The Index Investor

Invest Wisely…Get an Impartial Second Opinion.

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This Month's Issue: Key Points

This month's first feature article asks if timber as an asset class is overvalued today. We conclude that it is not. Our second feature examines sector (and sub-sector) index products, which have been rapidly growing in popularity. We review the three main reasons an investor might logically want to own them instead of or in addition to a broad equity market index. First, an investor might have a different position than the market – for example, she might already be heavily exposed to one sector in the form of restricted stock in her company. Second, an investor might have different risk preferences, and want to use sector funds to alter the risk and return parameters of his exposure to the equity market. We note that adjusting one's exposure to different asset classes, rather than taking different tilts within a single asset class is a better way to align one's portfolio with one's risk preferences. Finally, the most popular reason for investing in sector and sub-sector funds seems to be that investors have a forecast for one or more sectors that is different from the consensus forecast implied by current market prices. We review the two underlying types of forecast that might be at work: one based on the fundamental valuation of the sector, and the other that tries to anticipate the future behavior of other investors.   We conclude that in the United States, fundamental analysis indicates that many sectors are overvalued today. This conclusion draws further support from

the large short positions in many sector ETFs. It would thus appear that the continuing inflows into sector funds that we observe must be based on momentum, and its implict forecast for the future behavior of other investors. We caution that history teaches that momentum investing often ends in tears.

Our product and strategy notes deal with a range of issues. We review a new ETF launched in Europe that tracks the Reuters Jeffries Commodity Research Bureau Index. We conclude that the index closely resembles the Dow Jones AIG Commodity Index that we prefer.   In our letters section, we review another commodity index, from Mount Lucas Management. We conclude that it bears little resemblance to long-only commodity indexes; rather it tracks the performance of an active momentum based strategy that utilizes commodity, interest rate and currency futures. Another product and strategy note examines the arguments for and against investing in the new "public private equity fund" recently launched in Europe by KKR. We remain skeptics. We also review two very interesting new papers. The first is from the Bank for International Settlements. It reviews the development of the current global asset bubble, is historical analogues, and its likely outcome. We believe it is destined to become a classic. The second paper is by Professor Martin Weitzman of Harvard. Similar to Professor Robert Barro's recent paper, it concludes that the existence of a high equity risk premium and low yield on risk free real return government bonds is not a puzzle. Rather, it (along with equity's fat-tailed distribution of returns) is easily explained by investors' uncertainty about the complex adaptive process that generates equity returns. In this sense, Weitzman provides a theoretical justification for something market practitioners have long understood: changes in the level of uncertainty felt by investors (which, unlike risk, cannot be easily quantified) have a major impact on equity returns. In light of this, our last product and strategy note looks at a timely new asset allocation software package from Windham Capital Management, that allows users to use non-normal asset class returns, and to specify risk under both stable and turbulent market conditions. We note that had it been available a few years ago, it would have saved us weeks of model building!

A Note from Our Publisher

This month, we are making a number of important changes to *The Index Investor*. In the subscriber's section of our website, we have added pull-down menus (see Members' button titled "Generate a Model Portfolio" that make it easy to identify model portfolio solutions that correspond to different combinations of accumulation goal, savings rate and time horizon. This feature has proven to be very popular with subscribers to Retired Investor, and we hope that you will too.   We have also added the article search feature that many of you have asked for. In the free section of our site, we will also be adding this month another pull-down feature that enables one to identify the accumulation goal that corresponds to different combinations of target portfolio income (i.e., real withdrawal rate), target bequest, and expected years to be spent in retirement. We will also shortly be adding a community section where our subscribers can exchange their insights, and free podcasts to introduce people to our offerings. Also, as the technical changes we have made are quite extensive, there may be bugs we still have to iron out. If you come across any, please let us know so we can address the issue quickly.

Finally, and sadly, I regret to have to tell you that we are also going to start using cookies to limit the number of times a pdf version of our journals can be downloaded by a single user account. Unfortunately, the "sharing" of account information (and the associated rise in downloads) has reached an unacceptable level. While we appreciate the vote of confidence in our content quality that this represents, we are a small company and the costs of piracy really hurt us. If this new policy causes you any problems with your downloads, please contact customer service, and we will fix it straight away. Please also note, we do provide discounts for volume subscriptions. As always, if you have any further suggestions for how we can continue to increase our value to you, please don't hesitate to get in touch.

Best regards,

Susan Miller

This Month's Letters to the Editor

I'm a new subscriber, and am somewhat confused by your views on indexing versus active management. You really don't seem to be in one camp or the other. Could you please explain?

As we like to say, experience has taught us not to be ideologues when it comes to this debate. As a practical matter, our base case view is that, for long-term investors, indexing makes the most sense. Successful active management ultimately comes down to successful forecasting. In turn, this depends on having access to superior private information about a security or asset class, and/or using a superior model to analyze publicly available information. Over a long-period of time, superior sources of private information are hard to sustain, and models lose their effectiveness due to either copying by competitors or changes in the economy that invalidate their assumptions. This is why, as the length of time is extended, a geometrically smaller proportion of active managers have been able to outperform the relevant index fund. There is a reason people like Warren Buffett are so well known: their skills are incredibly rare.

However, there are four important exceptions to our general rule that, for investors with a long time horizon, indexing makes the most sense.

The first exception is that, over the course of an investing lifetime, almost everyone will come into possession of superior private (which is different from illegal) information, that creates the opportunity for an active management success. For example, an investor may be aware of different developments in her industry that lead her to conclude that the market as a whole is underestimating its future growth rate, which should soon accelerate. In this case, she might allocate a portion of her portfolio to an exchange traded fund that tracks the industry, and watch its returns outperform the overall market index over the next year. Of course, this also raises the point that successful active management also requires knowing when to sell, realize one's profits, and reinvest them back into index funds. In essence, two forecasts are involved: one that says it is time to buy, and one that says it is time to sell. Active opportunities like the one just described don't happen very often for most people. In addition, if your superior information is limited to developments at your own company about which the public is unaware, you run the risk of committing the crime of insider trading if you trade your company's shares rather than a broader ETF.

The second exception is one we have frequently written about: bubbles, or, more technically, situations in which one or more asset classes appear extremely overvalued. When these situations occur, and when the asset class in question is well above its target weight in your portfolio, prudent risk management demands that you make an active management decision to reduce your allocation to well-below its target weight. The purpose of our Asset Class Valuation Update section is to help investors make these decisions.

The third exception to our preference for indexing is an asset class (e.g., timber, or, in some regions, foreign currency bonds) where no indexed investment vehicle is yet available.

The fourth exception is the most challenging. We know that in hindsight, it is possible to identify rare human beings like Warren Buffett who are truly skilled active managers. But hindsight is not foresight. We also know that it is next-to-impossible to identify tomorrow's Warren Buffett with any confidence (in the statistical sense of a significant T-Ratio test). Under these difficult circumstances, an investor might still rationally choose to allocate a portion of his portfolio to actively managed funds, based on his subjective evaluation of an active manager's skills. Such evaluations are inherently uncertain, since superior past performance, in most asset classes, has been shown to be of no use in predicting future superior performance (though private equity has, in the past, been an exception to this rule). In our experience, there are a number of questions one should ask when evaluating an active manager. The first is simply whether you trust him or her. Does he or she inspire confidence and a sense of integrity? If not, don't even bother asking the other questions. Second, ask them to explain the theory that supports their belief that they can deliver positive active returns (i.e., returns above a comparable index fund, after costs and taxes) in the future. Third, ask the active manager to describe the obstacles that will prevent his or her approach from being copied by others in the future, and how long these obstacles will remain effective (note: the correct answer is not "forever". If the strategy's returns are attractive, competitors will inevitably overcome the obstacles to copying it). Fourth, have the manager describe how his or her theory is implemented in a disciplined investment process. Fifth, check to see that the manager's portfolio holdings reflect his or her active investment theory (any mismatch between the theory and the portfolio holdings is a red warning flag). Finally, check to see that the active manager's approach has actually delivered superior returns in the past.

In our view, any portfolio allocations made to active management strategies should logically be focused on funds that attempt to deliver returns that are uncorrelated with the returns that can be earned simply by investing in much cheaper asset class index funds. Technically, these are active funds whose objective is to produce "uncorrelated alpha." In contrast, traditional actively managed funds (which make up the majority offered to investors today) deliver a mix of overall asset class returns (technically known as "beta") and alpha. However, an investor can obtain the asset class returns more cheaply by buying an index fund. He or she therefore should only pay higher fees for returns that are not only above those on index funds, but also uncorrelated with them (because such returns add the most diversification benefit to a portfolio).

Our target return model portfolios with equity market neutral funds use this approach. They allow for an allocation of up to ten percent of the portfolio's assets to investments in equity market neutral funds whose objective is to deliver uncorrelated alpha through superior security selection. As we have discussed in our writing, another approach would be to use so-called "global macro" funds, which attempt to deliver alpha by shifting investment allocations to different asset classes over time. Research has shown that equity market neutral and global macro strategies add the most diversification benefits to an index fund portfolio that is broadly diversified across a range of asset classes.

In sum, we are definitely not rigid ideologues in the indexing versus active management debate. Rather, our objective is to highlight how each approach can best be used by an investor to achieve his or her long-term goals.

Is this a good time to be using stop-loss orders to hedge downside portfolio risk?

We should start by clarify some terminology. A limit order is one that triggers an action (either a buy or a sell) when the market price reaches a certain threshold. Conceptually, there are two types of "limit sells." The first, a so-called "stop-loss" order, triggers a sale when the market price has reached some level below the price at which an asset was purchased. The second is a so-called "take-profit" order, which triggers a sale when the market price passes some level above the price at which an asset was purchased. Both types of limit sell are risk management tools. The stop-loss prevents the accumulation of unrealized losses on an asset, while the

"take-profit" limits the risk of staying with an asset after its price rises above one's assessment of full (fair) valuation, and in so doing taking a loss (or at least a smaller gain) when this momentum is eventually reversed (i.e., when the "bubble pops.").

To put it in psychological terms, a stop-loss order protects an investor against the confirmation bias, which is the tendency to give more weight to information that confirms our views (e.g. about the fair value of an asset) than to discordant views. A take-profit protects an investor against excessive optimism.   More crudely, one could describe these two psychological risks as insufficient fear and excessive greed.

However, I should also note that recent academic studies have found that, to some extent, limit-sell orders have an aspect of "self-fulfilling prophecy" about them. It turns out that take-profit orders tend to cluster around round price numbers, while stop-loss orders cluster just beyond them. When these limits are hit, the spike in selling they trigger can cause liquidity to disappear from the market (e.g., dealers widen their bid/ask spreads and reduce the maximum order size they will accept at their posted prices). The spike in sales and reduced liquidity then accentuate the fall in price, raising the probability that more limits will be hit, and a cascade (e.g., a run for the exits) will develop.

From an individual investor's point of view, stop-loss orders raise a number of issues. All investors should start with the fundamental assumptions that markets will naturally rise and fall, that a higher frequency of extreme (in percentage terms) price changes will be found a shorter time horizons (e.g, daily) than longer ones (e.g., quarterly), and that forecasting fair asset value, and the behavior of other investors (and hence asset price fluctuations) is very difficult to do consistently well. Given this, the challenge in using stop-loss orders as a risk management tool is twofold: (1) how to set stop prices sufficiently low to avoid excessive transaction costs due to their being triggered by intra-day price changes that balance out at longer (say, monthly) time horizons, and (2) how to accurately forecast when it is time to get back into an asset class once a stop-loss sale has been triggered.

Neither of these challenges has an easy answer. For that reason, many investors, particularly those with longer time horizons, avoid the use of stop-loss orders and depend on a well-diversified portfolio to limit their exposure to risk. However, as we have written, there is a major exception to this rule: situations in which an asset class appears to be substantially overvalued. In our writing, we have stressed two important points in this regard. The first is

that in financial markets that function as complex adaptive systems, such substantial overvaluations should be expected to occur from time to time. The second is that it is extremely difficult to forecast when they will reverse (e.g., think back to the development of the technology bubble at the end of the 1990s, and all the people who said in 1998 that "this can't last").

As we have noted in our writing, one way to deal with this type of situation is to rebalance one's portfolio so that the actual weight of the overvalued asset class is below its target weight. However, this does not address the options facing an investor who wants to capture as much of the upside bubble return as possible, while limiting his or her potential downside risk. This investor basically has two choices. He or she can buy put options on the asset in question, if they are available, or enter an out-of-the-money stop loss order. Again, the trade-off here isn't easy. Put options require the payment of an option premium, which can become expensive unless the strike price is well out of the money (i.e., unless it exposes the investor to substantial loss before it pays off). Moreover, as anyone who bought put options on the U.S. equity market in 1998 can tell you, premiums add up -- you can be right without necessarily being profitable!

While stop-loss orders involve no premiums, there remains the challenge of knowing where to set the price. As previously noted, at daily time horizons, there are (in percentage terms) more extreme price changes than there are at longer horizons. Hence, a stop-loss runs a significant chance of being triggered unless it is relatively far below the current price. On the other hand, a stop-loss set this low runs the risk of being caught up in a "disappearing liquidity" cascade, that can cause a substantial fall in the market price of an asset below the stop-loss price before the order in question is fully executed (just ask anybody who was on a trading desk in October, 1987). In other words, because of the risk of disappearing liquidity in a falling market, an investor may still realize substantial losses even in the presence of a stop-loss order, if that order's price is set significantly below the current market price. This argues for gradually adjusting a stop-loss order upwards towards the current market price as the perceived overvaluation of an asset grows larger. In sum, there are no easy answers to the question you pose. On the other hand, we hope this reply will help you to think through the decision you face

Is there a contradiction between your February issue, which concludes that commodities may be overvalued, and your March issue, which contemplates overweighting them (among other asset classes) to hedge against the potential impact of a severe downturn in the global economy?

We agree that they appear to be in conflict, for which we apologize. To make a long story short, the two articles were written with different time frames and different indexes in mind when it comes to commodities. So, to clarify, in the short term, we believe that at a chaotic unwinding of today's global economic imbalances would most likely (absent a major supply disruption) trigger a fall in expected global economic growth and hence a fall in the price of those commodities (like energy and industrial metals) that are most overvalued today. Hence, commodity index funds that are heavily weighted towards energy (e.g., those that track the Goldman Sachs Commodities Index) would be most exposed to this correction. That was the basis for our February conclusion.

That being said, we have also noted that we believe that this downward price move will be less severe for commodity funds that track more broadly diversified commodities indexes with less energy exposure, like the Dow Jones AIG Commodities Index (which is the one we prefer to use when implementing our model portfolios' asset allocations). Moreover, in the medium term, if the global downturn triggers widespread deflation, then we also expect to see a coordinated attempt by more than one central bank to sharply expand the money supply and reflate the world economy (repeating the Japanese experience). Under these conditions, the price of real assets, including commodities, should rise. This was the basis for our March conclusion. Again, we apologize for any confusion this caused, and will redouble our efforts in the future to clearly describe the assumptions and logic underlying our conclusions.

What is the MLM Commodity Index?

The MLM Index was launched in 1988 by Mount Lucas Management of Princeton, New Jersey. It is based on a quantitative trend following (momentum) strategy, applied to an equally weighted mix of energy, metals, agricultural, interest rate and currency futures contracts. Mount Lucas Management revises the number of contracts traded each year; the

companies last 10-K report (filed with the U.S. Securities and Exchange Commission) showed that it was using 22 different contracts. The trend following strategy causes the index to take both long and short positions in these futures contracts.   In this sense, the MLM Index is not a true "passive strategy"; it very clearly has an underlying active component. Rather, we prefer to view it as one of a number of benchmarks against which the performance of other "Commodity Trading Advisors" (essentially, firms that actively trade futures contracts) can be measured. From a different perspective, the dynamics of the MLM Index are very different from those of long-only passive commodities indices like the Goldman Sachs Commodities Index or the Dow Jones AIG Commodities Index.   For example, in 2005, both of the latter delivered higher returns than the 3.75% (in US Dollars) on the MLM Index. Like many commodity trading advisors, the MLM Index suffered from the lack of strong trends in many commodities futures market. However, that being said, over a longer period the MLM's performance looks better, in particular because of its lower volatility compared to the GSCI and DJAIG. However, its low correlation versus both of these indices also shows it is a very different product – an active trading strategy (like a hedge fund) rather than an asset class. There are, as yet no publicly traded funds in the U.S. that track the MLM Index (though there is a privately placed fund that is available through some financial advisors). Outside the United States, SEI Canada offers a public fund that tracks the MLM.

Does the rising price of gold suggest the need to tilt one's commodity exposure in that direction?

First, well-diversified commodity indexes already include an allocation to gold futures (e.g., 6.22% in the Dow Jones AIG Commodity Index, and 2.10% of the Goldman Sachs Commodities Index). The question, therefore, is whether to increase these relative weights by investing in a gold ETF. We continue to believe that the medium term case for making an additional allocation to gold is fundamentally based on one's perception of the relative importance of its role as a store of value during periods of great monetary instability, including both deflation and inflation. Since current global economic conditions have increased the probability that one, and perhaps both of these conditions will occur in the future (e.g., a sharp economic slowdown that triggers deflation, followed by a concerted attempt to reflate the

global economy), the case for holding gold has undoubtedly strengthened. That being said, we have found no way to relate the strength of that case to the fairness of the current gold price, which appears to be drive as much by momentum as by fundamental valuation logic. Moreover, if one assumes that periods of great monetary instability may also put the functioning of financial markets at risk, then we continue to argue that holding a small amount of physical gold (e.g., coins in a safe deposit box) makes more sense than an ETF backed by gold bullion. Nevertheless, we recognize that many people might prefer the latter because it is a less complicated approach.

Global Asset Class Returns

YTD 28Apr06	In USD	In AUD	In CAD	In EURO	In JPY	In GBP	In CHF	In INR
Asset Held								
US Bonds	-1.00%	-4.61%	-5.00%	-7.55%	-4.59%	-7.00%	-6.83%	-1.32%
US Prop.	10.60%	6.99%	6.60%	4.05%	7.01%	4.60%	4.77%	10.28%
US Equity	6.50%	2.89%	2.50%	-0.05%	2.91%	0.50%	0.67%	6.18%
AUS Bonds	-0.93%	-4.54%	-4.93%	-7.48%	-4.51%	-6.93%	-6.75%	-1.24%
AUS Prop.	5.62%	2.01%	1.62%	-0.93%	2.04%	-0.38%	-0.20%	5.31%
AUS Equity	16.64%	13.03%	12.64%	10.09%	13.05%	10.64%	10.81%	16.32%
CAN Bonds	2.28%	-1.33%	-1.72%	-4.27%	-1.31%	-3.72%	-3.55%	1.96%
CAN Prop.	6.63%	3.02%	2.63%	0.08%	3.05%	0.63%	0.81%	6.32%
CAN Equity	13.52%	9.90%	9.52%	6.96%	9.93%	7.51%	7.69%	13.20%
Euro Bonds	4.15%	0.54%	0.15%	-2.40%	0.56%	-1.85%	-1.68%	3.83%
Euro Prop.	25.18%	21.57%	21.18%	18.63%	21.60%	19.18%	19.35%	24.87%
Euro Equity	17.26%	13.64%	13.26%	10.70%	13.67%	11.25%	11.43%	16.94%
Japan Bonds	1.44%	-2.17%	-2.56%	-5.11%	-2.15%	-4.56%	-4.39%	1.12%
Japan Prop.	8.48%	4.87%	4.48%	1.93%	4.89%	2.48%	2.65%	8.16%
Japan Equity	9.47%	5.85%	5.47%	2.91%	5.88%	3.46%	3.64%	9.15%
UK Bonds	3.80%	0.19%	-0.20%	-2.75%	0.21%	-2.20%	-2.03%	3.48%
UK Prop.	19.54%	15.93%	15.54%	12.99%	15.95%	13.54%	13.71%	19.22%
UK Equity	15.45%	11.83%	11.45%	8.89%	11.86%	9.44%	9.62%	15.13%
World Bonds	1.30%	-2.31%	-2.70%	-5.25%	-2.29%	-4.70%	-4.53%	0.98%
World Prop.	12.70%	9.09%	8.70%	6.15%	9.11%	6.70%	6.87%	12.38%
World Equity	10.80%	7.19%	6.80%	4.25%	7.21%	4.80%	4.97%	10.48%
Commodities	0.50%	-3.11%	-3.50%	-6.05%	-3.09%	-5.50%	-5.33%	0.18%
Timber	2.60%	-1.01%	-1.40%	-3.95%	-0.98%	-3.40%	-3.22%	2.29%
EqMktNeutral	3.93%	0.31%	-0.07%	-2.63%	0.34%	-2.08%	-1.90%	3.61%
Volatility	-3.98%	-7.59%	-7.98%	-10.53%	-7.56%	-9.98%	-9.80%	-4.29%
Currency								
AUD	3.61%	0.00%	-0.39%	-2.94%	0.03%	-2.39%	-2.21%	3.30%
CAD	4.00%	0.39%	0.00%	-2.55%	0.41%	-2.00%	-1.83%	3.68%
EUR	6.55%	2.94%	2.55%	0.00%	2.97%	0.55%	0.73%	6.24%
JPY	3.59%	-0.03%	-0.41%	-2.97%	0.00%	-2.42%	-2.24%	3.27%
GBP	6.00%	2.39%	2.00%	-0.55%	2.42%	0.00%	0.18%	5.69%
USD	0.00%	-3.61%	-4.00%	-6.55%	-3.59%	-6.00%	-5.83%	-0.32%
CHF	5.83%	2.21%	1.83%	-0.73%	2.24%	-0.18%	0.00%	5.51%
INR	0.32%	-3.30%	-3.68%	-6.24%	-3.27%	-5.69%	-5.51%	0.00%

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, which is equal to either 1% or 2%. Third, we use two different values for the equity risk premium required by investors: 2.5% and 4.0%. Different combinations of these variables yield high and low scenarios for both the future returns the market is expected to supply, and the future returns investors will demand. 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:

Australia	**Low Demanded Return**	**High Demanded Return**
High Supplied Return	80%	119%
Low Supplied Return	123%	169%

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Canada	**Low Demanded Return**	**High Demanded Return**
High Supplied Return	79%	132%
Low Supplied Return	140%	206%

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Eurozone	**Low Demanded Return**	**High Demanded Return**
High Supplied Return	80%	131%
Low Supplied Return	139%	201%

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Japan	**Low Demanded Return**	**High Demanded Return**
High Supplied Return	100%	205%
Low Supplied Return	267%	432%

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United Kingdom	**Low Demanded Return**	**High Demanded Return**
High Supplied Return	55%	97%
Low Supplied Return	97%	147%

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United States	**Low Demanded Return**	**High Demanded Return**
High Supplied Return	128%	195%
Low Supplied Return	225%	313%

Switzerland	**Low Demanded Return**	**High Demanded Return**
High Supplied Return	87%	155%
Low Supplied Return	174%	257%

India	**Low Demanded Return**	**High Demanded Return**
High Supplied Return	70%	148%
Low Supplied Return	168%	276%

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:

	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	2.53%	2.96%	5.49%	5.70%	0.21%	-1.94%
Canada	1.72%	2.40%	4.12%	4.49%	0.37%	-3.49%
Eurozone	1.87%	2.37%	4.24%	3.94%	-0.30%	2.88%
Japan	0.93%	0.77%	1.70%	1.93%	0.24%	-2.28%
UK	1.45%	3.17%	4.62%	4.65%	0.03%	-0.25%
USA	2.37%	2.93%	5.30%	5.08%	-0.22%	2.08%
Switz.	1.41%	2.03%	3.44%	2.71%	-0.73%	7.34%
India	1.85%	7.57%	9.42%	7.35%	-2.07%	21.04%

*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%. Were we to use this rate, bond markets would generally look even more overvalued. It 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.

Second, this analysis looks only at ten-year government bonds. The relative valuation of non-government bond markets is also affected by the extent to which their respective credit spreads (that is, the difference in yield between an investment grade or high yield corporate bond and a government bond of comparable maturity) are above or below their historical averages (with below average credit spreads indicating potential overvaluation). Today, in many markets credit spreads are at the low end of their historical ranges, which would make non-government bonds appear even more overvalued.

Third, 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.

Finally, 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. 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. This information is summarized in the following table:

Annual Exchange Rate Changes Implied by Bond Market Yields

	To AUD	To CAD	To EUR	To JPY	To GBP	To USD	To CHF	To INR
From								
AUD	0.00%	-1.21%	-1.76%	-3.77%	-1.05%	-0.62%	-2.99%	1.65%
CAD	1.21%	0.00%	-0.55%	-2.56%	0.16%	0.59%	-1.78%	2.86%
EUR	1.76%	0.55%	0.00%	-2.01%	0.71%	1.14%	-1.23%	3.41%
JPY	3.77%	2.56%	2.01%	0.00%	2.72%	3.15%	0.78%	5.42%
GBP	1.05%	-0.16%	-0.71%	-2.72%	0.00%	0.43%	-1.94%	2.70%
USD	0.62%	-0.59%	-1.14%	-3.15%	-0.43%	0.00%	-2.37%	2.27%
CHF	2.99%	1.78%	1.23%	-0.78%	1.94%	2.37%	0.00%	4.64%
INR	-1.65%	-2.86%	-3.41%	-5.42%	-2.70%	-2.27%	-4.64%	0.00%

Sector and Style Rotation Watch

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

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

We publish this table to make an important point: there is nothing unique about the various rotation strategies we describe, which are widely known by many investors. Rather, whatever active management returns (also known as "alpha") they are able to generate is directly related to how accurately (and consistently) one can forecast the turning points in the economic cycle. Regularly getting this right is beyond the skills of most investors. In other words, most of us are better off just getting our asset allocations right, 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 year-to-date 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.

As a further check, we have also included rows that describe the typical cycles in the markets for commercial property and commodities. However, rather than being leading indicators of future economic conditions, they tend to coincide with current economic and interest rate conditions. When many investors share the same expectations about future economic conditions, one would expect to see alignment between bond and equity market year-to-date returns, and conditions in commodity and commercial property markets. However, we also note that this is when markets are must fragile; large moves can occur if something happens to change these closely aligned expectations. In contrast, when investors do not share the same expectations for the future, you would expect to see misalignment between year-to-date returns in bond, equity, commodity and commercial property markets.

Year-to-Date Returns on Classic Rotation Strategies in the U.S. Markets

YTD 28Apr06

Economy	Bottoming	Strengthening	Peaking	Weakening
Interest Rates	Falling	Bottom	Rising	Peak
Style Rotation	Growth (IWZ) **3.97%**	Value (IWW) **8.84%**	Value (IWW) **8.84%**	Growth (IWZ) **3.97%**
Size Rotation	Small (IWM) **14.46%**	Small (IWM) **14.46%**	Large (IWB) **5.89%**	Large (IWB) **5.89%**
Style and Size Rotation	Small Growth (DSG) **13.84%**	Small Value (DSV) **11.80%**	Large Value (ELV) **7.29%**	Large Growth (ELG) **3.45%**
Sector Rotation	Cyclicals (IYC) **3.41%** Technology (IYW) **4.72%**	Basic Materials (IYM) **14.46%** Industrials (IYJ) **10.61%**	Energy (IYE) **13.24%** Staples (IYK) **2.37%**	Utilities (IDU) **1.02%** Financials (IYF) **7.82%**
Bond Market Rotation	High Risk (VWEHX) **1.80%**	Short Maturity (VBISX) **0.30%**	Low Risk (VIPSX) **-2.20%**	Long Maturity (VBLTX) **-5.30%**

YTD 28Apr06

Economy	Bottoming	Strengthening	Peaking	Weakening
Interest Rates	Falling	Bottom	Rising	Peak
Commodity Inventories	Peaking	Falling	Bottoming	Rising
Spot Prices	Bottoming	Rising	Peaking	Falling
Futures Prices Relative to Spot Price	Contango (futures higher than spot)	Uncertain	Backwardation (futures lower than spot)	Uncertain
Profitability of long commodity futures position, before diversification and collateral yields	Negative (falling spot and negative roll yield)	Uncertain (rising spot, uncertain roll yield)	Positive (rising spot and positive roll yield)	Uncertain (falling spot, uncertain roll yield)
Commercial Property Vacancy Rates	Peaking	Falling	Bottoming	Rising
Rents	Low	Rising	High	Falling
New Construction Completion (space coming onto the market)	Falling	Bottoming	Rising	Peaking
Property Valuation Ratios	Bottoming	Rising	Peaking	Falling
Expected Future Property Returns	Peaking	Falling	Bottoming	Rising

Is the Timber Asset Class Overvalued?

In their search for higher returns and risk reduction benefits, more and more investors are moving beyond traditional debt and equity, and including more of what are termed "alternative asset classes" in their portfolios. These include real return bonds, domestic and foreign commercial property, commodities, various hedge fund strategies (e.g., equity market neutral or global macro), and timber. With the latter growing in popularity, it is a good time to look more closely at the supply and demand of returns in this asset class, so that we may reach a conclusion about whether it is over, under, or fairly valued today.

Our basic approach to this issue is to compare the rate of return an asset class is expected to supply (which is equal to its current dividend yield plus the expected real growth rate for those dividends) with the rate of return an investor should rationally demand for holding the asset class (which is equal to the current yield on a long term real return government bonds, plus an appropriate asset class risk premium).

Let's start with the rate of return an investor should logical demand on his or her investment in timber. Over the last fifteen years, the historical spread between the rate of return on the main U.S. timberlands index (published by the National Council of Real Estate Investment Fiduciaries) was 6.5%. However, since this index tracks the performance of directly owned timberland investments, the 6.5% spread must reflect not only compensation for the relative risk of timber as an asset class, but also for the illiquid form in which it is held. Investors in timber based real estate investment trusts that are traded on the stock market (e.g., Timber REITS like Plum Creek and Rayonier) hold a much more liquid investment. Assuming the illiquidity premium equals 2.5%, the adjusted risk premium on liquid timberland investments drops to 4.0%.

Let's now look a little closer at this risk premium, and ask whether it is reasonable in light of the underlying risks that it compensates an investor for holding. The timber cash flow generation process is relatively simple: sun, rain and soil cause trees to grow; costs are incurred to manage the forest, harvest and market the trees; and the price for which they are sold varies. For the asset class as a whole, the physical risks are quite small. For example, Grantham, Mayo and van Otterloo (a major timberland manager) claims the annual risk due to disease, fire and the like is about one half of one percent per year. The potential impact of global climate

changes is harder to quantify, but undoubtedly adds more risk to some timber investments (e.g., a cooling climate in northern Europe would slow tree growth) while reducing it elsewhere (e.g., a warming climate in the eastern U.S. would speed tree growth). Operational risks are also small, because the underlying process is biological, with most inputs provided at no cost by mother nature. The major business risks in owning timber are on the demand side of the cash flow generation process. Broadly speaking, they fall into two categories: volume risks and price risks.

Timber demand is affected by two main factors. The first is economic growth; the stronger the economy, the higher the physical demand for wood in all forms (e.g., lumber, panels, cellulose fiber, packaging and paper products). The second is technological innovation, which enables a greater volume of end-use products to be produced from the same amount of wood. A classic example of this is the development of oriented strandboard (OSB) panels, which are made from sawmill scraps that were previously treated as waste. The interaction of these two factors results in the physical demand for timber growing more slowly than the real economy. For example, in "World Agriculture: Towards 2015/2030", the U.N. Food and Agriculture Organization estimates that long-term physical demand for wood will grow by 1.6% per year, versus 3.6% for real world GDP. On the other hand, this historical rate of real GDP growth is not very volatile, which implies that variations in physical timber demand (a measure of risk) shouldn't be very volatile either. But that's not the whole story.

Price risks result from the interaction of the demand for and supply of wood. In recent years, supply has been steadily increasing, due to the planting of more timber plantations and improved forestry management techniques. And, as we have seen, demand for timber is fundamentally linked to the real growth of overall GDP. This implies highly volatile prices. This is just what we found in global data recently made public by the International Monetary Fund. Between 1981 and 2005, the average annual change in real softwood prices (expressed in U.S. dollars) was 0.5%, with a standard deviation (a measure of dispersion around the average) of 9.4%. In contrast, real hardwood prices grew by 1.1% per year on average, but with a standard deviation of 22.3%. When the two are combined into a single global index of timber prices, the 1981 to 2005 period saw an average annual real timber price change of 0.3%, with a standard deviation of 12.1%.

So, let us sum up: at the level of a global asset class, investors in face moderate physical risks, but higher business risks, driven principally by price volatility. We estimate that investors should demand a risk premium of four percent over the current yield on real return government bonds for bearing this risk (assuming an investment in a liquid timber REIT), which is the same as the risk premium on domestic equities and commodities. We should also note that this risk premium implicitly takes into account the quite low historical correlation of real returns on timber with returns on other asset classes, which reflects the partly biological nature of the return generating process. By adding the current yield on real return government bonds (2.4%) to our 4.0% risk premium, we estimate that investors today should demand a real return of at least 6.4% for investing in timber via liquid real estate investment trusts.

The next question is what returns these REITs are likely to provide. We estimate the likely supply of returns by adding to the current dividend yield plus the rate at which dividends are likely to grow in the future. At the time this is written, the current weighted dividend yield on the two timber REITs we use as proxies for the asset class (Plum Creek, PCL, and Rayonier, RYN) is equal to 4.3%. The key uncertainty is the rate at which these will grow in the future. One way to estimate this is to assume that the market for timber investments is operating in equilibrium, and all assets are fully (but not over or under) valued. Since this implies that the supply and demand for returns are equal, you can derive the expected dividend growth rate by subtracting the current dividend yield from the sum of the real return bond yield plus the asset class risk premium. In this case, the calculation is 2.4% + 4.0% - 4.3% = 2.1%. Note that this dividend growth rate reflects a combination of both physical volume growth and real price changes.

Another way to estimate the expected dividend growth rate is to use historical data. Between 1980 and 2005, real world GDP grew by an average of 3.5% per year. Assuming the U.N. Food and Agriculture Organization's estimate is correct, and wood demand will grow by 2.0% less than GDP, the expected physical growth rate is 1.5% (3.5% - 2.0%). If we add the historical average real timber price change of .3% to this, we get an expected dividend growth rate of 1.8%, and an estimate of future returns supplied of 6.1% (4.3% dividend yield plus 1.8% dividend growth). Because this is less than our estimated required return on timber of 6.4%, it implies that timber is slightly overvalued today.

However, if we use the IMF's forecast that real world GDP will grow by about 4.8% per year over the next few years (e.g., reflecting faster growth in India and China), the implied physical growth rate is 2.8% (4.8% - 2.0%). Adding the historical .3% real price growth to this produces an expected dividend growth rate of 3.1%. In this case, you would conclude that timber was undervalued today, since the return the asset class is expected to supply (4.3% + 3.1% = 7.4%) is greater than the return investors demand (2.4% + 4.0% = 6.4%). Of course, an important caveat here is that this forecast is the IMF's "most likely" case, and risks of different outcomes are not evenly distributed around it, with relatively more of them lying on the downside.

On balance, we conclude that timber as an asset class is probably not overvalued today, and may, depending on one's point of view, still be slightly undervalued.

Timberland investment managers may raise some criticisms about this analysis. Specifically, they will point to the potential for earning higher real returns through the application of active management techniques (i.e., they might argue that our estimate of the future supply of returns is too low). Example of these active management techniques include purchasing timberland at attractive prices, wisely choosing when to sell it to maximize the price received (known as "storing it on the stump"), and generating additional income streams from the land on which the trees are growing (e.g., by charging fees to hike, ski, and snowmobile on it). Some of these arguments have more merit than others.

Clearly, if all timberland investment managers were smarter than the companies from whom they purchased timber assets, then the average return on the asset class itself should be higher. However, while this may have been the case in the past (e.g., when integrated forest products companies were selling their timber holdings for less than they were worth), it is probably not true today, and won't be true in the future. Timing timber sales is an easier argument -- while some sellers will wait to sell at higher prices, and in fact receive them, others will sell today and be disappointed in the future (or, perhaps, happy, if prices subsequently go down because of an economic slowdown). In aggregate, these individual wins and losses will balance out, leaving only the price change driven by supply and demand factors for the asset class as a whole. On the other hand, it is clear that generating additional fees from the recreational use of timberland (or, for that matter, its sale for commercial development) is not a

zero sum game. On that basis, our estimate of the returns timberland as a global asset class is likely to supply is conservative.

A final argument is that timber is not a single global asset class, but rather a series of national or regional asset classes, where, for example, timber demand and price growth may be higher than we assume. This argument certainly has some merit; for example, many U.S. timber managers point to average real long-term price changes of 2% per year in that market. On the other hand, the fact that many large institutional timber investors have diversified their portfolios across regions (e.g., owning timberland in the U.S. South, Canadian and U.S. Northwest, Chile and New Zealand), as well as the fact that global trade in timber has been growing faster than world GDP, suggests that our view of timber as a global asset class also has merit.

That being said, the fact remains that there is not (so far) a liquid global timber index product available today. As a result, in our model portfolios we use a second-best solution: a mix of two large liquid timber REITs (PCL and RYN) that own a range of timber properties in different locations.

Do Sector Index Funds Make Sense?

In markets around the world, sector and sub-sector exchange traded funds are rapidly growing in popularity. In the United States alone, their assets under management are up by almost $6 billion dollars (21%) so far this year. To capture these flows, many new products are being launched, based on even more narrowly defined indexes. Given these trends, this is an appropriate time to ask a basic question: does this make sense?

Let's start with a basic definition: just what is a sector index fund? In simple terms, these are based on an index that tracks the performance of a group of similar companies. Most of these products utilize one of two systems for classifying companies. The first is known as the "Industry Classification Benchmark" (www.icbenchmark.com). At the lowest level, the ICB identifies 104 groups of similar companies, termed "sub sectors." These are then combined into 39 "sectors", then into 18 "super sectors", and finally into 10 "industries." The ICB system is used by three major index providers: Dow Jones, FTSE, and Russell.

The competing system is the "Global Industry Classification Standard" (GICS) used by Standard and Poor's and Morgan Stanley Capital International

(www.gics.standardandpoors.com). At the lowest level, GICS identifies 147 "sub-industries", which are combined into 67 "industries", then into 24 "industry groups", and finally into 10 "sectors."

At the highest level, ICB and GICS are quite similar; in fact, in eight of ten areas they are pretty much in agreement. These include basic materials, energy, industrials, financial services, telecommunications, technology, healthcare and utilities. Where they disagree is on the proper classification of companies that sell to consumers. ICB distinguishes between companies that sell "Consumer Goods" versus "Consumer Services."   Its logic is that, particularly in the U.S. (but increasingly in all developed countries), the latter's revenues have been growing more quickly than the former. In contrast, GICS uses a split between companies that sell "Consumer Staples" and "Consumer Discretionary" items. This logic is based on the observation that latter's sales are more cyclical than the former.   However, when you compare the sectors side-by-side, there is a lot of commonality between Consumer Goods and Consumer Staples, and between Consumer Services and Consumer Discretionary. This is similarity also shows up in their returns, which track each other quite closely.

It is also interesting to see these sectors' weight in the overall market portfolio. As the following table shows, sector weights differ across regions:

Sector Weights in Broad Market Index

	World	USA	Eurozone	Japan
Materials	5.6%	3.1%	5.7%	8.1%
Industrials	12.4%	13.0%	11.0%	17.1%
Energy	8.6%	9.4%	7.5%	1.0%
Consumer Goods	10.7%	8.4%	11.1%	22.9%
Consumer Services	10.5%	12.6%	6.6%	8.4%
Financial Services	25.0%	21.2%	33.7%	25.0%
Technology	9.9%	14.4%	5.3%	6.6%
Telecommunications	4.2%	2.9%	6.3%	2.6%
Utilities	4.0%	3.2%	8.8%	3.9%
Health Care	9.1%	11.8%	4.0%	4.4%
	100.0%	100.0%	100.0%	100.0%

It is also important to remember that these sector weights are not static; they also differ over time, depending on investors' changing expectations for different sectors' future performance. For example, in 2000, technology had a much higher weight than it does today.

Let us now move on to the question of why one might want to invest in a sector index fund or ETF, instead of the broad market. There are three possible justifications for this. The first is because one's economic position significantly differs from that of the "average" investor who is satisfied to hold the market portfolio. The classic example of this would be someone who holds a large amount of restricted stock in his or her company. This investor might want to ensure that his or her exposure to the domestic equity market did not contain this sector exposure. In this case, his or her portfolio would contain a mix of the other nine sectors.

A second argument that is sometimes made for using sector funds is that an investor might have different risk preferences than the average investor who is content to own a broad market equity index fund. He or she might therefore want to construct a portfolio with sector weights that differed from those in the market portfolio, to achieve a different expected risk and return for his or her equity allocation. This argument is based on the observation than not only have sectors delivered different historical risks and returns, but also that their returns have not been perfectly correlated with each other. This is clearly shown in the following table:

Nominal U.S. Sector Performance 1992-2005

92-05	Return	Risk	BM	CS	CG	EN	FS	HC	IN	TEC	TEL	UT
Basic Matl	8.6%	13.8%	1.00									
Cons Serv	11.4%	22.3%	0.55	1.00								
Cons Goods	10.1%	13.0%	0.36	0.50	1.00							
Energy	14.9%	16.7%	0.46	0.17	0.48	1.00						
Financials	16.6%	20.1%	0.35	0.43	0.90	0.63	1.00					
Health Care	12.4%	23.1%	(0.02)	0.37	0.67	0.47	0.71	1.00				
Industrials	10.8%	17.5%	0.82	0.77	0.65	0.64	0.66	0.45	1.00			
Technology	18.9%	37.4%	0.62	0.82	0.27	0.24	0.25	0.34	0.79	1.00		
Telecomms	8.1%	26.8%	0.42	0.90	0.53	0.18	0.44	0.43	0.73	0.75	1.00	
Utilities	10.3%	22.8%	(0.02)	0.12	0.58	0.69	0.73	0.73	0.37	0.02	0.19	1.00

However, we see one significant problem with this argument. In our view, it makes far more sense to calibrate a portfolio to an investor's risk/return preferences by changing allocations across broad asset classes (e.g., by changing the weights given to bonds and equity) than by changing sector weights within just one asset class.

This brings us to the third, and probably the most popular justification for investing in sector (or subsector) index funds: because your forecast for one or more sectors or sub-sectors differs from the overall market consensus. This is active management, pure and simple. And like all other active management approaches, its success depends on superior forecasting skill, which in turn must be based on some combination of superior information or a superior model for deriving insights from it.   In turn, these insights must be focused on the two drivers of sector fund returns: either changes in fundamental valuation factors and/or the future behavior of other investors.

The more common name for "the future behavior of other investors" is "trend following" or "momentum." While there are many techniques for analyzing it, the simplest is to invest in the sector with the highest year to date returns, in the expectation that other investors will be doing the same, which will cause its price (and return) to rise still further. For example, the following table shows how different sectors have performed in the U.S. through April 21st.

Nominal U.S. Sector Year to Date Returns

Sector	Ticker	YTD 21Apr
Materials	VAW	15.52%
Industrials	VIS	13.47%
Energy	VDE	19.49%
Cons Staples	VDC	1.85%
Cons Discretionary	VCR	4.31%
Financial Services	VFH	5.99%
Technology	VGT	5.94%
Telecommunications	VOX	13.77%
Utilities	VPU	1.29%
Health Care	VHT	-0.79%

However, for all its attractions, we all know that this simple momentum strategy also has an important catch: how to accurately forecast when the trend is going to reverse, so you can get out at or close to the top. Unfortunately, history shows this is a lot easier said than done. The great risk of momentum investing is that it drives prices above their fair value, based on the underlying fundamentals of the return generating process. Once that happens, the process becomes very unstable, and prone to sudden and sharp reversal.

This brings us to the question of whether sector index funds appear to be under, over or fully valued today on the basis of their fundamentals. Our basic approach to this issue is to compare the supply of expected equity returns (defined as the current dividend yield plus the expected dividend growth rate) with the return investors should rationally demand (defined as the current yield on real return government bonds plus an appropriate risk premium). Overvaluation is implied when the returns the sector is expected to supply are lower than the returns investors demand (i.e., prices will have to fall to raise dividend yields). Undervaluation is implied when returns supplies are higher than those demanded. And full valuation is implied when they are equal.

Two issues are typically raised about this analysis. The first is the fact that, in addition to dividends, many companies return cash to their investors via share buybacks. To address this issue, we also perform the analysis after adding .5% to the dividend yield to reflect the estimated impact of buybacks. The second issue is the appropriate market equity risk premium to use. While much has been written about this question, there is still no consensus answer (e.g., in "The Equity Risk Premium in January, 2006: Evidence form the Global CFO Outlook Survey", Graham and Harvey found that over a ten year period, the average premium used by practitioners was 3.59%, but with considerable variability). Given this uncertainty, we perform our analysis using both a 3% and 4% equity market risk premium.

Even with these adjustments, it is unfortunately not a straightforward process to apply this analysis to sector funds, because they aggregate so many different companies. This makes it very difficult to estimate an appropriate expected growth rate. Given this, we calculate a "breakeven" growth rate instead, by subtracting the current dividend yield from the sum of the real return bond yield plus an equity market risk premium for the sector. This is the growth rate that implies full valuation of the sector, because it makes the supply of expected returns equal to the returns demanded by investors. If one believes this implied growth rate is too high,

the sector is overvalued; if it is too low, the sector is undervalued. The following table presents this analysis for U.S. sector funds, using end of March, 2006 data. The sector risk premia we use reflect the relative variability of the sector compared to the overall market (i.e., the sector beta), calculated over the past three years, multiplied times an overall equity market risk premium. This means that sectors whose returns are less variable than the market require lower risk premia, while those with higher variability require higher risk premia.

In the following table, we show four breakeven real (inflation adjusted) future growth rates for each sector, as well as the overall market, based on different combinations of dividend yield (plus buyback adjustment) and equity market risk premia (3% and 4%).

U.S. Sector Valuations, April 2006

Basic Materials	4% ERP	3% ERP
Dividend Only	6.6%	5.2%
Div plus Buyback	6.1%	4.7%

Industrials	4% ERP	3% ERP
Dividend Only	6.1%	5.2%
Div plus Buyback	5.6%	4.5%

Energy	4% ERP	3% ERP
Dividend Only	4.7%	4.0%
Div plus Buyback	4.2%	3.5%

Cons Staples	4% ERP	3% ERP
Dividend Only	3.4%	2.9%
Div plus Buyback	2.9%	2.4%

Cons Discretionary	4% ERP	3% ERP
Dividend Only	7.3%	5.9%
Div plus Buyback	6.8%	5.4%

Fin Services	4% ERP	3% ERP
Dividend Only	4.8%	3.8%
Div plus Buyback	4.3%	3.3%

Technology	4% ERP	3% ERP
Dividend Only	8.6%	7.0%
Div plus Buyback	8.1%	6.5%

Telecomms	4% ERP	3% ERP
Dividend Only	3.9%	3.0%
Div plus Buyback	3.4%	2.5%

Utilities	4% ERP	3% ERP
Dividend Only	1.8%	1.2%
Div plus Buyback	1.3%	0.7%

Health Care	4% ERP	3% ERP
Dividend Only	3.8%	3.3%
Div plus Buyback	3.3%	2.8%

Overall Market	4% ERP	3% ERP
Dividend Only	5.0%	4.0%
Div plus Buyback	4.5%	3.5%

These tables make two important points. First, in many sectors, the implied breakeven (or fair valuation) real growth rates are quite high relative the implied growth rate for the market as a whole. For example, at a time of unprecedented U.S. current account deficits and consumer borrowing, it is hard to imagine the consumer discretionary sector's dividends forever growing faster than those for the market as a whole. Second, the implied real growth rates for the market as a whole are exceptionally high relative to historical experience, even under the most aggressive assumptions (.5% buyback adjustment and 3% equity risk premium). In the past, dividends growth has been very closely correlated with growth in total factor productivity, which, over the last two years, has only grown by about 2.8% annually in the United States.

In light of these factors, it is hard to escape the conclusion that the U.S. equity market, and many of the sectors within it, are seriously overvalued today. If there are active trades to be made in sector index funds today, it looks like many of them are on the short side. This conclusion is further born out by the growing value of sector ETF shares that have already been sold short (in expectation of future price declines); for example, short interest in consumer discretionary/consumer goods ETFs is now greater than fifty percent of their market value, with

energy not far behind with short interest of more than forty percent. Unfortunately, something tells us that not many of these short sales have been made by individual investors.

To be sure, the continued heavy inflows into sector index products suggests that many investors either disagree with this analysis or are basing their investment decisions on their forecast for other investors' future behavior (i.e., momentum) rather than a fundamental value forecast. As we noted above, history has repeatedly shown that this is a very dangerous game to play, and its results are sadly predictable. For example, in their recent paper "The Dumb Money Effect", Lamont and Frazzini found that on average, "retail investors [who switch funds] direct their money to funds which invest in stocks that have low future returns. To achieve high returns, it is best to do the opposite of these investors. We calculate that mutual fund investors experience total returns that are significantly lower due to their reallocations. Therefore, mutual fund investors are "dumb" in the sense that their reallocations reduce their wealth on average. We call this predictability the 'dumb money' effect." Something tells us that when somebody gets around to writing a paper about the results of switching between sector index funds, they will find the same sad results.

Product and Strategy Notes

New Lyxor ETF Tracking the Reuters Jeffries CRB Commodities Index

Our Eurozone readers now have another commodity index ETF in which they can invest, besides the EasyEFT product that tracks the Goldman Sachs Commodities Index. Lyxor recently introduced a new product that tracks the Reuters Jeffries Commodity Research Bureau Index. The original CRB Index has been around for a long time, and gone through many changes of weighting schemes. The current index was introduced in 2005, with backwards calculations to 1995. Its weightings are very similar to those used by the Dow Jones AIG Commodity Index. They both give a 41% weighting to agricultural commodities; however, the DJAIG gives more weight to metals (26% vs. 20% for the RJCRB), while the RJCRB gives a higher weight to energy commodities (39% vs. 33% for the DJAIG). The historical data that accompanied the launch of the RJCRB index in 2005 showed that its historical standard deviation was about equal to that of the DJAIG, and its correlations with other commodity indexes and asset classes were also similar.

Of course, it goes without saying that the launch literature also used a comparison period during which the RJCRB slightly outperformed the DJAIG; however, by shifting the dates you can no doubt get the opposite result. That is why we focus on volatility (standard deviation) and correlations in our commodity index comparisons. In this case, the RJCRB and DJAIG appear to be quite close substitutes, with substantially lower weighting on energy than the 73% found in the Goldman Sachs Commodities Index. As we have noted in the past, since a substantial part of the expected return from a commodity index comes from the "diversification effect" (i.e., the benefit of investing in a group of different commodities whose returns have low correlations with each other), we prefer indexes that are relatively balanced across energy, metals, and agricultural commodities, as this will tend to maximize the diversification benefit. For this reason, we prefer indexes like the DJAIG and RJCRB.

However, we should also note that the new Lyxor ETF that tracks the RJCRB Index is somewhat different from other commodity index products. As we have noted in the past, commodity index funds invest in a mix of futures contracts, either directly or via swap contracts. In both cases, these investments are initially made at less than their full face value (e.g., to purchase a futures contract worth 100, you might only have to put down 10). Other commodity index funds usually invest the balance of their assets in government bonds. However, it appears from the Lyxor offering document (which is notably unclear on this point) that this fund will invest the balance of its assets in equities rather than bonds. Whether this will materially increase the riskiness of this product compared to other commodity ETFs ultimately depends on the nature of the derivative contracts (e.g., swaps) used by the fund. Unfortunately, the fund's offering document sheds little light on this issue, beyond saying that its objective is a tracking error versus the RJCRB index of no more than 1% per year. Finally, we should also note that the Lyxor Commodities ETF has a very attractive .35% expense ratio, which is much lower than the charges on similar funds in the United States, and below the already very low .45% charge on the EasyETF that tracks the GSCI.

Last but not least, we will also point out that there is an exchange rate risk lurking in both the Lxyor and EasyETF commodities products. This is due to the fact that the commodity indexes they track are quoted in U.S. dollars. Hence, a sharp depreciation of the USD versus the Euro could substantially reduce the return on these funds, even if commodity markets remain strong. Were commodity markets to weaken at the same time as the USD declined

against the Euro, the fall in returns would be even more severe. This makes the point that, in cases where an asset class appears to be substantially overvalued (and we have made that case for both commodities and the U.S. dollar), prudent risk management will sometimes require an investor to reduce his or her allocation to an asset class to a level below its long-term (normal) policy weight in his or her portfolio.

Another Public Fund Launched by a Private Equity Firms

In our July, 2005 issue, we made three observations. First, the work of different researchers led us to conclude that the expected returns from investing in private equity (also known as "leveraged buyout" funds), after manager fees, is about equal to that on the public equity market. Second, that average masks a critical point: the top quartile of funds did much better than the public equity market, while the bottom three quartiles did worse. And third, the decision to invest in a buyout fund therefore critically depends on an investor's confidence in his or her ability to identify superior managers.

We also made the point that, even for top quartile managers, the private equity business was becoming much more difficult. The challenges are well known:

- The wide availability of financial engineering skills and models, together with more demanding shareholders and much greater use of equity compensation by public companies have made it much harder to generate superior private equity returns simply by adding leverage and squeezing out excess costs. Lord Hanson would not find the current environment favorable to the game he once played with such gusto.

- Market timing (taking companies private when their sector is out of favor, then going public when it becomes popular again) has also become more difficult with the increasing number of hedge funds playing the same game.

- The ability to buy companies for much less than they are worth has become harder, given the increase in seller sophistication (e.g., more frequent use of auctions).

- Finally, there is a lot of money chasing deals today, interest rates are rising, and lenders are becoming more cautious.

We also noted that perhaps the best evidence for the increasing challenge of creating value in private equity was the change in the way that buyout funds were realizing the value of their investments. Traditionally this was done through either sales to industry buyers or initial public offerings. However, buyout funds today are increasingly using two other approaches to obtain cash to return to their investors. The first is sales to other buyout funds. If this raises some eyebrows (e.g., "what does the second buyout fund know that the first one didn't?"), the second approach should ring some alarm bells. This is the practice of releveraging a portfolio company to raised funds that are used to pay a special dividend to the buyout fund. As we noted then, the risk involved didn't disappear (and arguably, the higher leverage actually increased it). Rather, it was simply passed on to a different set of buyers (e.g., hedge funds, investors in high yield debt and the "equity" tranches of collateralized debt obligations, and buyers of credit default swaps).

In a recent series of articles, various writers from Financial Times have also had some rather negative things to say about private equity. On April 18th, the LEX Column noted that "the proliferation of private equity funds, a result of their popularity, is inevitably compressing available returns, making scrutiny of fees even more vital. That these fee structures have not changed in spite of much bigger fund sizes raises a further concern. Managers have a big incentive to outperform [to earn 20% of the profits] when they are charging 2% on a $500 million fund -- less so, perhaps, when they are already taking an annual cut of $200 million on a $10 billion fund. That is at odds with the philosophy of an industry which trumpets [the benefits of] alignment of interests" [between managers and investors]. On April 24th, John Plender titled his column "The Privileged Existence of Private Equity Funds" and noted "be warned -- it's too good to last." He noted that "the question for [institutional investors] when confronted with a [private] company returning [to the public equity market] is whether the disciplines [of ownership by a private equity fund] have left the company in genuinely better shape, or whether the business has been run for cash at the expense of investment and long-term prospects." He closed with this point: "the paradox of private equity is that it imposes immense discipline on managers of companies, while the discipline on managers of private

equity funds is more nebulous. Performance measurement data are suspect, transparency is poor, and the media trumpet successful deals while the dogs go mainly unreported. This encourages the extreme cyclicality of the industry, here money pours in a the top, and panics out at the bottom."

It is in this light that we must evaluate the recent launch by KKR (Kohlberg Kravis Roberts), perhaps the world's most famous LBO firm, of a U.S. $5 billion public offering on the Amsterdam stock exchange of KKR Private Equity Investors L.P. The new LP will invest in deals originated by KKR; the implied promise is that it will deliver exceptional returns. The fact that the deal's original goal was to raise $1.5 billion suggests that there are plenty of investors who agree with this story. Whether they are right will only be known in hindsight. However, there is a precedent for them to keep in mind. In 2004, another well-known buyout group, Apollo Investors, launched a similar parallel public fund (Apollo Investment Corp, ticker AINV). Its focus was on mid and small cap sized deals, and it now has a market cap of just over $1 billion. When it was launched, we had our doubts about whether it would deliver the exceptional returns investors seemed to expect. After two years, we are right about that; has outperformed the large cap S&P 500, but basically just equaled the performance of a small cap index fund (e.g., NAESX).

However, this example must have been well-known to many of the investors in the KKR LP. This suggests that at least part of their enthusiasm for the KKR offering (apart from the firm's reputation) was driven by a belief that the main future source of high private equity returns lies in taking private much bigger companies than have ever been targeted before, and, to a lesser extent, undertaking these transactions in a wider variety of countries. They may have thought that investing in KKR gave them access to one of the relatively few large funds that will be able to pursue this value creation strategy the future. While this argument seems logical, we have our doubts; we know few large companies that have not, under the pressure of intense global competition, become much more efficient in recent years. Indeed, the recent comments by the FT's John Dizard on the LBO market summarize the argument against investing in public funds sponsored by private equity firms: "it's not as though the original analytics that drove the LBO business from the last 1970s to the early 1990s didn't make sense. It's just that everyone has read the plan by now…[and] most corporations have learnt something about how to manage their business…After the [restructuring] pain of the past few years, [easy

LBO] opportunities no longer exist", and those that do have been made much less attractive in an era of rising interest rates.

More Insight in Asset Class Risk Premiums

On of the most frequently cited puzzles in finance is the fact that the returns on the equity market are far more variable than either changes in real economic growth or changes in real consumption spending. One manifestation of this is the so-called "equity premium puzzle", which argues that historical equity risk premiums (defined as the return on the equity market less the return on a risk free government security over the same period) are too high, given the underlying variability of the real economy. In a paper last summer ("Low Probability Events and the Equity Premium"), Robert Barro of Harvard argued that this was due to investors taking low probability but disastrous events (e.g., wars) into consideration in their forecasts of future distributions of returns. This would raise demand for low risk assets (such as government bonds) and depress their returns (since when a bond's price goes up, its return goes down), while raising the required return to hold risky assets such as equities. The underlying logic here is that investors use a two step (technically, a Bayesian) process to forecast expected future equity returns, combining historical data with their subjective views about the probability of future events and associated asset class returns.

Recently, another excellent paper was published that builds on Barro's insights. In "Risk, Uncertainty, and Asset-Pricing Antipuzzles", Martin Weitzman of Harvard starts with the critical distinction between risk and uncertainty. In essence, risk is variability that you understand, and uncertainty is variability that you don't. The risk associated with different possible outcomes (e.g., asset class returns) can be described with statistics (e.g., the familiar bell curve), while the uncertainty cannot. Weitzman notes that most analyses of the "equity premium puzzle" to date have assumed that over time, the accumulation of sufficient historical data will allow an investor to reduce uncertainty by learning – that is, by developing a more accurate understanding of the "true" economic and behavioral process generating asset class returns. He then goes on to make a critical point: this assumes that this underlying process is either unchanging, or changing in predictable ways (technically, it is "stationary"). But what happens if the underlying process is, in fact, a complex adaptive system (i.e., "non-stationary") that evolves in ways that cannot be understood, regardless of the amount of learning one

accumulates about its past performance? In other words, what happens to our required equity risk premium if there is a permanent degree of uncertainty associated with our views of the economic and behavioral process that generates asset class returns? Weitzman reaches the same conclusion as Barro: the low expected returns on real return government bonds and high required equity risk premium are not a puzzle at all. Rather, "the puzzling numbers being observed empirically are trying to tell a revealing story about the implicit background subjective distribution of uncertainty that investors actually have, and which is generating such data." Weitzman concludes that "the 'strong force' of … evolutionary uncertainty is a far more powerful determinant of asset prices and returns than the 'weak force' of rational expectations [about] risk."

What are the practical implications of these papers when it comes to managing investments? In terms of dynamic analysis, Weitzman and Barro have provided a plausible theory to explain what we frequently see in practice: as investors become more confident – that is, as their uncertainty declines – their required risk premiums on different asset classes decline (e.g., witness the high returns in recent years on low quality bonds and emerging market equities). Yet we also know that these changes in perceived uncertainty happen quickly, and are often difficult to predict. Today's circumstances provide a perfect example of this: the world is sailing in uncharted and dangerous economic waters, with record imbalances and unstable political situations in China, Iran, and the Middle East more generally. While financial markets and returns have remained robust so far, the question everybody asks but nobody can answer is "but how much longer can this last?" Clearly, Barro and Weitzman's findings suggest that accurate forecasting – and therefore successful active investing – is even harder the people had previously imagined. Diversification across asset classes is still most investors' best defense against the excessive volatility that reduces long-term returns.

The second implication of Barro and Weitzman's findings is that they argue for reduced allocations to actively managed products, and a focus on those that seek returns uncorrelated with the major asset classes.

The third implication is that when formulating a long-term asset allocation strategy, investors are well advised to use health asset class risk premia, and resist the temptation to use lower premiums that may be implied by strongly performing markets in a period of reduced background uncertainty.

A Timely New Asset Allocation Software Product

Given Barro and Weitzman's findings, it is interesting to see that Windham Capital Management has recently launched a very interesting new asset allocation software product called Windham Portfolio Advisor. Windham is a firm that serves institutional investors, to whom this product is currently targeted. We hope that in the future they will make available a less expensive version that can be used by retail investment advisers and financial planners. This new product is interesting for a number of reasons, including its use of non-normal asset return distributions (both historical and forward looking), its incorporation of a regime switching model as one way of modeling risk (that allows different specifications for asset class risk, return and correlation under normal and "turbulent" regimes), its inclusion of both absolute performance and benchmark relative targets, and its use of simulation (stochastic) optimization to generate portfolio solutions. All we can say is that if this product had been available when we started our journals, it would have saved us many, many hours of model building.

A Prescient Paper from the Bank for International Settlements

William White of the Bank for International Settlements has just published a working paper ("Is Price Stability Enough?") that we believe is destined to become more well known with time. As White puts it, "the core of the problem is that persistently easy monetary conditions can lead to the cumulative build-up over time of significant deviations from historical norms – whether in terms of debt levels, savings ratios, asset prices or other indicators of 'imbalances'. The historical record indicates that mean reversion is a common outcome with associated and negative implications for aggregate demand." He recounts the often forgotten pre-World War Two debate between the Keynesian and Austrian schools of economics, highlighting the latter's emphasis "on changes in relative prices that lead to resources misallocations and subsequent economic crises." White also notes that these concepts are "rarely present in the models used by academics, perhaps because they are so difficult to quantitatively model." This does not, however, make them any less important to understanding the problems facing the global economy today.

As a starting point, White calls for "explicit recognition of an increasingly obvious fact. Under the joint influences of deregulation and technology, the global economic and financial system has undergone massive change in recent years. The liberalization of the real economy, in particular the re-entry into the global trading system of such giants and China and India and developments in the global financial system over the last twenty years have profoundly changed how economic processes work."

Through a series of examples, White then calls attention to a key lesson from economic history, providing "stark evidence that a preceding period of price stability [the current objective of most central banks] is not sufficient to avoid serious macroeconomic downturns." In the examples he uses, the period before the onset of a prolonged downturn "was characterized by rapid technological innovation, rising productivity, rising credit, rapid increases in the prices of equity and real estate and strong fixed investment," a substantial portion of which later failed to achieve its expected profitability. The process works like this: "Buoyed by optimism about some particular development, credit is extended which drives up asset prices. This both encourages fixed investment and increases collateral values, which supports still more credit expansion. With time, and underpinned by an increase in output growth, this process leads to increased willingness to take on risks ('irrational exuberance'), which gives further impetus to the credit cycle…Subsequently, as exaggerated expectations concerning both risk and return are eventually disappointed, the whole process goes into reverse. As undershoot replaces overshoot, the dampening effect on the real economy of high debt levels and [unprofitable] investment becomes particularly notable. Frequently…the financial system is itself weakened [by debt defaults] and exerts a further dampening effect on the real economy."

White concludes that "the process of erroneous investment driven by credit creation is still noteworthy; while most Keynesian models [used by policymakers] assume relatively smooth adjustment from one equilibrium to another, the Austrians stressed growing imbalances and an eventual crisis, whose magnitude would reflect the size of the real imbalances that preceded it." He ends his paper on a somber note: "One hopes that it will not require a disorderly unwinding of current excesses [in the world economy] to prove convincingly that we have indeed been on a dangerous path." As we noted in last month's economic outlook, we do not share his optimism on this point.

2006-2007 Model Portfolios Update

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

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 2006, our U.S. cash benchmark is 4.40% (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 are shown in the tables on the following pages. Mutual and exchange traded funds that can be used to implement these model portfolios' asset allocations are listed on our website.

Model Portfolios Year-to-Date Performance

These portfolios seek to maximize the probability of achieving at least the target real return over twenty years, at the lowest possible risk.			
	YTD 28Apr06	**Weight**	**Weighted Return**
	In US$		In US$
7% Target Real Return	*YTD Returns are Nominal*		
Asset Classes			
Real Return Bonds	-2.2%	0.0%	0.0%
U.S. Bonds	-1.0%	0.0%	0.0%
Non-U.S. Bonds	3.6%	10.0%	0.4%
Domestic Commercial Property	10.6%	0.0%	0.0%
Foreign Commercial Property	12.0%	5.0%	0.6%
Commodities	0.5%	17.5%	0.1%
Timber	2.6%	2.5%	0.1%
U.S. Equity	6.5%	55.0%	3.6%
Foreign Equity (EAFE)	14.6%	5.0%	0.7%
Emerging Mkt. Equity	19.1%	5.0%	1.0%
Equity Market Neutral	3.9%	0.0%	0.0%
		100.0%	**6.4%**

	YTD 28Apr06	**Weight**	**Weighted Return**
	In US$		In US$
6% Target Real Return	*YTD Returns are Nominal*		
Asset Classes			
Real Return Bonds	-2.2%	2.5%	-0.1%
U.S. Bonds	-1.0%	0.0%	0.0%
Non-U.S. Bonds	3.6%	10.0%	0.4%
Domestic Commercial Property	10.6%	0.0%	0.0%
Foreign Commerical Property	12.0%	0.0%	0.0%
Commodities	0.5%	15.0%	0.1%
Timber	2.6%	5.0%	0.1%
U.S. Equity	6.5%	45.0%	2.9%
Foreign Equity (EAFE)	14.6%	15.0%	2.2%
Emerging Mkt. Equity	19.1%	7.5%	1.4%
Equity Market Neutral	3.9%	0.0%	0.0%
		100.0%	**7.1%**

	YTD 28Apr06	Weight	Weighted Return
	In US$		In US$
5% Target Real Return	*YTD Returns are Nominal*		
Asset Classes			
Real Return Bonds	-2.2%	2.5%	**-0.1%**
U.S. Bonds	-1.0%	27.5%	**-0.3%**
Non-U.S. Bonds	3.6%	12.5%	**0.5%**
Domestic Commercial Property	10.6%	0.0%	**0.0%**
Foreign Commercial Property	12.0%	0.0%	**0.0%**
Commodities	0.5%	15.0%	**0.1%**
Timber	2.6%	5.0%	**0.1%**
U.S. Equity	6.5%	17.5%	**1.1%**
Foreign Equity (EAFE)	14.6%	10.0%	**1.5%**
Emerging Mkt. Equity	19.1%	10.0%	**1.9%**
Equity Market Neutral	3.9%	0.0%	**0.0%**
		100.0%	**4.8%**

	YTD 28Apr06	Weight	Weighted Return
	In US$		In US$
4% Target Real Return	*YTD Returns are Nominal*		
Asset Classes			
Real Return Bonds	-2.2%	5.0%	**-0.1%**
U.S. Bonds	-1.0%	32.5%	**-0.3%**
Non-U.S. Bonds	3.6%	15.0%	**0.5%**
Domestic Commercial Property	10.6%	5.0%	**0.5%**
Foreign Commerical Property	12.0%	0.0%	**0.0%**
Commodities	0.5%	10.0%	**0.1%**
Timber	2.6%	10.0%	**0.3%**
U.S. Equity	6.5%	0.0%	**0.0%**
Foreign Equity (EAFE)	14.6%	15.0%	**2.2%**
Emerging Mkt. Equity	19.1%	7.5%	**1.4%**
Equity Market Neutral	3.9%	0.0%	**0.0%**
		100.0%	**4.6%**

	YTD 28Apr06	Weight	Weighted Return
	In US$		In US$
3% Target Real Return	*YTD Returns are Nominal*		
Asset Classes			
Real Return Bonds	-2.2%	12.5%	**-0.3%**
U.S. Bonds	-1.0%	42.5%	**-0.4%**
Non-U.S. Bonds	3.6%	10.0%	**0.4%**
Domestic Commercial Property	10.6%	0.0%	**0.0%**
Foreign Commerical Property	12.0%	0.0%	**0.0%**
Commodities	0.5%	12.5%	**0.1%**
Timber	2.6%	0.0%	**0.0%**
U.S. Equity	6.5%	5.0%	**0.3%**
Foreign Equity (EAFE)	14.6%	10.0%	**1.5%**
Emerging Mkt. Equity	19.1%	7.5%	**1.4%**
Equity Market Neutral	3.9%	0.0%	**0.0%**
		100.0%	**2.9%**

	YTD 28Apr06	Weight	Weighted Return
	In US$		In US$
2% Target Real Return	*YTD Returns are Nominal*		
Asset Classes			
Real Return Bonds	-2.2%	22.5%	**-0.5%**
U.S. Bonds	-1.0%	32.5%	**-0.3%**
Non-U.S. Bonds	3.6%	10.0%	**0.4%**
Domestic Commercial Property	10.6%	0.0%	**0.0%**
Foreign Commerical Property	12.0%	0.0%	**0.0%**
Commodities	0.5%	7.5%	**0.0%**
Timber	2.6%	5.0%	**0.1%**
U.S. Equity	6.5%	7.5%	**0.5%**
Foreign Equity (EAFE)	14.6%	10.0%	**1.5%**
Emerging Mkt. Equity	19.1%	5.0%	**1.0%**
Equity Market Neutral	3.9%	0.0%	**0.0%**
		100.0%	**2.6%**

	YTD 28Apr06	Weight	Weighted Return
	In US$		In US$
Equally Weighted Portfolio	*YTD Returns are Nominal*		
Asset Classes			
Real Return Bonds	-2.2%	10.0%	**-0.2%**
U.S. Bonds	-1.0%	10.0%	**-0.1%**
Non-U.S. Bonds	3.6%	10.0%	**0.4%**
Domestic Commercial Property	10.6%	10.0%	**1.1%**
Foreign Commercial Property	12.0%	10.0%	**1.2%**
Commodities	0.5%	10.0%	**0.1%**
Timber	2.6%	10.0%	**0.3%**
U.S. Equity	6.5%	10.0%	**0.7%**
Foreign Equity (EAFE)	14.6%	10.0%	**1.5%**
Emerging Mkt. Equity	19.1%	10.0%	**1.9%**
		100.0%	**6.6%**

These portfolios seek to maximize the probability of achieving at least the target real return over twenty years, at the lowest possible risk.		Unlike the other target return portfolios, these allow investment in uncorrelated alpha (equity market neutral) funds.	
	YTD 28Apr06	Weight	Weighted Return
	In US$		In US$
7% Target Real Return	YTD Returns are Nominal		
Asset Classes			
Real Return Bonds	-2.2%	0.0%	**0.0%**
U.S. Bonds	-1.0%	0.0%	**0.0%**
Non-U.S. Bonds	3.6%	0.0%	**0.0%**
Domestic Commercial Property	10.6%	0.0%	**0.0%**
Foreign Commercial Property	12.0%	7.5%	**0.9%**
Commodities	0.5%	12.5%	**0.1%**
Timber	2.6%	7.5%	**0.2%**
U.S. Equity	6.5%	52.5%	**3.4%**
Foreign Equity (EAFE)	14.6%	5.0%	**0.7%**
Emerging Mkt. Equity	19.1%	10.0%	**1.9%**
Equity Market Neutral	3.9%	5.0%	**0.2%**
		100.0%	**7.4%**

	YTD 28Apr06	Weight	Weighted Return
	In US$		In US$
6% Target Real Return	YTD Returns are Nominal		
Asset Classes			
Real Return Bonds	-2.2%	0.0%	**0.0%**
U.S. Bonds	-1.0%	5.0%	**-0.1%**
Non-U.S. Bonds	3.6%	7.5%	**0.3%**
Domestic Commercial Property	10.6%	0.0%	**0.0%**
Foreign Commercial Property	12.0%	0.0%	**0.0%**
Commodities	0.5%	10.0%	**0.1%**
Timber	2.6%	10.0%	**0.3%**
U.S. Equity	6.5%	37.5%	**2.4%**
Foreign Equity (EAFE)	14.6%	15.0%	**2.2%**
Emerging Mkt. Equity	19.1%	10.0%	**1.9%**
Equity Market Neutral	3.9%	5.0%	**0.2%**
		100.0%	**7.3%**

	YTD 28Apr06	Weight	Weighted Return
	In US$		In US$
5% Target Real Return	*YTD Returns are Nominal*		
Asset Classes			
Real Return Bonds	-2.2%	2.5%	-0.1%
U.S. Bonds	-1.0%	22.5%	-0.2%
Non-U.S. Bonds	3.6%	10.0%	0.4%
Domestic Commercial Property	10.6%	2.5%	0.3%
Foreign Commercial Property	12.0%	0.0%	0.0%
Commodities	0.5%	15.0%	0.1%
Timber	2.6%	5.0%	0.1%
U.S. Equity	6.5%	12.5%	0.8%
Foreign Equity (EAFE)	14.6%	10.0%	1.5%
Emerging Mkt. Equity	19.1%	10.0%	1.9%
Equity Market Neutral	3.9%	10.0%	0.4%
		100.0%	**5.1%**

	YTD 28Apr06	Weight	Weighted Return
	In US$		In US$
4% Target Real Return	*YTD Returns are Nominal*		
Asset Classes			
Real Return Bonds	-2.2%	12.5%	-0.3%
U.S. Bonds	-1.0%	27.5%	-0.3%
Non-U.S. Bonds	3.6%	0.0%	0.0%
Domestic Commercial Property	10.6%	0.0%	0.0%
Foreign Commercial Property	12.0%	2.5%	0.3%
Commodities	0.5%	12.5%	0.1%
Timber	2.6%	7.5%	0.2%
U.S. Equity	6.5%	5.0%	0.3%
Foreign Equity (EAFE)	14.6%	15.0%	2.2%
Emerging Mkt. Equity	19.1%	7.5%	1.4%
Equity Market Neutral	3.9%	10.0%	0.4%
		100.0%	**4.3%**

	YTD 28Apr06	Weight	Weighted Return
	In US$		In US$
3% Target Real Return	*YTD Returns are Nominal*		
Asset Classes			
Real Return Bonds	-2.2%	12.5%	-0.3%
U.S. Bonds	-1.0%	32.5%	-0.3%
Non-U.S. Bonds	3.6%	12.5%	0.5%
Domestic Commercial Property	10.6%	0.0%	0.0%
Foreign Commercial Property	12.0%	0.0%	0.0%
Commodities	0.5%	10.0%	0.1%
Timber	2.6%	5.0%	0.1%
U.S. Equity	6.5%	5.0%	0.3%
Foreign Equity (EAFE)	14.6%	10.0%	1.5%
Emerging Mkt. Equity	19.1%	5.0%	1.0%
Equity Market Neutral	3.9%	7.5%	0.3%
		100.0%	**3.1%**

	YTD 28Apr06	Weight	Weighted Return
	In US$		In US$
2% Target Real Return	*YTD Returns are Nominal*		
Asset Classes			
Real Return Bonds	-2.2%	17.5%	-0.4%
U.S. Bonds	-1.0%	35.0%	-0.4%
Non-U.S. Bonds	3.6%	12.5%	0.5%
Domestic Commercial Property	10.6%	0.0%	0.0%
Foreign Commercial Property	12.0%	0.0%	0.0%
Commodities	0.5%	7.5%	0.0%
Timber	2.6%	5.0%	0.1%
U.S. Equity	6.5%	5.0%	0.3%
Foreign Equity (EAFE)	14.6%	5.0%	0.7%
Emerging Mkt. Equity	19.1%	5.0%	1.0%
Equity Market Neutral	3.9%	7.5%	0.3%
		100.0%	**2.2%**