The Index Investor

Invest Wisely…Get an Impartial Second Opinion.

Contents

November 2009 Issue: Key Points

We view financial markets as a complex adaptive system, in which asset prices are, in the long term, attracted to their fundamental values. Unfortunately, experience has shown that asset class prices usually revert towards their fundamental values only over relatively long periods, and do so in a volatile manner that reflects the fact that fundamental value can only be estimated with some degree of uncertainty. For investors who are pursuing goals over shorter time horizons (e.g., a portfolio manager who is compensated on annual results), analysis of fundamental valuation on its own provides insufficient information for making decisions. They also need ways to forecast short term investor behavior and its impact on asset prices. That is the subject of this month's feature article, which attempts to boil down a large amount of recent research in different areas into a useable framework for thinking about an issue

ISSN 1554-5075

that is very complex, challenging and critical. We describe how collective investor behavior results from five processes. At the individual level, these include conscious and unconscious allocation of our scarce attention, and the processing of various types of information through our mental, emotional and decision models. Individual behavior is then aggregated through an evolving, non-linear process to produce collective investor behavior.

We conclude that forecasting collective investor behavior over the short-term remains a very difficult challenge. Yet it is one that investors ignore at their peril, as sharp downside moves will always be mathematically devastating to investors' ability to achieve their long-term goals. Rather like weather forecasting, identifying turning points in investor behavior requires the ability to integrate multiple indicators that measure the state of the financial markets system, and use them to draw inferences about the probability that severe storms may occur in the near future. And when that probability rises to a high enough level, it requires the willingness to buck conventional wisdom, and issue clear warnings to investors, as we did in May 2007.

With that in mind, we reiterate our belief that conditions are ripe for another sharp shift in investor behavior, that will likely have significantly negative results for asset classes (such as equity and high yield bonds) that do well in normal times, and somewhat less negative results for asset classes which hedge against high inflation (including property, commodities, and real return bonds). In contrast, asset classes which perform best under the high uncertainty regime should do well (including short term domestic and foreign government bonds, volatility and gold). With levels of uncertainty and network connectedness (see our Market Phase Change Analysis section) at high levels, and volatility displaying the signs of a system under high stress (e.g., short sharp increases in the VIX that quickly subside), we believe that professional investors who account for the majority of trading volume are engaged in a high stakes game of "beat the gun", hoping to preserve this year's gains through year end to justify high compensation, while anxiously watching for any sign that their peers have decided to liquidate their risk positions in substantial volume. In the absence of substantial improvements in the state of the political economic environment (which, if

ISSN 1554-5075

anything, seems to be worsening), we expect that failure to resolve the imbalances at the heart of this crisis (over leveraged consumers, weakened financial institutions, and unsustainable current account positions, particularly in China and the United States) will ultimately result in a substantial shock to financial markets, with very unpredictable political consequences.

This month's product and strategy notes summarize disturbing developments on the H1N1 influenza front (which further reinforce our expectation of higher levels of uncertainty in the months ahead), new research on the roles of skill and luck in corporate management (which should make one think twice about active strategies based on superior security selection), new products and interesting new research that provokes a common response: "Who knew?"

Global Asset Class Returns

YTD 30Oct09	**In USD**	**In AUD**	**In CAD**	**In EUR**	**In JPY**	**In GBP**	**In CHF**	**In INR**
Asset Held								
USD Bonds	-0.97%	-30.57%	-15.57%	-7.11%	-1.11%	-15.61%	-4.88%	-4.70%
USD Prop.	13.30%	-16.30%	-1.30%	7.16%	13.15%	-1.35%	9.38%	9.56%
USD Equity	18.46%	-11.14%	3.86%	12.32%	18.31%	3.81%	14.54%	14.72%
AUD Bonds	16.35%	-13.25%	1.75%	10.21%	16.21%	1.71%	12.44%	12.62%
AUD Prop.	31.88%	2.28%	17.27%	25.74%	31.73%	17.23%	27.96%	28.14%
AUD Equity	57.81%	28.21%	43.21%	51.67%	57.67%	43.16%	53.90%	54.08%
CAD Bonds	15.79%	-13.81%	1.19%	9.65%	15.65%	1.15%	11.88%	12.06%
CAD Prop.	51.45%	21.84%	36.84%	45.30%	51.30%	36.80%	47.53%	47.71%
CAD Equity	38.98%	9.38%	24.38%	32.84%	38.84%	24.34%	35.07%	35.25%
CHF Bonds	14.37%	-15.23%	-0.23%	8.23%	14.23%	-0.27%	10.46%	10.64%
CHF Prop.	20.94%	-8.66%	6.34%	14.80%	20.80%	6.30%	17.03%	17.21%
CHF Equity	16.73%	-12.88%	2.12%	10.58%	16.58%	2.08%	12.81%	12.99%
INR Bonds	-9.84%	-39.45%	-24.45%	-15.98%	-9.99%	-24.49%	-13.76%	-13.58%
INR Equity	68.51%	38.91%	53.91%	62.37%	68.37%	53.86%	64.59%	64.77%
EUR Bonds	3.56%	-26.05%	-11.05%	-2.59%	3.41%	-11.09%	-0.36%	-0.18%
EUR Prop.	42.25%	12.64%	27.64%	36.11%	42.10%	27.60%	38.33%	38.51%
EUR Equity	10.47%	-19.14%	-4.14%	4.32%	10.32%	-4.18%	6.55%	6.73%
JPY Bonds	-2.20%	-31.80%	-16.80%	-8.34%	-2.34%	-16.84%	-6.11%	-5.93%

ISSN 1554-5075

YTD 30Oct09	In USD	In AUD	In CAD	In EUR	In JPY	In GBP	In CHF	In INR
JPY Prop.	9.59%	-20.01%	-5.01%	3.45%	9.45%	-5.05%	5.68%	5.86%
JPY Equity	0.21%	-29.40%	-14.40%	-5.93%	0.06%	-14.44%	-3.71%	-3.53%
GBP Bonds	15.06%	-14.54%	0.46%	8.92%	14.92%	0.42%	11.15%	11.33%
GBP Prop.	24.48%	-5.13%	9.87%	18.33%	24.33%	9.83%	20.56%	20.74%
GBP Equity	30.30%	0.70%	15.70%	24.16%	30.16%	15.66%	26.39%	26.57%
1-3 Yr USGvt	0.60%	-29.01%	-14.01%	-5.55%	0.45%	-14.05%	-3.32%	-3.14%
World Bonds	6.64%	-22.97%	-7.97%	0.49%	6.49%	-8.01%	2.72%	2.90%
World Prop.	20.97%	-8.63%	6.37%	14.83%	20.83%	6.32%	17.05%	17.23%
World Equity	24.01%	-5.59%	9.41%	17.87%	23.87%	9.37%	20.10%	20.28%
Commod Long Futures	13.41%	-16.19%	-1.19%	7.27%	13.27%	-1.23%	9.50%	9.68%
Commod L/Shrt	-13.48%	-43.08%	-28.08%	-19.62%	-13.62%	-28.13%	-17.39%	-17.21%
Gold	18.50%	-11.10%	3.90%	12.36%	18.36%	3.86%	14.59%	14.77%
Timber	-1.27%	-30.88%	-15.88%	-7.42%	-1.42%	-15.92%	-5.19%	-5.01%
Uncorrel Alpha	9.35%	-20.25%	-5.25%	3.21%	9.21%	-5.30%	5.43%	5.61%
Volatility VIX	-23.28%	-52.88%	-37.88%	-29.42%	-23.42%	-37.92%	-27.19%	-27.01%
Currency								
AUD	29.60%	0.00%	15.00%	23.46%	29.46%	14.96%	25.69%	25.87%
CAD	14.60%	-15.00%	0.00%	8.46%	14.46%	-0.04%	10.69%	10.87%
EUR	6.14%	-23.46%	-8.46%	0.00%	6.00%	-8.50%	2.23%	2.41%
JPY	0.15%	-29.46%	-14.46%	-6.00%	0.00%	-14.50%	-3.77%	-3.59%
GBP	14.65%	-14.96%	0.04%	8.50%	14.50%	0.00%	10.73%	10.91%
USD	0.00%	-29.60%	-14.60%	-6.14%	-0.15%	-14.65%	-3.92%	-3.74%
CHF	3.92%	-25.69%	-10.69%	-2.23%	3.77%	-10.73%	0.00%	0.18%
INR	3.74%	-25.87%	-10.87%	-2.41%	3.59%	-10.91%	-0.18%	0.00%

Uncorrelated Alpha Strategies Detail

As we have repeatedly noted over the years, actively managed strategies whose objective is to produce returns with low or no correlation with the returns on major asset classes (so-called “uncorrelated alpha strategies”) have an undeniable mathematical benefit for a portfolio. Moreover, the potential size of this benefit increases with the portfolio’s long-term real rate of return target. On the other hand, we have also repeatedly noted that, for a wide range of reasons, active management is an extremely difficult game to play consistently well, and that this challenge only increases with time. Hence, in our model portfolios, we have tried to strike an appropriate balance between these two perspectives. We start by limiting allocations to uncorrelated alpha to no more than ten percent of a portfolio. We then equally divide

ISSN 1554-5075

this allocation between four different strategies. Within each strategy, we track the performance of two liquid, retail funds which can be used to implement it, and which have far lower costs than the 2% of assets under management and 20% of profits typically charged by hedge fund managers using the same strategy (for more on the advantages of such funds, see "How Do Hedge Fund Clones Manage the Real World?" by Wallerstein, Tuchshmid, and Zaker). The following table shows the year to date performance of these funds (which are listed by ticker symbol):

YTD 30 Oct 09	**In USD**	**In AUD**	**In CAD**	**In EUR**	**In JPY**	**In GBP**	**In CHF**	**In INR**
Eq Mkt Neutral								
HSKAX	-3.11%	-32.72%	-17.72%	-9.26%	-3.26%	-17.76%	-7.03%	-6.85%
OGNAX	-1.19%	-30.80%	-15.80%	-7.34%	-1.34%	-15.84%	-5.11%	-4.93%
Arbitrage								
ARBFX	8.63%	-20.97%	-5.98%	2.49%	8.48%	-6.02%	4.71%	4.89%
ADANX	7.70%	-21.90%	-6.90%	1.56%	7.55%	-6.95%	3.78%	3.96%
Currency								
DBV	19.41%	-10.19%	4.81%	13.27%	19.27%	4.77%	15.50%	15.68%
ICI	4.70%	-24.91%	-9.91%	-1.45%	4.55%	-9.95%	0.78%	0.96%
Equity L/S								
HSGFX	5.97%	-23.64%	-8.64%	-0.17%	5.82%	-8.68%	2.05%	2.23%
PTFAX	15.82%	-13.78%	1.22%	9.68%	15.68%	1.18%	11.91%	12.09%
GTAA								
MDLOX	16.33%	-13.27%	1.73%	10.19%	16.19%	1.69%	12.42%	12.60%
PASAX	19.24%	-10.36%	4.64%	13.10%	19.10%	4.60%	15.33%	15.51%

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

ISSN 1554-5075

twelve months. To obtain the cross-sectional perspective, we horizontally compare the row labeled "This Month's Average" for the three regimes. In our interpretation, the regime with the highest rolling three month average is the one which (on the specified date) the market's conventional wisdom believed was the most likely to develop.

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

Rolling Three Month Returns in USD		30-Sep-09
High Uncertainty	***High Inflation***	***Normal Growth***
Short Maturity US Govt Bonds (SHY) **0.79%**	US Real Return Bonds (TIP) **4.01%**	US Equity (VTI) **5.17%**
1 - 3 Year International Treasury Bonds (ISHG) **2.77%**	Long Commodities (DJP) **4.29%**	EAFE Equity (EFA) **5.73%**
Equity Volatility (VIX) **18.40%**	Global Commercial Property (RWO) **13.00%**	Emerging Equity (EEM) **5.00%**
Gold (GLD) **9.83%**	Long Maturity Nominal Treasury Bonds (TLT)* **2.01%**	High Yield Bonds (HYG) **3.37%**
Average ***7.95%*** ***Three Months Ago:*** ***-3.53%***	***Average (with TLT short)*** ***4.82%*** ***Three Months Ago:*** ***9.91%***	***Average*** ***4.82%*** ***Three Months Ago:*** ***18.76%***

* falling returns on TLT indicate rising inflation expectations

As you can see, at the end of last month, the conventional wisdom appeared to have undergone an important change, moving away from the previous belief in a

ISSN 1554-5075

relatively quick return to normal times (though with an undercurrent of worry about higher inflation), to one that is now much more concerned with a return to the high uncertainty regime.

At the request of many readers, we will now publish forecasts for real returns on different asset classes. They can be compared to asset class return forecasts regularly produced by GMO, to which many of our readers also subscribe. Given our belief that foresight accuracy is improved by combining the outputs from different forecasting methodologies, we have taken a different approach from GMO. As we understand it (and their methodology is available on their site), they start with their estimate of current over or undervaluation, and assume that these will return to equilibrium over a seven-year business cycle. They believe that the use of this time horizon will cause a number of ups and downs caused by cyclical and investor behavior factors to average out. It has always struck us as a very logical approach, though one that like ours, is based on unavoidably imperfect assumptions. The forecasting approach we have taken is grounded in our research in to the performance of different asset classes in three regimes, which we have termed high uncertainty, high inflation and normal times. In the latter regime, asset class returns are strongly attracted to their equilibrium levels – i.e., to the situation in which the returns supplied and the returns demanded are close to balance. Our approach to estimating returns under this regime is to appropriate risk premiums for different asset classes to our estimate of the equilibrium yield on risk return bonds when the system is operating under normal conditions. In contrast, the high uncertainty and high inflation regimes are very much disequilibrium conditions in which investor behavior determines the returns that are actually supplied. Under these regimes, our approach to return forecasting starts with our estimate of what the real rate of return would be (lower than normal under high uncertainty because of a lower time discount rate, and lower still under high inflation because of much stronger investor demand for inflation hedging assets like real return bonds). We then add an estimate of the realized return spread over the real bond yield for each asset class in the high uncertainty and high inflation regimes. To determine these premia, we began with the results from our historical regime analysis, and subjectively

ISSN 1554-5075

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. We are the first to admit that this 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. As always, we stress that research has shown that accuracy can be improved by combining forecasts produced using different methodologies. With that admonition, our results are as follows:

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

Table: One Year Asset Class Valuation Conclusions and Recent Momentum

ISSN 1554-5075

The following table sums up our conclusions (based on the analysis summarized in this article) as to potential asset class under and overvaluations at the end of **October 2009**, over a one year time horizon. Note that our views on valuation over a longer time horizon sometimes differ from our short-term views. As we repeatedly note, when discussing asset class valuation (or any forecast, for that matter), being specific about the time horizon is critical. Our longer term valuation views are contained in the Global Asset Class Valuation Analysis section of each month's journal.

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

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

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

The following table summarizes our current views about current prices compared to fundamental valuation estimates over a one year time horizon. Specifically, we reach conclusions about whether different asset classes appear close

ISSN 1554-5075

to fairly priced (in which case our rating is "neutral"), or whether they are under or overvalued.

The extent to which we believe over or undervaluation to be the case is reflected in the confidence rating we assign to each conclusion. We believe it is extremely important for the recipient of any estimate or assessment to clearly understand the analyst's confidence in the conclusions he or she presents. How best to accomplish this has been the subject of an increasing amount of research (see, for example, "Communicating Uncertainty in Intelligence Analysis" by Steven Rieber; "Verbal Probability Expressions in National Intelligence Estimates" by Rachel Kesselman, "Verbal Uncertainty Expressions: Literature Review" by Marek Druzdzel, and "What Do Words of Estimative Probability Mean?" by Kristan Wheaton). We use a three level verbal scale to express our confidence level in our valuation conclusions. "Possible" represents a relatively low level of confidence (e.g., 25% – 33%, or a 1 in 4 to 1 in 3 chance of being right), "likely" a moderate level of confidence (e.g., 50%, or a 1 in 2 chance of being right), and "probable" a high level of confidence (e.g., 67% to 75%, or a 2 in 3 to 3 in 4 chance of being right). We do not use a quantitative scale, because we believe that would give a false sense of accuracy to judgments that are inherently approximate due to the noisy data and subjective assumptions upon which they are based.

An exception to this approach is our assessment of the future return to local investors for holding U.S. dollars. In this case, our conclusions are mechanically driven by interest rate differentials on ten year government bonds. To be sure, the theory of Uncovered Interest Rate Parity, which calls for exchange rates offsetting interest rate differentials does not often hold 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 has shown 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.

ISSN 1554-5075

Our fundamental valuation estimates over a one year time horizon, as well as recent momentum, are summarized in the following table. We stress that these conclusions represent our assessment at a given point in time, which implies no forecast as to when any over and undervaluations will be reversed. Indeed, before such a reversal occurs, current over and undervaluations could actually become more extreme. That said, common sense suggests that more extreme situations are more likely to be recognized and reversed. An example of this would be a situation in which an asset class was deemed likely or probably overvalued, but where momentum data indicated an accelerating increase in prices. As so many authors have noted throughout history, trends that can't continue don't continue. Finally, conclusions about potential price reversals also have to be seen in the longer term context of the likely evolution of future 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 30 Oct 09	***Fundamental Valuation Estimate Based on a One Year Time Horizon***	***Rolling 3 Month Return in Local Currency***	***Rolling 3 Month Return 3 Months Ago***
AUD Real Bonds	Neutral	3.16%	-2.47%
AUD Bonds	Possibly Undervalued	1.14%	-8.28%
AUD Property	Possibly Overvalued	14.41%	-13.81%
AUD Equity	Neutral	10.40%	12.95%
CAD Real Bonds	Neutral	2.64%	6.89%
CAD Bonds	Possibly Undervalued	1.49%	-0.13%
CAD Property	Neutral	12.70%	23.16%
CAD Equity	Likely Overvalued	1.57%	16.14%
CHF Bonds	Neutral	-0.49%	1.78%
CHF Property	Neutral	15.74%	-3.71%

ISSN 1554-5075

Valuation at 30 Oct 09	*Fundamental Valuation Estimate Based on a One Year Time Horizon*	*Rolling 3 Month Return in Local Currency*	*Rolling 3 Month Return 3 Months Ago*
CHF Equity	Likely Overvalued	4.38%	14.93%
EUR Real Bonds	Neutral	1.84%	3.09%
EUR Bonds	Possibly Undervalued	0.58%	-1.06%
EUR Prop.	Neutral	20.96%	8.54%
EUR Equity	Neutral	0.25%	7.90%
GBP Real Bonds	Neutral	6.28%	2.19%
GBP Bonds	Neutral	3.69%	-0.67%
GBP Property	Neutral	18.50%	5.00%
GBP Equity	Possibly Undervalued	10.26%	4.81%
INR Bonds	Possibly Overvalued	-6.75%	-4.24%
INR Equity	Probably Overvalued	1.44%	37.42%
JPY Real Bonds	Neutral	0.18%	5.90%
JPY Bonds	Possibly Undervalued	0.00%	0.00%
JPY Property	Neutral	3.21%	11.30%
JPY Equity	Probably Overvalued	-8.70%	13.35%
USD Real Bonds	Neutral	4.44%	2.28%
USD Bonds	Possibly Undervalued	-4.36%	2.84%
USD Property	Possibly Overvalued	15.96%	9.56%
USD Equity	Probably Overvalued	5.23%	14.02%
Following in USD:			
Investment Grade Credit (CIU)	Possibly Overvalued	2.94%	7.12%
High Yield Credit (HYG)	Likely Overvalued	3.21%	13.00%
Emerging Mkt Equity (EEM)	Probably Overvalued	7.13%	30.40%
Commodities Long	Neutral	4.29%	14.89%
Commodities L/S	N/A	-0.65%	-1.49%
Gold	Possibly Undervalued	9.83%	6.97%
Timber	Possibly Undervalued	1.78%	-5.13%
Uncorrelated Alpha	N/A	2.60%	4.77%
Volatility (VIX)	Likely Undervalued	18.40%	-28.99%
Return in Local for holding USD:			

ISSN 1554-5075

Valuation at 30 Oct 09	*Fundamental Valuation Estimate Based on a One Year Time Horizon*	*Rolling 3 Month Return in Local Currency*	*Rolling 3 Month Return 3 Months Ago*
Returns to AUD Investor	Positive	-12.84%	-14.64%
Returns to CAD Investor	Neutral	-0.47%	-10.70%
Returns to EUR Investor	Neutral	-4.24%	-6.37%
Returns to JPY Investor	Negative	-5.84%	-1.68%
Returns to GBP Investor	Neutral	0.78%	-12.63%
Returns to CHF Investor	Negative	-4.97%	-5.10%
Returns to INR Investor	Positive	-2.16%	-4.13%

Market Phase Change Risk Analysis

One of our core assumptions is that financial markets function as complex adaptive systems. One of the key features of such systems is their ability to pass through so-called "phase transitions" that materially change their character once certain variables exceed or fall below critical thresholds. In our September 2009 issue, we reviewed a paper on one of critical variables, "Leverage Causes Fat Tails and Clustered Volatility" by Thurner, Farmer and Geanakoplos. This paper more formally demonstrated the importance of a factor that has been associated with booms and busts throughout financial history: the expansion of the supply of credit at a pace well in excess of real economic growth. In the past we have also noted that rising uncertainty and the changing connectedness and strength of social networks that influence investor decision making may also be critical variables driving phase transitions in financial systems (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 identify the strengthening of networks (and consequent alignment of opinions, which may or may not reflect irrational herding) that is often associated with phase transitions. It was with this in mind that we recently read 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

ISSN 1554-5075

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 phenomena that give rise to them. The parameter equals the number of financial markets or assets that have positive returns over a given interval, less the number that have negative returns, divided by the total number of financial markets or asset classes evaluated. If the value is zero, the markets are in a disordered state and far from the potential phase change point. However, as the parameter value approaches one or negative one, the markets are in an increasingly ordered state. In this state, networks are more extensive, and presumably social influences have a greater impact on investor decisions. Under these conditions, a market may be close to or at a phase change point, and therefore subject to a sudden, and potentially violent, shift in its previous trend. We have calculated this order parameter for the 38 financial markets (excluding foreign exchange) we evaluate each month. Here are the results so far for 2009:

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct
(0.57)	(0.68)	(0.47)	-	0.21	0.11	0.32	0.63	0.53	0.58

As you can see, in 2009 global financial markets appear to have swung from a relatively ordered and negatively oriented state early in the year, through a period of disorganization during the spring and early summer, then into a period of stronger positive orientation by August that has only revered slightly since then.

This Month's Letters to the Editor

I went to a Pimco conference this week that discussed the issue of risk-based factor modeling. There is a lot of discussion around this topic within the institutional community. What are your views on this methodology?

Thank you for your email — sounds like it was an interesting conference. Risk factor based asset allocation is an issue we have studied with great interest, and indeed

ISSN 1554-5075

written about over the past year. As you recall, in our series on different regimes, which also explored the differences between 2007-2008 and the long period of relative calm that preceded it, we made extensive use of principal components analysis, which related asset class returns to their different loadings on statistically independent factors in these two periods. As we noted, there are a number of challenges when it comes to practically applying this methodology to portfolio construction. First and foremost is the identification (within any period of data that is analyzed) of macroeconomic and other variables (ideally ones that can be measured in real time) that have a strong relationship with the statistical factors identified by the principal components technique. Unfortunately, the performance of allocation models that are based on widely available macro factors has been mixed at best. The obvious conclusion is that either these variables are not picking up the whole story, so to speak, or that asset class loadings on them vary over time.

In light of this history, we have been going down a somewhat different path, based on the critical observations that (1) investor decisions and behavior are based on a mix of cognitive and emotional inputs, and (2) are not wholly independent, but rather have a social component that varies in strength over time. Our current view (which may evolve in the future as new research is published) is based on the existence of different investment regimes, which we define as high uncertainty, high inflation, and normal times. Within these regimes, we have noted that asset class risks, returns and correlations are very different. From a factor perspective, one could say that we are moving towards an approach based on three meta factors defined by our regimes. Of course, this begs the question of the factors that determine our characterization of the regime (one could also ask why we use three instead of four, five, or any other number of regimes — in this case, we strove for the smallest number that captured most of the risk/return/correlation variation we've seen in the past). In turn, this reduces to the question of which factors drive a substantial departure from the normal regime. Clearly, high inflation was an obvious one. The others were more challenging. As we've noted in our writing, we have concluded that two key variables are involved. The first is the extent of individual uncertainty about the core drivers of

ISSN 1554-5075

fundamental asset class valuation (essentially future real economic growth and future real discount rates). The second is the extent to which investor behavior reflects relatively strong network (social influence) effects (in our Phase Change section, we have started to publish a metric that attempts to measure the strength of this factor). What we term the high uncertainty regime includes both the last phases of bubbles and the aftermath of crashes.

Our ultimate goal is a methodology that enables the design of portfolios that are robust under these three regimes, and to enable investors to better understand the trade-offs between different portfolio goals and constraints and the degree of robustness. We are the first to say that this approach isn't perfect — for example, it requires some assumptions about regime continuation and transition probabilities, and it requires assumptions about risks/returns/correlations under different regimes. Given that the high uncertainty and high inflation regimes are fundamentally disequilibrium regimes, these estimates are inescapably rough. In light of this, the approach we are taking is that an investor's default portfolio should be an equally weighted mix of broadly defined asset classes (including, I note, new investable volatility products, which build in downside protection, rather than having such protection depend on confidence in your valuation analysis and willingness to act on it, given the incentives one faces). This equally weighted portfolio provides exposure to a wide range of return generating factors (one could return to the issue of equal factor or risk exposures, but this takes you right back to model and parameter uncertainty issues). Our historical analysis shows that, across a range of currencies, it has typically returned compound real annual returns of 4% to 5%. The relative weight one gives to this default portfolio and the weight one gives to the portfolio that emerges from a regime based analysis (which also includes one's individual preferences and constraints) is then based on one's degree of confidence in the accuracy of the forecasts that underlie the second portfolio (higher confidence = greater weight), and the extent to which one needs to earn more or less than 4% to 5% to achieve one's long term objectives.

ISSN 1554-5075

In sum, factor-based asset allocation is one we've looked at for years. Without a doubt, its promise is tantalizing. However, in practice it has always seemed to fall short, principally, I believe, because it has ignored the emotional and social factors that, to varying degrees over time, also have an impact on asset prices. To be sure, there is a lot of work going on to rectify this (e.g., the introduction of investable volatility products). And as that work proceeds, I'm sure our approach will also evolve. But for now, this is where we're at in our thinking on this issue.

In reading your materials, you seem to define alpha and beta differently from other writers. Could you please explain this again?

Without a doubt, the widespread use of the terms alpha and beta, and the related terms active, passive and index investing, has done more to confuse investors than to enlighten them. Alpha and beta are mathematical terms that come from a linear regression equation, of the form Y = bX + a. In the commonly used case, "X" is an appropriate asset class or sub-asset class benchmark, and "Y" is the return on an actively managed fund. The equation shows that this return is a function of both exposure to the overall market (measured by beta, in the "bX" term), as well as a residual, termed "alpha", which active managers like to use as a measure of their skill. A related measure is the so-called Information Ratio, which divides average alpha by the standard deviation of (active portfolio return less benchmark return). The Information Ratio measures the amount of risk (relative to the benchmark) that is taken to achieve a given level of alpha. So far, so good. Now let me briefly define our view on how to apply these concepts. In our view, there are two basic investment strategies: passive and active. Passive investors hold portfolios whose composition does not depend on a forecast. Logically, the passive portfolio must be a portfolio that every investor could hold if he or she chose to do so. The only portfolio that meets this test is the market capitalization weighted portfolio. Any deviation from this portfolio implies a forecast of one type or another. An investor who believes that markets are usually close to efficient (i.e., with asset prices generally close to their fundamental

ISSN 1554-5075

values) would deviate from the market cap weighted portfolio in the expectation of earning either higher returns with higher risk than the passive portfolio, or lower returns with lower risk. In contrast, an investor who deviates with the expectation of earning higher returns with lower risk than the passive portfolio makes a different set of assumptions: (1) that some investors will consistently make valuation mistakes, or, in the case of public investors, make investment decisions on the basis of considerations beyond or besides profit maximization; (2) that these deviations can be forecast, to a degree beyond luck; and that (3) they can be exploited at a cost that is lower than the expected return from doing so. Some of these deviations from the passive portfolio have been embodied in index products that reduce the cost of implementing them. Examples of these include large capitalization stocks, value stocks, or stocks from a given country, region, or industry sector. Confusingly, the return on these low cost, index-based deviations is also referred to as "beta", because such products are the benchmark against which the returns of active managers' who invest in these types of stocks (e.g., small caps) are regressed to identify their "alpha." The logic here is that an active manager must add cost and risk adjusted value beyond what an investor could obtain simply by investing in the relevant index product. However, what is often overlooked in this analysis is that both the decision to deviate from the passive market portfolio and the decision to use an actively managed fund rather than an index product are based on forecasts. So, to put it differently, in our view this deviation involves one type of beta and two types of alpha (call them cheap and expensive), rather than two types of beta and one type of alpha.

November 2009 Economic Update

We assume that under normal conditions, the "base case" or "policy" asset allocations employed by our readers are sufficient to achieve their long-term goals within acceptable risk limits. Given this assumption, the main threat our readers' face is a substantial downside loss that breaches these risk limits, and substantially reduces the probability they will achieve their long-term goals. The goal of our

ISSN 1554-5075

economic updates is to provide timely warning about dangerous overvaluations that could lead to such losses in one or more asset classes. Our main focus is on what is known as "strategic warning" – "the what and the why", with a lesser focus on "operational warning" – "the how". Our objective is not to provide tactical warnings – "who, when and where" – that are more commonly known as "trading tips" intended to increase short term returns.

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

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

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

ISSN 1554-5075

scenarios and guide our search for information that provides insight about which of them is developing.

The assumptions we make in our analyses, and the conclusions we reach, are inescapably uncertain. We believe it is extremely important for the reader of any estimate or assessment to clearly understand the analyst's confidence in the conclusions he or she presents. How best to accomplish this has been the subject of an increasing amount of research (see, for example, "Communicating Uncertainty in Intelligence Analysis" by Steven Rieber; "Verbal Probability Expressions in National Intelligence Estimates" by Rachel Kesselman, "Verbal Uncertainty Expressions: Literature Review" by Marek Druzdzel, and "What Do Words of Estimative Probability Mean?" by Kristan Wheaton). In our analyses, we are standardizing on the use of a three level verbal scale to express our confidence level in our estimates. "Possible" represents a relatively low level of confidence (e.g., 25% – 33%, or a 1 in 4 to 1 in 3 chance of being right), "likely" a moderate level of confidence (e.g., 50%, or a 1 in 2 chance of being right), and "probable" a high level of confidence (e.g., 67% to 75%, or a 2 in 3 to 3 in 4 chance of being right). We do not use a quantitative scale, because we believe that would give a false sense of accuracy to judgments that are inherently approximate.

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

The past month was not an encouraging one for people who hope the cooperative scenario will develop.

ISSN 1554-5075

President Obama's trip to Asia failed to result in progress toward reducing the growing tension between the United States and China. Liu Mingkang, Chair of the China Banking Regulatory Commission, said the U.S. was facilitating speculative excess in financial markets around the world through its weak dollar and low interest rate policies. China also criticized rising protectionist measures taken by the United States against Chinese exports, even as it applied new import tariffs to U.S. exports of adipic acid (a key intermediary chemical). More critically, however, the European Union Chamber of Commerce in China published a very thorough analysis of "Overcapacity in China", which seems sure to provide further intellectual and political fuel to the strengthening view that China's continued investment in export capacity and fixed exchange rate versus the depreciating U.S. dollar (at a time of record unemployment in the U.S. and Europe) constitutes a 21st century version of "exporting deflation" (Japan's deflation is now running at 2.3%/year) and the "beggar thy neighbor" policies that helped to prolong the Great Depression. Indeed, the last month saw strong calls for appreciation of China's exchange rate from both Paul Krugman and Martin Feldstein. That is further evidence of a strengthening policy consensus that could easily lead to intensifying conflict between China and the United States. That this could result in a significant reduction in global trade and capital flows, and perhaps the development of regional blocs is obvious to all (*The Economist's* special section, "A Wary Respect" in its 22Oct09 issue provides an excellent overview; see also the writings of Michael Pettis and Andy Xie). What is more interesting to us has been the realization among a growing number of commentators that these forces also pose a serious threat to the future stability of China itself (e.g., see Politico, 10Nov09, "Is China Headed Toward Collapse?"), a point we have been making for quite some time.

In the United States, the last month saw essentially no progress towards addressing the growing credit quality problems in the financial system, across a range of sectors, including consumer loans (due to rising unemployment), commercial real estate, small banks, and municipal securities. Regulatory reform remains stalled, and the ability of the Obama administration to achieve progress on a range of domestic and foreign policy issues seems to be waning (e.g., see Spiegel 23Nov09, "Obama's

ISSN 1554-5075

Nice Guy Act Gets Him Nowhere on the World Stage", and a growing number of criticisms of the domestic policy paralysis from both left and right wing commentators). Ominously, IMF Managing Director Dominique Strauss-Kahn recently warned that "another huge call on public finances by the financial services sector would not be tolerated by the man in the street and could even threaten democracy" (*London Times*, 23Nov09 "IMF Warns Second Bailout Would Threaten Democracy").

Yet at a time when renewed private sector investment spending is the key to creating policy room for reducing the very high government deficits that have caused so much political angst, the *Financial Times* recently editorialized that "Democrats in [the US] Congress seem devoted to the principle that the rich – if an income of $200,000 makes you rich – can carry the entire burden of the government's [expanding spending] obligations. The party's single-mindedness on this point now borders on the pathological...It is time for the Democrats to recognize the limits of this approach...Top marginal rates cannot rise as high as Democrats want without weakening growth, and the party's fiscal strategy is reaching a point of rapidly diminishing returns. It already scares the voters and commands no credibility."

Even more interesting is an emerging change in commentary about the continuing burden of household mortgage debt. At a time when the data shows that 28% of households with a mortgage are facing negative equity, and when the Obama administration has publicly acknowledge that the existing mortgage modification program (cynically known as "extend and pretend") isn't working, some have begun to question the morality of continuing to pay. As one article noted, the moral obligation to do what is financially best for your family trumps the moral obligation to keep paying on a ruinous mortgage ("Owners' Willingness to Strategically Default on Loans Depends Largely on How Far Underwater They Are", *LA Times*, 22Nov09). Certainly, the very public gluttony at surviving financial services firms (think record setting bonuses at Goldman Sachs) has contributed to this trend. But so too has the inability of the financial services industry and/or the Obama administration to put in place a mortgage program that would actually reduce mortgage debt (e.g., via debt equity swaps). Left unchecked, and fueled by banks' record setting profits and resistance to

ISSN 1554-5075

reform, this movement could quickly mushroom into a major political crisis in the United States over the next year.

Finally, the last month also saw a worsening of relations between Iran and the West (with the Iranians playing for time, as Israel's patience rapidly runs out), and evidence that the H1N1 influenza virus is evolving in a potentially more dangerous direction (see this month's Product and Strategy Notes for more information on this).

In sum, in the past month we saw more developments that are inconsistent with our cooperative scenario than we did evidence that is inconsistent with our conflict scenario. (For more detail on key scenario-related evidence accumulated over the past three months, please see the Appendix).

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

ISSN 1554-5075

overvalued can substantially increase the probability that they will achieve their long term goals. This is the painful lesson learned by too many investors in the 2001 tech stock crash, and then learned again in the 2007-2008 crash of multiple asset classes.

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

Equity Markets

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

ISSN 1554-5075

fundamentals. As described in our November 2008 article "Are Emerging Market Equities Undervalued?", people can and do disagree about the "right" values for the variables we use in our fundamental analysis. Recognizing this, we present four valuation scenarios for an equity market, based on different values for three key variables. First, we use both the current dividend yield and the dividend yield adjusted upward by .50% to reflect share repurchases. Second, we define future dividend growth to be equal to the long-term rate of total (multifactor) productivity growth. For this variable, we use two different values, 1% or 2%. Third, we also use two different values for the equity risk premium required by investors: 2.5% and 4.0%. Different combinations of all these variables yield high and low scenarios for both the future returns the market is expected to supply (dividend yield plus growth rate), and the future returns investors will demand (real bond yield plus equity risk premium). We then use the dividend discount model to combine these scenarios, to produce four different views of whether an equity market is over, under, or fairly valued today. The specific formula is (Current Dividend Yield x 100) x (1+ Forecast Productivity Growth) divided by (Current Yield on Real Return Bonds + Equity Risk Premium - Forecast Productivity Growth). Our valuation estimates are shown in the following tables, where a value greater than 100% implies overvaluation, and less than 100% implies undervaluation. In our view, the greater the number of scenarios that point to overvaluation or undervaluation, the greater the probability that is likely to be the case.

Equity Market Valuation Analysis at 30 Oct 2009

Australia	**Low Demanded Return**	**High Demanded Return**
High Supplied Return	70%	101%
Low Supplied Return	102%	136%

Canada	**Low Demanded Return**	**High Demanded Return**
High Supplied Return	71%	122%
Low Supplied Return	128%	190%

ISSN 1554-5075

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Eurozone	Low Demanded Return	High Demanded Return
High Supplied Return	52%	87%
Low Supplied Return	87%	127%

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Japan	Low Demanded Return	High Demanded Return
High Supplied Return	95%	147%
Low Supplied Return	159%	224%

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United Kingdom	Low Demanded Return	High Demanded Return
High Supplied Return	27%	65%
Low Supplied Return	60%	104%

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United States	Low Demanded Return	High Demanded Return
High Supplied Return	85%	146%
Low Supplied Return	160%	238%

Switzerland	Low Demanded Return	High Demanded Return
High Supplied Return	79%	132%
Low Supplied Return	141%	249%

India	Low Demanded Return	High Demanded Return
High Supplied Return	77%	168%
Low Supplied Return	202%	336%

Emerging Markets	Low Demanded Return	High Demanded Return
High Supplied Return	98%	193%
Low Supplied Return	142%	237%

ISSN 1554-5075

In our view, the key point to keep in mind with respect to equity market valuations is the level of the current dividend yield (or, more broadly, the yield of dividends and buybacks), which history has shown to be the key driver of long-term real equity returns in most markets. The rise in uncertainty that accompanied the 2007-2008 crisis undoubtedly increased many investors' required risk and uncertainty premium above the long-term average, while simultaneously decreasing their long-term real growth forecasts. The net result was a fall in equity prices that caused dividend yields to increase. From the perspective of an investor with long-term risk and growth assumptions in the range we use in our model, in some regions this increase in dividend yields more than offset the simultaneous rise in real bond yields, and caused the equity market to become undervalued (using our long-term valuation assumptions). On the other hand, in a still weak economy, many companies have been cutting dividends at a pace not seen since the 1930s. Hence the numerator of our dividend/yield calculation may well further decline in the months ahead, which, all else being equal, should further depress prices. Despite this, the past few months have seen a very strong rally develop in many equity markets, which, in some cases, has caused our valuation estimates to rise into the "overvalued" region. Given the absence of progress in reducing the three main obstacles that block a return to sustainable economic growth (see our Economic Update), we believe that these rallies reflect investor herding (and the incentives of many professional investment managers to deliver positive returns on 2008's disastrous end-of-year base), rather than any improvement in the underlying fundamentals.

Real Return Bonds

Let us now move on to a closer look at the current level of real interest rates. In keeping with our basic approach, we will start by looking at the theoretical basis for determining the rate of return an investor should demand in exchange for making a one year risk free investment. The so-called Ramsey equation tells us that this should be a function of a number of variables. The first is our "time preference", or the rate at

ISSN 1554-5075

which we trade-off a unit of consumption in the future for one today, assuming no growth in the amount of goods and services produced by the economy. The correct value for this parameter is the subject of much debate. For example, this lies at the heart of the debate over how much we should be willing to spend today to limit the worst effects of climate change in the future. In our analysis, we assume the long-term average time preference rate is two percent per year.

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

Unfortunately, this rate of future growth is not guaranteed; rather, there is an element of uncertainty involved. Therefore we also need to take investors' aversion to risk and uncertainty into account when estimating the risk free rate of return they should require in exchange for letting others use their capital for one year. There are many ways to measure this, and unsurprisingly, many people disagree on the right approach to use. In our analysis, we have used Constant Relative Risk Aversion with an average value of three (see "How Risk Averse are Fund Managers?" by Thomas Flavin). The following table brings these factors together to determine our estimate of the risk free rate investors in different currency zones should logically demand in equilibrium (for an excellent discussion of the issues noted above, and their practical importance, see "The Stern Review of the Economics of Climate Change" by Martin Weitzman):

ISSN 1554-5075

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	2.0	3.0	3.2
Canada	0.8	1.00	1.8	0.9	2.0	3.0	3.8
Eurozone	0.4	1.20	1.6	0.8	2.0	3.0	3.9
Japan	-0.3	1.20	0.9	0.5	2.0	3.0	3.8
United Kingdom	0.5	1.20	1.7	0.9	2.0	3.0	3.8
United States	0.8	1.20	2.0	1.0	2.0	3.0	3.5

- 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 values 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 October 2009**.

Region	Risk Free Rate Demanded	Actual Risk Free Rate Supplied	Difference	Overvaluation (>100) or Undervaluation (<100)
Australia	3.2	2.9	-0.2	102
Canada	3.8	1.6	-2.2	123
Eurozone	3.9	1.7	-2.2	124
Japan	3.8	2.2	-1.6	117
United Kingdom	3.8	0.6	-3.3	138
United States	3.5	1.6	-1.9	121

We reiterate that this analysis is based on a medium term view of the logical value of the risk free real return investors should demand. For example, the sharp fall in

ISSN 1554-5075

consumer spending around the world implies a lower time preference rate than the 2.0% we have used in our analysis. For example, using a time preference of 1.0% would substantially reduce the estimated overvaluations in this asset class. Such a fall would be consistent with recent research findings that as perceived uncertainty increases, individuals 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).

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

Government Bond Markets

Our government bond market valuation update is based on the same supply and demand methodology we use for our equity market valuation update. In this case, the supply of future fixed income returns is equal to the current nominal yield on ten-year government bonds. The demand for future returns is equal to the current real bond yield plus historical average inflation between 1989 and 2003. We use the latter as a proxy for the average rate of inflation likely to prevail over a long period of time.

ISSN 1554-5075

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 October 2009

	Current Real Rate*	Average Inflation Premium (89-03)	Required Nominal Return	Nominal Return Supplied (10 year Govt)	Yield Gap	Asset Class Over or (Under) Valuation, based on 10 year zero
Australia	2.92%	2.96%	5.88%	5.57%	-0.31%	2.99%
Canada	1.60%	2.40%	4.00%	3.43%	-0.57%	5.68%
Eurozone	1.75%	2.37%	4.12%	3.22%	-0.90%	9.05%
Japan	2.20%	0.77%	2.97%	1.42%	-1.55%	16.40%
UK	0.57%	3.17%	3.74%	3.63%	-0.11%	1.08%
USA	1.57%	2.93%	4.50%	3.40%	-1.10%	11.17%
Switz.	1.77%	2.03%	3.80%	2.05%	-1.75%	18.53%
India	1.77%	7.57%	9.34%	7.86%	-1.48%	14.61%

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

It is important to note some important limitations of this analysis. Our bond market analysis uses historical inflation as an estimate of expected future inflation over the long-term. This may not produce an accurate valuation estimate, if the historical average level of inflation is not a good predictor of future average inflation levels. This is especially true today, when a period of deflation is a distinct possibility in many countries, particularly over the next 12 months. In this case, many nominal return bonds might in fact be undervalued today, over a shorter time horizon. On the other hand, a sharp currency depreciation could certainly change this view, particularly in countries like the U.K., that are significantly exposed to international trade.

ISSN 1554-5075

However, this raises the issue of how long a period of deflation might last, and how deep it might be, particularly given the unprecedented levels of monetary and fiscal deficit expansion that have been undertaken in many countries in response to the worst downturn since the Great Depression. History suggests that over the long-term, they are likely to result in higher rates of inflation. The following table, shows historical average inflation rates (and their standard deviations) for the U.K. and U.S. over longer periods of time, and helps to put our valuation analysis (and inflation assumptions) into context:

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

In sum, over a long-term time horizon in which inflation levels revert to their long-term averages, many government bond markets appear overpriced today (i.e., prevailing nominal yields appear to be too low). However, over a short-term time horizon, during which inflation should either be low or negative, one can make the case that many government bond markets are significantly undervalued today. As is always the case when it comes to questions about valuation levels, the underlying assumption about the time horizon being used is critical.

Credit Spreads

Let us now turn to the subject of the valuation of non-government bonds. Some have suggested that it is useful to decompose the bond yield spread into two parts. The first is the difference between the yield on AAA rated bonds and the yield on the ten year Treasury bond. Because default risk on AAA rated companies is very low, this spread primarily reflects prevailing liquidity and jump (regime shift) risk conditions

ISSN 1554-5075

(e.g., between a low volatility, relatively high return regime, and a high volatility, lower return regime). The second is the difference between BAA and AAA rated bonds, which tells us more about the level of compensation required by investors for bearing relatively high quality credit risk. Research has also shown that credit spreads on longer maturity intermediate risk bonds has predictive power for future economic demand growth, with a rise in spreads signaling a future fall in demand (see "Credit Market Shocks and Economic Fluctuations" by Gilchrist, Yankov, and Zakrajsek).

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

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

At **30 October 2009**, the AAA minus 10 year Treasury spread was 1.78%. The AAA minus BAA spread was 1.11%. Since these distributions are not normal (i.e., they do not have a "bell curve" shape), we take a different approach to putting them in perspective. Over the past twenty three years, there have been only 667 days with a higher AAA spread (5.7% of all days) and 1,450 days with a higher BAA spread (12.5% of all days in our sample). Clearly, and despite all the talk one hears about "green shoots", current spreads still reflect relatively a high degree of investor uncertainty about future liquidity and credit risk, despite the declines in the BBB and AAA spreads from their crisis highs. However, given the unchartered economic waters through which we are still passing, and our belief that the conventional wisdom underestimates the amount of trouble on the horizon, we believe that these spread

ISSN 1554-5075

possibly reflect the underpricing of liquidity and credit risk – or, to put it differently, the overpricing of AAA and BBB rated bonds – on a one year time horizon.

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

Currencies

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

ISSN 1554-5075

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

Annual Exchange Rate Changes Implied by Bond Market Yields on 30 October 2009

	To AUD	To CAD	To EUR	To JPY	To GBP	To USD	To CHF	To INR
From								
AUD	0.00%	-2.14%	-2.35%	-4.15%	-1.94%	-2.17%	-3.52%	2.29%
CAD	2.14%	0.00%	-0.21%	-2.01%	0.20%	-0.03%	-1.38%	4.43%
EUR	2.35%	0.21%	0.00%	-1.80%	0.41%	0.18%	-1.17%	4.64%
JPY	4.15%	2.01%	1.80%	0.00%	2.21%	1.98%	0.63%	6.44%
GBP	1.94%	-0.20%	-0.41%	-2.21%	0.00%	-0.23%	-1.58%	4.23%
USD	2.17%	0.03%	-0.18%	-1.98%	0.23%	0.00%	-1.35%	4.46%
CHF	3.52%	1.38%	1.17%	-0.63%	1.58%	1.35%	0.00%	5.81%
INR	-2.29%	-4.43%	-4.64%	-6.44%	-4.23%	-4.46%	-5.81%	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

ISSN 1554-5075

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

Our analysis also assumes that over the long-term, investors require a 3.0% risk premium above the yield on real return bonds as compensation for bearing the risk of securitized commercial property as an asset class. Last but not least, there is significant research evidence that commercial property markets are frequently out of equilibrium, due to slow adjustment processes as well as the interaction between fundamental factors and investors' emotions (see, for example, "Investor Rationality: An Analysis of NCREIF Commercial Property Data" by Hendershott and MacGregor; "Real Estate Market Fundamentals and Asset Pricing" by Sivitanides, Torto, and Wheaton; "Expected Returns and Expected Growth in Rents of Commercial Real Estate" by Plazzi, Torous, and Valkanov; and "Commercial Real Estate Valuation: Fundamentals versus Investor Sentiment" by Clayton, Ling, and Naranjo). Hence, it is extremely hard to forecast how long it will take for any over or undervaluations we identify to be reversed. The following table shows the results of our valuation analysis as of **30 October 2009**: We use the dividend discount model approach to produce our estimate of whether a property market is over, under, or fairly priced today, assuming a long-term perspective on property market valuation drivers. The specific formula is (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.

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)
Australia	5.2%	0.2%	5.4%	2.9%	3.0%	5.9%	110%
Canada	6.8%	0.2%	7.0%	1.6%	3.0%	4.6%	65%
Eurozone	4.4%	0.2%	4.6%	1.7%	3.0%	4.7%	104%
Japan	6.7%	0.2%	6.9%	2.2%	3.0%	5.2%	75%
Switzerland*	3.7%	0.2%	3.9%	1.8%	3.0%	4.8%	123%
U.K.	4.0%	0.2%	4.2%	0.6%	3.0%	3.6%	84%
U.S.A.	4.8%	0.2%	5.0%	1.6%	3.0%	4.6%	90%

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

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

ISSN 1554-5075

their jobs) due to their underperforming an asset class benchmark. The exception to our general view may come in Switzerland and the Eurozone, where rising insecurity often triggers an increased allocation to property, on the basis of traditional wealth preservation principles.

Commodities

Let us now turn to the Dow Jones AIG Commodity Index, 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

ISSN 1554-5075

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

ISSN 1554-5075

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

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

ISSN 1554-5075

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 October 2009**:

Commodity	**2009 DJAIG Weight**	**Current Status**
Crude Oil	13.8%	Contango
Natural Gas	11.9%	Contango
Gold	7.9%	Contango
Soybeans	7.6%	Backwardated
Copper	7.3%	Contango
Aluminum	7.0%	Contango
Corn	5.7%	Contango
Wheat	4.8%	Contango
Live Cattle	4.3%	Contango
Unleaded Gasoline	3.7%	Contango
	74.0%	

Given the continued presence of so many contangoed futures curves, expected near term roll returns on the DJAIG as a whole are still negative, absent major supply side shocks. That said, on a weighted basis, the forward premium (relative to the spot price) has fallen to 1.6% from 3.10% two months ago. Finally, we also note that when futures are contangoed, commodity funds that can take short as well as long positions may still deliver positive returns.

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

ISSN 1554-5075

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

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

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

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

ISSN 1554-5075

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

Another approach to assessing the valuation of commodities as an asset class is to compare the current value of the DJAIG Index to its long-term average. Between 1991 and 2008, the inflation adjusted (i.e., real) DJAIG had an average value of 91.61, with a standard deviation of 16.0 (skewness of .52, and kurtosis of -.13 – i.e., it was close to normal). The inflation adjusted **30 October 2009** closing value of 83.56 was .50 standard deviations below the long term average. Assuming the value of the index is normally distributed around its historical average (which in this case is approximately correct), a value within one standard deviation of the average should occur about 67% of the time, and a value within two standard deviations 95% of the time. Whether the current level of the inflation adjusted DJAIG signifies that commodities are undervalued depends upon one's outlook for future roll returns and price surprises, and, critically, the time horizon being used.

Two factors suggest that commodities are generally underpriced today, over the medium term time horizon. The first is the large amount of monetary easing underway in the world, which, at some point, will likely lead to higher inflation. The second factor is the equally large amount of fiscal stimulus being applied to the global economy, with its focus on infrastructure projects and clean fuels, both of which should eventually boost demand for commodities (and indirectly boost economic growth in commodity exporting countries like Australia and Canada). Gold prices should also benefit from rising investor uncertainty and/or worries about future inflation, which should generate higher retail flows into the expanding range of gold ETF products that make easier to invest in this commodity.

The argument that commodities are currently overpriced is based on the length of time that will pass before the three critical problems that underlie this global recession are resolved: excessive consumer debt, insolvent banks, and substantial world current account imbalances. Until this happens, the impact of fiscal stimulus on global real growth (and hence commodity prices) is likely to be, at best, weakly positive. To put it differently, the argument for overpricing is that commodity investors'

ISSN 1554-5075

belief in the strength of the economic recovery has gotten too far ahead of the reality on the ground. At the end of **October 2009** we believe that the balance of probabilities favors an increase in commodity prices over the medium term; hence we believe that, on a long-term view, commodities are possibly undervalued today. However, over a one-year time horizon, we believe that commodities are possibly overpriced. While the worsening crisis with Iran indicates a possibility for an upside surprise in oil prices, the consequent negative shock to a weak world economic recovery would work in the other direction for many other commodities. Finally, we continue to believe that gold is possibly underpriced in the short-term, given our view that the majority of market participants have underestimated the chances of a sharp increase in uncertainty over the next 12 months, and in inflation thereafter.

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

ISSN 1554-5075

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

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

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

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

ISSN 1554-5075

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

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

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 asset class.

ISSN 1554-5075

Growth Driver	**Assumption**
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

ISSN 1554-5075

investing in liquid timberland assets. Arguably, because at least part of timber's return generating process (physical growth) has zero correlation with the return generating processes for other asset classes, we should use an even lower risk premium. Again, we believe our approach is conservative in this regard. Given these assumptions, our assessment of the valuation of the timber asset class at **30 October 2009** is shown in the following table. We use the dividend discount model approach to produce our estimate of whether timber is over, under, or fairly valued today. The specific formula is (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)	5.20%
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	**6.20%**
Real Bond Yield	1.57%
Plus Risk Premium for Timber	3.00%
Equals Average Annual Real Return Demanded	**4.57%**
Ratio of Returns Demanded/Returns Supplied Equals Valuation Ratio (less than 100% implies undervaluation)	**68%**

We stress that this is a long-term valuation estimate that contains a higher degree of uncertainty that valuation estimates for larger and more liquid asset classes. Over a one-year time horizon, you could easily reach a different valuation conclusion. For example, if you believe that real timber prices will decline over the next year, and/or

ISSN 1554-5075

that physical harvesting rates will increase to cover costs and dividends, then you could argue that, in so far as PCL and RYN are roughly accurate proxies for the asset class as a whole, timber, as proxied by PCL and RYN, is likely overpriced today. On the other hand, whether looking over a short or long-term time horizon, if you believe that future revenues from timber's CO2 sequestration service are likely to be significant, and/or that four percent is too high a risk premium to use, then you could argue that timber is actually underpriced today.

In sum, timber valuation is an issue upon which reasonable people can and do disagree, in no small measure because of their different time horizons and the different underlying assumptions and methodologies they use to reach their conclusions. On balance, taking a long-term view, we continue to believe that timberland is likely underpriced today, for three reasons: (1) future revenue growth related to CO2 sequestration is likely to be significant; (2) the negative impact on timber prices caused by the recession and long-term slowdown in North American housing construction will be moderated or offset by the impact of supply side changes, such as the mountain pine beetle problem, and by rising demand for wood products that will accompany rising incomes in China. On a one-year view, however, we are neutral, with downward timber price risk (due to continuing economic weakness) balanced against the upside potential inherent in pending environmental legislation.

Volatility

Our approach to assessing the current value of equity market volatility (as measured by the VIX index, which tracks the level of S&P 500 Index volatility implied by the current pricing of put and call options on this index) is similar to our approach to commodities. Between January 2, 1990 and December 30, 2008, the average daily value of the VIX Index was 19.70, with a standard deviation of 7.88 (skewness 2.28, kurtosis 9.71 – i.e., a very "non-normal" distribution). On **30 October 2009**, the VIX closed at 30.69, To put this in perspective, only 332 days, or 6.9% of our sample had higher closing values of the VIX. In the short term – say, over the next 12 months --

ISSN 1554-5075

this very high (by historical standards) level of implied volatility may still be too low, if investors' hopes for a fast return to normalcy eventually meet with disappointment as the conflict scenario and/or a worsening global influenza pandemic develops. As we noted above with respect to commodities, despite the likely impact of fiscal stimulus on aggregate demand, and monetary growth on price levels (i.e., reducing the risk of prolonged deflation), the core issues that lie at the heart of the current recession remain unresolved. Critically, we do not believe that this information and its likely impact on future uncertainty levels has been fully incorporated into S&P 500 option prices, and hence into the VIX. For these reasons, at the end of **October 2009** we estimate that volatility is likely underpriced over a short-term time horizon. However, over a longer-term time horizon, volatility is possibly overpriced today. We hesitate to take a stronger stance on this issue, because we believe that structural changes – such as electronic trading, faster dispersal of information to investors, and the substantial amount of money committed to various quantitative trading strategies -- may well have made equity prices permanently more volatile than they have been in the past.

Sector and Style Rotation Watch

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

Current economic conditions affect the current cash flow an asset produces. Future economic conditions affect future cash flows and discount rates. Because they are more numerous, expected future cash flows have a much bigger impact on the

ISSN 1554-5075

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

We publish this table to make an important point: there is nothing unique about the various rotation strategies we describe, which are widely known by many investors. Rather, whatever active management returns (also known as "alpha") they are able to generate is directly related to how accurately (and consistently) one can forecast the turning points in the economic cycle. Regularly getting this right is beyond the skills of most investors. In other words, most of us are better off just getting our asset allocations right, rather than trying to earn extra returns by accurately forecasting the ups and downs of different sub-segments of the U.S. equity and debt markets (for three good papers on rotation strategies, see “Sector Rotation Over Business Cycles” by Stangl, Jacobsen and Visaltanachoti; “Can Exchange Traded Funds Be Used to Exploit Industry Momentum?” by Swinkels and Tjong-A-Tjoe; and “Mutual Fund Industry Selection and Persistence” by Busse and Tong).

That being said, the highest rolling three month returns in the table do provide us with a rough indication of how investors expect the economy and interest rates to perform in the near future. *The highest returns in a given row indicate that a plurality of investors (as measured by the value of the assets they manage) are anticipating the economic and interest rate conditions noted at the top of the next column* (e.g., if long maturity bonds have the highest year to date returns, a plurality of bond investor opinion expects rates to fall in the near future). Comparing returns across strategies provides a rough indication of the extent of agreement (or disagreement) investors about the most likely upcoming changes in the state of the economy. When the rolling returns on different strategies indicate different conclusions about the most likely

ISSN 1554-5075

direction in which the economy is headed, we place the greatest weight on bond market indicators. Why? We start from a basic difference in the psychology of equity and bond investors. The different risk/return profiles for these two investments produce a different balance of optimism and pessimism. For equities, the downside is limited (in the case of bankruptcy) to the original value of the investment, while the upside is unlimited. This tends to produce an optimistic view of the world. For bonds, the upside is limited to the contracted rate of interest and getting your original investment back (assuming the bonds are held to maturity). In contrast, the downside is significantly greater – complete loss of principal. This tends to produce a more pessimistic (some might say realistic) view of the world (although some might argue that the growth of the credit derivatives market has undermined this discipline). As we have written many times, investors seeking to achieve a funding goal over a multi-year time horizon, avoiding big downside losses is arguably 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 October 09***			
Economy	Bottoming	Strengthening	Peaking	Weakening
Interest Rates	Falling	Bottom	Rising	Peak
Style and Size Rotation	Small Growth (DSG) **2.04%**	Small Value (DSV) **5.14%**	Large Value (ELV) **5.17%**	Large Growth (ELG) **5.35%**
Sector Rotation	Cyclicals (RXI)	Industrials (EXI)	Staples (KXI)	Utilities (JXI)

ISSN 1554-5075

	3.20%	**5.70%**	**7.30%**	**1.71%**
Bond Market Rotation	Higher Risk (HYG) **3.37%**	Short Maturity (SHY) **0.79%**	Low Risk (TIP) **4.01%**	Long Maturity (TLT) **2.01%**

Feature Article: Predicting Changes in Investor Behavior

How do you respond when someone asks if an asset class is over, under, or fairly valued today? If you're like us, your first response is to ask, "over what time horizon?" We view financial markets as a complex adaptive system, in which asset prices are, in the long term, attracted to their fundamental values (itself a metric which can only be estimated with uncertainty). In the short term, however, asset prices are much more strongly influenced by collective investor behavior. We are the first to admit that this isn't exactly a new view – after all, in the 1934 edition of his classic book Security Analysis, Ben Graham famously noted that "in the short run, the market is a voting machine, but in the long run it's a weighing machine." However, this quote, and the view of financial market dynamics that underlies it, raises two critical questions. How do you estimate fundamental value? And how do you forecast investor behavior? Over the past ten years, we have written many articles and employed many methodologies to address the first question, with the latter principally focused on the relationship between the returns an asset class is expected to supply (e.g., in the case of equities, the current dividend yield plus the expected dividend growth rate) and the returns an investor should demand in normal conditions, when the attraction to equilibrium is strongest. We express this as the current return on real return (inflation indexed) bonds, plus an appropriate risk premium.

Unfortunately, experience has shown that asset class prices usually revert towards their fundamental values only over relatively long periods, and do so in a volatile manner that reflects the fact that fundamental value can only be estimated with some degree of uncertainty. For investors who are pursuing goals over shorter time horizons (e.g., a portfolio manager who is compensated on annual results), analysis of

ISSN 1554-5075

fundamental valuation on its own provides insufficient information for making decisions. They also need ways to forecast short term investor behavior and its impact on asset prices. That is the subject of this article, which attempts to boil down a large amount of recent research in different areas into a useable framework for thinking about an issue that is very complex, challenging and critical.

We begin with the observation that collective investor behavior results from two main processes: the way individuals make decisions in the face of uncertainty, and the process that aggregates individual decisions into collective behavior that causes changes in the prices of index products that track the performance of broadly defined asset classes. At the individual level, our reading of various strands of research over the past ten years had led us to conclude that behavior results from the interplay of three constructs, which we call the investor's mental model, emotional model, and decision model.

Different writers ascribe different meanings to the term "mental model." For us, a mental model is a cognitive framework or system that enables us to extract meaning from the flood of information we confront each day. Mental models describe our understanding of the dynamic process that generates outcomes that are of interest to us, including the key variables involved and relationships between them. They typically include four broad sets of rules. The first entails rules for categorizing the meaning of information, which provides a quick and coarse means of ascribing meaning to it. The second is a set of cause and effect rules, which we use to explain the past and predict the future. A critical (but often overlooked) aspect of this rule set is assumptions about how other parties who are relevant to a given situation will behave.

The third set of rules in a mental model tells us where to allocate our relatively scarce attention, given the flood of information we confront each day. At least three forces contribute to this process. The first are deeply rooted tendencies that helped our ancestors to survive eons ago on the East African savannah. These involve changes that are large, rapid, and/or surprising, that could signal a threat to our wellbeing (e.g., why was it that the Lehman bankruptcy set off such a large cascade in 2008, while the Bear Stearns rescue did not?). The second driver of attention

ISSN 1554-5075

allocation is the cause/effect relationships that populate our current mental model of an issue or situation, which tell us which information about it is important. Some writers have referred to the resulting tendency to automatically allocate scarce attention to information that reinforces our current mental model as the "confirmation bias." To be sure, the scientific method is based on seeking information that disproves our current views; however, this also leads to a situation in which all mental models are only tentatively held, in the sense that the best we can say in their defense is that they have yet to be disproven. Depending on the circumstances, this may be an insufficient basis for taking action. Hence, one can argue that the confirmation bias serves an evolutionary purpose, in that by reinforcing existing beliefs it enabled our ancestors (and us today) to generalize, and to take purposeful action to achieve important goals on the basis of those inductions. The third force that affects the allocation of our attention is our observation of the information that other people consider to be important. Again, the evolutionary basis for this seems clear, as it enables both imitation (an efficient form of learning) and the coordination of group action, both of which were undoubtedly advantageous to our ancestors.

Finally, the fourth set of rules that one should (but too often don't) find in a mental model are those governing self-evaluation and adaptation, that answer the questions "when do I need to change my mental model?" and "how do I go about doing that?"

Let us now move on to our emotional model. In recent years, researchers have moved from a view of reason and emotion as competing, if not antithetical systems, to one that sees them as complementary processes that generate the meaning we ascribe to different combinations of sensory and information inputs. Our concept of an "emotional model" is based on findings from psychology and neurobiology. In the case of the former, our starting point is Dietrich Dorner's Psi Theory, which posits a group of basic human desires (similar to those put forth in a more hierarchical structure by Abraham Maslow). These include self and species preservation, certainty (predictability), competence (i.e., the ability to satisfy one's needs) and affiliation. Complementing and reinforcing this view are recent findings from neurobiology, about

ISSN 1554-5075

which we have previously written. In the realm of investment management and changes in investor behavior, we have focused in particular on the role of the amygdala, and circumstances that trigger physiological fear reactions, and on those circumstances that elevate dopamine levels, and trigger feelings of pleasure. The former include the experience of loss (at the individual level, of resources, and at the social level of relative standing in a hierarchy), social isolation, and especially an increase in uncertainty. It is also important to note the interconnection between these fear-related effects, particularly the increased fear of social isolation in the presence of heightened uncertainty. There is also evidence of a feedback channel to our mental model, with an elevated amygdala response predisposing one to higher levels of pessimism about the meaning of new information. In contrast, it has been shown (e.g., by Coates and Herbert, in "Endogenous Steroids and Financial Risk Taking on a London Trading Floor") that trading success is associated with elevated testosterone and dopamine levels, and greater willingness to take risk, and, one suspects, with higher levels of optimism and/or overconfidence and willingness to dismiss or underweight negative information.

The interaction of outside stimuli with our mental and emotional models produces a mix of understanding, meaning (which encompasses both rational and emotional aspects), and intention – a desire to take action to satisfy cognitive and emotional needs produced by a given situation. The next step on the path to individual behavior is the processing of understanding, meaning and intention through a normative or decision model, which recalls or devises possible actions and evaluates them against a set of criteria. The first key aspect of an individual's normative model is the richness and variety of his or her previous experience. One marker of expertise is the ability to rapidly recognize and choose an action that is an appropriate response to a given situation. An expert can draw on a range of possible action plans that have produced desired results in the past, and can be executed with ease. On the other hand, this is another way in which the development of expertise often sows the seeds of its own demise, by making experts overconfident about their understanding of a

ISSN 1554-5075

situation, and prone to excessively anchor their behavior on what has worked for them in the past.

However, an equally important aspect of the normative model is the decision criteria that people use to select the action to execute. As we reviewed in our June 2009 issue, regret aversion has a powerful influence on human decision-making. Specifically, they prefer to avoid errors of commission (such taking an action at odds with the conventional wisdom/majority view and being wrong), even if that raises the probability of making errors of omission (not taking an action at odds with the conventional wisdom, when it later proves to be correct). And this is in spite of the fact that some studies have found that errors of omission are much more costly than errors of commission. Or as Keynes noted back in the 1930s, most people would prefer to fail conventionally than to be unconventionally right. Why is this, when we have previously noted how our neurobiology clearly associates loss with heightened fear? The answer, we believe, lies in the observation that many decisions have social as well as purely economic aspects. For example, in a recent paper ("Interdependent Utilities: How Social Ranking Affects Choice Behavior"), Bault, Coricelli, and Rustichini find that "the relative weight of gains and losses is the opposite in the private and social domain." When the results aren't observable by others, losses hurt about twice as much as gains feel good, just as Prospect Theory predicts. As a result, under these circumstances, human decision makers are usually willing to take more risk in order to reverse losses, but less risk when seeking to conserve gains. However, when others can observe the results of our decisions, losses run the risk of reducing our status in a social hierarchy. In this case, our strong aversion to loss of social status, and desire for increased social status, tends to make people more risk averse in the presence of losses, and less risk averse in the presence of gains. As the authors note, "social emotions [like envy] have stronger effects than their private counterparts, [and] they operate differently...social gains have a much stronger emotional affect than social losses – in other words, in social contexts, people like winning more than they dislike losing." Moreover, the experience of past social gains is associated with increased willingness to take risk in the future. The authors conclude, "In private environments,

ISSN 1554-5075

losses are particularly harmful because they can bring an individual closer to a critical level in terms of survival. Hence losses have to be avoided more than gains. In social environments, rewards are frequently assigned on the basis of a winner-takes-all rule [or something close thereto]... Hence, [in social environments] behavior is more driven by the prospect of winning than the prospect of losing."

With respect decision criteria in the world of delegated investment management, four other points are relevant. First, in virtually all asset classes, the majority of trading (and therefore price setting) is done by managers acting on behalf of principals whose money they manage. Second, these managers' performance is typically evaluated at regular intervals, most often at year end. Third, this performance evaluation often involves comparison to external benchmarks which contain, particularly in rising markets, a strong momentum component (which is reinforced as the market share of market capitalization based index funds rises). Fourth, professional investment managers usually face asymmetric incentives, with the rewards for superior performance substantially greater than the penalties for poor performance.

Let us now turn to the process by which individual behavior is aggregated into the collective behavior that drives changes in asset prices. As Duncan Watts notes in "The Collective Dynamics of Belief", "when individuals make decisions partially or fully in response to decisions of other people, the relationship between individual preferences and collective action breaks down... The collective outcome is determined by the interaction of chains of sequential decisions, where nobody is aware of the full chain...When collective behavior arises from a stochastic, non-linear aggregation process causation becomes diffuse and uncertainty arises." Indeed, multiple researchers have shown how in markets where people make decisions in part based social considerations (whether observation of or input from others), prices can depart from fundamental values, by substantial amounts and for long periods of time (e.g., see "The Reality Game" by Cherkashin, Farmer, and Lloyd; "Leading the Herd Astray" by Salganik and Watts; and any number of papers by Blake LeBaron and Cars Hommes). Across a range of disciplines, the manner in which social networks evolve

ISSN 1554-5075

and generate collective behavior is a very popular topic of study today. For our purposes, some of the most important findings from this research are that network fragility (i.e., susceptibility to so-called "punctuated equilibrium events") increases non-linearly with the size of a network, and density of connections within it (note too that in this context both high leverage and derivative use can be seen as a means of increasing network interconnectedness); that rising uncertainty increases people's desire for social affiliation, and hence network density; and that substantial changes in collective behavior are as likely to be driven by the transfer of information between relatively uninformed and sparsely connected individuals as they are by changes in behavior by highly connected and well informed individuals (so-called "influentials"). Regarding the latter phenomenon, it isn't so much the person telling you a story that matters, but rather the quality of the story (or "meme") itself that drives the spread of new information and collective behavior changes. This is reminiscent of one of Richard Nixon's famous sayings that a person should only run for office, "when you have something different to say and the people are ready to hear it."

So where does this leave us, when it comes to the challenge of predicting short term collective investor behavior? Our starting point is that the default assumption should be that the current trend will continue. This is consistent with a range of factors across our mental, emotional, decision and network models. These include the confirmation bias, our basic needs for predictability and competence, our strong aversion to errors of commission (deviating from the prevailing conventional wisdom and being proven wrong), the nature of the incentives facing many professional investment managers (asymmetric upside compensation, based on performance relative to benchmarks which have, especially in rising markets, a strong momentum component) and the observation that low uncertainty should hold down the relative size and density of social networks.

Our analysis also points to the conditions which raise the probability that a substantial change in investor behavior will occur. In the realm of mental models, we look for increasing evidence that is at odds with the "conventional wisdom", or prevailing model that people use to explain and forecast events. Due to the

ISSN 1554-5075

confirmation bias, these anomalies are likely to be underweighted by the majority of investors; hence we also look for changes in the amount of attention given to them by popular commentators. We also distinguish between rising doubts about the structure of the model itself (e.g., "do we really understand what is going on?") from the normal level of debate about the correct values for variables in the existing model ("unlike your firm, we're projecting capacity utilization will be 86% next month"). Uncertainty spikes when confidence in the current model collapses with no consensus about what should take its place. We also look for small spikes in volatility (the VIX index) that quickly disappear, that are akin to tremors that precede an earthquake in a geologic system under extreme stress. We also look for the appearance of substantial gaps between prices and our estimates of fundamental values, and for strong activity by a public policy player in an asset class (e.g., the financing of the U.S. current account deficit in 2007 and 2008 by foreign central banks; China's ongoing undervaluation of its currency, or today's policy actions by Western central banks intended to hold down government bond yields).

At the emotional level, we seek to quantitatively and qualitatively monitor the level of uncertainty felt by investors, as well as what we call the uncertainty versus envy balance. With respect to quantitative metrics, the VIX is most widely used, though S&P has recently issued a whitepaper describing a new (but as yet uninvestable) index designed to track a broader range of investment sentiment indicators. We also publish our own mix of indicators designed to track the market's evolving views on the probability that different regimes will develop, including the one we term "High Uncertainty." In terms of qualitative indicators, we believe that in recent years the combination of widening income gaps, increased conspicuous consumption by those at the top, and easy access to credit have tilted the uncertainty/envy balance more strongly in favor of the latter as a driver of investor behavior. In the runup to the crash of 2008, this shift undoubtedly prolonged price rises in many asset classes, and led to more extreme levels of overvaluation. Following the crash, we believe that envy remains a potent force, causing levels of thus far mostly repressed anger to rise in many segments of the population. We believe that as long as it is unresolved (e.g.,

ISSN 1554-5075

either by reduced unemployment and renewed wage growth, or by much higher taxes on the affluent) this tension will remain a potent source of future behavior changes that could be both sudden and substantial. We also believe that this potent emotional tension is only being strengthened by the growing gap between the apparent recovery in financial markets and continuing weak conditions in the real economy.

In terms of decision models, we believe that, given the nature of the compensation system facing delegated asset managers who dominate trading volume, all else being equal, the probability of downside moves decreases relative to upside moves the closer we get to year end performance evaluations and bonus determinations. On the other hand, when other variables in the system indicate an elevated probability of substantial asset price changes, the game among professional investment managers changes to what Keynes called "beat the gun" – or the excruciating tension between staying invested long enough to achieve top quartile performance, and the risk of not being able to get out ahead of a potential rout. In another famous analogy, Keynes likened this to a game in which the objective was to guess the average of what the other players' guesses would be (research has shown that in such games, most people reason at most two steps ahead). We believe that this tension helps to give rise to the short spikes in volatility that can occur during such periods (when managers are hyper sensitive to news items that they believe might trigger a major market move), and which often precede a substantial collapse in asset prices.

Finally, when it comes to indicators of heightened network size, connectedness, and communications intensity, we look to measures like short term correlations (or overlayed short-term asset class price charts), the phase change/asset class alignment metric we have started to publish each month, as well as our rolling three month returns for asset classes that perform relatively best under conditions of high uncertainty.

In sum, forecasting collective investor behavior over the short-term remains a very difficult challenge. Yet it is one that investors ignore at their peril, as sharp downside moves will always be mathematically devastating to investors' ability to

ISSN 1554-5075

achieve their long-term goals. Rather like weather forecasting, identifying turning points in investor behavior requires the ability to integrate multiple indicators that measure the state of the financial markets system, and use them to draw inferences about the probability that severe storms may occur in the near future. And when that probability rises to a high enough level, it requires the willingness to buck conventional wisdom, and issue clear warnings to investors, as we did in May 2007.

Product and Strategy Notes

H1N1 Update, November 2009

This is another update to our original assessment of the potential economic and asset allocation implications of H1N1 Swine Flu that was published in our May 2009 issue. At that time, we noted a number of warning indicators we would be monitoring. In some cases, important changes have or may be occurring in these areas.

The first observation is that worldwide H1N1 attack rates (i.e., the percentage of the population that becomes infected) may reach 50%, compared to 10% to 20% attack rate for normal seasonal influenza (reference: U.S. Defense Intelligence Assessment DI-1812-1555-09 dated 10Jun09, "Worldwide 2009-H1N1 Virus Might Have Substantially Higher Health Impact Than Typical Seasonal Influenza"). The World Health Organization has produced a lower H1N1 attack rate estimate, at 22% to 33%, and the UK's Planning Assumptions issued on 3 Sep 09 used 30%. In part, higher attack rates for H1N1 are due to the late start of vaccination programs in most countries, coupled with shortages of H1N1 vaccine. All else being equal, higher attack rates will lead to higher hospitalization rates (H1N1 related hospitalizations per 100,000 population) and deaths.

The second observation is related to H1N1's virulence, or its ability to cause severe illness and death. In May, we noted that we would be looking for "reports that it is associated with viral pneumonia, and cases of severe inflammation (which produce so-called 'cytokine storms', in which inflammation sets off a positive feedback loop, sending the body' immune system into overdrive, and filling the lungs with white blood

ISSN 1554-5075

cells and other fluids). This may be associated with an unusually high death rate for 19 – 64 year olds, relative to the death rates for younger and older infected patients" and "reports that the virus is characterized by unusually high replication rates in a host." Unfortunately, those reports are now starting to come in. The virus continues to disproportionately affect young people, with those 24 and younger statistically most at risk. There also appears to have been an important change in H1N1's ability to bind to tissue deep in the lungs and cause severe cases of viral pneumonia (technically you may see this change referred to as a new development in the H1N1 gene at position D225G). This is similar to a change which was thought to have occurred in the 1918 influenza virus that preceded its most deadly wave (see "Quantitative Biochemical Rationale for Differences in Transmissibility of 1918 Pandemic Influenza A Virus" by Srinivasan et al). There are also reports that the change at position D225G reduces the effectiveness of the H1N1 vaccine, reduces detection rates (because the viral load is higher in the lungs, but lower in the upper respiratory tract), increases viral loads, and increases reinfection rates. These developments can help to explain why the number of reported H1N1 infections has declined more slowly than epidemiology models first predicted.

We also note a rising number of reports of Tamiflu-resistant variants of H1N1. This is consistent with the spread of Tamiflu-resistance across seasonal influenza viruses, leaving Relenza as the most potent currently approved antiviral for use in fighting influenza.

In sum, the probability that we will experience another wave of H1N1 influenza infections that is more severe than what has been seen up to now appears to have increased. From an asset allocation perspective, this further raises the probability that financial markets will experience a longer-period of high uncertainty than many investors may currently expect. As a result, asset classes that deliver high relative returns when uncertainty is high (short term government bonds, volatility and gold) may be undervalued today. On the other hand, recent H1N1 developments have negative implications for those asset classes which perform best in the Normal

ISSN 1554-5075

Regime (such as equities and high yield bonds) that have staged a rather remarkable recovery in 2009 from their previous post-crash lows.

We will continue to closely monitor H1N1 developments.

Corporate Management Success: Luck Versus Skill

About five years ago, a researcher from Stanford (now at Said Business School at Oxford) named Jerker Denrell did some very creative work on the relative impact of luck versus skill in corporate management success. The results were undoubtedly disquieting to many, and Dr. Denrell probably paid a career price for his efforts. In "Random Walks and Sustained Competitive Advantage", he concluded that "sustained interfirm profitability differences may be very likely even if there are no a priori differences between firms...[Specifically], a random resource accumulation process is likely to produce persistent resource heterogeneity and sustained interfirm profitability differences." In a subsequent paper ("Should We Be Impressed with High Performance?"), Denrell noted that to the extent skill was involved in high performance, the tendency of management researchers to overemphasize the experiences of successful firms relative to the much larger number of failed firms could also be misleading. He noted that, "although it is reasonable to believe that more capable firms will achieve higher performance, several other factors influence firm performance, including luck. As a result, high performance is, at best, a very noisy signal of superior capabilities. Moreover, because it is a rare event, high performance is more likely for firms that engage in practices that produce high variability in outcomes. If such practices lead to lower average performance, exceptionally high performance will in fact be a signal of incompetence rather than competence." While we found these papers fascinating (and, we admit, intuitively in line with years of experience as line managers and consultants), they didn't get much traction in the larger management studies community. This was a great shame, because the analogies to and connections with active investment management are clear.

ISSN 1554-5075

We were therefore very excited recently to see that the role of luck in corporate management success has now been taken up by another set of researchers from Deloitte Consulting. Raynor, Ahmed and Henderson (the latter is at the University of Texas) sum up their analysis in "A Random Search for Excellence: Why 'Great Company" Research Delivers Fables and Not Facts." We were already familiar with Andrew Henderson's writing, as he had previously co-authored "How Quickly Do CEOs Become Obsolete?", which found that CEOs ability to add value declined faster the more dynamic the industry. So we had high hopes for the work Henderson had done with his co-authors from Deloitte. We were not disappointed. In the present paper, the authors note, "researchers who think they are studying successful companies are usually studying the winners of a random walk." They then ask a pointed question, and give an equally blunt answer: "What does this mean for the soundness of some of the most popular and influential management research? The bottom line: you can't trust it." They elaborate, "since there are many more lucky companies than good ones, the inputs to every success study we can lay our hands on are very likely the wrong inputs. This has material consequences for the confidence we can have in the advice offered, for no matter how rigorous the data collection, no matter how Artistotelian the logic, to deviate a bit from the old aphorism, 'randomness in, randomness out.' Because these studies fail as science, managers cannot hope to reliably achieve the results they are told to expect."

Using Return on Assets as their performance measure, and a long set of corporate performance data, the authors find that under one percent of firms deliver superior performance that is statistically different from what luck alone could produce. However, they also take pains to note that management quality is still important at companies that are not in this elite group: "None of this should be taken to suggest that management doesn't matter in firms with statistically unremarkable profiles. Rather, we're arguing that there is nothing demonstrably different, based purely on an examination of performance, about what management achieved in those firms. Remember, performance that is defensibly attributable to nothing other than common causes is still caused. But those causes are available, in a real sense, to all comers.

ISSN 1554-5075

The players in the drama of competition will certainly feel that they are working hard...because they are. But they are working no harder, and, more to the point, no more effectively, than the norm." The authors also note, "we do not take the paucity of firms with clear changes in performance as evidence that very few firms have ever changed their performance. We take it as evidence that very few firms have ever changed their performance enough to be distinguishable from the roar of white noise arising from the volatility endemic in a dynamic and unpredictable marketplace."

Last but not least, it is critical that investors recognize what happened when the authors replaced Return on Assets with Total Shareholder Returns as their key performance measure. They begin by noting that "shareholder returns are a function of the capital market's estimate of future performance. A good fraction of TSR tells the story of changing hopes for the future rather than delivering on past promises. Consequently, strong returns over time are often largely the result of consistent upside surprises that serve to ratchet up expectations, which is then made manifest in a rising stock price." Using TSR as a performance measure, the authors find no evidence of consistent superior performance beyond what would be expected due to luck alone. They conclude "markets rapidly bid up [the price] of any firm that is delivering exceptional returns so that it very quickly is no longer delivering exceptional returns."

The implications of these findings for active investment management are clear and harsh. If most cases of superior corporate performance are due to luck rather than skill, and if the stock prices of superior performers are quickly bid up to the point that additional superior returns become nearly impossible to achieve through skill (but not through an extended period of good luck), how many skilled (which is not synonymous with successful) active investment managers probably exist? This point is reinforced by another new paper, "The Alpha Uncertainty Principle" by Sassan Zaker from Banque Julius Baer. Zaker begins with an excellent review of the relationship between an active manager's Information Ratio and the years of data needed to distinguish between luck and skill, which is vastly longer than most managers' track records. He then offers the important and original insight that there is a further tradeoff between the breadth of strategies and techniques being employed to

ISSN 1554-5075

generate the alleged alpha and the amount of uncertainty regarding its authenticity (i.e., the statistical likelihood that it is based on skill rather than luck). In a version of Occam's razor, Zeker shows how, for a group of active managers with a given level of alleged alpha, we should prefer the manager who achieves it with the fewest degrees of freedom (i.e., different strategy elements, such as leverage, illiquidity, and/or dealing in multiple markets).

With respect to portfolio construction, we have three key takeaways from these papers. First, we have even more evidence that consistently successful active investment management (that creates skill-based value for investors after costs and taxes), must be very, very rare. Second, allocations to expensive active management strategies should therefore be used sparingly. Third, successful active strategies are more likely to be based on some form of arbitrage that exploits predictable behavioral tendencies rather than simple long-only security selection.

New Products

UBS has launched an exchange traded note (ETN) that tracks the Dow Jones UBS (formerly AIG) Commodities Index. Annual expenses are only 50 basis points, compared to 75 basis points on the competing iShares product (DJP). However, both of these products also require an investor to accept the credit risk of the note issuer. As we have noted in the past, in 2009 we switched from a long-only allocation to commodities futures to a new index product (LSC) that tracks the S&P Commodities Trend Indicator, which takes both long and short positions in different commodities futures. Our logic was that the flood of investor money into long-only commodities products had changed the structure of the market, raising futures prices relative to spot prices, and thereby reversing the positive roll returns that have been a key contributor (along with price surprises) to historical returns on commodities futures based index funds. In October, IndexIQ launched a similar equities based product (ticker GRES). It will track an equally weighted custom index of companies with operations in eight different commodities sectors, take long and short positions in them

ISSN 1554-5075

and offset its exposure to the overall equity market (presumably leaving a pure commodities exposure). Annual expenses will be 75 basis points. It is an interesting approach, and we look forward to seeing how it performs. Most importantly, it is another example of the move towards relatively low cost, uncorrelated alpha products that deliberately offset their beta exposure.

Elsewhere on the new product front, in the U.S. Schwab has launched a range of very low cost equity ETFs, while Vanguard recently launched a range of UCITS products (covering both equity and fixed income) that have been gaining traction in Europe. We were also very interested to see the U.S. launch of iShares Diversified Alternatives Trust ETF (ticker ALT). With annual expenses of slightly more than 1.00%, this new product aims to provide retail investors with access to a wide range of alternative strategies. Coming from the iShares shop, we know that it is well designed, and will be well executed. However the critical and as yet unanswered question is the degree to which ALT's returns will be correlated with the returns on broadly defined asset classes – in other words, is this really an uncorrelated alpha product? Time will tell. But we'll be watching with interest.

Finally, we call your attention to a very interesting new whitepaper from S&P ("A Beta for Sentiment?") that discusses the construction of a new investable index to track market sentiment. It makes for very interesting reading, and could lead to an equally interesting product at some point in the future. Ideally, we would like to see an inverse design that would cause returns to rise when sentiment declined, as it would offer investors another hedging instrument to potentially use in a portfolio.

Who Knew?

Over time, we read a lot of research. Some of these papers we set aside in the hope that we will one day be able to work them into an article. Eventually, this pile grows large enough that it can serve as the basis for an article on its own, usually very interesting, merits. Well, the pile has once again reached that height. So herewith is a short summary of some fascinating recent research.

ISSN 1554-5075

Using an extremely extensive data set from Finland, Grinblatt, Keloharju, and Linnainmaa ask an aged old question: "Do Smart Investors Outperform Dumb Investors?" Well, the definitive answer is now in. They do. And now for the question on every parent's mind: How much of this is due to genetics? In "Genetic Variation in Financial Decision Making", Ceasrini, Johannesson, et al analyze Swedish data and conclude that "approximately 25% of individual variation in portfolio risk is due to genetic variation." Coincidentally, another recent paper studied the same issue. In "Nature of Nurture: What Determines Investor Behavior?" Barnea, Cronqvist, and Siegel use data on 40,000 Swedish twins and "find that up to 45% of the variation in stock market participation, asset allocation and portfolio risk choices is explained by a genetic component." Interestingly, twins that are raised apart were found to have similar portfolios. Of course, nurture is also important. In "Growing Up in a Recession: Beliefs and the Macroeconomy" Giuliano and Spilimbergao find that "individuals growing up during recessions tend to believe that success in life depends more on luck than on effort, support more government redistribution, but are less confident in public institutions." Sure looks like interesting times ahead, eh?

Moving on to gender differences, Sapienza, Zingales, and Maestripieri find that "higher levels of testosterone were associated with lower risk aversion among women, but not men" and that the effect of testosterone levels on both genders was non-linear. Moreover, both men and women "with higher levels of testosterone and lower levels of risk aversion were more likely to choose risky careers in finance." ("Gender Differences in Financial Risk Aversion and Career Choice Are Affected by Testosterone"). In another paper, ("Menstrual Cycle and Competitive Bidding"), Pearson and Schipper find that "women bid significantly higher than men in an auction in their menstrual and premenstrual phase, but do not bid significantly different in other phases of the menstrual cycle." They hypothesize that evolution has "genetically predisposed women to behave more riskily during the fertile phase of their cycle in order to increase the probability of conception, quality of offspring, and genetic variety." On the other hand, in "Two Heads are Less Bubbly Than One", Cheung and Palan find that in an experimental stock market, having investment decisions made by

ISSN 1554-5075

a team reduces the change of bubbles forming, particularly when these teams are made up of either two women or a man and a woman. In contrast, all male teams are characterized by "more extreme, though not consistently more profitable behavior." Who knew?

Finally, we call your attention to "The Way You Make Me Feel: Evidence for Individual Differences in Affective Presence" by Eisenkraft and Elfenbein. The authors ask, how much do individuals influence the way that other people feel? Specifically, they try to disentangle the impact of our own disposition from the impact of another person's presence on the feelings we experience. After controlling for a range of other influences, the authors find that our positive feelings are 31% explained by our own individual traits, while our traits explain 19% of the negative feelings we experience. In contrast, the presence of another person explains 10% of our positive feelings, but 23% of our negative feelings. Think about that for a second. Much of our happiness seems to come from within, while other people can really tick us off. Once again, we can only marvel -- "Who knew?"

Model Portfolios Update

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

ISSN 1554-5075

investor is primarily investing in index funds, but is willing to allocate up to ten percent of his or her portfolio to equity market neutral investments.

We use two benchmarks to measure the performance of our model portfolios. The first is cash, which we define as the yield on a one year government security purchased on the last trading day of the previous year. For 2009, our GBP cash benchmark is 2.40% (in nominal terms). The second benchmark we use is a portfolio equally allocated between the ten asset classes we use (it does not include uncorrelated alpha). This portfolio assumes that an investor believes it is not possible to forecast the risk or return of any asset class. While we disagree with that assumption, it is an intellectually honest benchmark for our model portfolios' results.

The year-to-date nominal returns for all these model portfolios can be found at: http://www.indexinvestor.com/Members/YTDReturns/UK.php

ISSN 1554-5075

Appendix: Economic Scenarios and Accumulated Evidence

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

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

ISSN 1554-5075

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

ISSN 1554-5075

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

ISSN 1554-5075

	Cooperative Scenario	**Conflict Scenario**
	manageable level.	foreign exchange reserves. Result is a fragmentation of the global trade and financial system into much less integrated blocs.
Evidence Over the Previous Three Months <u>Against</u> Each Scenario (most recent month first)	***Evidence <u>Against</u> the Cooperative Scenario***	***Evidence <u>Against</u> the Conflict Scenario***
October 2009 (This month's issue)	• Rising trade tensions between US and China • Increasing calls by US commentators for an increase in the China/US exchange rate • Publication of major new report criticizing growing overcapacity in China and its negative impact on the world economy • With 28% of mortgaged houses in negative equity, Obama administration admits mortgage restructuring program isn't working; press discussion of morality of mortgage default • Growing recognition of probable extent of municipal bond crisis • Iran continues to delay discussions over its nuclear capability; Israel's patience reportedly running out • Widening gap between financial market	•

ISSN 1554-5075

	Cooperative Scenario	**Conflict Scenario**
	performance (and record bonuses on Wall Street) and conditions in real economy raises probability of substantial price declines in some asset classes (e.g., equities), and further ratcheting up of pressures on the banking and financial system	
September 2009	• LA Times (20Sep09) reports new Experian OliverWyman study that finds "the number of strategic mortgage defaults in 2008 was far beyond most industry estimates." A significant portion are by people with high education and incomes, who "see default as a business decision." • IMF's Global Financial Stability Review forecasts another $1.5 trillion in bank chargeoffs. It also concludes that earnings will be insufficient to absorb them, and that capital ratios will once again come under pressure. • London *Telegraph* reports draft Chinese report proposes export ban on rare earth minerals that are critical to many western industries, including	• G20 meeting in Pittsburgh agrees on need to address global imbalances. • Reports that Chinese agricultural land reforms are beginning to result in higher capital flows to peasant population (see James Kynge, "Seeds of Change in Rural China", FT 7Oct98 •

ISSN 1554-5075

	Cooperative Scenario	Conflict Scenario
	hybrid vehicles and windmills. • Obama Administration imposes duties on Chinese tire imports. China plans retaliation. • Reports that many Chinese companies, in an echo of 1980s Japan, are reaping large profits from land speculation (see Andy Xie's column in the 16 Sep 09 issue of Caijing, "What We Can Learn as Japan's Economy Sinks) • New Japanese Prime Minister Yukio Hatoyama proposes new Asian Economic Bloc, modeled on European Union • Iran acknowledges second uranium upgrading location; Israel reported to have evidence of substantial Russian involvement in Iranian nuclear program; Reports of Russian plans to thwart any blockade of gasoline imports into Iran imposed by Western nations; President Ahmadinejad delivers strong anti-Israel speech at U.N.; first death sentences imposed on people arrested in Iran during summer's post election protests.	

ISSN 1554-5075

	Cooperative Scenario	Conflict Scenario
August 2009	• IMF recognition that two key transitions needed to escape prolonged slow growth – shift from government to private sector spending in U.S., and to a lower Chinese current account surplus – will both be difficult to achieve. • Unemployment continues to worsen in the U.S., with continuing evidence of credit quality deterioration in multiple sectors, including residential and consumer mortgages, credit cards, municipal securities, and small and medium sized banks • 31% of workers report being worried about layoff; double the number of a year ago. Meanwhile, broadly measured U.S. unemployment is at 16.7%. • Minimal progress towards passage of healthcare reform legislation, and new financial services industry regulation • Growing resentment of booming profits and bonus accruals at Wall Street firms that benefit from de facto government guarantees	• H1N1 influenza epidemic is spreading in Northern Hemisphere as forecast; however, fatality rate thus far is lower than rates implied by some earlier Southern Hemisphere experiences (e.g., in Argentina), and vaccinations will start in October.

ISSN 1554-5075

	Cooperative Scenario	**Conflict Scenario**
	of their liabilities. • Chinese spying allegations against Rio Tinto, and U.S. imposition of anti-dumping duties on Chinese tire export • Falling profits reported in many Chinese industrial sectors, despite GDP growth fueled by aggressive bank lending. Bubble conditions in Chinese equity and possibly property markets. • In Iran, Ahmadinejad consolidates his position, and, with Russian's help, apparently forces Western nations to back down on demand for nuclear talks or imposition of sanctions. Israel may decide it has no choice but to attack Iran, as it did Iraq's Osirak reactor in 1981	

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