

The Index Investor

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January 2010 Issue: Key Points

This month's economic update summarizes the factors behind the feeling of foreboding with which we are entering 2010. We continue to believe that the market is underestimating the probability that we will re-enter the high uncertainty regime, and is instead placing too much emphasis on hopes that normal times will return and worries that the high inflation regime is just around the corner. Closely related to this debate is the question of the proper role of gold from an investor's point of view. For years, we have taken the position that while gold coins have a role to play in an investor's cash reserve, gold itself should not be treated as a separate asset class in an investor's strategic asset allocation policy. We have based this reasoning on two key points:

first, it is not easy to invest in gold, and second, it is not possible to establish the fundamental value of gold. With the advent of gold-based ETFs, the first assumption has been invalidated. Thus this month we return to the issue of gold's potential role in a portfolio, paying particular emphasis to the challenge of establishing its fundamental value. While our analysis produced a number of interesting findings, the best we could do on the valuation front was a methodology that we believe is likely to be directionally correct, but not wholly satisfactory. We do not deny the role of gold as a hedge against a decline in the value of short-term U.S. Treasury securities. This makes gold a potentially important asset for non-USD based investors wishing to hedge their exposure to the high uncertainty regime. However, lacking a satisfactory valuation methodology, we are not yet prepared to fully accept gold as just another asset class. That said, in 2010 we will include a new section on gold in our regular monthly asset class valuation analyses.

This month's product and strategy notes summarize a range of interesting new research, including the shortcomings of analysts' forecasts, linkages between directly held and securitized commercial property, the contribution of a liquidity risk premium to private equity returns, use of the certainty equivalent technique in investment discussions and why, as many of us have long suspected, the "beta equals one" approach is just as good, if not better, than much more laborious corporate cost of capital analyses. Finally, this month we also introduce a new column, the Financial Advisors' Corner, where we will present research that is particularly relevant to this large and fast growing segment of our global subscriber base.

Global Asset Class Returns

YTD 31Dec09	<u>In USD</u>	<u>In AUD</u>	<u>In CAD</u>	<u>In EUR</u>	<u>In JPY</u>	<u>In GBP</u>	<u>In CHF</u>	<u>In INR</u>
Asset Held								
USD Bonds	-1.68%	-30.68%	-19.44%	-4.90%	0.94%	-14.00%	-4.64%	-6.38%
USD Prop.	29.58%	0.58%	11.83%	26.36%	32.20%	17.26%	26.62%	24.88%
USD Equity	28.70%	-0.30%	10.95%	25.48%	31.32%	16.38%	25.74%	24.00%
AUD Bonds	14.45%	-14.55%	-3.31%	11.23%	17.07%	2.13%	11.49%	9.75%
AUD Prop.	33.29%	4.29%	15.54%	30.07%	35.91%	20.97%	30.33%	28.59%
AUD Equity	64.16%	35.16%	46.41%	60.95%	66.78%	51.84%	61.20%	59.46%

YTD 31Dec09	In USD	In AUD	In CAD	In EUR	In JPY	In GBP	In CHF	In INR
CAD Bonds	18.61%	-10.39%	0.86%	15.40%	21.23%	6.30%	15.65%	13.92%
CAD Prop.	67.43%	38.43%	49.68%	64.22%	70.05%	55.11%	64.47%	62.74%
CAD Equity	51.87%	22.87%	34.12%	48.66%	54.49%	39.56%	48.91%	47.18%
CHF Bonds	13.63%	-15.37%	-4.12%	10.42%	16.25%	1.32%	10.67%	8.94%
CHF Prop.	22.18%	-6.82%	4.43%	18.96%	24.80%	9.86%	19.22%	17.48%
CHF Equity	21.69%	-7.31%	3.94%	18.48%	24.31%	9.38%	18.73%	17.00%
INR Bonds	-8.01%	-37.01%	-25.77%	-11.23%	-5.39%	-20.33%	-10.97%	-12.71%
INR Equity	85.73%	56.73%	67.98%	82.51%	88.35%	73.41%	82.77%	81.03%
EUR Bonds	-1.05%	-30.05%	-18.81%	-4.27%	1.57%	-13.37%	-4.01%	-5.75%
EUR Prop.	40.48%	11.48%	22.73%	37.26%	43.10%	28.16%	37.52%	35.78%
EUR Equity	25.82%	-3.18%	8.07%	22.61%	28.44%	13.50%	22.86%	21.12%
JPY Bonds	-3.70%	-32.70%	-21.45%	-6.92%	-1.08%	-16.02%	-6.66%	-8.40%
JPY Prop.	3.29%	-25.71%	-14.46%	0.07%	5.91%	-9.03%	0.33%	-1.41%
JPY Equity	3.11%	-25.89%	-14.64%	-0.10%	5.73%	-9.21%	0.15%	-1.59%
GBP Bonds	10.78%	-18.22%	-6.97%	7.57%	13.40%	-1.53%	7.83%	6.09%
GBP Prop.	25.00%	-4.01%	7.24%	21.78%	27.62%	12.68%	22.04%	20.30%
GBP Equity	41.08%	12.08%	23.33%	37.87%	43.70%	28.76%	38.12%	36.38%
1-3 Yr USGvt	0.36%	-28.65%	-17.40%	-2.86%	2.98%	-11.96%	-2.60%	-4.34%
World Bonds	5.07%	-23.93%	-12.68%	1.85%	7.69%	-7.25%	2.11%	0.37%
World Prop.	30.50%	1.50%	12.75%	27.29%	33.12%	18.19%	27.55%	25.81%
World Equity	32.66%	3.66%	14.91%	29.45%	35.28%	20.34%	29.70%	27.97%
Commod Long Futures	20.09%	-8.91%	2.34%	16.88%	22.71%	7.77%	17.13%	15.39%
Commod L/Shrt	-12.82%	-41.82%	-30.57%	-16.03%	-10.20%	-25.14%	-15.78%	-17.51%
Gold	24.03%	-4.97%	6.28%	20.81%	26.65%	11.71%	21.07%	19.33%
Timber	15.41%	-13.59%	-2.34%	12.20%	18.03%	3.09%	12.45%	10.71%
Uncorrel Alpha	7.36%	-21.64%	-10.39%	4.15%	9.98%	-4.95%	4.40%	2.67%
Volatility VIX	-51.33%	-80.33%	-69.08%	-54.54%	-48.71%	-63.64%	-54.28%	-56.02%
Currency								
AUD	29.00%	0.00%	11.25%	25.79%	31.62%	16.68%	26.04%	24.31%
CAD	17.75%	-11.25%	0.00%	14.54%	20.37%	5.44%	14.79%	13.06%
EUR	3.22%	-25.79%	-14.54%	0.00%	5.84%	-9.10%	0.26%	-1.48%
JPY	-2.62%	-31.62%	-20.37%	-5.84%	0.00%	-14.94%	-5.58%	-7.32%
GBP	12.32%	-16.68%	-5.44%	9.10%	14.94%	0.00%	9.36%	7.62%
USD	0.00%	-29.00%	-17.75%	-3.22%	2.62%	-12.32%	-2.96%	-4.70%
CHF	2.96%	-26.04%	-14.79%	-0.26%	5.58%	-9.36%	0.00%	-1.74%
INR	4.70%	-24.31%	-13.06%	1.48%	7.32%	-7.62%	1.74%	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 31Dec09	In USD	In AUD	In CAD	In EUR	In JPY	In GBP	In CHF	In INR
Eq Mkt Neutral								
HSKAX	-4.64%	-33.64%	-22.39%	-7.85%	-2.02%	-16.95%	-7.60%	-9.33%
OGNAX	-0.30%	-29.30%	-18.05%	-3.51%	2.32%	-12.62%	-3.26%	-4.99%
Arbitrage								
ARBFX	7.36%	-21.64%	-10.39%	4.14%	9.98%	-4.96%	4.40%	2.66%
ADANX	7.80%	-21.20%	-9.95%	4.58%	10.42%	-4.52%	4.84%	3.10%
Currency								
DBV	21.22%	-7.79%	3.46%	18.00%	23.84%	8.90%	18.26%	16.52%
ICI	4.42%	-24.58%	-13.33%	1.21%	7.04%	-7.90%	1.46%	-0.28%
Equity L/S								
HSGFX	4.50%	-24.50%	-13.26%	1.28%	7.12%	-7.82%	1.54%	-0.20%
PTFAX	-2.20%	-31.20%	-19.95%	-5.41%	0.42%	-14.52%	-5.16%	-6.89%
GTAA								
MDLOX	20.01%	-9.00%	2.25%	16.79%	22.63%	7.69%	17.05%	15.31%
PASAX	15.46%	-13.54%	-2.29%	12.24%	18.08%	3.14%	12.50%	10.76%

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		31Dec09
<i>High Uncertainty</i>	<i>High Inflation</i>	<i>Normal Growth</i>
Short Maturity US Govt Bonds (SHY) -0.11%	US Real Return Bonds (TIP) 1.80%	US Equity (VTI) 5.86%
1 - 3 Year International Treasury Bonds (ISHG) -2.44%	Long Commodities (DJP) 9.60%	EAFE Equity (EFA) 2.00%
Equity Volatility (VIX) -23.98%	Global Commercial Property (RWO) 2.84%	Emerging Equity (EEM) 7.52%
Gold (GLD) 8.56%	Long Maturity Nominal Treasury Bonds (TLT)* -7.63%	High Yield Bonds (HYG) 4.75%
<i>Average</i> -4.49%	<i>Average (with TLT short)</i> 5.47%	<i>Average</i> 5.03%
<i>Three Months Ago:</i> 2.81%	<i>Three Months Ago:</i> 7.88%	<i>Three Months Ago:</i> 16.86%

* Falling returns on TLT indicate rising inflation expectations

As you can see, at the end of last month, the conventional wisdom appeared finally balanced between a move into the high inflation regime and normal times. It also appeared that investors (in aggregate) reduced the probability they attached to a return to the high uncertainty regime.

At the request of many readers, we will now publish forecasts for real returns on different asset classes. 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., averaging) forecasts produced using different methodologies. With that admonition, our results are as follows:

Regime	Normal Regime	High Uncertainty Regime	High Inflation Regime	Forecast Annualized USD Real Return
<i>Assumed Regime Probability Over Next 36 Months</i>	20%	50%	30%	
<i>Real Rate Under Regime</i>	3.50%	2.50%	1.50%	2.40%
<u>Asset Class Premia</u>				
Domestic Bonds	1.0%	1.0%	-3.0%	2.20%
Foreign Bonds	0.5%	2.0%	0.5%	3.65%
Domestic Property	3.0%	-10.0%	1.0%	-1.70%
Foreign Property	3.0%	-10.0%	-1.5%	-2.45%
Commodities	2.0%	-6.0%	3.0%	0.70%
Timber	2.0%	-8.0%	1.0%	-0.90%
Domestic Equity	3.5%	-12.0%	-5.0%	-4.40%
Foreign Equity	3.5%	-12.0%	-7.0%	-5.00%
Emerging Equity	4.5%	-15.0%	1.0%	-3.90%
Gold	-2.0%	2.0%	2.5%	3.75%
Volatility	-25.0%	50.0%	25.0%	29.90%

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 the end of **December 2009**, over a one year time horizon. Note that our views on valuation over a longer time horizon sometimes differ from our short-term views. As we repeatedly note, when discussing asset class valuation (or any forecast, for that matter), being specific about the time horizon is critical. Our longer term valuation views are contained in the Global Asset Class Valuation Analysis section of each month's journal.

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 preceeding three months, as well as the previous three month period, 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 31 Dec 09	Current Price versus Fundamental Valuation Estimate	Return Momentum (Most Dangerous Conditions are Positive Accelerating Momentum and Fundamental Overvaluation)	Rolling 3 Month Return in Local Currency	Rolling 3 Month Return 3 Months Ago
AUD Real Bonds	Neutral	Positive, Accelerating	3.54%	0.25%
AUD Bonds	Neutral	Positive, Accelerating	-3.17%	2.40%
AUD Property	Neutral	Positive, Slowing	-5.98%	28.32%
AUD Equity	Neutral	Positive, Slowing	3.29%	21.04%
CAD Real Bonds	Neutral	Positive, Slowing	5.24%	3.04%
CAD Bonds	Neutral	Positive, Neutral	-0.61%	1.83%
CAD Property	Likely Undervalued	Positive, Accelerating	6.71%	20.24%
CAD Equity	Likely Overvalued	Positive, Accelerating	3.69%	10.16%
CHF Bonds	Possibly Overvalued	Positive, Slowing	0.00%	2.98%
CHF Property	Possibly Overvalued	Positive, Accelerating	-0.02%	11.96%
CHF Equity	Probably Overvalued	Positive, Slowing	2.37%	17.08%

Valuation at 31 Dec 09	Current Price versus Fundamental Valuation Estimate	Return Momentum (Most Dangerous Conditions are Positive Accelerating Momentum and Fundamental Overvaluation)	Rolling 3 Month Return in Local Currency	Rolling 3 Month Return 3 Months Ago
EUR Real Bonds	Neutral	Positive, Neutral	0.00%	4.28%
EUR Bonds	Neutral	Positive, Slowing	-1.54%	1.27%
EUR Prop.	Neutral	Positive, Slowing	1.59%	31.85%
EUR Equity	Neutral	Positive, Accelerating	13.36%	8.35%
GBP Real Bonds	Possibly Overvalued	Positive, Accelerating	1.02%	2.95%
GBP Bonds	Neutral	Positive Accelerating	-2.16%	3.14%
GBP Property	Neutral	Positive, Slowing	2.75%	30.55%
GBP Equity	Likely Undervalued	Positive, Neutral	9.63%	21.25%
INR Bonds	Possibly Overvalued	Negative, Slowing	-0.96%	-8.46%
INR Equity	Probably Overvalued	Positive, Accelerating	1.97%	17.80%
JPY Real Bonds	Neutral	Positive, Slowing	3.18%	5.76%
JPY Bonds	Possibly Overvalued	Positive, Neutral	0.00%	0.99%
JPY Property	Likely Undervalued	Negative, Accelerating	-8.22%	3.65%
JPY Equity	Probably Overvalued	Negative, Accelerating	2.62%	-1.88%
USD Real Bonds	Neutral	Positive, Accelerating	1.90%	3.05%
USD Bonds	Neutral	Negative, Accelerating	-0.59%	-3.14%
USD Property	Neutral	Positive, Neutral	9.06%	34.55%
USD Equity	Probably Overvalued	Positive, Neutral	5.86%	16.46%
Following in USD:				
Investment Grade Credit (CIU)	Possibly Overvalued	Positive, Slowing	0.72%	4.63%
High Yield Credit (HYG)	Probably Overvalued	Positive, Slowing	4.45%	10.54%
Emerging Mkt Equity (EEM)	Probably Overvalued	Positive, Slowing	8.25%	41.63%
Commodities Long	Possibly Overvalued	Positive, Accelerating	9.60%	3.82%
Gold	Likely Undervalued	Positive, Accelerating	8.56%	8.41%
Timber	Possibly Undervalued	Positive, Accelerating	15.70%	7.80%
Uncorrelated Alpha	N/A	Positive, Neutral	-2.27%	4.30%
Volatility (VIX)	Probably	Negative, Slowing	-23.98%	-2.81%

Valuation at 31 Dec 09	Current Price versus Fundamental Valuation Estimate	Return Momentum (Most Dangerous Conditions are Positive Accelerating Momentum and Fundamental Overvaluation)	Rolling 3 Month Return in Local Currency	Rolling 3 Month Return 3 Months Ago
	Undervalued			
Future Return in Local Currency from holding USD:	Based on Covered Interest Parity			
Returns to AUD Investor	Positive	Negative, Accelerating	-3.30%	-12.63%
Returns to CAD Investor	Neutral	Negative, Accelerating	-3.21%	-9.31%
Returns to EUR Investor	Neutral	Negative, Accelerating	2.04%	-4.28%
Returns to JPY Investor	Negative	Negative, Accelerating	3.92%	-6.88%
Returns to GBP Investor	Neutral	Positive, Accelerating	-1.21%	3.87%
Returns to CHF Investor	Negative	Negative, Accelerating	-0.39%	-4.61%
Returns to INR Investor	Positive	Negative, Accelerating	-3.46%	0.43%

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, 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 so far for 2009 (note that they differ from last month because we have dropped Commodities Long/Short from our data set, in the belief that Commodities Long-Only provides a more accurate view):

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
(0.56)	(0.73)	(0.46)	0.03	0.24	0.14	0.35	0.68	0.57	0.62	0.62	0.62

As you can see, in 2009 global financial markets appear to have swung from a relatively ordered and negatively oriented state early in the year, through a period of disorganization during the spring and early summer, then into a period of stronger organization and positive orientation by August that has remained essentially unchanged since then. In short, we believe conditions exist that are conducive to rapid changes in asset prices, most likely due to a triggering event that causes investors' to question the fundamental understanding of the processes driving asset prices (i.e., the structure of their mental models), and thereby raises their uncertainty and fear.

This Month's Letters to the Editor

It is common practice to be very clear about one's objectives for investment, including the required time frame. This might well lead to multiple goals and portfolios, with different parcels of money. For instance, one portfolio for retirement in 30 years, one for college fees in 20 years and one for a new house extension in five years. How would you suggest thinking about the interrelationship between the different portfolios, and the correlation between different asset holdings?

The financial and investment planning problem you have described is one that many people face, and which unfortunately defies easy solution with the relatively simple planning tools that are available to most investors. Here is how we would approach it. In effect, between retirement, college fees and the house extension, you have specified a series of cash outflows that must be made at different times in the future (I'll assume we're dealing in real, inflation adjusted values in this example). At the same time, I'll assume that we also know the starting value of the total investable capital, as well as some (uncertain) notion of the level and variability of the investor's future income stream, and hence annual savings capacity. Given this, you can derive the minimum real return the portfolio must earn (on either a pretax or after tax basis, depending on the investor's circumstances) in order to fund the required cash outflows. So far, so good. The real challenge is determining the asset allocation that

will achieve this goal with an acceptable level of shortfall risk, and subject to any other constraints an investor might want to impose on his or her portfolio (e.g., no more than X% in a combination of asset classes). The first issue one confronts is the inherent uncertainty in forecasting a range of possible future returns for an asset class, and the relationships between asset class returns. As we have repeatedly noted in our writing over the years, there are multiple approaches to this problem from the simple (e.g., simply plug in average returns, standard deviations and correlations derived from historical data) to the complex (e.g., multiple regime models). However, none of these approaches can eliminate the uncertainty that is inherent in forecasting the behavior of a complex adaptive system like the financial markets. The second issue one confronts is the computational complexity of the asset allocation problem. When specified realistically, these problems typically can't be solved with optimization software; rather, they must be attacked with more complicated methods that at best can find solutions that are robust (i.e., likely to achieve an investor's goals under a wide range of scenarios), but not strictly optimal (i.e., conclusively the best solution possible). Finally, adding additional (but realistic) options to the problem (e.g., full or partial annuitization to meet retirement income needs, and/or the use of taxable and tax advantaged accounts to hold different investments) further complicates matters.

As you note, one way to simplify this problem is to create separate portfolios for liabilities with different time horizons. While that makes the calculations involved somewhat easier, it runs the risk of creating an overall asset allocation that is suboptimal in aggregate. Frankly, we think the best approach is to attack the problem both ways, ideally with the help of a quantitatively skilled financial adviser, and then compare the portfolios that result. Our instinct is that the integrated solution will usually be the more robust one, if not the easiest to live with because of human beings' well-known tendency to put different financial goals into separate "mental accounts." Again, this is where an adviser who has a good feeling for the emotional and behavioral aspects of investing can add tremendous value to a client's long-term financial wellbeing.

It appears that your allocation to uncorrelated alpha strategies almost seems to have random effects on portfolio returns. In some cases it helps, and in others it hurts. Given that, do you still believe that adding these strategies to a portfolio is beneficial?

Yes, we do, and for exactly the reason you cite. While the apparently random nature of uncorrelated alpha returns is undoubtedly emotionally stressful (as heightened uncertainty triggers a fear response in human beings), the fact that they have a very weak statistical relationship with returns on broad asset classes significantly reduces overall portfolio risk. This result is particularly important when an investor needs to achieve a relatively high compound real rate of return to achieve his or her goals (i.e., more than 5%). On the other hand, we also recognize that, like all actively managed investing approaches, uncorrelated alpha strategies are both more expensive than passive strategies, and very difficult to successfully implement over long periods of time. For this reason, we have limited our maximum portfolio allocations to them to no more than ten percent.

While I appreciate your new three-year asset class return forecast feature, I noticed it didn't change last month. Was this a typo?

No, it was not. Our forecasting approach is based on our subjective assessment of the percent of time, over the next three years, that the financial markets will spend in each of three regimes: high uncertainty, high inflation, and normal times. We believe that such estimates are unavoidably uncertain. For us, this implies that they should be stated in relatively round numbers, and that the use of more granular estimates, or more frequent changes of granular estimates, would convey a false sense of precision and confidence. This is not to say that we don't review our assessment each month; however, we have decided that we will only change it when we have sufficient evidence to support a relatively large – say, 10% -- change in the regime weights. It is helpful to contrast this approach with GMO's, which is based on the regression of current asset class valuation levels over a seven-year period to their respective

historical means. As current valuations change, so too do GMO's expected asset class returns. As always, we believe that the most accurate forecast is likely to come not from any single approach, but rather from the combination of forecasts made using different methodologies.

How do you reconcile your apparent increasing preference for the equally weighted portfolio with the unequal weights used in your model portfolios?

Excellent question. Let me start with a couple of my favorite stories. The first is about a professor, whose thesis advice to a PhD candidate was to take her master's thesis and cut it down by 50%. The second is a quote from Goethe, who once apologized to a correspondent for the length of his letter to him, saying that if he had had more time, it would have been much shorter. The point is that after almost fourteen years of researching and writing about asset class valuation and portfolio allocation, we have not only accumulated a lot of knowledge, but also finally reached the point where some apparently simple wisdom emerges. As we noted in the response to an earlier letter in this section, the process of portfolio construction is fraught with irreducible uncertainty, caused by two fundamental challenges: estimating asset class behavior in a complex adaptive system, and the methods currently available for solving complex combinatorial optimization problems. At the same time, we know that historically, across a range of currencies, a portfolio that gives equal weight to a number of broadly defined (and that is critical) asset classes has generated average real returns of 4% to 5% per year (note that, because of the impact of volatility, average compound, or geometric returns have been somewhat lower). Given that these returns require no skill in either forecasting or combinatorial optimization, we have concluded that the equally weighted portfolio should be both our logical benchmark and the default answer to an investor who simply asks, "knowing nothing about me, how would you recommend I allocate my assets?" One step removed from the equally asset weighted portfolio is the equally risk weighted portfolio. The only issue here is that while the relative volatility ranking of different asset classes tends to remain stable over time,

their covariances do not, due to significant variation in correlations over time. So the starting point you choose when calculating the equally risk weighted portfolio has an impact, and unavoidably introduces another uncertain forecast.

However, we also believe that there are circumstances in which a departure from the equally weighted portfolio is warranted. We use three broad examples of this. The first is where the compound real rate of return an investor requires to achieve his or her long-term goals is less than what the equally weighted portfolio has provided in the past. This usually results in a portfolio that puts more weight on relatively low risk asset classes. The second example is the mirror image of the first: an investor whose required rate of return is significantly greater than what the equally weighted portfolio is likely to provide. Again, this usually results in a portfolio that departs from equal weighting. The third example is an investor whose required return is consistent with the equally weighted portfolio, but who would like to achieve those returns but with less expected variability (e.g., due to the structure and timing of their liabilities, and/or emotional makeup), even if that means accepting the additional uncertainty that comes from forecasting asset class returns and using imperfect combinatorial optimization methodologies. So, to conclude, the changes you have seen do not reflect growing doubts on our part about forecasting and optimization; rather, they are based on our increasing appreciation of the wisdom of equal weighting.

Why don't you include emerging market bonds as an asset class?

We have the same view of emerging market bonds that we do of high yield bonds in developed markets. In both cases, the assets in question are likely to perform relatively poorly under both the high inflation and high uncertainty regimes, while in the normal regime they are likely to underperform emerging and developed market equities. We believe that both asset classes are most likely to appeal to investors who have an investment policy (either explicit or implicit) that places strong (and misguided, we believe) emphasis on earning current income without "invading capital." We believe that this policy blinds investors to the elevated default risk that they are really

taking on in the name of “high income.” Indeed, many collateralized debt obligations backed by various tranches of subprime mortgages tarted up with an erroneously high rating were marketed to these investors as something that approached the Holy Grail of high income and low default risk. Unfortunately, the inescapable truth that you usually don’t get something for nothing in life – in this case, higher return without higher risk – ultimately came back to haunt these investors with a vengeance. Beyond these arguments, our view of emerging market bonds is also undoubtedly tainted by our own experience working out bad Latin American bank loans for most of the 1980s. It is easy for foreign investors to get euphoric about the apparent potential of emerging markets to generate growth and high investment returns. However, the fact remains that many of these markets continue to be characterized by relatively weak disclosure requirements and protections for minority investors and bondholders, uneven application of contract and property law, judicial systems that are often far from impartial, and political and economic institutions that are less stable than their counterparts in developed countries. All this adds up to significantly higher long-term investment risks on emerging markets bonds relative to developed market bonds. Unfortunately, the relatively thin yield premiums on these bonds compared to U.S. Treasuries, German Bunds, or Australian or Canadian Governments suggests to us that investors in emerging market debt are not getting adequately compensated for the real risk exposure they are taking on.

January 2010 Economic Update

We assume that under normal conditions, the “base case” or “policy” asset allocations employed by our readers are sufficient to achieve their long-term goals within acceptable risk limits. Given this assumption, the main threat our readers’ face is a substantial downside loss that breaches these risk limits, and substantially reduces the probability they will achieve their long-term goals. The goal of our economic updates is to provide timely warning about dangerous overvaluations that could lead to such losses in one or more asset classes. Our main focus is on what is known as “strategic warning” – “the what and the why”, with a lesser focus on

“operational warning” – “the how”. Our objective is not to provide tactical warnings – “who, when and where” – that are more commonly known as “trading tips” intended to increase short term returns.

Our economic analysis methodology is based on a technique known as “analysis of competing hypotheses”, or “ACH.” Human beings normally seek to collect information that supports a hypothesis. However, since a piece of information may be consistent with more than one hypothesis, this method is inefficient. In contrast, ACH focused on disproving hypotheses, and values information on this basis. For example, a piece of evidence that has a very low probability of being observed under a given hypothesis is more valuable than a piece of evidence that is consistent with multiple hypotheses.

Our economic hypotheses take the form of two alternative scenarios. When it becomes apparent that one of them is much more consistent with the accumulated evidence, we generate two new ones. Our two current scenarios are based on traditional behavior patterns for complex social systems operating in far from equilibrium conditions. The first is enhanced cooperation and the second is higher levels of conflict. Realization of the cooperative scenario should result in a higher level of stability and predictability in the system’s operations, while development of the conflict scenario will prolong and quite possibly worsen the system’s instability. These scenarios are described in more detail in our previous issues, which (as you go back in time), also describe the scenarios that preceded them.

We further assume that financial market returns reflect the complex interplay between political and economic conditions, which in turn reflect the actions of key groups (i.e., networks), which in turn are comprised of individuals whose behavior is based on an evolving mix of cognitive, informational, emotional and social factors. In our analysis, we use both bottom up and top down approaches to develop our scenarios and guide our search for information that provides insight about which of them is developing.

The assumptions we make in our analyses, and the conclusions we reach, are inescapably uncertain. We believe it is extremely important for the reader 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 Druzdzal, and "What Do Words of Estimative Probability Mean?" by Kristan Wheaton). In our analyses, we are standardizing on the use of a three level verbal scale to express our confidence level in our estimates. "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.

With respect to the situation we face today, we believe three critical issues must be resolved in order for the world economy to return to a period of sustained growth and relatively normal conditions in financial markets – (1) high levels of household debt across much of the Anglosphere; (2) a deeply weakened world financial system; and (3) unsustainable structural imbalances in the economies of the United States and China, and in these countries' current account balances. We further believe that the actions of three groups – middle class Americans, Chinese peasants, and Iranian youth, are linchpins that could have an outsized impact on the future evolution of political and economic events, and, through them, on the resolution of the three critical issues we face and future asset class returns.

As 2010 begins, we are filled with a sense of foreboding about what lies ahead. Let me try to succinctly sum up the trends, uncertainties, and recent developments that have engendered that feeling:

- In terms of global aggregate demand and economic growth, we have seen a major shock – the sharp fall in U.S. private consumption expenditures – offset

by two main initiatives: an unprecedented peacetime increase U.S. federal government spending and the fiscal deficit, and unprecedented credit expansion (and a smaller increase in government spending) in China. In the short term, that stimulus prevented a disastrous collapse in spending, and, technically, has caused the end of the recession in many countries around the world. However, the continuation of these initiatives faces growing constraints in both countries.

- In the United States, the expansion of the government debt/GDP ratio comes on top of substantial future growth in off balance sheet federal liabilities for health care and social security spending – and that is before taking the impact of any new national health care programs and/or a federal bailout of state governments and/or additional support for the banking system into account. In broad terms, there are three ways the United States can eventually reduce its high level of government debt/GDP: (1) Increase the rate of economic growth; (2) Increase the amount of taxes collected; and/or (3) Reduce the real value of the debt via a combination of domestic inflation and/or depreciation of the U.S. dollar. Thus far, the Obama administration has not put forth a credible plan for reducing fiscal deficits and the debt/GDP ratio (which is not to say that others have not: see, for example, the recently published “Choosing the Nation’s Fiscal Future” by the National Research Council). Even worse, perhaps, it is increasingly clear that the current U.S. fiscal stimulus program was much more about satisfying traditional Democratic Party constituencies than it was about addressing fundamental obstacles to faster economic growth. Moreover, the paralysis affecting multiple U.S. state legislatures in the face of rapidly worsening fiscal crises (not to mention the intransigence of many public sector unions) has raised worrying concerns about the ability of the U.S. political system to take the politically difficult actions needed to resolve the crisis we face. For example, in a 31Dec09 lead editorial (“Failed State”), the New York Times wrote, “New Yorkers should be appalled at their failed state government,

particularly their corrupt and clueless Legislature. Scandal and irresponsibility have been Albany's creed for decades. This year, the gang added another outrage to the list: complete fiscal incompetence." More important, these worries are not confined to the state level. More and more often, high profile writers are questioning whether the U.S. federal government can muster the intellectual insight and political courage needed to make difficult policy changes. For example, in his January 2010 letter, PIMCO's Bill Gross wrote that "Our government doesn't work anymore, or perhaps more accurately, when it does, it works for special interests and not for the American people." In a similar vein, Jim Manzi wrote an exceptionally good article on "Keeping America's Edge" in the Winter 2010 issue of *National Affairs*. While Manzi does an outstanding job of summarizing the various dimensions that make up today's American predicament, the political achievability of his proposed solutions is doubtful in today's environment.

- Taken together, all of these factors have and continue to raise the uncertainty felt by U.S. domestic taxpayers and businesses, and for foreign holders of U.S. Government debt. More specifically, uncertainty about significant future tax increases, combined with a desire to reduce debt levels, has held down spending by the top 10% of U.S. households that are estimated to account for 42% of household sector spending (see, for example, "Upper Income Spending Reverts to New Normal" published on 10Dec09 by the Gallup Organization, and, for an analysis of household spending by income, "A Detailed Look at the Stratified U.S. Consumer" by Tyler Durden, published by www.zerohedge.com on 15Aug09). Uncertainty about future tax rates has been further reinforced by the rapidly increasing realization that due to substantial unfunded public sector pension and healthcare liabilities, the U.S. also faces a substantial state and local government fiscal crisis. This uncertainty, along with continued tight credit conditions and uncertainty about future demand growth, has also held down new business formation. As a recent report has shown ("Where Will the Jobs

Come From?” by the Kauffman Foundation), businesses aged 1 to 5 years have been the critical job creators in the U.S. economy in recent years. Yet today, their growth is held back, even as business failures increase. The net result is higher and longer unemployment, which further reinforces uncertainty, holding down private sector consumption and investment spending, and making continued federal deficits necessary to prevent a collapse in demand. It is, indeed, a vicious cycle.

- An obvious way to break this cycle would be a substantial increase in domestic consumption spending in China, which could, especially if accompanied by an appreciation of the Reminbi versus the U.S. Dollar, increase China's imports from the United States and Europe. To be sure, China alone would not be able to fully offset the global impact of the fall in U.S. private consumption spending – while the US accounts for 20% of global GDP (per the IMF, on a purchasing power parity basis), China accounts for only 12%. However, policy changes on China's part could certainly reduce the pressure on the U.S. government to continue aggressive fiscal stimulus, and would therefore help to reduce the fragility of the current recovery. However, it does not appear that China is willing and/or able to make these changes. After a dramatic credit expansion since the world economic crisis first began, China has begun to restrain bank lending, no doubt due to growing fears of asset bubbles (especially in property) it may be funding, and the historical tendency of credit booms to end very badly, with debt deflation and a sharp contraction in economic activity distinct possibilities (see, for example, “The Great Depression as a Credit Boom Gone Wrong” by Eichengreen and Mitchener published by the Bank for International Settlements, and “Credit Booms Go Wrong” by Schularick and Taylor on www.voxeu.org). More worrisome has been the observation that while asset prices have been rising strongly in China, core consumer prices (without energy and food included in the index) have been falling, reflecting the deflationary consequences of higher Chinese supply and much lower demand, as weaker

export demand has not been offset by stronger domestic private demand. Equally troubling have been reports that much of the Chinese lending surge has favored relatively inefficient state owned enterprises, while private Chinese businesses – which account for the bulk of job creation in politically critical cities – have been starved of credit and continue to struggle. Given this, we weren't surprised to see Chinese Premier Wen Jiabao warn of "a bumpy road ahead" in a year end interview. More specifically, we fear that some of those bumps may be quite large. In the United States and Europe, the issue of China's continuing refusal to allow its exchange rate to appreciate versus the U.S. Dollar is growing in visibility and importance, and seems to be inexorably pushing the world towards the beginning of a trade war. For example, in a December OpEd in the New York Times, Paul Krugman noted that "in today's depressed world, that policy is, to put it bluntly, predatory." The same month, the U.S. Federal Reserve Board published "Are Chinese Exports Sensitive to Changes in the Exchange Rate?", and found that "if the trade-weighted real Renminbi exchange rate had appreciated at an annual rate of 10 percent per quarter since mid-2005, Chinese real exports would be roughly 30 percent lower than they are today." Similarly, in a recent paper ("The End of Chimerica"), Niall Ferguson and Moritz Schularick noted that "the scale of Chinese currency intervention has been without precedent, as have been the resulting distortions in the world economy." Moreover, the authors unfavorably contrast the Chinese development experience with that of Germany and Japan, which both allowed their currencies to appreciate as their productivity improved and trade surpluses grew. Given this, the authors forecast a breakdown in the "Chimerica" system that has driven global economic growth in recent years. Meanwhile, in China, this view is vigorously rejected, and the onus of the need to change placed on the U.S., which is accused of resisting a necessary and prolonged period of deep austerity to correct its domestic imbalances. In light of current trends, it is not surprising to see articles like Gideon Rachman's "Why China and America Will Clash" (*Financial Times*, 18Jan10) appearing more frequently. What we

found most interesting about Rachman's piece was his point that the central assumption upon which U.S. policy towards China has been based for over two decades is increasingly being called into question: "Both Bill Clinton and George W. Bush firmly believed that free trade and, in particular, the information age would make political change in China irresistible...So far, the facts are refusing to conform to the theory." Across multiple domains, our research has shown that when the reliability of an underlying mental model is called into question, both uncertainty and the potential for substantial change dramatically increase.

- Finally, we have long noted our hypothesis that one indicator of rising domestic social and political stress in China would likely be a deliberately orchestrated increase in conflicts with the West, designed to stimulate nationalist and pro-government sentiments. With that in mind, in recent months we have observed a disturbing number of incidents that together form a pattern consistent with our hypothesis. These incidents include conflict with Rio Tinto (including imprisonment of its local representative) over annual iron ore pricing discussions, rising concern over Chinese defense spending, and development of dangerous new anti-ship ballistic missile systems (see "Chinese Buildup of Cyber, Space Tools Worries U.S." in DefenseNews, 13Jan10), more aggressive Chinese actions against domestic dissidents, Chinese leadership in scuppering any deal at the Copenhagen climate conference, and most recently the controversy involving Google, that has now escalated into a war of words with Secretary of State Hillary Clinton. In sum, uncertainty about the true state of China's economy is sharply rising, in parallel with tensions between China and the United States (we highly recommend two articles that present both sides of the argument about the state of the Chinese economy: "Contrarian Investor Sees Economic Crash in China" by David Barboza in the 8Jan10 *New York Times*, and "Bears in a China Shop" in the 14Jan10 *Economist*).

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- Moving beyond the fiscal situation and international imbalances, on the monetary front the world's financial system remains far from healthy, despite the excruciatingly large bonuses paid by some firms. European banks are still burdened with large volumes of bad debt to Eastern and Southern European borrowers. U.S. banks continue to struggle with worsening conditions in their commercial real estate portfolios. And while U.S. households appear to be struggling mightily to pay down their debt, continued unemployment is making this more difficult. More dangerously, with large numbers of adjustable rate mortgage loan interest rate resets and payment recasts coming up in 2010 and 2011, and with more and more commercial borrowers walking away from their mortgage loans, a growing number of articles are asking why individual households are not following the same course of action (see, for example, "Underwater, But Will They Leave the Pool?" by Richard Thaler in the 24Jan10 New York Times, "Debtor's Dilemma: Pay the Mortgage or Walk Away?" in the 17Dec09 Wall Street Journal, and "Underwater and Not Walking Away: Shame, Fear and the Social Management of the Housing Crisis" by Brent White of the University of Arizona). Both banks and non-banks face growing concerns about the quality of state and local government debt in the United States, while in the Eurozone questions have been raised about the willingness of countries like Ireland, Spain, Greece and Portugal to take the fiscal actions necessary to maintain their debt servicing ability at acceptable levels. More dangerously, Iceland has taken a step down the path of debt repudiation or default (and, presumably, Argentine-style renegotiation and reduction) with its President's refusal to sanction proposed legislation that would use public funds to provide payments to foreign creditors who lost money under IceSave and similar plans, that were supposedly backed by Iceland's deposit insurance fund.
 - In Iran, the Ashura holiday saw bloody clashes between demonstrators and the security forces, more aggressive moves against the opposition's leaders, publication by the *Times* of London of more damning evidence about Iran's

nuclear program, and some evidence that the Obama administration's initial attempts to negotiate with the Iranian regime and giving way to a much tougher stance that logically increases the likelihood of a military confrontation that would probably drive oil prices through the roof, providing a negative shock to the weak economic recovery that is now underway.

- Last but not least, there is growing evidence, from the Ukraine and elsewhere, that the latest evolution of the H1N1 virus is significantly deadlier than previous versions. As more stories appear alluding to "changes in D225G/N" that cause the virus to be much deadlier, we expect another rise in uncertainty and a further setback to economic growth.

What then, are the asset class valuation and allocation implications of the situation we face at the start of 2010? While acknowledging the uncertainty we face on the upside (we like to remind people that at Bill Clinton's post-1992 election economic summit in Little Rock, the word "internet" appeared only six times in over 600 pages of briefing books), we believe that the balance of risks is increasingly tilted towards the downside. More to the point, we believe that for various reasons, the majority of investors continue to underweight the probability of a return to a regime of high uncertainty later this year. As we have noted, asset classes that perform relatively well under this regime may still be undervalued today. These include short maturity U.S. Treasury and other government bonds, including real return bonds, volatility, gold, and some property markets (e.g., Switzerland and other European countries in which property is a traditional refuge in unsettled times). In particular, as we noted in this month's feature article, gold should do particularly well to the extent that doubts increase about the U.S. Government's ability (or, in the extreme case, willingness) to service its debt (which includes taking steps to avoid partial de-facto default via prolonged high inflation and exchange rate depreciation). We also reiterate our conclusion that under such circumstances, Australian and Canadian government bonds should also do well, given that these countries are rich in resources and have done a far better job than the

United States in addressing their liabilities healthcare and social security (though both could still do more to increase their total factor productivity growth).

In the same vein, we have not changed our oft-stated conclusion that asset classes that perform best under the normal regime – specifically, all equities (including emerging market equities) and credit bonds – are most likely overpriced today (though, as we note in this month’s asset class valuation section, the UK equity market appears to be the exception to this rule).

With respect to the “inflation versus deflation” dilemma that many investors face today, we reiterate our long held view that deflation is more likely in the short-term, as it is a phenomenon associated with the liquidation of private sector debt and the reduction of aggregate demand relative to aggregate supply that this creates (e.g., look at the falls in residential property prices in many markets). Over a longer time horizon, however, we believe that the risk of inflation increases to the extent that (a) governments either absorb private sector debts and/or are forced to engage in prolonged deficit spending to maintain aggregate demand, and (b) fail to set forth a credible program for increasing economic growth and reducing the ratio of government debt to GDP. To the extent that the yields on medium and longer dated government bonds are being bid up today in anticipation of a sharp increase in inflation, we would regard this as premature and perhaps a good short term trade for those of our readers looking for those ideas. On the other hand, while oil prices could easily spike in response to actions in Iran, we view the balance of risks for commodities as on the downside, with a fall in global demand likely to cause a fall in commodity prices. We also regard the balance of risks in commercial property to be on the downside as well.

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 $(\text{Current Dividend Yield} \times 100) \times (1 + \text{Forecast Productivity Growth})$ divided by $(\text{Current Yield on Real Return Bonds} + \text{Equity Risk Premium} - \text{Forecast Productivity Growth})$. 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 31 Dec 2009

<i>Australia</i>	Low Demanded Return	High Demanded Return
High Supplied Return	81%	116%
Low Supplied Return	120%	160%

<i>Canada</i>	Low Demanded Return	High Demanded Return
High Supplied Return	73%	127%
Low Supplied Return	135%	203%

<i>Eurozone</i>	Low Demanded Return	High Demanded Return
High Supplied Return	48%	85%
Low Supplied Return	84%	126%

<i>Japan</i>	Low Demanded Return	High Demanded Return
High Supplied Return	85%	144%
Low Supplied Return	157%	231%

<i>United Kingdom</i>	Low Demanded Return	High Demanded Return
High Supplied Return	31%	71%
Low Supplied Return	67%	114%

<i>United States</i>	Low Demanded Return	High Demanded Return
High Supplied Return	87%	151%

Low Supplied Return	168%	250%
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<i>Switzerland</i>	Low Demanded Return	High Demanded Return
High Supplied Return	78%	132%
Low Supplied Return	141%	255%

<i>India</i>	Low Demanded Return	High Demanded Return
High Supplied Return	74%	171%
Low Supplied Return	210%	357%

<i>Emerging Markets</i>	Low Demanded Return	High Demanded Return
High Supplied Return	106%	210%
Low Supplied Return	154%	259%

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 Economic Update), we believe that these rallies reflect investor herding (and the incentives of many professional investment managers to deliver positive returns on 2008’s disastrous end-of-year base), rather than any improvement in the underlying fundamentals.

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 **31 December 2009**.

Region	Risk Free Rate Demanded	Actual Risk Free Rate Supplied	Difference	Overvaluation (>100) or Undervaluation (<100)
Australia	2.2	3.0	0.8	92
Canada	2.8	1.5	-1.3	113
Eurozone	2.9	1.5	-1.5	115
Japan	2.8	1.7	-1.1	112
United Kingdom	2.8	0.7	-2.2	124
United States	2.5	1.5	-1.0	110

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 model 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 31 December 2009

	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 Inflation Rate over 10 year time horizon = $(1+Nom)/(1+Real)-1$
Australia	2.97%	2.96%	5.93%	5.73%	-0.20%	1.87%	2.68%
Canada	1.50%	2.40%	3.90%	3.61%	-0.29%	2.84%	2.08%

	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 Inflation Rate over 10 year time horizon = $(1+Nom)/(1+Real)-1$
Eurozone	1.47%	2.37%	3.84%	3.40%	-0.44%	4.32%	1.90%
Japan	1.67%	0.77%	2.44%	1.29%	-1.15%	11.98%	-0.38%
UK	0.68%	3.17%	3.85%	4.01%	0.17%	-1.58%	3.31%
USA	1.55%	2.93%	4.48%	3.84%	-0.64%	6.30%	2.26%
Switz.	1.64%	2.03%	3.67%	2.03%	-1.64%	17.27%	0.39%
India	1.64%	7.57%	9.21%	7.75%	-1.46%	14.39%	6.01%

*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 uncharted 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:

	<i>U.K.</i>	<i>U.S.</i>
<i>Avg. Inflation, 1775-2007</i>	2.19%	1.62%
Standard Deviation	6.60%	6.51%
<i>Avg. Inflation, 1908-2007</i>	4.61%	3.29%
Standard Deviation	6.24%	5.03%
<i>Avg. Inflation, 1958-2007</i>	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 **31 December 2009**, the AAA minus 10 year Treasury spread was 1.48%. The AAA minus BAA spread was 1.06%. 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 1,370 days with a higher AAA spread (11.8% of all days) and 1,639 days with a higher BAA spread (14.1% of all days in our sample). Current spreads still reflect relatively a 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 uncharted economic waters through which we are still passing, and our belief that the conventional wisdom underestimates the amount of trouble on the horizon, we believe that these spread possibly 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.

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 31 December 2009

	To AUD	To CAD	To EUR	To JPY	To GBP	To USD	To CHF	To INR
From								
AUD	0.00%	-2.12%	-2.33%	-4.44%	-1.72%	-1.89%	-3.70%	2.02%
CAD	2.12%	0.00%	-0.21%	-2.32%	0.40%	0.23%	-1.58%	4.14%
EUR	2.33%	0.21%	0.00%	-2.11%	0.61%	0.44%	-1.37%	4.35%
JPY	4.44%	2.32%	2.11%	0.00%	2.72%	2.55%	0.74%	6.46%
GBP	1.72%	-0.40%	-0.61%	-2.72%	0.00%	-0.17%	-1.98%	3.74%
USD	1.89%	-0.23%	-0.44%	-2.55%	0.17%	0.00%	-1.81%	3.91%
CHF	3.70%	1.58%	1.37%	-0.74%	1.98%	1.81%	0.00%	5.72%
INR	-2.02%	-4.14%	-4.35%	-6.46%	-3.74%	-3.91%	-5.72%	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 **31 December 2009**: 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 $(\text{Current Dividend Yield} \times 100) \times (1 + \text{Forecast NOI Growth})$ divided by $(\text{Current Yield on Real Return Bonds} + \text{Property Risk Premium} - \text{Forecast NOI Growth})$. 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	5.4%	0.2%	5.6%	3.0%	3.0%	6.0%	107%
Canada	6.2%	0.2%	6.4%	1.5%	3.0%	4.5%	69%
Eurozone	4.3%	0.2%	4.5%	1.5%	3.0%	4.5%	98%
Japan	6.5%	0.2%	6.7%	1.7%	3.0%	4.7%	69%
Switzerland*	3.6%	0.2%	3.8%	1.6%	3.0%	4.6%	122%
U.K.	3.9%	0.2%	4.1%	0.7%	3.0%	3.7%	88%
U.S.A.	4.1%	0.2%	4.3%	1.5%	3.0%	4.5%	106%

**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 **31 December 2009**:

Commodity	2009 DJAIG Weight	Current Status
Crude Oil	13.8%	Contango
Natural Gas	11.9%	Backwardated
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%	Contango
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) has fallen to .90% from 1.23% last month 1.60% two months ago, and 2.83% 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 are 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 fund's 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 sudden changes in demand (where downside surprises currently seem more likely than upside surprises) and/or supply (where the best chance of a positive return driver seems to be incomplete investor recognition of

slowing oil production from large reservoirs and/or the medium term impact of the current sharp cutback in E&P and refining investments).

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 **31 December 2009** closing value of 88.14 was .22 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 and clean fuels, both of which should eventually boost demand for commodities (and indirectly boost economic growth in commodity exporting countries like Australia and Canada). The third is that the continued fall in the value of the U.S. dollar versus other currencies will accelerate, causing investors to increase their holdings of commodities as confidence in fiat currencies wanes. 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 possibly overvalued today.

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. Hence we conclude that gold may (still) be possibly 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, for 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 CO2 sequestration value of timberland, see “Economic Valuation of Forest Ecosystem Services” by Chiabai, Trivisi, 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.

Growth Driver	Assumption
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, <i>Science</i> , 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 CO2 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 CO2 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 NCRIF 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 NCRIF 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 November 2009** 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 $(\text{Current Dividend Yield} \times 100) \times (1 + \text{Forecast Dividend Growth})$ divided by $(\text{Current Yield on Real Return Bonds} + \text{Timber Risk Premium} - \text{Forecast Dividend Growth})$. A value greater than 100% implies overvaluation, and less than 100% implies undervaluation.

Average Dividend Yield (70% PCL + 30% RYN)	4.55%
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	<u>5.55%</u>
Real Bond Yield	1.55%
Plus Risk Premium for Timber	3.00%
Equals Average Annual Real Return Demanded	<u>4.55%</u>
Ratio of Returns Demanded/Returns Supplied Equals Valuation Ratio (less than 100% implies undervaluation)	<u>77%</u>

We stress that this is a long-term valuation estimate that contains a higher degree of uncertainty than 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 CO₂ 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 actually 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 CO2 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 **31 December 2009**, the VIX closed at 19.47, To put this in perspective, 44% of the days in our sample had higher closing values of the VIX. In essence, the VIX has returned to its normal level. In the short term – say, over the next 12 months – this may prove to be too low, if investors’ expectations that the normal regime will continue eventually 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 also noted in this month's journal 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, at the end of **December 2009** we estimate that volatility is probably underpriced over a short-term time horizon. However, over a longer-term time horizon, volatility is possibly overpriced today. We hesitate to take a stronger stance on this issue, because we believe 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**
31 December 09

Economy	Bottoming	Strengthening	Peaking	Weakening
Interest Rates	Falling	Bottom	Rising	Peak
Style and Size Rotation	Small Growth (DSG) 4.37%	Small Value (DSV) 4.40%	Large Value (ELV) 4.47%	Large Growth (ELG) 7.98%
Sector Rotation	Cyclicals (RXI) 5.54%	Industrials (EXI) 3.40%	Staples (KXI) 6.75%	Utilities (JXI) 2.80%
Bond Market Rotation	Higher Risk (HYG) 4.75%	Short Maturity (SHY) -0.11%	Low Risk (TIP) 1.80%	Long Maturity (TLT) -7.63%

What is the Proper Role of Gold?

Our historical view of gold has been that an investor should allocate some portion of his or her liquid cash reserves to gold coins, as insurance against a “disaster scenario” characterized by a widespread loss of confidence in all fiat paper currencies (e.g., see “Gold on the Flip Side”, *Financial Times*, 16Dec09). Up to now, we have not considered gold as a separate asset class for an investment portfolio, because it was both hard to invest in it, and even harder to establish its fundamental value. Over the past two years, one of these assumptions has changed – thanks to the introduction of multiple ETFs, it is now much easier to invest in gold than it was in the past. More importantly, these ETFs have experienced very substantial inflows of investors’ funds, which was also accompanied by a sharp increase in gold prices. Taken together, these developments motivated us to take another look at the arguments for and

against the treatment of gold as a separate asset class in an investment portfolio, as opposed to a diversified holding in an investor's liquid cash reserve.

We started our analysis with the question of how different the returns on gold are compared to returns on other asset classes. One way to analyze this is to look at the correlation of real returns on gold and other asset classes. In our analysis, we have used rolling twelve month real returns between 2004 and 2008, which eliminates issues related to autocorrelation and scaling monthly to annual returns. Over this period, gold's strongest positive correlations were with timber (as measured by the NCREIF Timber Index), at .71; oil prices, .33; US CPI Inflation, .31; the Dow Jones UBS Commodities Futures Index, .30; and short term U.S. Treasuries, .27. Over the same period, gold's strongest negative correlation was with the return on the US BAA Bond Index (.28).

Another way to compare asset classes is principal components analysis. PCA decomposes the variance on a large number of asset classes into changes in a smaller number of factors, or principal components that are statistically independent of each other. The main limitations of principal components analysis are that the individual factors are sometimes hard to relate to "real world" variables, the fact that PCA assumes only linear relationships between the asset class returns and the underlying factors, and that PCA assumes that asset class returns are normally distributed. Because of these limitations, we like to say that PCA can provide insights that are indicative and suggestive, but seldom definitive. In this case, we used monthly real returns on multiple asset classes between 1990 and 2008. Our objective was to see how closely gold's loading on different principal components tracked the loadings of other asset classes. In our analysis, the first principal component accounted for 29% of the variance on the asset classes we analyzed. It loaded very negatively on volatility (the VIX) and positively on every other asset class. Gold's loading was very similar to that of the DJUBS Commodity Futures Index. The second PC accounted for 20% of the variance. Asset classes that loaded strongly on this PC were short term U.S. Treasuries, foreign currency bonds, Swiss Francs, and volatility. Gold's loading was positive, but significantly lower than the loading of these other

asset classes. The third PC accounted for 10% of variance. The DJUBS Index loaded very strongly on this factor, with gold's loading roughly half as strong. The fourth PC accounted for about 7% of the variance. Gold and timber loaded far more strongly on this factor than did any other asset class. It is this last case that we find most interesting, because it suggests a role for gold that differs from its role as a hedge against high uncertainty (PC2) and high inflation (PC3).

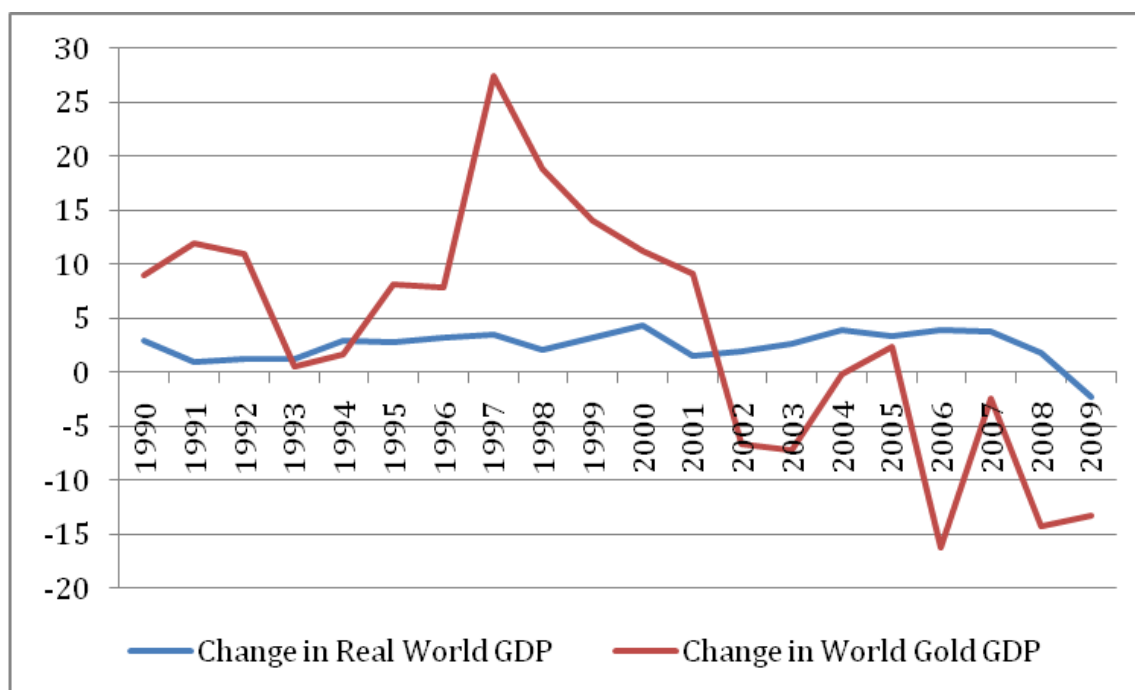
A third way to compare asset classes is to see how they performed under different regimes. In this analysis, we divided real monthly returns between 1990 and 2008 into three different regimes – high inflation, high uncertainty, and normal times. The following table shows the average real monthly return for different asset classes, expressed as a spread above or below the return on real return U.S. Government bonds. The standard deviations are calculated using actual returns.

USD TRR 90-08	<i>Normal</i>				<i>High Uncertainty</i>				<i>High Inflation</i>			
	Avg	Rank	Std Dev	Rank	Avg	Rank	Std Dev	Rank	Avg	Rank	Std Dev	Rank
Real Return Bonds	0.30%		1.10%		0.22%		2.06%		0.13%		1.39%	
Spread Over RRB												
Domestic Bonds	0.21%	7	1.17%	2	0.08%	4	1.70%	3	(0.26%)	9	1.06%	3
Foreign Bonds	0.15%	8	2.48%	4	0.40%	2	2.86%	4	0.08%	6	2.23%	4
Domestic Property	0.79%	3	4.04%	10	(0.88%)	7	7.24%	10	0.26%	3	4.49%	8
Foreign Property	0.69%	6	3.55%	7	(1.82%)	9	5.78%	7	(0.17%)	8	3.59%	6
Commodities	0.06%	9	3.63%	8	(0.68%)	6	5.72%	6	0.84%	2	5.59%	10
Timber	0.75%	4	1.47%	3	(0.98%)	8	1.20%	2	(0.05%)	7	0.55%	1
Domestic Equity	1.12%	2	3.47%	6	(2.08%)	10	6.19%	8	(0.44%)	10	3.40%	5
Foreign Equity	0.74%	5	3.87%	9	(2.32%)	11	6.47%	9	(0.63%)	12	5.14%	9
Emerging Equity	1.21%	1	5.51%	11	(2.58%)	12	9.24%	11	0.10%	5	7.14%	11
Short Treasuries	(0.30%)	11	0.59%	1	(0.21%)	5	0.70%	1	(0.62%)	11	0.57%	2
Gold	(0.17%)	10	3.45%	5	0.17%	3	3.96%	5	0.21%	4	4.20%	7
Volatility	(2.52%)	12	9.61%	12	14.29%	1	31.35%	12	1.96%	1	15.88%	12

As you can see gold delivered negative real returns during the normal regime, and positive real returns during the high uncertainty and high inflation regimes. However, in neither case was gold the best performing asset class under these regimes, in terms of either its return (where higher is better) or its volatility (where lower is better).

The next step in our analysis was to take another look at the vexing question of whether gold is susceptible to even a rough attempt at fundamental valuation analysis. For us, this is a critical issue for an asset class. At the outset, we acknowledged that over the years, many people's answer to this question has been that gold is a purely speculative asset, whose fundamental value cannot be estimated. Our starting point

was the observation that the price of gold captures more than just fear of expected inflation; it also seems to capture changes in overall uncertainty, as well as concerns about the quality of gold's nearest competitor as a store of value: short term U.S. Treasury securities. We wondered what would happen if we converted global nominal GDP into an equivalent quantity of gold using the prevailing gold price, and then compared changes in our "Gold GDP" measure with the IMF's estimate of changes in inflation adjusted GDP. The following chart shows the result of this analysis:



As you can see, our methodology resulted in a very different picture of the evolution of world GDP over the last twenty years. With 20/20 hindsight, it actually looks quite prescient – it is an indicator we will continue to track in the future. Yet this approach did not yield a forward looking basis for estimating gold's fundamental value. Put differently, we continued to search for a measure of the supply of returns gold could be expected to provide in equilibrium, which could be compared to the returns investors should logically demand for including it in a well-diversified portfolio. After a lot of dead ends, we hit upon a possible solution. Between 1980 and 2009, real annual world GDP growth averaged 3.25%, with a median of 3.42%. Clearly, this rate of growth has been based on historical levels of labor force growth (due to birth rates

and increased participation rates) and change in labor productivity. In the future, at least in most developed countries, labor force growth should decline; however we are assuming that overall world growth will remain the same as in the past, due to higher productivity growth and/or higher rates of participation in developing countries. At the same time, the annual increase in the quantity of gold “above ground” has averaged about 1.5% in recent years, although there are some indications this may be lower in the future (e.g., see “Gold Output Set for Decline in Long Run”, *Financial Times*, 15Nov09). However the same claims have repeatedly been made for declining outputs of other minerals, only to be confounded by technological breakthroughs that make deposits previously thought uneconomic profitable to produce. So in our analysis, we will assume that the supply of gold will continue to increase by 1.5% annually. Given these assumptions, in equilibrium, the real price of gold – its yield, if you will – should increase by about 1.75% to 2.00% per year, depending on whether one uses the average or median rate of world output growth. This represents the difference between the rate at which the volume of goods and services produced by the world’s economies increases, and the rate at which the world’s physical supply of gold increases. So, taking this approach, we now have a rough approximation for the real rate of return that gold should produce in equilibrium.

Having estimated, albeit approximately, a supply of returns that gold should produce, we turned to the rate of return that an investor should demand for holding gold. In our approach, this is expressed as the current yield on real return bonds plus an appropriate risk premium. Between 1990 and 2008 this risk premium (in real USD denominated returns) was negative (.63%) per year, based on the annualization of the average real monthly gold and real bond returns. The logic is clear – as in the case of volatility, investors are willing to accept a negative risk premium – or, alternatively, pay a positive insurance premium – in exchange for the protection against rare, but very adverse events that these asset classes provide to a portfolio. Given these inputs, we can now posit an initial relationship between the equilibrium supply of real returns from holding gold – about 1.75% to 2.00% per year – and the rate of return USD-based investors should logically demand for holding gold – the real return bond yield less

about 60 basis points, or, at 31Dec09, 1.55% less .60% equals .95%. Based on this analysis, at 31Dec09, gold appears undervalued in USD terms, hence its price should increase. Which, as we all know, it has. But now we come to the problem. In the case of stocks or bonds, when prices increase, current yields decline, which brings the relationship between the supply of and demand for returns on these asset classes back into balance. The problem is that there is not an obvious equivalent mechanism for driving the supply and demand for returns from holding gold back towards equilibrium. Put differently, it is not clear what mechanism would reduce our equilibrium estimate of a 1.75% to 2.00% real yield on gold to the .95% return that investors should currently demand to hold it. To be sure, you can back into a breakeven estimate and then ask if it seems reasonable. Let's assume an equilibrium estimate of a 2.00% supply of returns, and a .95% demand for returns. Let's further assume a one year time horizon. Between 1990 and 2008, the rolling twelve month real change in the price of gold (which, as we have seen, was itself a function of investors changing perceptions of multiple factors) was 2.7% (about .7% to 1.0% above our estimate equilibrium increase) -- but with a standard deviation of 13.9%. So a fall of 1.05% in the real price of gold over the next year – which would bring the apparent supply and demand for returns on gold back into equilibrium – is well within one standard deviation of what has been observed in the historical record. And that gets to the heart of the conundrum one faces when trying to fundamentally value gold – at best, you can be directionally correct – when the yield on U.S. real return bonds is below 2.35% to 2.60%, gold prices seem likely to increase. And when the yield on U.S. real return bonds is more than this, gold prices seem likely to fall. But we find it impossible to make a stronger statement about fundamental values or equilibrating mechanisms. The best it seems we can hope for is to be directionally correct.

The next step in our analysis was to review the relatively limited research on the fundamental valuation of gold. In “Short-Run and Long-Run Determinants of the Price of Gold”, Levin and Wright (in a paper published by the World Gold Council) find that “there is a long-term relationship between the price of gold and the U.S. price level...A one percent increase in the U.S. price level leads to a one percent increase in the

price of gold.” However, “in the wake of a shock that causes a deviation from this long-term relationship, there is a slow reversion back towards it...It typically takes around five years to eliminate two thirds of the deviation from the long-term relationship.” In “Is Gold a Hedge or a Safe Haven?”, Baur and Lucey distinguish between hedges, where one asset class has a long-term negative or zero correlation of returns with another, and “safe havens” where this relationship only occurs under extreme conditions. Examining U.S., U.K. and German stock and bond prices, they find that “gold is a hedge against stocks, gold is a safe-haven in extreme stock market conditions, but “gold is neither a hedge nor a safe haven for bonds.” In a subsequent paper (“Is Gold a Safe Haven? International Evidence”), Baur and McDermott find that “gold is a safe haven for major European and U.S. equity markets, but not for Australian, Canadian, Japanese or large emerging equity markets.” Finally, in “The Effects of News on Commodity Prices: Is Gold Just Another Commodity?”, Roache and Rossi from the IMF find that “gold is unique among commodities, with prices reacting to specific scheduled economic announcements in the United States and the Euro area (such as indicators of economic activity or interest rate decisions), in a manner consistent with gold’s traditional role as a safe-haven and store of value.” We were particularly interested in their conclusion that “higher U.S. real interest rates tend to appreciate the U.S. dollar and depress gold prices...and provide further evidence of gold’s dollar hedging characteristics.”

So where does this analysis leave us? We remain committed to our belief that gold coins have an important role to play in investors’ liquid cash reserve. However, our inability to identify a fundamental valuation methodology for gold as an asset class makes us wary of including a permanent allocation to it in a portfolio. To be sure, our latest research has raised our confidence that we can identify trigger conditions that are likely to result in rising and falling gold prices. And we now have the ability to make more statistically grounded statements about observed changes in the price of gold, much as we do for changes in the inflation adjusted values of the DJUBS Commodity Futures Index, and the VIX. However, we cannot escape the notion that other asset classes provide better hedges against our two primary disequilibrium

regimes – high inflation and high uncertainty, particularly for USD-based investors. For us, gold remains a unique asset class, that is perhaps more attractive to non-USD based investors than to USD based investors because it is ultimately a hedge against a sharp and sustained fall in the value of the USD against the rest of the world's major currencies. At this point, we are not yet prepared to add gold to our list of broad asset classes that are candidates for inclusion in an investor's long-term strategic asset allocation (policy) portfolio. Instead, this year we will add a section on gold to our monthly Asset Class Valuation Update section and see how our recent analysis, and the methodology that resulted from it, work out in practice over a longer period of time. In the short term, however, and particularly under the current circumstances, we can easily understand the desire of non-USD based investors to diversify their uncertainty hedges beyond short term U.S. Treasury securities to include gold and perhaps real return bonds issued by Australia and Canada. In the meantime, we consider this the beginning of a story, rather than the end of one.

Product and Strategy Notes

Interesting New Research Papers

- Many of our readers either are or, as an advisor, deal with clients responsible for making financial decisions within corporations. Having been in that position ourselves, we were very interested to read a recent paper by IESE's Pablo Fernandez over the holidays. In "Beta = 1 Does a Better Job Than Calculated Betas", Professor Fernandez provides further evidence for what we have always suspected to be the case – that all the effort spent by finance departments calculating the "right" beta to use in a cost of capital and discounted cash flow analysis is arguably wasted effort, particularly given all the uncertainty that typically surrounds the projected cash flows that are to be discounted. By and large, clients are better off taking the yield on real return government bonds and adding a market equity risk premium to it, and spending

the bulk of their time better understanding the factors that cause variability in future cash flows, and how to hedge them or otherwise limit their impact. For those who insist on calculating the “right” cost of capital, I have frequently used this approach: Ask the group to independently determine the risk free payment from the government they would exchange for each year’s risky cash flow from the operation or project in question. These risk free payments can then be discounted to their present value using the current yield on the government bond with approximately the same duration as the investment. Finally, by combining this present value with the initial forecasted risky cash flows, one can derive the implicit cost of capital an individual is using. More often than not, this highlights areas of disagreement among a management team about the nature and timing of the risks they are facing, and aims the discussion in a much more productive direction than “what is the right beta to use in calculating our cost of capital?”

- Technically, the technique just described is called the “certainty equivalent” method, because it converts uncertain cash flows into certain cash flows. We recently read another article that showed that it can also be usefully applied to investment management issues. In his 16Jan10 *Wall Street Journal*, column (“Why Many Investors Keep Fooling Themselves”) Jason Zweig had a fascinating column that detailed the responses to a simple question: “What risk free real rate of return would you expect over some future time horizon – say, ten years or more -- in exchange for the risky return on your current portfolio?” Many investors gave responses that seemed way too high. On the other hand, a few gave answers that in our opinion were in the right range: Bob Veres reported that his readers came in at an average of 6%, Bill Bernstein came in at 4%, Laurence Siegel at 3%, and Jack Bogle at 2.5%. What isn’t clear from these responses is the composition of the underlying portfolios they were swapping – hence, these answers are hard to compare with each other. For example, as we have frequently noted, across a range of currencies a portfolio

that is equally weighted across a wide range of broadly defined asset classes has historically delivered compound annual real returns of 4% to 5%. Also, it isn't clear how the issue of arithmetic versus geometric return was handled. We have often noted that, because of volatility, average geometric returns will be lower than arithmetic average returns. However, we don't know whether the people answering this question were asked to accept a coupon return on a government bond or the geometric return on a government bond. The way that the question was posed has an important impact on the reasonableness of the answers that are given to this question. That said, all of the answers noted above are in the right neighborhood. Overall, as was our experience with corporate teams, we believe that the proper use of the Certainty Equivalent technique can be an excellent starting point for a very productive discussion between an advisor and his or her investment clients. Specifically, we suspect that probing the reasoning behind excessively high return expectations – whether based on high expectations for an asset class or active management prowess -- is almost sure to generate a very productive discussion between advisors and their clients.

- In “Private Equity Performance and Liquidity Risk”, Franzoni, Nowak, and Phalippou analyze the cash flows from 4,403 liquidated private equity investments. They find that “a one standard deviation increase in unexpected aggregate liquidity raises returns from between 4% and 10% annually.” They estimate that the annual liquidity risk premium for private equity investments is about 3%, and that after accounting for this, the realized private equity alpha (before fees) for the investments they analyze is close to zero.
- In “Commodity Price Volatility and World Market Integration Since 1700”, Jacks, Fraser, and O'Rourke from Trinity College in Dublin “explores commodity and manufactured goods prices over three centuries.” They find that commodity price volatility has not increased over this period, during which commodity

prices have consistently been more volatile than manufactured goods prices. The authors also conclude that “three centuries of history show unambiguously that economic isolation caused by war or autarkic policy has been associated with much greater commodity price volatility, while world market integration associated with peace and pro-global policy has been associated with less commodity price volatility.”

- In “Linkages Between Direct and Securitized Real Estate”, Oikarinen, Hoesli, and Serrano examine 1978 – 2008 returns data for both the NCREIF Index of directly owned real estate (commercial property) and the NAREIT Index of securitized real estate. Using cointegration analysis, they conclude that the two are substitutes for each other over the long run, as one would expect, since the underlying assets are the same. As the authors note, “as the time horizon lengthens, the correlation between returns on the two indices approaches one.” However, in the short run the NAREIT Index reacts more quickly to changes in the investment environment than the NCREIF Index. Equally as important, neither index is found to be cointegrated with equity market returns, suggesting that investment in commercial property provides a long-term diversification benefit. That said, they also note that “in the short run [because of differing reaction times], the diversification benefits of REITs and direct real estate may differ substantially.”

Thought Provoking Research on Analyst Recommendations

Given the availability of data on equity research analysts' recommendations, they are increasingly the subject of research into the factors that underlie the efficacy of active management. We recently read five new papers on this fascinating topic (note that we try restrain our enthusiasm about this research when we are at social functions with people we don't know well...). In ‘Analysts’ Incentive and Cognitive Based Processing Biases’, Lin and Wu “examine how incentive-based and behavior-based variables

affect analyst recommendation revisions. They find that, “when controlling for favorable preceding recommendations, analysts delay conveying bad news, which is consistent with both the incentives and cognitive dissonance hypotheses.” However, when the authors “control for unfavorable preceding recommendations, they find that analysts delay conveying good news, which is only consistent with the cognitive dissonance hypothesis.” They conclude that their study reinforces previous studies that find that “individuals do not update their beliefs adequately in the face of new evidence.” In “Security Analyst Networks, Performance and Career Outcomes”, Horton and Serafeim “use social capital theory and techniques developed in social network analysis to measure analysts’ level of connectedness and investigate whether these connections provide any meaningful information advantage to the analyst.” They find that “better connected (i.e., better networked) analysts make more accurate, timely and bold forecasts. Moreover, analysts with better network positions are less likely to lose their jobs, suggesting that these analysts are more valuable to their brokerage houses.” Finally, the authors “do not find evidence that analysts’ innate forecasting ability predicts their future network position.” Rather, they find that “past forecast optimism has a positive association with building a better network of connections.” The large number errors resulting from analysts’ forecast biases are the basis for another recent paper, “A Re-Examination of Analysts’ Superiority Over Time-Series Forecasts” by Bradshaw, Drake, Myers and Myers. The authors “use a naive random walk time series model for annual earnings estimates to see when analysts’ annual forecasts are superior.” They find that “simple random walk EPS forecasts are more accurate than analysts’ forecasts over longer forecast horizons, and for firms that are smaller, younger, or have limited analyst following.”

Another paper focused on one possible result of the limitations of analysts’ forecasts. In “Uninformed Momentum Traders”, Emre Konukoglu of the Rotman School at the University of Toronto utilized data on foreign investment flows into emerging markets to isolate the behavior of investors who are known to be “informationally disadvantaged.” The author finds that momentum trading is concentrated in stocks where foreign investors’ informational inefficiencies are highest,

that such trading has a significant price impact, and that this price impact is followed by strong return reversals. In sum, lack of insightful information leads to higher levels of momentum trading. Last but not least, there was one paper that reminded us (as former credit analysts) that there is still hope. In “The Timeliness of the Bond Market’s Reaction to Bad News Earnings Surprises”, DeFond, and Zhang focus on how “bondholders’ limited upside potential” affects the timeliness of its reaction to various types of news. Given fixed income investors’ asymmetric payoff structure, we weren’t shocked to read the authors’ finding that “bond prices anticipate the majority of the information in bad news earnings surprises, but none of the information in good news earnings surprises.” The authors contrast this with the stock market, “which anticipates only a relatively modest amount of both good and bad news prior to announcements.” Overall, they conclude that their “findings are consistent with bond prices impounding bad news more quickly than good news, and with the bond market interpreting bad news more negatively and expending more resources to discover bad news than the stock market.”

Financial Advisors’ Corner

A significant percentage of our subscriber base is now professional financial advisors from around the world. With that in mind, this year we are launching this new monthly column, in which we will focus on new research that is relevant to the challenges faced by financial advisors.

In Australia and the U.K., there seems to be equal measures of confusion and trepidation about the impending end of trailing commissions. According to IBISWorld, in Australia these commissions, typically about half a percent of the funds under advice, have accounted for thirty five percent of the financial planning industry’s revenue. However, the end of trailing commissions need not be the end of the world, as thousands of fee-based Registered Investment Advisers have demonstrated in the United States.

We also read a number of end-of-year stories that all focused on the theme of clients leaving big firms and taking their business to smaller shops. The IBISWorld

survey again provides evidence of one factor behind this shift: it found that financial advisers regularly service only forty percent of their clients. Another factor, noted in a number of stories, was the desire on the part of large firm advisers to break free of the constraints on what they saw as the limited number of products that were approved for sale to clients, and, as important, the differential commissions paid on different types of investment (e.g., bonds versus stocks) that created conflicts of interest between advisers and their clients.

A new U.S. survey by Braun Research of 1,000 Americans with investable assets of at least \$250,000 provided evidence of what clients are seeking: 53% reported concerns about outliving their assets in retirement. Yet Bank of America reported survey findings that 67% of retirees still didn't work with a financial adviser, which was true of only 50% of pre-retirees. Meanwhile, a survey by Spectrem Group focused on the 837,000 U.S. households with net worth of between \$5 million and \$25 million. What jumped off the page for us was the finding that almost half this group's assets were invested without the use of an outside advisor.

In her 17Jan10 article in the *Financial Times*, ("Shift Back to Basics with The Boutiques") Ruth Sullivan looked at this trend in more depth, concluding that "rich individuals who got their fingers burned in the financial crisis [the author cites average falls in wealth of 25% for people whose total wealth previously topped \$30 million] are moving back to basics in search of transparent, simple, low-cost products, shifting from private banks to smaller, independent wealth managers and boutiques to get them." These trends have undoubtedly helped to drive the rapid growth of the ETF business, which, as the *Economist* recently noted ("Trillion Dollar Babies", 21Jan10 edition) have grown from \$40 billion in assets under management at the end of 1999 to more than \$1 trillion in AUM a decade later. In this new environment, the role of the financial advisor is changing, with asset allocation expertise growing in importance. As Alan Brown, Schoeders' Chief Investment Officer noted in the 3Jan10 *Financial Times*, in the coming years, "the role of the asset allocator will fundamentally change and become more important [and] advisors who can offer asset allocation skills will prosper."

On the other hand, the rapid development of the ETF business has not been wholly benign; as Jack Bogle long ago predicted, the creation of ever more narrowly defined indexes and ETFs has promoted frequent trading in a manner not very dissimilar to active investing in individual stocks. And speaking of Jack Bogle, don't miss his 18Jan10 OpEd in the *Wall Street Journal* on "Restoring Faith in Financial Markets." As always, it is a clarion call of common sense. Last but not least, a growing number of advisers are faced with the challenge of counseling clients on whether to strategically default on their home mortgages. We highly recommend two excellent background papers that help to put this difficult issue into a broader context: "Moral and Social Constraints to Strategic Default on Mortgages" by Guiso, Sapienza and Zingales, and "Underwater and Not Walking Away" by Brent T. White.

Model Portfolios Update

Our model portfolios are constructed using a simulation optimization methodology. They assume that an investor understands the long-term compound real rate of return he or she needs to earn on his or her portfolio to achieve his or her long-term financial goals. We use SO to develop multi-period asset allocation solutions that are "robust". They are intended to maximize the probability of achieving an investor's compound annual return target under a wide range of possible future asset class return scenarios. More information about the SO methodology is available on our website. Using this approach, we produce model portfolios for six different compound annual real return targets: 7%, 6%, 5%, 4%, 3%, and 2%. We produce two sets of these portfolios: one assumes only investments in broad asset class index funds. These are our "all beta" portfolios. The second set of model portfolios includes uncorrelated alpha strategy funds as a possible investment. These assume that an investor is primarily investing in index funds, but is willing to allocate up to ten percent of his or her portfolio to equity market neutral investments.

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 2009, our CHF cash benchmark was 1.08% (in nominal terms). The second benchmark we use is a portfolio equally allocated between the ten asset classes we use (it does not include uncorrelated alpha). 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 at:
<http://www.indexinvestor.com/Members/YTDReturns/Swiss.php>

Appendix: Economic Scenarios and Accumulated Evidence

The following table summarizes the accumulated evidence over the past three months (on a rolling basis) against both of our scenarios in the following table. More specifically, we report evidence that seems significantly more likely to be observed if a scenario is false than if it is true. This is in the spirit of the scientific method, where one tries not to *prove* hypotheses, but to *disprove* them. This approach also helps to minimize the risk that our conclusions will be skewed by the confirmation bias, of the tendency to only look for, and give relatively heavier weight to evidence which confirms one's existing views. We do not claim that this approach is foolproof, nor that it guarantees perfect objectivity and foresight. However, evidence from the use of this approach in the intelligence community suggests that it does help to improve forecast accuracy.

	Cooperative Scenario	Conflict Scenario
<i>Brief Scenario Description:</i>	More rapid domestic consumption growth in China and cleantech investment demand in North America return the world to a health rate of growth, and enable preservation of the world trading system, a reduction in global imbalances, and monetary actions to head off an extended period of high inflation.	Domestic politics prevents an increase in cleantech investment in the United States, while China continues to pursue export led growth while encouraging rising nationalism to limit domestic unrest and the political threat to the current Chinese leadership. This only reinforces growing demands for protection in Europe and the United States. Weak global demand is maintained by rising fiscal deficits, which are increasingly monetized, leading to much higher inflation.

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<i>Key Agent Level Scenario Assumptions</i>		
U.S. Middle Class	Resolution of banking crisis, passage of health care reforms, mortgage relief, and a sharp increase in cleantech driven investment spending lead to reduced uncertainty and a shift towards higher savings and lower consumption, without triggering populist demands for protectionism.	Continued economic stagnation, uncertainty, and insecurity lead to more extreme partisanship and the development of strong populist calls for protectionism and income redistribution.
Chinese Peasants	Land reform and economic growth (which provides jobs) boost incomes while a sharp increase in government spending on health care and education limits resentment of Communist Party corruption and economic inequality compared to coastal elites. This minimizes social unrest and threats to continued legitimacy of the Party's governance of China.	Growing unemployment and a sense that government stimulus is disproportionately benefiting coastal and party elites triggers widespread unrest and peasant alignment with disaffected students, urban unemployed, and members of the military. The Chinese government becomes aggressively nationalist in an attempt to channel this anger outward. At best, this triggers a global retreat into trading blocs; at worst, this strategy fails and China descends into fragmented authoritarian regions with minimal central control.
Iranian Youth	Prolonged economic stagnation and rising inflation lead to the defeat of President Ahmadinejad in June 2009 elections, and widespread pressure for better relations with the West. Economic self-	Supreme Leader Khamenei ensures that Ahmadinejad is re-elected. Repression and emigration are used to limit resistance by younger Iranians to these policies. The country attempts to improve economic

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	interest trumps the Revolutionary Guards' ideological opposition to this opening. Moderation of Iran's conflicts with the west and a renewal of inward investment flows lead to increased hydrocarbon production, limiting upward pressure on global energy prices.	conditions via closer ties with China, while maintaining its nuclear program (which could trigger an attack by Israel) and a conflict-oriented policy versus the US that continues to put upward pressure on energy prices.
Key Issue Level Scenario Assumptions:		
Overleveraged Consumers	Effective mortgage relief plans implemented in most affected countries, while stronger economic growth maintains income needed for debt repayment.	No effective mortgage relief legislation passed. Instead, rise in bankruptcies and mortgage foreclosures puts continuing downward pressure on housing prices.
Financial System Weakness	Combination of stronger investment and export led economic growth and effective bank rescue plans reduces uncertainty about health of system, and enables sufficient flow of credit to support renewed economic growth.	Worsening economic conditions and failure of bank rescue plans (due to design or political resistance) cause uncertainty to remain high, credit flows to be constrained, and defaults to increase, which all contribute to a worsening process of debt deflation.
International Imbalances	Rising domestic consumption spending in China enables a reduction in export dependence, while U.S. imports are reduced by a shift from private consumption to private saving and higher investment spending and greater exports. This reduces global current account imbalances to a	China's continued emphasis on export led growth, at a time when the US is incurring high fiscal deficits (and eventually higher taxes) to maintain global demand, triggers demands for greater protection, which in turn precipitate a dollar exchange rate crisis as other countries move to limit the losses on their

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	manageable level.	foreign exchange reserves. Result is a fragmentation of the global trade and financial system into much less integrated blocs.
<i>Evidence Over the Previous Three Months Against Each Scenario (most recent month first)</i>	<i>Evidence Against the Cooperative Scenario</i>	<i>Evidence Against the Conflict Scenario</i>
December 2009 (this month's issue)	<ul style="list-style-type: none"> • Times of London published more damning evidence about Iran's nuclear program; large opposition demonstrations on Ashura holiday are met with government crackdown on opposition leadership. Obama Administration appears to be moving away from desire to negotiate with Iran. • Rising number of papers, articles, OpEds that are harshly critical of China's refusal to let Renminbi appreciate. Jim Chanos receives much coverage for his negative beliefs about China. • Google (and Hilary Clinton's) growing conflict with China are just the latest in a growing list of conflicts (e.g., with RioTinto). • China is blamed for failure of Copenhagen Conference to achieve progress on CO2 	<ul style="list-style-type: none"> • <i>Economist</i> publishes an extensive article arguing that negative stories about China are overblown, and that its economic growth should continue and help maintain global aggregate demand (which, in turn, will reduce pressure on U.S. to continue aggressive fiscal policy and deficits – of course, this assumes no worsening of trade relations between China and the U.S., which would block an increase in U.S. exports) • Scott Brown's election to U.S. Senate may force Obama administration back into the center, as a similar shock forced the Clinton administration to moderate its position. In the latter case, this resulted in faster progress on key policy issues (e.g., welfare and budget reform).

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	<p>emissions reduction.</p> <ul style="list-style-type: none"> • Increasing number of findings – in both the U.S. and China – that the other side is restricting or illegally subsidizing trade in different product categories. • Sharp increase in worries about the creditworthiness of Greece, widening spreads on its sovereign bonds vs. German Bunds, and spread of credit concerns to Spain, Ireland and Portugal. • Iceland refuses to pass legislation committing public funds to repay UK government for making good on Iceland deposit insurance fund’s guarantee of foreign “IceSave” deposits. • Widening coverage and greater understanding of depth of fiscal problems faced by state and local governments in U.S. This is compounded by apparent inability of multiple governments to take the painful steps needed to address these problems. • Growing discussion of “strategic defaults” in U.S. by homeowners with underwater mortgages. If 	

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	<p>commercial borrowers can do it, why not us too?</p> <ul style="list-style-type: none"> • Scott Brown election in Massachusetts may tank U.S. healthcare reform and usher in a prolonged period of legislative gridlock.. 	
November 2009	<ul style="list-style-type: none"> • Israeli press leaks indicate that patience with Iran’s stalling tactics in the nuclear talks is at or close to the point of exhaustion, raising the probability of military action. • Publication of more articles forecasting increased trade conflicts with China in 2010, given continued undervaluation of Renminbi and emphasis on investment to increase capacity in export industries. • China takes aggressive stance vis-a-vis the west at opening of Copenhagen climate talks. • US mortgage modification program is apparently having little success; Dubai default, downgrading of Greece, and worsening commercial real estate conditions show that credit crisis continues 	<ul style="list-style-type: none"> • US EPA announces finding that greenhouse gases endanger human health, setting the stage for more aggressive regulations that could also stimulate higher business investment. • Obama administration begins campaign for second stimulus program aimed at reducing high levels of unemployment in USA that are constraining consumption spending

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	<ul style="list-style-type: none"> • Despite this, banks still seem intent on paying extremely high, and politically incendiary bonuses at year end 	
October 2009	<ul style="list-style-type: none"> • Rising trade tensions between US and China • Increasing calls by US commentators for an increase in the China/US exchange rate • Publication of major new report criticizing growing overcapacity in China and its negative impact on the world economy • With 28% of mortgaged houses in negative equity, Obama administration admits mortgage restructuring program isn't working; press discussion of morality of mortgage default • Growing recognition of probable extent of municipal bond crisis • Iran continues to delay discussions over its nuclear capability; Israel's patience reportedly running out • Widening gap between financial market performance (and record bonuses on Wall Street) and conditions in real economy raises 	<ul style="list-style-type: none"> •

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	probability of substantial price declines in some asset classes (e.g., equities), and further ratcheting up of pressures on the banking and financial system	