The Index Investor

Invest Wisely…Get an Impartial Second Opinion.

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October/November 2010 Double Issue: Key Points

This issue's first feature article is an extended synthesis of recent research that is relevant to the never-ending debate between advocates of active and passive investment management. The best news for the former is a series of papers that find that active managers who focus on idiosyncratic risk – stockpickers, rather than factor timers – are most likely to generate net alpha, after expenses, trading costs and taxes are taken into account. The bad news is that after taking the role of luck into consideration, the existing stock of manager performance data still leads to the conclusion that sustained generation of net alpha based on true skill remains extremely rare, and gets scarcer as an investor's time horizon increases. Put differently, it is true that you won't attain top quartile performance over a one year horizon if you invest in a portfolio of broad based, truly passive index funds. On the

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other hand, over a twenty year holding period, that same approach is very likely to produce top decile performance, with the net returns generated by the vast majority of actively managed funds lagging far behind. As we like to say, the biggest obstacle to greater use of passive investing is the fact that most people like to brag about their one year rather than their twenty year investment performance. After reviewing the latest stack of research, we are sticking with the conclusion we have held during the almost fifteen years we have written about this critical issue: For most investors, a diversified portfolio of broad based, low cost asset class index products is the best approach to take. However, we are not ideologues on this issue, and recognize the mathematical benefits that actively managed uncorrelated alpha can bring to a portfolio, particularly as an investor's long term target real return increases above 4%. For that reason, we also believe that a relatively small allocation to uncorrelated alpha strategies can provide a very useful complement to the basic portfolio of index funds.

With more stormy seas on the economic and financial market horizon, our second feature article looks at an issue of growing interest to advisors: the relationship between investor personality, risk tolerance, and adaptation to losses. We begin with an overview of the "Five Factor Model" that has become the standard for describing human personality traits. We then examine its application to risk taking and investments, at the level of both the individual and national cultures. Finally, we look at the complicated process through which investors adjust their reference points in reaction to gains and losses, and how personality influences the different ways investors cope with the latter.

Our product and strategy notes review recent research on the illiquidity premium, and how it can be earned using public market equities and mutual funds, recent research on national savings rates, and a short update on the continuing evolution of the influenza virus.

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Global Asset Class Returns

YTD31Oct10	In USD	In AUD	In CAD	In EUR	In JPY	In GBP	In CHF	In INR
Asset Held								
USD Bonds	9.34%	0.35%	6.31%	12.47%	-6.24%	10.33%	4.22%	4.59%
USD Prop.	25.18%	16.20%	22.15%	28.31%	9.61%	26.18%	20.06%	20.43%
USD Equity	9.00%	0.02%	5.97%	12.13%	-6.57%	10.00%	3.88%	4.25%
AUD Bonds	14.44%	5.45%	11.41%	17.57%	-1.14%	15.43%	9.32%	9.69%
AUD Prop.	10.30%	1.32%	7.27%	13.43%	-5.27%	11.30%	5.18%	5.55%
AUD Equity	7.55%	-1.44%	4.52%	10.68%	-8.03%	8.54%	2.43%	2.80%
CAD Bonds	10.13%	1.14%	7.10%	13.26%	-5.45%	11.12%	5.01%	5.37%
CAD Prop.	28.41%	19.42%	25.38%	31.53%	12.83%	29.40%	23.29%	23.65%
CAD Equity	13.35%	4.36%	10.32%	16.48%	-2.23%	14.35%	8.23%	8.60%
CHF Bonds	10.05%	1.07%	7.02%	13.18%	-5.53%	11.05%	4.93%	5.30%
CHF Prop.	31.04%	22.05%	28.01%	34.16%	15.46%	32.03%	25.92%	26.28%
CHF Equity	5.66%	-3.32%	2.63%	8.79%	-9.91%	6.66%	0.54%	0.91%
INR Bonds	1.22%	-7.76%	-1.81%	4.35%	-14.36%	2.22%	-3.90%	-3.53%
INR Equity	19.04%	10.06%	16.01%	22.17%	3.46%	20.04%	13.92%	14.29%
EUR Bonds	5.90%	-3.08%	2.87%	9.03%	-9.67%	6.90%	0.78%	1.15%
EUR Prop.	19.85%	10.87%	16.82%	22.98%	4.28%	20.85%	14.74%	15.10%
EUR Equity	-1.97%	-10.96%	-5.00%	1.15%	-17.55%	-0.98%	-7.09%	-6.73%
JPY Bonds	19.30%	10.32%	16.27%	22.43%	3.73%	20.30%	14.18%	14.55%
JPY Prop.	31.30%	22.31%	28.27%	34.42%	15.72%	32.29%	26.18%	26.54%
JPY Equity	2.87%	-6.11%	-0.16%	6.00%	-12.70%	3.87%	-2.24%	-1.88%
GBP Bonds	6.74%	-2.24%	3.71%	9.87%	-8.83%	7.74%	1.62%	1.99%
GBP Prop.	1.74%	-7.24%	-1.29%	4.87%	-13.83%	2.74%	-3.38%	-3.01%
GBP Equity	7.40%	-1.59%	4.37%	10.53%	-8.18%	8.39%	2.28%	2.65%
1-3 Yr USGvt	2.65%	-6.34%	-0.38%	5.78%	-12.93%	3.64%	-2.47%	-2.10%
World Bonds	5.83%	-3.16%	2.80%	8.96%	-9.75%	6.83%	0.71%	1.08%
World Prop.	19.61%	10.63%	16.58%	22.74%	4.04%	20.61%	14.49%	14.86%
World Equity	7.89%	-1.09%	4.86%	11.02%	-7.68%	8.89%	2.77%	3.14%
Commod Long Futures	5.23%	-3.75%	2.20%	8.36%	-10.34%	6.23%	0.11%	0.48%
Commod L/Shrt	-14.49%	-23.47%	-17.52%	-11.36%	-30.06%	-13.49%	-19.60%	-19.24%
Gold	23.59%	14.60%	20.56%	26.72%	8.01%	24.58%	18.47%	18.83%
Timber	8.84%	-0.14%	5.81%	11.97%	-6.73%	9.84%	3.72%	4.09%
Uncorrel Alpha	3.43%	-5.56%	0.40%	6.56%	-12.15%	4.43%	-1.69%	-1.32%
Volatility VIX	8.89%	-0.10%	5.86%	12.01%	-6.69%	9.88%	3.77%	4.13%
Currency								
AUD	8.98%	0.00%	5.95%	12.11%	-6.59%	9.98%	3.87%	4.23%

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YTD31Oct10	In USD	In AUD	In CAD	In EUR	In JPY	In GBP	In CHF	In INR
CAD	3.03%	-5.95%	0.00%	6.16%	-12.54%	4.03%	-2.09%	-1.72%
EUR	-3.13%	-12.11%	-6.16%	0.00%	-18.70%	-2.13%	-8.25%	-7.88%
JPY	15.57%	6.59%	12.54%	18.70%	0.00%	16.57%	10.46%	10.82%
GBP	-1.00%	-9.98%	-4.03%	2.13%	-16.57%	0.00%	-6.11%	-5.75%
USD	0.00%	-8.98%	-3.03%	3.13%	-15.57%	1.00%	-5.12%	-4.75%
CHF	5.12%	-3.87%	2.09%	8.25%	-10.46%	6.11%	0.00%	0.37%
INR	4.75%	-4.23%	1.72%	7.88%	-10.82%	5.75%	-0.37%	0.00%

Uncorrelated Alpha Strategies Detail

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

YTD 31Oct10	In USD	In AUD	In CAD	In EUR	In JPY	In GBP	In CHF	In INR
Eq Mkt Neutral								
HSKAX	-2.69%	-11.67%	-5.72%	0.44%	-18.26%	-1.69%	-7.80%	-7.44%
OGNAX	-3.19%	-12.17%	-6.22%	-0.06%	-18.76%	-2.19%	-8.30%	-7.94%
Arbitrage								
ARBFX	1.58%	-7.41%	-1.45%	4.71%	-14.00%	2.57%	-3.54%	-3.18%

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YTD 31Oct10	**In USD**	**In AUD**	**In CAD**	**In EUR**	**In JPY**	**In GBP**	**In CHF**	**In INR**
ADANX	3.43%	-5.55%	0.40%	6.56%	-12.14%	4.43%	-1.69%	-1.32%
Currency								
DBV	-0.42%	-9.41%	-3.45%	2.70%	-16.00%	0.57%	-5.54%	-5.18%
ICI	2.50%	-6.48%	-0.53%	5.63%	-13.07%	3.50%	-2.62%	-2.25%
Equity L/S								
HSGFX	2.19%	-6.79%	-0.84%	5.32%	-13.38%	3.19%	-2.93%	-2.56%
PTFAX	11.03%	2.05%	8.00%	14.16%	-4.54%	12.03%	5.92%	6.28%
GTAA								
MDLOX	6.34%	-2.64%	3.31%	9.47%	-9.23%	7.34%	1.23%	1.59%
PASAX	13.50%	4.52%	10.47%	16.63%	-2.07%	14.50%	8.39%	8.75%

Overview of Our Valuation Methodology

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

We emphasize that while forecasting the future behavior of a complex adaptive system (with a degree of accuracy beyond simple luck) is extremely challenging, it is not impossible. There are two reasons for this. First, complex adaptive systems are constantly evolving, and pass through phases when their behavior makes forecasting more and less challenging. In the investment context, we believe the best example of

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this is extreme overvaluations, which throughout history have confirmed that what can't continue doesn't continue. Second, it is also the case that, across a range of contexts, researchers have found that a small percentage of people and teams are able to develop superior mental models that provide them with a superior, if "coarse-grained" understanding of the dynamics of complex adaptive systems. More important there is also significant evidence that superior mental models translate into substantial performance advantages (see, for example, "Mental Models, Decision Rules, Strategy and Performance Heterogeneity" by Gary and Wood, "Team Mental Models and Team Performance" by Lim and Klein, and "Good Sensemaking is More Important than Information" by Eva Jensen).

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

We also believe that, in addition to careful asset allocation, a disciplined portfolio risk management process is critical to an investor achieving his or her long-

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

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

In each month's issue of our journals, we provide investors with updated valuation estimates for a wide range of asset classes. The basic assumptions that underlie our valuation methodology are as follows: (1) In the medium term, asset prices are attracted to their fundamental values. (2) However, fundamental valuation can only be estimated with a degree of uncertainty. (3) In the short term, asset prices

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are most strongly influenced by what Keynes called the market's "animal spirits", which we interpret as collective investor behavior resulting from the complex interplay between underlying political and economic trends and events, information flows, individual mental models, emotions, and social network interactions. (4) Valuation methodologies are most useful to investors when they are applied on a consistent basis over time.

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

Table: Market Implied Regime Expectations and Three Year Return Forecast

We use the following table to provide insight into the weight of market views about which of three regimes – high uncertainty, high inflation, or normal growth – is developing. The table shows rolling three month returns for different asset classes. The asset classes we list under each regime should deliver relatively high returns when that regime develops. We assume that both the cross-sectional and time series comparisons we present provide insight into the market's conventional wisdom – at a

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

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

Rolling Three Month Returns in USD		31Oct10
High Uncertainty	***High Inflation***	***Normal Growth***
Short Maturity US Govt Bonds (SHY) **0.58%**	US Real Return Bonds (TIP) **5.27%**	US Equity (VTI) **8.47%**
1 - 3 Year International Treasury Bonds (ISHG) **6.44%**	Long Commodities (DJP) **10.24%**	EAFE Equity (EFA) **9.82%**
Equity Volatility (VIX) **-9.79%**	Global Commercial Property (RWO) **11.90%**	Emerging Equity (EEM) **11.40%**
Gold (GLD) **14.83%**	Long Maturity Nominal Treasury Bonds (TLT)* **0.97%**	High Yield Bonds (HYG) **4.44%**
Average ***3.02%*** ***Three Months Ago:*** ***2.45%***	***Average (with TLT short)*** ***6.61%*** ***Three Months Ago:*** ***-2.63%***	***Average*** ***8.53%*** ***Three Months Ago:*** ***-3.01%***

* Falling returns on TLT indicate rising inflation expectations

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

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

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

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

Table: Fundamental Asset Class Valuation and Recent Return Momentum

The table at the end of this section sums up our conclusions (based on the analysis summarized in this article) as to potential asset class under and overvaluations at **31 Oct 10**. We believe that asset prices reflect the interaction of three broad forces. The first is fundamental valuation, as reflected in the balance

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

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

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

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

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

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

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

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

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

Valuation at 31Oct10	***Current Price versus Long-Term Fundamental Valuation Estimate***	***Rolling 3 Month Return in Local Currency***	***Rolling 3 Month Return 3 Months Ago***
AUD Real Bonds	Neutral	3.31%	2.32%
AUD Bonds	Neutral	0.29%	4.96%
AUD Property	Neutral	2.27%	-3.64%
AUD Equity	Neutral	4.97%	-5.92%
CAD Real Bonds	Neutral	8.01%	-0.34%
CAD Bonds	Neutral	2.62%	3.99%
CAD Property	Possibly Undervalued	11.80%	5.51%
CAD Equity	Possibly Overvalued	8.71%	-3.13%
CHF Bonds	Possibly Overvalued	-0.59%	3.50%
CHF Property	Likely Overvalued	9.46%	6.61%
CHF Equity	Possibly Overvalued	4.16%	-5.90%
EUR Real Bonds	Neutral	1.52%	0.45%
EUR Bonds	Possibly Overvalued	1.47%	3.56%
EUR Prop.	Neutral	13.28%	6.21%
EUR Equity	Possibly Undervalued	4.45%	-1.65%
GBP Real Bonds	Possibly Overvalued	3.79%	-0.39%
GBP Bonds	Neutral	2.33%	3.45%
GBP Property	Possibly Undervalued	9.50%	-4.75%
GBP Equity	Likely Undervalued	7.93%	-4.41%
INR Bonds	Neutral	-2.87%	1.47%
INR Equity	Probably Overvalued	12.11%	9.93%

Valuation at 31Oct10	*Current Price versus Long-Term Fundamental Valuation Estimate*	*Rolling 3 Month Return in Local Currency*	*Rolling 3 Month Return 3 Months Ago*
JPY Real Bonds	Neutral	1.65%	0.00%
JPY Bonds	Possibly Overvalued	1.50%	2.20%
JPY Property	Likely Undervalued	7.81%	-6.18%
JPY Equity	Likely Overvalued	-4.54%	-15.05%
USD Real Bonds	Neutral	5.28%	1.32%
USD Bonds	Possibly Overvalued	2.49%	4.33%
USD Property	Neutral	8.03%	-1.65%
USD Equity	Likely Overvalued	8.38%	-7.14%
Following in USD:			
Investment Grade Credit (CIU)	Possibly Overvalued	2.38%	2.87%
High Yield Credit (HYG)	Probably Overvalued	4.25%	1.23%
Emerging Mkt Equity (EEM)	Likely Overvalued	11.91%	-0.97%
Commodities Long	Likely Overvalued	10.24%	-0.69%
Gold	Likely Overvalued	14.83%	0.11%
Timber	Likely Undervalued	5.13%	-5.68%
Uncorrelated Alpha	N/A	2.48%	-0.83%
Volatility (VIX)	Neutral	-9.79%	6.58%
Future Return in Local Currency from holding USD:	***Based on Covered Interest Parity***		
Returns to AUD Investor	Positive	-8.39%	2.95%
Returns to CAD Investor	Neutral	-1.26%	1.78%
Returns to EUR Investor	Neutral	-5.56%	1.75%
Returns to JPY Investor	Negative	-8.81%	-8.32%
Returns to GBP Investor	Positive	-1.97%	-2.08%
Returns to CHF Investor	Negative	-6.24%	-2.79%
Returns to INR Investor	Positive	-4.48%	4.86%

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Investor Herding Risk Analysis

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

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

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

Nov	Dec09	Jan10	Feb10	Mar10	Apr10	May10	Jun10	Jul10	Aug10	Sep10	Oct10
0.72	0.24	(0.03)	0.30	0.46	0.44	(0.28)	0.28	0.35	0.24	0.51	0.41

Given these data, we conclude that at **31 Oct 10**, there was a moderate risk of a sudden, substantial, and highly correlated change in prices across multiple asset classes.

This Month's Letters to the Editor

Could you please clarify the criteria you use when reaching your conclusions about asset class over and under valuations – that is, your neutral, possible, likely and probable conclusions?

In our asset class valuation section, we note the following: The extent to which we believe over or underpricing to be the case is reflected in the confidence rating we assign to each conclusion. We believe it is extremely important for the recipient of any estimate or assessment to clearly understand the analyst's confidence in the conclusions he or she presents. How best to accomplish this has been the subject of an increasing amount of research (see, for example, "Communicating Uncertainty in Intelligence Analysis" by Steven Rieber; "Verbal Probability Expressions in National

Intelligence Estimates" by Rachel Kesselman, "Verbal Uncertainty Expressions: Literature Review" by Marek Druzdzel, and "What Do Words of Estimative Probability Mean?" by Kristan Wheaton). We use a three level verbal scale to express our confidence level in our valuation conclusions. "Possible" represents a relatively low level of confidence (e.g., 25% – 33%, or a 1 in 4 to 1 in 3 chance of being right), "likely" a moderate level of confidence (e.g., 50%, or a 1 in 2 chance of being right), and "probable" a high level of confidence (e.g., 67% to 75%, or a 2 in 3 to 3 in 4 chance of being right). Our possible, likely and probable confidence intervals do not exactly correspond to quantitative valuation ranges, because we believe that would give a false sense of accuracy to judgments that are inherently approximate due to the noisy data and the range of assumptions upon which our analysis is based. However, as we present a great deal of quantitative analysis each month, if a reader were so inclined, he or she would be able to establish a set of consistent valuation ranges to construct his or her own criteria for possible/likely/probable conclusions.

I've often wondered, what publications do you find most useful? Sometimes I think you must spend your whole day reading.

Truth be known, we have long desired clones that could do just that! Publications that we regularly read include the *Financial Times*, *The Economist*, *The New York Times*, *The Times* of London, Stratfor, Calculated Risk, Recombinomics, China Financial Markets, PEHub, RealClearMarkets, Politico, Spiegel, Gallup, Hussman, Bill Gross, GMO, the Pew websites, Shadow Government Statistics, SSRN, NBER, and openCRS. And when we have time, we try to get to a lot more. However, we think that the overall analytical process we use is more important than the specific sources of information that we regularly access. This process was most famously described by Peter Pirolli and Stuart Card in their article, "The Sensemaking Process and LeveragePoints for Analyst Technology as Identified Through Cognitive Task Analysis", in which they presented the following diagram of what they termed the sensemaking and information foraging processes:

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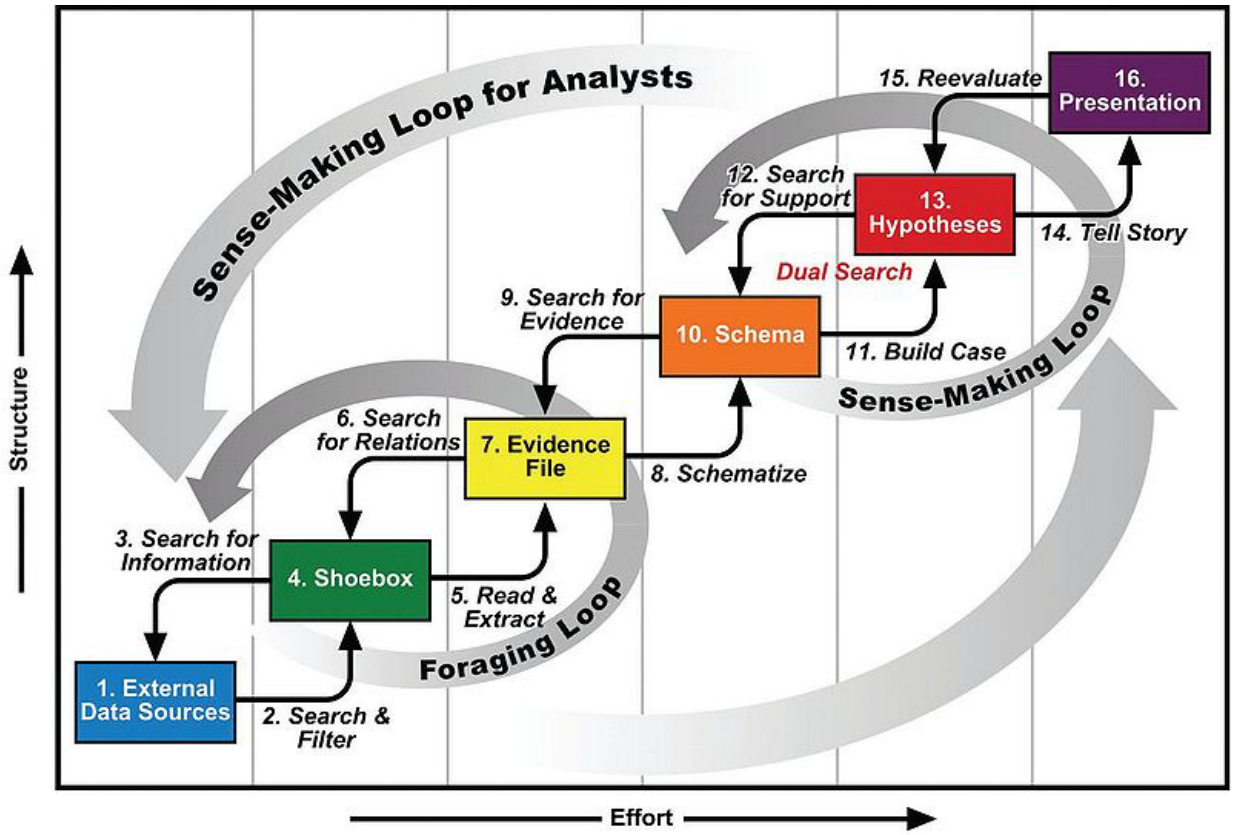

(Note that this can be downloaded from: http://en.wikipedia.org/wiki/File:Sense-making_loop_for_analysts.jpg). Over the years, we have found that this approach helps us manage information overload while still creating opportunities for the generation (or recognition) of novel insights. Of course, this leads to another of our favorite topics, the failure of most school systems to prepare children to function productively in a world of information overload. But that's a topic for another time.

Feature Article: Active Versus Passive Investing: A Synthesis of Recent Research

While we have been writing about active and passive investing for almost fifteen years, we continue to track academic and practitioner research in this area, to test and challenge our views. When our pile of research studies reaches a dangerous height, we report our findings to our readers. This summary of recent research is particularly timely, in light of the substantial amount of money that has flowed into indexed investment products, and exchange traded funds in particular, over the past two years.

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Indeed, judging by some of the comments we have heard from active management firms at recent conferences we have attended, they appear to have finally taken notice of these flows, and even seem a bit unsettled by them. But more on that later. Let's start with the basic logic of active management.

Let's start with our definitions of active and passive investing. The latter assumes no forecasting skill and is based on buying the broadest possible index fund in a given asset class. Any departure from that approach is, to one degree or another, active investing, even if it is done via an index fund. For example, within the equity asset class, a decision to invest in a small cap index fund represents an active management decision, based either on a preference for higher returns with higher risk than the overall market index can provide (and a belief that small caps will deliver them), or a belief that small caps will offer a superior risk return tradeoff than the overall market over some future time horizon. Alternatively, you could decide to invest in an actively managed mutual fund that only invests in a limited number of natural resources stocks, based on your belief that natural resources stocks offer a superior risk/return tradeoff and that your belief that the manager of the fund has the skill required to make investments that will produce higher net returns for you than a natural resources stock index fund, after expenses, trading costs and taxes are taken into account.

A belief in the likely long-term success of an active management approach to investing must be grounded in a number of critical underlying assumptions:

1. Asset prices do not always match their underlying fundamental values.
2. Through access to superior information and/or the use of a superior forecasting model, an investor can identify these mispricings.
3. The incremental costs and risks associated with exploiting these mispricings (compared to investing passively) do not exceed their expected benefits.

When an investor delegates responsibility for implementing an active investment program to a third party manager, two further assumptions must be satisfied:

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4. An investor can identify skilled active managers.
5. The incremental costs and risks associated with employing the active manager (compared to investing passively) do not exceed the expected incremental benefits.

Let us start with the first assumption, which too often fails to receive the attention it deserves. Clearly, the existence of bubbles and crashes suggests that asset prices can substantially depart from their fundamental values. But what does the latter really mean? Traditionally, financial assets have been seen as claims on the real economy (though in recent years, a growing percentage of financial assets have been derivative claims on other financial assets). Claims on the real economy are of two broad types. The first are direct claims on physical materials, such as futures contracts. The second are what we call "claims on business plans." As this is an unusual description, let us explain what we mean. Debt and equity are both claims on the assets of an organization. The fundamental value of those assets, is, in theory, equal to the discounted present value of the stream of future cash flows they will provide under a range of possible states, or scenarios. In practice, however, those future cash flows don't just magically appear. Rather, they result from the implementation of a business plan, which includes (at a high level), the ends or goals to be pursued, constraints on the resources available and the maximum amount of risk that may be taken to achieve them, and an intended sequence of actions and contingencies.

In turn, a business plan rests on a further series of assumptions, including future customer needs, budgets and priorities, technological possibilities, competitor offerings and pricing, and social, political, regulatory and economic conditions. Finally, the implementation of any business plan inevitably encounters problems and requires adaptation, whether due to unanticipated external circumstances, or internal frictions such as inadequate communication, lack of key skills, loss of key people, delays to key projects, and the like.

As any CEO or CFO can tell you, the very notion of "fundamental value" is suspect, as the future stream of cash flows a collection of assets will produce is highly

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uncertain, and results as much from continuous learning and adaptation as it does from accurate forecasting and careful planning. But there is more to the notion of fundamental value than just future cash flows – there is also the rate at which they should be discounted to their present value. Assume that, by considering a wide range of possible scenarios, we have fully captured all company-specific risk in the numerator of the present value equation (i.e., the range of possible cash flows). This still leaves us with uncertainty with respect to the appropriate real risk free rate and asset class risk premium we should use (at this point, we will refer only to real rates, and leave out the additional uncertainty that comes from trying to forecast the level and impact of future inflation or deflation). As we detail in each month's Asset Class Valuation Update, at any point in time, the yield on real return government bonds reflects a combination of views about future GDP growth (itself a function of future labor force growth and future labor productivity growth), the future variability of GDP growth, and investors' weighted level of time preference and risk aversion. In addition, the appropriate asset class risk premium to use also depends on investors' level of risk aversion. In sum, the fundamental value of a claim on a business plan can only be established in a very noisy and uncertain manner, with a great deal of room for disagreement between investors. In the asset pricing process, as uncertainty about an asset's fundamental value increases, one's perception of other investors' views grows in importance. Hence, as Keynes noted in the 1930s, the social process through which asset prices are determined often resembles a so-called "beauty contest" game, in which the object is to correctly forecast the contestant the other players will pick as the most beautiful. As a practical matter, this has resulted in the apparent historical success of active management strategies like momentum and illiquidity overweights that are directly or indirectly based on the forecasted outcome of social processes (see, for example, Andrew Haldane's excellent recent speech on "Patience and Finance" *www.bankofengland.co.uk/publications/speeches/2010/speech445.pdf*).

Now let's move on to the research, starting with some very interesting findings about the operation of social networks. In "Asset Pricing: Herding versus Individual Social Interaction", Frederik Konig starts with the premise that "individuals that herd

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act like the majority. In contrast, individual social interactions refers to the situation where an individual's behavior is influenced by only one or a few other individuals, and not by an aggregate outcome." After combining these two effects in a model, Konig finds that "although the influence from herding is dominant, the influence from individual social interactions plays a considerable role" in the determination of asset prices. Many of the new papers on social networks take as their starting point the pioneering 2006 research of Salganik, Dodds and Watts, who, in "Experimental Study of Inequality and Unpredictability in an Artificial Cultural Market" demonstrated how exposure to the opinion of others could dramatically alter individuals' perception of the best song from among a group of candidates. In "Of Songs and Men: A Model for Multiple Choice with Herding", Borghesi and Bouchaud derive a theoretical model based on a phase transition between weak and strong imitation, and find that it is able to explain Salganik's results. In "Theory of Collective Opinion Shifts: From Smooth Trends to Abrupt Swings", Michard and Bouchaud apply this theory to three very different data sets, including European cell phone adoption, European birth rates, and the drop off of applause in concert halls. The authors find that "changes in opinion can occur either abruptly or continuously", depending on an order parameter related to the strength of the herding effect. Most interestingly, they find that their model explains the variation over time in each of the data sets they examine.

Another new paper takes a closer look at how the structure of the network itself affects the manner in which different views are adopted. In "Opinion Formation and Cyclic Dominance in Adaptive Networks", Demirel, Prizak et al. "define an adaptive network on which the agent's opinions coevolve with the network topology of social contacts, producing dual processes of social adjustment and social segregation." They find that their social system operates in "four distinct phases which differ in the observed dynamics of opinions and topology." For example, "personal acquaintances, friends and family have a high subjective value, so links to them are likely to be maintained even if they hold a different opinion in certain matters. By contrast, it is very easy to 'rewire' links to online sources of information. It therefore seems natural to assume that an increasing importance of online communication corresponds to an

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increased frequency of segregation", which increases the system's probability of temporarily being in an unstable state characterized by multiple groups each of which has a high degree of internal consensus. Three other papers take a more practical approach to social network issues. In "In Search of Attention" Da, Engelberg and Gao use Google's "Search Volume Index" as a measure of attention, and "establish a strong and direct link between SVI changes and trading by less sophisticated investors, and stronger price momentum in these stocks." In "Heterogenous Expectations in Asset Pricing: Empirical Evidence from the S&P 500" Chiarella, He and Zwinkels empirically estimates a heterogenous agent model using S&P 500 data, and find that "the market is populated with fundamentalists [investors who believe prices will revert to fundamental values], chartists [investors who believe momentum will continue] and noise traders [who trade randomly – e.g., in response to immediate liquidity needs]" and that "agents switch between these groups conditional upon their previous performance." As other researchers have found using purely theoretical models of such a market, the authors also conclude that this constantly evolving mix of investing strategies explains empirical facts like heavy tails in returns distributions and volatility clustering (see, for example, "The Impact on the Pricing Process of Costly Active Management with Performance Chasing Clients" by Bird, Casavecchia, Pellizzari and Wooley).

A recently published paper by the Bank for International Settlements reaches a similar conclusion, albeit at a higher level of aggregation. In "Stochastic Volatility, Long Run Risks, and Aggregate Stock Market Fluctuations", Avdjiev and Balke find that "over short and medium term horizons, fluctuations in the price level of the aggregate US stock market are mainly driven by changes in expected excess returns." In theory, the real risk free rate and the required equity risk premium (ERP) for the market as a whole should move in opposite directions – e.g., as perceived uncertainty rises, real rates should fall (as investors shift into real return bonds and bid up their prices) while the required return for bearing equity market risk should rise. In practice, the authors find that changes in the ERP tend to move than offset opposite changes in the real risk free rate. However, the authors also find that over longer periods, "low

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frequency movements in the aggregate stock market are primarily driven by changes in the expected long-run growth rate of real dividends." In theory, this might be offset by increases in the real risk free rate that also reflect expectations of faster GDP growth. In practice, however, the authors find that expected changes in long-run real dividend growth dominate this relationship. In sum, in the short term, investors' reaction to macro uncertainty drives market movements. Over longer time horizons, however, changes in the expected growth rate of dividends have a substantial impact. In this regard, we found another paper particularly interesting. In "Group Decision Making Under Vagueness", Keck, Diecidue and Budescu find that human beings' natural aversion to uncertainty (which, as we have noted in the past, is a powerful fear trigger) is sharply reduced when a decision is either made by a group or when it is discussed with others before it is made by an individual. In this manner, social interaction can dampen investors' naturally fearful reaction to an increasingly uncertain market, in so doing delay the reversal of weakening trends.

In sum, recent research lends further support to the assumption that asset prices can depart, sometimes substantially and for long periods of time, from admittedly highly uncertain estimates of their fundamental value. Unfortunately, recent research also raises further doubts about the assumption that investors have the ability to consistently identify and react in a timely manner to asset mispricings. At the aggregate level, in "Learning About Consumption Dynamics", Johannes, Lochstoer and Mou "study the asset pricing implications of learning about the parameters, states and models determining aggregate consumption dynamics", which is the basis for many asset pricing models. The authors find that "revisions in beliefs stemming from parameter and model uncertainty are significantly related to aggregate equity returns…and are strongly time varying, exhibiting business cycle and/or long-run fluctuations." As a result, "much of the long-run behavior of asset prices is unanticipated ex-ante, which implies that about half of the post-WW2 observed equity market risk premium is due to unexpected revisions in beliefs about parameters and models." In a related paper, "Noisy Prices and Inference Regarding Returns", Asparouhova, Bessembinder, and Kalcheva find that market microstructure noise

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significantly distorts statistically derived estimates of asset returns – another reason why accurate forecasting is so difficult. A highly recommended paper on investor shortcomings is "Addressing the Psychology of Financial Markets" by David Tuckett. He notes that "markets are not well organized to manage the power that financial assets have to generate emotion and their wider effect on human imagination and judgment, anchored in neurobiology. Judgments and decisions about risk, reward and the evaluation of success can become systematically compromised because the excitement of potential gain is disconnected from anxiety about potential consequences, producing groupthink and bubbles. When anxiety breaks through, a catastrophic loss of confidence is inevitable. In the aftermath, the emotional pain that would be involved in accepting responsibility stands in the way of lessons being learned."

Beyond emotional obstacles, the sheer quantity of information confronting the active investor can also be a barrier to success. For example, in "Style Migration and the Cross Section of Average Stock Returns", Chen and Wermers find that "investors strongly judge a stock by its style, even when other information indicates they should not do so" and the result is lower returns. However, in the face of information overload, the seductive attractiveness of "category thinking" (or investing) is obvious.

Other researchers have found other barriers to learning from our investment successes, particularly when they receive recognition from others. In "Crowdsourcing and Individual Creativity Over Time: The Detrimental Effects of Past Success", Barry Bayus analyzes two years of panel data from Dell's IdeaStorm system and finds that "individual creativity is positively related to current effort, but negatively related to past success... Productive individuals are likely to have creative ideas, but are unlikely to repeat their early creative success once their ideas are recognized as being creative." In "The Icarus Paradox Revisited", Amason and Mooney conclude that "strong performance promotes a defensive mindset that may lead to dysfunctional outcomes. Strong performance is associated with framing subsequent issues as threats rather than opportunities. It is also associated with less comprehensive analysis in subsequent decision making."

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The level of an investor's anxiety also affects the way they interpret new information. In "Asymmetric Responses to Good and Bad News: An Empirical Case for Ambiguity", Christopher Williams finds that when the VIX increases, investors respond asymmetrically, weighing bad earnings news more than good earnings news. When VIX decreases, weighting is symmetrical. These findings are extended in "How Do Investors React Under Uncertainty", by Bird and Yeung. They find that that it is not only changes in VIX, but also level of VIX that conditions way info is perceived, and that investors become more pessimistic in interpretation of information when the VIX is high and when it increases. Finally, in "Managerial Miscalibration" Ben-David, Graham, and Harvey present a vivid picture of how poor even experienced managers are at forecasting future equity returns. The authors "study a unique panel of over 11,600 probability distributions provided by top financial executives and spanning nearly a decade of stock market expectations." Their results shown that "financial executives are severely miscalibrated: realized market returns are within the executives' 80% confidence intervals only 33% of the time."

In light of the challenges facing an individual investor who seeks to pursue an actively managed investment strategy, it comes as no surprise that the amount of assets managed by delegated/contracted managers has dramatically increased in recent years. In fact, delegated investment management has been shown to have physiological and emotional attractions for many investors. In "Expert Financial Advice Neurobiologically Offloads Financial Decision Making Under Risk", Engelmann, Capra, Noussair, and Bern "investigate the neurobiological basis of the influence of expert advice on financial decisions under risk" using functional magnetic residence brain imaging. They find that their subjects' "probability weighting functions change in direction of expert's advice (compared to the no advice condition). This is paralleled by distinctive neural activation patterns, such as reduced activity in areas associated with calculating the value of decision options. The authors also find "activation in regions associated with negative emotional arousal when subjects chose not to follow expert's advice in the face of uncertainty."

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A growing body of research also raises both doubts and hopes about the ability of individual investors to identify skilled investment managers. A great place to start is with Mike Mauboussin's excellent essay on "Untangling Skill and Luck", which is well worth a read. Mauboussin concludes that "the central insight is that the more the outcomes of an activity rely on luck (or randomness), the more powerful [in the data] reversion to the mean will be...It is clear that many decision makers do not behave as if they understand reversion to the mean, and predictably make decisions that are, as a consequence, harmful to their long-term outcomes. This is particularly pronounced in the investment industry."

The latest crop of research studies contains further evidence supporting Mauboussin's conclusion (and after almost fifteen years, we've already collected quite a stack). In "Absence of Value: An Analysis of Investment Allocation Decisions by Institutional Plan Sponsors", Stewart, Neumann, Knittel, and Heisler find that new allocation decisions often underperform prior allocations over the 1, 3, and 5 years following the decision. In "The Selection and Termination of Investment Managers by Plan Sponsors", Goyal and Wahal analyze data covering 3,700 plan sponsors between 1994 and 2003. They "find that plan sponsors hire investment managers after these managers earn large positive excess returns up to three years prior to hiring. However…this return chasing behavior does not deliver positive excess returns thereafter; post-hiring excess returns are indistinguishable from zero. Moreover, while plan sponsors terminate investment managers for underperformance, excess returns for these managers after being fired are frequently positive…We find that if plan sponsors had stayed with fired investment managers, their excess returns would be larger than those actually delivered by the newly hired managers."

In "Pension Fund Herding and Stock Returns", Russel Jame examines the daily trading activity of 590 money managers on behalf of 325 pension plan sponsors from 1999 to 2008. He finds that "pension funds engage in significant herding, which forecasts stock returns…The stocks most heavily bought by pension funds underperform the stocks most heavily sold by pension funds by over 4% over the subsequent year."

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In "Why Does Mutual Fund Performance Not Persist?", Bessler, Blake, Luckoff, Tonks conclude that, the two main reasons are that "winning funds receive inflows and lose managers." The first observation is consistent with the conclusions of Berk and Green's 2002 paper on "Mutual Fund Flows and Performance in Rational Markets", in which they concluded that a combination of return chasing investors (i.e., rising fund inflows following outperformance), decreasing returns to scale in active management (e.g., it is a lot easier to find ten $10 million dollar investment ideas than ten $100 million dollar investment ideas), and fund manager compensation in part based on assets under management would result in superior performance declining to the point where an active fund's incremental active returns compared to a passive index fund are exactly offset by incremental manager fees, expenses and trading costs.

David Tuckett, a trained psychiatrist, provides another perspective on the challenges facing active managers in his paper, "Addressing the Psychology of Financial Markets." It is such a unique and insightful contribution that it is worth quoting at length. Tuckett notes that, based on his field research, "most active investment managers are paid bonuses based on their annual performance. This creates an emotionally highly loaded institutional context for fund managers' work. Their interviews made it clear that they felt under pressure to perform exceptionally, even though to believe that it is possible to do so in any sustainable way in an inherently uncertain but also highly competitive situation flies in the face of standard economic and finance theory. Their situation is therefore, paradoxical; by simple arithmetic, those I interviewed knew that only a few among them could be exceptional. One conclusion is that the institutional situation in which fund managers find themselves will facilitate a divided state of mind. This is evident in the way funds are promoted—as for example on London buses and tubes. Claims are made in large print about exceptional performance in the last year or so, but with regulator-mandated remarks in small print about how it is unreliable to extrapolate performance from one year to another. But asset management companies do not advertise all their funds and understandably do not draw attention to those that have done badly. They usually

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amalgamate such funds into new funds when this happens, so that statistics exhibit survivor bias. "

"In keeping with their institutional context, it was very clear that the fund managers I studied were under pressure to search out (ahead of others) investment opportunities which they could believe were exceptionally interesting and profitable. The task was particularly challenging and potentially anxiety-provoking because although finding an exceptional opportunity was exciting, they always had both far too much and far too little information to determine future value and risk in any certain way. But, like Keynes' entrepreneurs, they had to believe and get others to believe that they could regularly obtain and maintain information advantage over others, and they had somehow to feel convinced enough to overcome doubt. Another of the characteristics of financial assets mentioned above was relevant; not only did they have to find situations which they thought were exceptionally interesting and act, but they also had to hold on to their beliefs for the necessary time period for the underlying thesis to come true. In order to do this (to make the leap of faith) they needed to feel a degree of comfort; in other words they had to build what they could feel was a defensible conviction in their own judgment, which would last over time. The volatility of most financial assets is a fact; indeed they were counting on price changes in their favor. To build up the necessary confidence, to inspire confidence in others and to maintain a mentally committed relationship to their investments, fund managers had to be spurred by excitement at the prospects of the rewards that they imagined. They also had to insulate themselves against potentially inhibiting doubts about loss giving rise to anxiety, which otherwise might prevent them from acting."

"The major finding of the interview study is that fund managers gained confidence by developing both general stories to explain their general strategy (stories which allowed them to feel comfortable about ignoring some of the masses of information to which they were subjected) and specific stories that enabled them to feel both excited and comfortable about each individual decision. These stories involved weaving facts together within an imaginative context that made emotional sense—that felt true. The specific stories managers told me about the individual

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securities they chose to buy, sell or hold, were thus woven to legitimate the sense that their choices were linked to their general strategy as well as having a reasonable chance of working out. They had to create the emotional conviction both to allow them to tie the initial knot when making the investment (involving them in a dependent relationship) and then to allow them to tolerate impatience and doubt so that they could remain attached to their decisions for the length of time necessary to let things work. It was evident from the stories they told that on the one hand they were able to believe that purchase of a given stock was desirable because the stock itself had exceptional qualities in that its true value was not recognized, its amazing potential was not understood or that those in charge of the companies were exceptional. On the other hand, other features of the stories suggested that managers believed they had somehow got potential downsides covered. "

"Thus, on the one hand they frequently described themselves quite spontaneously as getting excited by companies, liking companies and even loving them and also implied that their relationship to them was special to the extent of being at least semi-exclusive. They had found and owned something exceptional, which others knew less about, or to which they at least had more privileged access. Stocks were regularly described as "sexy", "spectacular", and "exciting", or on the other hand as "unfancied", "dopey" or "boring". Those that disappointed had clearly once also had such characteristics but now caused the disbelief, anger and hatred that goes with wanting someone to blame. Often this was leveled at company managements. On the other hand, stories also appeared to be constructed to help the fund managers to manage anticipated doubts and distrust; they were claiming, therefore, to see something that others had not and knew they would have to go on believing in that through time. To achieve such confidence, the companies they bought were said to be protected against the possibility that things might go wrong, that expectations might not be immediately rewarded or that managements might destroy rather than enhance value, or just against fears that the stock would perform in an unexciting way."

"Many stories, in effect, both reported reasons for being excited and reasons for feeling secure within a situation of inherent distrust. Reflecting on these stories, it is

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apparent that in effect fund managers found ways to believe that the stock they purchased could get higher rewards with little or no extra risk—or to put it another way, that they were in at least some measure "phantastic" objects, exceptional stories offering above average rewards but with only ordinary risk [note that this observation is consistent with one found in a recent German paper. In "The Illogicality of Stock Brokers", Knauff, Budeck, Wolf and Hamburger report on two experiments on the logical reasoning competence on 19 stockbrokers. They find that "stockbrokers were strongly biased by their prior knowledge. Stockbrokers more likely to make logically invalid inferences than to give up on prior belief."]

Tuckett continues, "bearing in mind that in a bubble period of financial instability decision-makers see exciting opportunities rather than risks, the stories fund managers tell are especially pertinent. The study suggests that managers are predisposed to find stories that overvalue opportunities and underestimate risks as they try to cope with the need to fulfill their clients' expectations that they can deliver exceptional returns. In order to cope, they need to find ways to believe they can get higher rewards than their rivals from the particular investments they choose; this means that they are constantly on the look out for the fantastic or for signs that others have found it. One might say that in order themselves to be seen as "fantastic" they are naturally attracted to seek "phantastic objects"; in extreme cases Internet stock, or tulips...If such findings are generalised through the professional investment community, it seems likely that as a group [active managers] tend to share an unconscious "basic assumption" that the "phantastic" is out there and achievable if only they can find it. In this way it seems that financial markets are continuously vulnerable both to becoming overexcited and to under-estimating risk; the twin factors, together with self-fulfilling technical effects, which produce asset-price bubbles. From this viewpoint financial asset bubbles are an emergent path-dependent property of a particular institutionally-based set of interactions between human beings chasing phantastic objects and individually enacting their given roles quite rationally.

Of course, none of Tuckett's analysis suggests that skilled active managers do not exist; rather, he highlights the psychological difficulty of the job, and the very high

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bar that a consistently successful active manager must bet over. In "Luck versus Skill in the Cross Section of Mutual Fund Returns", Fama and French conclude that "few actively managed funds produce benchmark adjusted returns sufficient to cover their costs" though also find that "there is evidence of superior performance – non-zero true alpha – in the extreme tail of the cross section of mutual fund alpha estimates."

Of course, some of this may be due to active managers exploiting information that is just a bit too good. In "Institutional Trades Around Takeover Announcements: Skill vs. Inside Information", Jegadeesh and Tang find that "trades of funds as a group, either before or after takeover announcements, are not profitable. However, funds that trade through the brokerage arms of target advisors are net buyers of target shares before announcements and their pre-announcement trades are significantly profitable. Therefore, leakage of inside information from brokerages that advise the target is a significant source of funds' informational advantage." However, they too also "find that a subset of funds is skilled at privately gathering information, even when they do not trade through target advisors."

Perhaps the most encouraging recent paper for active investment managers has been "Active Share and Mutual Fund Performance" by Antti Petajisto of the Stern School of Business at New York University. Again, it is worth quoting at length. Petajisto begins by noting that, "an active manager can only add value by deviating from his benchmark index. A manager can do this in two different ways: by stock selection or factor timing. Stock selection involves active bets on individual stocks, for example selecting only one stock from a particular industry. Factor timing, also known as tactical asset allocation, involves time-varying bets on broader factor portfolios, for example overweighting particular sectors of the economy, or having a temporary preference for value stocks, or even choosing to keep some assets in cash rather than invest in equities... Intuitively, Active Share is simply the percentage of the fund's portfolio that differs from the fund's benchmark index. For an all-equity mutual fund that has no leveraged or short positions, the Active Share of the fund will always be between zero and 100%... Intuitively, tracking error measures the volatility of the fund that is not explained by movements in the fund's benchmark index..."

"Conceptually, what is the difference between these two measures of active management? Too see that, let us consider a portfolio with 50 stocks – in other words, a potentially well-diversified portfolio. How active management shows up in these two measures of active management depends on one key question: do the active positions have exposure to systematic risk? For example, if all the overweight positions are in technology stocks which tend to move together, even small active positions will generate a high tracking error. Alternatively, assume there are 50 industries with 20 stocks in each industry, and the fund picks just one stock out of 20 in each industry, while keeping the same industry weights as the benchmark index. The fund is therefore very selective within industries, generating a high Active Share of about 95%, but because it is not taking any positions across industries, most of the risk in its active positions will be diversified away, producing low tracking error..."

"Hence, Active Share and tracking error emphasize different aspects of active management. Active Share is a reasonable proxy for stock selection, whereas tracking error is a proxy for systematic factor risk... I divide active managers into multiple categories based on both Active Share, which measures mostly stock selection, and tracking error, which measures mostly exposure to systematic risk. Active stock pickers [16% of all funds between 1990 and 2009] take large but diversified positions away from the index [i.e., they match the factor exposure of the index, but not its stock weights]. Funds focusing on factor bets [16%] generate large volatility with respect to the index even with relatively small active positions. Concentrated funds [4%] combine very active stock selection with exposure to systematic risk [i.e., they deviate from the index in both factor exposures and company weights]. Closet indexers [16%] do not engage much in any type of active management. A large number of funds in the middle [48%] are moderately active without a clearly distinctive style..."

"I find that closet indexing has been increasing in popularity in 2007-2009, currently accounting for about one third of all mutual fund assets. This could be related to the recent market volatility and negative returns, which would also explain the previous peak in closet indexing in 1999-2002...Consistent with the prior literature, I find weak performance across all actively managed funds, with the average fund

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losing to its benchmark by –0.41% [between 1990 and 2009]. The performance of closet indexers is predictably poor: they largely just match their benchmark index returns before fees, so after fees they lag behind their benchmarks by approximately the amount of their fees [0.91% per year]. However, funds taking factor bets perform even worse [an average loss of 1.28% per year. The only group adding value to investors has been the most active stock pickers, which have beaten their benchmarks by an average of 1.26% per year, after fees and expenses, between 1990 and 2009. Before fees, their stock picks have even beaten the benchmarks by 2.61%, displaying a nontrivial amount of skill. Concentrated funds have also made good stock picks, but their net returns have nevertheless just matched index returns", with an average loss of 0.25% per year." Finally, moderately active funds delivered an average loss of 0.52% per year.

Other researchers have replicated these results, using different data sets. For example, in "Find Out How Active Your Fund Is", Russel Kinnel of Morningstar finds that the least active quintile of active mutual funds (across all Morningstar fund categories) produced average (1.26%) annual loss, versus .03% gain for funds with the highest active share. And in "Global Equity Fund Performance, Portfolio Concentration, and the Fundamental Law of Active Management", Huik and Derwal found that "fund performance is mostly driven by concentration...Funds with high tracking error levels that are exposed to only one or two segments do not display outperformance and might even display underperformance." In sum, to the extent that skilled active portfolio managers exist, these studies conclude that they are most likely to be found among funds with a high active share, and in particular among funds run by stock pickers, who match the factor exposures of their benchmark indices while seeking to pick the best stocks within each sector covered by the index. Finally, Petajisto's findings are also consistent with those in a previous paper, "Best Ideas", in which Cohen, Polk and Silli conclude that an active manager's best ideas typically generate higher returns than the other assets in his or her portfolio. However, consistent with Berk and Green, they also note that "the organization of the money management industry appears to make it optimal for managers to introduce stocks into

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their portfolios that are not outperformers, even though they are able to pick good stocks."

Unfortunately, the methodology used in all these "active share" studies suffers from a common failing: they don't take the role of luck into account. In "False Discoveries in Mutual Fund Performance: Measuring Luck in Estimated Alphas", Barras, Scaillet, Wermers account for this factor, and examine the returns achieved by actively managed U.S. mutual funds between 1975 and 2006. Net of trading costs and expenses, the authors find that 75.4% of funds have zero alpha. They note that these "funds have managers with some stock picking ability, but they extract all of the returns generated by these abilities through fees." An additional 24.0% of fund managers are truly unskilled, with luck-adjusted alphas of less than zero. Only .6% of fund managers are truly skilled after accounting for the role of luck – an estimate that is statistically indistinguishable from zero. This has declined from 14.4% in early 1990. The authors conclude that, "although the number of actively managed funds dramatically increased over the 1990 – 2006 period, skilled managers (those capable of picking stocks well enough, over the long run, to overcome their trading costs and expenses) have become exceptionally rare."

The final consideration for an investor contemplating an investment in an actively managed fund is whether, as noted above, the higher costs associated with active management (e.g., management expenses, trading costs, and possibly taxes) will be more than offset by higher returns than could be obtained by investing in an active fund. In "Paying the High Price of Active Management: A New Look at Mutual Fund Fees", Ross Miller finds that "a sample of 731 actively managed large cap U.S. mutual funds analyzed for the three years ending December 31, 2009 had a mean active expense ratio [incremental expenses associated with active management, divided by the incremental returns generated] of 6.44%, more than 400% greater than their mean reported expense ratio of 1.20%."

We started this article with three assumptions that an investor must believe to be true before embarking on an actively managed investment strategy, and two further assumptions that one must believe in before delegating active management

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responsibility to a third party manager. We are strongly in agreement with the assumption that the market price of financial assets may deviate, sometimes substantially, from the "fundamental value" of those assets. Due to the valuation complexities involved, this is exponentially true of assets whose value derives from the value of other financial assets that represent claims on the success of business plans devised and executed in the real economy. We continue to harbor far greater doubts about the second critical active management assumption: that through either access to superior information or possession of a superior forecasting model, a skilled active investor can consistently deliver incremental returns in excess of the incremental cost of active over passive management. The increasing competitive intensity of active management, the institution of SEC Regulation FD to curb selective disclosure by corporate management, and the dawn of the internet and the age of information overload has made it much harder to consistently obtain superior (legal) information. And the increased complexity and pace of change in the real economy, as well as global financial markets, has dramatically shortened the effective life of superior forecasting models, as their underlying assumptions become outmoded. Finally, as noted above, adaptation to changes in the competitive environment – like the elimination of a previously strong forecasting signal once it is discovered by others – is most difficult for the active managers who have enjoyed the most previous success.

To be sure, hindsight shows that employing strategies based on predictable social effects and individual investor behavior – such as long momentum or illiquidity -- would have produced superior returns in the past. What remains unclear to us, however, is what, if any, barriers exist to prevent the superior returns that these strategies have produced in the past from being competed and arbitraged away in the future now that they are widely known, as has already happened to the size premium. Moreover, as Petajisto has noted, active strategies based solely on factor tilts like momentum and illiquidity (or small caps and value) have a poor recent track record when it comes to producing sustained alpha – logically because no barriers exist to their alphas being competed away (e.g., the "crowded trade" phenomenon).

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With respect to delegated investment management – outsourcing active investment management to a third party – this changes the nature but not the essence of the challenge facing an investor. Rather than identifying stocks and other assets that are likely to outperform a relevant internal or external index over a give period of time, the investor must identify an active manager who possesses the necessary skills to deliver risk adjusted returns, net of costs and taxes, that are better than those that could be obtained by investing in a passive fund. Once again, this is an enormously difficult decision. For example, in "When Active Management Shines vs. Passive" Jane Li analyzed the returns from 31,991 US domiciled non-index mutual funds in 73 categories over a 30 year period ending in February 2010. She regressed their returns on appropriate benchmark indexes, and identified the percentage of active managers that generated gross alpha (i.e., alpha that was not adjusted for either fund costs or for luck). Put differently, Li used evaluation criteria that were very favorable towards active management. She then reached a conclusion as to the attractiveness of active versus passive management across a range of fund categories. Even on this tilted playing field, active managers were not the preferred choice in all the broad fund categories we employ in our model portfolios, including real return bonds, intermediate term government bonds, world bonds, domestic and global commercial property, broad commodities, and domestic, foreign and emerging market equities.

A final concern with respect to the use of active management strategies by most investors was raised in a 22Aug2010 *Financial Times* article by John Chapman. In "The Real Losers in the Battle for Alpha", he notes that with the shift of many talented managers to hedge funds in recent years, as less restrictive regulations enabled their rapid growth, the distribution of alpha – which, as we know, is finite, and must net out to zero for active investors as a group – has become increasingly skewed. Citing estimates that gross hedge fund alphas have averaged about $125 billion per year, he notes that these gains by definition must be coming at expense of investors in other actively managed vehicles – e.g., pension, insurance, mutual funds, and individual investors. In short, the growth of hedge funds has benefited only a minority of investors, and has skewed the alpha game heavily in their favor. Champan

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concludes, "given that authorities have allowed only a minority of active investors [i.e., hedge funds] significant trading advantages, those with resulting losses could claim to be victims of licensed robbery." And it might not only be other active investors who have cause to wonder about the wisdom of their decision to not invest passively. Many hedge fund investors may also have reason to complain. As Bird, Liem, and Thorp note in "Hedge Fund Excess Returns Under Time-Varying Beta", when proper benchmarks are used, there is no evidence that hedge funds produce net alpha, as the excess returns they produce are captured by their managers via their compensation structure.

In light of these additions to the already substantial pile of evidence that generating sustained alpha net of costs is a Herculean challenge, it comes as no surprise to see a growing number of articles like this one, which appeared in the 27Jun2010 *Financial Times*:

"Investment Industry Set for Big Shift Into Passive Management" by Steve Johnson. He concludes that "the investment industry is set for a massive rebalancing from active to passive fund management as disillusionment about the ability of active managers to beat benchmark indices persists...Independent research by FRC, a Boston-based research house, suggest the proportion of US mutual fund assets managed passively will rise from 20 percent in 2009 to 30 percent by 2014."

Feature Article: Personality, Risk Tolerance, and Adaptation to Loss

Throughout 2010, we have repeatedly noted the challenges posed by four headwinds facing financial markets: the deleveraging process, inadequate and imbalanced global demand, deflationary pressures (and, paradoxically, the potential for much higher inflation as the price of avoiding deflation), and a growing crisis of political legitimacy, at both the global and national level. While we acknowledge that in the coming years it is possible that the confluence of these four headwinds will <u>not</u> produce a deeper and more extended crisis than we have seen up to now, we do not believe that outcome is likely. Given our belief that we are sailing into stormy seas, a critical

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question facing advisors is how best to prepare their clients for what lies ahead. To that end, this month's Advisors' Corner will review recent research findings on personality, risk tolerance, and adaptation to loss. Next month, we will look at how advisors can take a more proactive approach to helping their clients manage the emotional turmoil that will accompany the challenging market conditions that lie ahead.

In recent years, psychological researchers have settled on the so-called "Five Factor Model" (FFM) as the basic description of the most important dimensions of the human personality. Many different descriptions of each of these factors can be found in the literature. Here, we will use one by Lee, Kraeussl and Paas (from their paper, "Personality and Investment") that is admirably brief:

"The Big Five traits are commonly labeled as: (1) Extraversion; (2) Agreeableness; (3) Conscientiousness (or Dependability); (4) Emotional Stability (vs. Neuroticism); and (5) Openness to Experience...The Big Five traits are the five main dimensions of personality...

- *Extraversion* includes positive affectivity, sociability, assertiveness and sensitivity to reward. Individuals scoring high on extraversion tend to be energetic, cheerful, and optimistic, and they tend to view stressful situations as challenges...
- *Agreeableness* includes characteristics such as trust, altruism, and compliance. This dimension largely reflects interpersonal tendencies...
- *Conscientiousness* includes characteristics such as high levels of self-regulation, persistence, impulse control, achievement orientation, and self-discipline. Conscientiousness represents the general tendency to be strong-willed, and determined. Individuals scoring high on conscientiousness have strong control over their own attention; they are able to stay focused on tasks, regardless whether the tasks are enjoyable or not...
- *Neuroticism (vs. emotional stability)* reflects one's general tendency to experience negative affective states. *Neuroticism* includes characteristics such as negative affectivity, selfconsciousness, physiological reactivity, and behavioral inhibition. Neuroticism includes intense emotions and strong

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responses to stress. Individuals scoring high on neuroticism experience a high level of unpleasant arousal, when facing stressful events...

- *Openness to Experience*, represents the tendency to be creative and to engage in divergent thinking. Openness to experience includes creativity, curiosity, flexibility, imagination, and intellectual interests."

To give a sense of the range of descriptions for these factors, here is another set, from "The Big Five Personality Dimensions and Entrepreneurial Status", by Zhao and Seibert:

- "*Extraversion* describes the extent to which people are assertive, dominant, energetic, active, talkative and enthusiastic. People who score high on Extraversion tend to be cheerful, like people and large groups, and seek excitement and stimulation...People who score low on Extraversion prefer to spend more time alone and are characterized as reserved, quiet, and indpendent.
- *Agreeableness* assesses one's interpersonal orientation. Individuals high on Agreeableness can be characterized as trusting, forgiving, caring, altruistic and gullible. The high end of Agreeableness represents someone who has cooperative values and a preference for positive interpersonal relationships. Someone at the low end of this dimension can be characterized as manipulative, self-centered, suspicious and ruthless...
- *Conscientiousness* indicates an individual's degree of organization, persistence, hard work and motivation in pursuit of goal accomplishment. It has been the most consistent predictor of job performance across all types of work and occupations. Many scholars regard Conscientiousness as a broad personality dimension that is composed of two primary facets: achievement motivation and dependability...
- *Neuroticism* represents individual differences in adjustment and emotional stability. Individuals high on Neuroticism tend to experience a number of negative emotions including anxiety, hostility, depression, self-consciousness,

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impulsiveness and vulnerability. People who score low on Neuroticism can be characterized as self-confident, calm, even-tempered and relaxed.

- *Openness to Experience* is a personality dimension that characterizes someone who is intellectually curious and tends to seek new experiences and explore novel ideas. Someone high on Openness can be described as creative, innovative, imaginative, reflective and untraditional. Someone low on Openness can be characterized as conventional, narrow in interests, and unanalytical."

A person's willingness to bear risk is a function of both personality and the perceived benefits and costs of doing so in a given situation (e.g., see "The Role of Perceived Costs and Perceived Benefits in the Relationship Between Personality and Risk Related Choices" by Soane, Dewberry and Narendran). In most situations, cost/benefit calculations are the dominant consideration. However, researchers have also found that in many situations, personality factors are also significant. Much of the existing literature on the impact of personality is well summarized by Nicholson, Fenton-O'Creevy, Soane and Willman in their paper, "Risk Propensity and Personality." The authors conclude that "the general profile is strong and distinctive in terms of the Big Five. Together, they can be interpreted as a causal dynamic. High Extraversion (especially sensation-seeking) and Openness supply the motivational force, Low Neuroticism and Agreeableness supply the insulation against concern about negative consequences, and low Conscientiousness lowers the cognitive barriers. The last of these is of great interest. Most people take risks in order to reap some psychological or material benefit, not for the sake of risk itself. People with high Conscientiousness will pursue these benefits through disciplined striving, rather than risk taking. People with low Conscientiousness can be seen as attempting to 'get rich quick' – secure benefits by taking chances, rather than through controlled effort."

It is interesting to compare these findings with those in "The Big Five Personality Dimensions and Entrepreneurial Status". Zhao and Seibert find that there are "significant differences between entrepreneurs and [corporate] managers on four personality dimensions. Entrepreneurs scored higher on Conscientiousness and

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Openness, and lower on Neuroticism and Agreeableness. No difference was found for Extraversion." This further reinforces the often heard saying that, contrary to popular belief, entrepreneurs are not bigger risk takers as that phrase is commonly understood. Rather, they are better at taking risk in a very controlled manner.

In addition to a willingness to bear risk, the accuracy with which one perceives a given situation is also critically important to the returns one eventually earns. In this regard, Pan and Statman have found that "overconfidence [i.e., perceiving the range or variance of possible outcomes as narrower than it truly is] is pronounced among people with high Extraversion and low Agreeableness" ("Beyond Risk Tolerance: Regret, Overconfidence, Personality and Other Investor Characteristics"). Interestingly, the authors also found that "a propensity to attribute success to luck rather than skill is evident among those with high Agreeableness, high Openness, but low Conscientiousness." On the other hand, "the propensity for feeling regret is especially high among those with high Conscientiousness."

In another paper ("The Cultures of Risk Tolerance"), Statman moves beyond individual personality, and examines how national cultural or personality traits, as measured by Geert Hofstede's famous cultural dimensions, affects the propensity to bear risk (see www.geert-hofstede.com). For example, (Statman concludes that risk tolerance is relatively low in countries where uncertainty avoidance is relatively high, and in countries that are relatively individualistic (compared to those with a more collectivist culture). As an explanation for the latter, Statman posits that "ties between individuals are strong in collectivists countries where people are integrated into cohesive groups of family and friends who are expected to support one another". The following chart plots a number of countries on both the uncertainty avoidance and individualism cultural dimensions (risk tolerance decreases as you move from the lower left to the upper right of the chart):

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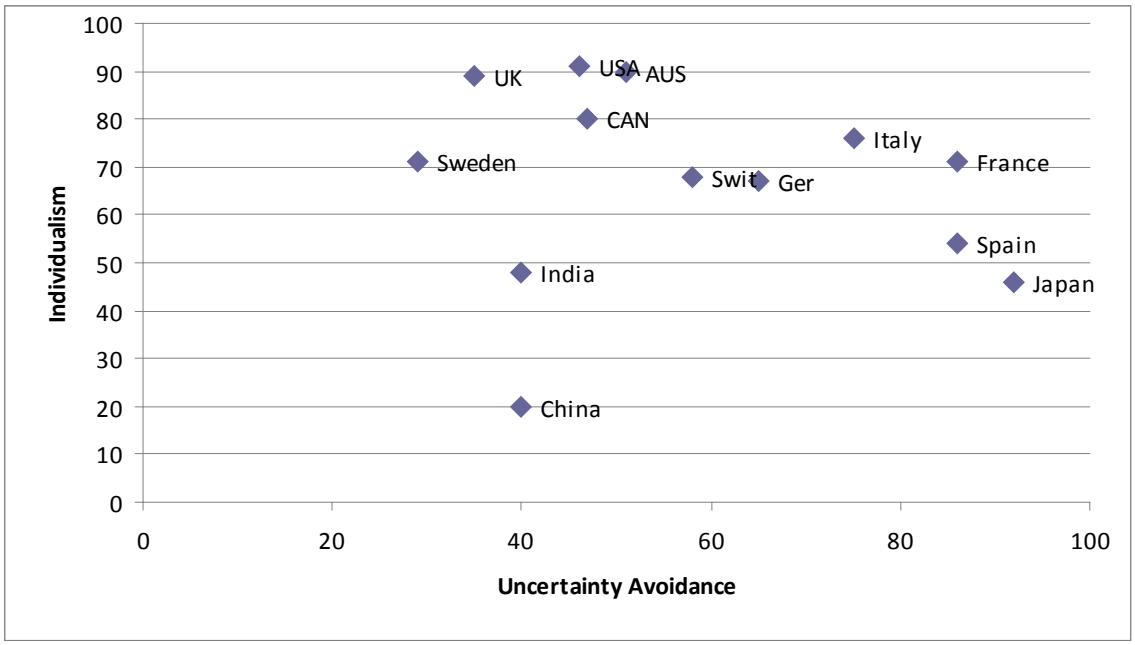

Once an investment decision has been taken, a reference point is established, and the perception of, and behavioral reactions to subsequent developments are heavily dependent on how that reference point evolves over time. For example, Prospect Theory asserts that people have a tendency to take gains relatively quickly, while "riding their losses", because people become more conservative with respect to gains, and more risk tolerant when facing losses. Hence, it is critically important that investment managers and advisors have a clear understanding of reference point behavior, and its relation to underlying personality factors.

In "The Role of Expectations in the Formation of Reference Points", Frauke Lammers finds that "when expectations are present, they have a significant impact on reference point formation and subsequent risky choice." In an investment context, this implies that the reference point is based on a combination of the price paid for an asset (the objective baseline for loss versus gain financial calculations) and the investor's expected future return at the time of the transaction (the subjective baseline for regret versus rejoice emotional calculations).

However, an increasing amount of research has also found that reference points evolve over time. For example, in "Reference Point Adaptation:Tests in the

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Domain of Security Trading", Arkes, Hirshleifer, Jiang, and Lim begin with the assumption that "reference points move in manner consistent with prior outcomes, shifting upwards following a gain, and downward following a loss." However, their research found that "reference point adaptation was significantly greater following a gain than following a loss of equivalent size." In another paper ("A Cross-Cultural Study of Reference Point Adaptation: Evidence from China, Korea and the U.S."), the same authors found that "subjects in all countries adapted their reference points more after a gain than after an equal-sized loss." However, Americans tended to adopt more quickly than Asians, which the authors conclude is due to "differences in these groups' respective loss aversion and tendency to expect reversals in fortune."

Other authors tie reference point adaptation to the so-called "disposition effect" – the tendency to ride losses too long. In "Reference Point Adaptation and the Disposition Effect", Chiyachantana and Yang analyze a large proprietary database of institutional trades, to "investigate whether, and to what extent, the dynamic adaptation of reference point translates into variations in the disposition effect." They reach three conclusions. "First, the propensity to realize losses declines sharply with the magnitude of prior losses due to insufficient adaptation of reference point. Second, recent adverse information accelerates investors' adaptation to price depreciation and increases investors' willingness to realize losses. Finally, a high priori chance of losing money in highly speculative investments decreases investors' aversion to realize losses." In "A Dynamic Model of Investor Decision-Making: How Adaptation to Losses Affects Future Selling Decisions:", Lee, Kraeussl, Lucas, and Paas begin by noting that "prospect theory is relatively silent about the dynamic aspect of financial decision-making. For example, it tells us little about why many investors eventually do capitulate on their loosing investments if the losses accumulate too much or extend over too long a period." Their investigation of this issues finds that "a larger total loss size and a longer time in a losing position are related to a downward shift in the reference point...[which]... increases the probability to capitulate. Also, a recent loss leads to more negative emotions, which also indirectly increases the probability to capitulate." And in "Adaptation Towards Reference Values: A Non-Linear

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Perspective", Georgellis, Gregoriou and Tsitsianis find that "the speed of adjustment increases in a non-linear fashion with the distance from the reference point." For advisors seeking a quick way to estimate a client's current reference point, in "Reference Point Formation and Updating" Baucells, Weber and Welfens report the results of experiments which lead them to conclude that first and last prices in a time series (e.g., purchase and current price) have the most influence.

Finally, personality factors also affect how an investor copes with a loss. In "Relations Between Personality And Coping", Connor-Smith and Flachsbart provide an overview of research findings on this issue. They begin by noting that, "because coping is motivated by stress exposure, stress reactivity and situational demands, the influence of personality on the frequency, intensity, and nature of stressors experienced may partially explain the relationship between personality and coping. For example, high Neuroticism is associated with high rates of stress exposure and intense emotional and physiological reactions to stress, high Agreeableness with infrequent interpersonal conflict, high Conscientiousness with limited stress exposure due to preventative efforts, and high Extraversion with low stress reactivity...Personality traits may also influence the effectiveness of different coping strategies, with strategies that are beneficial for some individuals being less effective or even harmful for those with different personality traits." The authors classify coping strategies into two broad groups. "Engagement Coping comprises active approaches toward the stressor or related emotions." These include problem solving, cognitive restructuring, obtaining social support, distraction, and acceptance. "Disengagement Coping" includes denial, wishful thinking, withdrawal, focusing on negative emotions, and substance abuse. The following table shows the coping strategies with the highest correlations with high levels of each of the five personality factors:

Extraversion	• Problem Solving • Cognitive Restructuring • Social Support
Agreeableness	• Emotional Support (relatively weak correlation) • Cognitive Restructuring

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	(relatively weak correlation)
Conscientiousness	• Problem Solving • Cognitive Restructuring
Neuroticism	• Denial • Wishful Thinking • Withdrawal • Focus on Negative Emotion • Substance Abuse
Openness	• Problem Solving (relatively weak correlation) • Cognitive Restructuring (relatively weak correlation)

Finally, in "Personality and Investment", Lee, Kraeussl, and Paas examine how personality differences affect investors' adaptation to losses. The authors note that acceptance as a general coping strategy is most closely related to reference point adaptation to investment losses. They conclude that higher levels of Agreeableness and Openness, and a lower level of Conscientiousness are the personality factors most closely associated with faster adaptation to financial losses.

As noted at the beginning of this article, we believe that the world's financial markets are about to enter another very stormy period. Under such circumstances, "knowing your client" takes on a much broader meaning for advisers, including a better understanding of clients' personalities, and the resulting implications for their risk tolerance, overconfidence, and approach to coping with losses. On the positive side, investors who develop insight in these areas may be able to improve their investment performance, while advisors may be able to increase their client base through a superior ability to help them emotionally cope with the challenging times that lie ahead.

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Global Asset Class Valuation Analysis

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

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

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moving prices far away from their fundamental values, it is usually a good indication a turning point is near.

Equity Markets

In the case of an equity market, we define the future supply of returns to be equal to the current dividend yield plus the rate at which dividends are expected to grow in the future. We define the return investors demand as the current yield on real return government bonds plus an equity market risk premium. While this approach emphasizes fundamental valuation, it does have an implied linkage to the investor behavior factors that also affect valuations. On the supply side of our framework, investors under the influence of fear or euphoria (or social pressure) can deflate or inflate the long-term real growth rate we use in our analysis. Similarly, fearful investors will add an uncertainty premium to our long-term risk premium, while euphoric investors will subtract an "overconfidence discount." As you can see, euphoric investors will overestimate long-term growth, underestimate long-term risk, and consequently drive prices higher than warranted. In our framework, this depresses the dividend yield, and will cause stocks to appear overvalued. The opposite happens under conditions of intense fear. To put it differently, in our framework, it is investor behavior and overreaction that drive valuations away from the levels warranted by the fundamentals. As described in our November 2008 article "Are Emerging Market Equities Undervalued?", people can and do disagree about the "right" values for the variables we use in our fundamental analysis. Recognizing this, we present four valuation scenarios for an equity market, based on different values for three key variables. First, we use both the current dividend yield and the dividend yield adjusted upward by .50% to reflect share repurchases. Second, we define future dividend growth to be equal to the long-term rate of total (multifactor) productivity growth. For this variable, we use two different values, 1% or 2%. Third, we also use two different values for the equity risk premium required by investors: 2.5% and 4.0%. Different combinations of all these variables yield high and low scenarios for both the future

returns the market is expected to supply (dividend yield plus growth rate), and the future returns investors will demand (real bond yield plus equity risk premium). We then use the dividend discount model to combine these scenarios, to produce four different views of whether an equity market is over, under, or fairly valued today. The specific formula is (Current Dividend Yield x 100) x (1+ Forecast Productivity Growth) divided by (Current Yield on Real Return Bonds + Equity Risk Premium - Forecast Productivity Growth). Our valuation estimates are shown in the following tables, where a value greater than 100% implies overvaluation, and less than 100% implies undervaluation. In our view, the greater the number of scenarios that point to overvaluation or undervaluation, the greater the probability that is likely to be the case.

Equity Market Valuation Analysis at 31 Oct 10

Australia	**Low Demanded Return**	**High Demanded Return**
High Supplied Return	67%	100%
Low Supplied Return	101%	140%

Canada	**Low Demanded Return**	**High Demanded Return**
High Supplied Return	56%	110%
Low Supplied Return	114%	182%

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Eurozone	**Low Demanded Return**	**High Demanded Return**
High Supplied Return	47%	86%
Low Supplied Return	85%	130%

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Japan	**Low Demanded Return**	**High Demanded Return**
High Supplied Return	68%	127%
Low Supplied Return	135%	210%

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United Kingdom	Low Demanded Return	High Demanded Return
High Supplied Return	29%	69%
Low Supplied Return	65%	111%

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United States	Low Demanded Return	High Demanded Return
High Supplied Return	50%	114%
Low Supplied Return	119%	202%

Switzerland	Low Demanded Return	High Demanded Return
High Supplied Return	51%	96%
Low Supplied Return	96%	232%

India	Low Demanded Return	High Demanded Return
High Supplied Return	47%	144%
Low Supplied Return	169%	316%

Emerging Markets	Low Demanded Return	High Demanded Return
High Supplied Return	60%	155%
Low Supplied Return	103%	199%

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

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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 months since March 2009 have seen a very strong rally develop in many equity markets, which, in some cases, has caused our valuation estimates to rise into the "overvalued" region. Given the absence of progress in reducing the three main obstacles that block a return to sustainable economic growth (see our recent Economic Updates), we believe that these rallies reflect investor herding, rather than any improvement in the underlying fundamentals. In turn, we strongly suspect that the root causes of this herding phenomenon, which appears to have strengthened in recent years, lie in a combination of the rising percentage of assets (and even higher percentage of trading) accounted for by delegated asset managers (rather than the investors who own the assets being traded), the incentive structure faced by these delegated managers (e.g., 2 and 20 on this years returns), and the rise of algorithmic trading.

Real Return Bonds

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

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heart of the debate over how much we should be willing to spend today to limit the worst effects of climate change in the future. In our analysis, we assume the long-term average time preference rate is two percent per year.

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

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

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

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

The next table compares this long-term equilibrium real risk free rate with the real risk free return that is currently supplied in the market. Negative spreads indicate that real return bonds are currently overvalued, as their prices must fall in order for their yields (i.e., the returns they supply) to rise. The valuation is based on a comparison of the present values of ten year zero coupon bonds offering the rate demanded and the rate supplied, as of **31 Oct 10**:

Region	Risk Free Rate Demanded	Actual Risk Free Rate Supplied	Difference	Overvaluation (>100) or Undervaluation (<100)
Australia	2.2	2.5	0.3	97
Canada	2.8	1.0	-1.7	118
Eurozone	2.9	1.3	-1.6	117
Japan	2.8	1.2	-1.6	116
United Kingdom	2.8	0.6	-2.3	125
United States	2.5	0.7	-1.8	120

Note that in this analysis we have conservatively used 1%, rather than our normal 2%, as the rate of time preference. This is consistent with recent research findings that as investors' sense of uncertainty increases, they typically reduce their time preference

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discount rate – that is, they become less impatient to consume, and more willing to save (see, for example, "Uncertainty Breeds Decreasing Impatience" by Epper, Fehr-Duda, and Bruhin). Given our conservative time preference assumption, it is interesting to speculate what accounts for the current situation in which yields on real return bonds are significantly lower than what our mode would suggest. Logically, answer must lie in some combination of reduced expectations for future economic growth, higher variability of future economic growth rates, and/or higher average levels of risk aversion.

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

Government Bond Markets

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

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

Bond Market Analysis as of 31 Oct 10

	Current Real Rate	Average Inflation (89-03)	Inflation Uncertainty Premium	Required Nominal Return	Nominal Return Supplied (10 year Govt)	Return Shortfall or Excess	Asset Class Over or (Under) Valuation, based on 10 year zero coupon	Implied Annual Inflation Over 10 Year Horizon
Australia	2.50%	2.96%	0.25%	5.71%	5.17%	-0.54%	**5.22%**	2.36%
Canada	1.04%	2.40%	0.25%	3.69%	2.81%	-0.88%	**8.87%**	1.50%
Eurozone	1.32%	2.37%	0.25%	3.94%	2.51%	-1.43%	**14.87%**	0.92%
Japan	1.24%	0.77%	0.25%	2.26%	0.92%	-1.34%	**14.04%**	-0.56%
UK	0.59%	3.17%	0.25%	4.01%	3.08%	-0.93%	**9.37%**	2.23%
USA	0.67%	2.93%	0.25%	3.85%	2.60%	-1.25%	**12.88%**	1.67%
Switzerland	1.22%	2.03%	0.25%	3.50%	1.54%	-1.96%	**21.12%**	0.06%
India	1.22%	7.57%	0.25%	9.04%	8.14%	-0.91%	**8.71%**	6.58%

*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 risk is especially acute today, when the world economy is operating in unchartered waters, and faces both deflationary pressures (from falling demand relative to productive capacity, and significant debt servicing problems in the private sector) and

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inflationary pressures (from unprecedented peacetime government deficits, that are largely being financed by central banks under the "quantitative easing" programs). Under these circumstances, one could argue that many nominal return government bonds might in fact be underpriced today, over a shorter time horizon (more likely to experience deflation), while overpriced over a longer time horizon (that is more likely to see higher levels of inflation – e.g., see the recent IMF study, "Fiscal Deficits, Public Debt, and Sovereign Bond Yields" by Baldacci and Kumar). As we like to point out, in the absence of public policy interventions, overindebtedness on the part of private borrowers typically results in widespread bankruptcies and deflation caused by the accelerating liquidation of collateral. In contrast, overindebtedness on the part of governments more often results in some combination of inflation and exchange rate depreciation (e.g., look at the history of Argentina, which we know all too well).

The following two pieces of information may help your to put the current situation in perspective. The last column of the table above shows the average annual inflation rate implied by the current spread between ten-year nominal rates and average real rates (note that research has shown that the real yield curve tends to be quite flat, which is consistent with economic theory). As you can see, apart from Japan and India, government bond markets do not appear to be incorporating either deflation or levels of inflation substantially above historical norms. This is not consistent with our view of how the future is likely to unfold. On the one hand, this may be due to wishful thinking by some investors. On the other hand, it may reflect efforts by central banks to maintain interest rates at a constant level, to maximize the impact of fiscal stimulus programs on aggregate demand.

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

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

Assuming inflation levels revert to their long-term averages over a long time horizon, many government bond markets appear overpriced today (i.e., prevailing nominal yields appear to be too low). However, over a short-term time horizon, it may well be the case that many countries will first experience declining prices (deflation) before they experience a substantial rise in inflation. From this perspective, government bonds may be underpriced over the expected time horizon for deflation, but overpriced in the context of the substantial reflations that governments will eventually attempt (given that the economic consequences of deflation seem to be much worse than those associated with higher than normal inflation). In sum, when it comes to questions about bond market valuation, one's time horizon assumption is critical.

Credit Spreads

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

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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, 2009. 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	1.24	0.98
Standard Deviation	1.13	0.89
Skewness	0.47	0.42
Kurtosis	0.90	3.00

At **31 Oct 10**, the AAA minus 10 year Treasury spread was 2.15%. The AAA minus BAA spread was 1.03%. Since the distributions of AAA and BAA credit spreads are not normal (i.e., they do not have a "bell curve" shape), we need to look at history rather than Gaussian (normal curve) statistics to put them into perspective. Over the past twenty-four years, 5.2% of all trading days had a higher AAA-Treasury spread. Over the same period, 31.2% of all trading days had a higher AAA-BBB spread.

Over a longer-term time horizon, when liquidity and credit risk premiums would be expected to return to their historical averages, one can argue that credit is underpriced today, given high prevailing yields (i.e, falling bond yields mean rising bond prices). However, the validity of that conclusion 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 spreads and their long-term averages (1.24% and .98%, respectively) are well under 100 basis points today, it doesn't take much mis-estimation of future default rates (and/or losses

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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 likely overpriced today, given the increasingly uncertain economic outlook and difficulty in accurately estimating future default and loss given default rates.

Currencies

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

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

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Our expected medium to long-term changes in exchange rates are summarized in the following table:

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

	To AUD	To CAD	To EUR	To JPY	To GBP	To USD	To CHF	To INR
From								
AUD	0.00%	-2.36%	-2.66%	-4.25%	-2.09%	-2.57%	-3.63%	2.97%
CAD	2.36%	0.00%	-0.30%	-1.89%	0.27%	-0.21%	-1.27%	5.33%
EUR	2.66%	0.30%	0.00%	-1.59%	0.57%	0.09%	-0.97%	5.63%
JPY	4.25%	1.89%	1.59%	0.00%	2.16%	1.68%	0.62%	7.22%
GBP	2.09%	-0.27%	-0.57%	-2.16%	0.00%	-0.48%	-1.54%	5.06%
USD	2.57%	0.21%	-0.09%	-1.68%	0.48%	0.00%	-1.06%	5.54%
CHF	3.63%	1.27%	0.97%	-0.62%	1.54%	1.06%	0.00%	6.60%
INR	-2.97%	-5.33%	-5.63%	-7.22%	-5.06%	-5.54%	-6.60%	0.00%

Commercial Property

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

Our analysis also assumes that over the long-term, investors require a 3.0% risk premium above the yield on real return bonds as compensation for bearing the risk of securitized commercial property as an asset class. Last but not least, there is

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significant research evidence that commercial property markets are frequently out of equilibrium, due to slow adjustment processes as well as the interaction between fundamental factors and investors' emotions (see, for example, "Investor Rationality: An Analysis of NCREIF Commercial Property Data" by Hendershott and MacGregor; "Real Estate Market Fundamentals and Asset Pricing" by Sivitanides, Torto, and Wheaton; "Expected Returns and Expected Growth in Rents of Commercial Real Estate" by Plazzi, Torous, and Valkanov; and "Commercial Real Estate Valuation: Fundamentals versus Investor Sentiment" by Clayton, Ling, and Naranjo). Hence, it is extremely hard to forecast how long it will take for any over or undervaluations we identify to be reversed. The following table shows the results of our valuation analysis as of **31 Oct 10**: We use the dividend discount model approach to produce our estimate of whether a property market is over, under, or fairly priced today, assuming a long-term perspective on property market valuation drivers. The specific formula is (Current Dividend Yield x 100) x (1+ Forecast NOI Growth) divided by (Current Yield on Real Return Bonds + Property Risk Premium - Forecast NOI Growth). Our estimates are shown in the following tables, where a value greater than 100% implies overpricing, and less than 100% implies underpricing.

Country	Dividend Yield	Plus LT Real Growth Rate	Equals Supply of Returns	Real Bond Yield	Plus LT Comm Prop Risk Premium	Equals Returns Demanded	Over or Undervaluation (100% = Fair Value)
Australia	5.8%	0.2%	6.0%	2.5%	3.0%	5.5%	91%
Canada	4.5%	0.2%	4.7%	1.0%	3.0%	4.0%	85%
Eurozone	4.2%	0.2%	4.4%	1.3%	3.0%	4.3%	97%
Japan	7.1%	0.2%	7.3%	1.2%	3.0%	4.2%	57%
Switzerland*	3.1%	0.2%	3.3%	1.2%	3.0%	4.2%	130%
U.K.	4.2%	0.2%	4.4%	0.6%	3.0%	3.6%	80%
U.S.A.	3.8%	0.2%	4.0%	0.7%	3.0%	3.7%	91%

**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*

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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. While these factors tend to undermine one source of support for property prices, we also recognize that, at least in some markets, they can be offset by property's historical attraction as a means of preserving wealth in very difficult and uncertain times. In sum, we believe that the sharp run up in property security prices in recent months is due to some combination of investor over-optimism about the speed and size of economic recovery, and/or the tendency of institutional investors to herd rather than risk losing assets (or their jobs) due to their underperforming an asset class benchmark. Switzerland and the Eurozone may be exceptions to this view, in that rising uncertainty may have triggered increased demand for property in these markets.

Commodities

Let us now turn to the Dow Jones AIG Commodity Index (now known as the DJ UBS Commodity Index), our preferred benchmark for this asset class because of the roughly equal weights it gives to energy, metals and agricultural products. One of our

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

The general form of the supply of returns an asset class is expected to generate in the future is its current yield (e.g., the dividend yield on equities), plus the rate at which this stream of income is expected to grow in the future. The key challenge with

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applying this framework to commodities is that the supply of commodity returns doesn't obviously fit into this framework. Broadly speaking, the supply of returns from an investment in commodity index futures comes from four sources. First, since commodity futures contracts can be purchased for less than their face value (though the full value has to be delivered if the contract is held to maturity), a commodity fund manager doesn't have to spend the full $100 raised from investors to purchase $100 of futures contracts. The difference is invested – usually in government bonds – to produce a return.

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

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

To the extent that any generalizations can be made, higher real option values, and hence backwardation and positive roll returns are more likely to be found when demand is strong and supplies are tight, and/or when there is a rising probability of a supply disruption in a commodity where storage is difficult. For example, ten commodities make up roughly 75% of the value of the Dow Jones AIG Commodities Index. The current term structures of their futures curves are as follows on **31 Oct 10**:

Commodity	DJAIG Weight	Current Status
Crude Oil	13.8%	Contango
Natural Gas	11.9%	Contango
Gold	7.9%	Contango
Soybeans	7.6%	Contango
Copper	7.3%	Contango
Aluminum	7.0%	Contango
Corn	5.7%	Contango

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Commodity	DJAIG Weight	Current Status
Wheat	4.8%	Contango
Live Cattle	4.3%	Contango
Unleaded Gasoline	3.7%	Contango
	74.0%	

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

Given the continued presence of so many contangoed futures curves, expected near term roll returns on the DJAIG as a whole are still negative, absent major supply side shocks. On a weighted basis (using the DJAIG weights), the forward premium (relative to the spot price) at **31 Oct 10** was 1.51%, compared to 1.64%. one month previously, 1.93% two months ago, and .22% three months ago. Remember, a forward premium means the roll return will be negative (because the futures investor will be selling the maturing contract at a lower price than he or she must pay to replace it with a longer-dated contract). Roll returns are positive only when there is a forward discount (when the average price of a futures contract with a long maturity is lower than the price of a contract with a very short maturity).

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This brings us to the third source of return for long-only commodity futures funds: unexpected changes in the price of the commodity during the term of the futures contract. It is important to stress that the market's prevailing consensus about the expected change in the spot price is already included in the futures price that is paid when the contract is purchased. The source of return we are referring to here is the portion of the final realized price change that was unexpected when the futures contract was purchased. Given the large increase in funds committed to long-only, commodity futures based index investments, unexpected price changes have become a much more important source of return than they have been in the past. The good news is that this return driver probably offers skilled active investors the best chance of making profitable forecasts, since most human beings find it extremely difficult to accurately understand situations where cause and effect are significantly separated in time (e.g., failure to recognize how fast rising house prices would – albeit with a time delay – trigger an enormous increase in new supply). In this regard, large price surprises seem to be more frequent when supply and demand for a commodity are finely balanced – the same conditions which can also give rise to changes in real option values and positive roll returns, under the Theory of Storage. However, given our economic outlook, at this point in time we view negative surprises on the demand side that depress commodity prices as more likely than demand or supply surprises that have the opposite effect. Put differently, on balance we expect price surprises to have a negative impact on commodity returns over the next year.

The fourth source of returns for a diversified commodity index fund is generated by rebalancing a 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.

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So, to sum up, the expected supply of returns from a commodity index fund over a given period of time equals (1) the current yield on real return bonds, reduced by the percentage of funds used to purchase the futures contracts; (2) expected roll yields, adjusted for commodities' respective weights in the index; (3) unexpected spot price changes; and (4) the expected rebalancing return. Of these, the yield on real return bonds can be observed, and we can conservatively assume a long-term rebalancing return of, for example, 1.0%. These two sources of return are clearly less than the demand for returns that are equal to the real rate plus a risk premium of, say, 3.0%. The difference must be made up by a combination of roll returns (which, given the current shape of futures curves, are likely to be negative in the near term) and unexpected price changes, due to unanticipated changes in demand (where downside surprises currently seem more likely than upside surprises) and/or unanticipated changes in supply conditions (e.g., incomplete investor recognition of slowing oil production from large reservoirs, a major disruption due to war/terrorism or a significant accident, discovery of significant new deposits, or a major breakthrough that makes biofuels much more cost competitive). On balance, at **31 Oct 10**, we believe that returns on many commodity futures are more likely to be negative over the next year than positive; hence, using this analytical framework we conclude that commodities are likely overpriced today, using a one-year time horizon.

Another approach to assessing the valuation of commodities as an asset class is to compare the current value of the DJAIG Index to its long-term average. Between 1991 and 2009, the inflation adjusted (i.e., real) DJAIG had an average value of 90.99, with a standard deviation of 15.92 (skewness of .57, and kurtosis of -.07; i.e., it was close to a normal distribution). The inflation adjusted **31 Oct 10** closing value of 92.17 was an estimated .07 standard deviations above 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.

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Whether the current level of the inflation adjusted DJAIG signifies that commodities are undervalued depends upon the time horizon being used. There are three arguments that, on a medium term (three to five year) view, commodities are underpriced today. The first is the large amount of monetary easing underway in the world, which, at some point, could lead to higher inflation. The second is the equally large amount of fiscal stimulus being applied to the global economy, with its focus on infrastructure projects, should eventually boost demand for commodities (and indirectly boost economic growth in commodity exporting countries like Australia and Canada). The third is that the possibility that we will see a substantial fall in the value of the US Dollar versus other currencies, causing investors to increase their holdings of commodities as confidence in fiat currencies wanes.

The argument that commodities are overpriced today on a medium term view is based on the belief that (a) investment in clean fuels and other changes in environmental regulation will cause a permanent reduction in global demand for oil relative to supply (and oil receives a relatively heavy weight in most commodity indexes); (b) The inability to quickly resolve the economic challenges facing the world economy will result in a prolonged period of weak or no growth (including a major slowdown in Chinese growth), which will reduce the demand for commodities; and (c) That in a scenario of prolonged global stagnation, investors will prefer to increase their holdings of short term government bonds, and perhaps gold, rather than increasing their holdings of a broader range of commodities.

On balance, we continue believe that, over the next three to five years, a fall in global aggregate demand is more likely than an inflation and/or US Dollar crisis, as the High Uncertainty Regime typically sees a flight into U.S. dollars rather than a flow out of them. On that basis, we conclude that, over this time horizon, commodities are likely overpriced today.

Gold

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

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

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

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We thus have a fully specified (if still rough) supply and demand equation for gold returns, with the return supplied equal to 1.75% plus changes in price caused by a perceived or expected change in regime, and the return demanded equal to the risk free rate plus the required risk premium, with the latter also varying under different regimes.

This raises the obvious question of how these variables change to restore the system to equilibrium when supply and demand are out of balance. That is not an easy question to answer. Under the normal (steady state) regime, the supply/demand balance is defined by the difference between 1.75% and the risk free rate less the "insurance premium" investors are willing to pay for gold. If the latter sum is greater than 1.75%, the price of gold should tend to increase. If it is less than 1.75%, the real price of gold should fall. So far, so good – and, more important, usually quite a stable return generating process. However, when the system shifts out of the normal regime, the relationship between the supply of and demand for returns from holding gold gets considerably more exciting. On the demand side there is a shift from a negative required risk premium to a positive risk premium, as the portfolio insurance provided by gold is expected to pay off. On the supply side, that should cause prices to rise by more than their long-term normal regime rate of 1.75% per year. The excitement comes when that price increase triggers investor herding, and the price increase exceeds the amount required to match the supply of returns to the demand for returns. As the system is driven further away from equilibrium, with the apparent supply of gold returns exceeding the fundamental demand for gold returns by ever-greater amounts, it becomes more fragile, as maintaining a constant annual percentage increase in price of gold requires ever larger annual dollar increases in the price of gold. Eventually the system is driven back towards equilibrium, via a sharp decline in the price of gold.

We have also noted our view that gold is ultimately a hedge against declining trust in short term U.S. Treasury Bills (and, for some investors, the U.S. Dollar) as the safest and most liquid means of preserving the real value of one's wealth. But consider what happens to the gold supply/demand equation if that trust is eroded. In

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terms of the supply of returns, the price of gold is driven up, and with it the associated annual return from holding it. But on the demand side, declining faith in U.S. Treasuries should logically lead to a decline in the risk premium investor require to hold gold even under the high uncertainty or high inflation regimes. In this manner, declining faith in Treasuries only worsens the imbalance between the supply of and demand for returns from holding gold, and causes the gold asset pricing system to become more fragile, likely in a non-linear manner. The process should then reverse (perhaps violently) when either confidence in U.S. Treasuries and the U.S. Dollar is restored, or when the securities and currency of another country replace those issues by the United States as the world's long-term, liquid store of value. At the very least, this dynamic suggests that a commitment to systematic portfolio rebalancing is a critical requirement for anyone choosing to use gold as an asset class (as opposed to adding gold coins to the mix of currencies they hold to meet their need for liquidity and precautionary savings, rather than long-term investment needs). Moreover, our analysis also shows that, if one wants to make a long-term allocation to gold as a type of portfolio insurance, the right time to add it to a portfolio is when its price is very cheap, and not when its price has started to rapidly increase.

At **31 Oct 10**, the yield on a 10-year USD real return bond was .50%, and we believe that the chances are high we are out of the normal regime, and into a situation in which most investors expect gold to pay a positive risk premium. So the real return demanded for holding gold should be around 3.00% per year. According to our approach, fair valuation of gold would require that the expected supply of real gold returns be of the same magnitude. However, over the last 12 months, the actual real return from holding gold (calculated using the change in the GLD ETF less the change in the US CPI) has been **29.3**%.

The recent pause in the accelerating upward climb in gold prices further reinforces the impression that the gold market may indeed be in a very fragile state. Conditions in the gold futures market further reinforce this view. Over the past few months, gold futures have became much less contangoed, with a recent forward premium (based on the price difference between the two nearest month contracts) of

only .02%. While further negative surprises that raise perceived uncertainty could yet drive gold prices higher (the most powerful of which would be increased worries about the creditworthiness of U.S. Treasury securities), we conclude that at present gold is likely overpriced today, based on our fundamental valuation methodology. That said, when the inevitable price decline will occur is anybody's guess.

Timber

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

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

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

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

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

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photosynthesis, trees sequester a portion of the carbon dioxide that would otherwise be added to the earth's atmosphere.

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

The third set of economic processes that affects the growth rate of dividends includes changes in a timber REIT's cost structure, and in its non-timber related revenue streams (e.g., proceeds from selling timber land for real estate development or conservation easements). For example, if wood prices decline, and non-timber sources of revenue dry up (as is happening during the current recession), a timber

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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.
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

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Growth Driver	Assumption
	class.
Change in prices of timber products	In line with IMF data, we assume that over the long term, average timber prices will just keep pace with inflation. Again, this is a "noisy" estimate, because the IMF data also shows that real prices are highly volatile. Moreover, there are indications that climate change is causing increasing tree deaths in some areas, which should lead to future real price increases (see "Western U.S. Forests Suffer Death by Degrees" by E. Pennisi, *Science*, 23Jan09). Hence we believe our long-term price change assumption is conservative.
Carbon credits	Until more comprehensive regulations are enacted, we assume no additional return to timberland owners from the CO2 sequestration service they provide (or for timber's use in various biomass energy applications). Again, given the high level of global concern with limiting the increase in atmospheric CO2 levels, we believe this is a conservative assumption.

This leaves the question of the appropriate return premium that investors should demand to compensate them for bearing the risk of investing in timber as an asset class. Historically, the difference between returns on the NCRIEF timberland index and those on real return bonds has averaged around six percent. However, since the timber REITS are much more liquid than the properties included in the NCRIEF index, and since timber has displayed a very low correlation with returns on other asset classes (particularly during the worst of the 2008 crisis, even in the case of liquid timber vehicles), we use three percent as the required return premium for investing in liquid timberland assets. Arguably, because a portion of timber's return generating process (physical growth) has zero correlation with the return generating processes for other asset classes, we should use an even lower risk premium. Again, we believe our approach is conservative in this regard. Given these assumptions, our

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assessment of the valuation of the timber asset class at **31 Oct 10** is shown in the following table. We use the dividend discount model approach to produce our estimate of whether timber is over, under, or fairly valued today. The specific formula is (Current Dividend Yield x 100) x (1+ Forecast Dividend Growth) divided by (Current Yield on Real Return Bonds + Timber Risk Premium - Forecast Dividend Growth). A value greater than 100% implies overvaluation, and less than 100% implies undervaluation.

Average Dividend Yield (70% PCL + 30% RYN)	4.35%
Plus Long Term Annual Biological Growth	6.00%
Less Percent of Physical Timber Stock Harvested Each Year	(5.00%)
Plus Long Term Real Annual Price Change	0.00%
Plus Other Sources of Annual Value Increase (e.g., Carbon Credits)	0.00%
Equals Average Annual Real Return Supplied	**5.35%**
Average Real Return Bond Yield	.67%
Plus Risk Premium for Timber	3.00%
Equals Average Annual Real Return Demanded	**3.67%**
Ratio of Returns Demanded/Returns Supplied Equals Valuation Ratio (less than 100% implies undervaluation)	**61%**

We stress that this is a long-term valuation estimate that contains a higher degree of uncertainty that valuation estimates for larger and more liquid asset classes. Over a one-year time horizon, you could easily reach a different valuation conclusion. For example, if you believe that real timber prices will decline over the next year, and/or that physical harvesting rates will increase to cover costs and dividends, then you could argue that, in so far as PCL and RYN are roughly accurate proxies for the asset class as a whole, timber, as measured by PCL and RYN, is likely overpriced today. On the other hand, whether looking over a short or long-term time horizon, if you

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believe that future revenues from timber's CO2 sequestration service are likely to be significant, and/or that four percent is too high a risk premium to use, then you could argue that timber is likely underpriced today.

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

Volatility

Our approach to assessing the current value of equity market volatility (as measured by the VIX index, which tracks the level of S&P 500 Index volatility implied by the current pricing of put and call options on this index) is similar to our approach to commodities. Between January 2, 1990 and December 31, 2009, the average daily value of the VIX Index was 20.29 (median 18.77), with a standard deviation of 8.36 (skewness 2.05, kurtosis 7.28 – i.e., a very "non-normal" distribution). On **31 Oct 10**, the VIX closed at 21.20. To put this in perspective, only 39% of the trading days in our sample had higher closing values of the VIX. In sum, at the end of last month, while volatility was high in historical terms, it was still at a level that we believe is inconsistent with the high uncertainty regime that we expect to prevail in global financial markets over the next year. For these reasons we concluded that volatility is likely underpriced over a one year time horizon.

Over a longer-term time horizon, we are neutral at the current level of volatility. The logic behind this view is that structural changes – such as electronic trading, faster

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dispersal of information to investors, and the substantial amount of money committed to various quantitative trading strategies -- may well have made equity prices permanently more volatile than they have been in the past.

Sector and Style Rotation Watch

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

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

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

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the skills of most investors. In other words, most of us are better off just getting our asset allocations right, rather than trying to earn extra returns by accurately forecasting the ups and downs of different sub-segments of the U.S. equity and debt markets (for three good papers on rotation strategies, see "Sector Rotation Over Business Cycles" by Stangl, Jacobsen and Visaltanachoti; "Can Exchange Traded Funds Be Used to Exploit Industry Momentum?" by Swinkels and Tjong-A-Tjoe; and "Mutual Fund Industry Selection and Persistence" by Busse and Tong).

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

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reaching for the last few basis points of return. Bond market investors' perspective tends to be more consistent with this view than equity investors' natural optimism. Hence, when our rolling rotation returns table provides conflicting information, we tend to put the most weight on bond investors' implied expectations for what lies ahead.

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

Rolling 3 Month Returns Through	***31 Oct 10***			
Economy	Bottoming	Strengthening	Peaking	Weakening
Interest Rates	Falling	Bottom	Rising	Peak
Style and Size Rotation	Small Growth (DSG) **11.30%**	Small Value (DSV) **5.50%**	Large Value (ELV) **6.40%**	Large Growth (ELG) **10.38%**
Sector Rotation	Cyclicals (RXI) **12.64%**	Industrials (EXI) **8.48%**	Staples (KXI) **8.96%**	Utilities (JXI) **7.69%**
Bond Market Rotation	Higher Risk (HYG) **4.44%**	Short Maturity (SHY) **0.58%**	Low Risk (TIP) **5.27%**	Long Maturity (TLT) **0.97%**

Product and Strategy Notes

- The U.S. Congressional Research Service (CRS) recently published on interesting overview of "Savings Rates in the United States: Calculation and Comparison." As always, the CRS report is extremely readable, and a great overview of this important subject. Starting at a rate of 2.1% of GDP in 2000, the United States' Gross Personal Savings Rate fell to just 1.1% of GDP in 2005, before spiking to 6.7% in 2009. Another table in the report compares a different measure, household savings rates (as a percentage of GDP) across a

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number of countries between 1999 and 2009. The following table compares these data in 1999, 2005, and 2009:

Country	**1999**	**2005**	**2009**
Canada	4.0%	2.1%	5.0%
France	12.1%	11.7%	16.3%
Germany	9.5%	10.5%	11.3%
Japan	10.0%	3.9%	2.3%
United Kingdom	5.2%	3.9%	7.0%
United States	3.1%	1.4%	4.3%

Of all these countries, the experience we found most notable was Japan's, where the demographic impact of an ageing population on household savings is clearly apparent. Since its stock and real estate bubble burst over 20 years ago, Japan has run a series of government deficits in order to maintain aggregate demand, and largely financed these with the issuance of government bonds to domestic investors. As you can see in the table, this is yet another example of one of our favorite sayings: Things that can't continue won't continue. Since an ageing population also consumes less, Japan appears to be facing an increasingly pressing need to either increase exports (which implies a greater dependence on Chinese growth), or accept increased austerity and a falling standard of living as the price of avoiding a politically catastrophic government debt crisis (since so much of the current debt is held by domestic investors).

- As regular readers know, one of the "wild cards" in our scenarios is a major influenza pandemic, which is an issue we have continued to monitor, even after it dropped off the front pages last year. The truth of the matter is that while last year's immunization program undoubtedly reduced the risk of a global pandemic for a while, that risk has not gone away. In fact, the influenza virus

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has continued to evolve. The H5N1 type virus is still infecting people in Asia and Egypt. H1N1 is evolving in a direction that enables it to cause more serious infections deeper in a patient's lungs (e.g., there have recently been clustered outbreaks of this type of H1N1 in North Carolina and Pennsylvania). It is also evolving in a way that will weaken the protection provided by last year's immunization campaign. Finally, recent months have also seen an increase in serious H3N2 infections, particularly in non-elderly patients, which is unusual for this type of influenza (which, even in a "normal" H3N2 outbreak, typically kills 2.7 times as many people as a "normal" H1N1 outbreak, according to the U.S. Centers for Disease Control and Prevention CDCs' data also shows that, over the 30 years ended in 2007, almost 90% of flu related deaths were people older than 65, 10% were 19-64, and only 1% were younger. Hence, any spike in influenza related deaths in people younger than 65 is an important warning indicator to watch. In sum, even though it is off the front pages, influenza remains an issue well worth monitoring.

- We recently read two new interesting research papers on the subject of illiquidity risk, and how to earn the return premium that is associated with a willingness to bear it. In "Liquidity as an Investment Style", Chen, Ibbotson, and Hu show (as others have) that there is a separate return premium associated with illiquidity that is distinct from those associated with small cap, value, and high momentum stocks. The authors then define and evaluate a number of different long/short strategies for earning this illiquidity premium. Specifically, they start by constructing an index that weights stocks by their share of the aggregate earnings of all stocks in the index. Illiquid stocks are those whose relative trading volume is less than their relative earnings weight, and highly liquid stocks are those with the opposite characteristic. The authors find that a portfolio long low liquidity stocks and short high liquidity stocks outperforms standard benchmark indexes on a risk adjusted basis. In a second paper, Idzorek, Xiong and Ibbotson apply their insights about liquidity to the world of

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mutual funds. They find that between January 1996 and December 2009, "on average, mutual funds that hold less liquid stocks significantly outperformed mutual funds that hold more liquid stocks." Moreover, they show that this is true across a range of Morningstar style categories. For example, for both the small cap core and midcap core categories, the difference in geometric (compound annual) returns between the top and bottom 20% of funds ranked by liquidity was about 2.50% over the almost 15 year period studied, with annual rebalancing. These papers lead us to two conclusions. The good news is that in the past, it appeared to be possible to use public market equities and mutual funds to earn a good portion of the return premium typically associated with private equity and other illiquid asset classes not traded on public exchanges. The bad news is that, as has been the case with other return anomalies, now that this approach to earning an illiquidity premium in public markets has been publicized, increased focus on it by hedge funds and other investment managers should result in it being eliminated in the future, unless one can make a compelling case that there are durable barriers to this arbitrage taking place.

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

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

We use two benchmarks to measure the performance of our model portfolios. The first is cash, which we define as the yield on a one year government security purchased on the last trading day of the previous year. For 2010, our USD cash benchmark is 0.44% (in nominal terms). The second benchmark we use is a portfolio equally allocated between the ten asset classes we use (it does not include uncorrelated alpha). This portfolio assumes that an investor believes it is not possible to forecast the risk or return of any asset class. While we disagree with that assumption, it is an intellectually honest benchmark for our model portfolios' results.

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