# Retired Investor
***Invest Wisely…Get an Impartial Second Opinion.***

## Contents

## May 2010 Issue: Key Points

We continue to believe that many asset classes are overvalued, that financial markets are in an increasingly fragile state, and that investors are underweighting the probability of a return into the High Uncertainty regime.

We also remain haunted by a rhetorical question our friend Russell Taylor (the excellent British financial writer) posed two years ago, during a discussion about the deceptive calm that prevailed during the early years of the 20$^{th}$ century: Are we reliving 1910? Following on last month's in-depth analysis of the future of China, this month's feature article takes an extended look at two other critical aspects issues that strongly bear on the answer to Russell's question. The first is the global leverage crisis. We examine how three different approaches to resolving debt crises – growing your way out of them, intense austerity, and default – apply to the debt problems faced by the household, non-financial corporate, financial and public sectors. The second is the

growing crisis of legitimacy for leaders of political systems around the world. We conclude with the asset allocation implications of two possible scenarios – one characterized by muddling through just short of widespread sovereign defaults, and the other characterized by high inflation, many sovereign defaults, and the collapse of the global system into a world dominated by blocs and restrictions on cross-border capital and trade flows.

## Global Asset Class Returns

| YTD 30Apr10 | In USD | In AUD | In CAD | In EUR | In JPY | In GBP | In CHF | In INR |
|---|---|---|---|---|---|---|---|---|
| Asset Held | | | | | | | | |
| **USD Bonds** | 2.25% | -1.24% | -1.26% | 9.58% | 3.23% | 7.46% | 6.35% | -2.65% |
| **USD Prop.** | 17.82% | 14.33% | 14.31% | 25.15% | 18.80% | 23.03% | 21.92% | 12.92% |
| **USD Equity** | 8.30% | 4.81% | 4.79% | 15.63% | 9.28% | 13.51% | 12.40% | 3.40% |
| | | | | | | | | |
| **AUD Bonds** | 3.68% | 0.19% | 0.17% | 11.01% | 4.66% | 8.89% | 7.78% | -1.22% |
| **AUD Prop.** | 6.30% | 2.80% | 2.78% | 13.62% | 7.27% | 11.51% | 10.40% | 1.39% |
| **AUD Equity** | 3.29% | -0.20% | -0.22% | 10.62% | 4.27% | 8.51% | 7.40% | -1.61% |
| | | | | | | | | |
| **CAD Bonds** | 3.87% | 0.38% | 0.36% | 11.20% | 4.85% | 9.09% | 7.98% | -1.03% |
| **CAD Prop.** | 9.81% | 6.31% | 6.29% | 17.13% | 10.78% | 15.02% | 13.91% | 4.90% |
| **CAD Equity** | 8.27% | 4.78% | 4.76% | 15.59% | 9.25% | 13.48% | 12.37% | 3.36% |
| | | | | | | | | |
| **CHF Bonds** | -2.12% | -5.61% | -5.63% | 5.20% | -1.15% | 3.09% | 1.98% | -7.03% |
| **CHF Prop.** | 3.79% | 0.30% | 0.28% | 11.12% | 4.77% | 9.01% | 7.90% | -1.11% |
| **CHF Equity** | -1.53% | -5.02% | -5.04% | 5.80% | -0.55% | 3.69% | 2.58% | -6.43% |
| | | | | | | | | |
| **INR Bonds** | 2.78% | -0.71% | -0.73% | 10.11% | 3.76% | 8.00% | 6.89% | -2.12% |
| **INR Equity** | -2.36% | -5.85% | -5.87% | 4.96% | -1.38% | 2.85% | 1.74% | -7.27% |
| | | | | | | | | |
| **EUR Bonds** | -3.57% | -7.07% | -7.09% | 3.75% | -2.60% | 1.64% | 0.53% | -8.48% |
| **EUR Prop.** | -5.11% | -8.61% | -8.63% | 2.21% | -4.14% | 0.10% | -1.01% | -10.02% |
| **EUR Equity** | -8.86% | -12.35% | -12.37% | -1.54% | -7.88% | -3.65% | -4.76% | -13.77% |
| | | | | | | | | |
| **JPY Bonds** | -0.98% | -4.47% | -4.49% | 6.35% | 0.00% | 4.24% | 3.13% | -5.88% |
| **JPY Prop.** | 13.43% | 9.94% | 9.92% | 20.76% | 14.41% | 18.64% | 17.53% | 8.53% |
| **JPY Equity** | 6.67% | 3.18% | 3.16% | 14.00% | 7.65% | 11.89% | 10.78% | 1.77% |
| | | | | | | | | |
| **GBP Bonds** | -3.44% | -6.94% | -6.96% | 3.88% | -2.47% | 1.77% | 0.66% | -8.35% |
| **GBP Prop.** | -6.71% | -10.20% | -10.22% | 0.62% | -5.73% | -1.49% | -2.60% | -11.61% |
| **GBP Equity** | -0.15% | -3.64% | -3.66% | 7.18% | 0.83% | 5.06% | 3.95% | -5.05% |
| | | | | | | | | |
| **1-3 Yr USGvt** | 0.99% | -2.50% | -2.52% | 8.31% | 1.96% | 6.20% | 5.09% | -3.92% |

| YTD 30Apr10 | In USD | In AUD | In CAD | In EUR | In JPY | In GBP | In CHF | In INR |
|---|---|---|---|---|---|---|---|---|
| World Bonds | -1.01% | -4.50% | -4.52% | 6.32% | -0.03% | 4.21% | 3.10% | -5.91% |
| World Prop. | 8.00% | 4.51% | 4.49% | 15.32% | 8.98% | 13.21% | 12.10% | 3.09% |
| World Equity | 2.85% | -0.64% | -0.66% | 10.18% | 3.83% | 8.07% | 6.96% | -2.05% |
| Commod Long Futures | -3.88% | -7.37% | -7.39% | 3.44% | -2.90% | 1.33% | 0.22% | -8.79% |
| Commod L/Shrt | -9.95% | -13.44% | -13.46% | -2.62% | -8.97% | -4.73% | -5.84% | -14.85% |
| Gold | 7.50% | 4.01% | 3.99% | 14.83% | 8.48% | 12.72% | 11.61% | 2.60% |
| Timber | 9.77% | 6.28% | 6.26% | 17.09% | 10.75% | 14.98% | 13.87% | 4.86% |
| Uncorrel Alpha | 1.77% | -1.72% | -1.74% | 9.09% | 2.75% | 6.98% | 5.87% | -3.14% |
| Volatility VIX | 13.25% | 9.76% | 9.74% | 20.58% | 14.23% | 18.47% | 17.36% | 8.35% |
| *Currency* | | | | | | | | |
| AUD | 3.49% | 0.00% | -0.02% | 10.82% | 4.47% | 8.71% | 7.60% | -1.41% |
| CAD | 3.51% | 0.02% | 0.00% | 10.84% | 4.49% | 8.73% | 7.62% | -1.39% |
| EUR | -7.33% | -10.82% | -10.84% | 0.00% | -6.35% | -2.11% | -3.22% | -12.23% |
| JPY | -0.98% | -4.47% | -4.49% | 6.35% | 0.00% | 4.24% | 3.13% | -5.88% |
| GBP | -5.21% | -8.71% | -8.73% | 2.11% | -4.24% | 0.00% | -1.11% | -10.12% |
| USD | 0.00% | -3.49% | -3.51% | 7.33% | 0.98% | 5.21% | 4.10% | -4.90% |
| CHF | -4.10% | -7.60% | -7.62% | 3.22% | -3.13% | 1.11% | 0.00% | -9.01% |
| INR | 4.90% | 1.41% | 1.39% | 12.23% | 5.88% | 10.12% | 9.01% | 0.00% |

## Uncorrelated Alpha Strategies Detail

As we have repeatedly noted over the years, actively managed strategies whose objective is to produce returns with low or no correlation with the returns on major asset classes (so-called "uncorrelated alpha strategies") have an undeniable mathematical benefit for a portfolio. Moreover, the potential size of this benefit increases with the portfolio's long-term real rate of return target. On the other hand, we have also repeatedly noted that, for a wide range of reasons, active management is an extremely difficult game to play consistently well, and that this challenge only increases with time. Hence, in our model portfolios, we have tried to strike an appropriate balance between these two perspectives. We start by limiting allocations to uncorrelated alpha to no more than ten percent of a portfolio. We then equally divide this allocation between four different strategies. Within each strategy, we track the performance of two liquid, retail funds which can be used to implement it, and which have far lower costs than the 2% of assets under management and 20% of profits typically charged by hedge fund managers using the same strategy (for more on the advantages of such funds, see "How Do Hedge Fund Clones Manage the Real

World?" by Wallerstein, Tuchshmid, and Zaker). The following table shows the year to date performance of these funds (which are listed by ticker symbol):

| YTD 30Apr10 | In USD | In AUD | In CAD | In EUR | In JPY | In GBP | In CHF | In INR |
|---|---|---|---|---|---|---|---|---|
| **Eq Mkt Neutral** | | | | | | | | |
| HSKAX | -0.83% | -4.32% | -4.34% | 6.49% | 0.15% | 4.38% | 3.27% | -5.74% |
| OGNAX | -1.59% | -5.08% | -5.11% | 5.73% | -0.62% | 3.62% | 2.51% | -6.50% |
| **Arbitrage** | | | | | | | | |
| ARBFX | 1.89% | -1.60% | -1.62% | 9.22% | 2.87% | 7.11% | 6.00% | -3.01% |
| ADANX | 1.30% | -2.19% | -2.21% | 8.62% | 2.28% | 6.51% | 5.40% | -3.61% |
| **Currency** | | | | | | | | |
| DBV | 2.46% | -1.03% | -1.05% | 9.79% | 3.44% | 7.68% | 6.57% | -2.44% |
| ICI | 3.44% | -0.05% | -0.07% | 10.77% | 4.42% | 8.66% | 7.55% | -1.46% |
| **Equity L/S** | | | | | | | | |
| HSGFX | -0.63% | -4.12% | -4.14% | 6.70% | 0.35% | 4.59% | 3.48% | -5.53% |
| PTFAX | 4.94% | 1.45% | 1.43% | 12.27% | 5.92% | 10.16% | 9.05% | 0.04% |
| **GTAA** | | | | | | | | |
| MDLOX | 2.24% | -1.26% | -1.28% | 9.56% | 3.21% | 7.45% | 6.34% | -2.67% |
| PASAX | 4.47% | 0.97% | 0.95% | 11.79% | 5.44% | 9.68% | 8.57% | -0.44% |

## Overview of Our Valuation Methodology

This short introduction is intended to provide an overview of our valuation methodology, and to put the analyses that follow into a larger, integrated context. Our core assumption is that forecasting asset prices is extremely challenging, because unlike physical systems, the behavior of political economies and financial markets isn't governed by constant natural laws. Instead, they are complex adaptive systems, in which positive feedback loops and non-linear effects are common, due to the interaction of competing investment strategies (e.g., value, momentum, arbitrage and passive approaches), and investor decisions that are made on the basis of incomplete information, by individuals with limited cognitive capacities, who are often pressed for time, affected by emotions, and subject to the influence of other people. We further believe that these interactions give rise to three different regimes in financial markets that are characterized by very different asset class return, risk, and correlation

parameters. We term these three regimes "High Uncertainty", "High Inflation" and "Normal Times."

We emphasize that while forecasting the future behavior of a complex adaptive system (with a degree of accuracy beyond simple luck) is extremely challenging, it is not impossible. There are two reasons for this. First, complex adaptive systems are constantly evolving, and pass through phases when their behavior makes forecasting more and less challenging. In the investment context, we believe the best example of this is extreme overvaluations, which throughout history have confirmed that what can't continue doesn't continue. Second, it is also the case that, across a range of contexts, researchers have found that a small percentage of people and teams are able to develop superior mental models that provide them with a superior, if "coarse-grained" understanding of the dynamics of complex adaptive systems. More important there is also significant evidence that superior mental models translate into substantial performance advantages (see, for example, "Mental Models, Decision Rules, Strategy and Performance Heterogeneity" by Gary and Wood, "Team Mental Models and Team Performance" by Lim and Klein, and "Good Sensemaking is More Important than Information" by Eva Jensen).

We believe that investors are best served when their primary performance benchmark is the long-term real return their portfolio must earn in order to achieve their long term financial goals. We believe the best way to implement this approach is via a portfolio of broadly defined, low cost, low turnover, asset class index products that provide exposure to a diversified mix of underlying return generating processes. In this context, conservatively managing risk in order to avoid large losses is mathematically more important than taking aggressive risk position to reach for additional returns via actively managed strategies. This is not to say that in some cases investors would benefit from those additional active returns. Such cases typically involve aggressive goals, low starting capital, low savings, and/or a short time horizon. In these situations, it is mathematically clear that an allocation to certain actively managed investment strategies can benefit a portfolio, provided the results of those strategies have a low or no correlation with returns on the investor's existing

allocations to broad asset class index products.  The use of these "uncorrelated alpha" products has a further benefit, in that they avoid the situation (common in traditional actively managed funds) where an investor pays much higher fees to an active manager for performance that is, in fact, a mix of the index fund's results (often referred to as "beta") and the manager's skill (often referred to as "alpha").

We also believe that, in addition to careful asset allocation, a disciplined portfolio risk management process is critical to an investor achieving his or her long-term goals.  In our view, there are four main elements to this process.  The first is a systematic approach to rebalancing a portfolio back to its target weights, either on the basis of time (e.g., yearly) or when one or more asset classes is over or under its target weight by a certain "trigger" amount. The second risk management discipline is the monitoring of asset class prices, in relation to estimates of both fundamental valuation and short term investor behavior, matched with a willingness to reduce exposure (e.g., by hedging with options or moving into cash or undervalued asset classes) when overpricing becomes substantial and dangerous to the achievement of long-term goals. We stress that the objective of this process is not market timing in pursuit of higher returns; rather, we view this risk discipline as the willingness to depart from one's normal, long-term (i.e., "policy") asset allocation and rebalancing strategy under exceptional circumstances when crash risk is very high.  Of course, this begs the question of when and how should one reinvest in an asset class after a bubble has inevitably burst.  Again, we believe that fundamental valuation analysis should be an investor's guide to this third risk management discipline. From a long-term investment perspective, the best time to get back in is when an asset class is undervalued, even though this may be the most psychologically difficult time to do so. As a compromise approach, many investors choose to reinvest over time (i.e., "dollar cost average") to limit potential regret.

We also recognize that the valuation analyses which form the basis for these risk management decisions all contain an irreducible element of uncertainty.  Hence, we believe that investors' fourth risk management discipline should be to combine our forecasts with those made by other analysts who use different methodologies.

Research has demonstrated that forecast combination, using either simple averaging or more complex methods, improves forecast accuracy.

In each month's issue of our journals, we provide investors with updated valuation estimates for a wide range of asset classes. The basic assumptions that underlie our valuation methodology are as follows: (1) In the medium term, asset prices are attracted to their fundamental values. (2) However, fundamental valuation can only be estimated with a degree of uncertainty. (3) In the short term, asset prices are most strongly influenced by what Keynes called the market's "animal spirits", which we interpret as collective investor behavior resulting from the complex interplay between underlying political and economic trends and events, information flows, individual mental models, emotions, and social network interactions. (4) Valuation methodologies are most useful to investors when they are applied on a consistent basis over time.

The analyses we provide each month can be grouped into three major categories. First, we compare prevailing asset class prices to our estimate of fundamental values. Second, we present a number of analyses that are intended to warn of the development of conditions that raise the probability of sudden and substantial short-term changes in collective investor behavior. These include (a) Trends in rolling three month asset class returns that assess the probability of a High Uncertainty or High Inflation regime developing (which are dangerous since both of these are extreme disequilibrium conditions); (b) Trends in sector returns within asset classes that indicate the next turning points in the normal business cycle; (c) An assessment of the direction and intensity of recent price momentum (with accelerating positive momentum in the face of fundamental overvaluation the most dangerous condition); and (d) A measure of the estimated strength of investor networks and herding risk. Finally, we summarize our views with an estimate of the percent of time that markets will spend in each regime over the next three years, and the resulting expected real returns on different asset classes over this time horizon.

## Table: Market Implied Regime Expectations and Three Year Return Forecast

We use the following table to provide insight into the weight of market views about which of three regimes – high uncertainty, high inflation, or normal growth – is developing. The table shows rolling three month returns for different asset classes. The asset classes we list under each regime should deliver relatively high returns when that regime develops. We assume that both the cross-sectional and time series comparisons we present provide insight into the market's conventional wisdom – at a specific point in time -- about the regime that is most likely to develop within the next twelve months. To obtain the cross-sectional perspective, we horizontally compare the row labeled "This Month's Average" for the three regimes. In our interpretation, the regime with the highest rolling three month average is the one which (on the specified date) the market's conventional wisdom believed was the most likely to develop.

For the time series perspective, we vertically compare this month's average rolling three month return for a given regime to the regime's rolling three month average three months ago. We believe this time series perspective provides insight into how fast and in what direction the conventional wisdom has been changing over time.

| Rolling Three Month Returns in USD | | 30Apr10 |
|---|---|---|
| *High Uncertainty* | *High Inflation* | *Normal Growth* |
| Short Maturity US Govt Bonds (SHY) **0.19%** | US Real Return Bonds (TIP) **1.16%** | US Equity (VTI) **12.01%** |
| 1 - 3 Year International Treasury Bonds (ISHG) **-3.42%** | Long Commodities (DJP) **4.37%** | EAFE Equity (EFA) **3.68%** |
| Equity Volatility (VIX) **-10.44%** | Global Commercial Property (RWO) **14.45%** | Emerging Equity (EEM) **9.85%** |

| Rolling Three Month Returns in USD | | 30Apr10 |
| --- | --- | --- |
| *High Uncertainty* | *High Inflation* | *Normal Growth* |
| Gold (GLD) **8.87%** | Long Maturity Nominal Treasury Bonds (TLT)* **0.83%** | High Yield Bonds (HYG) **5.96%** |
| *Average* *-1.20%* | *Average (with TLT short)* *4.79%* | *Average* *7.87%* |
| *Three Months Ago:* *-4.58%* | *Three Months Ago:* *1.12%* | *Three Months Ago:* *2.63%* |

* Falling returns on TLT indicate rising inflation expectations

As you can see, at the end of **April**, the conventional wisdom appeared to favor the normal times regime, with a lower probability attached to the high inflation regime, and an even lower probability attached to the high uncertainty regime. As we have repeatedly noted over many recent issues, we think this is exactly backwards, and that uncertainty is poised to significantly increase.

At the request of many readers, we will now publish forecasts for real returns on different asset classes in USD. They can be compared to asset class return forecasts regularly produced by GMO, to which many of our readers also subscribe. Given our belief that foresight accuracy is improved by combining the outputs from different forecasting methodologies, we have taken a different approach from GMO. As we understand it (and their methodology is available on their site), they start with their estimate of current over or undervaluation, and assume that these will return to equilibrium over a seven-year business cycle. They believe that the use of this time horizon will cause a number of ups and downs caused by cyclical and investor behavior factors to average out. It has always struck us as a very logical approach, though one that like ours, is based on unavoidably imperfect assumptions. The forecasting approach we have taken is grounded in our research in to the performance of different asset classes in three regimes, which we have termed high uncertainty, high inflation and normal times. In the latter regime, asset class returns are strongly

attracted to their equilibrium levels – i.e., to the situation in which the returns supplied and the returns demanded are close to balance.

Our approach to estimating returns under this regime is to appropriate risk premiums for different asset classes to our estimate of the equilibrium yield on risk return bonds when the system is operating under normal conditions. In contrast, the high uncertainty and high inflation regimes are very much disequilibrium conditions in which investor behavior determines the returns that are actually supplied. Under these regimes, our approach to return forecasting starts with our estimate of what the real rate of return would be (lower than normal under high uncertainty because of a lower time discount rate, and lower still under high inflation because of much stronger investor demand for inflation hedging assets like real return bonds). We then add an estimate of the realized return spread over the real bond yield for each asset class in the high uncertainty and high inflation regimes. To determine these premia, we began with the results from our historical regime analysis, and subjectively adjusted the results to make them more consistent with each other while generally preserving the rank ordering of asset class returns from our historical regime analysis.

The final step in our methodology is to subjectively estimate the percentage of time that the financial system will spend in each of the three different regimes over the next 36 months. These estimated probabilities may or may not change each month, in line with our assessment of evolving political and economic conditions. We are the first to admit that ours is, at best, a noisy estimate of the returns investors are likely to receive on different asset classes over our target time horizon. We have no doubt that GMO would say the same about the results produced by their methodology. Indeed, it is either naive or misleading to say anything else, given that one is attempting to forecast results produced by a constantly evolving complex adaptive system. On the other hand, we also believe that our readers appreciate our willingness to put a clear, quantitative stake in the ground, so to speak. As always, we stress that research has shown that foresight accuracy can be improved by combining (i.e., using simple averaging) forecasts produced using different methodologies. With that admonition, our results are as follows:

| Regime | Normal Regime | High Uncertainty Regime | High Inflation Regime | *Forecast Annual USD Real Return Over Next Three Years (weighted real return plus premium)* |
|---|---|---|---|---|
| *Assumed Regime Probability Over Next 36 Months* | *20%* | *45%* | *35%* | |
| *Real Return Bond Yield* | *3.5* | *2.5* | *1.5* | *2.4* |
| **Asset Class Premia Over Real Rate (pct)** | | | | |
| Domestic Bonds | 1.0 | 1.0 | -3.0 | *2.0* |
| Foreign Bonds | 0.5 | 2.0 | 0.5 | *3.5* |
| Domestic Property | 3.0 | -10.0 | 1.0 | *(1.2)* |
| Foreign Property | 3.0 | -10.0 | -1.5 | *(2.1)* |
| Commodities | 2.0 | -6.0 | 3.0 | *1.1* |
| Timber | 2.0 | -8.0 | 1.0 | *(0.5)* |
| Domestic Equity | 3.5 | -12.0 | -5.0 | *(4.1)* |
| Foreign Equity | 3.5 | -12.0 | -7.0 | *(4.8)* |
| Emerging Equity | 4.5 | -15.0 | 1.0 | *(3.2)* |
| Gold | -2.0 | 2.0 | 2.5 | *3.7* |
| Volatility | -25.0 | 50.0 | 25.0 | *28.6* |

## Table: Fundamental Asset Class Valuation and Recent Return Momentum

The table at the end of this section sums up our conclusions (based on the analysis summarized in this article) as to potential asset class under and overvaluations at **30 Apr 10**. We believe that asset prices reflect the interaction of three broad forces. The first is fundamental valuation, as reflected in the balance

between the expected supply of and demand for returns. The Global Asset Class Valuation Analysis of each month's journal contains an extensive discussion of fundamental valuation issues. One of our core beliefs is that while asset prices are seldom equal to their respective fundamental values (because the system usually operates in disequilibrium), they are, in the medium and long-run strongly drawn towards that attractor.

The second driver of asset prices, and undoubtedly the strongest in the short run, is investor behavior, which results from the interaction of a complex mix of cognitive, emotional and social inputs – the latter two comprising Keynes' famous "animal spirits". We try to capture the impact of investor behavior in each month's Market Implied Expectations Analysis, as well as in two measures of momentum for different asset classes – one covering returns over the most recent three months (e.g., June, July and August), and one covering returns over the previous non-overlapping three month period (e.g., March, April, and May).

The third driver of asset prices is the ongoing evolution of political and economic conditions and relationships, and the degree uncertainty that prevails about their future direction. We capture these longer term forces in our economic scenarios.

In the table, we summarize our most recent conclusions the current pricing of different asset classes compared to their fundamental valuations.

The extent to which we believe over or underpricing to be the case is reflected in the confidence rating we assign to each conclusion. We believe it is extremely important for the recipient of any estimate or assessment to clearly understand the analyst's confidence in the conclusions he or she presents. How best to accomplish this has been the subject of an increasing amount of research (see, for example, "Communicating Uncertainty in Intelligence Analysis" by Steven Rieber; "Verbal Probability Expressions in National Intelligence Estimates" by Rachel Kesselman, "Verbal Uncertainty Expressions: Literature Review" by Marek Druzdzel, and "What Do Words of Estimative Probability Mean?" by Kristan Wheaton). We use a three level verbal scale to express our confidence level in our valuation conclusions. "Possible" represents a relatively low level of confidence (e.g., 25% – 33%, or a 1 in 4 to 1 in 3

chance of being right), "likely" a moderate level of confidence (e.g., 50%, or a 1 in 2 chance of being right), and "probable" a high level of confidence (e.g., 67% to 75%, or a 2 in 3 to 3 in 4 chance of being right). We do not use a quantitative scale, because we believe that would give a false sense of accuracy to judgments that are inherently approximate due to the noisy data and subjective assumptions upon which they are based.

An exception to this approach is our assessment of the future return to local investors for holding U.S. dollars. In this case, our conclusions are mechanically driven by interest rate differentials on ten year government bonds. To be sure, the theory of Uncovered Interest Rate Parity, which calls for exchange rates offsetting interest rate differentials is more likely to apply in the long-run than in the short run, as the apparent profitability of the carry trade has shown (i.e., borrowing in low interest rate currencies to invest in high interest rate currencies). However, other research have found that a substantial portion of these profits represents compensation for bearing so-called "crash" risk (see "Crash Risk in Currency Markets" by Farhi, Fraiberger, Gabaix, et al) – as many who were long Icelandic Krona in 2007 and 2008 learned the hard way. In sum, exchange rates that are moving at an accelerating rate away from the direction they should move under interest rate parity indicates a rising risk of sudden reversal (i.e., crash risk).

The table also shows return momentum for different asset classes over the preceding three months, as well as the three months before that, to make it easier to see the direction of momentum, and whether it is accelerating, decelerating, or has reversed. The most dangerous situation is where an asset class is probably overvalued on a fundamental basis, yet positive return momentum is accelerating. As so many authors have noted throughout history, trends that can't continue don't continue. In these situations, we strongly recommend either hedging (e.g, via put options) or reducing exposure. In contrast, a situation where an asset class is probably undervalued, but negative return momentum is still accelerating, may be an exceptionally attractive opportunity to increase one's exposure to an asset class. Finally, conclusions about changes in asset class valuations also have to be seen in

the longer term context of the possible evolution of alternative political/economic scenarios, and their implications for asset class valuations and investor behavior (see, for example, our monthly Economic Updates). This is also an important input into investment decisions, as we do not believe that the full implications of these scenarios are typically reflected in current asset prices and investor behavior.

| *Valuation at 30Apr10* | *Current Price versus Long-Term Fundamental Valuation Estimate* | *Rolling 3 Month Return in Local Currency* | *Rolling 3 Month Return 3 Months Ago* |
|---|---|---|---|
| | | | |
| **AUD Real Bonds** | Neutral | 0.49% | 4.17% |
| **AUD Bonds** | Neutral | -2.62% | 1.34% |
| **AUD Property** | Neutral | 4.84% | -0.01% |
| **AUD Equity** | Possibly Overvalued | 6.33% | -1.05% |
| | | | |
| **CAD Real Bonds** | Neutral | 0.82% | 3.11% |
| **CAD Bonds** | Neutral | -1.30% | 1.35% |
| **CAD Property** | Possibly Undervalued | 4.23% | 11.55% |
| **CAD Equity** | Likely Overvalued | 10.26% | 2.45% |
| | | | |
| **CHF Bonds** | Likely Overvalued | 1.68% | 0.49% |
| **CHF Property** | Likely Overvalued | 6.09% | 3.61% |
| **CHF Equity** | Possibly Overvalued | 5.14% | 2.69% |
| | | | |
| **EUR Real Bonds** | Neutral | 2.84% | -0.04% |
| **EUR Bonds** | Possibly Overvalued | 1.56% | 0.39% |
| **EUR Prop.** | Likely Undervalued | 2.36% | 0.71% |
| **EUR Equity** | Likely Undervalued | 3.46% | 1.65% |
| | | | |
| **GBP Real Bonds** | Possibly Overvalued | 2.29% | -0.87% |
| **GBP Bonds** | Neutral | 0.98% | -1.17% |
| **GBP Property** | Likely Undervalued | 5.63% | -4.32% |
| **GBP Equity** | Probably Undervalued | 9.11% | 7.20% |
| | | | |
| **INR Bonds** | Likely Overvalued | -3.59% | 2.55% |
| **INR Equity** | Probably Overvalued | -0.99% | 2.90% |
| | | | |

| *Valuation at 30Apr10* | *Current Price versus Long-Term Fundamental Valuation Estimate* | *Rolling 3 Month Return in Local Currency* | *Rolling 3 Month Return 3 Months Ago* |
|---|---|---|---|
| **JPY Real Bonds** | Neutral | 0.59% | 4.88% |
| **JPY Bonds** | Possibly Overvalued | 0.40% | 0.89% |
| **JPY Property** | Likely Undervalued | 11.72% | -0.91% |
| **JPY Equity** | Probably Overvalued | 9.47% | 3.91% |
| | | | |
| **USD Real Bonds** | Neutral | 1.31% | 1.98% |
| **USD Bonds** | Possibly Overvalued | 0.53% | 0.97% |
| **USD Property** | Neutral | 24.44% | 8.28% |
| **USD Equity** | Probably Overvalued | 12.23% | 4.84% |
| *Following in USD:* | | | |
| **Investment Grade Credit (CIU)** | Possibly Overvalued | 1.75% | 2.11% |
| **High Yield Credit (HYG)** | Probably Overvalued | 5.96% | 3.06% |
| **Emerging Mkt Equity (EEM)** | Probably Overvalued | 9.59% | 2.89% |
| **Commodities Long** | Likely Overvalued | 4.37% | -2.48% |
| **Gold** | Likely Undervalued | 8.87% | 3.35% |
| **Timber** | Possibly Undervalued | 13.29% | 13.27% |
| **Uncorrelated Alpha** | N/A | 1.75% | 0.93% |
| **Volatility (VIX)** | Probably Undervalued | -10.44% | -19.78% |
| *Future Return in Local Currency from holding USD:* | *Based on Covered Interest Parity* | | |
| **Returns to AUD Investor** | Positive | -4.60% | 2.03% |
| **Returns to CAD Investor** | Neutral | -5.04% | -2.14% |
| **Returns to EUR Investor** | Negative | 4.08% | 6.34% |
| **Returns to JPY Investor** | Negative | 3.77% | 0.00% |
| **Returns to GBP Investor** | Neutral | 4.41% | 3.52% |
| **Returns to CHF Investor** | Negative | 2.14% | 2.94% |
| **Returns to INR Investor** | Positive | -4.15% | -1.78% |

## Investor Herding Risk Analysis

One of our core assumptions is that financial markets function as complex adaptive systems. One of the key features of such systems is their ability to pass through so-called "phase transitions" that materially change their character once certain variables exceed or fall below critical thresholds. In our September 2009 issue, we reviewed a paper on one of critical variables, "Leverage Causes Fat Tails and Clustered Volatility" by Thurner, Farmer and Geanakoplos. This paper more formally demonstrated the importance of a factor that has been associated with booms and busts throughout financial history: the expansion of the supply of credit at a pace well in excess of real economic growth. In the past we have also noted that rising uncertainty tends to increase the size, degree of connectedness and intensity of communications within social networks that influence investor decision making. In turn, this leads to greater coordination of investor behavior, causing not only a higher tendency toward momentum, but also higher fragility, and susceptibility to rapid changes in asset prices (see, for example, "Asset Pricing in Large Information Networks" by Ozsoylev and Walden, or "Dragon Kings, Black Swans, and the Prediction of Crises" by Didier Sornette).

As a practical matter, the challenge for investors has been to identify variables or statistics that can be used to track the strengthening of networks that is often associated with phase transitions. With this in mind, we call readers' attention to an excellent paper by Lisa Borland, of the asset management firm Evnine and Associates in San Francisco ("Statistical Signatures in Times of Panic: Markets as a Self Organizing System"). Using the phase transition approach, Borland searched for statistical signatures of market panics, and proposes a new order parameter that is easy to calculate and appears to capture the changing dynamics of asset return correlations and the underlying social network and herding phenomena that give rise to them. The parameter equals the number of financial markets or assets that have positive returns over a given interval (in 2010 we are switching from YTD to just the

past month, as we believe it provides a more accurate assessment), less the number that have negative returns, divided by the total number of financial markets or asset classes evaluated. If the value is zero, the markets are in a disordered state and far from the potential phase change point. However, as the parameter value approaches positive one or negative one, the markets are in an increasingly ordered state – that is, networks are larger and more active, causing increased alignment in collective investor behavior (more commonly known as "herding"). Under these conditions, a market may be close to a phase change point, and therefore subject to a sudden, and potentially violent, shift in its previous trend.  We have calculated this order parameter for the 38 financial markets (excluding foreign exchange) we evaluate each month. Here are the results for each of the most recent 12 months:

| May | Jun | Jul | Aug | Sep | Oct | Nov | Dec09 | Jan10 | Feb10 | Mar10 | Apr10 |
|------|------|------|------|------|--------|------|-------|--------|-------|-------|-------|
| 0.33 | 0.33 | 0.51 | 0.51 | 0.56 | (0.30) | 0.72 | 0.24 | (0.03) | 0.30 | 0.46 | 0.73 |

As you can see, in recent months global financial markets appear to have gone from a highly ordered and fragile state in November, to one that was highly disordered by the end of January (and therefore at lower risk of a sudden, substantial, and highly correlated change in prices across multiple asset classes) and back to a highly ordered and fragile state by the end of April.

## This Month's Letters to the Editor

*In her May 9th Financial Times column, Pauline Skypala questioned whether investment consultant's new advocacy of "dynamic asset allocation" was just a new version of market timing designed to make them, if not their clients, more money.  The approach that Skypala claims is advocated by the consultants seems quite similar to the approach you have advocated over the years. So I'd be very interested to hear your take on Skypala's column.*

First, let me say that we think Pauline Skypala writes a great column, and we read it regularly.  For our readers, here are some of her key points from the column in

question: "The opportunistic approach, or dynamic asset allocation, is increasingly what investment consultants prescribe, although they have different interpretations of what this means in practice. It sounds to me like market timing, and some consultants agree that is not an inaccurate label. Others say it is more about rethinking investment beliefs in the light of recent experience, and recalibrating the investment approach as a result…Towers Watson believes asset returns have "regimes", with alternating periods of high and low returns...Investors with time horizons of less, perhaps, than 100 years …need to adjust their asset allocation depending on the prevailing regime...Hewitt defines dynamic asset allocation as being an asset rebalancing strategy that changes as a [pension] plan's funded ratio improves."

As you can see, "dynamic asset allocation" is a term that is used in different ways by different advisors, and seems to cover a lot of the ground we have been writing about for years.  Let me start with Hewitt's approach.  We have long written that an investor's asset allocation reflects a number of other factors and decisions, including his or her starting capital, years to retirement (or, if already retired, expected remaining years of life), target post retirement income and bequest, and (for investors who are not yet retired), desired annual savings level (which is just the reverse of their desired consumption level).   As we have repeatedly noted, there is a compound annual real portfolio return that reconciles these factors and decisions, and, in the financial sense, would enable an investor to "get from here to there" – i.e., to achieve his or her goals, given their current starting point.   Once this minimum required compound rate of return is known, an investor can then identify a strategic asset allocation policy that maximizes the probability of achieving it.  If the probability is quite low, by definition the investor must accept a high level of risk in his or her financial plan.  If he or she doesn't want to do that, the next step is to revisit the previous decisions, which will reduce the minimum required rate of portfolio return, and lead to a more acceptable asset allocation. In short, it is an iterative process. Moreover, as Hewitt points out, it is a process that has to be revisited when circumstances change. For example, a large inheritance or windfall from the sale of a business can lead to some combination of earlier retirement, a more conservative asset allocation, higher

post-retirement income, a larger bequest, or more current consumption (with the same level of savings as before).  When you look at it this way, you can easily see how a good financial advisor can add tremendous value to a client's financial life.

As our long-time subscribers also know, we strongly agree with Towers Watson's conclusion that different asset class return regimes exist (though if we wanted to be snarky, we'd ask what took them so long to reach it).  However, we think the more important question is, "so what?"  How should an investor's behavior change in light of the conclusion that regimes exist, and, for us, the even more important conclusions that financial markets are complex adaptive systems that, while attracted to equilibrium, are seldom in it, and, in fact, sometimes operate far from it?  For many years we have described out thinking about this issue using a 2 x 2 matrix.  On one axis, we ask whether an investor's objective is to minimize downside risk, or add to returns?  On the other axis, we ask whether an investor's behavior is automatic or episodic (e.g., the result of a unique, "one off" decision)?  In our view, traditional criticisms of "market timing" refer to one box (quadrant) in this matrix: episodic decisions intended to generate returns above those that would be produced by the investor's long term strategic asset allocation policy.  It is hard to consistently succeed (i.e., generate compound returns that exceed costs) using this approach because (a) it depends on being right twice, buying when assets are undervalued, and selling either when assets are fully valued, or, if they become overvalued, before prices crash; (b) the incentives faced by people who manage other people's money typically work against both of these decisions (e.g., many clients will balk at buying an asset when its price is falling, and selling when its price is still going up); (c) the behavior of complex adaptive systems is extremely hard to forecast accurately (there are periods when it is easier, but they don't last); and (d) all valuations are only estimates, that inevitably contain an irreducible level of uncertainty that makes decision making much harder for most human beings.

However, we would also argue that the likelihood of success in the other three quadrants is much higher.  In the automatic decision/risk reduction quadrant, adhering to a regular rebalancing policy (based on time or exceeding a given maximum asset

class weight) has repeatedly been shown to reduce downside risk.  In the automatic decision/return enhancement quadrant, the argument is that (a) human behavior causes asset prices to regularly overshoot their fair values; (b) in a complex adaptive system, asset prices will be attracted back towards equilibrium/fair value when they overshoot; and (c) it should therefore be possible to earn incremental returns without taking on substantial extra risk by rebalancing overweight asset classes to slightly below their long-term target weights, and underweight asset classes to slightly above their long term target weights.  In our view, the evidence suggests that this approach can increase long term compound portfolio returns; however, the incremental return benefit is not likely to be large when prudent limits are set on the size of the over and underweight positions.

Finally, let's look at the last quadrant: episodic decisions intended to minimize downside risk.  This is another area we have written about a lot over the years.  Our starting point is a simple mathematical fact: a large loss has a larger impact on the probability of achieving a long-term compound annual portfolio return goal than a gain of equivalent size.  For an investor whose primary goal is achieving a long-term compound real portfolio return target, avoiding downside losses is more important than achieving incremental gains above those that the portfolio's strategic asset allocation policy is likely to produce.  Given this, the prudent course of action is to (a) over time, monitor a consistent set of asset class valuation indicators ; (b) be willing to reallocate into either undervalued asset classes, or into cash, or to purchase downside risk protection (e.g., puts) when it appears an asset class has become dangerously overvalued; and (c) gradually reallocate funds to the asset class in question when valuation metrics indicate it has become fairly or undervalued.  We recognize that all valuation analyses contain an irreducible level of uncertainty. While a better process can minimize this uncertainty (e.g., use of consistent valuation metrics and averaging of forecasts based on different methodologies), it cannot eliminate it. Implementing this strategy will always require some degree of potentially fallible human judgment.  In our view, however, the manifest damage that large downside financial losses can do to a person's life makes it prudent to monitor asset class valuation indicators, and stand

willing to episodically make decisions to reduce exposure to dangerous situations, as we recommended in both March 2000 and May 2007.

That said, we also recognize that for many investors, achieving a minimum long-term real portfolio return is not the most important goal, and perhaps not a goal at all. For some people, it is more important to beat a benchmark return, or outperform their Uncle Carl who is always bragging at family parties about his investment prowess. For others, being invested in what are perceived to be the "hottest" or most popular asset classes or investments is what counts. And for people who manage other people's money, not deviating from the herd (and thereby raising the risk that clients will pull their money), or staying invested through the end of the year in order to earn a bonus based on a portfolio's annual return may be far more important than a long-term compound annual portfolio return goal. We recognize that human beings are social beings, for who envy and regret aversion are very important behavioral drivers. So we do not minimize the difficulty of implementing the episodic downside risk management strategy that we recommend.

In sum, we think that the new trend towards "dynamic asset allocation" is potentially much more than simply a new way for consultants to generate fees. Indeed, if the full potential meaning of this term, as we understand it, becomes widely popularized, we believe that a great many investors could benefit. That said, after almost fifteen years of writing about these issues, we are also very painfully aware of the behavioral challenges that are involved in fully implementing a dynamic asset allocation policy.

*We are interested in investing in index linked gilt funds to protect our clients' portfolios from the threat of higher inflation in the future. However, they have been highly volatile recently. Is there anything that can be done to limit that volatility while still achieving the goal of hedging inflation risk?*

In some ways, the UK inflation linked gilt (ILG) market resembles Churchill's "riddle wrapped in a mystery, inside an enigma." Yields are consistently below those on index

linked bonds denominated in other currencies, despite a relatively high volume of new issues. Moreover, they have fallen from around 4% in the mid-1990s to below 1% today. The best explanation for this that we have seen is exceptionally high demand for long-dated issues from pension funds and insurance companies who need to hedge long-term inflation linked liabilities, and are moving away from equities and into ILGs as the means to do this. On top of this, there has been a sharp increase in demand from investors who want to hedge inflation risk in the wake of central banks aggressive money creation following the 2007/2008 crisis. Yet as we have seen, the probability that the market attaches to high inflation or deflation scenarios over the next three to five years has been constantly in flux. The net result of these drivers has been the increase in ILG volatility you note. Unfortunately, there isn't an easy direct way to limit this volatility. In theory, you could try to do this via futures, but I wonder whether the costs involved would exceed the potential benefits. A better approach might be to employ a variety of asset classes that provide a hedge against unexpected changes in inflation, including foreign bonds, property, commodities, timber, and gold. The net impact from including these as well as ILGs in a portfolio that currently only includes equities and nominal return bonds is likely to be a similar level of inflation protection with lower volatility than would be the case if only ILGs were added.

*Your recent asset class valuation updates indicate that many asset classes appear to be overvalued today. Does this imply it would be prudent to reduce exposure to them?*

There are two issues underlying your question. The first issue is, "when does overvaluation merit extraordinary action to limit risk exposure?" Our basic answer has always been, "when overvaluation reaches a dangerous level, which should occur only very rarely." Of course, that begs the question, "and what constitutes dangerous overvaluation?" Ultimately, this is a subjective judgment. Every month, we provide quantitative input to help readers make it, including valuation and momentum indicators, and our estimate of whether an asset class is possibly, likely, or probably overvalued. It is only in the latter case that we believe overvaluation is approaching

dangerous levels. And even then, we urge readers to combine our views with those of other analysts who use different valuation methodologies (research has shown that combining the results of different methodologies tends to improve forecast accuracy). We also provide qualitative analysis (e.g., our alternative scenarios and Economic Updates) of how economic and political conditions are likely to change in the future, and the implication for asset class valuations and returns. However, there are also subjective factors involved in deciding whether an asset class is dangerously overvalued. These include a client's emotional and financial tolerance for downside risk, and his or her exposure to the asset class in question.

The second issue is, if you decide that an asset class is dangerously overvalued, what should you do? Clearly, there is a range of options, including buying extra insurance (e.g., an index put option or volatility ETF), shifting exposure from overvalued to undervalued asset classes; and/or increasing one's allocation to cash (e.g., short term Treasuries). In our view, there is no right answer about the best course of action to pursue, as it depends on a wide range of factors including client preferences (e.g., some clients hate to see losses, even when they are offset by gains on a put option or volatility ETF), client mandates (some portfolios can't invest in derivatives), or the performance parameters upon which an advisor's performance evaluation and compensation are based.

## Feature Article: The Critical Challenges Posed by Leverage and Legitimacy

It is safe to say that the world economy has entered a period characterized by complex and dangerous dynamics that few people even begin to understand. And even fewer people have tried to think more than a few steps ahead, about where these dynamics may take us, much less what those future scenarios imply for asset allocation and risk management decisions today. Finally, it goes without saying that any attempt at such thinking is bound to be imperfect, given the complex and evolving nature of the underlying system that is generating the rapid and often confusing changes we see all around us today. Nevertheless, professionals who have been entrusted with the

management of other people's money, and especially those who have a fiduciary duty to their clients, have an obligation to think about these issues. The goal of this essay is to help our readers meet this challenge.

To preview what lies ahead, we will state our key conclusions up front.  The world faces two critical challenges in the years ahead. The first is obvious: How to deal with the problems caused by excessive leverage in multiple sectors of the global economy?  The second is less obvious, but possibly even more important: Will the legitimacy of current political systems be maintained as the leverage problem is resolved?  Broadly, the way in which these challenges are met could give rise to four scenarios; however, we will concentrate on only two: (1) the global debt problem is largely resolved through higher economic growth, and current political systems generally maintain their legitimacy; and (2) the global debt problem is largely resolved through austerity and various types of default, and many current political systems lose their popular legitimacy.  However, before we discuss these scenarios in more detail, we first need to look at the underlying issues in greater depth.

Options for Resolving the Global Debt Problem

We are squarely in the camp that believes that the seriousness of the debt problem facing the world economy has not been fully absorbed by most investors.  And the problem goes well beyond the building bubble in China, which we analyzed at length in last month's issue. Let us take a fast sector by sector tour, starting with the U.S. household sector.   The proximate cause of the 2007/2008 crisis – excessive construction of, and investment in residential property based on excessive mortgage borrowing and lending, leading to a price bubble that eventually collapsed – has not been resolved.  According to First American Core Logic, 28% of mortgaged U.S. residences still have negative or near negative equity at the end of the first quarter of 2010. As a number of analyses have noted, negative equity makes buyers increasingly unwilling to keep paying their mortgages, and increases the probability that they will "strategically default" on them.   At the same time, U.S. unemployment remains

stubbornly high (the broadest measure, so-called "U6 unemployment" has been stuck at more than 17% for over a year), which reduces borrowers' ability to make mortgage payments, even if they are willing to do so. Beyond mortgages, and despite net repayments, total household sector debt (which also includes credit card, auto, student and other loans) remains at or near record levels not just in the USA, but also in many other developed countries.

Moving on to the non-financial corporate sector, the two most glaring problems are loans for commercial real estate (CRE) and highly leveraged transactions (e.g., leveraged buyouts and recapitalizations by private equity funds). Just in the United States, the Congressional Oversight Panel (for TARP financing) has estimated that $1.4 trillion in CRE loans will come due between 2010 and 2014. The COP estimated that nearly half of these loans are underwater. Moreover, it did not estimate the future losses that banks will take when they sell the real estate assets they currently hold on their balance sheets as a result of previous foreclosures. With respect to highly leveraged transactions, Bain and Company recently estimated that $460 billion of debt for these transactions will mature between 2012 and 2014. In relation to these exposures, the aggregate capital of many banks is undoubtedly insufficient to absorb the potential losses they face.

To put it differently, marking all their assets to market value would likely reveal many banks (and probably a few insurance companies) to be technically insolvent. As a result, a number of steps have been taken to prevent this from happening, and in so doing to give the banks time to rebuild their capital, hopefully to a level that can absorb future losses without requiring further government support and/or nationalization. The first of these steps was a change in accounting rules that has allowed many dodgy assets to be carried on banks' balance sheets at higher values than those found in the secondary market for the same or similar assets. This "extend and pretend" approach was quite successful in the case of the 1982 LDC loan crisis, in which many large banks were also probably technically insolvent (although secondary markets for loans, as well as the degree of securitization, were both far less developed then than they are today).

The second step that has been taken to shore up bank profits and capital has been the efforts by central banks to hold down interest rates, and therefore bank funding costs relative to the rates being earned on their assets. The third step has been the change in policy that has enabled the banks to sell assets of questionable value to central banks at higher than market values in order to obtain funding liquidity. However, while these steps forestalled the first wave of the crisis, there is no guarantee that they will be sufficient if a second wave strikes.

One of the reasons for this is the rising doubts over the value of the government debt that many banks hold on their books. While Greece is now the best known example of this issue, others are not far behind, including the accelerating doubts about the creditworthiness of other national governments (e.g., Portugal, Spain, Japan, and even the United States) and sub-national national governments – for example, municipal bond issuers in the United States (e.g., see "State Debt Woes Grow Too Big to Camouflage", by Mary Williams Walsh in the March 29, 2010 *New York Times*; "Beware the Muni-Bond Bubble" by Nicole Gelinas; "Public Pension Deficits are Worse Than You Think" by Andrew Biggs in the March 22, 2010 *Wall Street Journal*; "States are the Canary in the Fiscal Coal Mine" by Josh Barro; "Next Big Crisis is Unfoding in Muni-Bond Markets" by Joe Mysak, published by Bloomberg.com on April 9, 2010; and many excellent articles on this issue by Steve Malanga, including "The Beholden State"). Many governments came into the crisis of 2007/2008 in questionable financial shape, due to high levels of outstanding contractual debt relative to national or state output (i.e., the debt/GDP ratio) as well as high levels of unfunded liabilities for future pension and healthcare commitments (e.g., Social Security, national health care, and public sector employee pensions – regarding the latter, see "Public Pension Promises: How Big Are They and What Are They Worth?" by Novy-Marx and Rauh). The arrival of the 2007/2008 crisis, and the subsequent downturn in the economy, then made this fiscal situation worse in three ways. First, it reduced government tax revenues. Second, it increased government transfer payments (e.g., unemployment benefits). Third, it increased the outflow of government resources that were used to shore up the financial system and, in some

cases (e.g., GM) non-financial corporations. The net impact of these changes was an explosion in government debt/GDP ratios around the world.

The net result of all the changes we have seen across multiple sectors was well summed up in a recent commentary by John Hussman ("Greek Debt and Backwards Induction", www.hussmanfunds.com). "Looking at the current state of the world economy, the underlying reality remains little changed: there is more debt outstanding than is capable of being properly serviced. It's certainly possible to issue government debt in order to bail out one borrower or another (and prevent their bondholders from taking a loss). However, this means that for every dollar of bad debt that should have been wiped off the books, the world economy is left with two - the initial dollar of debt that has been bailed out and must continue to be serviced, and an additional dollar of government debt that was issued to execute the bailout. Notice also that the capital that is used to provide the bailout goes from the hands of savers into the hands of bondholders who made bad investments. We are not only allocating global savings to governments. We are further allocating global savings precisely to those who were the worst stewards of the world's capital. From a productivity standpoint, this is a nightmare. New investment capital, properly allocated, is almost invariably more productive than existing investment, and is undoubtedly more productive than past bad investment. By effectively re-capitalizing bad stewards of capital, at the expense of good investments that could otherwise occur, the policy of bailouts does violence to long-term prospects for growth."

Let us now turn to the options that are available for dealing with excessive debt, relative to income. In broad terms, there are three choices: (a) Increase income. This requires no cut in current consumption, while the additional income is used to pay down debt. (b) Reduce consumption in order to pay down debt. (c) Reduce the amount of debt via some type of default – e.g., bankruptcy, debt/equity conversion, etc. How do these options apply to each of our overleveraged sectors of the economy?

Obviously, like every other sector, households would prefer to repay debt out of increased income. Yet how realistic is it to expect such an increase? On the one

hand, real incomes have been growing over the last twenty years for the top quintile of U.S. households (though this was often the result of a second earner entering the workforce).  On the other hand, this has not been the case for other households – and those are the households that hold the majority of U.S. household debt. Unfortunately, this phenomenon has not been limited to the U.S., but rather seems to characterize income dynamics in many OECD countries.    Multiple studies have examined the underlying causes of flat real household income growth – globalization, the impact of technology, growing skills mismatch, weakened unions, etc. – none of which is easy to quickly reverse.  Bottom line: for the household sector as a whole, repaying debt out of rising income does not appear to be an option.  That leaves austerity (reducing current consumption to repay debt) and/or default, in one form or another.  Both trends are clearly underway, as evidenced by historically weak personal consumption expenditure data, rising personal bankruptcies and, particularly in the U.S., a growing number of "strategic mortgage defaults." Thus far, political elites around the world have not taken steps to shift the balance of debt adjustment from austerity to making default easier for household borrowers.  To cite one example of this, the attempts thus far by the U.S. government to facilitate mortgage restructurings have generally been judged failures – because they have not significantly reduced the net present value of the amount owed, or shifted its mix from all debt to a combination of debt and equity – as evidenced by the relatively small number of homeowners who have pursued these options, as opposed to defaulting.

Turning to the non-financial corporate sector, we find that once again rising income is the preferred but unlikely to be realized solution to the debt problem.  In this case, rising income means rising revenue for borrowers, whether they be real estate developments (e.g., rising rents) or heavily leveraged companies.  In both cases, rising income would logically result from an economy whose growth is based on something other than continued government support financed by increasing levels of sovereign debt and a rising debt/GDP ratio.  To be sure, such a positive scenario could conceivably come to pass – provided that China and other Asian countries quickly reorient their economies from export to domestic consumption led growth while also

allowing a rising level of imports from OECD countries.  However, as we described at length in last month's issue, the odds against this scenario seem very high.  Once again, this leaves borrowers with a choice between austerity – i.e., cutting costs to free cash flow for debt payments – and default.  The available evidence shows that non-financial businesses have been aggressively cutting costs and paying down debt – though this results in higher unemployment, with knock-on negative effects for the household sector (and, later on, reduced revenues for non-financial businesses).

However, the evidence also shows a rising tide of bankruptcies and defaults – with perhaps the most visible example being the decision on the part of a number of large investment banks to walk away from some very large commercial real estate loans owed by their subsidiaries.  Again, this has knock on effects, as default and foreclosure saddles lenders' balance sheets with commercial property assets that are most likely worth much less than their carrying value. In turn, this reduces banks' willingness to extend risky loans to other borrowers – indeed, the evidence suggests that it is small businesses, which historically have created the most new jobs – that are bearing the brunt of this growing credit crunch. What we have yet to see in this crisis is the same degree of bankruptcies and debt/equity exchanges that we have seen in other serious debt crises, such as Latin American in the 1980s.  Instead, we appear to be going down the same road that Japan did in the 1990s, dragging out the resolution of our current debt crisis, and in the process causing a high level of growth depressing uncertainty to persist.

Unlike other sectors, financial businesses have squarely focused on rising income – due to widening spreads between funding costs and portfolio returns – as the means to work their way out of their own excessive leverage (and asset quality) problem.  In so far as austerity has been used, it has largely taken the form of cost reductions due to industry consolidation (e.g., layoffs following the acquisition of Bear Stearns and Lehman Brothers' failed businesses), rather than sharp reductions in employee compensation costs.   And rather than lenders to financial institutions bearing a share of leverage reduction costs (e.g., via debt/equity conversions), what

we have seen instead is taxpayers bearing most of the burden (via government absorption of bank failure costs and provision of funding at below market costs).

This brings us to the options facing governments, as they attempt to mange the debt problems brought about by both the crisis and the actions they have taken to respond to it. In the case of sovereign debt, the underlying math is straightforward (as described 22 years ago by Tim Congdon, in his book, Debt Trap, or, more recently, by Willem Buiter in his outstanding Citicorp Global Economics research report, "Sovereign Debt Problems in Advanced Industrial Countries"). In order for the debt/GDP ratio to remain stable, the public sector balance (i.e., the budget balance before interest payments) as a percent of GDP must exactly offset the difference between the real rate of interest on government debt and the rate of GDP growth. For example, if the real interest rate is 2.5% and real GDP growth is 3.0%, the public sector deficit can be no greater than .5% of GDP, else the debt/GDP ratio must increase.  Now consider a more realistic example today: if the real interest rate on government debt is 4.0% (because of some risk of default), and forecast real GDP growth is only 1.0%, the public sector must run a surplus of 3.0% if the debt/GDP ratio is to remain constant, and an even larger surplus if the debt/GDP ratio is to decrease (note that we have slightly simplified these calculations; to be technically correct, the difference between the real interest rate and real GDP growth should be divided by 1+real GDP growth – however, that isn't necessary to develop a basic understanding of the underlying math). Last but not least, it important to understand another bit of math that is also critical to the resolution of the debt problem facing many governments today.  As we have repeatedly noted over the years, a nation's current account deficit (as a percentage of GDP) by definition must equal the sum of its private sector deficit (total output less the sum of private consumption and private investment) and its public sector deficit.  To carry on the example used above, if, in order to maintain the government debt/GDP ratio a nation must switch from running a public sector deficit to a public sector surplus, either the private sector balance and/or the current account balance must also change.  For example, assume a nation is running a public sector deficit equal to 7% of GDP, with a private sector surplus of 4% of GDP,

and a current account deficit of 3% of GDP (4% + negative 7% = negative 3%). If the public sector balance must shift to a surplus of 5% of GDP, that swing of positive 12% must also be reflected in the private sector and/or the current account balance. For example, this could be accomplished by the private sector going from a positive 4% to a negative 5% (e.g., because of an increase in private consumption and/or investment) and the current account going from a negative 3% to 0% (e.g., due to a sharp increase in exports, or a sharp fall in imports). In reality, however, changes of this magnitude are extremely difficult to make – yet that is the challenge facing many governments today. Now that we understand the math, let's move on to the policy options governments confront.

As in every other case, governments would prefer to grow their way out of their debt problem. So let's take a closer look at the underlying drivers of GDP growth. At the highest level, GDP growth reflects three inputs: labor, capital, and productivity (i.e., the efficiency with which labor and capital inputs are used). Hence, a change in GDP must reflect some combination of a change in the labor force, a change in the amount of capital employed, and/or a change in productivity. Changes in the labor force usually reflect a combination of demographic and social factors, including birth and death rates, immigration and emigration rates, and the percentage of potential workers who choose to seek work. Changes in the amount of capital employed is a function of the after tax return that can be earned on it use, as well as its cost, which in turn depends on the savings rate, competing capital demands by other sectors (e.g., government) and the level of perceived uncertainty and risk. Finally, changes in productivity (also known as total factor or multi- factor productivity) also reflect a range of factors, including the rate and quality of research and development spending, the quality of the educational system (for example, see "The High Cost of Low Educational Performance" a recent report from the OECD), the quality of infrastructure (see "International Productivity Differences, Infrastructure, and Comparative Advantage" by Yeaple and Golub), the quality of different national institutional contexts (see "The New Kaldor Facts: Ideas, Institutions, Population and Human Capital" by Jones and Romer), and the variation of management practices across firms, sectors and

countries (see "Why Do Management Practices Differ Across Firms and Countries?" by Bloom and Van Reenen, "Micro Efficiency and Macro Growth" by Nallari and Bayraktar from the World Bank, and "Cross Country Comparisons of Industry Total Factor Productivity" by James Harrigan of the Federal Reserve Bank of New York).

A common way to sum up these growth drivers is by showing a country's rate of labor force growth and its rate of labor productivity growth, which captures increases in both the amount of capital per worker and in total factor productivity (though in the long run, the marginal return to more capital per worker declines to zero, and labor productivity growth solely reflects TFP growth). The following table (based on data from the OECD) shows how these vary across a number of developed countries that are faced with rising debt/GDP ratios. Where possible, we have also broken out the change in total factor productivity.

| *Country* | Annual Labor Force Growth 2000-2008 | Annual Labor Productivity Growth, 2000-2008 | Apparent Potential Annual GDP Growth | Note: Annual TFP Growth 1999-2007 |
|---|---|---|---|---|
| *Australia* | 2.01% | 1.03% | 3.04% | *0.59%* |
| *Canada* | 1.78% | 1.01% | 2.79% | *0.66%* |
| *United Kingdom* | 1.00% | 2.01% | 3.01% | *1.40%* |
| *United States* | 1.00% | 2.07% | 3.07% | *1.50%* |
| | | | | |
| *France* | 0.67% | 1.54% | 2.21% | *1.04%* |
| *Germany* | 0.69% | 1.40% | 2.09% | *1.02%* |
| *Italy* | 0.71% | 0.34% | 1.05% | *-0.08%* |
| *Spain* | 2.97% | 0.79% | 3.76% | *0.02%* |
| *Eurozone* | 1.25% | 1.16% | 2.41% | |
| | | | | |
| *Sweden* | 1.30% | 1.93% | 3.23% | *1.94%* |
| *Switzerland* | 1.32% | 1.26% | 2.58% | *0.70%* |
| | | | | |
| *Japan* | -0.22% | 1.94% | 1.72% | *1.54%* |

This table highlights a number of important points about the potential for nations to grow out of their debt problems. First, developed countries have taken different routes to growth over the past decade. For example, the UK and US has slower labor force growth rates than Australia and Canada, but higher rates of labor productivity growth,

which was largely driven by improvements in total factor productivity (TFP) rather than higher amounts of capital per worker. Sweden and Switzerland had comparable rates of labor force growth, but the former was able to achieve a much higher growth rate because of superior TFP performance.  Japan actually saw a fall in its labor force, which it offset with impressive TFP growth as well as higher capital per worker. Finally, among the four largest nations in the Eurozone, there was a significant difference in productivity growth between France and Germany on the one hand, and Italy and Spain on the other.

So what does this tell us about the chances a country will be able to grow its way out of its debt/GDP problem?  It appears there are two main strategies that could be used: increasing labor force growth (e.g., via skill-based immigration, as Australia and Canada have done), and/or increasing total factor productivity growth (via such policies as infrastructure investment – e.g., the internet or smart-grid, improvements to the educational system, and/or improvements to business management practices). Going back to our public sector math discussion, higher GDP growth would likely bring two additional benefits. The first would be a reduced probability of sovereign default, and hence a lower real interest rate on the nation's debt. The second would be higher government revenues and a reduce need for government deficit spending to support aggregate demand and economic growth.  Unfortunately, there are two critical obstacles to implementing this "grow our way out of the debt problem" strategy. The first is a timing problem: both increases in skilled immigration levels and implementation of reforms to increase TFP both take time and are likely to face opposition from interest groups that believe they will be adversely affected by such changes (e.g., in the U.S.,  look at the way teachers unions are resisting the Obama Administration's proposed education reforms). The second obstacle is a free rider problem – countries have an incentive to let other nations undertake these painful reforms, hoping that they can avoid them and simply increase their exports to grow their way out of their debt problems (in fact, the United States, many Eurozone countries, and China all seem to taking this path, which is obviously an unsustainable situaiton). Given this, it seems likely that a nation attempting to grow its way out of a

debt problem would also have to increase its level of protectionism to ensure that the job creation and economic demand benefits that result from its painful reforms actually accrue to its own residents.

Is there an alternative to this depressing scenario? Perhaps, at least for some countries. As we saw in our discussion of the mathematics of the problem, a country that needs to achieve a substantial swing in its public sector balance from deficit to surplus must simultaneously achieve some combination of (a) an increase in private sector consumption spending; (b) an increase in private sector investment spending; (c) an increase in exports; and/or (d) a decrease in imports. Given the already high levels of household debt in many OECD countries, increasing consumption spending would seem to be out of the question, at least as a primary target of policy (though it might later increase, as a second order effect in an improving economy). Similarly, significantly increasing exports would also seem to present an insurmountable challenge in a world with flat or negative economic growth and shrinking credit availability. That leaves increasing private sector investment and decreasing imports in a relatively quick time frame, in a manner that results in an increase in domestic employment without recourse to protectionism and a global trade war. In our view, the only strategy that meets these requirements would be a change in regulations in the United States that forced a substantial increase in private sector investment and employment in the environmental and energy sector. For example, a sharp increase in both domestically produced biofuels (e.g., cellulosic ethanol, and other fuels derived from algae and bacteria) and incentives to help electric vehicles gain market share would reduce oil imports. At the same time, an explicit price on carbon emissions would encourage higher investment in natural gas production, carbon capture and storage, and other technologies. Whether this would result in sufficient changes in the private and current account balances to achieve the required change in the public sector balance remains to be seen. However, as we look over the current options, this appears to be the best hope for the U.S. growing its way out of its burgeoning government debt/GDP problem. Hence, from our perspective, a key indicator to watch is the progress of the so-called Kerry-Lieberman-Graham environment and energy bill

that has been introduced in the U.S. Senate.  If it gains traction and is eventually passed, that will be a hopeful sign.  If this fails to happen, the odds of going the default route would significantly increase, in our view.

What about the second option – austerity?  In the case of government, this involves shrinking the debt/GDP ratio by running a fiscal balance that more than offsets the difference between the real rate of interest on the nation's debt and its rate of GDP growth.  At the aggregate level, in the absence any offsetting measures to stimulate either exports and/or private sector consumption and investment,  a sharp swing from government deficits to surpluses would lead to a sharp contraction in aggregate demand (i.e., negative GDP growth).  In terms of our economic balance equation, this would cause a sharp fall in imports, which would result in a large improvement in the current account balance.  However, in a slowing economy, there would be even lower levels of private sector consumption and investment, so the private sector balance would also likely increase.  Of course, this also assumes no trade war or knock on effects abroad, that would cause a fall in exports.  Were that to occur, the amount of painful domestic adjustment would be even higher.

Let's look at the austerity option from another perspective.  Today, with real interest rates in many cases higher than real GDP growth rates, austerity means making very large shifts from government deficits to government surpluses, at a time when government spending has been critical to maintaining aggregate demand.  In short, in the absence of renewed private sector growth (e.g., due to changes in labor force and TFP policies), reducing debt/GDP ratios via government austerity is likely a recipe for global depression (particularly given the rising probability – as we examined last month – of a collapse in Chinese growth rates).  This is not to say that some steps towards government austerity cannot and should not be part of the medium term solution to national debt problems. There are obvious opportunities for improving government finances in the medium, if not the short term (e.g., raising retirement ages, changing Social Security cost of living increase formulas, implementing consumption taxes, taking a different approach to medical cost containment, etc.).  However, it

seems clear that a sharp change from government deficits to government surpluses is not in the cards in the short term.

This brings us to the third option: reducing government debt/GDP via some type of default. As shown by Reinhart and Rogoff in their excellent book (This Time Is Different: Eight Centuries of Financial Folly), sovereign debt defaults have existed for almost as long as people have made loans to governments. Outright sovereign debt repudiation is quite rare; rather, default more commonly takes one of two forms – either exchange offers that reduce the real net present value of the debt, or increased rates of inflation that have the same effect.  Since the Latin American debt crisis in the 1980s, sovereign defaults have been more common than most investors realize, and an entire industry cluster has developed to manage them (indeed, one of us started out in this business way back when, and some of our colleagues are still at it almost 30 years later).  In fact, that industry has been hard at work preparing for an eventual Greek exchange offer, which they regard as inevitable at some point in the future, due to the mathematical challenges facing that country (including a very high debt/GDP ration, real interest rates made extra burdensome by a high default risk premium, a deeply distorted economy that virtually guarantees low GDP growth over the next few years, and the political impossibility of implementing a radical change in the government's fiscal situation and/or structural economic reforms that are needed to raise the potential growth rate). So default via an exchange offer is a viable course of action for many countries, particularly since repeated studies have shown that the long-term consequences of default have usually not been severe for the governments in question (see, for example, "The Costs of Sovereign Default: Theory and Reality" by Borensztein and Panizz). However, questions have been raised about how applicable the experience of past sovereign defaulters may be under the different conditions we face today.  For example, past sovereign defaults were in countries that were relatively small compared to the size of the world economy, which was enjoying strong growth when the defaults and recoveries from them occurred.

As for the default-via-inflation option, as Buiter shows in his Citi report, in most cases it is less attractive than it first seems. The reason for this is that defaulting via an

unexpected (by creditors) increase in inflation works best under a limited set of circumstances, including (a) a large amount of fixed rate debt; (b) that has a relatively long maturity/duration; (c) which is held by foreign investors.  Currently, the nation best positioned to undertake a default via inflation is the United States – yet going that route would seem sure to raise tensions with foreign parties holding U.S. government debt, particularly China.

Finally, a recent paper by the Bank for International Settlements makes a critical point about default on sovereign debt. In "The Future of Public Debt: Prospects and Implications", Cecchetti, Mohanty and Zampolli begin by noting that "since the start of the financial crisis, industrial country public debt levels have increased dramatically, and are set to continue rising for the foreseeable future. A number of countries also face the prospect of large and rising future costs related to the ageing of their populations." The authors' broad conclusion is that "the [current] path being pursued by fiscal authorities in a number of industrial countries is unsustainable. Drastic measures are necessary to check the rapid growth of current and future liabilities of governments and reduce their adverse consequences for long-term growth and monetary stability."  Specifically, the authors of the BIS report focus on two scenarios. The first is a so-called "sudden stop", in which investors, faced with high fiscal deficits and a rapidly rising debt/GDP ratio, stop buying a country's new debt issues. As the authors note, this would almost certainly force the nation's central bank to purchase (i.e., monetize) the debt, leaving it "impotent to control changes in inflation expectations."  A sudden stop would likely trigger a sharp fall in the nation's currency, which in turn could lead other nation's to impose trade and or capital controls (to limit the adverse impact on their own trade balance and employment).  The second scenario is one in which a nation's central bank gives in to pressures to undertake a partial default via inflation. The risk here is that "inflation expectations would become unanchored" by such a move, which would logically lead to a sharp increase in the yield demanded by investors in the inflating nation's debt, which would at minimum trigger a slowdown in GDP growth (and a worsening of the government's fiscal balance), and quite possibly a "sudden stop."

So where does this leave us?  Clearly, the first preference of every sector we have examined – households, non-financial corporates, financial institutions, and governments – would be to resolve their current debt problems by increasing their income – i.e., "growing their way out of it."  Indeed, a recent paper ("Great Depressions of the Twentieth Century", by Kehoe and Prescott) reinforces this point, concluding that "government policies that affect productivity and hours worked per working age person were the crucial determinants the great depressions of the twentieth century."  However, we have also seen that increasing income is much easier said than done, particularly in the short-term.  In the best case, a short period of austerity and reduced consumption would be able to keep the debt problem in check long enough for growth oriented reforms to be implemented and take over the debt reduction burden.

However, the combination of a high degree of political factionalism in many countries, as well as the temptation to be a free rider on growth reforms undertaken in other nations leaves us pessimistic about the likelihood that this scenario will materialize.  It therefore seems inescapable to us that a substantially higher level of defaults of various types, across all sectors, lies ahead in many nations. As we have long expressed in our Economic Updates, rising defaults are likely to be accompanied by greater deflationary pressures in the short term, but greater inflationary pressures thereafter, particularly if we experience a sudden stop in one or more major countries. We also continue to believe that it would be impossible for a rise in defaults to take place without rising protectionism, and possibly capital controls that would collectively lead to a world that, as we have repeatedly described in our Conflict Scenario, is much more organized on the basis of different blocs (e.g., the Anglosphere, Europe, Sinosphere, etc.) as well as some "wild card" countries, including Russia and Iran.

The Slowly Building Legitimacy Crisis

Let us now turn away from the debt problem, and towards the second crisis facing the world today: the accelerating erosion of political legitimacy.  A number of writers have

remarked on this, but we don't believe the majority of investors (or even a significant minority) have yet absorbed the full implications of their observations.  For example, in his article "Greece is the Welfare State's Death Spiral", Robert Samuelson notes that "virtually every advanced nation, including the United States, faces the same prospect. Ageing populations have been promised huge health and retirement benefits, which countries haven't fully covered with taxes. The reckoning has arrived in Greece, but it awaits most wealthy societies...Countries cannot overspend and overborrow forever. By delaying hard decisions about spending and taxes, governments maneuver themselves into a cul-de-sac...The welfare state's death spiral is this: Almost anything governments might do with their budgets threatens to make matters worse by slowing the economy... Cutting welfare benefits or raising taxes would, at least temporarily, weaken the economy, and perversely, make paying the remaining benefits even harder...[But] by allowing deficits to balloon, they risk a financial crisis as investors one day – no one knows when – doubt governments' ability to serve their debts and refuse to lend...If only a few countries faced these problems, the solution would be easy. Unlucky countries would trim budgets and resume growth by exporting to healthier nations.  But developed countries represent about half of the world economy, and most have overcommitted welfare states...What happens if all these countries are thrust into Greece's situation?"

Gideon Rachman's recent column in the *Financial Times* offers a blunt answer: "Europe is Unprepared for Austerity."  He begins by noting, "I used to think Europe had got it right.  Let the U.S. be a military superpower; let China be an economic superpower – Europe would be the lifestyle superpower...Life for most ordinary Europeans has never been more comfortable...It was a great strategy. But there was one big flaw in it. Europe cannot afford its comfortable retirement...Europe's existence as a lifestyle superpower has depended on an ample supply of credit...While Europeans no longer fear foreign armies, they are starting to fear foreign bondholders."  To be sure, Rachman offers a glimmer of hope: "the citizens of Latvia and Ireland have already swallowed actual cuts in wages and pensions. But these are both countries that have experienced real poverty in living memory, followed by

massive and unsustainable booms. They know that the past few years have been a bit unreal...[But] as the riots on the streets of Athens illustrate, not all Europeans will react so stoically to deep cuts in spending.  Many have come to regard early retirement, free public healthcare, and generous unemployment benefits as fundamental rights. They stopped asking, a long time ago, how these things were paid for. It is this sense of entitlement that makes reform so very difficult. As the British election has just amply illustrated, politicians are extremely reluctant to confront voters with the harsh choices that need to be made. Yet if Europeans do not accept austerity now, they will eventually be faced with something far more shocking."

And it is just not the Europeans who are struggling with the need to simultaneously rein in government spending and raise revenues.  Most American states are required by law to balance their budgets each year.  Yet achieving political consensus on the means to achieve this goal has proven to be extremely difficult, as evidenced by the fiscal crises now facing California, Illinois, New York, New Jersey, Rhode Island and many other states.  As Anatole Kaletsky noted in a recent column in the *Times* of London, in virtually all democracies, the major parties lack a narrative that can both explain how we got into the mess we're in today, and mobilize a majority of voters to make sacrifices in support of a plan to get us out of it.  As Kaletsky notes, if ever there was a need for a "third way" it is now; but as yet, it is lacking, which creates an opening for political leaders who hold more extreme and populist views – a situation which, throughout history, has often led to trouble.

In another FT column ("Irish Treat Pain of Crisis Like a Hangover"), Gillian Tett notes that "there are two other, less tangible factors that appear to have played a role in the Irish story...One of these is the issue of political infrastructure or, more specifically, whether a country has the decision-making machinery in place to cut debt. The second...is social cohesion, and whether a government is able to impose tough choices on a society without sparking political instability, social turmoil, or worse." Along similar lines, other analysts have noted that two other late 20th century national turnarounds (Canada and Sweden) both benefited from high levels of social cohesion and trust in national political institutions.

In essence, the underlying issue is as much whether nations have the willingness to solve their debt problems through means other than default, as whether they have the capacity to do so.  Unfortunately, there is growing evidence that in many countries (and in the case of the Eurozone, regions), the social cohesion and trust that seems critical to this willingness is either at low levels or in rapid decline.  For example, in countries around the world we repeatedly see public sector employees refusing to accept any reduction in their pay and benefits, and often turning to the courts to back their demands with judicial decisions. Unsurprisingly, this behavior is provoking a growing backlash (see, for example, "The Crippling Price of Public Employee Unions" by Mort Zuckerman, and "Do You Have to Love Labor Unions to be a Good Democrat?, by Mickey Kaus).  However, the fact that in many cases these same public sector unions have a very strong impact on elections (in effect, voting into office the people with whom they negotiate), is increasingly leading more and more citizens to question the underlying legitimacy of the current political system.

Similarly, in the U.S. pollster Scott Rasmussen (www.rasmussenreports.com) has repeatedly documented the very wide difference in views between the political and business elite (what he calls the "Political Class") and the rest of the nation. We don't doubt that similar polls in Europe would produce similar results.  As Rasmussen notes, "Most Americans trust the judgment of the public more than political leaders, view the federal government as a special interest group, and believe that big business and big government work together against the interests of investors and consumers. Only seven percent (7%) share the opposite view and can be considered part of the Political Class. On many issues, the gap between the Political Class and Mainstream Americans is bigger than the gap between Mainstream Republicans and Democrats." In this regard, we note again a point we made last month in our analysis of conditions in China: researchers have found that a key indicator of future political instability is the extent of factionalism in a society (see "A Global Model for Forecasting Political Instability" by Goldstone, Bates, et al). We also note that the Economist Intelligence Unit has adopted this model, and added to it worsening economic conditions as an important trigger event – and their "Political Instability Index" shows a rising likelihood

that such instability will occur in multiple countries. In this regard, we cannot help but see rising factionalism in Europe and the United States as very worrying signs. Other writers have concluded that the evidence shows that protracted downturns in economic growth and extended periods of unemployment undermine people's support for democracy, while increasing the attractiveness of leaders with more extreme views (e.g., see two recent papers on these issue: "Economic Growth and the Rise of Political Extremism" by Bruckner and Gruner; and "Joblessness and Perceptions About the Effectiveness of Democracy" by Altindag and Mocan).

In the United States, if not to the same extent in other developed countries, the negative impact of the mainstream/elite gap has been further reinforced by the wave of conspicuous consumption that has swept American in the past twenty years, led by the top quintile of households who benefited from globalization, and causing many others to take on loads of debt in an ultimately unsuccessful effort to keep up external appearances and internal self-images. We believe that some very basic neurobiological forces are at work in our society today. To begin with, fear is increased by the experience of loss and by a rise in uncertainty. However, it is also increased by envy – when others are perceived as more successful and attractive, one experiences a feeling of social loss. In turn, heightened primary feelings of fear have been shown to trigger a secondary reaction: a heightened fear of social isolation, and a stronger desire to stay with a group. It seems obvious that all of these reactions, which research findings suggest are hardwired into the amygdala region of our brains, were highly adaptive when small groups of humans first roamed the east African plain ages ago. They may prove much less adaptive today, especially given the frequently observed tendency for people and groups to react to fear with anger and aggression when they cannot flee from its source. Unfortunately, there is no doubt that there are a lot of fearful people out there today. Far too many households have seen the core elements of a middle class existence slipping from their grasp, including a sense of employment security, retirement income security, healthcare security, housing security, and confidence that their children would be able to attend college or university. Moreover, in Europe there is the additional pressure created by cultural

challenges posed sizeable and rapidly growing domestic Muslim populations. In comparison, the United States' difficulties in absorbing large numbers of Hispanic immigrants (or similar challenges in Australia and Canada) pales by comparison.

Recent events have no doubt caused an increasing number of already fearful and angry members of the OECD middle class to question the legitimacy of the system that has produced the situation they face, and which seems unwilling (e.g., via passage of a mortgage restructuring program in the U.S. that actually provided some cash flow relief) or unable (e.g., stemming the offshoring of jobs) to help them.

As George Friedman recently wrote ("The Global Crisis of Legitimacy", www.stratfor.com), "the state both invents the principle of the corporation and defines the conditions in which the corporation is able to arise. The state defines the structure of risks and liabilities and ensures that the laws are enforced. Emerging out of this complexity, and justifying it, is a moral regime. [Investors'] protection from liability [via the creation of the corporation] comes with a burden. Poor decisions will be penalized by losses, while wise decisions are rewarded by greater wealth. Because of this, society as a whole will benefit...The greatest systemic risk, therefore, is not an economic concept, but a political one. Systemic risk emerges when it appears that the political and legal protections given to economic actors, and particularly to members of the economic elite, have been used to subvert the intent of the system. In other words, the crisis occurs when it appears that the economic elite used the law's allocation of risk to enrich themselves in ways that undermined the wealth of the nation...with the political elite apparently taking no action to protect the victims." Friedman concludes with the observation that, "in extreme form, these crises can delegitimize regimes. In the most extreme form...the military elite typically steps in to take control of the system." We do not believe we are near this point today in most developed countries (see, for example, "American Coup D'Etat: Military Thinkers Discuss the Unthinkable", *Harpers*, April, 2006); however, we also note that we have seen coups happen plenty of times during three decades of work in emerging markets, and that Rasmussen and other polls regularly find that, in the United States, the military is held in much higher regard than virtually all other institutions today.

In sum, in May 2010, we see a building crisis of political legitimacy in many developed countries, perhaps most dangerously in the Eurozone and the United States, regions that are increasingly fractious, and where there is no clear consensus on the need for change, nor a clear desire to achieve a shared vision of a better future, nor an understanding of what sequence of changes must occur to get there, nor any sense of how these changes could be achieved.  Meanwhile, as debt crisis pressures increase, and the majority of households and businesses see their situations becoming more desperate, and as political elites only seem to protect the interests of the favored few, the overall legitimacy of the political system in the eyes of the many continues to corrode. We do not know what form the future will take if a tipping point is reached; however, in a recent essay ("Complexity and Collapse"), Niall Ferguson reminds us that fundamental change can happen far faster than most people realize, once the underlying level of tension within a system has reached a critical threshold. We have long believed that the new system that would emerge after a crisis of legitimacy would be one organized around blocs, with far lower levels of global trade, labor, and capital flows. We also rather strongly suspect it would be a world in which conspicuous consumption is far less prevalent, the financial system far more regulated, government spending and economic growth lower and inflation and taxes higher than is the case today.

Implications for Asset Allocation

At the outset, we proposed two scenarios that describe the way our Conflict Scenario could further evolve in the years ahead.  In one, current debt problems are resolved through an uncertain and unstable mix of austerity, renewed growth, and a limited number of defaults in the household, corporate and financial sectors, but generally (apart from some sub-national governments) no major defaults at the national government level.  Under this scenario, the current political elite and political system largely retain their legitimacy, though some rough patches are inevitable.  In our alternative scenario, both austerity and the changes required to increase GDP

growth are blocked by political opposition, forcing a growing series of defaults across all sectors, including national governments.  This scenario could also be triggered by a collapse in China, which we discussed last month. It includes a sharp period of debt deflation, followed by sudden stops, monetization of debt, and a sharp increase in inflation.  Politically, elites lose their legitimacy, significant political changes occur, global flows of trade, people and money sharply contract, and the world system reforms into a series of blocs, including the Anglosphere, Europe, and Sinosphere. The following table describes the implications of these scenarios for various asset classes:

| Asset Class | Scenario 1: Muddle Through Scenario | Scenario 2: Default Into Competing Blocs |
|---|---|---|
| **Real Return Bonds** | • Under either scenario, demand for real return bonds will increase, generating falling yields and positive returns (that said, there isn't much more room to fall from currently low levels). | • Real return bonds may also become subject to concerns about government defaults. Hence, discrimination in country quality will be critical under this scenario, in addition to the ability to repatriate funds invested outside a given bloc.  We continue to favor Australian and Canadian RRBs, as well as those issued by Sweden and Germany. |
| **Nominal Government Bonds** | • Default premiums on government bonds will spread, making good credit analysis important – e.g., monitoring government debt/GDP ratios, policy responses, and the evolution of the inescapable math of government debt and the economic balance equation. Even the countries we consider most attractive still face challenges (e.g., Australia's GDP is heavily dependent on Chinese growth; Canada's reliance on oil sands and U.S. growth, and significant household debt problems;  Sweden and Switzerland's dependence on the Eurozone's health, etc.). | • Timing will be critical, as nominal government bonds, in the absence of default, will do well during the initial deflation, but will then suffer as inflation and/or defaults increase.  Similarly, repatriation of capital will become an issue in a world of blocs.  On balance, in this scenario we prefer Anglosphere government bonds, as the flexibility of these economies promises a quicker recovery and fewer defaults.  Similarly, in the Eurozone we prefer Sweden, Switzerland and Germany. |
| **Nominal Credit Bonds** | • Careful credit risk analysis – not simple dependence on ratings -- is critical. Bond issued by companies in sectors with more stable cash | • Careful credit risk analysis – not simple dependence on ratings -- is critical. Bond issued by companies in sectors with more stable cash |

| Asset Class | Scenario 1: Muddle Through Scenario | Scenario 2: Default Into Competing Blocs |
|---|---|---|
| | flows – e.g., staples, utilities, energy – are likely to perform best. In the U.S., even in the absence of a deeper crisis, we still expect to see higher defaults by municipal issuers, with knock on implications for banks and insurance companies who hold this paper. | flows – e.g., staples, utilities, energy – are likely to perform best. The potential exists for very sharp and sudden losses as confidence is lost and many investors attempt to exit their fixed income positions. Lower quality issues – both private and public – are most at risk. |
| *Commercial Property* | • Returns will suffer as defaults on commercial mortgage backed securities increase (one high visibility REIT bust will shift psychology); however, this will likely also trigger an overreaction on the downside. | • In countries where bubbles may still exist (e.g., Australian and Canadian residential property), they will burst. REITs will suffer due to concerns with underlying leverage. Offsetting this may be inflows driven by inflation hedging – however, there will be competition for these from other asset classes. On the other hand, in regions (e.g., Europe, UK) where property has been a traditional refuge in difficult times, prices of directly owned investment property with solid tenants and modest leverage levels will increase. |
| *Commodities* | • Industrial metals likely to underperform relative to the past because of lower GDP growth. As corn ethanol is displaced by newer fuels, agriculturals' correlation with other commodities should fall, increasing their portfolio benefits. Energy as a sector should do well, but could experience a major shift driven by changes in energy and environmental policy. | • Performance of different sectors is likely to widely diverge. Industrial metals will likely suffer. Agricultural commodities may be hurt by trade restrictions; careful analysis will be critical, but so too will be capital controls. In the energy space, oil may underperform, due to declining demand and substitution on the supply side; gas may outperform due to higher use in electric generation. Energy MLPs may become an attractive alternative for traditional fixed income investors. |
| *Gold* | • Continued weak GDP growth and high uncertainty should hold down real bond yields in the US, which will support positive returns on gold. Returns on gold will also depend on the effectiveness | • Gold will do well; however, coins may outperform gold based ETFs in a world of capital controls and declining faith in financial instruments. |

| Asset Class | Scenario 1: Muddle Through Scenario | Scenario 2: Default Into Competing Blocs |
|---|---|---|
| | of policy choices in the US – the less effective default and austerity policies, the higher the returns on gold. | |
| *Timber* | • Continuing problems in the housing market will keep putting downward pressure on timber prices and returns. The price of timber investment vehicles will likely vary with changing inflation expectations.  However, timber prices could receive a significant upward boost if environmental legislation allows timber operators to recognize the value of the CO2 sequestration benefits provided by forests. | • As in the case of physical gold and property, investment in physical timber will be attractive as a store of real value in highly uncertain and likely highly inflationary times. |
| *Developed Country Equity* | • At best, prices in defensive sectors like stapes and utilities could benefit from outflows from fixed income as defaults mount.  Depending on legislative changes, the energy sector could also benefit. | • Cross border investments will be affected by restrictions on trade and capital movements, and the differing fortunes of emerging blocs.  Defensive sectors could benefit from a flow out of fixed income (remember, the size of fixed income markets dwarfs equities, and most issues are nominal, not real returns). |
| *Emerging Equity* | • Emerging markets may well see an even bigger bubble develop than exists today. | • Emerging markets will be negatively affected by trade and capital controls. Worsening conditions will also put pressure on local institutions, which could lead to deteriorating treatment of foreign portfolio investors (e.g.. look at the recent history of Venezuela,  Russia or China). |
| *Volatility* | • Will continue to provide valuable benefits to investors' portfolios. | • Will continue to provide valuable benefits to investors' portfolios. |
| *Uncorrelated Alpha Strategies* | • High level of uncertainty suggests that strategies without consistent long or short exposure should perform relatively better – e.g., equity market neutral and global macro.  Some event driven strategies may do well – e.g., distressed debt, assuming highly skilled | • Global macro and currency strategies will be negatively affected by trade and capital controls.  Equity market neutral should, assuming skilled manager, do well within a given bloc. Ditto for event-driven strategies – there will be no shortage of distressed debt, though |

| Asset Class | Scenario 1: Muddle Through Scenario | Scenario 2: Default Into Competing Blocs |
|---|---|---|
|  | managers. | recoveries are likely to be highly idiosyncratic, and less reflective of historical averages – hence, there is heightened risk for model driven strategies. |

## Global Asset Class Valuation Analysis

Our asset class valuation analyses are based on the belief that financial markets are complex adaptive systems, in which prices and returns emerge from the interaction of multiple rational, emotional and social processes. We further believe that while this system is attracted to equilibrium, it is generally not in this state.  To put it differently, we  believe it is possible for the supply of future returns a market is expected to provide to be higher or lower than the returns investors logically demand, resulting in over or underpricing relative to fundamental value.  The attraction of the system to equilibrium means that, at some point, these prices are likely to reverse in the direction of fundamental value.  However, the very nature of a complex adaptive system makes it hard to forecast when such reversals will occur.  It is also the case that, in a constantly evolving complex adaptive system like a financial market, any estimate of fundamental value is necessarily uncertain. Yet this does not mean that valuation analyses are a fruitless exercise. Far from it. For an investor trying to achieve a multiyear goal (e.g., accumulating a certain amount of capital in advance of retirement, and later trying to preserve the real value of that capital as one generates income from it), avoiding large downside losses is mathematically more important than reaching for the last few basis points of return.  Investors who use valuation analyses to help them limit downside risk when an asset class appears to be substantially overvalued can substantially increase the probability that they will achieve their long term goals.  This is the painful lesson learned by too many investors in the 2001 tech stock crash, and then learned again in the 2007-2008 crash of multiple asset classes.

We also believe that the use of a consistent quantitative approach to assessing fundamental asset class valuation helps to overcome normal human tendencies towards over-optimism, overconfidence, wishful thinking, and other biases that can cause investors to make decisions they later regret. Finally, we stress that our monthly market valuation update is only a snapshot in time, and says nothing about whether apparent over and undervaluations will in the future become more extreme before they inevitably reverse. That said, when momentum is strong and quickly moving prices far away from their fundamental values, it is usually a good indication a turning point is near.

## *Equity Markets*

In the case of an equity market, we define the future supply of returns to be equal to the current dividend yield plus the rate at which dividends are expected to grow in the future. We define the return investors demand as the current yield on real return government bonds plus an equity market risk premium. While this approach emphasizes fundamental valuation, it does have an implied linkage to the investor behavior factors that also affect valuations. On the supply side of our framework, investors under the influence of fear or euphoria (or social pressure) can deflate or inflate the long-term real growth rate we use in our analysis. Similarly, fearful investors will add an uncertainty premium to our long-term risk premium, while euphoric investors will subtract an "overconfidence discount." As you can see, euphoric investors will overestimate long-term growth, underestimate long-term risk, and consequently drive prices higher than warranted. In our framework, this depresses the dividend yield, and will cause stocks to appear overvalued. The opposite happens under conditions of intense fear. To put it differently, in our framework, it is investor behavior and overreaction that drive valuations away from the levels warranted by the fundamentals. As described in our November 2008 article "Are Emerging Market Equities Undervalued?", people can and do disagree about the "right" values for the variables we use in our fundamental analysis. Recognizing this, we present four

valuation scenarios for an equity market, based on different values for three key variables. First, we use both the current dividend yield and the dividend yield adjusted upward by .50% to reflect share repurchases. Second, we define future dividend growth to be equal to the long-term rate of total (multifactor) productivity growth. For this variable, we use two different values, 1% or 2%. Third, we also use two different values for the equity risk premium required by investors: 2.5% and 4.0%. Different combinations of all these variables yield high and low scenarios for both the future returns the market is expected to supply (dividend yield plus growth rate), and the future returns investors will demand (real bond yield plus equity risk premium). We then use the dividend discount model to combine these scenarios, to produce four different views of whether an equity market is over, under, or fairly valued today. The specific formula is (Current Dividend Yield x 100) x (1+ Forecast Productivity Growth) divided by (Current Yield on Real Return Bonds + Equity Risk Premium - Forecast Productivity Growth). Our valuation estimates are shown in the following tables, where a value greater than 100% implies overvaluation, and less than 100% implies undervaluation. In our view, the greater the number of scenarios that point to overvaluation or undervaluation, the greater the probability that is likely to be the case.

### *Equity Market Valuation Analysis at 30Apr10*

| *Australia* | **Low Demanded Return** | **High Demanded Return** |
|---|---|---|
| **High Supplied Return** | 76% | 111% |
| **Low Supplied Return** | 114% | 154% |

| *Canada* | **Low Demanded Return** | **High Demanded Return** |
|---|---|---|
| **High Supplied Return** | 70% | 124% |
| **Low Supplied Return** | 132% | 199% |

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| Eurozone | Low Demanded Return | High Demanded Return |
|---|---|---|
| High Supplied Return | 44% | 81% |
| Low Supplied Return | 79% | 122% |

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| Japan | Low Demanded Return | High Demanded Return |
|---|---|---|
| High Supplied Return | 78% | 142% |
| Low Supplied Return | 156% | 238% |

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| United Kingdom | Low Demanded Return | High Demanded Return |
|---|---|---|
| High Supplied Return | 30% | 68% |
| Low Supplied Return | 64% | 109% |

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| United States | Low Demanded Return | High Demanded Return |
|---|---|---|
| High Supplied Return | 80% | 147% |
| Low Supplied Return | 163% | 250% |

| Switzerland | Low Demanded Return | High Demanded Return |
|---|---|---|
| High Supplied Return | 66% | 117% |
| Low Supplied Return | 122% | 260% |

| India | Low Demanded Return | High Demanded Return |
|---|---|---|
| High Supplied Return | 67% | 171% |
| Low Supplied Return | 214% | 377% |

| Emerging Markets | Low Demanded Return | High Demanded Return |
|---|---|---|
| High Supplied Return | 90% | 190% |
| Low Supplied Return | 136% | 236% |

In our view, the key point to keep in mind with respect to equity market valuations is the level of the current dividend yield (or, more broadly, the yield of dividends and buybacks), which history has shown to be the key driver of long-term real equity returns in most markets. The rise in uncertainty that accompanied the 2007-2008 crisis undoubtedly increased many investors' required risk and uncertainty premium above the long-term average, while simultaneously decreasing their long-term real growth forecasts. The net result was a fall in equity prices that caused dividend yields to increase. From the perspective of an investor with long-term risk and growth assumptions in the range we use in our model, in some regions this increase in dividend yields more than offset the simultaneous rise in real bond yields, and caused the equity market to become undervalued (using our long-term valuation assumptions). On the other hand, in a still weak economy, many companies have been cutting dividends at a pace not seen since the 1930s. Hence the numerator of our dividend/yield calculation may well further decline in the months ahead, which, all else being equal, should further depress prices. Despite this, the past few months have seen a very strong rally develop in many equity markets, which, in some cases, has caused our valuation estimates to rise into the "overvalued" region. Given the absence of progress in reducing the three main obstacles that block a return to sustainable economic growth (see our recent Economic Updates), we believe that these rallies reflect investor herding, rather than any improvement in the underlying fundamentals. In turn, we strongly suspect that the root causes of this herding phenomenon, which appears to have strengthened in recent years, lie in a combination of the rising percentage of assets (and even higher percentage of trading) accounted for by delegated asset managers (rather than the investors who own the assets being traded), the incentive structure faced by these delegated managers (e.g., 2 and 20 on this years returns), and the rise of algorithmic trading.

### Real Return Bonds

Let us now move on to a closer look at the current level of real interest rates. In keeping with our basic approach, we will start by looking at the theoretical basis for determining the rate of return an investor should demand in exchange for making a one year risk free investment.  The so-called Ramsey equation tells us that this should be a function of a number of variables.  The first is our "time preference", or the rate at which we trade-off a unit of consumption in the future for one today, assuming no growth in the amount of goods and services produced by the economy.  The correct value for this parameter is the subject of much debate. For example, this lies at the heart of the debate over how much we should be willing to spend today to limit the worst effects of climate change in the future.  In our analysis, we assume the long-term average time preference rate is two percent per year.

However, it is not the case that the economy does not grow; hence, the risk free rate we require also should reflect the fact that there will be more goods and services available in the future than there are today. Assuming investors try to smooth their consumption over time, the risk free rate should also contain a term that takes the growth rate of the economy into account.  Broadly speaking, this growth rate is a function of the increase in the labor supply and the increase in labor productivity. However, the latter comes from both growth in the amount of capital per worker and from growth in "total factor productivity", which is due to a range of factors, including better organization, technology and education. Since capital/worker cannot be increased without limit, over the long-run it is growth in total factor productivity that counts.  Hence, in our analysis, we assume that future economic growth reflects the growth in the labor force and TFP.

Unfortunately, this rate of future growth is not guaranteed; rather, there is an element of uncertainty involved.  Therefore we also need to take investors' aversion to risk and uncertainty into account when estimating the risk free rate of return they should require in exchange for letting others use their capital for one year.  There are many ways to measure this, and unsurprisingly, many people disagree on the right

approach to use. In our analysis, we have used Constant Relative Risk Aversion with an average value of three (see "How Risk Averse are Fund Managers?" by Thomas Flavin).  The following table brings these factors together to determine our estimate of the risk free rate investors in different currency zones should logically demand in equilibrium (for an excellent discussion of the issues noted above, and their practical importance, see "The Stern Review of the Economics of Climate Change" by Martin Weitzman):

| Region | Labor Force Growth % | TFP Growth % | Steady State Econ Growth % | Std Dev of Econ Growth Rate % | Time Preference % | Risk Aversion Factor | Risk Free Rate Demanded* % |
|---|---|---|---|---|---|---|---|
| Australia | 1.0 | 1.20 | 2.2 | 1.1 | 1.0 | 3.0 | 2.2 |
| Canada | 0.8 | 1.00 | 1.8 | 0.9 | 1.0 | 3.0 | 2.8 |
| Eurozone | 0.4 | 1.20 | 1.6 | 0.8 | 1.0 | 3.0 | 2.9 |
| Japan | -0.3 | 1.20 | 0.9 | 0.5 | 1.0 | 3.0 | 2.8 |
| United Kingdom | 0.5 | 1.20 | 1.7 | 0.9 | 1.0 | 3.0 | 2.8 |
| United States | 0.8 | 1.20 | 2.0 | 1.0 | 1.0 | 3.0 | 2.5 |

- The risk free rate equals time preference plus (risk aversion times growth) less (.5 times risk aversion squared times the standard deviation of growth squared).

The next table compares this long-term equilibrium real risk free rate with the real risk free return that is currently supplied in the market.  Negative spreads indicate that real return bonds are currently overvalued, as their prices must fall in order for their yields (i.e., the returns they supply) to rise. The valuation is based on a comparison of the present values of ten year zero coupon bonds offering the rate demanded and the rate supplied, as of **30 Apr 10**:

| Region | Risk Free Rate Demanded | Actual Risk Free Rate Supplied | Difference | Overvaluation (>100) or Undervaluation (<100) |
|---|---|---|---|---|
| Australia | 2.2 | 2.8 | 0.6 | 94 |
| Canada | 2.8 | 1.4 | -1.3 | 114 |
| Eurozone | 2.9 | 1.3 | -1.6 | 117 |
| Japan | 2.8 | 1.3 | -1.5 | 115 |
| United Kingdom | 2.8 | 0.6 | -2.2 | 124 |
| United States | 2.5 | 1.3 | -1.2 | 113 |

Note that in this analysis we have conservatively used 1%, rather than our normal 2%, as the rate of time preference. This is consistent with recent research findings that as investors' sense of uncertainty increases, they typically reduce their time preference discount rate – that is, they become less impatient to consume, and more willing to save (see, for example, "Uncertainty Breeds Decreasing Impatience" by Epper, Fehr-Duda, and Bruhin). Given our conservative time preference assumption, it is interesting to speculate what accounts for the current situation in which yields on real return bonds are significantly lower than what our mode would suggest. Logically, answer must lie in some combination of reduced expectations for future economic growth, higher variability of future economic growth rates, and/or higher average levels of risk aversion.

Finally, we also recognize that certain structural factors can also affect the pricing (and therefore yields) of real return bonds. For example, some have argued that in the U.K., the large number of pension plans with liabilities tied to inflation has created a permanent imbalance in the market for index-linked gilts, causing their returns to be well below those that models (such as ours) suggest should prevail. A similar set of conditions may be developing in the United States, particularly as demand for inflation hedging assets increases. Finally, valuation of real return bonds is further complicated by deflation, which affects different instruments in different ways. For example, US TIPS and French OATi adjust for inflation by changing the principal (capital) value of the bond. However, they also contain a provision that the redemption value of the bond will not fall below its face value; hence, a prolonged period of

deflation could produce significant real capital gains (this is known as the "deflation put"). In light of these considerations, we have a neutral view on the valuation of real return bonds in all currency zones.

## *Government Bond Markets*

Our government bond market valuation update is based on the same supply and demand methodology we use for our equity market valuation update. In this case, the supply of future fixed income returns is equal to the current nominal yield on ten-year government bonds. The demand for future returns is equal to the current real bond yield plus historical average inflation between 1989 and 2003. We use the latter as a proxy for the average rate of inflation likely to prevail over a long period of time. To estimate of the degree of over or undervaluation for a bond market, we use the rate of return supplied and the rate of return demanded to calculate the present values of a ten year zero coupon government bond, and then compare them. If the rate supplied is higher than the rate demanded, the market will appear to be undervalued. This information is contained in the following table:

*Bond Market Analysis as of 30 Apr 10*

|  | Current Real Rate* | Average Inflation Premium (89-03) | Required Nominal Return | Nominal Return Supplied (10 year Govt) | Yield Gap | Asset Class Over or (Under) Valuation based on 10 year zero | Implied Annual Inflation Rate over 10 year time horizon = (1+Nom)/(1+ Real)-1 |
|---|---|---|---|---|---|---|---|
| Australia | 2.76% | 2.96% | 5.72% | 5.71% | -0.01% | **0.09%** | 2.87% |
| Canada | 1.42% | 2.40% | 3.82% | 3.65% | -0.17% | **1.67%** | 2.20% |
| Eurozone | 1.31% | 2.37% | 3.68% | 3.02% | -0.66% | **6.55%** | 1.69% |
| Japan | 1.34% | 0.77% | 2.11% | 1.29% | -0.82% | **8.34%** | -0.04% |
| UK | 0.65% | 3.17% | 3.82% | 3.90% | 0.08% | **-0.81%** | 3.23% |
| USA | 1.30% | 2.93% | 4.23% | 3.66% | -0.57% | **5.60%** | 2.33% |

| | Current Real Rate* | Average Inflation Premium (89-03) | Required Nominal Return | Nominal Return Supplied (10 year Govt) | Yield Gap | Asset Class Over or (Under) Valuation based on 10 year zero | Implied Annual Inflation Rate over 10 year time horizon = (1+Nom)/(1+Real)-1 |
|---|---|---|---|---|---|---|---|
| Switz. | 1.46% | 2.03% | 3.49% | 1.83% | -1.66% | **17.56%** | 0.36% |
| India | 1.46% | 7.57% | 9.03% | 7.98% | -1.05% | **10.15%** | 6.43% |

*For Switzerland and India, we use the average of real rates in other regions with real return bond markets

It is important to note some important limitations of this analysis. Our bond market analysis uses historical inflation as an estimate of expected future inflation over the long-term. This may not produce an accurate valuation estimate, if the historical average level of inflation is not a good predictor of future average inflation levels. This is especially true today, when the world economy is operating in unchartered waters, and is facing both potential deflationary pressures (from falling demand relative to productive capacity, and significant debt servicing problems in the private sector) and inflationary pressures (from unprecedented peacetime government deficits, that are largely being financed by central banks under the "quantitative easing" programs). Under these circumstances, one could argue that many nominal return government bonds might in fact be underpriced today, over a shorter time horizon (more likely to experience deflation), while overpriced over a longer time horizon (that is more likely to see higher levels of inflation). As we like to point out, in the absence of public policy interventions, overindebtedness on the part of private borrowers typically results in widespread bankruptcies and deflation caused by the accelerating liquidation of collateral. In contrast, overindebtedness on the part of governments more often results in some combination of inflation and exchange rate depreciation (e.g., look at the history of Argentina).

To help readers to put the current situation in perspective, we also include in the table above the average annual inflation rate implied by the current spread between ten year nominal rates and average real rates (note that research has shown

that the real yield curve tends to be quite flat, which is consistent with economic theory). The following table, shows historical average inflation rates (and their standard deviations) for the U.K. and U.S. over longer periods of time, and helps to put our government bond valuation analysis (and inflation assumptions) into a broader context:

|  | *U.K.* | *U.S.* |
|---|---|---|
| *Avg. Inflation, 1775-2007* | *2.19%* | *1.62%* |
| Standard Deviation | 6.60% | 6.51% |
| *Avg. Inflation, 1908-2007* | *4.61%* | *3.29%* |
| Standard Deviation | 6.24% | 5.03% |
| *Avg. Inflation, 1958-2007* | *5.98%* | *4.11%* |
| Standard Deviation | 5.01% | 2.84% |

In sum, assuming inflation levels revert to their long-term averages over a long time horizon, many government bond markets appear overpriced today (i.e., prevailing nominal yields appear to be too low). However, over a short-term time horizon, during which inflation should either be low or negative (i.e., during which we may actually experience a prolonged period of deflation), one can make the case that many government bond markets are significantly undervalued today. When it comes to questions about valuation, one's time horizon assumption is critical.


## *Credit Spreads*

Let us now turn to the subject of the valuation of non-government bonds. Some have suggested that it is useful to decompose the bond yield spread into two parts. The first is the difference between the yield on AAA rated bonds and the yield on the ten year Treasury bond. Because default risk on AAA rated companies is very low, this spread primarily reflects prevailing liquidity and jump (regime shift) risk conditions (e.g., between a low volatility, relatively high return regime, and a high volatility, lower return regime). The second is the difference between BAA and AAA rated bonds, which tells us more about the level of compensation required by investors for bearing relatively high quality credit risk. Research has also shown that credit spreads on

longer maturity intermediate risk bonds has predictive power for future economic demand growth, with a rise in spreads signaling a future fall in demand (see "Credit Market Shocks and Economic Fluctuations" by Gilchrist, Yankov, and Zakrajsek).

The following table shows the statistics of the distribution of these spreads between January, 1986 and December, 2008 (based on daily Federal Reserve data – 11,642 data points). Particularly in the case of the BAA spread, it is clear we are not dealing with a normal distribution!

|  | **AAA – 10 Year Treasury** | **BAA-AAA** |
|---|---|---|
| Average | 1.20% | .94% |
| Standard Deviation | .44% | .34% |
| Skewness | .92 | 3.11 |
| Kurtosis | .53 | 17.80 |

At **30 Apr 10**, the AAA minus 10 year Treasury spread was 1.47%. The AAA minus BAA spread was 0.94%. Since these distributions are not normal (i.e., they do not have a "bell curve" shape), we take a different approach to putting them in perspective. Over the past twenty three years, there have been only 1,417 days with a higher AAA spread (12.2% of all days) and 2,237 days with a higher BAA spread (19.2% of all days in our sample). Current spreads still reflect a relatively high degree of investor uncertainty about future liquidity and credit risk, despite the declines in the BBB and AAA spreads from their crisis highs. However, given the unchartered economic waters through which we are still passing, and our belief that the conventional wisdom naturally underestimates the amount of trouble on the horizon, we believe that these spread likely reflect the underpricing of liquidity and credit risk – or, to put it differently, the overpricing of AAA and BBB rated bonds – on a one year time horizon. We also note the high liquidity risk spread (AAA less Treasury), in contrast to the relatively lower credit spread. Something here doesn't add up, and we suspect it is the underpricing of credit risk.

Over a longer term time horizon, where risk premiums return to more normal levels, one can argue that credit is underpriced today, based on prevailing yields. However, the validity of that conclusion also critically depends on one's assumptions about future default rates and loss rates conditional upon default.  A decision to buy 50,000 in bonds at what appears to be a very attractive yield from a long-term perspective can still generate negative total returns if the future default rate (and losses conditional upon default) more than wipes out the apparently attractive extra yield.  And since the differences between current AAA and BBB credit spreads and their long-term averages are well under 100 basis points today, it doesn't take much mis-estimation of future default rates (and losses conditional on default) to turn today's apparently good decision into tomorrow's painful outcome.  And the "historically attractive yields" argument gets (non-linearly) less convincing the further down the credit ratings ladder you go.   On balance, we think that even on a long-term view, credit is at best fully valued today, and quite possibly overpriced, given the uncertain economic outlook and difficulty in accurately estimating future default and loss given default rates.

## *Currencies*

Let us now turn to currency prices and valuations. For an investor contemplating the purchase of foreign bonds or equities, the expected future annual percentage change in the exchange rate is also important.  Study after study has shown that there is no reliable way to forecast this, particularly in the short term. At best, you can make an estimate that is justified in theory, knowing that in practice it will not turn out to be accurate, especially over short periods of time (for a logical approach to forecasting equilibrium exchange rates over longer horizons, see "2009 Estimates of Fundamental Equilibrium Exchange Rates" by Cline and Williamson).

In our case, we have taken the difference between the yields on ten-year government bonds as our estimate of the likely future annual change in exchange rates between two regions. According to theory, the currency with the relatively higher

interest rates should depreciate versus the currency with the lower interest rates. Of course, in the short term this often doesn't happen, which is the premise of the popular hedge fund "carry trade" strategy of borrowing in low interest rate currencies, investing in high interest rate currencies, and, essentially, betting that the change in exchange rates over the holding period for the trade won't eliminate the potential profit. Because (as noted in our June 2007 issue) there are some important players in the foreign exchange markets who are not profit maximizers, carry trades are often profitable, at least over short time horizons (for an excellent analysis of the sources of carry trade profits – of which 25% may represent a so-called "disaster risk premium", see "Crash Risk in Currency Markets" by Farhi, Frailberger, Gabaix, Ranciere and Verdelhan). Our expected medium to long-term changes in exchange rates are summarized in the following table:

*Annual Exchange Rate Changes Implied by Bond Market Yields on 30 Apr 10*

|  | To AUD | To CAD | To EUR | To JPY | To GBP | To USD | To CHF | To INR |
|---|---|---|---|---|---|---|---|---|
| From |  |  |  |  |  |  |  |  |
| **AUD** | 0.00% | -2.06% | -2.69% | -4.42% | -1.81% | -2.05% | -3.88% | 2.27% |
| **CAD** | 2.06% | 0.00% | -0.63% | -2.36% | 0.25% | 0.01% | -1.82% | 4.33% |
| **EUR** | 2.69% | 0.63% | 0.00% | -1.73% | 0.88% | 0.64% | -1.19% | 4.96% |
| **JPY** | 4.42% | 2.36% | 1.73% | 0.00% | 2.61% | 2.37% | 0.54% | 6.69% |
| **GBP** | 1.81% | -0.25% | -0.88% | -2.61% | 0.00% | -0.24% | -2.07% | 4.08% |
| **USD** | 2.05% | -0.01% | -0.64% | -2.37% | 0.24% | 0.00% | -1.83% | 4.32% |
| **CHF** | 3.88% | 1.82% | 1.19% | -0.54% | 2.07% | 1.83% | 0.00% | 6.15% |
| **INR** | -2.27% | -4.33% | -4.96% | -6.69% | -4.08% | -4.32% | -6.15% | 0.00% |

## *Commercial Property*

Our approach to valuing commercial property securities as an asset class is also based on the expected supply of and demand for returns, utilizing the same mix of fundamental and investor behavior factors we use in our approach to equity valuation. Similar to equities, the supply of returns equals the current dividend yield on

an index covering publicly traded commercial property securities, plus the expected real growth rate of net operating income (NOI).  A number of studies have found that real NOI growth has been basically flat over long periods of time (with apartments showing the strongest rates of real growth). This is in line with what economic theory predicts, with increases in real rent lead to an increase in property supply, which eventually causes real rents to fall.  However, it is entirely possible – as we have seen in recent months – that rents can fall sharply over the short term during an economic downturn.

Our analysis also assumes that over the long-term, investors require a 3.0% risk premium above the yield on real return bonds as compensation for bearing the risk of securitized commercial property as an asset class.   Last but not least, there is significant research evidence that commercial property markets are frequently out of equilibrium, due to slow adjustment processes as well as the interaction between fundamental factors and investors' emotions (see, for example, "Investor Rationality: An Analysis of NCREIF Commercial Property Data" by Hendershott and MacGregor; "Real Estate Market Fundamentals and Asset Pricing" by Sivitanides, Torto, and Wheaton; "Expected Returns and Expected Growth in Rents of Commercial Real Estate" by Plazzi, Torous, and Valkanov; and "Commercial Real Estate Valuation: Fundamentals versus Investor Sentiment" by Clayton, Ling, and Naranjo). Hence, it is extremely hard to forecast how long it will take for any over or undervaluations we identify to be reversed.  The following table shows the results of our valuation analysis as of **30 Apr 10**: We use the dividend discount model approach to produce our estimate of whether a property market is over, under, or fairly priced today, assuming a long-term perspective on property market valuation drivers.  The specific formula is (Current Dividend Yield x 100) x (1+ Forecast NOI Growth) divided by (Current Yield on Real Return Bonds + Property Risk Premium - Forecast NOI Growth). Our estimates are shown in the following tables, where a value greater than 100% implies overpricing, and less than 100% implies underpricing.

| Country | Dividend Yield | Plus LT Real Growth Rate | Equals Supply of Returns | Real Bond Yield | Plus LT Comm Prop Risk Premium | Equals Returns Demanded | Over or Undervaluation (100% = Fair Value) |
|---|---|---|---|---|---|---|---|
| Australia | 5.7% | 0.2% | 5.9% | 2.8% | 3.0% | 5.8% | 98% |
| Canada | 4.8% | 0.2% | 5.0% | 1.4% | 3.0% | 4.4% | 88% |
| Eurozone | 5.6% | 0.2% | 5.8% | 1.3% | 3.0% | 4.3% | 73% |
| Japan | 8.5% | 0.2% | 8.7% | 1.3% | 3.0% | 4.3% | 48% |
| Switzerland* | 3.2% | 0.2% | 3.4% | 1.5% | 3.0% | 4.5% | 132% |
| U.K. | 4.8% | 0.2% | 5.0% | 0.6% | 3.0% | 3.6% | 71% |
| U.S.A. | 4.2% | 0.2% | 4.4% | 1.3% | 3.0% | 4.3% | 99% |

*Using the current dividend yield, the valuation of the Swiss property market appears to be significantly out of line with the others.  Hence, our analysis is based on the estimated income yield on directly owned commercial property in Switzerland instead of the dividend yield on publicly traded property securities.*

As you can see, on a long-term view, a number of commercial property markets still look underpriced today, despite the sharp recent increase in property share prices in many countries.  Over the next twelve months, however, we believe the balance of risks points in the other direction.  Consumer spending remains weak in many markets, occupancy rates are declining, rents are stagnant at best, and landlords continue to struggle with debt refinancings (indeed, the press is full of stories about the declining quality of commercial mortgage backed securities).  It is hard to see how government fiscal stimulus, strong though it is, will improve this situation very much, as long as the underlying problems – high consumer leverage, a weak financial system, and continuing international imbalances – remain unresolved.  Moreover, the development of real return bond and commodity markets has weakened, to some extent, property's traditional attraction as an inflation hedge.  In sum, we believe that the recent sharp run up in property security prices is yet another sign of some combination of investor over-optimism about the speed and size of economic recovery, and/or the tendency of institutional investors to herd rather than risk losing assets (or their jobs) due to their underperforming an asset class benchmark.  The exception to

our general view may come in Switzerland and the Eurozone, where rising insecurity often triggers an increased allocation to property, on the basis of traditional wealth preservation principles.

## *Commodities*

Let us now turn to the Dow Jones AIG Commodity Index (now known as the DJ UBS Commodity Index), our preferred benchmark for this asset class because of the roughly equal weights it gives to energy, metals and agricultural products. One of our core assumptions is that financial markets function as a complex adaptive system which, while attracted to equilibrium (which generates mean reversion) are seldom in it. To put it differently, we believe that investors' expectations for the returns an asset class is expected to supply in the future are rarely equal to the returns a rational long-term investor should logically demand. Hence, rather than being exceptions, varying degrees of over and under pricing are simply a financial fact of life. We express the demand for returns from an asset class as the current yield on real return government bonds (ideally of intermediate duration) plus an appropriate risk premium. While the former can be observed, the latter is usually the subject of disagreement. In determining the risk premium to use, we try to balance a variety of inputs, including historical realized premiums (which may differ considerably from those that were expected, due to unforeseen events), survey data and academic theory (e.g., assets that payoff in inflationary and deflationary states should command a lower risk premium than those whose payoffs are highest in "normal" periods of steady growth and modest changes in the price level). In the case of commodities, Gorton and Rouwenhorst (in their papers "Facts and Fantasies About Commodity Futures" and "A Note on Erb and Harvey") have shown that (1) commodity index futures provide a good hedge against unexpected inflation; (2) they also tend to hedge business cycle risk, as the peaks and troughs of their returns tend to lag behind those on equities (i.e., equity returns are leading indicators, while commodity returns are coincident indicators of the state of the real business cycle); and (3) the realized premium over real bond

yields has historically been on the order of four percent. We are inclined to use a lower ex-ante risk premium in our analysis (though reasonable people can still differ about what it should be), because of the hedging benefits commodities provide relative to equities. This is consistent with the history of equities, where realized ex-post premiums have been shown to be larger than the ex-ante premiums investors should logically have expected.

The general form of the supply of returns an asset class is expected to generate in the future is its current yield (e.g., the dividend yield on equities), plus the rate at which this stream of income is expected to grow in the future. The key challenge with applying this framework to commodities is that the supply of commodity returns doesn't obviously fit into this framework. Broadly speaking, the supply of returns from an investment in commodity index futures comes from four sources. First, since commodity futures contracts can be purchased for less than their face value (though the full value has to be delivered if the contract is held to maturity), a commodity fund manager doesn't have to spend the full $100 raised from investors to purchase $100 of futures contracts. The difference is invested – usually in government bonds – to produce a return.

The second source of the return on a long-only commodity index fund is the so-called "roll yield." Operationally, a commodity index fund buys futures contracts in the most liquid part of the market, which is usually limited to the near term. As these contracts near their expiration date, they are sold and replaced with new futures contracts. For example, a fund might buy contracts maturing in two or three months, and sell them when they approached maturity. The "roll yield" refers to the gains and losses realized by the fund on these sales. If spot prices (i.e., the price to buy the physical commodity today, towards which futures prices will move as they draw closer to expiration) are higher than two or three-month futures, the fund will be selling high and buying low, and thus earning a positive roll yield. When a futures market is in this condition, it is said to be in "backwardation." On the other hand, if the spot price is lower than the two or three month's futures price, the market is said to be in "contango" and the roll yield will be negative (i.e., the fund will sell low and buy high).

The interesting issue is what causes a commodity to be either backwardated or contangoed.   A number of theories have been offered to explain this phenomenon. The one that seems to have accumulated the most supporting evidence to date is the so-called "Theory of Storage": begins with the observation that, all else being equal, contango should be the normal state of affairs, since a person buying a commodity at spot today and wishing to lock in a profit by selling a futures contract will have to incur storage and financing costs. In addition to his or her profit margin, storage and financing costs should cause the futures price to be higher than the spot price, and normal roll yields to be negative.

However, in the real world, all things are not equal.  For example, some commodities are very difficult or expensive to store; others have very high costs if you run out of them (e.g., because of rapidly rising demand relative to supply, or a potential disruption of supply).  For these commodities, there may be a significant option value to holding the physical product (the Theory of Storage refers to this option value as the "convenience yield").  If this option value is sufficiently high, spot prices may be bid up above futures prices, causing "backwardation" and positive roll-yields for commodity index funds.  Hence, a key question is the extent to which different commodities within a given commodity index tend to be in backwardation or contango over time. Historically, most commodities have spent time in both states.   However, contango has generally been more common, but not equally so for all commodities. For example, oil has spent relatively more time in backwardation, as have copper, sugar, soybean meal and lean hogs.  This highlights a key point about commodity futures index funds – because of the critical impact of the commodities they include, the weights they give them, and their rebalancing and rolling strategies, they are, in effect, uncorrelated alpha strategies.  Moreover, because of changing supply and demand conditions in many commodities (e.g., global demand has been growing, while marginal supplies are more expensive to develop and generally have long lead times), it is not clear that historical tendencies toward backwardation or contango are a good guide to future conditions. To the extent that any generalizations can be made, higher real option values, and hence backwardation and positive roll returns are more likely to

be found when demand is strong and supplies are tight, and/or when there is a rising probability of a supply disruption in a commodity where storage is difficult.   For example, ten commodities make up roughly 75% of the value of the Dow Jones AIG Commodities Index. The current term structures of their futures curves are as follows on  **30 Apr 10**:

| Commodity | DJAIG Weight | Current Status |
|---|---|---|
| Crude Oil | 13.8% | Contango |
| Natural Gas | 11.9% | Contango |
| Gold | 7.9% | Contango |
| Soybeans | 7.6% | Contango |
| Copper | 7.3% | Contango |
| Aluminum | 7.0% | Contango |
| Corn | 5.7% | Contango |
| Wheat | 4.8% | Contango |
| Live Cattle | 4.3% | Backwardated |
| Unleaded Gasoline | 3.7% | Contango |
|  | *74.0%* |  |

Given the continued presence of so many contangoed futures curves, expected near term roll returns on the DJAIG as a whole are still negative, absent major supply side shocks. That said, on a weighted basis, the forward premium (relative to the spot price) rose in **April** at 1.14%, compared to .63% last month, .65% two months ago, and .94% three months ago. Finally, we also note that when futures are contangoed, commodity funds that can take short as well as long positions may still deliver positive returns.

The third source of commodity futures return is unexpected changes in the price of the commodity during the term of the futures contract. It is important to stress that the market's consensus about the expected change in the spot price is already included in the futures price. The source of return we are referring to here is the unexpected portion of the actual change.  This return driver probably offers investors the best chance of making profitable forecasts, since most human beings find it extremely difficult to accurately understand situations where cause and effect are

significantly separated in time (e.g., failure to recognize how fast rising house prices would – albeit with a time delay – trigger an enormous increase in new supply).

Again, large surprises seem more likely when supply and demand and finely balanced – the same conditions which can also give rise to changes in real option values and positive roll returns. Given our economic outlook, at this point we view negative surprises on the demand side that depress commodity prices as more likely than supply surprises that have the opposite effect.

The fourth source of returns for a diversified commodity index fund is generated by rebalancing a funds portfolio of futures contracts back to their target commodity weightings as prices change over time. This is analogous to an equity index having a more attractive risk/return profile than many individual stocks. This rebalancing return will be higher to the extent that price volatilities are high, and the correlations of price changes across commodities are low. Historically, this rebalancing return has been estimated to be around 2% per year, for an equally weighted portfolio of different commodities. However, as correlations have risen in recent years, the size of this return driver has probably declined – say to 1% per year.

So, to sum up, the expected supply of returns from a commodity index fund over a given period of time equals (1) the current yield on real return bonds, reduced by the percentage of funds used to purchase the futures contracts; (2) expected roll yields, adjusted for commodities' respective weights in the index; (3) unexpected spot price changes; and (4) the expected rebalancing return. Of these, the yield on real return bonds can be observed, and we can conservatively assume a long-term rebalancing return of, for example, 1.0%. These two sources of return are clearly less than the demand for returns that are equal to the real rate plus a risk premium of, say, 3.0%. The difference must be made up by a combination of roll returns (which, given the current shape of futures curves, are likely to be negative in the near term) and unexpected price changes, due to unanticipated changes in demand (where downside surprises currently seem more likely than upside surprises) and/or unanticipated changes in supply conditions (e.g., incomplete investor recognition of slowing oil production from large reservoirs, a major disruption due to war/terrorism or a

significant accident, discovery of significant new deposits, or a major breakthrough that makes biofuels much more cost competitive).

Another approach to assessing the valuation of commodities as an asset class is to compare the current value of the DJAIG Index to its long-term average. Between 1991 and 2008, the inflation adjusted (i.e., real) DJAIG had an average value of 91.61, with a standard deviation of 16.0 (skewness of .52, and kurtosis of -.13 – i.e., it was close to normal). The inflation adjusted **30 Apr 10** closing value of 84.32 was an estimated .42 standard deviations below the long term average. Assuming the value of the index is normally distributed around its historical average (which in this case is approximately correct), a value within one standard deviation of the average should occur about 67% of the time, and a value within two standard deviations 95% of the time. Whether the current level of the inflation adjusted DJAIG signifies that commodities are undervalued depends upon one's outlook for future roll returns and price surprises, and, critically, the time horizon being used.

There are three arguments that, on a medium term view, commodities are underpriced today. The first is the large amount of monetary easing underway in the world, which, at some point, could lead to higher inflation. The second is the equally large amount of fiscal stimulus being applied to the global economy, with its focus on infrastructure projects, should eventually boost demand for commodities (and indirectly boost economic growth in commodity exporting countries like Australia and Canada). The third is that the possibility that we will see a substantial fall in the value of the US Dollar versus other currencies, causing investors to increase their holdings of commodities as confidence in fiat currencies wanes.   The argument that commodities are overvalued today on a medium term view is based on the belief that (a) investment in clean fuels and other changes in environmental regulation will cause a permanent reduction in global demand for oil relative to supply; (b) the inability to quickly resolve the economic challenges facing the world economy will result in a prolonged period of weak or no growth (including a major slowdown in Chinese growth), which will reduce the demand for commodities; and (c) that in scenario of prolonged global stagnation, investors will prefer to increase their holdings of short term government bonds, and

perhaps gold, rather than increasing their holdings of a broader range of commodities. Taking all of these arguments into consideration, the valuation question comes down to the probabilities one attaches to a decline in global demand from today's relatively weak levels (which would cause commodities prices to fall) and the development of a crisis of confidence in the U.S. dollar (which would cause commodities prices to rise). On balance, we believe that the former is more likely than the latter, as the High Uncertainty Regime typically sees a flight into U.S. dollars rather than a flow out of them. On that basis, we conclude that commodities are likely overvalued today.

*Gold*

On the other hand, gold prices benefit both from rising investor uncertainty and/or worries about future inflation. Since both of these are increasing, gold prices should benefit from higher retail flows into the expanding range of gold ETF products that make easier to invest in this commodity. In addition, as we described at length in our January 2010 article on gold as a separate asset class, when the yield on U.S. real return bonds is lower than approximately 2.35%, there tends to be upward pressure on the price of gold. At the end of April, the yield on a 10 year USD real return bond was only 1.30%. Taking these different factors into consideration, we conclude that gold may (still) be likely undervalued today, on a one year time horizon.

*Timber*

The underlying diversification logic for investing in timber is quite simple: the key return driver is biological growth, which has essentially no correlation with factors driving returns on other asset classes. That said, the correlation of timber returns with other asset classes should be different from zero, as it also depends on the price of timber products (which depends, in part, on GDP growth) as well as changes in real interest rates and investor behavior – factors affect returns on other asset classes as well as timber.

However, in valuing timber as a global asset class, we face a number of significant challenges.  First, the underlying assets are not uniform – they are divided between softwoods and hardwoods, at different stages of maturity, located in different countries, face different supply conditions (e.g., development, harvesting, and environmental regulations and pest risks), and different demand conditions in end-user markets.  Second, the majority of investment vehicles containing these assets are illiquid limited partnerships, and the few publicly traded timber investment vehicles (e.g., timber REITs) provide insufficient liquidity to serve as the basis for indexed investment products.  Finally, the two indexes that attempt to measure returns from timberland investing (the NCREIF Index in North America, and IPD Index in Europe) are regional in coverage and utilize an appraisal based valuation methodology based on timber limited partnerships, which tends to understate the volatility of returns and their correlation with other asset classes. Given these challenges, the result of any valuation estimate for timber as a global asset class must be regarded as, at best, a rough approximation.

Our valuation approach is based on two timber REITs that are traded in the United States: Plum Creek (PCL) and Rayonier (RYN).  We chose this approach because both of these REITs are liquid, publicly traded vehicles, and both derive most of their revenues from their timberland operations.  This avoids many of the problems created by appraisal-based approaches such as the NCREIF and IPD indexes.  That said, tor the reasons noted above, this approach is still far from a perfect solution to the asset class valuation problem presented by timber.

As in the case of equities, we compare the returns that a weighted mix of PCL and RYN are expected to supply (defined as their current dividend yield plus the expected growth rate of those dividends) to the equilibrium return investors should rationally demand for holding timber assets (defined as the current yield on real return bonds plus an appropriate risk premium for this asset class).  We note that, since PCL and RYN are listed securities, investors should not demand a liquidity premium for holding them, as they would in the case of an investment in a TIMO Limited Partnership (Timber Management Organization). Two of the variables we use in our

valuation analysis are readily available: the dividend yields on the timber REITS and the yield on real return bonds.  The other two variables, the expected rate of growth and the appropriate risk premium, have to be estimated. The former presents a particularly difficult challenge.

In broad terms, the rate of dividend growth results from the interaction of physical, economic, and regulatory processes.  Physically, trees grow, adding a certain amount of mass each year.  The exact rate depends on the mix of trees (e.g., southern pine grows much faster than northern hardwoods), on silviculture techniques employed (e.g., fertilization, thinning, etc.), and weather and other natural factors (e.g., fires, drought, and beetle invasions).  Another aspect of the physical process is that a certain number of trees are harvested each year, and sold to provide revenue to the timber REIT.  A third aspect of the physical process is that trees are exposed to certain risks, such as fire, drought, or disease (e.g., the mountain pine beetle in the northwest United States and Canada).   And fourth physical process is that, through photosynthesis, trees sequester a portion of the carbon dioxide that would otherwise be added to the earth's atmosphere.

In the economic area, three processes are important. First, as trees grow, they can be harvested to make increasingly valuable products, starting with pulpwood when they are young, and sawtimber when they reach full maturity.  This value-increasing process is known as "in-growth." The speed and extent to which in-growth occurs depends on the type of tree; in general, this process produces greater value growth for hardwoods (whose physical growth is slower) than it does for pines and other fast-growing softwoods.  At the level of individual timber investments, the rate of in-growth is a key driver of returns; however, at the asset class level, we have decided to assume a constant mix of grades over time.  The second economic process (or, more accurately, processes) is the interaction of supply and demand that determines changes in real prices for different types and grades of timber. As is true in the case of commodities, there is likely to be an asymmetry at work with respect to the impact of these processes, with prices reacting more quickly to more visible changes in demand, while changes in supply side factors (which only happen with a significant time delay)

are more likely to generate surprises. In North America., a good example of this may be the eventual supply side and price impact of the mountain pine beetle epidemic that has been spreading through the northwestern forests of the United States and Canada.  The IMF produces a global timber price index that captures the net impact of demand and supply fluctuations. The average annual change in real prices (derived by adjusting the IMF series for changes in U.S. inflation) between 1981 and 2007 was 0.1% (i.e., average prices over the period remained essentially constant in real terms), but with a significant standard deviation of 9.2% -- i.e., it is normal for real timber prices to be quite volatile from year to year.

The third set of economic processes that affects the growth rate of dividends includes changes in a timber REIT's cost structure, and in its non-timber related revenue streams (e.g., proceeds from selling timber land for real estate development or conservation easements).  For example, if wood prices decline, and non-timber sources of revenue dry up (as is happening during the current recession), a timber REIT (or timber LP) will have to either cut operating costs and/or distributions to investors, or increase the physical volume of trees that are harvested.

Regulatory processes also affect the future growth rate for timber REIT dividends.  In the past, the most important of these included restrictions on harvesting or land development.  In the future, the most important regulatory factor is likely to be the imposition of carbon taxes or a cap and trade systems to limit carbon emissions. These new environmental regulations could provide an additional source of revenue for timber REITs in the future (for an early attempt at establishing the $CO_2$ sequestration value of timberland, see "Economic Valuation of Forest Ecosystem Services" by Chiabai, Travisi, Ding, Markandya and Nunes. For a review of similar studies, see "Estimates of Carbon Mitigation Potential from Agricultural and Forestry Activities" by the U.S. Congressional Research Service).

The following table summarizes the assumptions we make about these physical and economic variables in our valuation model:

| Growth Driver | Assumption |
|---|---|
| Biological growth of trees | We assume 6% as the long term average for a diversified timberland portfolio. We stress that biological growth rates can vary widely for different types of timber investment (with softwoods and timber located in tropical countries delivering the highest growth, and hardwoods and timber in more temperate climates delivering the slowest growth rates).  We have also changed our valuation model to assume a constant mix of product grades, to present a better approximation for timber as a global asset class. |
| Harvesting rate | As a long term average, we assume that 5% of tree volume is harvested each year. As a practical matter, this should vary with timber prices and the REITs prevailing dividend level.  So 5% is a "noisy" long-term estimate for timber as a global asset class. |
| Change in prices of timber products | In line with IMF data, we assume that over the long term, average timber prices will just keep pace with inflation. Again, this is a "noisy" estimate, because the IMF data also shows that real prices are highly volatile. Moreover,  there are indications that climate change is causing increasing tree deaths in some areas, which should lead to future real price increases (see "Western U.S. Forests Suffer Death by Degrees" by E. Pennisi, *Science*, 23Jan09). Hence we believe our long-term price change assumption is conservative. |
| Carbon credits | Until more comprehensive regulations are enacted, we assume no additional return to timberland owners from the $CO_2$ sequestration service they provide (or for timber's use in various biomass energy applications).  Again, given the high level of global concern with limiting the increase in atmospheric $CO_2$ levels, we believe this is a conservative assumption. |

This leaves the question of the appropriate return premium that investors should demand to compensate them for bearing the risk of investing in timber as an asset class. Historically, the difference between returns on the NCRIEF timberland index and those on real return bonds has averaged around six percent. However, since the timber REITS are much more liquid than the properties included in the NCRIEF index, and since timber has displayed a very low correlation with returns on other asset classes (particularly during the worst of the 2008 crisis, even in the case of liquid timber vehicles), we use three percent as the required return premium for investing in liquid timberland assets. Arguably, because at least part of timber's return generating process (physical growth) has zero correlation with the return generating processes for other asset classes, we should use an even lower risk premium. Again, we believe our approach is conservative in this regard. Given these assumptions, our assessment of the valuation of the timber asset class at **30 April 10** is shown in the following table. We use the dividend discount model approach to produce our estimate of whether timber is over, under, or fairly valued today. The specific formula is (Current Dividend Yield x 100) x (1+ Forecast Dividend Growth) divided by (Current Yield on Real Return Bonds + Timber Risk Premium - Forecast Dividend Growth). A value greater than 100% implies overvaluation, and less than 100% implies undervaluation.

| | |
|---|---|
| Average Dividend Yield (70% PCL + 30% RYN) | 4.15% |
| Plus Long Term Annual Biological Growth | 6.00% |
| Less Percent of Physical Timber Stock Harvested Each Year | (5.00%) |
| Plus Long Term Real Annual Price Change | 0.00% |
| Plus Other Sources of Annual Value Increase (e.g., Carbon Credits) | 0.00% |
| Equals Average Annual Real Return Supplied | **5.15%** |
| Real Bond Yield | 1.30% |

| | |
|---|---|
| Plus Risk Premium for Timber | 3.00% |
| Equals Average Annual Real Return Demanded | **4.30%** |
| Ratio of Returns Demanded/Returns Supplied Equals Valuation Ratio (less than 100% implies undervaluation) | **79%** |

We stress that this is a long-term valuation estimate that contains a higher degree of uncertainty that valuation estimates for larger and more liquid asset classes. Over a one-year time horizon, you could easily reach a different valuation conclusion. For example, if you believe that real timber prices will decline over the next year, and/or that physical harvesting rates will increase to cover costs and dividends, then you could argue that, in so far as PCL and RYN are roughly accurate proxies for the asset class as a whole, timber, as proxied by PCL and RYN, is likely overpriced today. On the other hand, whether looking over a short or long-term time horizon, if you believe that future revenues from timber's $CO_2$ sequestration service are likely to be significant, and/or that four percent is too high a risk premium to use, then you could argue that timber is likely underpriced today.

In sum, timber valuation is an issue upon which reasonable people can and do disagree, in no small measure because of their different time horizons and the different underlying assumptions and methodologies they use to reach their conclusions. On balance, taking a long-term view, we continue to believe that timberland is likely underpriced today, for three reasons: (1) future revenue growth related to $CO_2$ sequestration is likely to be significant; (2) the negative impact on timber prices caused by the recession and long-term slowdown in North American housing construction will be moderated or offset by the impact of supply side changes, such as the mountain pine beetle problem, and by rising demand for wood products that will accompany rising incomes in China. On a one-year view, however, we are neutral, with downward timber price risk (due to continuing economic weakness) balanced against the upside potential inherent in pending environmental legislation.

*Volatility*

Our approach to assessing the current value of equity market volatility (as measured by the VIX index, which tracks the level of S&P 500 Index volatility implied by the current pricing of put and call options on this index) is similar to our approach to commodities.  Between January 2, 1990 and December 30, 2008, the average daily value of the VIX Index was 19.70, with a standard deviation of 7.88 (skewness 2.28, kurtosis 9.71 – i.e., a very "non-normal" distribution).   On **30 Apr 10**, the VIX closed at 22.05. To put this in perspective, 40% of the days in our sample had higher closing values of the VIX.  In sum, at the end of last month, as far as volatility was concerned, the conventional wisdom was that equity market conditions had returned to normal. We continue to believe that, in the short term – say, over the next 12 months – this will probably prove to be too low, as investors' expectations that the normal regime will continue will meet with disappointment as the conflict scenario and/or a worsening global influenza pandemic develops.  As we noted above with respect to commodities, despite the likely impact of fiscal stimulus on aggregate demand, and monetary growth on price levels (i.e., reducing the risk of prolonged deflation), the core issues that lie at the heart of the current recession remain unresolved. We have repeatedly noted in recent months that the probability of a return to the high uncertainty regime is rising. Critically, we do not believe that this information and its likely impact on future uncertainty levels has been fully incorporated into S&P 500 option prices, and hence into the VIX.  For these reasons as of **30 Apr 10**  we estimate that volatility is probably underpriced over a short-term time horizon.  Over a longer-term time horizon, we also believe that volatility is still possibly underpriced today.  The logic behind this view is that structural changes – such as electronic trading, faster dispersal of information to investors, and the substantial amount of money committed to various quantitative trading strategies -- may well have made equity prices permanently more volatile than they have been in the past.

## Sector and Style Rotation Watch

The following table shows a number of classic style and sector rotation strategies that attempt to generate above index returns by correctly forecasting turning points in the economy.  This table assumes that active investors are trying to earn high returns by investing today in the styles and sectors that will perform best in the next stage of the economic cycle. The logic behind this is as follows: Theoretically, the fair price of an asset (also known as its fundamental value) is equal to the present value of the future cash flows it is expected to produce, discounted at a rate that reflects their relative riskiness.

Current economic conditions affect the current cash flow an asset produces. Future economic conditions affect future cash flows and discount rates. Because they are more numerous, expected future cash flows have a much bigger impact on the fundamental value of an asset than do current cash flows.  Hence, if an investor is attempting to earn a positive return by purchasing today an asset whose value (and price) will increase in the future, he or she needs to accurately forecast the future value of that asset.   To do this, he or she needs to forecast future economic conditions, and their impact on future cash flows and the future discount rate. Moreover, an investor also needs to do this before the majority of other investors reach the same conclusion about the asset's fair value, and through their buying and selling cause its price to adjust to that level (and eliminate the potential excess return).

We publish this table to make an important point: there is nothing unique about the various rotation strategies we describe, which are widely known by many investors.  Rather, whatever active management returns (also known as "alpha") they are able to generate is directly related to how accurately (and consistently) one can forecast the turning points in the economic cycle. Regularly getting this right is beyond the skills of most investors.  In other words, most of us are better off just getting our asset allocations right, rather than trying to earn extra returns by accurately forecasting the ups and downs of different sub-segments of the U.S. equity and debt markets (for three good papers on rotation strategies, see "Sector Rotation Over Business Cycles"

by Stangl, Jacobsen and Visaltanachoti; "Can Exchange Traded Funds Be Used to Exploit Industry Momentum?" by Swinkels and Tjong-A-Tjoe; and "Mutual Fund Industry Selection and Persistence" by Busse and Tong).

That being said, the highest rolling three month returns in the table do provide us with a rough indication of how investors expect the economy and interest rates to perform in the near future. *The highest returns in a given row indicate that a plurality of investors (as measured by the value of the assets they manage) are anticipating the economic and interest rate conditions noted at the top of the next column* (e.g., if long maturity bonds have the highest year to date returns, a plurality of bond investor opinion expects rates to fall in the near future). Comparing returns across strategies provides a rough indication of the extent of agreement (or disagreement) investors about the most likely upcoming changes in the state of the economy. When the rolling returns on different strategies indicate different conclusions about the most likely direction in which the economy is headed, we place the greatest weight on bond market indicators. Why? We start from a basic difference in the psychology of equity and bond investors. The different risk/return profiles for these two investments produce a different balance of optimism and pessimism. For equities, the downside is limited (in the case of bankruptcy) to the original value of the investment, while the upside is unlimited. This tends to produce an optimistic view of the world. For bonds, the upside is limited to the contracted rate of interest and getting your original investment back (assuming the bonds are held to maturity). In contrast, the downside is significantly greater – complete loss of principal. This tends to produce a more pessimistic (some might say realistic) view of the world (although some might argue that the growth of the credit derivatives market has undermined this discipline). As we have written many times, investors seeking to achieve a funding goal over a multi-year time horizon, avoiding big downside losses is mathematically more important than reaching for the last few basis points of return. Bond market investors' perspective tends to be more consistent with this view than equity investors' natural optimism. Hence, when our rolling rotation returns table provides conflicting information, we tend to put the most weight on bond investors' implied expectations for what lies ahead.

*Three Month Rolling Nominal Returns on Classic Rotation Strategies in the U.S. Markets*

| *Rolling 3 Month Returns Through* | *30 Apr 10* | | | |
|---|---|---|---|---|
| *Economy* | Bottoming | Strengthening | Peaking | Weakening |
| *Interest Rates* | Falling | Bottom | Rising | Peak |
| *Style and Size Rotation* | Small Growth (DSG) **19.48%** | Small Value (DSV) **19.75%** | Large Value (ELV) **10.00%** | Large Growth (ELG) **11.15%** |
| *Sector Rotation* | Cyclicals (RXI) **13.60%** | Industrials (EXI) **13.96%** | Staples (KXI) **3.89%** | Utilities (JXI) **-0.64%** |
| *Bond Market Rotation* | Higher Risk (HYG) **5.96%** | Short Maturity (SHY) **0.19%** | Low Risk (TIP) **1.16%** | Long Maturity (TLT) **0.83%** |

## Product and Strategy Notes

- If you are looking for just one paper to read to understand the arguments behind different approaches to fixing the global financial system, read Andrew Haldane's new paper: "The $100 Billion Question." It is outstanding – incisive, and not loaded up with fancy equations and Greek notation. It is a paper that advisors can send to their more sophisticated clients who are interested in this issue.

- Since the 2007/2008 crisis, much has been written about whether diversification works. In the past, we have noted our conclusion that it does, and the fault lies not with the theory but rather with the models that were used to implement it. Specifically, we are strong believers in the value of regime switching models.

Another paper in this line of research which recently caught our eye was "Is the Potential for International Diversification Disappearing?" by Christofferson, Errunza, Jacobs and Jin. They compare returns on emerging and developed market equities between 1973 and 2009, and find that, under a normal regime correlations both within these two asset classes and between them have been increasing (which is what you would expect, given globalization, and in contrast to the recently popularized "decoupling" theory). However, the authors also highlight that this upward trend in correlations has not been the case during extreme market events ("tail events"). They conclude that "the diversification benefits from adding emerging markets to a portfolio still appear to be significant."

- With growing concerns about the credit quality of sovereign debt, Giesecke, Longstaff, Schaefer, and Strebulaev have published an excellent paper new paper: "Corporate Bond Default Risk: A 150 Year Perspective." They find that between 1866 and 2008, the corporate bond market "has repeatedly suffered clustered default events much worse than those experienced during the Great Depression" and that "default events are only weakly correlated with economic downturns." In addition, "over the long term, credit spreads have averaged 153 basis points over the sample period, about twice the estimate default rate. This yields a realized premium of about 80 basis points for bearing default risk over the 1866 – 2008 period." They also note that there is "little or no evidence that credit spreads respond to current or lagged default rates…which supports the view that they are driven largely by factors such as illiquidity."

- We have previously summarized the findings of an IMF working paper, "Inflation Hedging for Long Term Investors" by Attie and Roach (May, 2009 issue). A new paper has substantially confirmed their findings. In "Inflation Risk and the Inflation Risk Premium", Bekaert and Wang find that foreign bonds and gold both provide some degree of hedging against unexpected inflation and do a

better job than commercial property.  However, none of these asset classes provide as good of a hedge as inflation indexed (real return) bonds. They also find that, for nominal return bonds, "the inflation risk premium is sizeable and substantially varies over time."

- As regular readers know, we are strong admirers of the folks at Windham Capital, who we regard as among the leading global thinkers on asset allocation.  Mark Kritzman, the chairman of the firm, has just published an interesting new paper, along with co-authors Yuanzhen Li, Sebastien Page, and Roberto Rigobon.  In "Principla Components as a Measure of Systemic Risk", the authors explore a subject near and dear to our hearts – the early identification of periods of heighted financial market fragility, when the probability of extreme market moves is highest.  The essence of their approach is the association of heightened fragility with periods during which a fixed number of principal components explain the highest proportion of the change in equity market returns.  They conclude that it is not the case that "a spike in the absorption ration [the metric they use to summarize the results of their principal components analysis] reliably leads to a significant drawdown in stock prices. In many instances, stocks performed well following a spike in the absorption ratio…On average, however, significant increases in the absorption ratio are followed by significant market losses, while significant decreases in the absorption ratio are followed by significant gains…We would be correct to conclude though, that a spike in the absorption ratio is a near necessary condition for a significant drawdown, just no a sufficient condition.  Again, a high absorption ratio is an indication of market fragility."  Going forward, we will begin to use this approach to track asset class fragility, in parallel with the approach we already publish each month in our Investor Herding Risk Analysis.  If the Windham methodology proves to be insightful at the asset class level, we will being to regularly publish our results.

- We are always on the lookout for good articles about the asset classes we use in our model portfolios. Two pieces about timber recently caught our eye.  In "Wealth Investors Discover Timberland", (The Wall Street Journal, 1May10), Jeff Opdyke presents a good summary of timber investing issues, and concludes that "for small investors keen on buying timberland now, the best option might be a timber real-estate investment trust, such as Potlatch, Plum Creek Timber, or Rayonier."   The second article was by Reuters "Forestry to Have Big Role in U.S. Carbon Plan" (7Apr10).  Quoting Barclays Capital, the article notes that "domestic deals to convert bare lands into forests and keep tree stands healthy could supply 60 percent of available offsets in any U.S. cap and trade plan to limit greenhouse gas emissions."

- Finally, we note the continuing investigation into just what caused the sudden crash and equally sudden recovery in US stock prices on May 6th.  More and more, the investigation points to the interaction of various algorithmic trading programs as the culprit.  The increase in market fragility that the deployment of these programs has created is one we have made repeatedly. Needless to say, we are very interested to see where this investigation leads.

## Model Portfolios Year-to-Date Nominal Returns

We offer over 2,000 model portfolio solutions for subscribers whose functional currencies (that is, the currency in which their target income and bequest/savings are denominated) include Australian, Canadian, and U.S. Dollars, Euro, Yen, Pounds-Sterling, Swiss Francs and Indian Rupees.  In addition to currency, each solution is based on input values for three other variables:

- The target annual income an investor wants her or his portfolio to produce, expressed as a percentage of the starting capital.  There are eight options for this input, ranging from 3 to 10 percent.

- The investor's desired savings and/or bequest goal. This is defined as the multiple of starting capital that one wants to end up with at the end of the chosen expected life. There are five options for this input, ranging from zero (effectively equivalent to converting one's starting capital into a self-managed annuity) to two.

- The investor's expected remaining years of life. There are nine possible values for this input, ranging from 10 to 50 years.

We use a simulation optimization process to produce our model portfolio solutions. A detailed explanation of this methodology can be found on our website. To briefly summarize its key points, in order to limit the impact of estimation error, our assumptions about future asset class rates of return, risk, and correlation are based on a combination of historical data and the outputs of a forward looking asset pricing model. For the same reason, we also constrain the maximum weight that can be given to certain asset classes in a portfolio. These maximums include 30% for foreign equities, 20% for foreign bonds, domestic and foreign commercial property, and commodities (including a sub-limit of 10% on timber), and 10% for emerging markets equities. There are no limits on the weight that can be given to real return and domestic bonds, and to domestic equities.

Each model portfolio solution includes the following information: (a) The minimum real (after inflation) internal rate of return the portfolio must earn in order to achieve the specified income and savings/bequest objectives over the specified expected lifetime. (b) The long-term asset allocation strategy that will maximize the probability of achieving this return, given our assumptions and constraints. (c) The recommended rebalancing strategy for the portfolio. And (d) the probability that the solution will achieve the specified income and savings/bequest goals over the specified time frame.

We use two benchmarks to measure the performance of our model portfolios. The first is cash, which we define as the yield on a one year government security purchased on the last trading day of the previous year. For 2010, our USD cash

benchmark is 0.44% (in nominal terms). The second benchmark we use is a portfolio equally allocated between the ten asset classes we use (it does not include equity market neutral). This portfolio assumes that an investor believes it is not possible to forecast the risk or return of any asset class. While we disagree with that assumption, it is an intellectually honest benchmark for our model portfolios' results.

The year-to-date nominal returns for all these model portfolios can be found here: http://www.retiredinvestor.com/Members/Portfolio/USA.php