Retired Investor

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This Month's Issue: Key Points

Our first article this month presents our quarterly economic update. We review our basic analytical framework of the global economy and financial markets as a complex adaptive system. Imbalances continue to build which are ultimately unsustainable. However, with foreign central banks now major providers of financing for the U.S. current account deficit, the point at which those imbalances will unwind has become a political decision that will reflect political considerations on the part of the parties involved, and not just rational economic calculations. So the only honest answer to the question of how much longer this can last is, "we just don't know." More interesting to us are what will come next after the current cracks that are beginning to show widen enough to trigger a widespread pullback of liquidity and increase in risk premiums on many asset classes that seem overvalued today. Will the crisis we expect result in cooperative solutions or a prolonged conflict? At this point, the behavior of three groups we believe to be critical to the answer to this question – Chinese peasants, Iranian youth and the American middle class – seems to be pointing toward a

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prolonged conflict scenario. However, this can change quickly and much uncertainty about the likely future course of events and asset class returns continues to exist.

Our second feature article is well timed in light of the first. As we start out biennial model portfolio review, we step back and take a look at the daunting challenges we face in asset allocation analysis. We conclude that when it comes to asset allocation, great humility is in order, even if it is infrequently seen in the press and advice given by too many financial advisers. This month's product and strategy notes examine the potential impact of sovereign wealth funds (higher bond yields and lower equity market risk premiums), the issues that underlie the current spate of new products that attempt to replicate hedge fund returns, a great new paper on the real source of the risk premium earned from investing in commodity futures contracts, and two new papers on decumulation strategy.

This Month's Letters to the Editor

I have enjoyed reading your monthly publication for more than 2 years. Recently I concluded that despite your best efforts to educate the investing public, unintentionally you (and the academic community) have encouraged what I consider to be one of the greatest sources of risk in investing, namely the ability of Wall Street and its environs to produce investment instruments at the drop of a hat that seem to fill "gaps" in asset categories, investment strategies, etc. The developers of these products can then hide behind the veneer of academia to justify their new tools when the primary purpose is to enrich the product developers. Witness the proliferation of commodity ETFs and mutual funds in a short period of time. Witness the proliferation of ETFs that split markets into tiny slices. Witness the index investors who place 1/2 of their domestic stock holdings into small caps because academic research shows the benefit of such an asset category when they potentially have increased risk by dramatically over-investing in an asset category (relative to the broader S&P 500 market). Your publication tries to caution against such vehicles yet at the same time the academic research you and others cite reinforces this type of thinking.

Let me start by saying that we agree with you about the dangers of product proliferation and the questionable efficacy of taking many of the tilts these narrowly defined products are supposed to facilitate. You also make a very insightful implicit point about academic research. As we frequently write, our basic view of the economy and financial markets as a complex adaptive system means that sustained active management success is extremely difficult. Investors who learn and adapt will eventually copy previously successful strategies and eliminate their profitability. Moreover, the constant adaptations by millions of investors

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and other actors in the global economy can cause fundamental changes (also known as regime shifts) that invalidate the assumptions upon which previously successful investment strategies were based. Technically, this causes the process that generates returns to be "non-stationary", which limits the usefulness of historical data when trying to predict the future. What we have failed to note with as much vigor is that these same factors potentially limit the usefulness of academic research to investors who are trying to use it to generate alpha – that is, returns above those available to investors in broadly defined asset class index funds. Research findings about the apparent effectiveness of a given investment strategy that are based on data from one regime may not hold when and if the system evolves into another regime, or if the strategy is widely copied by other investors (the erosion of the small cap stock premium is a good example of this).

Also, the process of hypothesis testing used in many academic research papers has been subject to a number of serious criticisms (see, for example, "The Empire of Chance" by Gigerenzer, Swijink, Porter, Daston, Beatty and Kruger for a dated by still excellent overview, or "Statistical Errors in Medical Research – A Review of Common Pitfalls" by Strasak, Zaman, Pfeiffer, Gobel and Ulmer for a more recent summary). Traditional or "frequentist" statistics compares one hypothesis (e.g., that a variable is significant) to the so called "null hypothesis" (e.g., that it is not significant). Statistically significant differences are those that are unlikely, based on some criterion, to have occurred by chance. So called "p-values" are used to measure this. The smaller the p-value, the less likely the result occurred by chance. For example, a p-value of 5% implies a 1 in 20 probability a result (i.e., a difference between the two hypotheses) occurred by chance; a p-value of .1% implies 1 in 1,000 odds. Another way of looking at this is that 1 less p is the probability of getting the same result if the experiment is repeated.

So what is wrong with this approach? Plenty. First, its underlying logic is based on disproving the so called "null hypothesis." Usually, this null hypothesis is that some variable has no impact, which is often not the case. More accurately, multiple alternative hypotheses usually exist against which the focal hypothesis could be tested. Second, the p-statistics used by different studies are usually based on different sample sizes. This is critical, because the probability that a study will find a statistically significant difference between two hypotheses is function not only of the magnitude of the effect in question, but also the size of the sample,

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and the degree of variability between the subjects in the experiment. Third, finding that a hypothesis is statistically significant tells you nothing about whether it is important (i.e., of practical significance) or the about the underlying causal relationships. With a large enough sample size, relatively unimportant hypotheses can be found to be statistically significant.

A different approach, so-called Bayesian statistics, overcomes many of these limitations. It considers the evidence from one study in light of accumulated findings from prior studies. Rather than treating the analysis of a given hypothesis as a stand-alone test, it takes an incremental approach. Bayesian statistics also allow for the easy comparison of multiple hypotheses, calculating "likelihood ratios" for each of them, which are defined as the probability one hypothesis is true in light of the evidence divided by the probability other hypotheses are true. Unfortunately, most academic research is still based on the frequentist approach, and Bayesians are still in the minority.

In sum, there are significant limitations to many academic research studies, and all publications (ourselves included) should do a better job of making them clear. Moreover, in light of these limitations investors must decide (a) how to define the default asset allocation if you believe that no prediction is possible and no research studies are true in the sense that they can be helpful in making practical investing decisions; and (b) the criteria to use in deciding whether to move away from this default view of the world and resulting asset allocation. With respect to (a) we believe there are two defensible alternatives: (1) a portfolio equally weighted across multiple broadly defined asset classes (i.e., asset classes whose definition reflects significantly different underlying return generating processes) and (2) the market capitalization weighted portfolio. To oversimplify, equal weighting implies that an investor has no confidence in anybody's predictions about returns, risks, or dependencies between asset classes. In contrast, market cap weighting implies confidence in the wisdom of crowds, or collective intelligence, if not any individual's abilities. Of course, the potential flaw here is the assumption that all those investment decisions that lead to the market cap weighting are being made independently, and not under the influence of some common effect (e.g., a mania for internet stocks). Under both approaches, differences in an investor's risk and return preferences could theoretically be accommodated by different cash holdings or use of leverage.

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The second question is more challenging: what criteria to use in deciding whether to move away from one of these default allocations. Ultimately, this comes down to a question of the extent to which relative returns, risks and relationships between asset classes, or, at lower levels, industries and companies, can be predicted with any degree of accuracy. Insofar as the performance of active managers over time in comparison to index funds constitutes a giant experiment, the evidence clearly implies that consistently successful prediction is very, very hard – but not impossible. In addition, the evidence from other studies suggests that relative asset class risk (e.g., as measured by volatility) and the relationships between different asset classes (e.g., as measured by correlation) are easier to predict than returns. However, as you imply in your letter, beyond these points academic research (e.g. about whether different tilts produce superior risk/return tradeoffs) is on thinner ice – perhaps much thinner, after the statistical techniques used in these studies are examined more closely. In practice, many successful institutional quant funds today implicitly recognize the limitations of published academic research based on frequentist hypothesis testing. In place of a single model, they often use Bayesian statistics to constantly evolve and test different investment models, which is consistent with a view of the world as a complex adaptive system. Unfortunately, few funds that use this approach are available to retail investors, perhaps because marketing departments believe simple stories are easier to sell.

Relative to your global market call of May, some questions, recognizing that no one has a crystal ball: Do you anticipate the global asset class bubble deflation that you are predicting will take the form of a rather violent, "black swan" crash event variety or more likely a slow, painful unraveling (deflation) of asset class valuations across the board? If of the "Black Swan" variety, do you think this will be across the board or one major asset class (equities for instance) that will provide a domino effect of other asset classes? What time frame best approximates when this rather bleak "horizon" is likely to be upon us? And, if that period passes without the expected correction, at what point (if at all) would you consider reevaluating the initial forecast? Would, at that point, your evaluation still be mainly based on asset class valuations?

First, for readers who haven't read it, The Black Swan: The Impact of the Highly Improbable is a new book by Nassim Nicholas Taleb, who also wrote Fooled By Randomness: The Hidden Role of Chance in the Markets and Life. "Black Swans" are highly improbably events that have a substantial impact. The size of their impact causes us to create stories after

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the fact that make Black Swans appear more predictable and with fewer random elements than was really the case before they occurred. This leads to overconfidence in our thinking about future events; one of the ways this manifests itself is a persistent tendency to use overly narrow confidence intervals when estimating the possible range a variable or variables may take in the future. This also makes future Black Swans inevitable. Taleb has written a very interesting book we greatly enjoyed reading. Regarding your question, history shows that bubbles have more often collapsed quickly and violently than slowly and gradually. In the situation we currently confront, Black Swan events could take the form of a broader collapse (in terms of the asset classes affected) than previously experienced, or a more prolonged downturn than people have seen since the 1930s. We're also sure there are others out there that we don't see. As for time frame, as we note in this month's Economic Update, there is no good answer to that question. With the marginal financing for the U.S. current account deficit increasingly being provided by foreign central banks, and especially China, the end of the current system is, in essence, a political decision that will reflect political, and not just economic considerations on the part of the parties involved.

A couple of points about your article on whole life insurance as a source of returns which are uncorrelated with returns on broad asset classes. First, we should choose if we are having a taxable or a tax-exempt discussion. I suggest we start with taxable returns and then see if the tax advantage (which is an estate planning benefit!) adds value. It won't to the living. Second, let's make a hypothetical allocation in the same proportions to the mentioned asset classes and look at the returns that would have accumulated over the same period if directly invested. The correlation argument applies both to the portfolio wrapped in the whole life policy and the direct portfolio, doesn't it? You might make the argument that the average retail investor hasn't got access to some of the investments outside the whole life policy, but even that might be challenged to a considerable extent.

You raise some very good and interesting points, which we generally agree with. We also think that the tax savings arguments for whole life are generally overblown for most people. You hit the nail on the head with respect to the key to whole life as a source of uncorrelated returns is that built into its structure is exposure to an asset class (e.g., mortality/longevity risk) and active management skill in managing this risk that a retail investor today cannot access outside an insurance product. If and when products become available that offer investors direct exposure to mortality/longevity risk, then we will re-evaluate our view of whole life insurance as a source of uncorrelated alpha.

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Global Asset Class Returns

YTD 29Jun07	In USD	In AUD	In CAD	In EURO	In JPY	In GBP	In CHF	In INR
Asset Held								
US Bonds	0.75%	-6.71%	-8.85%	-1.56%	4.39%	-1.72%	1.30%	-7.56%
US Prop	-6.33%	-13.79%	-15.93%	-8.64%	-2.69%	-8.80%	-5.78%	-14.64%
US Equity	7.47%	0.01%	-2.13%	5.16%	11.11%	5.00%	8.02%	-0.84%
AUS Bonds	4.58%	-2.88%	-5.03%	2.27%	8.22%	2.11%	5.13%	-3.73%
AUS Prop	5.76%	-1.70%	-3.84%	3.45%	9.40%	3.30%	6.31%	-2.54%
AUS Equity	21.15%	13.69%	11.54%	18.84%	24.79%	18.68%	21.70%	12.84%
CAN Bonds	5.29%	-2.17%	-4.31%	2.98%	8.93%	2.82%	5.84%	-3.02%
CAN Prop	12.82%	5.37%	3.22%	10.52%	16.47%	10.36%	13.37%	4.52%
CAN Equity	20.26%	12.80%	10.65%	17.95%	23.90%	17.79%	20.81%	11.95%
Euro Bonds	-3.38%	-10.83%	-12.98%	-5.68%	0.27%	-5.84%	-2.83%	-11.68%
Euro Prop.	-2.55%	-10.00%	-12.15%	-4.85%	1.10%	-5.01%	-2.00%	-10.85%
Euro Equity	14.18%	6.72%	4.57%	11.87%	17.82%	11.71%	14.73%	5.87%
Japan Bnds	-5.59%	-13.05%	-15.19%	-7.90%	-1.95%	-8.05%	-5.04%	-13.89%
Japan Prop	9.05%	1.59%	-0.55%	6.74%	12.69%	6.58%	9.60%	0.74%
Japan Eqty	2.11%	-5.35%	-7.49%	-0.20%	5.75%	-0.36%	2.66%	-6.20%
UK Bonds	-3.71%	-11.17%	-13.31%	-6.02%	-0.07%	-6.17%	-3.16%	-12.01%
UK Prop.	-16.35%	-23.81%	-25.95%	-18.66%	-12.71%	-18.82%	-15.80%	-24.66%
UK Equity	9.14%	1.68%	-0.46%	6.83%	12.78%	6.67%	9.69%	0.84%
World Bnds	0.46%	-7.00%	-9.15%	-1.85%	4.10%	-2.01%	1.00%	-7.85%
World Prop.	3.02%	-4.44%	-6.58%	0.71%	6.66%	0.55%	3.57%	-5.29%
World Eqty	9.71%	2.25%	0.10%	7.40%	13.35%	7.24%	10.25%	1.40%
Commod	3.11%	-4.35%	-6.50%	0.80%	6.75%	0.64%	3.66%	-5.20%
Timber	8.33%	0.87%	-1.27%	6.02%	11.97%	5.86%	8.88%	0.02%
EqMktNtrl	4.66%	-2.80%	-4.94%	2.35%	8.30%	2.19%	5.21%	-3.65%
Volatility	40.40%	32.94%	30.79%	38.09%	44.04%	37.93%	40.95%	32.09%
Currency								
AUD	7.46%	0.00%	-2.15%	5.15%	11.10%	4.99%	8.01%	-0.85%
CAD	9.60%	2.15%	0.00%	7.30%	13.25%	7.14%	10.15%	1.30%
EUR	2.31%	-5.15%	-7.30%	0.00%	5.95%	-0.16%	2.86%	-6.00%
JPY	-3.64%	-11.10%	-13.25%	-5.95%	0.00%	-6.11%	-3.09%	-11.95%
GBP	2.47%	-4.99%	-7.14%	0.16%	6.11%	0.00%	3.02%	-5.84%
USD	0.00%	-7.46%	-9.60%	-2.31%	3.64%	-2.47%	0.55%	-8.31%
CHF	-0.55%	-8.01%	-10.15%	-2.86%	3.09%	-3.02%	0.00%	-8.86%
INR	8.31%	0.85%	-1.30%	6.00%	11.95%	5.84%	8.86%	0.00%

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Asset Class Valuation Update

Our market valuation analyses are based on the assumption that markets are not perfectly efficient and always in equilibrium. This means that 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. 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 May, 2005 issue, 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.

Equity Market Valuation Analysis at 29 June 07

Australia	**Low Demanded Return**	**High Demanded Return**
High Supplied Return	85%	123%
Low Supplied Return	128%	171%

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Canada	Low Demanded Return	High Demanded Return
High Supplied Return	117%	183%
Low Supplied Return	211%	298%

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Eurozone	Low Demanded Return	High Demanded Return
High Supplied Return	95%	142%
Low Supplied Return	153%	210%

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Japan	Low Demanded Return	High Demanded Return
High Supplied Return	105%	197%
Low Supplied Return	245%	380%

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United Kingdom	Low Demanded Return	High Demanded Return
High Supplied Return	67%	111%
Low Supplied Return	115%	168%

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United States	Low Demanded Return	High Demanded Return
High Supplied Return	140%	207%
Low Supplied Return	242%	329%

Switzerland	Low Demanded Return	High Demanded Return
High Supplied Return	114%	168%
Low Supplied Return	186%	328%

India	Low Demanded Return	High Demanded Return
High Supplied Return	112%	198%
Low Supplied Return	242%	364%

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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 the historical average inflation premium (the difference between nominal and real bond yields) between 1989 and 2003. 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 29Jun07

	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	2.89%	2.96%	5.85%	6.26%	0.41%	-3.83%
Canada	2.12%	2.40%	4.52%	4.55%	0.03%	-0.32%
Eurozone	2.51%	2.37%	4.88%	4.56%	-0.32%	3.05%
Japan	1.22%	0.77%	1.99%	1.87%	-0.12%	1.18%
UK	1.75%	3.17%	4.92%	5.46%	0.54%	-4.99%
USA	2.65%	2.93%	5.58%	5.04%	-0.54%	5.28%
Switz.	2.63%	2.03%	4.66%	3.23%	-1.43%	14.75%
India	2.46%	7.57%	10.03%	8.16%	-1.87%	18.70%

*Derived from ten year yield and forecast inflation

It is important to note some important limitations of this analysis. First, it uses the current yield on real return government bonds (or, in the cases of Switzerland and India, the implied real yield if those bonds existed). Over the past forty years or so, this has averaged around 3.00% in the United States. Were we to use this rate, the required rate of return would generally increase. 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

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increases, so to should the demand for investment, which 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 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). These variables are not unrelated; a negative correlation (of about .3) has been found between risk aversion and the time discount rate. This means that as people become more risk averse, they also tend to be more concerned about the future (i.e., as risk aversion rises, the time discount rate falls).

All three of these variables can only be estimated with 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 multifactor productivity growth between 1995 and 2002 (with France and Germany proxying for the Eurozone). We then try to back out estimates for risk aversion and the time discount rate that would bring theoretical rates into line with those that have been observed in the market. Lower risk aversion may also be associated with rising danger of overvaluations occurring in other asset markets. The real rate formula is [Time Discount Rate + ((1/Risk Aversion Factor) x MFP Growth)].

Real Interest Rate Analysis at 29Jun07

Real Rate Analysis	AUD	CAD	EUR	JPY	GBP	USD
Risk Aversion Factor	4.0	5.0	4.0	6.0	5.5	4.0
Time Discount Rate	2.25%	1.75%	2.00%	1.00%	1.50%	2.25%
MFP Growth	1.60%	1.20%	1.40%	0.60%	1.40%	1.40%
Theoretical Real Rate	2.65%	1.99%	2.35%	1.10%	1.75%	2.60%
Real Rate	2.89%	2.12%	2.51%	1.22%	1.75%	2.65%

Our bond market analysis also 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 average future inflation levels. For example, if expected future inflation is lower than historical inflation, required returns will be lower. All

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else being equal, this would reduce any estimated overvaluation or increase any estimated undervaluation. For example, if one were to assume a very different scenario, involving a prolonged recession, accompanied by deflation, then one could argue that government bond markets are actually undervalued today.

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 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).

	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%

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At 29 June 2007, the AAA minus 10 year Treasury spread was .78%. This is still below the long-term average compensation for bearing liquidity and jump risk (assuming our model is correct). At the end of the month, the BBB minus AAA spread was .90%. This is also below the long-term average compensation for bearing credit risk. Given other developments underway in the world economy, we believe that it is more likely that credit risk is underestimated rather than overestimated today, and that corporate bonds are overvalued rather than undervalued. 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 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 long-term changes in exchange rates are summarized in the following table:

Annual Exchange Rate Changes Implied by Bond Market Yields on 29Jun07

	To AUD	**To CAD**	**To EUR**	**To JPY**	**To GBP**	**To USD**	**To CHF**	**To INR**
From								
AUD	0.00%	-1.71%	-1.70%	-4.39%	-0.80%	-1.22%	-3.03%	1.90%
CAD	1.71%	0.00%	0.01%	-2.68%	0.91%	0.49%	-1.32%	3.61%
EUR	1.70%	-0.01%	0.00%	-2.69%	0.90%	0.48%	-1.33%	3.60%
JPY	4.39%	2.68%	2.69%	0.00%	3.59%	3.17%	1.36%	6.29%
GBP	0.80%	-0.91%	-0.90%	-3.59%	0.00%	-0.42%	-2.23%	2.70%
USD	1.22%	-0.49%	-0.48%	-3.17%	0.42%	0.00%	-1.81%	3.12%
CHF	3.03%	1.32%	1.33%	-1.36%	2.23%	1.81%	0.00%	4.93%
INR	-1.90%	-3.61%	-3.60%	-6.29%	-2.70%	-3.12%	-4.93%	0.00%

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Our approach to valuing commercial property securities as an asset class is hindered by a lack of historical data about rates of dividend growth. To overcome this limitation, we have assumed that markets are fairly valued today (i.e., the expect supply of returns equals the expected returns demanded by investors), and "backed out" the implied future real growth rates for dividends (which over time should correlated with the real change in rental income) to see if they are reasonable in light of other evidence about the state of the economy (see below). This analysis assumes that investors require a 2.5% risk premium above the yield on real return bonds to compensate an investor for the risk of securitized commercial property as an asset class. The following table shows the results of this analysis:

Commercial Property Securities Analysis as of 29Jun07

Country	Real Bond Yield	Plus Commercial Property Risk Premium	Less Dividend Yield on Commercial Property Securities	Equals Expected Rate of Future Real Dividend Growth
Australia	2.89%	2.50%	5.2%	0.2%
Canada	2.12%	2.50%	3.9%	0.8%
Eurozone	2.51%	2.50%	2.3%	2.7%
Japan	1.22%	2.50%	1.1%	2.6%
Switzerland	2.63%	2.50%	3.5%	1.6%
United Kingdom	1.75%	2.50%	2.0%	2.3%
United States	2.65%	2.50%	3.8%	1.4%

If you think the real growth estimates in the last column are too high relative to your expectation for the future real growth in average rents, this implies commercial property securities are overvalued today. On the other hand, if you think the implied growth rate is too low, that implies undervaluation. Since we expect a significant slowdown in the global economy over the next few years, we are inclined to view most of these implied real growth assumptions as too optimistic (Australia and perhaps Canada excepted), and therefore to believe that the balance of business cycle and valuation evidence suggests that commercial property securities in many markets are probably overvalued today.

To estimate the likely direction of short term commodity futures price changes, we compare the current price to the historical distribution of futures index prices. Between 1991

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and 2005 period, the Dow Jones AIG Commodities Index (DJAIG) had an average value of 107.6, with a standard deviation of 21.9. The 29 June 2007 closing value of 169.67 was about 2.8 standard deviations above the average (assuming the value of the index is normally distributed around its historical average, a value greater than three standard deviations away from that average should occur less than 1% of the time). Given this, the probability of a near term decline in the spot price of the DJAIG still seems much higher than the probability of an increase. At any given point in time, the current price of a commodity futures contract should equal the expected future spot price less some premium (i.e., expected return) the buyer of the future expects to receive for bearing the risk that this forecasted future spot price will be inaccurate. However, the *actual* return realized by the buyer of the futures contract can turn out to be quite different from the expected return. When it occurs, this difference will be due to unexpected changes in the spot price of the contract that occur after the date on which the futures contract was purchased but before it is closed out. If the unexpected change in the spot price is positive, the buyer of the futures contract (i.e., the investor) will receive a higher than expected return; if the unexpected price change is negative, the buyer's return will be lower than expected. In a perfectly efficient market, these unexpected price changes should be unpredictable, and over time net out to zero. On the other hand, if the futures market is less than perfectly efficient – if, for example, investors' emotions cause prices to sometimes diverge from their rational equilibrium values – then it is possible for futures contracts to be over or undervalued.

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). As is the case with equities, 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. A number of factors contribute to the expected future growth rate of timber REIT dividends. These are listed in the following table, along with the assumptions we make about their future values:

Growth Driver	**Assumption**
Biological growth of trees	While this varies according to the maturity a given timber property, we assume 6% as the long term average.

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Growth Driver	Assumption
Change in prices of timber and land on which the trees are growing	We assume that over the long term they just keep pace with inflation. Hence, their contribution to the real growth rate is zero.
Diversification across countries	As in the case of commodities, that an investor in an internationally diversified portfolio of timber assets should earn a diversification return, similar to the one earned by investors in a well diversified portfolio of commodity futures contracts. In the interest of conservatism, we assume that in the case of timber this equals zero.
Carbon credits	In the future, investors in timberland may earn additional returns from the receipt and resale of carbon credits. However, since the future value of those credits is so uncertain, we have assumed no additional return from this source.

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.

Given these assumptions, our assessment of the valuation of the timber asset class at 29 June 2007 is as follows:

1. Forecast supplied return = 4.15% (Div Yld) + 6.00% (Long Term Growth) = 10.15%
2. Return demanded = 2.65% (Real Bond Yield) + 4.00% (Risk Premium) = 6.65%
3. Return Demanded/Return Supplied = 66%
4. Conclusion: Timber is probably undervalued today.

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

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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 29 June 2007, the VIX closed at 16.23. This is .5 standard deviation below the VIX's long term average value. This level still strikes us as very low in light of rising uncertainty in the world economy and financial markets. Hence, we conclude that equity volatility is possibly undervalued today.

Sector and Style Rotation Watch

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

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

We publish this table to make an important point: there is nothing unique about the various rotation strategies we describe, which are widely known by many investors. Rather, whatever active management returns (also known as "alpha") they are able to generate is

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directly related to how accurately (and consistently) one can forecast the turning points in the economic cycle. Regularly getting this right is beyond the skills of most investors. In other words, most of us are better off just getting our asset allocations right, 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. That being said, the highest rolling three month returns in the table give 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 most investors 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 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.

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

Rolling 3 Month Returns Through	***29Jun07***			
Economy	Bottoming	Strengthening	Peaking	Weakening
Interest Rates	Falling	Bottom	Rising	Peak
Style and Size Rotation	Small Growth (DSG) **8.49%**	Small Value (DSV) **3.77%**	Large Value (ELV) **5.71%**	Large Growth (ELG) **6.35%**
Sector Rotation	Cyclicals (IYC) **2.77%** Technology (IYW) **10.32%**	Basic Materials (IYM) **9.29%** Industrials (IYJ) **10.00%**	Energy (IYE) **14.86%** Staples (IYK) **3.38%**	Utilities (IDU) **-0.83%** Financials (IYF) **1.05%**
Bond Market Rotation	Higher Risk (LQD) **-1.14%**	Short Maturity (SHY) **0.71%**	Low Risk (TIP) **-2.18%**	Long Maturity (TLT) **-2.46%**

The following table sums up our subjective view of possible asset class under and overvaluations at the end of June 2007. The distinction between possible, likely and probable reflects a rising degree of confidence in our conclusion.

Probably Overvalued	Commodities, Corporate Bonds
Likely Overvalued	Commercial Property, Equity Markets
Possibly Overvalued	U.S. and Swiss Government Bonds
Possibly Undervalued	Australian Government Bonds
Likely Undervalued	Equity Volatility. U.K. Government Bonds
Probably Undervalued	Non-U.S. Dollar Bonds (based on expected XR changes); Timber

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Economic Update, June 2007

Our starting point for thinking about the workings of the global economy and financial markets is that they function as a complex adaptive system, populated by agents (e.g., policymakers, investors, fund managers, etc.) who pursue different goals using different strategies, which they adjust over time depending on how well they have performed in practice. Making predictions about the future of such a system is hazardous; while we can observe the behavior of individual components, the system's overall behavior is an emergent property that is usually different than the sum of its parts due to the presence of time lags, learning, and a variety of positive and negative feedback loops. For example, these can cause the system to experience so-called "phase" or "regime" changes (e.g., from low to high volatility) that substantially reduce the usefulness of historical data as a guide to the future. Given the large number of uncertainties involved, regime changes are hard if not impossible to predict with much precision; hindsight does a much better job of identifying them than foresight. Looking forward, the best we can realistically hope for is "coarse-grained" insight into the system's dynamics and likely direction of change, if not its specific timing and sequence.

With those limitations in mind, we note that many commentators (including us) have noted the growing level of tension within the global economic and financial system, as various imbalances have grown in size. These include the indebtedness of U.S. consumers, the expansion of Chinese investment and productive capacity in an ever wider range of industries, the growing overvaluation of China's currency (which has remained almost unchanged versus the U.S. dollar, even as China's relative productivity has sharply increased), the growth of the U.S. current account deficit to an unprecedented size as a percentage of U.S. GDP, and the simultaneous growth in China's foreign exchange reserves, as it has become the primary financier of the U.S. deficit. The impact of these imbalances on the world's financial markets has been equally clear, with rising liquidity levels and low real and nominal interest rates leading to compressed credit spreads and the simultaneous and unprecedented overvaluation of a wide range of asset classes.

That a sudden and likely very painful unwinding of these imbalances has not yet occurred is testimony to the tendency of all complex adaptive systems' resilience and ability

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to create new adaptive structures to avoid tipping over into a region of chaos. Yet if the underlying pressures continue to build up unabated, the tipping point must occur, and the tenuous equilibrium punctuated by a period of sharp change and instability. That this has not yet happened is not evidence that it won't.

The first key question to ask is how close are we to the tipping point today? Unfortunately, the only honest answer is that nobody knows for sure. As the McKinsey Global Institute noted in a recent report ("The U.S. Imbalancing Act: Can the Current Account Deficit Continue?"), assuming no increase in China's domestic consumption spending, there appears to be sufficient savings available in the world to continue the financing of the current system for a few more years. Yet, the McKinsey report also notes that, "eventually, the U.S. current account deficit will need to stabilize or even decline relative to the size of the U.S. economy. A major rebalancing of global demand and a dollar depreciation of historic proportions [e.g., on the order of 23% to 30%] would be required for this to happen over the next five years."

Frankly, we've always liked former U.S. Treasury Secretary Lawrence Summers' characterization of the current state of the world economy as a "financial balance of terror." His analogy was to the nuclear balance of terror which characterized the Cold War, and resulted in a prolonged period of wary and watchful stability in the world's politico-military system. In the world economy and financial markets, Summers' characterization has never been more true that it is today, when the marginal financing for the U.S. current account deficit comes not from private investors but rather from foreign Central Banks, of which the largest investor is the People's Bank of China. So how much longer can or will this stability last? Nobody can tell for sure. At the very least, a situation in which the economic growth of the world's leading military power depends on debt financing by a nation with a very different political system that seeks a stronger world role is inherently unstable.

In sum, the question of how much longer the world can avoid a substantial economic and financial markets shock has become a political one. Given this, two looming events in 2008 could prove to be critical. The first is the Beijing Olympics. Our guess is that the Chinese leadership will try very hard to prevent any disruptive economic and financial changes from occurring before then. Its pointed warning to the International Monetary Fund last month not to back U.S. calls for appreciation of the renminbi is a case in point. So too is

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its recent political pressure on the World Bank to alter a planned report that was highly critical of China's environmental track record.

To a much greater degree than their counterparts in the U.S., Chinese political leaders seem to have a high sensitivity to the law of unintended consequences and the danger so impulsive change. On the other hand, 2008 is also a presidential election year in the United States, during which politicians will be seeking votes from highly indebted and frustrated middle class voters. The temptation to "bash China" (for example, through the enactment of protectionist legislation) as the central villain in an anti-globalization campaign morality play will undoubtedly grow stronger in the months ahead.

However, when and how we go past the tipping point may not be the most important issue to consider. The question of whether, once they system is operating in the chaotic region, it is more attracted to cooperative solutions (which would hasten the system's recovery) or to increasing conflict (which would prolong and deepen the crisis) could have an even larger impact on long-term growth and asset values. As we have noted in the past, we believe that the attitudes and behaviors of three groups (call them "centers of gravity") will be critical to how this question turns out. The first of these groups is the rural Chinese peasantry. As noted in a recent World Bank paper ("Poverty, Inequality and Social Disparities During China's Economic Reforms" by David Dollar), while poverty rates have fallen in recent years, the gap between the standard of living of China's relatively large rural population and its smaller (and much more productive) urban population has grown much, much wider. Another recent paper, ("Is the Chinese Growth Miracle Built to Last?" by Eswar Prasad) summarizes the large number of internal imbalances and contradictions that have developed in the Chinese economy during the course of its rapid recent growth. To this must be added growing rural resentment against government corruption, environmental pollution, and the relatively worse health and education services provided outside urban areas. This situation will only be made worse by the prospective loosening of China's "One Child" policy in urban areas as it attempts to address a looming skilled labor shortage. These growing economic, political and social tensions must eventually be resolved. While the Chinese leadership is well aware of them, and indeed has taken steps to begin to address them, it remains uncertain whether these will turn out to be "too little, too late." Chinese history is clearly not without examples of previous situations in which the resolution of internal imbalances involved significant

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economic, political and social unrest and disruption. In our view, if China plunges into domestic disarray, the probability of reaching cooperative solutions to the building global economic crisis will be significantly lower.

The second major group we closely watch are Iran's young people. Iran's relationship with the west is critical to the stability of the world economy. It has a large population, is a prospective nuclear power, and a key supporter of many terrorist groups, and occupies a strategic location in the Middle East. Yet over half its population was born after the U.S. Embassy was seized in 1979, and many of them are highly educated, and quite western in their attitudes and outlook. In 1999 Iranian students' dissatisfaction with the ruling regime boiled over into widespread protests that were harshly put down. Since then, tension between the majority of Iranian youth and an increasingly radical government has simmered. They recently boiled over, albeit briefly, in a series of riots sparked by the announcement of gasoline rationing (Iran must import gasoline, as Western economic sanctions have limited the construction of new domestic refining capacity). In our view, if Iranian youth remain subdued and the country continues to be led by a radical regime, the chances for cooperative solutions to a global economic crisis will be much lower.

The third group whose attitudes and behavior we believe to be critical is the U.S. middle class. In recent years, they have borrowed heavily to keep up with the conspicuous consumption of the country's new rich, as increasing secularism made such spending central to more people's sense of self-worth. At the same time, their grip on the core elements of middle class life – housing, access to health care, a secure retirement and a college education for one's children – has become much more tenuous. This has created a politically explosive situation, whose full effects have yet to be seen. We expect to see their outline emerge during the 2008 election campaign, as every candidate strives mightily to attract and mobilize this large and critical bloc of voters. Flashes of middle class anger are already in evidence, whether in hardening attitudes towards China, resentment of CEOs and private equity barons, or attacks on allegedly "predatory" mortgage lenders. If this anger gets out of control, or, even worse, is fanned by demagogic candidates, cooperative solutions to a global economic crisis will be much harder to achieve.

That investors have recently become much more sensitive to these trends and uncertainties and their potential implications is undeniable. The blip in financial market

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volatility and bond yields in mid-June, and Standard Life's early July warning about the U.K. commercial property sector are all signs that reassessment and change is afoot. This development is in keeping with the idea that investor's required risk premiums rise with the ambiguity of the information they are receiving (see, for example, "Ambiguity, Information Quality and Asset Pricing" by Epstein and Schneider). It may also be in keeping with the ideas contained in Professor Robert Schiller's new paper "Historic Turning Points in Real Estate." He suggests that turning points in this market occur for two reasons that seem to apply to other asset classes as well. First, investors fail to appreciate the increase in supply and competition that only occurs with a time lag in response to high returns in an earlier period. They become overconfident about the relative uniqueness of a given situation, and bid up asset prices to unreasonable levels on the basis of excessive expectations about future returns. More important, perhaps, is the psychological transition that marks the end of a boom. As Schiller notes, "the story changes", often following some event that takes many investors by surprise. Stories about savvy investors and their outsized gains, begin to be replaced by stories about people who made stupid mistakes, with said people often claiming they'd been duped and betrayed. We have noted before the finding by many researchers that human beings have a strong aversion to regret; when the possibility of experiencing regret seems to sharply increase, an equally sharp jump in the risk premium those investors require can't be far behind. So, do those stories exist today? In some housing markets, they almost certainly do. But housing markets are local (though entering into exotic mortgage contracts may be more of a national story). What has been missing, so far, is a major "story change" in an institutional market. That may not be the case for much longer. Coval, Jurek and Stafford have just published a paper that suggests that many institutional investors have been taken for a big (and very expensive) ride by the investment banks at the heart of the rapid growth in Collateralized Debt Obligations. In a simple CDO, a group of loans or securities is purchased by a special purpose company. The company then issues a series of different securities, whose repayment is based on the pooled cash flows received on the original securities. Securities whose repayment terms differ are known as "tranches." For example, the lowest rated tranche bears the initial brunt of any defaults on the underlying securities; the highest (often AAA) rated tranche gets paid first whenever cash flows on the underlying securities are received. In "Economic Catastrophe Bonds", Coval, Juke and Stafford take a

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close look at how these tranches are priced. They note that according to asset pricing theory (which they imply the investment bankers understood better than their trusting institutional investor customers), the value of a tranche is a function of two factors: (1) its expected default probability and (2) how that probability varies with the overall return on the market. A tranche whose expected default probability has a high negative correlation with market returns (i.e., it is more likely to default when the market return declines) should command a higher risk premium than one which had a low or no correlation with the return on the overall market. So far, so good.

The problem appears to be that many institutional investors didn't price CDO tranches this way. Rather, they priced them on the basis of their Standard and Poor's or Moody's credit rating, which represents an overall default probability and does not take variation with the market into account. From too many investors' faulty perspective, an AAA rated tranche of a CDO carried the same price as an AAA rated corporate bond. However, as the authors point out, the underlying risk is quite different. The AAA rated corporate represents a combination of company and industry specific (idiosyncratic) risk, along with overall systematic risk tied to the overall market return (e.g., to the health of the economy). In contrast, because the AAA rated CDO tranche is (a) based on a diversified pool of underlying securities and (b) receives first call on those securities' cash flows, in effect all of the risk in holding it is systematic risk. In the author's words, it would only suffer a default in the case of an "economic catastrophe". Coval, Jurek and Stafford then show how equity options could also be used to produce a similar exposure to economic catastrophe – but at a much lower price. In sum, it would appear that AAA rated CDO tranches have repeatedly been purchased by institutional investors at too high a price – potentially creating just the type of "Schiller story change" that signals and indeed helps cause the end of a boom. Time will tell. The only thing we can say with complete confidence is that nobody – perhaps with the exception of certain officials in China – knows for sure when today's many imbalances in the world economy and financial markets will finally unwind. That this will eventually happen, however, seems a high probability bet, as does the view that the initial adjustment will happen quite fast and leave quite a mess in its wake (the disappearance of liquidity in markets with leveraged investment positions is never a pretty combination). After we reach that point, whether events take a cooperative or conflict laden path is even less clear. However, if we had

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to make a bet today, we believe the latter seems the more likely path. Finally, we note that our perception of a rising probability of quite rough water ahead is consistent with the findings of Robert Barro ("Rare Events and the Equity Premium") and Xavier Gabaix ("A Unified Theory of Ten Financial Puzzles"), who point to situations (like today's) with low real interest rates and apparently high equity market risk premiums as indicative of rising investor worries about the possibility of a future economic disaster.

The following table updates our economic early warning indicators through the end of June 2007:

Indicator	Dangerous Trend	Recent Observations
Real Return Bond Yields	Declining (lack of investment relative to savings)	A slight increase in some countries over the last three months, though still unusually low. While global savings as a percent of GDP is about where it was in 1990, forecasts for capital investments outside China are very low.
Yield on Nominal Return Ten Year U.S. Treasury Bond	Rising (increases probability of rising mortgage rates, weakening housing markets, consumer credit problems and economic recession)	Rising.
Oil Prices	Rising and/or at high levels. (Since oil price functions as a tax on consumers, higher prices raise probability of economic slowdown)	Still quite high, which imposes a further drag on demand growth around the world.
U.S. /Euro Exchange Rate	Weakening (should lead to higher U.S. interest rates, and economic slowdown)	Euro is at very strong levels versus the dollar. Also, there is growing evidence of gradual shift of reserves away from dollar and into Euro.

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Indicator	Dangerous Trend	Recent Observations
Domestic Private Demand (consumption and investment) Growth in Japan and Eurozone	Weakening (world growth remains overdependent on U.S. consumer spending)	Has been strengthening in both regions, though not by enough to offset likely reduction in U.S. private consumption.
Private Consumption Spending in China	No Increase (world remains overdependent on U.S. consumers; danger of overinvestment and deflationary pressure in many industries)	While acknowledged as a priority by Chinese leaders, no progress yet.
Political Instability and Increased Repression in China	Increase signifies higher probability of sharp economic slowdown in China and/or higher global tensions	Evidence of growing pressures, though offset by great efforts to contain it at least until the Olympics are past.
Iranian Rhetoric and Actions on Nuclear Issue	Aggressive rhetoric and actions raise probability of dangerously destabilizing military clash between Iran and West.	Uncertain how growing evidence of domestic discontent (e.g., over gas price increases) will affect regime's behavior.
Policy Solutions Gaining Popularity with American Middle Class	Protectionist trade measures and punitive taxes increase likelihood of a longer and deeper economic slowdown	Growing bipartisan support for trade protection legislation aimed at China.
Human-to-Human Transmission of H5N1 Virus, and Associated Mortality Rate	Easier human-to-human transmission without a significant decline in the current mortality rate	Evidence in Indonesia and Egypt of increased transmission rates and Tamiflu resistance, with high mortality rate especially among young people. Transmission rates have not yet risen to pandemic levels.

As we said in December, 2006, our outlook for financial markets in 2007 remains pessimistic. We continue to put our faith in the timeless observation that things that can't continue eventually don't continue. We are already seeing negative changes in political and economic conditions, as well as widening credit spreads, a further weakening of the U.S. Dollar versus the UK Pound, the Euro, the Australian and Canadian Dollars and the Swiss Franc, widening 10 year government bond yield spreads between the U.S. and those countries, more frequent

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rumors of possible funding liquidity issues, and rising volatility levels. In terms of asset class valuations, our current views are summed up in the following table:

Probably Overvalued	Commodities, Corporate Bonds
Likely Overvalued	Commercial Property, Equity Markets
Possibly Overvalued	U.S. and Swiss Government Bonds
Possibly Undervalued	Australian Government Bonds
Likely Undervalued	Equity Volatility. U.K. Government Bonds
Probably Undervalued	Non-U.S. Dollar Bonds; Timber

Asset Allocation and the Limits to Our Knowledge

As frequent readers know, we update our model portfolio weights every two years. These updates take into account not only new estimates of future asset class risks, returns and relationships, but also advances in optimization methodologies and the availability of new products that give investors access to new asset classes (e.g., timber) or uncorrelated alpha strategies (e.g., equity market neutral or currency trading). However, before we embark on that journey yet again, it is critical that readers of our publications (and indeed, all investors) understand how the limits of our knowledge unavoidably constrain the accuracy of our analysis results. Broadly speaking, these limits fall into four areas: (1) our ability to understand and model and investor's utility function; (2) our ability to forecast asset class risks, returns and relationships; (3) our ability to identify and model optimal rebalancing strategies; and (4) our ability to intelligently and efficiently search and test a very large set of asset allocation/rebalancing strategy combinations.

Utility is economics-speak for the amount of satisfaction an investor derives from the distribution of his or her portfolio's returns over time. In general terms, this is a function of the returns earned relative to the risks taken. The challenge lies in understanding, and then modeling, what these terms mean in practice to real investors. For example, how should return be measured? Relative to investment in a risk free asset (which begs the question of how to define said asset – e.g., short term government securities or long-term inflation indexed government bonds that will preserve purchasing power over time)? Relative to another benchmark (e.g., the equally weighted or market capitalization weighted portfolio)? Relative to a liability target (e.g., the compound rate of return needed to accumulate a certain amount of funds by a certain date in the future) or a withdrawal rate target (the internal rate of

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return needed to avoid running out of money and fund a given bequest)? Or simply beating your bragging brother-in-law's performance (but over what time frame)? And how much satisfaction does an investor derive from avoiding regret? For many investors, satisfaction undoubtedly derives from some mix of these factors, and probably others we haven't identified.

However, the understanding and modeling how investors think about returns is undoubtedly much easier than the way they think about risk. In practical terms, the meaning of risk goes far beyond the standard deviation of historical returns that is often used as a proxy for it in asset allocation analyses (see, for example, Paul Slovic's classic paper, "The Perception of Risk"). Let's start with the basic difference between "risk" (where both the possible outcomes and their probabilities are known), "ambiguity" (where outcomes are known, but not their probabilities), and "uncertainty" (where neither all possible outcomes nor their probabilities are known), and the way tolerance for/aversion to each of these varies between people. Then add to that the fact that this tolerance has both cognitive/rational and affective/emotional components (e.g., as Kahneman and Tversky found in their development of "Prospect Theory", losses below a reference point seem to hurt twice as much as gains above it feel good) that researchers have recently begun to find are rooted in basic differences in investors' neurobiology.

Taken together, all these concerns suggest that conceptualizing investor utility in light of just two variables – the mean and standard deviation of the forecast distribution of portfolio returns – as is frequently done in "asset allocation analyses" is extremely naïve. Even if we could successfully meet the other challenges we face, it would still be extremely hard to identify an asset allocation and rebalancing strategy that was optimal for a given investor's utility function (i.e., the factors the contribute to their perception of overall satisfaction). To be sure, some leading edge researchers are moving in this direction (see, for example, "Portfolio Formation With Higher Moments and Plausible Utility" by Cremers, Kritzman and Page), by taking into account a variety of other performance measures (e.g., shortfall probability, maximum drawdown over some period, and the skewness and kurtosis of the distribution of expected portfolio returns). However, effective ways of gauging, for example, regret, ambiguity and uncertainty aversion are still out of reach, as is an easy-to-use way of

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pulling all these concerns together into an investor utility model that can be used to evaluate different asset allocation/rebalancing strategy options.

The second major challenge to our knowledge lies in the development of forecasts for future returns, risk, and dependencies between different asset classes. As noted above, in light of the most likely investor utility functions, limiting these forecasts to average return and its standard deviation is almost certainly suboptimal; higher moments are almost certainly also important to many investors (e.g. "skewness", or whether a distribution is symmetrical around its average, and "kurtosis" or the relative proportion of extreme returns in a distribution). The question thus becomes how best to forecast these variables for different asset classes. Here we face three major issues: using an inaccurate model of the return generating process, inaccurately specifying the value of the parameters in whatever model we are using, and the risk that the underlying return process will change and thereby invalidate our model's assumptions.

The starting point for modeling the return generating process for an asset class usually is a look at its history. For most asset classes, this leads to the observation that the distribution of historical returns is not quite "normal" – that is, it differs from the typical "bell curve." Usually, this difference is slight (causing many analysts to disregard it in the interest of simplifying their modeling challenge), and takes the form of a slight negative asymmetry (i.e., the median return is lower than the average return) and slightly fatter than normal tails (i.e., more extreme returns than in the case of the normal distribution). The challenge then becomes how to model the process that is generating these returns. A variety of approaches have been proposed; the one we prefer is a so-called "regime switching" model, in which a system switches between two states comprised of normal distributions of asset class returns (see, for example, "Volatility Regimes and Global Equity Returns" by Catao and Timmerman). In the first regime, volatility is relatively high, and returns are relatively low; in the other, the opposite holds true. The advantage of this approach is that regime switching can generate the observed historical results; however, there are also considerable challenges to applying this approach in practice. The first the challenge lies in accurately modeling how regime shifts occur (e.g., because of sudden changes in liquidity or investors' perception of the extent of uncertainty that exists) and how long each regime lasts (see, for example, Maheu

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and McCurdy's "How Useful Are Historical Date for Forecasting the Long Run Equity Return Distribution?").

A more fundamental challenge is that in a complex adaptive system, we should not expect the return generating processes for different asset classes to remain stable ("stationary" in statistics speak) over time. Moreover, the ways in which these processes will evolve in the future are highly uncertain (e.g., just because there has been a relatively low proportion of extreme outcomes in a given asset class in the past is no guarantee that this proportion will not increase in the future). Empirical data do not contradict either of these conjectures. There is ample evidence of so-called "structural breaks" in data series, which occur when the underlying return generating process undergoes a fundamental change. Moreover, the dismal long-term track record of active managers versus appropriate index fund benchmarks suggests that it is extremely difficult to successfully identify these breaks, and adapt forecasting models after they occur.

Another issue is how to estimate the relationship between returns on two or more asset classes. The traditional approach has been to use some measure of correlation; indeed, this approach is central to almost all asset allocation models in use today. However, correlation has some widely recognized limitations (e.g., it underestimates the dependence between extreme returns in two or more asset classes when their return distributions are not normal). In addition, it is not constant over time (e.g., in some cases, correlation increases when crises hit, reducing the anticipated diversification benefit just when it is most needed). Over the past two years, interest has grown in using copulas instead of correlation to measure dependence. However, there is controversy about the correct copula to use (see, for example, "Selecting Copulas for Risk Management" by Kole, Koedijk, and Verbeek). In addition, other researchers have found that modeling variation in volatility is more important to minimizing portfolio risk than modeling changes in dependence between asset classes (see, for example, "Dynamic Correlations and Optimal Hedge Ratios" by Bos and Gould). On balance, this is a very interesting area of emerging research that may be a year or so away from easy application to realistic asset allocation problems.

In addition to errors caused by choosing an incorrect model of the return generating process, there are errors caused by placing incorrect values on the parameters in the model or models that are used. If the underlying return generating process for an asset class did not

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change over time, history would be an accurate guide to parameter estimation, assuming that the historical data series contained the full range of results that could be produced by the underlying return generating process (which might not be the case). Unfortunately, that sometimes isn't the case. "Structural breaks" (also known as "non-stationarities") are a regular feature of most historical financial data series (see, for example, "Instability of Return Prediction Models" by Paye and Timmerman). The net result is that model error, parameter estimation error and non-stationarity will almost certainly affect the accuracy of asset allocation analyses that are (unlike the equally weighted portfolio) predicated on the use of accurate forecasts (see, for example, "Estimation Error in the Assessment of Financial Risk Exposure" by Stephen Figlewski). Once again, leading edge researchers are attacking this problem (see, for example, "Bayesian Model Averaging in the Presence of Structural Breaks" by Rarazzolo Paap, van Dijk, and Franses; "Forecast Combinations" by Allan Timmerman, and "Preditive Systems: Living With Imperfect Predictors" by Pastor and Stambaugh). However, the underlying problems are far from solved; for now, we must accept that structural breaks in asset class return generating processes are hard to detect, we can only imperfectly model those processes, and we make errors in estimating the parameters of those models.

A lesser challenge, but still a significant one, is how best to model the rebalancing process, so that it contributes the most to enhancing portfolio returns and minimizing portfolio risk over time. As we have frequently noted, this has been an under-researched area. However, here to, leading edge researchers have been making progress (see, for example, "Portfolio Rebalancing" by Kritzman, Myrgen and Page).

Last but not least, we face the problem of the computational impossibility of using a "brute force" approach to evaluate all possible asset allocation and rebalancing strategy combinations. For example, if you have ten asset classes and allow each to change by one percent, about 4.3 trillion portfolios are possible. And if you are using Monte Carlo simulation (possibly in the form of a regime switching model) to evaluate how each of these portfolio performs over a multi-year time horizon, the dimensions of the problem far outstrip the capabilities of available computing power. What is needed is a combination of techniques for reducing the size of the computational challenge and that enable an analyst to intelligently and efficiently search the reduced but still huge landscape of possibilities to identify and

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prioritize robust asset allocation/rebalancing strategy combinations that are likely to maximize an investor's utility under a wide variety of possible future scenarios. This essence of this search problem has been described as trying to find the highest peak in a very jagged landscape within a fixed period of time, using two techniques: climbing further up the hill or ridge you are on, or taking a "leap" or "long-jump" into another region of the landscape and continuing your search from there. Different software approaches (e.g., scatter/tabu search and evolutionary algorithms) have been developed to attack these types of problems, and they are constantly being improved, in terms of both their search effectiveness and efficiency. Despite these advances, the fundamental asset allocation problem, when modeled realistically, still remains computationally intractable, in the sense that no analyst can ever be sure that his or her solution is truly optimal. The best we can still hope for are strategies that are robust in the face of irreducible uncertainty – that is, strategies that have a high probability of achieving an investor's goals (i.e., utility target) under a wide range of possible future scenarios for asset class returns (for additional reading on these issues, see, for example, "Optimization with Tail Dependencies and Tail Risk: A Copula Based Approach" by Francesco Natale; "Optimal Portfolio Allocation Under Higher Moments" by Jondeau and Rockinger; "International Asset Allocation Under Regime Switching, Skew and Kurtosis Preferences" by Guidolin and Timmerman; and "Mean Variance Versus Full Scale Optimization" by Adler and Kritzman).

In sum, while progress has been made over the past two years, the continuing and significant constraints on our ability to understand and model and investor's utility function; to forecast asset class risks, returns and relationships; to identify and model optimal rebalancing strategies; and to intelligently and efficiently search and test a very large set of asset allocation/rebalancing strategy combinations cause us to approach this year's model portfolio rebalancing with considerable humility. We have done this long enough to be very aware of the limitations of our approach to the asset allocation problem; as we have noted in our writing, when dealing with complex adaptive systems, the best one can hope to attain is a so-called "coarse grained" understanding of how it functions and how its behavior may evolve in the future. We have also stressed that this raises a logical question of what an investor's default allocation should be, and the conditions under which he or she should move away from it. The admonition to diversify one's exposure across as many basic return generating processes seems inarguable, provided those processes have no or weak relationships with each

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other. As we have shown, broadly defined asset classes generally meet this test (see our July 2006 Product and Strategy Note on "Asset Classes and Return Generating Processes").

However, the correct default weights to put on these asset classes remain an unsettled question. We believe that good arguments can be made for equal weighting (which assumes that accurate prediction of asset class risks, returns and relationships is impossible over a time horizon within which an investor could cost efficiently change them) and for market capitalization weighting (which assumes that the cumulative decisions of millions of investors – even if some of those decisions are not independent of each other – will still result in approximately fair asset class valuations).

The conditions under which an investor should move away from these default weightings also seem well established, and can be summarized by "the three Ps." First, an investor's economic position may be different from that of the average investor who holds the default portfolio; for example, he or she might have a much better defined benefit pension, a bigger bequest objective, a larger than average position in residential property, or might work in a job that makes his or her income highly dependent on the performance of a given asset class (e.g., as would be true of a stockbroker). Second, an investor may have different preferences from the average investor, in terms of his or her aversion to risk, ambiguity and/or uncertainty. Third, an investor may have different predictions about future asset class risks, returns and relationships than those held by the average investor, as implied by different asset class weights in the market capitalization weighted global market portfolio. When one or more of the three Ps differs from the average, an investor would logically want to hold a portfolio that differs from the default portfolio. However, there also remains the question of how to implement any movement away from the default portfolio. On the one hand (the one favored by most financial advisers), this can be accomplished by using different weights for different asset classes. On the other hand (the one favored by many finance academics), deviation from the default portfolio's expected risk and return can also be accomplished by combining it either with cash (to reduce expected risk and return) or with leverage (to increase expected risk and return).

As we said at the outset, the cumulative impact of these issues and challenges should generate considerable humility in anyone performing asset allocation analyses, and a willingness to recognize their inescapable limitations. It is deeply unfortunate for investors

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that this is not the impression one gets from either reading the mainstream media or from talking with too many financial advisers.

Going forward, we will continue to use both the equally weighted and market capitalization weighted portfolios as our default allocations and benchmarks (along with the return on cash, which we proxy with a one year government bill purchased on December 31st). We will also continue to base our asset allocation analyses on our core assumptions that relative riskiness across asset classes is more stable over one year horizons than relative returns, and that over the long-term (but not the short-term), the actions of millions of investors will cause return premiums to reflect the relative riskiness of different asset classes. Since our concern is with the achievement of an investor's goals over long time horizons, this basic perspective makes sense. That being said, we will continue to use our monthly asset class valuation update and quarterly economic updates to highlight emerging overvaluations (and therefore heightened risk of a substantial short-term negative returns) to evaluate the evidence in favor of short-term deviations from our long-term asset class weightings in our different model portfolios. Going forward, we hope to make our thinking in this area more rigorous by adopting a more explicitly Bayesian approach – i.e., using recent data to update our prior views, and comparing them to views implicit in current asset class weights in the global market portfolio.

Other issues we have described in this article present us with greater challenges. This year we will enhance our regime switching modeling methodology (which includes a high volatility/low return and low volatility/high return regime, with normally distributed asset class returns within each regime). We see this as the easiest way to model return generating processes that produce the "not quite normal" distributions of returns observed in the empirical data. How best to model the relationships between returns on different asset classes under different regimes remains a challenge. As noted above, the copula approach is promising, but still faces many methodology questions. Consequently, we will continue to utilize correlation to measure asset class return relationships, but recognize that correlations change with regimes. Finally, we will incorporate a wider range of rebalancing strategies in our models, as well as advances in landscape search algorithms. However, we continue to stress that, at best, all these changes will provide us with at best only a slightly less "coarse grained view" of the asset allocation problem, which we hope will provide slightly better –

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but still very far from perfect – solutions. As we noted at the outset, the longer we study and perform asset allocation analyses, the more humble about the process we become – as we hope you do too.

Product and Strategy Notes

Sovereign Wealth Funds

A lot of ink has been spilled recently on the subject of so-called "sovereign wealth funds." Traditionally, countries accumulating foreign exchange reserves invested them in low risk and very liquid government securities – e.g., U.S. Treasury and Agency bills, notes and bonds. However, as the size of some countries' reserves have grown to levels well in excess of any conceivable precautionary needs, they have established new vehicles (Sovereign Wealth Funds) to invest in a wider variety of asset classes to earn higher long-term returns. Norway was among the first nations to take this approach when its North Sea oil revenues rose; a number of Persian Gulf oil exporters have also gone this route (e.g., the Kuwait Investment Office). However, it seems that the announcement that China would also take this approach (via the launch of the China Investment Corporation) set of a new wave of analyses of SWFs' likely impact on the financial markets. By far the best of these was produced by Morgan Stanley. They estimate that, in future years, the shift of foreign exchange reserves out of government bonds and into other asset classes could push up average yields on the former by 30 to 40 basis points, while reducing the equity risk premium by 80 to 110 basis points – a not insignificant amount if you believe, as we do, that the best estimate of the ex-ante ERP (what investors expect to receive, as opposed to the ex-post return they actually realize) is between 3.5% and 4.0%.

Alternative Beta Funds

In Molière's "Bourgeois Gentilhomme," Monsieur Jourdain was surprised to discover he had been speaking prose all his life. We have had a similar reaction to some recent articles on the "new concept" of "alternative beta" funds that claim to replicate (at least to some degree) the "higher returns, lower risk" results claimed by many hedge fund sponsors through the use of investments in "non-traditional" asset classes. Reduced to its essence the main message

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some of the marketing literature is that a portfolio that includes more asset classes than domestic debt and equity can deliver a superior risk/return profile. And here we were thinking that for the past ten years all we had been doing was advocating the advantages of allocating investments across a wide range of broadly defined asset classes. If we'd only know how avant-garde we were!

Unfortunately, but perhaps predictably, the pitches for these "new" products leave out a critical point – the distinctions between passive and active management, and correlated and uncorrelated returns. As we have frequently noted, the returns between broadly defined asset classes will on average be relatively low – say, .6 or less (although this will vary over market cycles and regimes). Diversifying a portfolio across these asset classes will therefore reduce risk (usually by quite a bit compared to the strawman domestic bonds and equities benchmark so beloved by many fund sponsors). This diversification can be accomplished very cheaply through the use of the index products that are available across a growing number of asset classes (or, in their absence, through the use of actively managed investments like timber REITs). So far, so good.

It may (and we emphasize the may) be possible to further improve the risk/return performance of this well diversified passive portfolio by adding to it selective actively managed investments whose returns have a low correlation with the returns on the broadly defined asset classes. Collectively, these investments are often referred to as "uncorrelated alpha strategies." A small number of uncorrelated alpha strategies are available to retail investors. Most of them are so-called "equity market neutral" strategies that take long and short positions in different companies based on their expected future performance while hedging away the broad market risk, leaving only uncorrelated company-specific risk and returns. There are also a few other uncorrelated alpha strategies available to retail investors, for example, those based on foreign exchange trading.

"Uncorrelated alpha strategy" is not synonymous with "hedge fund". Some hedge funds are indeed uncorrelated alpha strategies, but some are really "alternative beta" strategies that have quite high correlations with the returns on one or more broad asset classes (for which you pay a much higher price than going the mix of low cost index fund route). So why might a rational investor be willing to pay these high fees (we'll leave aside the irrational reasons one might pay them)? The starting point here is the shape of the distribution of

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historical returns on most broadly defined asset classes. They are nearly normal (i.e., bell curve shaped). Technically, many are Student's T distributions, with slightly fatter "tails" (i.e., a greater proportion of extreme events) than the normal distribution. In contrast, the shape of the historical (and, presumably, expected future) distribution of most hedge fund returns is decidedly non-normal, due to the trading strategies they employ and their use of derivative instruments like options and futures. For example, a hedge fund that writes (sells) options on extreme events (i.e., provides insurance against severe financial market events) should earn steady, low risk returns under a wide variety of market conditions, unless the disaster scenario occurs.

Today, the cutting edge of the debate over replicating hedge fund returns at a much lower cost to investors is not about "alternative beta." Rather, it is about creating low cost products whose expected distribution of future returns approximate those of much higher priced "traditional" hedge funds. Broadly speaking, three approaches have been proposed: factor models, trading rules, and direct distribution replication. Factor models use long and short positions in a limited number different traded instruments (e.g. going long a value stock index and short a growth stock index) to replicate the return distribution of a given type of hedge fund. Essentially, it is an exercise in finding the best regression model to explain historical hedge fund returns, and hoping it continues to work in the future. Trading rules are just that: automatic mechanical instructions to buy this and sell that if a given set of conditions occurs that attempt to copy the dynamic trading strategy of a hedge fund manager. The underlying statistics used to discover these rules can be much more challenging than regression. Perhaps the most controversial approach is the use of options and futures trading rules to create an expected distribution of returns that has a particular shape (e.g., mean, standard deviation, skewness and kurtosis) and sometimes low correlations with returns on one or more broad asset classes. Again, the underlying statistics are daunting.

As noted above, this is the cutting edge of the debate. Some have argued that the products now coming to market (which are still more expensive than "do-it-yourself alternative beta with a bit of uncorrelated alpha") fall well short of what a "real hedge fund" should produce. Others claim these new products are the best thing since sliced bread, and will expose the extent to which "real hedge fund" managers have overcharged their investors. Time will tell which of these opinions accumulates the most supporting evidence. In the

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meantime, if you want to read more about this subject, we recommend the following three papers: "Alternative Routes to Hedge Fund Return Replication" by Harry Kat; "Thoughts on Hedge Fund Return Replication" by Northwater Capital Management, and the soon to be published "The Myths and Limits of Passive Hedge Fund Replication" by Amenc, Gehin, Martellini, and Meyfredi.

Don't Miss This New Paper on Commodities

In our past writing about commodities, we have noted the controversy over the nature of the underlying return generating process. In their new paper, "The Fundamentals of Commodity Futures Returns", Gorton, Hayashi and Rouwenhorst significantly increase our understanding of this asset class. The starting point for their analysis is the Theory of Storage. The authors note that "this theory provides a link between the term structure of futures prices and the level of inventories of commodities. This link, also known as 'cost of carry arbitrage', predicts that in order to induce storage, futures prices and expected spot prices of commodities have to rise sufficiently over time to compensate inventory holders for the costs associated with storage." The authors summarize previous research findings in this area, which predict "a link between the level of inventories and future spot price volatility, since inventories act as buffer stocks which can be used to absorb shocks to demand and supply, thus dampening the impact on spot prices…At low inventories, the risk of a stock-out increases and expected future spot price volatility rises." Gorton, Hayashi and Rouwenhorst extend these previous analyses by allowing for a link between the level of inventories and a risk premium embedded in futures prices. "Given that futures contracts provide insurance against price volatility, the level of inventories is negatively related to the required risk premium on commodity futures." Using a new data set covering 31 commodities between 1996 and 2006, the authors test this hypothesis and find that, as predicted, "low inventory levels for a commodity are associated with a backwardated term structure of futures prices [where futures prices are lower than spot prices], while high levels of inventories are associated with a contangoed term structure [where futures prices are higher than spot prices]." The authors also find that "the shape of the futures curve is non-linear; the slope becomes steeper as inventories decline."

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Up to now, the expected return on commodity index products that are based on baskets of futures contracts has been shown to be comprised of three main parts: (1) the return earned on collateral securities, like government bonds (since futures contracts are bought on margin); (2) the so-called "roll return", which comes from selling maturing futures contracts and purchasing new ones (when futures prices are backwardated – i.e., when the longest dated futures are priced below the current spot price – roll returns are positive); and (3) unexpected changes in spot prices (which, in theory, should net out to zero over time). Gorton, Hayashi and Rouwenhorst have now shown that the roll return really amounts to "compensation earned for bearing risk during times when commodity inventories are low." Finally, this paper's findings may lead to a reexamination of the structure of commodity index funds, and either some adjustment to their weighting rules (e.g., making them more dynamic and related to inventory levels) or the introduction of new quantitative funds that take this approach.

Two New Papers on Sustainable Portfolio Withdrawal Rates

For retired investors, the question of how to decumulate their assets over time to provide income is central to their standard of living and quality of life. That is why we are avid readers of the increasing number of research papers that are (finally) being published on this issue. Unfortunately, the results so far have brought both good and bad news. The good news is that our understanding of withdrawal strategies is gradually growing; the bad news is that most of these papers are based on an unrealistically narrow assumption that a retiree's financial portfolio is invested only in domestic bonds, equity and cash. For example, in "Sustainable Retirement Income for the Socialite, the Gardener, and the Unhealthy", Robinson and Tahani of York University (a side note: Canada seems to be the leader in producing decumulation research) present a very interesting model that varies not only annual portfolio returns, but also the annual rate of consumption and the date of death. They conclude that, at best, a 6% withdrawal rate is the maximum sustainable given realistic limits on a retiree's tolerance for the risk of running out of money. However, in all their analyses, the authors assume an average portfolio return of 4% with a standard deviation of 14%, without describing the underlying asset allocation or rebalancing rule, or considering how their analysis would be different if these were allowed to vary.

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Similarly, in "Optimal Retirement Asset Decumulation Strategies: The Impact of Housing Wealth", Sun, Triest, and Webb compare two different approaches to tapping housing wealth in retirement: taking a reverse mortgage and a home equity line of credit. They conclude that the former is substantially superior, but speculate that the use of reverse mortgages may suffer from the same factors that cause many retirees to avoid investing in annuities to provide income. The authors also find that when a reverse mortgage is added to a portfolio of domestic bonds and stock, it tends to displace the former rather than the latter. However, we are once again left with the question of how these conclusions would change had a broader and more realistic mix of asset classes been used in the financial portfolio.

In sum, both of these studies make interesting reading, particularly for financial advisers. But both also suffer from shortcomings; we have yet to read a definitive academic analysis of the decumulation problem with all of its many elements taken into account.

2006-2007 Model Portfolios Year-to-Date Nominal Returns

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

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

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

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

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

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

We use two benchmarks to measure the performance of our model portfolios. The first is cash, which we define as the yield on a one year government security purchased on the last trading day of the previous year. For 2007, our U.S. cash benchmark is 5.00% (in nominal terms). The second benchmark we use is a portfolio equally allocated between the ten asset classes we use (it does not include equity market neutral). This portfolio assumes that an investor believes it is not possible to forecast the risk or return of any asset class. While we disagree with that assumption, it is an intellectually honest benchmark for our model portfolios' results.

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

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