Retired Investor
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May 2009 Issue: Key Points

This month's feature article reviews important new research findings that enable investors and their advisers more solidly ground risk management in neuroscience. With so much frustration over the shortcomings of standard deviation as a measure of risk, our analysis has important implications for investors, advisers and regulators. We conclude that risk management needs to be based on three circumstances that trigger a body's unconscious physiological responses to fear. These include loss, uncertainty, and the possibility of social isolation. We then review how these fear triggers affect the behavior of investors when they are connected to each other in social networks. For example, we examine how a small increase in uncertainty can push the percentage of noise traders past a tipping point, and set the market on the path towards a bubble. We also review how adaptive social networks tend to produce outcomes characterized by power law rather than normal distributions, and note how this undermines the effectiveness of traditional approaches to asset allocation. Approaches to portfolio construction that are consistent with neuroscience research should focus on

minimizing shortfall probability, and employ multiple regimes (including one with high uncertainty), instead of maximizing return per unit of standard deviation. This article ends with the implications of this new approach to risk for individual investors, advisers and regulators. The way we frame results can minimize our susceptibility of fear caused by loss. Having good frameworks for understanding changing environments and identifying important information reduces the fear caused by uncertainty. And more frequent and carefully structured communications between clients and their advisers can reduce the fear of isolation that peaks when fear of loss and uncertainty are high. Finally, regulators should focus on network effects, and ensure clear distinctions between financial product sales and the provision of advice by fiduciaries.

Elsewhere, our economic update reviews high value evidence that appeared over the past month, with a focus on the key groups and issues that will determine when the world economy returns to a period of normal growth. We conclude that sharp rise in expectations that normal growth will soon return are likely premature, and that in the near term higher uncertainty and higher inflation are more likely. That said, we also note that the probability that the world will experience a longer than expected period of deflation also appears to be rising.

This month's product and strategy notes include a lengthy review of the inflation hedging benefits of different asset classes. The best inflation hedges differ, depending on whether an investor's horizon is just one year or covers a longer term. In the former, case, the best performing asset classes are likely to be inflation protected bonds, commodities, and gold. In the latter case, inflation protected bonds, timber, gold and commercial property are likely to best insulate a portfolio from the effects of inflation over the medium term. Other product and strategy notes look at interesting new research and product announcements (including the registration of an ETF that will track the U.S. Consumer Price Index), IBM's forecast that the investment management industry is quickly evolving towards three groups (advisers, and providers of beta and uncorrelated alpha products), and our previously emailed overview of influenza risks and their potential implications for asset class valuations and returns. Last but not least, we also note Credit Suisse's press comments that

demand for advice on global asset allocation is rising – don't forget to recommend us to your friends and colleagues!

This Month's Letters to the Editor

Why don't you write shorter articles like the ones I read in Money and Forbes?

On the one hand, as someone who has lost count of the memos, reports, analyses and articles I have written and read over the years, I am very sympathetic with your desire for concise communications. On the other hand, I am also a strong believer in Einstein's admonition to "make everything as simple as possible, but not simpler." As the CEO of a public company, I was reminded of this every quarter when I signed our public filings, including my certification that they contained no misrepresentation of our returns or the risks we took to produce them – I was compelled to have a clear mental model of our company's operations. Given the changes in securities laws since the Enron and WorldCom fiascos, I never casually put my signature on that document. That experience made me realize that anyone acting as a fiduciary has an obligation to understand not only the "who, what, when, and where" about an issue, but also the "why and how" behind it. Unfortunately, the enormous destruction of value over the past year has provided very painful support for this view. In that regard, most of our subscribers are fiduciaries, whether legally (as in the case of many financial advisers and plan trustees), or morally (in the case of people investing their own family's resources). To be sure, we work very hard to write as clearly and concisely as possible. However, some of the subjects we analyze are so complex that our results cannot be explained (to a level that we believe a fiduciary should demand) in the amount of space that Money or Forbes usually allocate to an article.

What do you think of the "CUT" ETF?

We appreciate the logic behind ETFs like CUT and WOOD. While their sponsors undoubtedly appreciate the diversification benefits of timberland investing, they also confront the challenge of creating an ETF on the basis of underlying securities with sufficient liquidity to enable easy creation and redemption (i.e. the delivery of a basket of stocks which can be exchanged for an ETF, or vice versa). From this perspective, CUT and WOOD are essentially compromise solutions, that are based on a number of more liquid "forest product industry" stocks that create exposure to industrial and consumer products, as well as the underlying timber resources. From an asset allocation perspective, these exposures dilute the benefits of timberland investing. For that reason, in our model portfolios we use two timberland REITS (PCL and RYN) that provide a more pure exposure to timberland as an asset class. We also note that similar securities are now available in London, in the form of Phaunos Timber Fund (PTF.L), Cambium Global Timberland Ltd (TREE.L), an AIM-listed company, and Quadris Environmental Investments Fund. In our view, these publicly listed vehicles represent a good tradeoff between the illiquidity of traditional timberland investment management organization (TIMO) limited partnerships used by institutions (whose returns include an illiquidity premium) and the greater liquidity, but diluted focus of ETFs like CUT and WOOD.

I don't understand the methodology you use in your economic analysis. Isn't the best approach to look for evidence that supports your views?

Like the scientific method, the "Analysis of Competing Hypotheses" methodology we use focuses on the search for evidence that disproves a given hypothesis. By taking this approach, we are trying to offset the confirmation bias (which causes us to naturally pay more attention and give greater weight to evidence which seems to support our views, at the expense of evidence which is at odds with them). We also seek evidence that has a much higher likelihood of appearing under one scenario than under another. A piece of evidence that is credible but consistent with multiple

scenarios has relatively low forecasting value; in contrast, a piece of credible evidence that one would only expect to see under one scenario has a much higher value. For these reasons, the ACH methodology has become increasingly popular in the intelligence community. For more on this methodology, see: http://www.au.af.mil/au/awc/awcgate/psych-intel/art11.html   For a free software application that makes it easy to implement, see: http://www2.parc.com/istl/projects/ach/ach.html

Global Asset Class Returns

YTD 30Apr2009	In USD	In AUD	In CAD	In EURO	In JPY	In GBP	In CHF	In INR
Asset Held								
USD Bonds	0.69%	-4.69%	-3.22%	5.37%	8.55%	-2.37%	7.24%	3.32%
USD Prop.	-10.82%	-16.20%	-14.73%	-6.14%	-2.96%	-13.88%	-4.27%	-8.19%
USD Equity	-1.27%	-6.65%	-5.18%	3.41%	6.59%	-4.33%	5.28%	1.36%
AUD Bonds	-1.10%	-6.48%	-5.02%	3.57%	6.75%	-4.16%	5.44%	1.52%
AUD Prop.	9.09%	3.72%	5.18%	13.77%	16.95%	6.03%	15.64%	11.72%
AUD Equity	8.20%	2.82%	4.28%	12.87%	16.06%	5.14%	14.74%	10.82%
CAD Bonds	3.74%	-1.64%	-0.18%	8.41%	11.60%	0.68%	10.28%	6.36%
CAD Prop.	2.51%	-2.87%	-1.41%	7.18%	10.37%	-0.55%	9.05%	5.13%
CAD Equity	9.35%	3.97%	5.44%	14.03%	17.21%	6.29%	15.90%	11.98%
CHF Bonds	2.51%	-2.87%	-1.40%	7.19%	10.37%	-0.55%	9.06%	5.14%
CHF Prop.	-1.55%	-6.93%	-5.46%	3.13%	6.31%	-4.61%	5.00%	1.08%
CHF Equity	-12.51%	-17.89%	-16.43%	-7.84%	-4.65%	-15.57%	-5.97%	-9.89%
INR Bonds	-5.87%	-11.25%	-9.78%	-1.19%	1.99%	-8.93%	0.68%	-3.24%
INR Equity	15.58%	10.20%	11.66%	20.25%	23.43%	12.52%	22.12%	18.20%
EUR Bonds	-6.79%	-12.17%	-10.70%	-2.11%	1.07%	-9.85%	-0.24%	-4.16%
EUR Prop.	-1.01%	-6.39%	-4.92%	3.67%	6.85%	-4.07%	5.54%	1.62%
EUR Equity	-8.23%	-13.61%	-12.15%	-3.56%	-0.37%	-11.29%	-1.69%	-5.61%
JPY Bonds	-10.20%	-15.58%	-14.11%	-5.53%	-2.34%	-13.26%	-3.65%	-7.57%
JPY Prop.	-12.58%	-17.96%	-16.49%	-7.90%	-4.72%	-15.64%	-6.03%	-9.95%
JPY Equity	-11.17%	-16.55%	-15.08%	-6.49%	-3.31%	-14.23%	-4.62%	-8.54%
GBP Bonds	0.55%	-4.83%	-3.37%	5.22%	8.41%	-2.51%	7.09%	3.17%
GBP Prop.	-8.67%	-14.05%	-12.58%	-3.99%	-0.81%	-11.73%	-2.12%	-6.04%
GBP Equity	3.14%	-2.23%	-0.77%	7.82%	11.00%	0.08%	9.69%	5.77%
1-3 Yr US Govt	-0.25%	-5.63%	-4.16%	4.43%	7.61%	-3.31%	6.30%	2.38%
World Bonds	-1.35%	-6.73%	-5.27%	3.32%	6.51%	-4.41%	5.19%	1.27%
World Prop.	-10.38%	-15.76%	-14.29%	-5.70%	-2.52%	-13.44%	-3.83%	-7.75%
World Equity	-1.64%	-7.02%	-5.55%	3.04%	6.22%	-4.70%	4.91%	0.99%
Commod Long	-5.34%	-10.72%	-9.26%	-0.67%	2.52%	-8.40%	1.20%	-2.72%
Commod L/Shrt	-11.59%	-16.97%	-15.51%	-6.92%	-3.73%	-14.65%	-5.05%	-8.97%
Gold	0.87%	-4.51%	-3.05%	5.54%	8.73%	-2.19%	7.41%	3.49%
Timber	2.24%	-3.14%	-1.67%	6.92%	10.10%	-0.82%	8.79%	4.87%
Uncorrel Alpha	1.73%	-3.65%	-2.19%	6.40%	9.59%	-1.33%	8.27%	4.35%
Volatility VIX	-8.75%	-14.13%	-12.66%	-4.07%	-0.89%	-11.81%	-2.20%	-6.12%
Currency								
AUD	5.38%	0.00%	1.47%	10.05%	13.24%	2.32%	11.92%	8.00%
CAD	3.91%	-1.47%	0.00%	8.59%	11.77%	0.85%	10.46%	6.54%

YTD 30Apr2009	In USD	In AUD	In CAD	In EURO	In JPY	In GBP	In CHF	In INR
EUR	-4.68%	-10.05%	-8.59%	0.00%	3.18%	-7.74%	1.87%	-2.05%
JPY	-7.86%	-13.24%	-11.77%	-3.18%	0.00%	-10.92%	-1.31%	-5.23%
GBP	3.06%	-2.32%	-0.85%	7.74%	10.92%	0.00%	9.61%	5.69%
USD	0.00%	-5.38%	-3.91%	4.68%	7.86%	-3.06%	6.55%	2.63%
CHF	-6.55%	-11.92%	-10.46%	-1.87%	1.31%	-9.61%	0.00%	-3.92%
INR	-2.63%	-8.00%	-6.54%	2.05%	5.23%	-5.69%	3.92%	0.00%

Uncorrelated Alpha Strategies Detail

YTD 30Apr2009	In USD	In AUD	In CAD	In EURO	In JPY	In GBP	In CHF	In INR
Eq Mkt Neutral								
HSKAX	-2.81%	-8.19%	-6.72%	1.87%	5.05%	-5.87%	3.74%	-0.18%
OGNAX	-1.19%	-6.57%	-5.11%	3.48%	6.67%	-4.25%	5.35%	1.43%
Arbitrage								
ARBFX	3.98%	-1.40%	0.06%	8.65%	11.84%	0.92%	10.52%	6.60%
ADANX	3.20%	-2.18%	-0.71%	7.88%	11.06%	0.14%	9.75%	5.83%
Currency								
DBV	5.46%	0.08%	1.54%	10.13%	13.32%	2.40%	12.00%	8.08%
ICI	0.62%	-4.76%	-3.30%	5.29%	8.48%	-2.44%	7.16%	3.24%
Equity L/S								
HSGFX	9.16%	3.78%	5.24%	13.83%	17.02%	6.10%	15.70%	11.78%
PTFAX	2.64%	-2.74%	-1.28%	7.31%	10.50%	-0.42%	9.18%	5.26%
GTAA								
MDLOX	-1.27%	-6.65%	-5.18%	3.41%	6.59%	-4.33%	5.28%	1.36%
PASAX	0.80%	-4.58%	-3.12%	5.47%	8.66%	-2.26%	7.34%	3.42%

Global Asset Class Valuation Updates

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 undervaluation. The attraction of the system to equilibrium means that, at some point, these situations are likely to reverse in the direction of their fundamental valuation. However, the complex adaptive nature of the system means that it is difficult if not impossible to accurately forecast how and when such reversals will occur. Yet this does not mean that valuation analyses are a fruitless enterprise. Far from it. For an investor trying to achieve a multiyear goal (e.g., accumulating a certain amount of capital in advance of retirement, and later trying to preserve the real value of that capital as one generates income from it), avoiding large downside losses is mathematically more important than reaching for the last few basis points of return. Investors who use valuation analyses to help them limit downside risk when an asset class appears to be substantially overvalued can substantially increase the probability that they will achieve their long term goals. This is the painful lesson learned by too many investors in the 2001 tech stock crash, and then learned again in the 2007-2008 crash of multiple asset classes.

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

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 30 April 2009

Australia	Low Demanded Return	High Demanded Return
High Supplied Return	46%	68%
Low Supplied Return	67%	91%

Canada	Low Demanded Return	High Demanded Return
High Supplied Return	73%	115%
Low Supplied Return	118%	168%

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Eurozone	Low Demanded Return	High Demanded Return
High Supplied Return	41%	64%
Low Supplied Return	62%	88%

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Japan	Low Demanded Return	High Demanded Return
High Supplied Return	105%	151%
Low Supplied Return	162%	217%

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United Kingdom	Low Demanded Return	High Demanded Return
High Supplied Return	29%	56%
Low Supplied Return	52%	82%

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United States	Low Demanded Return	High Demanded Return
High Supplied Return	85%	134%
Low Supplied Return	142%	202%

Switzerland	Low Demanded Return	High Demanded Return
High Supplied Return	74%	116%
Low Supplied Return	120%	204%

India	Low Demanded Return	High Demanded Return
High Supplied Return	76%	145%
Low Supplied Return	162%	254%

Emerging Markets	Low Demanded Return	High Demanded Return
High Supplied Return	79%	141%
Low Supplied Return	108%	171%

In our view, the key point to keep in mind with respect to equity market valuations is the level of the current dividend yield, which history has shown to be the key driver of long-term real equity returns in most markets. The recent rise in uncertainty has 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 has been a fall in equity prices that has caused dividend yields to increase. From the perspective of an investor with long-term risk and growth assumptions in the range we use in our model, this increase in dividend yields has more than offset the simultaneous rise in real bond yields, and caused at least some equity markets to appear undervalued. That said, many companies are 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. In sum, we believe that rather than trying

to catch the bottom of different equity markets, most investors are best advised to either wait or commence a staged increase in their equity allocations.

Our government bond market valuation update is based on the same supply and demand methodology we use for our equity market valuation update. In this case, the supply of future fixed income returns is equal to the current nominal yield on ten-year government bonds. The demand for future returns is equal to the current real bond yield plus historical average inflation between 1989 and 2003. We use the latter as a proxy for the average rate of inflation likely to prevail over a long period of time. To estimate of the degree of over or undervaluation for a bond market, we use the rate of return supplied and the rate of return demanded to calculate the present values of a ten year zero coupon government bond, and then compare them. If the rate supplied is higher than the rate demanded, the market will appear to be undervalued. This information is contained in the following table:

Bond Market Analysis as of 30 April 09

	Current Real Rate*	Average Inflation Premium (89-03)	Required Nominal Return	Nominal Return Supplied (10 year Govt)	Yield Gap	Asset Class Over or (Under) Valuation, based on 10 year zero
Australia	2.61%	2.96%	5.57%	4.78%	-0.79%	7.80%
Canada	2.09%	2.40%	4.49%	3.09%	-1.40%	14.44%
Eurozone	2.07%	2.37%	4.44%	3.17%	-1.27%	13.01%
Japan	2.93%	0.77%	3.70%	1.42%	-2.28%	24.90%
UK	1.07%	3.17%	4.24%	3.51%	-0.73%	7.28%
USA	2.09%	2.93%	5.02%	3.11%	-1.91%	20.15%
Switz.	2.14%	2.03%	4.17%	2.18%	-1.99%	21.31%
India	2.14%	7.57%	9.71%	6.64%	-3.07%	32.81%

*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.

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. The following table, which shows historical average inflation rates (and their standard deviations) for the U.K. and U.S. over longer periods of time than the ones we have used, helps to put the possible size of any estimation and valuation errors into context:

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

If future inflation is expected to be lower than the inflation assumption we have used in our valuation analysis, then required returns should be lower. All else being equal, this would reduce any estimated overvaluation. In this regard, the difference between yields on ten year U.S. government nominal and inflation linked bonds is a rough proxy for the expected future rate of inflation (we say rough because it technically includes not only the expected inflation rate, but also a further premium for inflation risk). This implied future rate is currently well below the average historical rate of inflation we have used in our analysis.

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. As is often the case, the correct value for this parameter is the subject of much debate. For example, this lies at the heart of the debate over how much we should be willing to spend today to limit the worst effects of climate change in the future. In our analysis, we assume

the average time preference is two percent per year. However, it is not the case that the economy does not grow; hence, the risk free rate we require should reflect the fact that there will be more goods and services available in the future than there are today. Assuming investors try to smooth their consumption over time, the risk free rate should also contain a term that takes the growth rate of the economy into account. Broadly speaking, this growth rate is a function of the increase in the labor supply and the increase in labor productivity. However, the latter comes from both growth in the amount of capital per worker and from growth in "total factor productivity", which is due to a range of factors, including better organization, technology and education. Since capital/worker cannot be increased without limit, over the long-run it is growth in total factor productivity that counts. Hence, in our analysis, we assume that future economic growth reflects the growth in the labor force and TFP. However, this future growth is not guaranteed; rather, there is an element of uncertainty involved. Hence we also need to take investor's aversion to risk and uncertainty into account when estimating the risk free rate of return they should require in exchange for letting others use their capital for one year. There are many ways to measure this, and unsurprisingly, many people disagree on the right approach to use. In our analysis, we have used Constant Relative Risk Aversion with an average value of three (see "How Risk Averse are Fund Managers?" by Thomas Flavin). The following table brings these factors together to determine our estimate of the risk free rate investors in different currency zones should logically demand in equilibrium (for an excellent discussion of the issues noted above, and their practical importance, see "The Stern Review of the Economics of Climate Change" by Martin Weitzman):

Region	Labor Force Growth %	TFP Growth %	Steady State Econ Growth %	Std Dev of Econ Growth Rate %	Time Preference %	Risk Aversion Factor	Risk Free Rate Demanded* %
Australia	1.0	1.20	2.2	1.1	2.0	3.0	3.2
Canada	0.8	1.00	1.8	0.9	2.0	3.0	3.8
Eurozone	0.4	1.20	1.6	0.8	2.0	3.0	3.9
Japan	-0.3	1.20	0.9	0.5	2.0	3.0	3.8

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* %
United Kingdom	0.5	1.20	1.7	0.9	2.0	3.0	3.8
United States	0.8	1.20	2.0	1.0	2.0	3.0	3.5

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

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

Region	Risk Free Rate Demanded	Actual Risk Free Rate Supplied	Difference	Overvaluation (>100) or Undervaluation (<100)
Australia	3.2	2.6	-0.5	105
Canada	3.8	2.1	-1.7	118
Eurozone	3.9	2.1	-1.9	120
Japan	3.8	2.9	-0.9	109
United Kingdom	3.8	1.1	-2.8	131
United States	3.5	2.1	-1.4	115

We reiterate that this analysis is based on a medium term view of the logical value of the risk free real return investors should demand. For example, plunging consumer spending around the world implies a lower time preference rate than the 2.0% we have used in our analysis, which would reduce the apparent overvaluation of this asset class.

Let us now turn to the subject of the valuation of non-government bonds. Some have suggested that it is useful to decompose the bond yield spread into two parts.

The first is the difference between the yield on AAA rated bonds and the yield on the ten year Treasury bond. Because default risk on AAA rated companies is very low, this spread primarily reflects prevailing liquidity and jump (regime shift) risk conditions (e.g., between a low volatility, relatively high return regime, and a high volatility, lower return regime). The second is the difference between BAA and AAA rated bonds, which tells us more about the level of compensation required by investors for bearing relatively high quality credit risk. Research has also shown that credit spreads on longer maturity intermediate risk bonds has predictive power for future economic demand growth, with a rise in spreads signaling a future fall in demand (see "Credit Market Shocks and Economic Fluctuations" by Gilchrist, Yankov, and Zakrajsek).

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

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

At **30 April 2009**, the AAA minus 10 year Treasury spread was 2.34%. The AAA minus BAA spread was 2.79%. Since these distributions are not normal (i.e., they do not have a "bell curve" shape), we take a different approach to putting them in perspective. Over the past twenty three years, there have been only 128 days with a higher AAA spread (1.10% of all days) and 54 days with a higher BAA spread (.46%). Clearly, current spreads, and particularly credit spreads, still reflect severe investor uncertainty about future liquidity and credit risk. However, given the unchartered economic waters through which we are now passing, it is not clear to us whether these spreads represent the over, under, or fair valuation of liquidity and credit risk.

Let us now turn to currency 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. 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. 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 30Apr09

	To AUD	To CAD	To EUR	To JPY	To GBP	To USD	To CHF	To INR
From								
AUD	0.00%	-1.69%	-1.61%	-3.36%	-1.27%	-1.67%	-2.60%	1.86%
CAD	1.69%	0.00%	0.08%	-1.67%	0.42%	0.02%	-0.91%	3.55%
EUR	1.61%	-0.08%	0.00%	-1.75%	0.34%	-0.06%	-0.99%	3.47%
JPY	3.36%	1.67%	1.75%	0.00%	2.09%	1.69%	0.76%	5.22%
GBP	1.27%	-0.42%	-0.34%	-2.09%	0.00%	-0.40%	-1.33%	3.13%
USD	1.67%	-0.02%	0.06%	-1.69%	0.40%	0.00%	-0.93%	3.53%
CHF	2.60%	0.91%	0.99%	-0.76%	1.33%	0.93%	0.00%	4.46%
INR	0.00%	-1.69%	-1.61%	-3.36%	-1.27%	-1.67%	-2.60%	1.86%

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. Our analysis also assumes that over the long-term, investors require a 2.5% risk premium above the yield on real return bonds as compensation for bearing the risk of securitized commercial property as an asset class. Last but not least, there is significant research evidence that commercial property markets are frequently out of equilibrium, due to slow adjustment processes as well as the interaction between fundamental factors and investors' emotions (see, for example, "Investor Rationality: An Analysis of NCREIF Commercial Property Data" by Hendershott and MacGregor; "Real Estate Market Fundamentals and Asset Pricing" by Sivitanides, Torto, and Wheaton; "Expected Returns and Expected Growth in Rents of Commercial Real Estate" by Plazzi, Torous, and Valkanov; and "Commercial Real Estate Valuation: Fundamentals versus Investor Sentiment" by Clayton, Ling, and Naranjo). Hence, it is extremely hard to forecast how long it will take for any over or undervaluations we identify to be reversed. The following table shows the results of our valuation analysis as of **30 April 2009**: We use the dividend discount model approach to produce our estimate of whether a property market is over, under, or fairly valued today. 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 overvaluation, and less than 100% implies undervaluation.

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	9.1%	0.2%	9.3%	2.6%	2.5%	5.1%	54%
Canada	11.5%	0.2%	11.7%	2.1%	2.5%	4.6%	38%
Eurozone	9.6%	0.2%	9.8%	2.1%	2.5%	4.6%	45%
Japan	7.9%	0.2%	8.1%	2.9%	2.5%	5.4%	66%
Switzerland	0.5%	0.2%	0.7%	2.1%	2.5%	4.6%	887%
U.K.	7.1%	0.2%	7.3%	1.1%	2.5%	3.6%	47%
United States	7.9%	0.2%	8.1%	2.1%	2.5%	4.6%	55%

As you can see, the valuation of the Swiss property market appears to be significantly out of line with the others. As a check, we substituted the 2008 year-end income yield on directly owned commercial property in Switzerland (4.5%) for the dividend yield on publicly traded property securities. This changes the valuation estimate to 99%.

Let us now turn to the Dow Jones AIG Commodity Index, our preferred benchmark for this asset class because of the roughly equal weights it gives to energy, metals and agricultural products. One of our core assumptions is that financial markets function as a complex adaptive system which, while attracted to equilibrium (which generates mean reversion) are seldom in it. To put it differently, we believe that investors' expectations for the returns an asset class is expected to supply in the future are rarely equal to the returns a rational long-term investor should logically demand. Hence, rather than being exceptions, over and undervaluations of different degrees are simply a financial fact of life. We express the demand for returns from an asset class as the current yield on real return government bonds (ideally of intermediate duration) plus an appropriate risk premium. While the former can be observed, the latter is usually the subject of disagreement. In determining the risk premium to use, we try to balance a variety of inputs, including historical realized premiums (which may differ considerably from those that were expected, due to unforeseen events), survey data and academic theory (e.g., assets that payoff in inflationary and deflationary states should command a lower risk premium than those whose payoffs are highest in "normal" periods of steady growth and modest changes

in the price level). In the case of commodities, Gorton and Rouwenhorst (in their papers "Facts and Fantasies About Commodity Futures" and "A Note on Erb and Harvey") have shown that (1) commodity index futures provide a good hedge against unexpected inflation; (2) they also tend to hedge business cycle risk, as the peaks and troughs of their returns tend to lag behind those on equities (i.e., equity returns are leading indicators, while commodity returns are coincident indicators of the state of the real business cycle); and (3) the realized premium over real bond yields has historically been on the order of four percent. We are inclined to use a lower ex-ante risk premium in our analysis (though reasonable people can still differ about what it should be), because of the hedging benefits commodities provide relative to equities. This is consistent with the history of equities, where realized ex-post premiums have been shown to be larger than the ex-ante premiums investors should logically have expected.

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

The second source of the return on a long-only commodity index fund is the so-called "roll yield." Operationally, a commodity index fund buys futures contracts in the most liquid part of the market, which is usually limited to the near term. As these contracts near their expiration date, they are sold and replaced with new futures contracts. For example, a fund might buy contracts maturing in two or three months, and sell them when they approached maturity. The "roll yield" refers to the gains and

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

However, in the real world, all things are not equal. For example, some commodities are very difficult or expensive to store; others have very high costs if you run out of them (e.g., because of rapidly rising demand relative to supply, or a potential disruption of supply). For these commodities, there may be a significant option value to holding the physical product (the Theory of Storage refers to this option value as the "convenience yield"). If this option value is sufficiently high, spot prices may be bid up above futures prices, causing "backwardation" and positive roll-yields for commodity index funds. Hence, a key question is the extent to which different commodities within a given commodity index tend to be in backwardation or contango over time. Historically, most commodities have spent time in both states.   However, contango has generally been more common, but not equally so for all commodities. For example, oil has spent relatively more time in backwardation, as have copper, sugar, soybean meal and lean hogs. This highlights a key point about commodity futures index funds – because of the critical impact of the commodities they include, the

weights they give them, and their rebalancing and rolling strategies, they are, in effect, uncorrelated alpha strategies. Moreover, because of changing supply and demand conditions in many commodities (e.g., global demand has been growing, while marginal supplies are more expensive to develop and generally have long lead times), it is not clear that historical tendencies toward backwardation or contango are a good guide to future conditions. To the extent that any generalizations can be made, higher real option values, and hence backwardation and positive roll returns are more likely to be found when demand is strong and supplies are tight, and/or when there is a rising probability of a supply disruption in a commodity where storage is difficult. For example, ten commodities make up roughly 75% of the value of the Dow Jones AIG Commodities Index. The current term structures of their futures curves are as follows:

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

While many commodity curves have improved over the past month, given the continued prevalence of so many contangoed futures curves, expected near term roll returns on the DJAIG are still negative, absent major supply side shocks (note that this can generate positive returns for commodity funds that can take short positions – i.e., sell rather than buy futures contracts).

The third source of commodity futures return is unexpected changes in the price of the commodity during the term of the futures contract. It is important to stress that the market's consensus about the expected change in the spot price is already

included in the futures price. The source of return we are referring to here is the unexpected portion of the actual change. Again, large surprises seem more likely when supply and demand and finely balanced – the same conditions which can also give rise to changes in real option values and positive roll returns. At the present time, with economic growth weakening, demand is falling across a wide range of commodities. Hence, the source of any surprising price increases must be a changes in expected supply that either occur suddenly and are extremely hard to forecast (e.g., a weather or terrorist related incident) or changes that investors may have not yet fully incorporated into their valuation models (e.g., the faster than expected decline in oil production from current reservoirs). This return driver probably offers investors the best chance of making profitable forecasts, since most human beings find it extremely difficult to accurately understand situations where cause and effect are significantly separated in time (e.g., failure to recognize how fast rising house prices would – albeit with a time delay – trigger an enormous increase in new supply).

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

So, to sum up, the expected supply of returns from a commodity index fund over a given period of time equals (1) the current yield on real return bonds, reduced by the percentage of funds used to purchase the futures contracts; (2) expected roll yields, adjusted for commodities' respective weights in the index; (3) unexpected spot price changes; and (4) the expected rebalancing return. Of these, the yield on real return bonds can be observed, and we can conservatively assume a long-term rebalancing return of, for example, 1.0%. These two sources of return are clearly less

than the demand for returns that are equal to the real rate plus a risk premium of, say, 3.0%. The difference must be made up by a combination of roll returns (which, given the current shape of futures curves, are likely to be negative in the near term) and unexpected price changes, due to sudden changes in demand (where downside surprises currently seem more likely than upside surprises) and/or supply (where the best chance of a positive return driver seems to be incomplete investor recognition of slowing oil production from large reservoirs and/or the medium term impact of the current sharp cutback in E&P and refining investments).

Another approach to assessing the valuation of commodities as an asset class is to compare the current value of the DJAIG Index to its long-term average. Between 1991 and 2008, the inflation adjusted (i.e., real) DJAIG had an average value of 91.61, with a standard deviation of 16.0 (skewness of .52, and kurtosis of -.13 – i.e., it was close to normal). The inflation adjusted **30 April 2009** closing value of 71.1 was 1.28 standard deviations below the long term average. Assuming the value of the index is normally distributed around its historical average (which in this case is approximately correct), a value within one standard deviation of the average should occur about 67% of the time, and a value within two standard deviations 95% of the time. Whether the current level of the inflation adjusted DJAIG signifies that commodities are undervalued depends upon one's outlook for future roll returns and price surprises.

Two factors argue in favor of undervaluation. The first is the large amount of monetary easing underway in the world, which, at some point, will likely lead to higher inflation. The second factor is the equally large amount of fiscal stimulus being applied to the global economy, with its focus on infrastructure projects and clean fuels, both of which should boost demand for commodities (and indirectly boost economic growth in commodity exporting countries like Australia and Canada). There is also the potential for commodity prices to get a further boost if countries like China choose to diversify some of their foreign exchange holdings out of the U.S. dollar and into oil or other hard assets, as they apparently already have done in the case of gold. Gold prices should also benefit from rising investor uncertainty and worries about future inflation, which

should generate higher retail flows into the expanding range of gold ETF products that make easier to invest in this commodity.

The argument in favor of a neutral view on commodity valuations is (as more fully discussed in our Economic Update) is based on the continued failure to resolve three critical problems that underlie this global recession: excessive consumer debt, insolvent banks, and substantial world current account imbalances. Until these core issues are resolved, the impact of fiscal stimulus on global growth (and hence commodity prices) is likely to be limited, though still positive. After weighing these two views, we conclude that commodities, and gold in particular, are possibly undervalued today.

Our approach to assessing the current valuation of timber is based on two publicly traded timber REITS: Plum Creek (PCL) and Rayonier (RYN). As in the case of equities, we compare the return these 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 have to be estimated, which presents a particularly difficult challenge with respect to the rate at which dividends will grow in the future.

In broad terms, the rate of dividend growth results from the interaction of physical, and economic processes. In the first part of the physical process, 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). In the second part of the physical process, a certain amount of trees are harvested each year, and sold to

provide revenue to the timber REIT. In the economic area, three processes are important, 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 increased value 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. The second economic process (or, more accurately, processes) is the interaction of supply and demand that determines changes in real prices for pulpwood, sawtimber and other forest products. 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, which is further broken down into hardwood and softwood. The average annual change in real prices (derived by adjusting the IMF series for changes in U.S. inflation) between 1981 and 2007 are shown in the following table:

	Average	**Standard Deviation**
Hardwood	0.4%	11.8%
Softwood	1.7%	21.6%
All Timber	0.1%	9.2%

As you can see, over the long term, prices have been quite stable in real terms, though with a high degree of volatility from year to year (and additional volatility across different regional markets). The final economic process that affects the growth rate of dividends is changes in the REIT's cost structure, and non-timber related revenue streams (e.g., from selling timber land for real estate development). With respect to

the latter, the potential imposition of carbon taxes or cap and trade systems for carbon emissions could provide a new source of revenue for timber REITs in the future.

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.
Harvesting rate	As a long term average, we assume that 5% of tree volume is harvested each year.
In-growth of trees	We assume this adds 3% per year to the value of timber assets, assuming no change in the real price of pulpwood, sawtimber and other final products.
Change in prices of timber products	We assume that over the long term prices will just keep pace with inflation. However, 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 our assumption is conservative.
Carbon credits	We assume no additional return from this potential source of value, which also appears to be conservative given forests' role in CO_2 absorption.

This leaves the question of the appropriate return premium to assume for the overall 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, we have used four percent as the required return premium for investing in liquid timberland assets. Arguably, this may still be too high, as timber is an asset class whose return generating process (being partially biologically driven) has a low correlation with returns on other asset class.

Hence, it should provide strong diversification benefits to a portfolio when they are most needed, and investors should therefore require a relatively low risk premium to hold this asset class.

Given these assumptions, our assessment of the valuation of the timber asset class at **30 April 2009** is shown in the following table. We use the dividend discount model approach to produce our estimate of whether timber is over, under, or fairly valued today. The specific formula is (Current Dividend Yield x 100) x (1+ Forecast Dividend Growth) divided by (Current Yield on Real Return Bonds + Timber Risk Premium - Forecast Dividend Growth). A value greater than 100% implies overvaluation, and less than 100% implies undervaluation.

Average Dividend Yield	5.10%
Plus Long Term Annual Biological Growth	6.00%
Less Percent of Physical Timber Stock Harvested Each Year	(5.00%)
Plus Average Annual Increase in Stock Value due to In-growth	3.00%
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	**9.10%**
Real Bond Yield	2.09%
Plus Risk Premium for Timber	4.00%
Equals Average Annual Real Return Demanded	**6.09%**
Ratio of Returns Demanded/Returns Supplied Equals Valuation Ratio (less than 100% implies undervaluation)	**39%**

Our approach to assessing the current value of equity market volatility (as measured by the VIX index, which tracks the level of S&P 500 Index volatility implied by the current pricing of put and call options on this index) is similar to our approach to commodities. Between January 2, 1990 and December 30, 2008, the average daily

value of the VIX Index was 19.70, with a standard deviation of 7.88 (skewness 2.28, kurtosis 9.71 – i.e., a very "non-normal" distribution).   On **30 April 2009**, the VIX closed at 36.50, To put this in perspective, only 136 days, or 2.8% of our sample had higher closing values of the VIX. This high (by historical standards) level of implied volatility may actually be too low, if (as described in this month's economic update) investors' rapidly rising hopes for a fast return to normalcy meet with disappointment as the conflict scenario develops. As we noted above with respect to commodities, despite the likely benefits of fiscal stimulus on aggregate demand, and monetary growth on price levels (i.e., reducing the risk of prolonged deflation), the core issues that lie at the heart of the current recession remain unresolved. Critically, we do not believe that this information and its likely impact on uncertainty levels has been fully incorporated into S&P 500 option prices, and hence into the VIX. For these reasons, we estimate that volatility is likely undervalued today.

Sector and Style Rotation Watch

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

Current economic conditions affect the current cash flow an asset produces. Future economic conditions affect future cash flows and discount rates. Because they are more numerous, expected future cash flows have a much bigger impact on the fundamental value of an asset than do current cash flows. Hence, if an investor is attempting to earn a positive return by purchasing today an asset whose value (and price) will increase in the future, he or she needs to accurately forecast the future

value of that asset.   To do this, he or she needs to forecast future economic conditions, and their impact on future cash flows and the future discount rate. Moreover, an investor also needs to do this before the majority of other investors reach the same conclusion about the asset's fair value, and through their buying and selling cause its price to adjust to that level (and eliminate the potential excess return).

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

That being said, the highest rolling three month returns in the table do provide us with a rough indication of how investors expect the economy and interest rates to perform in the near future. *The highest returns in a given row indicate that a plurality of investors (as measured by the value of the assets they manage) are anticipating the economic and interest rate conditions noted at the top of the next column* (e.g., if long maturity bonds have the highest year to date returns, a plurality of bond investor opinion expects rates to fall in the near future). Comparing returns across strategies provides a rough indication of the extent of agreement (or disagreement) investors about the most likely upcoming changes in the state of the economy. When the rolling returns on different strategies indicate different conclusions about the most likely direction in which the economy is headed, we place the greatest weight on bond market indicators. Why? We start from a basic difference in the psychology of equity and bond investors.   The different risk/return profiles for these two investments

produce a different balance of optimism and pessimism. For equities, the downside is limited (in the case of bankruptcy) to the original value of the investment, while the upside is unlimited. This tends to produce an optimistic view of the world. For bonds, the upside is limited to the contracted rate of interest and getting your original investment back (assuming the bonds are held to maturity). In contrast, the downside is significantly greater – complete loss of principal. This tends to produce a more pessimistic (some might say realistic) view of the world (although some might argue that the growth of the credit derivatives market has undermined this discipline). As we have written many times, investors seeking to achieve a funding goal over a multi-year time horizon, avoiding big downside losses is arguably more important than reaching for the last few basis points of return. Bond market investors' perspective tends to be more consistent with this view than equity investors' natural optimism. Hence, when our rolling rotation returns table provides conflicting information, we tend to put the most weight on bond investors' implied expectations for what lies ahead.

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

Rolling 3 Month Returns Through	30 Apr 09			
Economy	Bottoming	Strengthening	Peaking	Weakening
Interest Rates	Falling	Bottom	Rising	Peak
Style and Size Rotation	Small Growth (DSG) **17.32%**	Small Value (DSV) **13.83%**	Large Value (ELV) **3.09%**	Large Growth (ELG) **10.61%**
Sector Rotation	Cyclicals (RXI) **20.31%**	Industrials (EXI) **10.18%**	Staples (KXI) **-1.05%**	Utilities (JXI) **-7.19%**
Bond Market Rotation	Higher Risk (HYG) **4.40%**	Short Maturity (SHY) **0.19%**	Low Risk (TIP) **1.73%**	Long Maturity (TLT) **-4.63%**

The following table sums up our conclusions (based on the analysis summarized in this article) as to potential asset class under and overvaluations at the end of **April 2009**. Our starting point is that asset class valuations evolve in response to three forces. The first is fundamental valuation, as reflected in the balance between the expected supply of and demand for returns. The second is investor behavior, which results from a complex mix of cognitive, emotional and social inputs – the latter two comprising Keynes' famous "animal spirits". The third force is the ongoing evolution of political and economic conditions, and the degree of prevailing uncertainty about their future direction. We capture these longer term forces in our economic scenarios. This asset class valuation update contains an extensive discussion of fundamental valuation issues. Our current fundamental valuation estimates are summarized in the following table. The distinction between possible, likely and probable under or overvaluation reflects an increasing degree of confidence in our estimate. We stress that these conclusions represent our assessment of quantitative valuation indicators at a given point in time, which implies no forecast as to when any over and undervaluations will be reversed. Indeed, before this reversal occurs current over and undervaluations could actually become more extreme. That said, common sense suggests that more extreme situations are more likely to be recognized and reversed.

To aid in that assessment, for each asset class we have also included the most recent three month rolling return (in local currency), as a means of capturing the direction and force of investor behavior. We believe that the likelihood and expected size of a reversal increase when fundamental over or undervaluation becomes more extreme (e.g., moves from possible to likely to probable) and there is evidence of strong returns momentum in the opposite direction (e.g., strong positive returns in the case of an asset class that is probably overvalued). However, conclusions about potential reversals and their likely durability also have to be tested against the likely evolution of future political/economic scenarios and their implications for asset class valuation and investor behavior over a longer time frame (see, for example, our March 2009 Economic Update). This is an important third input into investment decisions, as

we do not believe that the full implications of these scenarios are typically reflected in current valuations and investor behavior.

Table: Valuation Conclusions and 3 Month Momentum

Valuation at 30 Apr 09	*Fundamental Valuation Estimate*	*Rolling 3 Mos Return in Local Currency*
AUD Real Bonds	Neutral	-1.18%
AUD Bonds	Possibly Overvalued	-6.13%
AUD Prop.	Probably Undervalued	3.72%
AUD Equity	Probably Undervalued	12.17%
CAD Real Bonds	Possibly Overvalued	4.33%
CAD Bonds	Likely Overvalued	1.43%
CAD Prop.	Probably Undervalued	-0.92%
CAD Equity	Possibly Overvalued	9.56%
CHF Bonds	Probably Overvalued	0.52%
CHF Property	Neutral	9.15%
CHF Equity	Possibly Overvalued	0.35%
EUR Real Bonds	Possibly Overvalued	2.81%
EUR Bonds	Likely Overvalued	1.36%
EUR Prop.	Probably Undervalued	3.29%
EUR Equity	Probably Undervalued	-2.80%
GBP Real Bonds	Likely Overvalued	-0.83%
GBP Bonds	Possibly Overvalued	2.33%
GBP Property	Probably Undervalued	13.49%
GBP Equity	Probably Undervalued	10.79%
INR Bonds	Probably Overvalued	-0.88%
INR Equity	Probably Overvalued	20.98%
JPY Real Bonds	Neutral	-1.61%
JPY Bonds	Probably Overvalued	-1.28%
JPY Property	Probably Undervalued	7.62%

Valuation at 30 Apr 09	*Fundamental Valuation Estimate*	*Rolling 3 Mos Return in Local Currency*
JPY Equity	Probably Overvalued	11.07%
USD Real Bonds	Possibly Overvalued	2.28%
USD Bonds	Probably Overvalued	1.42%
USD Property	Probably Undervalued	7.95%
USD Equity	Likely Overvalued	7.62%
Following in USD:		
Emerging Mkt Equity (EEM)	Possibly Overvalued	26.58%
Commodities Long	Possibly Undervalued	-0.23%
Gold	Possibly Undervalued	-4.43%
Timber	Probably Undervalued	19.95%
Volatility (VIX)	Likely Undervalued	-18.60%
Return in Local for holding USD:		
USD per AUD	Appreciate	-13.03%
USD per CAD	Neutral	-4.33%
USD per EUR	Neutral	-2.91%
USD per JPY	Depreciate	8.89%
USD per GBP	Neutral	-2.80%
USD per CHF	Depreciate	-1.62%
USD per INR	Appreciate	2.29%

Feature Article: Grounding Risk Management in Neuroscience

We recently read a disturbing story in the Australian publication *Money Management*. "Research conducted by CoreData shows that Australian financial planners have lost approximately 215,000 clients over the past 12 months. Even more disturbing, 28 percent of respondents who currently have a relationship with a planner are 'very likely' to consider not using a planner in the future – up from only 4% last November." Equally unsettling was an article in the *Financial Times*, noting that "poor practices in explaining risk to investors are set to be exposed by a surge in the number of complaints against financial advisers in the next few months, according to the Financial Ombudsman Service."

What is going on? And what can advisers and investors do to reverse these disturbing trends? Over the past few months, we have undertaken a research project focused on developing a new view of risk, and the implications for asset class valuation, portfolio construction, and risk management. In light of recent developments, we have extended this to include implications for financial advisers and regulators. This article summarizes our research and the conclusions we have reached.

Let's start with the obvious: using the standard deviation of a time series of returns as the primary measure of investment risk fails to pass most investors' common sense test. While this approach makes mathematical models easier to solve, it falls flat with most investors. Moreover, there is an even deeper problem. Asset allocation is, in essence, a decision problem. However, both of the two major approaches to decision analysis – Expected Utility Theory and Prospect Theory – focus on making choices in the face of risk – that is, situations in which both the range of possible future outcomes and their associated probabilities are known in advance. In the real world, most decisions – including investment decisions – are made in the face of uncertainty, where neither the full range of possible future outcomes nor their associated probabilities are known for certain in advance. In sum, investors are right to feel confused about the way risk is typically explained to them. The truth of the matter is that the models we use to support investment decision making, at best, only very roughly capture the underlying issues.

So how can we improve upon existing approaches? Our starting point was an article we had read years ago, "Risk as Feelings" by Lowenstein, Weber, Hsee, and Welch. The authors note that "virtually all theories of choice under risk or uncertainty are cognitive and consequentialist. They assume that people assess the desirability and likelihood of possible outcomes of choice alternatives and integrated this information through some type of expectation-based calculus to arrive at a decision...An alternative theoretical perspective, the risk as feelings hypothesis, highlights the role of affect experienced at the moment of decision making...Emotional reactions to risky situations often diverge from cognitive assessments of those risks.

When such divergence occurs, emotional reactions often drive behavior."   In our experience, this hypothesis accurately described quite a few decisions we have seen made over the years. Moreover, in our work as consultants and as a CEO, we have repeatedly found that explicitly asking a group or team to reconcile any differences between their cognitive analysis of a decision and their gut feelings about it never failed to produce a valuable discussion – and improve the quality of the decision.

Our next step was to delve more deeply into the latest findings from neurobiology about the nature of the feelings people experience. An important starting point is the distinction between "emotions" and "feelings." The former are essentially pre-conscious reactions to certain types of sensory stimuli that produce measurable changes in bodily function – e.g., physiological responses like the release of adrenaline or other chemicals, a higher heartbeat, or faster breathing. "Feelings" are the labels our consciousness attaches to these combinations of sensory input and emotional reaction – e.g., anxiety, fear, arousal, or euphoria. Our key hypothesis is that when it comes to investment decision making, the feeling upon which we should focus our research is fear – the primal, visceral reaction that is much more real to an average investor than a standard deviation (to distinguish: while they are closely related, fear is anticipation of being harmed in the present, while anxiety is anticipation of being harmed in the future).

Inside the brain, the key to fear is the region known as the amygdala. Functional magnetic resonance imaging (FMRI) studies of brain function have found that this is region that controls the emotional responses we associated with the feeling of fear (for an overview, see "The Amygdala: Vigilance and Emotion" by Davis and Whalen). In essence, the amygdala evaluates sensory input, and decides whether it should prepare the body for a "fight or flight" response (which will depend on how other areas of the brain consciously – but more slowly -- process the input). We were fascinated to learn that this fear response can be triggered both by the looks on other people's faces ("Fear, Faces and the Human Amygdala" by Ralph Adolphs and "Learning Fears by Observing Others" by Olsson, Nearing and Phelps), and that the only sensory nerve that directly connects to the amygdala is our sense of smell. In

other words, the evidence seems to support old sayings like "I could see the fear on their faces" or "I could smell their fear." One can easily see how this makes sense from an evolutionary perspective, as it no doubt helped our ancestors to survive eons ago on the East African savannah. And one can also see how it could accelerate reactions when financial bubbles collapse.

More specifically, three triggers of amygdala reactions seem critical from an investment perspective. The first is loss (see "Dissociable Systems for Gain and Loss Related Value Predictions and Errors of Prediction in the Human Brain" by Glascher, Schroeder, Sommer, Braus, and Buchel). From an evolutionary perspective, the association of loss with fear clearly makes sense. It also helps to explain media stories about the extreme psychological distress experienced by people who have lost large amounts of money over the past year, but are still "rich" by any objective standard (see, for example, "Money Shrinks Soothe Souls of the Tragically Rich" by Lorinda Toledo of the Associated Press). From a different perspective, it also seems to explain two key findings from Prospect Theory. First, people are more willing to take risks to avoid losses than they are to expand gains – hence the frequently heard saying that "losses hurt twice as much as gains feel good." Second, framing – that is, the way a problem is presented to a decision maker – makes a big difference (see "Frames, Biases, and Rational Decision Making in the Human Brain" by De Martino, Kumaran, Seymour, and Dolan). Decisions that are framed as choices to avoid a loss (e.g., by manipulating a reference point) produce very different behavior than when the same decision is framed in terms of preserving or expanding a positive outcome.

The second important amygdala trigger is uncertainty (see "Neural Systems Responding to Degrees of Uncertainty in Human Decision Making" by Hsu, Bhatt, Adolphs, Tranel and Camerer, "Processing of Temporal Unpredictability in Human and Animal Amygdala" by Herry, Bach, et al, or "The Neurobiological Foundations of Valuation in Human Decision Making Under Uncertainty" by Bossaerts and Hsu). Again, one can see how this is adaptive from an evolutionary perspective – on the East African savannah, a heightened sense of uncertainty (that "funny feeling" about something we still get, but too often try to rationalize away) was usually associated

with what we now call "significant downside risk" (e.g., something is stalking me). As we have seen over the last year, in financial markets a sharp increase in uncertainty produces an equally sharp increase in investors' preference for the most liquid assets.

The third amygdala trigger with important implications for investor behavior is the threat of social rejection or isolation (see "Neurobiological Correlates of Social Conformity and Independence During Mental Rotation" by Berns, Chappelow et al). Again, the evolutionary logic behind this fear seems clear (see "Social Networks, Self Denial, and Median Preferences: Conformity as an Evolutionary Strategy" by Klick and Parisi). Moreover, absent this amygdala response, researchers have concluded that it is doubtful cognition alone would lead to cooperation between large groups of human beings (see "Cooperative Homo Economicus" by Bowles and Gintis).   It may also be that fear of social isolation is stronger when other fear triggers are also operating. For example, in "The Dubious Benefit of Group Heterogeneity in Highly Uncertain Situations", David Owens of Vanderbilt University finds that as uncertainty increases, performance improves with team homogeneity. In "Groupthink: Collective Delusions in Organizations and Markets", Roland Benabou of Princeton University shows how in the face of prospective losses an individual's tendency toward conformity may increase. And in "The Effect of Neuropeptides on Human Trust and Altruism", Ernst Fehr shows how this may be due to another neurochemical process. Oxytocin is a brain chemical that dampens the response of the amygdala to fear producing stimuli, creating the conditions for trust to develop. It is released when we eat, when we are touched and possibly through prolonged social contact (conversation, eye contact, etc.). In sum, heightened uncertainty can cause people to pay more attention that usual to the opinions and actions of others – which, of course, is a crucial component of herding in financial markets.

While herding can be stopped by a rising fear of loss, bubbles show that sometimes this process takes a long time. Why is that? One of the answers to this question lies in the neurochemical balance between fear and reward. In addition to oxytocin, dopamine also inhibits the fear response by the amygdala.   Not coincidentally, dopamine is produced by those parts of the brain associated with the

processing of expected rewards. For example, in "The Influence of Affect on Beliefs, Preferences and Financial Decisions", Kuhnen and Knutson show how higher states of arousal and excitement about potential rewards "induce people to take more risk, and to be more confident in their ability to evaluate the available investment options...while negative emotions such as anxiety have the opposite effects." Critically, these authors also note that investors "beliefs are updated in a way that is consistent with the self-preservation motive of maintaining positive affect [feelings] and avoiding negative affect, by not fully taking into account new information that is at odds with an individual's prior choices." To put it differently, we tend to resist searching for, and fully accepting, information that raises our uncertainty, separates us from mainstream views, and potentially causes feelings of loss (in this case, as a result of having to change our mental model and beliefs). In other words, so-called "cognitive biases" like selective attention, confirmation, anchoring, and overconfidence are likely rooted in underlying neurochemical processes involving, to some extent, the amygdala. Perhaps more important, the overthrow of strongly held mental models and beliefs by surprising events (e.g., the 9-11 attacks, or the crash of 2008) is inevitably accompanied by a sharp increase in fear, caused by spikes in loss and uncertainty and the threat of social isolation when we are feeling highly vulnerable.

　　　As we have seen, events that stimulate fear are also likely to stimulate a stronger commitment to group behavior norms, at least in the short-term. For that reason, any discussion of the practical meaning of investment risk must take into account the way humans organize themselves into networks. Like neurobiology, network theory is another area where interesting new research findings have begun to accumulate more quickly. From a static perspective, networks created by human actions seem to have a number of distinguishing characteristics. Assume that a network is described by nodes (e.g., people or companies) and links (e.g., transactions, emails, text messages, phone calls, product and financial flows, etc.) between them. When nodes are sorted by the number of links they have, the result is a power law distribution (i.e., a few nodes have a very high number of links, while a very high number of nodes have very few links). Moreover, these distributions are

said to be "scale free" or "fractal", because they look similar regardless of the resolution one uses (e.g., connections between investors in California or between investors in North America). There is also a tendency for the majority of a node's links to be with other nodes with a similar level of links. However, thanks to a relatively smaller number of connections between nodes of different degree (i.e., nodes with very different numbers of connections), social networks are also characterized by the familiar "small world" phenomenon – a relatively small number of links can be used to connect a given node to any other node in the network (think "six degrees of Kevin Bacon", or, on the internet, LinkedIn or Facebook).

The impact of social networks on investment returns has been explored in a number of recent studies. For example, in "The Small World of Investing: Board Connections and Mutual Fund Returns", Cohen, Frazzini and Malloy "focus on connections between mutual fund managers and corporate board members via shared education networks. [They] find that portfolio managers place larger bets on connected firms and perform significantly better on these holdings relative to their nonconnected holdings." In "Sell Side School Ties", Frazzini, Cohen and Malloy, find "evidence that sell-side analysts outperform on their stock recommendations when they have an educational link to a senior officer of a company." In "Information Diffusion Effects in Individual Investors' Common Stock Purchases: Covet Thy Neighbors' Investment Choices", Ivkovic and Weisbenner "study the relation between households' stock purchases and stock purchases made by their neighbors. A ten percentage point increase in neighbors' purchases of stocks from an industry is associated with a two percentage point increase in households' own purchases of stocks from that industry. The effect is considerably larger for local stocks and among households in more social states. Controlling for area sociability, households' and neighbors' investment style preferences, and the industry composition of local firms, they attribute approximately one-quarter to one-half of the correlation between households' stock purchases and stock purchases made by their neighbors to word-of-mouth communication." Finally, in "Do Bubbles Have a Birthdate? The Role of College Interaction in Portfolio Choice", Massa and Simonov "show that the impact of college-based interaction is statistically

and economically significant. Investors invest in the same stocks in which their former classmates do and skew their portfolios towards growth stocks if their former classmates do the same. Moreover, investors are more likely to herd with the other investors who went to the same college than with the rest of the population. College-based interaction also affects investors' decision to concentrate their portfolios in few stocks."

Beyond the structure of human social networks, their dynamics are also critical. For example, the relative centrality of nodes seems to vary over time, with some dropping out, others joining and still others changing their degree of connectivity over time (see "A Dynamic Model of Time-Dependent Complex Networks" by Hill and Braha). A recent example would be the spike in the number of connections to websites with information on pandemic influenza over the past month. More important, the interconnectedness of networks and the time it takes for information and influence to percolate through them (e.g., via positive and negative feedback loops) means that events involving collective human action over time are rarely independent – rather, most are interdependent. This means that events that result from human interactions – like investment returns -- are usually better described by a power law distribution than by the familiar normal (Gaussian) distribution or "bell curve." (see, for example, "Power Laws, Pareto Distributions, and Zipf's Law" by M.E.J. Newman, "Statistical Physics of Social Dynamics" by Castellano, Fortunato, and Loreto, and "Beyond Gaussian Averages: Redirecting Management Research Toward Extreme Events and Power Laws" by Andriani and McKelvey).

Perhaps most interesting and important is the way the dynamics of social networks change over time, and how that may be related to the level and type of fear felt by individual agents. Borrowing from physics and biology, social network researchers have adopted the concept of a "phase change", when conditions in a network shift from one regime to another (e.g., think of the change of water from a solid to a liquid to a gas). Broadly speaking, there are two not mutually exclusive theories about how phase changes occur.

In the first view, phase transitions result from a change in an external (to the network) variable. In the case of changes in the state of water, this external variable is temperature (or a combination of temperature and pressure). In the case of financial markets, the classic view would be that the external variable is new information; a more recent view is that another critical control variable is the overall amount of leverage employed in the system (see "Anatomy of Financial Crashes: An Agent Based Model of the Leverage Cycle" by Stefan Thurner).

In the second view, phase changes are caused not by changes in outside (exogenous) control variables, but rather by the dynamic evolution of the network itself, and in particular the extent to which nodes are connected, and hence their actions are no longer independent. In physics, the classic example of this "self-organizing criticality" phenomenon is a sandpile. Dropping additional grains of sand on a pile causes increasing pressures that in turn result in tighter bonds between the grains of sand. As the pile grows larger, weak bonds break, producing small slides. Eventually the pressures and connections become so great that one additional grain of sand triggers an extremely big slide (also note that the size of these slides follows a power law distribution). In investments, quite a few researchers employing agent based models have found that financial markets experience phase changes (e.g., bubbles and crashes) when the proportion of wealth managed using different strategies (e.g., trend following momentum investors, or momentum plus passive investors) passes a critical threshold (e.g., see "Complex Evolutionary Systems in Behavioral Finance" by Hommes and Wagener, "Heterogeneity, Market Mechanisms, and Asset Price Dynamics" by Chiarella, Dieci, and He, or "Dynamic Regimes of a Multi-Agent Stock Market Model" by Yu and Li). Other researchers have shown that the financial market effects of phase changes caused by outside (exogenous) news are very different from (endogenous) changes caused by self-organizing criticality in the market itself (see, for example, "Stock Price Jumps: News and Volume Play a Minor Role" by Joulin, Lefvre, Grunberg and Bouchaud, and "Volatility Fingerprints of Large Shocks: Endogenous Versus Exogenous" by Sornette, Malevergne and Muzy).

To sum up this research, the volatility impact of exogenous shocks dissipates much more quickly.

Thus far, almost all the financial market phase transition models created by Hommes, Chiarella, and other researchers have been based on cognitively driven strategy switches – for example, assuming an investor switches from a fundamental value to a momentum strategy when he or she observes that the latter has delivered better returns over some period of time. Indeed, the literature on herd behavior in financial markets is extensive (e.g., see "Thought and Behavior Contagion in Capital Markets" by Hirshleifer and Teoh). However, based on the research noted above, we believe it is highly likely that changes in network dynamics are as much driven by emotional factors (fear and reward reactions) as they are by cognitive processes. In particular, factors that affect an investor's perception of loss or uncertainty seem to be critical in determining when herding (extra-high conformity) becomes more likely. For example, the metric used to measure performance (whether of an asset manager, an adviser, or an investor's portfolio) has a critical impact on the perception of what constitutes a loss, or a potential loss. Identical performance may be perceived as a loss under a peer benchmark, or as a gain under a liability-driven benchmark (i.e., the long-term real return an investor must earn on his or her portfolio to achieve his or her financial goals).

The quality of an investor's mental model – i.e., their framework for identifying important information and understanding its meaning in light of their goals -- also seems critical to their feelings of uncertainty and the fear it produces. Indeed, researchers have found a clear link between managers' performance and the quality of their mental models (see, for example, "Mental Models, Decision Rules, Strategies and Performance Heterogeneity" by Gary and Wood). Other research has shown a link between levels of uncertainty and investors' tendency to herd (see "Herd Behavior in Financial Markets: An Experiment with Financial Market Professionals" by Cipriani and Guarino of the IMF, or "Ambiguous Information, Risk Aversion and Asset Pricing" by Philipp Illeditsch). Finally, other researchers have shown that there is a strong link between levels of uncertainty and levels of liquidity in financial markets (see "Trading

Asymmetric Information Asset Pricing Models" by Kelly and Ljungqvist and "A Simple Model of Trading and Pricing Risky Assets Under Ambiguity" by Guidolin and Rinaldi).

However, few researchers have examined how investors' increased desire to conform due to heightened fears due to loss and/or uncertainty, as well as the socially contagious nature of fear itself affects network dynamics. Five studies address this issue indirectly. In "Information and Noise" Eli Berniker notes that as a network becomes more tightly coupled (i.e., as the time available to make decisions shrinks, as in the case of an investor using a momentum strategy), and as it becomes more complex (in terms of the number of nodes and links it contains), the quality of information communicated within it degrades, as the ratio of noise to signal increases. Hence, the degree of uncertainty would seem to increase with the proportion of momentum-based traders in a market. This conjecture finds further support in another paper, "Cognitive Hierarchy: A Limited Thinking Theory in Games" by Chong, Camerer and Ho. In essence, successful momentum investing requires an investor to correctly anticipate the future actions of other investors, who are all making the same calculation. Chong and his co-authors study the extent to which individuals are capable of this type of reasoning, and find that most can only reason one or two steps ahead (a finding also made by other researchers). In another paper ("The Reality Game"), Cherkashin, Farmer and Lloyd describe in detail the extreme complexity (and hence uncertainty) involved in situations where the amount wagered on different outcomes (e.g., invested using momentum strategies) affects the probability they will occur.

We also note two papers which analyze how financial markets can self-organize to critical points that lead to phase changes (i.e., bubbles and crashes). In "Explaining What Leads Up to Stock Market Crashes" Yalamova and McKelvey focus the interaction between the proportion of informed (e.g, fundamental and market making) and noise (e.g., momentum, liquidity, passive) traders in a market, and the level of asset valuations. Increasing complexity (e.g., due to the introduction of derivatives) raises uncertainty and causes a relative increase in noise strategies, which drive up valuations. Absent exogenous shocks with sufficient force to reverse the process,

rising valuations increase uncertainty and the proportion of noise traders in a positive feedback process that gradually reduces underlying liquidity and ultimately triggers a crash when the system passes a critical point. In "Endogenous Versus Exogenous Origins of Financial Rallies and Crashes", Harras and Sornette describe a process where random exogenous news flows generate high performance for some investors, which sets off copying by both rational investors (who see the superior performance as a sign that some investors possess superior private information about correct valuations) and by noise traders, who simply copy the investments made by the successful investors they observe. This sets off what the authors call "a transient herding regime" that, in the absence of offsetting exogenous news (which must be increasingly powerful as momentum builds) eventually results in a crash. Finally, in "Global, Local, and Contagious Investor Sentiment", Baker, Wurgler, and Yuan use an innovative principal components technique to create sentiment indices in six equity markets, and use them to show not only contagious effects, but also that their sentiment indicator is a contrarian predictor of future returns (i.e., rising sentiment forecasts lower returns, and vice versa).

What none of these papers capture, however, is the underlying process that churns in investors' brains, as fear triggered by rising uncertainty and either actual (relative to a peer benchmark) or anticipated (when the bubble breaks) loss competes with fear of abandoning the herd and with the euphoric affect of continuing (and, for a time at least, increasing) rewards. We believe these emotional factors, which exist below the level of conscious thought, constitute the most basic "quantum" building blocks of the risk and return relationships we ultimately observe in financial time series data.

Let us now turn to the implications of changing from a mental model based on "risk as the standard deviation of normally distributed returns" to one based on risk as the fear produced by loss, uncertainty, and social isolation. We divide our conclusions into six areas: asset class valuation, portfolio construction, risk management, financial advisers, individual investors, and regulation.

In terms of asset class valuation, this approach to risk as emotion reinforces the findings of other studies (e.g., by "rational herding" researchers) that substantial overvaluations are a danger to which investment portfolios are unavoidably exposed. Given the complexity of today's financial markets, as well as the information overload broadband creates, a greater percentage of investors than in the past may feel overwhelmed and uncertain. At the same time, they receive a higher number of messages telling them where the herd is headed. So investors and those with fiduciary responsibilities must continue to be on guard for the appearance of new bubbles that can destroy financial plans when they eventually (and inevitably) implode.

The implications for portfolio construction of an approach to risk grounded in neurobiology also seem clear. The research on the power law distributions produced by interacting human activity suggests that the burden of proof should shift to those who continue to argue for the use of normal distributions in asset allocation analyses. Regime switching methodologies and other approaches that include non-normal distributions seem much better supported by the available evidence. Beyond this, the finding that loss triggers fear further reinforces the already strong case for using shortfall risk minimization (i.e., Roy's "Safety First" approach) as a key decision criterion when building portfolios to achieve long-term objectives. Similarly, the findings on the linkage between uncertainty and fear suggests that allocation methodologies need to incorporate high uncertainty regimes, and take into account the tradeoff between returns and asset classes like government bonds, volatility futures and gold that perform best when uncertainty rises.

Our findings on the key triggers of investor fear also imply the need for changes in our approach to risk management. We have long argued that while diversification and rebalancing are necessary, they are not sufficient for adequate risk management. The possibility of dangerous overvaluations sometimes makes more active steps, like moving to cash or buying options, both necessary and prudent steps to take. In light of the research findings we have presented, we now believe that effective risk management requires even more active approaches, aimed not at the portfolio, but rather at the investor, to minimize his or her perceptions of loss, uncertainty and social

isolation. The use of liability driven instead of external benchmarks can not only minimize the perception of losses, but also help to avoid them, to the extent that their use makes it easier for an investor or adviser to justify reducing exposure to a dangerously overvalued asset class.

Just as important are more frequent and better structured communications between advisers and clients. For example, Metrinomics recently interviewed about 1,000 financial adviser clients in eleven countries. They found that "clients are demanding constant hand-holding and vastly improved client service...The responses were [filled] with calls for more regular, more informative, and more transparent client communications." Similarly, IBM recently surveyed 2,754 investors and other investment industry participants from around the world. They found that above all else, clients sought, and were willing to pay a premium for, "unbiased, high quality advice and excellent service."

It is clear that when uncertainty rises, investors are more likely to need (if not always proactively seek) reassurance, advice and social connection. Rather than reducing communication during these periods, advisers must increase it, helping clients to understand the source of their fears, and constructively work through them. Advisers need to proactively send carefully structured messages designed to minimize clients' uncertainty (e.g., highlighting frameworks for understanding the current situation and identifying key information in the flood of daily data) and reduce their perception of loss (e.g., keeping the focus on different ways that post-retirement income targets can still be achieved, such as by saving more or working longer, etc.). The good news is that there is ample evidence that better thinking enabled by effective advisers can help clients control their fears (e.g., see "Thinking Like a Trader Selectively Reduces Individuals' Loss Aversion" by Sokol-Hessner, Hus, et al, or the reams that have been written on various approaches to "cognitive therapy").

For individual investors, our findings have some important implications. First, we must recognize that the way we frame issues has a strong impact on our emotional response to them. For example, considering portfolio losses not on their own, but rather in relation to gains experienced in other aspects of life can reduce feelings of

fear and anxiety. So can other efforts to reduce uncertainty, such as using a comprehensive personal financial planning model to put portfolio losses into a less threatening perspective (e.g., "I can save a bit more, and work a couple of years longer, and still achieve my long-term goals", or "relative to my long-term real return target, things don't look that bad"). We also need effective mental models that help us bound the range of outcomes that could occur, and identify critical information about them in the flood of data that we face each day (this is the purpose of our monthly economic updates). Finally, though many of us find it difficult to talk about money, to minimize our fear of social isolation we need to connect with others, to share our uncertainty and sense of loss. Talking with other people forces us to cognitively engage our fears, which often weakens their power over us. A good financial adviser is ideally positioned to play this role, while maintaining the confidentiality investors desire.

The research we have reviewed in this article also has at least two important implications for future regulatory changes. The first is the need for regulators concerned with limiting systemic risk to directly monitor and control the drivers of destabilizing phase transitions in financial markets. Clearly, tighter regulation of leverage is part of this (see, for example, "Could a Systemic Regulator Have Seen the Current Crisis?" by Eric Rosengren, President of the Federal Reserve Bank of Boston). Equally important are initiatives to reduce complexity and uncertainty, maintain the heterogeneity of views and strategies in the financial system, and ensure the most important nodes in the network (e.g., the biggest banks) are adequately capitalized and regulated. Far and away, the best paper we have read on this is "Rethinking the Financial Network" by Andrew Haldane of the Bank of England. It renews our hope that the future (at least when it comes to financial market regulation) will be better than the past!

The research we have reviewed also has important implications for a second issue: official enquiries into financial advisers' sales practices that are now underway in Australia, the U.K. (following publication of the Retail Distribution Review) and the United States. In all three countries, surveys have found that the majority of clients

continue to be confused about the difference between a salesperson (broker, tied agent, etc.) and an adviser who has a fiduciary obligation to his or her client. This issue is central, not only because of the impending wave of complaints about allegedly inadequate risk disclosure (how could it be otherwise, when standard deviation was the criterion used?), but also because the betrayal of trust has repeatedly been shown to trigger a strong response in the amygdala (due to the powerful mix of loss, uncertainty, and fear of social isolation it involves). When people trust an adviser to provide fear reducing advice, it should come as no surprise that some become explosively angry when they realize that, in legal terms, they have been dealing with the product provider's salesperson, not a fiduciary who is legally obligated to put their best interests first.   It is therefore very encouraging to see that in all three countries, the debate seems to be swinging in favor of a stronger separation between financial product salespeople and fiduciary advisers. For example, in Australia, Bruce Baker the Director of Puzzle Finance stated in his recent parliamentary submission that "it is time to give consumers of financial advice a fair go. Remuneration practices and conflicts of interest in the financial planning industry are very complex and it is unreasonable to expect consumers to appreciate how these can and do taint the advice. The Financial Services Reform Act attempted to address this issue through disclosure, but clearly this has not achieved the desired outcome...Therefore, it is time to take the next regulatory step...Consumers want conflict free advice. The regulatory system needs to be adjusted ...to provide it." Similar steps towards the clear separation of fiduciary, fee based advice and financial product sales are also underway in the UK. And in the US, Paul Stevens, the head of the Investment Company Institute (the mutual fund industry's biggest trade group) has said that he supports requiring all financial advisers to be covered by fiduciary regulations.

In sum, the emerging focus on the neurochemical drivers of investor decision making will eventually lead to a new, and much better, approach to a wide range of issues, including asset class valuation, portfolio construction, risk management, the provision of financial advice and regulation of the financial system. For financial advisers, it also has important short-term implications for improving client retention and

increasing satisfaction following one of the most challenging periods in financial history. And for all investors, the "risk as emotions" approach offers important lessons for improving the way we make investment and other decisions.

May 2009 Economic Update

Our economic analysis methodology utilizes two alternative scenarios that are based on traditional attractors for complex social systems operating in far from equilibrium conditions. The first is enhanced cooperation and the second is higher levels of conflict. Realization of the cooperative scenario should result in a higher level of stability and predictability in the system's operations, while development of the conflict scenario will prolong and quite possibly worsen the system's instability. These scenarios are described in more detail in our previous issues, which (as you go back in time), also describe the scenarios that preceded them. Overall, our political analysis process is best characterized as a sequence of two scenario alternatives, one which is discarded, and one which develops and then generates two new scenarios that describe the alternative paths along which events could evolve in the future.

We further assume that financial market returns reflect the complex interplay between political and economic conditions and investor perceptions, emotions, and behavior. With respect to current economic conditions, we believe that three issues must be resolved in order for the current "high uncertainty regime" to be replaced by a "normal growth regime" – high levels of household debt, a deeply weakened financial system, and destabilizing structural imbalances in the balance of payments accounts of the United States and China. Finally, we believe that the actions of three groups – middle class Americans, Chinese peasants, and Iranian youth, are linchpins that could have an outsized impact on the future evolution of political and economic events.

This month, we will start our update with what, in our judgment, are potentially high value pieces of information from China, in the sense that they

represent evidence that is significantly more likely to be observed under either the cooperative or conflict scenario or, on occasion, that seems to be significantly at odds with both scenarios. In April, the Boao Forum for Asia was hosted by China on Hainan Island. Conference delegates from around Asia heard two aggressive speeches by senior Chinese officials. Vice Premier Zeng Peiyan noted the rising risk of inflation associated with the U.S. Federal Reserve's quantitative easing policy, and recommended that, "to assure the world, the U.S. should improve the mechanism of pegging government bond earnings to inflation to ensure the good value and protect the interests of Asian countries and other international investors." Later in his speech, he reinforced the point: "The reserve currency countries should take up their due international responsibilities, keep their currency values stable, and prevent an exchange rate war incurred by competitive devaluation." These points were made yet again in a speech by Zheng Xinli, who recently moved from his post as Deputy Director of the Policy Research Office of the Communist Party's Central Committee to the Vice Chair position at China's newly created (and intended to be preeminent) think tank, the China Center of International Economic Exchanges. He made three proposals to expand economic cooperation in Asia "and help the globe get rid of this crisis...First, to protect the safety of the US Dollar reserves held by countries, Asian countries should join hands to demand that the US make commitments to peg the value of the US Treasury Bonds to inflation rates." Zheng's second proposal was to explore an expanded reserve role for the SDR, and his third proposal was to create new Asian Infrastructure and Agricultural Investment banks. Finally, at the same conference, Zhang Xiaoqiang, Vice Minister of the National Development and Reform Commission, suggested an expanded role for Asian countries in setting commodity prices. He noted that "Although we are the biggest commodity buyer in the world, our role in price setting is limited" and added that "international collaboration is essential to enhance the oversight of financial speculation in commodity markets." His call was echoed by Fu Chengyu, CEO of China National Offshore Oil Corporation, who called on Asian countries to negotiate as a group with the world's major crude oil suppliers. Finally, at the same time the Boao conference was underway, Admiral Wu Shengli,

commander in chief of the People's Liberation Army Navy (not a typo), announced plans for a major expansion and commitment to build a so-called "blue water" navy that is capable of global power projection. Considering that the Anglo Saxon nations' dominance of the oceans has been integral to their world power for close to three hundred years, this is not a challenge one throws down lightly (e.g., see Walter Russell Mead's book God and Gold: Britain, America and the Making of the Modern World).

In our view, there is likely to be a relationship between the extent to which China employs confrontational rhetoric vis-a-vis the United States, and the extent of the Communist Party leadership's fears about declining domestic economic conditions. Over the last decade, the Chinese Communist Party has evolved into an economic interest group whose interests are largely aligned with the middle class and entrepreneurial elites of the coastal regions. China's high levels of corruption and failure (thus far) to enact significant rural land reforms (or put in place better healthcare, education, and retirement income security systems) mean that its legitimacy essentially rests on its ability to deliver economic growth that is sufficiently high to absorb both the middle class's children when they graduate from university, and the peasantry's children as they migrate to the cities. With perhaps as much as 60% of its population still located in rural areas, China's leaders need look no further than Thailand to see the instability that results when a disgruntled rural majority decides to take its frustrations into the streets. And in China's case, this risk is not helped by the fact that the People's Armed Police has performed relatively poorly in meeting recent public order challenges (it had to be backed up by the Army during last year's problems in Tibet), while the People's Liberation Army is now drawing most of its recruits from rural regions (due to the lack of sufficient employment opportunities). To be sure, there are multiple reports of "green shoots" of growth in China; however, the ones that seem most important to us are those that are hard to fudge: power production was down almost 3% in the first quarter, while oil consumption was down almost 5%. As a recent study by the Hong Kong Monetary Authority noted ("How Much Do Exports Matter to China's Growth?"), "a ten percentage point decline in

export growth has been associated with a decline of about 2.5% in GDP growth on average. This is much higher than the estimated direct impact of exports on growth." Considering that China's exports are down 17% (using official data) over the year ended in March, the domestic demand and employment effects are undoubtedly substantial. Moreover, as Zeng Peiyan noted in his Boao speech, China's "consumer demand can hardly increase significantly in the short term." Given this, reports that China's state banks are making large amounts of loans to state owned companies to enable the latter to maintain employment come as no surprise. So China is trapped in a dynamic that seems likely to lead to the conflict scenario – or has it found a way out?

Two anomalous developments caught our attention this month. The first was a new report from the Center for American Progress that for the first time collected and examined a wide range of data about China's spending on environmental programs and research ("We Must Seize the Energy Opportunity or Slip Further Behind" by Ben Furnas). The report quoted an analysis by HSBC research that concluded that almost half of China's stimulus package – US $221 billion – was "going toward public investment in renewable energy, low-carbon vehicles, high-speed rail, an advanced electric grid, efficiency improvements, and water-treatment and pollution controls." The CAP noted that the US stimulus plan allocates only US $112 billion to similar investments. China's cleantech spending amounts to more than three percent of GDP, versus less than one half of one percent in the US. It was in the context of this report that we read a Reuters' dispatch on May 1st, reporting that "Chinese state researchers [at the Ministry of Finance] have been asked to draw up proposals for a carbon tax." These new reports lead to an intriguing possibility: could it be that, given the sharp decline in export markets, and an inability to quickly raise domestic consumption spending, China has decided to maintain investment led growth (and employment) by switching to an aggressive focus on cleantech? Some domestic benefits are obvious: higher domestic economic growth and employment. Others are more subtle. In recent years, religious belief has been growing quickly in China, (see, for example, "China's Protestants: A Mustard Seed for Moral Renewal?" by Carol Hamrin). The Chinese authorities' attempts to limit this growth (e.g., their attacks on

Falun Gong) suggest that they view religion's alternative principles of legitimacy and organizational capability as a potentially serious threat to their own power. However, it can also be argued that environmentalism's narrative offers many elements found in religious narratives, including stories of creation, a fall, and redemption. It is also clear that rising environmental pollution is a growing source of public frustration with the Chinese leadership. Hence, by putting their support behind an aggressive environmental investment program, the Chinese government could not only strengthen their economy, but also build an alternative basis for the legitimacy of their rule. Externally, an aggressive environmental push might also have multiple benefits. It would create new export markets that, because of the power of the environmental narrative in the West, might prove very resistant to protectionist forces. Just as important, it could weaken the Obama administration's plan to use higher cleantech investment (and, hopefully, exports to the rest of the world) as the means to avoid a prolonged period of low growth in America, as overleveraged consumers cut their spending to rebuild their savings. Somewhere, Sun Tzu may be smiling. This is an emerging development that clearly bears watching.

In Iran, we also saw further significant developments over the past month. The first was the entry into presidential race of Mohsen Rezaie, a retired commander of the Islamic Revolutionary Guards Corps, who accused President Ahmadinejad of having led Iran to a "precipice". Indeed, Ahmadinejad's recent firebrand speech last month to the U.N. Conference on Racism certainly did nothing to change that image. This was followed by Supreme Leader Ayatollah Khamenei overruling a high profile political appointment by President Ahmadinejad, and the sudden cancellation of the latter's trip to South America. Simultaneously, we saw the defusal of a crisis building over Iran's April jailing of the journalist Roxana Saberi, a dual American-Iranian national who lives in North Dakota (she was released). Iran now has two presidential candidates (the other being former Prime Minister Hossein Mousavi) who appear more open to the improvement in relations offered by the Obama administration. On its face, this would seem to raise the probability of the cooperative scenario developing. That said, there is no evidence that, given further Chinese gains in their relative balance of power vis-

a-vis the United States, Iran would not readily increase the strength of its alliance with the Sinosphere. At best, these recent developments in Iran seem to reduce the short-run probability of conflict with the United States, but not necessarily the medium-term probability.

In the United States, there is no sign that the middle class is becoming less volatile. If anything, events seem likely to ratchet up frustration over the next few months. First, multiple polls (e.g., from Gallup, Rasmussen and Pew) all continue to show very high levels of anxiety about a range of financial issues, from retirement income to health care to paying for college to job loss to having enough money to pay the bills. Moreover, the mortgage credit crisis is about to more aggressively affect the middle class, via a wave of interest rate and payment resets on higher quality Alt-A and Option-ARM loans. Continuing job losses are also having a strong negative impact on many households, whose spending and borrowing behavior was often predicated on the assumption of having two incomes (for more on this, see the book High Wire, by Peter Gosselin, or "Subprime Outcomes: Risky Mortgages, Homeownership Experiences and Foreclosures" by Gerardi, Shapiro, and Willen, that shows how many subprime mortgages were actually refinancings – the implication being that many middle class families hit by economic shocks when house prices were rising turned to subprime mortgages to raise cash). Yet what does the American middle class see in the media? Legislation to reduce mortgage debt failing to pass in the U.S. Congress, as banks (who advocate mortgage reduction to avoid foreclosure in order to protect the value of the second liens on houses via home equity lines of credit) battle against holders of securities backed by first lien mortgages (who oppose mortgage reduction, believing that foreclosures may maximize the value of the securities they hold). They also see aggressive attempts by the Obama administration to save the banking system, but with no high profile forced resignations for the people who created the problems (indeed, there are reports that, with trading commissions and net interest margins at record levels, Wall Street bonus accruals in the first quarter were quite large).

Similarly, the middle class sees aggressive attempts to save autoworker jobs (at quite a high cost per job), even as others continue to be lost in other sectors of the economy. In every state, (with California perhaps the most visible example) the middle class has seen public sector unions dig in their heels to block spending cuts and insist on tax increases. They are also watching a prolonged Congressional debate over environmental legislation, with, if the polls are correct, growing worry about the potential job losses that will be associated with passage of a cap and trade system.

In sum, a rising equity market and the media gushing on about "green shoots" and recovery seems strongly at odds with what the economic and polling data say about how the American middle class views its circumstances today. This growing divide between the American elite and the middle class has been highlighted in a recent series of polls by Rasmussen Reports (www.rasmussenreports.com), which find a 14%/75% split between what they term "elite opinion" (which includes both the political and business elite) and "mainstream" opinion. Strikingly, the gap between Democrats and Republicans within each of these groups was far smaller than the gap between the two groups themselves. Notably, Rasmussen's data show that there is a very large gap between the elite and the mainstream about the state of the economy. In sum, we do not see the rising frustration (and, we suspect, anger just below the surface) of U.S. middle class as consistent with the development of our cooperative scenario.

Let us now move up from the agent level of our hierarchy, to the three issues whose resolution we believe to be critical to a return to a regime of normal economic growth. The first of these is the reduction in the high levels of household indebtedness, not just in the United States, but in the household sector across the Anglosphere, and in selected other countries (e.g., Spain). In none of them have we yet seen real progress towards meaningful debt reduction (e.g., as noted above, disagreements between key financial interest groups have blocked this legislation in the United States). As a result, we see middle class households enduring rising foreclosures, entering into bankruptcies in greater numbers, and rapidly cutting spending to pay

down debts and raise savings and cash holdings. Given that consumer spending previously accounted for a high percentage of GDP growth (reaching 70% in the U.S.), these cutbacks have a strong impact on aggregate demand. While the very aggressive stimulus programs undertaken by governments can, to some extent, offset the impact of consumer cutbacks (and give rise to the widely reported "green shoots" of recovery), governments cannot forever maintain very high levels of deficit spending, particularly if this is used to finance transfer payments rather than public investment. Eventually, the unwillingness of investors to buy their debt will either force them to cut back spending, or lead to increase money supply creation, rising inflation and a prolonged period of weak growth. In the medium term, given reduced consumer spending and a limit on government borrowing, a sustainable recovery in aggregated demand growth must be driven by some combination of exports and private investment. With the whole world battling the same recession, a sustainable increase in exports seems very difficult to achieve, unless you have a very strong position in goods and services whose demand is rising in large global markets (e.g., environmental goods might fit this description, as would, obviously, food). Moreover, at a time of high domestic unemployment, the political opposition in foreign markets to job losses caused by higher imports (the opposite side of another country's higher exports) is likely to be even stronger than in the past.

Given this, for the Anglosphere, the only path out of the current recession that appears sustainable in the medium term seems to be higher private sector investment, complemented by higher public sector investment. But given record low rates of capacity utilization, increased investment won't quickly happen in traditional areas -- hence the importance of enacting legislation (e.g., a carbon tax or cap and trade system) that will stimulate new investment in the range of sectors collectively known as "cleantech." Historically, there is strong precedent for this approach in the long period of growth that followed the end of World War Two, where public sector investment (e.g., in infrastructure, R&D, and improvements in education) and private sector investment both played important roles. Indeed, in his very detailed April 14th speech on economic strategy at Georgetown University, President Obama gave a

clear indication that his administration understands this, and is focused on raising productivity and economic growth by improving health care, education, and the environment in the United States. Yet Obama's ability to navigate the treacherous Washington political waters and actually enact legislation needed to implement this strategy remains highly uncertain, particularly given the yawning gap between elite and middle class views on these issues.

Resolving the actual or near insolvency of much of the world's financial system is the second critical issue that must be resolved before the world economy can return to a normal growth regime. With the release of the "stress test" results in the United States, that nation's strategy has now become clear: the Treasury, Fed, and FDIC apparently plan to escape the crisis over time through a combination of higher bank net interest margins (i.e., the difference between the low cost of government provided funding and rates earned on government debt and performing loans), changes to accounting rules (which relaxed mark-to-market requirements, allowing losses to be recognized over a long period of time), public private partnerships to get some bad assets off the banks' balance sheets, and, where necessary, the conversion of government funding into common equity in the most troubled banks. Of course, this strategy also reflects the very real constraints they face, including the likely high political cost of asking Congress for further bailout funding and the failure, thus far, to pass legislation that would improve the process of managing the failure of a large, systemically important institution. Whether the U.S. government will win this race is open to question – for example, the low end of the IMF's recent estimates of yet-to-be realized losses at U.S. banks seem to be at the high end of the estimates used by U.S. regulators. Moreover, there remains a significant possibility that the global financial system could experience another significant shock from the failure of a large European or Asian institution if the global recession drags on. Finally, the Obama administration seems to be needlessly creating headwinds for itself via the Chrysler bankruptcy, where its behavior has raised serious and widely publicized questions about politically-driven changes to creditor seniority structures that were thought to be solidly grounded in years of case law (the specific issue is the proposal to give a much higher payout to

the United Auto Workers Union's claims than to the claims of more senior creditors). If the bankruptcy court ends up siding with the Obama administration, or if political pressure forces the senior creditors to waive their claims, the resulting increase in financial system uncertainty will only move us further away from a cooperative resolution of the problems facing the world today. Of course, to be fair we should also note that the creditors do not have totally clean hands in this argument. It has also been widely reported that in at least some bankruptcies, creditors whose loans have been insured via their purchase of credit default swaps have resisted restructuring proposals (e.g., like debt/equity swaps) that would have kept a firm out of bankruptcy. We don't doubt that this is a card the Obama administration will aggressively play if the seniority issue continues to heat up. Yet the end result will be the same: a higher level of uncertainty that discourages private sector investment and delays the return to higher levels of economic growth.

The third issue that must be resolved for the world to return to normal growth is the unsustainable global imbalances that developed over the past decade, as seen most vividly in the United States' large current account deficit and China's large current account surplus. In the cooperative scenario, these imbalances would be reduced through an increase in consumption spending in China and an increase in investment spending in the United States. In the conflict scenario, neither of these would happen, and global trade would likely fall, as the system evolves into de-facto blocs. Based on developments to date, it seems that the conflict scenario outcome is more likely than the cooperative one. Another factor that seems likely to hasten the development of the conflict scenario would be a prolonged period of deflation. At this point, the conventional wisdom appears to be that strong money supply creation by many central banks has tipped the balance of risks in favor of a significant increase in inflation at some point in the future. We continue to share that conventional wisdom.

However, we also recognize that the case for a prolonged period of deflation is also growing stronger. First, the surplus of many factors of production has been rising, not only in the form of higher unemployment around the world, but also in the form of sharp drops in the rate of capacity utilization (e.g., at 69.3% in the United States, it is

at its lowest level since the series began in 1967) and rising storage levels for many commodities. On the demand side, we have yet to see any sustained increase in consumption or private investment as a result of the large government stimulus programs underway around the world. Some will argue that this is only a matter of time. However, others will make the counterargument that any recovery in private sector demand still faces very strong headwinds due to already high leverage and a financial system unwilling to make new loans accept to the most creditworthy borrowers and even then under very tight terms (compared to the recent past). Moreover, continuing weak demand and trouble obtaining financing will undoubtedly lead for further business failures, increasing supplies of inputs, and quite possibly sharp falls in their price, as we have already seen in the housing market. In sum, in the real economy, conditions seem ripe for deflation, particularly if the global trading system remains intact, given the pressure China adds to the excess of global supply in many industries.

On the monetary side, the case for inflation rests on the eventual impact of the "quantitative easing" programs undertaken by many central banks. However, when you check the data against the underlying logic of this argument, you see that, rather than using the funds they have received from the central bank to expand lending (which would push up demand relative to supply, eventually causing prices to rise), banks are instead holding excess reserve balances. Another way to look at this is in terms of the MV=PQ equation so beloved by monetarists. This equation states that the money supply times the velocity of money (the number of times a unit of money is spent) equals the price level times real output (i.e., nominal GDP). The inflation argument rests on the belief that the increase in M must lead to an increase in the price level (inflation). However, this argument can be undermined by a fall in the velocity of money (e.g., banks holding excess reserves, or households and businesses holding higher cash balances) and/or by a fall in real output (Q) – e.g., due to high debt levels, political dithering, and rising uncertainty.

On balance, we believe that governments recognize that a prolonged period of deflation would likely be far more debilitating than an equal period of high inflation, and

that they will do everything in their power to avoid the former outcome. Assuming progress on key policy issues (e.g., environmental, health care, and financial reforms in the United States), we still expect them to succeed. Yet we cannot deny that the case for prolonged deflation has strengthened in the past month.

So what does last month's data mean for investors and their asset allocations? We use the following table to provide insight into the balance of market views as to which of three regimes – high uncertainty, high inflation, or normal growth – is developing. Under each regime, certain asset classes should deliver relatively higher returns. We assume that the rolling three month return on these asset classes is a useful indicator of the market's collective estimate of the regime that is most likely to develop in the short-term.

Rolling Three Month Returns in USD		30-Apr-09
High Uncertainty	***High Inflation***	***Normal Growth***
Short Maturity US Govt Bonds (SHY)	US Real Return Bonds (TIP)	US Equity (VTI)
0.19%	**1.73%**	**7.46%**
1 - 3 Year International Treasury Bonds (ISHG)	Long Commodities (DJP)	EAFE Equity (EFA)
0.02%	**-0.24%**	**8.32%**
Equity Volatility (VIX)	Global Commercial Property (RWO)	Emerging Equity (EEM)
10.35%	**8.76%**	**26.58%**
Gold (GLD)	Long Maturity Nominal Treasury Bonds (TLT)*	High Yield Bonds (HYG)
-4.42%	**-4.63%**	**4.40%**
Average	***Average (with TLT short)***	***Average***
1.53%	*3.72%*	*11.69%*
Last Month:	***Last Month:***	***Last Month:***

3.66%	-4.25%	-9.16%

* falling returns on TLT indicate rising inflation expectations

As you can see, the weight of investor opinion has shifted quite dramatically over the past month, away from continuation of the high uncertainty regime and toward a return to normal growth, with a greater risk of high inflation. Based on our analysis, we conclude that these expectations are at best premature, and quite possibly flat out wrong.   In our view, continuation of the uncertain regime seems the most likely, followed by the high inflation regime.

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

	Cooperative Scenario	**Conflict Scenario**
Brief Scenario Description:	More rapid domestic consumption growth in China and cleantech investment demand in North America return the world to a health rate of growth, and enable preservation of the world trading system, a reduction in global imbalances, and monetary actions to head off an extended period of	Domestic politics prevents an increase in cleantech investment in the United States, while China continues to pursue export led growth while encouraging rising nationalism to limit domestic unrest and the political threat to the current Chinese leadership. This only reinforces growing

	Cooperative Scenario	Conflict Scenario
	high inflation.	demands for protection in Europe and the United States. Weak global demand is maintained by rising fiscal deficits, which are increasingly monetized, leading to much higher inflation.
Key Agent Level Scenario Assumptions		
U.S. Middle Class	Resolution of banking crisis, passage of health care reforms, mortgage relief, and a sharp increase in cleantech driven investment spending lead to reduced uncertainty and a shift towards higher savings and lower consumption, without triggering populist demands for protectionism.	Continued economic stagnation, uncertainty, and insecurity lead to more extreme partisanship and the development of strong populist calls for protectionism and income redistribution.
Chinese Peasants	Land reform and economic growth (which provides jobs) boost incomes while a sharp increase in government spending on health care and education limits resentment of Communist Party corruption and economic inequality compared to coastal elites. This minimizes social unrest and threats to continued legitimacy of the Party's governance of China.	Growing unemployment and a sense that government stimulus is disproportionately benefiting coastal and party elites triggers widespread unrest and peasant alignment with disaffected students, urban unemployed, and members of the military. The Chinese government becomes aggressively nationalist in an attempt to channel this anger outward. At best, this triggers a global retreat into trading blocs; at worst, this strategy fails and China descends into fragmented authoritarian regions with minimal central control.

	Cooperative Scenario	**Conflict Scenario**
Iranian Youth	Prolonged economic stagnation and rising inflation lead to the defeat of President Ahmadinejad in June 2009 elections, and widespread pressure for better relations with the West. Economic self-interest trumps the Revolutionary Guards' ideological opposition to this opening. Moderation of Iran's conflicts with the west and a renewal of inward investment flows lead to increased hydrocarbon production, limiting upward pressure on global energy prices.	Supreme Leader Khamenei ensures that Ahmadinejad is re-elected. Repression and emigration are used to limit resistance by younger Iranians to these policies. The country attempts to improve economic conditions via closer ties with China, while maintaining its nuclear program (which could trigger an attack by Israel) and a conflict-oriented policy versus the US that continues to put upward pressure on energy prices.
Key Issue Level Scenario Assumptions:		
Overleveraged Consumers	Effective mortgage relief plans implemented in most affected countries, while stronger economic growth maintains income needed for debt repayment.	No effective mortgage relief legislation passed. Instead, rise in bankruptcies and mortgage foreclosures puts continuing downward pressure on housing prices.
Financial System Weakness	Combination of stronger investment and export led economic growth and effective bank rescue plans reduces uncertainty about health of system, and enables sufficient flow of credit to support renewed economic growth.	Worsening economic conditions and failure of bank rescue plans (due to design or political resistance) cause uncertainty to remain high, credit flows to be constrained, and defaults to increase, which all contribute to a worsening process of debt deflation.
International Imbalances	Rising domestic consumption spending in China enables a reduction in	China's continued emphasis on export led growth, at a time when the US is

	Cooperative Scenario	**Conflict Scenario**
	export dependence, while U.S. imports are reduced by a shift from private consumption to private saving and higher investment spending and greater exports. This reduces global current account imbalances to a manageable level.	incurring high fiscal deficits (and eventually higher taxes) to maintain global demand, triggers demands for greater protection, which in turn precipitate a dollar exchange rate crisis as other countries move to limit the losses on their foreign exchange reserves. Result is a fragmentation of the global trade and financial system into much less integrated blocs.
Evidence Over the Previous Three Months Against Each Scenario (most recent month first)	*Evidence Against the Cooperative Scenario*	*Evidence Against the Conflict Scenario*
April 2009 (This Month's Issue)	• Aggressive speeches by Chinese officials at Boao Forum meeting of Asian nations, demanding US protect Chinese holdings of Treasury bonds against inflation, and that Asian nation's organize to negotiate with commodity suppliers.. Another speech acknowledged that increase in domestic consumption demand would take time to realize • Declining power and oil consumption in China • Failure to pass legislation to ease mortgage debt burden in United States • Environmental and	• Increased probability that China may aggressively push cleantech, both domestically and in export markets • New conservative enters presidential race in Iran, saying Ahmadinejad has pushed nation to "precipice." • US Stress Test results have clarified strategy for rescuing financial system • Obama Georgetown University speech presented a coherent overview of economic strategy

	Cooperative Scenario	**Conflict Scenario**
	energy legislation that is key to higher investment in cleantech is stalled in US Congress • Obama administration actions in Chrysler bankruptcy increase uncertainties facing creditors • Wall Street bonus accruals in first quarter back at high levels, and no executive firings a la Rick Wagoner at GM. • Polling data indicates widening gap between elite's view of current situation (improving) and view of middle class (worsening) • Evidence that the chance of an extended period of deflation has increased	
March 2009 (April Issue)	• In the US, proposed environmental, energy and healthcare reform legislation all look to be in trouble. • Much criticism of the Geithner bank rescue plan in the US, and the sense it will not resolve the growing asset quality crisis. • Growing populist anger at bankers and the cost of bank bailouts in US and UK • At best only very weak movement towards	• G20 agreed significant increase in IMF resources (though admittedly this includes funds that were already in the pipeline). This will enable better support for developing countries and Eastern Europe, to limit fall in demand and banking crises fallout in those regions. • Evidence that fall in consumer spending is stabilizing, and that inventory rebuilding is starting, after record setting reductions

	Cooperative Scenario	Conflict Scenario
	residential mortgage relief in the US • Growing emphasis on "China as the victim" narrative, from official and unofficial sources. • Apparent Chinese emphasis on maintaining exports, though with attempt to create an alternative to the USD in which to accumulate FX reserves. • Growing stress within Eurozone and European Union, as Germany's interests diverge from what most stressed nations see as being in their best interest. France reverting to type with growing labor unrest, corporatism, and attacks on Anglo Saxons. Also evidence of growing European estrangement from the US, with dawning realization that underlying problems are related to national policies and interests, and not presidential personalities. • Lack of agreement at G20 on appropriate level of fiscal stimulus and best way to re-regulate financial sector. Failure of NATO to agree more European troops for Afghanistan mission. Growing risk that US	(thanks to extremely efficient global supply chains). • Evidence that fall in consumer confidence has bottomed out. • Mohammand Khatami, the most moderate of the candidates in the Iranian presidential race, has dropped out, ostensibly to avoid splitting the opposition vote with the somewhat more conservative Hussein Moussavi. This apparently raises the probability of an Ahmadinejad defeat in June.

	Cooperative Scenario	**Conflict Scenario**
	middle class will grow increasingly resentful of what it may come to see as raising its taxes to carry more than its fair share of the world's economic and security burdens.	
February 2009 (March Issue)	• Whether due to inexperience or lack of staff, there are apparently serious delays in getting the Obama stimulus funds flowing – for example, cleantech investment has ground to a halt. There is also evidence of delay in reaching agreement on the details of Secretary Geithner's bank bailout plan. • Growing questions about the ability of the US Government to bear the cost of bailing out the financial system, in addition to the large deficits implied by the Obama stimulus program and budget, not to mention the off-balance sheet liabilities for future Social Security and Medicare spending (assuming no changes in these programs). These concerns are reflected in rising spreads on credit default swaps written on US government debt. • Obama administration	• Obama's proposed energy and environmental programs, along with healthcare and education reforms, should stimulate investment spending, and also produce higher tax revenue (via auction of cap and trade plan's emissions allowances). • Level of technology spending in Obama package is, in constant dollar terms, approximately equal to spending incurred to put a man on the moon. If the Obama program produces similar productivity and other spinoff benefits, the impact on long term growth could be very significant. • Chinese have made some adjustments to their stimulus plan in the direction of greater social safety net spending. • Federal Reserve is aggressively increasing the money supply, and

	Cooperative Scenario	Conflict Scenario
	continues to support Card Check legislation. Some studies show that Roosvelt's support for Wagner Act (which, like Card Check also made it easier to unionize private sector businesses) increased uncertainty and limited business investment and employment growth. • Public sector unions around the world appear to be digging in their heels and demanding higher taxes to fund their wages and benefits. This is raising domestic conflict in many countries. • A growing amount of evidence is consistent with the hypothesis that China may be intentionally fomenting conflict with the west as part of a long term strategy to return the Middle Kingdom to its proper place in the world. • The cancellation of many projects on the supply side of the global energy industry seems to guarantee an eventual spike in prices when global demand begins to recover. As was the case in the summer of 2008, such a spike would	attempting to directly boost credit availability, and has announced a long-term 2% inflation target. All of these measures will minimize the risk of a prolonged deflationary spiral developing.

	Cooperative Scenario	Conflict Scenario
	function as a tax that could quickly choke off the beginnings of a sustained global recovery.	

Product and Strategy Notes

Which Asset Classes are the Best Inflation Hedges?

In response to the global recession, money supply growth rates are now at record levels in many parts of the world, which has significantly raised the chances of higher inflation in the years ahead. A number of recent research papers have re-examined the inflation hedging properties of different asset classes, and we will summarize their key findings here.

In "Inflation Hedging for Long-Term Investors", Attie and Roache of the IMF begin with two important distinctions: first, between the one year and longer term response of nominal asset class returns to an increase in inflation, and second, between an increase in expected inflation and an unexpected increase in inflation. From our perspective, for a long-term investor, the key issue is the evolution of longer term asset class returns to both expected and unexpected increases in inflation.

The IMF paper focuses on U.S. markets (where data availability is best) and examines the inflation hedging properties of cash (i.e., short term government securities), nominal return government bonds, equities, commodities and gold. They also include two SDR weighted indices of global equity and global government bonds (i.e., these country weights are proportionate to the weights of different currencies in the Special Drawing Rights basket). Let's start with the twelve month change in returns on different asset classes (between 1973 and 2008) in response to a one percent increase in the rate of inflation (i.e., the short-term response). The IMF finds that the two best hedges were commodities (a 9.87% increase in the GSCI index) and gold (a 6.87% increase). Cash was next best, with a fall of 57 basis points, followed

by short term foreign bonds with a fall of 69 basis points.   In contrast, domestic equities fell by (2.59%), global equities by (3.48%), domestic government bonds (all maturities) by (1.33%) and global bonds (all maturities) by (2.36%).

However, for long-term investors, the one year return response to a rise in inflation is less important than the five year response. As the IMF notes, "inflation shocks persist...After one year, the cumulative increase in price level is nearly three times the size of an initial shock, and after five years this has risen to five times." Hence, the long-run return response of different asset classes is critical. To capture this, the IMF calculates a long-run return multiplier, which essentially measures the extent to which the effects of an inflation shock are offset by a rise in nominal asset class returns. A multiplier of 1.0 signifies that the inflation shock is completely offset by higher asset class returns; greater than 1.0 signifies more than offset, and less than 1.0 (or negative) signifies a failure to fully offset the effects of inflation.

Short term Treasuries have a long-run multiplier of .8. Bonds suffer sharp relative declines in the short-run, but after a trough at three years begin to offset earlier losses through increases in yields relative to inflation, leading to a multiplier of .1. Equities show the worst performance, with a multiplier of (.2). Commodities are a more interesting case, with the strong short term response offset after about two years by a decline in economic activity (and commodity demand) triggered by higher inflation. As a result, their long-term multiplier is, like equities, (.2). The IMF paper does not present a longer term analysis of the gold multiplier.

Finally, two methodology points should be kept in mind about this study. First, as the authors acknowledge, the data it uses covers a period (1973-2008) when a number of structural breaks have occurred in the underlying economic series and return generating processes for some asset classes. Hence, the study's conclusions are at best rough estimates.   This view is further reinforced by the second methodology observation, that some of the study's methodology assumes normally distributed returns. While this makes the math tractable, it is at odds with actual distributions which have fatter tails (i..e, a greater portion of extreme returns).

Two other asset classes that are traditionally viewed as good inflation hedges are absent from the IMF study: real return (inflation-indexed) bonds, and commercial property. Two studies find that, in both the U.S. and U.K, inflation indexed bonds provide good hedges against inflation: "Diversification Benefits of Treasury Inflation Protected Securities: An Empirical Puzzle" by Mamun and Visaltanachoti" and "Asset Allocation with Inflation Protected Bonds" by Kothari and Shanken. However, neither study takes the IMF approach, and examines the long-term multiplier effect following an inflation shock. However, the IMF does raise the interesting point that historically, a rise in inflation has been associated with a longer-term rise in realized (ex-post) real interest rates, due to a sharp increase in the inflation risk premium required by investors in nominal bonds. However, they make no mention of whether this also applies to ex-ante real rates (indeed, if the real interest rate rise is all due to higher inflation risk premia, then ex-ante real yields would remain flat or decline). This is an important consideration for investors in inflation protected bonds, since a fall in real yields would boost their returns, while a rise in real yields would cause them to decline over the longer-run. On balance, given the decline in real economic activity associated with rising inflation, we think it most likely that ex-ante (expected) real yields – which drive inflation protected bond pricing -- would decline (raising returns on this asset class), and that any increase in realized real returns on nominal government bonds is driven by an overestimation of the inflation risk premium relative to the rate of inflation that later occurs.

The inflation hedging benefits of commercial property is a far more interesting issue. First, it is complicated by data and market issues affecting both exchange traded and directly owned commercial property. These are sufficiently complicated that they will be the subject of a longer article in next month's issue. Second, the hedging benefits of commercial property also has a significant time-lag component. In the short-term, property rents are generally fixed (though revenue related retail rents and similar structures are an exception). However, as leases come up for renewal, they tend to catch up with inflation – though the extent of the catch up can be offset by the decline in economic activity caused by inflation. These issues are examined in

another paper, "The Inflation Hedging Characteristics of US and UK Investments: A Multi-Factor Error Correction Approach" by Hoesli, Lizieri and MacGregor. In the short-run, the authors find little adjustment to an inflation shock; however, in the long-run, they find that in both the US and the UK property returns recover most (but not all) of the ground they lost – to put it in the terms used by the IMF, the multiplier is positive, but less than 1.0.

Last but not least, also absent from the IMF study is any discussion of timber as an inflation hedge. We would expect it to perform in a manner similar to commercial property. In the short term, timber producers' earnings and returns might decline following a rise in inflation, assuming costs rose faster than revenues earned on fixed price contracts. However, given the continuing (and completely uncorrelated) biological growth of timber, as well as the renegotiation of contract prices over time, we would expect timber to have a five year inflation multiplier close to 1.0 (though still below it because of rising inflation's negative impact on aggregate demand growth).

So, to sum up: in the short-term, inflation-protected bonds, commodities and gold appear to be the best inflation hedges. Not far behind are short-term domestic and foreign government securities (with the performance of the latter driven by the difference between home country inflation and average inflation in major foreign bond markets). In the medium term, inflation protected bonds and short-term bonds continue to do well. We suspect this also applies to gold and timber. Commodities, however, lose some of their hedging benefits if higher inflation leads to lower real economic activity. On the other hand, as is well described in another new paper ("The Three Epochs of Oil" by Dvir and Rogoff), declining demand can be more than offset by changing commodity supply conditions, as happened in 1973 and 1979 – so the medium term decline in commodities' inflation hedging benefits is not automatic, and in fact may not occur. Finally, any long-term decline in commodities returns may be offset by better long-term hedging performance in commercial property, where adjustments to higher inflation only occur over time.

New Products

In Canada, a number of new gold funds have been announced, by Claymore and Sprott. They will join the Central Fund of Canada (which invests in gold and silver bullion) and the BMG Bullion fund (which invests in gold, silver and platinum).

In the United States, IndexIQ, recently filed a registration statement for even more ETFs that track hedge fund indexes, including equity market neutral, global macro, distressed debt, managed futures, and a number of arbitrage strategies. In March, its first hedge fund tracking ETF product (QAI) began trading. It invests in an underlying portfolio of ETFs to replicate the returns of a broad hedge fund index. We are not enthusiastic about QAI because the index it tracks includes a wider universe of underlying hedge fund strategies than those that seek to deliver alpha with a low correlation to returns on broad asset classes that can be obtained at a lower cost by passive index investors. Because of their more granular strategy segmentation, these new products may be more attractive. We will monitor their performance after they start trading, and write about them again. However, also included in the IndexIQ prospectus was a product that we find even more interesting and potentially useful in investor portfolios: an ETF that tracks US CPI inflation. We look forward to analyzing it in more depth once it has passed through the SEC and actually launched on the market.

Other News of Note

- It was nice to read JP Morgan's new research note on the virtues of investing in timber as an asset class ("Investing in Timberland: Another Means of Diversification" by Jeff Mortimer).
- We note that art prices are off more than 35%, according to the Mei Moses Index, confirming our long-held view that investing in art would provide little in the way of

diversification benefits (given the strong linkages of many buyers' wealth to GDP and equity market performance).

- We couldn't help but notice the comment by Bob Barker of Credit Suisse Asset Management in a recent FT article ("Multi Challenges for Asset Managers" by Pauline Skypala). He noted there is rising demand for from clients for advice on global asset allocation. Don't forget to recommend us to your friends and colleagues!

- In "What Matters More for Entrepreneurial Success: Skills, Personality, or Luck?", Liechti, Loderer, and Peyer apply econometric techniques to a database of Swiss entrepreneurs and conclude that "luck is about two to three times as important as the other two success factors." That certainly agrees with our observations over the years, across a wide range of countries and businesses. But the winners don't want to admit it, and coming from the losers it sounds too self-serving.

- Another FT article ("Europe's Rich Rush for Hedge Fund Exits" by Deborah Brewster) noted that "rich Europeans, who were the first to invest in hedge funds and once comprised the majority of investors, have been the first to exit in the downturn", citing a new BNY Mellon study. Apparently Asian investors weren't far behind. Over the past three years, individual investors' share of hedge fund assets fell from 67% to 57%. From our perspective, this seems logical, as investors realize that (a) many expensive "hedge fund" strategies were actually directional bets that contained a lot of asset class beta they could have obtained much more cheaply from other sources; (b) hedge fund compensation structures were not only expensive, but created significant principal/agent conflicts, due to fund manager's ability to wind up the fund rather than spend years working only for fees to regain a high water mark; (c) they now recognize that for many strategies, compensation for bearing either liquidity or extreme tail (insurance) risk accounted for a greater share of returns than they initially believed; and (d) more and more uncorrelated alpha strategies are available at much lower cost in the form of mutual and exchange traded funds.

- The implications of these fund flows are further fleshed out in "Toward Transparency and Sustainability", an interesting new report from IBM Global Business Services on the future of the investment management industry. Depressingly, their survey data paints a picture of an industry that is not only out of touch with its client's top needs, but also believes itself to be falling short in areas that are critical to its future, like managing systemic risk, implementing new technologies, and eradicating inefficiencies in its business processes. IBM concludes that "the days when the financial markets industry could make large sums of money by capitalizing on pockets of opacity and high leverage are over." In its place, they forecast greater division of firms into three strategic groups: providers of beta returns, providers of uncorrelated alpha returns, and advisers. It is a vision we've shared for years, the realization of which is long overdue and cannot help but benefit investors.

- Last but not least, we occasionally come across an academic study that leaves us chuckling. In "The Demographics of Fund Turnover", Christoffersen and Sarkissian "document that demographic factors influence mutual fund turnover." Since turnover adds to fund costs and therefore detracts from returns, we were curious about their findings. "These factors include managerial experience, location, education and gender. On average, funds in financial centers trade more, but this excess turnover declines with experience. While most extra trading is concentrated among less experienced managers in financial centers, they do not outperform inexperienced managers located in smaller cities." The authors also found that "managers in financial centers increased their trading after good performance. This result was particularly strong for less experienced more educated male fund managers investing in growth stocks and located in New York." Based on years of observation, we are certain that this is a conclusion many a New York bartender would strongly support!

Pandemic Influenza Briefing (Previously Sent as Email)

As long-time subscribers are well aware, for many years now, we have regularly reviewed the asset class valuation and return impact of a "wild card" influenza pandemic scenario, and in particular, a step-function increase in the transmissibility of H5N1 – so called "bird flu." Given the headlines over the past few days about a new strain of H1N1 influenza that is apparently spreading from Mexico, we have prepared this short background memo for our subscribers.   It covers three issues: (1) Background on influenza, and its potential economic impact; (2) Warning Indicators to monitor; and (3) Our estimate of the possible implications of H1N1 Mexican influenza for asset class valuations and returns over the next twelve months.

Background on Influenza

Influenza viruses are classified first by type (A, B, or C); then by subtype, and then by strain. Most influenza viruses, including the most recent Mexican "swine flu" and so called "bird flu" (or, more technically, "Highly Pathogenetic Avian Influenza" or HPAI) are type A influenzas. Viruses are subtyped based two of the eight strands of RNA found on their genome: HA (which affects the production of the glycoprotein hemagluttin) and NA (which affects the production of the glycosylate enzyme neuraminidase). Hence, HPAI is of the subtype H5N1, and the latest Mexican swine flu is of the H1N1 subtype. Currently, 15 HA subtypes and 9 NA subtypes have been identified. These subtypes are further classified according to their so-called "strain", which is based on the genetic heritage of the different strands of RNA they contain. In between periodic outbreaks in humans, the world's population of influenza viruses resides in the intestinal tract of waterfowl, which are usually not affected by them. In contrast, human influenza viruses have a marked preference for the upper respiratory tract. Hence, in order for an avian influenza virus to attain the capability to infect humans, its genome must change, so that it develops a preference for attaching itself to the human upper respiratory tract rather than the intestinal tract of aquatic birds. There are different theories about how these changes happen. Some treat them as random accidents, produced by the tendency of the influenza virus to replicate itself in

great numbers, but with poor fidelity between generations (i.e., to randomly mutate different aspects of its eight RNA strands).

Another theory is that the creation of new virus types is facilitated when a host becomes infected with more than one type of influenza virus. Pigs are the prime suspect for this mechanism, because their intestinal tracts are similar to waterfowl (in that influenza viruses that bind to the latter can bind to the former), while the upper respiratory tracts are similar to humans'. Hence the reassortment of influenza RNA in pigs can produce new "swine" viruses with both avian and human characteristics. Yet another theory posits that the evolution of the influenza virus is driven more purposefully, in that variants with higher fitness (i.e., ability to attach to a host, replicate, and be transmitted) are (through some mechanism) selected as different subtypes recombine (e.g., this seems to account for the rapid spread of antiviral resistance through multiple types of flu viruses around the world in the past two years).

Three different terms are critical when it comes to assessing the danger posed by an influenza virus. The first is its transmissibility, or the ease with which it is passed from human to human (abbreviated as H2H), without any common exposure to aquatic or other birds (e.g., chickens have become a reservoir for HPAI) or pigs. The second is referred to as either the virus's "virulence" or its "pathogenicity." Both of these terms refer to the degree of sickness (and, ultimately, the death rate) produced by a given strain of influenza. Finally, you may hear the term "tissue tropism" in the same context as virulence or pathogenicity. This refers to the specific body organs that are affected by an influenza virus. The typical influenza virus affects the upper respiratory tract. It kills via a number of mechanisms, including aggravation of preexisting respiratory and cardiopulmonary conditions, and weakening a host so as to allow the development of a secondary bacterial pneumonia infection. Less often, an influenza virus can directly cause a type of viral pneumonia (which, unlike bacterial pneumonia, cannot be treated with antibiotics). This was the main way that the 1918 pandemic influenza (which was also of the H1N1 subtype) killed its victims, via rapid lung inflammation and associated haemorrhaging. What has made many medical professionals particularly fearful of H5N1 has been the evidence of its broad tropism, with apparently severe effects on a

range of organs, including the brain, liver, and intestinal tract. Last (but certainly not least), history has shown that in most cases (1918 being an exception) there is an apparent evolutionary tradeoff between transmissibility and virulence – for example, while easily transmissible, seasonal flu is not particularly deadly; in contrast, while quite virulent, H5N1 has thus far shown (in humans) very weak transmissibility.

Let us now turn to the economic impact of influenza. One thing to keep in mind is that our knowledge of these issues is limited by the weakness of the underlying data we have to work with. For example, records from the 1918 pandemic are quite poor. More surprising is that even more recent data has significant weaknesses. For example, there is an ongoing controversy about the measurement in the United States of "flu related deaths." The narrower definition is based on influenza and pneumonia related deaths, leading to estimates of on the order of 36,000 annual deaths from seasonal flu in the United States. Yet on its website, the Center for Disease Control also offers a higher annual estimate (51,000) that also includes deaths from other causes (e.g., cardio-pulmonary and other respiratory diseases) that are aggravated by influenza.

One commonly used assumption is that each year in the United States, 15% to 20% of the population is infected with seasonal influenza. Based on a population of 306 million, this amounts to about 61 million infections per year. However, since the strains of seasonal flu in circulation are usually relatively mild, only 1% of infected people (about 610,000) end up being hospitalized. The highest hospitalization rates are typically found among the very young and the very old. Of those who are hospitalized because of influenza, roughly 8% die (which yields 49,000 deaths, or about 0.08% -- i.e., eight one hundredths of one percent -- of those infected, or 0.016% of the overall population). As noted above, data on the 1918 pandemic are limited. However, available estimates suggest that 675,000 people died in the United States, out of a population of about 103 million, for an overall death rate of about 0.66% of the population. Of those infected, an estimated 2.5% died. To put that into current terms, out of a 2009 population of 306 million, an exact repetition of the Spanish flu would lead to just over 2 million deaths.

However, many things have changed since 1918, and it is therefore highly unlikely that we would see such an exact repetition. Specifically, three factors seem likely to reduce the death rate from any pandemic. First, influenza vaccines exist today. To be sure, the 2008 vaccine does not appear to give any immunity to the latest Mexican swine flu. But vaccine development and production technology is sufficiently advanced that significant dosage volumes could be available about six months after the outbreak of a highly virulent new strain of influenza (there is a caveat here, which is that H5N1 is lethal to chicken eggs, which is a primary production technique for traditional influenza vaccines; however, the latest Mexican H1N1 strain has not been reported to be lethal to eggs). Second, much more sophisticated modeling methodologies are available to help devise policies (e.g., school closings and travel bans) that can help to limit the spread of a virus until large volumes of vaccine become available (of course, the caveat here is that globalization enables viruses to move around the world much more quickly, as we are seeing with the Mexican case). Third, modern medicine has more treatments at its disposal than were available in 1918, including antivirals (though rising levels of virus resistance to amantadine and Tamiflu have limited the effectiveness of this line of attack), mechanical ventilators, and antibiotics to control secondary infections. So it is unlikely (though not impossible) that we would again see the high death rates associated with the 1918 influenza pandemic.

Warning Indicators to Monitor

Thus far, based on available media reports, the Mexican swine flu does not appear to be highly virulent. The cases outside of Mexico appear to have been mild, with few hospitalizations required and no deaths. However, the data from within Mexico paint a different picture, with more than 143 deaths now reported. Since we don't have an estimate of underlying infection rates (which are at best very rough, even under ideal conditions), we can't reach any conclusions about the meaning of this figure. Moreover, we have very little information on the cause of death – though the good news here is that there are no reports of unusual tropisms – apparently, deaths are

caused by traditional (for flu) respiratory tract complications (and Mexico City's high level of pollution and pre-existing respiratory conditions would logically elevate its death rate from these).

That said, we are looking for the following warning signs that this outbreak represents a more serious threat than it now appears to be:

1. Reports that the Mexican swine flu affects other organs – e.g., that it is neurotopic, or that it affects the digestive tract, liver or kidneys.

2. Also with respect to virulence, we are looking for any reports of coinfection (e.g., in swine) with Mexican H5N2 poultry influenza, which was associated with heart, pancreas and kidney tropism. Similarly, we are looking for any reports of Mexican swine H1N1 reaching Indonesia or Egypt, where H5N1 infections in poultry (and possibly other animals) have reached high levels (it is no coincidence that two of the United States premier infectious disease research organizations – Naval Medical Research Units 2 and 3, are, respectively, deployed to Indonesia and Egypt). The analogy we have in mind is 1918, when the initial mild wave of flu infections was soon followed by a subsequent wave of much more serious infections (which could have been caused by reassortment or recombination with more dangerous strains of the influenza virus).

3. Reports that it is associated with viral pneumonia, and cases of severe inflammation (which produce so-called "cytokine storms", in which inflammation sets off a positive feedback loop, sending the body' immune system into overdrive, and filling the lungs with white blood cells and other fluids). This may be associated with an unusually high death rate for 19 – 64 year olds, relative to the death rates for younger and older infected patients

4. Reports that the virus is characterized by unusually high replication rates in a host.

5. Rising rates of hospitalizations – above 1 – 2% of infected patients.

6. Reports of more than 10% of those hospitalized with Mexican swine flu dying from the disease.

Economic and Asset Allocation Implications

In recent years, there have been a large number of estimates of the amount of economic damage that could result from a serious global influenza pandemic (see, for example, "Pandemic Economics: The 1918 Influenza and its Modern Day Implications" by Thomas Garrett, or "A Potential Influenza Pandemic: Possible Macroeconomic Effects and Policy Issues" by the U.S. Congressional Budget Office). All of them agree that the impact on a normally functioning global economy could be quite serious – e.g., a reduction in global GDP of more than 2.5%. However, that is already happening, even in the absence of an influenza pandemic. The real question is whether a pandemic would make things much worse. Our guess is that while it would worsen the situation somewhat in the short term, it might actually help it in medium term. This view rests on the key assumption that a flu pandemic might move the world back towards our cooperative scenario, and off the track towards increased conflict that we seem to be on today.

In terms of asset class valuations, our previous analysis was that the primary impact of an influenza pandemic would be a sharp rise in uncertainty, and an associated increase in demand for appropriate hedges, such as short term government securities and gold. Differential demand for different currencies could be driven by perceptions that one or more areas were coping significantly better or worse with the flu outbreak. The reduced economic output associated with a flu pandemic would obviously be bad for equities, as well as commodities, assuming that the fall in

demand for them would be much greater than any offsetting fall in supply. The impact on commercial property would depend on the severity of the influenza outbreak, with the more severe scenarios associated with lower valuations for commercial property, due to reduced demand. However, as noted with respect to the economic impact of pandemic flu, these negative asset allocation effects have already occurred due to the financial panic of 2008. So rather than a substantial effect, at this point we estimate that the most likely result of the Mexican swine flu (assuming it doesn't become much worse) is a damping of the (quite possibly premature) rally in global equity markets, and some further upward pressure on gold and short-term government security prices.

Model Portfolios Year-to-Date Nominal Returns

We offer over 2,000 model portfolio solutions for subscribers whose functional currencies (that is, the currency in which their target income and bequest/savings are denominated) include Australian, Canadian, and U.S. Dollars, Euro, Yen, Pounds-Sterling, Swiss Francs and Indian Rupees. In addition to currency, each solution is based on input values for three other variables:

- The target annual income an investor wants her or his portfolio to produce, expressed as a percentage of the starting capital. There are eight options for this input, ranging from 3 to 10 percent.

- The investor's desired savings and/or bequest goal. This is defined as the multiple of starting capital that one wants to end up with at the end of the chosen expected life. There are five options for this input, ranging from zero (effectively equivalent to converting one's starting capital into a self-managed annuity) to two.

- The investor's expected remaining years of life. There are nine possible values for this input, ranging from 10 to 50 years.

We use a simulation optimization process to produce our model portfolio solutions. A detailed explanation of this methodology can be found on our website. To briefly summarize its key points, in order to limit the impact of estimation error, our assumptions about future asset class rates of return, risk, and correlation are based on a combination of historical data and the outputs of a forward looking asset pricing model. For the same reason, we also constrain the maximum weight that can be given to certain asset classes in a portfolio. These maximums include 30% for foreign equities, 20% for foreign bonds, domestic and foreign commercial property, and commodities (including a sub-limit of 10% on timber), and 10% for emerging markets equities. There are no limits on the weight that can be given to real return and domestic bonds, and to domestic equities.

Each model portfolio solution includes the following information: (a) The minimum real (after inflation) internal rate of return the portfolio must earn in order to achieve the specified income and savings/bequest objectives over the specified expected lifetime. (b) The long-term asset allocation strategy that will maximize the probability of achieving this return, given our assumptions and constraints. (c) The recommended rebalancing strategy for the portfolio. And (d) the probability that the solution will achieve the specified income and savings/bequest goals over the specified time frame.

We use two benchmarks to measure the performance of our model portfolios. The first is cash, which we define as the yield on a one year government security purchased on the last trading day of the previous year. For 2009, our USD cash benchmark is 0.37% (in nominal terms). The second benchmark we use is a portfolio equally allocated between the ten asset classes we use (it does not include equity market neutral). 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 here: http://www.retiredinvestor.com/Members/Portfolio/USA.php