IFE

Real Return Fund: The Case for a Real Asset Class

Inflation is as violent as a mugger, as frightening as an armed robber and as deadly as a hit man.

Ronald Reagan, 1978

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REAL RETURN FUND

The Case for a Real Asset Class

How would the typical US pension plan fare if inflation returned to what it was in the mid-seventies, when it was well over 10%? How would future liabilities be met if equity returns in the coming decade were to be similar to those of the thirties (1.6%pa) or, indeed, the seventies (-0.7%pa)?

We believe there is a strong case for pension plans to invest in assets that both hedge inflation and also offer diversification benefits to traditional asset classes. In part, this reflects the fact that a large part of pension fund liabilities are real liabilities, and so plans need to protect themselves against inflation. Additionally, of course, many plans find utility in smoothing their overall returns; assets whose returns move in line with inflation are therefore potentially valuable offsets to conventional assets.

This paper looks at the case for investing in real assets and, in particular, whether it is feasible to put together a real return fund whose characteristics would be helpful to institutional investors. We will begin by looking at asset classes, then see what real assets may be the most promising, and which are realistically available to institutional clients. After considering what kind of real returns have been achieved in the past and may be in prospect, how real assets behave in relation to conventional securities, we will examine the effect of combining conventional assets with real ones.

1. WHAT IS AN ASSET CLASS?

The term "asset class" means different things to different people, and indeed there are perfectly good reasons why they do not have to agree on a definition. A plan invests in those classes which, taken together, will match its liabilities as closely as can be, hopefully with some margin of outperformance. There is no reason why the list of classes appropriate for any one plan should be the same as that for any other plan. However, there is more common ground on what an useful asset class should look like.

Plans are interested in asset classes for a number of reasons. We have already alluded to the fact that the analysis may help them match their liabilities more closely. Many plans also want to smooth their flow of returns, and

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allocation between asset classes is central to this exercise. Also, of course, if the returns to asset classes are sufficiently different then asset allocation at plan level - rather than leaving it to fund managers - can be a way to add value. Finally, dividing the plan between asset classes may enable a plan to hire better, more specialist, money managers.

To be useful in these respects, an asset class will comprise a set of securities which behave in some coherent way. Not that they all have to move in exactly the same direction - although even the elements of a wide class such as international bonds will all be affected alike by some major variable, in this case the performance of the dollar. However, in most cases the returns to the securities in an asset class can be expected to be similar. Finally, an asset class may also be defined in terms of the appropriate techniques of investment; such as large- and small-cap equities

An asset class which is going to be useful will be one which reflects the investor's liabilities in some way, and also whose return characteristics are both internally consistent, and, by differing from returns on other asset classes, they will offer diversification benefits [Greer, 1997]. Real assets look promising in all these respects, especially for fixed income investor.

2. REAL ASSETS

What Are Real Assets?

Real assets are assets which rise in price along with inflation. They can therefore be considered at least a partial hedge against inflation, protecting the underlying value of the holdings.

What Is Inflation?

There are many measures of inflation. One crucial question, certainly for the purpose of a central bank trying to control inflation, is whether the definition should encompass asset prices, in addition to the prices of goods and services. For this paper, however, especially as we are investigating the behavior of asset prices separately, we take inflation to refer to the prices of goods and services only; in short, we will take inflation to be a persistent rise over time in the general price of goods. To keep things conveniently simple, we will take the rate of increase in consumer prices (CPI) as the measure of inflation, which is a force affecting all prices and all sectors of the economy. In further work, we will examine whether other indices, such as PPI (producer prices) or the GNP deflator, will lead to similar conclusions.

Which Assets Are Real?

A common answer to this question is "equities", and is what we expected when we began our exercise. However, the results suggest that the picture is not so straightforward. The quarterly correlation between the CPI in the US, and US equities is actually negative, and consistent for each index at around -16%. This is true whether we take the DJ index, the S&P 500 or the Wilshire 5000, and negative correlations with inflation are also found when monthly or yearly data are used. The message seems to be that while equities may be a real asset over a long-term horizon - indeed we believe they are - on a shorter view they are not. This may not be really so surprising. For example, equity markets would probably react badly to a surge in inflation, which might provoke a hike in interest rates.

Real assets are those whose prices move in line with inflation. Exhibit 1 shows how various assets are correlated with inflation. The data cover the period 1984-2000, because this is the longest period for which we have data for one important class, real return securities. This is for UK index-linked gilts.

For commodities, we have taken the Goldman Sachs Commodity Price Index (GSCI). This is generally regarded as the best commodity index available, as it is a market-weighted index of liquid exchange-traded commodity spot prices. For a full description of the GSCI and its attributes see Ankrim and Hensel (1993), and also Appendix 1 for current GSCI weightings. Many investors, of course, tend to avoid commodities because they want to avoid difficulties with custody and delivery. However, the GSCI avoids this problem because there is a freely tradeable futures contract.

These results are very interesting. We have already mentioned the surprising outcome as far as equities are concerned. Much less surprising, but perhaps most notable, is the fact that commodity prices (GSCI) have been very well correlated with inflation. This gives this index the potential to be the basis for an operationally useful real asset class. GSCI has also negatively correlated with all the equity indicies, and has almost zero correlation with the various bond asset classes in the table [also see Anson, 1999]. This offers strong evidence that not only does the GSCI appear to be convincingly "real", but that it also

Exhibit 1. QUARTERLY CORRELATIONS OF RETURNS, 1984 – 2000

	US CPI	UK CPI	S&P 500	DJ IND.	EAFE	US GBI	WGBI	WGBI ex US	GSCI	WILT 5000	UK Linkers
USCPI	100%										
UK CPI	40%	100%									
S&P 500	-16%	-5%	100%								
DJ IND.	-17%	-4%	95%	100%							
EAFE	-36%	-20%	62%	62%	100%						
US Bonds	10%	9%	-2%	-1%	0%	100%					
WGBI	2%	6%	-17%	-16%	9%	83%	100%				
WGBI ex US	-15%	-9%	-13%	-13%	34%	23%	68%	100%			
GSCI	47%	13%	-30%	-27%	-21%	1%	0%	-3%	100%		
WILT 5000	-16%	-7%	99%	92%	61%	-1%	-18%	-16%	-30%	100%	
UK Linkers	13%	-14%	1%	-6%	-10%	-9%	-17%	-22%	12%	2%	100%

Notes:
US CPI- United States Consumer Price Index
UK CPI- United Kingdom Retail Prices Index
S&P 500 - Standard and Poor 500 Equity Index
DJ Index- Dow Jones Industrial Average
MS EAFE- Morgan Stanley Europe, Australasia and the Far East Index
US Bonds- Salomon Smith Barney US Government Bond Index
WGBI- Salomon Smith Barney World Government Bond Index
WGBI exUS- Salomon Smith Barney World Government Bond Index, ex USA
GSCI- Goldman Sachs Commodity Index
Wilt 5000 .... - Wiltshire 5000 Equity Index
UK Linkers- British Government Index-Linked All-Stocks-total return Index

appears to be an excellent diversifier.

It was very surprising to find that UK Linkers (UK Index-linked Gilts) were negatively correlated with UK inflation, a result which also held true on monthly or yearly data, or using an 8-month lag, which is the lag used to calculate the coupons on these securities. We therefore investigated further by dividing the data into three periods: 1) when UK CPI falls, 2) when UK CPI rises and 3) when UK CPI is stable – changes by less than _% in a quarter.

The results of this exercise are summarized in Exhibit 2; they show that UK Linkers have been actually well correlated with UK inflation when inflation is getting worse, but the correlation turns negative when inflation is falling. Moreover whenever inflation is relatively stable (quarterly change of less than 1/2% up or down), the negative correlation remains.

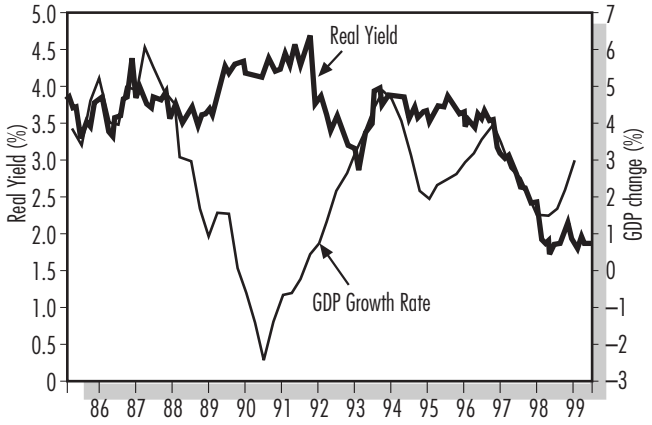
Because it has the longest history [Wiseman, 1996], the UK index-linked market is probably the best basis for examining the relation between inflation and index-linked securities. That said, it must be admitted that the data are limited, even for the UK. For other inflation-linked markets (see Appendix 2 for details) information is even more scarce. Moreover, there is no guarantee that these markets will perform as has the UK; tax circumstances or supply/demand conditions may vary significantly. Only the brave would take the UK results and expect them to apply to the newer index-linked markets. Unfortunately, reliable results on the diversification benefits of international index linked bonds will have to wait until these markets become more mature and we have more extensive information on how they actually behave.

There are arguments for holding inflation-linked securities, both for diversification and for strong returns. The return prospects will be discussed later. From the diversification viewpoint, the argument is (Lucas and Queck, 1998) that real rates offered by markets tend to rise during periods of high growth, and this leads to poor returns from index-linked bonds. Similarly, in periods of low real growth, market real yields

Exhibit 2. CORRELATION OF RETURNS - UK LINKERS WITH UK CPI, 1984 - 2000

	Inflation Rising	Inflation Falling	Inflation table
Correlation	29%	-17%	-9%

Exhibit 3. REAL YIELDS AND GDP GROWTH—UK



should decline, to the benefit of real return securities. In contrast, periods of high real growth are generally good for equities while low growth often causes equities to decline. With the return pattern to inflation-linked securities expected to be the inverse of that for equities, then one should expect them to be an excellent hedge for equities. This is a plausible argument, but the evidence from the UK market experience is actually not very supportive. Exhibit 3 shows that UK real rates are not well linked with UK GDP growth (the correlation coefficient is -18%).

Our conclusion is that commodities offer valuable diversification benefits for all traditional asset classes, especially equities. Commodities also provide the best available hedge against inflation, ie these assets correlate most closely with inflation.

There are strong theoretical arguments suggesting that real return bonds should offer similar diversification, but we do not yet have enough data to demonstrate this conclusively. Pension fund liabilities have a substantial real component, and a priori these should be matched with real assets. Finally, real return bonds should become more popular as the inherent attractiveness of the yields on offer become better recognized.

3. REAL RETURNS

Having seen the diversification qualities of real assets, lets us now consider what sort of returns we may expect. We will talk about real returns, ie after inflation, as this allows us to compare better across markets and periods. We also think it is useful to focus on real return. In the end, they are what create plan surpluses and pay the pensioners.

One way of judging the level of market real yields is to make an analogy with economic growth [Lucas and Queck,1996]. A government pays interest out of taxes, and thus in the long run the real rate it can pay will be constrained by the growth of national income or productivity. Economic growth rates in most developed economies tend to cluster around 2%, when you strip out differences in growth of working population, etc. This suggests that the real rate of return on a risk-free asset should also be approximately 2%. Anything above that would be good; anything less would be inadequate.

That is theory. What has happened in practice? First we shall look at index-linked real returns, and then consider the returns available from commodities, before comparing both with the returns which have been seen on traditional asset classes.

Real Returns on Index-Linked Securities

For the purpose of this paper we shall take a risk-free real return to be the return available on government index-linked securities. There are now six developed bond markets which offer these securities (see Appendix 2), the latest addition being France in 1998. There are 13 emerging markets where index-linked securities are available. Index-linked bonds is a growing asset class which will likely become more significant in future.

Historical experience with actual index-linked securities in developed countries has shown they generally offer returns considerably above our theoretical 2%. For the most part real yields have run in the range of 2-5%. Higher yields generally attach only to the much less liquid markets. Markets with the longest history show real yields over 4.5% have usually proved to be close to the top. Exhibit 4 shows that real yields offered in the market have been in the 3-4% range for most of the time.

Exhibit 4. INDEX-LINKED REAL YIELDS AROUND THE GLOBE

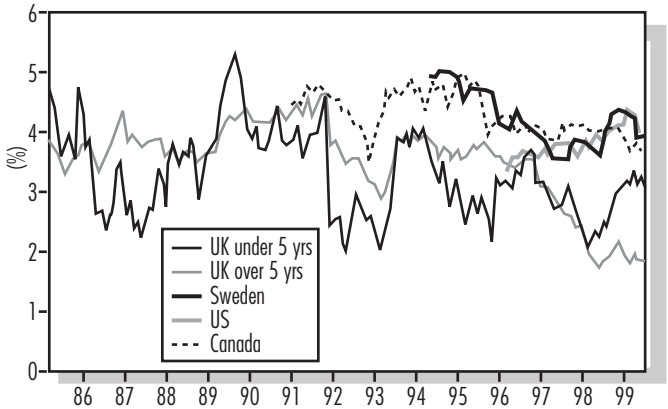


Exhibit 5. MARKET YIELDS ON 10 YEAR INFLATION-LINKED BONDS, APRIL 28, 2000

	Real Yield (%)	*Market Size ($bn)*
US	4.0	107
UK	2.2	53
France	3.9	10
Sweden	3.9	14
Canada	3.9	8
Australia	3.5	3

It is important to remember that index-linked bonds are not free of all risk. Returns are normally linked to CPI, and this may be affected by government policy via tax, subsidies or interest rates, and may be affected by changes in definition, as happened in the US after the Boskin report. Also, the return is only risk-free if the security is held to maturity. Returns to shorter holding periods will be affected by changes in what the market offers in terms of real return. Longer-dated index-linked bonds may provide an attractive real return, but their duration (ie price sensitivity) with respect to changes in real yield, can be quite high. A real yield guaranteed to maturity, can realise rather volatile actual returns over shorter periods. Finally, non-base currency holdings would be subject to exchange rate risk unless currency hedged.

At the present time (April 28, 2000), real yields in all the world markets, where real return bonds are available, are in the 3-4% range. The UK is an outlier, as is shown in Exhibit 5.

The appeal of real bonds for institutional investors is diminished by a relative lack of liquidity - although this is not too bad in the US or the UK. It is probably true that US institutions still give real bonds less room than they deserve. This may be because US equities have had such a good run, dulling real bonds in comparison. However, in normal times a generous risk-free guaranteed real return should be attractive to a long run investor with real liabilities. Should the perception of index-linked assets change - particularly the perception of TIPS in the US - there is considerable potential for lower real yields, and hence very much higher actual realised returns. From the graph above, we can see that real returns in the UK started around 4%, stayed there for about 5 years, but in the last 5 years have averaged only 3%. When the market real return falls by 1%, the price of a 25yr TIP rises almost 20%.

Exhibit 6. GSCI REAL RETURNS (% PA)

	1999	*10yrs*	*20yrs*	*30yrs*
GSCI	37.2	0.9	3.1	6.3

Real Returns on Commodities

Real returns from the Goldman Sachs Commodity Price Index (GSCI) are shown in Exhibit 6. The table shows the GSCI returns in US$, deflated by the US CPI.

GSCI has been used because this index is regarded as very representative and has 30 years of history behind it. A possible alternative would be to use a selection of stocks which are predominantly raw materials based companies, as these provide exposure to commodities themselves with the additional potential from raw materials processing. This is not a simple issue, particularly in terms of which stocks to include, but we think this is a very interesting area where we intend to do more research.

Real returns on Other Asset Classes

How do returns from commodities compare with what has been seen on other assets? Exhibits 7 & 8 summarize the real returns achieved by the main asset classes over various historical periods. Nominal returns have been deflated by the Retail Price Index in the UK, and by the CPI in the USA [Barclays Capital, Equity-Gilt Study 2000].

For index-linked bonds, over the ten available

Exhibit 7. UK REAL RETURNS (% PA)

	1999	*10yrs*	*20yrs*	*30yrs*	*50yrs*
Equities	21.7	10.7	13.1	7.7	8.1
Gilts	–5.2	8.3	7.6	3.6	1.1
Corporate Bonds	–3.4				
Index-Linked Gilts	3.2	5.7			
Cash	3.7	4.5	4.6	1.9	1.3

Exhibit 8. USA REAL RETURNS (% PA)

	1999	*10yrs*	*20yrs*	*30yrs*	*50yrs*
Equities	20.2	14.3	12.8	8.0	9.2
Govt Bonds	-10.2	5.5	6.4	3.6	1.5
Cash	1.8	1.9	2.7	1.5	1.1

Exhibit 9. EFFICIENT ALLOCATION MODEL, Q2 1973 – Q1 2000

	Allocation	*A*	*B*	*C*	*D*	*E*	*F*	*G*	*H*	*I*	*J*	*K*
Portfolio Statistics												
Return (%)	6.0	7.2	8.2	9.3	10.4	11.5	12.6	13.6	14.8	15.9	18.2	
Risk (%)	8.4	7.3	7	6.9	7.1	7.5	8	8.9	11.2	17.9	40.6	
Sharpe	-0.24	-0.11	0.03	0.19	0.34	0.46	0.57	0.63	0.60	0.44	0.25	
Ret/Risk	0.71	0.98	1.18	1.34	1.46	1.53	1.56	1.53	1.32	0.88	0.45	
Allocation %												
US Equity		2.8	10.7	17.6	24.2	30.7	37.3	49.8	63.7	69.8		
EAFE		1.3	0.6									
US Bonds	100.0	82.8	68.7	53.5	38.4	23.3	8.2					
WGBIexUS			3.9	10.2	16.1	22	27.9	19.7				
GSCI		13	16.1	18.7	21.3	24	26.6	30.5	31.3	8.4		
US REITS									5.0	21.9	100.0	

years the return of 5.7%pa compares well with the 5.5%pa on US bonds. While it may be below the 8.3% on UK gilts, this has happened in a period of falling inflation, which favors conventional bonds. The equity returns over this period of 10.7%pa (UK) and 14.3%pa (USA) are also exceptionally high. It is also worth noting that locking in at the current 4% real returns offered by US real return bonds would compare very favorably with the long term results for both the US and UK bond markets.

As we can see, taking a 30year comparison, the best real returns have come from equities. However, this has occurred at the end of a long equity boom without parallel in post-war history. In that respect, the 6.3%pa real return on commodities compares very well with a real equity return of 8.0%pa (USA) or 7.7%pa (UK), and better than the real 3.6%pa on government bonds in both those markets.

The 50yr real return from cash and bonds has been only 1-2%. The fact that long run real returns from commodities has been so strong, may surprise many investors whose memory is strongly colored by the experience of the 1990s.

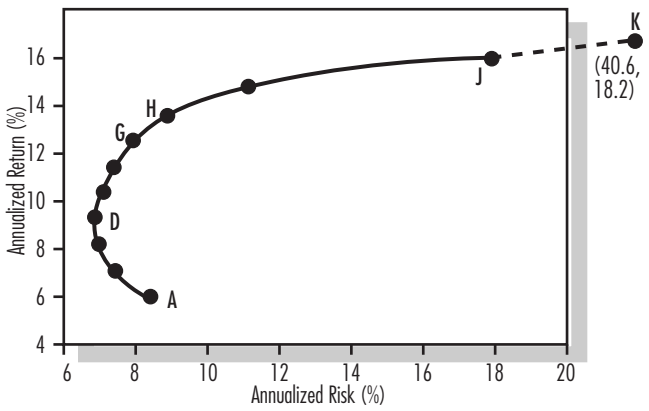
4. REAL RETURN FUND – Combining Real and Conventional Assets

We have examined the potential benefits of including commodities in the asset mix. We considered a fund which had the freedom to invest in the following asset classes:

1. Morgan Stanley Capital International US Equities Total Return Index (US Equity)
2. Morgan Stanley Capital International EAFE Total Return Index in US$ (EAFE)
3. Salomon Smith Barney US Government Bond Total Return Index (US Bonds)
4. Salomon Smith Barney Non-US World Government Bond Total Return Index (WGBI ex US)
5. The Goldman Sachs Commodity Index (GSCI), and
6. A total return index for US REITS created by DataStream (US REITS).

The exercise covers the period 1973-Q2 to 2000 Q1- the period over which GSCI data are available – and the results are in Exhibit 9. Allocation A represents the lowest return possible (100% US bonds). Allocation K was set by choosing the highest return possible (100% US REITS). Intermediate allocations were determined using a mean-variance optimizer, to produce minimum-risk intermediate returns, roughly equally spaced.

Exhibit 10. EFFICIENT FRONTIER



You will have noticed the absence of an index-linked category. It is frustrating, that lack of data means one cannot analyze how a multi-currency portfolio would have performed, ie one which would have included inflation-linked bonds. There are some papers [McFall, 1998; Foot, 1995] showing how synthetic inflation-linked bonds would have performed. However, when one looks at the case for a multi-currency portfolio, the number of assumptions that have to be made, and the complexity of the interactions, make the results very tenuous. We have therefore not included them in this section. However, as we have already stated we would expect index-linked to be included in any real asset portfolio going forward.

Which is the optimal allocation? Measured as the allocation with the highest Sharpe ratio, the answer is allocation H, and we can see that it comes with a sizeable allocation of 30.5% to commodities. Measured as the allocation with the best return per unit of risk, the answer is allocation G.; this also has a sizeable 26.6% portion in commodities. In fact, all the "best" allocations D through I have commodity allocations of between 18.7% and 31.3%. (Most conventional equity indexes have less than 5% exposure to commodities, ie stocks which are raw materials based) Only when targeting high returns (14%-plus) do REITS get in, and it is interesting to note that the fund almost never allocates to international equities, the exception being tiny amounts in allocations C and D. Exhibit 10, shows the efficient frontier.

If we repeat this exercise using different periods and finding the optimal allocation (as measured by maximising return per unit of risk, see Exhibit11), we see that the allocation to commodities does vary but is always given a significant allocation.

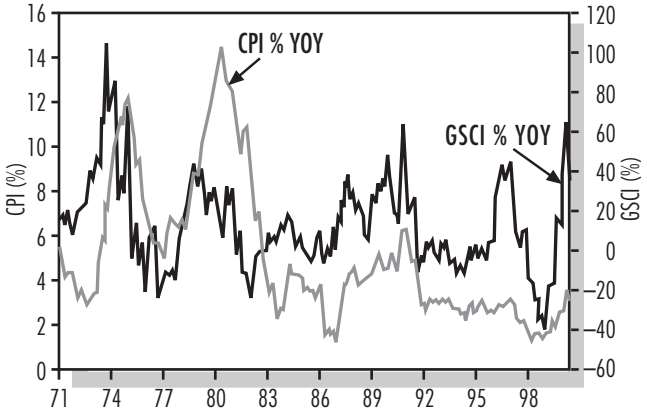
Exhibit 11. OPTIMAL ASSET ALLOCATION FOR VARYING TIME PERIODS

	Q2 1973-Q1 2000	Q2 1980-Q1 2000	Q2 1990-Q1 2000	Q2 1995-Q1 2000
Portfolio Statistics				
Return (%)	12.0	13.0	11.0	12.0
Risk (%)	8.0	7.8	4.8	4.0
Ret/Risk	1.49	1.66	2.31	2.97
Allocation %				
US Equity	37.3	38.9	31.9	24.4
EAFE				
US Bonds	8.2	26.0	53.3	64.8
WGBI ex US	27.9	14.6	1.7	
GSCI	26.6	19.4	13.1	10.7
US REITS		1.1		

The variability of the GSCI allocation is not surprising when we consider how volatile commodity returns have been – as can be seen from Graph 4, below, which covers the changes in the US CPI and GSCI over the past 30 years. Considering how poorly commodities performed in 1998 it is not surprising to see that shorter time periods allocate a lower percentage to the GSCI.

Exhibit 12 also shows how commodity prices were a good leading indicator for US inflation up until the mid-80s. Since that time, the two series have moved much more closely in step. In terms of our exercise, what this means is that the GSCI has become an even better hedge for US inflation. As the two indexes have come closer together, so the potential usefulness of systematic inflation forecasting has increased. If we can successfully predict inflation, then we should be in a

Exhibit 12. US CPI VS. GSCI



better position to improve performance through the inclusion of exposure to GSCI commodities in our portfolios. By doing so we can not only improve the risk profile of our portfolios, but also increase returns.

6. CONCLUSION

We believe that a Real Asset Class can no longer be ignored. The 20-year equity bull run cannot be sustained indefinitely, so alternative real asset classes are needed to give pension plans downside protection. We believe our work has shown that a Real Asset Class can go a long way to protect plan sponsors from the pain of not meeting actuarial return assumptions.

Real assets give sponsors the opportunity to improve their portfolios via diversification, but also with enhanced returns. Aside from the UK, the history of inflation-linked bonds is short, but these assets already provide good investment opportunities. Their liquidity can only improve, as will our experience of how they behave.

Assets offering real yields over 4% deserve to find a place in plan portfolios. These returns are competitive with other assets, and they also come with a government guarantee.

Lastly, and this may surprise some investors, commodities have a history of real returns bettered only by equities. Combine this with their ability to track inflation and to offer great diversification from other asset classes, they become difficult for the rational pension plan investor to ignore.

Just like the ocean, the spectacular stuff in markets is the waves. Get them wrong, and you get wet. However, also like the ocean, the turn of the tide in markets is often quiet and hard to see. No doubt, the spectacular returns from equities will not be repeated over the coming decade or so. And if the balance of the returns coming from the different asset classes is going to be different, then maybe asset allocations should also change. In a few years time, there may be quite a few plans wishing they had put more of their eggs in some very old-economy, and very real, baskets.

APPENDIX 1
GSCI WEIGHTINGS (APRIL, 2000)

COMMODITY	*PERCENT WEIGHT ($)*	*COMMODITY*	*PERCENT WEIGHT ($)*
Crude Oil	26.30%	Gold	2.15%
Brent	10.91%	Soybeans	2.11%
Heating Oil	8.39%	Coffee	1.69%
Live Cattle	7.31%	Sugar	1.59%
Natural Gas	6.11%	Kansas Wheat	1.52%
Unleaded Gas	5.62%	Zinc	0.93%
Aluminium	4.28%	Orange Juice	0.77%
Corn	4.27%	Nickel	0.75%
Wheat	3.74%	Lead	0.28%
Lean Hogs	3.17%	Silver	0.26%
Gasoil	2.97%	Cocoa	0.22%
Copper	2.17%	Platinum	0.19%
Cotton	2.17%	Tin	0.13%

APPENDIX 2
OVERVIEW OF G13 INFLATION-LINKED MARKETS
AS OF MARCH 2000

	Australia	*Canada*	*Sweden*	*UK*	*USA*	*France*
MARKET CHARACTERISTICS						
Started	1985	1991	1994	1981	1997	1998
Maturities	2005 to 2020	2021 to 2031	2001 to 2028	2001 to 2030	2002 to 2029	2009 to 2029
Amount in issue	$2.5 bn	$7.9 bn	$14.2 bn	$52.7 bn	$107 bn	$9.5 bn
% of bond Market	7%	5%	18%	15%	6%	2%
SECURITY CHARACTERISTICS						
Reference Price Index	CPI (quarterly)	CPI (monthly)	CPI (monthly)	RPI (monthly)	CPI-Urban (monthly)	INSEE CPI (monthly)
Coupon frequency	Quarterly	Semi-annual	Annual	Semi-annual	Semi-annual	Annual
Coupon type	Pre-determined	Post-determined	Post-determined	Pre-determined	Post-determined	Post-determined
Indexation mechanism	Q'ly with 3-month lag	Daily with 3-month lag	Daily with 8-month lag	On RPI with 3-month lag	Daily with 3-month lag	Daily with 3-month lag
Floor					Redemption at par min	Redemption at par min

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