The Index Investor

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2008 Year End Double Issue: Key Points

With many of our readers laboring over their year-end client letters, our first feature article this month takes an extended look at three critical questions that are probably on their minds:

- *Can strategy add value in the financial management business?*
- *Why were so many investors and advisers surprised by this year's events?*
- *How do we expect the industry to adapt in 2009 and beyond?*

We conclude that strategy – defined as the ends, ways, and means to achieve long-term goals in the face of uncertainty – in fact has an even more important role to play than in the past. However, we caution that strategy is not synonymous with planning, nor is uncertainty synonymous with risk. Consequently, while effective strategy is more important than ever, many financial services professionals may have to raise their game to deliver it to their clients in 2009. With many of those clients moving beyond their initial shock and now angrily demanding to know why they weren't warned about the ferocious crisis that hit global markets in late 2008, we reject the simplistic excuse that "nobody could see this coming" and examine in depth why

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so many people were taken by surprise. Our starting point is a model of the processes that drive human beings' behavior: We first allocate our scarce attention to stimuli that seem important, and then our brains then attempt to extract meaning from them while using as little of our scarce cognitive capacity as possible. In broad terms, this processing is intended to produce three outputs: (1) rational and emotional categorization of the information in light of our conscious goals and usually unconscious needs (since processing aggregated categories requires fewer cognitive resources); (2) a set of possible actions (again, to save cognitive resources, we first attempt to use previously learned "condition-action" rules); and (3) a set of expectations about the results of different possible actions (including their emotional outcome). We call the results of these processes our thoughts and feelings. In the next stage of the process, we choose which of the possible actions to execute, based on the range of internal and external, rational, emotional, and social incentives we face. And once again, this decision is not made in a wholly conscious manner (e.g., did you ever hesitate to walk down a street because you just had a "funny feeling" about it?). After we act, uncertainties are resolved, random effects occur (which together we often call "luck") and we evaluate the results of our action using one or more metrics. Sometimes these results trigger conscious or unconscious learning, most often they merely serve as new information inputs as the process enters a new cycle. Echoing findings from studies of surprise attack in the military and intelligence spheres, we find that investors were either taken by surprise, and/or failed to act on the warnings they received, because of failures at all stages of this process. Our conclusions regarding the first two questions frame our answer to the third – the range of adaptations we expect the financial services industry to make in 2009 and beyond. Suffice to say, they are many and important.

Our second feature article is an update to both our assessment of the evolving situation in the world economy and financial markets, and to our analytical methodology. We conclude that if the world pursues cooperative solutions in 2009, the damage to the world economy and investors' portfolios will be far less than if the world heads down the conflict ridden path, either by accident or because of the

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intentional actions of one or more parties. In the near term, we will be paying close attention to the way critical micro and macro uncertainties are being resolved. At the micro/agent based modeling level, there are two central uncertainties. The first is whether the Obama administration will be able to reduce the insecurities and confusion facing the American middle class, before they metastasize into destructive and unpredictable populist anger. The second is whether growing economic and political frustration in China reaches a tipping point where it can no longer be held in check by increased government spending and higher levels of repression. Both of these micro level issues involve a mix of cognitive and emotional changes at the individual level, and their amplification through social interaction.

At the macro level, the central uncertainties are whether potential South Asian/Middle Eastern conflicts can be held in check and whether a balance can be struck between the United States, China and the Eurozone that enables current account imbalances to reduced over time without a violent disruption of world trade and financial markets. On the first issue, the actions of India and Pakistan, and Israel and Iran, will determine whether current conflicts explode or are held in check. On the second macro issue, the evolution of events in China will be critical. This feature concludes with an assessment of the asset allocation implications of our analysis, as we prepare to enter the Chinese year of the ox, which (accurately, we hope) is characterized by prosperity through fortitude. We believe that some asset classes appear to be quite undervalued today, though we caution that valuations could go lower depending on whether our cooperative or conflict scenario unfolds. On balance, we believe that the most upside is offered by moving into inflation hedges (e.g., real return bonds, commercial property, commodities and timber), as valuations for uncertainty/deflation hedges seems quite rich while those for equities, while tempting in some cases, are still marked by high uncertainty. Finally, as we have since May 2007, we reiterate the importance we attach to maintaining an adequate level of liquid reserves.

This month's product and strategy notes also cover a lot of ground. We begin with a proposal to simultaneously reduce household mortgage burdens while creating

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new securities that provide investors with access to residential property as an asset class. We then review the lessons of the Madoff scandal, and highlight some examples of great writing that has been inspired by the 2008 crisis. We move on to some interesting returns data that caught our eye (who doesn't like to compare their performance to the Harvard Endowment's?), as well as some thought provoking research that was recently published. Finally, we review a number of new product introductions, including new ways to (more profitably, we hope) invest over the long-term in commodities.

This Month's Letters to the Editor

I appreciate the supply and demand of returns methodology you use in your month Asset Class Valuation Update. However, I'm still struggling with how it applies to commodities, and in particular how the equilibration process works. Could you please explain this again?

The supply of returns from a commodity futures-based index comes from four sources. Since futures can be purchased at less than their face value, excess cash is invested (e.g., in real return bonds) to generate returns. There is also a diversification return that comes from investing in a range of commodities (e.g., energy, agricultural and metals) that have low correlations of returns from each other. The third source of return is the so-called "roll yield" that is earned when futures contracts nearing maturity are sold, and the proceeds used to replace them with longer-dated contracts. When futures prices are "backwardated" (i.e., near dated futures prices are higher than longer dated prices), the roll yield is positive; when prices are contangoed (near term prices are lower than longer dated prices), the roll yield is negative. The final source of returns is unexpected changes in the price of the commodity (i.e., price changes that the seller of the contract has not assumed when transacting with the buyer).

Let us now assume a situation like past two years, when the economy was rapidly growing. This caused a tightening of the supply/demand balance for many

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commodities. In turn, this raised the probability that price surprises would occur (e.g., a positive surprise in the case of an unexpected supply outage, or a negative surprise if demand growth was less than expected). It also raised the premium on having access to physical commodities. When the supply/demand balance is slack, a company that uses a commodity has the choice of either buying, financing, and storing it, or buying sufficient futures contracts that can be exchanged for physical products. Logically, all else being equal, the price of the futures contract should equal the spot price (i.e., the cost of buying the commodity today), plus the cost of financing the purchase and storing the physical product until it is used. However, when supply/demand conditions are tight things change, particularly when there are high costs associated with running short of the commodity in question. Under these conditions, owning the physicals, rather than taking a chance on something going wrong with the delivery of a futures contract, and/or having more flexibility to vary production by using the stored physicals, may seem a more prudent course of action to take. Hence, users of commodities, when supply and demand are tight, may bid the spot price up higher than the futures price, producing a "backwardated futures curve" – and profitable roll yields for investors in commodity futures-based index products (technically, this is known as the "convenience yield" effect).

So far, so good. Now let's consider the dynamics underway on the supply and demand sides of this market. On the supply side, rising prices will lead to investment in new capacity. And on the demand side, rising prices will lead to searches for more efficient processes and substitute products. Eventually, this will result in a shift in the supply/demand balance, unexpected falls in commodity prices, a shift from a backwardated to a contagoed futures curve, and negative roll yields. But that's not the end of the story.

As we have seen over the past two months, falling prices cause new projects to be canceled, that sets in motion a tightening of the supply/demand balance. For example, the most recent "World Energy Outlook" from the International Energy Agency cautions "globally, oil resources might be plentiful, but there can be no guarantee that they will be developed quickly enough to meet the level of demand

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projected in our Reference Scenario… The projected increase in global oil output hinges on adequate and timely investment. Some 64 million barrels/day of additional gross capacity – the equivalent of almost six times that of Saudi Arabia today – needs to be brought on stream between 2007 and 2030. Some 30 mb/d of new capacity is needed by 2015. There remains a real risk that under-investment will cause an oil-supply side crunch in that timeframe." However, while falling prices cause cancellation or delay of new supply side investments, they also cause consumption (say, of gasoline) to rise. Eventually, the supply/demand balance tightens to the point that positive price surprises and backwardated futures curves reappear. Through this complex set of processes, the supply of and demand for returns on the commodities asset class are constantly attracted to equilibrium, even if they seldom attain it. A further issue (which is covered in this month's Product and Strategy Notes) is the extent to which rising investor interest in commodity futures may have changed the operation of this adjustment process. For example, did a spike in futures buying by investors attracted by the upside price surprises in early to mid-2008 more than offset the convenience yield effect, and produced an unprofitable contango instead, while also creating more upside price surprises? While this issue remains unresolved, it does hint at a change in the adjustment dynamics that could produce much more volatile commodity returns. On the positive side (and as discussed in this month's Product and Strategy Notes), it should also offer lead to the development of new products that offer better ways to invest in commodities investors.

I'm having a hard time figuring out how the Dow Jones AIG Commodities Index is constructed, and whether it keeps up with inflation. If so, what are the implications of this for assessing the value of this asset class using current prices compared to the distribution of historical index values? Finally, when it comes to commodities, there is one key issue I have never been able to reconcile in my mind – at the aggregate level, surely this is a zero sum game. So if a diversified basket of commodities futures in fact offers equity like returns, the question is, why would anyone sell them?

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Thank you for a great question. The weight of different commodities in the DJAIG is based on a combination of their relative liquidity and production volumes. These weights are multiplied by the current price of so-called "designated futures contracts" to get the daily value of the index. DJAIG values are reported in two ways: (1) the excess returns index is based only on roll returns and price changes in the underlying futures contracts, while (2) the total returns index includes the returns on underlying collateral (which is assumed to be U.S. Treasury Bills; however, some product providers invest their collateral in other products – e.g., PIMCO uses U.S. real return bonds, which they believe provide a better inflation hedge, consistent with the purpose of commodities in many investor portfolios). More information about the DJAIG methodology can be found here: *www.djindexes.com/mdsidx/downloads/aig/methodology/DJ-AIG_Commodity_Index_Methodology.pdf*

With respect to your query about whether the DJAIG has kept up with inflation, we calculated the real return on the DJAIG excess returns index between 1992 and 2007 (using U.S. CPI as our measure of inflation). Over this period, the average annual real return on the index was 4.6%, with a standard deviation of 16.8%. Over the full fifteen years, the compound annual real return was 3.1% (which is in line with the general rule of thumb that the compound annual return is equal to the arithmetic average less half the variance – which is the standard deviation squared). So, to answer your question, over the period we analyzed, the returns on the DJAIG in fact exceeded the rate of inflation.

On the subject of the impact of this on our valuation judgments, we are the first to admit that our comparison of the current DJAIG index level with a normal distribution of historical index values is only a rough indicator. The question we have always asked was how much the accuracy of our estimate would improve as the result of using inflation adjusted index returns in our analysis, and perhaps making assumptions about the impact of new commodity market dynamics on the shape of the distribution we use. At least in 2008, we decided that this wouldn't have changed our conclusion that commodities were probably overvalued; as a result, we invested our

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time in developing an alternative valuation model for commodities, based on our supply of and demand for asset class returns framework. That said, we continue to pursue improvements in this area.

Your last question – why would anybody sell futures if buying them generates a long term return premium over real return bonds – gets us back to the underlying dynamics of commodity markets. As we have noted in the past, they are complex, to put it mildly. Based on our reading of the research, at least four different underlying processes are at work. The original purpose of commodity futures markets was to enable product producers to lock-in the price of their output, and product users to lock-in the cost of their inputs. Since the desired purchases of these two groups were not always in balance (e.g., during a period of falling price, there would be more producer interest in selling futures than user interest in buying them), a role was created for liquidity providers, who would take the other side of these trades (for an anticipated profit) to eliminate the imbalance. In terms of futures curves (with price on the vertical axis, and time to expiration – arrayed from near to longer term – on the horizontal), this "hedging pressure" theory would generate downward sloping (i.e., backwardated) futures curves when prices were falling, as producers want to sell more contracts than users want to buy, and upward sloping (i.e., contangoed) curves when prices are rising.

The second process is driven by the costs users bear when they run out of a commodity, and what it costs for them to buy and store it. When supply and demand are tight and prices are rising, users may fear running out of a product, and hence place a higher value on owning inventories of physical product than they would when markets have more slack. Hence, they will bid up the price of physical commodities (i.e., the "spot price") relative to futures, causing the futures curve to become backwardated. In contrast, when supplies are plentiful, users would rationally tradeoff the cost of buying a commodity at spot, and then storing it until it is needed, or buying a futures contract. In an efficient market without the opportunity for arbitrage profits, the futures price would equal the spot price plus the user's storage and financing costs – in other words, the futures curve would be contangoed.

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As you can see, these two theories produce diametrically opposite predictions about the shape of the futures curve when prices are rising or falling. On balance, the evidence seems to favor the theory of storage, at least in terms of its impact on prices (it seems hard to believe that the hedging pressure process is not also underway). However, two other processes also affect prices, and these are driven by financial investors, not the producers and users of commodities. Active investors (ironically known as "speculators" in traditional writing about commodity markets) buy and sell futures contracts in order to profit from what they believe are their superior forecasts of future commodity prices. Their activities introduce new sources of supply and demand in the futures markets. More important, since trend following (i.e., momentum) is a popular basis for these active strategies, the rising percentage of market trading volume driven by these active managers has probably caused a fundamental change in commodity market dynamics. Research on the application of complex adaptive systems theory to financial markets (e.g., see multiple papers by Blake LeBaron or Cars Hommes) has found that they are reasonably stable and efficient when investors who use "fundamental value" strategies (traditional producers and users in our commodity market example) are the dominant players. However, as more and more trading is driven by momentum strategies, market prices become less efficient (i.e., they do not stay as close to fundamental values), more volatile, and characterized over time by a rich ecology of complicated boom and bust cycles. Most recently, a fourth process has also become a more powerful influence – an increased buying of futures contracts by commodities index funds. All else being equal (which it clearly isn't) this should put upward pressure on futures prices, relative to spot prices, and thereby raise the probability that the market will be in contango.

With a better understanding of the complex dynamics underway in today's commodity markets, we can better answer your question about why someone would sell a futures contract. Producers sell them to lock in a price for their output. Liquidity providers sell them to earn a return from helping to make orderly markets. And speculators sell them to profit from anticipated price declines or to arbitrage inefficiencies in the relationship between spot and futures prices.

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It appears that Equity Market Neutral products have had little impact on the returns of your various model portfolios. It almost seems to have had random effects; in some cases it helped, and in others it hurt. Given that, do you still believe that adding Equity Market Neutral positions is beneficial?

Yes, we do, because of a point you noted in your question: the random returns produced by equity market neutral and other active strategies whose returns have a low correlation with those on the broadly defined, passively managed, low cost index products that form the basis of our model portfolios. Mathematically, the inclusion of uncorrelated alpha strategies can raise average long-term portfolio returns while not adding much to risk. However, as you seem to imply in your question, on a year to year basis this can be frustrating, because an uncorrelated alpha product can move in the same direction or the opposite direction of the rest of the portfolio. However, this does not imply that it is a bad investment in terms of the long-term value it adds to a portfolio. In fact, some asset allocation methodologies (e.g., those based on allocating equal amounts of a risk budget to different asset classes) recommend significant allocations to actively managed uncorrelated alpha strategies.

On the other hand, we have also pointed out some limitations of this approach. First, few active strategies seek to deliver returns that have a low correlation of returns with those on multiple broadly defined asset classes (a lesson many investors in "hedge" funds have learned the hard way this year). Second, even when you find such a strategy, you cannot be sure how long the manager's edge will last. As we have repeatedly written, the continuing evolution of the economy and financial markets can make today's superior source of information or superior model obsolete tomorrow – and there is always the chance they will be copied by other investors, who will compete away the alpha they have generated in the past. For this reason, we have in the past limited our allocation to the relatively few equity market neutral and other uncorrelated alpha strategies that have been available to retail investors. However, this is an issue we will continue to re-examine as the number of investment offerings in this category continues to expand.

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Could you expand on what you mean by the term "liquidity reserves"?

Unfortunately, it seems that a degree of confusion has been created by different writers' use of terms like "emergency fund", "precautionary savings", "liquidity reserves" and similar terms. While similar, they appear to refer to slightly different concepts. An "emergency fund" is often thought of as an amount sufficient to cover normal living expenses for a given period of time (e.g., a period of unemployment) – say somewhere between three months and one year. "Precautionary savings" strikes us as a broader term that includes not only funds sufficient to cover living expenses, but also larger liabilities (e.g., unexpected health care expenses or assisted living costs). When we use the term "liquidity reserves", we have in mind an even broader concept that includes not only emergency and precautionary savings, but also savings for large purchases (which assumes reduced use of credit cards), and money taken out of one's investment portfolio because of (a) substantial overvaluation in some asset classes, and (b) no other asset classes where both current valuations and current portfolio allocations make further investment attractive. To put it differently, rather than including "cash" as an asset class in our model portfolios that is somehow different from emergency and precautionary savings, we recognize that as a practical matter all liquid assets are fungible and investors usually think of them as being in a different category than their investment portfolio.

Since May 2007 we have advocated raising liquidity reserves because we believed the coming crisis (which has now arrived) would be long and could easily involve substantial unemployment and reductions in the availability of consumer credit, and because we believed that many asset classes were substantially overvalued. We have also repeatedly noted our belief that the proper role of gold is in an investor's liquid reserves, in the form of gold coins such as South African Krugerrands, Canadian Maple Leafs, or U.S. Eagles and Buffaloes. In the case of a true economic disaster, gold coins provide a liquid store of value that is easy to use in transactions – unlike ETFs that are backed by gold (when you sell those ETF shares, you receive currency, not metal!). Beyond gold, there is also an argument, we have long believed, for

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holding at least a portion of one's cash reserves in another currency – a bank account is ideal, with foreign currency CDs or ETFs a good alternative. Finally, recent events have also made it painfully clear that money market funds are not exactly the same as insured demand deposit accounts at a commercial bank, and involve a greater risk of capital loss.

I am a new subscriber, and am a bit confused by the purpose of your Asset Class Valuation Update section. Are you advocating market timing?

We are the first to admit we are pragmatists, not purists! The logic behind this monthly update is as follows. First, simple mathematics shows that avoiding large downside returns is more important to an investor pursuing long-term goals than reaching for the last few basis points of return. Second, we believe that financial markets are best characterized, not as an efficient market in which prices generally reflect fundamental values, but rather as a complex adaptive social system in which, though attracted to efficiency, can still give rise to bubbles and crashes. Third, we believe that the first line of defense against large downside risks is a well diversified portfolio and a regular (i.e., systematic) rebalancing strategy (e.g., one that rebalances when an asset class is more than 5% above or below its long-term target weight). However, this systematic approach does not address the needs of an investor who needs to decide when and where to add new funds to a portfolio, nor does it address the risk of multiple asset classes simultaneously becoming substantially overvalued, and justifying a move into cash and other highly liquid assets. In both these situations, it helps to have a view on the current valuation of different asset classes, which is what we provide each month in our Asset Class Valuation Update. It is not our intent to help investors earn higher returns by providing tactical market timing inputs; rather, our goal is to provide strategic warning that can help limit downside risk exposure. To this end, we very clearly state that "this is an assessment of valuations at a given point in time, which implies no forecast as to whether and when the market's "animal spirits" will cause any

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over and undervaluations to reverse in the future. Bear in mind that before such a reversal occurs, over and undervaluations could actually become more extreme."

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Global Asset Class Returns

YTD 31Dec08	In USD	In AUD	In CAD	In EURO	In JPY	In GBP	In CHF	In INR
Asset Held								
US Bonds	5.04%	25.63%	25.10%	9.96%	-18.20%	32.81%	-1.33%	24.14%
US Prop	-37.05%	-16.46%	-16.99%	-32.13%	-60.29%	-9.28%	-43.42%	-17.95%
US Equity	-37.04%	-16.45%	-16.98%	-32.12%	-60.28%	-9.27%	-43.41%	-17.94%
AUS Bonds	3.25%	23.85%	23.31%	8.18%	-19.98%	31.03%	-3.12%	22.36%
AUS Prop	-71.74%	-51.15%	-51.69%	-66.82%	-94.98%	-43.97%	-78.12%	-52.64%
AUS Equity	-48.30%	-27.71%	-28.24%	-43.38%	-71.54%	-20.53%	-54.67%	-29.20%
CAN Bonds	-11.35%	9.24%	8.70%	-6.43%	-34.59%	16.42%	-17.73%	7.75%
CAN Prop	-56.65%	-36.06%	-36.59%	-51.72%	-79.89%	-28.88%	-63.02%	-37.55%
CAN Equity	-46.39%	-25.79%	-26.33%	-41.46%	-69.62%	-18.62%	-52.76%	-27.29%
Euro Bonds	9.21%	29.80%	29.26%	14.13%	-14.03%	36.98%	2.83%	28.31%
Euro Prop.	-43.25%	-22.66%	-23.19%	-38.32%	-66.49%	-15.48%	-49.62%	-24.15%
Euro Equity	-47.79%	-27.20%	-27.74%	-42.87%	-71.03%	-20.02%	-54.17%	-28.69%
Japan Bnds	26.55%	47.14%	46.60%	31.47%	3.31%	54.32%	20.17%	45.65%
Japan Prop	-34.16%	-13.57%	-14.10%	-29.24%	-57.40%	-6.39%	-40.53%	-15.06%
Japan Eqty	-27.35%	-6.76%	-7.30%	-22.43%	-50.59%	0.42%	-33.73%	-8.25%
UK Bonds	-16.96%	3.64%	3.10%	-12.03%	-40.19%	10.81%	-23.33%	2.14%
UK Prop.	-72.96%	-52.37%	-52.91%	-68.04%	-96.20%	-45.19%	-79.34%	-53.86%
UK Equity	-47.73%	-27.14%	-27.68%	-42.81%	-70.97%	-19.96%	-54.11%	-28.63%
World Bnds	3.41%	24.00%	23.46%	8.33%	-19.83%	31.18%	-2.97%	22.51%
World Prop.	-47.61%	-27.02%	-27.55%	-42.69%	-70.85%	-19.84%	-53.98%	-28.51%
World Eqty	-40.57%	-19.98%	-20.51%	-35.65%	-63.81%	-12.80%	-46.94%	-21.47%
Commod	-37.42%	-16.83%	-17.36%	-32.49%	-60.66%	-9.65%	-43.79%	-18.32%
Timber	-18.89%	1.71%	1.17%	-13.96%	-42.12%	8.88%	-25.26%	0.21%
EqMktNtrl	-17.17%	3.43%	2.89%	-12.24%	-40.40%	10.61%	-23.54%	1.94%
Volatility	77.78%	98.37%	97.83%	82.70%	54.54%	105.55%	71.40%	96.88%
Currency								
AUD	-20.59%	0.00%	-0.54%	-15.67%	-43.83%	7.18%	-26.97%	-1.49%
CAD	-20.06%	0.54%	0.00%	-15.13%	-43.29%	7.72%	-26.43%	-0.95%
EUR	-4.92%	15.67%	15.13%	0.00%	-28.16%	22.85%	-11.30%	14.18%
JPY	23.24%	43.83%	43.29%	28.16%	0.00%	51.01%	16.86%	42.34%
GBP	-27.77%	-7.18%	-7.72%	-22.85%	-51.01%	0.00%	-34.15%	-8.67%
USD	0.00%	20.59%	20.06%	4.92%	-23.24%	27.77%	-6.37%	19.10%
CHF	6.37%	26.97%	26.43%	11.30%	-16.86%	34.15%	0.00%	25.48%
INR	-19.10%	1.49%	0.95%	-14.18%	-42.34%	8.67%	-25.48%	0.00%

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Asset Class Valuation Update

Our market 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. 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 that 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 materially increase the probability that they will achieve their long term goals.

We also believe that the use of a consistent quantitative approach to assessing 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 become more extreme or reverse.

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. As described in our

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

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Equity Market Valuation Analysis at 31 Dec 2008

Australia	Low Demanded Return	High Demanded Return
High Supplied Return	41%	61%
Low Supplied Return	59%	81%

Canada	Low Demanded Return	High Demanded Return
High Supplied Return	71%	111%
Low Supplied Return	114%	160%

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Eurozone	Low Demanded Return	High Demanded Return
High Supplied Return	41%	63%
Low Supplied Return	61%	84%

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Japan	Low Demanded Return	High Demanded Return
High Supplied Return	106%	152%
Low Supplied Return	163%	218%

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United Kingdom	Low Demanded Return	High Demanded Return
High Supplied Return	31%	60%
Low Supplied Return	57%	90%

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United States	Low Demanded Return	High Demanded Return
High Supplied Return	93%	138%
Low Supplied Return	146%	200%

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Switzerland	Low Demanded Return	High Demanded Return
High Supplied Return	56%	86%
Low Supplied Return	85%	187%

India	Low Demanded Return	High Demanded Return
High Supplied Return	75%	139%
Low Supplied Return	152%	233%

Emerging Markets	Low Demanded Return	High Demanded Return
High Supplied Return	78%	130%
Low Supplied Return	103%	155%

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 sharp 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.

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

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

Bond Market Analysis as of 31 Dec 08

	Current Real Rate*	Average Inflation Premium (89-03)	Required Nominal Return	Nominal Return Supplied (10 year Govt)	Return Gap	Asset Class Over or (Under) Valuation, based on 10 year zero
Australia	2.48%	2.96%	5.44%	4.52%	-0.92%	9.13%
Canada	2.18%	2.40%	4.58%	3.33%	-1.25%	12.75%
Eurozone	2.37%	2.37%	4.74%	3.26%	-1.48%	15.33%
Japan	2.96%	0.77%	3.73%	1.40%	-2.33%	25.46%
UK	1.08%	3.17%	4.25%	3.78%	-0.47%	4.65%
USA	2.64%	2.93%	5.57%	2.93%	-2.64%	28.85%
Switz.	2.28%	2.03%	4.31%	2.23%	-2.08%	22.37%
India	2.28%	7.57%	9.85%	6.28%	-3.57%	39.21%

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

It is important to note some important limitations of this analysis. Our bond market analysis uses historical inflation as an estimate of expected future inflation. This may not produce an accurate valuation estimate, if the historical average level of inflation is not a good predictor of future average inflation levels. The following table, which shows historical average inflation rates (and their standard deviations) for the U.K. and U.S. over longer periods of time than the ones we have used, helps to put the possible size of any estimation and valuation errors into context:

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

If future inflation is expected to be lower than the inflation assumption we have used in our valuation analysis, then required returns should be lower. All else being equal, this would reduce any estimated overvaluation. In this regard, the difference between yields on ten year U.S. government nominal and inflation linked bonds is about one percent, 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 value is currently well below the average historical rate of inflation we have used in our analysis.

Let us now move on to a closer look at the current level of real interest rates. Over the past forty years or so, this has averaged around 3.00% in the United States. Theoretically, the "natural" or equilibrium real rate of interest is a function of three variables: (1) the expected rate of multifactor productivity growth (as it increases, so to should the demand for investment, which, given a fixed amount of saving, will tend to raise the real rate); (2) risk aversion (as investors become more risk averse they save more, which should reduce the real rate of interest, all else being equal); and (3) the time discount rate, or the rate at which investors are willing to trade off consumption today against consumption in the future. A higher discount rate generally reflects a greater desire to consume today rather than waiting (as consumption today becomes relatively more important, savings decline, which should cause the real rate to increase). However, in the case of a so-called "uncertainty shock" (see "The Impact of Uncertainty Shocks" by Nicholas Bloom), a sharp rise in the time discount rate might also reflect a desire to hold greater than normal amounts of cash. The stability of risk

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aversion and the time discount rate, and the relationship between them, remain subjects of great controversy in economics. Clearly, investor behavior varies across individuals within in a single period, and over time for both individuals and groups. The controversial issue is what exactly it is that motivates the observed changes in behavior – is it a change in risk preferences, in the time discount rate, or both (in which case, it is generally thought the two preferences are negatively correlated, with rising risk aversion associated with a longer time horizon and thus a lower time discount rate).

All three of these variables can only be estimated with considerable uncertainty. For example, a time discount rate of 2.0% and risk aversion factor of 4 are considered to be average, but studies show that there is wide variation within the population and across the studies themselves. The analysis in the following table starts with current real return bond yields and the OECD's estimates of total factor productivity growth between 1995 and 2006 (with France and Germany proxying for the Eurozone). We assume that risk aversion is constant across time and regions, and that changes in observed real bond yields therefore reflect changes in the time discount rate. Given risk aversion and expected total factor productivity growth, as well as the observed yield on real return bonds, we can then back out the time discount rate (hence the change in the real interest rate from month to month is equal to the change in the underlying time discount rate).

Real Interest Rate Analysis at 31 Dec 08

Currency Zone	AUD	CAD	EUR	JPY	GBP	USD
Risk Aversion	4.0	4.0	4.0	4.0	4.0	4.0
TFP Growth	1.20%	1.00%	1.20%	1.20%	1.20%	1.20%
Actual Real Rate	2.48%	2.18%	2.37%	2.96%	1.08%	2.64%
Estimated Time Discount Rate This Month	2.18%	1.93%	2.07%	2.66%	0.78%	2.34%
Time Discount Rate Last Month	2.47%	2.48%	2.67%	3.07%	1.55%	3.11%
Change in Time Disc. Rate	***-0.29%***	***-0.55%***	***-0.60%***	***-0.41%***	***-0.77%***	***-0.77%***

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As you can see, the past month has seen a fall in real rates in all regions. Our interpretation is that this reflects the gradual dissipation of the uncertainty shock and a consequent decline in the demand for liquidity. A possible alternative explanation is an anticipated fall in the global demand savings relative to their future supply, which logically would be driven by sharp falls in demand and investment.

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 may primarily reflect 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 BBB and AAA rated bonds, which may tell us more about the level of compensation required by investors for bearing relatively high quality credit risk. For example, between August and October, 1998 (around the time of the Russian debt default and Long Term Capital Management crises), the AAA-Treasury spread jumped from 1.18% to 1.84%, while the BBB-AAA spread increased by much less, from .62% to .81%. This could be read as an indication of investor's higher concern with respect to the systematic risk implications of these crises (i.e., their potential to shift the financial markets into the low return, high volatility regime), and lesser concern with respect to their impact on the overall pricing of credit risk.

The following table shows the average level of these spreads between January, 1970 and December, 2005 (based on monthly Federal Reserve data), along with their standard deviations and 67% (average plus or minus one standard deviation) and 95% (average plus or minus two standard deviations) confidence range (i.e., based on historical data, 95% of the time you would expect the current spreads to be within two standard deviations of the long term average).

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	AAA – 10 Year Treasury	BBB-AAA
Average	.97%	1.08%
Standard Deviation	.47%	.42%
Avg. +/- 1 SD	1.44% - .50%	1.51% - .66%
Avg. +/- 2 SD	1.91% - .03%	1.93% - .23%

At **31 December 2008**, the AAA minus 10 year Treasury spread was 2.39%. This is an extraordinary three standard deviations above the long-term average compensation for bearing liquidity and jump risk (assuming our model is correct), and reflects continuing and severe investor concerns about the problems that have roiled the fixed income markets since August 2007 and have yet to fully abate. However, if one expects that they will eventually abate, then the current AAA spread should decline and today's low bond investment grade corporate bond prices could represent a historic opportunity for investors.

At the end of the month, the BBB minus AAA spread was 3.33%. This is an unprecedented 5.4 standard deviations above the long-term average compensation for bearing credit risk. However, as conditions in the real economy continue to deteriorate, it may well be the case that this represents reasonable compensation for bearing relatively high quality credit risk under the current circumstances.

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. That is what we have chosen to do here. Specifically, 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

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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 31Dec08

	To AUD	To CAD	To EUR	To JPY	To GBP	To USD	To CHF	To INR
From								
AUD	0.00%	-1.19%	-1.26%	-3.12%	-0.74%	-1.59%	-2.29%	1.76%
CAD	1.19%	0.00%	-0.07%	-1.93%	0.45%	-0.40%	-1.10%	2.95%
EUR	1.26%	0.07%	0.00%	-1.86%	0.52%	-0.33%	-1.03%	3.02%
JPY	3.12%	1.93%	1.86%	0.00%	2.38%	1.53%	0.83%	4.88%
GBP	0.74%	-0.45%	-0.52%	-2.38%	0.00%	-0.85%	-1.55%	2.50%
USD	1.59%	0.40%	0.33%	-1.53%	0.85%	0.00%	-0.70%	3.35%
CHF	2.29%	1.10%	1.03%	-0.83%	1.55%	0.70%	0.00%	4.05%
INR	-1.76%	-2.95%	-3.02%	-4.88%	-2.50%	-3.35%	-4.05%	0.00%

Our approach to valuing commercial property securities as an asset class is also based on the expected supply of and demand for returns. As with equities, the supply of returns equals the current dividend yield 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 rapid increases in rent attracting new property investors, finance the construction of new space which, when it comes onto the market, causes rents to fall. Our analysis also assumes that over the long-term, investors require a 2.5% risk premium above the yield on real return bonds as compensation for bearing the risk of securitized

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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 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 this month's valuation analysis:

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	11.3%	0.2%	11.5%	2.5%	2.5%	5.0%	42.1%
Canada	13.8%	0.2%	14.0%	2.2%	2.5%	4.7%	32.4%
Eurozone	9.9%	0.2%	10.1%	2.4%	2.5%	4.9%	47.1%
Japan	7.5%	0.2%	7.7%	3.0%	2.5%	5.5%	69.7%
Switzerland	1.6%	0.2%	1.8%	2.3%	2.5%	4.8%	279.8%
United Kingdom	7.4%	0.2%	7.6%	1.1%	2.5%	3.6%	45.6%
United States	8.4%	0.2%	8.6%	2.6%	2.5%	5.1%	58.8%

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

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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. Since commodity index funds are fully collateralized investments, the first source of return is the yield on the cash that is received by the fund by not used to purchase commodity futures (which can be bought for a fraction of their face value). We conservatively assume

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that about 20% of funds are used to purchase futures, and 80% is invested in real return bonds.

The second source of return 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

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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 n in both states. However, contango has generally been more common, but not equally so for all commodities. For example, oil has spent relatively more time in backwardation, as have copper, sugar, soybean meal and lean hogs. This highlights a key point about commodity futures index funds – because of the critical impact of the commodities they include, the weights they give them, and their rebalancing and rolling strategies, they are, in effect, uncorrelated alpha strategies. Moreover, because of changing supply and demand conditions in many commodities (e.g., global demand has been growing, while marginal supplies are more expensive to develop and generally have long lead times), it is not clear that historical tendencies toward backwardation or contango are a good guide to future conditions. To the extent that any generalizations can be made, higher real option values, and hence backwardation and positive roll returns are more likely to be found when demand is strong and supplies are tight, and/or when there is a rising probability of a supply disruption in a commodity where storage is difficult. For example, ten commodities make up roughly 75% of the value of the Dow Jones AIG Commodities Index. The current term structures of their futures curves are as follows:

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

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Given the prevalence of contangoed futures curves, in the near term (i.e., the next three months), roll returns on the DJAIG should be negative, absent major supply side shocks.

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 positive and negative surprises seem more likely when supply and demand and finely balanced – the same conditions which can also give rise to changes in real option values and positive roll returns.

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 bond return plus a risk premium of, say, 3.0%. The difference must be made up by a combination of roll returns and unexpected price changes. In the near term, roll returns seem likely to be negative. Moreover, with economic growth weakening, demand is falling across a wide range of

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commodities and most markets seem to be characterized by substantial excess supply. Hence, the potential for near term positive price surprises seems limited, except, perhaps, for a rise in oil prices due to rising violence in South Asia and/or the Middle East that threatens the supply of this commodity.

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 2005 period, the DJAIG had an average value of 107.6, with a standard deviation of 21.9. The **31 December 2008** closing value of 117.24 was less than one standard deviation above the long term average (assuming the value of the index is normally distributed around its historical average, a value within one standard deviation of the average should occur about 67% of the time). So on this basis, and in light of the continuing deterioration of global economic demand, the best that one can say is that commodities might possibly still be overvalued. That said, it may also be the case that, because of structural changes in the world economy, the past behavior of this index may not be a good guide to the future (e.g., the peak oil thesis, changing diets and the increasing use of agricultural commodities for fuel as well as food, etc.).

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). Two of these variables are published: 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

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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%

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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.
Carbon credits	We assume no additional return from this potential source of value.

This leaves the question of the appropriate return premium to assume for the overall risk of investing in timber as an asset class. Historically, the difference between returns on the NCRIEF timberland index and those on real return bonds has averaged around six percent. However, since the timber REITS are much more liquid than the properties included in the NCRIEF index, we have used four percent as the required return premium for investing in liquid timberland assets. Arguably, this may still be too high, as timber is an asset class whose return generating process (being partially biologically driven) has a low correlation with returns on other asset class. Hence, it should provide strong diversification benefits to a portfolio when they are

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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 **31 December 2008** is as follows:

Average Dividend Yield	5.75%
Plus Long Term Annual Biological Growth	6.00%
Less Percent of Physical Timber Stock Harvested Each Year	(5.00%)
Plus Average Annual Increase in Stock Value due to In-growth	3.00%
Plus Long Term Real Annual Price Change	0.00%
Plus Other Sources of Annual Value Increase (e.g., Carbon Credits)	0.00%
Equals Average Annual Real Return Supplied	**9.75%**
Real Bond Yield	2.64%
Plus Risk Premium for Timber	4.00%
Equals Average Annual Real Return Demanded	**6.64%**
Ratio of Returns Demanded/Returns Supplied Equals Valuation Ratio (less than 100% implies undervaluation)	**44%**

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, 2005, the average value of the VIX Index was 19.45, with a standard deviation of 6.40. The one standard deviation (67% confidence interval) range was 13.05 to 28.85, and the two standard deviations (95% confidence) range was from 6.65 to 32.25. On **31 December 2008**, the VIX closed at 40, just over three standard deviations above its historical average. This seems in line with the degree of uncertainty that still exists in financial markets and the world economy following the shocks experienced in 2008, and as a result, it is hard to say whether Volatility is under or overvalued today. In this case, an investor's

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valuation view fundamentally depends on his or her view of the likelihood that the impact of the 2008 economic shocks will be reversed before the downturn becomes self-sustaining, and much harder to turn around.

Sector and Style Rotation Watch

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

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

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

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the skills of most investors. In other words, most of us are better off just getting our asset allocations right, and implementing them via index funds 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 more on this, see "Sector Rotation Over Business Cycles" by Stangl, Jacobsen, and Visaltanachoti and "Can Exchange Traded Funds Be Used to Exploit Industry Momentum?" by Swinkels and Tjong-A-Tjoe).

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. 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

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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 through: 31 December 2008

Economy	Bottoming	Strengthening	Peaking	Weakening
Interest Rates	Falling	Bottom	Rising	Peak
Style and Size Rotation	Small Growth (DSG) **-28.72%**	Small Value (DSV) **-26.11%**	Large Value (ELV) **-21.69%**	Large Growth (ELG) **-23.28%**
Sector Rotation	Cyclicals (IYC) **-19.66%**	Industrials (IYJ) **-24.47%**	Staples (IYK) **-18.75%**	Utilities (IDU) **-11.20%**
Bond Market Rotation	Higher Risk (HYG) **-4.13%**	Short Maturity (SHY) **2.78%**	Low Risk (TIP) **-1.24%**	Long Maturity (TLT) **27.29%**

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 **December 2008**. The distinction between possible, likely and probable reflects a rising degree of confidence in our estimate. Finally, we stress that this is an assessment of valuations at a given point in time, which implies no forecast as to whether and when the market's "animal spirits" will cause any over and undervaluations to reverse in the future. Bear in mind, that before such a reversal occurs, over and undervaluations could actually become more extreme.

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Probably Overvalued	U.S., Japan, Swiss and India Government Bonds; Swiss Commercial Property
Likely Overvalued	Japan Real Return Bonds; Equity in U.S., Japan, and India
Possibly Overvalued	Canadian and Eurozone Government Bonds
Possibly Undervalued	Japan Commercial Property; US AAA Corp. Bonds
Likely Undervalued	Commercial Property in Australia, Canada, Eurozone, UK and US
Probably Undervalued	Timber; Equity in Australia, Eurozone and UK; Canada Commercial Property

"What Will We Tell The Clients?"

This year's events have shocked many clients, and caused many investment managers to question the conceptual basis, and perhaps legitimacy, of their profession. Many are also wondering if their own knowledge and skills are up to the challenges they and their clients will face over the next few years. With many of our readers brooding this Christmas about what to write in their end-of-year client letters, or anxiously waiting to read them, we offer our thoughts on three critical questions:

- *Can strategy add value in the financial management business?*
- *Why were so many investors and advisers surprised by this year's events?*
- *How do we expect the industry to adapt in 2009 and beyond?*

Can Strategy Add Value?

Let's start with a concise definition of strategy: it encompasses the ends, ways, and means to achieve long-term goals in the face of uncertainty. To elaborate a bit further, long-term goals typically include (a) survival; (b) some measure of economic well-being; (c) achievement of some non-economic purpose; and (d) some type of constraint on a strategy's maximum chance of failure.

The ends of a strategy are the sequence of the objectives it is intended to achieve, along with a clear statement of why they are important – e.g., how they relate to achieving the long-term goals. In the military, this is known as the commander's

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intent. Long-time students of strategy often point out that accurately framing the problem (e.g., initial sensemaking about the elements, relationships, and dynamics in the system of interest) and getting the sequence of objectives right is more critical to long term success than most people realize, and consequently is too often given inadequate attention (for evidence of this from studies of business manager performance, see "Mental Models, Decision Rules, Strategies and Performance Heterogeneity" by Gary and Wood, and "Pitfalls in Managerial Decision Making: A Systematic Perspective" by Maani and Li).

The means of a strategy are the resources that are available to implement it, whether they are material, financial, informational, psychological or social (e.g., the existence of alliance partners). "Ways" are what most people think of when they hear the world "strategy" – the conceptual approaches and methodologies that enable the achievement of specified ends with available means within any specified constraints (e.g., maximum chance of failure).

Critically, strategy operates in the realm of uncertainty, where for certain critical variables, the range of possible future outcomes, much less their associated probabilities is unknown. High levels of uncertainty typically characterize complex adaptive systems like the economy and financial markets, in which effects have multiple causes, which often operate over different time scales, are non-linear in their impact, and evolve over time. Situations involving high uncertainty stand in contrast to those involving only "risk", where the range of possible outcomes and their associated probabilities are either known or can be estimated with high confidence.

In this sense, strategy can be contrasted with planning. Strategy is a synthetic, creative process that operates over time horizons characterized by high levels of uncertainty (e.g., due to the ongoing evolution of a complex adaptive system such as the economy or financial markets). Planning is an analytic, deductive process that operates over shorter time horizons that are primarily characterized by risk.

If the dominant goal of strategy is effectiveness, the dominant goal of planning is efficiency – the conservation of resources while achieving specified objectives. In his excellent paper on strategy, ("Refining the Art of Command for the 21st Century"),

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retired General Huba Wass de Czege notes that in the original Greek, the "Strategos [army leader] invents strategema, or stratagems for maneuvering forces into the most advantageous position prior to battle....However, even the most brilliant Strategos could not win without clever, clear-headed and brave Taktikos (literally, "those fit for arranging or putting in order")....to make many crucial arrangements to implement the strategema and carry the day during the heat of battle...The Strategos gains understanding from inductive reasoning and synthesis, the Taktikos from deductive reasoning and analysis. The former takes an ill-structured problem and gives it conceptual structure; the other transforms that conceptual structure into concrete results."

While the Greeks understood that the roles of both the Strategos and Taktikos are important to an organization's success, many people today seem to confuse the two, and indeed prefer planning to strategy, perhaps because of the false sense of certainty it seems to offer. Consider a few examples from widely different areas. How often have you seen boards and investors express their disappointment (or worse) with a CEO who misses a quarterly earnings target? Even as the competitive environment has become more uncertain, boards and investors (and not a few CEOs) still seem reluctant to acknowledge this change, perhaps because they fear that acknowledging their lack of traditional control (in the planning sense) could be interpreted as a sleight on their competence, or worse, potentially expose them to litigation. This situation has many similarities to ones faced by intelligence and military officers in their discussions with political policymakers, many of whom fear the electoral consequences of acknowledging the extent of uncertainty we face. Similarly, many clients who turn to financial advisers seek a sense of control and security in predictions and plans, and shy away from confronting the more challenging requirements of success in the face of uncertainty. In the face of these normal human tendencies, Dr. Harry Yarger of the U.S. Army War College has written (in his book, Strategic Theory for the 21st Century), "strategy formulation is not the domain for the thin of skin or self-serving. Detractors stand ever ready to magnify a strategy's errors or limitations. Even success is open to criticism from pundits who question it role,

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methods or continued validity. Furthermore, strategy achieves strategy consequences by the multiorder effects it creates over time – always a point of contention in a time-conscious society that values quick results and lacks patience with the long view. In the end, it is the destined role of the strategist to be underappreciated and often demeaned in his own time. Consequently, strategy remains the domain of the strong intellect, the life-long student, the dedicated professional, and the invulnerable ego."

Given uncertainty, the success of both strategy and plans also depends on successful adaptation to changed circumstances. In the case of planning, this usually takes the form of established contingencies – branches and sequels to existing plans that are executed as the outcomes of known risks are resolved over a relatively short time frame. Strategists, however, must not only prepare to deal with so-called "known unknowns" (i.e., identified uncertainties whose range of outcomes and associated probabilities cannot be estimated with an acceptable degree of accuracy), but also with "unknown unknowns" or simply "unknowables" – situations in which we are ignorant of the existence or importance of a variable until it bursts on the scene and has a substantial impact on the achievement of objectives and goals.

To deal with uncertainties, strategists take a variety of approaches, including developing better measurements and theories to move uncertainties into the realm of risk (see, for example, "The Known, the Unknown, and the Unknowable in Financial Risk Management" by Diebold, Doherty and Herring), employing so called "maxmin" conceptual approaches which are designed to achieve minimal acceptable objectives under the worst foreseeable circumstances (see, for example, Dr. Yakov Ben-Hami's book Information Gap Decision Theory: Decisions Under Severe Uncertainty), and identifying opportunities to hedge exposures to negative uncertainties at an acceptable cost. To deal with unknowables, strategists take three main approaches. First, they ensure clear understanding, at all levels of the organization, of the objectives being pursued and why they are important to achieving long-term goals. This clarity of "commander's intent" focuses and catalyzes adaptation to new circumstances. Second, strategists pay close attention to the development of an organization's learning and adaptation processes, including where it focuses its attention, how

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feedback loops work, and the ways it generates, selects, and develops new ideas. Dr. Anne Marie Grisogono of the Australian Defense Science and Technology Organization is one of the leading experts in this area, and has written a number of very interesting papers on adaptation (see, for example, "The Implications of Complex Adaptive Systems Theory for C2" and "Success and Failure in Adaptation"). She notes that strategy must take into account five different levels of adaption: (1) "Action in the World" – fine tuning the implementation of existing approaches and plans; (2) "Learning" – expanding or modifying existing approaches; (3) "Learning to Learn" – improving the effectiveness of our own learning processes; (4) "Defining Success" – improving the alignment of organizational fitness measures (e.g., that are used to select the investment options that will receive resources) with the ones that are actually used in the "market ecosystem" to determine which organizations survive over time; and (5) "Co-Adaptation" – consciously tuning our interaction with those other systems connected with our own organization.

Finally, successful strategists realize that increased efficiency is usually purchased as the cost of reduced adaptability. Hence, they aggressively defend apparently inefficient investment in a range of options or capabilities that is diverse enough to provide a rich set of potential responses when unknowables arrive with bang. To put it differently, strategists seek not optimal approaches, but rather ones that are sufficiently robust to ensure at least a minimal level of organizational resilience in the face of uncertainty and unknown unknowns.

It is clear that strategy, defined in this manner, is widely believed to add value in areas as diverse as business management and the employment of military power to achieve national goals. Can the same be said for the field of financial management? In theory the answer is clearly "yes." Financial professionals can work with clients (be they individuals or organizations) to clarify long-term goals, and to develop strategies that maximize the chance of achieving them in the face of uncertainty. They can translate these into short-term plans, and maintain what Grisogono calls an "adaptive stance" – an awareness of the uncertainties and conjectures with a potentially large

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impact on key decisions, and an active search for information that could disprove current assumptions in these areas.

However, it is also the case that in practice, reality often differs from this ideal. For example, career, geographic location, housing, borrowing, and risk management choices (broadly construed) should all logically be part of a financial strategy for achieving life goals, in addition to decisions about when to retire, post-retirement income and bequest targets, how much to save each year, how to minimize taxes, how to allocate one's financial assets, and whether/how to use passive and active investment management approaches, as well as annuitization. Yet how many financial professionals are able – either individually or part of a network – to offer an integrated strategy to clients that covers all these areas? For example, how many advisers, when reading this, would say that career advice is for headhunters, and housing is for real estate agents? Essentially, this is the equivalent of telling clients that they must be their own strategist (or, to use a construction analogy, general contractor, who integrates the work of various specialists into a coherent finished product). To be sure, there are financial advisers who offer comprehensive approaches, and software companies that increasingly support their efforts, such as Economic Security Planner (www.esplanner.com). But overall, our impression is that too few are adding as much value as they could for their clients. Some will say this is due to those clients' inability to recognize the value of such advice, and unwillingness to pay for it. Our response is that if we are convinced of the value of comprehensive advice, and of some advisers' ability to provide it (either individually or more likely as part of a team), then fiduciary duty implores us to keep seeking new ways to help clients understand the value of a more strategic approach to their futures. But, to reiterate our answer to this section's initial question, we have no doubt that strategy can add substantial value for clients.

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Why Were So Many People Surprised in 2008?

We'll begin our analysis of this question with a model that will help us identify the root causes of surprise. Every day, human beings with limited attention face a torrent of information and must decide what to take into their equally limited active memory. Part of this attention allocation process is under conscious cognitive control, and part is automatic, driven by emotional responses that were hard wired into human beings ages ago when they were fighting to survive on the East African savannah (e.g., we are programmed to pay heightened attention to potential threats to our survival). Researchers have also found that the relative balance between the rational and emotional direction of our attention is governed by our existing emotional state – for example, high anxiety leads to more attention to potential threats (see, for example, "Affective Influences and Selective Attention" by Fenske and Raymond; and "How Brains Beware: Neural Mechanisms of Emotional Attention" by Patrik Vuilleumier).

Other research has shown that social factors (and in particular, possible threats to our social standing in a group) also influence how we direct our attention (see "Conscious and Preconscious Selective Attention to Social Threat" by van Honk, et al, and "Thought and Behavior Contagion in Capital Markets" by Hirshleifer and Teoh). The impact of this on investor behavior and asset returns has been shown to be substantial by a number of researchers (see "All that Glitters: The Effect of Attention and News on the Buying Behavior of Individual and Instititutional Investors" by Barber and Odea; "A Tale of Two Anomalies: The Implications of Investor Attention for Price and Earnings Momentum" by Hou, Peng and Xiong; "Bubbles, Rational Expectations and Financial Markets" by Blanchard and Watson; "Rational Herding in Financial Economics" by Devenow and Welch; "Information Diffusion Effects in Individual Investors' Common Stock: Purchasers Covet Thy Neighbors' Investment Choices" by Ivkovich and Weisbenner; and "Leading the Herd Astray: An Experimental Study of Self-Fulfilling Prophecies in an Artificial Cultural Market" by Salganik and Watts).

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Once information inputs have been collected, our brains then attempt to extract meaning from them while using as little of our scarce cognitive capacity as possible. In broad terms, this processing is intended to produce three outputs: (1) rational and emotional categorization of the information in light of our conscious goals and usually unconscious needs (since processing aggregated categories requires fewer cognitive resources); (2) a set of possible actions (again, to save cognitive resources, we first attempt to use previously learned "condition-action" rules); and (3) a set of expectations about the results of different possible actions (including their emotional outcome). We call the results of these processes our thoughts and feelings. For the great majority of information we attend to each day, these processes operate unconsciously, as our existing mental models direct our attention and guide the processing of information we collect. In a small minority of cases, this processing happens in a partially conscious manner, in that we are aware of the slower cognitive manipulation of information inputs, but unaware of the much faster emotional (or, as it is also called, "affective") evaluation that is also occurring. In the next stage of the process, we choose which of the possible actions to execute, based on the range of internal and external, rational, emotional, and social incentives we face. And once again, this decision is not made in a wholly conscious manner (e.g., did you ever hesitate to walk down a street because you just had a "funny feeling" about it?). Once we act, uncertainties are resolved, random effects occur (which together we often call "luck") and we evaluate the results of our action using one or more metrics. Sometimes these results trigger conscious learning, more frequently they trigger unconscious learning, and most often they merely serve as new information inputs as the process enters a new cycle.

As you can see, processes through which we cognitively and emotionally interact with the world are complex and not wholly under conscious control. While at one level this fills us with awe, at another, it makes us realize there are a lot of things that can go wrong at every stage of the process. To limit the load placed on our brains by attention related processes, we subconsciously filter information, sorting it into recognized patterns (e.g., a tree). However, there is considerable evidence that we

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don't use all the available sensory data to construct these patterns, and instead to a great deal of "filling in" in order to conserve cognitive resources. A commonly used example of this is called the "Noah Illusion." Ask people "how many animals of each kind did Moses take on the Ark?" Most people will answer "two" without noting that it was Noah, not Moses, who built the Ark. Examples like this are more common than most people realize (see The Science of False Memory by Brainerd and Reyna) and contribute to the so-called "hindsight bias" in which people have a distorted view of the accuracy of their past perceptions, and hence fail to learn and update their mental models.

This is critical, because the conscious direction of our attention is guided by our existing mental models. For example, in January, 2006, Markit and CDS IndexCo launched the ABX.HE index, which tracks the pricing of credit default swaps on an underlying portfolio of bonds backed by subprime U.S. mortgages. The press release accompanying the launch noted that the index was intended to "give clients an efficient, standardized tool with which to quickly gain exposure to this asset class...on both the buy-side and the sell-side...by building liquidity and transparency." In retrospect, this was a critical turning point in the building housing crisis, as for the first time it enabled the aggregation of investors' views on the value of the underlying subprime securities. Yet until the crisis was well underway, relatively few investors attended to ABX prices, since their existing mental models did not deem it important.

A second example is the downgrade of General Motors and Ford corporate bonds in May 2005 (which in some ways mirrored the Russian and Long Term Capital Management crises of 1998). As documented by Acharya, Schaefer and Zhang ("Liquidity Risk and Correlation Risk: A Clinical Study of the General Motors and Ford Downgrades"), this episode highlighted the underlying relationships and risks that would later be at the heart of the September 2008 near-meltdown of the global financial system. Specifically, the authors show how the downgrade triggered a sell-off in the bonds and a widening in credit default swap spreads that in turn caused liquidity problems for large market makers, which drove a sharp rise in the correlation of price changes for a much wider range of bonds and CDS. Yet with the benefit of

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hindsight, it is clear that too many investors failed to adjust their mental models, and pay sufficient attention to the risk posed by the rising use of leverage by many large market players, and declining liquidity for many instruments – even after New York Federal Reserve Bank President Timothy Geithner reinforced these points in his May 15, 2007 speech on "Liquidity Risk and the Global Economy."

A third example is the continued buildup of imbalances in the global economy in recent years, which we have repeatedly highlighted in our writing. These include the growing U.S. current account deficit, foreign holdings of U.S. dollar denominated claims on the United States (the necessary counterpart to years of current account deficits), the replacement of foreign private purchases of U.S. assets by foreign official purchases (as private investors saw what was coming, forcing central banks to replace them in order to prevent – or, as it turned out, delay – a crisis), and the heavy dependence of world demand on the behavior of increasingly leveraged U.S. consumers. Either many investors were under the impression these imbalances could continue to grow forever, they had high hopes that increased domestic growth in China and other emerging markets would enable them to be gradually unwound, or, more cynically they thought they would be smart enough to get out before the inevitable crash (for evidence of this phenomenon, see James Montier's description of the technology bubble, "Running with the Devil: The Advent of a Cynical Bubble", and "Hedge Funds and the Technology Bubble" by Brunnermeier and Nagel). On all counts, the mental models that counseled either ignoring or minimizing the significance of growing imbalances proved to be deficient.

Clearly, inaccurate mental models of the economy and financial markets (i.e., "priors" from a Bayesian perspective) may have been one of the main causes of the surprise experienced by many investors in 2008. The underlying issue here is large, and, in our view, absolutely fundamental: are financial markets better described by the prevailing "efficient markets" hypothesis (EMH), or an alternative model based on complex adaptive systems theory? Which theory should we use to draw conclusions from the data we observe? Some type of efficient markets theory currently forms the basis for many investors' mental models, with its core assumptions that markets are

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usually in or close to equilibrium, and asset prices therefore are, at the margin, close to their true values because they are determined by the actions of reasonably rational investors who incorporate most available information. Because of its simplicity, EMH has been very successful as an idea (or, more specifically, a meme). Yet over the past twenty five years, a substantial body of evidence has accumulated that shows it is a far from perfect description of the way real markets work. One stream of thought has attempted to extend the EMH while staying true to many of its underlying assumptions (e.g., the three factor model of Fama and French, the four factor model of Carhart, and other models that add a fifth liquidity factor). In essence, these extensions assert that apparent asset pricing mistakes reflect a failure to take missing rationally priced risk factors into account, and are not evidence of more serious shortcomings of the underlying "rational agent" approach.

The alternative to this view is, as we have noted for years, an approach based on the application of complex adaptive systems theory to financial markets. In broad terms, complex adaptive systems (CAS) are populated by agents (e.g., investors) pursuing different goals, who adjust their strategies over time according to their perceived effectiveness. These agents have limited attentional and cognitive processing resources, and their behavior is also influenced by emotions and social considerations. In such systems, observed effects can have many causes, some of which evolve over time and some of which may be non-linear in their impact. The signature characteristic of a CAS is the inability to use knowledge of agents' decision rules to predict the evolution of system level effects and novel outcomes that emerge over time from agent interactions (see "Evolution of Behavior in the Prisoner's Dilemma" by Kristian Lindgren for a classic description of this process). Complex Adaptive Systems are seldom in equilibrium, yet are generally attracted to it (see, for example, "Do Asset Prices Reflect Fundamentals? Freshly Squeezed Evidence from the OJ Market" by Boudoukh et al). Yet while prices may significantly diverge from fundamental values, the evolving nature of agents' decision rules and relationships makes it very hard (but not impossible, when the system is in a relatively stable state), to predict these departures with consistent accuracy beyond simple luck. Moreover,

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this also implies that when dealing with a complex adaptive system, an analyst must constantly question and be ready to adapt his or her own mental models for making sense of its behavior. And as most readers already know, staying true to this admonition requires a degree of intellectual curiosity and humility that is too often lacking in the financial services world (e.g., the type of rigorous "after action reviews" and course of action critiquing techniques used by the military are notably absent in many corporations).

Finally, unlike more stable physical systems in which normal (Gaussian) distributions are a good statistical description of the range of possible outcomes, complex adaptive systems are more often characterized by power laws and statistical distributions with a higher percentage of more extreme outcomes. This is critical, since a substantial portion of current asset pricing theory is built on the back of the normal distribution. When industry professionals refer to their surprise at the repeated appearance of "ten standard deviation" returns (e.g., severe losses), the underlying assumption is that the process generating them should produce a normal distribution. While less convenient as an excuse, it seems much more likely that the people making these statements simply don't understand the underlying return generating process, which, in a complex adaptive system, is unlikely to produce normally distributed results. For example, Hyman Minsky's "Financial Instability Hypothesis" is but one description of how such extreme changes can come about, not through external shocks, but through the internal workings of the system itself.

The application of complex adaptive systems theory to financial markets is being led by a growing number of researchers who, up to now, have been viewed as outside the mainstream of economics and academic finance. They include W. Brian Arthur, J. Doyne Farmer, Blake LeBaron, Cars Hommes, Didier Sornette, Eric Beinhocker and Andrew Lo, who has coined the term "The Adaptive Markets Hypothesis" to describe this new paradigm (see his paper with the same title for an excellent overview). Some of these researchers, and others who share their views, (including, we immodestly note, ourselves), have been warning for quite some time about the crisis that has now arrived with stunning force. They include Stephen

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Roach, Jeremy Grantham, Wynne Godley, Raghuram Rajan, Bill White, Nouriel Roubini and Martin Wolf, among others. Yet theirs and other writers' warnings were largely ignored by the majority of investors. At a time when many clients now mowing beyond initial shock and disbelief, and beginning to angrily ask "why didn't anyone tell me this was going to happen?" it is critical to face the painful question of why warnings were disregarded. In our view, there are three main suspects.

Some investors (mainly individuals) may have simply been unaware of the warnings. It is not unusual for individual investors with many other things going on in their lives to pay little attention to financial news until a crisis has occurred and the time for value conserving action has passed. Nor is it unusual for people to dismiss their own private doubts about a course of action they see many other people confidently pursuing. So-called "rational herding" theory suggests this may be a reasonable course of action when people whose behavior is being copied are considered better informed or to have greater expertise in the area in question. And when their behavior meets with visible success, envy may further reinforce others' desire to imitate them. To put it bluntly, a lot of people with very busy lives may have thought, "hey, if the smart investment guys aren't worried, why should I be?"

Another obvious explanation is that investors were aware of the warnings that were offered, but didn't believe them because they were too much at odds with their existing mental models of how financial markets work, and the emotional and social cost of changing those models was too high. This is certainly a logical possibility; we have frequently written about the so-called "confirmation bias" that causes human beings to pay more attention, and give greater weight to evidence which supports their existing views compared to evidence that contradicts them (see, for example, our September 2008 article on "Possible Implications of Some Trends that Cannot Continue"). More recent research has found that this bias seems to be more powerful when investors are incurring losses than when they are experiencing gains (see "Persistence of Beliefs in an Investment Experiment" by Ko and Hansch). And other research has found that experts seem to find it particularly difficult to change their views, which are often closely intertwined with their reputations and self-image (see

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Expert Political Judgment: How Good Is It? How Can We Know? By Philip Tetlock). To put it differently, the extent of social and emotional obstacles to changing a mental model seem strongly related to the extent to which others perceive you, and you perceive (or, perhaps more accurately, your *need* to perceive) yourself, as an expert in a given area. However, many clients surely entrusted professional managers with the stewardship of their assets because they expected them to be less prone to these biases, and more willing to relentlessly examine their assumptions and adjust them where necessary. Undoubtedly with the benefit of hindsight, many investors now say they saw the crisis coming. Yet if this is true, why did do few apparently act on their changing views to protect the value of their clients' portfolios? And why, instead of ad hominem dismissals, did we so few rigorous responses to the arguments presented by those offering warnings about the crisis that lay ahead?

These awkward questions leads to the third possibility: many professional investment managers had strong incentives to ignore the warnings that were offered, even if they believed them to be generally true. On the research side, Raghuran Rajan's 2005 paper was particularly prescient on this issue of misaligned incentives and the systemic risks they were creating (see "Has Financial Development Made the World Riskier?"). On the practical side, however, this problem (if not its eventual 2008 result) has been clear to many industry participants for a much longer period of time. For example, as a young banker in South America in 1981, I walked into our country manager's office with a group of my peers to ask why we were still making loans when we could very clearly see a balance of payments (and, given the currency mismatch, credit) crisis on the near horizon. He had a succinct answer that I never forgot: "I have a wife, three children and a mortgage; head office wants us to make loans to meet corporate earnings goals, and if I don't hit my lending targets I'll be replaced with someone who will." He told us to keep making loans, while sharply increasing the collateral we required. And then the LDC debt crisis made it clear that developed country governments thought some financial institutions were "too big to fail." It wasn't long after that when a friend who was a bond trader told me over drinks why he had the greatest job in the world: "I get to bet with the firm's money. If I'm right, I get rich,

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and if I'm wrong all I lose is my job." It was, he said, a "call option on wealth" (in an ironic and enlightening twist, he later found himself managing a trading floor filled with young people who thought like he once had). In the years since this insight was offered early in the 1980s, the incentives for people working in financial services have become substantially more lucrative (think 2% of the assets under management and 20% of annual profits), while the enormous wealth (and equally visible consumption) accumulated by successful financial services players only heightened the willingness of others to take greater risks (and look the other way more often at questionable thinking and behavior) in pursuit of their own pile of riches. Underneath it all remained the belief that some institutions were too big to fail, and that if times got tough the Federal Reserve would, once again, bail everyone out with rapid money supply growth and interest rate cuts, to get asset prices rising again. This was one lesson the financial services industry had learned all too well over the past quarter century. Technically, this is called "moral hazard" risk; however, that seems too bloodless a way to describe the much more corrosive process that has been undermining individual and collective self-control in the financial services industry over the past quarter century.

To be sure, there were regulatory attempts to limit the risks created by this system, such as the Basel II risk capital guidelines that were issued in 2004. Unfortunately, this included mandatory use (by usually underpaid and under-respected risk managers) of a common Value at Risk methodology, which suffered from two glaring faults. The first was widely remarked upon, but tolerated in the absence of an agreed upon alternative: VaR models' critical assumption about future volatility was based either upon historical data (which might not resemble the future) or option implied volatility (essentially, a weighted average of what other players were using, and which could be an equally inaccurate guide to the future). The second fault became clear in 2008: falling asset prices caused volatility to rise and VaR models to prescribe reducing the size of trading positions, which forced more asset sales and thereby accelerated the process underway. In the last analysis, however, regulations have never been the ultimate guarantor of systemic financial stability. Rather, that role

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has been played by the sense of stewardship and probity felt and displayed by the men and women who lead the financial services industry.

It is hard to say when this began to erode. Perhaps it was the revelations of the LDC debt crisis. Perhaps it was Salomon Brothers ceasing to be a partnership, and becoming a public company via its acquisition by Phibro in 1981. Perhaps it was the epic traders versus bankers battle in 1983 that saw Pete Peterson resign as Lehman Brothers CEO, leaving Lew Glucksman in control of the firm. Maybe it was the saga of Drexel, or when John Weinberg stepped down as senior partner of Goldman Sachs in 1990. Maybe it was when Jeff Vinik was driven from the helm of the Magellan Fund for his belief that prudence was the best course of action in the face of what he correctly identified as a growing bubble in technology stocks. Maybe it was the bailout of Long Term Capital Management in 1998. Or maybe it was the rise of private equity and hedge funds, with their supercharged incentives for delivering high returns. I honestly don't know when the tipping point was reached – but I do know that when Goldman went public in mid-1999, we had reached the end of an era.

Sadly, the results are all too easy to see, from the internet bubble (and its subsequent revelations about the unethical and occasionally illegal behavior of too many financial services professionals), to the housing bubble, to what may yet turn out to have been a private equity bubble, and to the growing number of hedge fund managers who, with results well below their high watermarks (which must be made up before their 20% of the profits kicks in again), are choosing to close their funds instead of trying to earn back the money their investors have lost. Once again, there are exceptions – not everyone in the financial services business has behaved badly (people like Jack Bogle and many fee-based investment advisers come to mind). Yet it remains depressingly clear that, even after necessary changes to incentives are made, it will be a long-time before the financial services industry regains the trust and respect of clients who now feel acutely betrayed. I'm not sure where the new leaders will come from, but it is apparent they will be desperately needed in what is sure to be a radically changed environment for financial services companies.

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So what are we to conclude? A lot of smart people on the buy-side undoubtedly got a very nasty surprise in 2008. In some cases, it was because they weren't paying attention. In more cases, it was due to a flawed mental model of how the economy and financial markets work, and either an inability to learn or a mistaken belief that, as Keynes once put it, they could "beat the gun." But in too many other cases, particularly on the sell-side, I suspect there was precious little surprise, and instead a cynical satisfaction that their bet that the government would ultimately save them from the full consequences of their self-destructive urges has once again paid off. As Walter Bagehot wrote so long ago, in great financial crises, "avaricious people get hurt, but it is in the nature of crashes that they are not the ones who get hurt most." Then again, that may not be true this time around. On December 1, 2008, in the Federal District Court, Judge Mariana Pfaelzer rejected a motion by Countrywide Financial executives to dismiss a lawsuit brought against them alleging they violated securities laws in connection with their actions related to the subprime loan crisis. The judge's opinion noted "a complex series of misrepresentations and omissions over a long period of time" by the Countrywide defendants, and that "Countrywide's practices so departed from its public statements that even [vague] terms like 'high quality' [which are normally not legally actionable] became materially false and misleading." And if financial executives are found to be party to a fraudulent scheme, their earnings from the scheme (i.e., past bonuses) could be subject to forfeiture. In short, the Countrywide litigation bears watching, because if the plaintiffs there win their case, many other financial services executives could find themselves the target of similar lawsuits.

How Will the Industry Adapt?

In her research, Anne Marie Grisogono has found that successful organizations adapt on five different levels. The financial services industry should be no exception to this rule, so we will use her framework to offer our conjectures for what lies ahead.

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The first level of adaptation is finding better ways to execute the current strategy. At this level, we would expect to see greater emphasis on maintaining adequate liquidity reserves, the use of asset allocations that more explicitly include positions to hedge against adverse states (e.g., use of government bonds, timber and volatility that perform relatively well in a high uncertainty state, and property, real return bonds and commodities to hedge against inflation), greater use of regime switching models to support these allocations, and more attention given to rebalancing, both on an automatic basis and when normal asset class valuation ranges are significantly exceeded. We also believe that the value of adding even high quality non-government fixed income instruments to portfolios will increasingly be called into question. As we have noted in the past, we have not included high yield or emerging market bonds in our model portfolios because of their high correlation with equity returns. To put it differently, they all seemed to have similar return generating processes and downside risks, while one (equity) offered significantly greater upside returns. Today, similar questions can be asked about many investment grade corporate credits. Over the long term, these investor concerns may force a change in the ways corporations finance themselves, with greater reliance on equity rather than debt, at the cost of potentially lower, yet more stable returns.

We also believe that the 2008 crisis will cause many more investors to agree with us on the importance of making distinctions between alleged “alpha generating” active strategies that are based on simply adding leverage, earning insurance fees (from selling out of the money puts) or holding illiquid assets, and alpha that is based on true skill in identifying undervalued assets and/or forecasting the future behavior of other investors. Finally, in the wake not just of the Madoff fraud, but also the failure of so many expensive strategies to protect against downside risk, we expect that advisers will place renewed emphasis on understanding the return generating process that underlies the claims made by active managers. In particular, any promise of higher returns with lower risk will seem more suspect than before, and more advisers will demand evidence of the consistent investor valuation errors and persistent barriers to arbitrage (and copying the strategy) upon which such claims must rest.

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The second level of adaptation involves the use of different approaches, rather than modifications of the current strategy or plan. This is the level at which we expect to see the most far reaching changes. This includes more attention being given to clarification of long-term goals and the establishment of a sequence of objectives to achieve them. For example, many people will need to reconfigure their trade-offs between time to retirement, savings levels, target retirement incomes and bequests, and acceptable levels of investment uncertainty. It seems inevitable, that, faced with these challenges, professional financial advisers will have to integrate career and housing decisions into their objectives in a more explicit manner than they have before. And given the large roles that consumption and social comparison have played in many clients' lives over the past twenty years, advisers will have to become comfortable with and effective in discussing painful changes in these areas with their clients.

It also seems clear that the events of 2008 will accelerate the paradigm shift from the efficient markets to the adaptive markets view of the world. This is likely to have more far reaching effects than most people realize. As Brian Arthur points out in his excellent overview of this subject ("Out of Equilibrium Economics and Agent Based Modeling"), the Adaptive Markets Hypothesis is part of a larger shift from looking at systems in equilibrium to looking at systems that are out of equilibrium, in which "standard equilibrium behavior becomes a special case. It follows that out-of-equilibrium economics is not in competition with equilibrium theory; it is merely economics done in a more general, generative way...If heterogenous agents (or strategies) adjust continually to the overall situation they together create, then they change that ecology...Because out-of-equilibrium economics is by its nature evolutionary, it resembles modern evolutionary biology more than it does 19th century physics" [which, with its constant behavioral laws and highly mathematical proofs, has become the intellectual model for equilibrium economics].

One consequence of moving from the Efficient to the Adaptive Markets Hypothesis is a shift from a risk-based view of the world to one that explicitly incorporates uncertainty. This is important, because the theoretical basis for decision

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making in the face of uncertainty is far less developed than it is for decision making in the face of risk (see, "Probability and Uncertainty in Economic Modeling" by Gilboa, Postelwaite, and Schmeidler; "Investing in the Unknown and Unknowable" by Richard Zeckhauser; "Knightian Decision Theory" by Truman Brewley; and "Reflections on Decision Making under Uncertainty" by Paul Kleindorfer). For example, the last paper notes one study which found people much more willing to pay to avoid uncertainty when they knew they would have to later explain their decision to a group. Brewley finds that inertia plays an important role in decision making under uncertainty, as it causes people to avoid acting unless doing so seems preferable to the status quo under a wide range of assumptions about the future. Yet another study found that investors using fundamental value based strategies are less uncertainty-averse than those using momentum based strategies that are based on the anticipated reactions of others (see "Uncertainty Aversion in an Agent-Based Model of Foreign Exchange Rate Formation" by Kozhan and Salmon). Clearly, there is still much to learn in this area.

Closely related to this is the issue of loss aversion. Recent neurobiology research has found that loss aversion has very deep roots in our evolutionary past and is "hardwired" into our cognitive and emotional processing systems (see "Neural Correlates of Adaptive Decision Making for Risky Gains and Losses" by Weller, Levin, Shiv and Bechara and "On the Evolutionary Origin of Prospect Theory" by McDermott, Fowler and Smirnov). This aligns with research by Paul Slovic on the way people categorize hazards. He and his colleagues found that what they termed "risk perception" was driven by two factors: (a) "Dread Risk", which was related to lack of control and potential for catastrophic and unequally distributed consequences, and (2) "Unknown Risk", which captured the extent to which hazards were new, observable, and understood. Loss aversion is a critical issue because other researchers have found that it has a significant impact on asset prices and volatility (see "An Agent Based Approach to Financial Stylized Facts" by Shimokawa, Suzuki and Misawa – which finds the impact of loss aversion is magnified by a lack of liquidity – and "From Boom 'til Bust: How Loss Aversion Affects Asset Prices" by Berkelaar and Kouwenberg). We expect that increased recognition of the importance of loss

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aversion will lead to a shift away from the use of the variance/standard deviation of returns as a proxy for risk, and towards the use of various downside risk measures.

We also expect that recent events will lead to a much greater emphasis on incorporating information/uncertainty and liquidity risk into asset pricing and risk management (e.g., Value at Risk) models. Clearly, recent events have heightened investor awareness of the potential severity of these risks, which should inevitably lead to their demanding higher compensation for bearing it. Some good work has been done in this area in the past (see, for example, "Asset Pricing with Liquidity Risk" by Acharya and Pedersen; "The Time Varying Liquidity Premium: Speculator Hesitation in Liquidity Shocks" by Peter Blaustein -- which finds the small company premium is highly correlated with the liquidity premium; and "Ambiguity, Information Quality and Asset Pricing" by Epstein and Schneider), and more is now being published (e.g., "Informtion, Liquidity and Asset Prices" by Lester, Postelwaite and Wright; "Moral Hazard, Collateral and Liquidity" by Acharya and Viswanathan, "Cross Section of Stock Returns in the U.K. Market: the Role of Liquidity Risk" by Hwang and Lu, and "Liquidity and Valuation in an Uncertain World" by Easley and O'Hara, which draws on Trewleys work noted above to explain the disappearance of bond market liquidity in September 2008). However, a definitive work that integrates liquidity into an asset pricing and risk management model that applies to multiple asset classes has yet to be written.

As the Adaptive Markets Hypothesis becomes more widely accepted, we will see more research into two areas: pattern recognition and, at a more fundamental level, agent based modeling. While consistently accurate prediction of events in complex adaptive systems (i.e., empirical time series analysis) is extremely difficult (due to the complex, non-linear, and evolving relationships between causes and effects), it remains possible to gain a so-called "coarse grained understanding" of their main dynamics, and to recognize the recurring patterns in higher level outcomes that they tend to produce. Given this, successful investment in an adaptive market may owe more to superior pattern recognition skills than to superior forecasting abilities. For example, recent research has found that value and momentum effects exist in

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multiple asset classes, and across time as well (see "Global Tactical Cross-Asset Allocation: Applying Value and Momentum Across Asset Classes" by Blitz and van Vliet, "Value and Momentum Everywhere" by Asness, Moskowitz, and Pedersen, and "Price Momentum in Stocks: Insights from Victorian Age Data" by Chabot, Ghysels and Janagnnathan). Other research has found that markets dynamics become more stable as the percentage of fundamental value oriented investors goes up, and less stable as the percentage of momentum traders rises. Taking another approach, Didier Sornette and other "econophysics" researchers have found that changes in market returns follow a power law, with large changes that relieve a substantial amount of system stress preceded by a larger number of smaller ones as that stress accumulates, much as earthquakes are often preceded by smaller tremors.

The underlying cause of these patterns is changes in the strategies employed by investors, and in their interactions with each other. Developing realistic agent based models that involve investor learning and interaction over time, and which can reproduce observed economic and financial market patterns is the holy grail of the adaptive markets research program (see J. Doyne Farmer's paper "Toward Agent Based Models for Investment" and "Statistical Physics of Social Dynamics" by Castellano, Fortunato, and Loreto). The military (and its collaborators in the commercial gaming industry) has been at the forefront of agent based modeling research, and in particular efforts to incorporate emotional, social and learning factors into agent behaviors. For example, "Close Combat: Modern Tactics" is a commercial version of a U.S. Marine Corps squad leader training simulation that includes realistic modeling of fighters' physical and emotional states, experience and unit cohesion. Earlier this year, the U.S. National Research Council published an overview of the state of this research program (Behavioral Modeling and Simulation: From Individuals to Societies by Zacharias, MacMillan and Van Hemel). The authors note that "unrealistic expectations are often based on a misconception about what sort of prediction a human behavior model can actually produce. In most situations of interest, there is a range of plausible behaviors, and within the same situation, different people will behave differently, and the same person may behave differently at different

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times. Rather than generating a single definitive prediction of behavior, a good human behavior model will instead identify a space of possible outcomes, given probability assessments for these behaviors, and specify some of the factors that could alter these probability assessments...[Hence] the value of these models should be measured in terms of the reduction in uncertainty they achieve."

An excellent recent example of where this line of research is headed in the financial area is found in a recent paper by Harras and Sornette ("Endogenous versus Exogenous Origins of Financial Rallies and Crashes in an Agent-Based Model with Bayesian Learning and Imitation"). Their model's agents "form opinions and invest, based on three sources of information: (1) public information, i.e. news; (2) information from their friendship network, promoting imitation; and (3) private information. Agents use Bayesian learning to adapt their strategy according to the past relevance of the three sources of information." Simulations with their model show that "rallies and crashes occur as amplifications of random lucky or unlucky streaks of news" which generate superior performance for some agents that triggers "collective transient herding regimes...A positive feedback loop is created by two dominating mechanisms, Bayesian learning and social imitation, which, by reinforcing each other, result in rallies and crashes."

Relatively speaking, this research program is still in its infancy; however, it has the potential to produce some real breakthroughs in the future. One example of this would be a better understanding of the different factors that underlie the return generating processes for different asset classes. Ideally, an investor would like to be able to diversity his or her portfolio across these factor exposures; in practice, however, this is still extremely difficult to accomplish. While principal component analysis can identify independent statistical factors driving asset class returns, it cannot tell us what these factors correspond to in the real world – e.g., Industrial production? Exchange rates? Price levels? Productivity changes? The percentage of assets being managed using momentum strategies? The level of uncertainty among investors who play central roles in large social networks? Those are questions that agent based modeling may one day help us to answer. In the meantime, we expect to

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see far greater use of alternatives to traditional mean/variance optimization analysis in the construction of investor portfolios, with its unrealistic assumption of normal distributions of asset returns that can be forecast with minimal uncertainty (and equally unrealistic assumption of quadratic investor utility, for more technically minded readers). Instead of MVO, we expect to see wider adoption of the approach we have been using for years, with greater focus on regime switching models (that produce more realistic return distributions), integrated rebalancing strategies, and stochastic search techniques to identify "robust" asset allocation solutions intended to achieve minimum investor objectives over a wide range of possible circumstances. We also expect to see greater recognition that, in a complex adaptive market, extreme overvaluations are possible, and for that reason asset allocation and portfolio management must be on guard against them and the large downside returns they can cause when bubbles pop. To put it differently, we expect more people to recognize that asset allocation will always be as much of an art as a science.

Regardless of the underlying theories upon which they are based, another adaptation we expect to see is greater emphasis on rigorously assessing the quality of the models that underlie much of modern finance. Specifically, we expect to see a migration into financial services of a body of work that has recently emerged from the U.S. nuclear weapons laboratories, and their work on the validation and verification of complex models used to test new bomb designs. "The Good, The Bad, and the Ugly of Predictive Science" by Hemez and Ben-Haim provides an excellent (and minimally quantitative) introduction to this research, and explains the inescapable trade-off between three conceptions of a "good model." The first is fidelity to data. This matters, "because no analyst will trust a numerical simulation that does not reproduce the measurements of past experiments or the information contained in historical databases." The second is robustness to uncertainty, or the range of different settings for a model that produce no more than a given level of prediction error. A model's "robustness to uncertainty minimizes the vulnerability of decisions to uncertainty and lack of knowledge." In our work, a good example of this is our use of broadly defined asset classes, which have relatively low correlations of returns with each other. This

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results in our asset allocation solutions being relatively robust to significant errors in our estimates of future rates of return and volatility of the asset classes we use. The third conception of a good model is termed "confidence in prediction" by Hemez and Ben-Haim. It is a function of the range of predictions for a given set of outputs made by different models. "To have confidence in predictions, there should be as much consistency as possible between the predictions provided by equally credible [models]…from expert judgment to high-fidelity simulations." Unfortunately, it is not possible to have a model that simultaneously presents high fidelity to data, robustness to uncertainty, and confidence in prediction. The authors show how this trade-off is caused by "robustness to uncertainty decreasing as fidelity to data improves; confidence in prediction increasing as robustness improves; and an improvement in fidelity reducing confidence in prediction."

Grisogono's third level of adaptation is "learning to learn." In addition to an increased openness to the Adaptive Markets Hypothesis and new approaches like agent based modeling, we also expect a heightened focus on competitive analysis, questioning the conventional wisdom, and more closely examining outcomes that substantially differ from expectations. In sum, we expect the financial services industry to adopt many of lessons learned by intelligence agencies and the military in the wake of surprises they have experienced in the past.

The fourth level of adaptation – what Grisogono terms "fitness measures" is another area where we expect to see major changes occur. Some of these changes will be imposed by regulators (e.g., limits on leverage, increased disclosure, and more severe penalties for failing to carry out fiduciary responsibilities) and others by shareholders and investors, who will probably focus on realigning compensation incentives. We also expect to see the trend towards "liability driven investing" gain more momentum, as more investors realize that funding their long term goals is what counts, and not simply having their manager achieve higher annual returns than an index or a peer group. In turn, this should strengthen the focus on managing downside risk and creating robust strategies. However, we don't think the move toward the Adaptive Markets Hypothesis will dim the potential attraction of uncorrelated alpha

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delivered by active management. In fact, the AMH may actually make some active managers' lives easier, as there is growing evidence that human beings have widely varying skill when it comes to effectively operating in a complex adaptive environment, and a rare few seem particularly talented in this area (see, for example, The Logic of Failure by Dietrich Dorner, which has inspired something of a cottage industry among German researchers in the study of this issue).

On the other hand, the events of 2008 will surely accelerate the move away from long-only active funds that provide a high cost mix of passive and active exposures, and a more jaundiced view of active strategies whose "alpha" is due to leverage, insurance premiums or liquidity risk, rather than investment management skill. To put it differently, when making decisions in the face of uncertainty, there is an unavoidable trade-off between so-called Type 1 errors (rejecting a true hypothesis, such as "this investment will generate alpha") and Type 2 errors (accepting a false hypothesis, such as "Bernie Madoff is a great active manager"). In recent years, the incentives facing asset managers seem to have been strongly oriented toward minimizing the chances of making Type 1 errors (i.e., rejecting investments in successful actively managed strategies). However, that has inescapably come at the price of accepting a very high probability of making Type 2 errors, and investing in too many active strategies that failed to deliver their anticipated results. The financial effects of this trade-off are today painfully visible in the carnage in the hedge fund sector and many investor portfolios. In the future, we expect a realignment of incentives that leads to a better balance between the chances of making Type 1 and Type 2 errors.

Grisgono's fifth level of adaptation is "Co-Adaptation", which she defines as "consciously tuning our interaction with those other systems connected with our own organization." Clearly, this will happen with respect to regulators. However, for professional advisers, it may also happen in their relationships with clients, where effective financial strategies – which have now become more critical – will likely require more coordination with a wider range of professionals and organizations, and better information technology to facilitate these interactions.

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In sum, we expect the painful events of 2008 to catalyze a large number of changes in the asset management industry, which will ultimately improve its intellectual, ethical, and behavioral underpinnings and in so doing result in much more value being delivered to its clients.

2008 Year End Situation and Methodology Update

Over the past few months, we have thought long and hard about how we can help our readers to improve their decision making processes as we enter a period of substantial uncertainty. One of the results of this review has already been rolled out, in the form of asset class valuation models that utilize a consistent "supply of versus demand for returns" methodology. In this issue, we will roll out another result, in the form of a more consistent and explicitly Bayesian methodology for communicating and updating our views on the future of the economy and the evolution of asset class valuations. From this month on, we will begin these updates with a summary of our prior view (i.e., key aspects of our existing mental model), then highlight new developments that seem to represent significant indicators as to the scenario that is developing, and where appropriate, give special attention to outlying or apparently anomalous data and what it could mean. We will conclude with an updated set of views (our "posterior distribution" in Bayesian terms), which will later become the prior for the next update.

Our Prior View

Let us begin with a description of our prior view. We first described it at length in our March 2006 Economic Update. To bring new subscribers up to date, it is worth repeating (in the future, the summaries of our priors will be much more succinct):

"A forecast is constructed in three steps. The first one is to identify the variables that drive the outcome you are trying to forecast, and the most important relationships between them. Together, these variables and relationships constitute your forecasting

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model. The second step is to estimate future values for these variables. The final step is to judge one's confidence in the forecast, or range of forecasts produced by your model. This is not easy, since there are multiple sources of uncertainty to contend with. "Model uncertainty" is caused by the fact that most models are inevitably simplifications of a much more complex reality. "Parameter uncertainty" is associated with our estimates (forecasts) of future values for the variables included in the model. Up to a point, good analysis can reduce these uncertainties; however, some will always remain. For that reason, managing uncertainty also requires that an individual or organization also have the capability to adjust quickly to unexpected changes in their environment. To that end, we find it very useful to identify the few "linchpin assumptions" upon which a forecast rests.

Linchpins are assumptions that will have a large impact on the outcomes of interest (e.g. future asset class returns) and are also highly uncertain. To facilitate rapid adaptation to changing circumstances, we use these linchpin assumptions to construct a set of "early warning indicators" to help us discern (hopefully ahead of others) the economic scenario that is developing.

In our basic mental model, the top layer -- the target of the forecast -- are current asset class valuations, and their expected future returns. When asset class valuations are above their historical averages, future returns are typically below them. We review these each month in our asset class valuation update. Our current conclusion is that many, if not most asset classes are fully or overvalued today, and, with a few exceptions (which we will discuss at the end of this article), their future returns are therefore likely to be lower than they have been over the last ten years.

Asset class returns result from a complex set of inputs, which one can organize in different layers. Right below asset class returns lies investor behavior. As we have discussed in previous articles, before deciding whether to buy or sell an asset, an investor has to not only assess whether he or she believes it is under, fully, or overvalued, but also assess how he or she expects other investors to behave. For example, a "value investor" will place heavy emphasis on whether his or her forecasting model indicates the asset is undervalued; in contrast, a "momentum"

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investor will focus on his or her forecast for future investor behavior. Broadly speaking, there is a documented tendency for many investors to be overoptimistic about future valuations, and overconfident about the accuracy of their forecasts, whether about future dividend growth or the future actions of other investors. For example, almost everyone believes they will be smart enough to "get out at the top," even though history shows that few people do. Other analyses have identified the existence of a "cynical bubble" in the last years of the technology boom, in which professional investment managers, while aware of extreme overvaluations, hesitated to sell too soon because their compensation was tied to their annual returns compared to indexes and other fund managers. Sad though it is to admit, we may well be seeing a repeat of this today. Of course, this begs the question of why many asset classes may be overvalued today. The answer to that question lies in the deeper layers of our analytical framework.

Below investor behavior lie policy decisions made by monetary authorities. A key driver of today's high valuations has been the sharp fall in global interest rates in recent years. Taking a long view of this, we go back to the late 1970s, when U.S. Federal Reserve Chairman Paul Volker raised interest rates to historically high levels to quell the sharp rise in inflation that had developed as a result of the monetary expansion that accompanied the "guns and butter" deficit financing of the Vietnam War and the 1973 and 1979 oil price shocks. In 1982, the resulting global economic slowdown triggered a crisis in developing countries that had financed growing current account deficits with short term foreign currency bank loans. Developing countries' inability to repay or rollover their loans threatened the solvency of many of the world's banks, and raised the specter of a severe global depression triggered by a debt implosion. Faced with this threat, central banks reversed their tight money supply policies and lowered interest rates, which enabled banks to rebuild their capital and developing countries to restructure their loans. Falling rates also contributed mightily to a twenty year bull market in bonds and equities. However, one can also argue that monetary loosening made a substantial contribution to the development of the massive property bubble in Japan. And we all know what happened when that collapsed: Japan

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has been in a prolonged deflationary recession for the better part of the last fifteen years.

More important to our current view is the fact that this process was repeated after the collapse of the technology bubble in 2001. Once again, governments were faced with the prospect of a sharp slowdown in economic growth. However, unlike twenty years previously, this time it was not the banking system that was in the most danger. Rather, it was the U.S. consumer, whose appreciating equity had supported a massive increase in borrowing. More important, with Japan and Europe in the economic doldrums, and Asian countries dependent on exports to the U.S. for their growth, a sharp slowdown in U.S. consumer spending could have led, once again, to a global recession and debt-collapse induced deflation. And so what did we see? Another burst of money supply creation, which led to falling interest rates, which in turn triggered a huge rise in residential property prices, not just in the United States, but in virtually every other country in the world. This enabled consumers, particularly in the U.S. to keep borrowing (this time against rising house values) and spending.

At the same time these developments were occurring in the monetary policy layer of our model, other developments were occurring in the real economy, which is often divided into four sectors: households and corporations (together, the private sector), the public sector, and the external sector (i.e., the current account of the balance of payments). We have already noted how households, particularly in the United States have borrowed heavily to finance an enormous consumption boom. One can argue at length about the underlying drivers of this seemingly unstoppable urge to spend, particularly at a time when more and more people faced sharp rises in job insecurity due to the spread of globalization and the intensification of competition in many industries. Our theory is that it had three causes. The first was the widening gap between the compensation earned by those at the top of the income distribution and everyone else. In no small measure, this reflects the differential impact of information technology on different types of jobs. Middle managers whose function was to aggregate and process information often found their incomes pressured by technology. In contrast, higher managers, whose jobs fundamentally involve the

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application of knowledge and experience, were able to use technology to leverage their skills, boost their productivity and earn higher incomes. The widening gap between incomes triggered the second cause of the leveraged consumption boom, which is our natural tendency (no doubt hardwired into us by evolution) to want to "keep up with the Joneses." The final piece of the puzzle was the absence of traditional constraints on people's borrowing and spending behavior, whether they be the prudence and moderation encouraged by religious belief or by the requirement that a bank keep its loans on its own balance sheet, rather than packaging them into securities and selling them on to other investors.

Now let us move on to the corporate sector. One of the most vivid memories of the 1980s for many U.S. corporate managers was the radical change in the market for corporate control. With the wider availability of debt financing, and the erosion in court cases of many anti-takeover defenses, it became much easier to acquire and restructure underperforming companies. As a result, corporate managers have focused with a vengeance on maximizing productivity and shareholder value. Enabled by the internet revolution, this has led not only to downsizing and consolidation in many industries, but also to the outsourcing of many business functions to those countries that offer superior cost/quality tradeoffs. While "globalization" is the short-hand term most often used to describe these developments, a more accurate description is the dawn of a new age of "near perfect competition" in many industries that has put tremendous pressure on prices (and, in turn, limited wage increases). While job losses and changes in the world's current account balances are the outcomes most people tend to focus on, another one has been just as important. In many industries, the combination of organizational changes and new technology have led to dramatic improvements in productivity, which have enabled them to meet rising demand for their products and services with far smaller increases in employment and capital investment than had previously been the case.

While these developments were occurring in their respective private sectors, western governments were gradually facing up to an even bigger problem: the enormous liabilities they face as their populations age (for more on this, see "Who's

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Going Broke? Rising Health Care Costs in Ten OECD Counries" by Hagist and Kotlikoff). As many writers have noted, there are a limited number of ways to deal with this problem, including substantial increases in taxes, and/or household savings, and/or economic growth, and/or cuts in state benefits provided to retirees. In addition, the fiscal impact of this fundamental challenge was further complicated by other problems. In Japan, it was the need to run large deficits in a pro-longed attempt to use higher government spending to lift the economy out of its prolonged recession; in the Eurozone, it was a need to run countercyclical government deficits, as a reluctance to pursue politically difficult structural reforms led to weak private sector growth; in the United States, it was a Lyndon Johnson-like political desire to avoid a sharp tax increase to pay for the rapidly rising cost of the Iraq war. The net result of these problems has been substantial public sector deficits in Japan, the Eurozone and the United States.

By definition, a country's current account balance of payments is equal to the difference between its domestic savings and investment. The difference between domestic savings and investment can be further subdivided into the private sector and public sector balances. Countries that invest more than they save will run current account deficits, while those that save more than they invest will run current account surpluses. The story we have told thus far can be summed up as follows: thanks to a large supply of domestic savings, Japan now runs a substantial current account surplus (as a percentage of its Gross Domestic Product), despite its large public sector deficit. In the Eurozone, public sector deficits are basically balanced by a surplus of domestic savings, leaving a current account balance of close to zero. In contrast, the United States is running very large private and public sector deficits, which have led to a record current account deficit. To fully understand the dangerous and unchartered waters in which the global economy is now sailing, we must now turn to the People's Republic of China.

In our March, 2004 Economic Review, we presented an in-depth analysis of China's goals, strategy, and risks. We will begin now as we did then, with an assumption about China's grand strategy, as summed up in the 2002 Report to

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Congress by the U.S. China Security Review Commission: "It is clear that China anticipates America's decline and is working to shape a world with a weaker United States and stronger competing poles of power where it can play a central role. China's strategy to achieve this objective appears to include biding its time by avoiding confrontation with the United States, and meanwhile gaining access to American investment, technology and know-how. Economic growth is a central pillar of Chinese power. The Chinese government and its industries share an overwhelming and driving goal to increase the power and international stranding of China as a nation-state."

In broad terms, China's economic strategy has resembled that of other Asian countries: use high domestic savings and foreign direct investment to finance the development of export industries which combine low labor costs, new capital equipment and competitive exchange rates to achieve success in world markets. What has been different about it has been its scale. As we have written before, the aggressive entry of China into the global economy represents a supply side shock of a magnitude not seen since the rapid industrialization at the end of the 19th century.

Over the past ten years, this strategy has, despite its potential for economic disruption, worked remarkably well. Externally, rising Chinese current account surpluses have been used to buy U.S. Treasury Bonds and thus to finance the U.S. current account deficit, while holding down the external value of China's currency. This strategy also held down interest rates in the United States, which kept housing values rising, U.S. consumers borrowing and spending, and Chinese exports growing. Domestically, China's strategy has produced stunning real growth rates -- on the order of nine percent per year -- and in the process created a large Chinese middle class. More important, the leadership of the Chinese Communist Party has remained in power, despite, or perhaps because of, these radical changes to the country's economy.

However, the Chinese growth model is now coming under increasing stress, from many different directions. These include rising domestic dissatisfaction with corruption by party leaders, increasing discontent among peasants at seizures of land (usually without compensation) for urban expansion, growing environmental problems,

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continued failure to reform a very inefficient and ineffective domestic banking system, overinvestment and overcapacity in many industries, and increasing difficulty in limiting the domestic monetary impact (e.g., the expansion of credit and bad loans at state-owned banks) caused by the enormous increase in its foreign exchange reserves that result from its rising current account surplus. And yet the Chinese leaders know that if the economy fails to keep growing, their hold on power could rapidly dissipate, or lead to an increase in external tensions, if they choose to use nationalism and an external threat to retain their control of the country. The most recent problem added to this mix has been a sharp rise in tensions with the United States.

From the U.S. perspective, the root causes of this growing conflict were well described in the 2005 report of the U.S. - China Economic and Security Review Commission. It began by noting that, "the U.S. - China economic relationship has continued over the past year to expand at a rapid pace. New U.S. foreign direct investment in China totaled nearly $4 billion. The trade relationship grew markedly, with U.S. imports from China outpacing U.S. exports to China by more than five to one. The result was a bilateral goods trade deficit that reached $162 billion in 2004 -- a 31 percent increase over the previous year -- and is on pace to considerably exceed $200 billion in 2005. U.S. manufacturers in a broad array of industries are under increasing competitive pressures from domestic and foreign-investor owned, China-based manufacturers. Although each U.S. industry has a unique set of competitive concerns with China, the principal crosscutting concerns are China's undervalued currency, extensive system of government subsidies (particularly those favoring export-oriented production), weak intellectual property rights protections, and repressive labor practices...China remains in violation of many critical commitments it made in order to obtain agreement that it could enter the World Trade Organization -- on a transitional basis due to the extensive economic reforms necessary for its economy to conform to the market practices of WTO members. China's continued recalcitrance is causing material injury to U.S. companies, workers, and communities. It also is contributing to a highly skewed bilateral economic relationship marked by a soaring U.S. trade deficit and a weakening competitive position for many U.S. firms."

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As a result of these frictions, and reflecting the fact that 2006 is an election year in the United States, two pieces of legislation have been proposed in the U.S. Congress (the Schumer-Graham and Grassley-Baucus bills) that would mandate aggressive tariff increases and other actions should China not allow a significant appreciation of its currency versus the U.S. dollar. Because of the substantial negative impact this would have on its economic growth, Chinese leaders seem certain to resist these pressures from the United States.

In sum, we believe that the apparently healthy condition of the world economy today [remember, this was written in March 2006], with very high growth in China and the rest of Asia, recovery in Japan, hints of rising domestic demand in Europe, continued growth in the United States, and fully or overvalued (yet still strangely rising) asset class values around the world is far more fragile than it appears. To be sure, we would be the first to point out that complex adaptive systems like the global economy have an amazing ability to adapt themselves and thus stay in a relatively fragile state far longer than one might first imagine. For example, there were plenty of people who thought equity markets looked overvalued in 1998; however, the crash didn't come until 2001. As those who study complexity like to point out, natural systems can exist in three states. One is excessively stable, one is chaotic, and one exists between the first two, and marks the system's region of maximum adaptability. Clearly, the economic and financial events of the past few years paint a convincing picture of a system struggling to avoid tipping over into the chaotic region. And yet we strongly believe that is where we will end up in the not-too-distant future...[We would like to highlight a number of points]. The first is the extent to which global economic growth has become heavily dependent on the American consumer and continuing investment in China. The second is the record size of the resulting current account imbalances that need to be financed. Today these current account imbalances primarily belong to the United States and China. However, the unwinding of these imbalances implies that other nations will have to generate faster domestic growth, and accept larger current account deficits. The third point is the potential size of the required changes. For example, while the Eurozone and Japan combined account for about the same

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percentage of global GDP as the United States, their growth rates have been slower, and their combined current account surplus amounts to only .23 percent of global GDP, compared to a United States current deficit that amounts to (1.26)% of global GDP. Even adding India to this mix hardly makes a dent on the balance of payments front. That is a very sobering thought, when you consider that a spending slowdown by overleveraged U.S. consumers is inevitable (likely due to rising interest rates weakening the housing market, as has already occurred in Australia and the U.K.), as is reduced investment in China, which faces growing concerns about concerns about overcapacity and domestic deflation in many industries. In short, the current system's days seem numbered.

To be sure, there is another story taking shape, that claims a major global economic disruption - or, as we have described it, a trip into the chaotic region – can be avoided. This story assumes four key changes from today's situation: (1) faster domestic demand growth in Japan and the Eurozone (due to accelerating structural economic reforms); (2) a shift to lower savings, higher domestic consumption and lower investment in China; (3) depreciation of the U.S. dollar versus Asian currencies; and (4) a prolonged reduction in U.S. economic growth rates. In order to avoid a severe economic disruption, all four shifts need to happen reasonably close together. However, there are good reasons to believe this won't happen. With aging populations and state pension and health systems in questionable fiscal health, there is limited scope for increases in personal consumption (which means reduced savings) and domestic demand growth in Japan and Europe. Moreover, faster domestic demand growth also depends on more progress toward structural reforms, for which political support today seems uneven at best (rising in Germany, falling in France, and uncertain in Japan).

In China, it is hard to envision a substantial reduction in savings and rise in domestic consumption as long as its state pension and health care systems are not trusted by the population. In addition, given the critical link between political stability and economic growth in China, and given the low probability of smoothly shifting its economy away from exports and towards increased domestic consumption, it also

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appears that it will be hard to achieve a coordinated depreciation of the U.S. dollar versus Asian currencies. Finally, given the erosion of U.S. export capacity in recent years, as well as its increased reliance on imports (particularly for many consumption goods), it is impossible to reduce the U.S. current account deficit to a sustainable level only through faster growth abroad and dollar depreciation. The painful -- and politically unpalatable -- truth of the matter is that correcting the enormous imbalances that have built up in the global economy will require a prolonged period of slower growth in the United States.

As you can see, the joint probability that all four of the critical changes that underlie the "we can avoid a major crisis" story will occur is very low indeed. Hence our conclusion that, while we don't know which of many possible causes will set it off, at some point in the future, it seems highly likely that the world economy will go through a period of chaotic change, most likely characterized by a sudden and sharp drop in the value of the U.S. dollar, a sharp rise in U.S. interest rates, and a slowdown in global economic growth (for a good summary of the conflicting views about when this will occur, see "Global Imbalances: The New Economy, the Dark Matter, the Savvy Investor, and the Standard Analysis" by Barry Eichengreen).

Chaotic change, however, is not quite the same as random change. While their actions are basically impossible to forecast, systems operating in the chaotic region typically vacillate unpredictably between two or more poles, or, as they are technically called, "attractors" before returning to the adaptive or stable zones. For our purposes here, we will consider as attractors two familiar themes for all complex social systems: conflict and cooperation. Let us now look more closely at possible conflict-driven and cooperative scenarios for the three groups that we believe could have a great impact on a global economy operating in the chaotic zone: the American middle class, Chinese peasants, and Iranian students.

The American middle class is barely hanging on today. Health insurance, education for their children, and a secure retirement all seem increasingly out of reach. Leveraged up to their eyeballs with mortgage, auto, and credit card debt, they are working harder than ever, but with a growing fear of losing their job and lifestyle due to

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outsourcing, corporate consolidation, or increased foreign competition. In this context, the prolonged period of low U.S. growth needed to unwind our current global imbalances will create a head on collision between orthodox economics and political reality. In this case, the conflict-driven outcome would see waves of middle class families declaring bankruptcy, losing their homes, and becoming easy prey to demagogic calls for protectionism and higher inflation, along with much higher taxes on corporations and rich CEOs who "sold out American workers." Once this dynamic gets going, there is no telling where it will end.

Now consider the alternative: a cooperative solution that involves a more controlled form of populism.Such a movement might offer a return to a secure middle class existence, to be obtained by forsaking the excessive "borrow and buy" consumerism of the last twenty years, while accepting a larger role for government and tilt back towards community and away from radical individualism. Specifically, a new populist agenda might start with a change in bankruptcy law that makes it easier for people to shed their credit card debts while allowing them to stay in their homes. Given the extremely high real interest rates earned by credit card companies in recent years, this seems likely to garner wide political support after the economy enters its inevitably sharp and prolonged downturn. On the health insurance front, a Swiss or Australian style single payer plan should also prove popular with American voters. As in the case of the current Medicare program for senior citizens, government would provide a basic health insurance policy to all citizens. To prevent over-utilization of expensive health care services, the single payer policy would carry an annual deductible that could be scaled by income and tied to the tax system. Services would be provided by competing private sector organizations, both for and not-for profit. Elective surgery and other "luxury" items could be covered by additional health insurance policies sold by private companies.

A similar plan could be used to pay for higher education, with government providing a fixed annual loan to students, with repayments tied to the student's post-graduation income, and collections integrated into the tax system. To strengthen retirement security, the new populist agenda might call for an Australian-style

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mandatory defined contribution pension plan for all workers, based on a prudent mix of low-cost index funds, with required conversion to a real life annuity upon retirement. Additional retirement income could come from voluntary saving and a means-tested minimum social security benefit.

Last but not least, a new middle class populist agenda in the United States might replace the current income tax system with one that progressively taxes consumption. This would not only encourage savings, but also discourage the destructive and divisive "keep up with the Joneses" conspicuous consumption that has driven the overleveraging of the American middle class. Many of you reading these proposals are no doubt shaking your heads and saying, "impossible." And under normal political and economic conditions, you would be quite right. However, it is becoming increasingly clear that what we consider "normal conditions" are illusory, and will radically change whenever foreign institutions and/or governments believe it economically (or, more accurately, politically) expedient to stop their lending to the United States. When that day comes, it is not inaccurate to say that "all hell will break loose", which will confront U.S. political leaders with a choice. They can either go down in history as the people who presided over the destruction of the American middle class, or they can propose and support a bold new populist agenda that will mitigate some of the pain that must accompany the elimination of the extraordinary imbalances that have built up in the world economy. Only time will tell which choice they will make (for another good paper on this issue, see "Is the U.S. Bankrupt?" by Laurence Kotlikoff).

Let us now move on to Chinese peasants. Their future role is likely to be critical because of China's history of peasant revolts, and the current leadership's fear of seeing that happen again. A recent report from the RAND Corporation ("China's Internal Security Strategy" by Murray Scott Tanner) provided an insightful view of the problem faced by the Chinese leadership, and the ways they are attempting to respond to it. Tanner notes that "beginning in about 1998-1999, Beijing's internal security experts launched a serious search for a more sophisticated strategy for dealing with the persistent increases in popular protest that had begun in the early

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1990s. Security officials and analysts had begun to recognize that it was probably no longer possible to force protests back down to the very low rates China witnessed in the years immediately following the 1989 Beijing massacre. These security experts explicitly recognized that growing numbers of citizens had legitimate complaints about unemployment, layoffs, illegal taxes and fees, corruption, and numerous other developmental problems that China could not solve anytime soon. Consequently, their new implicit goal was to forge an internal security strategy that would permit them to effectively contain unrest, address some of its underlying economic and policy-related causes, and prevent it from becoming a major threat to the regime's stability...."

"Beijing's goal is to reach out to the vast majority of Chinese citizens who are relatively apolitical -- especially the rapidly emerging urban economic elite -- and persuade them that only the Communist Party can provide them with economic growth, efficient governance, social stability and low crime rates, national unity, and international respect -- to offer them, if you will, clean, responsive autocracy. At the same time, the Party wants to drive a wedge of prosperity and coercion between this enormous mainstream of average citizens and the minority who try to organize opposition, promote systemic political change, or who ascribe to heterodox religious views." However, Tanner's conclusion (in February, 2006) is not optimistic: "Recent reports suggest China is encountering major setbacks in implementing its strategy to contain unrest." Symptoms of this failure include "prolonged protests, increased use of deadly force, signs of increased organization among the protestors, and rising willingness of protestors to resist police attempts to disperse them."

The outlines of a conflict-driven scenario are easy to describe: rising China-U.S. tensions spark either a fall in the U.S. dollar and/or passage of protectionist legislation that causes a sudden drop in Chinese economic growth. This causes domestic frustrations to boil over on a large scale, perhaps driven by an alliance between disgruntled peasants and newly disappointed urban workers. The result could range from increased repression to spreading chaos and falling growth to a sharp rise in tensions with Taiwan as the Chinese leaderships foments an external crisis and uses strong nationalism to regain domestic control. In short, after a sudden drop in Chinese

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economic growth, lots of things could happen, and few of them are good from a global economic perspective.

Is there a cooperative scenario that could help avoid this fate? The Economist recently spelled out one approach, which can be summed up as a Roosevelt style "New Deal" for the Chinese countryside. The basic idea is that a combination of land reform (creation of private agricultural property) and new government social programs (focused on health, education and retirement security) could not only buy peace in the countryside, but also speed China's transition away from exports and toward domestic consumption led economic growth. It goes without saying that implementing this approach would require overcoming a number of significant obstacles, both economic (e.g., reforming the banking system so that it becomes a far better judge of credit risk), and, perhaps more important, political (much wider private property rights and a far stronger rule of law).

However, China's challenges look easy in comparison to resolving the problem Iran currently poses to the global economy. Work on Iran's nuclear program sharply accelerated following the "9-11 attacks" in the United States and the subsequent American - led regime change in Afghanistan, and later Iraq. This program is under the control of the Revolutionary Guards, who, in their wide involvement in commerce (both legal and otherwise), desire for ideological purity, and apparently ambivalent relationship with supreme leader Ali Khamenei bear a more than passing resemblance to the Chinese People's Liberation Army. With the 2005 election of Mahmoud Ahmadinejad, a stridently anti-western former Revolutionary Guard as president of Iran, it seems increasingly clear that, as Frederic Tellier noted in his recent paper "The Iranian Moment", the country is in the middle of a transition fraught with danger. On the one hand, the political power of the Islamic ideology that dominated the country since the 1979 revolution is giving way to a new leadership philosophy based on nationalism, economic development, and (for the Guards, at least) political authoritarianism (again, the similarities with China are clear). On the other hand, though a large number of reformist candidates were disqualified before the last election by the Governing Council (headed by Khamenei), there still lurks beneath the

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surface of Iranian society a strong desire for reform, with half the population under 25, and many familiar with and attracted to Western culture.

Multiple writers have suggested that President Ahmadinedjad (and, behind him, the Revolutionary Guards) are betting that, in essence, economic development, leavened with Iranian nationalism, will keep young Iranians' desire for more widespread political reforms in check. Unfortunately, a focal point of their nationalist rhetoric is their program to develop nuclear weapons, which presents the United States and Europe with an agonizing choice. Given their distrust of Ahmadinejad and the Revolutionary Guards' motives, and, indeed, willingness to play by rational cold war rules of nuclear deterrence, many western nations are loathe to see Iran develop a nuclear weapon (see, for instance, "The Day After Iran Gets the Bomb" by Kenneth Timmerman, in the book Getting Ready for a Nuclear-Ready Iran, published by the United States Army Strategic Studies Institute in November, 2005). However, as multiple writers have pointed out, the very act of preemptively attacking Iran to prevent its acquisition of a nuclear weapon not only has uncertain chances for military success, but may also, by stoking the flames of Iranian nationalism, substantially reduce the probability of a viable domestic "Solidarity-like" movement ever arising to challenge the Revolutionary Guards' control. Along with the potential for a genetic mutation to set off a serious global influenza pandemic (the consequences of which we have frequently written about), the future course of events in Iran is perhaps the most important "wild card" facing the global economy today.

Unfortunately, the easiest scenario to envision is the one driven by conflict, with the Iranian leadership seeking to exploit a global economic crisis (and perhaps their deepening relationship with China) to accelerate their progress toward acquiring a nuclear weapon. To say that such a move would carry with it a very high risk of violent consequences with incalculable negative results (e.g. significant disruption of energy markets, or worse) is probably an understatement. On the other hand, one can, albeit dimly, also perceive the outlines of a cooperative scenario. In this case, young Iranians would organize and protest, not to change the regime, but rather to clearly convey to the leadership their preference for accelerating economic development (which requires

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rising engagement with Western Europe, and probably the United States) rather than a dramatic fall in their standard of living -- or worse. Unfortunately, if it is hard to predict how the Chinese leadership will respond to the choices forced on them by a global economic crisis, it seems infinitely more difficult to predict how President Ahmadinejad and his colleagues will react.

So, let us sum up our analysis. Our first conclusion is that at some point in the future (though the timing of this is notoriously hard to get right) the world economy will suffer a sharp negative shock, characterized by a sudden and substantial drop in the value of the U.S. dollar, a sharp rise in U.S. interest rates, and a sudden slowdown in global economic growth. This conclusion rests on the linchpin assumption that at least one of the four major changes needed to avoid this shock will not happen: (1) a significant increase in domestic demand in Japan and Europe that pushes their current accounts into deficit; (2) a sharp rise in domestic consumption in China, which significantly reduces or eliminates its current account surplus; (3) a substantial fall in the value of the U.S. dollar versus Asian currencies; and (4) a prolonged reduction in U.S. growth rates.

Assuming we are correct, and the global economic system tips over into the chaotic region, the path it will take depends on an additional set of uncertain linchpin assumptions. In the United States, the critical issue is whether the middle class supports a rational populist agenda or a more demagogic and unpredictable one. In China, the critical issue is whether an effective New Deal is offered to the increasingly angry peasantry, before they more aggressively pursue the tradition of agrarian revolt. And in Iran, the critical issue is whether young Iranians, realizing what is at stake, place their continued economic advancement above the extremely unpredictable and potentially devastating consequences of nationalist passions.

Let us now return to the top level of our model. If all four of the major changes needed to avert a crisis are executed, or, once we have entered the chaotic zone, middle class Americans, Chinese peasants and young Iranians all take the cooperative approach to the ensuing crisis, then it is likely that the inevitable global adjustment we face could take place without major long-term damage to a well-

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diversified portfolio. Under these circumstances, our basic advice to diversify across asset classes that perform well under inflation, normal conditions and deflation would still apply.

However, if this isn't the case -- that is, if the global economic system enters the chaotic region and one or more groups pursues a conflict-driven approach, then, as they say, all normal bets are off. Despite the strong recent performance of the global economy and many asset classes, we reiterate the fragility of the current situation. The world economy is in uncharted waters, and substantial deviations from equilibrium are a distinct possibility. The potentially severe consequences that would accompany uncontrolled rage on the part of the American middle class, Chinese peasants, and/or young Iranians would, should they occur, justify a substantial reallocation of one's portfolio toward short term government bonds (i.e., cash), real return bonds, foreign currency bonds (i.e., foreign government bonds), gold and other commodities (including timber) whose value should remain fairly stable in comparison to bonds, property, and equity which should suffer more in a prolonged global recession."

Over the nearly three years since March 2006, we have regularly updated this basic mental model. For example, we have added two "wild cards" – developments that are hard to predict but which could cause a very substantial change in the trajectory of the world economy and financial markets: a sudden increase in the human-to-human ("H2H") communicability of H5N1 influenza (i.e., "bird flu"), without any reduction in its mortality rate, and an environmental incident that causes substantial damage and loss of life, which results in a material change in the perceived trade-off between growth and the control of carbon emissions. The most recent updates to our forecasting framework were in our September, October and November 2008 issues. In September, we looked beyond our current model, and presented a preliminary analysis of five developing flash points. These include (1) investors' growing concern about the level of the United States Government's on and off balance sheet liabilities; (2) a potential collapse of public order in Mexico; (3) the widening gap between population growth rates in younger, poorer and older, richer countries, and the sustainability of the resulting increase in immigration flows; (4) the demographic

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time bomb in the Middle East, as the number of unemployed young people continues to grow; and (5) the increasing tension between authoritarian and democratic countries that both utilize capitalist or semi-capitalist economic systems.

In October, we noted that, “in the United States, we have seen a sharp drop in consumer confidence and spending, and rising unemployment and loan delinquencies along with aggressive government action to maintain liquidity and capital adequacy in the financial system and forestall a deflationary debt collapse. What we have yet to see is an equally aggressive attempt to deal with the root cause of the problem: the overleveraged American consumer. We have lived through enough credit crises to conclude that ‘growing your way out of debt’ doesn't work. Once they reach a critical mass, the resolution of credit crises requires reducing the economic burden of underlying debt, whether through bankruptcy, debt/equity swaps, renegotiation or inflation. Until we see that happening in the United States, consumer spending will continue to fall, and (barring a dramatic increase in domestic consumption in China) will probably pull the world economy down with it...”

“Looking at the uncertain economic situation we face today, it is hard to say whether our cooperative or our conflict scenario appears more likely to develop, as there are forces pushing the global system in both directions. If we had to make a call, we would go with the conflict scenario, principally because of our doubts about China's ability to manage the transition from an economy driven by exports to one driven by domestic demand. We are also less than sanguine about the ability, and perhaps the willingness, of a President Obama to resist the legislative priorities of some of the more radical (and conflict stimulating) elements in his party, who seem likely to control the U.S. Congress for the next two years...”

“Going forward, our best estimate today is that the economic downturn into which we are headed will be long and deep, and will proceed from a deflationary to an inflationary stage. Given this outlook, we are not of the school that simply says "sit tight and it will be okay." We believe that advice runs too high a risk of turning frightened paralysis into a virtue. Hence, as we have been saying since May 2007, the first order of business for all investors is ensuring the adequacy of their liquidity

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reserves. Beyond that, we are strong believers in the proposition that investors can improve their risk/return tradeoff over time by following a disciplined approach to rebalancing that involves (1) automatically considering adjustments to asset class weights when a trigger based on a maximum allowable divergence of an actual weight from a target weight (e.g., 2.5% or 5%) is exceeded; and (2) taking current asset class valuations into account, with a specific objective of reducing exposure to substantially overvalued asset classes. To repeat a point we cannot make too often: when it comes to achieving long-term financial goals, the avoidance of large losses is far more important than obtaining a few more basis points of return. On the other side, we believe in increasing asset class exposures when they fall short of target weights by a trigger amount, provided that the asset class in question does not appear to be substantially overvalued. At a time like this, adherence to this approach is not easy. Yet we continue to believe it is the key to long-term investment success."

In November 2008, we took an in-depth look at the threat posed by debt deflation. We reviewed "the apparent lessons of the Great Depression of the 1930s, the history of debt deflations, and the more recent depression in Japan:

- Avoiding a collapse of the banking system and a contraction of the money supply is necessary to stave off a depression. Policymakers recognize this, and have been taking aggressive steps in this area.

- In Japan, as in the U.S. Savings and Loan crisis, re-establishing transparent values for questionable assets, and moving them off (nationalized) banks' balance sheets and onto the balance sheet of the government (e.g., into the Resolution Trust Company), seemed to speed the return of the financial system to health.

- However, while necessary, preventing a banking and money supply collapse may not be sufficient to prevent a debt deflation and depression.

- Uncertainty and confidence are critical to consumers' willingness to spend, and businesses' willingness to maintain employment and invest.

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- Both too few and too many policy initiatives can further raise uncertainty.

- Beyond reduced uncertainty, however, lies the more fundamental problem of the high levels of debt on consumer balance sheets that was slowing down spending even before the financial markets crisis blew up. The following table shows OECD estimates of household debt as a percentage of household income as of 2005. Keep in mind that in 1985 the OECD average for this measure was only 40%!

Country	Household Debt/Income
Australia	173%
Canada	126%
France	89%
Germany	107%
Japan	132%
Sweden	134%
United Kingdom	159%
United States	135%

- Throughout history, the essential process underway in debt deflations has been the destruction of creditors' wealth, the removal of debt from borrowers' balance sheets, and an increase in the value of and cash and real assets generating positive cash flow. With capital scarce, investors could earn very high returns, and thus were, perhaps, more willing to once again lend and invest, rather than hoard their funds in cash. Similarly, the removal of onerous debt service requirements from borrowers' backs made them more willing and able to resume spending.

- For better or worse, we live in a different world today, where creditors are either large institutions whose failure would pose systemic risk, or collective investment vehicles like pension funds and insurance companies, whose failure might well escalate uncertainty and further reduce consumer and business spending. Hence,

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there are political and economic obstacles to the traditional approach of allowing debt deflations to "wipe the slate clean" after periods of excessive borrowing and spending.

- The scale of the problem also seems too big for established bankruptcy courts to resolve in an acceptable period of time.

- In the absence of a politically and economically acceptable means of quickly and substantially reducing consumers' debt burden, it is hard to see how deflation and further falls in aggregate demand can be avoided. In the face of uncertainty about whether and when they can get out from under the debt they have taken on, which will inevitably be compounded by fears of losing their job, health insurance, and house, people will not spend on anything but necessities - and this will inevitably trigger further employment losses, collateral value declines, and further write downs of the value of loans and other debt securities.

- As the Japanese learned through very expensive experience, neither tax cuts nor large increases in government spending can do more than temporarily alleviate this problem. In fact, by repeatedly raising and then dashing hopes, these efforts at fiscally stimulating Japan out of depression may have worsened the problem, by reducing consumers' and businesses' expectations about the likely impact of these programs. This is not dissimilar to the life-long consumption habits that characterized people who came of age during the Great Depression, or who experienced the high inflation of the 1970s (see “Depression Babies: Do Macroeconomic Experiences Affect Risk-Taking?” by Malmendier and Nagel).

In light of the evidence we reviewed, we reached four conclusions:

1. Historical data suggest that the risks of deflation may have been systematically underestimated by policymakers and investors.

2. That said, the deflation expectations implied by the current U.S. government yield curve appear to be excessive, given historic experience, unless one makes the

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further assumption that there is a high probability of serious policy errors being made by the United States and other countries.

3. While the immediate threat of a banking collapse and severe monetary contraction has been avoided, this is far from a full solution to the problem we confront.

4. The critical indicator of what lies ahead is likely to be what, if any, steps are taken to reduce household debt burdens. If a politically and economically acceptable way to accomplish this cannot be found, the probability of an extended deflationary depression significantly increases.

In sum, our prior view envisioned two possible paths the economy and financial markets can take. In what we term the cooperative scenario, the Obama administration succeeds in keeping the lid on middle class anger through a combination of programs to reduce consumer debt, increase people's sense of financial security in the medium term (e.g., through national health insurance, retirement savings, and education, tax and other reforms), and fiscal stimulus (e.g., spending on infrastructure and greener energy) that limits job losses and reductions in aggregate demand (but not necessarily personal consumption spending, which has to fall from 70% to a more sustainable level as a percentage of GDP). At the same time, the Federal Reserve continues to aggressively expand the money supply to prevent deflation from taking hold, while (along with the Treasury) providing the capital, guarantees and stronger regulatory oversight needed to restore confidence in the soundness of the United States' financial system.

The cooperative scenario is also characterized by success by China in maintaining social peace and economic growth while reducing reliance on exports, through a combination of fiscal and monetary stimulus, improvements in the social safety net (to help stimulate personal consumption spending), more aggressive anti-corruption efforts, and the selective use of repression (which is likely to be supported by a conservative middle class eager, as in Thailand, to preserve the material gains made over the past decade). The resulting reductions in China's current account surplus will in turn make it possible for the United States to reduce its external deficit

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(and financing requirements), as well as the pressures placed on the U.S. public sector balance by sharp increase in private sector savings. By reducing the need for monetization of U.S. government debt, this also reduces inflation pressures in the medium term. Elsewhere, the cooperative scenario envisions a stable environment in the Middle East (and hence no sharp security driven spike in oil prices), as falling oil revenues and rising discontent among Iranian youth make the Iranian leadership wary of aggressively pursuing policies (e.g., nuclear weapon development and sponsorship of Hezbollah and Hamas) likely to bring it into armed conflict with other nations. Finally, this scenario further benefits from the absence of destabilizing shocks, such as a significant increase in human H5N1 influenza communicability, or a collapse of public order in Mexico or Egypt.

In contrast, our conflict scenario includes a failure to reduce the severe uncertainty that now confronts the U.S. middle class, leading to a worsening downward spiral of private spending cuts, rising unemployment and bankruptcies, exploding federal debt and money supply growth, and growing populist anger and demands for more extreme measures (e.g., punitive tariffs on Chinese exports and much higher taxes on incomes and wealth). While this scenario may involve an initial period of deflation, it is certain to end in high inflation. In China, this scenario involves the failure to stimulate sufficient domestic demand growth to maintain social stability, leading to aggressive attempts to maintain exports, which trigger conflicts with the United States and the Eurozone. This scenario could also see the Chinese Communist Party attempting to heighten nationalist feelings (e.g., by raising the temperature of its simmering conflict with Taiwan or perhaps Vietnam) to arrest growing peasant anger and threats to its survival in power. Another way to do this would be through closer cooperation with Iran, which, in exchange for greater Chinese economic support, might be quite willing to help raise international tensions in the Middle East (which would generate higher oil prices and government revenues). The untimely death of Egyptian President Hosni Mubarak and the temptations this would pose to Iran would only heighten the potential dangers in this scenario, as would a Russian move to side with China in a growing conflict with the West.

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Potentially Significant Recent Developments

In the last two months, we have observed a number of developments that are interesting, in that the likelihood of them occurring under both of our scenarios is low. They include the following:

On the negative side, in the United States, government reaction to the financial crisis since September has been haphazard, with frequent policy shifts and no clear guiding principles. This has likely worsened the uncertainty felt by consumers and investors, and contributed to the sharp fall in spending and flight from riskier assets. There is a fine balance that must be struck in times of economic crisis between policy experimentation and policy consistency; both too little and too much experimentation can easily make a bad situation worse (see, for example, The Forgotten Man, by Amity Shlaes and "Great Expectations and the End of the Depression" by Gauti Eggertsson of the Federal Reserve Bank of New York). In addition, while billions have been spent rescuing financial institutions (and their well-compensated employees), millions of Americans continue for struggle under the weight of mortgage, home equity and credit card debts, with no relief in sight. We have no doubt that this has generated a rising tide of anger and resentment among the American middle class, that thus far has been held in check by shock at the ferocity of the downturn, and hopes for what an Obama presidency will bring.

On the positive front, President-elect Obama's initial appointments suggest a "stay the course" strategy on the national security front, and the intention to use the opportunity presented by the current crisis to make substantial progress towards restoring the sense of security of the American middle class. For example, here is what President-elect Obama said in his 3 January 09 radio address: "The problems we face today are not Democratic problems or Republican problems. The dreams of putting a child through college, or staying in your home, or retiring with dignity and security know no boundaries of party or ideology. These are America's problems, and we must come together as Americans to meet them with the urgency this moment demands. Economists from across the political spectrum agree that if we don't act swiftly and boldly, we could see a much deeper economic downturn that could lead to

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double digit unemployment and the American Dream slipping further and further out of reach...We need an American Recovery and Reinvestment Plan that not only creates jobs in the short-term but spurs economic growth and competitiveness in the long-term. And this plan must be designed in a new way—we can't just fall into the old Washington habit of throwing money at the problem. We must make strategic investments that will serve as a down payment on our long-term economic future. We must demand vigorous oversight and strict accountability for achieving results. And we must restore fiscal responsibility and make the tough choices so that as the economy recovers, the deficit starts to come down. That is how we will achieve the number one goal of my plan—which is to create three million new jobs, more than eighty percent of them in the private sector. To put people back to work today and reduce our dependence on foreign oil tomorrow, we will double renewable energy production and renovate public buildings to make them more energy efficient. To build a 21st century economy, we must engage contractors across the nation to create jobs rebuilding our crumbling roads, bridges, and schools. To save not only jobs, but money and lives, we will update and computerize our health care system to cut red tape, prevent medical mistakes, and help reduce health care costs by billions of dollars each year. To make America, and our children, a success in this new global economy, we will build 21st century classrooms, labs, and libraries. And to put more money into the pockets of hardworking families, we will provide direct tax relief to 95 percent of American workers." In so far as this represents an accurate statement of President Obama's policy intentions, it raises the probability of the cooperative scenario developing. On the other hand, this plan is likely to run into resistance from powerful interest groups (e.g., insurance companies, doctors, teachers unions, etc.) that have frustrated past attempts at reform. It remains to be seen whether the current crisis will enable the Obama administration to overcome their opposition.

We also noted the publication of three recent OpEds by highly respected commentators that acknowledge the necessity of some type of debt reduction mechanism to speed the resolution of the current crisis (see, "Keynes Offers Us the Best Way to Think About the Financial Crisis" by Martin Wolf in the 24Dec08 Financial

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Times, “The Age of Obligation” by Niall Ferguson in the 18Dec08 Financial Times, and “Radical Solutions for a Crazy Crisis” by Nouriel Roubini in the 27Nov08 Forbes).

Just as interesting was a 3Dec08 OpEd in the Guardian by Ken Rogoff, former Director of Research at the IMF. Rogoff is also the co-author, with Carmen Reinhart, of an outstanding series of papers that solidly grounds the current crisis in economic history, and warns of its potential severity. In “Is the 2007 U.S. Sub-Prime Financial Crisis So Different? An International Historical Comparison”, they concluded that “the precedent found in the aftermath of other episodes suggests that the strains can be quite severe, depending especially on the initial degree of trauma to the financial system (and to some extent, the policy response). The average drop in (real per capita) output growth is over 2 percent, and it typically takes two years to return to trend. For the five most catastrophic cases (which include episodes in Finland, Japan, Norway, Spain and Sweden), the drop in annual output growth from peak to trough is over 5 percent, and growth remained well below pre-crisis trend even after three years. These more catastrophic cases, of course, mark the boundary that policymakers particularly want to avoid.” In “Banking Crises: An Equal Opportunity Menace”, the extend their analysis to include the historical antecedents from experience in emerging market crises, and again conclude that downturns accompanied by banking crises are likely to be exceptionally severe.

Most recently, in “The Aftermath of Financial Crises”, Reinhart and Rogoff reach three disturbing conclusions: ““More often than not, the aftermath of severe financial crises share three characteristics. First, asset market collapses are deep and prolonged. Real housing price declines average 35 percent stretched out over six years, while equity price collapses average 55 percent over a downturn of about three and a half years. Second, the aftermath of banking crises is associated with profound declines in output and employment. The unemployment rate rises an average of 7 percentage points over the down phase of the cycle, which lasts on average over four years. Output falls (from peak to trough) an average of over 9 percent, although the duration of the downturn, averaging roughly two years, is considerably shorter than for unemployment. Third, the real value of government debt tends to explode, rising an

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average of 86 percent in the major post–World War II episodes. Interestingly, the main cause of debt explosions is not the widely cited costs of bailing out and recapitalizing the banking system. Admittedly, bailout costs are difficult to measure, and there is considerable divergence among estimates from competing studies. But even upper-bound estimates pale next to actual measured rises in public debt. In fact, the big drivers of debt increases are the inevitable collapse in tax revenues that governments suffer in the wake of deep and prolonged output contractions, as well as often ambitious countercyclical fiscal policies aimed at mitigating the downturn." Similar conclusions were also reached in another recent paper, "What Happens During Recessions, Crunches and Busts" by Claessens, Kose and Terrones of the IMF.

In his most recent OpEd, Rogoff notes that "modern finance has succeeded in creating a default dynamic of such stupefying complexity that it defies standard approaches to debt workouts. Securitisation, structured finance and other innovations have so interwoven the financial system's various players that it is essentially impossible to restructure one financial institution at a time...As the recession deepens, bank balance sheets will be hammered further by a wave of defaults in commercial real estate, credit cards, private equity and hedge funds. As governments try to avoid nationalisation of banks, they will find themselves being forced to carry out second and third recapitalisations...When one looks across the landscape of remaining problems, including the multi-trillion dollar credit default swap market, it is clear that the hole in the financial system is too big to be filled entirely by taxpayer dollars... System-wide solutions are needed. Moderate inflation in the short-run – say, 6% for two years – would not clear the books. But it would significantly ameliorate the problems, making other steps less costly and more effective...In addition to tempering debt problems, a short burst of moderate inflation would reduce the real (inflation-adjusted) value of residential real estate, making it easier for that market to stabilize...If inflation rises, nominal house prices don't need to fall as much." In sum, we believe that stark warnings of the dangers we face by analysts like Reinhart and Rogoff (to say nothing of the equity markets' collapse after the U.S. Congress failed to approve the Troubled Asset Relief Program when it was first proposed) have set the stage for a range of

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policy actions that should move the United States in the direction of the cooperative scenario. The main risk to this scenario is a repeat of the "gays in the military" flap that so damaged the Clinton administration at the start of its term in office. In our view, the issue that could do similar damage to the Obama administration is so-called "card check" legislation, that would replace the use of secret ballots for workers deciding whether to support workplace unionization with the use of "check cards" which would have to be filled out in full public view of union "organizers." At a time when public blame for the U.S. automakers' woes attaches as much to unions as to the management of these companies, and when the gap between taxpayers and public sector unions has grown wide and increasingly bitter, card check could be an explosive issue that squanders the political capital needed to pass programs critical to reducing uncertainty.

While events in the United States on balance seem to be heading in the right direction, the same cannot be said about China, where there is growing evidence that critical nation may instead be following a path towards the conflict scenario. On 4Dec08, Reuters reported comments by Zhou Tianyoung, a well known researcher at the Central Party School that trains China's future top leaders. Zhou warned that "China risks massive social turmoil [in 2009] as the economy slows and the number of angry jobless grows...This is extremely likely to create a reactive situation of mass-scale social turmoil." These comments should be read in the context of growing support in China for the so-called "Charter 08" manifesto released on 10 December, that is signed by over 300 leading academics, lawyers and journalists, and calls for an end to one party rule, free elections, religions freedom and strengthening of the rule of law. In sum, there are clear indications that domestic political conflict is growing in China as we enter 2009.

A weakening economy seems likely to further fuel this conflict. A report showed Shanghai residential property prices falling ten percent in the second half of 2008, which strikes at the source of the rising wealth of the urban middle class. Then on 26Dec08 of Zhou Xiaochuan, governor of The People's Bank of China (the central bank made the following remarks: "although the [Chinese] government has pledged to

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boost consumption to sustain growth, we still face difficulties in identifying which areas and which measures we should take to spur spending." The similarly timed announcement of Chinese policy moves to support companies in labor intensive export industries, and other steps to slow the reduction in China's current account surplus imply that the nation's leaders are pessimistic about the expected impact of their policy reforms and stimulus program on domestic demand growth. The details of this program are well covered in the World Bank's most recent China Quarterly Update; also, for more on Chinese reluctance to expand consumption spending, see "Prudent Asia is Unlikely to Bail Out the West" by David Pilling in the 10Dec08 *Financial Times*.

Our pessimistic view of emerging developments in China was reinforced by Chinese leaders' comments during their December meetings with U.S. Treasury Secretary Henry Paulson. Zhou Xiaochuan, the Governor of The People's Bank of China (the central bank), noted "the important reasons for the U.S. financial crisis include excessive consumption and high leverage." And, in an ironic echo of the advice the United States has given to over-indebted developing countries in the past, Zhou recommended that the U.S. "should speed up domestic adjustment, raise its savings rate and reduce its trade and fiscal deficits." Zhou's remarks ignore a fundamental point: China cannot have it both ways – absent much larger (and unlikely) current account deficits in Europe and elsewhere, smaller U.S. current account deficits cannot be achieved without a sharp reduction in China's current account surplus. This point was very succinctly summed up by the *Financial Times*' Martin Wolf in his 2Dec08 column: "This then is the endgame for the global imbalances. On the one hand are the surplus countries. On the other are these huge fiscal deficits. So deficits aimed at sustaining demand will be piled on top of the fiscal costs of rescuing banking systems bankrupted in the rush to finance excess spending by uncreditworthy households via securitised lending against overpriced houses. This is not a durable solution to the challenge of sustaining global demand. Sooner or later – sooner in the case of the UK, later in the case of the US – willingness to absorb government paper and the liabilities of central banks will reach a limit. At that point crisis will come."

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"To avoid that dire outcome, the private sector of these economies must be able and willing to borrow, or the economy must be rebalanced, with stronger external balances as the counterpart of smaller domestic deficits. Given the overhang of private debt, the first outcome looks not so much unlikely as lethal. So it must be the latter. In normal times, current account surpluses of countries that are either structurally mercantilist – that is, have a chronic excess of output over spending, like Germany and Japan – or follow mercantilist policies – that is, keep exchange rates down through huge foreign currency intervention, like China – are even useful. In a crisis of deficient demand, however, they are dangerously contractionary. Countries with large external surpluses import demand from the rest of the world. In a deep recession, this is a "beggar-my-neighbour" policy. It makes impossible the necessary combination of global rebalancing with sustained aggregate demand. John Maynard Keynes argued just this when negotiating the post-second world war order. In short, if the world economy is to get through this crisis in reasonable shape, creditworthy surplus countries must expand domestic demand relative to potential output. How they achieve this outcome is up to them. But only in this way can the deficit countries realistically hope to avoid spending themselves into bankruptcy. Some argue that an attempt by countries with external deficits to promote export-led growth, via exchange-rate depreciation, is a beggar-my-neighbour policy. This is the reverse of the truth. It is a policy aimed at returning to balance. The beggar-my-neighbour policy is for countries with huge external surpluses to allow a collapse in domestic demand. They are then exporting unemployment. If the countries with massive surpluses allow this to occur they cannot be surprised if deficit countries even resort to protectionist measures."

Finally, Iran seems to be pursuing a more conflict oriented line as its government's domestic fiscal and political situation deteriorates with falling oil prices and the continued trade and investment embargo by western nations intended to curb its nuclear program. It may well be more than coincidence that the recent increase in rocket attacks by Hamas (whose main backer is Iran) on Israel from Gaza occurred just as President Ahmadinejad was forced to introduce what is sure to be extremely unpopular legislation ending domestic subsidies on fuel and electricity ahead of the

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presidential election in June, 2009. Could this be a ploy to raise oil prices by further ratcheting up Middle East security worries that were already high in the wake of the Mumbai attacks and the renewed threat of India attacking an already fragile (and nuclear armed) Pakistan? Or, to take this argument one step further, could Ahmadinejad be trying to trigger Iranian involvement in a larger conflict that would heighten nationalistic feelings and deflect the anger of Iranian youth from the country's quickly deteriorating economic conditions? Clearly, the means, motive and opportunity are present, so this hypothesis cannot be rejected at this point. In sum, it seems more likely that events in Iran are developing in the direction of the conflict rather than the cooperative scenario. While domestic frustration among Iranian youth is undoubtedly rising, the chances of this triggering large-scale collective action and replacement of the Ahmadinejad government with a much more moderate regime still seem remote.

Updated Mental Model, Critical Uncertainties, and Asset Allocation Implications

In 2007, United States private consumption expenditures represented almost 15% of world GDP, on a purchasing power parity basis (70% of U.S. GDP, which accounted for 21% of world GDP). That spending (and the consumer credit extension that supported it for so long) is now in freefall. The following table, which we have frequently used in the past, helps to understand the implications of this drop.

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Region	Pct of World PPP GDP in 2007	Private Sector Balance (% GDP)	Public Sector Balance	External Balance	Govt Debt/GDP
Australia	1.1%	(6.7%)	1.8%	(4.9%)	16%
Canada	1.8%	0.2%	0.7%	0.9%	64%
China	10.8%	9.7%	(0.4%)	9.3%	18%
Eurozone	15.8%	1.0%	(1.5%)	(0.5%)	66%
India	4.7%	1.5%	(4.3%)	(2.8%)	58%
Japan	6.5%	7.4%	(3.4%)	4.0%	170%
Switzerland	0.5%	7.8%	1.5%	9.3%	44%
United Kingdom	3.1%	(0.1%)	(3.5%)	(3.6%)	44%
United States	21.1%	(0.5%)	(4.1%)	(4.6%)	61%
Middle East	3.9%			22.8%	

These data are based on the October 2008 World Economic Outlook issued by the IMF. The nine countries and regions covered account for almost 70% of global GDP, calculated on a purchasing power parity basis. The third, fourth and fifth columns describe the relationship that we refer to as "the economic balance equation." According to this accounting identity, the sum of a nation's private sector balance (Total GDP less private consumption – which equals private savings – less private investment) plus its public sector balance (revenues less expenditures) must equal its current account (external) balance with the rest of the world. This table helps clarify the crux of the current crisis. Given the fall in U.S. private consumption spending, either its current account deficit must shrink, or its public sector deficit must rise. If the former is to happen, then it must be accomplished through a combination of a decrease in China, Japan, and the Middle East's current account surpluses, or a rise in the Eurozone's current account deficit. Falling oil prices will account for some of this adjustment. But mathematically, they cannot fully offset the fall in U.S. private consumption. For this to happen, China, Japan and the Eurozone must either stimulate private consumption spending or increase government consumption.

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Unfortunately, all these regions face considerable obstacles to increased private consumption, not the least of which are strong cultural norms that value saving, which have been further reinforced by the current climate of global uncertainty and fear. This leaves an increase in government spending. Here the level of government debt that Japan accumulated during its prolonged battle against the forces of deflation and stagnation constrains their ability to run large government deficits today. That leaves the Eurozone and China, two areas that might both expect to benefit from a weaker United States.

We therefore seem to be currently engaged in the macroeconomic equivalent of a game of chicken. On the one hand, in the absence of greater fiscal deficits in China and the Eurozone, the United States faces a choice between a deep and prolonged recession/depression or the accumulation of debilitating amounts of debt to finance extremely high fiscal deficits for a prolonged period of time, during which inflation, trade protectionism and international conflicts will inevitably increase. On the other hand, China and the Eurozone face a choice between running greater fiscal deficits or living in a slower growing, inflation ridden world that could easily devolve into four blocs: An Asian bloc led by China; an Americas bloc led by the United States (which might incorporate a greater Anglosphere that also includes India); a European region characterized by an uneasy tension between Russia and the E.U.; and a very unstable but resource rich Middle East.

If the world pursues cooperative solutions in 2009, the damage to the world economy and investors' portfolios will be far less than if the world heads down the conflict ridden path, either by accident or because of the intentional actions of one or more parties. In the near term, we will be paying close attention to the way critical micro and macro uncertainties are being resolved.

At the micro/agent based modeling level, there are two central uncertainties. The first is whether the Obama administration will be able to reduce the insecurities and confusion facing the American middle class, before they metastasize into destructive and unpredictable populist anger. The second is whether growing economic and political frustration in China reaches a tipping point where it can no

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longer be held in check by increased government spending and higher levels of repression. Both of these micro level issues involve a mix of cognitive and emotional changes at the individual level, and their amplification through social interaction.

At the macro level, the central uncertainties are whether potential South Asian/Middle Eastern conflicts can be held in check and whether a balance can be struck between the United States, China and the Eurozone that enables current account imbalances to reduced over time without a violent disruption of world trade and financial markets. On the first issue, the actions of India and Pakistan, and Israel and Iran, will determine whether current conflicts explode or are held in check. On the second macro issue, the evolution of events in China will be critical.

Let us now turn to the asset allocation implications of this analysis, as we prepare to enter the Chinese year of the ox, which (accurately, we hope) is characterized by prosperity through fortitude. Here is our assessment (from our Asset Class Valuation Update) of current asset class over and under valuations at the end of December 2008:

Probably Overvalued	U.S., Japan, Swiss and India Government Bonds; Swiss Commercial Property
Likely Overvalued	Japan Real Return Bonds; Equity in U.S., Japan, and India
Possibly Overvalued	Canadian and Eurozone Government Bonds
Possibly Undervalued	Japan Commercial Property; US AAA Corp. Bonds
Likely Undervalued	Commercial Property in Australia, Canada, Eurozone, UK and US
Probably Undervalued	Timber; Equity in Australia, Eurozone and UK; Canada Commercial Property

Looking forward, we divide economic and financial conditions into three possible states, under which different asset classes will tend to outperform; hence, the highest returns from tactical over and underweights will be earned by those investors who best anticipate these turning points. We are currently in the state we term Uncertainty/Deflation, in which government bonds, equity volatility and timber will perform well. However, apart from timber, these asset classes appear to be either fully or even (in the case of many government bond markets) overvalued today. This

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is not to say that they may yet see further price appreciation, if the conflict scenario develops and our stay in the current state is extended. However, some of these gains, particularly in the case of nominal government bonds, seem likely to be reversed when the economy moves into the Inflation state, which the current explosion of money supply creation has made virtually inevitable.

When this occurs, one would expect to see real return bonds, commercial property, commodities (including gold coins) and timber outperform, as they all help to preserve the real value of an investor's capital. Today, two of these (commercial property and timber) seem undervalued, and that may also be the case (on a forward looking view) for the other two as well. In the inflation state, it is also not clear to us how various currencies will perform. Over the past year, we have seen, central banks financing virtually all the U.S. current account deficit, and a sharp appreciation of the dollar as the 2008 crisis worsened, due to a rush by global investors into the perceived safety of short term U.S. Treasury securities. However, with record-setting U.S. fiscal deficits on the horizon (not to mention very substantial off balance sheet liabilities for future health care and retirement spending), one cannot dismiss a rush out of the dollar at some point in the future, particularly if the Obama administration fails to significantly reform the U.S. health care and retirement savings systems, and/or if massive fiscal stimulus fails to reignite economic growth. However, there remains the equally significant question of where one heads after rushing out of the U.S. dollar. While the Euro offers deep and liquid markets, its attractiveness will depend on how it handles the current crisis (the riots in Greece and crises at multiple banks are not good omens), and how the larger macroeconomic and global political environment evolves in the months ahead. In the past, we have argued that the Australian and Canadian dollars are even more attractive than the Euro, given the strength of their underlying resource endowments and their very significant progress on managing immigration, health care and retirement income security issues. However, neither Australia nor Canada offers sufficiently deep and liquid markets to absorb a large flow of money out of U.S. dollar assets. That leaves gold and oil, two commodities with deep markets that can also serve as relatively liquid stores of value. So in addition to

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a hedge against inflation, these two assets are potentially attractive as hedges against a sharp fall in the U.S. dollar.

At some point, as happened in the early 1980s, the inflation dragon will be forced back into its cave -- the presence of Paul Volker on President Obama's team suggests this might happen relatively quickly after it makes its inevitable appearance. We expect the demise of inflation to mark a return to the normal state, which will favor the performance of equities in all regions of the world. As noted above, we believe that in many markets, equities are already significantly undervalued. Indeed, just looking at dividend yields – which studies have shown to deliver the bulk of long-term equity returns -- it is hard not to be tempted by Taiwan (8.2%), Netherlands (8.0%), Singapore (6.9%), Sweden (6.8%), Norway (6.4%), Australia (6.7%), France (5.4%), Hong Kong (4.6%), the UK (4.5%) and Switzerland (4.4%). This raises the question of whether it makes sense to overweight them today. In response, we like to point out the old saying that a stock that is down 90% is one that went down 80% and then another 50%! For investors with long horizons and sufficient resources (financial, emotional and social) to live with the possibility that last drop may not yet have occurred, and with the possibility that the world may yet slip into a prolonged period of heightened conflict, an overweighting of some equities looks attractive today. However, for investors who are more worried about not getting caught out by the next stage of the current crisis, an overweight in inflation hedges should be a less stressful course of action to pursue.

We also continue to believe that, regardless of overall market conditions, a small allocation to equity market neutral active strategies can benefit most investors' portfolios, provided the EMN fund or funds have a low historical correlation of returns with those on broad asset classes (for better or worse, this is the best indicator individual investors are likely to have when it comes to predicting future correlations). Investors who wish to "outsource" opportunistic tactical allocations across asset classes should also consider a small (e.g., no more than five percent of total assets) allocation to a broadly based TAA or Global Macro fund, such as PIMCO's publicly traded (in the U.S.) All Asset Fund or, in Australia, Blackrock's Asset Allocation Alpha

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Fund. Finally, we stress (yet again) the importance of taking a prudent approach to managing liquid reserves (the category in which we include cash and physical gold coins). In light of the elevated levels of uncertainty we confront, precautionary savings should be higher than normal in relation to funds allocated to long-term investments in the above mentioned asset classes and active strategies.

Product and Strategy Notes

A Proposal to Kill Two Birds with One Stone in the Housing Market

As many commentators have noted (including us), the current crisis will persist, and quite possibly continue to worsen, unless and until a way is found to reduce the real debt burden household borrowers have amassed over the last decade. There are multiple means for accomplishing this objective, including revising bankruptcy laws and judicial processes, or a prolonged period of higher inflation (which would, however, help only those with fixed rate mortgages). However, based on our experience with LDC debt and corporate workouts, we believe that greater use of debt/equity type swaps is potentially a far more attractive approach. Here is how they might work. In the case of housing, borrowers would be given the option to refinance their current mortgage (which would help break the Gordian Knot of multiple securitizations and derivatives that has so far been a significant obstacle to effectively dealing with this issue). In place of their existing loan, they would enter into a smaller loan while also issuing to the lender the right to participate in a percentage of any future profit on the sale of the house securing the new mortgage. Logically, the percentage upside given away would be linked to the size of the loan reduction received. For tax purposes, the value of this participation right would be deemed equal to the difference in loan values, to avoid the adverse tax consequences that have stung homeowners who have been forced into short-sales up to now (where the forgiven amount is treated as taxable income to an already financially struggling borrower). The entity making the new loan and receiving the participation right (which would logically be either a government agency or program) would then bundle the

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participation rights into tradable securities that would track the performance of one or more residential property indexes. The government agency could then sell these for cash to institutional and retail investors seeking to further diversify their portfolios across asset classes (e.g., an individual renting a flat in San Francisco might want to add exposure to the residential property asset class to his or her portfolio).

A similar approach might be used to relieve borrowers of some of the burden of credit card debt. In this case, the lender reducing and refinancing the debt (logically at a fixed rate) would receive a right to participate in some portion of any increase in the borrower's income (which would be calculated and collected as part of the borrower's annual tax return) over some period in the future. These participation rights could then be repackaged into securities that track the performance of a wage index. In sum, creatively structured debt/equity swaps could not only achieve a widespread reduction in household debt burdens, but also create attractive new asset classes in which to invest.

Why He Madoff With Their Money

Sadly, it is really only scale that differentiates the Madoff story from dozens of scams that have preceded over the years. As always, red flags were ignored (e.g., the failure to separate asset management, trading, and custody; use of a very small accounting firm; lack of online statements; statistically improbable returns). As always, there were people who suspected something was amiss (e.g., apparently Goldman Sachs and some other large asset managers were in this category), some of whom (e.g., Boston money manager Harry Markopolos) tried to warn the Securities and Exchange Commission about potentially fraudulent activity at Madoff's firm. As always, regulators failed to heed these warnings and terminate the fraud before great damage was done. As always, there were people who were wiped out because they tossed prudent diversification (and skepticism) to the winds, and invested all their savings in what seemed to be such a great opportunity. As always, there were plenty of people who forgot or rejected one of life's great maxims: If something seems too

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good to be true, it's probably false. And, as always, some of the people who made this mistake were professional managers who collected substantial fees for their alleged investment skill. At the end of the day, we feel the most pity for the investors who trusted these professionals to be good stewards of their funds. They weren't directly taken in by Madoff's scheme, yet they must suffer its cruel consequences. When all is said and done, we suspect that it will be their painful stories that will have the most lasting impact, in the form of greater investor distrust of the financial services industry, less willingness to take risks, and, ultimately, fewer people reaching the financial goals they had once hoped to achieve.

Great Writing, Not to Be Missed

One silver lining in the 2008 crisis is the outpouring of great writing it has produced on the way the financial services industry has evolved over the past two decades, and how those trends led us to where we are today. In no particular order, we recommend taking a look at all of the following:

- "Barbarians of Yore Perish in Bonfire of Inanities" by John Helyar (on bloomberg.com)
- "Why Wall Street Always Blows It" by Henry Blodgett in the December 2008 *Atlantic Monthly*
- "The End" by Michael Lewis on portfolio.com
- "Wall Street Lays Another Egg" by Niall Ferguson in the December 2008 *Vanity Fair*
- "Risk Management" by Joe Nocera in the 4Jan09 *New York Times*

And lest any reader think that we have only been paying attention to great stories about the financial services industry, we also note the growing popularity of this quote from Alfred P. Sloan's 1963 book, My Years With General Motors:

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> *"Success, however, may bring self-satisfaction...The spirit of adventure is lost in the inertia of the mind against change. When such influences develop, growth may be arrested or a decline may set in, caused by the failure to recognize advancing technology or altered consumer needs, or perhaps by competition that is more virile and aggressive...This is the greatest challenge to be met by the leaders of an industry. It is a challenge to be met by the General Motors of the future."*

Some Interesting Returns Data

In the mass of returns data we've been wading through, five items caught our eye. Through the end of November 2008, the Harvard University Endowment, which is managed by some of the best (and well compensated) managers in the world, was down (22%) in nominal U.S. dollar terms. That is right in line with our USD 5% long-term target compound real return portfolio, which had returned – in nominal terms -- (22.3%) YTD. By comparison, our USD 6% target real return portfolio was down (31.4%), our USD 4% target real return portfolio was down (18.9%), and our equally weighted USD portfolio was down (27.2%). The second number that caught our eye was the performance of the equity market neutral strategy (which we use in our model portfolios as a source of uncorrelated returns) in comparison to other hedge fund strategies. All the major hedge fund index providers (e.g., Tremont, HFR, etc.) showed it losing far less than other hedge fund styles. Of course that was before the Madoff scandal blew up, which will undoubtedly skew these returns (we expect to see future EMN returns reported in two forms: with and without Bernie).

The third number that caught our eye was the news that, through the end of November 2008, Bill Miller's Legg Mason Value Trust (ticker LMVTX) was down (55.7%) compared to the overall U.S. equity market (as measured by VTSMX) YTD return of (38.2%). Remember that Bill Miller outperformed the overall U.S. equity market every year between 1991 and 2005. Statistically, the chances that Miller accumulated this track record by luck were very slim; a conclusion that he posses true

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skill seems much better supported by the data. However, as we have repeatedly noted over the years, in a complex adaptive system like the economy and financial market, relationships between variables, as well as investor strategies, are constantly evolving, which eventually either makes superior forecasting models and sources of information obsolete, and/or leads to competition that eliminates the superior return returns they have delivered in the past. This raises an inevitable conflict between the normal human tendency to stick with what has been working and the need to constantly explore and innovate in order to remain successful in a constantly evolving environment (for an academic analysis of this issue, see "Path Dependent Preferences: The Role of Early Experience and Biased Search in Preference Development" by Hoeffler, Ariely and West). Sadly, it appears that this truism has finally caught up with Bill Miller, after a truly extraordinary run of investment success.

In the past, we have written about the controversy surrounding so-called fundamental and dividend based approaches to constructing equity market indexes. We therefore note how two EFTs that use these approaches stacked up in 2008 against a traditional, market capitalization based approach. Drum roll, please. In third place, with a 2008 return of (40.79%), was PRF, the PowerShares Fundamental Index Fund. In second place, at (36.50%) was VTI, the Vanguard (market capitalization weighted) Total Market Index. And in first place, at (34.96%) was DTD, the Wisdom Tree Total Dividend Fund. For us, the biggest surprise in this outcome was that DTD didn't outperform VTI by a greater amount, given the relatively high importance of dividend yields for long-term equity returns. So it looks like there's still a lot of life left in "old fashioned" market cap equity index weighting! Last but not least, we call your attention to the performance of two of the funds we have included in our allocation to uncorrelated alpha strategies. In 2008, the James Market Neutral Fund (JAMNX) returned (4.54%) and the J.P. Morgan Market Neutral Fund (OGNAX) returned (0.31%) -- both of these have performed as intended under extremely challenging circumstances, which raises our confidence in their management and the valuable role they can play in a portfolio.

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Thought Provoking Research

As if disappointing returns, client fund withdrawals, and Bernie Madoff weren't enough, the hedge fund industry now has to contend with a growing number of papers questioning the source of the profits that have driven the 20% manager payouts under the famous "2 and 20" formula. In "Large Stakes and Big Mistakes", Ariely, Gneezy, Loewenstein and Mazar find evidence that high potential monetary rewards can deter performance in cognitively complex tasks. This further confirms the so-called Yerkes-Dodson law, that higher arousal only stimulates better performance up to a certain point, after which further arousal degrades performance (possibly because it interferes with the functioning of various cognitive processes). The authors note, that "many institutions provide very large incentives for tasks that require creativity, problem solving and memory. Our results challenge the assumption that increases in motivation would necessarily lead to improvements in performance. Across multiple tasks...higher monetary incentives led to worse performance." However, they also noted that "in general, the optimal level of arousal [as one would expect higher monetary incentives to produce] should be higher for more practiced tasks, particularly if prior practice has occurred under conditions of high incentives." Count on some hedge fund manager to repeat that sentence at some point in the future.

In another study ("Hedge Fund Alphas: Do They Reflect Managerial Skills or Mere Compensation for Liquidity Risk Bearing?"), Gibson and Wang find that "the outperformance [of many hedge fund strategies] disappears or weakens dramatically...once the effect of liquidity risk is incorporated into the performance evaluation framework... alphas are reduced to insignificant levels for most hedge fund styles but Equity Market Neutral, Fixed Income Arbitrage and Multi-Strategy."

Finally, here is some good news as we finish a hard year, and enter another one that may turn out to be even worse. So-called "happiness research" has been a hot topic among academics for the past few years, as they try to develop a better real world understanding of the theoretical, if hazy, concept of "utility." As one would expect, attempting to compare happiness across populations has triggered more than

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a few disagreements over the right methodology to use. These issues are well summarized in a new paper by three researchers from the RAND Corporation, Arie Kapteyn, James Smith, and Arthur van Soest. In "Comparing Life Satisfaction", they employ a very innovative new approach to eliminate response biases and different interpretations of survey questions that have called the results of previous studies into question. Using this methodology, they conclude that "life satisfaction is well described by four domains: social contacts and family have the highest impact, followed by job and daily activities, and then by health. Income has the lowest impact." While we all hope for better economic and financial market performance in 2009, investors and their advisers should not forget that it isn't income and financial returns that generate happiness.

Interesting New Products

In Europe, Pictet has launched the PF (Lux) Timber Fund. It will invest in the stocks of companies with high timber exposures. As we have noted in the past, we believe the best way for retail investors to access this asset class is via timber REITs, such as Plum Creek (PCL) and Rayonier (RYN) which limit exposure to industrial operations (e.g., as one would get via an investment in Weyerhauser). While a substantial portion of the Pictet's fund is invested in timber REITs or similar companies, it also includes exposure to forest related industrial assets. Still, we regard the creation of more vehicles that offer retail investors relatively liquid exposure to timber as a very positive development.

As frequent readers know, we have long advocated an allocation to commodities in most portfolios, and have frequently presented research on this asset class. On the basis of our analysis over the years, our preferred vehicles for gaining access to this asset class have been products that track the Dow Jones AIG Commodities Index. The main reason for this choice has been the fact that in comparison to other indexes, the DJAIG offers the most evenly balanced exposure to agricultural, metals and energy commodities, and should therefore maximize the so-

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called "diversification" return from a portfolio of futures contracts on different commodities. However, we have also noted a limitation of the commodity index products available to investors: they were all "long-only" and could not take short positions in so-called contangoed commodities (where futures prices are higher than spot prices). Because of this limitation, long-only commodity indexes were guaranteed to produce negative roll-yields (the profit or loss when a futures contract about to mature is sold and replaced by one with a longer tenor) when a commodity was in contango. In this regard, a critical (and still unresolved question) is whether increased investment interest in commodities as an asset class has substantially increased the probability of contango occurring, as more investors are bidding to buy futures contracts, and thereby driving up their price relative to the spot market.

From an investment perspective, the first step towards addressing this potential issue was the introduction of new indices in 2008 by Morningstar and Standard and Poor's that were based on taking long (in cases of backwardation) and short (in cased of contango) positions in commodity futures. For years, Mount Lucas Management has offered a similar index, but its use was limited to a fund offered by this company to high net worth and institutional investors (the MLM index also invested in currency and bond futures, and not just energy, agriculture and metals). The new Morningstar and S&P indices both employ moving average and momentum measures in the algorithms they use to determine whether to be long or short a given commodity. Both were also constructed with target limits on the volatility the index would generate. And most important, the new indexes were made available to ETF and index fund sponsors. Two new products were launched in mid-2008 that track the S&P Commodity Trends Indicator Index: An exchange traded note from Elements (ticker LSC, expenses .75bp, note obligor, HSBC bank), and a mutual fund from Direxion: the Commodity Trends Strategy Fund (ticker DXCTX, expenses 1.84%, minimum investment US$ 25,000). From June to September, the new products closely tracked the performance of DJP and PCRDX, and ETN and mutual fund, respectively, which track the DJAIG. However, once the crisis fully hit, the performance of these products significantly diverged, with the S&P-based products substantially outperforming the DJAIG-based

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products over the last four months of 2008, presumably because of their ability to take short positions in a falling market. Up to now, we have hesitated to recommend switching to these products, because we were not sure they would perform as promised. That issue has now been put to rest. However, these products are still not perfect – with the ETN, an investor must accept credit risk exposure to HSBC bank, as one takes exposure to Barclays with DJP (we know more than a few RIAs who have put clients back into PCRDX because of this issue). On the other hand, the $25k minimum for DXCTX is high, as is its expense ratio. On balance, we need to see a better product before we can wholeheartedly recommend a switch. But clearly, these new long/short commodity indexes seem to hold great promise for improving the performance of investors' portfolios.

Another alternative to traditional long-only investment in the DJAIG is use of a product that only invests in oil futures (e.g., an ETF like USO). The logic in this case is as follows. Between 1992 and 2007, the real return (with US CPI used to adjust for inflation) on the IMF's crude oil price index (which equally weights WTI, Brent and Dubai) averaged 9.8% per year with a standard deviation of 23.9%, or .41 units of return per unit of risk. Over the same period, the average annual real return on the DJAIG excess return index was 4.6%, with a standard deviation of 16.8%, or .27 units of return per unit of risk. The correlation between the two return series was .74. This was significantly higher than the correlation between the DJAIG and the IMF industrial metals price index (.30) and the IMF grains price index (.28). Moreover, because it is more difficult to store, and because stockouts are more costly to users, the convenience yield of oil is thought to be high, which raises the chances its future curve will be profitably backwardated, and not unprofitably contangoed. Based on the most recent IEA outlook, it also looks like oil supply and demand will be tightly balanced when the global economy recovers. And in the meantime, oil's deep and liquid futures markets appear to have made it an attractive destination for assets that are fleeing the U.S. dollar and/or seeking a hedge against inflation. In sum, evolving changes in both commodity markets and commodity investment products are making alternatives to long-only DJAIG-based products increasingly attractive.

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Finally, in the United States, the ever-creative product developers at Barclays Global Investors have launched a series of new target-date and target risk-based ETFs, based on new ETF-based indexes from Standard and Poor's. We were particularly intrigued with the latter, and wondered to what extent they match the allocations in our long-term target real rate of return model portfolios. Here is what we found. The risk ETFs have attractive annual expense charges, ranging from .31% to .34% (i.e., 31 to 34 basis points per year). However, we were less impressed with the range of asset classes (represented by EFTs) in which they can invest. These include: large cap (IVV), mid cap (IJH) and small cap (IJR) U.S. equities; the EAFE index (EFA); emerging equities (EEM); large U.S. REITs (ICF); the Lehman Brothers Aggregate Bond Index (AGG); U.S. real return bonds (TIP); and short term U.S. Treasury bonds (SHV). From our perspective, this amounts to only six asset classes: real return and domestic U.S. government bonds, U.S. property, and U.S., foreign and emerging markets equities. Missing from the list are other asset classes we use in some of our portfolios, including foreign government bonds, foreign commercial property, commodities, timber and equity market neutral strategies, and one (equity market volatility) we would add if a retail index product was available. For example, the absence of a wider range of investment alternatives results in the "Aggressive" ETF having a 64.8% allocation to U.S. equities, and a 90.8% allocation to U.S., foreign and emerging market equities. That is significantly higher than the allocations to these asset classes in our most aggressive (7% long term target real rate of return) portfolios.

Unfortunately, neither Barclays nor S&P discloses the long-term expected real returns these four target risk ETFs are expected to produce. Rather, they disclose target risk thresholds for each fund (below which a "shortfall" is said to have occurred) and the maximum allowable probability that a target-risk fund will exceed this threshold, as shown in the following table:

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	Conservative Fund	Moderate Fund	Moderate Growth Fund	Aggressive Fund
Risk (Shortfall) Threshold Return (per year)	(6%)	(9%)	(12%)	(15%)
Maximum Allowable Probability that Shortfall Will Occur	12%	14%	16%	18%

Each fund's asset allocation appears (from the public documents) to be determined once per year in the following manner. First, S&P surveys the asset allocations used by the "ten largest asset allocation fund managers for whom asset class exposures are readily available on their respective websites." These averages provide inputs into the ETFs' asset allocations, which are then refined using an optimization model that incorporates the past 30 months of historical returns (with more recent returns given more weight, but assuming normal distributions) and the above shortfall constraints. We have two basic problems with this approach. First, it assumes the future will be like the recent past. There is no attempt to use forward looking asset class assumptions or to model regime switching or any of the dynamics that give rise to fatter tails (i.e., more extreme returns) than are found in the normal distribution. More importantly, its underlying philosophy appears to be that investors essentially have but one choice to make: what level of risk are they comfortable with? On the basis of that answer, one presumably "backs into" expected retirement income and bequests over time, as a function of the savings contributed to your portfolio, when you choose to retire, and the returns produced by the evolving asset allocation that is consistent with your risk choice.

Quite simply, we don't think that this reflects the way real life investors think about the challenges they face and what they can do about them. Instead, we believe that investors realize they have a series of tradeoffs to make, between levels of annual savings, target retirement date, the extent of part-time work after retirement, target post-retirement income and bequests, the extent of annuitization, rebalancing strategy, and allocations to different asset classes that imply different (and necessarily

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imperfectly estimated) probabilities of achieving specified objectives. We don't start out with the assumption that everything proceeds from an investor's target risk appetite, or that said risk appetite is immutable. Rather, we believe that, while most investors have a risk and uncertainty "comfort zone", depending on circumstances, they may be willing to move out of it to varying degrees that change with their financial and life circumstances. Moreover, that comfort zone might also shift in the other direction, for example, if a large bequest was received or one's health suddenly deteriorated. If that all sounds a bit messy and complicated, it is because we believe it is an accurate description of the way most people experience life. In our view, the great challenge facing the financial services industry is to provide a better experience for their customers, and not the other way around. So while we applaud S&P and Barclays for moving in the direction they have with these products, we believe that their innovation efforts should continue along the path they are on.

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 equity market neutral (uncorrelated alpha) 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.

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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 2008, our Eurozone cash benchmark is 4.50% (in nominal terms). The second benchmark we use is a portfolio equally allocated between the ten asset classes we use (it does not include equity market neutral). This portfolio assumes that an investor believes it is not possible to forecast the risk or return of any asset class. While we disagree with that assumption, it is an intellectually honest benchmark for our model portfolios' results.

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

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