

# The Index Investor

*Invest Wisely...Get an Impartial Second Opinion.*

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## April 2010 Issue: Key Points

The past two months have seen a sharp escalation in news coverage about the future of China, with sharp disagreement about whether that country will soon face a collapse of epic proportion with highly unpredictable results for world politics and economics, or whether the leadership of the Chinese Communist Party will be able to muddle through, avoid collapse, and gradually transition the nation to higher levels of private consumption spending and much lower dependence on export and investment led growth. Since this issue is central to investors' portfolio risk management decisions, this month, in place of our usual broad review, this month we present and evaluate the conflicting evidence regarding the future of China.

We find that the weight of evidence suggests that a serious crisis in China will probably occur within the next three years. However, the timing of that crisis remains uncertain; with a leadership transition due in 2012, we believe that the Chinese

Communist Party will try its best to forestall its arrival until after a new President and Premier is in place. That said, events outside of China – such as the enactment of trade sanctions by a U.S. government frustrated by continuing high unemployment – may trigger a crisis before 2012. We also find that the outcome of the current competition between two key CCP factions – known as the Princelings and the China Youth League – will probably have a very strong impact on the way the almost inevitable crisis will play out. The former group appears to be counting on a return to a populist version of Maoism will enable them to weather the storm and retain legitimacy as the rightful rulers of the nation. In contrast, the latter's recent behavior leads us to conclude that they seem more likely to rely on nationalism and external conflict as the means of retaining their legitimacy and power. We conclude with a view of the asset allocation implications of our analysis.

## Global Asset Class Returns

<i>YTD 31Mar10</i>	<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								
<b>USD Bonds</b>	1.32%	-0.74%	-2.02%	7.01%	1.69%	7.38%	3.10%	-2.34%
<b>USD Prop.</b>	10.08%	8.02%	6.75%	15.77%	10.45%	16.15%	11.87%	6.43%
<b>USD Equity</b>	6.00%	3.94%	2.67%	11.69%	6.37%	12.07%	7.79%	2.35%
<b>AUD Bonds</b>	1.68%	-0.38%	-1.65%	7.37%	2.05%	7.75%	3.47%	-1.97%
<b>AUD Prop.</b>	6.20%	4.14%	2.86%	11.89%	6.57%	12.26%	7.98%	2.54%
<b>AUD Equity</b>	1.93%	-0.13%	-1.41%	7.62%	2.30%	7.99%	3.71%	-1.73%
<b>CAD Bonds</b>	3.99%	1.93%	0.66%	9.68%	4.36%	10.06%	5.78%	0.34%
<b>CAD Prop.</b>	7.21%	5.16%	3.88%	12.91%	7.59%	13.28%	9.00%	3.56%
<b>CAD Equity</b>	6.73%	4.68%	3.40%	12.43%	7.11%	12.80%	8.52%	3.08%
<b>CHF Bonds</b>	-0.51%	-2.56%	-3.84%	5.19%	-0.13%	5.56%	1.28%	-4.16%
<b>CHF Prop.</b>	10.69%	8.64%	7.36%	16.39%	11.06%	16.76%	12.48%	7.04%
<b>CHF Equity</b>	3.77%	1.72%	0.44%	9.47%	4.15%	9.84%	5.56%	0.12%
<b>INR Bonds</b>	2.59%	0.53%	-0.75%	8.28%	2.96%	8.65%	4.37%	-1.07%
<b>INR Equity</b>	-3.61%	-5.67%	-6.95%	2.08%	-3.24%	2.45%	-1.83%	-7.27%
<b>EUR Bonds</b>	-2.65%	-4.70%	-5.98%	3.05%	-2.27%	3.42%	-0.86%	-6.30%
<b>EUR Prop.</b>	2.50%	0.44%	-0.83%	8.20%	2.87%	8.57%	4.29%	-1.15%
<b>EUR Equity</b>	-4.11%	-6.17%	-7.44%	1.58%	-3.74%	1.96%	-2.32%	-7.76%

YTD 31Mar10	In USD	In AUD	In CAD	In EUR	In JPY	In GBP	In CHF	In INR
JPY Bonds	-1.35%	-3.41%	-4.69%	4.34%	-0.98%	4.71%	0.43%	-5.01%
JPY Prop.	8.15%	6.09%	4.81%	13.84%	8.52%	14.22%	9.94%	4.49%
JPY Equity	7.19%	5.13%	3.85%	12.88%	7.56%	13.26%	8.98%	3.53%
GBP Bonds	-4.99%	-7.05%	-8.33%	0.70%	-4.62%	1.08%	-3.20%	-8.65%
GBP Prop.	-6.57%	-8.63%	-9.90%	-0.88%	-6.20%	-0.50%	-4.78%	-10.22%
GBP Equity	-0.47%	-2.53%	-3.81%	5.22%	-0.10%	5.59%	1.31%	-4.13%
1-3 Yr USGvt	0.69%	-1.37%	-2.65%	6.38%	1.06%	6.75%	2.47%	-2.97%
World Bonds	-0.55%	-2.60%	-3.88%	5.15%	-0.18%	5.52%	1.24%	-4.20%
World Prop.	4.17%	2.11%	0.84%	9.86%	4.54%	10.24%	5.96%	0.52%
World Equity	3.32%	1.26%	-0.02%	9.01%	3.69%	9.39%	5.11%	-0.33%
Commod Long Futures	-5.68%	-7.74%	-9.01%	0.02%	-5.31%	0.39%	-3.89%	-9.33%
Commod L/ Shrt	-8.54%	-10.60%	-11.87%	-2.85%	-8.17%	-2.47%	-6.75%	-12.19%
Gold	1.53%	-0.53%	-1.81%	7.22%	1.90%	7.60%	3.32%	-2.12%
Timber	5.59%	3.54%	2.26%	11.29%	5.97%	11.66%	7.38%	1.94%
Uncorrel Alpha	1.06%	-0.99%	-2.27%	6.76%	1.44%	7.13%	2.85%	-2.59%
Volatility VIX	-9.66%	-11.71%	-12.99%	-3.96%	-9.28%	-3.59%	-7.87%	-13.31%
<b>Currency</b>								
AUD	2.06%	0.00%	-1.28%	7.75%	2.43%	8.13%	3.85%	-1.60%
CAD	3.33%	1.28%	0.00%	9.03%	3.71%	9.40%	5.12%	-0.32%
EUR	-5.69%	-7.75%	-9.03%	0.00%	-5.32%	0.37%	-3.91%	-9.35%
JPY	-0.37%	-2.43%	-3.71%	5.32%	0.00%	5.70%	1.42%	-4.03%
GBP	-6.07%	-8.13%	-9.40%	-0.37%	-5.70%	0.00%	-4.28%	-9.72%
USD	0.00%	-2.06%	-3.33%	5.69%	0.37%	6.07%	1.79%	-3.65%
CHF	-1.79%	-3.85%	-5.12%	3.91%	-1.42%	4.28%	0.00%	-5.44%
INR	3.65%	1.60%	0.32%	9.35%	4.03%	9.72%	5.44%	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):

<i>YTD 31Mar10</i>	<i>_ln USD</i>	<i>_ln AUD</i>	<i>_ln CAD</i>	<i>_ln EUR</i>	<i>_ln JPY</i>	<i>_ln GBP</i>	<i>_ln CHF</i>	<i>_ln INR</i>
<b><i>Eq Mkt Neutral</i></b>								
HSKAX	0.77%	-1.29%	-2.57%	6.46%	1.14%	6.84%	2.56%	-2.89%
OGNAX	-0.40%	-2.46%	-3.73%	5.30%	-0.03%	5.67%	1.39%	-4.05%
<b><i>Arbitrage</i></b>								
ARBFX	1.73%	-0.32%	-1.60%	7.43%	2.11%	7.80%	3.52%	-1.92%
ADANX	0.37%	-1.69%	-2.96%	6.07%	0.74%	6.44%	2.16%	-3.28%
<b><i>Currency</i></b>								
DBV	0.21%	-1.84%	-3.12%	5.91%	0.58%	6.28%	2.00%	-3.44%
ICI	2.19%	0.14%	-1.14%	7.89%	2.57%	8.26%	3.98%	-1.46%
<b><i>Equity L/S</i></b>								
HSGFX	-0.31%	-2.37%	-3.65%	5.38%	0.06%	5.76%	1.48%	-3.97%
PTFAX	2.70%	0.64%	-0.64%	8.39%	3.07%	8.77%	4.49%	-0.96%
<b><i>GTAA</i></b>								
MDLOX	1.62%	-0.44%	-1.71%	7.32%	1.99%	7.69%	3.41%	-2.03%
PASAX	1.75%	-0.31%	-1.58%	7.45%	2.12%	7.82%	3.54%	-1.90%

## 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

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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

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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

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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

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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.

<i>Rolling Three Month Returns in USD</i>			31 Mar10
<i>High Uncertainty</i>	<i>High Inflation</i>	<i>Normal Growth</i>	
Short Maturity US Govt Bonds (SHY) <b>0.69%</b>	US Real Return Bonds (TIP) <b>0.20%</b>	US Equity (VTI) <b>5.71%</b>	
1 - 3 Year International Treasury Bonds (ISHG) <b>-6.41%</b>	Long Commodities (DJP) <b>-5.68%</b>	EAFE Equity (EFA) <b>1.27%</b>	
Equity Volatility (VIX) <b>-9.66%</b>	Global Commercial Property (RWO) <b>4.17%</b>	Emerging Equity (EEM) <b>1.49%</b>	
Gold (GLD) <b>1.53%</b>	Long Maturity Nominal Treasury Bonds (TLT)* <b>0.25%</b>	High Yield Bonds (HYG) <b>2.09%</b>	
<i>Average</i> <b>-3.46%</b>	<i>Average (with TLT short)</i> <b>-0.39%</b>	<i>Average</i> <b>2.64%</b>	
<i>Three Months Ago:</i> <b>-4.49%</b>	<i>Three Months Ago:</i> <b>5.47%</b>	<i>Three Months Ago:</i> <b>5.03%</b>	

\* Falling returns on TLT indicate rising inflation expectations

As you can see, at the end of March, the conventional wisdom appeared to favor normal times. It also appeared that investors (in aggregate) reduced the probability they attached to a return to the high inflation regime, and continued to lower the probability attached to a return to a high uncertainty regime. As we have repeatedly noted in recent months, we think that uncertainty is poised to significantly increase.

At the request of many readers, we will now publish forecasts for real returns on different asset classes. 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

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(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:

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

### **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

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overvaluations at **31 Mar 10**. We believe that asset prices reflect the interaction of three broad forces. The first is fundamental valuation, as reflected in the balance between the expected supply of and demand for returns. The Global Asset Class Valuation Analysis of each month's journal contains an extensive discussion of fundamental valuation issues. One of our core beliefs is that while asset prices are seldom equal to their respective fundamental values (because the system usually operates in disequilibrium), they are, in the medium and long-run strongly drawn towards that attractor.

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

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

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

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

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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 three months before that, to make it easier to see the direction of momentum, and whether it is accelerating, decelerating, or has reversed. The most dangerous situation is where an asset class is probably overvalued on a fundamental basis, yet positive return momentum is accelerating. As so many authors have noted throughout history, trends that can’t continue don’t continue. In these situations, we strongly recommend either hedging (e.g, via put options) or reducing exposure. In contrast, a situation where an asset class is probably undervalued, but negative return momentum is still accelerating, may be an

exceptionally attractive opportunity to increase one's exposure to an asset class. Finally, conclusions about changes in asset class valuations also have to be seen in the longer term context of the possible evolution of alternative political/economic scenarios, and their implications for asset class valuations and investor behavior (see, for example, our monthly Economic Updates). This is also an important input into investment decisions, as we do not believe that the full implications of these scenarios are typically reflected in current asset prices and investor behavior.

<i>Valuation at 31Mar10</i>	<i>Current Price versus Long-Term Fundamental Valuation Estimate</i>	<i>Rolling 3 Month Return in Local Currency</i>	<i>Rolling 3 Month Return 3 Months Ago</i>
<b>AUD Real Bonds</b>	Neutral	2.96%	3.54%
<b>AUD Bonds</b>	Neutral	-0.38%	-3.17%
<b>AUD Property</b>	Neutral	4.14%	-5.98%
<b>AUD Equity</b>	Possibly Overvalued	-0.13%	3.29%
<b>CAD Real Bonds</b>	Neutral	0.49%	5.24%
<b>CAD Bonds</b>	Neutral	0.66%	-0.61%
<b>CAD Property</b>	Possibly Undervalued	3.88%	6.71%
<b>CAD Equity</b>	Possibly Overvalued	3.40%	3.69%
<b>CHF Bonds</b>	Likely Overvalued	1.28%	0.00%
<b>CHF Property</b>	Possibly Overvalued	12.48%	-0.02%
<b>CHF Equity</b>	Probably Overvalued	5.56%	2.37%
<b>EUR Real Bonds</b>	Neutral	1.57%	0.00%
<b>EUR Bonds</b>	Likely Overvalued	3.05%	-1.54%
<b>EUR Prop.</b>	Possibly Undervalued	8.20%	1.59%
<b>EUR Equity</b>	Likely Undervalued	1.58%	13.36%
<b>GBP Real Bonds</b>	Possibly Overvalued	2.07%	1.02%
<b>GBP Bonds</b>	Neutral	1.08%	-2.16%
<b>GBP Property</b>	Neutral	-0.50%	2.75%
<b>GBP Equity</b>	Likely Undervalued	5.59%	9.63%
<b>INR Bonds</b>	Likely Overvalued	-1.07%	-0.96%

<b>Valuation at 31Mar10</b>	<b>Current Price versus Long-Term Fundamental Valuation Estimate</b>	<b>Rolling 3 Month Return in Local Currency</b>	<b>Rolling 3 Month Return 3 Months Ago</b>
INR Equity	Probably Overvalued	-7.27%	1.97%
JPY Real Bonds	Neutral	0.40%	3.18%
JPY Bonds	Possibly Overvalued	-0.98%	0.00%
JPY Property	Likely Undervalued	8.52%	-8.22%
JPY Equity	Probably Overvalued	7.56%	2.62%
USD Real Bonds	Neutral	0.36%	1.90%
USD Bonds	Possibly Overvalued	1.32%	-0.59%
USD Property	Neutral	10.08%	9.06%
USD Equity	Probably Overvalued	6.00%	5.86%
<b>Following in USD:</b>			
Investment Grade Credit (CIU)	Possibly Overvalued	2.03%	0.72%
High Yield Credit (HYG)	Probably Overvalued	2.09%	4.45%
Emerging Mkt Equity (EEM)	Probably Overvalued	2.47%	8.25%
Commodities Long	Likely Overvalued	-5.68%	9.60%
Gold	Likely Undervalued	1.53%	8.56%
Timber	Possibly Undervalued	5.59%	15.70%
Uncorrelated Alpha	N/A	1.06%	0.45%
Volatility (VIX)	Probably Undervalued	-9.66%	-23.98%
<b>Future Return in Local Currency from holding USD:</b>	<b>Based on Covered Interest Parity</b>		
Returns to AUD Investor	Positive	-2.06%	-3.30%
Returns to CAD Investor	Neutral	-3.33%	-3.21%
Returns to EUR Investor	Negative	5.69%	2.04%
Returns to JPY Investor	Negative	0.37%	3.92%
Returns to GBP Investor	Neutral	6.07%	-1.21%
Returns to CHF Investor	Negative	1.79%	-0.39%
Returns to INR Investor	Positive	-3.65%	-3.46%

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## **Investor Herding Risk Analysis**

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

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

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

Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec09	Jan10	Feb10	Mar10
0.35	0.33	0.33	0.51	0.51	0.56	(0.30 )	0.72	0.24	(0.03 )	0.30	0.46

As you can see, in recent months global financial markets appear to have gone from a highly ordered and fragile state in November to one that was highly disordered by the end of January, and therefore at lower risk of a sudden, substantial, and highly correlated change in prices across multiple asset classes. By March, however, global financial markets had become noticeably more ordered, and were approaching the relatively high degree seen last summer.

### **This Month’s Letters to the Editor**

*You write a lot about the attractions of volatility as an asset class, but how can a retail investor access it?*

The issue with accessing volatility as an asset class is similar to that posed by commodities: While investing in futures contracts is much easier than investing in the physicals, sometimes the performance of the two differs by a substantial amount.

In theory, the price of a futures contract reflects investors' current forecast of what the future spot price of the commodity will be when the futures contract matures. Actually, this relationship isn't perfect, as the pricing of the futures contract should also contain some premium that reflects the uncertainty inherent in the forecast of the

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future spot price. Most commodity index funds are based on a continuously rolled over portfolio of futures contracts that are owned by the fund (some commodity index funds are based on underlying swap contracts, but I won't go into those here). As we note each month in our journals, the return on a continuously rolled over portfolio of futures contracts broadly comes from three sources: (1) Because futures contracts can be purchased at a fraction of their face value, index funds invest the difference in short term government bonds that generate interest income. This is known as the collateral yield. (2) When the price of a futures contract is lower than the spot price, the futures curve is said to be "backwardated." As a result, as the futures contract approaches maturity, its price approaches the spot price, enabling the index fund to generate a profit when the futures contract is sold, and a portion of the proceeds used to replace the maturing contract with a new one at a price that is lower than the spot price. The profit that results from rolling over a portfolio of futures contracts when the futures curve is backwardated is known as the "roll yield." However, futures prices can also be higher than the spot price, a situation known as a "contangoed" futures curve. In this situation, the roll yield is negative rather than positive. (3) Finally, to the extent that the spot price on the date when the futures contract matures differs from the spot price that was forecast when the futures contract was originally purchased (and that was reflected in the price of the futures contract), the index fund will earn a "spot return" that can be either positive or negative. This is an important point -- too many investors in commodity index funds expect that they will earn returns that reflect changes in the spot price of a commodity. This is not the case. Rather, to the extent that investors earn a return from changes in spot prices, it will be due to changes in spot prices that were not anticipated at the time the futures contract was originally purchased. For example, if at the time of purchase the market consensus is for an increase in oil prices by \$2.00/bbl over the next 3 months, and the actual change turns out to be \$5.00/bbl, the futures contract investor will earn a spot return of \$3.00, not \$5.00.

This brief overview of the sources of return from commodity futures investing is an introduction to the issue of investing in equity market volatility (which is a good

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proxy for overall financial market volatility) as an asset class. In this case, the "spot" market is the current level of volatility implied by options prices on the S&P 500. This is measured by the well-known VIX index. Using the commodity analogy, the VIX can be thought of as the spot price of volatility. There are also futures contracts traded on the VIX. In mid-2009, Barclays introduced two exchange traded notes (ETNs) whose returns are based on changes in the price of these futures contracts. In maturity terms, the closest ETN to the VIX is VXX, which tracks changes in the S&P 500 VIX Short-Term Futures Index, which is based on the price of first and second month futures contracts on the VIX (the other ETN, VXZ, tracks changes in longer dated VIX futures contracts). In the United States, VXX has attracted over \$1 billion in investments. At the end of 2009, Barclays listed its volatility based ETNs on the Toronto and Frankfurt exchanges, making it much easier for retail investors in Canada, the UK, Germany and Italy to allocate a portion of their portfolios to volatility as an asset class.

As is the case with other commodity funds based on continuously rolled futures, the return on VXX should reflect a roll return as well as a spot return (that reflects unanticipated changes in the level of the VIX over the time horizon covered by the one and two month VIX futures contracts). These roll and spot returns can be positive or negative. Moreover, because the ETN is an exchange traded note (with .89% annual expenses), there is no collateral return. Finally, since the ETN is a debt obligation of Barclays, owners of these ETNs are also taking Barclays credit risk. Indeed, one suspects that, if volatility sharply increased (generating valuable portfolio benefits), so too might the credit risk of Barclays Bank. For this reason, we look forward to the day when a volatility based ETF is introduced that eliminates this credit risk exposure by directly trading in futures (note that ETFs based on underlying swap contracts, which are common in Europe, involve counterparty credit risk exposure to the provider of the swap).

More information about these volatility ETNs can be found on [www.ipathetn.com](http://www.ipathetn.com). Data on that site show that, over the past five years, the correlation of returns on the VXX with returns on the VIX itself has been around .70.

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While this is not a perfect substitute for directly owning the VIX, it is reasonably close. For now, these ETNs are the easiest way for a retail investor to gain access to volatility as an asset class.

*In your valuation summary, I find the words you use in the “Return Momentum” column quite confusing. Could you try to make it easier to understand?*

We take your point, and, as you can see, we have eliminated this column from the table. However, we have left in the two columns that show, for each asset class, the most recent 3 month return, and the comparable data for the previous three month period. We hope that the elimination of what have been, in retrospect, confusing words, will make it easier for our readers to see what for us is an important point -- the comparison of fundamental valuation estimates with market trends, or, more technically, momentum. We find it very useful to compare our fundamental valuation estimate with momentum. The combination of fundamental overvaluation and accelerating positive momentum is clearly dangerous, unless you are short. On the other hand, the combination of fundamental undervaluation with accelerating negative momentum represents a very attractive opportunity, albeit one that may be very difficult to explain to your trend chasing friends.

## **Feature Article: What Lies Ahead for China?**

### Methodology

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 alternative behavior patterns often exhibited by 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 usually results in a higher level of stability and predictability in the system’s operations and gradual movement back towards equilibrium. In contrast, realization of the conflict scenario usually prolongs and often worsens the system’s instability. These two 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.

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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.

### The Current Situation

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 way in which the three critical issues we face evolve, and whether we follow a path that looks more like our cooperative or conflict scenario. As our previous monthly financial updates have

shown, we believe that the accumulated evidence against the development of the cooperative scenario is much more convincing (to a clear and convincing standard) than the evidence against the development of the conflict scenario (as we seek not to prove, but rather, in the spirit of the scientific method, to disprove our hypotheses).

The essential predicament facing the global economy is by now well known: overleveraged private sectors in the developed world have sharply cut back spending in order to repay their debts. In order to avoid the collapse in GDP that this would otherwise cause, governments have sharply increased their spending and fiscal deficits as a percentage of GDP, which in turn has boosted Debt/GDP ratios that in some cases were already uncomfortably high. This has provoked rising concern with fiscal deficits and sovereign credit risk that has recently come to a head in Greece. However, aggressive though it has been, aggressive debt financed government spending around the world has usually not fully offset private sector retrenchment, resulting in some reductions in the size of global current account deficits and surpluses, particularly those that exist in the United States and China. To offset the contraction caused by a fall in its exports, China has embarked on a stimulus program that has been marked by extraordinary levels of credit growth, which in turn (as has been the case throughout history) has fed what many perceive to be a growing bubble in domestic property markets. Moreover, in order to maintain employment and social/political stability, China has sought to maintain its export markets and export led growth model, either because it is unwilling or unable to increase its level of domestic consumption spending. In sum, while unprecedented fiscal and monetary stimulus around the world has thus far avoided a repeat of the Great Depression, the global economic recovery remains extremely fragile.

The past two months have seen a sharp escalation in news coverage about the future of China, with sharp disagreement about whether that country will soon face a collapse of epic proportion with highly unpredictable results for world politics and economics, or whether the leadership of the Chinese Communist Party will be able to muddle through, avoid collapse, and gradually transition the nation to higher levels of private consumption spending and much lower dependence on export and investment

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led growth. Since this issue is central to investors' portfolio risk management decisions, this month, in place of our usual broad review, this month we will present and evaluate the conflicting evidence regarding the future of China.

### Our View of China in 2004

Our starting point – or our prior view, in Bayesian terms, -- was first described in the in-depth analysis of China that we presented in our March 2004 issue.

*Let's start with the big picture: China's grand strategy, as summed up in the 2002 Report to Congress by the U.S. China Security Review Commission. "It is clear that China anticipates America's decline and is working to shape a world with a weaker United States and stronger competing poles of power where it can play a central role. China's strategy to achieve this objective appears to include biding its time by avoiding confrontation with the United States, and meanwhile gaining access to American investment, technology and know-how...Economic growth is a central pillar of Chinese power. The Chinese government and its industries share an overwhelming and driving goal to increase the power and international standing of China as a nation-state...Chinese policy has been guided since the 1970s by the maxim enunciated by Deng Xiaoping that science and technology from abroad is the prime force of production and central to China's rise from poverty and weakness... They view joining the World Trade Organization as essential to continue rapid growth by accelerating economic reform, attracting higher levels of foreign investment, maintaining and expanding export markets, and playing a more influential role in shaping the rules of the world trading system...China's economic relations with Europe and Japan reflect both an interest in building relations with America's traditional allies and also decreasing China's dependency on the United States for its technology, investment and export markets...Chinese leaders believe that American-style democratic capitalism*

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*threatens the Chinese Communist Party's political monopoly, but they also believe they can grow economically and still maintain their power...China has carefully fanned the flames of nationalism and anti-Americanism through the state-controlled media...[This] reflects a larger strategy on the part of the CCP to maintain stability and control as the economy rapidly opens up to the outside world and to American values and culture."*

*Since the introduction of reforms by Deng Xiaoping in 1978, this grand strategy has, to date, been remarkably successful. But will it continue to be in the future? A number of recent analyses suggest that China may be entering a much more turbulent period. An article in the July/August 2001 issue of Foreign Affairs ("China's Coming Transformation" by Gilboy and Heginbotham) concludes that "the social forces unleashed by economic reform are driving towards a fundamental transformation of Chinese politics...The struggle to maintain the political status quo while pursuing rapid economic growth has resulted in a non-adaptive, brittle state that is unable to cope with an increasingly organized, complex and robust society...Efforts [by the CCP] to resist political change will only squander economic dynamism...and ultimately threaten the system with collapse."*

*A subsequent article, ("China's Governance Crisis" by Minxin Pei in the September/October 2002 issue of Foreign Affairs) adds more detail to this argument. Pei notes that "China's current crisis results from fundamental contradictions in the reforms it has pursued over the last two decades, the hidden costs of which have begun to surface." These include the increasing problems caused by a weak legal system, declining participation in the CCP (former President Jiang Zemin's attempt to attract intellectuals and entrepreneurs to the party proved unsuccessful), widespread corruption (involving many CCP members) an growing resentment of it, widening income gaps, particularly between urban dwellers and the 800 million people living outside the cities, weakening of the healthcare and educational systems,*

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*growing unemployment and widespread underemployment (particularly at state owned enterprises), increasing environmental problems, energy shortages, and a huge volume of non-performing loans (estimated at up to 50% of total assets) to unprofitable (but job creating) state owned enterprises piled up on the books of China's four main state owned banks which dominate the financial system. Regarding the latter, some have estimated that the cost to clean up the state owned banks' books (ahead of full opening to foreign bank competition due in 2006 under the terms of the WTO agreement) amounts to 30% of GDP. Unfortunately, a key tool for alleviating the bad loan problem has recently been put on hold: due to questions about the accuracy of their financial reporting, further public equity offerings by state owned Chinese companies effectively have been suspended by the SEC. Added to the existing 30% public debt/GDP ratio, the contingent liability for cleaning up the Chinese banking system brings the country's public sector liabilities to 60% of GDP, an amount roughly equal to that found in the United States and Eurozone. Whether or not this will constrain the government's ability to address critical problems in the areas of healthcare, education and old age pensions that lead to high domestic saving (and hold back the development of domestic demand) remains to be seen.*

*Last but not least, a number of commentators have recently pointed to the mounting signs that the money supply growth caused by China's recycling of U.S. dollar export receipts is beginning to have noticeable negative effects on the economy, including, for example, overinvestment in productive capacity, potential asset bubbles in the property market, and greater number of non-performing loans state owned banks.*

*To be sure, the current leadership of the CCP is trying to address these issues. President Hu Jintao and Prime Minister Wen Jiabao have launched a widespread anti-corruption program, and tried to reposition the CCP as a more populist organization fighting for the country's still very, very large number of "have nots." At the same time, they have explicitly set lower growth goals for the*

*economy, and taken steps to limit the impact of dollar recycling (e.g., mandating slower bank credit growth, and allowing more overseas investment of export proceeds by companies). The critical uncertainty is whether these actions will be able to limit the building pressures for fundamental political change. If it does not, their only alternative means of holding the state together (and maintaining the CCP in power) would logically require an appeal to nationalism, which in turn would seem to require a more bellicose China (e.g., a serious, and economically debilitating crisis involving Taiwan). The pressures on the political system "already in the pipeline" seem likely to become more intense due to mounting economic problems."*

### Evidence Against the Cooperative Scenario Developing

Let us now turn to the evidence that has been presented in various articles over the past two months or so against the hypothesis that the cooperative scenario is developing in China – i.e., against the proposition that a smooth transition to growth driven by private consumption is underway, that will result in minimal domestic disruption along the way as well as minimal conflict with the United States.

In “China’s Red Flags”, GMO’s Edward Chancellor first reviews ten characteristics of “speculative manias and financial crises” throughout history, and then applies them to the current situation in China. The following table briefly summarizes his analysis (though we urge you to download and read the full piece):

<b><i>Historical Indicator</i></b>	<b><i>Application to China Today</i></b>
<i>“Great investment debacles generally start out with a compelling story.”</i>	<i>“Forecasts for urbanization and economic growth make for a compelling Wall Street pitch...Yet like the projections for internet growth back in the late 1990s, there’s a possibility that these forecasts may be exaggerated.”</i>

<b>Historical Indicator</b>	<b>Application to China Today</b>
<i>“A blind faith in the competence of the authorities is another typical feature of a classic mania.”</i>	“In the Communist Party of China We Trust.” Belief that the CCP will be able to take steps to avoid a significant slowdown in growth, or a deep crisis.
<i>“A general increase in investment is another leading indicator of financial distress. Capital is generally misspent during periods of euphoria.”</i>	China’s fixed investment/GDP ratio, at 58%, is unprecedented. Yet there is growing evidence that this money has not been well spent, with substantial overcapacity in many industry sectors. The efficiency of investment (change in investment divided by change in GDP) has been declining for more than 10 years.
<i>“Great booms are inevitably accompanied by a surge in corruption.”</i>	Widespread evidence of endemic corruption in China.
<i>“Strong growth in the money supply is another robust leading indicator of financial fragility. Easy money lies behind all great episodes of speculation.”</i>	“Low interest rates are part of Beijing’s policy to promote investment and subsidize state owned enterprises (SOEs)...Last year the money supply grew by nearly 30% while interest rates were maintained well below the economy’s nominal growth rate.”
<i>“Fixed currency regimes often produce inappropriately low interest rates, which are liable to feed booms and end in busts.”</i>	“An undervalued exchange rate has boosted exports and kept interest rates low.”
<i>“Crises generally follow a period of rampant credit growth.”</i>	“In response to the global financial crisis and the collapse of export orders, Beijing ordered its banks to go out and lend. Last year new bank lending increased by a sum equivalent to 29% of GDP.”
<i>“Moral hazard is another common feature of great speculative manias. Credit booms are often taken to extremes due to a prevailing belief that the authorities won’t let bad things</i>	“The major Chinese banks are controlled by the state. They have a history of poor lending decisions...Policy driven lending to China’s SOEs has landed China’s

<b>Historical Indicator</b>	<b>Application to China Today</b>
<i>happen to the financial system.”</i>	banks in trouble before.”
<i>“A rising stock of debt is not the only cause for concern. The economist Hyman Minsky observed that during periods of prosperity, financial structures become precarious. Investments financed with borrowed money don’t generate enough income to repay the loan (what Minsky called Ponzi Finance). As a result, the financial system becomes increasingly vulnerable to what would normally be considered insignificant events, such as a small rise in interest rates or a decline in asset prices.”</i>	“The trouble is, land sales to property developers account for some half of local government revenue. So if the real estate market tanks, then the local authorities may have trouble fulfilling their implicit obligation to make good on the infrastructure loans they have indirectly backed... No one can gauge the robustness of the credit system since Chinese banks appear particularly reluctant to report problem loans.”
<i>“Dodgy loans are generally secured against collateral, most commonly real estate. Thus, a combination of strong credit growth and rapidly rising property prices are a reliable leading indicator of very painful busts.”</i>	“Given low rates on cash and the wild volatility of stocks, property appears a much more attractive bet to Chinese savers...Boosting the housing market was a key element in Beijing’s stimulus package...Residential completions in Beijing have grown faster than the population...Much of this excess supply is being purchased by property market investors. A recent survey found nearly a fifth of all recently sold properties were kept vacant...Real estate prices have become very stretched relative to income...Housing has become a national obsession...The commercial property market looks similarly overblown.”

Chancellor sums up his argument thus: “In the past, whenever an economy has exhibited the ten red flags listed in this paper, there has been an unpleasant outcome...Three years ago Premier Wen described China’s economy as ‘unstable, unbalanced, uncoordinated, and unsustainable.’ The Great Recession hasn’t cured

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these imbalances. Rather, China's ensuing investment and credit booms exacerbated them."

Another widely read and influential research report is "China's Investment Boom: The Great Leap Into the Unknown" by Pivot Capital Management. It is also worth quoting at some length (again, we urge you to read the whole piece). "The Chinese economic "miracle", referring to the past 30 years of growth at an average real rate of 10% can be broadly split into three periods. In the 1980s, the first stage was unleashed by modest reforms of Deng Xiapoing such as liberalization of prices in the agricultural sector. After a brief pause coinciding with the Tiananmen events, the second stage concentrated on rationalization of labor that saw a proliferation of light industries at the expense of agriculture and State Owned Enterprises (SOEs). The third stage has been focused on expansion of heavy industries and infrastructure. What all three stages had in common was a central role of investments as a driver of economic growth. Indeed, China has emulated the path of other countries that have rapidly developed in the second half of the 20th century driven by high investment to GDP ratios. However, both in its duration and intensity, China's capital spending boom is now outstripping previous great transformation periods (e.g. postwar Germany and Japan or South Korea in the 1980-90s). The gradual increase in China's investment ratio that started in 1998 has now reached unprecedented levels. As a result, capital spending has become the dominant growth driver. The experience of the Asian tigers, as well as the post-war reconstruction periods of Germany and Japan, provides highly relevant benchmarks for analyzing China's multi-decade growth process and current situation. The eventual reversion of investment ratios in those countries tells a cautionary tale on its own, however, what makes the situation even more alarming, is the rapidly decreasing efficiency of China's investments. In the third decade of expansion, the Incremental Capital Output Ratio (ICOR, defined as the ratio of Gross Fixed Capital Formation to GDP divided by real GDP growth. The lower the ratio, the more efficient capital spending is at generating growth.) in China has markedly deteriorated compared to the previous two decades as well as to other high-growth countries in their pre-peak investment stages. In 2009 China's ICOR will be more than 2 times

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higher than the 80s and 90s average. The falling marginal returns on investment are symptomatic of the increasingly speculative nature of China's capital spending boom, where a self-feeding process of credit growth and investments in manufacturing, infrastructure and real estate is currently under way...[However], the effectiveness of domestic credit in generating growth is collapsing. In the period from 2000 to 2008, it took on average \$1.5 of credit to generate \$1 of GDP growth in China. This compares very favorably with the peak \$4 of credit for \$1 of GDP in USA in 2008. However in H1 2009 in China this ratio was already at around \$7 to \$1. Credit might be going into the luxury property and stock markets, but the trickle down to the real economy is very poor... The decreasing efficiency of investments will ultimately lead to a pullback in capital expenditures... To sum up, China is already at a very advanced stage of industrialization even when measured on a per capita basis, so room for further capacity expansion is limited. Urbanization is a driver that is vastly overstated, as China is much more urbanized than is reflected in statistics, so there is no "explosive" pent-up demand for residential construction and all that it entails. China's infrastructure is also relatively well developed and the expansion in the areas that still have room to grow was fast-forwarded by the stimulus implying that capex growth rates will already peak out this year. Sectoral analysis of investment in China confirms our initial conclusion that effectiveness of capex at boosting growth is diminishing and so investment will cease to be the dominant driver of future China's growth..."

"As the dust settles, we believe China will enter a phase of permanently reduced capital spending activity, whereby consumption will become the upper boundary of growth... In the best-case scenario emphasized by China bulls, private consumption will smoothly overtake investment as the growth engine so that there is no pullback in the overall growth rates. Here, we will start with a very simple fact that private consumption in China accounts for about a third of GDP. After a bumper year for credit and investment activity, it is going to be hard for investment to continue growing at an annual real rate of 30%. Even if we assume optimistic real annual investment growth rates of 10% for 2010 and 0% for 2011, leaving the trade balance where it is now, private consumption would have to grow at an average real rate of 20-30% for the next

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two years for overall GDP real growth levels to hit the magic 10%. On a conceptual level, consumption is one of the most stable components of any country's national accounts. Even in post-war US, real private consumption growth very rarely exceeded 10%, with the highest rolling 10-year average close to 5% (1952-1962). Likewise, in a war devastated, un-urbanized and demographically booming Japan, real annual consumption growth peaked at 12% in 1961. The average for the 1970s was a tamer 6%. Pundits calling for 20-30% growth rates in Chinese private consumption should dust their economic textbooks...Between 1997 and 2007, China's average real annual consumption growth rate averaged 8.2%...This means that private consumption would have to grow at anywhere between 3 to 4 times faster than in the past decade to compensate for the imminent [decline] in investment...It is hard to overemphasize what this shift to a consumption driven economy means for China's overall growth rate. On a simple mathematical level, it means that average real consumption growth rates are going to be capped at 7% to 8%, so that the overall economy grows at 5% to 6% per year for the foreseeable future, and probably slowing down even more later on... In a soft landing scenario, China is likely to shift to a lower growth trajectory for the next decade. In a hard landing scenario, which is entirely feasible, there would be an abrupt decline in capital spending exacerbated by a banking crisis...Considering China's role as a trailblazer and locomotive for current global recovery efforts, any sign of a Chinese slowdown would have significant global consequences. Not only would it challenge the notion of emerging markets leading the world economy out of its slump, but it would also raise doubts over the sustainability and effectiveness of various stimulus efforts underway in other countries."

A number of other recent analyses have focused more narrowly on the argument that the "mother of all property bubbles" is building in China. James Chanos concluded that "China is on a treadmill to hell...The nation is Dubai times a thousand...that can't afford to get off the heroin of property development, as it is the only thing keeping the economic growth numbers growing ("China on Treadmill to Hell Amid Bubble", Bloomberg.com, 8April10). Takatoshi Ito, a professor of economics at Tokyo University, concluded that "China's property bubble is worse than it looks...[as] official

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data may be significantly underestimating real price increases.” Moreover, “What is happening in China now is familiar to any Japanese who lived through the bubble in the second half of the 1980s and its subsequent burst” (“China’s Property Bubble”, voxeu.org 15April10, and “China’s Property Bubble is Worse than It Looks” *Financial Times* 16Mar10). Finally, Andy Xie, formerly Morgan Stanley’s Asia economist, and a man whose opinions we have found to be quite insightful over the years, has also been widely quoted about the growing Chinese property bubble. In the 23March10 issue of *Caixin*, Xie questioned whether China’s attempts to slowly deflate the growing bubble would meet with success: “We have seen this movie before. Beijing launched property tightening measures several times in the past but then relaxed them as soon as the market felt the bite. The bottom line is that local governments, and Beijing through them, depend very much on property for fiscal revenues. The market does not believe the government will cut off the hand that feeds it...The [current property bubble] will continue until Beijing proves its credibility. And it can only prove its credibility by maintaining a tight market policy until local governments and developers run out of money. After that, everyone will have to play by new rules.” At the present time, however, “local governments are readying for another round of property inflation. They have been using bank loans to resettle residents [from land they want to sell to developers to generate fiscal revenue] and resettlement costs have skyrocketed since those being moved need enough compensation to buy properties at today’s high prices...Such resettlements played an important role in supporting demand for property...Resettlement compensation...is probably the most important government action supporting today’s economy...But it comes with major negatives. Local governments borrow to pay resettlement packages, using land as collateral for the loans. Resettled residents use the cash they receive from the local government as down payments for housing. In this way, government debt becomes equity supporting household mortgage debt; there is no real equity in the financing chain. This gives local governments a strong interest in further inflating property prices.” Xie also believes that cultural factors are at work “China was a rural economy not so long ago. The most important asset was always land. ‘Be a government official and become rich’

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is a millennium old Chinese saying. It didn't explain where the money went. It always went into agricultural land." Xie also notes that a substantial portion of money derived from China's endemic corruption is now also flowing into the domestic property market, further fueling the boom ("I'll Tell You When the Chinese Bubble is About to Burst" Bloomberg.com, 25April10). In summary, Xie concludes that "China's property market is a massive bubble."

Other authors have taken a closer look at the flip side of the property bubble: the massive amount of potentially bad debt that has built up in China, whether it has been fully acknowledged, and who will bear the cost when the bad loans are eventually written off and/or worked out. In "Is China Actually Bankrupt?", Jim Jubak shows how IMF public sector Debt/GDP data for China fails to include some very critical categories, including local government debt, debts incurred by investment companies sponsored by local governments, debts that resulted from the 1999 resolution of China's last non-performing loan crisis, and loans from state owned banks to state owned enterprises. Taken together, Jubak estimates that China's true public sector Debt/GDP ratio is closer to 100% than the much lower estimates that are usually reported. Victor Shih, from Northwestern University, focuses on one aspect of the problem (which appears to be the most important): direct and indirect borrowings by local government entities. He estimates the total amount to be \$1.7 trillion at the end of 2009 (about 33% of GDP), which Shih forecasts will double by the end of 2011. Shih also estimates at least 25% of direct and indirect loans to local governments and government sponsored entities will eventually go bad ("China's 8,000 Credit Risks", *The Wall Street Journal*, 8Feb10, and "Victor Shih Sees Bank Bailout Redux", China Real Time Blog, WSJ.com, 17Mar10).

Michael Pettis, of *China Financial Markets* recently wrote an excellent overview of "Who Will Pay for China's Bad Loans?" (6April10). Pettis notes that, while a surge in non-performing loans (NPLs) doesn't automatically result in a banking collapse, they do, always and inevitably, extract a cost from the economy. The key question is how this cost is allocated. Looking back at the 1999 NPL crisis in China, Pettis notes,

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“China paid a very high price for its [last] banking crisis. This cost didn’t come in the form of a banking collapse, but rather in the form of a collapse in consumption growth, as households were forced to pay for the enormous clean up bill.” Pettis concludes that “there were three sets of tools that Beijing used to manage the sharp increase in bad loans that threatened the banking system a decade ago...The first involved reducing the accumulation rate of NPLs by keeping the interest rate charged to borrowers low...Households paid for this in the form of very low returns on their savings (and, with few alternative investment opportunities, they had no choice but to accept the cost)...The second was infusing the banks with additional equity, both directly and via the creation of Asset Management Companies to purchase NPLs at face value. In both cases, the capital infusion was financed by government borrowing, which at artificially low rates reduced the income paid to lenders – in this case, banks which bought the bonds, and the household depositors which received lower deposit rates...The third and most important tool involved the central bank mandating a wide spread between bank lending and the deposit rate, which increased bank profitability...With all these transfers from the household sector to the banks, amounting to at least 5% of GDP every year, households were forced to clean up the Chinese banking system. Beijing’s strategy to clean up the banks was very successful, and certainly prevented the banking crisis that everyone expected [ten years ago].” However there was a significant cost to the economy, in the form of artificially depressed household incomes and consumption spending, which made China more dependent on investment and exports to maintain GDP growth and employment. As Pettis notes, “added to the other major transfers from the household sector (the undervalued exchange rate and slow wage growth relative to productivity growth)...it is not surprising that during the period of the bank bailout, household income in China, already a relatively low share of GDP, declined to alarming levels.” Moreover, by artificially holding down lending rates, this approach to resolving the NPL problem also caused firms’ cost of capital to be artificially low, leading to inefficient investment, the results of which we have recently seen in China’s worsening Incremental Capital to Output Ratio. Pettis concludes, “This, then, is the real risk of

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another bout of rising non-performing loans in China...If the world can no longer absorb rising trade deficits, and especially if over the next few years trade tensions, increase, China must reduce its excessive reliance on exports and investments to fuel its continued growth. The only healthy way it can do so is if household consumption rises as a share of GDP because of surging consumption...But since growth in household consumption has always been constrained in China by the growth of household income, it may be unreasonable to expect a surge in consumption when households are also required to [once again] clean up another sharp increase in non-performing loans in the banking system...As part of the trade dispute that China is facing with the rest of the world, this should give some indication of how little room China has for adjustment. Anyone who is too impatient with the glacial pace of Chinese adjustment must recognize how difficult it will be for China to quickly reorient its economy towards household consumption. The risk is that China, like Japan in the 1990s, will rebalance towards a higher share of consumption in GDP not through a surge in consumption, but rather through a sharp contraction in investment and exports and overall GDP growth, as households struggle to pay for consequences of the lending boom.”

### Evidence Against the Development of the Conflict Scenario

Let us now turn to the economic evidence against the conflict scenario – that is, evidence that, in contrast to the above, suggests that a cooperative transition – both within China and within the global economy – is possible. Perhaps the most important is a recent study from the IMF, “Determinants of China’s Private Consumption: An International Perspective” by Guo and N’Diaye. The authors begin by reviewing the arguments that have been put forth that the high levels of savings in China somehow result from unique cultural circumstances (some of which we have covered in previous issues, such as how the one child policy resulted in an oversupply of males and therefore raised the amount of savings that must be accumulated to attract a spouse). The authors then review comparative economic data for China and other countries that have passed through similar development stages. They conclude that this analysis

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shows there is nothing special about the low level of consumption [and the high level of savings] in China. “Around one third of the fall in private consumption from 2000 to 2007 can be directly attributed to a fall in household income, while the remaining two thirds is due to other factors that may affect directly or indirectly household income and the household savings rate...The challenge is to explain why variables that drive higher consumption elsewhere are so low today in China, including a low level of service sector employment, the low level of financial sector development, and the low level of real interest rates...Efforts to further raise household income, the share of employment in the services sector, and to liberalize interest rates and create alternative savings instruments are likely to have the biggest impact on consumption.” In a second IMF paper, “Public Expenditures on Social Programs and Household Consumption in China”, Baldacci, Callegari, et al, conclude that “a sustained 1% of GDP in public expenditures, distributed equally across education, health and pensions, would result in a permanent increase in the household consumption ratio of 1.25% of GDP.” Finally, a number of commentators have suggested that a rise in the Chinese exchange rate relative to the U.S. Dollar might also result in higher Chinese household consumption spending on imported goods.

However, rebuttals to these papers are not hard to find. Regarding the first IMF paper, one need look no further than Pettis’ work to find reasons why neither an increase in household income nor liberalization of interest rates are likely to happen, given the nation’s approaching need to work out yet another non-performing loan crisis. With respect to higher government spending on social programs driving higher consumption spending, one would imagine that the leaders of a country facing a slowdown in GDP growth, a substantial non-performing loan problem, quite possibly a dangerous rise in unemployment, and with one of the world’s fastest aging populations (the legacy of the one child policy), as well as a very inefficient tax system, might think long and hard before creating new government healthcare and pensions liabilities. Moreover, in a nation that has a long tradition of upheaval, and shifting power between the central and local government, how much trust would Chinese households actually place in such new government entitlement programs, even if they were enacted? Finally, two

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other recent analyses conclude that the impact on employment of an appreciation of the Chinese Renminbi versus the U.S. Dollar is quite likely to be negative, at least in the short run. Chapter four of the April 2010 IMF *World Economic Outlook* is titled, "Getting the Balance Right: Transitioning Out of Sustained Current Account Surpluses." It is clearly aimed at finding ways to reduce a critical global imbalance: China's high current account surplus and the United States current account deficit. While it attempts to provide encouragement for a substantial appreciation of the CNY versus the USD, this goal is undermined by some of its findings, particularly that negative growth and employment effects are more likely to follow exchange rate appreciation in a surplus country when it has a larger surplus and a faster rate of GDP growth. These conclusions are echoed in another recent IMF analysis, "Employment Effects of Growth Rebalancing in China", also by Guo and N'Diaye. They find that "while rebalancing China's growth toward a domestic-demand led economy would likely raise aggregate employment in the long run, there could be employment losses in the short run as the economy moves away from the tradable sector to the non-tradable sector. Yet when maintaining employment growth is seen by the leaders of the Chinese Communist Party as critical to social peace and their own continued legitimacy, it is close to impossible to see them blithely acceding to demands for a substantial revaluation of the CNY versus the USD. In sum, it is one thing for Chinese Premier Wen Jiabao to promise a boost in employment, household consumption, consumer credit, and service industry growth, as he did at the end of the recent National People's Congress. But it is quite another thing to actually deliver on those promises.

### Conclusions

So where does this leave us?

This review has not changed our previous conclusion, that the evidence against the cooperative scenario developing is far more compelling than the evidence against the conflict scenario developing. We believe that there will probably be a serious economic downturn in China at some point over the next three years. While the CCP leadership

would like to delay that crisis until after 2012, events outside of China – such as the enactment of trade sanctions by a U.S. government frustrated by continuing high unemployment – may trigger it before then. However, that still leaves us with three issues: (1) the timing of what seems to be the inevitable crisis; (2) the way it will play out; and (3) the implication of these developments for asset allocation.

### What Happens Next?

With respect to timing, we can only repeat an observation we have made many times over the past 14 years: One of the hallmarks of a complex adaptive system is that, as its level of internal and external tension rises, and its stability declines, so too will its creative efforts to adapt and prevent a move into the chaotic region of operation. We saw this process play out in the run-up to the crisis of 2007; so too, we believe we are seeing it play out again today, both in China and in the global economy and financial markets as a whole. One example of this is the decision on the part of Chinese and U.S. leaders to pull back from the rapidly intensifying conflict that was developing in the run-up to the scheduled April release date for the semi-annual U.S. report on which nation's have been deliberately manipulating their exchange rates, to the detriment of the U.S. economy. At a time when the U.S. faces the highest unemployment levels since the Great Depression, this was surely not a decision taken lightly by the Obama Administration (e.g., a recent Rasmussen poll found that 25% of Americans now bay China is the biggest threat to the United States, trailing only Iran at 30%). Yet as this review has shown, the Chinese leadership also faces serious problems and constraints, and the central governments of both nations undoubtedly are unwilling to push the system into the chaotic region if this step can be avoided, or until they believe that taking this step would be to their advantage. In sum, one of the hallmarks of a complex adaptive system is its ability to absorb rising tensions without tipping over into the chaotic region for a much longer period of time than most people initially believe is possible. We don't believe that China will be an exception to this rule – in particular, we believe that with a major leadership transition on the horizon in 2012, every effort will be made by the CCP to maintain stability at least until a new

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generation of leaders are in place.

That leadership contest is now aggressively underway, and may offer us important insights as to how events in China could develop over the next five years. Some have described the 2012 leadership transition as a contest between two factions: the so-called “Princelings” (offspring of party elders, especially those who were close to Mao) and the so-called “Communist Youth League” (CYL) faction, who generally come from humbler backgrounds, and which provided the current leadership team of President Hu Jintao and Premier Wen Jiabao. The two most visible Princelings vying for 2012 leadership positions are Vice President Xi Jinping, and Chongqing Party Secretary Bo Xilai.

In broad terms, the CYL faction seems relatively more focused on finding a way to prolong the current system, including such measures as aggressive bank lending, resistance to substantial appreciation of the CNY versus the USD, and berating the United States for failing to adjust its own economy. More darkly, the CYL leadership has not hesitated to run roughshod over property and contract law in order to benefit Chinese companies (the recent controversy over forced disclosure of technology secrets as a condition of Western companies selling to the Chinese government being only the latest incident), has presided over a very substantial increase in military and domestic security spending, and has stoked the fires of Chinese nationalism, in a variety of ways, from the Olympics to the rhetoric of various government officials (the Commerce Ministry being the most vociferous). In our view, they are the faction whose behavior is most likely to lead to our conflict scenario, when the current Chinese bubble inevitably pops.

In contrast, the Princelings seem to be taking a different route, preparing to use a resurgence in Maoist teachings and beliefs to manage the challenges to CCP legitimacy that will inevitably accompany the bursting of the bubble. Bo Xilai epitomizes this approach, with his aggressive anti-corruption campaign in Chongqing and his populist focus on economic development that benefits the masses rather than just the elites. In this regard, Bo Xilai seems to be using an archetypal religious

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script, that features a creation story (the Long March, Mao's pulling down of the "three big mountains" of feudalism, bureaucracy, and imperialism, etc.), a fall (the rise of uneven economic development) and redemption (presumably, via a return to fundamental Maoist precepts). This is likely to have a powerful impact, as people traditionally turn more to religious belief (and clearly I am stretching the meaning of that term here) for solace during periods of deep turmoil. Put differently, the Princelings seem to be preparing for one of the periods of intensified inward focus during a period of turmoil that have characterized Chinese history – call it tradition with Maoist elements. Whether the rest of the world will find this approach more cooperative and less confrontational remains to be seen. Indeed, it seems uncertain – at best, a 50/50 bet -- whether neo-Maoism will be able to contain the social and political forces that will be unleashed by the combination of dashed expectations, nationalism, and a surplus of young males. Moreover, the rest of the world is not a passive, reactive player in this game, as shown by rising demands in the United States for trade sanctions and tariffs on China (in the absence of exchange rate changes) in order to reverse perceived job losses. Events in China may well be significantly affected by developments abroad.

Finally, we highlight another aspect of the ongoing leadership transition in China. In an excellent recent paper, ("A Global Model for Forecasting Political Instability"), Goldstone, Bates, et al present a four factor model that appears, at least in retrospect, to have an excellent track record in forecasting the onset of serious episodes of political instability between 1955 and 2003. Three of the variables are straightforward: the level of infant mortality, the extent of instability and conflict in neighboring countries, and the extent of state led discrimination against domestic groups. The fourth, however, has the most explanatory power: the authors call it "Regime Type", which they characterize by "patterns in the process of recruiting political leaders and competition between political participants." The type of regime that has the highest association with political instability is what the authors call "Partial Democracy with Factionalism", which is characterized by a leadership selection process based on a mix of birth status and limited use of elections, and political competition that is

dominated by factional groups. China increasingly seems to fit this description, which provides an early warning indicator that rough waters lie ahead.

### Implications for Asset Allocation

Finally, what are the asset allocation implications for our updated assessment of possible future developments in China? The following table summarizes our views on this question:

<b>Asset Class</b>	<b>Comments</b>
<b>Real Return Bonds</b>	<ul style="list-style-type: none"> <li>• Lower global economic growth and higher uncertainty should hold down real return bond yields</li> </ul>
<b>Fixed Income</b>	<ul style="list-style-type: none"> <li>• Reluctance of China to change export oriented model and/or significantly revalue CNY/USD XR will exert deflationary pressures. However, this should be followed by stronger measures to reflate. Careful attention to valuation will be critical. So too will credit risk management, including sovereigns, for which credit risk is now an issue. We agree with PIMCO that high quality corporate risks could play a role in a portfolio, along with CAD and AUD. Norway and Sweden may also prove attractive, providing investors view them as relatively more stable than other nations. Appeal of USD Govts will depend on the extent to which the economy's response to the crises that lie ahead is characterized by superior flexibility and innovation, and resolution of municipal debt, social security, and health care financing challenges.</li> </ul>
<b>Commercial Property</b>	<ul style="list-style-type: none"> <li>• In certain regions where property is a traditional refuge in periods of deep uncertainty (e.g., EUR and CHF), it should do well. Elsewhere, it will generally suffer from economic stagnation, while</li> </ul>

	<p>retaining some appeal as an inflation hedge. A bright spot may be industrial property, to the extent that turmoil in China and/or XR changes results in return of production to Europe and North America.</p>
<b>Commodities</b>	<ul style="list-style-type: none"> <li>Falling growth in China will trigger a sharp downward shock. Recovery will depend on perceived attractiveness as an inflation hedge.</li> </ul>
<b>Timber</b>	<ul style="list-style-type: none"> <li>Will remain attractive as a long-term inflation hedge and diversifying asset class for portfolios.</li> </ul>
<b>Developed Market Equities</b>	<ul style="list-style-type: none"> <li>Continued high uncertainty will limit investment and growth; Growth expectations implicit in current prices are unlikely to be realized; Returns will likely be below long-term averages.</li> </ul>
<b>Emerging Market Equities</b>	<ul style="list-style-type: none"> <li>Without strong Chinese growth, very likely that current valuations will be viewed as too high, with falling prices resulting.</li> </ul>
<b>Volatility</b>	<ul style="list-style-type: none"> <li>Likely to rise from current levels, which seemed to be depressed either by ignorance of the scale of the challenges that lie ahead, or excessive optimism about the world economy's ability to meet them without substantial disruption and uncertainty.</li> </ul>
<b>Gold</b>	<ul style="list-style-type: none"> <li>Along with rising concerns about high public sector debt levels, rising instability in China and failure to achieve investor's current growth expectations for that country will increase uncertainty, fear and gold prices.</li> </ul>
<b>Uncorrelated Alpha Strategies</b>	<ul style="list-style-type: none"> <li>Conditions will be ripe for skilled global macro managers to deliver high returns. Not so for Equity Long/Short, which will be hurt by its traditional net long position. As always, Equity Market Neutral will come down to superior manager skill, and disciplined hedging of</li> </ul>

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	market exposure. Arbitrage strategies could suffer as historical relationships fail to work in a period of fundamental economic change and high uncertainty. Currency strategies like carry trades will also likely suffer due to high uncertainty and unpredictable changes in the global economy.
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## **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 31Mar10*

<i>Australia</i>	<b>Low Demanded Return</b>	<b>High Demanded Return</b>
<b>High Supplied Return</b>	79%	115%
<b>Low Supplied Return</b>	118%	160%

<i>Canada</i>	<b>Low Demanded Return</b>	<b>High Demanded Return</b>
<b>High Supplied Return</b>	72%	126%
<b>Low Supplied Return</b>	134%	202%

<i>Eurozone</i>	<b>Low Demanded Return</b>	<b>High Demanded Return</b>
<b>High Supplied Return</b>	45%	83%

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<b>Low Supplied Return</b>	81%	125%
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<i>Japan</i>	<b>Low Demanded Return</b>	<b>High Demanded Return</b>
<b>High Supplied Return</b>	87%	151%
<b>Low Supplied Return</b>	168%	250%

<i>United Kingdom</i>	<b>Low Demanded Return</b>	<b>High Demanded Return</b>
<b>High Supplied Return</b>	29%	69%
<b>Low Supplied Return</b>	65%	111%

<i>United States</i>	<b>Low Demanded Return</b>	<b>High Demanded Return</b>
<b>High Supplied Return</b>	92%	159%
<b>Low Supplied Return</b>	179%	266%

<i>Switzerland</i>	<b>Low Demanded Return</b>	<b>High Demanded Return</b>
<b>High Supplied Return</b>	74%	129%
<b>Low Supplied Return</b>	137%	265%

<i>India</i>	<b>Low Demanded Return</b>	<b>High Demanded Return</b>
<b>High Supplied Return</b>	68%	165%
<b>Low Supplied Return</b>	201%	348%

<i>Emerging Markets</i>	<b>Low Demanded Return</b>	<b>High Demanded Return</b>
<b>High Supplied Return</b>	107%	212%
<b>Low Supplied Return</b>	155%	260%

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

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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 Mar 10**:

Region	Risk Free Rate Demanded	Actual Risk Free Rate Supplied	Difference	Overvaluation (>100) or Undervaluation (<100)
Australia	2.2	2.8	0.6	94
Canada	2.8	1.5	-1.3	113
Eurozone	2.9	1.3	-1.6	117
Japan	2.8	1.6	-1.2	113
United Kingdom	2.8	0.6	-2.3	125
United States	2.5	1.6	-0.9	109

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

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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 Mar 10*

	<b>Current Real Rate*</b>	<b>Average Inflation Premium (89-03)</b>	<b>Required Nominal Return</b>	<b>Nominal Return Supplied (10 year Govt)</b>	<b>Yield Gap</b>	<b>Asset Class Over or (Under) Valuation based on 10 year zero</b>	<b>Implied Annual Inflation Rate over 10 year time horizon = <math>(1+Nom)/(1+Real)-1</math></b>
Australia	2.80%	2.96%	5.76%	5.77%	0.01%	-0.07%	2.89%
Canada	1.48%	2.40%	3.88%	3.57%	-0.31%	3.06%	2.06%
Eurozone	1.28%	2.37%	3.65%	3.09%	-0.56%	5.60%	1.78%
Japan	1.55%	0.77%	2.32%	1.39%	-0.93%	9.58%	-0.16%
UK	0.60%	3.17%	3.77%	3.93%	0.16%	-1.56%	3.31%
USA	1.58%	2.93%	4.51%	3.84%	-0.67%	6.59%	2.23%
Switz.	1.55%	2.03%	3.58%	1.90%	-1.68%	17.75%	0.35%
India	1.55%	7.57%	9.12%	7.87%	-1.25%	12.24%	6.22%

\*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!

	<b>AAA – 10 Year Treasury</b>	<b>BAA-AAA</b>
Average	1.20%	.94%
Standard Deviation	.44%	.34%
Skewness	.92	3.11
Kurtosis	.53	17.80

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At **31 Mar 10**, the AAA minus 10 year Treasury spread was 1.48%. The AAA minus BAA spread was 0.99%. 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 1,854 days with a higher BAA spread (15.9% of all days in our sample). Current spreads still reflect a relatively high degree of investor uncertainty about future liquidity and credit risk, despite the declines in the BBB and AAA spreads from their crisis highs. However, given the uncharted economic waters through which we are still passing, and our belief that the conventional wisdom naturally underestimates the amount of trouble on the horizon, we believe that these spread likely reflect the underpricing of liquidity and credit risk – or, to put it differently, the overpricing of AAA and BBB rated bonds – on a one year time horizon. We also note the high liquidity risk spread (AAA less Treasury), in contrast to the relatively lower credit spread. Something here doesn’t add up, and we suspect it is the underpricing of credit risk.

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

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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:

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**Annual Exchange Rate Changes Implied by Bond Market Yields on 31 Mar 10**

	To AUD	To CAD	To EUR	To JPY	To GBP	To USD	To CHF	To INR
From								
<b>AUD</b>	0.00%	-2.20%	-2.68%	-4.38%	-1.84%	-1.93%	-3.87%	2.10%
<b>CAD</b>	2.20%	0.00%	-0.48%	-2.18%	0.36%	0.27%	-1.67%	4.30%
<b>EUR</b>	2.68%	0.48%	0.00%	-1.70%	0.84%	0.75%	-1.19%	4.78%
<b>JPY</b>	4.38%	2.18%	1.70%	0.00%	2.54%	2.45%	0.51%	6.48%
<b>GBP</b>	1.84%	-0.36%	-0.84%	-2.54%	0.00%	-0.09%	-2.03%	3.94%
<b>USD</b>	1.93%	-0.27%	-0.75%	-2.45%	0.09%	0.00%	-1.94%	4.03%
<b>CHF</b>	3.87%	1.67%	1.19%	-0.51%	2.03%	1.94%	0.00%	5.97%
<b>INR</b>	-2.10%	-4.30%	-4.78%	-6.48%	-3.94%	-4.03%	-5.97%	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 Mar 10**: We use the dividend discount model approach to produce our estimate of whether a property market is over, under, or fairly priced today, assuming a long-term perspective on property market valuation drivers. The specific formula is  $(\text{Current Dividend Yield} \times 100) \times (1 + \text{Forecast NOI Growth})$  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	5.8%	0.2%	6.0%	2.8%	3.0%	5.8%	96%
Canada	4.9%	0.2%	5.1%	1.5%	3.0%	4.5%	87%
Eurozone	5.0%	0.2%	5.2%	1.3%	3.0%	4.3%	81%
Japan	9.7%	0.2%	9.9%	1.6%	3.0%	4.6%	45%
Switzerland*	3.3%	0.2%	3.5%	1.5%	3.0%	4.5%	132%
U.K.	3.6%	0.2%	3.8%	0.6%	3.0%	3.6%	93%
U.S.A.	4.4%	0.2%	4.6%	1.6%	3.0%	4.6%	99%

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

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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

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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

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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 Mar 10**:

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

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) held about even in March at .63%, compared to .65% last month, .94% two months ago, and .90% 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

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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 Mar 10** closing value of 83.01 was .50 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.

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There are three arguments that, on a medium term view, commodities are underpriced today. The first is the large amount of monetary easing underway in the world, which, at some point, could lead to higher inflation. The second is the equally large amount of fiscal stimulus being applied to the global economy, with its focus on infrastructure projects, should eventually boost demand for commodities (and indirectly boost economic growth in commodity exporting countries like Australia and Canada). The third is that the possibility that we will see a substantial fall in the value of the US Dollar versus other currencies, causing investors to increase their holdings of commodities as confidence in fiat currencies wanes. The argument that commodities are overvalued today on a medium term view is based on the belief that (a) investment in clean fuels and other changes in environmental regulation will cause a permanent reduction in global demand for oil relative to supply; (b) the inability to quickly resolve the economic challenges facing the world economy will result in a prolonged period of weak or no growth, which will reduce the demand for commodities; and (c) that in scenario of prolonged global stagnation, investors will prefer to increase their holdings of short term government bonds, and perhaps gold, rather than increasing their holdings of a broader range of commodities. Taking all of these arguments into consideration, the valuation question comes down to the probabilities one attaches to a decline in global demand from today's relatively weak levels (which would cause commodities prices to fall) and the development of a crisis of confidence in the U.S. dollar (which would cause commodities prices to rise). On balance, we believe that the former is more likely than the latter, as the High Uncertainty Regime typically sees a flight into U.S. dollars rather than a flow out of them. On that basis, we conclude that commodities are likely overvalued today.

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 likely undervalued today, on a one year time horizon.

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## 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

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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

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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, Travisi, Ding, Markandya and Nunes. For a review of similar studies, see “Estimates of Carbon Mitigation Potential from Agricultural and Forestry Activities” by the U.S. Congressional Research Service).

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

<b>Growth Driver</b>	<b>Assumption</b>
Biological growth of trees	We assume 6% as the long term average for a diversified timberland portfolio. We stress that biological growth rates can vary widely for different types of timber investment (with softwoods and timber located in tropical countries delivering the highest growth, and hardwoods and timber in more temperate climates delivering the slowest growth rates). We have also changed our valuation model to assume a constant mix of product grades, to present a better approximation for timber as a global asset class.
Harvesting rate	As a long term average, we assume that 5% of tree volume is harvested each year. As a practical matter, this should vary with timber prices and the REITs prevailing dividend level. So 5% is a “noisy” long-term estimate for timber as a global asset class.
Change in prices of timber products	In line with IMF data, we assume that over the long term, average timber prices will just keep pace with inflation. Again, this is a “noisy” estimate, because the IMF data also shows that real prices are highly volatile. Moreover, there are indications that climate change is causing increasing tree deaths in some areas, which should lead to future real price increases (see

Growth Driver	Assumption
	“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 **31 Mar 10** is shown in the following table. We use the dividend discount model approach to produce our estimate of whether timber is over, under, or fairly valued today. The specific formula is  $(\text{Current Dividend Yield} \times 100) \times (1 + \text{Forecast Dividend Growth})$  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)	4.30%
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	<b><u>5.30%</u></b>
Real Bond Yield	1.58%
Plus Risk Premium for Timber	3.00%
Equals Average Annual Real Return Demanded	<b><u>4.58%</u></b>
Ratio of Returns Demanded/Returns Supplied Equals Valuation Ratio (less than 100% implies undervaluation)	<b><u>82%</u></b>

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 CO<sub>2</sub> sequestration service are likely to be significant, and/or that four percent is too high a risk premium to use, then you could argue that timber is likely underpriced today.

In sum, timber valuation is an issue upon which reasonable people can and do disagree, in no small measure because of their different time horizons and the different underlying assumptions and methodologies they use to reach their conclusions. On balance, taking a long-term view, we continue to believe that timberland is likely

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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 Mar 10**, the VIX closed at 17.59. To put this in perspective, 53% of the days in our sample had higher closing values of the VIX. In sum, at the end of March, as far as volatility was concerned, the conventional wisdom was that equity market conditions had returned to normal. We continue to believe that, in the short term – say, over the next 12 months – this will probably prove to be too low, as investors’ expectations that the normal regime will continue will meet with disappointment as the conflict scenario and/or a worsening global influenza pandemic develops. As we noted above with respect to commodities, despite the likely impact of fiscal stimulus on aggregate demand, and monetary growth on price levels (i.e., reducing the risk of prolonged deflation), the core issues that lie at the heart of the current recession remain unresolved. We have repeatedly noted in recent months that the probability of a return to the high uncertainty regime is rising. Critically, we do not believe that this information and its likely impact on future uncertainty levels has been fully incorporated into S&P 500 option prices, and hence

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into the VIX. For these reasons as of **31 Mar 10** we estimate that volatility is probably underpriced over a short-term time horizon. Over a longer-term time horizon, we believe that volatility is still possibly underpriced today. The logic behind this view is that structural changes – such as electronic trading, faster dispersal of information to investors, and the substantial amount of money committed to various quantitative trading strategies -- may well have made equity prices permanently more volatile than they have been in the past.

### **Sector and Style Rotation Watch**

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

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

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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 Mar 10**

<b><i>Economy</i></b>	Bottoming	Strengthening	Peaking	Weakening
<b><i>Interest Rates</i></b>	Falling	Bottom	Rising	Peak
<b><i>Style and Size Rotation</i></b>	Small Growth (DSG) <b>8.91%</b>	Small Value (DSV) <b>10.21%</b>	Large Value (ELV) <b>5.57%</b>	Large Growth (ELG) <b>4.89%</b>
<b><i>Sector Rotation</i></b>	Cyclicals (RXI) <b>6.98%</b>	Industrials (EXI) <b>9.10%</b>	Staples (KXI) <b>3.97%</b>	Utilities (JXI) <b>-4.79%</b>
<b><i>Bond Market Rotation</i></b>	Higher Risk (HYG) <b>2.09%</b>	Short Maturity (SHY) <b>0.69%</b>	Low Risk (TIP) <b>0.20%</b>	Long Maturity (TLT) <b>0.25%</b>

## Product and Strategy Notes

- On the new product front, State Street has filed for a new US ETF that will track an index of non-USD investment grade corporate bonds. Given the investors' growing worries about sovereign debt (the subject of an article in next month's

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issue), this new product (planned ticker is IBND) could prove quite useful in the years ahead. Elsewhere, Claymore has launched an ETF that tracks the Wilshire 5000 US Equity Index, which is the broadest measure of US equity market performance. Its ticker is WFVK, and, with expenses of just 12 basis points per year, it is very aggressively priced.

- On the fixed income indexing front, we were interested to read two recent articles: “In Bond Indexing, the Worst is First” by Randall Forsyth in the March 16, 2010 issue of *Barrons*, and “Region of Reverse Command”, by Ramin Toloui from PIMCO. Both of them raised the same criticism of bond indexes that we did in our December 2004 article on “Investing in Debt Markets” – because (unlike equities) bonds don’t represent a residual claim on the issuer’s cash flow, market capitalization based indexing methodologies run the risk of perversely giving more weight in an index to profligate issuers whose credit quality may be on the decline. Unsurprisingly, PIMCO found that a GDP weighted index of sovereign bonds outperformed a market cap based index. As we first noted six years ago, we continue to believe that fixed income indexing methodologies are relatively underdeveloped, and that sampling approaches (e.g., an equally weighted matrix defined by duration and credit exposure) are preferable to market cap weighting. The PIMCO article also made another point that we have previously raised: that in today’s brave new world, there is room for debate over what constitutes the “risk free asset” upon which so much asset pricing theory depends. As a practical matter, we believe that U.S. Treasury securities will continue to play that role; however, but for the limited liquidity of their markets, we continue to believe that Australian and Canadian government bonds could also be candidates for that role, given these nations’ resource endowments, good fiscal management, well functioning political systems, and the way they have dealt with their pension and health care liabilities.

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- Speaking of fixed income, with many sovereigns needing to issue large amounts of debt over the next few years, public debt management offices are undoubtedly searching for new products to entice investors. With that in mind, we found a new discussion paper from the UK based Pensions Institute a very interesting read. In “Sharing Longevity Risk: Why Governments Should Issue Longevity Bonds”, Blake, Boardman and Cairns make a compelling case for governments taking this step. If you want to quickly develop a good understanding of what may soon emerge as an investable asset class, read this excellent paper.
  - We also recommend two recent papers on investing in commercial property/real estate. Institutions such as insurance companies and pension funds that are trying to match long term assets with long-term liabilities need to develop estimates of their respective durations (i.e., weighted average maturity and sensitivity to interest rate changes, which are often used to discount pension liabilities to their present value). In this context, the duration of commercial property, and therefore its role in a portfolio that seeks to match the duration of assets and liabilities has long been a subject for debate, because many of the cash flows associated with real property (e.g., rents and maintenance) can change over time, in line with economic growth and inflation, as well as factors specific to a given property market (e.g., the degree to which new supply is constrained). In a new paper (“The Interest Rate Sensitivity of Real Estate”), Chaney and Hoesli present a new study of the real estate duration issue, using a very detailed database covering the Swiss investment real estate market. We were very interested to read their conclusion that the average Swiss property in their database had a long-term free cash flow based return of 4.4% per year – exactly in line with the 4.5% assumption we have used in our valuation model for Swiss commercial property. On the duration issue, the authors conclude that a 1% change in interest rates should, on average, produce a 13.1% change in the value of a commercial office property.

- The second interesting paper on real estate investing is “Real Estate Allocation Puzzle in the Mixed Asset Portfolio: Fact or Fiction?” by Cheng, Lin, Liu and Zhang. The authors’ starting point is the observation that actual allocations to real property are lower than modern portfolio theory suggests they should be. In response, they note that MPT is a single period model that, critically, assumes that asset class returns are independent and identically distributed over time (i.i.d.) They show that for non-securitized property (i.e., non-REITS), this assumption is rejected by the data. As a result, actual real property returns and risk are holding period dependent. They conclude, “once real estate performance is measured over more realistic holding periods – which are longer due to illiquidity and high transaction costs – the real estate allocation puzzle appears to be fiction rather than fact.”

## **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 2010, our GBP cash benchmark is .81% (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/UK.php>