The Index Investor

Invest Wisely…Get an Impartial Second Opinion.

Contents

ISSN 1554-5075

October: Key Points

We review three key analyses that were released by the IMF last month: the Fiscal Monitor, Global Financial Stability Report, and World Economic Outlook. Taken together, they paint a relatively bleak picture of a world economy poised on the cusp of a dangerous regime shift. We find nothing in these reports that contradicts our long-held view that financial markets are heading into a prolonged period of very rough sailing. To be sure, there always grounds for hope, and plans for escaping the current downward trend, and we review two more of them this month. However, whether it is the IMF's or other analyses, relatively hopeful scenarios for the next few years always include an assumption that China will be willing and able to reorient its economy to generate a much higher level of private consumption demand. That great uncertainty will be our focus next month.

Global Asset Class Returns

YTD30Sep11	In USD	In AUD	In CAD	In EUR	In JPY	In GBP	In CHF	In INR
Asset Held								
USD Bonds	7.26%	12.44%	11.90%	7.25%	2.04%	7.76%	4.63%	15.96%
USD Prop.	-5.58%	-0.40%	-0.94%	-5.59%	-10.81%	-5.08%	-8.21%	3.11%
USD Equity	-9.76%	-4.58%	-5.12%	-9.77%	-14.98%	-9.26%	-12.39%	-1.06%
AUD Bonds	8.56%	13.74%	13.20%	8.55%	3.34%	9.07%	5.93%	17.26%
AUD Prop.	-10.01%	-4.83%	-5.37%	-10.02%	-15.24%	-9.51%	-12.64%	-1.32%
AUD Equity	-17.61%	-12.43%	-12.97%	-17.61%	-22.83%	-17.10%	-20.24%	-8.91%
CAD Bonds	5.13%	10.31%	9.77%	5.12%	-0.10%	5.63%	2.50%	13.82%
CAD Prop.	9.06%	14.24%	13.70%	9.06%	3.84%	9.57%	6.43%	17.76%
CAD Equity	-16.84%	-11.66%	-12.20%	-16.85%	-22.06%	-16.33%	-19.47%	-8.14%
CHF Bonds	10.63%	15.81%	15.27%	10.62%	5.41%	11.13%	8.00%	19.33%
CHF Prop.	13.48%	18.66%	18.12%	13.47%	8.26%	13.99%	10.85%	22.18%
CHF Equity	-11.52%	-6.33%	-6.87%	-11.52%	-16.74%	-11.01%	-14.14%	-2.82%
INR Bonds	-17.53%	-12.35%	-12.89%	-17.54%	-22.75%	-17.02%	-20.16%	-8.83%
INR Equity	-28.47%	-23.29%	-23.83%	-28.48%	-33.69%	-27.97%	-31.10%	-19.77%
EUR Bonds	11.02%	16.20%	15.66%	11.01%	5.80%	11.52%	8.39%	19.72%
EUR Prop.	-12.13%	-6.95%	-7.49%	-12.14%	-17.36%	-11.63%	-14.76%	-3.44%
EUR Equity	-20.11%	-14.93%	-15.47%	-20.12%	-25.33%	-19.60%	-22.74%	-11.41%

ISSN 1554-5075

YTD30Sep11	In USD	In AUD	In CAD	In EUR	In JPY	In GBP	In CHF	In INR
JPY Bonds	6.12%	11.30%	10.76%	6.11%	0.89%	6.62%	3.49%	14.81%
JPY Prop.	-10.22%	-5.03%	-5.57%	-10.22%	-15.44%	-9.71%	-12.84%	-1.52%
JPY Equity	-12.48%	-7.30%	-7.84%	-12.49%	-17.71%	-11.98%	-15.11%	-3.79%
GBP Bonds	9.44%	14.62%	14.09%	9.44%	4.22%	9.95%	6.82%	18.14%
GBP Prop.	-8.15%	-2.97%	-3.51%	-8.16%	-13.38%	-7.65%	-10.78%	0.54%
GBP Equity	-14.02%	-8.84%	-9.38%	-14.02%	-19.24%	-13.51%	-16.65%	-5.32%
1-3 Yr USGvt	1.30%	6.48%	5.94%	1.29%	-3.92%	1.81%	-1.33%	10.00%
World Bonds	3.14%	8.32%	7.78%	3.14%	-2.08%	3.65%	0.51%	11.84%
World Prop.	-10.24%	-5.06%	-5.60%	-10.25%	-15.47%	-9.74%	-12.87%	-1.55%
World Equity	-14.32%	-9.14%	-9.68%	-14.33%	-19.54%	-13.81%	-16.95%	-5.62%
Commod Long Futures	-15.02%	-9.84%	-10.38%	-15.03%	-20.25%	-14.52%	-17.65%	-6.33%
Commode L/Short	-12.38%	-7.20%	-7.74%	-12.39%	-17.61%	-11.88%	-15.01%	-3.69%
Gold	13.94%	19.12%	18.58%	13.93%	8.72%	14.45%	11.31%	22.64%
Timber	-0.28%	4.90%	4.36%	-0.29%	-5.51%	0.22%	-2.91%	8.41%
Unmoral Alpha	-1.63%	3.55%	3.01%	-1.64%	-6.85%	-1.13%	-4.26%	7.07%
Volatility VIX	142.03%	147.21%	146.67%	142.02%	136.81%	142.53%	139.40%	150.73%
Currency								
AUD	-5.18%	0.00%	-0.54%	-5.19%	-10.40%	-4.68%	-7.81%	3.52%
CAD	-4.64%	0.54%	0.00%	-4.65%	-9.86%	-4.14%	-7.27%	4.06%
EUR	0.01%	5.19%	4.65%	0.00%	-5.22%	0.51%	-2.62%	8.70%
JPY	5.22%	10.40%	9.86%	5.22%	0.00%	5.73%	2.59%	13.92%
GBP	-0.50%	4.68%	4.14%	-0.51%	-5.73%	0.00%	-3.13%	8.19%
USD	0.00%	5.18%	4.64%	-0.01%	-5.22%	0.50%	-2.63%	8.70%
CHF	2.63%	7.81%	7.27%	2.62%	-2.59%	3.13%	0.00%	11.33%
INR	-8.70%	-3.52%	-4.06%	-8.70%	-13.92%	-8.19%	-11.33%	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

ISSN 1554-5075

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

YTD 30Sep11	**In USD**	**In AUD**	**In CAD**	**In EUR**	**In JPY**	**In GBP**	**In CHF**	**In INR**
Eq Mkt Neutral								
HSKAX	-2.66%	2.52%	1.98%	-2.67%	-7.89%	-2.16%	-5.29%	6.03%
OGNAX	0.73%	5.91%	5.37%	0.72%	-4.49%	1.24%	-1.90%	9.43%
Arbitrage								
ARBFX	2.94%	8.12%	7.58%	2.93%	-2.29%	3.44%	0.31%	11.63%
ADANX	0.18%	5.36%	4.82%	0.17%	-5.04%	0.68%	-2.45%	8.88%
Currency								
DBV	-3.33%	1.85%	1.31%	-3.34%	-8.55%	-2.82%	-5.96%	5.37%
ICI	-5.05%	0.13%	-0.41%	-5.06%	-10.27%	-4.54%	-7.68%	3.65%
Equity L/S								
HSGFX	7.16%	12.34%	11.80%	7.15%	1.94%	7.66%	4.53%	15.86%
PTFAX	-4.91%	0.27%	-0.27%	-4.91%	-10.13%	-4.40%	-7.54%	3.79%
GTAA								
MDLOX	-7.70%	-2.52%	-3.06%	-7.71%	-12.92%	-7.19%	-10.33%	1.00%
PASAX	-3.67%	1.51%	0.97%	-3.67%	-8.89%	-3.16%	-6.30%	5.03%

Overview of Our Valuation Methodology

This short introduction is intended to provide an overview of our valuation methodology, and to put the analyses that follow into a larger, integrated context. Our core assumption is that forecasting asset prices is extremely challenging, because unlike physical systems, the behavior of political economies and financial markets isn't governed by constant natural laws. Instead, they are complex adaptive systems, in which positive feedback loops and non-linear effects are common, due to the

ISSN 1554-5075

interaction of competing investment strategies (e.g., value, momentum, arbitrage and passive approaches), and investor decisions that are made on the basis of incomplete information, by individuals with limited cognitive capacities, who are often pressed for time, affected by emotions, and subject to the influence of other people. We further believe that these interactions give rise to three different regimes in financial markets that are characterized by very different asset class return, risk, and correlation parameters. We term these three regimes "High Uncertainty", "High Inflation" and "Normal Times."

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

We believe that investors are best served when their primary performance benchmark is the long-term real return their portfolio must earn in order to achieve their long term financial goals. We believe the best way to implement this approach is via a portfolio of broadly defined, low cost, low turnover, asset class index products that provide exposure to a diversified mix of underlying return generating processes. In this context, conservatively managing risk in order to avoid large losses is mathematically more important than taking aggressive risk position to reach for

ISSN 1554-5075

additional returns via actively managed strategies. This is not to say that in some cases investors would benefit from those additional active returns. Such cases typically involve aggressive goals, low starting capital, low savings, and/or a short time horizon. In these situations, it is mathematically clear that an allocation to certain actively managed investment strategies can benefit a portfolio, provided the results of those strategies have a low or no correlation with returns on the investor's existing allocations to broad asset class index products. The use of these "uncorrelated alpha" products has a further benefit, in that they avoid the situation (common in traditional actively managed funds) where an investor pays much higher fees to an active manager for performance that is, in fact, a mix of the index fund's results (often referred to as "beta") and the manager's skill (often referred to as "alpha").

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

ISSN 1554-5075

approach, many investors choose to reinvest over time (i.e., "dollar cost average") to limit potential regret.

We also recognize that the valuation analyses which form the basis for these risk management decisions all contain an irreducible element of uncertainty. Hence, we believe that investors' fourth risk management discipline should be to combine our forecasts with those made by other analysts who use different methodologies. Research has demonstrated that forecast combination, using either simple averaging or more complex methods, improves forecast accuracy.

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

The analyses we provide each month can be grouped into three major categories. First, we compare prevailing asset class prices to our estimate of fundamental values. Second, we present a number of analyses that are intended to warn of the development of conditions that raise the probability of sudden and substantial short-term changes in collective investor behavior. These include (a) Trends in rolling three month asset class returns that assess the probability of a High Uncertainty or High Inflation regime developing (which are dangerous since both of these are extreme disequilibrium conditions); (b) Trends in sector returns within asset classes that indicate the next turning points in the normal business cycle; (c) An assessment of the direction and intensity of recent price momentum (with accelerating positive momentum in the face of fundamental overvaluation the most dangerous

ISSN 1554-5075

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 sees as the most likely to develop.

For the time series perspective, we vertically compare this month's average rolling three-month return for each of the three regimes to the respective rolling three month averages 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.

ISSN 1554-5075

Rolling Three Month Returns in USD		**30Sep2011**
High Uncertainty	***High Inflation***	***Normal Growth***
Short Maturity US Govt Bonds (SHY) **0.53%**	US Real Return Bonds (TIP) **4.52%**	US Equity (VTI) **-15.17%**
1 - 3 Year International Treasury Bonds (ISHG) **-5.48%**	Long Commodities (DJP) **-11.62%**	EAFE Equity (EFA) **-20.55%**
Equity Volatility (VIX) **160.05%**	Global Commercial Property (RWO) **-16.84%**	Emerging Equity (EEM) **-26.27%**
Gold (GLD) **8.26%**	Long Maturity Nominal Treasury Bonds (TLT)* **29.40%**	High Yield Bonds (HYG) **-7.43%**
Average ***40.84%*** ***Three Months Ago:*** ***0.18%***	***Average (with TLT short)*** ***-13.34%*** ***Three Months Ago:*** ***-1.01%***	***Average*** ***-17.35%*** ***Three Months Ago:*** ***0.47%***

* Falling returns on TLT indicate rising inflation expectations

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

ISSN 1554-5075

of different asset classes in three regimes, which we have termed high uncertainty, high inflation and normal times. In the latter regime, asset class returns are strongly attracted to their equilibrium levels – i.e., to the situation in which the returns supplied and the returns demanded are close to balance.

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

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

ISSN 1554-5075

averaging) forecasts produced using different methodologies. With that admonition, our results are as follows:

Regime	Normal Regime	High Uncertainty Regime	High Inflation Regime	***Forecast Annual USD Real Return Over Next Three Years (weighted real return plus premium)***
Assumed Regime Probability Over Next 36 Months	*20%*	*50%*	*30%*	
Real Return Bond Yield	*3.5*	*2.5*	*1.5*	*2.4*
Asset Class Premia Over Real Rate (pct)				
Domestic Bonds	1.0	1.0	-3.0	*2.2*
Foreign Bonds	0.5	2.0	0.5	*3.7*
Domestic Property	3.0	-10.0	1.0	*(1.7)*
Foreign Property	3.0	-10.0	-1.5	*(2.5)*
Commodities	2.0	-6.0	3.0	*0.7*
Timber	2.0	-8.0	1.0	*(0.9)*
Domestic Equity	3.5	-12.0	-5.0	*(4.4)*
Foreign Equity	3.5	-12.0	-7.0	*(5.0)*
Emerging Equity	4.5	-15.0	1.0	*(3.9)*
Gold	-2.0	2.0	2.5	*3.8*
Volatility	-25.0	50.0	25.0	*29.9*

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

ISSN 1554-5075

overvaluations at **30 Sep 11**. 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

ISSN 1554-5075

verbal scale to express our confidence level in our valuation conclusions. "Possible" represents a relatively low level of confidence (e.g., 25% – 33%, or a 1 in 4 to 1 in 3 chance of being right), "likely" a moderate level of confidence (e.g., 50%, or a 1 in 2 chance of being right), and "probable" a high level of confidence (e.g., 67% to 75%, or a 2 in 3 to 3 in 4 chance of being right). We do not use a quantitative scale, because we believe that would give a false sense of accuracy to judgments that are inherently approximate due to the noisy data and subjective assumptions upon which they are based.

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

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

ISSN 1554-5075

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

Valuation at 30Sep11	***Current Price versus Long-Term Fundamental Valuation Estimate***	***Rolling 3 Month Return in Local Currency***	***Rolling 3 Month Return 3 Months Ago***
AUD Real Bonds	Neutral	7.80%	1.88%
AUD Bonds	Neutral	10.97%	2.40%
AUD Property	Possibly Underpriced	-7.73%	-0.92%
AUD Equity	Likely Underpriced	-11.51%	-4.59%
CAD Real Bonds	Possibly Overpriced	3.93%	4.38%
CAD Bonds	Possibly Overpriced	7.75%	2.30%
CAD Property	Likely Underpriced	0.40%	-0.05%
CAD Equity	Possibly Underpriced	-12.31%	-5.24%
CHF Bonds	Likely Overpriced	7.68%	2.38%
CHF Property	Likely Overpriced	0.45%	6.32%
CHF Equity	Neutral	-11.96%	-1.45%
EUR Real Bonds	Neutral	1.72%	-1.76%
EUR Bonds	Likely Overpriced	11.55%	3.55%
EUR Prop.	Possibly Underpriced	-17.21%	3.87%
EUR Equity	Likely Underpriced	-23.52%	0.38%

ISSN 1554-5075

Valuation at 30Sep11	*Current Price versus Long-Term Fundamental Valuation Estimate*	*Rolling 3 Month Return in Local Currency*	*Rolling 3 Month Return 3 Months Ago*
GBP Real Bonds	Possibly Overpriced	2.52%	4.16%
GBP Bonds	Possibly Overpriced	8.10%	2.30%
GBP Property	Possibly Underpriced	-20.64%	9.18%
GBP Equity	Probably Underpriced	-13.97%	0.47%
INR Bonds	Neutral	-5.17%	-5.66%
INR Equity	Neutral	-12.69%	-3.15%
JPY Real Bonds	Neutral	-0.78%	2.96%
JPY Bonds	Neutral	1.09%	1.09%
JPY Property	Possibly Underpriced	-8.90%	-1.58%
JPY Equity	Neutral	-14.26%	-0.77%
USD Real Bonds	Possibly Overpriced	4.42%	3.46%
USD Bonds	Possibly Overpriced	4.16%	3.06%
USD Property	Possibly Underpriced	-14.31%	3.46%
USD Equity	Neutral	-15.04%	-0.12%
Following in USD:			
Investment Grade Credit (CIU)	Possibly Overpriced	1.09%	2.21%
High Yield Credit (HYG)	Likely Overpriced	-7.20%	1.14%
Emerging Mkt Equity (EEM)	Possibly Underpriced	-26.31%	-0.79%
Commodities Long	Likely Overpriced	-11.62%	-8.02%
Gold	Neutral	8.26%	4.39%
Timber	Probably Underpriced	-13.43%	-2.55%

ISSN 1554-5075

Valuation at 30Sep11	*Current Price versus Long-Term Fundamental Valuation Estimate*	*Rolling 3 Month Return in Local Currency*	*Rolling 3 Month Return 3 Months Ago*
Uncorrelated Alpha	N/A	-3.39%	0.76%
Volatility (VIX)	Neutral	160.05%	-6.88%
Future Return in Local Currency from holding USD:	***Based on Covered Interest Parity***		
Returns to AUD Investor	Positive	10.07%	-3.58%
Returns to CAD Investor	Neutral	7.85%	-0.83%
Returns to EUR Investor	Neutral	8.77%	-2.44%
Returns to JPY Investor	Negative	-4.82%	-2.51%
Returns to GBP Investor	Positive	3.13%	-0.16%
Returns to CHF Investor	Negative	9.04%	-8.99%
Returns to INR Investor	Positive	8.73%	0.24%

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. A great challenge across multiple scientific disciplines has been to identify indicators that could give an early warning that a system is approaching one or more critical thresholds (also known as a tipping points) that if passed could generate a phase transition or regime change. Clearly, this is extremely difficult; indeed, studies in this area are at the leading edge of complexity science (see, for example, "Turning Back from the Brink: Detecting An Impending Regime Shift in Time to Avoid It" by Biggs, Carpenter and Brock, "Early Warning Signals of Extinction in Deteriorating Environments" by Drake and Griffen, "Interacting Regime Shifts in Ecosystems: Implications for Early Warning" by Brock and Carpenter, and "Early Warning Signals for Critical Transitions" by Sheffer et al).

Broadly speaking, the early warning indicators that have been tentatively identified fall into three categories. The first is increased alignment in the behavior of different parts of a system (e.g., individual investors, in a narrowly defined bubble; or

ISSN 1554-5075

multiple asset classes and subsectors, in a broader, systemic bubble). 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 (we use the past month), 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

ISSN 1554-5075

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:

Oct10	*Nov10*	*Dec10*	*Jan11*	*Feb11*	*Mar11*	*Apr11*	*May11*	*Jun11*	*Jul11*	*Aug11*	*Sep11*
0.41	(0.57)	0.46	-	0.50	0.19	0.57	0.19	(0.24)	0.30	(0.28)	(0.26)

The second broad category of indicators is based on analysis of time series data – in our case, our monthly returns data for these 38 financial markets. Researchers have identified three time series indicators that seem to presage regime shifts. The first is known as "critical slowing down", in which a system "approaching a critical point becomes increasingly slow in recovering from small perturbations." As a result of this slowing down in the rate at which a system changes, "the state of the system at any given moment becomes more like its past state." In statistical terms, the autocorrelation factor increases – i.e., the correlation between the current set of monthly asset class returns the preceding set approaches 1.0 as the responsiveness of a complex system slows down. The second time series indicator is known as "flickering", which occurs as a system enters a critical region where it is affected by two so-called "attractors", or alternate states (e.g., the recent trend toward "risk on" and "risk off" trades, involving two broad baskets of asset classes). As a system is pulled back and forth between these two states – as it "flickers" – the variance and standard deviation of performance metrics (e.g., financial returns) tend to increase. The third time series indicator is an increase in skewness, as fluctuations in the state of a system (e.g., asset class returns) become more asymmetrical (i.e., skewed) as a critical phase transition approaches.

As financial markets become more fragile, and approach a possible phase transition to a new regime, we would therefore expect to observe some combination of the following indicators: an increase in the order parameter towards 1.0 or (1.0); an increase in autocorrelation; an increase in standard deviation, and an increase in skewness. With that in mind, we have analyzed our historical series of local currency

returns data for 38 asset classes (e.g., equities) and subsectors (e.g., Australia and Canadian equities), and used them to construct indicators for monthly average autocorrelation, standard deviation and skewness, in addition to Borland's order parameter. We have approached this analysis from two perspectives. First, at the individual asset class and subsector level, we calculate rolling autocorrelations, standard deviation and skewness for two distinct 12 month periods, ending in the most recent month. For a specific asset class and subsector, an alert is triggered when all three have increased between the two periods. At the end of **September, 2011**, the behavior of the following asset classes has triggered alerts, indicating a heightened possibility of a regime change that would likely be accompanied by a sharp change in asset prices: CA Government Bonds, EUR Real Return Bonds, EUR Equities, GBP Property, JPY Real Return Bonds, Emerging Market Equities, Gold, and USD/Euro.

To assess the riskiness of the global financial system as a whole, the following table shows levels of autocorrelation, standard deviation and skewness over the past twelve months.

Key Regime Change Time Series Indicators

Deltas	Oct10	Nov10	Dec10	Jan11	Feb11	Mar11	Apr11	May11	Jun11	Jul11	Aug11	Sep11
Autocorrel	0.60	(0.51)	(0.43)	(0.35)	0.00	(0.23)	0.13	(0.25)	(0.02)	0.46	0.75	0.64
Std Dev%	2.99	3.56	5.86	3.77	2.50	3.10	3.75	2.56	2.81	9.39	6.79	8.41
Skewness	(1.53)	1.40	(2.46)	0.61	0.01	(0.10)	(2.98)	(0.84)	0.92	4.57	1.45	2.38

As you can see, all three indicators have experienced sharp increases and remain at high, and therefore dangerous, levels.

The third indicator of system riskiness that we use is the spread between the yields on AAA bonds and ten year, nominal return U.S. Treasuries (based on data published in the Federal Reserve's H15 report). We regard this as a proxy for perceived liquidity risk in the global financial system – as that risk increases, investors sell AAA bonds (bidding down their price and driving up their yields) and buy more liquid Treasuries (bidding up their price, and driving down their yields). Hence, a widening yield spread between AAA bonds and 10 year Treasuries indicates rising

ISSN 1554-5075

systematic liquidity risk in the global financial system. At the end of **September 2011**, this yield was almost two (1.74) standard deviations above its historical mean (based on daily observations between 1986 and 2010). Only 7% of days over this period had a higher spread. We conclude that this indicates a very substantially elevated level of liquidity risk in the global financial system.

Overall, our analysis of the different early warning indicators described above leads us to conclude that, at the end of **September 2011**, there continues to be a significant and growing risk of a sudden, substantial, and highly correlated change in prices across multiple global asset classes.

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

ISSN 1554-5075

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.

Equities

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

ISSN 1554-5075

Equities Undervalued?", people can and do disagree about the "right" values for the variables we use in our fundamental analysis.

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

Equity Market Valuation Analysis at 30 Sep 2011

Australia	**Low Demanded Return**	**High Demanded Return**
High Supplied Return	39%	66%
Low Supplied Return	63%	93%

Canada	**Low Demanded Return**	**High Demanded Return**
High Supplied Return	36%	82%
Low Supplied Return	80%	135%

ISSN 1554-5075

.

Eurozone	Low Demanded Return	High Demanded Return
High Supplied Return	43%	70%
Low Supplied Return	68%	98%

.

Japan	Low Demanded Return	High Demanded Return
High Supplied Return	43%	94%
Low Supplied Return	94%	156%

.

United Kingdom	Low Demanded Return	High Demanded Return
High Supplied Return	14%	49%
Low Supplied Return	43%	83%

.

United States	Low Demanded Return	High Demanded Return
High Supplied Return	32%	87%
Low Supplied Return	85%	153%

Switzerland	Low Demanded Return	High Demanded Return
High Supplied Return	33%	68%
Low Supplied Return	65%	176%

India	Low Demanded Return	High Demanded Return
High Supplied Return	22%	98%
Low Supplied Return	100%	205%

Emerging Markets	Low Demanded Return	High Demanded Return
High Supplied Return	34%	100%
Low Supplied Return	64%	130%

ISSN 1554-5075

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 ultimately drives the increase in productivity. Hence, in our analysis, we assume that future economic growth reflects the growth in the labor force and TFP.

Unfortunately, future economic growth is not guaranteed; 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 all 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
UK	0.5	1.20	1.7	0.9	1.0	3.0	2.8
US	0.8	1.20	2.0	1.0	1.0	3.0	2.5

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

The next table compares this long-term equilibrium real risk free rate with the real risk free return that is currently supplied in the market. Negative spreads indicate that real return bonds are currently overvalued, as their prices must fall in order for their yields (i.e., the returns they supply) to rise. The valuation is based on a comparison of the present values of ten year zero coupon bonds offering the rate demanded and the rate supplied, as of **30 Sep 2011**:

ISSN 1554-5075

Region	Risk Free Rate Demanded %	Actual Risk Free Rate Supplied %	Difference	Overvaluation (>100) or Undervaluation (<100)
Australia	2.2	1.7	-0.5	105
Canada	2.8	0.7	-2.1	123
Eurozone	2.9	1.9	-1.1	111
Japan	2.8	0.8	-2.0	122
UK	2.8	0.1	-2.7	131
US	2.5	0.4	-2.1	123

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

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

ISSN 1554-5075

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 Bonds

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 plus a premium for inflation uncertainty. We use the latter two variables as a proxy for the average rate of inflation likely to prevail over a long period of time. To estimate of the degree of over or undervaluation for a bond market, we use the rate of return supplied and the rate of return demanded to calculate the present values of a ten year zero coupon government bond, and then compare them. If the rate supplied is higher than the rate demanded, the market will appear to be undervalued. This information is contained in the following table:

Bond Market Analysis as of 30 Sep 2011

	Current Real Rate	Average Inflation (89-03)	Inflation Uncertainty Premium	Required Nominal Return	Nominal Return Supplied (10 year Govt)	Return Shortfall or Excess	Asset Class Over or (Under) Valuation, based on 10 year zero coupon	Implied Annual Inflation Over 10 Year Horizon
Australia	1.70%	2.96%	0.25%	4.91%	4.17%	-0.74%	**7.34%**	2.18%
Canada	0.69%	2.40%	0.25%	3.34%	2.14%	-1.20%	**12.39%**	1.19%
Eurozone	1.85%	2.37%	0.25%	4.47%	1.89%	-2.58%	**28.41%**	-0.21%
Japan	0.78%	0.77%	0.25%	1.80%	1.03%	-0.77%	**7.89%**	0.00%
UK	0.12%	3.17%	0.25%	3.54%	2.42%	-1.12%	**11.49%**	2.05%
USA	0.39%	2.93%	0.25%	3.57%	1.93%	-1.64%	**17.31%**	1.28%
Switzerland	0.92%	2.03%	0.25%	3.20%	0.96%	-2.24%	**24.56%**	-0.21%
India	0.92%	7.57%	0.25%	8.74%	9.13%	0.39%	**-3.48%**	7.88%

ISSN 1554-5075

*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 inflation levels. This risk is especially acute today, when the world economy is operating in unchartered waters, and faces both 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 – e.g., see the recent IMF study, "Fiscal Deficits, Public Debt, and Sovereign Bond Yields" by Baldacci and Kumar). As we like to point out, in the absence of public policy interventions, over indebtedness on the part of private borrowers typically results in widespread bankruptcies and deflation caused by the accelerating liquidation of collateral. In contrast, over indebtedness 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, which we know all too well).

The following two pieces of information may help your to put the current situation in perspective. The last column of the table above shows 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). As you can see, apart from Japan and India, government bond markets do not appear to be incorporating either deflation or levels of inflation substantially above historical norms. This is not consistent with our view of how the future is likely to unfold. On the one hand, this may be due to wishful thinking by some investors. On the other hand, it may reflect efforts by central

banks to maintain interest rates at a constant level, to maximize the impact of fiscal stimulus programs on aggregate demand.

The second piece of information that can help to put our government bond valuation analysis into a larger context is presented in the following table. It shows historical average inflation rates (and their standard deviations) for the U.K. and U.S. over very long periods of time:

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

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, it may well be the case that many countries will first experience declining prices (deflation) before they experience a substantial rise in inflation. From this perspective, government bonds may be underpriced over the expected time horizon for deflation, but overpriced in the context of the substantial reflations which governments will eventually attempt (given that the economic consequences of deflation seem to be much worse than those associated with higher than normal inflation). In sum, when it comes to questions about bond market valuation, one's time horizon assumption is critical.

Liquidity and 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,

ISSN 1554-5075

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, 2010. The average standard deviation measures the extent to which observed values vary around the average; about 67% of the time, the outcome should be within one standard deviation, assuming the outcomes are normally distributed (i.e., have a "bell curve" shape); 95% of the time, the outcome should be within two standard deviations. Skewness measures the extent to which the distribution is non-symmetrical around the mean (i.e., departs from the normal distribution); a normal distribution has skewness equal to zero. Positive values indicate that more than half the outcomes are above the average. Kurtosis measures the extent to which a distribution has more or fewer extreme outcomes than a normal distribution, or, put differently, the extent to which the size of the variance (the standard deviation squared) is driven by extreme outcomes. Kurtosis above zero indicates that a distribution has more extreme outcomes than a normal distribution.

Particularly in the case of the BAA spread, it is clear we are not dealing with a normal distribution!

	AAA – 10 Year Treasury	**BAA-AAA**
Average	1.26	0.98
Standard Deviation	.47	.41
Skewness	0.81	3.00
Kurtosis	.16	12.56

ISSN 1554-5075

At **30 September 2011**, the AAA minus 10 year Treasury spread was 2.08%. The AAA minus BAA spread was 1.28%. Since the distributions of AAA and BAA credit spreads are not normal (i.e., they do not have a "bell curve" shape), we need to look at history rather than Gaussian (normal curve) statistics to put them into perspective. Over the past twenty-four years, about 7% of all trading days had a higher AAA-Treasury spread. Over the same period, about 14% of all trading days had a higher AAA-BBB spread. In sum, current yield differentials paint a picture of a debt market in which liquidity risk is rising and credit risk is possibly underpriced given other data pointing to a significant rise in macroeconomic and financial market risk (i.e., BBB yields are too low).

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

ISSN 1554-5075

(as noted in our June 2007 issue) there are some important players in the foreign exchange markets who are not profit maximizers, carry trades are often profitable, at least over short time horizons (for an excellent analysis of the sources of carry trade profits – of which 25% may represent a so-called "disaster risk premium", see "Crash Risk in Currency Markets" by Farhi, Frailberger, Gabaix, Ranciere and Verdelhan). Our expected medium to long-term changes in exchange rates are summarized in the following table:

Annual Exchange Rate Changes Implied by Bond Market Yields on 30 Sep 2011

	To AUD	To CAD	To EUR	To JPY	To GBP	To USD	To CHF	To INR
From								
AUD	0.00%	-2.03%	-2.28%	-3.14%	-1.75%	-2.24%	-3.21%	4.96%
CAD	2.03%	0.00%	-0.25%	-1.11%	0.28%	-0.21%	-1.18%	6.99%
EUR	2.28%	0.25%	0.00%	-0.86%	0.53%	0.04%	-0.93%	7.24%
JPY	3.14%	1.11%	0.86%	0.00%	1.39%	0.90%	-0.07%	8.10%
GBP	1.75%	-0.28%	-0.53%	-1.39%	0.00%	-0.49%	-1.46%	6.71%
USD	2.24%	0.21%	-0.04%	-0.90%	0.49%	0.00%	-0.97%	7.20%
CHF	3.21%	1.18%	0.93%	0.07%	1.46%	0.97%	0.00%	8.17%
INR	-4.96%	-6.99%	-7.24%	-8.10%	-6.71%	-7.20%	-8.17%	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

ISSN 1554-5075

in recent months – that rents can fall sharply over the short term during an economic downturn.

Our analysis also assumes that over the long-term, investors require a 3.0% risk premium above the yield on real return bonds as compensation for bearing the risk of securitized commercial property as an asset class. Last but not least, there is significant research evidence that commercial property markets are frequently out of equilibrium, due to slow adjustment processes as well as the interaction between fundamental factors and investors' emotions (see, for example, "Investor Rationality: An Analysis of NCREIF Commercial Property Data" by Hendershott and MacGregor; "Real Estate Market Fundamentals and Asset Pricing" by Sivitanides, Torto, and Wheaton; "Expected Returns and Expected Growth in Rents of Commercial Real Estate" by Plazzi, Torous, and Valkanov; and "Commercial Real Estate Valuation: Fundamentals versus Investor Sentiment" by Clayton, Ling, and Naranjo). Hence, it is extremely hard to forecast how long it will take for any over or undervaluations we identify to be reversed. The following table shows the results of our valuation analysis as of **30 Sep 2011**: We use the dividend discount model approach to produce our estimate of whether a property market is over, under, or fairly priced today, assuming a long-term perspective on property market valuation drivers. The specific formula is (Current Dividend Yield x 100) x (1+ Forecast NOI Growth) divided by (Current Yield on Real Return Bonds + Property Risk Premium - Forecast NOI Growth). Our estimates are shown in the following tables, where a value greater than 100% implies overpricing, and less than 100% implies underpricing.

Country	Dividend Yield	Plus LT Real Growth Rate	Equals Supply of Returns	Real Bond Yield	Plus LT Comm Prop Risk Premium	Equals Returns Demanded	Over or Undervaluation (100% = Fair Value)
Australia	6.2%	0.2%	6.4%	1.7%	3.0%	4.7%	72%
Canada	5.3%	0.2%	5.5%	0.7%	3.0%	3.7%	65%
Eurozone	5.8%	0.2%	6.0%	1.9%	3.0%	4.9%	80%
Japan	5.0%	0.2%	5.2%	0.8%	3.0%	3.8%	71%
Switzerland*	2.7%	0.2%	2.9%	0.9%	3.0%	3.9%	136%

ISSN 1554-5075

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)
U.K.	3.6%	0.2%	3.8%	0.1%	3.0%	3.1%	81%
U.S.A.	3.7%	0.2%	3.9%	0.4%	3.0%	3.4%	86%

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

As you can see, on a long-term view, an increased number of commercial property markets look underpriced today. Over the next twelve months, however, we believe the balance of risks points in a negative direction. Consumer spending remains weak in many markets, rents are generally stagnant, and landlords still face significant debt refinancing. It is hard to see how further government stimulus 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. While these factors tend to undermine (but not eliminate) inflation hedging based demand as source of support for property security prices, we also recognize that, at least in some markets, this can be offset by property's historical attraction as a means of preserving wealth in very difficult and uncertain political circumstances. In sum, a combination of circumstances is making current property security prices look more attractive than they have in months.

ISSN 1554-5075

Commodities

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

premiums have been shown to be larger than the ex-ante premiums investors should logically have expected.

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

The second source of the return on a long-only commodity index fund is the so-called "roll yield." Operationally, a commodity index fund buys futures contracts in the most liquid part of the market, which is usually limited to the near term. As these contracts near their expiration date, they are sold and replaced with new futures contracts. For example, a fund might buy contracts maturing in two or three months, and sell them when they approached maturity. The "roll yield" refers to the gains and losses realized by the fund on these sales. If spot prices (i.e., the price to buy the physical commodity today, towards which futures prices will move as they draw closer to expiration) are higher than two or three-month futures, the fund will be selling high and buying low, and thus earning a positive roll yield. When a futures market is in this condition, it is said to be in "backwardation." On the other hand, if the spot price is lower than the two or three month's futures price, the market is said to be in "contango" and the roll yield will be negative (i.e., the fund will sell low and buy high). The interesting issue is what causes a commodity to be either backwardated or contangoed. A number of theories have been offered to explain this phenomenon. The one that seems to have accumulated the most supporting evidence to date is the so-called "Theory of Storage": begins with the observation that, all else being equal,

ISSN 1554-5075

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. Moreover, because of changing supply and demand conditions in many physical commodity markets (e.g., global demand has been growing, while marginal supplies are more expensive to develop and generally have long lead times), it is not clear that historical tendencies toward backwardation or contango are a good guide to future conditions.

To the extent that any generalizations can be made, higher real option values, and hence backwardation and positive roll returns are more likely to be found when demand is strong and supplies are tight, and/or when there is a rising probability of a supply disruption in a commodity where storage is difficult. For example, ten commodities make up roughly 75% of the value of the Dow Jones AIG Commodities Index. The current term structures of their futures curves are as follows on **30 Sep 2011**:

ISSN 1554-5075

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

However (and this is a critical however), this Theory of Storage analysis assumes that there is no change in the relative supply of investors willing to purchase futures contracts sold by commodity producers. This assumption has been violated in recent years, which have seen a dramatic increase in the amount of investment committed to long-only commodity futures based index funds. Some observers have argued that this increase in demand for commodity futures has overwhelmed any changes that have taken place on the supply side that are driven by the Theory of Storage. They conclude that this has resulted in a permanent change in the structure of many commodity futures markets that has made contangoed conditions, and hence negative roll returns, much more likely. We are persuaded of the logic of this argument, which is why in our model portfolios we now use products (e.g., the ETF LSC), that can take both long and short positions in commodity futures, based on market supply and demand conditions as evaluated by an algorithm (technically, this produces an index that the fund tracks; however, for all intents and purposes, these are active quantitative strategies).

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. On a weighted basis (using the DJAIG weights), the forward premium (relative to the spot price) at **30 Sep 2011** was 1.48%, (up from .81% last month), compared to .64% at the end of 2010. Remember, a forward premium means the roll

ISSN 1554-5075

return will be negative (because the futures investor will be selling the maturing contract at a lower price than he or she must pay to replace it with a longer-dated contract). Roll returns are positive only when there is a forward discount (when the average price of a futures contract with a long maturity is lower than the price of a contract with a very short maturity).

This brings us to the third source of return for long-only commodity futures funds: unexpected changes in the price of the commodity during the term of the futures contract. It is important to stress that the market's prevailing consensus about the expected change in the spot price is already included in the futures price that is paid when the contract is purchased. The source of return we are referring to here is the portion of the final realized price change that was unexpected when the futures contract was purchased. Given the large increase in funds committed to long-only, commodity futures based index investments, unexpected price changes have become a much more important source of return than they have been in the past. The good news is that this return driver probably offers skilled active 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). In this regard, large price surprises seem to be more frequent when supply and demand for a commodity are finely balanced – the same conditions which can also give rise to changes in real option values and positive roll returns, under the Theory of Storage. However, given our economic outlook, at this point in time we view negative surprises on the demand side that depress commodity prices as more likely than demand or supply surprises that have the opposite effect. Put differently, on balance we expect price surprises to have a negative impact on commodity returns over the next year.

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

ISSN 1554-5075

will be higher to the extent that price volatilities are high, and the correlations of price changes across commodities are low. Historically, this rebalancing return has been estimated to be around 2% per year, for an equally weighted portfolio of different commodities. However, as correlations have risen in recent years, the size of this return driver has probably declined – say to 1% per year.

So, to sum up, the expected supply of returns from a futures based commodity index fund over a given period of time equals (1) the current yield on real return bonds, reduced by the percentage of funds used to purchase the futures contracts; (2) expected roll yields, adjusted for commodities' respective weights in the index; (3) unexpected spot price changes; and (4) the expected rebalancing return. Of these, the yield on real return bonds can be observed, and we can conservatively assume a long-term rebalancing return of, for example, 1.0%. These two sources of return are clearly less than the demand for returns that are equal to the real rate plus a risk premium of, say, 3.0%. The difference must be made up by a combination of roll returns (which, given the current shape of futures curves, are likely to be negative in the near term) and unexpected price changes, due to unanticipated changes in demand (where downside surprises currently seem more likely than upside surprises) and/or unanticipated changes in supply conditions (e.g., incomplete investor recognition of slowing oil production from large reservoirs, a major disruption due to war/terrorism or a significant accident, discovery of significant new deposits, or a major breakthrough that makes biofuels much more cost competitive). On balance, at **30 Sep 2011**, we believe that returns on many commodity futures are more likely to be negative over the next year than positive; hence, using this analytical framework we conclude that commodities are likely overpriced today, using a one-year time horizon.

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 2010, the inflation adjusted (i.e., real) DJAIG had an average value of 90.73, with a standard deviation of 15.62 (skewness of .62, and kurtosis of .05; i.e., it was close to a normal distribution). The inflation adjusted **30 Sep 2011** closing value of 84.48 was about half a standard deviation below the long term average for the real

index (last month it was about half a standard deviation above). Assuming the possible values of the index are normally distributed around its historical average (which in this case is approximately correct), a value within plus or minus one standard deviation of the average should occur about 67% of the time, and a value within two standard deviations 95% of the time. So in this sense, the real value of the real DJAIG Index is still well within its normal range.

Whether the current level of the inflation adjusted DJAIG signifies that commodities are undervalued depends upon the time horizon being used. There are four arguments that, on a medium term (three to five year) 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 recovering growth in the world economy, which is causing demand for many commodities to bump up against supply side constraints (because it takes time to increase the supply of most commodities, in the short term increases in demand beyond a certain point trigger rapid price increases). 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 fourth is that, given a rising world population, and increasing levels of development and affluence in many developing countries, demand for many commodities is rising faster than their supply, which will structurally put upward pressure on future prices. To be sure, where these conditions have existed in the past, some combination of new technology and new discoveries have enabled supply growth to exceed demand growth, and thereby caused the observed long term decline in the real price of many commodities (as has most vividly recently happened to natural gas). However, the argument has been made (most cogently by GMO's Jeremy Grantham, in "Time to Wake Up: Days of Abundant Resources and Falling Prices Are Over Forever") that this long term structural trend has reversed in recent years.

The argument that commodities are overpriced today on a medium term view is based on the belief that (a) investment in clean fuels and the electrification of an

ISSN 1554-5075

increasing share of the transport sector will cause a permanent reduction in global demand for oil relative to supply (and oil receives a relatively heavy weight in most commodity indexes); (b) The inability to quickly resolve the economic challenges facing the world economy will result in a prolonged period of weak or no growth (including a major slowdown in Chinese growth), which will reduce the demand for commodities (particularly metals, but less so for energy and agricultural, which are also affected by rising global standards of living); and (c) That in a 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.

On balance, we continue believe that, over the next three to five years, a fall in global aggregate demand is more likely than a global inflation and/or US Dollar crisis, 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, over this time horizon, broad commodity indexes are likely overpriced today. More narrowly, this conclusion applies most strongly to industrial metals, then to energy, and least strongly to agricultural commodities.

Gold

Our approach to asset pricing theory is based on a few key assumptions: (1) Asset prices reflect the interaction of the supply of and demand for real returns from a given asset class; (2) The supply of returns reflects the current yield provided by an asset class, plus expected changes in its price over a given period of time; (3) The demand for returns reflects the prevailing real risk free rate plus a required risk premium; (4) Imbalances between the supply of and demand for returns are normal feature of asset markets; (5) While asset markets are drawn to an equilibrium where the supply of returns equals the demand for returns, they can operate far from equilibrium for extended periods of time; and (6) Asset markets return to equilibrium due to changes in all four underlying variables – the current yield of the asset,

ISSN 1554-5075

expectations for future price changes, the real risk free interest rate, and required risk premiums.

In an article in our January 2010 issue, we described why we would expect the real price of gold to increase by about 1.75% per year under normal conditions. This is the difference between our assumed long-term growth rate of real global GDP of 3.25% per year and our assumed long-term growth rate of the world stock of gold of 1.50% per year. We can further expand our description of the supply of gold returns, viewing 1.75% per year as the normal "income return" from holding gold, and adding to it the change in the price of gold that is driven by regime changes – i.e., changes in perceived uncertainty and expected inflation.

When we looked at the return for holding gold that an investor would logically demand, in terms of a risk premium above the real risk free interest rate, we found that it varied considerably depending on the regime that prevailed. In normal times, the risk premium has been negative, reflecting the fact that gold plays the role of portfolio insurance, for which, in normal times, an investor should logically expect to pay, rather than receive, a risk premium. However, this insurance policy is expected to pay off under the high inflation and high uncertainty regimes, when the risk premium above the real risk free rate turns positive, ranging between 2.5% in the high inflation regime to 2.0% in the high uncertainty regime.

To estimate the extent to which gold is over or undervalued today we had to start at a point in time at which we assumed gold was fairly valued. We chose 1996 as this point, when gold was priced at about $400/ounce. Our logic was that during the mid-1990s, changes in nominal global GDP deflated by the gold price (what we term "gold GDP") reasonably approximated changes in nominal global GDP deflated by consumer prices, suggesting that the gold market was approximately in equilibrium. Our next step was to apply a version of the dividend discount model to check the logic underlying the $400/ounce price. This model states that the fair value of an asset equals is current income divided by an appropriate discount rate that is equal to (a) the risk free rate, (b) plus a risk premium for holding the asset, (c) less the rate at which the income from the asset is expected to grown in the future. Applying the 1.75% per

ISSN 1554-5075

year long term price appreciation rate discussed above to the $400 price gives a current income (we acknowledge this is stretching the theory, but bear with us) of $7.00. Since TIPS weren't around in 1996, we next had to estimate the real risk free rate. To do this, we subtracted the 1995 inflation rate of 2.5% from the nominal 6.51% yield on 10 year Treasuries, giving us an estimated real risk free rate of about 4.00%. To this, we added a risk premium of negative 50 basis points (since in good times investors should be willing to pay an insurance premium for asset classes that perform well in bad times). This yielded a required real rate of return to hold gold of 3.50%. From this, we subtracted the 1.75% rate at which real gold prices were expected to increase, due to the difference between the change in economic output and the change in the supply of gold, to obtain our discount rate of 1.75% (3.50% less 1.75%). Discounting $7.00 by 1.75% gave a price per ounce of $400. So far, so good. Now let's bring the analysis forward to **September, 2011.**

As previously noted, in the absence of any other changes, the equilibrium price of gold should have increased by the difference between the growth in global economic output and global gold supply between 1996 and 2011. According to IMF data, real global output (GDP) grew by 72.6% over this period. Other data shows that the global supply of gold increased by an estimated 36.2%. Therefore, in equilibrium, the price of gold should have increased by 36.2%, to about $545/ounce by 2011, assuming increases in the supply of gold lagged behind increases in economic output. The current expected "income" would therefore be $545 x 1.75%, or $9.54. However, other valuation variables have also changed since 1996. Our next step was to replace the 4.00% real risk free rate with the current 0.39% average yield on TIPS (note that the fall in the real risk free yield has been associated with rising uncertainty about future economic growth and inflation, as well as the creditworthiness of the U.S. Government). To this risk free rate we added a risk premium of 2.00%, which our historical analysis found was appropriate for periods of high inflation and/or uncertainty, when investors expected gold returns to offset losses on other asset classes. This generated a current required real rate of return of 2.39% to hold gold. From this we subtracted 1.75% (the "natural" growth rate of the current income level)

ISSN 1554-5075

to obtain a discount rate of 0.64%. Discounting $9.54 at 0.64% yielded an estimated fair price of $1,490/ounce. The current price of $1,581/ounce is about 6% above our estimated fair price at the end of **September, 2011.** In sum, using our methodology, gold seems neither over nor undervalued today.

To be sure, our analysis is based on a lot of assumptions that can be challenged. However, our conclusion seems consistent our theory, which says that the price of gold should reflect not only long term structural trends (in economic output and growth in physical gold supply), but also shorter term emotional and social factors that reflect changing levels of uncertainty about future growth, inflation, and political conditions.

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)

ISSN 1554-5075

are regional in coverage and utilize an appraisal based valuation methodology based on timber limited partnerships, which tends to understate the volatility of returns and their correlation with other asset classes. Given these challenges, the result of any valuation estimate for timber as a global asset class must be regarded as, at best, a rough approximation.

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

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

In broad terms, the rate of dividend growth results from the interaction of physical, economic, and regulatory processes. Physically, trees grow, adding a certain amount of mass each year. The exact rate depends on the mix of trees (e.g., southern pine grows much faster than northern hardwoods), on silviculture techniques employed (e.g., fertilization, thinning, etc.), and weather and other natural factors (e.g., fires, drought, and beetle invasions). Another aspect of the physical process is that a

ISSN 1554-5075

certain number of trees are harvested each year, and sold to provide revenue to the timber REIT. A third aspect of the physical process is that trees are exposed to certain risks, such as fire, drought, or disease (e.g., the mountain pine beetle in the northwest United States and Canada). And fourth physical process is that, through photosynthesis, trees sequester a portion of the carbon dioxide that would otherwise be added to the earth's atmosphere.

In the economic area, three processes are important. First, as trees grow, they can be harvested to make increasingly valuable products, starting with pulpwood when they are young, and sawtimber when they reach full maturity. This value-increasing process is known as "in-growth." The speed and extent to which in-growth occurs depends on the type of tree; in general, this process produces greater value growth for hardwoods (whose physical growth is slower) than it does for pines and other fast-growing softwoods. At the level of individual timber investments, the rate of in-growth is a key driver of returns; however, at the asset class level, we have decided to assume a constant mix of grades over time. The second economic process (or, more accurately, processes) is the interaction of supply and demand that determines changes in real prices for different types and grades of timber. As is true in the case of commodities, there is likely to be an asymmetry at work with respect to the impact of these processes, with prices reacting more quickly to more visible changes in demand, while changes in supply side factors (which only happen with a significant time delay) are more likely to generate surprises. In North America., a good example of this may be the eventual supply side and price impact of the mountain pine beetle epidemic that has been spreading through the northwestern forests of the United States and Canada. The IMF produces a global timber price index that captures the net impact of demand and supply fluctuations. The average annual change in real prices (derived by adjusting the IMF series for changes in U.S. inflation) between 1981 and 2007 was 0.1% (i.e., average prices over the period remained essentially constant in real terms), but with a significant standard deviation of 9.2% -- i.e., it is normal for real timber prices to be quite volatile from year to year.

ISSN 1554-5075

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:

Growth Driver	**Assumption**
Biological growth of trees	We assume 6% as the long term average for a diversified timberland portfolio. We stress that biological growth rates can vary widely for different types of timber investment (with softwoods and timber located in tropical countries delivering the highest growth, and hardwoods and timber in more temperate climates delivering the slowest growth rates). We have also changed our valuation model to assume a constant mix of product grades, to present a better approximation for timber as a global

ISSN 1554-5075

Growth Driver	Assumption
	asset class.
Harvesting rate	As a long term average, we assume that 5% of tree volume is harvested each year. As a practical matter, this should vary with timber prices and the REITs prevailing dividend level. So 5% is a "noisy" long-term estimate for timber as a global asset class.
Change in prices of timber products	In line with IMF data, we assume that over the long term, average timber prices will just keep pace with inflation. Again, this is a "noisy" estimate, because the IMF data also shows that real prices are highly volatile. Moreover, there are indications that climate change is causing increasing tree deaths in some areas, which should lead to future real price increases (see "Western U.S. Forests Suffer Death by Degrees" by E. Pennisi, *Science*, 23Jan09). Hence we believe our long-term price change assumption is conservative.
Carbon credits	Until more comprehensive regulations are enacted, we assume no additional return to timberland owners from the 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 NCRIEF timberland index and those on real return bonds has averaged around six percent. However, since the timber REITS are much more liquid than the properties included in the NCRIEF index, and since timber has displayed a very low correlation with returns on other asset classes (particularly during the worst of the 2008 crisis, even in the case of

liquid timber vehicles), we use three percent as the required return premium for investing in liquid timberland assets. Arguably, because a portion of timber's return generating process (physical growth) has zero correlation with the return generating processes for other asset classes, we should use an even lower risk premium. Again, we believe our approach is conservative in this regard. Given these assumptions, our assessment of the valuation of the timber asset class at **30 Sep 2011** is shown in the following table. We use the dividend discount model approach to produce our estimate of whether timber is over, under, or fairly valued today. The specific formula is (Current Dividend Yield x 100) x (1+ Forecast Dividend Growth) divided by (Current Yield on Real Return Bonds + Timber Risk Premium - Forecast Dividend Growth). A value greater than 100% implies overvaluation, and less than 100% implies undervaluation.

Average Dividend Yield (70% PCL + 30% RYN)	4.60%
Plus Long Term Annual Biological Growth	6.00%
Less Percent of Physical Timber Stock Harvested Each Year	(5.00%)
Plus Long Term Real Annual Price Change	0.00%
Plus Other Sources of Annual Value Increase (e.g., Carbon Credits)	0.00%
Equals Average Annual Real Return Supplied	**5.60%**
Average Real Return Bond Yield	0.39%
Plus Risk Premium for Timber	3.00%
Equals Average Annual Real Return Demanded	**3.39%**
Ratio of Returns Demanded/Returns Supplied Equals Valuation Ratio (less than 100% implies undervaluation)	**51%**

We stress that this is a long-term valuation estimate that contains a higher degree of uncertainty that valuation estimates for larger and more liquid asset classes. Over a one-year time horizon, you could easily reach a different valuation conclusion. For

ISSN 1554-5075

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 measured by PCL and RYN, could be overpriced today (in reality, US lumber futures are at about the same level they were a year ago, though in between these points there was a big run up followed by a downturn as the economic outlook worsened). On the other hand, whether looking over a short or long-term time horizon, if you believe that future revenues from timber's CO2 sequestration service are likely to be significant, and/or that four percent is too high a risk premium to use, then you could argue that timber is likely underpriced today.

In sum, timber valuation is an issue upon which reasonable people can and do disagree, in no small measure because of their different time horizons and the different underlying assumptions and methodologies they use to reach their conclusions. On balance, taking a long-term view, we continue to believe that timberland is likely underpriced today, for two reasons: (1) future revenue growth related to CO2 sequestration is likely to be significant; and (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.

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 31, 2010, the average daily value of the VIX Index was 20.5 (median 19.0), with a standard deviation of 8.2 (skewness 2.0, kurtosis 7.3 – i.e., a very "non-normal" distribution). On **30 Sep 2011**, the VIX closed at 42.96. To put this in perspective, only about 2% of the trading days

ISSN 1554-5075

in our sample had higher closing values of the VIX. In sum, at the end of last month, volatility was at a level that we believe reflects the high uncertainty regime that we expect to prevail in global financial markets over the next year. For these reasons we concluded that volatility is probably close to fairly priced over a one year time horizon.

Sector and Style Rotation Watch

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

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

We publish this table to make an important point: there is nothing unique about the various rotation strategies we describe, which are widely known by many investors. Rather, whatever active management returns (also known as "alpha") they are able to generate is directly related to how accurately (and consistently) one can

ISSN 1554-5075

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

ISSN 1554-5075

goal over a multi-year time horizon, avoiding big downside losses is mathematically more important than reaching for the last few basis points of return. Bond market investors' perspective tends to be more consistent with this view than equity investors' natural optimism. Hence, when our rolling rotation returns table provides conflicting information, we tend to put the most weight on bond investors' implied expectations for what lies ahead.

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

Rolling 3 Month Returns Through	***30 Sep 2011***			
Economy	Bottoming	Strengthening	Peaking	Weakening
Interest Rates	Falling	Bottom	Rising	Peak
Style and Size Rotation	Small Growth (DSG) **-19.39%**	Small Value (DSV) **-20.02%**	Large Value (ELV) **-16.19%**	Large Growth (ELG) **-11.02%**
Sector Rotation	Cyclicals (RXI) **-17.23%**	Industrials (EXI) **-23.02%**	Staples (KXI) **-7.16%**	Utilities (JXI) **-9.91%**
Bond Market Rotation	Higher Risk (HYG) **-7.43%**	Short Maturity (SHY) **0.53%**	Low Risk (TIP) **4.52%**	Long Maturity (TLT) **29.40%**

This Month's Letters to the Editor

There seems to be an increasing amount of criticism directed at Exchange Traded Funds. How do you respond to this?

Not to be glib, but the answer really depends on the criticism being leveled. For example, we believe that there is a lot of merit to criticism of ETFs that are based on underlying derivative contracts, rather than physical baskets of stocks, bonds or

ISSN 1554-5075

whatever else is contained in the index tracked by the fund. The use of derivatives introduces higher levels of complexity (e.g., counterparty risk, and flow trading to manage exposures) that is usually far from transparent. This is a movie we've all seen before, most recently in the sub-prime mortgage bond fiasco. Unfortunately, we know by now how this movie usually ends. The good news is that this type of structure is far more prevalent in Europe than it is in North America. The bad news is that European financial regulators are preoccupied with other issues these days, so these ETF issues may remain unaddressed for far too long. Another criticism of ETFs that we have a lot of time for is that too often they are nothing more than active strategies dressed up in index clothing. As we have long stressed, the only portfolio that every investor can passively and simultaneously hold is the market cap weighted portfolio. By definition, any departure from this portfolio is an active strategy of one type or another, whether that is a tilt within a given asset class, or a different mix of asset classes.

To be sure, there are practical issues when it comes to implementing this view – for example, as we've written many times, market cap weighting applies much more easily to equities than it does to some other asset classes, like bonds and commodities. However, the point is clear. Today, we see too many ETF sponsors creating new products that are based on incredibly narrow indexes (or worse, leveraged indexes), and fear that at least some investors may be fooled into believing that they are somehow avoiding the risks of active investing by investing in an allegedly "passive" strategy, when this couldn't be farther from the truth. However, this argument is also closely related to another one whose merits we find more dubious. This is the assertion that the growing market share of ETFs is somehow inhibiting capital formation in the United States, because investors are reducing their interest in individual stocks. To begin with, going public is not automatically the best route for a small company to take, as anyone familiar with Canadian corporate finance can attest. In the absence of deep venture capital and private equity markets as are found in the U.S., too often small Canadian companies are forced to go public too early, then proceed to fall short of investors' expectations in a quarter, and find themselves unable to raise more funds to support their growth. Frankly, if growing interest in ETFs

ISSN 1554-5075

prevents more U.S. companies from going public until they are large and stable enough to quality for inclusion in an index, this is not a negative, in our view. Beyond this however, given the manifest and extremely well documented failure of most people (and funds) to achieve sustained success as active investors in individual stocks, we don't see "going back to the good old days" as a "solution" that is in their best interest.

In the past, you have been pretty negative on the outlook for municipal bonds in the United States. Given all the criticism of Meredith Whitney for her overly pessimistic forecasts for municipal defaults, have you changed your views on this issue?

We're not so sure her forecasts are overly pessimistic in terms of the size of the underlying problem – though we admit her default rate estimate was too aggressive, at least in the short-term. A review of the extensive analysis of the size of public pension fund shortfalls in a series of papers published by Robert Novy-Marx and Joshua Rauh should put to rest any doubts about the size of the pension funding shortfall facing many state and local governments. And make no mistake, the consequences are beginning to appear – and they are ugly. We have argued that the smallest state in the nation – Rhode Island – may well be the proverbial "canary in the coal mine" for the United States. Consider what has happened there over the past year. First, the small city of Central Falls declared bankruptcy and cut the size of pension payments to retirees when its pension fund ran out of cash. Later, the state's General Assembly passed a law that gave bondholders first claim on the state's tax revenues, out of fear that the state of its pension underfunding (the worst in the nation) could close its access to bond markets. This came at about the same time that the SEC announced an investigation into the adequacy of the state's disclosures to investors in its bonds. Most recently, Gina Raimondo, the Democrat (and former venture capitalist) who is the state's General Treasurer, has introduced a wide ranging pension reform plan that involved cutbacks to benefits to current retirees – accompanied by a brutally direct, and admirably clear education campaign that focused on the inescapable math at the

ISSN 1554-5075

root of the problem (see, for example, "The Little State with the Big Mess" in the 23Oct2011 *New York Times*).

Rhode Island is a perfect, perhaps *the* perfect, example of what Walter Russell Mead has termed the "Blue State Model", which includes lavish benefits for public sector unions, lavish social programs, and a political and regulatory climate that is generally unfavorable to business. Mead argues, and we agree, that this model is, ultimately, unsustainable. We suspect that Raimondo also agrees, when she refers to Rhode Island as "Athens on the Narragansett". There is, however, one big difference – Greeks generally find it much harder to move to Germany where the economy is booming than Rhode Islanders who set out for Texas (indeed, RI is a national leader in population loss, and especially loss of middle class family households). In some ways, the easier mobility in the United States (even after taking two career concerns, health insurance and underwater mortgages into account) makes the challenges facing Rhode Island and other blue states potentially even more difficult to resolve than those facing Greece – which, after all, can default on its debt, withdraw from the Euro, and hope to devalue its way to an economic recovery. Under these circumstances, it comes as no surprise that the public sector unions in Rhode Island are seeking to overturn the law giving bondholders preferential access to the state's tax revenues, on the theory that "every party should share the pain." In our view, Whitney was too early on her default rate call, but her analysis was right on target – keep your eye on the Ocean State to see where we may be headed next.

The IMF's Gloomy Outlook

In recent years, the IMF has substantially improved its analytical coverage of the world economy. In addition to its semi-annual World Economic Outlook, it now also publishes reports focused on the global financial system (the Global Financial Stability Review) and government fiscal policy (the Fiscal Monitor). The most recent versions of these three reports were released in September. They do not make for encouraging

ISSN 1554-5075

reading. Nonetheless, any investor struggling to take appropriate action in the face of the complexity and uncertainty we confront today must be familiar with their contents, which we will briefly summarize here.

Let's start with the latest Fiscal Monitor, as questions surrounding sovereign debt sustainability lie at the heart of the growing crisis we face today. The IMF notes that "Global fiscal risks remain very high, stemming from several unresolved, interrelated challenges:

Sustainability and market sentiment in the euro area. Despite significant fiscal adjustment in most advanced European economies and the mid-July 2011 agreement by leaders of the euro area countries to improve the tools available to fight crises, borrowing costs remain high in several euro members, reflecting market participants' concerns about the sustainability of fiscal policies and public debts. Such concerns — which had their origin in weak fiscal fundamentals but subsequently intensified owing to doubts about the credibility of the euro area crisis resolution mechanisms — jeopardize the stability of the area, with major potential spillovers for other sovereign debt markets."

"Medium-term fiscal adjustment in the United States and Japan. Fiscal deficits remain at near-record levels in the two largest advanced economies, and their debt ratios continue to rise. These two countries benefit from large stores of goodwill from investors, but these favorable conditions could shift if needed policy changes are not forthcoming."

"Using good times wisely in emerging economies. There are risks of complacency, with the key question being whether fiscal balances should not be strengthened more rapidly, given output gaps that have essentially closed in many emerging economies, rising inflation, and strong revenues, particularly for commodity exporters."

"Debt overhang from the crisis and long-term challenges. For both advanced and emerging economies, the debt burden created by the crisis needs to be reduced, over the longer term, against the rising tide of health care and pension spending. The

ISSN 1554-5075

challenges confronting many economies in this regard are essentially without precedent."

The Fiscal Monitor has some pointed words of caution for governments in Japan and the United States: "The speed and severity with which financial pressures spread in the euro area should serve as a cautionary tale to Japan and the United States… Low interest rates in the United States and Japan partly reflect structural factors, including some that do not seem likely to change abruptly in the near term:

A substantial share of domestic debt holdings. In Japan, close to 95 percent of public debt is held domestically. The share is lower for the U.S. federal government, but rises to 70 percent for the general government. Moreover, the share of debt held domestically increases further for the United States if holdings by foreign central banks are excluded. This is significant, because private nonresidents maybe more willing to shift their investments out of a country than are domestic investors, and foreign central banks may follow different investment practices than do other market participants."

"*Significant local central bank debt purchases.* The U.S. Federal Reserve has purchased 7 percent of GDP in Treasury securities (cumulative, under its quantitative easing programs), an amount equivalent to 12 percent of publicly held Treasury securities. Government securities purchases under the Bank of Japan's Asset Purchase Program have so far amounted to 1 percent of GDP. (If transactions undertaken as part of traditional monetary policy operations are included, the share of bond purchases undertaken by the Bank of Japan rises to17 percent of GDP.) Large purchases by local central banks also took place elsewhere (gilt purchases by the Bank of England under the Asset Purchasing Facility amounted to 11 percent of GDP, and the purchases by the ECB amount to a large share of securities issued mean that not all debt issued by these countries has yet been subjected to a market test."

"*Strong demand by a relatively stable investor base*. Institutional investors—including insurance companies, mutual funds, and pension funds—hold 24 percent of government securities in Japan and 12 percent of Treasury securities in the United States. A further 22 percent of U.S. Treasuries and an estimated 2 percent of Japanese government bonds are held by foreign official entities. In addition, more than

ISSN 1554-5075

one third of U.S. Treasuries issued by the federal government are held by other government agencies, including the Social Security Fund, and 20 percent of Japanese government bonds are held by Japan Post Bank… The widening crisis in the euro area should nevertheless serve as a cautionary tale for the United States and Japan, as well as other countries with high debts and deficits…"

[However], "the relatively benign treatment by market participants of sovereign bonds issued by Japan and the United States may not fully reflect fiscal fundamentals: current general government debt and deficits, and projected increases in debt over the next five years, are at least as high for the United States and Japan as they are for several euro area economies under market pressure or the euro area in general. In addition, projected long-term increases in pension and health care spending in the United States are larger than in many euro area economies. Japan and the United States face the largest gross financing requirements among all advanced economies this year and are projected to do so in 2012 and 2013 as well, reflecting their large deficits and debt stocks as well as their still relatively short debt maturity profiles... Recent developments in Spain and Italy demonstrate how swiftly and severely market confidence can weaken and how even large advanced economies are exposed to changes in market sentiment…"

The Fiscal Monitor also includes this short but very interesting point about China: "New figures indicate that China's debt stock, previously believed to be one of the lowest among emerging economies, is in fact close to the group average. The degree to which the new debt figures may constrain the scope for countercyclical policies in China going forward is difficult to assess."

The IMF concludes that "it is difficult to overstate the challenge confronting many advanced economies and some emerging market economies, as the adjustment required to restore their debt ratios to more moderate levels is daunting…While there is wide variation across countries, adjustment needs average about 8 percent of GDP over the next decade for advanced economies and equal 13 percent of GDP in Japan…Adjustment needs in both advanced and emerging economies are even greater when the projected growth of health and pension spending over the next two

ISSN 1554-5075

decades is taken into account…several advanced economies the required primary surplus is well above levels they have sustained in the past…an extended period of extraordinary fiscal virtue will be required over the coming decades to restore debt ratios to more normal levels."

The Global Financial Stability Report contains a wealth of data, including the following fascinating table:

Indebtedness and Leverage in Selected Advanced Countries

Percent of 2011 GDP

	United States	Japan	United Kingdom	Euro area
Government Gross Debt	100	233	81	89
Government Primary Balance	-8.0	-8.9	-5.6	-1.5
Households Gross Debt	92	77	101	70
Nonfinancial Corporates Gross Debt	90	143	118	138
Financial Institutions Gross Debt	94	188	547	143
Bank Claims on Public Sector	8	80	9	n.a.
Total Economy Gross External Liabilities	151	67	607	169
Government Debt Held Abroad	30	15	19	25

	Belgium	France	Germany	Greece	Ireland	Italy	Portugal	Spain
Government Gross Debt	95	87	83	166	109	121	106	67
Government Primary Balance	-0.3	-3.4	0.4	-1.3	-6.8	0.5	-1.9	-4.4
Households Gross Debt	53	61	60	71	123	50	106	87
Nonfinancial Corporates Gross Debt	175	150	80	74	245	110	149	192
Financial Institutions Gross Debt	112	151	98	22	689	96	61	111
Bank Claims on Public Sector	23	17	23	28	25	32	24	24
Total Economy Gross External Liabilities	390	264	200	202	1680	140	284	212
Government Debt Held Abroad	58	50	41	91	61	51	53	28

This table makes a number of critical points. As you can see, high household debt/GDP is much more of a problem in the Anglosphere than it is elsewhere. However, in the global context, the Anglosphere's household debt problem has an outsized effect, as these countries have been much greater contributors to global demand, as evidenced by their ratios of private consumption to GDP (e.g., 66% in the UK and 71% in the US in 2010, compared to 34% in China, 57% in India, 58% in the Eurozone, 59% in Japan, and 61% in Brazil). To the extent that high household debt levels are restraining consumer spending in the Anglosphere (as the evidence

ISSN 1554-5075

indicates), and to the extent that China and other countries do not offset this fall, then global final demand weakens, as it is ultimately final consumption spending by the private and public sectors that drive GDP growth derived from investment spending and net exports.

Another set of interesting data points are those involving the financial sector. The size of Irish banks' gross debt/GDP stands out, and makes clear the roots of the crisis there, where bad property loans in the banking system, and the government's ill-judged decision to stand behind its banks, have forced a tremendous downturn upon that country. The UK is the only other nation that comes close to Ireland on this metric. Another key indicator, which highlights the issue that lies at the heart of the current Eurozone banking crisis, is "Bank Claims on the Public Sector" as a percent of GDP. Essentially, this represents the amount of sovereign debt the banks have on their books. As you can see, this is extremely high in Japan, and much higher in the Eurozone than in the U.S. or U.K. And if the creditworthiness of that sovereign debt comes into question, so too does the quality of banks' assets, and the sufficiency of the capital that supports them. Also interesting is the ratio of non-financial corporate debt/GDP. While in the Anglosphere press the point is often made that corporate have strong balance sheets and large amounts of unspent cash, a look at this table shows that this point does not necessarily apply to Japan and the Eurozone, where corporate balance sheets are more leveraged (with further attendant consequences for bank credit quality).

On the sovereign debt front, the table highlights different potential sources of vulnerability, including the absolute amount of government debt relative to GDP, the size of the primary government budget surplus or deficit (in the case of the latter, this plus maturing debt must be financed by new borrowing each year), and the amount of government debt held by foreign investors (who, presumably, would be the ones most likely to flee in the face of problems, and potentially trigger a crisis). A comparison of other countries' indicators to those for Greece suggests that current concerns over Spain may be overdrawn, concerns over Italy are appropriate, and worries about Belgium may have been overlooked.

ISSN 1554-5075

The Global Financial Stability Report bluntly concludes that "Risks are elevated, and time is running out to tackle vulnerabilities that threaten the global financial system and the ongoing economic recovery. The priorities in advanced economies are to address the legacy of the crisis and conclude financial regulatory reforms as soon as possible in order to improve the resilience of the system…Perhaps most crucially, the policy tools available in most advanced economies are geared to combating temporary liquidity shocks rather than tackling concerns about solvency. The result is that balance sheets have not been "cured," and the financial system remains highly vulnerable to sovereign risks."

More broadly, the IMF notes that, "public balance sheets in many advanced economies are highly vulnerable to rising financing costs, in part owing to the transfer of private risk to the public sector. Strained public finances force policymakers to exercise particular care in the use of fiscal policy to support economic activity, while monetary policy has only limited room to provide additional stimulus. Against this backdrop, the crisis— now in its fifth year—has moved into a new, more political phase."

"In the euro area, important steps have been taken to address current problems, but political differences *within* economies undergoing adjustment and *among* economies providing support have impeded achievement of a lasting solution. Meanwhile, the United States is faced with growing doubts over the ability of the political process to achieve a necessary consensus regarding medium-term fiscal adjustment, which is critically important for global stability. As political leaders in these advanced economies have not yet commanded broad political support for sufficiently strengthening macro-financial stability and for implementing growth-enhancing reforms, markets have begun to question their ability to take needed actions…"

" In the euro area, sovereign pressures threaten to reignite an adverse feedback loop between the banking system and the real economy. The euro area sovereign credit strain from high-spread countries is estimated to have had a direct impact of about €200 billion on banks in the European Union since the outbreak of the sovereign debt crisis in 2010. This estimate does not measure the capital needs of

ISSN 1554-5075

banks, which would require a full assessment of bank balance sheets and income positions. Rather, it seeks to approximate the increase in sovereign credit risk experienced by banks over the past two years. These effects are amplified through the network of highly interconnected and leveraged financial institutions; when including interbank exposures to the same countries, the size of spillovers increases by about one half. Banks in some economies have already lost access to private funding markets. This raises the risk of more severe deleveraging, credit contraction, and economic drag unless adequate actions are taken to deal with the sources of sovereign risk — through credible fiscal consolidation strategies — and to address the potential consequences for the financial system — through enhancing the robustness of banks…"

" With growth remaining sluggish in the advanced economies, low rates are appropriate as a natural policy response to weak economic activity. Nevertheless, in many advanced economies some sectors are still trapped in the repair-and-recovery… phase of the credit cycle because balance sheet repair has been incomplete, while a search for yield is pushing some other segments to become more leveraged and hence vulnerable again. Moreover, low rates are diverting credit creation into more opaque channels, such as the shadow banking system. These conditions increase the potential for a sharper and more powerful turn in the credit cycle, risking greater deterioration in asset quality in the event of new shocks…"

"Emerging market economies are at a more advanced phase in the credit cycle. Brighter growth prospects and stronger fundamentals, combined with low interest rates in advanced economies, have been attracting capital inflows. These flows have helped to fuel expansions in domestic liquidity and credit, boosting balance sheet leverage and asset prices. Especially where domestic policies are loose, the result could be overheating pressures, a gradual buildup of financial imbalances, and a deterioration in credit quality, as nonperforming loans are projected to increase significantly in some regions. At the same time, emerging markets face the risk of sharp reversals prompted by weaker global growth, sudden capital outflows, or a rise in funding costs that could weaken domestic banks."

ISSN 1554-5075

The World Economic Outlook opens with what is, by the standards of typical diplomat-speak, a blunt, succinct letter from Olivier Blanchard, the IMF's chief economist. It is worth reading in full, as the WEO is really just an elaboration of the key points he makes:

"Relative to our previous World Economic Outlook last April, the economic recovery has become much more uncertain. The world economy suffers from the confluence of two adverse developments. The first is a much slower recovery in advanced economies since the beginning of the year, a development we largely failed to perceive as it was happening. The second is a large increase in fiscal and financial uncertainty, which has been particularly pronounced since August. Each of these developments is worrisome— their combination and their interactions more so. Strong policies are urgently needed to improve the outlook and reduce the risks.

Growth, which had been strong in 2010, decreased in 2011. This slowdown did not initially cause too much worry. We had forecast some slowdown, due to the end of the inventory cycle and fiscal consolidation. One-time events, from the earthquake and tsunami in Japan to shocks to the supply of oil, offered plausible explanations for a further slowdown. And the initial U.S. data understated the size of the slowdown itself. Now that the numbers are in, it is clear that more was going on.

What was going on was the stalling of the two rebalancing acts, which we have argued in many previous issues of the World Economic Outlook are needed to deliver "strong, balanced, and sustainable growth." Take first internal rebalancing: What is needed is a shift from fiscal stimulus to private demand. Fiscal consolidation is indeed taking place in most advanced economies (although not in Japan). But private demand is not taking the relay. The reasons vary, depending on the country. But tight bank lending, the legacy of the housing boom, and high leverage for many households all turn out to be putting stronger brakes on the recovery than we anticipated.

Turn to external rebalancing: Advanced economies with current account deficits, most notably the United States, need to compensate for low domestic demand through an increase in foreign demand. This implies a symmetric shift away from foreign demand toward domestic demand in emerging market economies with current

ISSN 1554-5075

account surpluses, most notably China. This rebalancing act is not taking place. While imbalances decreased during the crisis, this was due more to a large decrease in output in advanced relative to emerging market economies than to structural adjustment in these economies. Looking forward, the forecast is for an increase rather than a decrease in imbalances.

Now turn to the second adverse development, increased fiscal and financial uncertainty: Markets have clearly become more skeptical about the ability of many countries to stabilize their public debt. For some time, their worries were mostly limited to a few small countries on the periphery of Europe. As time has passed, and as growth prospects have dimmed, their worries have extended to more European countries and to countries beyond Europe—from Japan to the United States. Worries about sovereigns have translated into worries about the banks holding these sovereign bonds, mainly in Europe. These worries have led to a partial freeze of financial flows, with banks keeping high levels of liquidity and tightening lending. Fear of the unknown is high. Stock prices have fallen. These will adversely affect spending in the months to come. Indeed, August numbers indicate that this is already happening. Low underlying growth and fiscal and financial linkages may well feedback on each other, and this is where the risks are. Low growth makes it more difficult to achieve debt sustainability and leads markets to worry even more about fiscal stability.

Low growth also leads to more nonperforming loans and weakens banks. Front-loaded fiscal consolidation in turn may lead to even lower growth. Weak banks and tight bank lending may have the same effect. Weak banks and the potential need for more capital lead to more worry about fiscal stability. Downside risks are very real.

I have been focusing so far on advanced economies. The reason is that, until now, emerging market economies have been largely immune to these adverse developments. They have had to deal with volatile capital flows, but in general have continued to sustain high growth. Indeed, some are close to overheating, although prospects are more uncertain again for many others. Under the risk scenarios, they may well suffer more adverse export conditions and even more volatile capital flows. Low exports and, perhaps, lower commodity prices will also create challenges for low-

ISSN 1554-5075

income countries. In light of the weak baseline and high downside risks, strong policy action is of the essence. It must rely on three main legs.

The first leg is fiscal policy. Fiscal consolidation cannot be too fast or it will kill growth. It cannot be too slow or it will kill credibility. The speed must depend on individual country circumstances, but the key continues to be credible medium-term consolidation. Some countries need substantial outside help to succeed. Going beyond fiscal policy, measures to prop up domestic demand, ranging from continued low interest rates, to increased bank lending, to resolution programs for housing, are also of the essence.

The second leg is financial measures. Fiscal uncertainty will not go away overnight. And even under the most optimistic assumptions, growth in advanced economies will remain low for some time. During that time, banks have to be made stronger, not only to increase bank lending and baseline growth, but also—and more important—to reduce risks of vicious feedback loops. For a number of banks, especially in Europe, this is likely to require additional capital buffers, either from private or from public sources.

The third leg is external rebalancing. It is hard to see how, even with the policy measures listed above, domestic demand in the United States and other economies hit by the crisis can, by itself, ensure sufficient growth. Thus, exports from the United States and crisis-hit economies must increase, and, by implication, net exports from the rest of the world must decrease. A number of Asian economies, in particular China, have large current account surpluses and have indicated plans to rebalance from foreign to domestic demand. These plans cannot be implemented overnight. But they must be implemented as fast as possible. Only with this global rebalancing can we hope for stronger growth in advanced economies and, by implication, for the rest of the world."

In sum, last month the IMF provided three different perspectives on different aspect of the challenges that face us today. Unfortunately, the conclusions they reached were relatively bleak. Two other new papers provide further food for thought. In "Political Uncertainty and Risk Premia", Pastor and Veronesi "find that political

ISSN 1554-5075

uncertainty commands a risk premium" in equity returns, "whose magnitude is larger in poorer economic conditions…making stocks more volatile and more correlated when the economy is weak." Closely related to this is another new paper, "Measuring Economic Policy Uncertainty" by Baker, Bloom and Davis. The authors "develop a new index of policy-related economic uncertainty and estimate its dynamic relationship to output, investment, and employment." They find that their index "spikes near consequential presidential elections and after major events such as the Gulf wars and the 9/11 attack. Index values are very high in recent year, with clear jumps around the Lehman bankruptcy and TARP legislation, the 2010 midterm elections [in the US], the Eurozone crisis, and the U.S. debt ceiling dispute." The authors analysis "show that an increase in policy uncertainty equal to the actual change between 2006 and 2011 foreshadows large and persistent declines in aggregate outcomes, with peak declines of 2.2% in real GDP, 13% in private investment, and 2.5 million in aggregate employment." Put differently, reducing the currently high level of policy uncertainty could have a substantial positive impact on the economy – if such a reduction were possible in today's highly polarized and partisan political environment.

Finally, we call our readers attention to two other excellent articles that have recently appeared, both of which serve to remind us that the future may not be as bleak as it seems. In an article in the October 2011 *McKinsey Quarterly* titled "The Second Economy", Brian Arthur (a leader in the application of complex adaptive systems thinking to economic questions), notes that "every so often – every 60 years or so – a body of technology comes along and over several decades, quietly, almost unnoticeably, transforms the economy: it brings new social classes to the fore, and creates a different world for business." Arthur believes that such a transformation is currently underway, as multiple "digitized business processes" increasingly intelligently interact with each other, and in so doing "form a second economy alongside the physical economy." Arthur puts it like this: "Think of it this way. With the coming of the Industrial Revolution – roughly from the 1760s, when Watt's steam engine appeared, through around 1850 and beyond – the economy developed a muscular system in the form of machine power. Now it is developing a neural system…[which] may be the

ISSN 1554-5075

biggest change ever in the economy. It is a deep qualitative change that is bringing intelligent, automatic responses to the economy." While this is good news for productivity growth over the medium term, and most likely for consumer satisfaction as well, Arthur also notes that the expansion of digitized processes has negative implications for job creation. He thus envisions that in the future, (re)distribution issues will likely play a larger role in our political discourse.

The second paper that is well worth a read is "The Way Forward", by Alpert, Hockett, and Roubini, that was just published by the New America Foundation. The authors do an admirable job of succinctly covering the challenges posed by deleveraging, inadequate and imbalanced demand, and deflation – though they fail to cover the growing crisis of political legitimacy. More important, they lay out a credible plan for restoring growth that is based on what they term "three pillars": a focused program of public infrastructure investment to increase demand, a program to accelerate deleveraging via debt reduction, and a program of global economic rebalancing. As always seems to be the case with these analyses – whether done by the IMF, the New American Foundation, Index Investor, or other analysts – China's willingness to support the rebalancing of its domestic economy and consequently the global economy is perhaps the most critical uncertainty we face. For this reason, that issue will be our focus next month.

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

ISSN 1554-5075

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 2011, our USD cash benchmark is 0.27% (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/USA.php

ISSN 1554-5075