%	2.6%	-3.1%
High GDP, low CPI	10.9%	5.3%	1.2%	1.4%
High GDP, High CPI	8.2%	-1.2%	-0.9%	25.4%
Low GDP, High CPI	-1.9%	-5.0%	-1.7%	3.8%

*Note: GSCI commodities starts in 1970. Source: Barclays Capital, CRSP and GSCI

Modern portfolio approaches, such as mean-variance optimization, provide techniques to systematically harness the power of diversification by explicitly optimizing allocations based on the risk-return trade-off perceived in the markets. These approaches succeed or fail by the accuracy of the estimates of risk and expected return, and many investors have found that the resulting allocations provide less effective diversification and worse results in practice than the theory suggests. The lack of diversification in optimized portfolios was illustrated during the credit crisis of 2007. As the crisis unfolded and the search for a safe haven led to flight to quality on a global scale, correlations between instruments and asset classes correlations moved to extremes and diversification within and between many asset classes disappeared. These approaches are also particularly sensitive to changes in expected returns, and because of the mechanical approach to portfolio optimization, the final portfolio may not be a true reflection of investor views. Decades of empirical analysis have led to the widespread understanding that it is easier to accurately predict a portfolio's risk than its return. This has led to the development of more robust allocation approaches that explicitly aim to achieve risk diversification with less focus on specific return forecasts.

A risk-based approach

Risk-driven asset allocation (RDAA) is based on the idea that diversification (ie, the allocation of capital) should be expressed in terms of the effect of asset allocation decisions on overall portfolio risk, without the usual emphasis on expected returns. It stresses the importance of understanding and balancing the drivers of portfolio risk. One specific example of RDAA is known as the Risk Parity approach. This concept was born out of the observation that equity risk dominates bond risk in balanced institutional portfolios, and is typically used as a motivation to leverage the bond component of mixed portfolios so that risk is equally distributed over equity and fixed income constituents. This results in a portfolio that is overweight bonds relative to traditional 60/40 portfolios and has proven to be a winning proposition over the past three decades. Proponents argue that Risk Parity offers a way to engineer better risk/return trade-offs, and provides a more efficient way to structure mixed equity/bond portfolios. Critics argue that while Risk Parity might provide a better risk/return trade-off, the returns are also substantially lower than the traditional benchmark portfolio. The leverage needed to compensate for the lower returns on bonds might lead to sizable underperformance in times of rising rates. Although we agree with the critics that there are obvious shortcomings to the simple risk-parity example, the insight that diversification is better measured by risk impact than capital allocation is important. The more general RDAA approach builds on the fact that diversification can be measured and relatively accurately predicted through quantitative risk models, and still leaves room for expected returns to be incorporated as qualitative fundamental views through the selection of and constraints on portfolio constituents.

The most important question to answer in an RDAA framework is which risks to consider. The sources of risk in a diversified portfolio can be defined by asset class, at the macroeconomic level, or even through pure statistical approaches (such as principal component analysis). Once the risk framework is determined, an investor will need to form views on how those risks should be compensated. There are as many views on asset class returns as there are investors. Fundamentally, asset classes should be priced according to what the investor would pay for the future cash flows associated with the relevant instruments. This is, of course, precisely the reason why it is so hard to come up with useful, precise quantitative measures of expected returns; both future cash flows and the value that investors place on them through personal discount factors are subject to great uncertainty. An intuitive implicit assumption underlying RDAA is that when the risk of an asset class increases, valuations come down as lower expectations of future cash flows are discounted at a higher rate. Maintaining risk diversification over various economic environments can help balance exposure to time-varying risk premia, resulting in better and more stable performance,

One danger of this approach is that a perception of low risk could lead proponents to systematically hold overvalued assets in bubble periods. We do not propose blind adherence to a mechanical risk-based allocation rule. A focus on risk diversification should encourage investors to look for investments that are expected to deliver appropriate compensation for the associated risk.

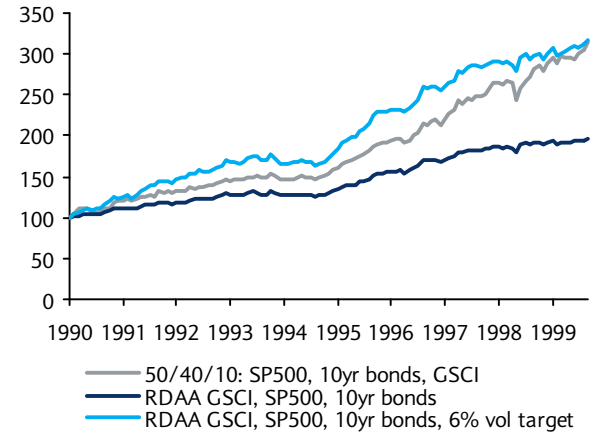
Risk-weighted allocations and inflexion points

We examine the benefits of targeting risk diversification over time, rather than trying to time the inflexion points or shifts in the business cycle. The first two examples provide a simple comparison of a traditional benchmark portfolio with monthly rebalanced weightings of 50%, 40%, and 10% across equities, bonds, and commodities, respectively, with two rules-based benchmark RDAA portfolios. The first is a simple monthly risk-weighted portfolio of the same constituents; in the second, the bond component is leveraged every month to target a constant annual portfolio volatility of 6%. We examine the performance across two decades. First, the 1990s proved to be the best decade for US equities since the 1930s, with an average

annual real return of 14%. Second, we examine the past 10 years, which have been one of the worst decades for US stocks, with an average real annual return of just 0.8%. The Noughties have, in fact, been labelled the lost decade, encompassing two major equity boom/bust cycles. The simple risk-weighted portfolio has a tendency to underperform the traditional benchmark portfolio in terms of overall returns when risky assets perform well. As Figure 4 and Figure 5 highlight, this is dependent on the period being examined. During the 1990s, when equities were soaring, the traditional portfolio outperformed the simple risk-weighted approach, given the higher weighting in stocks. However, an investor using the risk-weighted portfolio to target a portfolio volatility of just 6% outperformed the traditional benchmark while maintaining a lower level of risk. In 2000-10, both risk-weighted portfolios significantly outperformed the traditional benchmark portfolio and sustained significantly lower losses during the credit crisis. This suggests that the risk-driven asset allocation strategy can help protect against inflexion points when markets are undergoing long-term volatile conditions.

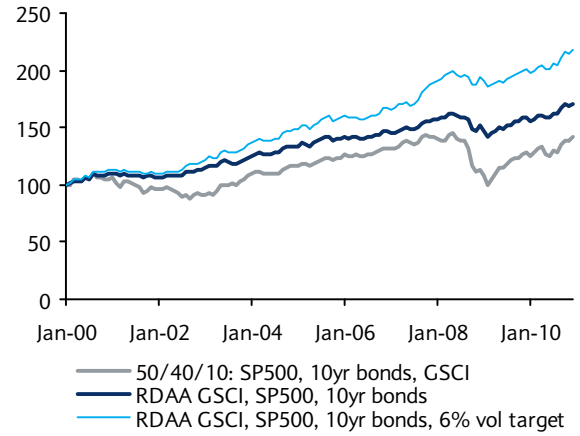
Taking a closer look at the main inflexion points over the past decade emphasises the ability of the risk-weighted approach to protect investors from the main turning points. Figures 6 and 7 provide a close-up of the three portfolios around the turn of the dot-com boom and the credit crunch. In both cases, the risk-weighted approach smoothed out the portfolio risk and return, and significantly outperformed the traditional benchmark portfolio. These examples underline the importance of the risk-driven allocation framework in protecting investors from sharp market corrections, without needing to pinpoint the timing of the correction. In times of flight to quality, risk-weighting naturally leads the investor to

Figure 4: Risk-driven allocation during the 1990s



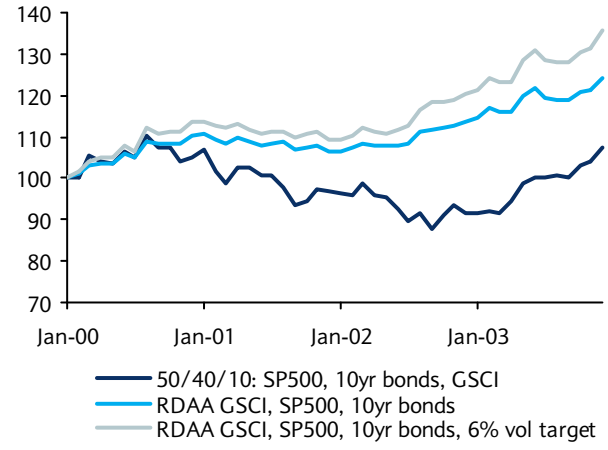
Source: Barclays Capital

Figure 5: The lost decade: risk-driven allocation outperformed



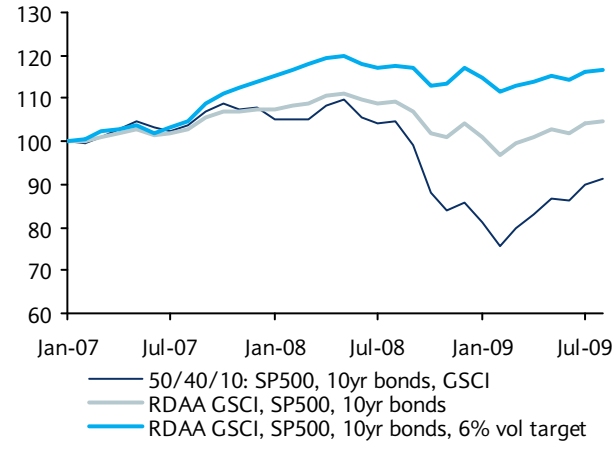
Source: Barclays Capital

Figure 6: RDAA protected portfolios as the dotcom bubble burst



Source: Barclays Capital

Figure 7: RDAA dampened losses during the credit crunch



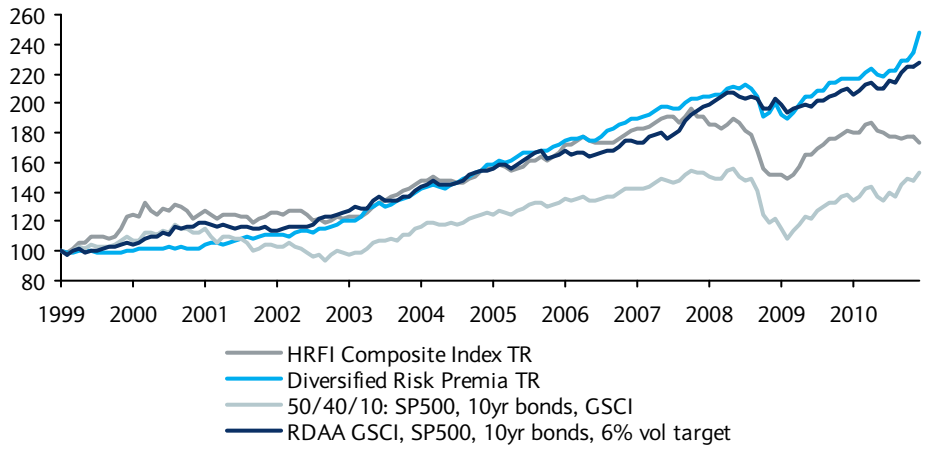
Source: Barclays Capital

reallocate to safer assets in response to changes in valuations between asset classes. Furthermore, it provides investors with the flexibility to target their own risk preferences; in our example, we assume the investor wants to constrain portfolio volatility to 6%, but a more risk-hungry investor could leverage up further.

The RDAA framework does not need to be constrained to traditional asset classes. We can extend the approach to incorporate various alternative beta strategies and diversify further across potential sources of portfolio returns. The inclusion of alternative beta components in a traditional asset class portfolio could be particularly valuable now, given the longer-term drags on traditional asset returns, including the macro volatility and demographic trends outlined in prior chapters.

Alternative beta strategies capture exposure to systematic and well understood investment strategies that seek mainly to harvest well understood risk premia across markets. Alternative betas extracted by hedge funds and other active investors include various equity style factors, such as small-cap versus large-cap, value versus growth, momentum, event risk strategies, exposure to volatility, hedging demand premiums in futures markets, and various types of spread positions employed in rates, credit, and FX markets. They are expected to have positive risk-adjusted returns over long horizons, but may experience severe and sustained draw-downs when risks materialise. Thus, in the absence of timing ability, diversification across these strategies is key. Figure 8 provides an example of a risk-weighted portfolio of FX carry and interest rate curve risk premia strategies that could be considered a further source of returns and diversification.

Figure 8: Diversifying across strategies can provide additional return and protection



Source: Barclays Capital

The FX carry strategy selects from a pool of G10 currencies, going long the highest yielders and short the lowest. It earns the yield differential in compensation for the potential crash risk of the high yielding currencies. It tends to perform well in normal market conditions, but poorly in volatile ones.

The rates curve premium strategies look to earn excess return by taking longer-maturity risk. These perform well when the yield curve is stable and upward-sloping and when yields fall across the curve, but underperform during rates bear markets or sudden curve steepening.

Figure 8 shows that this simple diversified risk premia portfolio significantly outperforms not only the traditional benchmark portfolio, but also the average hedge fund, as captured by the HFR aggregate index. Diversifying risk across just two well-known alternative beta strategies provided more stable returns and less drawdown than either the traditional investment portfolio or the typical hedge fund during both the dotcom correction and the credit crunch, two of the biggest equity bear markets in history. Although we have provided

a very simple example of just two strategies, the approach can be extended to include a number of other systematic strategies commonly used by hedge fund managers. For example, the approach can be extended to include momentum and volatility premium strategies across asset classes.

It is often said that the only "free lunch" in financial markets is portfolio diversification. RDAA shows how the humble idea of diversification can be understood better and extended in fundamental ways to provide portfolio protection against the current volatile financial backdrop. Risk-driven asset allocation encourages investors to understand, select, and balance portfolio risks through the various stages of the economic cycle. It allows investors to tailor their portfolios to suit their own appetites for risk, and can help investors protect portfolio returns without worrying about forecasting future returns or timing the next big downturn. It is an approach that can be adapted in various ways by investors of all types. Indeed, with a better understanding of risk and diversification, and less focus on pinpointing future returns, the free lunch can be even more satisfying.

CHAPTER 5

Dismal demographics and asset returns revisited

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The 2005 edition of the *Equity Gilt Study (EGS)* contended that demographics are a powerful driver of medium- to long-term trends in bond and equity markets. In this edition, we re-examine the issue of demographics and asset returns more formally in order to address criticisms of past attempts at quantifying potential linkages between them. We find that demographics matter, though perhaps not quite as much as our earlier work had suggested. Accordingly, our original findings that demographics would reduce both stock and bond returns over the medium- to long-term remain unchanged, and we still expect equities to outperform bonds over the next decade. However, we now conclude that the equity risk premium may be 1% lower than the historical average, whereas we formerly reckoned that it would be 1% higher.

The 2005 edition of the *Equity Gilt Study (EGS*) argued that most developed countries' demographics were "dismal"; that is, that the aging of the baby boomer generation was likely to cause the majority of this group to switch from saving to running down accumulated assets.[1]

Such a switch in behaviour, the report noted, might have a significant impact on long-term interest rates and the return on equities – and, hence, on the equity risk premium.

There were two main reasons for this gloomy assessment:

- There appeared to be a high correlation between US long-term bond yields and the proportion of debtors (those aged 25-34) plus the retired (those over the age of 65) divided by the proportion of those likely to be high savers (those aged 35 to 54). Running forward official (UN) population projections by age group, for example, it seemed likely that the ratio of debtors and retired to high savers would rise by about one quarter over the next two decades. On the basis of the past correlation between yields and this ratio, bond yields looked set to increase by nearly five percentage points per decade – to nearly 14% by 2025.

- **Equity returns, too, seemed to be highly correlated with demographic variables.** In the case of the US, a regression of real equity returns against the ratio of the high savers group to the population as a whole, the growth rate of the retired cohort and the growth rate of the high savers cohort, resulted in a model with three significant driving variables and a high R-squared (of 0.79). Again, using official population projections by age group, when such a model was run forward it produced a forecast of a huge (>50%) decline in real returns over the next two decades.

As a check on these pessimistic forecasts, UK data were also examined in the 2005 *EGS* to see if they exhibited similar correlations between demographic variables and returns. The answer was a resounding "yes". Alternative US specifications were also tried, such as including demographics to explain the price to earnings ratio, rather than real equity returns. Likewise, the report checked whether a life-cycle model helped explain, in a statistical sense, fluctuations in the savings ratio. Broadly speaking, this additional work was found to support the contention that demographics are a powerful driver of medium- to long-term trends in bond and equity markets.

Given these findings, the framework is one that regular Equity Gilt Study readers have grown accustomed to seeing updated each January. In last year's report, for example, the analysis was refreshed – leading to the rather gloomy forecast that "the acceleration in the growth of the newly retired population, along with the shrinkage in the proportion of the population in the high

[1] See, in particular, Chapter 2, *Equity Gilt Study* (2005).

savings age bracket, should continue to lower the equilibrium valuation of equity markets".[2] Thus, over the next five years, the demographic-based model suggested that the US price-to-earnings ratio would drop from around 16 to around 11, before recovering slightly over the next five years. For the 2010-20 decade as a whole, (nominal) equity returns of 7% per annum were pencilled in – ie, a pace of appreciation that would be well below the historical average.

As for bond returns, the updated demographic model was still very gloomy, pointing to 20-year yields drifting up from a little above 4% a year ago to close to 10% by 2020, in both the US and the UK. Assuming a constant maturity investment in 20-year bonds, such a profile for yields would result in returns of less than 2% per annum over the next decade and something close to zero over the next five years. Thus the *ex post* equity risk premium over the next decade would end up in the region of 5% – ie, very slightly higher than the historical average of close to 4%.

With cash rates also looking set to stay low for quite some time, a typical traditional long-only fund – comprising, say, 10% cash, 60% equities and 30% bonds – looked set to deliver pretty low returns over the next decade, of perhaps only about 5% per annum.[3] Assuming an inflation rate of about 2% per annum over this period, real returns would end up at only about a 3% annualised rate. This compares with a real long-run rate of return of just shy of 4% per annum for such a fund (with "long-run" defined for these purposes as based on data running back to 1900), and a return of nearly 7% per annum in real terms between 1977 and 2007.

In other words, were such a projection to turn out to be true, investors might reasonably expect to double their real wealth only about once every 24 years, whereas, in the three decades before the financial crisis, they were managing to do so once every 11 years.

In the rest of this paper, we consider possible pitfalls with the approach that led to those conclusions. We then investigate, in a formal manner, how best to deal with these issues – checking if demographics really are important once other economic drivers of asset returns have been taken into account. We find that demographics do indeed matter to both bond and equity markets, but that they are not quite as powerful a driver as previous editions of the EGS suggested. Our new research suggests that US bond yields will back up to around the 7% mark over the next decade, resulting in a rate of return on US Treasuries of around 3% per annum. It suggests that US equity markets will deliver a rate of return of about 6% a year. Accordingly, we now judge it likely that the equity risk premium will be around the 3% mark – a little less than the historical average, rather than a little more than average, as we had formerly thought likely.

Possible pitfalls of this sort of approach

A number of academic studies have examined how demographics might affect financial markets. Some are rather more skeptical of there being any relationship at all. Others admit to the likelihood of one, but argue that impacts will be much smaller than the simple *Equity Gilt Study* relationships have suggested.

One stream of criticism is broadly theoretical in nature. It claims that the realization of outcomes that are fairly easy to predict with some certainty (and over long horizons) ought not to move markets. After all, these outcomes hardly represent "news". Rather, they merely confirm what biology made largely inevitable quite some time ago. These arguments hold weight with those who believe that markets are largely efficient and quick to price in new information. Most empirical studies, by contrast, find that markets do not generally fit perfectly with this notion. Indeed, a whole new school of behavioural finance admits to the importance of psychological drivers of human (and, hence, financial market) behaviour that sometimes lead to irrational

[2] See Chapter 1, *Equity Gilt Study* (2010), page 11.
[3] With the 5% calculated as: (0.1*3%)+(0.6*7%)+(0.3*2%).

expectations, "bubbles", mispricing and even the failure of market participants to take into account freely available information when deciding how to trade.

A second stream of criticism of the demographics-driven studies into drivers of financial markets warrants closer attention, in our view, because it focuses more on the data and techniques used to estimate the proposed relationships and the alternative hypotheses that could explain the claimed relationships. In particular, we emphasise three strands of attack:

- **Data issues.** Most demographic analyses have been carried out on US datasets, often using quite short runs of data. It is natural, therefore, to consider both extending data further far back in time, to verify the robustness of claimed explanations, and extending such studies to other countries.[4] One does, however, have to be careful. After all, it is possible to construct an explanation of why demographic shifts might have a powerful impact on US financial markets, but this might not necessarily be repeated elsewhere. (For example, even though US investors' strong home bias meant that their life-cycling showed up in asset demand at home, "foreign" investors' demographic-induced shifts in asset demand might not reveal themselves as much in demand fluctuations for foreign (ie, US) asset classes if their financial markets were not well developed, as their savings would end up being channelled overseas.)

- **Econometric techniques used.** Most studies suffer from using a set of highly autocorrelated regressors and regressands, most of which are not stationary. In other words, many of the variables being examined move together and in such a way that their means vary over time. When faced with such a problem, it is important to test formally for the order of integration of the series being examined, and to look for so-called co-integration between some subsets of the variables in the study.[5] Otherwise, it is very easy to end up with "spurious regressions" that appear to suggest linkages between variables that do not hold in reality or do so with a much weaker scale of pass-through from one driving variable to another. In other words, using the wrong estimation technique makes it easy to bias the estimated linkages from one variable to another or even to imagine linkages that do not exist.

- **Alternative hypotheses.** The most damning assessments of the demographic studies come from those who criticise researchers for "data-mining" – ie, searching among large datasets, with scant thought given to theory or econometric technique, until something shows up. A better method, the critics say, would be to start with a plausible alternative explanatory framework for what drives equity and bond returns and then see what happens when demographics are added.[6] If demographics are really important, they ought to help explain, in a statistical sense, either the residuals of the existing framework – ie, that element of variation in the data not explained by the other factors – or they ought to knock out the role attributed to some other factor(s) by doing a better job of explaining past return fluctuations.

In this chapter of this year's *Equity Gilt Study* we have decided to re-examine the issue of demographics and asset returns more formally in order to address criticisms of past attempts at quantifying potential linkages between them. We find that our demographic terms come through the relevant statistical tests with flying colours, but at a cost – that is,

[4] The point about the importance of using long runs of data has been stressed by, *inter alia*, James Poterba. (See, for example, "The Impact of Population Aging on Financial Markets", in "Global Demographic Change: Economic Impacts and Policy Challenges", A Symposium Sponsored by the Federal Reserve Bank of Kansas City, Jackson Hole, 2004. In our study, we focus on US data, although we have obtained similar results for the United Kingdom (available on request). Several international studies have found similar, though usually smaller, impacts elsewhere in the developed world. See, for example, "Do Demographic Changes Affect Risk Premiums? Evidence from International Data", by Andrew Ang and Angela Maddaloni, ECB working paper no. 208, January 2003 and "Demographics and Financial Asset Prices in the Major Industrial Economies", by Philip Davis and Christine Li, Brunel University working paper no. 03-07, 2003.
[5] This point has been emphasised by Robin Brooks in "Demographic Change and Asset Prices", in "Demography and Financial Markets; Proceedings of a Conference", Reserve Bank of Australia, 2006.
[6] A good example of a recent paper that emphasises the importance of getting one's theory right is "Demographics and the Term Structure of Stock Market Risk", by Carl Favero and Andrea Tamoni, Innocenzo Gasparini Institute for Economic Research working paper no. 360, February 2010.

the power we end up attributing to them to explain past fluctuations in bond yields and in equity returns. Accordingly, we end up needing to amend our former projections for medium- and long-term trends in returns on the main asset classes. Because we also end up with a more sophisticated story to tell – with more drivers of bond and equity returns – we must also consider a richer attribution process when examining past return drivers, and a more complex set of projections, to take account not just of our best-guess ("modal") forecasts, but also of the risks around them.

A new approach

We begin by going back to a study we carried out to examine drivers of US equity returns over the past three decades, using what might be termed a "macro" approach to modelling.[7] In other words, we begin by assuming that stock market returns are largely explained by growth (GDP), inflation and interest rates. Importantly, however, we recognise something that Clifford Asness, the US hedge fund manager and quantitative financial theorist, pointed out some time ago: in order to explain the equity risk premium, one needs to consider not just the differential between the two asset classes' returns, but also their relative volatility. This, it turns out, is not just a theoretically important consideration, but also an empirical one. This is because, when using a long run of data, one finds that the ratio of the returns is not stationary. Accordingly, one needs an additional non-stationary variable to help explain it. And the relative volatility does just that – helping to produce a co-integrating vector.

Our main extension to the Asness analysis was to substitute for drivers of the relative return volatilities using GDP and inflation volatility.[8] Stripping out the business cycle volatility of these drivers (by using six- or seven-year moving averages), we found that we could come up with fairly good models for equity and bond returns using GDP, CPI inflation, the volatility of each, and long-term interest rates. (In some specifications, we were also able to identify a small role for the oil price.)

Thus, to see whether demographics were up to a more difficult task – ie, of being a driver of equity and bond returns, even after making allowances for other possible explanations – we began by re-estimating our old "preferred" specification but using a very long run of (annual) data, extended right back to 1900. To start with, we examined US data. Thus, we estimated a model of the form:

$$\log(\text{RERI}) = \alpha_1 + \alpha_2 * \log(\text{RGDP}) + \alpha_3 * \text{GDPVOL} + \alpha_4 * \text{INF} + \alpha_5 * \text{INFVOL} + \alpha_6 * \text{LR}$$

where log stands for the natural logarithm, RERI is the real equity return index, RGDP is real GDP, GDPVOL is a 7-year moving average of the standard deviation of annual real GDP growth rates, INFVOL is a commensurate measure of inflation volatility, INF is the annual inflation rate (based on the CPI) and LR is the long-term interest rate.

The various α_i terms are the parameters of the model, which require estimation. Time subscripts have been dropped from all the variables for ease of notation, with current values used for all variables. (In other words, no lags are allowed for in this relationship, as it is intended to be used only as a means of finding a sensible long-run model for real equity returns, with the resultant equation then used as an error correction term in a dynamic specification when attempting to augment the equation so as to model short-term ("dynamics") of equity returns.[9]) We also found it necessary to include a dummy variable, which took the value of unity during the Second World War – to help explain why equity returns were so depressed during this period.

[7] See "Stocks versus Bonds: Explaining the Equity Risk Premium", *Financial Analysts' Journal*, 2000.
[8] For further details, see the article "A short look at the long run", contained in our quarterly publication entitled *Signpost*, Barclays Wealth Research, September 2007.
[9] For more on this approach to modeling, see *Dynamic Econometrics*, by Hendry, David. Oxford University Press, 1995.

BOX 1: A "macro" model of real equity returns in the US.

Dependent Variable: LOG (REQRINDEX)
Method: Least Squares
Date: 12/21/10 Time: 14:53
Sample (adjusted): 1901-2010
Included observations: 110 after adjustments

	Coefficient	Std. Error	t-Statistic	Prob.
C	-7.660612	0.331165	-23.13230	0.0000
LOG(RGDP)	1.591533	0.036248	43.90708	0.0000
INF	-0.016280	0.005684	-2.864149	0.0051
GROWTHVOL	-0.053005	0.017124	-3.095278	0.0025
INFVOL	-0.105175	0.011844	-8.879929	0.0000
LR	-0.040499	0.013261	-3.053971	0.0029
DUMWW2	-0.613988	0.106389	-5.771165	0.0000

R-squared	0.984401	Mean dependent var	3.892484
Adjusted R-squared	0.983493	S.D. dependent var	1.984708
S.E. of regression	0.254998	Akaike info criterion	0.166398
Sum squared resid	6.697462	Schwarz criterion	0.338247
Log likelihood	-2.151895	Hannan-Quinn criter.	0.236101
F-statistic	1083.347	Durbin-Watson stat	0.670229
Prob(F-statistic)	0.000000		

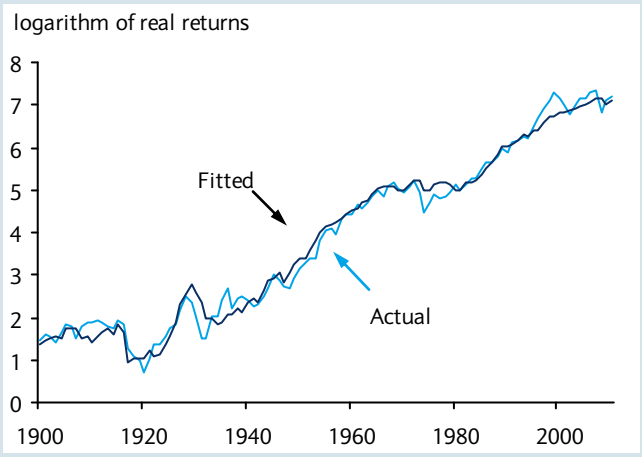
Source: Barclays Wealth Economics Research

For descriptions of the variables, please see the main text.

As a check on the model's usefulness in explaining long-run trends in equity returns, we need to both eyeball the goodness of fit – shown in Figure 1– and, more important, to test it. At first glance, the model seems reasonable enough, tracking as it does the broad trends in real returns over the past century or so. When it comes to formal testing, we first require that both the dependent variable and at least some of the driving ("explanatory") variables have the same order of integration. (Or, to use plainer language, we require that if the returns series has a mean that rises through time – as it clearly does – then at least one of the explanatory series must do so, too.) It turns out that all of the series used in the regression are integrated of order one (ie, if they are first differenced, the resultant ("delta") terms are stationary, with constant means.) So, this first test is passed easily.

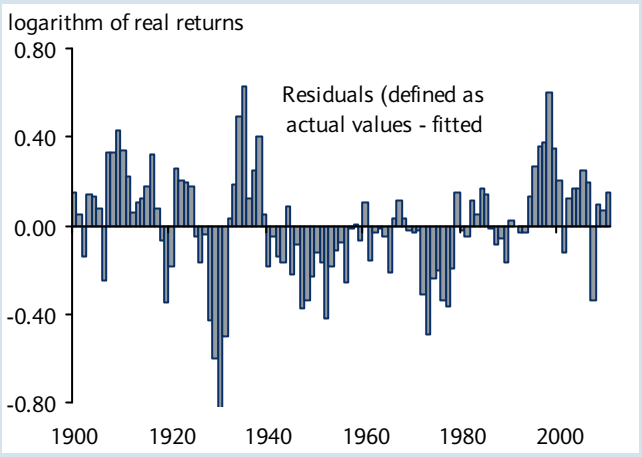
Next, we require that the residuals from the regression – shown in Figure 2– are a stationary series. In other words, to have found a suitable candidate as a possible long-run equation (or "co-integrating vector"), we cannot have a model that makes errors that exhibit time-varying means. Using a Dickey-Fuller test on the residuals of the model, it again turns out that the model passes this requirement with flying colours (more formal tests, such as Johansen estimation, corroborate these findings). Thus, we have what most econometricians would call a reasonable (or "valid") model for real equity returns, which does a pretty good job in empirical terms and makes good sense from a theoretical point of view.

Figure 1: Actual and fitted values from a "macro" model of real equity returns



Source: Barclays Wealth Economics Research

Figure 2: Residuals from the "macro" model of real equity returns



Source: Barclays Wealth Economics Research

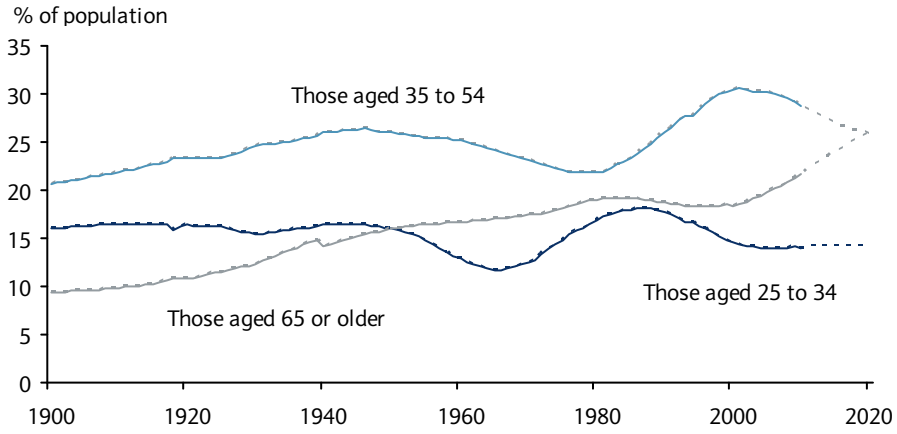
The results of estimating this model are shown in Box 1. As theory suggests, equity returns rise when real GDP rises, and with an elasticity well above one. (In other words, when growth takes off, equity markets really soar.) Inflation, on the other hand, detracts from equity values. Likewise, when long-term interest rates head higher, the real value of equity markets falls, although not by much. Last of all, the uncertainty caused by raised volatility of either growth or inflation creates downward pressure on the stock market. The impact of raised inflation volatility is especially powerful in this model. A doubling of volatility, for example – as has occurred since 2007 – causes the stock market to be more than 10% lower than it would otherwise have been, *ceteris paribus*.

So our model makes sense – insofar as estimated parameter values take the sign that theory suggests they should. More important, the model passes the relevant statistical tests required for it to be a valid description of the long-run drivers of equity returns – as detailed in Box 1. When it comes to eye-balling the fitted values from the equation against actual past developments, the model does a pretty good job – with the gaps between fitted and actual values (or 'residuals') fairly small and pretty random (Figure 1 and Figure 2). Note, too, that the R-squared of the model is, at 0.98, much higher than that of the aforementioned *Equity Gilt Study* model, of 0.79. So, at first glance at least, it would seem that one does not need to include a role for demographics if one wants to explain equity market moves.

Adding demographics to the mix

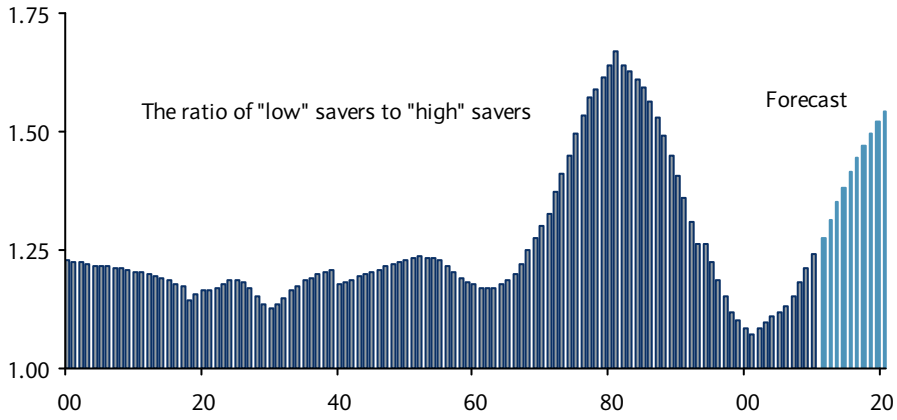
Having created an Aunt Sally/straw man, as it were, we next consider what happens if we augment this model with a demographic variable – based on using three separate variables: the percentage of people aged 25-34; the percentage aged 35-54; and the percentage aged over 60. Figure 3 shows these three variables, illustrating how the baby-boomers led to a surge in the proportion of middle-aged people in the population during the 1980s and 1990s, which topped out around the millennium. Longer life expectancy shows up, too, in a gentle upward drift in the proportion of people aged 65 or older. And the young workers' cohort has gone through a number of undulations in the post-war period – sliding during the early 1960s, before recovering in the 1970s and first half of the 1980s (when it peaked). Thereafter, the proportion of people in the population aged 25-34 has fallen back to close to where it was in the first half of the 20th century. The dotted lines in the chart show how the United Nations projects demographic pressures to shift over the next decade – with a sharp increase in the proportion of people who are retired and a quite marked decline in the proportion of those who are middle-aged.

Figure 3: Shifting age cohorts in the US population



Source: United Nations and Barclays Wealth Economics Research

Figure 4: The ratio of "low" to "high" savers.*



Note: * Defined as the ratio of those aged 25 to 34 plus those aged 65 or over to those aged 35 to 54.
Source: United Nations and Barclays Wealth Economics Research

Figure 4 shows what was proposed as a best single driver of equity returns in the 2005 *Equity Gilt Study* – the ratio of the youngest of these three age cohorts added to the oldest, divided by the middle one. (The idea is that the "young adults" group comprises mainly debtors, who save little, if at all; the "middle-aged" group comprises mainly high savers; and the "retired" comprises predominantly those who are running down their savings.) The chart makes stark the big shift that has taken place in the proportion of the US populace that was likely to be saving a high proportion of their incomes since the 1970s and early 1980s – assuming, of course, that the life-cycle of consumption and savings behaviour holds true. It also shows the subsequent collapse in this proportion thereafter, with the nadir reached early in the 2000s. Of late, the proportion has returned to close to its pre-1960s average. But it appears set to repeat the surge of the 1970s.

Using this variable as an additional potential explanatory factor driving real equity returns, we found that it was impossible to retain all the other factors that had been found to be statistically useful in our previous attempt. In particular, when the low-to-high savers' ratio was included in the equation, the long-term interest rate term was no longer significant (or, for that matter, correctly signed).[10] We therefore dropped this variable from the model and re-estimated the equation, resulting in the model shown in Box 2.

As before, the residuals from this model were tested to see if they formed an adequate – from a statistical point of view – long-run model for equity returns. Again, we found that they did. In terms of goodness of fit, this model ended up doing just as good a job as its macro rival. Indeed, it did a slightly better one in terms of explaining past variation in equity returns. Given, however, that most of the coefficients' estimates relating to the various macro-economic driving variables were very similar for the two specifications, the two models are very much alike – twins but for the demographic/interest rate twist.

[10] Some might argue that it might make more sense to have a short-term, rather than a long-term interest rate in the model (although we disagree, given that dividend discount models for equity valuation require long-term interest rates in order to discount future profits/dividends). In fact, it turns out that it does not matter which type of interest rate term is used: the results are much the same.

BOX 2: A demographics-enhanced "macro" model of real equity returns in the US

Dependent Variable: LOG(REQRINDEX)
Method: Least Squares
Date: 12/21/10 Time: 22:30
Sample (adjusted): 1901-2010
Included observations: 110 after adjustments

	Coefficient	Std. Error	t-Statistic	Prob.
C	-6.957329	0.356383	-19.52207	0.0000
LOG(RGDP)	1.605916	0.034550	46.48134	0.0000
INF	-0.015819	0.005190	-3.048034	0.0029
GROWTHVOL	-0.040745	0.015303	-2.662615	0.0090
INFVOL	-0.105344	0.011114	-9.478676	0.0000
DUMWW2	-0.583508	0.099009	-5.893484	0.0000
TIMSRATIO	-0.853041	0.180194	-4.734005	0.0000

R-squared	0.986029	Mean dependent var	3.892484
Adjusted R-squared	0.985215	S.D. dependent var	1.984708
S.E. of regression	0.241330	Akaike info criterion	0.056215
Sum squared resid	5.998719	Schwarz criterion	0.228064
Log likelihood	3.908158	Hannan-Quinn criter.	0.125918
F-statistic	1211.537	Durbin-Watson stat	0.733718
Prob(F-statistic)	0.000000		

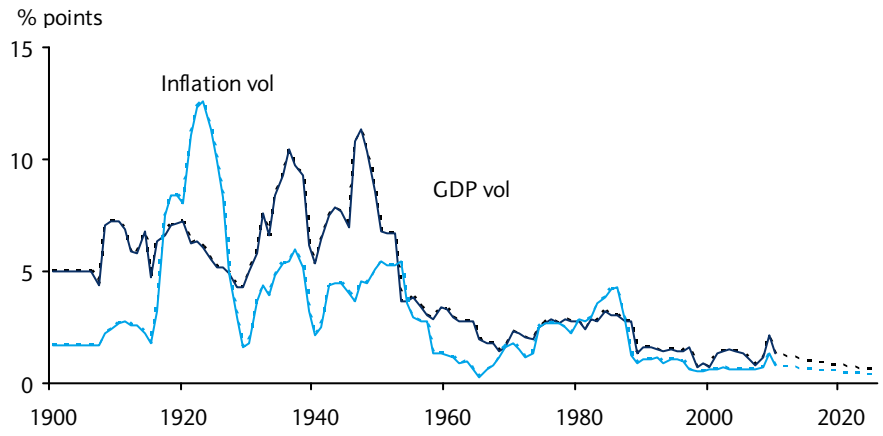
Source: Barclays Wealth Economics Research.

The bottom line on equities

What about the future impact of the population share variables? Well, in this respect, the new model suggests a rather more worrying story than in previous editions of the *Equity Gilt Study*.

We start with the basic, macro-based equities return model, and run it forward using what we deem to be reasonable values for the driving variables. We presume that real GDP growth averages 3% per annum over the next decade; that inflation runs at 2%; that both growth and inflation volatility decline slightly (as shown in Figure 5); and that long-term interest rates rise gradually to 5½% and then stay there. On that basis, the model predicts nominal equity returns of just over 7% per annum – ie, more or less what last year's *Equity Gilt Study* ended up with in terms of a modal (or "best-guess") forecast.

Figure 5: GDP and inflation volatility



Source: Barclays Wealth Economics Research

One might reasonably argue, however, that this projection is inconsistent with last year's *EGS*, which suggested that long-term interest rates were likely headed far higher than the 5½% we assumed when making the projection. (Figure 7 in last year's report showed 20-year yields heading for double digits.) Substituting a more aggressive profile for the back-up in bond yields causes our macro-based equity model to become more pessimistic. If yields march all the way up to 10% by 2020, for example, then the model forecasts nominal equity returns of only 5.5% per annum. So, it would seem that our macro-based approach to forecasting equity returns is a shade more pessimistic than last year's EGS analysis.

Next, we consider what our new demography-augmented equity returns model suggests will happen. Using the same assumptions for its driving variables as we used above, it predicts real returns of just 3% per annum and, thus, nominal returns of only 5% each year.[11] Breaking down the projected returns to gauge how important the demographic factors are in driving the forecast, we find that were the ratio of high to low savers to remain at its current value – rather than drift higher, as the UN projections suggest – the real equity return would average a rather stronger 5½% per annum over the next decade, or spot on what the macro-based model suggested would happen under the assumption that bond yields rise substantially from here. (Or, put another way, half of the gap between the new model's forecast and last year's EGS projection seems to be driven by the demographic term and half by the macro-economic drivers.)

Of course, one way to reconcile these projections is to recognise that the two models might be saying much the same thing if it is the case that demographics cause long-term interest rates to head a lot higher – a subject to which we turn next. After all, it may well be that it does not matter too much whether one uses the driving force behind the rise in yields (the shifting propensity of the population to save) or the yields themselves when modelling equity returns. But the more important message seems to be that it is tough to envisage long-term equity returns being as high as we thought they would be a year ago.

What about bonds?

In order to test more formally the importance of demographic terms in driving government bond yields (and hence returns on bonds), we followed much the same approach that we did in the case of equities – starting with a macro-based approach and then seeing what happens if we augment the model with the same demographic term that we found to be useful, in a statistical sense, in explaining equity returns.

Rather than use the return on a government bond index as the dependent variable, we stuck with the more conventional modelling approach of using a long-term bond yield as the dependent variable. As for drivers, we decided to condition the model on short-term interest rates and a slow-moving average of actual inflation; the logarithm of the CPI; and the (budget) deficit-to-GDP ratio. (None of the volatility terms that we used successfully in the case of modelling equities proved useful when modelling bond returns.) Given the huge deficits run during the First and Second World Wars (Figure 6), we decided to dummy out these periods when looking to permit the deficit-to-GDP ratio to affect bond yields.

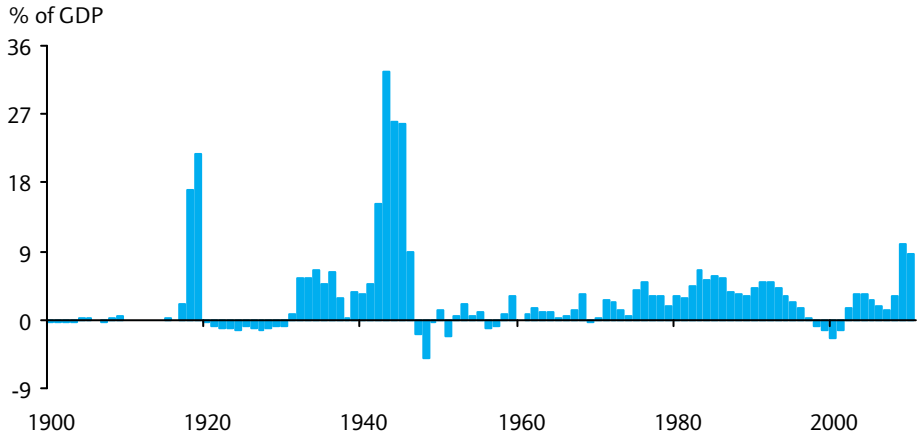
Thus, we began by estimating a model of the form:

$$LR = \alpha_1 + \alpha_2 * \log(CPI) + \alpha_3 * INF + \alpha_4 * DEFGDP * (1 - WWDUMMY) + \alpha_5 * SR$$

where log stands for the natural logarithm, LR is the long-term interest rate, CPI is the consumer price index, INF is the annual inflation rate, DEFGDP is the deficit to GDP ratio, WWDUMMY is a dummy variable which takes the value unity during the duration of the First and Second World Wars and SR is the short-term interest rate. As before, the various α_i terms represent the parameters of the model to be estimated, and time subscripts have been dropped so as to keep the notation simple.

[11] Long-term interest rate assumptions do not matter because the specification does not include a role for them.

Figure 6: The budget deficit as a % of GDP

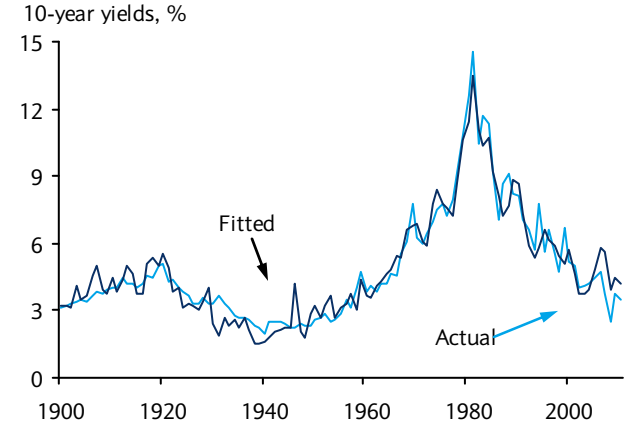


Source: Barclays Wealth Economics Research

Our first, macro-based, bond model implied a powerful feed-through from changes in official (short-term) interest rates to long-term bond yields – with nearly two thirds of any rise in the former showing up in the latter. Interestingly, this effect does not appear to have diminished much over time, implying that the Fed's signalling role when shifting its policy stance is still regarded as exceptionally powerful.

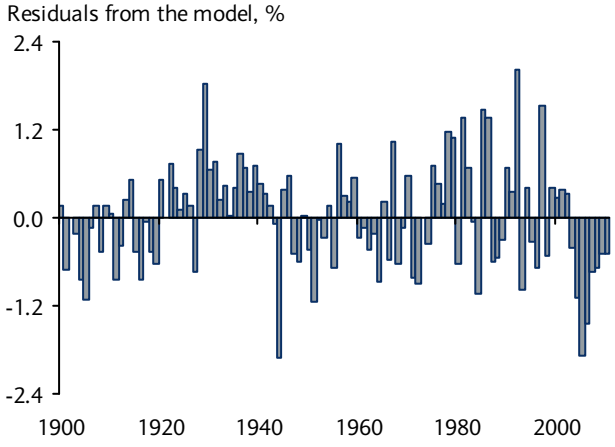
As for trend shifts in inflation, these, too, appear to feed through to yields in the way that theory suggests they ought, but by no means one for one. (The data strongly reject enforcing such a restriction on the model, implying that other factors – such as short-term rates and the deficit are acting as a proxy for expected future inflation.) Last (but no less important), changes in the budget balance to GDP ratio affect bond yields. A sustained one percentage point rise in the budget deficit, measured as a percentage of GDP, leads to yields rising by about 20bp. This accords with our previous research using post-war data.[12] Box 3 provides further details of the results.

Figure 7: Actual and fitted values from a "macro" model of US bond yields



Source: Barclays Wealth Economics Research

Figure 8: Residuals from a "macro" model of US bond yields



Source: Barclays Wealth Economics Research

[12] See *Curve Advisor*, by Michael Dicks and Fred Goodwin, August 2002, Lehman Brothers Economic Research

BOX 3: A "Macro" Model Of US Bond Yields

Dependent Variable: LR
Method: Least Squares
Date: 12/22/10 Time: 15:39
Sample (adjusted): 1901-2010
Included observations: 110 after adjustments

	Coefficient	Std. Error	t-Statistic	Prob.
C	0.373572	0.258126	1.447244	0.1508
SR	0.645309	0.034816	18.53496	0.0000
INFTARGET1000	0.271676	0.056133	4.839870	0.0000
(1-DUMWARDEF)*DEFGDP	0.206234	0.030312	6.803673	0.0000
LOG(CPI)	0.265343	0.078418	3.383716	0.0010
R-squared	0.919155	Mean dependent var		4.859818
Adjusted R-squared	0.916075	S.D. dependent var		2.477346
S.E. of regression	0.717683	Akaike info criterion		2.218811
Sum squared resid	54.08222	Schwarz criterion		2.341560
Log likelihood	-117.0346	Hannan-Quinn criter.		2.268599
F-statistic	298.4442	Durbin-Watson stat		1.660073
Prob(F-statistic)	0.000000			

Source: Barclays Wealth Economics Research

As with our preferred equity model, with our "macro" bond equation we first tested whether this equation was valid as a potential long-run explanatory model for bond yields, by checking the order of integration of the driving variables and of the residuals of the model. Again we discovered that most of the variables we used in the study required first differencing in order to render them stationary. The budget deficit to GDP ratio was the exception in this regard: its mean does not appear to time-vary, whatever the impression given by recent events. As for whether the residuals from the model appear to be well behaved, the answer is a resounding "yes" – as indeed is evident from even a cursory glance at Figure 8.

Generally speaking, the macro-based bond yield model does a good job of tracking the data, as shown in Figure 7. In recent years, however, it appears to have broken down, with a stark contrast between the model's ability to explain the most recent period and what it was able to do during the 1930s. (Yields turned out much higher than the model suggested they ought to have done during the Great Depression, but lower than expected during the Great Recession.) One potential explanation of late has been the Fed's exceptional policy effort to provide support to the economy. (The impact of the LSAP and QE2 programmes can be thought of as, in effect, pushing the effective short-rate below zero.) But the model went off-track *before* the crisis. So it may well be that foreign purchases of Treasuries, by the likes of China's State Administration of Foreign Exchange (SAFE), have also helped lower yields relative to where they would otherwise have been, as indeed has been argued by, among others, former Fed chairman Alan Greenspan.[13]

What happens when the "high" to "low" savings rate demographic term is added to the model? The answer, as we found with the equities equation, is that most of the driving

[13] Recent Fed research suggests that 10-year yields are likely to have been lowered by some 50bp thanks to the LSAP program. (See "Flow and Stock Effects of Large-Scale Treasury Purchases", by Amico, Stefania, and King, Thomas, Fed working paper no. 2010-52, *Finance and Economics Discussion Series* September 2010.) As for the impact of foreign capital flows, Fed research published in 2005 suggested that higher-than-average foreign demand was then responsible for yields being about 100bp lower than they would otherwise have been. See, in particular, "International Capital Flows and U.S. Interest Rates" by Warnock, Francis, and Warnock, Veronica, Fed working paper no. 840, *International Finance Discussion Papers*, September 2005. Add these two effects together and they sum to about what the residuals have been over the past four or five years. Of course, when making projections but without explicitly including these two (potential explanatory) variables, we are implicitly assuming that their impacts remain constant.

variables retain their significance, although in the case of the slow-moving average of inflation its significance is a little questionable, to say the least.[14] More important, the new demographics term is found to be highly significant, and correctly signed from a theoretical point of view. (When there are more "low" savers, proportionately, so yields need to rise.) Interestingly, when the new term is added, coefficients pertaining to the budget deficit and to trend inflation drop somewhat, while the coefficient related to the logarithm of the CPI rises quite a lot. Box 4 provides full details.

As with the macro model, the new equation passes the tests for being a valid co-integrating vector, with residuals that look very similar to those of the simpler "macro" model. And it fits the data slightly better than when demographics are ignored. So, as with the earlier work, it seems that the usefulness of including some aspect of the demographics story is in no doubt. More interesting, however, is its quantitative impact.

BOX 4: A demographics-enhanced "macro" model of US bond yields

Dependent Variable: LR
Method: Least Squares
Date: 12/22/10 Time: 15:53
Sample (adjusted): 1901-2010
Included observations: 110 after adjustments

	Coefficient	Std. Error	t-Statistic	Prob.
C	-3.721908	1.090945	-3.411636	0.0009
SR	0.559918	0.039533	14.16315	0.0000
INFTARGET1000	0.123713	0.065276	1.895241	0.0608
(1-DUMWARDEF)*DEFGDP	0.122892	0.035782	3.434424	0.0009
LOG(CPI)	0.355513	0.077345	4.596481	0.0000
TIMSRATIO	3.740527	0.971436	3.850514	0.0002
R-squared	0.929242	Mean dependent var		4.859818
Adjusted R-squared	0.925840	S.D. dependent var		2.477346
S.E. of regression	0.674638	Akaike info criterion		2.103720
Sum squared resid	47.33416	Schwarz criterion		2.251019
Log likelihood	-109.7046	Hannan-Quinn criter.		2.163465
F-statistic	273.1601	Durbin-Watson stat		1.615256
Prob(F-statistic)	0.000000			

Source: Barclays Wealth Economics Research

A quick look ahead

When it comes to forecasting bond yields over the next decade, a key issue concerns how fast the Fed returns official rates to close to what might be termed an equilibrium rate – ie, the rate that is consistent with the output gap being fully closed, growth being and expected to remain close to potential, and inflation being near its (unofficial) target (of 2%). Very important in this regard is the current scale of the output gap. Some analysts claim that this may be as big as 6% of GDP. (See, for example, the production-function-based approaches taken by the CBO and OECD.) Others, including work carried out by the Barclays Capital Research team, judge that it might be only around 4% of GDP.[15]

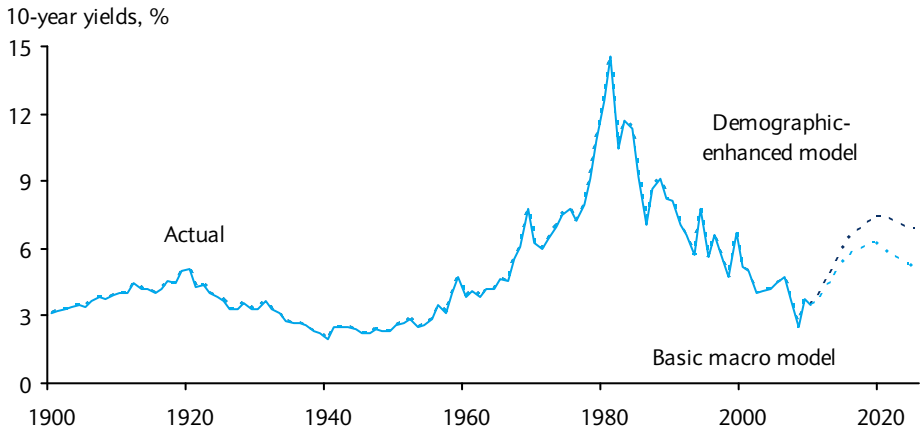
In making our forecasts, we assume that the Fed moves official rates only slowly, getting the Fed funds rate back to 5% by 2016, and thereafter pushing it only a little above this level

[14] The t-value for this term is less than two – and so not significant at a 95% confidence level. However, it is miles above unity, which is the value required for it to reduce the standard error of the equation (and hence lower the adjusted R-squared of the model). We therefore chose to retain it.
[15] For the CBO and OECD attempts, see *http://www.cbo.gov/ftpdocs/120xx/doc12039/01-26_FY2011Outlook.pdf* and *http://www.oecd-ilibrary.org/economics/oecd-economic-outlook_16097408*. For the recent Barclays Capital attempt, see "Beyond the cycle: Weaker growth, higher unemployment", by Newland, Peter, *Economics Research note*, 15 December 2010.

– so as to avoid potential price pressures. Likewise, we assume that efforts to curb the budget deficit begin only in 2012 and progress very gently. We assume fiscal effort of about 1% of GDP per annum thereafter, which ought to lead to a return to budget balance around 2020 or thereabouts.

The two equations provide rather different projections of what may happen over the next decade on the basis of these assumptions for the driving variables. The raw macro model sees 10-year yields rising to about 6% over the next decade – a fairly tame back-up relative to what was being projected as plausible in last year's *Equity Gilt Study* (where 10% was deemed as a reasonable expectation for 2020). The demographics-enhanced equation, by contrast, looks for a somewhat more aggressive increase in yields, as Figure 9 shows. It predicts that 10-year Treasury yields will be around the 7½% mark in 10 years' time. Of this near-four-percentage-point back-up, it turns out that the "low" to "high" savings ratio term explains a little over 1pp. So, demographics do matter, but so do many other things.

Figure 9: The two models' forecasts for 10-year bond yields



Source: Barclays Wealth Economics Research.

The bottom line on bonds…

What all this tells us is that the criticisms of the demography story are not really warranted. Using a long run of data, up-to-date techniques, and testing the hypothesis against alternatives, it turns out that demographics matter, though perhaps not quite as much as our earlier work had suggested might be the case. This means that the aging of the baby boomers will put additional upward pressure on bond yields – depressing returns for those holding existing stock – while equities will post less impressive capital appreciation than were the aging process to be absent or somehow held at bay. Importantly, we find it is not just the demographics story that is pointing to lower equity returns: other macro factors matter, such as the likelihood that potential growth has moved down a notch or two. Better news comes from the other (macro) drivers of bond yields, which do look set to back up markedly, but perhaps not by as much as our earlier research had suggested.

…and on the equity risk premium

To complete our analysis, we also need to revise our earlier projections for equity returns to make them consistent with what our bond model projects. When we do that – by letting yields move up to the 7½% mark by 2020 – we find that the macro-based model points to nominal equity returns of just a little less than in our first run, when we simply assumed yields would get to 5½% and stay there. The average annual rate of return in nominal terms comes out at just over 6.5%. The demographics-enhanced model, with its projection of only 5%, does seem exceptionally gloomy. So, in the spirit of Bayesian averaging, we

propose nudging our previous "best-guess" estimate of 7% down to 6%, deliberately keeping it as a round number.[16]

With the bond yield rising to perhaps 7% – with, again, a weighted average of our two models being used to come up with this round number forecast – the projected average annualised return on bonds over the next decade would only be about the 3% mark. So, it would seem reasonable to expect that the equity risk premium might be something around the 3% mark. This would be about 1pp lower than the historical average and 2pp lower than we had previously thought. Thus, our message is similar to that delivered last year, but with one new wrinkle: we still expect demographics to reduce both stock and bond returns over the medium- to long-term and we still expect equities to outperform bonds over the next decade or so, but the excess return may be a bit smaller (rather than slightly higher) than in the past.

[16] With the demographic model superior but not by miles, we use weights of 2/3 on it and 1/3 on the simpler 'macro' specification.

CHAPTER 6

UK asset returns since 1899

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This chapter presents the real returns of the major asset classes in the UK. We analyse returns on equities, gilts and cash from end-1899 to end-2010. Index-linked gilt returns are available from 1982, while corporate bonds begin in 1999. In order to deflate the nominal returns, a cost-of-living index is computed, which uses the Bank of England inflation data from 1899 to 1914 and thereafter the Retail Price Index, calculated by the Office of National Statistics.

Figure 1: Real investment returns by asset class (% pa)

	2010	10 years	20 years	50 years	111 years
Equities	8.9	0.6	6.0	5.4	5.1
Gilts	4.4	2.4	5.8	2.5	1.2
Corporate bonds	3.9	2.1	N/A	N/A	N/A
Index-linked	5.3	2.4	4.3	N/A	N/A
Cash	-4.1	1.1	2.6	1.7	1.0

Note: * Entire sample. Source: Barclays Capital

Figure 1 summarises the real investment returns of each asset class over various time horizons. The first column provides the real returns over one year, the second column the real annualised returns over 10 years, and so on. Financial markets faced a volatile year in 2010, yet equities managed to end the year in positive territory. Global equity indices were hit by a series of unfortunate events, starting with the sovereign debt crisis in spring, followed by the Flash crash in May, while the summer was dominated by fears of a double-dip recession in the US. The announcement of a second round of quantitative easing helped fuel a year-end rally. The FTSE all share price index had fallen 12% year-to-date by July, but managed to rally 23% for the remainder of the year. Equities were the worst performing asset over the decade, producing a meagre inflation-adjusted return of just 0.6%, although this is a marginal improvement over the negative 10-year returns produced over the past two years. The effects of the dot-com crash and the credit crunch led the noughties to be the worst decade since the stagflationary 1970s.

Gilts continued to outperform equities over the 10-year horizon and the annual performance in 2010 was a marked improvement from the negative returns during 2009. Along with Bunds and Treasuries, they rallied as the European sovereign debt crisis escalated in the first half of the year. Corporate bonds performed reasonably well, although returns were far weaker than the 16% posted during the initial stage of the risk asset recovery in 2009.

Figure 2: Real investment returns (% pa)

	Equities	Gilts	Index-linked	Cash
1900-1910	4.0	-0.1		1.9
1910-20	-7.9	-10.8		-6.3
1920-30	12.8	13.1		9.8
1930-40	2.3	4.0		-1.2
1940-50	6.3	0.3		-1.1
1950-60	12.1	-4.1		-0.6
1960-70	3.3	-1.4		1.6
1970-80	0.4	-3.2		-3.1
1980-90	11.7	6.0		5.2
1990-2000	11.8	9.4	6.2	4.2
2000-2010	0.6	2.4	2.4	1.1

Source: Barclays Capital

Figure 2 decomposes real asset returns for consecutive 10-year intervals. Gilts produced the best performance over the most recent decade, marginally outperforming cash. Ranking the annual returns and placing them into deciles provides a clearer illustration of their historical significance. The results for 2010 are shown in Figure 3. The equity portfolio is ranked in the 5th best decile since 1899, slipping from the 2nd best decile in 2009. The ranking for gilts has improved from the 7th to the 4th best decile. Inflation-linked bonds moved up from 5th to the 3rd decile, despite investors being refocused on deflationary risks. The ranking for cash fell from the 5th to the 9th decile, as yields were held near zero.

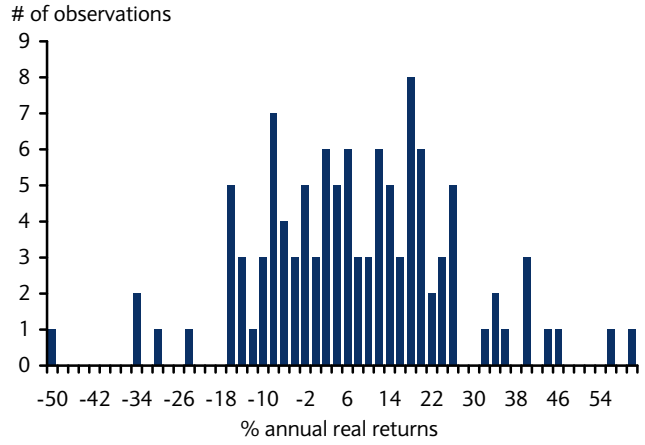
Figure 4-Figure 6 illustrate the distribution of returns over the past 111 years. They clearly show that equity returns have the widest dispersion, followed by gilts and then cash. The observed distributions are in accordance with financial theory; from an ex-ante perspective,

Figure 3: Comparison of 2010 real returns with historical performance ranked by decile

	Decile
Equities	5
Gilts	4
Index-Linked	3
Cash	9

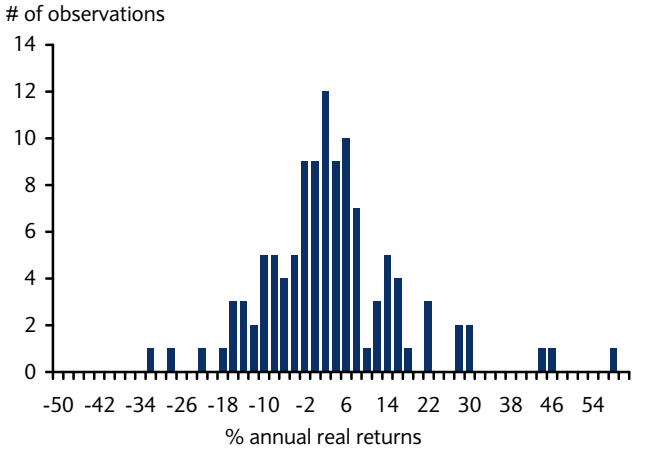
Notes: Deciles ranking: 1 signifies the best 10% of the history, 10 the worst 10%. Source: Barclays Capital

Figure 4: Distribution of real annual equity returns



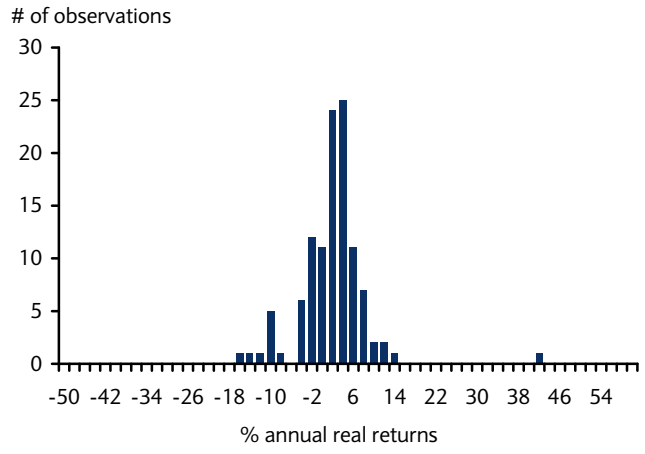
Source: Barclays Capital

Figure 5: Distribution of real annual gilt returns



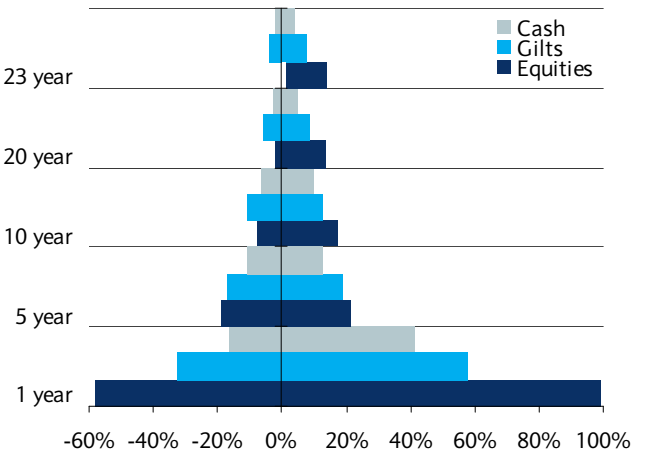
Source: Barclays Capital

Figure 6: Distribution of real annual cash returns



Source: Barclays Capital

Figure 7: Maximum and minimum real returns over different periods



Source: Barclays Capital:

we would apply the highest risk premium to equities, given their perpetual nature and our uncertainty over future growth in corporate profits and changes in the rate of inflation. For gilts, the uncertainty with respect to inflation remains, but the risk from the perspective of coupon and principal is reduced, given their government guarantee. Over the past 30 years, the dispersion of annual gilt returns has widened significantly; in the 1970s and 1980s, an unexpected increase in the inflation rate led to significant negative real returns, while in the 1990s, an unanticipated fall in inflation, in conjunction with lower government deficits, facilitated above-average real returns. The cash return index has the lowest dispersion. In recent years, the real returns to cash have been relatively stable, with the move towards inflation targeting by the Bank of England stabilising the short-term real interest rate.

Performance over time

Having analysed the annual real returns since 1899, we now examine returns over various holding periods. Figure 7 compares the annualised returns when the holding period is extended to 5, 10 and 20 years.

The most striking feature of the chart is the change in the volatility of returns as the investments are held for longer periods. The variance of equity returns falls significantly in relation to the other assets as the holding period is extended. When equities are held for as long as 20 years, the minimum return is actually greater than for either gilts or cash. However, as discussed in previous issues of this study, we do not believe that this fall in volatility should be interpreted as an indication of mean reversion in the returns. The series used are of rolling returns; hence, there is an overlap in the data. For example, in the 10-year holding period, nine of the annual returns will be the same in any consecutive period; thus, the observations cannot be considered as independently drawn.

Figure 8 illustrates the performance of equities against gilts and cash for different holding periods. The first column shows that over a holding period of two years, equities outperformed cash in 73 out of 111 years; thus, the sample-based probability of equity outperformance is 66%. Extending the holding period out to 10 years, this rises to 90%.

Figure 8: Equity performance

	Number of consecutive years					
	2	3	4	5	10	18
Outperform cash	73	75	78	80	92	93
Underperform cash	37	34	30	27	10	1
Total number of years	110	109	108	107	102	94
Probability of Equity Outperformance	66%	69%	72%	75%	90%	99%
Outperform Gilts	76	81	82	80	81	84
Underperform Gilts	34	28	26	27	21	10
Total number of years	110	109	108	107	102	94
Probability of Equity Outperformance	69%	74%	76%	75%	79%	89%

Source: Barclays Capital

The importance of reinvestment

Figure 9 and Figure 10 show how the reinvestment of income affects the performance of the various asset classes. The first table shows £100 being invested at the end of 1899 without reinvesting income; the second table is with reinvestment. £100 invested in equities at the end of 1899 would be worth just £180 in real terms without the reinvestment of dividend income, while with reinvestment the portfolio would have grown to £24,133. The effect upon the gilt portfolio is less in absolute terms, but the ratio of the reinvested to non-reinvested portfolio is over 300 in real terms.

Figure 9: Today's value of £100 invested at the end of 1899 without reinvesting income

	Nominal	Real
Equities	£12,655	£180
Gilts	£49	£1

Source: Barclays Capital

Figure 10: Today's value of £100 invested at the end of 1899, income reinvested gross

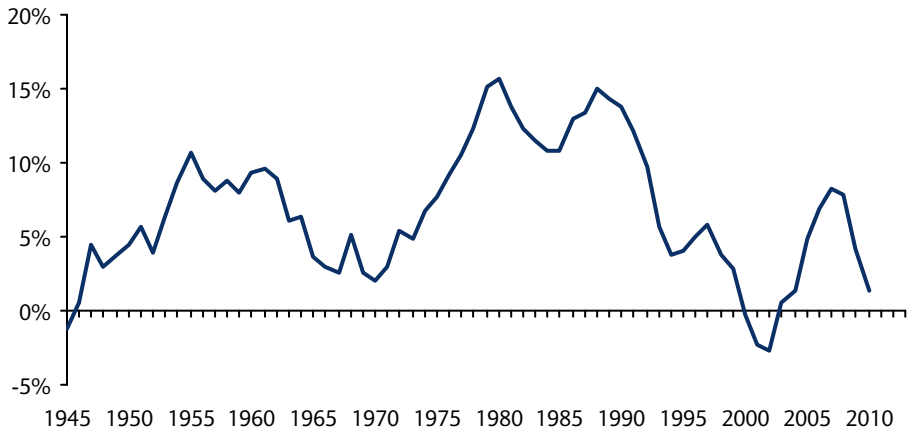
	Nominal	Real
Equities	£1,697,204	£24,133
Gilts	£25,916	£369
Cash	£20,126	£286

Source: Barclays Capital

Turning to the dividend growth ratio, Figure 11 shows that the five-year average growth rate dipped to 1.3% as corporates began cutting dividends in 2008. Between 1997 and 2001, dividend income had fallen a cumulative 15%, as companies cut dividends with the reasoning that funds would be put to better use by corporates than the shareholder. In the wake of the dot-com crash, investors actively sought income-yielding stocks as a method of lowering risk.

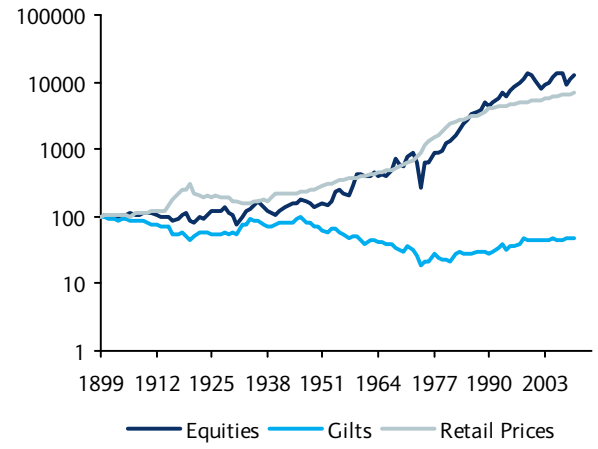
Figure 12 and Figure 13 illustrate the time series of price indices and total return indices for equities, gilts and cash over the entire series. These returns are in nominal terms and are shown with the use of a logarithmic scale.

Figure 11: Five-year average dividend growth rates



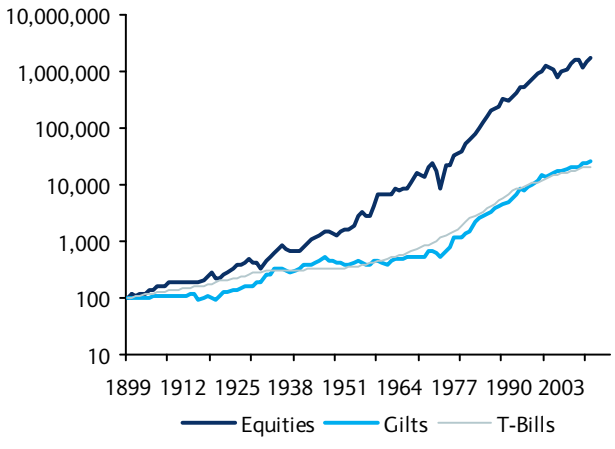
Source: Barclays Capital

Figure 12: Barclays Capital price indices – Nominal terms



Source: Barclays Capital

Figure 13: Barclays Capital total return indices – Nominal terms, gross income reinvested



Source: Barclays Capital

Figure 14: Today's value of £100 invested at the end of 1945 without reinvesting income

	Nominal	Real
Equities	£7,932	£255
Gilts	£53	£2

Source: Barclays Capital

Figure 15: Today's value of £100 invested at the end of 1945, gross income reinvested

	Nominal	Real
Equities	£136,107	£4,370
Gilts	£5,565	£179
Cash	£6,163	£198

Source: Barclays Capital

Figure 16: Today's value of £100 invested at the end of 1990, gross income reinvested

	Nominal	Real
Equities	£568	£323
Gilts	£547	£311
Index-linked gilts	£407	£232
Treasury bills	£295	£168

Source: Barclays Capital

CHAPTER 7

US asset returns

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This is the 11th year in which we have incorporated US asset return data, kindly provided by the Centre for Research into Security Prices (CRSP). The CRSP database continues to be maintained by the Chicago Graduate School of Business. The first holding period covered in the analysis below is the calendar year 1926, which would represent money invested at the end of 1925 and its value at the end of 1926. The total sample includes 85 annual return observations for equities, government bonds, and cash. The construction of the series is explained in more detail in the indices in Chapter 8. The corporate bond performance is captured using the Barclays Capital Investment Grade Corporate Long Index, which incorporates bonds with a maturity of 10 years or more. The Barclays Capital US Inflation Linked 15-year Plus Index is used to represent the performance of TIPS. The nominal return series are deflated by the change in the consumer price index, which is calculated by the Bureau of Labor Statistics.

Figure 1: Real investment returns (% pa)

Last	2010	10 years	20 years	50 years	85 years*
Equities	16.5	0.8	7.2	5.8	6.7
Government Bond	8.0	4.2	5.6	2.9	2.4
TIPS	7.0	6.0			
Corporate Bond	9.6	5.2	5.6		
Cash	-1.4	-0.2	0.9	1.2	0.6

*Note: Entire sample. Source: CRSP, Barclays Capital

Figure 1 provides the real annualised returns over various time horizons. The table illustrates that US asset returns followed a similar trend to those of the UK set out in the previous chapter. Equities were the best performing asset, despite periods of intense volatility. US equities followed European stocks lower as the sovereign debt crisis unravelled in the spring. The turbulence continued into the summer as weaker domestic economic data triggered fears of a deflationary spiral back into recession. The Fed's announcement of a second round of quantitative easing helped fuel a recovery in global equities into year-end. Over the decade, equities underperformed all assets aside from cash.

Treasuries and TIPS performed well, as the flight-to-quality trend dominated during the spring and summer months. Corporate bonds posted a respectable return of almost 10%, although this was weaker than the 2009 return of 16%, as most of the liquidity premia in corporate bonds had been eliminated during 2009. Figure 2 breaks the study period down into consecutive decades.

Figure 2: Real investment returns (% pa)

	Equities	Government bonds	Corporate bonds	Cash
1930-40	3.7	6.4		1.6
1940-50	7.5	-3.1		-5.1
1950-60	13.8	-0.4		0.2
1960-70	5.2	-1.5		1.3
1970-80	1.4	-3.6		-1.1
1980-90	7.9	8.8	9.5	3.9
1990-2000	14.1	7.1	6.1	1.9
2000-2010	0.8	4.2	5.2	-0.2

Source: CRSP, Barclays Capital

Equities underperformed Treasuries and corporate bonds in the most recent decade. Equities' best decades came in the immediate aftermath of WWII and the 1990s, while the past decade proved to be the worst in our sample. Bonds have enjoyed the strongest back-to-back performance over the past three decades. Strong real bond returns are largely explained by continued disinflation since the late 1970s.

Figure 3 ranks the relative performance of the 2010 returns by deciles, in order to get a clearer indication of the historical significance. The US equity ranking has jumped from the 2nd best in 2009 to the 4th decile in 2010. These results are similar to the performance of UK equities. Bonds reversed fortune and moved from the worst decile to the 3rd, while cash returns remained weak and moved from the 10th to the 8th decile.

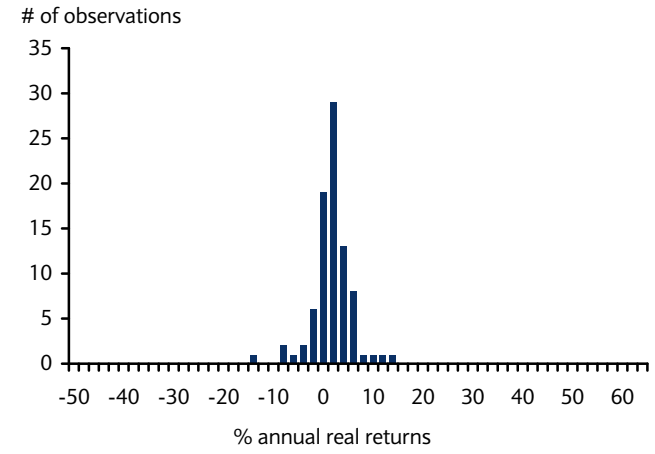
Figure 4, Figure 5 and Figure 6 plot the sample distributions using a histogram with identical maximum and minimum categories across each. These charts are useful in that they allow the reader to appreciate the volatility of each asset class while gaining an understanding of the distribution of the annual return observations. It is clear from these figures that cash exhibits the lowest volatility of each asset class, with bonds next and equities exhibiting the highest dispersion of returns.

Figure 3: Comparison of 2010 real returns with historical performance ranked by decile

	Decile
Equities	4
Government bonds	3
Cash	8

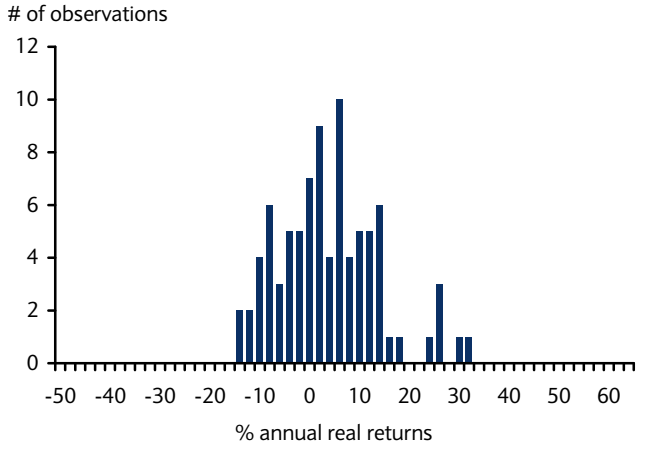
Notes: Deciles ranking - 1 signifies the best 10% of the history, 10 the worst 10%. Source: CRSP, Barclays Capital

Figure 4: Distribution of real annual cash returns



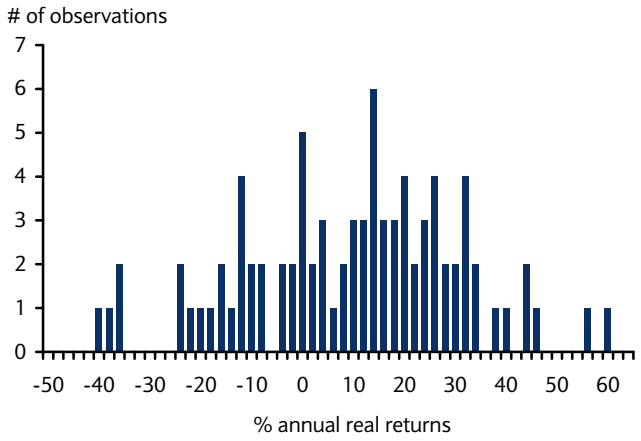
Source: CRSP, Barclays Capital

Figure 5: Distribution of real annual bond returns



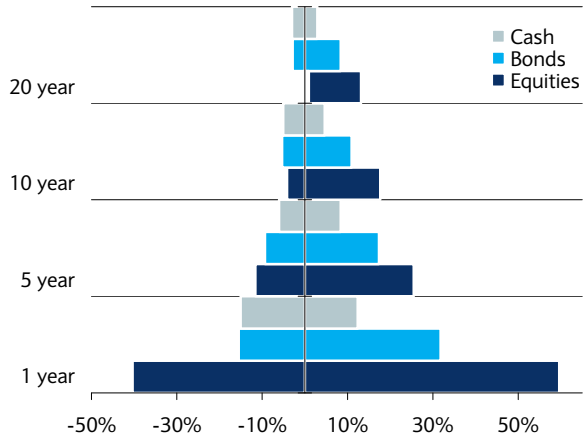
Source: CRSP, Barclays Capital

Figure 6: Distribution of real annual equity returns



Source: CRSP, Barclays Capital

Figure 7: Maximum and minimum real returns over different periods



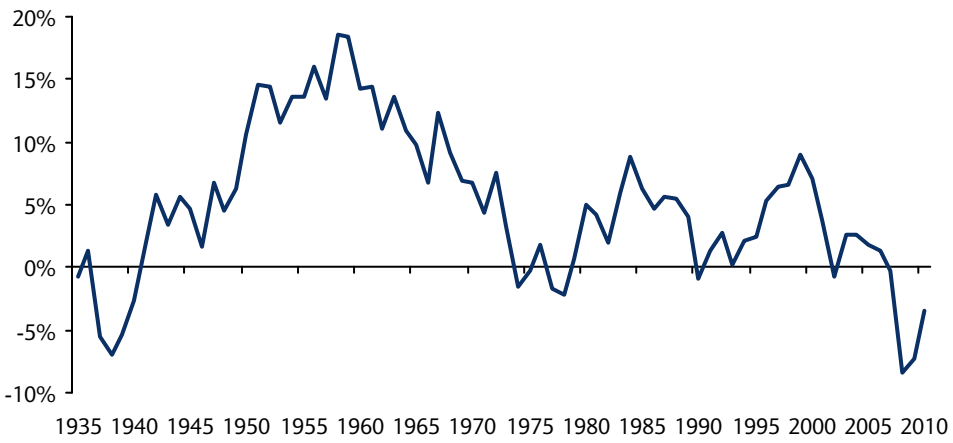
Source: CRSP, Barclays Capital

In Figure 7, we show the extremes of the return distribution for various holding periods. The volatility of equities over very short horizons is shown clearly in the maximum and minimum distribution of one-year returns. As we extend the holding period, the distribution begins to narrow. Over the past 85 years, the worst average annualised 20-year return for equities has been 0.9%, whilst the best is 13.2%. Is this suggesting that it is impossible to lose money by holding equities over a 20-year period? In our view, as the analysis is conducted on an ex-post basis, it is still possible for equities to generate negative real returns over a 20-year period. The chart is merely highlighting the fact that such an occurrence seems unlikely, given their performance over the past 85 years.

In addition, over the long term, we would expect the ex-ante equity risk premium to provide a cushion against uncertainty. Over the long term, we would expect such a premium to provide an offset against the effect of unanticipated events. Bonds and cash have experienced negative returns over a 20-year horizon, a reflection of the unexpected jumps in inflation, which took effect at various points in the past century.

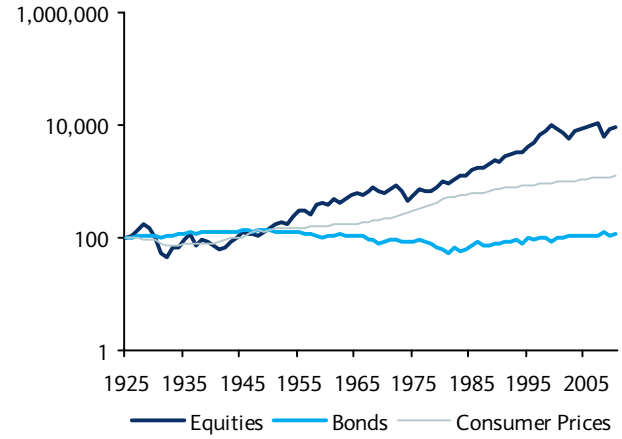
Figure 8 plots the US equity risk premium and shows that the 10-year annualised excess return of equities over bonds is currently negative, although it continues to bounce back from the lows of 2008.

Figure 8: Equity-risk premium – excess return of equities relative to bonds (10-yr annualised)



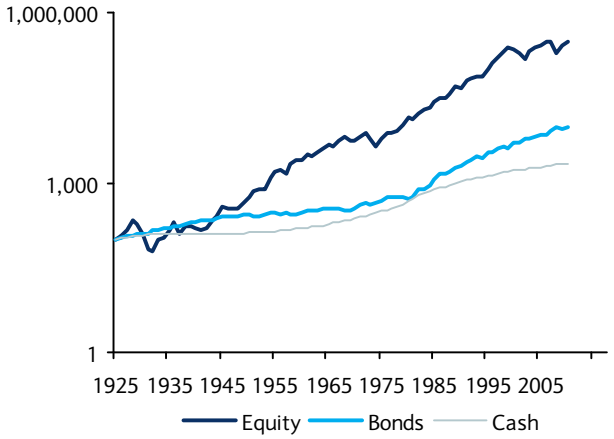
Source: CRSP, Barclays Capital

Figure 9: Barclays Capital US price indices in nominal terms



Source: CRSP, Barclays Capital

Figure 10: Barclays Capital US total return indices in nominal terms with gross income reinvested



Source: CRSP, Barclays Capital

Figure 11: Value of $100 invested at the end of 1925 without reinvesting income

	Nominal	Real
Equities	$9,524	$778
Bonds	$113	$9

Source: CRSP, Barclays Capital

Figure 12: Value of $100 invested at the end of 1925 with income reinvested gross

	Nominal	Real
Equities	$302,850	$24,733
Bonds	$9,296	$759
Cash	$2,040	$167

Source: CRSP, Barclays Capital

The importance of reinvestment

Figure 9 and Figure 10 show the importance of reinvestment of income, in the form of both dividends on equity investments and coupons on government bonds.

CHAPTER 8

Barclays indices

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We have calculated three indices: changes in the capital value of each asset class; changes to income from these investments; and a combined measure of the overall return, on the assumption that all income is reinvested.

Additional series allow for the effects of inflation. The data for cash include building society deposit rates and Treasury bills. The series on index-linked securities is based at December 1982 and the corporate bond index starts at the end of 1990.

Barclays Equity Index

The Barclays Equity Index is designed to give as accurate a measure as possible of the performance of a representative portfolio of equities. Three main types of index can be used. The FT Index, which for years was the most widely used in the UK, is geometric, meaning that the price changes of the 30 shares it comprises are multiplied together to produce the change on the index. We believe that this is a fair basis for indicating short-term market behaviour, but that over long periods it imparts a downward bias. The second type of index uses the Dow formula, in which the prices of a number of shares are added together. This does not have the distorting effect of a geometric index, but the weighting of the various shares is arbitrary and varies with changes in capitalisation.

We think the most accurate and representative indices are arithmetic and weighted by the number of shares in issue by each company. These indices include virtually all of the large quoted companies, and thus we believe they accurately reflect the behaviour of an equity market. The Standard & Poor's Indices are of this type, and they date back to the 1920s. The FT Actuaries Indices, introduced in the 1960s, were the first of this type in the UK. Subsequently, a number of weighted arithmetic international indices, such as those calculated by Morgan Stanley Capital International and Datastream, have been introduced. More recently, the FTSE 100 Index, which uses the same construction but incorporates only the 100 leading shares, has been introduced and, generally, is now used as the main market indicator because it is calculated on a real-time basis throughout the day.

The new Barclays Equity Index, which is used in this study, is a weighted arithmetic index, and is now available for the period since 1899, with a dividend yield and an income index. The original Barclays Equity Index, used in editions of this study until 1999, was first calculated retrospectively in 1956 and included 30 shares chosen because of their similarities to the FT 30 Index, which covers the 1935 to 1962 period. For the 2000 edition of this study, we compiled a new index for 1899-1935, based on the 30 largest shares by market capitalisation in each year. From 1962, the Barclays Equity Index is based on the FTSE Actuaries All-Share Index because, with its broader coverage, it gives a more accurate picture of market movements. The indices are only calculated annually, at year-end.

The equity returns between 1899 and 1935 are therefore calculated from a new Equity Index, consisting of the 30 largest shares by market capitalisation in each year; between 1935 and 1962 they are calculated from the FT 30 Index and from 1962 onwards they are derived from the FTSE Actuaries All-Share Index.

Figure 1: Equity Index constituents

Constituents at December 1899	Constituents at December 1934	Constituents at December 1962
De Beers Consolidated Mines	Woolworth Ltd	Associated Portland Cement
Rio Tinto Ltd	Imperial Chemical Industries	Bass Mitchells & Butlers
Armstrong Whitworth	Shell' Transport & Trading Ltd	British Motor
Consolidated Gold Fields	Courtaulds Ltd	Coats Patons
London and County Bank	Royal Insurance Co	Cory (William)
London City & Midland Bank Ltd	Barclay & Company	Courtaulds
Lloyds Bank Ltd	Lloyds Bank	Distillers
London & Westminster Bank Ltd	Prudential Assurance Co Ltd	Dunlop
Vickers, Sons & Maxim Ltd	Westminster Bank Ltd	EMI
Imperial Ottoman Bank	Midland Bank Ltd	Fine Spinners & Doublers
Parrs Bank Ltd	London & Lancashire Fire Ins. Co	General Electric
Royal Insurance Co	North British & Mercantile In. Co Ltd	Guest Keen
Tharsis Sulphur & Copper Ltd	Reckitt & Sons Ltd	Hawker Siddeley
Great Northern of Copenhagen	County of London Electric Supply Co	House of Fraser
Simmer & Jack PropietaryMines Ltd	Unilever Ltd	ICI
North British & Mercantile Insurance	Tate & Lyle Ltd	Imperial Tobacco
Consett Iron Ltd	Alliance Assurance Company	International Stores
Eastern Extension Australasia * China Ltd	Boots Pure Drug Co Ltd	Leyland Motors
Nobel Dynamite TstLtd	Pearl Assurance Co	London Brick
Mysore Gold Mining Ltd	Marks & Spencer Ltd	Murex
Exploration Co	Cory (WM.) & Son	P&O Steam Navigation
Alliance Assurance Co	National Bank Of Egypt	Rolls-Royce
Aerated Bread Ltd	Consolidated Gold Fields Of South Africa	Swan Hunter
Howard & Bullough Ltd	Bass, Ratcliff & Gretton Ltd	Tate & Lyle
Sun Insurance Office	GeduldProp Mines Ltd	Tube Investments
New JagersfonteinMining & Expl Ltd	Sun Insurance Office	Turner & Newall
Champion Reef Gold Mining	Bank Of Australasia	United Steel
National Telephone Ltd	British South Africa Co	Vickers
Northern Assurance	Chartered Bank Of India, Australia & China	WatneyMann
Phoenix Assurance Co	North Eastern Elec Supply Co	Woolworth

Source: Barclays Capital

The Equity Index is a weighted arithmetic average. In the Equity Index, the weights of the 30 constituent companies for each year are proportional to their market capitalisation at the beginning of the year. Each year a fund was constructed. The number of shares in the fund for each company was calculated so that its market value at the beginning of the year was equal to the company's index weighting. The value of the fund was calculated annually at the end of the year.

For 1899 to 1962, the Equity Income Index is based on the Barclays Equity Fund. The Income Index relates to the dividend income actually received in the 12 months prior to the date of the index. It is calculated by totalling the dividends paid on the shares in the fund. We believe that it is the only published index based on actual income receipts.

From 1963 the Income Index is derived from the yield on the FTSE All-Share Index. Despite a minimal discontinuity in the yield, in our view, this is the most representative method of evaluating equity performance over the period. The dividend yield is quoted net from 1998, with non-taxpayers no longer able to reclaim ACT.

Barclays Gilt Index

The Gilt Index measures the performance of long-dated gilts. From 1899 to 1962 the index is based on the prices of undated British funds. During this period the undated stocks were a major part of the gilt market, but over the years the effect of high interest rates on their prices, together with the growing number of conventional long-dated issues, meant that undated stocks became less and less representative of the market as a whole.

Since 1962, the Barclays Gilt Index has been based on a portfolio of long-dated stocks, selected on 1 January each year. The portfolio was chosen to represent as closely as possible a 20-year security on a par yield, and contains a weighted combination of four long-dated stocks with a mean life of 20½ years (so that the average life of the stocks for the year in which they are in the portfolio was 20 years). The combination and weightings of the four stocks are chosen to have the minimum possible deviation from a par yield. Small issues (less than £1bn) are excluded and in any year none of the four stocks has been allocated a weight of more than 40%, or less than 5% of the index.

During the late 1980s there was a steady contraction in the number of issues that satisfied the criteria for inclusion in the Gilt Index. As a result of the lack of issues of new long-dated stocks and the fall in the remaining life of existing stocks, the universe of eligible stocks narrowed sharply. By the end of 1989 there were four stocks with a life of more than 20 years, and only two of these were over £1bn nominal.

Thus from the beginning of 1990 the index has been constructed to represent a portfolio of 15-year par yielding gilts.

Barclays Inflation-linked Index

The index-linked market has now been established for almost three decades and is capitalised at £245bn (compared with the £850bn capitalisation of the conventional market). The index has been constructed to mirror as closely as possible the rules of the conventional gilt index. An average life of 20 years was used up until 1990, and 15 years thereafter. Again, stocks have been chosen to be as close to par as possible, although of course in this case par means “indexed par”.

Barclays Corporate Bond Index

The UK corporate bond market has expanded dramatically since the beginning of 1999. The index and returns are based on the Barclays Capital Sterling Aggregate Corporate Index. Clearly, we are unable to select individual stocks for this index in the way we do for the gilt indices because such a small sample of stocks cannot be representative of the market.

Barclays Building Society Fund

In previous editions of this study we have included indices of the value of £100 invested in a building society at the end of 1945. We originally used the average interest rate on an ordinary share account. In the mid-1980s many building societies introduced new tiered interest rate accounts, which provided a higher rate of interest while still allowing instant access. In response to this we have been tracking both types of account, but as time progressed the old style “ordinary share accounts” became less and less representative and by the mid-1990s had been completely superseded by the new accounts. From 1986 the Barclays Index follows the Halifax Liquid Gold Account (formerly called the Halifax Instant Xtra) as a representative of the newer tiered interest rate-style accounts. The Halifax is no longer a building society, having converted to a bank, so from 1998 we follow the Nationwide Invest Direct Account. This is the closest equivalent account offered by the Nationwide Building Society (which is now the largest remaining building society in the UK); the difference is that it is operated by post. We consider this type of postal account to be

more representative of building society returns than the branch operated passbook accounts, which are more in the nature of a cash-based transaction account.

US asset returns

The US indices used in this study were provided by the Center for Research in Security Prices (CRSP) at the Graduate School of Business in the University of Chicago. The value-weighted equity index covers all common stocks trading on the New York, American and Nasdaq Stock Exchanges, excluding ADRs. For the bond index, the CRSP has used software which selects the bond that is closest to a 20-year bond in each month. The same methodology has been employed for the 30-day T-Bill.

Total returns

In this study we have shown the performance of representative investments in British equities and long gilts, with additional analysis of equivalent US returns in both monetary and real (inflation adjusted) terms. The total returns to the investor, however, also include the income on the investment. This is important throughout the study for comparability between asset classes. For example, when constructing an index for a cash investment such as the Treasury Bill Index, the £100 invested at the end of 1899 grew to approximately £104 by the end of the following year. This full amount is reinvested and by the end of 1920 the value of this investment had grown to about £190. In contrast, equity and bond market returns can be split into two components: capital appreciation; and dividend income. The most commonly quoted stock market indices usually include only the capital component of the return. In order to calculate returns on a comparable basis, we need to include the returns obtained by reinvesting this income. This is particularly important in looking at bonds where the scope for capital appreciation is small, so almost all of the return will be from income. In this study total returns are calculated assuming income is reinvested at the end of the year.

Taxation

The total return to an investor depends crucially on the tax regime. The largest long-term investors in the British equity and gilt markets are pension funds and similar institutions that (until the abolition of the advance corporation tax (ACT) credit) have not suffered tax on their income or capital; our main tables therefore make no allowance for tax until 1998, which was the first full year that non-taxpayers were unable to reclaim the ACT credit. This effectively reduced the dividend yield to non-taxpayers, and is reflected in our main tables and gross total return series.

The personal investor must suffer tax. The net return to a building society account is straightforward to compute. However, changes in the tax regime in recent years make the net return to equity and gilt investment less straightforward to calculate on a consistent basis. For example, the change to total return taxation for gilts means that it is inappropriate to calculate a net total return on the basis of taxing income alone. Thus returns are quoted gross throughout, but for reference we also quote basic tax rates.

Arithmetic and geometric averages

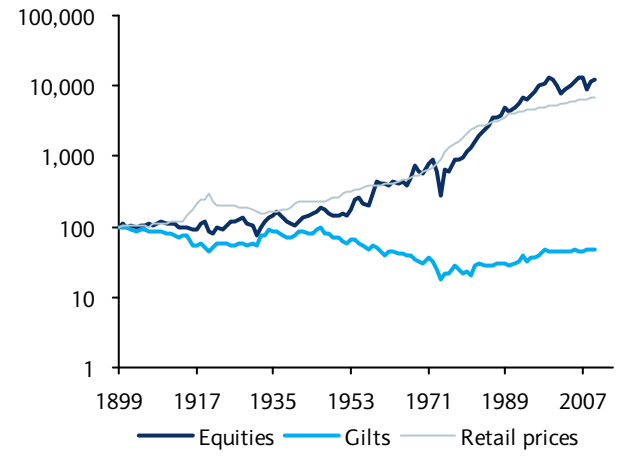
Our analysis of past data usually relies on calculations of the geometric mean for each series. Arithmetic averages can provide a misleading picture. For example, suppose equities rose from a base of 100 to 200 over one year and then fell back to 100 over the next year. The return for year one would have been 100% and for year two minus 50%. The arithmetic average return would be 25% even though equities are actually unchanged in value over the two years.

The geometric average return in this example would be zero. This method of calculation is therefore preferable. Over long periods of time the geometric average for total returns is the rate at which a sum invested at the beginning of the period will grow to by the end of the period, assuming all income is reinvested. The calculation of geometric averages depends only on the initial and final values for the investment, not particular values at any other point in time.

For periods of one year, arithmetic and geometric averages will be the same. But over longer periods the geometric average is always less than the arithmetic average, except when all the individual yearly returns are the same. For the mathematically minded, the geometric return is approximately equal to the arithmetic return minus one-half the variance of the arithmetic return.

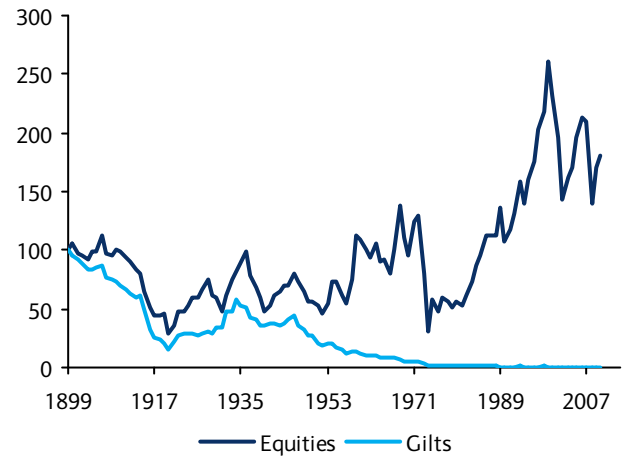
Although geometric returns are appropriate to analyse the past, arithmetic returns should be used to provide forecasts. Arithmetic averages provide the better unbiased estimator of returns (for a statistical proof of this see Ian Cooper's paper *Arithmetic vs Geometric Premium: setting discount rates for capital budgeting calculations*, IFA Working Paper 174-93, April 1993).

Figure 2: Barclays price indices in nominal terms



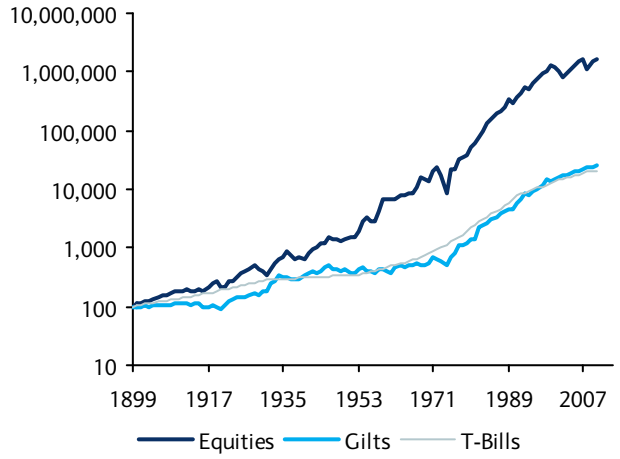
Source: Barclays Capital

Figure 3: Barclays price indices in real terms



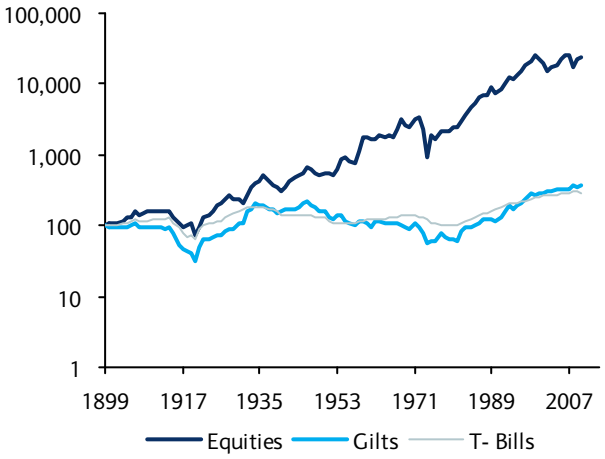
Source: Barclays Capital

Figure 4: Barclays total return indices in nominal terms with gross income reinvested



Source: Barclays Capital

Figure 5: Barclays total return indices in real terms with gross income reinvested



Source: Barclays Capital

Capital value indices

The indices in Figure 2 show the nominal capital value of £100 invested in equities and gilts at the end of 1899. The chart also plots the Barclays Cost of Living Index. Note how the equity index has correlated with increases in the cost of living versus a similar investment in gilts. The index values at the end of 2010 were 12,655 for equities, 49 for gilts, and 7033 for the cost of living.

We then show the same capital indices adjusted for the increase in the cost of living since 1899. Figure 3 shows the end-2010 real equity price index at 180 with the real gilt price index at 0.7.

Total return indices

The next two charts show the nominal and real value of the equity, gilt and cash funds with gross income received reinvested at the end of each year since 1899. Figure 4 shows that the nominal worth of £100 invested in equities at the end of 1899 was £1,697,204. The same investment in gilts was worth £25,916 and in T-Bills £20,126. When these values are adjusted for inflation, the equity fund is worth £24,133, the gilt £369 and the cash fund £286.

Figure 6: Barclays UK Cost of Living Index

Year	December (1899=100)	Change %		Year	December	Change %	
		In year	5y average			In year	5y average
1900	103.3	3.3		1956	358.3	3.0	4.0
1901	103.3	0.0		1957	374.9	4.6	3.7
1902	106.7	3.2		1958	381.8	1.8	3.9
1903	106.7	0.0		1959	381.8	0.0	3.1
1904	106.7	0.0	1.3	1960	388.7	1.8	2.3
1905	106.7	0.0	0.6	1961	405.7	4.4	2.5
1906	100.0	-6.2	-0.7	1962	416.5	2.6	2.1
1907	110.0	10.0	0.6	1963	424.2	1.9	2.1
1908	113.3	3.0	1.2	1964	444.6	4.8	3.1
1909	113.3	0.0	1.2	1965	464.5	4.5	3.6
1910	113.3	0.0	1.2	1966	481.6	3.7	3.5
1911	116.7	2.9	3.1	1967	493.4	2.5	3.4
1912	120.0	2.9	1.8	1968	522.7	5.9	4.3
1913	120.0	0.0	1.1	1969	547.1	4.7	4.2
1914	120.0	0.0	1.1	1970	590.3	7.9	4.9
1915	148.3	23.6	5.5	1971	643.6	9.0	6.0
1916	175.8	18.5	8.6	1972	692.9	7.7	7.0
1917	212.5	20.9	12.1	1973	766.2	10.6	7.9
1918	244.7	15.2	15.3	1974	912.8	19.1	10.8
1919	250.3	2.3	15.8	1975	1140.0	24.9	14.1
1920	299.2	19.6	15.1	1976	1311.8	15.1	15.3
1921	221.4	-26.0	4.7	1977	1471.1	12.1	16.3
1922	200.2	-9.5	-1.2	1978	1594.4	8.4	15.8
1923	196.9	-1.7	-4.3	1979	1869.3	17.2	15.4
1924	201.3	2.3	-4.3	1980	2151.9	15.1	13.5
1925	196.9	-2.2	-8.0	1981	2411.2	12.0	12.9
1926	199.1	1.1	-2.1	1982	2541.6	5.4	11.6
1927	188.0	-5.6	-1.3	1983	2676.7	5.3	10.9
1928	186.9	-0.6	-1.0	1984	2799.3	4.6	8.4
1929	185.8	-0.6	-1.6	1985	2958.5	5.7	6.6
1930	172.4	-7.2	-2.6	1986	3068.6	3.7	4.9
1931	164.6	-4.5	-3.7	1987	3182.0	3.7	4.6
1932	159.1	-3.4	-3.3	1988	3397.6	6.8	4.9
1933	159.1	0.0	-3.2	1989	3659.5	7.7	5.5
1934	160.2	0.7	-2.9	1990	4001.4	9.3	6.2
1935	163.5	2.1	-1.1	1991	4180.0	4.5	6.4
1936	168.0	2.7	0.4	1992	4287.8	2.6	6.1
1937	178.0	6.0	2.3	1993	4369.3	1.9	5.2
1938	173.5	-2.5	1.8	1994	4495.6	2.9	4.2
1939	192.4	10.9	3.7	1995	4640.3	3.2	3.0
1940	216.9	12.7	5.8	1996	4754.2	2.5	2.6
1941	223.6	3.1	5.9	1997	4926.6	3.6	2.8
1942	222.5	-0.5	4.6	1998	5062.1	2.8	3.0
1943	221.4	-0.5	5.0	1999	5151.4	1.8	2.8
1944	223.6	1.0	3.0	2000	5302.3	2.9	2.7
1945	225.8	1.0	0.8	2001	5339.2	0.7	2.3
1946	226.9	0.5	0.3	2002	5496.3	2.9	2.2
1947	234.2	3.2	1.0	2003	5650.2	2.8	2.2
1948	245.7	4.9	2.1	2004	5847.3	3.5	2.6
1949	254.3	3.5	2.6	2005	5976.6	2.2	2.4
1950	262.4	3.2	3.0	2006	6241.4	4.4	3.2
1951	294.0	12.0	5.3	2007	6493.9	4.0	3.4
1952	312.7	6.3	6.0	2008	6561.7	1.0	3.0
1953	316.0	1.1	5.2	2009	6712.5	2.3	2.8
1954	328.5	4.0	5.3	2010	7032.8	4.8	3.3
1955	347.7	5.8	5.8				

Figure 7: Barclays UK Equity Index

Year	Equity Price Index December		Equity Income Index December		Income yield %	Equity Price Index adjusted for Cost of Living		Equity Income Index adjusted for Cost of Living	
1899	100					100			
1900	108	+8.3%	100		6.3	105	+4.8%	100	
1901	100	-7.9%	69	-30.6%	4.8	97	-7.9%	69	-30.6%
1902	101	+1.3%	80	+15.6%	5.4	95	-1.9%	78	+11.9%
1903	98	-2.7%	66	-17.3%	4.6	92	-2.7%	64	-17.3%
1904	106	+8.0%	62	-6.1%	4.0	100	+8.0%	60	-6.1%
1905	105	-0.7%	71	+13.7%	4.6	99	-0.7%	69	+13.7%
1906	112	+6.1%	77	+8.5%	4.7	112	+13.2%	79	+15.7%
1907	107	-4.7%	79	+2.9%	5.1	97	-13.3%	74	-6.4%
1908	108	+1.3%	57	-27.4%	3.6	95	-1.7%	52	-29.5%
1909	115	+6.3%	73	+26.5%	4.3	101	+6.3%	66	+26.5%
1910	112	-2.1%	69	-4.5%	4.2	99	-2.1%	63	-4.5%
1911	109	-2.9%	71	+2.1%	4.4	94	-5.7%	63	-0.8%
1912	108	-1.4%	69	-3.2%	4.4	90	-4.2%	59	-5.8%
1913	100	-7.1%	57	-16.5%	3.9	83	-7.1%	49	-16.5%
1914	96	-4.4%	57	+0.1%	4.1	80	-4.4%	49	+0.1%
1915	96	0.0%	36	-37.8%	2.6	64	-19.1%	25	-49.7%
1916	89	-6.8%	67	+88.2%	5.2	51	-21.4%	39	+58.8%
1917	93	+4.2%	66	-2.2%	4.8	44	-13.8%	32	-19.1%
1918	108	+16.3%	63	-3.6%	4.0	44	+1.0%	27	-16.3%
1919	116	+7.7%	34	-47.0%	2.0	46	+5.3%	14	-48.2%
1920	86	-25.6%	77	+128.9%	6.1	29	-37.8%	26	+91.4%
1921	80	-7.1%	79	+2.7%	6.7	36	+25.5%	37	+38.8%
1922	96	+19.8%	73	-7.9%	5.2	48	+32.5%	37	+1.8%
1923	92	-4.0%	72	-0.8%	5.3	47	-2.4%	38	+0.9%
1924	106	+15.3%	67	-7.5%	4.3	53	+12.8%	34	-9.5%
1925	117	+9.9%	73	+10.3%	4.3	59	+12.4%	39	+12.7%
1926	119	+1.8%	83	+12.5%	4.8	60	+0.7%	43	+11.2%
1927	124	+4.0%	76	-8.2%	4.2	66	+10.1%	42	-2.8%
1928	139	+12.2%	79	+3.9%	3.9	74	+12.9%	44	+4.5%
1929	113	-19.1%	90	+14.9%	5.5	61	-18.6%	50	+15.6%
1930	102	-9.2%	80	-11.0%	5.4	59	-2.1%	48	-4.2%
1931	77	-24.3%	65	-18.7%	5.8	47	-20.8%	41	-14.8%
1932	99	+27.9%	64	-2.4%	4.4	62	+32.4%	41	+1.0%
1933	119	+20.6%	60	-5.6%	3.5	75	+20.6%	39	-5.6%
1934	131	+9.8%	70	+15.7%	3.6	82	+9.0%	45	+14.9%
1935	144	+9.9%	78	+11.5%	3.7	88	+7.7%	49	+9.2%
1936	166	+15.1%	82	+5.8%	3.4	99	+12.1%	51	+3.0%
1937	138	-16.7%	93	+12.7%	4.6	78	-21.4%	54	+6.4%
1938	118	-14.9%	94	+1.8%	5.5	68	-12.7%	56	+4.4%
1939	114	-3.1%	90	-4.8%	5.4	59	-12.6%	48	-14.2%
1940	102	-10.2%	94	+4.8%	6.3	47	-20.3%	45	-7.1%
1941	119	+16.8%	91	-3.6%	5.2	53	+13.3%	42	-6.5%
1942	135	+12.9%	86	-4.5%	4.4	61	+13.4%	40	-4.0%
1943	144	+7.1%	86	-0.2%	4.1	65	+7.7%	40	+0.3%
1944	156	+8.3%	87	+0.4%	3.8	70	+7.3%	40	-0.6%
1945	160	+2.0%	88	+2.0%	3.8	71	+1.0%	40	+1.0%
1946	182	+13.9%	93	+4.9%	3.5	80	+13.3%	42	+4.4%
1947	170	-6.3%	107	+15.1%	4.3	73	-9.2%	47	+11.6%
1948	157	-7.7%	98	-7.7%	4.3	64	-12.1%	41	-12.1%
1949	141	-10.3%	103	+4.4%	5.0	55	-13.3%	42	+0.8%
1950	149	+5.6%	109	+5.6%	5.0	57	+2.3%	43	+2.3%
1951	153	+3.0%	121	+11.2%	5.4	52	-8.1%	42	-0.7%
1952	144	-5.9%	128	+6.3%	6.1	46	-11.5%	42	-0.0%
1953	170	+17.8%	134	+4.3%	5.4	54	+16.6%	44	+3.2%
1954	242	+42.4%	155	+16.0%	4.4	74	+36.9%	49	+11.6%

Year	Equity Price Index December		Equity Income Index December		Income yield %	Equity Price Index adjusted for Cost of Living		Equity Income Index adjusted for Cost of Living	
1955	256	+5.8%	179	+15.4%	4.8	74	-0.0%	53	+9.1%
1956	220	-13.9%	183	+2.2%	5.7	62	-16.5%	53	-0.8%
1957	205	-7.0%	188	+2.8%	6.3	55	-11.1%	52	-1.7%
1958	289	+41.1%	202	+7.5%	4.8	76	+38.5%	55	+5.5%
1959	432	+49.5%	227	+12.1%	3.6	113	+49.5%	61	+12.1%
1960	421	-2.6%	276	+21.7%	4.5	108	-4.4%	73	+19.5%
1961	409	-3.0%	286	+3.5%	4.8	101	-7.0%	73	-0.8%
1962	391	-4.4%	285	-0.4%	5.0	94	-6.9%	71	-3.0%
1963	450	+15.2%	266	-6.5%	4.1	106	+13.1%	65	-8.2%
1964	405	-10.0%	303	+13.7%	5.1	91	-14.2%	70	+8.5%
1965	428	+5.9%	326	+7.7%	5.2	92	+1.3%	73	+3.1%
1966	389	-9.3%	328	+0.5%	5.8	81	-12.5%	70	-3.1%
1967	500	+28.7%	319	-2.5%	4.4	101	+25.6%	67	-4.8%
1968	718	+43.5%	339	+6.1%	3.2	137	+35.4%	67	+0.2%
1969	609	-15.2%	342	+0.8%	3.9	111	-19.0%	65	-3.7%
1970	563	-7.5%	360	+5.5%	4.4	95	-14.3%	63	-2.3%
1971	799	+41.9%	379	+5.1%	3.3	124	+30.2%	61	-3.6%
1972	901	+12.8%	414	+9.3%	3.2	130	+4.8%	62	+1.6%
1973	619	-31.4%	430	+3.9%	4.8	81	-37.9%	58	-6.0%
1974	276	-55.3%	472	+9.6%	11.7	30	-62.5%	53	-8.0%
1975	653	+136.3%	521	+10.4%	5.5	57	+89.2%	47	-11.6%
1976	628	-3.9%	588	+12.8%	6.4	48	-16.5%	46	-2.0%
1977	886	+41.2%	682	+16.1%	5.3	60	+25.9%	48	+3.5%
1978	910	+2.7%	768	+12.6%	5.8	57	-5.3%	50	+3.9%
1979	949	+4.3%	951	+23.8%	6.9	51	-11.0%	53	+5.6%
1980	1206	+27.1%	1073	+12.8%	6.1	56	+10.4%	52	-2.0%
1981	1294	+7.2%	1111	+3.5%	5.9	54	-4.3%	48	-7.6%
1982	1579	+22.1%	1211	+9.0%	5.3	62	+15.8%	49	+3.4%
1983	1944	+23.1%	1309	+8.1%	4.6	73	+16.9%	51	+2.7%
1984	2450	+26.0%	1578	+20.6%	4.4	88	+20.5%	58	+15.3%
1985	2822	+15.2%	1781	+12.8%	4.3	95	+9.0%	62	+6.8%
1986	3452	+22.3%	2033	+14.1%	4.0	112	+17.9%	68	+10.0%
1987	3596	+4.2%	2264	+11.4%	4.3	113	+0.4%	74	+7.4%
1988	3829	+6.5%	2628	+16.1%	4.7	113	-0.3%	80	+8.7%
1989	4978	+30.0%	3076	+17.0%	4.2	136	+20.7%	87	+8.7%
1990	4265	-14.3%	3401	+10.5%	5.5	107	-21.6%	88	+1.1%
1991	4907	+15.1%	3591	+5.6%	5.0	117	+10.1%	89	+1.1%
1992	5635	+14.8%	3573	-0.5%	4.4	131	+11.9%	86	-3.0%
1993	6951	+23.3%	3414	-4.4%	3.4	159	+21.0%	81	-6.2%
1994	6286	-9.6%	3684	+7.9%	4.0	140	-12.1%	85	+4.9%
1995	7450	+18.5%	4127	+12.0%	3.8	161	+14.8%	92	+8.5%
1996	8320	+11.7%	4536	+9.9%	3.7	175	+9.0%	99	+7.3%
1997	9962	+19.7%	4690	+3.4%	3.2	202	+15.5%	98	-0.2%
1998	11048	+10.9%	4026	-14.2%	2.5	218	+7.9%	82	-16.5%
1999	13396	+21.2%	4140	+2.8%	2.1	260	+19.1%	83	+1.0%
2000	12329	-8.0%	4007	-3.2%	2.2	233	-10.6%	78	-5.9%
2001	10428	-15.4%	3998	-0.2%	2.6	195	-16.0%	77	-0.9%
2002	7825	-25.0%	4049	+1.3%	3.6	142	-27.1%	76	-1.6%
2003	9121	+16.6%	4121	+1.8%	3.1	161	+13.4%	75	-1.0%
2004	9961	+9.2%	4428	+7.5%	3.1	170	+5.5%	78	+3.8%
2005	11764	+18.1%	5058	+14.2%	3.0	197	+15.5%	87	+11.8%
2006	13311	+13.2%	5549	+9.7%	2.9	213	+8.3%	92	+5.0%
2007	13580	+2.0%	5978	+7.7%	3.0	209	-1.9%	95	+3.5%
2008	9129	-32.8%	5974	-0.1%	4.5	139	-33.4%	94	-1.0%
2009	11407	+25.0%	5321	-10.9%	3.2	170	+22.0%	82	-13.0%
2010	12655	+10.9%	5331	+0.2%	2.9	180	+5.9%	78	-4.4%

Figure 8: Barclays UK Gilt Index

Year	Gilt Price Index December		Yield %	Gilt Price Index Adjusted for Cost of Living	
1899	100.0			100.0	
1900	98.4	-1.6%	2.8	95.2	-4.8%
1901	94.6	-3.8%	2.9	91.5	-3.8%
1902	93.7	-0.9%	3.0	87.8	-4.0%
1903	88.3	-5.8%	2.9	82.8	-5.8%
1904	89.4	+1.2%	2.8	83.8	+1.2%
1905	90.1	+0.8%	2.8	84.4	+0.8%
1906	86.6	-3.8%	2.9	86.6	+2.6%
1907	84.1	-2.9%	3.0	76.5	-11.7%
1908	84.6	+0.6%	3.0	74.7	-2.4%
1909	83.6	-1.3%	3.0	73.7	-1.3%
1910	80.0	-4.3%	3.1	70.6	-4.3%
1911	77.7	-2.8%	3.2	66.6	-5.6%
1912	75.8	-2.4%	3.3	63.2	-5.1%
1913	72.3	-4.7%	3.5	60.2	-4.7%
1914	73.0	+1.0%	3.4	60.9	+1.0%
1915	73.0	0.0	3.4	49.2	-19.1%
1916	55.7	-23.8%	4.5	31.7	-35.7%
1917	54.9	-1.4%	4.6	25.8	-18.4%
1918	59.4	+8.3%	4.2	24.3	-6.0%
1919	51.9	-12.7%	4.8	20.7	-14.6%
1920	45.6	-12.1%	5.5	15.2	-26.5%
1921	50.6	+11.1%	4.9	22.9	+50.2%
1922	56.2	+10.9%	4.4	28.1	+22.6%
1923	56.1	-0.2%	4.5	28.5	+1.5%
1924	57.7	+2.9%	4.3	28.6	+0.6%
1925	55.4	-3.9%	4.5	28.1	-1.7%
1926	54.5	-1.6%	4.6	27.4	-2.7%
1927	55.9	+2.6%	4.5	29.8	+8.7%
1928	56.7	+1.3%	4.4	30.3	+1.9%
1929	53.3	-6.0%	4.7	28.7	-5.4%
1930	57.8	+8.5%	4.3	33.5	+16.9%
1931	55.0	-4.7%	4.5	33.4	-0.2%
1932	74.7	+35.6%	3.3	46.9	+40.4%
1933	74.6	-0.1%	3.3	46.9	-0.1%
1934	92.8	+24.4%	2.7	57.9	+23.5%
1935	87.4	-5.8%	2.9	53.4	-7.8%
1936	85.1	-2.6%	2.9	50.7	-5.2%
1937	74.8	-12.2%	3.3	42.0	-17.1%
1938	70.7	-5.4%	3.5	40.8	-3.0%
1939	68.9	-2.6%	3.6	35.8	-12.2%
1940	77.4	+12.3%	3.2	35.7	-0.3%
1941	83.1	+7.4%	3.0	37.2	+4.2%
1942	82.9	-0.3%	3.0	37.2	+0.2%
1943	80.0	-3.4%	3.1	36.1	-3.0%
1944	82.1	+2.6%	3.0	36.7	+1.6%
1945	91.8	+11.8%	2.7	40.6	+10.7%
1946	99.2	+8.0%	2.5	43.7	+7.5%
1947	82.5	-16.8%	3.0	35.2	-19.4%
1948	80.6	-2.3%	3.1	32.8	-6.9%
1949	70.9	-12.0%	3.5	27.9	-15.0%
1950	71.3	+0.5%	3.5	27.2	-2.6%
1951	61.9	-13.1%	4.0	21.1	-22.4%
1952	59.0	-4.8%	4.2	18.9	-10.5%
1953	64.7	+9.7%	3.9	20.5	+8.5%
1954	66.1	+2.2%	3.8	20.1	-1.7%
1955	56.9	-13.8%	4.4	16.4	-18.6%

Year	Gilt Price Index December		Yield %	Gilt Price Index Adjusted for Cost of Living	
1956	52.7	-7.5%	4.7	14.7	-10.2%
1957	46.9	-10.9%	5.3	12.5	-14.9%
1958	52.4	+11.7%	4.8	13.7	+9.6%
1959	50.4	-3.9%	5.0	13.2	-3.9%
1960	44.3	-11.9%	5.6	11.4	-13.5%
1961	38.3	-13.7%	6.5	9.4	-17.3%
1962	45.3	+18.3%	5.4	10.9	+15.3%
1963	44.5	-1.7%	5.5	10.5	-3.5%
1964	41.0	-7.9%	6.1	9.2	-12.1%
1965	40.3	-1.7%	6.2	8.7	-6.0%
1966	39.5	-2.1%	6.4	8.2	-5.5%
1967	37.9	-4.1%	6.9	7.7	-6.4%
1968	34.4	-9.3%	7.6	6.6	-14.4%
1969	31.7	-7.6%	8.5	5.8	-11.7%
1970	30.1	-5.2%	9.3	5.1	-12.2%
1971	35.4	+17.6%	8.3	5.5	+7.8%
1972	31.0	-12.3%	9.6	4.5	-18.5%
1973	25.3	-18.6%	11.9	3.3	-26.4%
1974	18.3	-27.5%	17.0	2.0	-39.2%
1975	21.8	+19.2%	14.8	1.9	-4.6%
1976	21.6	-1.1%	15.0	1.6	-14.0%
1977	28.2	+30.6%	10.9	1.9	+16.4%
1978	24.4	-13.3%	13.2	1.5	-20.0%
1979	22.2	-9.2%	14.7	1.2	-22.6%
1980	23.5	+6.2%	13.9	1.1	-7.8%
1981	20.7	-12.1%	15.8	0.9	-21.6%
1982	28.2	+36.2%	11.1	1.1	+29.2%
1983	29.5	+4.9%	10.5	1.1	-0.4%
1984	28.5	-3.4%	10.6	1.0	-7.7%
1985	28.7	+0.4%	10.5	1.0	-5.0%
1986	28.8	+0.4%	10.5	0.9	-3.2%
1987	30.6	+6.2%	9.5	1.0	+2.4%
1988	30.6	+0.0%	9.3	0.9	-6.3%
1989	29.4	-3.7%	10.0	0.8	-10.6%
1990	28.1	-4.5%	10.6	0.7	-12.7%
1991	30.4	+8.0%	9.8	0.7	+3.4%
1992	33.0	+8.7%	8.7	0.8	+6.0%
1993	39.4	+19.3%	6.4	0.9	+17.1%
1994	32.2	-18.1%	8.6	0.7	-20.4%
1995	35.5	+10.3%	7.6	0.8	+6.8%
1996	35.7	+0.6%	7.6	0.8	-1.8%
1997	40.0	+11.8%	6.3	0.8	+7.9%
1998	47.4	+18.6%	4.4	0.9	+15.4%
1999	43.4	-8.4%	5.3	0.8	-10.0%
2000	45.2	+4.0%	4.7	0.9	+1.0%
2001	43.4	-3.8%	5.0	0.8	-4.5%
2002	45.5	+4.8%	4.4	0.8	+1.8%
2003	44.1	-3.2%	4.7	0.8	-5.8%
2004	45.2	+2.5%	4.5	0.8	-1.0%
2005	47.0	+3.9%	4.1	0.8	+1.7%
2006	44.8	-4.6%	4.7	0.7	-8.6%
2007	45.1	+0.6%	4.5	0.7	-3.3%
2008	48.8	+8.3%	3.4	0.7	+7.3%
2009	46.4	-5.0%	4.2	0.7	-7.3%
2010	48.7	+5.0%	3.6	0.7	+0.3%

Figure 9: Barclays UK Treasury Bill Index

Year	Treasury Bill Index December		Treasury Bill Index adjusted for cost of living	
1899	100		100	
1900	104	+4.0%	101	+0.6%
1901	107	+2.5%	103	+2.5%
1902	110	+3.0%	103	-0.3%
1903	114	+3.4%	106	+3.4%
1904	117	+2.9%	110	+2.9%
1905	119	+2.2%	112	+2.2%
1906	123	+3.0%	123	+9.9%
1907	128	+3.8%	116	-5.7%
1908	130	+2.2%	115	-0.8%
1909	133	+2.1%	118	+2.1%
1910	137	+3.1%	121	+3.1%
1911	141	+2.8%	121	-0.1%
1912	144	+2.0%	120	-0.8%
1913	148	+3.0%	124	+3.0%
1914	153	+3.0%	127	+3.0%
1915	158	+3.0%	106	-16.6%
1916	162	+3.0%	92	-13.1%
1917	167	+3.0%	79	-14.7%
1918	172	+3.0%	70	-10.5%
1919	179	+3.6%	71	+1.3%
1920	190	+6.5%	64	-11.0%
1921	199	+4.7%	90	+41.5%
1922	204	+2.6%	102	+13.4%
1923	210	+2.7%	107	+4.4%
1924	217	+3.5%	108	+1.2%
1925	226	+4.2%	115	+6.6%
1926	237	+4.6%	119	+3.5%
1927	247	+4.4%	131	+10.5%
1928	257	+4.3%	138	+4.9%
1929	271	+5.4%	146	+6.1%
1930	278	+2.5%	161	+10.5%
1931	289	+3.7%	175	+8.6%
1932	293	+1.5%	184	+5.0%
1933	295	+0.6%	185	+0.6%
1934	297	+0.7%	185	+0.0%
1935	298	+0.5%	182	-1.5%
1936	300	+0.6%	179	-2.1%
1937	302	+0.6%	170	-5.1%
1938	304	+0.6%	175	+3.2%
1939	308	+1.3%	160	-8.6%
1940	311	+1.0%	143	-10.4%
1941	314	+1.0%	140	-2.0%
1942	317	+2.0%	143	+1.5%
1943	320	+1.0%	145	+1.5%
1944	324	+1.0%	145	+0.0%
1945	327	+0.9%	145	-0.1%
1946	328	+0.5%	145	+0.0%
1947	330	+0.5%	141	-2.6%
1948	332	+0.5%	135	-4.2%
1949	333	+0.5%	131	-2.9%
1950	335	+0.5%	128	-2.6%
1951	337	+0.5%	115	-10.3%
1952	344	+2.1%	110	-4.0%
1953	352	+2.4%	111	+1.3%
1954	359	+1.9%	109	-2.0%
1955	371	+3.5%	107	-2.2%

Year	Treasury Bill Index December		Treasury Bill Index adjusted for cost of living	
1956	390	+5.0%	109	+1.9%
1957	409	+5.0%	109	+0.4%
1958	430	+5.1%	113	+3.2%
1959	445	+3.4%	117	+3.4%
1960	467	+5.0%	120	+3.2%
1961	491	+5.1%	121	+0.7%
1962	513	+4.5%	123	+1.8%
1963	533	+3.8%	126	+1.9%
1964	556	+4.4%	125	-0.4%
1965	591	+6.3%	127	+1.7%
1966	627	+6.1%	130	+2.4%
1967	664	+5.9%	135	+3.4%
1968	714	+7.4%	137	+1.4%
1969	770	+7.9%	141	+3.1%
1970	828	+7.5%	140	-0.4%
1971	879	+6.2%	137	-2.6%
1972	927	+5.4%	134	-2.1%
1973	1010	+9.0%	132	-1.4%
1974	1137	+12.6%	125	-5.5%
1975	1259	+10.8%	110	-11.3%
1976	1402	+11.3%	107	-3.2%
1977	1534	+9.4%	104	-2.4%
1978	1658	+8.1%	104	-0.3%
1979	1881	+13.5%	101	-3.2%
1980	2204	+17.2%	102	+1.8%
1981	2507	+13.8%	104	+1.5%
1982	2817	+12.4%	111	+6.6%
1983	3103	+10.1%	116	+4.6%
1984	3399	+9.5%	121	+4.8%
1985	3803	+11.9%	129	+5.8%
1986	4219	+10.9%	137	+7.0%
1987	4624	+9.6%	145	+5.7%
1988	5133	+11.0%	151	+4.0%
1989	5880	+14.6%	161	+6.4%
1990	6812	+15.9%	170	+6.0%
1991	7602	+11.6%	182	+6.8%
1992	8322	+9.5%	194	+6.7%
1993	8810	+5.9%	202	+3.9%
1994	9286	+5.4%	207	+2.4%
1995	9911	+6.7%	214	+3.4%
1996	10522	+6.2%	221	+3.6%
1997	11246	+6.9%	228	+3.1%
1998	12137	+7.9%	240	+5.0%
1999	12805	+5.5%	249	+3.7%
2000	13601	+6.2%	257	+3.2%
2001	14349	+5.5%	269	+4.8%
2002	14939	+4.1%	272	+1.1%
2003	15500	+3.8%	274	+0.9%
2004	16211	+4.6%	277	+1.1%
2005	17022	+5.0%	285	+2.7%
2006	17856	+4.9%	286	+0.4%
2007	18903	+5.9%	291	+1.8%
2008	19891	+5.2%	303	+4.2%
2009	20026	+0.7%	298	-1.7%
2010	20126	+0.5%	286	-4.1%

Figure 10: Barclays UK Index-linked Gilt Index

Year	Index Linked Gilt Price Index December		Real yield %	Money yield %	Index Linked Gilt Price Index adjusted for Cost of Living	
1982	100		2.7	8.3	100	
1983	98.1	-1.9%	3.2	8.7	93.2	-6.8%
1984	101.6	+3.6%	3.3	8.1	92.3	-1.0%
1985	98.5	-3.1%	3.9	9.8	84.6	-8.3%
1986	101.4	+3.0%	4.1	7.9	84.0	-0.7%
1987	105.1	+3.6%	4.0	7.9	84.0	-0.1%
1988	116.0	+10.4%	3.8	10.8	86.8	+3.3%
1989	129.1	+11.3%	3.5	11.5	89.7	+3.3%
1990	130.8	+1.3%	4.0	13.8	83.1	-7.4%
1991	133.2	+1.8%	4.5	9.2	81.0	-2.5%
1992	151.1	+13.4%	3.9	6.6	89.6	+10.6%
1993	177.1	+17.2%	2.9	4.9	103.0	+15.0%
1994	158.3	-10.6%	4.0	7.0	89.5	-13.1%
1995	171.1	+8.1%	3.6	6.9	93.7	+4.7%
1996	176.2	+3.0%	3.6	6.1	94.2	+0.5%
1997	193.4	+9.8%	3.1	6.9	99.8	+5.9%
1998	227.4	+17.6%	2.0	4.8	114.2	+14.4%
1999	233.7	+2.8%	2.2	4.0	115.3	+1.0%
2000	235.4	+0.8%	2.3	5.3	112.9	-2.1%
2001	227.7	-3.3%	2.7	3.4	108.4	-4.0%
2002	240.7	+5.7%	2.1	5.1	111.3	+2.7%
2003	251.9	+4.7%	1.7	4.5	113.3	+1.8%
2004	267.6	+6.3%	1.7	5.3	116.3	+2.7%
2005	286.7	+7.1%	1.5	3.8	121.9	+4.8%
2006	287.0	+0.1%	1.6	6.0	116.9	-4.1%
2007	297.9	+3.8%	1.4	5.5	116.6	-0.3%
2008	290.3	-2.5%	1.4	2.3	112.5	-3.5%
2009	302.5	+4.2%	0.8	3.2	114.5	+1.8%
2010	328.3	+8.5%	0.4	5.2	118.6	+3.6%

Figure 11: Barclays UK Equity, Gilt and Treasury Bill Funds

	Equities				Gilts				Treasury Bills			
Year	Value of Fund December £		Adjusted for Cost of Living		Value of Fund December£		Adjusted for Cost of Living		Value of Fund December £		Adjusted for Cost of Living	
1945	100		100		100		100		100		100	
1946	118	+17.9%	117	+17.3%	111	+10.7%	110	+10.2%	101	+0.5%	100	+0.0%
1947	115	-2.3%	111	-5.3%	95	-14.3%	92	-16.9%	101	+0.5%	97	-2.6%
1948	111	-3.8%	102	-8.3%	96	+0.7%	88	-4.0%	102	+0.5%	93	-4.2%
1949	104	-5.8%	93	-8.9%	87	-8.9%	77	-12.0%	102	+0.5%	91	-2.9%
1950	116	+10.9%	100	+7.4%	91	+4.0%	78	+0.8%	103	+0.5%	88	-2.6%
1951	126	+8.5%	97	-3.1%	82	-9.6%	63	-19.3%	103	+0.5%	79	-10.3%
1952	126	-0.1%	91	-6.1%	81	-0.8%	59	-6.7%	105	+2.1%	76	-4.0%
1953	156	+24.2%	111	+22.9%	93	+14.0%	66	+12.8%	108	+2.4%	77	+1.3%
1954	232	+48.6%	159	+42.9%	98	+6.1%	67	+2.0%	110	+1.9%	75	-2.0%
1955	257	+10.9%	167	+4.8%	88	-10.1%	57	-15.0%	114	+3.5%	74	-2.2%
1956	234	-9.0%	147	-11.7%	85	-3.2%	54	-6.0%	119	+5.0%	75	+1.9%
1957	231	-1.1%	139	-5.5%	80	-6.2%	48	-10.4%	125	+5.0%	75	+0.4%
1958	342	+47.9%	202	+45.2%	94	+17.0%	55	+14.9%	132	+5.1%	78	+3.2%
1959	529	+54.8%	313	+54.8%	95	+0.9%	56	+0.9%	136	+3.4%	81	+3.4%
1960	539	+1.8%	313	-0.1%	88	-7.0%	51	-8.7%	143	+5.0%	83	+3.2%
1961	548	+1.7%	305	-2.5%	81	-8.1%	45	-11.9%	150	+5.1%	84	+0.7%
1962	550	+0.4%	298	-2.2%	101	+24.7%	55	+21.5%	157	+4.5%	85	+1.8%
1963	659	+19.9%	351	+17.7%	105	+3.7%	56	+1.8%	163	+3.8%	87	+1.9%
1964	623	-5.4%	317	-9.8%	102	-2.3%	52	-6.7%	170	+4.4%	87	-0.4%
1965	694	+11.4%	337	+6.6%	107	+4.4%	52	-0.1%	181	+6.3%	88	+1.7%
1966	666	-4.0%	312	-7.4%	111	+4.2%	52	+0.5%	192	+6.1%	90	+2.4%
1967	895	+34.3%	410	+31.1%	114	+2.6%	52	+0.1%	203	+5.9%	93	+3.4%
1968	1326	+48.1%	573	+39.8%	111	-2.4%	48	-7.8%	219	+7.4%	94	+1.4%
1969	1168	-11.9%	482	-15.9%	112	+0.2%	46	-4.2%	236	+7.9%	97	+3.1%
1970	1127	-3.5%	431	-10.5%	116	+3.6%	44	-4.0%	253	+7.5%	97	-0.4%
1971	1652	+46.5%	579	+34.4%	147	+27.3%	52	+16.8%	269	+6.2%	94	-2.6%
1972	1922	+16.4%	626	+8.1%	142	-3.8%	46	-10.7%	284	+5.4%	92	-2.1%
1973	1382	-28.1%	407	-35.0%	129	-8.9%	38	-17.6%	309	+9.0%	91	-1.4%
1974	690	-50.1%	171	-58.1%	109	-15.2%	27	-28.8%	348	+12.6%	86	-5.5%
1975	1719	+149.3%	341	+99.6%	150	+36.8%	30	+9.5%	386	+10.8%	76	-11.3%
1976	1759	+2.3%	303	-11.1%	170	+13.7%	29	-1.1%	429	+11.3%	74	-3.2%
1977	2614	+48.6%	401	+32.5%	247	+44.8%	38	+29.1%	470	+9.4%	72	-2.4%
1978	2839	+8.6%	402	+0.2%	242	-1.8%	34	-9.4%	508	+8.1%	72	-0.3%
1979	3165	+11.5%	382	-4.9%	252	+4.1%	30	-11.2%	576	+13.5%	70	-3.2%
1980	4268	+34.8%	448	+17.1%	305	+20.9%	32	+5.0%	675	+17.2%	71	+1.8%
1981	4846	+13.6%	454	+1.3%	310	+1.8%	29	-9.2%	768	+13.8%	72	+1.5%
1982	6227	+28.5%	553	+21.9%	469	+51.3%	42	+43.6%	863	+12.4%	77	+6.6%
1983	8019	+28.8%	676	+22.3%	544	+15.9%	46	+10.0%	950	+10.1%	80	+4.6%
1984	10552	+31.6%	851	+25.8%	581	+6.8%	47	+2.1%	1041	+9.6%	84	+4.8%
1985	12680	+20.2%	968	+13.7%	644	+11.0%	49	+5.0%	1165	+11.9%	89	+5.8%
1986	16139	+27.3%	1188	+22.7%	715	+11.0%	53	+7.0%	1292	+10.9%	95	+7.0%
1987	17536	+8.7%	1244	+4.8%	831	+16.3%	59	+12.1%	1416	+9.6%	100	+5.7%
1988	19552	+11.5%	1299	+4.4%	909	+9.4%	60	+2.4%	1572	+11.0%	104	+4.0%
1989	26498	+35.5%	1635	+25.8%	963	+5.9%	59	-1.7%	1801	+14.6%	111	+6.4%

Year	Equities				Gilts				Treasury Bills			
	Value of Fund December £		Adjusted for Cost of Living		Value of Fund December£		Adjusted for Cost of Living		Value of Fund December £		Adjusted for Cost of Living	
1990	23947	-9.6%	1351	-17.4%	1017	+5.6%	57	-3.4%	2086	+15.9%	118	+6.0%
1991	28936	+20.8%	1563	+15.7%	1209	+18.9%	65	+13.8%	2328	+11.6%	126	+6.8%
1992	34672	+19.8%	1826	+16.8%	1432	+18.4%	75	+15.4%	2549	+9.5%	134	+6.7%
1993	44207	+27.5%	2285	+25.1%	1844	+28.8%	95	+26.4%	2698	+5.9%	139	+3.9%
1994	41590	-5.9%	2089	-8.6%	1635	-11.3%	82	-13.8%	2844	+5.4%	143	+2.4%
1995	51163	+23.0%	2490	+19.2%	1945	+19.0%	95	+15.3%	3035	+6.7%	148	+3.4%
1996	59275	+15.9%	2815	+13.1%	2095	+7.7%	100	+5.1%	3222	+6.2%	153	+3.6%
1997	73263	+23.6%	3358	+19.3%	2503	+19.4%	115	+15.3%	3444	+6.9%	158	+3.1%
1998	83284	+13.7%	3715	+10.6%	3129	+25.0%	140	+21.7%	3717	+7.9%	166	+5.0%
1999	103120	+23.8%	4520	+21.7%	3018	-3.5%	132	-5.2%	3921	+5.5%	172	+3.7%
2000	97023	-5.9%	4132	-8.6%	3296	+9.2%	140	+6.1%	4165	+6.2%	177	+3.2%
2001	84226	-13.2%	3562	-13.8%	3340	+1.3%	141	+0.6%	4394	+5.5%	186	+4.8%
2002	65440	-22.3%	2689	-24.5%	3668	+9.8%	151	+6.7%	4575	+4.1%	188	+1.1%
2003	78643	+20.2%	3143	+16.9%	3725	+1.6%	149	-1.2%	4747	+3.8%	190	+0.9%
2004	88508	+12.5%	3418	+8.8%	3994	+7.2%	154	+3.6%	4964	+4.6%	192	+1.1%
2005	107609	+21.6%	4066	+18.9%	4329	+8.4%	164	+6.0%	5213	+5.0%	197	+2.7%
2006	125243	+16.4%	4531	+11.4%	4323	-0.1%	156	-4.4%	5468	+4.9%	198	+0.4%
2007	131639	+5.1%	4577	+1.0%	4550	+5.2%	158	+1.2%	5789	+5.9%	201	+1.8%
2008	92460	-29.8%	3185	-30.4%	5135	+12.9%	177	+11.8%	6091	+5.2%	210	+4.2%
2009	119238	+29.0%	4011	+25.9%	5087	-1.0%	171	-3.3%	6133	+0.7%	206	-1.7%
2010	136107	+14.1%	4370	+8.9%	5565	+9.4%	179	+4.4%	6163	+0.5%	198	-4.1%

Note: Original Investment of £100 December 1945, gross income reinvested.

Figure 12: Barclays UK Treasury Bills and Building Society Accounts

Year	Treasury Bills Annual Return %	Building Society Acc. Annual Rate of Interest	Basic Rate Income Tax Calendar Year Average	Year	Treasury Bills Annual Return %	Building Society Acc. Annual rate of Interest	Basic Rate Income Tax Calendar Year Average
				1980	17.17	15.00	30.00
				1981	13.76	12.94	30.00
				1982	12.38	12.19	30.00
				1983	10.14	9.64	30.00
				1984	9.55	9.99	30.00
				1985	11.87	10.81	30.00
1946	0.51	6.51	46.25	1986	10.95	10.55	29.26
1947	0.51	6.36	45.00	1987	9.58	9.66	27.50
1948	0.51	6.36	45.00	1988	11.01	8.26	25.50
1949	0.52	6.36	45.00	1989	14.55	10.71	25.00
1950	0.52	6.36	45.00	1990	15.86	12.04	25.00
1951	0.52	4.82	46.88	1991	11.59	9.32	25.00
1952	2.09	4.65	47.50	1992	9.47	9.59	24.68
1953	2.36	4.60	45.62	1993	5.86	4.12	24.50
1954	1.89	4.55	45.00	1994	5.40	3.69	20.00
1955	3.50	4.69	43.12	1995	6.74	3.93	20.00
1956	5.02	5.44	42.50	1996	6.16	2.61	20.00
1957	5.01	6.09	42.50	1997	6.88	3.06	20.00
1958	5.11	6.09	42.50	1998	7.92	7.06	20.00
1959	3.42	5.59	39.69	1999	5.51	5.11	23.00
1960	5.04	5.52	38.75	2000	6.22	5.50	22.00
1961	5.14	5.81	38.75	2001	5.50	4.70	22.00
1962	4.46	6.12	38.75	2002	4.12	3.40	22.00
1963	3.80	5.81	38.75	2003	3.75	3.33	22.00
1964	4.40	5.71	38.75	2004	4.59	4.21	22.00
1965	6.29	6.50	40.62	2005	5.00	3.95	22.00
1966	6.12	6.81	41.25	2006	4.90	4.36	22.00
1967	5.90	7.23	41.25	2007	5.87	4.77	22.00
1968	7.43	7.52	41.25	2008	5.23	0.85	20.00
1969	7.93	8.29	41.25	2009	0.68	0.25	20.00
1970	7.45	8.51	41.25	2010	0.50	0.20	20.00
1971	6.18	8.25	39.38				
1972	5.42	8.16	38.75				
1973	9.01	9.70	32.19				
1974	12.56	11.07	32.25				
1975	10.75	11.01	34.50				
1976	11.34	10.65	35.00				
1977	9.44	10.65	34.25				
1978	8.06	9.42	33.25				
1979	13.45	12.22	30.75				

Note:
1. Annual returns on treasury bills are based on four consecutive investments in 91-day bills.
2. The building society rate of interest above is gross of tax.

Figure 13: Barclays Index-linked Funds

	Index Linked gilts			
	Value of Fund December £		Adjusted for Cost of Living	
1982	100		100	
1983	101	+0.8%	96	-4.3%
1984	107	+6.6%	98	+1.9%
1985	107	-0.2%	92	-5.5%
1986	114	+6.1%	94	+2.3%
1987	122	+6.9%	97	+3.1%
1988	138	+13.7%	103	+6.5%
1989	158	+14.5%	110	+6.3%
1990	165	+4.4%	105	-4.5%
1991	174	+5.2%	106	+0.7%
1992	204	+17.1%	121	+14.1%
1993	247	+21.1%	144	+18.9%
1994	227	-7.9%	128	-10.5%
1995	254	+12.0%	139	+8.5%
1996	271	+6.5%	145	+4.0%
1997	307	+13.4%	158	+9.4%
1998	369	+20.3%	186	+17.1%
1999	388	+5.0%	191	+3.2%
2000	400	+3.1%	192	+0.1%
2001	396	-0.9%	189	-1.6%
2002	428	+8.2%	198	+5.1%
2003	457	+6.8%	206	+3.9%
2004	497	+8.6%	216	+4.9%
2005	542	+9.1%	231	+6.7%
2006	554	+2.3%	226	-2.1%
2007	585	+5.5%	229	+1.4%
2008	578	-1.2%	224	-2.1%
2009	610	+5.6%	231	+3.1%
2010	673	+10.3%	243	+5.3%

Figure 14: Barclays US Equity Index

Year	Equity Price Index December		Equity Income Index December		Income Yield %	Equity Price Index Adjusted for Cost of Living		Equity Income Index Adjusted for Cost of Living	
1925	100					100			
1926	104	+4.2%	100		5.5	105	+5.4%	100	
1927	133	+27.3%	143	+43.3%	6.2	137	+30.2%	146.5985	+46.6%
1928	177	+33.7%	167	+16.4%	5.4	186	+35.2%	172.6287	+17.8%
1929	145	-18.2%	79	-52.4%	3.1	151	-18.6%	81.75549	-52.6%
1930	99	-32.1%	56	-29.3%	3.3	110	-27.4%	61.78934	-24.4%
1931	52	-47.7%	30	-47.1%	3.3	63	-42.3%	36.06677	-41.6%
1932	44	-14.5%	47	+56.7%	6.0	60	-4.7%	62.9825	+74.6%
1933	67	+51.1%	75	+60.6%	6.4	90	+49.9%	100.3819	+59.4%
1934	67	+0.1%	49	-34.7%	4.2	89	-1.4%	64.56871	-35.7%
1935	93	+39.0%	95	+94.2%	5.9	120	+35.0%	121.7487	+88.6%
1936	117	+26.5%	116	+21.8%	5.6	150	+24.7%	146.1842	+20.1%
1937	73	-38.1%	44	-61.9%	3.5	90	-39.8%	54.1931	-62.9%
1938	89	+22.7%	84	+91.5%	5.4	114	+26.2%	106.7559	+97.0%
1939	87	-2.6%	72	-14.6%	4.8	111	-2.6%	91.22098	-14.6%
1940	76	-12.7%	69	-3.8%	5.2	96	-13.3%	87.12327	-4.5%
1941	64	-15.7%	68	-2.0%	6.1	74	-23.3%	77.67114	-10.8%
1942	69	+8.7%	93	+36.3%	7.6	73	-0.3%	97.0832	+25.0%
1943	84	+21.7%	94	+1.7%	6.4	87	+18.2%	95.92084	-1.2%
1944	97	+15.5%	100	+6.3%	5.9	98	+12.9%	99.67736	+3.9%
1945	129	+32.9%	125	+24.5%	5.5	127	+30.0%	121.3657	+21.8%
1946	117	-9.7%	78	-37.4%	3.8	97	-23.6%	64.27848	-47.0%
1947	114	-2.2%	112	+43.3%	5.6	87	-10.2%	84.6293	+31.7%
1948	110	-3.9%	120	+7.1%	6.2	82	-6.7%	88.02723	+4.0%
1949	123	+12.1%	172	+43.1%	8.0	93	+14.5%	128.6618	+46.2%
1950	149	+21.3%	227	+32.3%	8.7	107	+14.5%	160.7312	+24.9%
1951	171	+14.2%	199	-12.3%	6.7	115	+7.7%	132.9688	-17.3%
1952	183	+7.4%	190	-4.6%	5.9	123	+6.6%	125.9675	-5.3%
1953	174	-5.1%	165	-13.4%	5.4	116	-5.8%	108.3046	-14.0%
1954	249	+43.1%	307	+86.4%	7.0	167	+44.2%	203.3685	+87.8%
1955	299	+20.3%	263	-14.4%	5.0	200	+19.8%	173.4251	-14.7%
1956	312	+4.3%	230	-12.5%	4.2	202	+1.2%	147.3988	-15.0%
1957	268	-14.1%	175	-24.0%	3.7	169	-16.5%	108.8595	-26.1%
1958	374	+39.3%	361	+106.4%	5.5	231	+36.9%	220.8343	+102.9%
1959	407	+9.0%	255	-29.3%	3.6	248	+7.2%	153.5392	-30.5%
1960	398	-2.2%	237	-7.2%	3.4	239	-3.6%	140.5374	-8.5%
1961	491	+23.3%	313	+32.3%	3.6	293	+22.5%	184.6736	+31.4%
1962	426	-13.3%	222	-29.2%	3.0	251	-14.4%	129.1071	-30.1%
1963	499	+17.1%	330	+49.0%	3.8	289	+15.2%	189.2013	+46.5%
1964	563	+12.8%	340	+2.9%	3.5	323	+11.8%	192.8581	+1.9%
1965	624	+11.0%	370	+9.0%	3.4	351	+8.9%	206.2102	+6.9%
1966	551	-11.7%	289	-22.1%	3.0	300	-14.6%	155.3255	-24.7%
1967	688	+24.7%	462	+60.1%	3.8	363	+21.0%	241.2677	+55.3%
1968	763	+10.9%	433	-6.2%	3.2	385	+5.9%	216.1173	-10.4%
1969	660	-13.5%	309	-28.8%	2.7	313	-18.6%	144.948	-32.9%

Year	Equity Price Index December		Equity Income Index December		Income Yield %	Equity Price Index Adjusted for Cost of Living		Equity Income Index Adjusted for Cost of Living	
1970	637	-3.4%	388	+25.6%	3.5	287	-8.5%	172.5109	+19.0%
1971	719	+12.8%	426	+9.7%	3.4	313	+9.2%	183.3158	+6.3%
1972	822	+14.3%	443	+4.1%	3.1	346	+10.5%	184.6129	+0.7%
1973	647	-21.2%	275	-38.0%	2.4	251	-27.5%	105.2256	-43.0%
1974	446	-31.1%	244	-11.3%	3.1	154	-38.6%	83.07757	-21.0%
1975	588	+31.8%	570	+134.1%	5.5	190	+23.3%	181.8333	+118.9%
1976	717	+21.9%	609	+6.8%	4.9	221	+16.3%	185.2142	+1.9%
1977	665	-7.3%	503	-17.5%	4.3	192	-13.1%	143.2858	-22.6%
1978	687	+3.3%	631	+25.6%	5.3	182	-5.3%	165.0508	+15.2%
1979	812	+18.3%	870	+37.8%	6.1	190	+4.4%	200.7895	+21.7%
1980	1033	+27.1%	1104	+26.9%	6.1	214	+13.0%	226.4601	+12.8%
1981	947	-8.4%	724	-34.5%	4.4	180	-15.9%	136.2508	-39.8%
1982	1081	+14.2%	1168	+61.5%	6.2	198	+10.0%	211.8722	+55.5%
1983	1275	+17.9%	1062	-9.1%	4.8	225	+13.6%	185.5656	-12.4%
1984	1260	-1.1%	950	-10.5%	4.3	214	-4.9%	159.712	-13.9%
1985	1594	+26.5%	1380	+45.2%	4.9	261	+21.8%	223.4314	+39.9%
1986	1781	+11.8%	1176	-14.8%	3.8	289	+10.6%	188.3505	-15.7%
1987	1757	-1.4%	980	-16.7%	3.2	273	-5.5%	150.3112	-20.2%
1988	1985	+13.0%	1589	+62.2%	4.6	295	+8.2%	233.4435	+55.3%
1989	2462	+24.0%	1897	+19.4%	4.4	350	+18.5%	266.3303	+14.1%
1990	2231	-9.4%	1291	-32.0%	3.3	298	-14.6%	170.7964	-35.9%
1991	2892	+29.6%	2029	+57.1%	4.0	375	+25.8%	260.3902	+52.5%
1992	3069	+6.1%	1583	-22.0%	2.9	387	+3.1%	197.4137	-24.2%
1993	3339	+8.8%	1630	+3.0%	2.8	410	+5.9%	197.8275	+0.2%
1994	3230	-3.3%	1427	-12.4%	2.5	386	-5.8%	168.7149	-14.7%
1995	4279	+32.5%	2368	+66.0%	3.2	499	+29.2%	273.0742	+61.9%
1996	5082	+18.8%	2142	-9.5%	2.4	574	+14.9%	239.0757	-12.5%
1997	6513	+28.2%	2465	+15.1%	2.2	723	+26.0%	270.4523	+13.1%
1998	7850	+20.5%	2413	-2.1%	1.8	857	+18.6%	260.5785	-3.7%
1999	9707	+23.7%	2748	+13.9%	1.6	1032	+20.4%	289.0536	+10.9%
2000	8536	-12.1%	1460	-46.9%	1.0	878	-14.9%	148.505	-48.6%
2001	7474	-12.4%	1538	+5.4%	1.2	757	-13.8%	154.107	+3.8%
2002	5821	-22.1%	1292	-16.0%	1.3	576	-23.9%	126.3737	-18.0%
2003	7613	+30.8%	3140	+143.1%	2.4	739	+28.4%	301.5195	+138.6%
2004	8439	+10.8%	3178	+1.2%	2.2	794	+7.4%	295.6017	-2.0%
2005	8895	+5.4%	2999	-5.6%	1.9	809	+1.9%	269.7308	-8.8%
2006	10145	+14.0%	3835	+27.9%	2.2	900	+11.2%	336.3746	+24.7%
2007	10678	+5.3%	3772	-1.7%	2.0	910	+1.1%	317.8441	-5.5%
2008	6443	-39.67%	1623	-56.98%	1.4	549	-39.72%	136.6126	-57.02%
2009	8255	+28.13%	4631	+185.41%	3.2	684	+24.74%	379.5804	+177.85%
2010	9524	+15.39%	4135	-10.68%	2.5	778	+13.69%	333.9069	-12.00%

Figure 15: Barclays US Bond Index

Year	Bond Price Index December		Yield %	Bond Price Index adjusted for Cost of Living	
1925	100			100	
1926	104	+3.9%	3.5	105	+5.1%
1927	110	+5.4%	3.2	113	+7.8%
1928	106	-3.1%	3.4	111	-2.0%
1929	106	-0.2%	3.4	110	-0.8%
1930	107	+1.3%	3.3	119	+8.2%
1931	98	-8.5%	4.1	120	+0.9%
1932	111	+12.9%	3.2	151	+25.8%
1933	107	-3.1%	3.4	146	-3.9%
1934	115	+6.8%	2.9	153	+5.2%
1935	117	+2.1%	2.8	152	-0.8%
1936	122	+4.6%	2.6	157	+3.1%
1937	119	-2.5%	2.7	148	-5.2%
1938	123	+2.8%	2.5	157	+5.8%
1939	127	+3.5%	2.3	163	+3.5%
1940	132	+3.8%	1.9	167	+3.0%
1941	131	-1.0%	2.0	151	-10.0%
1942	131	+0.7%	2.4	139	-7.6%
1943	131	-0.4%	2.5	135	-3.3%
1944	131	+0.3%	2.4	132	-1.9%
1945	142	+8.1%	2.0	140	+5.8%
1946	139	-2.4%	2.1	115	-17.4%
1947	132	-4.9%	2.4	101	-12.6%
1948	133	+0.9%	2.4	99	-2.0%
1949	138	+4.0%	2.1	105	+6.2%
1950	135	-2.3%	2.2	97	-7.8%
1951	127	-6.3%	2.7	86	-11.6%
1952	125	-1.4%	2.8	84	-2.1%
1953	126	+0.9%	2.7	84	+0.2%
1954	131	+4.1%	2.6	88	+4.9%
1955	126	-3.6%	3.0	84	-4.0%
1956	115	-9.1%	3.4	75	-11.7%
1957	120	+4.7%	3.2	76	+1.8%
1958	110	-8.4%	3.8	68	-10.0%
1959	103	-6.4%	4.4	63	-8.0%
1960	112	+9.0%	3.8	68	+7.5%
1961	109	-3.4%	4.0	65	-4.0%
1962	113	+4.0%	3.8	67	+2.6%
1963	108	-4.3%	4.1	63	-5.8%
1964	109	+0.4%	4.1	62	-0.6%
1965	104	-3.9%	4.4	59	-5.7%
1966	104	+0.0%	4.5	57	-3.3%
1967	94	-9.9%	5.2	50	-12.6%
1968	89	-14.9%	5.7	45	-21.1%
1969	79	-11.1%	6.6	37	-16.3%

Year	Bond Price Index December		Yield %	Bond Price Index adjusted for Cost of Living	
1970	85	+7.0%	6.2	38	+1.4%
1971	95	+12.2%	4.5	41	+8.6%
1972	96	+1.3%	4.5	40	-2.1%
1973	88	-8.8%	7.1	34	-16.1%
1974	84	-3.8%	7.7	29	-14.4%
1975	83	-1.7%	7.7	27	-8.0%
1976	91	+9.8%	6.9	28	+4.7%
1977	86	-6.0%	7.5	25	-11.9%
1978	77	-10.3%	8.8	20	-17.7%
1979	69	-10.0%	9.9	16	-20.5%
1980	60	-13.3%	11.6	12	-22.9%
1981	53	-11.5%	13.7	10	-18.7%
1982	65	+23.3%	10.5	12	+18.8%
1983	59	-9.4%	11.6	10	-12.7%
1984	61	+2.5%	11.3	10	-1.4%
1985	72	+18.7%	9.3	12	+14.3%
1986	84	+16.1%	7.6	14	+14.8%
1987	75	-11.0%	8.8	12	-14.8%
1988	74	-0.6%	8.8	11	-4.8%
1989	81	+9.5%	7.9	12	+4.6%
1990	79	-2.8%	8.2	11	-8.4%
1991	86	+9.1%	7.3	11	+5.9%
1992	86	-0.3%	7.3	11	-3.1%
1993	93	+8.8%	6.4	11	+5.9%
1994	80	-14.3%	7.9	10	-16.5%
1995	97	+21.1%	5.9	11	+18.1%
1996	90	-7.0%	6.6	10	-10.0%
1997	97	+7.7%	5.9	11	+5.9%
1998	103	+6.1%	5.3	11	+4.4%
1999	88	-14.5%	6.7	9	-16.8%
2000	100	+13.3%	5.5	10	+9.6%
2001	98	-2.1%	5.7	10	-3.6%
2002	108	+10.5%	4.8	11	+7.9%
2003	105	-2.9%	5.0	10	-4.7%
2004	107	+2.4%	4.8	10	-0.8%
2005	110	+2.2%	4.6	10	-1.2%
2006	105	-4.1%	4.8	9	-6.5%
2007	109	+4.1%	4.5	9	-0.0%
2008	131	+19.8%	3.1	11	+19.7%
2009	107	-17.9%	4.5	9	-20.1%
2010	113	+4.8%	4.1	9	+3.3%

Figure 16: Barclays US Treasury Bill Index

Year	Treasury Bill Index December		Treasury Bill Index adjusted for Cost of Living	
1925	100		100	
1926	103	+3.2%	104	+4.4%
1927	106	+3.1%	110	+5.5%
1928	110	+3.8%	116	+5.0%
1929	116	+4.7%	120	+4.1%
1930	118	+2.3%	132	+9.3%
1931	120	+1.0%	147	+11.4%
1932	121	+0.8%	165	+12.3%
1933	121	+0.3%	164	-0.5%
1934	121	+0.2%	162	-1.3%
1935	121	+0.2%	157	-2.7%
1936	122	+0.2%	155	-1.3%
1937	122	+0.3%	152	-2.5%
1938	122	+0.0%	156	+2.9%
1939	122	+0.0%	156	+0.0%
1940	122	-0.1%	155	-0.8%
1941	122	+0.0%	141	-9.0%
1942	122	+0.3%	130	-8.0%
1943	123	+0.3%	126	-2.5%
1944	123	+0.3%	124	-1.9%
1945	124	+0.3%	121	-1.9%
1946	124	+0.4%	103	-15.1%
1947	125	+0.5%	95	-7.7%
1948	126	+1.0%	93	-2.0%
1949	127	+1.1%	96	+3.2%
1950	129	+1.2%	92	-4.5%
1951	131	+1.5%	88	-4.3%
1952	133	+1.6%	89	+0.9%
1953	135	+1.8%	90	+1.0%
1954	136	+0.9%	91	+1.6%
1955	138	+1.6%	92	+1.2%
1956	142	+2.4%	92	-0.5%
1957	146	+3.1%	92	+0.2%
1958	148	+1.4%	92	-0.3%
1959	152	+2.8%	93	+1.1%
1960	156	+2.6%	94	+1.2%
1961	160	+2.2%	95	+1.5%
1962	164	+2.7%	97	+1.4%
1963	169	+3.2%	98	+1.5%
1964	175	+3.5%	101	+2.5%
1965	182	+4.0%	103	+2.0%
1966	191	+4.7%	104	+1.2%
1967	199	+4.1%	105	+1.1%
1968	209	+9.7%	105	+0.5%
1969	223	+6.6%	106	+0.4%

Year	Treasury Bill Index December		Treasury Bill Index adjusted for Cost of Living	
1970	237	+6.4%	107	+0.8%
1971	247	+4.3%	108	+1.0%
1972	257	+3.9%	108	+0.5%
1973	275	+7.1%	107	-1.5%
1974	297	+8.1%	103	-3.8%
1975	315	+5.8%	102	-1.0%
1976	331	+5.2%	102	+0.3%
1977	348	+5.2%	100	-1.5%
1978	373	+7.3%	99	-1.6%
1979	413	+10.7%	96	-2.3%
1980	461	+11.5%	96	-0.9%
1981	529	+14.9%	101	+5.4%
1982	586	+10.7%	107	+6.6%
1983	638	+8.8%	113	+4.9%
1984	701	+10.0%	119	+5.8%
1985	755	+7.7%	124	+3.7%
1986	801	+6.1%	130	+4.9%
1987	844	+5.4%	131	+0.9%
1988	897	+6.3%	133	+1.8%
1989	971	+8.2%	138	+3.4%
1990	1046	+7.7%	140	+1.5%
1991	1103	+5.5%	143	+2.4%
1992	1141	+3.4%	144	+0.5%
1993	1174	+2.9%	144	+0.1%
1994	1219	+3.9%	146	+1.2%
1995	1287	+5.5%	150	+2.9%
1996	1353	+5.1%	153	+1.8%
1997	1422	+5.1%	158	+3.3%
1998	1490	+4.8%	163	+3.1%
1999	1558	+4.6%	166	+1.8%
2000	1647	+5.8%	169	+2.3%
2001	1710	+3.8%	173	+2.2%
2002	1738	+1.6%	172	-0.7%
2003	1755	+1.0%	170	-0.8%
2004	1776	+1.2%	167	-2.0%
2005	1829	+3.0%	166	-0.4%
2006	1916	+4.8%	170	+2.2%
2007	2006	+4.7%	171	+0.6%
2008	2036	+1.5%	173	+1.4%
2009	2038	+0.1%	169	-2.6%
2010	2040	+0.1%	167	-1.4%

CHAPTER 9

Total investment returns

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Our final chapter presents a series of tables showing the performance of equity and fixed-interest investments over any period of years since December 1899.

The first section reviews the performance of each asset class taking inflation into account. The second section reviews the performance over the past 50 years since December 1960. On each page we provide two tables illustrating the same information in alternative forms. The first table shows the average annual real rate of return; the second shows the real value of a portfolio at the end of each year, which includes reinvested income. This section provides data on equities and gilts, with dividend income reinvested gross. Finally, we provide figures for Treasury bills and building society shares.

The final pullout section provides the annual real rate of return on both UK and US equities and bonds with reinvestment of income for each year since 1899 for the UK, and 1925 for the US). There is also a table showing the real capital value of equities for the UK. Source for all data in this chapter are the Barclays indices as outlined in Chapter 8.

1960-2010

- Equities – income gross
- Gilts – income gross
- Treasury Bills – income gross
- Building Society Shares – income gross
- Index-linked gilts
- Corporate bonds

UK: 1899-2010
US: 1925-2010

- UK and US real bond returns – income gross
- UK and US real equities returns – income gross
- UK Equities – real capital value

REAL RETURN ON EQUITIES - GROSS INCOME RE-INVESTED
AVERAGE ANNUAL REAL RATE OF RETURN

INVESTMENT FROM END YEAR

	1960	1961	1962	1963	1964	1965	1966	1967	1968	1969	1970	1971	1972	1973	1974	1975	1976	1977	1978	1979	1980	1981	1982	1983	1984
1961	(2.5)																								
1962	(2.4)	(2.2)																							
1963	3.9	7.3	17.7																						
1964	0.3	1.3	3.0	(9.8)																					
1965	1.5	2.6	4.2	(1.9)	6.6																				
1966	(0.0)	0.5	1.2	(3.8)	(0.7)	(7.4)																			
1967	3.9	5.0	6.6	3.9	9.0	10.2	31.1																		
1968	7.8	9.4	11.5	10.3	16.0	19.3	35.4	39.8																	
1969	4.9	5.9	7.1	5.4	8.8	9.3	15.5	8.5	(15.9)																
1970	3.3	3.9	4.7	3.0	5.3	5.0	8.4	1.7	(13.2)	(10.5)															
1971	5.8	6.6	7.7	6.5	9.0	9.4	13.2	9.1	0.4	9.7	34.4														
1972	6.0	6.8	7.7	6.7	8.9	9.2	12.3	8.9	2.3	9.1	20.5	8.1													
1973	2.1	2.4	2.9	1.5	2.8	2.4	3.9	(0.1)	(6.6)	(4.1)	(1.9)	(16.2)	(35.0)												
1974	(4.2)	(4.4)	(4.5)	(6.3)	(6.0)	(7.3)	(7.3)	(11.8)	(18.3)	(18.7)	(20.7)	(33.5)	(47.8)	(58.1)											
1975	0.6	0.8	1.0	(0.2)	0.7	0.1	1.0	(2.3)	(7.2)	(5.6)	(4.6)	(12.4)	(18.4)	(8.6)	99.6										
1976	(0.2)	(0.0)	0.1	(1.1)	(0.4)	(1.0)	(0.3)	(3.3)	(7.7)	(6.4)	(5.7)	(12.2)	(16.6)	(9.4)	33.2	(11.1)									
1977	1.5	1.7	2.0	1.0	1.8	1.5	2.3	(0.2)	(3.9)	(2.3)	(1.0)	(5.9)	(8.5)	(0.4)	33.0	8.5	32.5								
1978	1.4	1.6	1.9	0.9	1.7	1.4	2.1	(0.2)	(3.5)	(2.0)	(0.9)	(5.1)	(7.1)	(0.3)	23.9	5.7	15.2	0.2							
1979	1.1	1.3	1.5	0.5	1.3	0.9	1.6	(0.6)	(3.6)	(2.3)	(1.3)	(5.1)	(6.8)	(1.1)	17.5	2.9	8.1	(2.4)	(4.9)						
1980	1.8	2.0	2.3	1.4	2.2	1.9	2.6	0.7	(2.0)	(0.7)	0.4	(2.8)	(4.1)	1.4	17.4	5.6	10.3	3.7	5.5	17.1					
1981	1.8	2.0	2.2	1.4	2.1	1.9	2.5	0.7	(1.8)	(0.5)	0.5	(2.4)	(3.5)	1.4	15.0	4.9	8.4	3.1	4.1	8.9	1.3				
1982	2.6	2.9	3.1	2.4	3.2	3.0	3.6	2.0	(0.2)	1.1	2.1	(0.4)	(1.2)	3.5	15.8	7.2	10.6	6.6	8.3	13.1	11.1	21.9			
1983	3.4	3.7	4.0	3.3	4.1	3.9	4.6	3.2	1.1	2.5	3.5	1.3	0.7	5.2	16.5	9.0	12.2	9.1	11.0	15.3	14.7	22.1	22.3		
1984	4.3	4.6	4.9	4.3	5.1	5.0	5.7	4.4	2.5	3.9	5.0	3.0	2.6	6.9	17.4	10.7	13.8	11.3	13.3	17.4	17.4	23.3	24.0	25.8	
1985	4.6	4.9	5.3	4.7	5.5	5.4	6.1	4.9	3.1	4.5	5.5	3.7	3.4	7.5	17.1	11.0	13.8	11.6	13.4	16.7	16.7	20.8	20.5	19.6	13.7
1986	5.3	5.6	5.9	5.4	6.2	6.2	6.9	5.8	4.1	5.4	6.5	4.9	4.7	8.6	17.5	12.0	14.6	12.8	14.5	17.6	17.7	21.2	21.0	20.6	18.1
1987	5.2	5.6	5.9	5.4	6.1	6.1	6.8	5.7	4.2	5.4	6.4	4.9	4.7	8.3	16.5	11.4	13.7	12.0	13.4	15.9	15.7	18.3	17.6	16.5	13.5
1988	5.2	5.5	5.8	5.4	6.1	6.0	6.7	5.7	4.2	5.4	6.3	4.9	4.7	8.0	15.6	10.9	12.9	11.3	12.4	14.6	14.2	16.2	15.3	13.9	11.2
1989	5.9	6.2	6.5	6.1	6.8	6.8	7.5	6.5	5.1	6.3	7.3	5.9	5.8	9.1	16.3	11.9	13.9	12.4	13.6	15.6	15.5	17.4	16.7	15.8	13.9
1990	5.0	5.3	5.5	5.1	5.7	5.7	6.3	5.3	4.0	5.0	5.9	4.6	4.4	7.3	13.8	9.6	11.3	9.8	10.6	12.2	11.7	12.9	11.8	10.4	8.0
1991	5.3	5.6	5.9	5.5	6.1	6.1	6.7	5.7	4.5	5.5	6.3	5.1	4.9	7.8	13.9	10.0	11.6	10.2	11.0	12.4	12.0	13.2	12.2	11.0	9.1
1992	5.7	5.9	6.2	5.9	6.5	6.5	7.0	6.2	5.0	6.0	6.8	5.6	5.5	8.2	14.1	10.4	11.9	10.6	11.4	12.8	12.4	13.5	12.7	11.7	10.0
1993	6.2	6.5	6.8	6.4	7.1	7.1	7.6	6.8	5.7	6.7	7.5	6.4	6.4	9.0	14.6	11.2	12.6	11.5	12.3	13.6	13.4	14.4	13.8	12.9	11.6
1994	5.7	6.0	6.3	5.9	6.5	6.5	7.0	6.2	5.1	6.0	6.8	5.7	5.6	8.1	13.3	10.0	11.3	10.2	10.8	12.0	11.6	12.5	11.7	10.8	9.4
1995	6.1	6.4	6.6	6.3	6.9	6.9	7.4	6.7	5.6	6.5	7.3	6.3	6.2	8.6	13.6	10.5	11.7	10.7	11.3	12.4	12.1	12.9	12.3	11.5	10.2
1996	6.3	6.6	6.8	6.5	7.1	7.1	7.6	6.9	5.9	6.8	7.5	6.5	6.5	8.8	13.6	10.6	11.8	10.8	11.4	12.5	12.2	12.9	12.3	11.6	10.5
1997	6.6	6.9	7.2	6.9	7.4	7.4	8.0	7.3	6.3	7.2	7.9	7.0	6.9	9.2	13.8	11.0	12.1	11.2	11.8	12.8	12.6	13.3	12.8	12.1	11.1
1998	6.7	7.0	7.3	7.0	7.5	7.5	8.0	7.4	6.4	7.3	8.0	7.1	7.1	9.2	13.7	10.9	12.1	11.2	11.8	12.7	12.5	13.2	12.6	12.0	11.1
1999	7.1	7.4	7.6	7.4	7.9	7.9	8.4	7.8	6.9	7.7	8.4	7.6	7.6	9.7	14.0	11.4	12.5	11.6	12.2	13.1	12.9	13.6	13.2	12.6	11.8
2000	6.7	6.9	7.2	6.9	7.4	7.4	7.9	7.3	6.4	7.2	7.8	7.0	7.0	9.0	13.0	10.5	11.5	10.7	11.2	12.0	11.8	12.3	11.8	11.2	10.4
2001	6.1	6.3	6.6	6.3	6.8	6.8	7.2	6.6	5.7	6.5	7.0	6.2	6.2	8.1	11.9	9.4	10.4	9.5	9.9	10.7	10.4	10.9	10.3	9.7	8.8
2002	5.3	5.5	5.7	5.4	5.8	5.8	6.2	5.5	4.7	5.3	5.9	5.1	5.0	6.7	10.3	8.0	8.8	7.9	8.2	8.8	8.5	8.8	8.2	7.5	6.6
2003	5.5	5.7	5.9	5.6	6.1	6.0	6.4	5.8	5.0	5.7	6.2	5.4	5.3	7.0	10.6	8.3	9.1	8.2	8.6	9.2	8.8	9.2	8.6	8.0	7.1
2004	5.6	5.8	6.0	5.7	6.1	6.1	6.5	5.9	5.1	5.8	6.3	5.5	5.4	7.1	10.5	8.3	9.0	8.3	8.6	9.2	8.8	9.2	8.6	8.0	7.2
2005	5.9	6.1	6.3	6.0	6.4	6.4	6.8	6.2	5.4	6.1	6.6	5.9	5.8	7.5	10.8	8.6	9.4	8.6	8.9	9.5	9.2	9.6	9.1	8.5	7.7
2006	6.0	6.2	6.4	6.1	6.5	6.5	6.9	6.4	5.6	6.2	6.8	6.1	6.0	7.6	10.8	8.7	9.4	8.7	9.0	9.6	9.3	9.6	9.2	8.6	7.9
2007	5.9	6.1	6.3	6.0	6.4	6.4	6.8	6.2	5.5	6.1	6.6	5.9	5.8	7.4	10.5	8.5	9.2	8.5	8.7	9.3	9.0	9.3	8.8	8.3	7.6
2008	5.0	5.1	5.3	5.0	5.4	5.4	5.7	5.1	4.4	5.0	5.4	4.7	4.6	6.1	9.0	7.0	7.6	6.9	7.1	7.6	7.3	7.5	7.0	6.4	5.7
2009	5.3	5.5	5.7	5.4	5.8	5.8	6.1	5.6	4.9	5.4	5.9	5.2	5.1	6.6	9.4	7.5	8.1	7.5	7.7	8.1	7.9	8.1	7.6	7.1	6.4
2010	5.4	5.6	5.8	5.5	5.9	5.9	6.2	5.7	5.0	5.5	6.0	5.3	5.2	6.6	9.4	7.6	8.2	7.5	7.7	8.2	7.9	8.1	7.7	7.2	6.5
	1960	1961	1962	1963	1964	1965	1966	1967	1968	1969	1970	1971	1972	1973	1974	1975	1976	1977	1978	1979	1980	1981	1982	1983	1984

INVESTMENT FROM END YEAR

	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009
1986	22.7																								
1987	13.4	4.8																							
1988	10.3	4.6	4.4																						
1989	14.0	11.2	14.6	25.8																					
1990	6.9	3.3	2.8	2.0	(17.4)																				
1991	8.3	5.6	5.9	6.4	(2.2)	15.7																			
1992	9.5	7.4	8.0	8.9	3.7	16.2	16.8																		
1993	11.3	9.8	10.7	11.9	8.7	19.1	20.9	25.1																	
1994	8.9	7.3	7.7	8.2	5.0	11.5	10.1	7.0	(8.6)																
1995	9.9	8.6	9.1	9.7	7.3	13.0	12.3	10.9	4.4	19.2															
1996	10.2	9.0	9.5	10.1	8.1	13.0	12.5	11.4	7.2	16.1	13.1														
1997	10.9	9.9	10.4	11.1	9.4	13.9	13.6	13.0	10.1	17.1	16.1	19.3													
1998	10.9	10.0	10.5	11.1	9.5	13.5	13.2	12.6	10.2	15.5	14.3	14.9	10.6												
1999	11.6	10.8	11.3	12.0	10.7	14.4	14.2	13.8	12.0	16.7	16.1	17.1	16.0	21.7											
2000	10.2	9.3	9.7	10.1	8.8	11.8	11.4	10.7	8.8	12.0	10.7	10.1	7.2	5.5	(8.6)										
2001	8.5	7.6	7.8	8.1	6.7	9.2	8.6	7.7	5.7	7.9	6.2	4.8	1.5	(1.4)	(11.2)	(13.8)									
2002	6.2	5.2	5.3	5.3	3.9	5.9	5.1	3.9	1.8	3.2	1.1	(0.8)	(4.3)	(7.8)	(15.9)	(19.3)	(24.5)								
2003	6.8	5.9	6.0	6.1	4.8	6.7	6.0	5.1	3.2	4.6	3.0	1.6	(1.1)	(3.3)	(8.7)	(8.7)	(6.1)	16.9							
2004	6.9	6.0	6.1	6.2	5.0	6.9	6.2	5.4	3.7	5.0	3.6	2.5	0.3	(1.4)	(5.4)	(4.6)	(1.4)	12.8	8.8						
2005	7.4	6.7	6.8	6.9	5.9	7.6	7.1	6.4	4.9	6.2	5.0	4.2	2.4	1.3	(1.8)	(0.3)	3.4	14.8	13.7	18.9					
2006	7.6	6.9	7.0	7.2	6.2	7.9	7.4	6.7	5.4	6.7	5.6	4.9	3.4	2.5	0.0	1.5	4.9	13.9	13.0	15.1	11.4				
2007	7.3	6.6	6.7	6.9	5.9	7.4	6.9	6.3	5.1	6.2	5.2	4.5	3.1	2.3	0.2	1.5	4.3	11.2	9.9	10.2	6.1	1.0			
2008	5.3	4.6	4.6	4.6	3.6	4.9	4.3	3.5	2.2	3.1	1.9	1.0	(0.5)	(1.5)	(3.8)	(3.2)	(1.6)	2.9	0.3	(1.8)	(7.8)	(16.2)	(30.4)		
2009	6.1	5.4	5.5	5.5	4.6	5.9	5.4	4.7	3.6	4.4	3.5	2.8	1.5	0.7	(1.2)	(0.3)	1.5	5.9	4.1	3.3	(0.3)	(4.0)	(6.4)	25.9	
2010	6.2	5.6	5.6	5.7	4.8	6.0	5.6	5.0	3.9	4.7	3.8	3.2	2.0	1.4	(0.3)	0.6	2.3	6.3	4.8	4.2	1.5	(0.9)	(1.5)	17.1	8.9
	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009

The dates along the top (and bottom) are those on which each portfolio starts. Those down the side are the dates to which the annual rate of return is calculated. Reading the top figure in each column diagonally down the table gives the real rate of return in each year since 1960. The table can be used to see the real rate of return over any period; thus a purchase made at the end of 1960 would have lost 2.5% (allowing for reinvestment of income) in one year but over the first three years (up to the end of 1963) would have given an average annual real return of 3.9%. Each figure on the bottom line of the table shows the real growth up to December 2010 from the year shown below the figure.

REAL RETURN ON EQUITIES - GROSS INCOME RE-INVESTED
REAL VALUE OF £100 INVESTED

INVESTMENT TO END YEAR

	1960	1961	1962	1963	1964	1965	1966	1967	1968	1969	1970	1971	1972	1973	1974	1975	1976	1977	1978	1979	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009
1961	97																																																
1962	95	98																																															
1963	112	115	118																																													
1964	101	104	106	90																																												
1965	108	111	113	96	107																																											
1966	100	102	105	89	99	93																																										
1967	131	134	137	117	129	121	131																																									
1968	183	188	192	163	181	170	183	140																																								
1969	154	158	162	137	152	143	154	118	84																																							
1970	138	141	145	123	136	128	138	105	75	89																																						
1971	185	190	194	165	183	172	185	141	101	120	134																																					
1972	200	205	210	179	198	186	201	153	109	130	145	108																																				
1973	130	134	137	116	129	121	130	99	71	85	94	70	65																																			
1974	55	56	57	49	54	51	55	42	30	35	40	29	27	42																																		
1975	109	112	114	97	108	101	109	83	59	71	79	59	54	84	200																																	
1976	97	99	102	86	96	90	97	74	53	63	70	52	48	74	177	89																																
1977	128	132	135	114	127	119	128	98	70	83	93	69	64	98	235	118	133																															
1978	128	132	135	115	127	119	129	98	70	83	93	69	64	99	236	118	133	100																														
1979	122	125	128	109	121	113	122	93	67	79	89	66	61	94	224	112	126	95	95																													
1980	143	147	150	128	141	133	143	109	78	93	104	77	71	110	262	132	148	112	111	117																												
1981	145	149	152	129	143	134	145	111	79	94	105	78	72	111	266	133	150	113	113	119	101																											
1982	177	181	186	158	175	164	177	135	97	115	128	95	88	136	324	162	183	138	138	145	124	122																										
1983	216	222	227	193	214	200	217	165	118	140	157	117	108	166	396	199	223	169	168	177	151	149	122																									
1984	272	279	286	243	269	252	272	208	149	177	197	147	136	209	499	250	281	212	212	223	190	188	154	126																								
1985	309	317	325	276	306	287	310	236	169	201	224	167	154	238	567	284	320	241	241	253	216	213	175	143	114																						
1986	380	390	398	339	375	352	380	290	207	246	275	205	190	292	696	349	392	296	295	311	265	262	215	176	140	123																					
1987	398	408	417	355	393	369	398	304	217	258	289	215	199	305	729	365	411	310	310	325	278	274	225	184	146	129	105																					
1988	415	426	436	370	411	385	416	317	227	270	301	224	207	319	762	382	429	324	323	340	290	286	235	192	153	134	109	104																				
1989	523	536	549	466	517	485	523	399	286	339	379	282	261	401	958	480	540	408	407	428	365	360	296	242	192	169	138	131	126																			
1990	432	443	453	385	427	400	433	330	236	280	313	233	216	332	792	397	446	337	336	353	302	298	244	200	159	140	114	109	104	83																		
1991	500	513	524	446	494	463	500	382	273	324	363	270	250	384	916	459	516	390	389	409	349	344	283	231	184	162	132	126	120	96	116																
1992	584	599	613	521	577	541	584	446	319	379	423	315	291	448	1070	536	603	455	454	478	408	402	330	270	215	189	154	147	141	112	135	117														
1993	730	749	766	651	722	677	731	558	399	474	530	394	365	561	1339	671	755	569	568	597	510	503	413	338	268	236	192	184	176	140	169	146	125												
1994	668	685	701	596	660	619	669	510	365	434	485	361	333	513	1224	613	690	521	520	546	467	460	378	309	245	216	176	168	161	128	155	134	114	91										
1995	796	817	835	710	787	738	797	608	435	517	577	430	397	611	1459	731	822	621	619	651	556	549	450	368	292	257	210	200	192	152	184	159	136	109	119									
1996	900	923	944	803	889	834	901	687	492	584	653	486	449	691	1650	827	930	702	700	736	629	620	509	416	331	291	237	226	217	172	208	180	154	123	135	113								
1997	1073	1101	1126	957	1061	995	1075	820	586	697	779	579	536	824	1968	986	1109	837	835	878	750	740	607	496	394	347	283	270	258	205	248	215	184	147	161	135	119							
1998	1187	1218	1246	1059	1174	1101	1189	907	649	771	862	641	593	912	2177	1091	1227	926	924	972	830	819	672	549	436	384	313	299	286	227	275	238	203	163	178	149	132	111						
1999	1445	1482	1516	1289	1428	1340	1447	1104	789	938	1048	780	722	1110	2649	1327	1493	1127	1124	1182	1009	996	817	668	531	467	381	363	348	276	334	289	248	198	216	182	161	135	122					
2000	1321	1355	1386	1178	1305	1224	1323	1009	722	858	958	713	660	1014	2422	1213	1365	1030	1028	1081	923	910	747	611	485	427	348	332	318	253	306	264	226	181	198	166	147	123	111	91				
2001	1138	1168	1195	1016	1125	1056	1140	870	622	739	826	615	569	874	2088	1046	1177	888	886	932	795	785	644	527	418	368	300	286	274	218	264	228	195	156	171	143	127	106	96	79	86			
2002	859	882	902	766	849	797	861	656	470	558	624	464	429	660	1576	790	888	670	669	703	600	592	486	397	316	278	226	216	207	164	199	172	147	118	129	108	95	80	72	59	65	75		
2003	1005	1031	1054	896	993	931	1006	767	549	652	729	542	502	771	1842	923	1038	783	782	822	702	693	568	465	369	325	265	253	242	192	233	201	172	138	150	126	112	94	85	70	76	88	117	
2004	1092	1121	1147	974	1080	1013	1094	835	597	709	793	590	546	839	2003	1004	1129	852	850	894	763	753	618	505	402	353	288	275	263	209	253	219	187	150	164	137	121	102	92	76	83	96	127	109
2005	1299	1333	1364	1159	1284	1205	1301	993	710	844	943	702	649	998	2383	1194	1343	1013	1011	1063	908	896	735	601	478	420	342	327	313	249	301	260	223	178	195	163	144	121	109	90	98	114	151	129	119
2006	1448	1486	1520	1292	1432	1343	1450	1106	791	940	1051	782	723	1112	2656	1331	1497	1129	1127	1185	1012	998	819	670	532	468	382	364	349	277	335	290	248	198	217	182	161	135	122	100	110	127	169	144	133	111
2007	1463	1501	1536	1305	1446	1356	1465	1118	799	950	1062	790	731	1124	2683	1344	1512	1141	1139	1197	1022	1009	827	677	538	473	385	368	352	280	339	293	251	200	219	184	163	136	123	101	111	129	170	146	134	113	101
2008	1018	1045	1068	908	1006	944	1019	778	556	661	739	550	508	782	1867	935	1052	794	792	833	711	702	576	471	374	329	268	256	245	195	236	204	174	139	152	128	113	95	86	70	77	89	118	101	93	78	70	70		
2009	1282	1316	1346	1144	1267	1189	1284	979	700	832	930	692	640	985	2351	1178	1325	1000	998	1049	896	884	725	593	471	414	338	322	309	245	297	257	220	176	192	161	142	119	108	89	97	113	149	128	117	99	89	88	126	
2010	1397	1433	1466	1246	1381	1295	1399	1067	763	907	1014	754	698	1073	2561	1283	1444	1089	1087	1143	976	963	790	646	513	452	368	351	336	267	323	280	239	191	209	176	155	130	118	97	106	123	163	139	128	107	96	95	137	109
	1960	1961	1962	1963	1964	1965	1966	1967	1968	1969	1970	1971	1972	1973	1974	1975	1976	1977	1978	1979	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009

The dates along the top (and bottom) are those on which each portfolio starts. Those down the side are the dates to which the change in real value is calculated. Reading the top figure in each column diagonally down the table gives the growth in each year since 1960. The table can be used to see the real growth over any period; thus an investment of £100 made at the end of 1960 would have fallen to £97 (allowing for reinvestment of income and the effect of inflation) in one year but after three years (up to the end of 1963) would have reached £112 in real terms. Each figure on the bottom line of the table shows the real growth up to December 2010 from the year shown below the figure.

REAL RETURN ON GILTS - GROSS INCOME RE-INVESTED
AVERAGE ANNUAL REAL RATE OF RETURN

INVESTMENT FROM END YEAR

INVESTMENT TO END YEAR

	1960	1961	1962	1963	1964	1965	1966	1967	1968	1969	1970	1971	1972	1973	1974	1975	1976	1977	1978	1979	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009
1961	(11.9)																																																	
1962	3.5	21.5																																																
1963	2.9	11.2	1.8																																															
1964	0.4	4.9	(2.6)	(6.7)																																													
1965	0.3	3.6	(1.8)	(3.5)	(0.1)																																												
1966	0.3	3.0	(1.2)	(2.2)	0.2	0.5																																											
1967	0.3	2.5	(0.9)	(1.6)	0.2	0.3	0.1																																										
1968	(0.8)	0.9	(2.1)	(2.9)	(1.9)	(2.5)	(4.0)	(7.8)																																									
1969	(1.1)	0.3	(2.4)	(3.1)	(2.4)	(2.9)	(4.0)	(6.1)	(4.2)																																								
1970	(1.4)	(0.2)	(2.6)	(3.2)	(2.6)	(3.1)	(4.0)	(5.4)	(4.1)	(4.0)																																							
1971	0.1	1.4	(0.6)	(0.9)	(0.1)	(0.1)	(0.2)	(0.3)	2.4	5.9	16.8																																						
1972	(0.9)	0.2	(1.7)	(2.1)	(1.5)	(1.7)	(2.0)	(2.4)	(1.0)	0.0	2.1	(10.7)																																					
1973	(2.3)	(1.4)	(3.3)	(3.7)	(3.4)	(3.8)	(4.4)	(5.1)	(4.6)	(4.7)	(4.9)	(14.2)	(17.6)																																				
1974	(4.4)	(3.8)	(5.7)	(6.4)	(6.3)	(7.0)	(7.9)	(9.0)	(9.1)	(10.1)	(11.6)	(19.4)	(23.4)	(28.8)																																			
1975	(3.6)	(2.9)	(4.6)	(5.1)	(5.0)	(5.4)	(6.1)	(6.8)	(6.7)	(7.1)	(7.7)	(13.0)	(13.7)	(11.7)	9.5																																		
1976	(3.4)	(2.8)	(4.4)	(4.8)	(4.7)	(5.1)	(5.6)	(6.2)	(6.0)	(6.3)	(6.6)	(10.7)	(10.7)	(8.3)	4.1	(1.1)																																	
1977	(1.8)	(1.1)	(2.4)	(2.7)	(2.4)	(2.6)	(2.9)	(3.2)	(2.6)	(2.4)	(2.2)	(5.1)	(3.9)	(0.1)	11.8	13.0	29.1																																	
1978	(2.2)	(1.6)	(2.9)	(3.2)	(2.9)	(3.1)	(3.4)	(3.8)	(3.3)	(3.2)	(3.1)	(5.7)	(4.8)	(2.1)	6.1	5.0	8.1	(9.4)																																	
1979	(2.7)	(2.2)	(3.4)	(3.7)	(3.5)	(3.7)	(4.1)	(4.4)	(4.1)	(4.1)	(4.1)	(6.4)	(5.8)	(3.6)	2.4	0.7	1.3	(10.3)	(11.2)																																
1980	(2.3)	(1.8)	(2.9)	(3.2)	(3.0)	(3.2)	(3.4)	(3.7)	(3.4)	(3.3)	(3.2)	(5.2)	(4.5)	(2.5)	2.8	1.5	2.2	(5.5)	(3.4)	5.0																															
1981	(2.7)	(2.2)	(3.3)	(3.6)	(3.4)	(3.6)	(3.8)	(4.1)	(3.8)	(3.8)	(3.8)	(5.6)	(5.0)	(3.3)	1.0	(0.4)	(0.2)	(6.4)	(5.4)	(2.3)	(9.2)																															
1982	(0.9)	(0.4)	(1.4)	(1.5)	(1.2)	(1.3)	(1.4)	(1.5)	(1.0)	(0.8)	(0.5)	(1.9)	(1.0)	1.0	5.5	5.0	6.0	1.9	5.0	11.1	14.2	43.6																															
1983	(0.5)	0.1	(0.8)	(1.0)	(0.7)	(0.7)	(0.8)	(0.8)	(0.3)	(0.0)	0.3	(1.0)	(0.1)	1.9	6.0	5.6	6.6	3.2	6.0	10.8	12.8	25.7	10.0																														
1984	(0.4)	0.2	(0.7)	(0.8)	(0.5)	(0.5)	(0.6)	(0.6)	(0.2)	0.1	0.4	(0.8)	0.1	1.9	5.6	5.2	6.0	3.1	5.3	9.0	10.0	17.3	6.0	2.1																													
1985	(0.2)	0.4	(0.5)	(0.6)	(0.3)	(0.3)	(0.3)	(0.3)	0.1	0.4	0.7	(0.4)	0.5	2.2	5.6	5.2	5.9	3.3	5.3	8.3	9.0	14.1	5.7	3.6	5.0																												
1986	0.1	0.6	(0.2)	(0.3)	0.1	0.1	0.0	0.0	0.5	0.8	1.1	0.1	0.9	2.5	5.7	5.3	6.0	3.7	5.5	8.1	8.7	12.6	6.0	4.7	6.0	7.0																												
1987	0.5	1.0	0.3	0.2	0.6	0.6	0.6	0.6	1.1	1.4	1.7	0.8	1.6	3.2	6.2	5.9	6.6	4.5	6.2	8.6	9.1	12.5	7.2	6.5	8.0	9.5	12.1																												
1988	0.6	1.1	0.4	0.3	0.6	0.7	0.7	0.7	1.1	1.4	1.7	0.9	1.7	3.1	5.9	5.6	6.2	4.3	5.8	7.9	8.3	11.0	6.4	5.7	6.6	7.1	7.2	2.4																												
1989	0.5	1.0	0.3	0.2	0.5	0.6	0.6	0.6	1.0	1.3	1.6	0.8	1.5	2.8	5.4	5.1	5.6	3.8	5.1	6.9	7.1	9.4	5.2	4.4	4.9	4.8	4.2	0.4	(1.7)																												
1990	0.4	0.8	0.2	0.1	0.4	0.4	0.4	0.4	0.8	1.0	1.3	0.6	1.2	2.5	4.8	4.5	4.9	3.3	4.4	5.9	6.0	7.9	4.1	3.3	3.4	3.1	2.2	(0.9)	(2.5)	(3.4)																												
1991	0.8	1.2	0.6	0.6	0.8	0.9	0.9	0.9	1.3	1.6	1.9	1.2	1.8	3.1	5.3	5.1	5.5	4.0	5.1	6.6	6.7	8.4	5.1	4.5	4.9	4.8	4.4	2.6	2.6	4.8	13.8																												
1992	1.2	1.7	1.1	1.0	1.3	1.4	1.4	1.5	1.9	2.2	2.5	1.8	2.5	3.7	5.9	5.6	6.1	4.7	5.8	7.2	7.4	9.1	6.1	5.7	6.1	6.3	6.2	5.0	5.7	8.3	14.6	15.4																												
1993	1.9	2.4	1.8	1.8	2.1	2.2	2.3	2.3	2.8	3.1	3.4	2.8	3.5	4.7	6.8	6.7	7.2	5.9	7.1	8.5	8.8	10.4	7.8	7.6	8.2	8.6	8.9	8.3	9.5	12.5	18.4	20.8	26.4																												
1994	1.4	1.8	1.3	1.3	1.5	1.6	1.6	1.7	2.1	2.3	2.6	2.0	2.7	3.7	5.7	5.5	5.9	4.7	5.6	6.8	7.0	8.3	5.8	5.4	5.8	5.9	5.7	4.8	5.2	6.7	9.4	7.9	4.4	(13.8)																												
1995	1.8	2.2	1.7	1.7	2.0	2.0	2.1	2.1	2.5	2.8	3.1	2.6	3.2	4.2	6.1	6.0	6.4	5.2	6.2	7.4	7.5	8.8	6.5	6.2	6.6	6.8	6.7	6.1	6.6	8.1	10.5	9.7	7.9	(0.3)	15.3																												
1996	1.9	2.3	1.8	1.8	2.1	2.1	2.2	2.2	2.6	2.9	3.2	2.7	3.3	4.3	6.1	5.9	6.3	5.2	6.1	7.2	7.4	8.6	6.4	6.1	6.5	6.6	6.6	6.0	6.4	7.6	9.6	8.8	7.2	1.5	10.1	5.1																												
1997	2.2	2.6	2.1	2.1	2.4	2.5	2.6	2.7	3.0	3.3	3.6	3.1	3.7	4.7	6.5	6.3	6.7	5.7	6.6	7.7	7.8	9.0	7.0	6.8	7.1	7.3	7.3	6.9	7.4	8.6	10.4	9.8	8.8	4.7	11.8	10.1	15.3																												
1998	2.7	3.1	2.6	2.7	2.9	3.0	3.1	3.2	3.6	3.9	4.2	3.7	4.3	5.3	7.1	7.0	7.4	6.4	7.3	8.3	8.5	9.7	7.8	7.7	8.1	8.4	8.5	8.1	8.7	10.0	11.7	11.5	10.8	7.9	14.2	13.8	18.4	21.7																												
1999	2.5	2.9	2.4	2.4	2.7	2.8	2.9	2.9	3.3	3.6	3.8	3.4	4.0	4.9	6.6	6.4	6.8	5.9	6.6	7.6	7.8	8.8	7.0	6.8	7.2	7.3	7.4	7.0	7.4	8.3	9.7	9.2	8.4	5.6	10.0	8.7	9.9	7.4	(5.2)																												
2000	2.6	3.0	2.5	2.5	2.8	2.9	3.0	3.0	3.4	3.7	3.9	3.5	4.1	5.0	6.5	6.4	6.7	5.9	6.6	7.6	7.7	8.6	7.0	6.8	7.1	7.2	7.3	6.9	7.3	8.1	9.4	8.9	8.1	5.7	9.3	8.2	9.0	7.0	0.3	6.1																												
2001	2.5	2.9	2.5	2.5	2.7	2.8	2.9	3.0	3.3	3.6	3.8	3.4	3.9	4.8	6.3	6.2	6.5	5.6	6.4	7.2	7.3	8.2	6.6	6.5	6.7	6.8	6.8	6.4	6.8	7.5	8.5	8.0	7.2	5.0	8.1	6.9	7.3	5.3	0.4	3.3	0.6																												
2002	2.6	3.0	2.6	2.6	2.8	2.9	3.0	3.1	3.4	3.7	3.9	3.5	4.0	4.9	6.3	6.2	6.5	5.7	6.4	7.2	7.3	8.2	6.6	6.5	6.7	6.8	6.8	6.5	6.7	7.4	8.4	7.9	7.2	5.2	7.9	6.9	7.2	5.6	1.9	4.4	3.6	6.7																												
2003	2.5	2.9	2.5	2.5	2.7	2.8	2.9	3.0	3.3	3.5	3.7	3.4	3.8	4.7	6.1	5.9	6.2	5.4	6.1	6.8	6.9	7.7	6.3	6.1	6.3	6.3	6.3	6.0	6.2	6.8	7.6	7.1	6.4	4.6	6.8	5.8	5.9	4.4	1.3	3.0	2.0	2.7	(1.2)																												
2004	2.5	2.9	2.5	2.5	2.8	2.8	2.9	3.0	3.3	3.5	3.7	3.4	3.8	4.6	6.0	5.9	6.1	5.3	6.0	6.7	6.8	7.5	6.1	5.9	6.1	6.2	6.2	5.8	6.0	6.6	7.3	6.8	6.1	4.5	6.5	5.6	5.6	4.3	1.7	3.1	2.4	3.0	1.2	3.6																												
2005	2.6	3.0	2.6	2.6	2.8	2.9	3.0	3.0	3.4	3.6	3.8	3.4	3.9	4.7	6.0	5.9	6.1	5.4	6.0	6.7	6.7	7.5	6.1	6.0	6.1	6.2	6.2	5.8	6.0	6.5	7.2	6.8	6.1	4.6	6.5	5.6	5.7	4.5	2.3	3.6	3.1	3.7	2.8	4.8	6.0																												
2006	2.5	2.8	2.4	2.4	2.7	2.7	2.8	2.9	3.1	3.4	3.6	3.2	3.7	4.4	5.6	5.5	5.7	5.0	5.6	6.3	6.3	7.0	5.7	5.5	5.6	5.7	5.6	5.3	5.4	5.9	6.5	6.0	5.4	3.9	5.5	4.7	4.6	3.5	1.4	2.4	1.8	2.1	0.9	1.7	0.7	(4.4)																												
2007	2.4	2.8	2.4	2.4	2.6	2.7	2.7	2.8	3.1	3.3	3.5	3.2	3.6	4.3	5.5	5.4	5.6	4.9	5.4	6.1	6.1	6.7	5.5	5.3	5.4	5.5	5.4	5.1	5.2	5.6	6.1	5.7	5.1	3.7	5.2	4.4	4.3	3.3	1.4	2.3	1.7	1.9	1.0	1.5	0.9	(1.7)	1.2																												
2008	2.6	3.0	2.6	2.6	2.8	2.9	2.9	3.0	3.3	3.5	3.7	3.4	3.8	4.5	5.7	5.6	5.8	5.1	5.6	6.3	6.3	6.9	5.7	5.5	5.7	5.7	5.7	5.4	5.5	5.9	6.5	6.0	5.5	4.2	5.6	4.9	4.9	4.0	2.4	3.3	2.9	3.3	2.7	3.5	3.5	2.6	6.4	11.8																												
2009	2.5	2.8	2.5	2.5	2.7	2.7	2.8	2.9	3.1	3.3	3.5	3.2	3.6	4.3	5.4	5.3	5.5	4.8	5.3	5.9	6.0	6.5	5.4	5.2	5.3	5.3	5.3	5.0	5.1	5.4	5.9	5.5	4.9	3.7	5.0	4.3	4.3	3.4	1.9	2.6	2.2	2.4	1.8	2.3	2.1	1.1	3.0	4.0	(3.3)																												
2010	2.5	2.9	2.5	2.5	2.7	2.8	2.8	2.9	3.2	3.4	3.6	3.2	3.6	4.3	5.4	5.3	5.5	4.8	5.3	5.9	5.9	6.5	5.3	5.2	5.3	5.3	5.2	4.9	5.1	5.4	5.8	5.4	4.9	3.8	5.0	4.3	4.3	3.5	2.1	2.8	2.4	2.6	2.2	2.6	2.5	1.8	3.4	4.1	0.5	4.4

The dates along the top (and bottom) are those on which each portfolio starts. Those down the side are the dates to which the annual rate of return is calculated. Reading the top figure in each column diagonally down the table gives the real rate of return in each year since 1960. The table can be used to see the real rate of return over any period; thus a purchase made at the end of 1960 would have lost 11.9% (allowing for reinvestment of income) in one year but over the first three years (up to the end of 1963) would have given an average annual real return of 2.9%. Each figure on the bottom line of the table shows the real growth up to December 2010 from the year shown below the figure.

REAL RETURN ON GILTS - GROSS INCOME RE-INVESTED
REAL VALUE OF £100 INVESTED

The dates along the top (and bottom) are those on which each portfolio starts. Those down the side are the dates to which the change in real value is calculated. Reading the top figure in each column diagonally down the table gives the growth in each year since 1960. The table can be used to see the real growth over any period; thus an investment of £100 made at the end of 1960 would have fallen to £88 (allowing for reinvestment of income and the effect of inflation) in one year but after three years (up to the end of 1963) would have reached £109 in real terms. Each figure on the bottom line of the table shows the real growth up to December 2010 from the year shown below the figure.

INVESTMENT TO END YEAR

	1960	1961	1962	1963	1964	1965	1966	1967	1968	1969	1970	1971	1972	1973	1974	1975	1976	1977	1978	1979	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009
1961	88																																																	
1962	107	121																																																
1963	109	124	102																																														
1964	102	115	95	93																																													
1965	101	115	95	93	100																																												
1966	102	116	95	94	100	101																																											
1967	102	116	95	94	100	101	100																																									
1968	94	107	88	86	93	93	92	92																																								
1969	90	102	84	83	89	89	88	88	96																																							
1970	87	98	81	79	85	85	85	85	92	96																																						
1971	101	115	94	93	99	100	99	99	107	112	117																																					
1972	90	102	84	83	89	89	88	88	96	100	104	89																																				
1973	74	84	69	68	73	73	73	73	79	83	86	74	82																																			
1974	53	60	49	49	52	52	52	52	56	59	61	52	59	71																																		
1975	58	66	54	53	57	57	57	57	62	64	67	57	64	78	110																																	
1976	57	65	54	53	56	56	56	56	61	64	66	57	63	77	108	99																																
1977	74	84	69	68	73	73	73	72	79	82	86	73	82	100	140	128	129																															
1978	67	76	63	61	66	66	66	66	71	74	77	66	74	90	127	116	117	91																														
1979	59	68	56	55	59	59	58	58	63	66	69	59	66	80	112	103	104	80	89																													
1980	62	71	58	57	61	62	61	61	66	69	72	62	69	84	118	108	109	84	93	105																												
1981	57	64	53	52	56	56	56	56	60	63	66	56	63	76	107	98	99	77	85	95	91																											
1982	81	92	76	75	80	80	80	80	87	90	94	81	90	110	154	141	142	110	122	137	130	144																										
1983	90	102	84	82	88	88	88	88	95	99	104	89	99	121	169	155	156	121	134	151	143	158	110																									
1984	92	104	86	84	90	90	90	90	97	102	106	91	101	123	173	158	160	124	137	154	147	161	112	102																							
1985	96	109	90	88	95	95	94	94	102	107	111	95	107	129	182	166	168	130	143	162	154	169	118	107	105																					
1986	103	117	96	94	101	101	101	101	109	114	119	102	114	138	194	177	179	139	153	173	165	181	126	115	112	107																				
1987	115	131	108	106	113	114	113	113	123	128	133	114	128	155	218	199	201	156	172	194	185	203	142	129	126	120	112																			
1988	118	134	110	108	116	116	116	116	126	131	137	117	131	159	223	204	206	160	176	199	189	208	145	132	129	123	115	102																		
1989	116	132	109	107	114	114	114	114	123	129	134	115	129	156	220	200	203	157	173	195	186	205	143	130	127	121	113	101	98																	
1990	112	127	105	103	110	111	110	110	119	125	130	111	124	151	212	194	196	152	167	189	180	198	138	125	123	117	109	97	95	97																
1991	128	145	119	117	126	126	125	125	136	142	148	126	142	172	241	220	223	173	191	215	204	225	157	142	139	133	124	111	108	110	114															
1992	147	167	138	135	145	145	144	144	157	164	170	146	163	198	279	254	257	199	220	248	236	260	181	164	161	153	143	128	125	127	131	115														
1993	186	211	174	171	183	184	183	182	198	207	215	184	206	251	352	321	325	252	278	313	298	328	229	208	203	194	181	162	158	160	166	146	126													
1994	161	182	150	147	158	158	157	157	171	178	186	159	178	216	303	277	280	217	240	270	257	283	197	179	175	167	156	139	136	138	143	126	109	86												
1995	185	210	173	170	182	182	181	181	197	205	214	183	205	249	350	319	323	250	276	311	296	326	227	206	202	193	180	160	157	159	165	145	126	99	115											
1996	195	221	182	179	191	192	191	191	207	216	225	193	216	262	368	336	340	263	290	327	311	343	239	217	213	202	189	169	165	167	173	152	132	104	121	105										
1997	224	255	210	206	221	221	220	220	238	249	259	222	248	302	424	387	391	303	335	377	359	395	275	250	245	233	218	194	190	193	200	176	152	120	140	121	115									
1998	273	310	255	250	268	269	267	267	290	303	315	270	302	367	516	471	476	369	407	459	437	481	335	304	298	284	265	237	231	235	243	214	185	146	170	147	140	122								
1999	259	294	242	237	254	255	254	253	275	287	299	256	287	348	489	446	451	350	386	435	414	456	317	288	282	269	251	224	219	223	230	202	175	139	161	140	133	115	95							
2000	274	311	256	252	270	270	269	269	292	305	317	272	304	369	519	473	479	371	410	461	439	483	337	306	300	285	267	238	232	236	245	215	186	147	171	148	141	122	101	106						
2001	276	314	258	253	272	272	271	270	293	306	319	273	306	371	522	476	482	373	412	464	442	487	339	308	302	287	269	239	234	238	246	216	187	148	172	149	142	123	101	107	101					
2002	295	334	275	270	290	290	289	289	313	327	341	292	326	396	557	508	514	398	440	495	471	519	362	329	322	306	287	255	249	254	263	231	200	158	183	159	151	131	108	114	107	107				
2003	291	330	272	267	286	287	285	285	309	323	336	288	322	391	550	502	508	393	434	489	466	513	357	325	318	303	283	252	246	251	259	228	197	156	181	157	150	130	107	113	106	105	99			
2004	301	342	282	277	297	297	296	295	320	335	349	298	334	405	570	520	526	407	450	507	482	531	370	336	329	314	293	261	255	260	269	236	205	162	188	163	155	134	111	117	110	109	102	104		
2005	320	363	299	293	315	315	313	313	340	355	370	316	354	430	604	552	558	432	477	537	512	563	392	357	349	333	311	277	271	275	285	250	217	172	199	173	164	143	117	124	117	116	109	110	106	
2006	306	347	286	281	301	301	300	299	325	339	353	303	339	411	578	527	534	413	456	514	489	539	375	341	334	318	297	265	259	263	272	239	207	164	190	165	157	136	112	118	111	111	104	105	101	96
2007	309	351	289	284	304	305	303	303	329	343	357	306	343	416	584	534	540	418	462	520	495	545	380	345	338	322	301	268	262	266	276	242	210	166	193	167	159	138	113	120	113	112	105	106	103	97
2008	346	393	323	317	340	341	339	339	367	384	400	342	383	465	653	597	604	467	516	581	553	609	424	386	378	360	336	300	293	298	308	271	235	186	215	187	178	154	127	134	126	125	117	119	115	108
2009	335	380	313	307	329	330	328	328	355	371	387	331	371	450	632	577	584	452	499	562	535	589	411	373	365	348	325	290	283	288	298	262	227	180	208	181	172	149	123	129	122	121	114	115	111	105
2010	349	397	326	321	344	344	342	342	371	388	404	346	387	470	660	603	610	472	521	587	559	615	429	390	382	363	340	303	296	301	311	274	237	187	218	189	180	156	128	135	127	126	119	120	116	109

1960	1961	1962	1963	1964	1965	1966	1967	1968	1969	1970	1971	1972	1973	1974	1975	1976	1977	1978	1979	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009

REAL RETURN ON TREASURY BILLS - GROSS INCOME RE-INVESTED
AVERAGE ANNUAL REAL RATE OF RETURN

INVESTMENT FROM END YEAR

INVESTMENT TO END YEAR

	1960	1961	1962	1963	1964	1965	1966	1967	1968	1969	1970	1971	1972	1973	1974	1975	1976	1977	1978	1979	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009
1961	0.7																																																	
1962	1.3	1.8																																															
1963	1.5	1.8	1.9																																														
1964	1.0	1.1	0.8	(0.4)																																													
1965	1.1	1.2	1.1	0.7	1.7																																											
1966	1.3	1.5	1.4	1.2	2.0	2.4																																										
1967	1.6	1.8	1.8	1.8	2.5	2.9	3.4																																									
1968	1.6	1.7	1.7	1.7	2.2	2.4	2.4	1.4																																								
1969	1.8	1.9	1.9	1.9	2.4	2.6	2.6	2.3	3.1																																							
1970	1.6	1.6	1.6	1.6	1.9	2.0	1.9	1.4	1.3	(0.4)																																						
1971	1.2	1.2	1.1	1.1	1.3	1.2	0.9	0.4	0.0	(1.5)	(2.6)																																					
1972	0.9	0.9	0.8	0.7	0.8	0.7	0.4	(0.1)	(0.5)	(1.7)	(2.3)	(2.1)																																				
1973	0.7	0.7	0.6	0.5	0.6	0.4	0.2	(0.4)	(0.7)	(1.6)	(2.0)	(1.7)	(1.4)																																			
1974	0.3	0.2	0.1	(0.1)	(0.0)	(0.2)	(0.6)	(1.1)	(1.5)	(2.4)	(2.9)	(3.0)	(3.5)	(5.5)																																			
1975	(0.6)	(0.7)	(0.8)	(1.1)	(1.1)	(1.4)	(1.8)	(2.4)	(3.0)	(4.0)	(4.7)	(5.2)	(6.2)	(8.5)	(11.3)																																		
1976	(0.7)	(0.8)	(1.0)	(1.2)	(1.3)	(1.6)	(2.0)	(2.5)	(3.0)	(3.9)	(4.4)	(4.8)	(5.4)	(6.8)	(7.4)	(3.2)																																	
1977	(0.8)	(0.9)	(1.1)	(1.3)	(1.4)	(1.6)	(2.0)	(2.5)	(2.9)	(3.7)	(4.1)	(4.4)	(4.8)	(5.7)	(5.7)	(2.8)	(2.4)																																
1978	(0.8)	(0.9)	(1.1)	(1.3)	(1.3)	(1.5)	(1.9)	(2.3)	(2.7)	(3.3)	(3.7)	(3.8)	(4.1)	(4.6)	(4.4)	(2.0)	(1.4)	(0.3)																																
1979	(0.9)	(1.0)	(1.2)	(1.4)	(1.4)	(1.7)	(2.0)	(2.4)	(2.7)	(3.3)	(3.6)	(3.7)	(4.0)	(4.4)	(4.2)	(2.3)	(2.0)	(1.8)	(3.2)																																
1980	(0.8)	(0.9)	(1.0)	(1.2)	(1.2)	(1.4)	(1.7)	(2.1)	(2.4)	(2.9)	(3.1)	(3.1)	(3.3)	(3.5)	(3.2)	(1.5)	(1.1)	(0.6)	(0.8)	1.8																														
1981	(0.7)	(0.8)	(0.9)	(1.0)	(1.1)	(1.3)	(1.5)	(1.8)	(2.1)	(2.5)	(2.7)	(2.7)	(2.8)	(2.9)	(2.5)	(1.0)	(0.5)	(0.1)	(0.0)	1.7	1.5																														
1982	(0.4)	(0.4)	(0.5)	(0.7)	(0.7)	(0.8)	(1.0)	(1.3)	(1.5)	(1.8)	(1.9)	(1.9)	(1.9)	(1.9)	(1.4)	0.1	0.6	1.2	1.6	3.3	4.0	6.6																												
1983	(0.2)	(0.2)	(0.3)	(0.4)	(0.4)	(0.5)	(0.7)	(0.9)	(1.1)	(1.4)	(1.5)	(1.4)	(1.3)	(1.3)	(0.8)	0.6	1.2	1.8	2.2	3.6	4.2	5.6	4.6																											
1984	0.0	0.0	(0.1)	(0.2)	(0.1)	(0.2)	(0.4)	(0.6)	(0.7)	(1.0)	(1.0)	(0.9)	(0.8)	(0.7)	(0.3)	1.1	1.6	2.2	2.6	3.8	4.4	5.3	4.7	4.8																											
1985	0.3	0.2	0.2	0.1	0.1	0.0	(0.1)	(0.3)	(0.4)	(0.6)	(0.6)	(0.4)	(0.3)	(0.2)	0.3	1.5	2.1	2.6	3.1	4.2	4.7	5.4	5.1	5.3	5.8																											
1986	0.5	0.5	0.5	0.4	0.4	0.4	0.3	0.1	0.0	(0.1)	(0.1)	0.0	0.2	0.3	0.8	2.0	2.6	3.1	3.6	4.6	5.0	5.7	5.5	5.9	6.4	7.0																											
1987	0.7	0.7	0.7	0.6	0.7	0.6	0.5	0.4	0.3	0.2	0.2	0.4	0.6	0.7	1.2	2.3	2.8	3.4	3.8	4.7	5.1	5.7	5.6	5.8	6.2	6.3	5.7																											
1988	0.8	0.8	0.8	0.7	0.8	0.7	0.7	0.5	0.5	0.4	0.4	0.6	0.8	0.9	1.4	2.4	2.9	3.4	3.8	4.6	5.0	5.5	5.3	5.4	5.6	5.5	4.8	4.0																											
1989	1.0	1.0	1.0	1.0	1.0	1.0	0.9	0.8	0.8	0.7	0.7	0.9	1.1	1.2	1.7	2.7	3.2	3.7	4.0	4.8	5.1	5.6	5.4	5.6	5.8	5.7	5.3	5.2	6.4																											
1990	1.2	1.2	1.2	1.1	1.2	1.2	1.1	1.0	1.0	0.9	1.0	1.2	1.4	1.5	2.0	2.9	3.4	3.8	4.2	4.9	5.2	5.6	5.5	5.6	5.8	5.8	5.5	5.4	6.2	6.0																											
1991	1.3	1.4	1.4	1.3	1.4	1.4	1.3	1.3	1.3	1.2	1.2	1.4	1.6	1.8	2.3	3.2	3.6	4.1	4.4	5.1	5.4	5.8	5.7	5.8	5.9	6.0	5.8	5.8	6.4	6.4	6.8																											
1992	1.5	1.5	1.5	1.5	1.6	1.6	1.5	1.5	1.5	1.4	1.5	1.7	1.9	2.1	2.5	3.4	3.8	4.2	4.6	5.2	5.5	5.8	5.8	5.9	6.0	6.1	5.9	6.0	6.5	6.5	6.8	6.7																											
1993	1.6	1.6	1.6	1.6	1.7	1.7	1.6	1.6	1.6	1.5	1.6	1.8	2.0	2.1	2.6	3.4	3.8	4.2	4.5	5.1	5.3	5.7	5.6	5.7	5.8	5.8	5.6	5.6	5.9	5.8	5.8	5.3	3.9																											
1994	1.6	1.6	1.6	1.6	1.7	1.7	1.7	1.6	1.6	1.5	1.6	1.8	2.0	2.2	2.6	3.3	3.7	4.1	4.4	4.9	5.1	5.4	5.3	5.4	5.5	5.4	5.2	5.2	5.4	5.2	5.0	4.3	3.2	2.4																											
1995	1.7	1.7	1.7	1.7	1.7	1.7	1.7	1.7	1.7	1.6	1.7	1.9	2.1	2.2	2.6	3.4	3.7	4.1	4.3	4.8	5.0	5.3	5.2	5.2	5.3	5.2	5.0	4.9	5.1	4.9	4.6	4.1	3.2	2.9	3.4																											
1996	1.7	1.7	1.7	1.7	1.8	1.8	1.8	1.7	1.7	1.7	1.8	2.0	2.1	2.3	2.6	3.4	3.7	4.0	4.3	4.7	4.9	5.2	5.1	5.1	5.1	5.1	4.9	4.8	4.9	4.7	4.5	4.0	3.3	3.2	3.5	3.6																											
1997	1.7	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.7	1.8	2.0	2.2	2.3	2.7	3.4	3.7	4.0	4.2	4.7	4.8	5.0	4.9	5.0	5.0	4.9	4.7	4.6	4.7	4.5	4.3	3.9	3.3	3.2	3.4	3.4	3.1																											
1998	1.8	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	2.1	2.3	2.4	2.8	3.4	3.7	4.0	4.3	4.7	4.8	5.0	4.9	5.0	5.0	4.9	4.7	4.7	4.7	4.5	4.4	4.0	3.6	3.5	3.8	3.9	4.1	5.0																											
1999	1.9	1.9	1.9	1.9	2.0	2.0	2.0	1.9	2.0	1.9	2.0	2.2	2.3	2.5	2.8	3.4	3.7	4.0	4.2	4.6	4.8	5.0	4.9	4.9	4.9	4.8	4.7	4.6	4.6	4.5	4.3	4.0	3.6	3.5	3.8	3.9	3.9	4.4	3.7																											
2000	1.9	1.9	1.9	1.9	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.2	2.4	2.5	2.8	3.4	3.7	4.0	4.2	4.6	4.7	4.9	4.8	4.8	4.8	4.7	4.6	4.5	4.5	4.3	4.2	3.9	3.5	3.5	3.7	3.7	3.8	4.0	3.4	3.2																											
2001	2.0	2.0	2.0	2.0	2.1	2.1	2.1	2.1	2.1	2.0	2.1	2.3	2.4	2.6	2.9	3.5	3.8	4.0	4.2	4.6	4.7	4.9	4.8	4.8	4.8	4.7	4.6	4.5	4.5	4.4	4.2	4.0	3.7	3.7	3.8	3.9	4.0	4.2	3.9	4.0	4.8																											
2002	2.0	2.0	2.0	2.0	2.1	2.1	2.1	2.0	2.0	2.0	2.1	2.2	2.4	2.5	2.8	3.4	3.7	3.9	4.1	4.4	4.5	4.7	4.6	4.6	4.6	4.5	4.4	4.3	4.3	4.1	4.0	3.7	3.4	3.4	3.5	3.5	3.5	3.6	3.2	3.0	2.9	1.1																											
2003	1.9	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.1	2.2	2.3	2.5	2.8	3.3	3.6	3.8	4.0	4.3	4.4	4.5	4.4	4.4	4.4	4.3	4.1	4.1	4.1	3.9	3.7	3.5	3.2	3.1	3.2	3.2	3.1	3.1	2.7	2.5	2.3	1.0	0.9																											
2004	1.9	1.9	1.9	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.2	2.3	2.4	2.7	3.2	3.5	3.7	3.8	4.1	4.2	4.4	4.3	4.2	4.2	4.1	4.0	3.9	3.9	3.7	3.5	3.3	3.0	2.9	3.0	2.9	2.9	2.8	2.5	2.2	2.0	1.0	1.0	1.1																											
2005	1.9	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.2	2.3	2.4	2.7	3.2	3.4	3.7	3.8	4.1	4.2	4.3	4.2	4.2	4.1	4.1	3.9	3.8	3.8	3.6	3.5	3.3	3.0	2.9	3.0	2.9	2.8	2.8	2.5	2.3	2.1	1.5	1.6	1.9	2.7																											
2006	1.9	1.9	1.9	1.9	2.0	2.0	2.0	2.0	2.0	1.9	2.0	2.1	2.3	2.4	2.6	3.1	3.3	3.5	3.7	3.9	4.0	4.1	4.0	4.0	4.0	3.9	3.7	3.6	3.6	3.5	3.3	3.1	2.8	2.7	2.8	2.7	2.6	2.5	2.2	2.0	1.8	1.3	1.3	1.4	1.6	0.4																											
2007	1.9	1.9	1.9	1.9	2.0	2.0	2.0	1.9	2.0	1.9	2.0	2.1	2.2	2.4	2.6	3.1	3.3	3.5	3.6	3.9	3.9	4.0	3.9	3.9	3.9	3.8	3.6	3.5	3.5	3.4	3.2	3.0	2.7	2.7	2.7	2.6	2.5	2.5	2.2	2.0	1.8	1.3	1.4	1.5	1.6	1.1	1.8																											
2008	1.9	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.1	2.2	2.3	2.4	2.7	3.1	3.3	3.5	3.6	3.9	4.0	4.0	3.9	3.9	3.9	3.8	3.7	3.6	3.5	3.4	3.3	3.1	2.8	2.8	2.8	2.7	2.7	2.6	2.4	2.2	2.1	1.7	1.9	2.0	2.3	2.1	3.0	4.2																											
2009	1.9	1.9	1.9	1.9	1.9	2.0	1.9	1.9	1.9	1.9	2.0	2.1	2.2	2.3	2.5	3.0	3.2	3.3	3.5	3.7	3.8	3.8	3.7	3.7	3.7	3.6	3.4	3.3	3.3	3.1	3.0	2.8	2.6	2.5	2.5	2.4	2.3	2.3	2.0	1.8	1.7	1.3	1.3	1.4	1.5	1.2	1.4	1.2	(1.7)																											
2010	1.7	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.7	1.8	1.9	2.0	2.1	2.3	2.8	2.9	3.1	3.2	3.4	3.5	3.6	3.4	3.4	3.4	3.3	3.1	3.0	2.9	2.8	2.6	2.4	2.2	2.1	2.1	2.0	1.9	1.8	1.5	1.3	1.1	0.7	0.6	0.6	0.5	0.1	0.0	(0.6)	(2.9)	(4.1)																											

	1960	1961	1962	1963	1964	1965	1966	1967	1968	1969	1970	1971	1972	1973	1974	1975	1976	1977	1978	1979	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009

INVESTMENT FROM END YEAR

The dates along the top (and bottom) are those on which each portfolio starts. Those down the side are the dates to which the annual rate of return is calculated. Reading the top figure in each column diagonally down the table gives the real rate of return in each year since 1960. The table can be used to see the real rate of return over any period; thus a purchase made at the end of 1963 would have lost 0.4% (allowing for reinvestment of income) in one year but over the first three years (up to the end of 1966) would have given an average annual real return of 1.2%. Each figure on the bottom line of the table shows the real growth up to December 2010 from the year shown below the figure.

REAL RETURN ON TREASURY BILLS - GROSS INCOME RE-INVESTED
REAL VALUE OF £100 INVESTED

INVESTMENT TO END YEAR

	1960	1961	1962	1963	1964	1965	1966	1967	1968	1969	1970	1971	1972	1973	1974	1975	1976	1977	1978	1979	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009
1961	101																																																
1962	103	102																																															
1963	104	104	102																																													
1964	104	103	102	100																																												
1965	106	105	103	101	102																																											
1966	108	108	106	104	104	102																																										
1967	112	111	109	107	108	106	103																																									
1968	114	113	111	109	109	107	105	101																																								
1969	117	116	114	112	113	111	108	105	103																																							
1970	117	116	114	112	112	110	108	104	103	100																																							
1971	114	113	111	109	109	107	105	101	100	97	97																																						
1972	111	110	109	106	107	105	103	99	98	95	95	98																																					
1973	110	109	107	105	105	104	101	98	97	94	94	97	99																																				
1974	104	103	101	99	100	98	96	92	91	88	89	91	93	94																																			
1975	92	91	90	88	88	87	85	82	81	78	79	81	83	84	89																																		
1976	89	88	87	85	85	84	82	79	78	76	76	78	80	81	86	97																																	
1977	87	86	85	83	83	82	80	77	76	74	74	76	78	79	84	94	98																																
1978	86	86	84	83	83	82	80	77	76	74	74	76	78	79	83	94	97	100																															
1979	84	83	82	80	80	79	77	75	74	71	72	74	75	76	81	91	94	96	97																														
1980	85	85	83	82	82	80	79	76	75	73	73	75	77	78	82	93	96	98	98	102																													
1981	86	86	84	83	83	82	80	77	76	74	74	76	78	79	83	94	97	100	100	103	102																												
1982	92	92	90	88	89	87	85	82	81	79	79	81	83	84	89	100	104	106	107	110	108	107																											
1983	96	96	94	92	93	91	89	86	85	82	83	85	87	88	93	105	108	111	111	115	113	111	105																										
1984	101	100	99	97	97	95	93	90	89	86	87	89	91	92	98	110	114	116	117	121	119	117	110	105																									
1985	107	106	104	102	103	101	99	95	94	91	92	94	96	98	103	116	120	123	124	128	126	124	116	111	106																							
1986	114	114	112	109	110	108	106	102	101	98	98	101	103	104	110	124	129	132	132	137	134	132	124	119	113	107																					
1987	121	120	118	116	116	114	112	108	106	103	104	106	109	110	117	132	136	139	140	144	142	140	131	125	120	113	106																				
1988	126	125	123	120	121	119	116	112	111	107	108	111	113	115	121	137	141	145	145	150	148	145	136	130	124	118	110	104																			
1989	134	133	130	128	128	126	123	119	118	114	115	118	120	122	129	145	150	154	155	160	157	155	145	139	132	125	117	111	106																		
1990	142	141	138	136	136	134	131	126	125	121	121	125	127	129	137	154	159	163	164	169	166	164	154	147	140	132	124	117	113	106																	
1991	151	150	148	145	145	143	140	135	133	129	130	133	136	138	146	165	170	174	175	181	178	175	164	157	150	141	132	125	120	113	107																
1992	161	160	157	155	155	152	149	144	142	138	138	142	145	147	156	176	182	186	187	193	190	187	175	167	160	151	141	134	128	121	114	107															
1993	168	166	164	161	161	158	155	150	148	143	144	148	151	153	162	183	189	193	194	200	197	194	182	174	166	157	147	139	133	125	118	111	104														
1994	172	171	168	164	165	162	159	153	151	147	147	151	154	157	166	187	193	198	199	205	202	199	186	178	170	161	150	142	137	129	121	114	106	102													
1995	178	176	173	170	171	168	164	159	156	152	152	156	160	162	171	193	200	205	205	212	209	205	193	184	176	166	155	147	141	133	125	117	110	106	103												
1996	184	183	180	176	177	174	170	164	162	157	158	162	166	168	178	200	207	212	213	220	216	213	200	191	182	172	161	152	146	138	130	122	114	110	107	104											
1997	190	188	185	182	182	179	175	170	167	162	163	167	171	173	183	207	214	219	220	227	223	220	206	197	188	178	166	157	151	142	134	126	118	113	111	107	103										
1998	199	198	195	191	192	188	184	178	176	170	171	176	179	182	192	217	224	230	231	238	234	231	216	207	197	187	174	165	159	149	141	132	124	119	116	112	108	105									
1999	207	205	202	198	199	195	191	185	182	177	177	182	186	189	200	225	233	238	239	247	243	239	224	214	205	193	181	171	165	155	146	137	128	123	120	116	112	109	104								
2000	213	212	208	204	205	202	197	190	188	182	183	188	192	195	206	232	240	246	247	255	250	247	231	221	211	200	187	177	170	160	151	141	132	127	124	120	116	112	107	103							
2001	224	222	218	214	215	211	206	200	197	191	192	197	201	204	216	243	251	258	258	267	262	258	242	232	221	209	195	185	178	167	158	148	138	133	130	126	121	118	112	108	105						
2002	226	224	221	216	217	214	209	202	199	193	194	199	203	206	218	246	254	261	261	270	265	261	245	234	224	211	198	187	180	169	160	149	140	135	132	127	123	119	113	109	106	101					
2003	228	227	223	218	219	216	211	204	201	195	196	201	205	208	220	248	257	263	264	273	268	264	247	237	226	213	200	189	182	171	161	151	141	136	133	128	124	120	114	110	107	102	101				
2004	231	229	225	221	222	218	213	206	203	197	198	203	207	210	223	251	259	266	267	276	271	267	250	239	228	216	202	191	184	173	163	152	143	137	134	130	125	121	116	112	108	103	102	101			
2005	237	235	231	227	228	224	219	212	209	202	203	209	213	216	229	258	267	273	274	283	278	274	257	246	235	222	207	196	189	177	167	157	147	141	138	133	129	125	119	115	111	106	105	104	103		
2006	238	236	232	228	229	225	220	212	210	203	204	210	214	217	230	259	268	274	275	284	279	275	258	247	236	223	208	197	189	178	168	157	147	142	139	134	129	125	119	115	112	106	105	104	103	100	
2007	242	240	236	232	233	229	223	216	213	207	208	213	218	221	234	264	272	279	280	289	284	280	263	251	240	226	212	200	193	181	171	160	150	144	141	136	132	128	121	117	113	108	107	106	105	102	102
2008	252	251	246	242	243	238	233	225	222	216	216	222	227	230	244	275	284	291	292	302	296	292	274	262	250	236	221	209	201	189	178	167	156	150	147	142	137	133	127	122	118	113	112	111	109	107	106
2009	248	246	242	238	238	234	229	222	218	212	213	218	223	226	240	270	279	286	287	297	291	287	269	257	246	232	217	205	197	186	175	164	154	148	144	140	135	131	124	120	116	111	110	109	108	105	104
2010	238	236	232	228	229	225	220	213	210	203	204	210	214	217	230	259	268	274	275	284	279	275	258	247	236	223	208	197	189	178	168	157	147	142	139	134	129	125	119	115	112	106	105	104	103	100	100

1960	1961	1962	1963	1964	1965	1966	1967	1968	1969	1970	1971	1972	1973	1974	1975	1976	1977	1978	1979	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009

The dates along the top (and bottom) are those on which each portfolio starts. Those down the side are the dates to which the change in real value is calculated. Reading the top figure in each column diagonally down the table gives the growth in each year since 1960. The table can be used to see the real growth over any period; thus an investment of £100 made at the end of 1978 would have fallen to £97 (allowing for reinvestment of income and the effect of inflation) in one year but after four years (up to the end of 1982) would have reached £107 in real terms. Each figure on the bottom line of the table shows the real growth up to December 2010 from the year shown below the figure.

REAL RETURN ON BUILDING SOCIETY ACCOUNT - GROSS INCOME RE-INVESTED

AVERAGE ANNUAL REAL RATE OF RETURN

INVESTMENT FROM END YEAR

INVESTMENT TO END YEAR

	1960	1961	1962	1963	1964	1965	1966	1967	1968	1969	1970	1971	1972	1973	1974	1975	1976	1977	1978	1979	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009
1961	1.4																																																	
1962	2.4	3.4																																																
1963	2.9	3.6	3.9																																															
1964	2.4	2.7	2.4	0.9																																													
1965	2.3	2.5	2.2	1.4	1.9																																												
1966	2.4	2.6	2.4	1.9	2.5	3.0																																											
1967	2.7	3.0	2.9	2.6	3.2	3.8	4.7																																										
1968	2.6	2.7	2.6	2.4	2.8	3.1	3.1	1.5																																									
1969	2.7	2.8	2.8	2.6	2.9	3.2	3.2	2.5	3.5																																								
1970	2.5	2.6	2.5	2.3	2.5	2.6	2.5	1.8	2.0	0.6																																							
1971	2.2	2.2	2.1	1.9	2.0	2.1	1.9	1.2	1.1	(0.1)	(0.7)																																						
1972	2.0	2.1	2.0	1.7	1.8	1.8	1.6	1.0	0.9	0.1	(0.1)	0.5																																					
1973	1.8	1.8	1.7	1.5	1.6	1.5	1.3	0.7	0.6	(0.1)	(0.3)	(0.2)	(0.8)																																				
1974	1.2	1.1	1.0	0.7	0.7	0.6	0.2	(0.4)	(0.7)	(1.5)	(2.0)	(2.4)	(3.8)	(6.8)																																				
1975	0.3	0.2	(0.0)	(0.3)	(0.4)	(0.7)	(1.1)	(1.8)	(2.2)	(3.2)	(3.9)	(4.7)	(6.3)	(9.0)	(11.1)																																				
1976	0.0	(0.1)	(0.3)	(0.6)	(0.7)	(1.0)	(1.4)	(2.0)	(2.4)	(3.3)	(3.9)	(4.5)	(5.7)	(7.3)	(7.6)	(3.8)																																				
1977	(0.0)	(0.1)	(0.4)	(0.7)	(0.8)	(1.0)	(1.4)	(1.9)	(2.3)	(3.0)	(3.5)	(4.0)	(4.8)	(5.8)	(5.5)	(2.6)	(1.3)																																			
1978	0.0	(0.1)	(0.3)	(0.6)	(0.7)	(0.9)	(1.2)	(1.7)	(2.0)	(2.6)	(3.0)	(3.3)	(3.9)	(4.5)	(3.9)	(1.4)	(0.2)	1.0																																			
1979	(0.2)	(0.3)	(0.5)	(0.8)	(0.9)	(1.1)	(1.4)	(1.9)	(2.2)	(2.8)	(3.1)	(3.4)	(4.0)	(4.5)	(4.0)	(2.1)	(1.6)	(1.7)	(4.3)																																			
1980	(0.2)	(0.3)	(0.5)	(0.8)	(0.9)	(1.0)	(1.3)	(1.8)	(2.0)	(2.5)	(2.8)	(3.1)	(3.5)	(3.9)	(3.4)	(1.7)	(1.2)	(1.2)	(2.2)	(0.1)																																		
1981	(0.2)	(0.2)	(0.4)	(0.7)	(0.8)	(0.9)	(1.2)	(1.6)	(1.8)	(2.2)	(2.5)	(2.7)	(3.0)	(3.3)	(2.8)	(1.3)	(0.8)	(0.7)	(1.2)	0.3	0.8																																	
1982	0.1	0.1	(0.1)	(0.3)	(0.4)	(0.5)	(0.7)	(1.1)	(1.3)	(1.6)	(1.8)	(1.9)	(2.1)	(2.3)	(1.7)	(0.3)	0.4	0.7	0.6	2.3	3.6	6.4																																	
1983	0.3	0.2	0.1	(0.1)	(0.1)	(0.3)	(0.4)	(0.8)	(0.9)	(1.2)	(1.3)	(1.4)	(1.6)	(1.6)	(1.1)	0.3	0.9	1.3	1.3	2.8	3.8	5.3	4.1																																
1984	0.5	0.5	0.3	0.2	0.1	0.0	(0.1)	(0.4)	(0.5)	(0.8)	(0.9)	(0.9)	(1.0)	(1.0)	(0.4)	0.8	1.4	1.8	2.0	3.2	4.1	5.2	4.6	5.2																																
1985	0.7	0.6	0.5	0.4	0.3	0.3	0.1	(0.1)	(0.2)	(0.5)	(0.5)	(0.5)	(0.6)	(0.6)	0.0	1.2	1.8	2.2	2.4	3.5	4.3	5.1	4.7	5.0	4.8																																
1986	0.9	0.9	0.8	0.6	0.6	0.6	0.4	0.2	0.1	(0.1)	(0.1)	(0.0)	(0.1)	(0.0)	0.6	1.7	2.3	2.7	2.9	3.9	4.6	5.4	5.2	5.5	5.7	6.6																																
1987	1.1	1.0	1.0	0.8	0.8	0.8	0.7	0.5	0.4	0.3	0.2	0.3	0.3	0.4	0.9	2.0	2.6	3.0	3.2	4.2	4.8	5.5	5.3	5.6	5.7	6.2	5.7																																
1988	1.1	1.1	1.0	0.9	0.9	0.8	0.7	0.5	0.5	0.3	0.3	0.4	0.4	0.4	1.0	2.0	2.5	2.8	3.0	3.9	4.4	4.9	4.6	4.7	4.6	4.5	3.5	1.4																																
1989	1.1	1.1	1.0	0.9	0.9	0.9	0.8	0.6	0.6	0.4	0.4	0.5	0.5	0.6	1.1	2.0	2.5	2.8	3.0	3.7	4.2	4.6	4.4	4.4	4.3	4.1	3.3	2.1	2.8																																
1990	1.2	1.2	1.1	1.0	1.0	1.0	0.9	0.7	0.7	0.5	0.5	0.6	0.6	0.7	1.2	2.1	2.5	2.8	2.9	3.6	4.0	4.4	4.1	4.1	4.0	3.8	3.1	2.2	2.6	2.5																																
1991	1.3	1.3	1.2	1.1	1.1	1.1	1.0	0.9	0.8	0.7	0.7	0.8	0.8	0.9	1.4	2.2	2.6	2.9	3.1	3.7	4.1	4.4	4.2	4.2	4.1	3.9	3.4	2.8	3.3	3.6	4.6																																
1992	1.5	1.5	1.4	1.3	1.3	1.3	1.2	1.1	1.1	1.0	1.0	1.1	1.1	1.2	1.7	2.5	2.9	3.2	3.3	4.0	4.3	4.6	4.4	4.5	4.4	4.3	4.0	3.6	4.2	4.6	5.7	6.8																																
1993	1.5	1.5	1.4	1.3	1.4	1.3	1.3	1.1	1.1	1.0	1.0	1.1	1.2	1.3	1.7	2.5	2.9	3.1	3.3	3.8	4.1	4.4	4.2	4.2	4.1	4.1	3.7	3.4	3.8	4.0	4.5	4.5	2.2																																
1994	1.5	1.5	1.4	1.3	1.3	1.3	1.3	1.1	1.1	1.0	1.0	1.1	1.1	1.2	1.7	2.4	2.7	3.0	3.1	3.6	3.9	4.1	3.9	3.9	3.8	3.7	3.3	3.0	3.3	3.4	3.6	3.2	1.5	0.8																																
1995	1.4	1.4	1.4	1.3	1.3	1.3	1.2	1.1	1.1	1.0	1.0	1.1	1.1	1.2	1.6	2.3	2.6	2.9	3.0	3.4	3.7	3.9	3.7	3.7	3.5	3.4	3.0	2.7	2.9	2.9	3.0	2.6	1.2	0.7	0.7																																
1996	1.4	1.4	1.3	1.3	1.3	1.3	1.2	1.1	1.1	1.0	1.0	1.1	1.1	1.2	1.5	2.2	2.5	2.7	2.8	3.2	3.4	3.6	3.4	3.4	3.2	3.1	2.7	2.4	2.5	2.5	2.5	2.1	0.9	0.5	0.4	0.2																																
1997	1.3	1.3	1.3	1.2	1.2	1.2	1.1	1.0	1.0	0.9	0.9	1.0	1.0	1.1	1.5	2.1	2.4	2.5	2.6	3.0	3.2	3.4	3.2	3.1	2.9	2.8	2.4	2.1	2.2	2.1	2.1	1.7	0.6	0.3	0.1	(0.2)	(0.5)																																
1998	1.4	1.4	1.4	1.3	1.3	1.3	1.2	1.1	1.1	1.0	1.0	1.1	1.1	1.2	1.6	2.2	2.4	2.6	2.7	3.1	3.3	3.4	3.2	3.2	3.0	2.9	2.6	2.3	2.4	2.4	2.3	2.0	1.2	1.0	1.1	1.2	1.8	4.2																																
1999	1.5	1.5	1.4	1.3	1.4	1.3	1.3	1.2	1.2	1.1	1.1	1.2	1.2	1.3	1.6	2.2	2.5	2.7	3.1	3.3	3.4	3.2	3.2	3.0	2.9	2.6	2.4	2.5	2.4	2.4	2.2	1.5	1.4	1.5	1.8	2.3	3.7	3.3																																
2000	1.5	1.5	1.4	1.4	1.4	1.4	1.3	1.2	1.2	1.2	1.2	1.3	1.3	1.7	2.2	2.5	2.6	2.7	3.1	3.2	3.4	3.2	3.1	3.0	2.9	2.6	2.4	2.5	2.4	2.4	2.2	1.6	1.6	1.7	1.9	2.3	3.3	2.9	2.5																																
2001	1.6	1.6	1.5	1.4	1.5	1.4	1.4	1.3	1.3	1.2	1.3	1.3	1.4	1.4	1.8	2.3	2.5	2.7	2.8	3.1	3.3	3.4	3.2	3.2	3.1	3.0	2.7	2.5	2.6	2.6	2.6	2.4	1.9	1.9	2.0	2.2	2.7	3.5	3.3	3.2	4.0																																
2002	1.5	1.5	1.5	1.4	1.4	1.4	1.4	1.3	1.3	1.2	1.2	1.3	1.3	1.4	1.7	2.2	2.5	2.6	2.7	3.0	3.1	3.2	3.1	3.0	2.9	2.8	2.6	2.4	2.4	2.4	2.4	2.2	1.8	1.7	1.8	2.0	2.3	2.9	2.5	2.3	2.2	0.4																																
2003	1.5	1.5	1.5	1.4	1.4	1.4	1.4	1.3	1.3	1.2	1.2	1.3	1.3	1.4	1.7	2.2	2.4	2.5	2.6	2.9	3.0	3.1	3.0	2.9	2.8	2.7	2.5	2.2	2.3	2.3	2.3	2.1	1.6	1.6	1.7	1.8	2.0	2.5	2.1	1.8	1.6	0.5	0.5																																
2004	1.5	1.5	1.4	1.4	1.4	1.4	1.3	1.2	1.2	1.2	1.2	1.3	1.3	1.3	1.6	2.1	2.3	2.5	2.5	2.8	2.9	3.0	2.9	2.8	2.7	2.6	2.4	2.2	2.2	2.2	2.1	2.0	1.6	1.5	1.6	1.7	1.9	2.2	1.9	1.6	1.4	0.6	0.6	0.7																																
2005	1.5	1.5	1.4	1.4	1.4	1.4	1.3	1.3	1.3	1.2	1.2	1.3	1.3	1.4	1.6	2.1	2.3	2.4	2.5	2.8	2.9	3.0	2.8	2.8	2.6	2.5	2.3	2.1	2.2	2.1	2.1	1.9	1.6	1.5	1.6	1.7	1.8	2.2	1.9	1.6	1.5	0.8	1.0	1.2	1.7																																
2006	1.5	1.5	1.4	1.4	1.4	1.4	1.3	1.2	1.2	1.2	1.2	1.2	1.3	1.3	1.6	2.0	2.2	2.3	2.4	2.6	2.8	2.8	2.7	2.6	2.5	2.4	2.2	2.0	2.1	2.0	2.0	1.8	1.5	1.4	1.4	1.5	1.7	1.9	1.6	1.4	1.2	0.7	0.7	0.8	0.8	(0.1)																																
2007	1.4	1.4	1.4	1.3	1.3	1.3	1.3	1.2	1.2	1.1	1.2	1.2	1.2	1.3	1.6	2.0	2.2	2.3	2.3	2.6	2.7	2.8	2.6	2.5	2.4	2.3	2.1	1.9	2.0	1.9	1.9	1.7	1.4	1.3	1.4	1.4	1.6	1.8	1.5	1.3	1.1	0.7	0.7	0.8	0.8	0.3	0.7																																
2008	1.4	1.4	1.4	1.3	1.3	1.3	1.3	1.2	1.2	1.1	1.1	1.2	1.2	1.3	1.5	1.9	2.1	2.2	2.3	2.5	2.6	2.6	2.5	2.4	2.3	2.2	2.0	1.9	1.9	1.8	1.8	1.6	1.3	1.3	1.3	1.3	1.4	1.6	1.4	1.1	1.0	0.6	0.6	0.6	0.6	0.2	0.3	(0.1)																																
2009	1.3	1.3	1.3	1.2	1.2	1.2	1.2	1.1	1.1	1.0	1.0	1.1	1.1	1.2	1.4	1.8	2.0	2.1	2.1	2.3	2.4	2.5	2.3	2.3	2.1	2.0	1.8	1.7	1.7	1.6	1.6	1.4	1.1	1.0	1.1	1.1	1.2	1.3	1.0	0.8	0.6	0.2	0.2	0.1	0.0	(0.4)	(0.5)	(1.1)	(2.1)																																
2010	1.2	1.2	1.2	1.1	1.1	1.1	1.1	1.0	1.0	0.9	0.9	0.9	1.0	1.0	1.2	1.6	1.8	1.9	1.9	2.1	2.2	2.2	2.1	2.0	1.9	1.8	1.6	1.4	1.4	1.3	1.3	1.1	0.8	0.7	0.7	0.7	0.7	0.8	0.6	0.3	0.1	(0.3)	(0.4)	(0.5)	(0.7)	(1.2)	(1.5)	(2.2)	(3.2)	(4.4)																																

	1960	1961	1962	1963	1964	1965	1966	1967	1968	1969	1970	1971	1972	1973	1974	1975	1976	1977	1978	1979	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009

INVESTMENT FROM END YEAR

The dates along the top (and bottom) are those on which each portfolio starts. Those down the side are the dates to which the annual rate of return is calculated. Reading the top figure in each column diagonally down the table gives the real rate of return in each year since 1960. The table can be used to see the real rate of return over any period; thus a purchase made at the end of 1960 would have grown by 1.4% (allowing for reinvestment of income) in one year but over the first three years (up to the end of 1963) would have given an average annual real return of 2.9%. Each figure on the bottom line of the table shows the real growth up to December 2010 from the year shown below the figure.

REAL RETURN ON BUILDING SOCIETY ACCOUNT - GROSS INCOME RE-INVESTED
REAL VALUE OF £100 INVESTED

INVESTMENT TO END YEAR

	1960	1961	1962	1963	1964	1965	1966	1967	1968	1969	1970	1971	1972	1973	1974	1975	1976	1977	1978	1979	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009
1961	101																																																
1962	105	103																																																
1963	109	107	104																																														
1964	110	108	105	101																																													
1965	112	110	107	103	102																																												
1966	115	114	110	106	105	103																																											
1967	121	119	115	111	110	108	105																																									
1968	123	121	117	113	112	109	106	101																																								
1969	127	125	121	116	115	113	110	105	103																																							
1970	127	126	122	117	116	114	111	106	104	101																																							
1971	127	125	121	116	115	113	110	105	103	100	99																																						
1972	127	125	121	117	116	114	110	105	104	100	100	100																																					
1973	126	124	120	116	115	113	109	105	103	100	99	100	99																																				
1974	118	116	112	108	107	105	102	97	96	93	92	93	92	93																																			
1975	105	103	100	96	95	93	91	87	85	82	82	83	82	83	89																																		
1976	101	99	96	92	92	90	87	83	82	79	79	79	79	80	85	96																																	
1977	99	98	95	91	90	89	86	82	81	78	78	78	78	79	84	95	99																																
1978	100	99	96	92	91	89	87	83	82	79	79	79	79	79	85	96	100	101																															
1979	96	95	91	88	87	86	83	79	78	76	75	76	75	76	81	92	95	97	96																														
1980	96	94	91	88	87	86	83	79	78	76	75	76	75	76	81	92	95	97	96	100																													
1981	97	95	92	89	88	86	84	80	79	76	76	76	76	76	82	92	96	97	96	101	101																												
1982	103	101	98	94	94	92	89	85	84	81	81	81	81	81	87	98	102	104	103	107	107	106																											
1983	107	105	102	98	97	96	93	89	87	84	84	84	84	85	91	102	106	108	107	112	112	111	104																										
1984	112	111	107	103	102	100	98	93	92	89	88	89	88	89	96	108	112	113	112	117	117	117	109	105																									
1985	118	116	112	108	107	105	102	98	96	93	92	93	93	93	100	113	117	119	118	123	123	122	115	110	105																							
1986	126	124	120	115	114	112	109	104	103	99	99	99	99	100	107	120	125	127	126	131	131	130	122	118	112	107																					
1987	133	131	127	122	121	119	115	110	108	105	104	105	105	105	113	127	132	134	133	139	139	138	129	124	118	113	106																				
1988	135	133	129	124	123	120	117	112	110	106	106	106	106	107	115	129	134	136	135	141	141	140	131	126	120	114	107	101																			
1989	138	137	132	127	126	124	120	115	113	109	109	109	109	110	118	132	138	140	138	144	145	144	135	130	123	117	110	104	103																		
1990	142	140	135	130	129	127	123	118	116	112	111	112	112	112	121	136	141	143	142	148	148	147	138	133	126	120	113	107	105	102																	
1991	149	146	142	136	135	133	129	123	121	117	116	117	117	118	126	142	148	150	148	155	155	154	145	139	132	126	118	112	110	107	105																
1992	159	156	151	146	144	142	138	131	129	125	124	125	125	126	135	152	158	160	158	166	166	164	154	148	141	135	126	119	118	115	112	107															
1993	162	160	155	149	148	145	141	134	132	128	127	128	127	128	138	155	161	163	162	169	169	168	158	152	144	137	129	122	120	117	114	109	102													
1994	163	161	156	150	149	146	142	135	133	129	128	129	128	129	139	156	163	165	163	170	171	169	159	153	145	139	130	123	121	118	115	110	103	101											
1995	164	162	157	151	150	147	143	136	134	130	129	130	129	130	140	157	164	166	164	172	172	170	160	154	146	139	131	124	122	119	116	111	104	101	101										
1996	165	162	157	151	150	147	143	136	134	130	129	130	130	131	140	158	164	166	165	172	172	171	160	154	146	140	131	124	122	119	116	111	104	102	101	100									
1997	164	162	156	150	149	146	142	136	134	129	129	129	129	130	139	157	163	165	164	171	171	170	160	153	146	139	130	123	122	118	115	110	103	101	100	100	99								
1998	171	168	163	157	155	152	148	141	139	135	134	135	134	135	145	163	170	172	170	178	178	177	166	160	152	145	136	128	127	123	120	115	108	105	104	104	104	104							
1999	176	174	168	162	161	157	153	146	144	139	138	139	139	140	150	169	175	178	176	184	184	183	172	165	157	150	140	133	131	127	124	119	111	109	108	107	107	108	103						
2000	181	178	172	166	165	161	157	150	148	143	142	143	142	143	154	173	180	182	180	189	189	187	176	169	161	153	144	136	134	130	127	122	114	111	111	110	110	110	106	102					
2001	188	185	179	173	171	168	163	156	153	148	147	148	148	149	160	180	187	189	188	196	196	195	183	176	167	159	150	141	139	136	132	127	118	116	115	114	114	115	110	107	104				
2002	189	186	180	173	172	169	164	156	154	149	148	149	148	150	160	181	188	190	188	197	197	196	184	176	168	160	150	142	140	136	133	127	119	116	116	115	115	115	111	107	104	100			
2003	190	187	181	174	173	169	164	157	155	150	149	150	149	150	161	181	189	191	189	198	198	197	185	177	169	161	151	143	141	137	134	128	120	117	116	115	115	116	111	108	105	101	101		
2004	191	188	182	175	174	171	166	158	156	151	150	151	150	151	162	183	190	193	191	199	200	198	186	179	170	162	152	144	142	138	135	129	120	118	117	116	116	117	112	108	106	102	101	101	
2005	194	192	185	178	177	174	168	161	159	153	152	154	153	154	165	186	193	196	194	203	203	201	189	182	173	165	155	146	144	140	137	131	122	120	119	118	118	119	114	110	108	103	103	102	102
2006	194	191	185	178	177	173	168	161	158	153	152	153	153	154	165	186	193	196	194	203	203	201	189	182	173	165	154	146	144	140	137	131	122	120	119	118	118	119	114	110	107	103	103	102	102
2007	195	193	187	180	178	175	170	162	160	154	153	154	154	155	166	187	194	197	195	204	204	203	190	183	174	166	156	147	145	141	138	132	123	121	120	119	119	119	115	111	108	104	104	103	102
2008	195	193	186	179	178	174	169	162	159	154	153	154	154	155	166	187	194	197	195	204	204	202	190	183	174	166	155	147	145	141	138	132	123	120	120	119	119	119	114	111	108	104	103	103	102
2009	191	189	182	176	174	171	166	158	156	151	150	151	150	152	163	183	190	193	191	200	200	198	186	179	170	162	152	144	142	138	135	129	121	118	117	116	116	117	112	108	106	102	101	101	100
2010	183	180	174	168	166	163	159	151	149	144	143	144	144	145	155	175	182	184	183	191	191	189	178	171	163	155	146	138	136	132	129	123	115	113	112	111	111	112	107	104	101	97	97	96	96

	1960	1961	1962	1963	1964	1965	1966	1967	1968	1969	1970	1971	1972	1973	1974	1975	1976	1977	1978	1979	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009

The dates along the top (and bottom) are those on which each portfolio starts. Those down the side are the dates to which the change in real value is calculated. Reading the top figure in each column diagonally down the table gives the growth in each year since 1960. The table can be used to see the real growth over any period; thus an investment of £100 made at the end of 1960 would have grown to £101 (allowing for reinvestment of income and the effect of inflation) in one year but after three years (up to the end of 1963) would have reached £109 in real terms. Each figure on the bottom line of the table shows the real growth up to December 2010 from the year shown below the figure.

REAL RETURN ON INDEX-LINKED GILTS

AVERAGE ANNUAL REAL RATE OF RETURN

GROSS INCOME RE-INVESTED

INVESTMENT TO END YEAR

	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009
1983	(4.3)																											
1984	(1.2)	1.9																										
1985	(2.7)	(1.9)	(5.5)																									
1986	(1.5)	(0.5)	(1.7)	2.3																								
1987	(0.6)	0.4	(0.1)	2.7	3.1																							
1988	0.6	1.6	1.5	3.9	4.8	6.5																						
1989	1.4	2.3	2.4	4.5	5.3	6.4	6.3																					
1990	0.6	1.3	1.2	2.7	2.7	2.6	0.8	(4.5)																				
1991	0.6	1.3	1.2	2.3	2.3	2.2	0.7	(1.9)	0.7																			
1992	1.9	2.6	2.7	3.9	4.2	4.4	3.9	3.2	7.2	14.1																		
1993	3.3	4.1	4.4	5.7	6.2	6.7	6.8	6.9	11.0	16.5	18.9																	
1994	2.1	2.7	2.8	3.8	3.9	4.1	3.7	3.1	5.2	6.7	3.1	(10.5)																
1995	2.6	3.2	3.3	4.2	4.4	4.6	4.3	4.0	5.8	7.1	4.9	(1.5)	8.5															
1996	2.7	3.2	3.3	4.2	4.4	4.5	4.3	4.0	5.5	6.5	4.6	0.3	6.2	4.0														
1997	3.1	3.7	3.8	4.6	4.8	5.0	4.8	4.7	6.0	7.0	5.6	2.5	7.3	6.7	9.4													
1998	3.9	4.5	4.7	5.5	5.8	6.1	6.0	6.0	7.4	8.3	7.4	5.3	9.6	10.0	13.2	17.1												
1999	3.9	4.4	4.6	5.4	5.6	5.8	5.7	5.7	6.9	7.7	6.8	4.9	8.3	8.3	9.7	9.9	3.2											
2000	3.7	4.2	4.3	5.0	5.2	5.4	5.3	5.2	6.2	6.8	5.9	4.2	6.9	6.6	7.2	6.5	1.6	0.1										
2001	3.4	3.8	4.0	4.6	4.7	4.8	4.7	4.6	5.5	5.9	5.1	3.5	5.6	5.2	5.4	4.4	0.5	(0.7)	(1.6)									
2002	3.5	3.9	4.0	4.6	4.7	4.9	4.7	4.6	5.4	5.9	5.1	3.6	5.6	5.2	5.4	4.6	1.7	1.2	1.7	5.1								
2003	3.5	3.9	4.0	4.6	4.7	4.8	4.7	4.6	5.3	5.7	5.0	3.7	5.4	5.0	5.1	4.4	2.1	1.8	2.4	4.5	3.9							
2004	3.6	4.0	4.1	4.6	4.7	4.8	4.7	4.6	5.3	5.6	5.0	3.8	5.3	5.0	5.1	4.5	2.6	2.4	3.0	4.6	4.4	4.9						
2005	3.7	4.1	4.2	4.7	4.8	4.9	4.8	4.7	5.4	5.7	5.1	4.0	5.5	5.2	5.3	4.8	3.2	3.2	3.8	5.2	5.2	5.8	6.7					
2006	3.5	3.8	3.9	4.4	4.5	4.5	4.4	4.3	4.9	5.2	4.6	3.5	4.8	4.5	4.5	4.0	2.5	2.4	2.8	3.7	3.3	3.1	2.2	(2.1)				
2007	3.4	3.7	3.8	4.2	4.3	4.4	4.3	4.2	4.7	4.9	4.4	3.4	4.5	4.2	4.3	3.7	2.4	2.3	2.6	3.3	2.9	2.7	2.0	(0.3)	1.4			
2008	3.2	3.5	3.5	3.9	4.0	4.1	3.9	3.8	4.3	4.5	3.9	3.0	4.1	3.7	3.7	3.2	1.9	1.8	2.0	2.5	2.1	1.7	0.9	(0.9)	(0.4)	(2.1)		
2009	3.2	3.4	3.5	3.9	4.0	4.0	3.9	3.8	4.2	4.4	3.9	3.0	4.0	3.7	3.7	3.2	2.0	1.9	2.1	2.6	2.2	2.0	1.4	0.1	0.8	0.5	3.1	
2010	3.2	3.5	3.6	4.0	4.0	4.1	4.0	3.9	4.3	4.5	4.0	3.2	4.1	3.8	3.8	3.4	2.3	2.2	2.4	2.9	2.6	2.4	2.0	1.1	1.9	2.1	4.2	5.3

REAL VALUE OF £100 INVESTED

GROSS INCOME RE-INVESTED

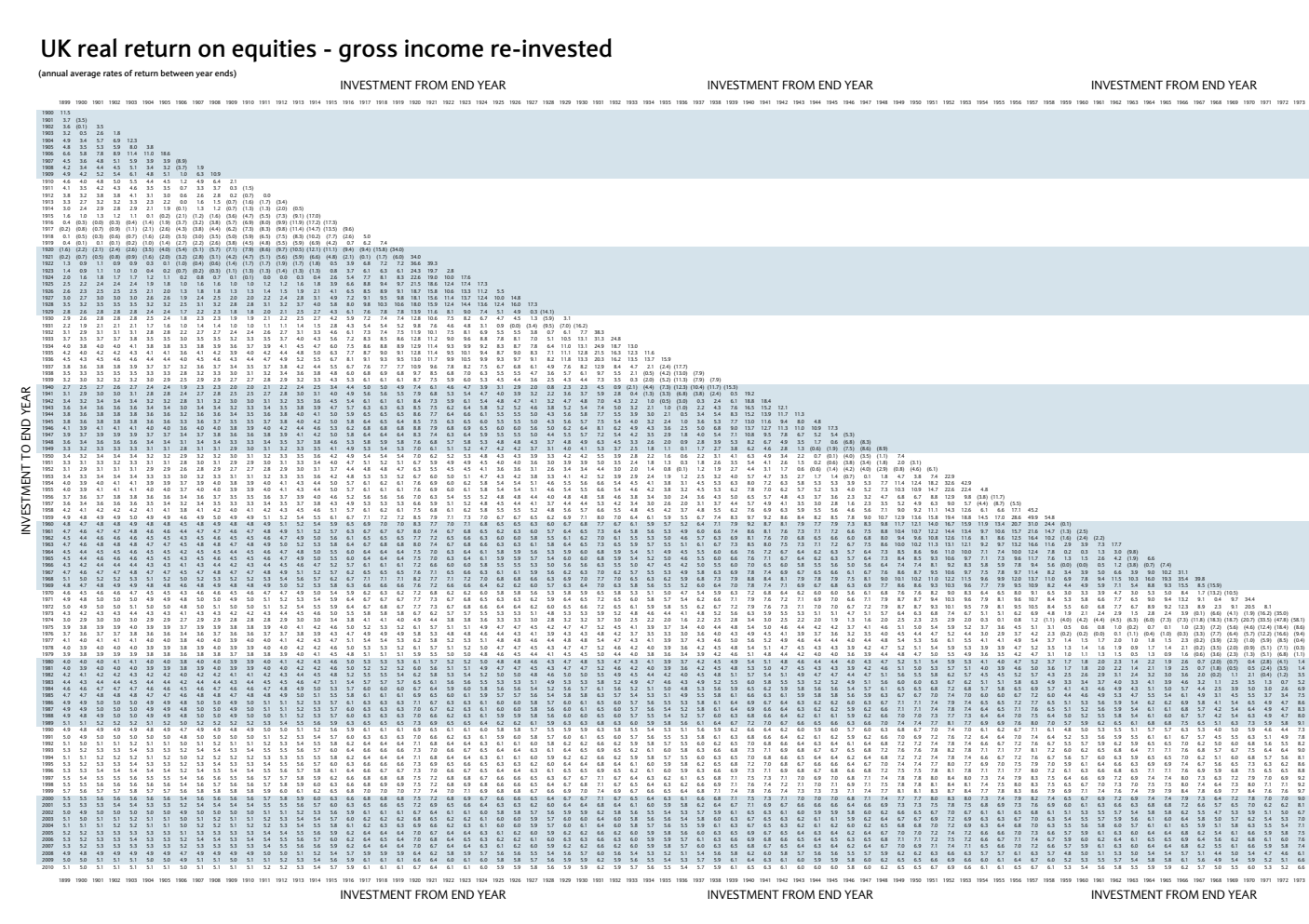
INVESTMENT TO END YEAR

	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009
1983	96																											
1984	98	102																										
1985	92	96	94																									
1986	94	98	97	102																								
1987	97	102	100	105	103																							
1988	103	108	106	112	110	106																						
1989	110	115	113	119	117	113	106																					
1990	105	110	108	114	111	108	102	95																				
1991	106	111	108	115	112	109	102	96	101																			
1992	121	126	124	131	128	124	117	110	115	114																		
1993	144	150	147	156	152	148	139	130	137	136	119																	
1994	128	134	132	139	136	132	124	117	122	121	106	89																
1995	139	146	143	151	148	143	135	127	133	132	115	97	108															
1996	145	151	148	157	154	149	140	132	138	137	120	101	113	104														
1997	158	166	162	172	168	163	153	144	151	150	131	110	123	114	109													
1998	186	194	190	201	197	191	179	169	177	175	154	129	144	133	128	117												
1999	191	200	196	208	203	197	185	174	182	181	158	133	149	137	132	121	103											
2000	192	200	196	208	203	197	185	174	182	181	159	133	149	138	132	121	103	100										
2001	189	197	193	205	200	194	182	171	179	178	156	131	147	135	130	119	102	99	98									
2002	198	207	203	215	210	204	191	180	189	187	164	138	154	142	137	125	107	104	103	105								
2003	206	215	211	223	218	212	199	187	196	194	170	143	160	148	142	130	111	108	107	109	104							
2004	216	226	221	234	229	222	209	196	206	204	179	150	168	155	149	136	116	113	113	115	109	105						
2005	231	241	236	250	244	237	223	210	219	218	191	161	179	165	159	145	124	120	120	122	116	112	107					
2006	226	236	231	245	239	232	218	205	215	213	187	157	176	162	156	142	122	118	118	120	114	110	105	98				
2007	229	239	235	248	243	236	221	208	218	216	190	160	178	164	158	144	123	120	119	121	116	111	106	99	101			
2008	224	234	230	243	238	231	217	204	213	212	186	156	175	161	155	141	121	117	117	119	113	109	104	97	99	98		
2009	231	241	237	251	245	238	223	210	220	218	191	161	180	166	160	146	125	121	121	123	117	112	107	100	102	101	103	
2010	243	254	249	264	258	250	235	221	232	230	202	170	190	175	168	154	131	127	127	129	123	118	113	106	108	106	109	105

UK real return on equities - gross income re-invested

(annual average rates of return between year ends)

INVESTMENT FROM END YEAR | INVESTMENT FROM END YEAR | INVESTMENT FROM END YEAR | INVESTMENT FROM END YEAR



INVESTMENT TO END YEAR

HOW TO USE TABLES OF TOTAL RETURNS

The dates along the top (and bottom) are those on which each portfolio starts; those down the side are the dates to which the annual rate of return is calculated. Thus the figure at the bottom right hand corner - 8.9 - shows that the real return on a portfolio bought at the end of December 2009 and held for one year to December 2010 was 8.9%. Figures in brackets indicate negative returns.

Each figure on the bottom line of the table shows the average annual return up to the end of December 2010 from the year shown below the figure. The first figure is 5.1, showing that the average annual rate of return over the whole period since 1899 has been 5.1%.

The top figure in each column is the rate of return in the first year, so that reading diagonally down the table gives the real rate of return in each year since 1899. The table can be used to see the rate of return over any period; thus a purchase made at the end of 1900 would have lost 3.5% of its value in one year (allowing for reinvestment of income) but, over the first five years (up to the end of 1905), would have given an average annual real return of 3.5%.

UK real capital value of equities

(annual average rates of return between year-ends)

INVESTMENT FROM END YEAR

INVESTMENT TO END YEAR

HOW TO USE TABLES OF RETURNS

The dates along the top (and bottom) are those on which each portfolio starts; those down the side are the dates to which the annual rate of return is calculated. Thus the figure at the bottom right hand corner - 106 - shows that the real capital value of a portfolio bought at the end of December 2009 and held for one year to December 2010 was £106. Figures in brackets indicate negative returns.

Each figure on the bottom line of the table shows the real capital value of £100 up to the end of December 2010 from the year shown below the figure. The first figure is 180, showing that the accumulated capital value of £100 for the whole period since 1899 is £180.

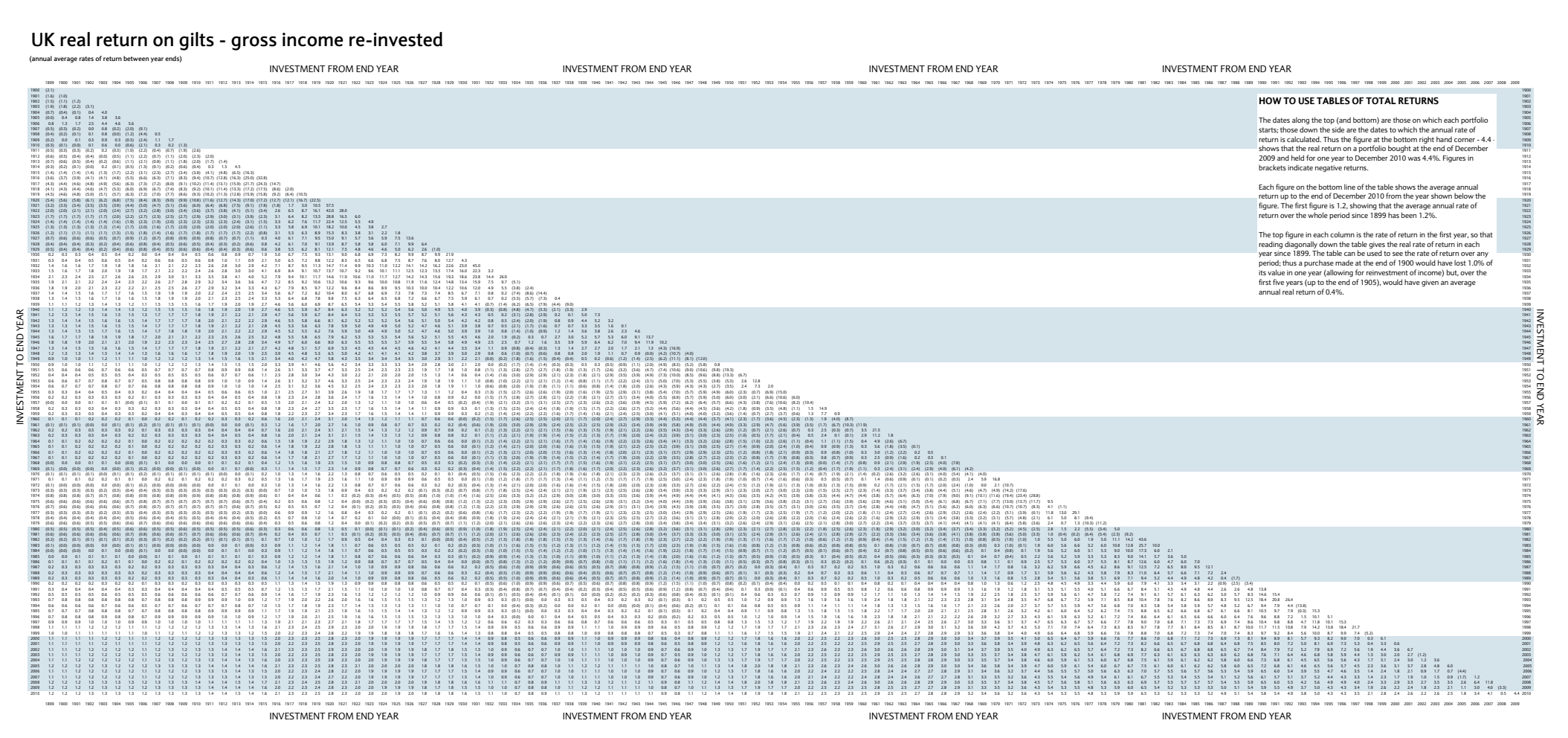
The top figure in each column is the capital value in the first year, so that reading diagonally down the table gives the capital value in each year since 1899. The table can be used to see the cumulative capital growth over any period; thus a £100 investment made at the end of 1940 would have fallen to £92 in one year but, over the first five years (up to the end of 1905), would have climbed back up to £94, £6 below the original investment.

UK real return on gilts - gross income re-invested

(annual average rates of return between year ends)

INVESTMENT FROM END YEAR

INVESTMENT TO END YEAR



HOW TO USE TABLES OF TOTAL RETURNS

The dates along the top (and bottom) are those on which each portfolio starts; those down the side are the dates to which the annual rate of return is calculated. Thus the figure at the bottom right hand corner - 4.4 - shows that the real return on a portfolio bought at the end of December 2009 and held for one year to December 2010 was 4.4%. Figures in brackets indicate negative returns.

Each figure on the bottom line of the table shows the average annual return up to the end of December 2010 from the year shown below the figure. The first figure is 1.2, showing that the average annual rate of return over the whole period since 1899 has been 1.2%.

The top figure in each column is the rate of return in the first year, so that reading diagonally down the table gives the real rate of return in each year since 1899. The table can be used to see the rate of return over any period; thus a purchase made at the end of 1900 would have lost 1.0% of its value in one year (allowing for reinvestment of income) but, over the first five years (up to the end of 1905), would have given an average annual real return of 0.4%.

US real return on equities - gross income re-invested

(annual average rates of return between year ends)

INVESTMENT FROM END YEAR

INVESTMENT TO END YEAR

	1925	1926	1927	1928	1929	1930	1931	1932	1933	1934	1935	1936	1937	1938	1939	1940	1941	1942	1943	1944	1945	1946	1947	1948	1949	1950	1951	1952	1953	1954	1955	1956	1957	1958	1959	1960	1961	1962	1963	1964	1965	1966	1967	1968	1969	1970	1971	1972	1973	1974	1975	1976	1977	1978	1979	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009
1926	11.2
1927	24.0	38.2
1928	29.9	40.4	42.5
1929	16.4	18.2	9.4	(16.1)
1930	6.6	5.5	(3.6)	(20.7)	(25.1)
1931	(3.2)	(5.9)	(14.5)	(27.9)	(33.2)	(40.4)
1932	(2.6)	(4.8)	(11.6)	(21.5)	(23.3)	(22.4)	1.0
1933	3.6	2.5	(2.5)	(9.6)	(7.9)	(1.3)	27.0	59.6
1934	3.5	2.5	(1.7)	(7.6)	(5.8)	(0.3)	18.3	28.0	2.7
1935	6.9	6.4	3.0	(1.7)	0.9	7.1	24.0	32.8	21.1	42.9
1936	8.9	8.7	5.8	2.0	4.8	10.9	25.5	32.5	24.6	37.2	31.7
1937	4.0	3.3	0.4	(3.5)	(1.8)	2.1	11.7	14.0	4.8	5.4	(9.4)	(37.7)
1938	6.0	5.5	3.0	(0.3)	1.6	5.5	14.5	16.9	9.9	11.8	3.0	(9.0)	33.1
1939	5.7	5.3	2.9	(0.1)	1.6	5.1	12.9	14.7	8.5	9.7	2.7	(5.4)	16.5	2.0
1940	4.6	4.2	1.9	(0.9)	0.7	3.7	10.2	11.4	5.9	6.4	0.3	(6.3)	7.4	(3.5)	(8.8)
1941	3.0	2.5	0.3	(2.4)	(1.1)	1.4	6.9	7.6	2.4	2.4	(3.1)	(8.9)	0.2	(8.9)	(13.9)	(18.7)
1942	3.2	2.8	0.8	(1.7)	(0.5)	1.9	7.0	7.6	3.0	3.0	(1.7)	(6.4)	1.6	(5.1)	(7.3)	(6.6)	7.3
1943	4.4	4.0	2.2	(0.1)	1.2	3.5	8.4	9.1	5.0	5.3	1.4	(2.4)	5.2	0.4	0.0	3.1	16.1	25.7
1944	5.1	4.8	3.1	1.0	2.3	4.6	9.2	9.9	6.3	6.6	3.2	0.1	7.2	3.4	3.6	7.0	17.2	22.6	19.5
1945	6.5	6.3	4.8	2.9	4.2	6.5	11.0	11.8	8.6	9.1	6.2	3.7	10.5	7.6	8.6	12.5	21.9	27.3	28.0	37.2
1946	5.1	4.8	3.2	1.4	2.5	4.6	8.6	9.1	6.0	6.3	3.4	1.0	6.5	3.6	3.8	6.1	11.9	13.1	9.2	4.3	(20.7)
1947	4.6	4.3	2.8	1.1	2.1	4.0	7.7	8.1	5.1	5.3	2.7	0.4	5.3	2.6	2.7	4.4	8.9	9.2	5.4	1.1	(13.2)	(5.1)
1948	4.3	4.0	2.6	1.0	1.9	3.7	7.1	7.5	4.7	4.9	2.4	0.3	4.7	2.2	2.3	3.7	7.4	7.4	4.1	0.6	(9.3)	(3.0)	(0.9)
1949	5.1	4.8	3.5	1.9	2.9	4.7	8.0	8.4	5.8	6.0	3.8	1.9	6.2	4.0	4.2	5.8	9.3	9.6	7.1	4.8	(2.0)	5.2	10.7	23.6
1950	5.8	5.6	4.3	2.9	3.9	5.6	8.8	9.2	6.8	7.1	5.1	3.4	7.5	5.6	5.9	7.5	10.9	11.4	9.5	7.9	2.8	9.7	15.1	24.1	24.5
1951	6.1	5.9	4.8	3.4	4.3	6.0	9.1	9.5	7.3	7.5	5.7	4.1	8.0	6.3	6.6	8.2	11.3	11.8	10.1	8.8	4.7	10.7	15.1	20.9	19.6	14.9
1952	6.4	6.2	5.1	3.7	4.7	6.3	9.3	9.7	7.6	7.8	6.1	4.6	8.3	6.7	7.1	8.6	11.4	11.9	10.4	9.3	5.9	11.1	14.6	18.9	17.3	13.9	12.9
1953	6.1	5.9	4.8	3.6	4.5	6.0	8.8	9.2	7.1	7.4	5.7	4.3	7.7	6.2	6.5	7.8	10.4	10.7	9.3	8.2	5.0	9.3	11.9	14.7	12.5	8.8	5.9	(0.7)
1954	7.5	7.4	6.4	5.2	6.1	7.7	10.5	10.9	9.0	9.3	7.8	6.6	10.0	8.7	9.2	10.6	13.3	13.8	12.8	12.1	9.6	14.1	17.2	20.5	19.9	18.7	20.1	23.8	54.4
1955	8.0	7.9	7.0	5.9	6.8	8.3	11.1	11.5	9.7	10.1	8.6	7.6	10.9	9.7	10.2	11.6	14.1	14.7	13.8	13.3	11.1	15.4	18.2	21.2	20.9	20.1	21.5	24.5	39.4	25.8
1956	8.0	7.9	6.9	5.9	6.8	8.2	10.8	11.3	9.5	9.9	8.5	7.4	10.6	9.4	9.9	11.2	13.5	14.0	13.1	12.6	10.6	14.3	16.7	19.2	18.5	17.6	18.1	19.5	27.0	15.2	5.5
1957	7.2	7.1	6.2	5.1	6.0	7.3	9.8	10.2	8.5	8.7	7.4	6.3	9.2	8.1	8.5	9.6	11.6	11.9	11.0	10.4	8.4	11.5	13.3	15.0	14.0	12.5	12.2	12.0	15.4	4.8	(4.4)	(13.4)
1958	8.2	8.1	7.3	6.2	7.1	8.5	10.9	11.3	9.7	10.0	8.8	7.8	10.7	9.7	10.1	11.3	13.3	13.7	13.0	12.5	10.8	13.9	15.8	17.7	17.0	16.1	16.3	16.9	20.7	13.5	9.7	11.8	44.5
1959	8.3	8.2	7.4	6.4	7.2	8.6	10.9	11.3	9.8	10.1	8.9	8.0	10.7	9.7	10.1	11.2	13.2	13.6	12.8	12.4	10.8	13.7	15.4	17.0	16.4	15.5	15.6	16.0	19.0	13.0	10.0	11.6	26.6	11.0
1960	8.0	7.9	7.1	6.2	7.0	8.3	10.5	10.9	9.4	9.6	8.5	7.6	10.2	9.3	9.6	10.6	12.4	12.7	12.0	11.6	10.0	12.6	14.1	15.5	14.8	13.8	13.7	13.8	16.1	10.7	7.9	8.5	16.9	5.2	(0.3)
1961	8.5	8.4	7.7	6.8	7.6	8.8	11.0	11.4	10.0	10.2	9.1	8.3	10.9	10.0	10.4	11.4	13.1	13.4	12.8	12.4	11.0	13.5	15.0	16.3	15.7	15.0	15.0	15.2	17.4	12.9	10.8	11.9	19.4	12.0	12.5	26.9
1962	7.9	7.8	7.0	6.2	6.9	8.1	10.2	10.5	9.1	9.4	8.3	7.5	9.8	9.0	9.3	10.2	11.8	12.0	11.3	10.9	9.5	11.8	13.0	14.0	13.3	12.5	12.2	12.2	13.7	9.4	7.3	7.6	12.3	5.5	3.7	5.8	(11.9)
1963	8.2	8.1	7.4	6.5	7.3	8.4	10.5	10.8	9.5	9.7	8.7	7.9	10.2	9.4	9.7	10.6	12.1	12.4	11.7	11.3	10.1	12.2	13.4	14.4	13.8	13.0	12.8	12.8	14.3	10.5	8.7	9.2	13.5	8.2	7.5	10.2	2.6	19.6
1964	8.4	8.3	7.6	6.8	7.5	8.6	10.6	10.9	9.7	9.9	8.9	8.2	10.4	9.6	9.9	10.8	12.3	12.5	11.9	11.6	10.3	12.4	13.5	14.5	13.9	13.2	13.0	13.1	14.4	11.0	9.5	10.0	13.8	9.4	9.0	11.5	6.8	17.6	15.6
1965	8.5	8.4	7.7	6.9	7.6	8.8	10.7	11.0	9.7	10.0	9.0	8.3	10.5	9.7	10.0	10.9	12.3	12.5	12.0	11.6	10.5	12.4	13.5	14.4	13.8	13.1	13.0	13.0	14.2	11.2	9.8	10.3	13.7	9.8	9.6	11.7	8.2	15.9	14.1	12.6
1966	7.9	7.8	7.2	6.4	7.0	8.1	10.0	10.2	9.0	9.2	8.3	7.6	9.6	8.9	9.1	9.9	11.2	11.4	10.8	10.4	9.3	11.0	11.9	12.7	12.1	11.4	11.1	11.0	12.0	9.0	7.6	7.8	10.5	6.8	6.2	7.4	3.8	8.2	4.6	(0.5)	(12.1)
1967	8.3	8.2	7.6	6.8	7.5	8.6	10.4	10.7	9.5	9.7	8.8	8.1	10.1	9.4	9.7	10.4	11.7	11.9	11.4	11.0	10.0	11.7	12.6	13.4	12.8	12.2	12.0	11.9	12.9	10.2	9.0	9.3	11.9	8.8	8.5	9.8	7.2	11.5	9.5	7.6	5.1	25.7
1968	8.3	8.3	7.6	6.9	7.5	8.6	10.3	10.6	9.5	9.7	8.8	8.1	10.1	9.4	9.7	10.4	11.6	11.8	11.3	11.0	9.9	11.6	12.4	13.2	12.6	12.0	11.8	11.8	12.7	10.1	9.0	9.3	11.7	8.8	8.6	9.7	7.5	11.1	9.5	8.0	6.5	17.2	9.4
1969	7.7	7.6	7.0	6.2	6.9	7.8	9.5	9.8	8.6	8.8	8.0	7.3	9.1	8.4	8.7	9.3	10.5	10.6	10.1	9.7	8.7	10.2	10.9	11.5	11.0	10.3	10.0	9.9	10.6	8.1	7.0	7.1	9.0	6.2	5.8	6.5	4.2	6.7	4.7	2.6	0.3	4.8	(4.4)	(16.4)
1970	7.4	7.3	6.7	6.0	6.6	7.5	9.1	9.4	8.2	8.4	7.6	6.9	8.7	8.0	8.2	8.8	9.9	10.0	9.5	9.1	8.1	9.5	10.2	10.7	10.1	9.5	9.2	9.0	9.6	7.2	6.1	6.2	7.8	5.2	4.7	5.2	3.1	5.1	3.2	1.2	(0.9)	2.1	(4.7)	(11.0)	(5.3)
1971	7.5	7.4	6.8	6.1	6.7	7.6	9.2	9.4	8.4	8.5	7.7	7.1	8.8	8.1	8.3	8.9	10.0	10.1	9.6	9.2	8.3	9.6	10.3	10.8	10.3	9.6	9.4	9.2	9.8	7.6	6.5	6.6	8.2	5.8	5.4	5.9	4.0	5.9	4.4	2.8	1.3	4.2	(0.6)	(3.7)	3.4	12.9
1972	7.6	7.6	7.0	6.3	6.9	7.8	9.3	9.6	8.5	8.7	7.9	7.3	8.9	8.3	8.5	9.1	10.1	10.2	9.7	9.4	8.5	9.8	10.4	10.9	10.4	9.8	9.6	9.4	10.0	7.9	6.9	7.0	8.6	6.4	6.0	6.6	4.9	6.7	5.4	4.2	3.0	5.8	2.2	0.5	6.8	13.4	13.9
1973	6.8	6.7	6.1	5.4	6.0	6.8	8.3	8.5	7.5	7.6	6.8	6.2	7.8	7.1	7.3	7.8	8.8	8.8	8.3	7.9	7.0	8.2	8.8	9.2	8.6	8.0	7.7	7.4	7.8	5.8	4.8	4.8	6.0	3.8	3.4	3.6	1.9	3.3	1.8	0.3	(1.1)	0.6	(3.1)	(5.4)	(2.5)	(1.5)	(8.0)	(25.7)
1974	5.7	5.6	5.0	4.3	4.8	5.6	7.0	7.1	6.1	6.2	5.4	4.8	6.2	5.6	5.7	6.1	7.0	7.0	6.4	6.0	5.1	6.2	6.6	6.9	6.3	5.6	5.2	4.9	5.1	3.1	2.1	1.9	2.8	0.7	0.0	0.1	(1.8)	(0.9)	(2.5)	(4.2)	(5.9)	(5.1)	(8.8)	(11.6)	(10.6)	(11.8)	(18.8)	(31.4)	(36.7)
1975	6.1	6.0	5.4	4.8	5.3	6.1	7.5	7.6	6.6	6.7	5.9	5.3	6.8	6.2	6.3	6.8	7.6	7.6	7.1	6.7	5.8	6.9	7.4	7.7	7.1	6.5	6.1	5.8	6.2	4.3	3.3	3.2	4.2	2.2	1.7	1.8	0.2	1.2	(0.2)	(1.5)	(2.8)	(1.7)	(4.7)	(6.5)	(4.8)	(4.7)	(8.6)	(15.1)	(9.3)	30.1
1976	6.4	6.3	5.8	5.1	5.6	6.4	7.8	7.9	7.0	7.1	6.3	5.7	7.2	6.6	6.7	7.2	8.0	8.0	7.5	7.2	6.3	7.4	7.8	8.2	7.6	7.0	6.7	6.5	6.8	5.0	4.1	4.0	5.1	3.2	2.8	3.0	1.5	2.6	1.4	0.3	(0.8)	0.4	(2.0)	(3.4)	(1.4)	(0.7)	(3.2)	(7.1)	0.1	25.9	21.9
1977	6.1	6.0	5.4	4.8	5.3	6.0	7.4	7.5	6.5	6.6	5.9	5.3	6.7	6.1	6.2	6.7	7.5	7.5	7.0	6.6	5.8	6.8	7.2	7.5	7.0	6.4	6.1	5.8	6.1	4.3	3.5	3.4	4.3	2.5	2.1	2.2	0.8	1.7	0.6	(0.5)	(1.5)	(0.5)	(2.8)	(4.1)	(2.4)	(2.0)	(4.3)	(7.5)	(2.3)	12.9	5.1	(9.4)
1978	6.0	5.9	5.3	4.7	5.1	5.9	7.2	7.3	6.4	6.5	5.8	5.2	6.6	6.0	6.1	6.5	7.3	7.3	6.8	6.4	5.6	6.6	7.0	7.2	6.7	6.1	5.8	5.5	5.8	4.2	3.3	3.2	4.1	2.4	1.9	2.1	0.8	1.6	0.5	(0.5)	(1.4)	(0.5)	(2.6)	(3.7)	(2.2)	(1.8)	(3.7)	(6.4)	(1.9)	9.4	3.3	(4.9)	(0.3)
1979	6.0	6.0	5.4	4.8	5.3	6.0	7.3	7.4	6.5	6.6	5.9	5.3	6.7	6.1	6.2	6.6	7.4	7.4	6.9	6.6	5.8	6.7	7.1	7.3	6.8	6.3	6.0	5.7	6.0	4.4	3.6	3.5	4.4	2.8	2.4	2.5	1.3	2.1	1.1	0.2	(0.6)	0.3	(1.5)	(2.5)	(0.9)	(0.4)	(2.0)	(4.1)	0.1	9.7	5.1	0.0	5.1	10.8
1980	6.3	6.2	5.7	5.1	5.5	6.3	7.5	7.7	6.8	6.8	6.2	5.6	6.9	6.4	6.5	6.9	7.7	7.7	7.2	6.9	6.1	7.1	7.4	7.7	7.2	6.7	6.4	6.2	6.5	5.0	4.2	4.2	5.0	3.5	3.1	3.3	2.2	3.0	2.1	1.4	0.6	1.6	(0.0)	(0.8)	0.8	1.4	0.2	(1.4)	2.7	11.3	7.9	4.7	9.8	15.3	19.9
1981	5.9	5.8	5.3	4.7	5.2	5.9	7.1	7.2	6.3	6.4	5.7	5.2	6.5	5.9	6.0	6.4	7.1	7.1	6.7	6.3	5.6	6.4	6.8	7.1	6.6	6.0	5.8	5.5	5.7	4.3	3.5	3.4	4.2	2.7	2.4	2.5	1.4	2.2	1.3	0.5	(0.2)	0.6	(0.9)	(1.7)	(0.4)	0.1	(1.1)	(2.6)	0.7	7.6	4.3	1.1	3.9	5.3	2.6	(12.2)
1982	6.1	6.0	5.5	4.9	5.4	6.1	7.3	7.4	6.5	6.6	5.9	5.4	6.7	6.2	6.2	6.6	7.3	7.3	6.9	6.6	5.9	6.7	7.1	7.3	6.9	6.4	6.1	5.9	6.1	4.7	4.0	3.9	4.7	3.3	3.0	3.1	2.1	2.9	2.1	1.3	0.7	1.6	0.1	(0.5)	0.9	1.4	0.4	(0.9)	2.4	8.7	6.0	3.5	6.3	8.0	7.1	1.3	16.8
1983	6.3	6.2	5.7	5.2	5.6	6.3	7.5	7.6	6.8	6.8	6.2	5.7	6.9	6.4	6.5	6.9	7.6	7.6	7.2	6.9	6.2	7.0	7.4	7.6	7.2	6.7	6.5	6.3	6.5	5.2	4.5	4.5	5.2	3.9	3.6	3.8	2.8	3.6	2.8	2.2	1.7	2.5	1.2	0.7	2.1	2.7	1.8	0.8	3.9	9.8	7.5	5.6	8.3	10.2	10.0	6.9	17.9	19.0
1984	6.2	6.1	5.6	5.1	5.5	6.2	7.3	7.4	6.6	6.7	6.1	5.6	6.8	6.3	6.4	6.7	7.4	7.4	7.0	6.7	6.0	6.8	7.2	7.4	7.0	6.5	6.2	6.0	6.3	5.0	4.3	4.3	5.0	3.7	3.4	3.6	2.7	3.4	2.7	2.1	1.5	2.3	1.1	0.6	1.9	2.4	1.6	0.7	3.5	8.7	6.6	4.8	7.0	8.2	7.7	4.9	11.3	8.6	(0.8)
1985	6.5	6.4	6.0	5.4	5.8	6.5	7.7	7.8	7.0	7.1	6.5	6.0	7.2	6.7	6.8	7.2	7.8	7.8	7.4	7.2	6.5	7.3	7.7	7.9	7.5	7.1	6.8	6.7	6.9	5.6	5.0	5.0	5.7	4.5	4.3	4.5	3.6	4.3	3.7	3.2	2.7	3.5	2.4	2.0	3.3	3.9	3.3	2.5	5.3	10.3	8.5	7.1	9.4	10.9	10.9	9.1	15.2	14.7	12.6	27.9
1986	6.7	6.6	6.1	5.6	6.0	6.7	7.8	7.9	7.1	7.2	6.6	6.2	7.3	6.8	6.9	7.3	8.0	8.0	7.6	7.3	6.7	7.5	7.8	8.1	7.7	7.3	7.0	6.9	7.1	5.9	5.3	5.3	6.0	4.9	4.6	4.8	4.0	4.8	4.2	3.7	3.2	4.1	3.1	2.7	4.0	4.6	4.0	3.4	6.0	10.7	9.1	7.9	10.0	11.3	11.4	10.1	15.1	14.7	13.3	21.1	14.7
1987	6.5	6.4	6.0	5.4	5.8	6.5	7.6	7.7	6.9	7.0	6.4	6.0	7.1	6.6	6.7	7.1	7.7	7.7	7.4	7.1	6.5	7.2	7.6	7.8	7.4	7.0	6.8	6.6	6.8	5.6	5.1	5.0	5.7	4.6	4.4	4.5	3.8	4.4	3.9	3.4	3.0	3.8	2.8	2.4	3.6	4.1	3.6	3.0	5.4	9.6	8.1	6.9	8.7	9.7	9.6	8.2	12.0	11.0	9.1	12.7	5.8	(2.5)
1988	6.6	6.5	6.1	5.6	6.0	6.6	7.7	7.8	7.0	7.1	6.5	6.1	7.2	6.8	6.9	7.2	7.9	7.9	7.5	7.2	6.6	7.4	7.7	7.9	7.6	7.1	6.9	6.8	7.0	5.8	5.3	5.3	6.0	4.9	4.7	4.8	4.1	4.8	4.2	3.8	3.4	4.2	3.2	2.9	4.1	4.6	4.2	3.6	5.9	9.9	8.4	7.4	9.1	10.0	10.0	8.8	12.1	11.4	9.9	12.8	8.2	5.0	13.1
1989	6.8	6.8	6.3	5.8	6.2	6.9	7.9	8.1	7.3	7.4	6.8	6.4	7.5	7.1	7.2	7.5	8.2	8.2	7.8	7.6	7.0	7.7	8.1	8.3	7.9	7.5	7.3	7.2	7.4	6.3	5.8	5.8	6.5	5.4	5.2	5.4	4.7	5.4	4.9	4.5	4.2	4.9	4.1	3.8	5.0	5.6	5.2	4.7	6.9	10.7	9.5	8.6	10.2	11.2	11.3	10.3	13.5	13.1	12.1	14.9	11.9	10.9	18.3	23.7
1990	6.5	6.5	6.0	5.5	5.9	6.5	7.6	7.7	7.0	7.0	6.5	6.1	7.1	6.7	6.8	7.1	7.7	7.7	7.4	7.1	6.5	7.2	7.6	7.8	7.4	7.0	6.8	6.7	6.9	5.8	5.2	5.2	5.9	4.8	4.6	4.8	4.1	4.8	4.2	3.8	3.5	4.2	3.3	3.1	4.1	4.6	4.2	3.7	5.7	9.2	7.9	7.0	8.3	9.1	8.9	7.9	10.4	9.6	8.3	9.9	6.7	4.7	7.3	4.5	(11.8)
1991	6.9	6.8	6.4	5.9	6.3	6.9	7.9	8.1	7.3	7.4	6.9	6.5	7.5	7.1	7.2	7.5	8.1	8.1	7.8	7.6	7.0	7.7	8.0	8.2	7.9	7.5	7.4	7.2	7.4	6.4	5.9	5.9	6.5	5.5	5.4	5.6	4.9	5.6	5.1	4.7	4.4	5.1	4.4	4.2	5.2	5.7	5.4	4.9	7.0	10.3	9.2	8.4	9.8	10.6	10.6	9.8	12.3	11.8	10.9	12.7	10.4	9.5	12.7	12.6	7.4	30.8
1992	6.9	6.8	6.4	5.9	6.3	6.9	7.9	8.0	7.3	7.4	6.9	6.5	7.5	7.1	7.2	7.5	8.1	8.1	7.8	7.5	7.0	7.7	8.0	8.2	7.9	7.5	7.3	7.2	7.4	6.4	5.9	5.9	6.5	5.6	5.4	5.6	5.0	5.6	5.1	4.8	4.5	5.2	4.4	4.2	5.2	5.7	5.4	5.0	6.9	10.1	9.0	8.3	9.6	10.3	10.3	9.5	11.7	11.2	10.4	11.9	9.8	8.9	11.4	11.0	7.0	17.9	6.2
1993	6.9	6.8	6.4	5.9	6.3	6.9	7.9	8.0	7.3	7.4	6.9	6.5	7.5	7.1	7.2	7.5	8.1	8.1	7.8	7.6	7.0	7.7	8.0	8.2	7.9	7.5	7.4	7.2	7.4	6.4	6.0	6.0	6.6	5.7	5.5	5.7	5.1	5.7	5.2	4.9	4.6	5.3	4.6	4.4	5.4	5.9	5.6	5.2	7.0	10.0	9.0	8.3	9.5	10.2	10.2	9.4	11.5	11.0	10.2	11.5	9.6	8.9	11.0	10.5	7.5	14.8	7.5	8.8
1994	6.7	6.7	6.2	5.8	6.2	6.7	7.7	7.8	7.1	7.2	6.7	6.3	7.3	6.9	7.0	7.3	7.9	7.9	7.6	7.3	6.8	7.5	7.8	7.9	7.6	7.3	7.1	7.0	7.2	6.2	5.7	5.7	6.3	5.4	5.2	5.4	4.8	5.4	5.0	4.6	4.4	5.0	4.3	4.1	5.0	5.5	5.2	4.8	6.5	9.3	8.3	7.6	8.7	9.3	9.2	8.5	10.3	9.7	8.9	9.9	8.1	7.3	8.8	8.1	5.2	9.9	3.7	2.5	(3.4)
1995	7.1	7.0	6.6	6.1	6.5	7.1	8.1	8.2	7.5	7.6	7.1	6.7	7.7	7.3	7.4	7.7	8.3	8.3	8.0	7.8	7.3	7.9	8.2	8.4	8.1	7.8	7.6	7.5	7.7	6.8	6.3	6.4	6.9	6.1	5.9	6.1	5.6	6.1	5.7	5.4	5.2	5.9	5.2	5.1	6.0	6.5	6.2	5.9	7.6	10.4	9.5	8.8	9.9	10.6	10.6	10.0	11.8	11.4	10.8	11.9	10.4	9.9	11.6	11.4	9.4	14.2	10.4	11.9	13.5	33.3
1996	7.2	7.2	6.8	6.3	6.7	7.3	8.2	8.3	7.7	7.8	7.3	6.9	7.9	7.5	7.6	7.9	8.5	8.5	8.2	8.0	7.5	8.1	8.4	8.6	8.3	8.0	7.8	7.7	7.9	7.0	6.6	6.6	7.2	6.4	6.2	6.4	5.9	6.5	6.1	5.8	5.6	6.2	5.6	5.5	6.4	6.9	6.6	6.4	8.0	10.7	9.8	9.3	10.3	11.0	11.0	10.4	12.1	11.8	11.3	12.4	11.0	10.7	12.3	12.1	10.6	14.8	11.9	13.3	14.9	25.3	17.7
1997	7.5	7.4	7.0	6.6	7.0	7.5	8.5	8.6	8.0	8.1	7.6	7.2	8.2	7.8	7.9	8.2	8.8	8.8	8.5	8.3	7.8	8.5	8.8	9.0	8.7	8.4	8.3	8.2	8.4	7.5	7.1	7.1	7.7	6.9	6.8	7.0	6.5	7.0	6.7	6.4	6.2	6.9	6.3	6.2	7.1	7.6	7.4	7.2	8.8	11.4	10.6	10.1	11.2	11.8	11.9	11.4	13.1	12.9	12.4	13.5	12.4	12.2	13.8	13.9	12.7	16.7	14.5	16.3	18.2	26.4	23.1	28.8
1998	7.7	7.6	7.2	6.8	7.2	7.7	8.7	8.8	8.2	8.3	7.8	7.4	8.4	8.0	8.1	8.4	9.0	9.0	8.7	8.6	8.1	8.7	9.0	9.2	8.9	8.6	8.5	8.4	8.6	7.8	7.4	7.4	8.0	7.2	7.1	7.3	6.8	7.4	7.1	6.8	6.7	7.3	6.8	6.7	7.6	8.1	7.9	7.7	9.3	11.8	11.1	10.6	11.6	12.3	12.3	11.9	13.5	13.3	13.0	14.0	13.0	12.9	14.4	14.5	13.6	17.2	15.4	17.0	18.7	25.0	22.3	24.7	20.7
1999	7.8	7.8	7.4	7.0	7.4	7.9	8.9	9.0	8.4	8.5	8.0	7.7	8.6	8.2	8.4	8.7	9.2	9.2	9.0	8.8	8.3	9.0	9.3	9.5	9.2	8.9	8.8	8.7	8.9	8.1	7.7	7.7	8.3	7.6	7.5	7.7	7.2	7.8	7.5	7.2	7.1	7.7	7.2	7.1	8.0	8.5	8.4	8.2	9.7	12.2	11.5	11.1	12.1	12.7	12.8	12.5	14.0	13.9	13.5	14.6	13.7	13.6	15.1	15.2	14.4	17.8	16.2	17.7	19.3	24.4	22.3	23.9	21.5	22.4
2000	7.5	7.5	7.1	6.7	7.0	7.6	8.5	8.6	8.0	8.1	7.6	7.3	8.2	7.8	7.9	8.2	8.8	8.8	8.5	8.3	7.9	8.5	8.8	9.0	8.7	8.4	8.3	8.2	8.4	7.5	7.2	7.2	7.7	7.0	6.9	7.1	6.6	7.1	6.8	6.6	6.4	7.0	6.5	6.4	7.2	7.7	7.5	7.3	8.8	11.0	10.3	9.9	10.8	11.3	11.4	11.0	12.3	12.1	11.7	12.5	11.6	11.3	12.5	12.4	11.5	14.1	12.4	13.2	13.8	17.0	14.0	13.0	8.3	2.5	(14.1)
2001	7.2	7.2	6.8	6.4	6.7	7.3	8.2	8.3	7.7	7.7	7.3	6.9	7.8	7.5	7.6	7.9	8.4	8.4	8.1	7.9	7.5	8.1	8.3	8.5	8.2	7.9	7.8	7.7	7.9	7.1	6.7	6.7	7.2	6.5	6.4	6.5	6.1	6.6	6.2	6.0	5.8	6.4	5.9	5.8	6.5	7.0	6.8	6.5	7.9	10.1	9.4	8.9	9.7	10.2	10.1	9.7	10.9	10.6	10.2	10.9	9.9	9.6	10.5	10.3	9.2	11.4	9.6	10.0	10.1	12.2	9.0	7.3	2.6	(2.9)	(13.4)	(12.8)
2002	6.8	6.7	6.3	5.9	6.3	6.8	7.6	7.7	7.1	7.2	6.7	6.4	7.3	6.9	7.0	7.3	7.8	7.8	7.5	7.3	6.8	7.4	7.6	7.8	7.5	7.2	7.1	7.0	7.1	6.3	5.9	6.0	6.4	5.7	5.6	5.7	5.2	5.7	5.4	5.1	4.9	5.4	4.9	4.8	5.5	5.9	5.6	5.4	6.7	8.7	7.9	7.4	8.2	8.5	8.4	7.9	9.0	8.6	8.1	8.6	7.6	7.2	7.8	7.5	6.3	8.0	6.1	6.1	5.8	7.0	3.7	1.6	(3.1)	(8.3)	(16.7)	(18.0)	(23.0)
2003	7.0	7.0	6.6	6.2	6.6	7.1	7.9	8.0	7.4	7.5	7.1	6.7	7.6	7.3	7.3	7.6	8.1	8.1	7.9	7.7	7.2	7.8	8.0	8.2	7.9	7.6	7.5	7.4	7.6	6.8	6.4	6.4	6.9	6.2	6.1	6.2	5.8	6.3	6.0	5.7	5.5	6.1	5.6	5.5	6.2	6.6	6.4	6.1	7.4	9.4	8.7	8.2	9.0	9.4	9.3	8.9	9.9	9.6	9.2	9.7	8.8	8.5	9.2	8.9	7.9	9.6	8.0	8.2	8.1	9.5	6.8	5.4	1.9	(1.5)	(6.7)	(4.1)	0.6	31.4
2004	7.1	7.0	6.7	6.3	6.6	7.1	8.0	8.1	7.5	7.5	7.1	6.8	7.6	7.3	7.4	7.7	8.1	8.1	7.9	7.7	7.3	7.8	8.1	8.2	8.0	7.7	7.5	7.4	7.6	6.8	6.5	6.5	7.0	6.3	6.2	6.3	5.9	6.4	6.0	5.8	5.7	6.2	5.7	5.6	6.3	6.6	6.5	6.2	7.5	9.4	8.7	8.3	9.0	9.4	9.3	8.9	9.9	9.6	9.2	9.7	8.8	8.5	9.2	9.0	8.1	9.6	8.2	8.3	8.3	9.5	7.2	5.9	3.0	0.3	(3.6)	(0.8)	3.5	20.0	9.7
2005	7.0	7.0	6.6	6.2	6.6	7.1	7.9	8.0	7.4	7.5	7.1	6.7	7.6	7.2	7.3	7.6	8.1	8.1	7.8	7.6	7.2	7.7	8.0	8.1	7.9	7.6	7.5	7.4	7.5	6.8	6.4	6.4	6.9	6.2	6.1	6.3	5.8	6.3	6.0	5.8	5.6	6.1	5.6	5.5	6.2	6.6	6.4	6.2	7.4	9.2	8.6	8.1	8.8	9.2	9.1	8.7	9.7	9.4	9.0	9.4	8.6	8.3	8.9	8.7	7.8	9.2	7.8	8.0	7.9	9.0	6.8	5.7	3.1	0.8	(2.4)	0.1	3.6	14.4	6.7	3.9
2006	7.1	7.1	6.7	6.3	6.7	7.1	8.0	8.1	7.5	7.6	7.1	6.8	7.7	7.3	7.4	7.7	8.2	8.2	7.9	7.7	7.3	7.8	8.1	8.2	8.0	7.7	7.6	7.5	7.7	6.9	6.6	6.6	7.0	6.4	6.3	6.4	6.0	6.5	6.2	6.0	5.8	6.3	5.8	5.7	6.4	6.8	6.6	6.4	7.5	9.3	8.7	8.3	9.0	9.3	9.3	8.9	9.8	9.5	9.2	9.6	8.8	8.5	9.2	8.9	8.1	9.5	8.2	8.4	8.3	9.4	7.4	6.4	4.2	2.3	(0.3)	2.3	5.6	14.2	9.0	8.6	13.6
2007	7.1	7.0	6.7	6.3	6.6	7.1	7.9	8.0	7.4	7.5	7.1	6.8	7.6	7.3	7.4	7.6	8.1	8.1	7.8	7.7	7.2	7.8	8.0	8.2	7.9	7.6	7.5	7.4	7.6	6.8	6.5	6.5	7.0	6.3	6.2	6.4	5.9	6.4	6.1	5.9	5.7	6.2	5.8	5.7	6.3	6.7	6.5	6.3	7.4	9.1	8.6	8.1	8.8	9.1	9.1	8.7	9.6	9.3	8.9	9.3	8.6	8.3	8.8	8.6	7.8	9.1	7.9	8.0	8.0	8.9	7.1	6.1	4.1	2.4	0.2	2.4	5.2	11.9	7.5	6.8	8.3	3.2
2008	6.3	6.3	5.9	5.6	5.9	6.3	7.1	7.2	6.6	6.7	6.3	6.0	6.8	6.4	6.5	6.7	7.2	7.2	6.9	6.7	6.3	6.8	7.0	7.1	6.9	6.6	6.4	6.3	6.5	5.7	5.4	5.4	5.8	5.1	5.0	5.1	4.7	5.1	4.8	4.6	4.4	4.8	4.4	4.2	4.8	5.1	4.9	4.7	5.7	7.3	6.7	6.2	6.8	7.0	6.9	6.5	7.2	6.9	6.4	6.7	5.9	5.5	5.9	5.6	4.7	5.7	4.4	4.2	3.9	4.5	2.5	1.4	(0.8)	(2.7)	(5.2)	(4.0)	(2.7)	1.2	(4.0)	(7.1)	(10.5)	(20.6)	(38.9)
2009	6.6	6.5	6.2	5.8	6.1	6.6	7.4	7.5	6.9	7.0	6.5	6.2	7.0	6.7	6.8	7.0	7.4	7.5	7.2	7.0	6.6	7.1	7.3	7.5	7.2	6.9	6.8	6.7	6.8	6.1	5.8	5.8	6.2	5.6	5.5	5.6	5.2	5.6	5.3	5.1	4.9	5.3	4.9	4.8	5.4	5.7	5.5	5.3	6.3	7.9	7.3	6.9	7.4	7.7	7.6	7.2	7.9	7.6	7.2	7.5	6.8	6.4	6.8	6.6	5.8	6.8	5.6	5.5	5.3	5.9	4.2	3.3	1.4	(0.2)	(2.2)	(0.8)	0.8	4.7	0.8	(0.8)	(2.0)	(6.7)	(11.3)	28.7
2010	6.7	6.6	6.3	5.9	6.2	6.7	7.5	7.6	7.0	7.1	6.7	6.4	7.2	6.8	6.9	7.1	7.6	7.6	7.3	7.2	6.7	7.2	7.5	7.6	7.3	7.1	7.0	6.9	7.0	6.3	6.0	6.0	6.4	5.8	5.7	5.8	5.4	5.8	5.5	5.3	5.1	5.6	5.1	5.0	5.6	5.9	5.7	5.5	6.5	8.1	7.5	7.1	7.7	7.9	7.8	7.5	8.2	7.9	7.5	7.9	7.1	6.8	7.2	7.0	6.2	7.2	6.1	6.1	6.0	6.6	5.0	4.1	2.5	1.1	(0.7)	0.8	2.4	6.1	2.9	1.9	1.5	(1.4)	(2.8)	22.4	16.5

HOW TO USE TABLES OF TOTAL RETURNS

The dates along the top (and bottom) are those on which each portfolio starts; those down the side are the dates to which the annual rate of return is calculated. Thus the figure at the bottom right hand corner - 16.5 - shows that the real return on a portfolio bought at the end of December 2009 and held for one year to December 2010 was 16.5%.Figures in brackets indicate negative returns.

Each figure on the bottom line of the table shows the average annual return up to the end of December 2010 from the year shown below the figure. The first figure is 6.7, showing that the average annual rate of return over the whole period since 1925 has been 6.7%.

The top figure in each column is the rate of return in the first year, so that reading diagonally down the table gives the real rate of return in each year since 1925. The table can be used to see the rate of return over any period; thus a purchase made at the end of 1926 would have gained 38.1% in value in one year (allowing for reinvestment of income) but, over the first five years (up to the end of 1931), would have fallen in value by an average annual real rate of -5.7%.

US real return on bonds - gross income re-invested

(annual average rates of return between year ends)

HOW TO USE TABLES OF TOTAL RETURNS

The dates along the top (and bottom) are those on which each portfolio starts; those down the side are the dates to which the annual rate of return is calculated. Thus the figure at the bottom right hand corner - 8.0 - shows that the real return on a portfolio bought at the end of December 2009 and held for one year to December 2010 was 8.0%. Figures in brackets indicate negative returns.

Each figure on the bottom line of the table shows the average annual return up to the end of December 2010 from the year shown below the figure. The first figure is 2.4, showing that the average annual rate of return over the whole period since 1925 has been 2.4%.

The top figure in each column is the rate of return in the first year, so that reading diagonally down the table gives the real rate of return in each year since 1925. The table can be used to see the rate of return over any period; thus a purchase made at the end of 1926 would have gained 11.3% in value in one year (allowing for reinvestment of income) but, over the first five years (up to the end of 1931), would have risen in value by an average annual real rate of 6.2%

INVESTMENT FROM END YEAR (columns) / INVESTMENT TO END YEAR (rows)

	1925	1926	1927	1928	1929	1930	1931	1932	1933	1934	1935	1936	1937	1938	1939	1940	1941	1942	1943	1944	1945	1946	1947	1948	1949	1950	1951
1926	8.8																										
1927	10.1	11.3																									
1928	7.1	6.2	1.3																								
1929	5.9	5.0	2.0	2.7																							
1930	7.1	6.6	5.1	7.1	11.7																						
1931	6.7	6.2	5.0	6.3	8.1	4.6																					
1932	9.7	9.9	9.6	11.8	15.0	16.6	30.0																				
1933	8.3	8.3	7.8	9.1	10.8	10.5	13.6	(0.8)																			
1934	8.3	8.3	7.8	9.0	10.3	9.9	11.8	3.7	8.3																		
1935	7.7	7.5	7.1	7.9	8.9	8.3	9.2	3.1	5.1	1.9																	
1936	7.5	7.4	7.0	7.7	8.4	7.9	8.5	3.8	5.3	3.9	5.9																
1937	6.6	6.4	6.0	6.5	7.0	6.3	6.6	2.5	3.3	1.7	1.6	(2.6)															
1938	6.8	6.6	6.2	6.7	7.1	6.6	6.9	3.4	4.3	3.3	3.8	2.8	8.5														
1939	6.7	6.5	6.2	6.6	7.0	6.5	6.7	3.8	4.6	3.8	4.3	3.8	7.2	5.9													
1940	6.6	6.5	6.1	6.5	6.9	6.4	6.6	4.0	4.7	4.1	4.5	4.2	6.5	5.6	5.2												
1941	5.6	5.4	5.0	5.3	5.5	5.0	5.0	2.5	3.0	2.2	2.3	1.6	2.6	0.8	(1.7)	(8.2)											
1942	4.9	4.7	4.3	4.5	4.6	4.1	4.0	1.7	2.0	1.2	1.2	0.4	1.0	(0.8)	(2.9)	(6.8)	(5.3)										
1943	4.6	4.4	3.9	4.1	4.2	3.7	3.6	1.5	1.7	1.0	0.9	0.2	0.7	(0.8)	(2.4)	(4.8)	(3.1)	(0.8)									
1944	4.4	4.1	3.7	3.9	4.0	3.4	3.4	1.4	1.6	1.0	0.9	0.2	0.7	(0.6)	(1.8)	(3.5)	(1.9)	(0.2)	0.5								
1945	4.6	4.4	4.0	4.1	4.2	3.8	3.7	1.9	2.1	1.6	1.6	1.1	1.6	0.6	(0.2)	(1.3)	0.5	2.5	4.2	8.1							
1946	3.5	3.3	2.9	2.9	3.0	2.4	2.3	0.6	0.7	0.1	(0.1)	(0.7)	(0.5)	(1.5)	(2.6)	(3.8)	(2.9)	(2.3)	(2.8)	(4.4)	(15.4)						
1947	2.8	2.6	2.1	2.2	2.2	1.6	1.4	(0.2)	(0.2)	(0.8)	(1.0)	(1.6)	(1.5)	(2.6)	(3.6)	(4.8)	(4.2)	(4.0)	(4.7)	(6.4)	(12.9)	(10.4)					
1948	2.7	2.5	2.1	2.1	2.1	1.6	1.4	(0.2)	(0.1)	(0.7)	(0.9)	(1.5)	(1.4)	(2.3)	(3.2)	(4.2)	(3.6)	(3.3)	(3.7)	(4.8)	(8.7)	(5.2)	0.4				
1949	3.0	2.7	2.4	2.4	2.4	1.9	1.8	0.3	0.4	(0.1)	(0.3)	(0.7)	(0.6)	(1.3)	(2.0)	(2.8)	(2.1)	(1.6)	(1.8)	(2.2)	(4.7)	(0.8)	4.4	8.6			
1950	2.6	2.4	2.0	2.0	2.0	1.5	1.4	(0.0)	0.0	(0.5)	(0.6)	(1.1)	(0.9)	(1.7)	(2.4)	(3.1)	(2.5)	(2.1)	(2.3)	(2.8)	(4.8)	(2.0)	1.0	1.3	(5.5)		
1951	2.1	1.9	1.5	1.5	1.5	1.0	0.8	(0.5)	(0.5)	(1.0)	(1.2)	(1.6)	(1.6)	(2.3)	(2.9)	(3.7)	(3.2)	(3.0)	(3.2)	(3.7)	(5.6)	(3.5)	(1.7)	(2.3)	(7.4)	(9.2)	
1952	2.1	1.8	1.5	1.5	1.4	1.0	0.8	(0.5)	(0.5)	(0.9)	(1.1)	(1.5)	(1.4)	(2.1)	(2.7)	(3.3)	(2.9)	(2.6)	(2.8)	(3.2)	(4.7)	(2.8)	(1.2)	(1.6)	(4.9)	(4.5)	0.4
1953	2.1	1.9	1.5	1.5	1.5	1.1	0.9	(0.3)	(0.3)	(0.7)	(0.9)	(1.3)	(1.2)	(1.8)	(2.3)	(2.9)	(2.4)	(2.1)	(2.3)	(2.6)	(3.8)	(2.0)	(0.6)	(0.8)	(3.0)	(2.1)	1.6
1954	2.3	2.1	1.7	1.8	1.7	1.3	1.2	0.0	0.1	(0.3)	(0.4)	(0.8)	(0.7)	(1.2)	(1.7)	(2.1)	(1.7)	(1.3)	(1.4)	(1.6)	(2.6)	(0.9)	0.6	0.6	(0.9)	0.3	3.7
1955	2.2	2.0	1.6	1.7	1.6	1.2	1.1	(0.0)	0.0	(0.3)	(0.5)	(0.8)	(0.7)	(1.2)	(1.6)	(2.1)	(1.6)	(1.3)	(1.3)	(1.5)	(2.4)	(0.9)	0.4	0.4	(0.9)	0.0	2.5
1956	1.8	1.6	1.3	1.3	1.2	0.8	0.7	(0.4)	(0.4)	(0.7)	(0.9)	(1.2)	(1.1)	(1.6)	(2.0)	(2.5)	(2.1)	(1.9)	(1.9)	(2.1)	(3.0)	(1.7)	(0.7)	(0.8)	(2.1)	(1.5)	0.1
1957	1.9	1.7	1.4	1.4	1.3	1.0	0.8	(0.2)	(0.1)	(0.5)	(0.6)	(0.9)	(0.8)	(1.3)	(1.7)	(2.1)	(1.7)	(1.4)	(1.5)	(1.6)	(2.4)	(1.1)	(0.1)	(0.2)	(1.2)	(0.6)	0.9
1958	1.6	1.4	1.1	1.1	1.1	0.7	0.6	(0.4)	(0.4)	(0.8)	(0.9)	(1.2)	(1.1)	(1.6)	(1.9)	(2.3)	(2.0)	(1.8)	(1.8)	(2.0)	(2.7)	(1.6)	(0.7)	(0.8)	(1.8)	(1.4)	(0.2)
1959	1.5	1.3	1.0	0.9	0.9	0.5	0.4	(0.6)	(0.6)	(0.9)	(1.0)	(1.3)	(1.2)	(1.7)	(2.0)	(2.4)	(2.1)	(1.9)	(1.9)	(2.1)	(2.8)	(1.8)	(1.0)	(1.1)	(2.0)	(1.7)	(0.7)
1960	1.7	1.5	1.3	1.3	1.2	0.9	0.8	(0.2)	(0.1)	(0.4)	(0.5)	(0.8)	(0.7)	(1.1)	(1.4)	(1.8)	(1.4)	(1.2)	(1.2)	(1.3)	(1.9)	(0.9)	(0.1)	(0.1)	(0.9)	(0.4)	0.6
1961	1.7	1.5	1.2	1.2	1.2	0.8	0.7	(0.2)	(0.1)	(0.4)	(0.5)	(0.8)	(0.7)	(1.1)	(1.4)	(1.7)	(1.4)	(1.1)	(1.2)	(1.3)	(1.8)	(0.8)	(0.1)	(0.1)	(0.8)	(0.4)	0.5
1962	1.8	1.6	1.4	1.4	1.3	1.0	0.9	0.0	0.1	(0.2)	(0.3)	(0.5)	(0.4)	(0.8)	(1.1)	(1.3)	(1.0)	(0.8)	(0.8)	(0.9)	(1.4)	(0.4)	0.3	0.3	(0.3)	0.1	1.0
1963	1.7	1.5	1.3	1.3	1.2	0.9	0.8	(0.0)	(0.0)	(0.3)	(0.4)	(0.6)	(0.5)	(0.8)	(1.1)	(1.4)	(1.1)	(0.9)	(0.9)	(0.9)	(1.4)	(0.5)	0.1	0.1	(0.5)	(0.1)	0.8
1964	1.7	1.6	1.3	1.3	1.3	1.0	0.9	0.1	0.1	(0.2)	(0.2)	(0.5)	(0.4)	(0.7)	(1.0)	(1.2)	(0.9)	(0.7)	(0.7)	(0.7)	(1.2)	(0.3)	0.3	0.3	(0.2)	0.2	0.9
1965	1.6	1.5	1.2	1.2	1.2	0.9	0.8	0.0	0.0	(0.2)	(0.3)	(0.5)	(0.4)	(0.7)	(1.0)	(1.2)	(0.9)	(0.7)	(0.7)	(0.8)	(1.2)	(0.4)	0.2	0.2	(0.3)	0.0	0.7
1966	1.6	1.4	1.2	1.2	1.2	0.9	0.8	0.0	0.0	(0.2)	(0.3)	(0.5)	(0.4)	(0.7)	(0.9)	(1.2)	(0.9)	(0.7)	(0.7)	(0.7)	(1.1)	(0.4)	0.2	0.2	(0.3)	0.0	0.7
1967	1.4	1.2	0.9	0.9	0.9	0.6	0.5	(0.2)	(0.2)	(0.5)	(0.5)	(0.7)	(0.7)	(1.0)	(1.2)	(1.4)	(1.2)	(1.0)	(1.0)	(1.1)	(1.5)	(0.8)	(0.3)	(0.3)	(0.8)	(0.5)	0.1
1968	1.2	1.0	0.8	0.8	0.7	0.4	0.3	(0.4)	(0.4)	(0.6)	(0.7)	(0.9)	(0.8)	(1.1)	(1.4)	(1.6)	(1.3)	(1.2)	(1.2)	(1.3)	(1.7)	(1.0)	(0.5)	(0.5)	(1.0)	(0.8)	(0.2)
1969	0.9	0.7	0.5	0.5	0.4	0.1	0.0	(0.7)	(0.7)	(0.9)	(1.0)	(1.2)	(1.2)	(1.5)	(1.7)	(2.0)	(1.7)	(1.6)	(1.6)	(1.7)	(2.1)	(1.5)	(1.0)	(1.1)	(1.6)	(1.3)	(0.9)
1970	1.0	0.8	0.6	0.6	0.5	0.3	0.2	(0.5)	(0.5)	(0.7)	(0.8)	(1.0)	(1.0)	(1.2)	(1.5)	(1.7)	(1.4)	(1.3)	(1.3)	(1.4)	(1.8)	(1.1)	(0.7)	(0.8)	(1.2)	(1.0)	(0.5)
1971	1.2	1.1	0.9	0.9	0.8	0.6	0.5	(0.2)	(0.2)	(0.4)	(0.5)	(0.6)	(0.6)	(0.9)	(1.1)	(1.3)	(1.0)	(0.9)	(0.9)	(0.9)	(1.2)	(0.6)	(0.2)	(0.2)	(0.6)	(0.4)	0.1
1972	1.3	1.1	0.9	0.9	0.8	0.6	0.5	(0.2)	(0.1)	(0.4)	(0.4)	(0.6)	(0.5)	(0.8)	(1.0)	(1.2)	(0.9)	(0.8)	(0.8)	(0.8)	(1.1)	(0.5)	(0.1)	(0.1)	(0.5)	(0.3)	0.2
1973	1.0	0.9	0.6	0.6	0.6	0.3	0.2	(0.4)	(0.4)	(0.6)	(0.7)	(0.8)	(0.8)	(1.0)	(1.2)	(1.4)	(1.2)	(1.1)	(1.1)	(1.1)	(1.5)	(0.9)	(0.5)	(0.6)	(0.9)	(0.7)	(0.3)
1974	0.8	0.7	0.5	0.4	0.4	0.1	0.0	(0.6)	(0.6)	(0.8)	(0.8)	(1.0)	(1.0)	(1.2)	(1.4)	(1.6)	(1.4)	(1.3)	(1.3)	(1.4)	(1.7)	(1.1)	(0.8)	(0.8)	(1.2)	(1.0)	(0.6)
1975	0.8	0.6	0.4	0.4	0.4	0.1	0.0	(0.6)	(0.6)	(0.8)	(0.8)	(1.0)	(1.0)	(1.2)	(1.4)	(1.6)	(1.4)	(1.3)	(1.3)	(1.3)	(1.6)	(1.1)	(0.8)	(0.8)	(1.2)	(1.0)	(0.6)
1976	1.0	0.9	0.7	0.6	0.6	0.4	0.3	(0.3)	(0.3)	(0.5)	(0.5)	(0.7)	(0.7)	(0.9)	(1.1)	(1.2)	(1.0)	(0.9)	(0.9)	(0.9)	(1.2)	(0.7)	(0.4)	(0.4)	(0.7)	(0.5)	(0.1)
1977	0.9	0.7	0.5	0.5	0.5	0.3	0.2	(0.4)	(0.4)	(0.6)	(0.7)	(0.8)	(0.8)	(1.0)	(1.2)	(1.3)	(1.1)	(1.0)	(1.0)	(1.1)	(1.3)	(0.9)	(0.5)	(0.5)	(0.9)	(0.7)	(0.3)
1978	0.7	0.5	0.3	0.3	0.3	0.0	(0.1)	(0.6)	(0.6)	(0.8)	(0.9)	(1.0)	(1.0)	(1.2)	(1.4)	(1.6)	(1.4)	(1.3)	(1.3)	(1.3)	(1.6)	(1.2)	(0.8)	(0.9)	(1.2)	(1.0)	(0.7)
1979	0.4	0.3	0.1	0.0	(0.0)	(0.2)	(0.3)	(0.9)	(0.9)	(1.1)	(1.2)	(1.3)	(1.3)	(1.5)	(1.7)	(1.9)	(1.7)	(1.6)	(1.6)	(1.7)	(2.0)	(1.5)	(1.2)	(1.3)	(1.6)	(1.5)	(1.2)
1980	0.2	(0.0)	(0.2)	(0.2)	(0.3)	(0.5)	(0.6)	(1.2)	(1.2)	(1.4)	(1.4)	(1.6)	(1.6)	(1.8)	(2.0)	(2.2)	(2.0)	(1.9)	(1.9)	(2.0)	(2.3)	(1.9)	(1.6)	(1.7)	(2.0)	(1.9)	(1.6)
1981	0.0	(0.1)	(0.3)	(0.3)	(0.4)	(0.6)	(0.7)	(1.3)	(1.3)	(1.5)	(1.5)	(1.7)	(1.7)	(1.9)	(2.1)	(2.3)	(2.1)	(2.0)	(2.1)	(2.1)	(2.4)	(2.0)	(1.7)	(1.8)	(2.1)	(2.0)	(1.7)
1982	0.5	0.4	0.2	0.2	0.1	(0.1)	(0.2)	(0.7)	(0.7)	(0.9)	(0.9)	(1.1)	(1.0)	(1.2)	(1.4)	(1.6)	(1.4)	(1.3)	(1.3)	(1.3)	(1.6)	(1.2)	(0.9)	(0.9)	(1.2)	(1.1)	(0.8)
1983	0.5	0.4	0.2	0.1	0.1	(0.1)	(0.2)	(0.7)	(0.7)	(0.9)	(0.9)	(1.1)	(1.0)	(1.3)	(1.4)	(1.6)	(1.4)	(1.3)	(1.3)	(1.4)	(1.6)	(1.2)	(0.9)	(1.0)	(1.2)	(1.1)	(0.8)
1984	0.7	0.5	0.3	0.3	0.3	0.1	0.0	(0.5)	(0.5)	(0.7)	(0.7)	(0.8)	(0.8)	(1.0)	(1.1)	(1.3)	(1.1)	(1.0)	(1.0)	(1.1)	(1.3)	(0.9)	(0.6)	(0.6)	(0.9)	(0.8)	(0.5)
1985	1.0	0.9	0.7	0.7	0.7	0.5	0.4	(0.1)	(0.0)	(0.2)	(0.2)	(0.4)	(0.3)	(0.5)	(0.6)	(0.8)	(0.6)	(0.5)	(0.5)	(0.5)	(0.7)	(0.3)	(0.0)	(0.0)	(0.2)	(0.1)	0.2
1986	1.4	1.2	1.1	1.1	1.0	0.9	0.8	0.3	0.3	0.2	0.2	0.1	0.1	(0.1)	(0.2)	(0.3)	(0.1)	0.0	0.0	0.0	(0.2)	0.2	0.5	0.5	0.3	0.5	0.8
1987	1.2	1.1	1.0	0.9	0.9	0.7	0.7	0.2	0.2	0.1	0.0	(0.1)	(0.0)	(0.2)	(0.3)	(0.4)	(0.2)	(0.1)	(0.1)	(0.1)	(0.3)	0.1	0.4	0.4	0.2	0.3	0.6
1988	1.3	1.2	1.0	1.0	1.0	0.8	0.7	0.3	0.3	0.1	0.1	0.0	0.1	(0.1)	(0.2)	(0.3)	(0.2)	(0.0)	(0.0)	(0.0)	(0.2)	0.2	0.5	0.5	0.3	0.4	0.7
1989	1.5	1.3	1.2	1.2	1.2	1.0	0.9	0.5	0.5	0.4	0.3	0.2	0.3	0.1	0.0	(0.1)	0.1	0.2	0.2	0.2	0.1	0.5	0.7	0.7	0.6	0.7	1.0
1990	1.4	1.3	1.2	1.2	1.2	1.0	0.9	0.5	0.5	0.4	0.3	0.2	0.3	0.1	0.0	(0.1)	0.1	0.2	0.2	0.2	0.1	0.5	0.7	0.7	0.6	0.7	1.0
1991	1.6	1.5	1.4	1.4	1.4	1.2	1.1	0.7	0.7	0.6	0.6	0.5	0.5	0.4	0.3	0.2	0.4	0.5	0.5	0.5	0.4	0.7	1.0	1.0	0.9	1.0	1.3
1992	1.7	1.6	1.4	1.4	1.4	1.2	1.2	0.8	0.8	0.7	0.7	0.6	0.6	0.5	0.4	0.3	0.5	0.6	0.6	0.6	0.5	0.8	1.1	1.1	1.0	1.1	1.4
1993	1.8	1.7	1.6	1.6	1.6	1.4	1.4	1.0	1.0	0.9	0.9	0.8	0.8	0.7	0.6	0.5	0.7	0.8	0.9	0.9	0.7	1.1	1.4	1.4	1.2	1.4	1.6
1994	1.7	1.6	1.4	1.4	1.4	1.3	1.2	0.8	0.8	0.7	0.7	0.6	0.7	0.5	0.4	0.3	0.5	0.6	0.7	0.7	0.5	0.9	1.1	1.1	1.0	1.1	1.4
1995	2.0	1.9	1.8	1.8	1.7	1.6	1.6	1.2	1.2	1.1	1.1	1.0	1.0	0.9	0.8	0.8	0.9	1.1	1.1	1.1	1.0	1.3	1.6	1.6	1.5	1.6	1.9
1996	1.9	1.8	1.7	1.7	1.7	1.5	1.5	1.1	1.1	1.0	1.0	0.9	1.0	0.8	0.8	0.7	0.9	1.0	1.0	1.0	0.9	1.2	1.5	1.5	1.4	1.5	1.8
1997	2.1	2.0	1.8	1.8	1.8	1.7	1.6	1.3	1.3	1.2	1.2	1.1	1.2	1.0	1.0	0.9	1.1	1.2	1.2	1.2	1.1	1.5	1.7	1.7	1.6	1.8	2.0
1998	2.2	2.1	2.0	2.0	2.0	1.8	1.8	1.4	1.4	1.3	1.3	1.3	1.3	1.2	1.1	1.1	1.2	1.3	1.4	1.4	1.3	1.6	1.9	1.9	1.8	1.9	2.2
1999	2.0	1.9	1.8	1.8	1.8	1.6	1.6	1.2	1.2	1.1	1.1	1.1	1.1	1.0	0.9	0.9	1.0	1.1	1.2	1.2	1.1	1.4	1.6	1.7	1.5	1.7	1.9
2000	2.2	2.1	2.0	2.0	2.0	1.8	1.8	1.4	1.5	1.4	1.3	1.3	1.3	1.2	1.2	1.1	1.3	1.4	1.4	1.4	1.3	1.6	1.9	1.9	1.8	1.9	2.2
2001	2.2	2.1	2.0	2.0	2.0	1.8	1.8	1.4	1.5	1.4	1.4	1.3	1.4	1.3	1.2	1.1	1.3	1.4	1.4	1.4	1.3	1.7	1.9	1.9	1.8	2.0	2.2
2002	2.3	2.2	2.1	2.1	2.1	2.0	2.0	1.6	1.6	1.6	1.5	1.5	1.5	1.4	1.4	1.3	1.5	1.6	1.6	1.7	1.5	1.9	2.1	2.1	2.0	2.2	2.4
2003	2.3	2.2	2.1	2.1	2.1	2.0	1.9	1.6	1.6	1.5	1.5	1.5	1.5	1.4	1.4	1.3	1.5	1.6	1.6	1.6	1.5	1.9	2.1	2.1	2.0	2.1	2.4
2004	2.3	2.3	2.1	2.1	2.1	2.0	2.0	1.6	1.7	1.6	1.6	1.5	1.6	1.5	1.4	1.4	1.5	1.6	1.7	1.7	1.6	1.9	2.1	2.2	2.1	2.2	2.4
2005	2.4	2.3	2.2	2.2	2.2	2.0	2.0	1.7	1.7	1.6	1.6	1.6	1.6	1.5	1.5	1.4	1.6	1.7	1.7	1.7	1.6	1.9	2.2	2.2	2.1	2.2	2.5
2006	2.3	2.2	2.1	2.1	2.1	2.0	2.0	1.6	1.7	1.6	1.6	1.5	1.6	1.5	1.4	1.4	1.5	1.6	1.7	1.7	1.6	1.9	2.1	2.1	2.0	2.2	2.4
2007	2.3	2.3	2.2	2.2	2.2	2.0	2.0	1.7	1.7	1.6	1.6	1.6	1.6	1.5	1.5	1.4	1.6	1.7	1.7	1.7	1.6	1.9	2.2	2.2	2.1	2.2	2.4
2008	2.6	2.5	2.4	2.4	2.4	2.3	2.3	2.0	2.0	1.9	1.9	1.9	1.9	1.8	1.8	1.7	1.9	2.0	2.0	2.1	2.0	2.3	2.5	2.5	2.4	2.6	2.8
2009	2.3	2.3	2.2	2.2	2.2	2.1	2.0	1.7	1.7	1.7	1.6	1.6	1.7	1.6	1.5	1.4	1.6	1.7	1.7	1.8	1.7	2.0	2.2	2.2	2.1	2.2	2.4
2010	2.4	2.3	2.2	2.2	2.2	2.1	2.1	1.8	1.8	1.7	1.7	1.7	1.7	1.6	1.6	1.5	1.7	1.8	1.8	1.9	1.8	2.1	2.3	2.3	2.2	2.3	2.5

	1952	1953	1954	1955	1956	1957	1958	1959	1960	1961	1962	1963	1964	1965	1966	1967	1968	1969	1970	1971	1972	1973	1974	1975	1976	1977	1978	1979	1980	1981	1982
1953	2.8																														
1954	5.3	7.9																													
1955	3.2	3.4	(1.0)																												
1956	0.1	(0.8)	(4.9)	(8.7)																											
1957	1.0	0.6	(1.7)	(2.1)	5.0																										
1958	(0.3)	(0.9)	(3.0)	(3.6)	(1.0)	(6.7)																									
1959	(0.8)	(1.4)	(3.2)	(3.7)	(2.0)	(5.3)	(3.9)																								
1960	0.6	0.3	(0.9)	(0.9)	1.2	(0.0)	3.5	11.5																							
1961	0.5	0.2	(0.8)	(0.8)	0.9	(0.1)	2.2	5.4	(0.4)																						
1962	1.1	0.9	0.1	0.2	1.8	1.1	3.2	5.7	2.9	6.2																					
1963	0.8	0.6	(0.2)	(0.1)	1.2	0.6	2.1	3.6	1.1	1.9	(2.3)																				
1964	1.0	0.8	0.1	0.2	1.4	0.9	2.2	3.5	1.6	2.3	0.4	3.1																			
1965	0.7	0.6	(0.1)	0.0	1.0	0.5	1.6	2.6	0.9	1.2	(0.4)	0.5	(2.0)																		
1966	0.7	0.6	(0.0)	0.1	1.0	0.5	1.5	2.3	0.8	1.1	(0.2)	0.5	(0.8)	0.5																	
1967	0.1	(0.1)	(0.7)	(0.7)	0.1	(0.4)	0.3	0.9	(0.6)	(0.6)	(1.9)	(1.8)	(3.4)	(4.1)	(8.4)																
1968	(0.3)	(0.5)	(1.0)	(1.1)	(0.4)	(0.9)	(0.3)	0.2	(1.2)	(1.3)	(2.5)	(2.5)	(3.9)	(4.5)	(6.9)	(5.4)															
1969	(1.0)	(1.2)	(1.8)	(1.8)	(1.3)	(1.8)	(1.3)	(1.1)	(2.4)	(2.6)	(3.8)	(4.1)	(5.5)	(6.3)	(8.5)	(8.5)	(11.5)														
1970	(0.6)	(0.8)	(1.3)	(1.3)	(0.8)	(1.2)	(0.7)	(0.4)	(1.5)	(1.7)	(2.6)	(2.7)	(3.6)	(3.9)	(5.0)	(3.8)	(2.9)	6.4													
1971	0.1	(0.1)	(0.5)	(0.5)	0.1	(0.3)	0.3	0.6	(0.3)	(0.3)	(1.0)	(0.9)	(1.4)	(1.3)	(1.7)	0.1	2.0	9.5	12.6												
1972	0.2	0.0	(0.4)	(0.4)	0.2	(0.1)	0.3	0.7	(0.2)	(0.1)	(0.8)	(0.6)	(1.0)	(0.9)	(1.1)	0.4	1.9	6.8	7.0	1.6											
1973	(0.3)	(0.5)	(0.9)	(0.9)	(0.4)	(0.8)	(0.4)	(0.1)	(0.9)	(1.0)	(1.6)	(1.6)	(2.1)	(2.1)	(2.4)	(1.4)	(0.6)	2.4	1.1	(4.2)	(9.8)										
1974	(0.7)	(0.8)	(1.2)	(1.3)	(0.8)	(1.2)	(0.8)	(0.6)	(1.4)	(1.5)	(2.1)	(2.1)	(2.6)	(2.7)	(3.0)	(2.3)	(1.7)	0.4	(1.1)	(5.3)	(8.5)	(7.3)									
1975	(0.7)	(0.8)	(1.2)	(1.2)	(0.8)	(1.1)	(0.8)	(0.6)	(1.4)	(1.4)	(2.0)	(2.0)	(2.4)	(2.5)	(2.8)	(2.1)	(1.6)	0.2	(1.0)	(4.1)	(6.0)	(4.0)	(0.7)								
1976	(0.2)	(0.3)	(0.7)	(0.6)	(0.2)	(0.5)	(0.1)	0.1	(0.6)	(0.6)	(1.1)	(1.0)	(1.3)	(1.2)	(1.4)	(0.6)	0.0	1.8	1.1	(1.1)	(1.8)	1.1	5.5	12.0							
1977	(0.4)	(0.5)	(0.8)	(0.8)	(0.4)	(0.7)	(0.4)	(0.2)	(0.8)	(0.9)	(1.3)	(1.3)	(1.6)	(1.5)	(1.7)	(1.0)	(0.5)	0.9	0.2	(1.8)	(2.4)	(0.5)	1.9	3.1	(5.1)						
1978	(0.8)	(0.9)	(1.3)	(1.3)	(0.9)	(1.2)	(0.9)	(0.7)	(1.4)	(1.4)	(1.9)	(1.9)	(2.2)	(2.2)	(2.5)	(1.9)	(1.6)	(0.4)	(1.2)	(3.0)	(3.8)	(2.5)	(1.3)	(1.5)	(7.7)	(10.3)					
1979	(1.2)	(1.4)	(1.7)	(1.8)	(1.4)	(1.7)	(1.5)	(1.4)	(2.0)	(2.1)	(2.6)	(2.6)	(2.9)	(3.0)	(3.3)	(2.8)	(2.6)	(1.6)	(2.5)	(4.2)	(5.1)	(4.2)	(3.6)	(4.4)	(9.3)	(11.3)	(12.3)				
1980	(1.7)	(1.8)	(2.2)	(2.2)	(2.0)	(2.2)	(2.0)	(2.0)	(2.6)	(2.7)	(3.2)	(3.2)	(3.6)	(3.7)	(4.0)	(3.7)	(3.5)	(2.7)	(3.6)	(5.3)	(6.1)	(5.6)	(5.3)	(6.2)	(10.2)	(11.9)	(12.7)	(13.0)			
1981	(1.8)	(2.0)	(2.3)	(2.4)	(2.1)	(2.4)	(2.2)	(2.1)	(2.7)	(2.8)	(3.3)	(3.4)	(3.7)	(3.8)	(4.1)	(3.8)	(3.7)	(3.0)	(3.8)	(5.3)	(6.1)	(5.6)	(5.3)	(6.1)	(9.4)	(10.4)	(10.4)	(9.5)	(5.7)		
1982	(0.8)	(1.0)	(1.3)	(1.3)	(1.0)	(1.2)	(1.0)	(0.9)	(1.4)	(1.4)	(1.8)	(1.8)	(2.0)	(2.0)	(2.2)	(1.8)	(1.5)	(0.7)	(1.3)	(2.4)	(2.8)	(2.0)	(1.3)	(1.4)	(3.5)	(3.2)	(1.3)	2.6	11.5	31.8	
1983	(0.9)	(1.0)	(1.3)	(1.3)	(1.0)	(1.2)	(1.0)	(0.9)	(1.4)	(1.4)	(1.8)	(1.8)	(2.0)	(2.0)	(2.1)	(1.7)	(1.5)	(0.7)	(1.3)	(2.3)	(2.7)	(2.0)	(1.3)	(1.4)	(3.2)	(2.9)	(1.4)	1.6	7.0	14.0	(1.5)
1984	(0.5)	(0.6)	(0.9)	(0.9)	(0.6)	(0.8)	(0.6)	(0.4)	(0.9)	(0.9)	(1.2)	(1.2)	(1.4)	(1.4)	(1.5)	(1.0)	(0.7)	0.0	(0.4)	(1.4)	(1.6)	(0.8)	(0.2)	(0.1)	(1.5)	(1.0)	0.6	3.4	8.0	13.0	4.6
1985	0.2	0.1	(0.1)	(0.1)	0.2	0.0	0.3	0.5	0.0	0.1	(0.2)	(0.1)	(0.3)	(0.2)	(0.2)	0.3	0.6	1.4	1.1	0.3	0.2	1.1	1.9	2.2	1.1	1.9	3.8	6.8	11.3	16.0	11.1
1986	0.8	0.7	0.5	0.6	0.9	0.8	1.0	1.2	0.8	0.9	0.7	0.8	0.7	0.8	0.9	1.4	1.8	2.6	2.4	1.7	1.7	2.7	3.5	3.9	3.2	4.1	6.1	9.0	13.2	17.4	14.0
1987	0.6	0.5	0.3	0.4	0.7	0.5	0.8	0.9	0.6	0.6	0.4	0.5	0.4	0.5	0.5	1.0	1.3	2.1	1.8	1.2	1.2	2.0	2.8	3.0	2.3	3.0	4.6	7.0	10.2	13.1	9.7
1988	0.7	0.6	0.4	0.5	0.8	0.6	0.9	1.1	0.7	0.7	0.5	0.7	0.5	0.7	0.7	1.1	1.5	2.2	2.0	1.4	1.4	2.1	2.9	3.1	2.4	3.1	4.6	6.6	9.4	11.8	8.7
1989	1.0	1.0	0.8	0.8	1.1	1.0	1.3	1.4	1.1	1.2	1.0	1.1	1.0	1.2	1.2	1.6	2.0	2.7	2.5	2.0	2.0	2.8	3.5	3.8	3.2	3.9	5.3	7.3	9.8	11.9	9.4
1990	1.0	0.9	0.8	0.8	1.1	1.0	1.2	1.4	1.1	1.1	1.0	1.1	1.0	1.1	1.1	1.6	1.9	2.6	2.4	1.9	1.9	2.7	3.3	3.6	3.0	3.6	4.9	6.6	8.8	10.6	8.2
1991	1.3	1.3	1.1	1.2	1.5	1.4	1.6	1.8	1.5	1.5	1.4	1.5	1.5	1.6	1.6	2.1	2.4	3.1	3.0	2.5	2.5	3.3	3.9	4.2	3.7	4.4	5.6	7.2	9.3	10.9	8.8
1992	1.4	1.4	1.2	1.3	1.5	1.5	1.7	1.9	1.6	1.7	1.5	1.6	1.6	1.7	1.8	2.2	2.5	3.2	3.0	2.6	2.7	3.4	4.0	4.3	3.8	4.4	5.6	7.1	8.9	10.4	8.4
1993	1.7	1.6	1.5	1.6	1.8	1.8	2.0	2.2	1.9	2.0	1.9	2.0	2.0	2.1	2.2	2.6	2.9	3.6	3.5	3.1	3.1	3.8	4.4	4.7	4.3	4.9	6.0	7.5	9.3	10.6	8.9
1994	1.4	1.4	1.2	1.3	1.6	1.5	1.7	1.9	1.6	1.7	1.5	1.6	1.6	1.7	1.8	2.2	2.5	3.1	2.9	2.5	2.6	3.2	3.8	4.0	3.6	4.1	5.1	6.3	7.9	9.0	7.3
1995	1.9	1.9	1.8	1.8	2.1	2.0	2.3	2.5	2.2	2.3	2.2	2.3	2.3	2.4	2.5	2.9	3.2	3.9	3.8	3.4	3.5	4.1	4.7	5.0	4.6	5.2	6.2	7.5	9.0	10.1	8.6
1996	1.8	1.8	1.6	1.7	2.0	1.9	2.1	2.3	2.1	2.1	2.0	2.2	2.1	2.3	2.3	2.7	3.0	3.6	3.5	3.1	3.2	3.8	4.3	4.6	4.2	4.7	5.6	6.8	8.2	9.2	7.7
1997	2.0	2.0	1.9	2.0	2.2	2.2	2.4	2.6	2.3	2.4	2.3	2.5	2.4	2.6	2.6	3.0	3.3	3.9	3.8	3.5	3.6	4.2	4.7	5.0	4.6	5.1	6.0	7.1	8.5	9.4	8.1
1998	2.2	2.2	2.1	2.2	2.4	2.4	2.6	2.8	2.6	2.6	2.5	2.7	2.7	2.8	2.9	3.3	3.6	4.1	4.1	3.8	3.8	4.4	5.0	5.2	4.9	5.4	6.3	7.3	8.6	9.5	8.2
1999	1.9	1.9	1.8	1.9	2.1	2.1	2.3	2.4	2.2	2.3	2.2	2.3	2.3	2.4	2.5	2.8	3.1	3.6	3.5	3.2	3.3	3.8	4.3	4.5	4.2	4.6	5.4	6.4	7.5	8.3	7.1
2000	2.2	2.2	2.1	2.2	2.4	2.4	2.6	2.8	2.5	2.6	2.5	2.7	2.6	2.8	2.9	3.2	3.5	4.0	3.9	3.7	3.7	4.3	4.7	5.0	4.7	5.1	5.9	6.8	7.9	8.7	7.6
2001	2.2	2.2	2.1	2.2	2.4	2.4	2.6	2.8	2.5	2.6	2.5	2.7	2.6	2.8	2.8	3.2	3.5	4.0	3.9	3.6	3.7	4.2	4.7	4.9	4.6	5.0	5.7	6.6	7.7	8.4	7.3
2002	2.5	2.4	2.3	2.4	2.7	2.6	2.8	3.0	2.8	2.9	2.8	2.9	2.9	3.1	3.1	3.5	3.8	4.3	4.2	3.9	4.0	4.5	5.0	5.2	4.9	5.4	6.1	6.9	8.0	8.7	7.6
2003	2.4	2.4	2.3	2.4	2.6	2.6	2.8	2.9	2.8	2.8	2.7	2.9	2.9	3.0	3.1	3.4	3.7	4.2	4.1	3.8	3.9	4.4	4.8	5.0	4.8	5.2	5.8	6.7	7.6	8.3	7.3
2004	2.5	2.5	2.4	2.4	2.7	2.6	2.8	3.0	2.8	2.9	2.8	2.9	2.9	3.0	3.1	3.4	3.7	4.2	4.1	3.9	3.9	4.4	4.8	5.0	4.8	5.2	5.8	6.6	7.5	8.1	7.2
2005	2.5	2.5	2.4	2.5	2.7	2.6	2.9	3.0	2.8	2.9	2.8	2.9	2.9	3.1	3.1	3.5	3.7	4.2	4.1	3.9	3.9	4.4	4.8	5.0	4.7	5.1	5.7	6.5	7.4	8.0	7.0
2006	2.4	2.4	2.3	2.4	2.6	2.6	2.8	2.9	2.7	2.8	2.7	2.8	2.8	3.0	3.0	3.3	3.6	4.0	4.0	3.7	3.8	4.2	4.6	4.8	4.5	4.9	5.5	6.2	7.0	7.6	6.7
2007	2.5	2.5	2.4	2.4	2.7	2.6	2.8	3.0	2.8	2.9	2.8	2.9	2.9	3.0	3.1	3.4	3.6	4.1	4.0	3.8	3.8	4.3	4.6	4.8	4.6	4.9	5.5	6.2	7.0	7.5	6.6
2008	2.8	2.8	2.7	2.8	3.0	3.0	3.2	3.4	3.2	3.3	3.2	3.3	3.3	3.5	3.5	3.9	4.1	4.5	4.5	4.3	4.4	4.8	5.2	5.3	5.1	5.5	6.1	6.8	7.5	8.1	7.2
2009	2.5	2.5	2.4	2.4	2.7	2.6	2.8	2.9	2.8	2.8	2.8	2.9	2.9	3.0	3.1	3.3	3.6	4.0	3.9	3.7	3.8	4.2	4.5	4.7	4.4	4.8	5.3	5.9	6.7	7.1	6.3
2010	2.6	2.6	2.5	2.5	2.8	2.7	2.9	3.0	2.9	3.0	2.9	3.0	3.0	3.1	3.2	3.5	3.7	4.1	4.0	3.8	3.9	4.3	4.6	4.8	4.5	4.9	5.4	6.0	6.7	7.2	6.4

	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009
1984	11.1																										
1985	18.0	25.3																									
1986	19.7	24.2	23.2																								
1987	12.6	13.1	7.5	(6.2)																							
1988	10.9	10.8	6.4	(1.1)	4.1																						
1989	11.3	11.3	8.0	3.4	8.6	13.2																					
1990	9.6	9.4	6.4	2.6	5.7	6.5	0.3																				
1991	10.2	10.1	7.7	4.9	7.8	9.1	7.1	14.4																			
1992	9.6	9.4	7.3	4.9	7.2	8.0	6.4	9.5	4.9																		
1993	10.0	9.8	8.0	6.0	8.2	9.0	8.0	10.7	9.0	13.2																	
1994	8.1	7.8	6.1	4.1	5.6	5.9	4.5	5.6	2.8	1.7	(8.6)																
1995	9.5	9.3	7.9	6.3	8.0	8.5	7.8	9.3	8.1	9.2	7.2	25.7															
1996	8.5	8.3	6.8	5.3	6.7	7.0	6.1	7.1	5.8	6.0	3.7	10.4	(3.1)														
1997	8.8	8.6	7.3	6.0	7.3	7.6	7.0	8.0	6.9	7.3	5.9	11.2	4.7	13.0													
1998	8.9	8.8	7.6	6.4	7.6	8.0	7.4	8.3	7.5	7.9	6.9	11.2	6.7	12.0	10.9												
1999	7.6	7.4	6.2	5.0	6.0	6.2	5.5	6.1	5.1	5.1	3.8	6.5	2.2	4.0	(0.2)	(10.2)											
2000	8.1	7.9	6.9	5.8	6.8	7.0	6.4	7.1	6.3	6.5	5.5	8.1	4.9	6.9	5.0	2.2	16.2										
2001	7.8	7.6	6.6	5.6	6.5	6.6	6.1	6.7	5.9	6.0	5.2	7.3	4.5	6.1	4.4	2.3	9.2	2.6									
2002	8.1	7.9	7.0	6.1	6.9	7.1	6.7	7.2	6.6	6.8	6.1	8.1	5.8	7.3	6.2	5.1	10.7	8.1	13.9								
2003	7.7	7.6	6.6	5.7	6.5	6.7	6.2	6.7	6.1	6.2	5.5	7.2	5.1	6.4	5.3	4.2	8.1	5.6	7.1	0.7							
2004	7.6	7.4	6.5	5.7	6.4	6.6	6.1	6.6	6.0	6.1	5.5	7.0	5.1	6.2	5.2	4.3	7.5	5.4	6.3	2.7	4.7						
2005	7.4	7.2	6.4	5.6	6.3	6.4	6.0	6.4	5.9	5.9	5.3	6.7	5.0	5.9	5.1	4.3	6.9	5.1	5.7	3.1	4.4	4.0					
2006	7.0	6.8	6.0	5.2	5.9	6.0	5.6	5.9	5.4	5.4	4.8	6.0	4.4	5.2	4.4	3.6	5.7	4.0	4.3	2.0	2.5	1.4	(1.2)				
2007	7.0	6.8	6.0	5.2	5.9	5.9	5.6	5.9	5.4	5.4	4.9	6.0	4.5	5.2	4.4	3.7	5.6	4.2	4.5	2.7	3.2	2.7	2.0	5.2			
2008	7.6	7.5	6.8	6.1	6.7	6.8	6.5	6.8	6.4	6.5	6.1	7.2	5.9	6.7	6.1	5.7	7.6	6.6	7.1	6.0	7.1	7.7	9.0	14.5	24.6		
2009	6.6	6.4	5.7	5.0	5.6	5.6	5.3	5.5	5.1	5.1	4.6	5.5	4.2	4.8	4.1	3.5	5.0	3.8	4.0	2.7	3.0	2.6	2.3	3.5	2.6	(15.5)	
2010	6.7	6.5	5.8	5.1	5.7	5.7	5.4	5.6	5.2	5.2	4.8	5.7	4.5	5.0	4.4	3.9	5.3	4.2	4.4	3.3	3.7	3.5	3.4	4.6	4.4	(4.5)	8.0

INVESTMENT FROM END YEAR

Analyst Certification(s)

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