

The Index Investor

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June 2009 Issue: Key Points

This month's feature article examines the disappointing performance of global commercial property as an asset class over the past 18 months, particularly relative to global equities. We identify the fundamental valuation and investor behavior factors that seem to have been responsible for property's underperformance – negative views of the future growth of free cash flow from property, and a sharp rise in uncertainty tied to property companies' and partnerships' ability to rollover their maturing debt. We also analyze why correlations across global property markets have been so high relative to expectations, and conclude that while previous research correctly identified the presence of a global GDP growth factor as a driver of property returns, the asymmetric nature of its impact on the downside was underestimated (and the potential impact of a global liquidity and credit crisis was essentially ignored). We also review the contentious issue of whether there is any difference between property that is directly held and property that is held in a securitized form, as in the case of REITs.

Economically, the most recent research, which properly adjusts different indexes to make them comparable, concludes that there is no difference beyond the lower liquidity of direct property investments. However, we also note that from a behavioral perspective, direct property is less exposed to investor overreaction driven by emotions and social interactions. In addition, the appraisal based valuation of direct property investments tends to reduce the portfolio impact of fluctuations in underlying values over time. Depending on your perspective, this may or may not be beneficial.

Next, we look to the future, and conclude that the lessons learned over the past 18 months have weakened the case for holding commercial property in a portfolio, while also strengthening the case for making allocations to a single developed markets property asset class rather than distinguishing between local and international property asset classes.

In our economic update, we conclude that the current enthusiasm for “green shoots” will likely weaken over the coming months, as the continuing reality of high household debt levels, a weak banking system, and a very strained international system continue to exert strong downward pressure on real GDP growth. We also conclude that, as is true of the recent increase in equity prices, the recent upturn in prices for inflation hedging assets is also premature, and that assets that hedge against uncertainty seem undervalued today.

In this month’s product and strategy notes, we take an extended look at how regret aversion affects investment decisions, and compare the impact of errors of commission and omission over short and long periods of time. Human beings try harder to avoid errors of commission, even though research shows that the economic cost (and, over the long term, the emotional cost) of errors of omission is often greater. We conclude with two recommendations for avoiding these traps: first, being aware of them, and second, improving foresight accuracy by getting a range of independent (and sometimes conflicting) advice before making important decisions.

This Month's Letters to the Editor

Do you have any opinion on the differences between leading brokerages like Fidelity, Schwab and TD Ameritrade?

In truth, we don't. From our perspective, they are all top tier firms who compete very aggressively with each other to provide superior experience to their clients. We know people who work at all of them, and if they are any indication, all of these firms attract first class talent.

Do you feel your allocation models are superior to those found on other sites that are based on modern portfolio theory/mean variance optimization?

We do. As we have repeatedly noted, we do not believe that markets are generally in equilibrium and securities are priced close to their fundamental values. We believe that financial markets are filled with positive feedback loops and nonlinear effects caused by the interaction of competing strategies (for example, value, momentum, and passive approaches) and underlying decisions made by investors with imperfect information and limited cognitive capacities who are often pressed for time, affected by emotions, and subject to the influence of other people. As a result, while attracted to equilibrium, financial markets never reach it and can sometimes generate substantial over and undervaluations. In addition, complex adaptive financial markets will tend to pass through different periods during which the probability of making accurate forecasts rises and falls. We also believe that human beings have widely varying capacities for understanding the dynamics of complex adaptive systems. Finally, we are highly conscious of the limitations of all quantitative modeling approaches, and recognize that confidence in any solution increases when it can be arrived at using very different methodologies. All of these beliefs contribute to our approach to asset allocation, which is grounded in (a) the belief that asset allocation is almost always a

multiperiod problem, for which single period techniques like MVO are suboptimal; (b) the use of multiple regimes characterized by very different asset class returns, risks and correlations; (c) the use of shortfall as our primary risk constraint; (d) the use of broad asset class definitions, shrinkage estimators and constraints to limit the impact of estimation errors; (e) a belief that in complex adaptive systems one must search for solutions that are robust – that have a high probability of achieving a long term portfolio return goal under a wide range of scenarios – because it is impossible to identify a single optimal solution; (f) belief that successful active management is extremely rare, but possible, and, mathematically, most valuable to a portfolio when it delivers uncorrelated alpha at a relatively low price; a (g) belief that any departure from a portfolio equally weighted across asset classes – the zero intelligence portfolio – must be justifiable both quantitative and qualitative (i.e., “plain English”) terms; and (h) a belief that, because of the mathematical importance (when it comes to achieving target long term returns) of avoiding steep losses, and the inevitability of substantial overvaluations, risk management requires the constant monitoring of asset class valuations, and a willingness to occasionally go beyond rebalancing and employ more active hedging measures, like moving to cash or buying insurance (e.g., put options). Overall, we take a considerably different approach than the traditional buy and hold based on MVO (using a single set of asset class inputs derived from historical data) with regular rebalancing. While reasonable people can and do disagree about the relative merits of the two approaches (and others), we believe that research has conclusively shown that an investor or adviser will improve his or her foresight by taking all of these approaches into account when making his or her investment decisions.

Can you clarify your use of the terms “possible”, “likely” and “probable” in your asset class valuation updates? Also, is your judgment about commodities valuations based on the long/short fund (LSC) or a long-only fund?

Research in the intelligence community has shown that it is far more useful to the recipient of advice to know not only an analyst's conclusion, but also his or her degree of confidence in it. In line with this research, we have taken the view that, when it comes to estimating results produced by the actions of a complex adaptive system (like financial markets), quantitative confidence estimates suggest a degree of precision that simply isn't possible, and can create a false sense of security with respect to a conclusion. Hence, we have chosen to use a graduated scale of qualitative confidence indicators, with the lowest degree of confidence being "possible", followed by "likely" and then "probable". These estimates are derived from the combination of our fundamental analysis of asset class valuations, and our views about the probability of different scenarios developing in the medium term.

With respect to commodities, our valuation estimate is for a long-only position in a typical futures-based commodity index fund. However, as we have noted in the past, when it comes to implementing our model portfolios' allocation to commodities as an asset class, we concluded that the new long/short fund (of which more are in registration) seemed preferable to a long-only fund because of the structural imbalance in the market between buyers and sellers of futures contracts. In our view, this imbalance has made contangoed positions more likely, in which roll-return based profits are earned by being a futures contract seller, not buyer.

Global Asset Class Returns

YTD 29 May 2009	In USD	In AUD	In CAD	In EURO	In JPY	In GBP	In CHF	In INR
Asset Held								
USD Bonds	1.53%	-13.27%	-11.14%	-0.30%	6.54%	-10.63%	1.73%	-1.88%
USD Prop.	-8.72%	-23.52%	-21.39%	-10.55%	-3.71%	-20.88%	-8.52%	-12.13%
USD Equity	4.04%	-10.76%	-8.63%	2.21%	9.05%	-8.12%	4.24%	0.63%
AUD Bonds	2.46%	-12.34%	-10.21%	0.63%	7.47%	-9.70%	2.66%	-0.95%
AUD Prop.	-1.13%	-15.93%	-13.79%	-2.95%	3.89%	-13.28%	-0.92%	-4.54%
AUD Equity	19.40%	4.60%	6.74%	17.58%	24.42%	7.25%	19.61%	15.99%
CAD Bonds	11.11%	-3.70%	-1.56%	9.28%	16.12%	-1.05%	11.31%	7.69%
CAD Prop.	25.20%	10.40%	12.53%	23.37%	30.21%	13.04%	25.40%	21.79%
CAD Equity	29.46%	14.66%	16.79%	27.63%	34.47%	17.30%	29.66%	26.05%
CHF Bonds	6.12%	-8.68%	-6.55%	4.29%	11.13%	-6.04%	6.32%	2.71%
CHF Prop.	7.40%	-7.40%	-5.27%	5.57%	12.41%	-4.76%	7.60%	3.99%
CHF Equity	-2.21%	-17.01%	-14.88%	-4.04%	2.80%	-14.37%	-2.01%	-5.62%
INR Bonds	1.02%	-13.78%	-11.65%	-0.81%	6.03%	-11.14%	1.22%	-2.39%
INR Equity	55.01%	40.21%	42.34%	53.18%	60.02%	42.85%	55.21%	51.60%
EUR Bonds	-4.18%	-18.98%	-16.85%	-6.01%	0.83%	-16.34%	-3.98%	-7.59%
EUR Prop.	6.86%	-7.95%	-5.81%	5.03%	11.87%	-5.30%	7.06%	3.44%
EUR Equity	1.94%	-12.86%	-10.72%	0.12%	6.96%	-10.21%	2.15%	-1.47%
JPY Bonds	-8.12%	-22.92%	-20.79%	-9.95%	-3.11%	-20.28%	-7.92%	-11.53%
JPY Prop.	-3.50%	-18.30%	-16.17%	-5.33%	1.51%	-15.66%	-3.30%	-6.91%
JPY Equity	-2.19%	-16.99%	-14.86%	-4.02%	2.82%	-14.35%	-1.99%	-5.60%
GBP Bonds	9.18%	-5.62%	-3.49%	7.35%	14.19%	-2.98%	9.38%	5.77%
GBP Prop.	-3.99%	-18.79%	-16.65%	-5.82%	1.03%	-16.15%	-3.79%	-7.40%
GBP Equity	12.00%	-2.80%	-0.66%	10.18%	17.02%	-0.15%	12.21%	8.59%
1-3 Yr US Govt	-0.20%	-15.00%	-12.86%	-2.02%	4.82%	-12.35%	0.01%	-3.61%
World Bonds	2.06%	-12.74%	-10.61%	0.23%	7.07%	-10.10%	2.26%	-1.35%
World Prop.	-2.55%	-17.35%	-15.22%	-4.38%	2.46%	-14.71%	-2.35%	-5.96%
World Equity	8.79%	-6.01%	-3.87%	6.97%	13.81%	-3.36%	9.00%	5.38%
Commod Long	7.76%	-7.04%	-4.91%	5.93%	12.77%	-4.40%	7.96%	4.35%
Commod L/Shrt	-7.92%	-22.72%	-20.58%	-9.74%	-2.90%	-20.07%	-7.71%	-11.33%
Gold	11.19%	-3.61%	-1.48%	9.36%	16.20%	-0.97%	11.39%	7.78%
Timber	4.58%	-10.22%	-8.08%	2.76%	9.60%	-7.57%	4.78%	1.17%
Uncorrel Alpha	4.40%	-10.40%	-8.27%	2.57%	9.41%	-7.76%	4.60%	0.99%
Volatility VIX	-27.70%	-42.50%	-40.37%	-29.53%	-22.69%	-39.86%	-27.50%	-31.11%
Currency								
AUD	14.80%	0.00%	2.14%	12.97%	19.82%	2.64%	15.00%	11.39%

YTD 29 May 2009	In USD	In AUD	In CAD	In EURO	In JPY	In GBP	In CHF	In INR
CAD	12.67%	-2.14%	0.00%	10.84%	17.68%	0.51%	12.87%	9.26%
EUR	1.83%	-12.97%	-10.84%	0.00%	6.84%	-10.33%	2.03%	-1.58%
JPY	-5.01%	-19.82%	-17.68%	-6.84%	0.00%	-17.17%	-4.81%	-8.42%
GBP	12.16%	-2.64%	-0.51%	10.33%	17.17%	0.00%	12.36%	8.75%
USD	0.00%	-14.80%	-12.67%	-1.83%	5.01%	-12.16%	0.20%	-3.41%
CHF	-0.20%	-15.00%	-12.87%	-2.03%	4.81%	-12.36%	0.00%	-3.61%
INR	3.41%	-11.39%	-9.26%	1.58%	8.42%	-8.75%	3.61%	0.00%

Uncorrelated Alpha Strategies Detail

YTD 29May2009	In USD	In AUD	In CAD	In EURO	In JPY	In GBP	In CHF	In INR
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Eq Mkt Neutral

HSKAX	-1.71%	-16.51%	-14.38%	-3.54%	3.30%	-13.87%	-1.51%	-5.12%
OGNAX	0.99%	-13.81%	-11.67%	-0.83%	6.01%	-11.16%	1.20%	-2.42%

Arbitrage

ARBFX	5.25%	-9.56%	-7.42%	3.42%	10.26%	-6.91%	5.45%	1.83%
ADANX	3.50%	-11.30%	-9.17%	1.67%	8.51%	-8.66%	3.70%	0.09%

Currency

DBV	9.53%	-5.28%	-3.14%	7.70%	14.54%	-2.63%	9.73%	6.12%
ICI	-0.23%	-15.03%	-12.90%	-2.06%	4.78%	-12.39%	-0.03%	-3.64%

Equity L/S

HSGFX	5.72%	-9.08%	-6.94%	3.90%	10.74%	-6.43%	5.93%	2.31%
PTFAX	6.59%	-8.21%	-6.07%	4.77%	11.61%	-5.56%	6.80%	3.18%

GTAA

MDLOX	7.08%	-7.72%	-5.59%	5.25%	12.09%	-5.08%	7.28%	3.67%
PASAX	7.27%	-7.53%	-5.40%	5.44%	12.28%	-4.89%	7.47%	3.86%

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.

Equity Markets

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

different views of whether an equity market is over, under, or fairly valued today. The specific formula is $(\text{Current Dividend Yield} \times 100) \times (1 + \text{Forecast Productivity Growth})$ divided by $(\text{Current Yield on Real Return Bonds} + \text{Equity Risk Premium} - \text{Forecast Productivity Growth})$. Our valuation estimates are shown in the following tables, where a value greater than 100% implies overvaluation, and less than 100% implies undervaluation. In our view, the greater the number of scenarios that point to overvaluation or undervaluation, the greater the probability that is likely to be the case.

Equity Market Valuation Analysis at 29 May 2009

<i>Australia</i>	Low Demanded Return	High Demanded Return
High Supplied Return	56%	79%
Low Supplied Return	78%	103%

<i>Canada</i>	Low Demanded Return	High Demanded Return
High Supplied Return	78%	126%
Low Supplied Return	132%	189%

<i>Eurozone</i>	Low Demanded Return	High Demanded Return
High Supplied Return	46%	73%
Low Supplied Return	71%	102%

<i>Japan</i>	Low Demanded Return	High Demanded Return
High Supplied Return	124%	173%
Low Supplied Return	190%	249%

<i>United Kingdom</i>	Low Demanded Return	High Demanded Return
High Supplied Return	29%	57%
Low Supplied Return	53%	86%

<i>United States</i>	Low Demanded Return	High Demanded Return
High Supplied Return	84%	136%
Low Supplied Return	146%	210%

<i>Switzerland</i>	Low Demanded Return	High Demanded Return
High Supplied Return	76%	118%
Low Supplied Return	123%	225%

<i>India</i>	Low Demanded Return	High Demanded Return
High Supplied Return	98%	184%
Low Supplied Return	222%	345%

<i>Emerging Markets</i>	Low Demanded Return	High Demanded Return
High Supplied Return	83%	153%
Low Supplied Return	115%	186%

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.

Government Bond Markets

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

Bond Market Analysis as of 29 May 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	3.15%	2.96%	6.11%	5.46%	-0.65%	6.37%
Canada	1.97%	2.40%	4.37%	3.40%	-0.97%	9.80%
Eurozone	2.04%	2.37%	4.41%	3.59%	-0.82%	8.17%
Japan	3.29%	0.77%	4.06%	1.50%	-2.56%	28.24%
UK	0.98%	3.17%	4.15%	3.76%	-0.39%	3.86%
USA	1.89%	2.93%	4.82%	3.47%	-1.35%	13.83%
Switz.	2.22%	2.03%	4.25%	2.44%	-1.81%	19.14%
India	2.22%	7.57%	9.79%	6.55%	-3.24%	34.91%

*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:

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

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.

Real Return Bonds

Let us now move on to a closer look at the current level of real interest rates. In keeping with our basic approach, we will start by looking at the theoretical basis for determining the rate of return an investor should demand in exchange for making a

one year risk free investment. The so-called Ramsey equation tells us that this should be a function of a number of variables. The first is our “time preference”, or the rate at which we trade-off a unit of consumption in the future for one today, assuming no growth in the amount of goods and services produced by the economy. 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
United Kingdom	0.5	1.20	1.7	0.9	2.0	3.0	3.8
United States	0.8	1.20	2.0	1.0	2.0	3.0	3.5

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

The next table compares this long-term equilibrium real risk free rate with the real risk free return that is currently supplied in the market. Negative values indicate that real return bonds are currently overvalued, as their prices must fall in order for their yields (i.e., the returns they supply) to rise. The valuation is based on a comparison of the present values of ten year zero coupon bonds offering the rate demanded and the rate supplied, as of **29 May 2009**.

Region	Risk Free Rate Demanded	Actual Risk Free Rate Supplied	Difference	Overvaluation (>100) or Undervaluation (<100)
Australia	3.2	3.2	0.0	100
Canada	3.8	2.0	-1.8	119
Eurozone	3.9	2.0	-1.9	120
Japan	3.8	3.3	-0.5	105
United Kingdom	3.8	1.0	-2.9	132
United States	3.5	1.9	-1.6	117

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.

Credit Spreads

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

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

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

At **29 May 2009**, the AAA minus 10 year Treasury spread was 1.89%. The AAA minus BAA spread was 2.40%. 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 520 days with a higher AAA spread (4.47% of all days) and 56 days with a higher BAA spread (.48%). Clearly, and despite all the talk one hears about “green shoots”, current spreads still reflect extreme investor uncertainty about future liquidity and credit risk. However, given the uncharted 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. Given our assessment of the relative probability of our cooperative and conflict scenarios, we tend towards toward the fully to overvalued view.

Currencies

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 29 May 09

	To AUD	To CAD	To EUR	To JPY	To GBP	To USD	To CHF	To INR
From								
AUD	0.00%	-2.06%	-1.87%	-3.96%	-1.70%	-1.99%	-3.02%	1.09%
CAD	2.06%	0.00%	0.19%	-1.90%	0.36%	0.07%	-0.96%	3.15%
EUR	1.87%	-0.19%	0.00%	-2.09%	0.17%	-0.12%	-1.15%	2.96%
JPY	3.96%	1.90%	2.09%	0.00%	2.26%	1.97%	0.94%	5.05%
GBP	1.70%	-0.36%	-0.17%	-2.26%	0.00%	-0.29%	-1.32%	2.79%
USD	1.99%	-0.07%	0.12%	-1.97%	0.29%	0.00%	-1.03%	3.08%
CHF	3.02%	0.96%	1.15%	-0.94%	1.32%	1.03%	0.00%	4.11%
INR	-1.09%	-3.15%	-2.96%	-5.05%	-2.79%	-3.08%	-4.11%	0.00%

Commercial Property

Our approach to valuing commercial property securities as an asset class is also based on the expected supply of and demand for returns, utilizing the same mix of fundamental and investor behavior factors we use in our approach to equity valuation. Similar to equities, the supply of returns equals the current dividend yield on an index covering publicly traded commercial property securities, plus the expected real growth rate of net operating income (NOI). A number of studies have found that real NOI growth has been basically flat over long periods of time (with apartments showing the strongest rates of real growth). This is in line with what economic theory predicts, with increases in real rent lead to an increase in property supply, which eventually causes real rents to fall. Our analysis also assumes that over the long-term, investors require a 3.0% risk premium above the yield on real return bonds as compensation for bearing the risk of securitized commercial property as an asset class (see this month's feature article on 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 **29 May 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 $(\text{Current Dividend Yield} \times 100) \times (1 + \text{Forecast NOI Growth})$ divided by $(\text{Current Yield on Real Return Bonds} + \text{Property Risk Premium} - \text{Forecast NOI Growth})$. Our estimates are shown in the following tables, where a value greater than 100% implies 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	8.7%	0.2%	8.9%	3.2%	3.0%	6.2%	69%
Canada	10.0%	0.2%	10.2%	2.0%	3.0%	5.0%	48%
Eurozone	9.5%	0.2%	9.7%	2.0%	3.0%	5.0%	51%
Japan	7.4%	0.2%	7.6%	3.3%	3.0%	6.3%	82%
Switzerland	0.5%	0.2%	0.7%	2.2%	3.0%	5.2%	1027%*
U.K.	7.5%	0.2%	7.7%	1.0%	3.0%	4.0%	51%
United States	7.7%	0.2%	7.9%	1.9%	3.0%	4.9%	61%

**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 111%.*

Commodities

Let us now turn to the Dow Jones AIG Commodity Index, our preferred benchmark for this asset class because of the roughly equal weights it gives to energy, metals and agricultural products. One of our core assumptions is that financial markets function as a complex adaptive system which, while attracted to equilibrium (which generates mean reversion) are seldom in it. To put it differently, we believe that investors' expectations for the returns an asset class is expected to supply in the future are rarely equal to the returns a rational long-term investor should logically demand. Hence, rather than being exceptions, 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 on **29 May 2009**:

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

While many commodity curves (especially oil) have improved their prospective roll yields over the past month, given the continued presence of so many contangoed futures curves, expected near term roll returns on the DJAIG as a whole are still negative, absent major supply side shocks (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 are 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 change 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 **29 May 2009** closing value of 80.84 was .67 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.

Timber

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, <i>Science</i> , 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 CO2 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 NCRIF timberland index and those on real return bonds has averaged around six percent. However, since the timber REITS are much more liquid than the properties included in the NCRIF index, 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 **29 May 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	5.05%
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	<u>9.05%</u>
Real Bond Yield	1.89%
Plus Risk Premium for Timber	4.00%
Equals Average Annual Real Return Demanded	<u>5.89%</u>
Ratio of Returns Demanded/Returns Supplied Equals Valuation Ratio (less than 100% implies undervaluation)	<u>36%</u>

Volatility

Our approach to assessing the current value of equity market volatility (as measured by the VIX index, which tracks the level of S&P 500 Index volatility implied by the current pricing of put and call options on this index) is similar to our approach to commodities. Between January 2, 1990 and December 30, 2008, the average daily value of the VIX Index was 19.70, with a standard deviation of 7.88 (skewness 2.28, kurtosis 9.71 – i.e., a very “non-normal” distribution). On **29 May 2009**, the VIX closed at 28.92, To put this in perspective, only 447 days, or 9.3% 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 eventually 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*

29 May 09

<i>Economy</i>	Bottoming	Strengthening	Peaking	Weakening
<i>Interest Rates</i>	Falling	Bottom	Rising	Peak
<i>Style and Size Rotation</i>	Small Growth (DSG) 36.30%	Small Value (DSV) 35.23%	Large Value (ELV) 25.39%	Large Growth (ELG) 24.12%
<i>Sector Rotation</i>	Cyclicals (RXI) 34.06%	Industrials (EXI) 35.34%	Staples (KXI) 17.58%	Utilities (JXI) 13.95%
<i>Bond Market Rotation</i>	Higher Risk (HYG) 18.88%	Short Maturity (SHY) 0.39%	Low Risk (TIP) 6.07%	Long Maturity (TLT) -6.70%

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 **May 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

<i>Valuation at 29 May 09</i>	<i>Fundamental Valuation Estimate</i>	<i>Rolling 3 Mos Return in Local Currency</i>
AUD Real Bonds	Neutral	-4.31%
AUD Bonds	Neutral	-12.01%
AUD Prop.	Likely Undervalued	-15.93%
AUD Equity	Likely Undervalued	14.12%
CAD Real Bonds	Possibly Overvalued	5.39%
CAD Bonds	Possibly Overvalued	0.02%
CAD Prop.	Probably Undervalued	13.08%
CAD Equity	Possibly Overvalued	21.35%
CHF Bonds	Likely Overvalued	-2.01%
CHF Property	Possibly Overvalued	11.85%
CHF Equity	Possibly Overvalued	4.58%
EUR Real Bonds	Possibly Overvalued	3.81%
EUR Bonds	Neutral	-2.67%
EUR Prop.	Probably Undervalued	4.64%
EUR Equity	Likely Undervalued	0.90%
GBP Real Bonds	Likely Overvalued	0.68%
GBP Bonds	Neutral	1.84%
GBP Property	Probably Undervalued	7.81%
GBP Equity	Probably Undervalued	10.52%
INR Bonds	Probably Overvalued	-0.02%
INR Equity	Probably Overvalued	55.17%
JPY Real Bonds	Neutral	-3.53%
JPY Bonds	Probably Overvalued	-2.05%
JPY Property	Possibly Undervalued	14.67%
JPY Equity	Probably Overvalued	18.12%
USD Real Bonds	Possibly Overvalued	4.17%
USD Bonds	Possibly Overvalued	2.27%

<i>Valuation at 29 May 09</i>	<i>Fundamental Valuation Estimate</i>	<i>Rolling 3 Mos Return in Local Currency</i>
USD Property	Probably Undervalued	10.50%
USD Equity	Likely Overvalued	13.41%
<i>Following in USD:</i>		
Emerging Mkt Equity (EEM)	Likely Overvalued	26.58%
Commodities Long	Possibly Undervalued	13.57%
Gold	Possibly Undervalued	5.35%
Timber	Probably Undervalued	22.69%
Volatility (VIX)	Likely Undervalued	-35.50%
<i>Return in Local for holding USD:</i>		
USD per AUD	Neutral	-21.69%
USD per CAD	Neutral	-13.04%
USD per EUR	Neutral	-8.94%
USD per JPY	Depreciate	6.01%
USD per GBP	Neutral	-11.92%
USD per CHF	Neutral	-7.48%
USD per INR	Appreciate	-3.72%

The Role of Property in a Portfolio, Given Recent Experience

Investors with portfolio allocations to commercial property (real estate) today confront three unpleasant facts: (1) During the 2008 downturn, real estate investment trusts (REITs) and other forms of securitized commercial property (e.g., real estate operating companies) underperformed equities, contrary to what theory and experience led us to expect; (2) Global correlations across commercial property markets have generally been quite high; and (3) Based on reported results, directly owned commercial property seems to have outperformed REITs.

These facts raise three questions for investors and their advisers: (a) What is the future role of commercial property in a portfolio? (b) For the purpose of asset allocation, does it make sense to distinguish between regional markets, or should commercial property be treated as a single global asset class? And (c) what is the best way to invest in commercial property: directly, via REITs, or a combination of both?

Before answering these questions, we first need to develop a better understanding of what has happened over the past two years. The first issue is why global REITs have underperformed global equities. Logically, the roots of REITs' underperformance lie in some combination of causes related to fundamental valuation and investor behavior. To assess the former, let us start with our basic valuation model, in which the value of an asset is equal to the following: $(\text{Current Free Cash Flow}) \times (1 + \text{Forecast FCF Growth})$ divided by $(\text{Current Yield on Real Return Bonds} + \text{Risk Premium} - \text{Forecast FCF Growth})$. In this case, let us further assume that FCF refers to the cash flow that is actually distributed to investors – dividends and stock buybacks. Across multiple countries, one of the defining characteristics of the REIT structure is the requirement to pay out to investors a very high percentage of free cash flow. Almost always, this means that the current cash flow (as a percentage of market value) from companies in a REIT index is higher than the current cash flow yield from the companies that comprise the public equity market. So this cannot be the source of REITs underperformance.

What about the rates at which these cash flows are expected to grow in the future? As we note in our Asset Class Valuation Section, over the long-term, the real rate of growth in REIT market FCF is quite low. This is logical, as the barriers to expanding the supply of commercial property are quite low – rising rents tend to trigger new construction. In contrast, the long-term real growth rate for equity market FCF is higher, because it is ultimately based on total factor productivity growth, which, because of its complex root causes, is harder to duplicate than a building, and hence less susceptible to being competed away by new entrants (however, as we note in this month's Economic Update, public policy decisions can significantly affect a country's long term total factor productivity growth rate). Moving from the long-term to the short-term view, the relevant question is whether there is a logical basis for assuming that the rate of FCF growth for REITs in aggregate over the next five years would be significantly less than the rate of FCF growth for equities. On the one hand, there seem to be some strong arguments favoring REITs – while corporations under growing financial stress could be expected to cut their dividends and buybacks, REITs

remain legally required to payout a substantial portion of their cash flow. On the other hand, one might argue that this payout advantage would be offset (or perhaps more than offset) by forces that would cause commercial property FCF to suffer greater declines than FCF for the equity market as a whole. One concern is the higher average level of operating and financial leverage in commercial property relative to the equity market as a whole. In good times, many real estate managers were no doubt tempted to raise leverage, in order to provide higher dividends to income-oriented investors during a period of falling yields on many fixed income assets. Yet during the downturn, high leverage magnifies the FCF impact of a fall in rents. Beyond this, additional FCF concerns may have been raised by specific structural characteristics of the major global commercial property and REIT indices. For example, just five countries account for about 75% of the market capitalization of both the Dow Jones Global Real Estate Index and the FTSE EPRA NAREIT Global REIT Index – the United States (at, respectively, 33% and 40%), Japan (14% in both), Hong Kong (14% and 6%), Australia (8% and 9%) and the UK (5% and 7%). As you can see, the Anglo Saxon countries, where the 2008 credit and economic crisis hit hardest, have (except for the US) different weights in these commercial property indices than they do in global equity indices. Moreover, from a sector point of view, both global real estate indices give relatively heavy weight to retail property (32% and 29%), which will be particularly hard hit by a prolonged decline in consumer spending. In sum, an expectation that commercial property in general, and in certain countries and sectors in particular, would suffer worse reductions in free cash flow than the global equity market could have accounted for the underperformance of global property indices compared to global equity indices.

The final question is whether changes in discount rates could also help to explain commercial property's poor performance. We think of the discount rate as being composed of three parts. The first is the yield on real return government bonds. This is common to all asset classes. The second is a premium for risk – payment for accepting variability of future returns that an investor believes he or she understands – i.e., a range of possible future outcomes whose probabilities can be roughly estimated.

The third part of the discount rate is a premium for bearing uncertainty – returns variability whose range of possible outcomes and associated probabilities cannot be estimated. We believe that risk aversion is a more rational construct that is relatively constant over time. In contrast, as we noted in last month's issue, uncertainty triggers the brain's fear circuits (i.e., the amygdala) and is an emotional and social phenomenon that varies greatly over time. In light of this view of discount rates, the key question to ask is whether there is any basis for believing that uncertainty with respect to commercial property (and hence the discount rate) has been higher over the past year than uncertainty about equities. We believe such a basis exists, due to heightened fears about REITs' ability to maintain debt payments and/or refinance maturing loans in the face of declining rents, falling credit availability, rising lending standards, and, if worries about future inflation prove accurate, rising nominal interest rates. In sum, there seem to be logical reasons – involving both the relative rate of future free cash flow growth and the relative rate at which it is discounted to present value – that can explain global property's underperformance compared to global equities over the past year.

The second issue we must examine is the high correlation between commercial property returns across multiple regions in 2008. In the past, some researchers have noted the common exposure of all commercial property markets to global GDP growth. However, the data used in these analyses did not include a period characterized by a decline in global GDP – hence, the asymmetric impact of this factor (much stronger on the downside than the upside) was not picked up. Similarly, to our knowledge, no previous analysis fully captured the exposure of commercial property to a global liquidity risk factor, which only came into play – violently – on the downside. Finally, recent years have seen a number of developments that collectively have made the commercial property market much more globally integrated, including the spread of the REIT structure, increasing cross-border investment flows, greater institutional and retail interest in diversifying across a wider range of asset classes, and improved information availability due to the internet. Collectively, these go a long way toward explaining the significant rise in correlations across global property markets over the

past year. That said, there have also been exceptions in the other direction, with Switzerland being the most notable example, as Swiss property appears to have receive a significant amount of “safe haven” inflows.

The third issue is why direct property investments (e.g., via a limited partnership structure) have apparently outperformed securitized commercial property vehicles like REITs. This is an issue about which reasonable people can and do disagree. Some of the difference is undoubtedly due to the different ways that direct property return indexes (e.g., from NCREIF or IPD) and securitized property indexes (e.g., from Dow Jones or EPRA/NAREIT) are calculated. Direct property indexes typically reflect a mix of actual cash flows (for net operating income or funds from operations) and appraised capital values. Multiple studies have shown that appraised values tend to be much more correlated over time than values based on purchases and sales in a continuously operating market (which is the way REIT values are calculated). As a result, the appraisal approach tends to understate both volatility and correlations. REIT indexes include the effect of leverage, while direct property indexes are typically reported on an unleveraged basis (note too that directly owned real estate is generally believed to employ higher leverage than REITs). In addition, neither direct nor REIT indexes explicitly take into account the fact that securitized real estate is much more liquid than directly held property. Finally, REIT and direct property indexes are also based on different sector weights (e.g., retail, industrial, office, multifamily residential, etc.), and typically have different management fees (higher in the case of direct property). In short, simple comparisons (which usually claim direct property ownership is superior) are usually badly flawed.

A number of statistical techniques can be used to “unsmooth” appraisal based returns. Invariably, they result in an increase in estimate volatility for directly held property and higher return correlations with other asset classes. Perhaps the best adjustment to appraisal based data has been undertaken by the Center for Real Estate at MIT. They have constructed a transactions based index from the NCREIF directly owned commercial property database. As expected, this also resulted in an increase in the volatility of commercial property returns, and their correlations with

returns on other asset classes (see “A Quarterly Transactions-Based Index of Institutional Real Estate Investment Performance and Movements in Supply and Demand” by Fisher, Geltner, and Pollakowski). Two other studies have started with this MIT data, and taken further steps to make it comparable with the NAREIT index (e.g., by adjusting sector weights and leverage). Both of these studies (“Privately Versus Publicly Held Asset Investment Performance” by Riddiough, Moriarty, and Yeatman, and “A Successive Effort on Performance Comparison Between Public and Private Real Estate Equity Investment” by MIT’s Jengbin Tsai) have found that the returns on directly owned and securitized property are very similar. Riddiough et al found a 3% average return advantage in favor of REITs, which they conjectured could reflect differences in liquidity or geographic differences in the underlying properties whose impact was not taken into account. Tsai found (using a different time period) that the two series were essentially the same – between 1995 and 2005, the geometric average return on REITs was 13.12% and the standard deviation (of annual returns) was 8.99%, compared to 13.03% and 9.18% on the adjusted MIT Transactions Based Index for directly owned properties. In sum, differences in reported results for directly owned versus securitized property seem to be due to a variety of factors that mask the essential economic similarity of these two different approaches to investing in commercial property. However, this is not to say that in some circumstances these differences are unimportant. For example, the delayed impact of changes in appraisal based indexes can smooth out reported fluctuations in a portfolio’s value. If one believes that public markets are more susceptible to overreactions driven by investor emotions and herding, this may, in fact, be beneficial from a decision making perspective.

Having examined the past, let us now turn to our three questions about the future role of commercial property in investment portfolios. First, given what we have learned over the past 18 months, does commercial property still have a role in a diversified investment portfolio? In a 2005 paper, Dhar and Goetzmann report the results of a survey study of “Institutional Perspectives on Real Estate Investing: the Role of Risk and Uncertainty.” They find that “the main reasons for investing in

commercial property given by institutional investors are diversification and inflation hedging, while liquidity, lack of reliable valuation data, and poor management were cited as the main risks...The expected return and risk of real estate is perceived as mid-way between U.S. stock and bonds.” After the events of the last 18 months, these assumptions are worth reexamining.

We'll start with the basics: are the underlying economic drivers of commercial property returns different from those on other asset classes? We think the answer is quite clearly yes – what other asset class involves site selection, architectural excellence, construction management, and the careful marketing and management of the non-storable services that a building provides? On the other hand, commercial property shares some common activities with equity (e.g., making good decisions about debt levels and structures) and with fixed income (e.g., making good decisions about rental contract duration). At least in the past, studies using sophisticated quantitative techniques like cointegration analysis have reached similar conclusions.

Now let's look at how the commercial property asset class has actually performed. In last month's issue, we reviewed a recent IMF study of the inflation hedging properties of different asset classes over short and medium term time horizons. At best, commercial property (because of rising replacement costs and rents) provides a partial hedge in the medium term, but not the short term. Yet other inflation hedges are available, including real return bonds, commodities, timber and gold. On the other hand, apart from the first of these, none provide the current income stream that is available from property. Moreover, as generations of European investors have confirmed over long periods of historical ups and downs, there is a sense of psychological security that comes from owning a property that, with the exception of gold, no other asset class can match.

We also need to consider how property has performed in two other regimes. In periods of normal growth, equities should deliver the highest return of any asset class (note that we are not including uncorrelated alpha strategies here, because they are active management approaches, not asset classes). However, in the years before the 2007 – 2009 crash we saw equities outperformed by commercial property and

commodities. Arguably, the former reflected both fundamental factors (debt financed growth in the economy in general and consumption in particular), lenders' underpricing of risk, and poor decisions by too many property managers to raise leverage ratios higher. Similarly, high commodity returns were due to a difficult to disentangle combination of (a) supply/demand imbalances in the physicals market – e.g., the rising marginal cost of finding and producing a barrel of oil; (b) supply/demand imbalances in the futures markets – e.g., the growth of “long-only” commodity index funds relative to the supply of contracts; and (c) the availability of leverage – e.g., via low margin requirements on futures and options contracts. And what about a regime with high uncertainty, deleveraging, deflation, and severe economic contraction? Commercial property has delivered worse performance than real return and nominal government bonds, gold, timber and investable volatility products.

These observations lead us to conclude that, at best, the case for including commercial property in a portfolio is weaker than it was before the events of the past 18 months. Some studies have concluded that it is not persuasive at all (see, for example, “Real Estate in an ALM Framework” by Brounen, Porras Prado, and Verbeek). Others have concluded that use of a shortfall risk instead of a maximum volatility constraint also weakens the case for property in a portfolio (see “The Maximum Drawdown as a Risk Measure: The Role of Real Estate in the Optimal Portfolio Revisited” by Hamelink and Hoesli). As we head into the 2009 reassessment of our model portfolios (which will be based on a three regime model), we have decided that recent events merit an increase in the required risk premium on commercial property as an asset class, from 2.5% to 3.0% above the yield on real return government bonds. Along with our use of a shortfall risk constraint, we suspect that this will result in lower allocations to commercial property in our revised portfolios.

The second issue, assuming one invests in the asset class, is it worth distinguishing between domestic and foreign commercial property? Researchers were divided on this issue before the most recent crisis (for contrasting views of international real estate markets' cointegration, see “Global Property Market Diversification” by Gallo and Zhang, and “Random Walks and Market Efficiency:

Evidence from International Real Estate Markets” by Kleiman, Payne and Sahu). However, apart from Switzerland, the evidence from the past 18 months suggests a higher than expected degree of integration on the downside. This argues for treating developed country commercial property markets as a single asset class – as might also be the case for developed equity markets.

Finally, there is the question of whether to invest in commercial property directly or via securitized vehicles like real estate investment trusts. We are persuaded by the studies that find, as common sense suggests, that in economic terms the two are very similar, apart from the superior liquidity of securitized vehicles. However, we also recognize that the flip side to illiquidity is a lower chance of investor herding causing significant over and undervaluations, and that the time lag caused by appraisal-based valuations can impart stability to a portfolio and help to minimize client overreactions and, quite frankly, fear.

Over the past 18 months, perhaps no asset class has proven more disappointing – and frustrating -- than commercial property. In a period of unprecedented uncertainty, other asset classes have delivered better diversification benefits, as property returns around the world were crushed by declining GDP and relatively high leverage. Moreover, studies have shown that if we return to a high inflation regime, other asset classes may better preserve the real value of investors’ capital. And under normal circumstances, equities should deliver higher returns. In sum, the case for investing in commercial property has grown much weaker.

June 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, and, through them, on asset class valuations and returns.

One of our core investment beliefs is that human beings generally have poor foresight in situations where cause and effect are widely separated by time and non-linear in impact. The updating of their views (and departures from the prevailing conventional wisdom) under these conditions is further hampered by the well-known “confirmation bias”, which may become more severe as uncertainty (and fear) increase. Under these conditions, investors can gain an information advantage by combining forecasts that are based on different methodologies, and by using a framework that enables them to develop better situational awareness in the face of uncertainty, complexity and rapid change.

Over the past month, the global “green shoots” story began to give way to a more sober view of the future, though this has just begun to show up in financial market returns. One critical aspect of this is the recognition of the full implications of the constraint on U.S. – and indeed, global – growth caused by the continuing high level of U.S. household indebtedness. The Federal Reserve Bank of San Francisco’s most recent Economic Letter made the following points: “To achieve a sustainable level of debt relative to income, households may need to undergo a prolonged period

of deleveraging, whereby savings is increased and debt is reduced...Since 1960, the growth rate of real household debt in the United States has far outpaced the growth of real disposable income...Beginning in 2000, however, the pace of debt accumulation accelerated dramatically...Going forward, the downward pressure on debt is likely to come from both lenders and households.”

As an example, the FRBSF assumes that, as was true of the Japanese corporate sector between 1991 and 2001, the U.S. household sector reduces its debt by 30% over the next ten years. “Given an effective nominal interest rate on existing household debt of 7%, a future nominal growth rate of disposable income of 5%, and that 80% of future savings is used for debt repayment, the household saving rate would need to rise from around 4% currently to 10% by the end of 2018.” This would result in an annual reduction in real consumption growth of $\frac{3}{4}$ of 1%. Over the five years ended in 2007, personal consumption accounted for more than 70% of real GDP growth, which averaged 2.76% per year. A fall of $\frac{3}{4}$ of 1% in real consumption growth would reduce overall GDP growth by at least .5% per year – or by about 20%. In terms of real personal consumption growth, a reduction in the growth rate of .75% is equivalent to 35% of average real consumption growth between 2002 and 2007. This represents a significant shock to the American middle class for whom the “mass affluent” lifestyle had become a (debt financed) habit over the past decade. Given the difficulty of swallowing that medicine, the FRBSF looks at alternative ways the target reduction in household debt could be achieved: “If accomplished through some form of default on existing household debt, such as real estate short sales, foreclosures, or bankruptcy, deleveraging would involve significant costs for consumers, including tax liabilities on forgiven debt, legal fees, and lower credit scores. Moreover, this form of deleveraging would simply shift the problem onto banks that hold these loans as assets on their balance sheets. Either way the process of household deleveraging will not be painless.”

Of course, there is an optimistic scenario, in which household incomes grow by a sufficient amount to enable debt reduction with no reduction in living standards or increase in bankruptcies. Realization of this scenario would require both a sustained

increase in American productivity growth and, just as important, a shift in the division of the economic pie away from (recently record high) corporate profits to labor compensation. Unfortunately, neither of these developments seem likely to occur. Though undeniably boring to discuss with friends, families and (most) clients, sustained growth in a nation's total factor productivity is absolutely central to fiscal sustainability and growth in living standards over time. For proof of this, one need look no further than the relative decline over the past twenty years (relative to the OECD) of New Zealand and Switzerland, whose economies have both suffered from low TFP growth. Just this month, the Council of Canadian Academies (the equivalent of the U.S. National Academy of Sciences) released a report warning that Canada faces a similar fate if does not make some fundamental changes ("Innovation and Business Strategy: Why Canada Falls Short"). Unfortunately, there is no silver bullet solution to improving TFP. Even in the United States, it took many years for companies to discover that information technology alone did not do the trick, and that many organizational habits and assumptions had to be changed in order to realize its full potential. Moreover, public sector changes are just as important as private sector improvements when it comes to increasing TFP. It seems that the Obama administration realizes this – its economic stimulus program and first budget focused on human and physical capital improvements that are critical for productivity growth (e.g., education and health care reform, support for clean technologies and infrastructure improvements, and increased R+D funding). Unfortunately, the Obama proposals are running into serious opposition in the U.S. Congress – most often from Democratic Senators and Representatives! For example, both education and health care reform have run into serious opposition from entrenched interest groups, and the administration's environmental and energy bill has, in effect, been gutted. For example, rather than auctioning 100% of the permits under the proposed CO2 cap and trade plan, 85% will now be given away, and the effective cost of carbon emissions set at about \$28/metric tonne – too low to produce much productivity improving (and job creating) investment, much less meaningful reductions in atmospheric CO2 levels. At the same time, the renewable energy and efficiency mandates proposed by the

Obama administration have also been weakened, which will further reduce the incentive to invest in this area. And this is just what the U.S. House of Representatives has done to the Obama legislation – the Senate has yet to take it up!

The elimination of the revenue from CO2 permit auctions has gravely worsened the projected U.S. budget deficit, and led to discussion of both higher income tax rates for “the rich” (a term whose meaning, at least in tax terms, has been repeatedly “defined down”) as well as renewed proposals for national consumption based taxes, like a European style VAT. This means that a large portion of any wage gains that are realized due to higher U.S. productivity will likely end up paying higher taxes than maintaining consumption while simultaneously reducing household debt levels. In short, for the American middle class, reduced consumption – perhaps for a prolonged period – seems unavoidable. While on the one hand this seems likely to generate more support for long-overdue health care reform in the United States (as more and more people losing their jobs are losing the health insurance that went with them), it will probably also limit the scope for Social Security reform (e.g., the imposition of an Australian style mandatory superannuation plan in the US, which we have long supported), as the middle class now realizes it is more dependent on Social Security than ever before. At best, a mandatory super with a government “top up” guarantee to achieve a minimum long-term return seems the most we can hope to achieve – and even that is a stretch, since it would leave less disposable income in the absence of strong productivity gains.

I don't think this comes as a surprise to Ben Bernanke, judging from the large number of studies the Federal Reserve has recently published on the impact of the substantial job losses now occurring in the U.S. and other OECD economies. Along with a number of papers by university researchers, they paint a dismal picture of what lies ahead. For example, in “Modeling Earnings Dynamics”, Altonji, Sith and Vidangos find that growth in general and company-specific “human capital accounts for most of the growth in earnings over a career, although job seniority and job mobility also play significant roles. [As a result], unemployment shocks have a large impact on earnings in the short turn as well as a substantial long term effect that operates through wages.

Shocks associated with job changes and unemployment make a large contribution to the variance of career earnings.” In “Long Term Earnings Losses Due to Job Separation During the 1982 Recession”, Wachter, Song and Manchester use a very long-term data set to examine the consequences of job loss. They find that “workers permanently leaving their long-term employer in the period from 1980 to 1985 experienced large and persistent earnings reductions lasting 15 to 20 years compared to workers of similar age and earnings potential who did not leave their employer.” In “Employment Insecurity: The Decline in Worker-Firm Attachment in the United States”, Henry Farber from Princeton University finds that long term employment relationships (especially for men) have become much less common in the private sector, with a significant rise in what he terms “churning” – the proportion of workers who have worked in their current jobs for less than one year. However, the trend in the public sector has been running in the opposite direction. Finally, in “House Prices, Home-Equity Based Borrowing, and the U.S. Household Leverage Crisis”, Mian and Sufi of the University of Chicago analyze individual level data on mortgage debt and defaults between 1997 and 2008 and reach a startling conclusion: “borrowing against the increase in home equity by existing homeowners is responsible for a significant fraction of both the sharp rise in U.S. household leverage from 2002 to 2006, and the increase in defaults from 2006 to 2008.” Rather than a crisis caused by the overextension of credit to lower income borrowers, the authors paint a compelling picture of a crisis caused by a large portion of the middle class reaching the end of its financial rope.

And “green shoots” and rising equity markets aside, the situation seems to be steadily growing worse. According to the Mortgage Bankers Association, one in eight American households with a mortgage is now late on a payment or in foreclosure. At least half of homes with a mortgage have negative equity. While there has been some pick up in sales at the lower end of the housing market (based on rental economics), at the higher end conditions are worsening – homeowners are losing jobs, while tightening lending standards, rising mortgage rates, high debt levels, and uncertainty

about future income eliminate demand from “move up” buyers. Half the loans now in foreclosure were made to prime borrowers.

In our view, this confluence of events has created a politically explosive situation among the middle class – and not just in the United States. The recent explosion of anger at expense fiddling by UK MPs is a perfect example of what happens when the populist rage that now boils just out of sight finds an outlet. As with the 2007 – 2008 financial crisis, it is hard to say in advance what the trigger event will be that sets off what will likely be a political crisis of some type. Resentment of public sector union intransigence in the face of rising economic pressure on middle class taxpayers is a growing theme across the OECD, with California (and the unions’ suggestion that the Federal government should bail out the state, to avoid cutting spending in excess of tax revenue) recently becoming the most visible example. So too is anger at the apparent lack of suffering in the financial sector (can’t you just wait for the first headline trumpeting the large bonuses earned for trading carbon emissions credits, while business leaders lament that uncertainty about future carbon prices is holding down job-creating investment?). If the teachers unions and private health insurance industry successfully block reforms in these two areas in the U.S., they may also become targets. And there’s no telling what will happen when and if the legislative dismembering of the Obama energy and environmental proposals prolongs the current absence of significant cleantech investment.

In this environment, it comes as no surprise that a coalition of U.S. Senators and Representatives recently proposed legislation that would impose tariffs on countries that were found to be artificially holding down their exchange rate (no prize for guessing who they have in mind). With job losses and foreclosures in nice neighborhoods accelerating, special interests blocking what seem like overdue reforms, and the perception that everyone but them has been bailed out by the government, there is an inescapable logic to the middle class demanding a sharp rise in protectionism as the price of their continued support for the Obama administration, if not U.S. democracy itself. As a friend from the UK recently remarked, we have not

seen such political volatility for close to a hundred years – and nobody knows where it will lead.

Of course, with more than a trillion dollars of government fiscal stimulus underway around the world, not to mention unprecedented monetary expansion, the odds are that the day of reckoning is still a ways off. There is little doubt that massive stimulus of this sort will produce some green shoots and trigger market hopes that this has all been just a bad dream, and things will soon return to the way they were “before.” Nowhere is this more true than in the U.S. banking system, where the massive expansion of bank reserves by the Fed is enabling an equally huge investment by insolvent banks in Treasury securities, which, along with cheap government backed funding, has widened interest spreads and raised hopes of being able to “earn our way out of these (temporary, and of course unforeseeable) problems”. Hence the tepid reaction to the Public Private Investment Partnerships proposal to get bad debts (oops, “legacy loans and securities”) off the banks’ books -- of course, fiddling with creditor seniority rights in the Chrysler bankruptcy and slamming “greedy bankers” also probably didn’t help the Obama administration’s sales pitch. It reminds us of the Wizard of Oz, where Dorothy is told not to look behind the curtain. In this case, we wouldn’t want her to be frightened by the rising volume of credit card, mortgage, real estate construction and development, leveraged buyout, and other loans and securities on the banks’ books whose probability of future repayment declines by the day. No, we’re all just going to hope they can earn their way out of it, while keeping their bondholders whole. Time will tell. But we’ve seen this movie too many times before (granted, in foreign languages with English subtitles) to be optimistic about the way this one will end. At some point, we still expect to see more banking crises erupt (and not just in the U.S. – European banks seem quite on the brink too), some type of debt/equity conversion plan for home mortgages (in the US and possibly elsewhere – say, the UK, Ireland and Spain) and (via government mandated good bank/bad bank restructurings) the conversion of at least some bank bondholders into shareholders in an asset management companies with lots of questionable paper on their books (let a hundred Resolution Trust Companies

bloom...). We have no doubt that this is preferable to a prolonged period of ever-more-creative plans to support overleveraged “zombie” homeowners and banks, while the economy endures prolonged low growth and (at the point when the dollar starts to seriously decline) quite possibly much higher inflation. Unfortunately, we’re still a long way – and probably not a few painful twists and turns of events -- from that point.

In the meantime, at least some global investors seem to have jumped the gun a bit (at least from the Obama administration’s perspective), and begun betting more heavily that some version of the conflict scenario will develop. Alternatively, they may be inadvertently raising its probability by taking actions (such as selling long-term U.S. Treasury bonds and driving up their yields) that seem rational from the perspective of an individual investor (or country), but whose cumulative impact can bring about the scenario they wish to avoid. The simultaneous increase in oil prices (while physical storage is still bulging and demand remains flat) also raises suspicions that more than a few investors are taking steps to hedge against a future rise in U.S. inflation. Unfortunately, rising interest rates and energy costs only serve to undermine the positive impact of governments’ fiscal and monetary stimulus, and raise the chances that in the near term our main threat will come from deflation, not inflation.

Meanwhile, it has been a relatively quiet month outside the United States as well (again, we believe that much of the important change is taking place below the surface, at the individual level). Both the Chinese and U.S. Treasury Secretary Geithner made appropriately conciliatory statements ahead of the latter’s visit to Beijing. On the other hand, China has also apparently been shifting more of its Treasury bond holdings into shorter maturities, which not only affords better protection against inflation, but potentially provides more leverage on U.S. policies. China also announced that one quarter of its stimulus package would go to Sichuan province to stimulate recovery from last year’s earthquake. This raised quite a few questions about what this meant for the efficacy of its stimulus program, as well as the extent of social unrest that may be occurring in Sichuan. Similarly, more analysts have been raising questions about the medium-term consequences of China’s rapid expansion of bank loans to support employment at state owned enterprises. The worry is that these

companies will not be able to repay them, forcing the government to cut back on other spending (e.g., on better health care and social security, which are needed to reduce private savings and increase domestic consumption) in order to recapitalize the banking system. Finally, April export data was worse than March, providing further evidence that, whatever the official statistics say, China's economy – and therefore social and political system – is still under considerable pressure.

In Iran, Supreme Leader Ayatollah Ali Khamenei was reported to be urging voters not to support “pro-Western” candidates in the June 12th election – which is apparently anyone other than President Ahmadinejad. This marks an apparent increase in Khamenei's support for Iran's embattled president, and raises the probability of him winning another term (if no candidate wins a majority, there will be a runoff between the two top candidates on June 19th). Last but not least, last month India also had national elections, and saw an unexpectedly strong win by the Congress Party, which observers are hoping will translate into a quickening in the pace of economic reforms and GDP growth.

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.

<i>Rolling Three Month Returns in USD</i>			<i>29-May-09</i>
<i>High Uncertainty</i>	<i>High Inflation</i>	<i>Normal Growth</i>	
Short Maturity US Govt Bonds (SHY) 0.39%	US Real Return Bonds (TIP) 6.07%	US Equity (VTI) 26.62%	

Rolling Three Month Returns in USD		29-May-09
<i>High Uncertainty</i>	<i>High Inflation</i>	<i>Normal Growth</i>
1 - 3 Year International Treasury Bonds (ISHG) 0.02%	Long Commodities (DJP) 19.02%	EAFE Equity (EFA) 36.82%
Equity Volatility (VIX) 10.35%	Global Commercial Property (RWO) 39.26%	Emerging Equity (EEM) 56.57%
Gold (GLD) 3.85%	Long Maturity Nominal Treasury Bonds (TLT)* -6.70%	High Yield Bonds (HYG) 18.88%
Average 3.65% Last Month: 1.53%	Average (with TLT short) 17.76% Last Month: 3.72%	Average 34.72% Last Month: 11.69%

* falling returns on TLT indicate rising inflation expectations

As you can see, the weight of investor opinion has continued its dramatic shift away from uncertainty and towards a sharply strengthening belief in the imminent return to normal times (though with a rising undercurrent of worry about higher inflation). Based on our analysis, we conclude that these expectations are quite likely wrong. If anything, it seems to us that the probability of a return to higher uncertainty (and stronger deflation) has occurred over the past month. Hence, on this metric, we believe the risk of “normal regime” assets being overvalued has increased, as has the probability that “uncertainty regime” assets are undervalued.

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

	Cooperative Scenario	Conflict Scenario
Chinese Peasants	Land reform and economic growth (which provides jobs) boost incomes while a sharp increase in government spending on health care and education limits resentment of Communist Party corruption and economic inequality compared to coastal elites. This minimizes social unrest and threats to continued legitimacy of the Party's governance of China.	Growing unemployment and a sense that government stimulus is disproportionately benefiting coastal and party elites triggers widespread unrest and peasant alignment with disaffected students, urban unemployed, and members of the military. The Chinese government becomes aggressively nationalist in an attempt to channel this anger outward. At best, this triggers a global retreat into trading blocs; at worst, this strategy fails and China descends into fragmented authoritarian regions with minimal central control.
Iranian Youth	Prolonged economic stagnation and rising inflation lead to the defeat of President Ahmadinejad in June 2009 elections, and widespread pressure for better relations with the West. Economic self-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:		

	Cooperative Scenario	Conflict Scenario
Overleveraged Consumers	Effective mortgage relief plans implemented in most affected countries, while stronger economic growth maintains income needed for debt repayment.	No effective mortgage relief legislation passed. Instead, rise in bankruptcies and mortgage foreclosures puts continuing downward pressure on housing prices.
Financial System Weakness	Combination of stronger investment and export led economic growth and effective bank rescue plans reduces uncertainty about health of system, and enables sufficient flow of credit to support renewed economic growth.	Worsening economic conditions and failure of bank rescue plans (due to design or political resistance) cause uncertainty to remain high, credit flows to be constrained, and defaults to increase, which all contribute to a worsening process of debt deflation.
International Imbalances	Rising domestic consumption spending in China enables a reduction in export dependence, while U.S. imports are reduced by a shift from private consumption to private saving and higher investment spending and greater exports. This reduces global current account imbalances to a manageable level.	China's continued emphasis on export led growth, at a time when the US is incurring high fiscal deficits (and eventually higher taxes) to maintain global demand, triggers demands for greater protection, which in turn precipitate a dollar exchange rate crisis as other countries move to limit the losses on their foreign exchange reserves. Result is a fragmentation of the global trade and financial system into much less integrated blocs.
<i>Evidence Over the Previous Three Months Against Each Scenario (most recent month first)</i>	<i>Evidence Against the Cooperative Scenario</i>	<i>Evidence Against the Conflict Scenario</i>
May 2009 (This Month's Issue)	<ul style="list-style-type: none"> • US Congress has sharply reduced renewable energy requirements 	<ul style="list-style-type: none"> • Signs that credit market conditions are returning towards, if not to,

	Cooperative Scenario	Conflict Scenario
	<p>proposed by Obama administration, and chose to auction only 15% of CO2 emissions permits, rather than 100%. This has opened an even wider gap in the Obama budget deficit forecast, and raised worries about significant increases in inflation. This has led to an increase in long term interest rates and commodity prices. All of these factors create headwinds for the conversion of the enormous government fiscal and monetary stimulus into a sustained recovery.</p> <ul style="list-style-type: none"> • Continued worsening of unemployment and problems in the mortgage, housing and household credit markets, with problems moving into ever higher levels of the middle class. This is not only creating more headwinds for economic recovery, but also strengthening an explosive populist anger whose eventual impact is unclear, but unlikely to be positive. • It appears that interest groups are gaining ground in their plans to block or weaken significant parts of the 	<p>normal.</p> <ul style="list-style-type: none"> • Low enthusiasm for PPIP, and stated desire on the part of some banks to repay TARP funds, implies they believe they can “earn their way out of the crisis” via the large gap between the yields on the Treasuries they hold and their low government guaranteed funding costs. • During his trip to China, Secretary Geithner and his Chinese hosts have made conciliatory statements to each other, backing away from some of the more inflammatory rhetoric seen in the past few months. • Strong win by Congress Party in Indian elections should lead to faster reform and GDP growth

	Cooperative Scenario	Conflict Scenario
	<p>Obama economic program</p> <ul style="list-style-type: none"> • Introduction of protectionist legislation in US Congress aimed at China • Weakening of Chinese export demand in April; surprise announcement that 25% of stimulus program will be directed to Sichuan suggest domestic conditions may be worsening in China • Worsening growth in Japan and Europe raises the risk of political unrest and a new banking crisis • In Iran, Khamenei seems to have switched support to Ahmadinejad in the 12 June presidential election 	
April 2009 (May Issue)	<ul style="list-style-type: none"> • 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 	<ul style="list-style-type: none"> • 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

	Cooperative Scenario	Conflict Scenario
	<ul style="list-style-type: none"> • Failure to pass legislation to ease mortgage debt burden in United States • Environmental and 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 	<p>presented a coherent overview of economic strategy</p>
March 2009 (April Issue)	<ul style="list-style-type: none"> • 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. 	<ul style="list-style-type: none"> • 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.

	Cooperative Scenario	Conflict Scenario
	<ul style="list-style-type: none"> • Growing populist anger at bankers and the cost of bank bailouts in US and UK • At best only very weak movement towards 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 	<ul style="list-style-type: none"> • Evidence that fall in consumer spending is stabilizing, and that inventory rebuilding is starting, after record setting reductions (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
	<p>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 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.</p>	

Product and Strategy Notes

The Powerful Impact of Regret

Last month we reviewed three key fear triggers – loss, uncertainty, and social isolation – that have a powerful impact on investor behavior. This month, we'll look at a closely related topic – regret. Regret is the feeling we experience when we compare the outcome of a previous decision to what would have happened had we chosen another course of action. It is distinct from disappointment, which is what we feel when confronted with an unexpected negative outcome for which we do not believe our previous decision was responsible. In terms of neurobiology, regret is produced by the activation of the orbitofrontal cortex, a region of the brain that is associated with cognitive processing (see "The Involvement of the Orbitofrontal Cortex in the Experience of Regret" by Camille, Coricelli, Sallet et al). However, repeated experiences of regret (and increasing regret aversion) have been shown to activate the amygdala as well, indicating that there is a fear component involved as well as a

cognitive one (see “Regret and Its Avoidance: A Neuroimaging Study of Choice Behavior” by Coricelli, Citchley Joffily, et al).

Research has found that the desire to avoid regret has a strong influence on human decision making (see, for example, “Predicting Human Interactive Learning by Regret-Driven Neural Networks” by Marchiori and Warglien). Broadly speaking, the nature of the regret experience seems to depend on two factors: whether it involved an error of commission or omission, and whether it is being viewed from a near term or longer term time perspective. Errors of commission involve taking actions that later turn out to have worse consequences than an alternative course of action. Errors of omission involve not taking an action that would have produced a better result than the one obtained by not acting. These are closely related to, and often confused with the Type 1 and Type 2 errors found in statistics. In the statistical field of hypothesis testing, one usually compares a hypothesis that some action has a statistically significant effect with the so-called “null hypothesis” that it does not. In a Type 1 error, the null hypothesis (no effect) is rejected when it is true – hence, this type of error is also known as a “false positive.” In a Type 2 error, the test hypothesis is rejected (and the null accepted) when the test hypothesis is actually statistically significant – hence, this error is also known as a “false negative.” As you can see, the more you try to limit the chance of one type of error, the more you increase the chance of making the other.

Confusion usually arises when errors of commission and omission are used interchangeably with Type 1 and Type 2 errors. The underlying – and usually unstated – issue is what constitutes the null hypothesis. Consider a manager who decides to make an investment that later declines in value. Clearly, this is an error of commission. But is it a Type 1 or a Type 2 error? It depends. If the null hypothesis was “this is not a good investment” then it is a Type 1 error. But if the null hypothesis was “this is a good investment” and the test hypothesis “this is a bad investment” is rejected, it is a Type 2 error. Do you see how this can get confusing? After struggling for years with how to apply Type 1 and Type 2 error concepts to practical (non-statistical) decision problems, I’ve come to think of the null hypothesis as whatever in the situation in question constitutes the conventional wisdom. Hence, in my view of

the world, a Type 1 error involves accepting a thesis at odds with the conventional wisdom when the latter is correct, while a Type 2 error involves accepting the conventional wisdom when it is actually not correct. Perhaps more important, this helps to make it clear why people tend to place more emphasis on avoiding errors of commission (Type 1) than they do on avoiding errors of omission (Type 2) – the first involves going against the crowd, while the second requires only that you go along with the crowd. This nicely aligns with the findings we reviewed in last month's issue that social isolation is a powerful fear trigger.

Unfortunately, there is other evidence that in this case, our instincts do not align with our best economic interests. Consciously or unconsciously, people seek to minimize future regrets when making important decisions. In their paper "Fear and Loathing in Las Vegas: Evidence from Blackjack Tables", Carlin and Robinson find that errors of commission produce stronger feelings of regret than errors of omission. Consider the situation facing an investor. Deviating from the conventional wisdom (e.g., the weight of different investments in a peer or market benchmark) creates the possibility of generating a loss or a gain. However, losses have a more powerful impact, because they trigger primal fear, which may be further reinforced by heightened uncertainty and social isolation following the loss. This appears to be the neurochemical basis for the findings of prospect theory researchers that human beings' aversion to loss is about twice as strong as their preference for gains. Hence, investors have a natural tendency to be very careful about departing from the conventional wisdom (i.e., to make an error of commission), since sticking with the crowd is the emotionally safer course of action. Unfortunately, in their studies of blackjack players in Las Vegas Carlin and Robinson also find that the economic cost of errors of omission is significantly higher than the cost of errors of commission. The higher economic cost of errors of omission may be one of the reasons behind a second paper's finding that as the period of hindsight lengthens, errors of omission weigh more heavily on our memories than errors of commission (see "Regret for Errors of Commission and Omission in the Distant Versus Near Term" by Leach and Plaks). One wonders if this is also true in the case of investments. Looking back over

a five or ten year period, do people most strongly regret the bad investments they made, or the good investment decisions they didn't make? And is there any difference between the emotional power of errors of omission that resulted in foregone gains compared to those that could have avoided realized losses? Unfortunately, we can find no research on these questions – though we have no doubt they are one of the keys to improving the investor/adviser relationship and its underlying system of performance metrics and rewards.

What can investors and advisers do to limit potential regret? First, we can become more aware of our natural tendency to place more emphasis on avoiding errors of commission, and consequent willingness to accept more errors of omission – often at a significant cost. Second, when faced with a decision, we can solicit advice. As Ilan Yaniv notes in his paper “Receiving Other People's Advice: Influence and Benefits”, “seeking advice is a basic practice in making real life decisions. Until recently, however, little attention has been given to it, either in empirical studies or theories of decision making”, even though the use of advice significantly improved the accuracy of decisions. Another paper (“An Experimental Test of Advice and Social Learning” by Celen, Kariv and Schotter) finds that while most herding theories are based on people simply copying others' observed behavior, advice has a much more powerful effect. Yet all advice is not created equal. In a second paper (“Spurious Consensus and Opinion Revision: Why Might People Be More Confident in Their Less Accurate Judgments?”) Yaniv and his co-authors find that receiving advice from independent sources whose views do not agree improves accuracy much more than receiving advice from people who agree, but whose opinions are not independent of each other. However, because of their aversion to conflict (and its attendant threat of social isolation), people tend to have more confidence in a decision made with the second type of advice rather than the first. Similar findings are reported by Michael Smithson, in “Conflict Aversion: Preference for Ambiguity Versus Conflict in Sources and Evidence.” In sum, when seeking advice, it pays to gather a range of independent inputs, and to accept a perhaps uncomfortable level of conflict between them as the cost of making the best decision possible.

More Research on Why Consistently Successful Actively Managed Funds are Rare

We recently read a number of new research papers on one of our favorite subjects: why consistently successful active management is so rare. In “Why is Persistent Mutual Fund Performance So Difficult to Achieve?”, Bessler, Blake, Luckoff and Tonks analyze a sample of 3,948 U.S. mutual funds covering the period from 1992 to 2007. They conclude that “the future performance of past top performing funds strongly suffers from both the departure of skilled fund managers and even more from excessive inflows.” They also find that these two mechanisms are linked, in that superior past performance tends to draw in new funds, which makes it harder to sustain past performance. At the same time, superior past performance also raises the probability of manager turnover. Another reason for active manager underperformance is that experience provides less protection against getting caught up in bubbles than investors might like to think. In “Thar She Blows: Can Bubbles Be Rekindled with Experienced Subjects?” Hussam, Porter and Smith show how increased dividend uncertainty and liquidity can reignite bubbles in markets populated by traders who have twice before experienced bubbles and crashes. They conclude that learning about bubbles is context dependent, and does not easily transfer across time when key elements of the environment change – as they did from the time of the internet bubble to the time of the credit bubble almost a decade later. Finally, in “Performance Maximization of Actively Managed Funds” Guasoni, Huberman and Wang make a very important point: the illusion of active management skill can be created by buying an index and writing (selling) call options against it, provided that the implied volatility of the options is higher than the realized volatility of the index returns. The authors conclude that this finding raises questions about the appropriate benchmark to use when determining active manager’s alpha and information ratio.

Did the Financial Media Do a Good Job Predicting the 2008 Crisis?

In a new article in the Columbia Journalism Review (“Power Problem”), Dean Starkman begins by noting that “these are grim times for the nation’s financial media. Not only must they witness the unraveling of their own business, they must at the same time fend off charges that they failed to cover adequately their central beat – finance – during the years prior to an implosion that is forcing... the entire world into an economic winter.” Starkman provides an in-depth evaluation of the accuracy of this accusation, and finds it is generally correct – though with some important exceptions, who he names. Starkman concludes that the underlying cause of the poor coverage is a type of Stockholm Syndrome among many members of the financial media with respect to their relationship with the Wall Street and Washington institutions and people they cover. Unfortunately, beyond widening one’s sources of information, there don’t appear to be any easy answers to this problem.

How Rigorous Is Your Investment Logic?

We recently came across a very thought provoking paper by two Dutch researchers that we strongly recommend to our subscribers. In “Investment Beliefs: The Importance of Focus for Institutional Investors”, Koejijk and Slager start with a four stage model of the investment process, consisting of (1) investment beliefs about repeated behavior that is observed in financial markets; (2) investment theories about how these behaviors result in mispricing; (3) investment strategies that describe how these mispricings can be profitably exploited, and (4) organizational policies that describe how the strategy will be consistently implemented. While most investment professionals have thought about these issues often over the years, this paper not only brings them together in an integrated format, but also presents survey data on the different views of these issues held by pension fund sponsors and active managers.

Model Portfolios Update

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

We use two benchmarks to measure the performance of our model portfolios. The first is cash, which we define as the yield on a one year government security purchased on the last trading day of the previous year. For 2009, our INR cash benchmark is 5.56% (in nominal terms). The second benchmark we use is a portfolio equally allocated between the ten asset classes we use (it does not include uncorrelated alpha). This portfolio assumes that an investor believes it is not possible to forecast the risk or return of any asset class. While we disagree with that assumption, it is an intellectually honest benchmark for our model portfolios’ results.

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