

The Index Investor

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This Month's Issue: Key Points

This month's first two feature articles look at two new asset classes: timber and the volatility of the U.S. equity market. Timber has a unique three-part return generating process. Current income is provided by cutting and selling it. Over time, timber demand tends to grow with real gross domestic product, while timber prices have historically tended to rise at a rate somewhat above inflation. Capital gains come from the natural growth of the trees, plus appreciation of the land on which they are planted. The fact that timber is not included in most futures-based commodity index funds has led many investors to ask if it should be treated as a separate asset class. The answer from a growing number of institutional investors is, "yes." We agree, and find that it has not only attractive historical risk and return parameters, but also low correlations with many other asset classes.

We have long believed that equity volatility (i.e., the standard deviation of returns on a broad equity index) was a potentially attractive asset class. First, volatility is not stable over

time. Second, equity returns tend to be negatively correlated with volatility. When volatility (which is not constant over time) goes up, returns tend to go down. Third, since changes in equity volatility tend to track changes in credit spreads in the debt markets (i.e., the yield on risky debt instruments less the yield on default-risk free government bonds), the potential diversification benefits of adding this asset class to a portfolio appeared to be significant. However, until last year, it was hard to invest in equity volatility. That changed when a future contract based on the "VIX" index was introduced in the United States. The VIX tracks the volatility implied by the price of options contracts on the Standard and Poor's 500 Index. A similar contract had also been introduced in Germany (the "VOLAX" on the "DAX" equity index), but had not generated the same investor interest and liquidity as the VIX and its associated futures contract. The interesting question is whether non-U.S. dollar based investors could benefit from adding U.S. equity volatility as an asset class to their portfolios. We find that this appears to be the case. We conclude that the time has come to introduce a retail volatility index product based on continuously rolled over futures (similar to today's commodity index products).

Our third feature article updates our economic warning indicators. We conclude that the probability has decreased that the "conventional wisdom", "muddle through" scenario will come to pass, and that we are increasingly likely to encounter difficult economic circumstances in the not-too-distant future.

In our product and strategy notes section, we review a series of recent new product announcements, including the Virgin indexed superannuation offering in Australia, new tax changes and real return bond products in the Eurozone, and three new products in the United States: municipal real return bonds, ETFs that track microcap indexes, and a fund that tracks the "Arnett" fundamental value index discussed in our January issue.

This Month's Letter to the Editor

What does it mean to "separate alpha from beta?"

The terms "alpha" and "beta" refer to two different types of risk within an asset class, and the returns one earns for including them in your portfolio. "Beta" risk applies to the asset

class as a whole. For this reason, it is also known as "systematic" risk. "Alpha" is unique to a security, or group of securities within an asset class. It is also known as "company-specific" or "non-systematic risk." Within an entire asset class, the returns for bearing alpha risk cancel each other out, leaving the beta return for the asset class as a whole. For this reason, another term for alpha is "diversifiable risk", and another term for beta is "un-diversifiable" risk. For example, if you buy a broad based (highly diversified) equity index fund, the positive and negative alpha returns on the individual securities will net out, leaving you with just the return for bearing beta risk. On the other hand, when you buy an actively managed mutual fund that invests in a different mix of securities than those in the index, the alphas don't net out, and you are left with either a positive or negative alpha on top of the beta return for the asset class.

This simple example makes two important points. First, it shows that accurately forecasting alpha is the key to success for actively managed mutual funds that try to outperform an index through superior security selection within an asset class. Second, it raises a fundamental point about the expenses charged by actively managed funds. As I just noted, owning an index fund that provides you with the beta return on an asset class doesn't cost much -- usually well under .50% (fifty basis points). However, the typical expenses charged by actively managed funds are much higher -- 1.25% or more. Using this example, you are paying an additional .75% for the active manager's presumed skill at generating (positive) alpha. But this raises an obvious question: how many active managers consistently deliver alpha that is greater than the incremental costs they charge above and beyond those on a comparable index fund? Judging by the recent behavior of institutional investors, their answer is, "not many."

What we are increasingly seeing in the institutional world is the separate management of beta risk and alpha risk. Institutional investors start with a maximum amount of risk they want to take, given the liabilities they are trying to fund (e.g., long-term pension obligations). The majority of this is beta risk. Here the key challenge is deciding how to allocate it between different asset classes. The actual implementation of this policy is accomplished at the lowest possible cost through the use of indexed products. When it comes to the allocation of the remaining part of their risk budget to alpha risk, institutional investors are increasingly reluctant to allocate it to traditional "long-only" managers, whose returns are actually composed of both beta and alpha. Rather than paying high active manager charges for a

combination of beta and alpha returns, institutional investors are allocating the remaining portion of their portfolios to so-called "pure alpha" managers. A good example of this is an equity market neutral hedge fund. In this case, the manager of the fund would use his or her skill to forecast future positive and negative alphas for different stocks. He or she would go long the former and short the latter, while also using derivatives to eliminate his or her exposure to moves in the overall market. What is left is pure alpha. The net effect of this is that institutional investors are moving to a system where they pay a low price for beta risk and return, and a higher price for alpha risk and return.

The obvious question is, "to what extent can a retail investor replicate this strategy?" The answer ranges somewhere between "completely" and "quite closely." If you have sufficient assets, you can directly invest in an equity market neutral hedge fund, along with a mix of index funds covering different asset classes. You might also want to complement the equity market neutral hedge fund with a "global macro" fund, which aims to generate alpha through a superior ability to time changes in the returns to different types of beta risk (i.e., by constantly re-allocating funds to different asset classes, based on their forecast short term returns). If you can't directly invest in "pure alpha" type hedge funds, you can invest in the growing number of mutual funds that closely (if not perfectly) replicate their strategies. We have written about two of these funds in the past. The Hussman Strategic Growth Fund (HSGFX) employs some of the techniques used by equity market neutral managers (e.g., shorting the overall equity market to reduce the beta exposure of the stocks it owns). Alternatively, the PIMCO All Asset Fund (PASDX) aims to generate total returns by shifting its allocation across a wide range of asset classes. The following table shows the year-to-date nominal U.S. dollar returns for these funds, plus low-cost funds in other asset classes:

Asset Class	Fund	Ticker	YTD Return
Real Return Bonds	Vanguard Inflation Protected Securities	VIPSX	2.5%
U.S. Investment Grade Bonds	Vanguard Total Bond Market	VBMFX	2.5%
Foreign Currency Bonds	T. Rowe Price International Bond	RPIBX	(5.7%)
U.S. Commercial Property	Vanguard REIT Index	VGSIX	6.2%
Foreign Commercial Property	Fidelity International Real Estate	FIREX	0.3%* (fund launched in 2005)
Commodities	PIMCO Commodities Real Return	PCRDY	7.7%
U.S. Equity	Vanguard Total Stock Market	VTSMX	(.3%)
EAFE Equity	Vanguard Developed Markets Index	VDMIX	(1.5%)
Emerging Equity Markets	Vanguard Emerging Markets Index	VEIEX	5.2%
Equity Market Neutral	Hussman Strategic Growth	HSGFX	3.5%
Global Macro	PIMCO All Asset	PASDX	3.3%

Global Asset Class Returns

YTD 30Jun05	In USD	In AUD	In CAD	In EURO	In JPY	In GBP
Asset Held						
US Bonds	2.50%	5.25%	4.67%	13.44%	10.03%	9.14%
US Prop.	6.20%	8.95%	8.37%	17.14%	13.73%	12.84%
US Equity	-0.30%	2.45%	1.87%	10.64%	7.23%	6.34%
AUS Bonds	-0.74%	2.02%	1.43%	10.20%	6.79%	5.90%
AUS Prop.	-9.11%	-6.35%	-6.94%	1.83%	-1.57%	-2.47%
AUS Equity	5.87%	8.62%	8.04%	16.81%	13.40%	12.50%
CAN Bonds	3.34%	6.09%	5.51%	14.28%	10.87%	9.98%
CAN Prop.	6.20%	8.95%	8.37%	17.14%	13.73%	12.84%
CAN Equity	4.97%	7.73%	7.14%	15.91%	12.51%	11.61%
Euro Bonds	-6.33%	-3.58%	-4.16%	4.61%	1.20%	0.31%
Euro Prop.	9.12%	11.87%	11.28%	20.05%	16.65%	15.75%
Euro Equity	-2.01%	0.74%	0.16%	8.93%	5.52%	4.62%
Japan Bonds	-5.72%	-2.97%	-3.55%	5.22%	1.81%	0.92%
Japan Prop.	2.01%	4.76%	4.18%	12.95%	9.54%	8.64%
Japan Equity	-7.14%	-4.39%	-4.98%	3.80%	0.39%	-0.51%
UK Bonds	-2.05%	0.70%	0.12%	8.89%	5.48%	4.59%
UK Prop.	-4.95%	-2.20%	-2.78%	5.99%	2.58%	1.69%
UK Equity	-0.66%	2.09%	1.50%	10.28%	6.87%	5.97%
World Bonds	-1.60%	1.15%	0.57%	9.34%	5.93%	5.04%
World Prop.	3.91%	6.66%	6.08%	14.85%	11.44%	10.54%
World Equity	-0.55%	2.20%	1.62%	10.39%	6.98%	6.09%
Commodities	7.70%	10.45%	9.87%	18.64%	15.23%	14.34%
Timber	0.77%	3.53%	2.94%	11.71%	8.31%	7.41%
Hedge Funds	0.01%	2.76%	2.18%	10.95%	7.54%	6.65%
Volatility	-9.41%	-6.65%	-7.24%	1.53%	-1.87%	-2.77%
A\$	-2.75%	0.00%	-0.59%	8.19%	4.78%	3.88%
C\$	-2.17%	0.59%	0.00%	8.77%	5.36%	4.47%
Euro	-10.94%	-8.19%	-8.77%	0.00%	-3.41%	-4.30%
Yen	-7.53%	-4.78%	-5.36%	3.41%	0.00%	-0.90%
UK£	-6.64%	-3.88%	-4.47%	4.30%	0.90%	0.00%
US\$	0.00%	2.75%	2.17%	10.94%	7.53%	6.64%

Equity and Bond Market 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. These estimates are shown in the following tables, where a value greater than 100% implies overvaluation, and less than 100% implies undervaluation:

<i>Australia</i>	Low Demanded Return	High Demanded Return
High Supplied Return	97%	164%
Low Supplied Return	185%	272%

<i>Canada</i>	Low Demanded Return	High Demanded Return
High Supplied Return	103%	169%
Low Supplied Return	191%	278%

<i>Eurozone</i>	Low Demanded Return	High Demanded Return
High Supplied Return	53%	97%
Low Supplied Return	98%	151%

<i>Japan</i>	Low Demanded Return	High Demanded Return
High Supplied Return	61%	153%
Low Supplied Return	179%	314%

<i>United Kingdom</i>	Low Demanded Return	High Demanded Return
High Supplied Return	54%	94%
Low Supplied Return	95%	143%

<i>United States</i>	Low Demanded Return	High Demanded Return
High Supplied Return	97%	164%
Low Supplied Return	185%	272%

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	2.63%	2.96%	5.59%	5.12%	-0.47%	4.54%
Canada	1.83%	2.40%	4.23%	3.80%	-0.43%	4.17%
Eurozone	1.27%	2.37%	3.64%	3.13%	-0.51%	5.05%
Japan	0.49%	0.77%	1.26%	1.18%	-0.08%	0.79%
UK	1.47%	3.17%	4.64%	4.17%	-0.47%	4.58%
USA	1.67%	2.93%	4.60%	3.98%	-0.62%	6.13%

It is important to note some important limitations of this analysis. First, it uses the current yield on real return government bonds. Over the past forty years or so, it has averaged around 3.00%. Were we to use this rate, bond markets would generally look even more overvalued.

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 A\$	To C\$	To EU	To YEN	To GBP	To US\$
From						
A\$	0.00%	-1.32%	-1.99%	-3.94%	-0.95%	-1.14%
C\$	1.32%	0.00%	-0.67%	-2.62%	0.37%	0.18%
EU	1.99%	0.67%	0.00%	-1.95%	1.04%	0.85%
YEN	3.94%	2.62%	1.95%	0.00%	2.99%	2.80%
GBP	0.95%	-0.37%	-1.04%	-2.99%	0.00%	-0.19%
US\$	1.14%	-0.18%	-0.85%	-2.80%	0.19%	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 employing different strategies expect the economy 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. Similar returns in multiple columns (within the same strategy) indicate a relative lack of agreement between investors about the most likely future state of the economy.

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

<i>Economy</i>	Bottoming	Strengthening	Peaking	Weakening
<i>Interest Rates</i>	Falling	Bottom	Rising	Peak
<i>Style Rotation</i>	Growth (IWZ) -1.76%	Value (IWW) 1.56%	Value (IWW) 1.56%	Growth (IWZ) -1.76%
<i>Size Rotation</i>	Small (IWM) -0.97%	Small (IWM) -0.97%	Large (IWB) 0.25%	Large (IWB) 0.25%
<i>Style and Size Rotation</i>	Small Growth (DSG) 1.16%	Small Value (DSV) -1.09%	Large Value (ELV) 0.38%	Large Growth (ELG) -4.01%
<i>Sector Rotation</i>	Cyclicals (IYC) -3.26%	Basic Materials (IYM) -7.24%	Energy (IYE) 20.41%	Utilities (IDU) 14.15%
	Technology (IYW) -5.40%	Industrials (IYJ) -4.77%	Staples (IYK) -1.02%	Financials (IYF) -2.42%
<i>Bond Market Rotation</i>	High Risk (VWEHX) 0.80%	Short Maturity (VBISX) 0.90%	Low Risk (VIPSX) 2.50%	Long Maturity (VBLTX) 7.30%

Timber as an Asset Class

The fact that timber is not included in most futures-based commodity index funds has led many investors to ask if it should be treated as a separate asset class. The answer from a growing number of institutional investors is, "yes." To begin with, timber has a unique three-part return generating process. Current income is provided by cutting and selling the timber. Over time, timber demand tends to grow with real gross domestic product, while timber prices have historically tended to rise at a rate somewhat above inflation.

Capital appreciation on a timber investment comes from the appreciation of the land itself (e.g., as it becomes more valuable to housing developers), and from the natural growth of the trees. Measuring the historical returns and risks on timber is somewhat difficult because of the absence of a standardized tradable product that covers the whole asset class. As a result, different methods have been used to construct "synthetic" indexes. For example, the National Council of Real Estate Investment Fiduciaries is a group of institutional investors who directly own timber and other commercial properties. Their index is constructed on the basis of actual returns their members have earned on timber properties in the United States. In contrast, the Hancock Timber Resources Group uses an econometric approach based on timber prices to estimate returns on timber not only in the United States, but also in two other key production areas, British Columbia and New Zealand. The good news is that both deliver similar estimates of the risk and return for this asset class. Between 1989 and 2004, the average real U.S. dollar return on the (U.S. only) NCREIF Timber Index was 10.67%, with a standard deviation of 8.76%. Between 1963 and 2002, the average real U.S. dollar return on the global Hancock Timber Index was 9.29% with a standard deviation of 12.40%.

However, you cannot invest in a timber index; you can only invest in companies or trusts that own timber, which exposes you to alpha in addition to beta risk. For example, between 1990 and 2004, Plum Creek Timber (PCL), which owns a well-diversified group of properties in the United States, delivered average annual real returns of 25.34%, with a similar standard deviation. However, in New Zealand, the three major timber companies (Carter Holt Harvey, Fletcher Forests, and Evergreen Forests) all had negative average real returns over the past ten years (Fletcher has consequently sold its timber properties, while the other two

are reducing their holdings). Other possible timber investments include Rayonier (RYN), Deltic (DEL), TimberWest (TWF.UN), and West Fraser Timber (WFT.TO).

With that important caution in mind, let's take a look at the real returns on timber over the 1989 -2004 period in different currencies, and their correlation with returns for other asset classes over this period.

	A\$	C\$	Euro	Yen	GBP	USD
Average Annual Return	12.7%	11.4%	10.1%	11.6%	10.0%	10.7%
Std. Deviation	11.1%	11.0%	15.3%	15.1%	14.5%	8.8%
Skewness	.08	1.32	1.73	.54	2.62	2.25
Kurtosis	(.73)	3.42	5.71	1.33	11.13	6.80
Correlations						
Domestic Bonds	.21	.15	.06	(.07)	.08	.21
World Bonds	.16	.39	.71	.66	.63	(0.4)
Domestic Comm'l Property	.39	(.32)	.21	(.17)	.14	.01
Commodities (GSCI)	(.02)	0.0	.25	.34	.20	(.13)
Domestic Equity	.54	(.06)	.35	.76	.27	.18
Foreign Equity	.36	.08	.55	.54	.44	.11
Emerging Equity	.27	(.07)	.47	.35	.36	.04
Equity Market Neutral HF	.14	.62	.76	.86	.54	(.01)
Global Macro HF	.08	.14	.37	.54	.14	(.22)

As you know, we use two different tests to define an asset class. First, it must have a return generating process that is substantially different from those of other asset classes. Second, its correlation of returns with other asset classes must, on average, be less than .65 (which leads to asset allocation solutions that are relatively insensitive to small changes in expected returns). We conclude that timber meets these tests, so we will include it as a possible asset class when we update our model portfolios later this year. In the meantime, we are also including year-to-date nominal returns for timber in our global asset class returns summary. This return is a weighted (70/30) combination of the year-to-date returns on Plum Creek Timber (PCL) and Rayonier (RYN).

Equity Volatility as an Asset Class

We have long believed that equity volatility (i.e., the standard deviation of returns on a broad equity index) was a potentially attractive asset class. First, volatility is not stable over time. Second, equity returns tend to be negatively correlated with volatility. When volatility (which is not constant over time) goes up, returns tend to go down. Third, since changes in equity volatility tend to track changes in credit spreads in the debt markets (i.e., the yield on risky debt instruments less the yield on default-risk free government bonds), the potential diversification benefits of adding this asset class to a portfolio appeared to be significant. However, until last year, it was hard to invest in equity volatility. That changed when a future contract based on the "VIX" index was introduced in the United States. The VIX tracks the volatility implied by the price of options contracts on the Standard and Poor's 500 Index. A similar contract had also been introduced in Germany (the "VOLAX" on the "DAX" equity index), but had not generated the same investor interest and liquidity as the VIX and its associated futures contract.

The underlying payoff on the VIX is easy to understand. Rising uncertainty and risk typically lead to increases in implied volatility and the value of the VIX. These increases in perceived risk are often associated with declining returns on the equity asset class. In theory, these can be offset by increased returns on a futures contract tied to the VIX. A second benefit of investing in VIX futures is more subtle. Returns on many hedge fund strategies are not normally distributed -- they have significant skewness (i.e., they are more tilted than

normal) and kurtosis (i.e., they have fatter tails -- more extreme returns -- than normal). Statistically, these are related to the fact that volatility is not constant over time, and instead varies between high and low regimes. To some extent, investing in VIX futures can offset the negative impact of changes in equity market volatility, and in so doing make "more normal" the distribution of returns in a portfolio that includes hedge funds (for more on this, see "How the VIX Ate My Kurtosis" by Keith Black).

The interesting question is whether non-U.S. dollar based investors could benefit from adding U.S. equity volatility as an asset class to their portfolios. The following table shows the impact this would have, as well as the average real returns from holding the VIX between 1990 and 2004.

	A\$	C\$	Euro	Yen	GBP	USD
Average Annual Return	0.3%	8.9%	7.8%	8.2%	7.0%	7.9%
Std. Deviation	8.6%	62.7%	58.0%	60.0%	59.4%	60.4%
Skewness	1.28	1.51	1.32	1.27	1.38	1.51
Kurtosis	2.38	2.64	2.12	2.11	2.29	2.54
Correlations						
Domestic Bonds	(.06)	.06	.20	.04	.02	.19
World Bonds	.53	.46	(.07)	.18	.12	.25
Domestic Comm'l Property	..06	(.17)	(.44)	(.25)	(.37)	(.34)
Commodities (GSCI)	.23	.35	.17	.26	.22	.26
Domestic Equity	(.15)	(.51)	(.56)	(.39)	(.57)	(.61)
Foreign Equity	.23	(.38)	(.50)	(.46)	(.50)	(.47)
Emerging	(.13)	(.47)	(.44)	(.44)	(.45)	(.51)

	A\$	C\$	Euro	Yen	GBP	USD
Equity						
Equity Market Neutral HF	.23	.33	(.15)	.12	(.12)	(.09)
Global Macro HF	(.01)	.23	(.06)	.12	(.02)	.02

As you can see, there appears to be a strong case for including U.S. equity market volatility, as measured by the VIX index, as a new asset class when we update our model portfolios later this year. We also hope that at some point, a retail index product will be introduced, based on continuously rolled over VIX futures (i.e., one similar to current commodity index fund products). In the meantime, we are also including year-to-date nominal returns for volatility in our global asset class returns summary.

Economic Warning Indicators: An Update

Due to reader requests, each quarter this year we will update the warning indicators we described in our March Economic Review. They are intended to help us understand which of two directional scenarios may be developing. The first of these is our "conventional wisdom" scenario, in which the global economy continues to "muddle through" without a major crisis. Logically, this requires continued demand growth in the United States and China (the worlds two growth locomotives today), and the continued willingness of foreign investors (especially Asian central banks) to keep accumulating dollar denominated assets to finance the United States current account deficit.

Our most dangerous scenario is characterized by a sudden rush out of dollar investments, perhaps caused by foreign (and some domestic) investors' declining confidence in the ability of U.S. political leaders to resolve that country's fiscal problems (particularly those related to the exploding costs of Social Security and Medicare). This would not only cause a much sharper fall in the U.S. exchange rate than we have seen thus far, but also a sharper rise in nominal U.S. interest rates (as bonds are sold, their prices fall, which causes their yields to rise). Domestically, this could trigger a fall in housing values, a wave of bankruptcies by heavily leveraged consumers and a crash stop in their spending, which would

plunge the U.S. into a deep, and quite possibly deflationary recession. Internationally, this would trigger a sharp drop in export demand in all those other regions whose growth is heavily dependent on the United States. Most dangerously, this would include China, where the sharp slowdown in growth could easily trigger the bursting of domestic property bubbles and increased social unrest, with very unpredictable consequences (e.g., aggression toward Taiwan to maintain the Communist Party's political power). Finally, faced with a choice of inflating away the wealth of bondholders (and enriching holders of residential real estate with low fixed rate mortgages) or watching large numbers of voters losing their homes to bankruptcy, we believe it would not be long before American political leaders, possibly in cooperation with other nations, embarked upon a massive exercise in monetary expansion and reflation. Whether this would be sufficient to keep the world economy out of a prolonged Japan style stag-deflation remains to be seen.

An excellent place to start with our warning indicator update is the recently released annual report from the Bank for International Settlements. It begins with a short review of the last twenty years of economic history, and finds that "four features stand out. The first has been a welcome reduction in inflation worldwide and an associated decline in its volatility. The second has been generally robust growth in the global economy, again accompanied by lower short-term volatility, with sluggish growth in Japan and Germany more recently an important exception to this rule. The third feature has been the widening of external imbalances [e.g., the U.S. current account deficit]. And finally, one must note the increasing prominence of credit, asset price and investment booms, often followed by financial difficulties of various kinds...The single most remarkable feature in the financial area has been the recurrence of credit, asset price, and investment booms and busts. A first cycle began in the industrial countries in the 1970s, affecting both equities and real estate. A second cycle started in the mid-1980s, ending in a property bust a few years later...Moreover, it seems increasingly evident that we are today well into the boom phase of a third such cycle, dating from the economic upturn of the mid-1990s. Equity prices were affected first but, after their sharp decline in early 2001, the upward momentum of demand was transferred to the housing market. Indeed, it is not an exaggeration to say that, over the last year or so, the house price phenomenon has achieved global sweep. Most industrial countries are now

showing signs of overheating in the housing market. So too are many emerging market economies, including China and Korea..."

"Explaining these broad macroeconomic developments in a parsimonious way presents a great analytical challenge. What is clear is that they have taken place against a background of at least three welcome structural shifts in the global economy. First, the liberalization of the economies of many emerging markets has unleashed competitive forces that have led to major changes in the industrial world as well. Indeed, the integration of China and other previously socialist countries into the global market economy is an unprecedented occurrence. Second, there has been a similar pattern of liberalization in financial markets, which has both made them more efficient and given them global reach. And third, monetary authorities almost worldwide have increasingly on bringing inflation down to low levels and keeping prices stable thereafter. What is not clear is whether the interaction of these structural forces has had, or might still have, some unwelcome side effects as well..."

"One possibility is that problems encountered to date will, in the end, prove only transitional. Learning to live with low inflation, a liberalized financial sector, and recent advances in financial technology simply takes time. During the learning process, disruptive mistakes have been made by their incidence and costs will decline [in the future]...An alternative possibility is that such instability might be longer lasting. Liberalize financial systems, while more efficient than repressed ones, might be inherently prone to instability if competitive pressures occasionally lead to excessive risk taking. A second point is that they also seem to be inherently procyclical. That is, perceptions of value and risk move up and down with the economy, as does the willingness to take on risk. Credit spreads, asset prices, external ratings... and [bank] loan loss provisions have all demonstrated this characteristic over the last few decades. This can result in powerful financial forces spurring real economic growth during an economic upturn, but an equally powerful downdraft should the initial optimism eventually come to be seen as excessive."

If these trends brought us to where we are today, the BIS also notes that over the past year, "evidence began to accumulate which suggested a heightened probability of turning points. Inflationary pressures appeared to be growing, even as output growth in the industrial countries showed signs of slowing. In addition, the prices of many financial assets started to

soften after looking increasingly disconnected from both fundamentals and the mounting uncertainties about the economic outlook...A continuation of steady, non-inflationary growth might seem the most likely outcome, given the positive aspects of the fundamental structural changes described above. However, it is by no means guaranteed. On the one hand, the significant monetary stimulus seen to date could yet end in overt inflation. On the other hand, the implications of growing debt levels, both domestic and international, remain a great unknown. Either debtors or creditors, or both, might retrench as debt levels mount. Reductions in asset prices and assessments of private sector wealth could reinforce such behavior...Given how little experience we have had with the interactions of the many structural changes [that have taken place], these less welcome possibilities cannot be ruled out...From this perspective, the unforeseen developments that regularly emerge serve as healthy reminders of the limitations of our understanding of the dynamics of a modern economy."

One particular point of global economic vulnerability is the apparent boom in housing markets around the world. This subject has recently been analyzed by a number of publications, including the Financial Times, the Wall Street Journal, and the Economist. The latter stated its case quite succinctly: "Never before have real house prices risen so fast, for so long, in so many countries...Not only does this dwarf any previous house price boom, it is larger [as a percentage of gross domestic product] than the global stock market bubble in the late 1990s, or America's stock market bubble in the late 1920s. In other words, it looks like the biggest bubble in history." The authors of this article note that around the world, rent to house price ratios (a rough equivalent of the dividend yield in an equity market) are at all time lows. To bring them back in line with historical norms, either rents must rise substantially, or prices fall. In a low inflation environment, the Economist believes the latter more likely. And, as has been noted by multiple commentators, a sharp fall in house prices would be disastrous for domestic demand, and consumers' ability to service their record levels of debt. However, we have also noted an alternative scenario: a sharp reflation to avoid a prolonged Japan-style deflationary depression. In this case, those consumers who have financed their home with a fixed rate mortgage will receive windfall gains, as inflation sharply reduces the real value of their debt. If push ever comes to shove, we think that for this reason inflation, not prolonged middle class misery, is the more politically preferable, and therefore likely,

outcome. Still, we should all keep a close eye on Australia and the U.K., (where housing markets are rapidly cooling) to see how this scenario might unfold.

Another area that has seen interesting developments of late has been China. Reports indicate that popular unrest is continuing to increase, but not yet to the point that it has acquired a national critical mass. An interesting theory put forth in a recent paper ("Chinese Government Responses to Rising Social Unrest" by Murray Tanner of the RAND Corporation) is that the Chinese government may be moving toward increased use of nationalism to redirect this growing popular frustration. Tanner gives the example of the recent demonstrations against Japan. Another one that is on the horizon is increased tensions with the United States. Apparently, the new head of the Central Intelligence Agency has conducted a "Team B" analysis (i.e., a review of existing data by a team of outside analysts) that has concluded that the United States has missed a sharp increase in Chinese military modernization in recent years. Rumors also have it that this impression will be reinforced in the Pentagon's upcoming annual report to the U.S. Congress on Chinese military power, which may assert that China is becoming a "fascist, socialist, nationalist" state that increasingly threatens the United States' global interests. At a time when China plays an increasingly important role in many industry supply chains, not to mention the financing of the U.S. current account deficit, this is not a welcome development. The following table updates the current state of our other warning indicators:

Indicator to Watch	Dangerous Trend	Current Assessment
Real Interest Rates	Falling trend (sign of worry about long term economic growth slowdown)	Falling (indicates weakening demand and investment relative to increased saving by more worried consumers)
Oil Prices	Remain high and/or rise higher (raises probability of global growth slowdown)	Rising; now above \$60/BBL
U.S. Ten Year Treasury Bond Nominal Yield	Rising trend (raises probability of slowdown)	Falling (Potential indicator of weakening economy)
U.S. Dollar Exchange Rate	Falling trend (weakening dollar, which should trigger	Rising (A temporary result of reduced confidence in the

Indicator to Watch	Dangerous Trend	Current Assessment
	higher U.S. interest rates and slowing economy)	long term health of the Euro, following the "Non" vote on the proposed EU Constitution?)
Inflation in China	Rising trend is a leading indicator of economic pressures; could lead to exchange rate appreciation and bubble collapse.	April and May saw declines in year on year inflation.
Political Stability in China	Reports of growing political unrest, which could also lead to sharp economic slowdown and/or more external tension with United States and/or Japan	Recent reports of growing unrest caused by popular frustration about corruption, rising inequality. Government attempting to use nationalism to redirect anger toward Japan? Or U.S.A.?
Real Domestic Demand Growth in the Eurozone	Falling trend (no sign of region replacing U.S. as global growth engine)	Falling. Little progress toward structural reform. Upcoming election in Germany will be a good indicator of the extent of popular support for the reforms needed to stimulate domestic demand growth.
Real Domestic Demand Growth in Japan	Falling trend (no sign of region replacing U.S. as global growth engine)	Demand seems to be growing; however, renewed conflict between Ministry of Finance and Bank of Japan over monetary policy could yet choke it off.
H5N1 Pandemic Influenza	Signs of increased communicability between humans, with no reduction in currently high mortality rates. Pandemic could result in sharp, and possibly prolonged reduction in global economic growth.	Clear indications that communicability is improving (see www.recombinomics.com). Major question mark about whether this has been accompanied by a fall in mortality rates may be resolved as more

Indicator to Watch	Dangerous Trend	Current Assessment
		information about reported outbreak in Western China becomes available.

In light of all these developments, we continue to believe that the probability has decreased that the "conventional wisdom", "muddle through" scenario will come to pass, and that we are increasingly likely to encounter difficult economic circumstances in the not-too-distant future.

Product and Strategy Notes

Virgin Launches Index Superannuation Offering in Australia

For a fee of just one percent per year (well below that charged on actively managed offerings), Virgin Money has recently launched a new index-based superannuation fund. Until now, the main competitor in this low-cost space has been Vanguard. For readers outside Australia, these are defined contribution pension plans to which contributions are mandatory. The underlying index funds are provided by Macquarie Funds Management. Virgin is concentrating on what it does best: branding and marketing. The Virgin offering is also one of the first to introduce a lifecycle fund option to the Australian market, in addition to a self-managed asset allocation approach. The new Virgin super includes the following asset class options: domestic bonds, domestic property, domestic equity and foreign developed market equity. In the future, we hope they add more asset classes, which would further improve the potential benefits to investors.

New U.S. Microcap Exchange Traded Funds on the Way

As described in our June, 2004 article on the advantages and disadvantages of tilting one's equity allocation toward small cap companies, "micro caps" are the smallest companies in the public equity market. Our analysis showed that a tilt toward microcaps historically produced a better information ratio (a measure of incremental return relative to incremental risk versus the broad equity market index) than a tilt toward small caps. Back then, the problem was that

it was hard to implement this approach using an index fund. In the United States, only two were available: the Bridgeway Ultra-Small Company Market Fund (BRSIX) which was then closed (it has since re-opened to new investors), and the DFA U.S. MicroCap Fund (DFSCX). That is about to change.

In the past month, two new microcap indexes (which are expected to serve as the basis for new exchange traded funds) were launched by the Frank Russell Company and by Dow Jones. They join the new microcap index launched earlier this year by MSCI, and existing indexes from Wilshire and the University of Chicago Center for Research in Securities Prices (CRSP). However, as is ever the case, not all microcap indexes are the same.

As we have noted in other articles, when it comes to constructing an equity index, there are two basic approaches one can take. Either one include a fixed number of companies in the index, and vary the percentage of total market capitalization it covers, or one can take the opposite approach, targeting coverage of a fixed percentage of market cap, and letting the number of companies vary to achieve it. Indexes that start with a fixed number of companies (ranked by market capitalization) include those from Russell (e.g., the Russell 3000 Index), Standard and Poor's (e.g., the Standard and Poor's 500 Index), and Morgan Stanley Capital International (e.g., the MSCI Investable Market 2500 Index). Indexes that start with a fixed percentage of market capitalization include those from Wilshire (e.g., the Wilshire 5,000, which covers 100% of market capitalization), Dow Jones (e.g., the Dow Jones Total Market Index covers 95% of market capitalization) and Morningstar (whose broad index covers 97% of market capitalization).

To understand where the differences between the new microcap indexes, it helps to take a closer look at the classifications used by different index providers. Wilshire is the most straightforward. Its Wilshire 5000 is the broadest of all U.S. equity indexes, and covers 100% of total U.S. equity market capitalization. It defines the top 750 companies ranked by market cap as “large cap”. Confusingly, it defines companies ranked 500 to 1000 as “midcap” – there is thus a 250 company overlap with the “large cap” index. Companies ranked 751 to 2500 are “small cap”. Again, there is a 250 company overlap with the midcap index. Companies ranking below 2500 are micro caps. And if that wasn't confusing enough, the second best known Wilshire index is probably the 4500 (or “completion index”), which includes all companies in the U.S. market that are not included in the Standard and Poor's 500.

Standard and Poor's, which has yet to launch a microcap index, uses a committee to select companies to include in its 500 (large cap) which covers about 77% of total U.S. public equity market capitalization, 400 (mid cap; 7% of total market capitalization) and 600 (small cap; 3% of total market capitalization) indexes. Together, they make up the S&P 1500 (broad market) index. In this sense, there is a degree of "active management" involved in the construction of these indexes.

The top 3,000 companies (ranked by market capitalization) make up the Russell 3000 (broad market) index. Collectively, they cover about 98% of total U.S. public equity market capitalization. The Russell 1000 index includes the largest companies ranked by market capitalization. Together, they make up about 90% of total market cap. The 1000 is further divided into the large cap 200 index (about 67% of total market capitalization) and the mid cap 800 (23% of total market cap). The Russell 2000 covers the bottom part of the 3000, and includes about 8% of total market capitalization. Confusingly, the new Russell microcap index will include the smallest 1000 companies in the Russell 2000, plus the next 1000 companies (i.e., from 3001 to 4000) ranked by market capitalization. Hence, if you invest in both the Russell 2000 and the Russell microcap indexes, you will be giving a very heavy weight to the 1000 companies that are common to both.

The MSCI Investable Market Index includes the top 2,500 companies ranked by market capitalization. MSCI notes that "the investable market segment includes all securities with reasonable size, liquidity, and investability that can cost effectively be represented in institutional and pooled retail portfolios of reasonable size." MSCI also claims that, like Russell, its investable index covers about 98% of total market capitalization. However, because it contains 500 fewer companies, its coverage is probably somewhat lower. The top 300 companies ranked by market capitalization make up its large cap index (covering about 71% of total market cap), the next 450 its mid cap index (15% of total market cap) and the next 1750 its small cap index (12% of total market cap). MSCI notes that "the micro cap [index] will comprise companies with a market capitalization rank lower than the 2,500 companies in the investable market segment and included in the top 99.5% of the US equity universe ranked by full market capitalization. The micro cap segment is estimated to cover around 1.5% of the market capitalization of the US equity universe...The combination of the Investable Market Index and the Micro Cap Index form the US Broad Market Index, which

thus includes the companies comprised in the top 99.5% of the US equity universe ranked by full market capitalization.” The Broad Market Index is the one tracked by the popular Vanguard Total Market index (VTSMX) and exchange traded funds (VTI).

The Dow Jones Total Market Index covers 95% of total market capitalization. When companies are ranked by market capitalization, those that make up the top 70% of the market are included in the large cap index, the next 20% in the mid cap index, and the next 5% in the small cap index. The new Dow Jones Select Microcap Index uses a different methodology. It defines the microcap universe to include companies in the smallest two deciles (numbers 9 and 10) as defined by CRSP. From this group, it then selects a smaller number (currently only 281) based on their relative liquidity and other screening criteria (most of which look like value screens to us). We suspect that this will bias the coverage of this index toward companies that are typically included (though at the bottom end) of the small cap, rather than microcap, indexes that are produced by others.

Since both the Bridgeway and DFA microcap funds are also based on the CRSP methodology (10 in the case of the former, and 9 and 10 in the case of the latter), it is useful to take a closer look at it. To put it charitably, the CRSP takes a hybrid approach. It starts with the companies listed on the New York Stock Exchange, ranked by market capitalization, and divides them into ten equal groups (e.g., 178 companies in each group). Next it determines the market cap "breakpoints" for each group (that is, the high and low market capitalizations that define each group's boundaries). Using these breakpoints, it then assigns companies from the American Stock Exchange and National Association of Securities Dealers Automated Quote System (the NASDAQ) to different groups, which it calls "deciles." Stocks in deciles 1 and 2 are often called "large caps", those in deciles 3 to 5, "mid-caps", those in deciles "6 to 8, "small-caps", and those in deciles 9 and 10, "micro-caps." Unfortunately, this can easily create confusion, because the "deciles" contain neither equal percentages of total market capitalization, nor equal numbers of companies.

So far, ETFs that will track the Russell and DowJones micro cap indexes have been registered with the Securities and Exchange Commission (but not yet launched). We would not be surprised to soon see Vanguard join this lineup, with a microcap index product tied to the MSCI index. Frankly, we hope that this happens soon, because it strikes us that both the Russell and DowJones microcap indexes have significant limitations for anyone wanting to

take a true microcap tilt in his or her U.S. equity allocation. Until such a product is offered, we continue to prefer the Bridgeway fund (BRSIX) for taking microcap tilts.

Last but not least, we offer a final caution about this tilt. Thanks to the increased regulatory requirements created by the Sarbanes Oxley legislation, the cost of being a public company has become much more onerous. At the same time, the amount of money controlled by private equity partnerships has substantially increased. We are now facing a situation in which small companies no longer have to go public to obtain the capital they need to grow. In fact, one could argue that there is a substantial disincentive to doing so. This raises the possibility that at exactly the time more new microcap index funds are being created, the number of companies in this segment of the public equity market will be declining (or at least not growing at the same pace as the flow of investable funds moving into this sector). To us, that suggests a heightened risk of overvaluation, and ripe opportunities for active momentum investors. It is a caution worth keeping in mind as the wave of new microcap marketing materials hits your mailbox.

New Real Return Bond Products in Eurozone and U.S.

Lyxor Asset Management (<http://retail.lyxor.com>) has just launched the EuroMTS Inflation Linked exchange traded fund (MTI.PA). It tracks the EMTXi index, which is composed of Eurozone inflation linked government bonds. Along with recent launches of ETFs that track Eurozone commercial property and the Goldman Sachs Commodities Index, this marks a major step forward in the development of the Eurozone ETF market.

In the United States, this month saw a second real return bond issue by a U.S. state, when Connecticut joined Massachusetts in this asset class. Both of these bonds not only have attractive tax characteristics (they are exempt from both federal and state taxes for residents of these states), but also have the same coupon adjustment mechanism used by Series I Savings Bonds (which we prefer to the capital adjustment approach used by Treasury Inflation Protected Securities).

New PIMCO Fund Linked to “Arnott Index”

Back in January, we wrote about Bob Arnott’s new approach to index weighting, which uses indicators such as book asset value, sales, and cash flow rather than stock market capitalization. Arnott calls this approach “fundamental” weighting, which produces a “Main Street” rather than “Wall Street” index. Most interestingly, he also found that, on a backtested basis, his new index (based on the top 1000 companies in the U.S. public equity market) outperformed similar market cap weighted products. For example, between 1962 and 2003, it outperformed the Russell 1000 by an average of 2.06% per year. Our analysis found that this was due to the value tilt implicit in the fundamental index. PIMCO has now launched two new funds based on Arnott’s work. The first new fund is called the Fundamental IndexPlus Fund, and will track the RA Fundamental 1000 Index. Unfortunately, it does not have a ticker symbol yet. In another interesting twist, the fund will attempt to implement its equity allocations using derivatives, while investing most of its capital in short term bonds. In essence, this is a type of alpha overlay strategy on top of a fixed income fund managed by PIMCO (one of the world’s best fixed income managers). The second new fund will be called the Fundamental IndexPlus TR Fund. Unlike the basic fund, this one will invest in both short and medium term bonds, up to 30% of which can be denominated in foreign currencies and up to 10% of which can be high yield. So in this case, we have an equity index overlay on top of an active bond strategy. Definitely not your typical index funds, but very interesting nonetheless. The expense charge will be .90% per year on the Fundamental IndexPlus fund, and 1.14% on the TR fund.

Bad News for Active UK and Eurozone Investors

You would think that in a low return environment, fund managers would be trying to cut their products expenses, right? Not so in the U.K., where a number of actively managed funds have just announced increases of between .25% to .30%. Makes index tracker funds look better than ever, doesn’t it?

And that’s before taking taxes into account. The European Savings Tax Directive became effective on 1 July 2005. Under its terms, EU countries are going to start sharing

information about people non-residents who receive savings income in their jurisdictions, but reside elsewhere in the E.U. Austria, Belgium and Luxembourg will impose withholding taxes on savings income (which does not include dividends) rather than sharing information. The withholding tax will start at 15%, but rise to 35% by 1 July 2011. Interestingly, these new rules will not apply to investments owned by corporate entities and trusts. Plus ca change...

Model Portfolios Update

We produce three different types of model portfolios. Each of these is based on a different portfolio construction methodology.

We use a "rule of thumb" approach (or, to use the more formal term, a "heuristic approach") to construct our benchmark portfolios. More specifically, we use three "rules of thumb" that are often cited in news stories a mix of 80% equities and 20% debt (for our high risk/high return portfolios); a mix of 60% equities and 40% debt (for our moderate risk/moderate return portfolios); and a mix of 20% equities and 80% debt (for our low risk/low return portfolios). Using different terminology, somebody else might call these three portfolios aggressive, balanced, and conservative. We implement these three rules of thumb in two different ways (to construct six different benchmark portfolios). The first uses just two asset classes: domestic investment grade bonds and domestic equity. The second uses a broader mix of asset classes: domestic and foreign investment grade bonds, and domestic and foreign (including emerging market) equity. In addition to these 80/20, 60/40, and 20/80 portfolios, we also provide our "couch potato" portfolio. This portfolio is equally allocated to all of the asset classes we use. More formally, this is known as the "1/N heuristic," which research has shown is an approach used by a significant proportion of retirement plan investors. This portfolio implicitly assumes that it is impossible to accurately forecast future asset class risk and return; consequently, the best approach is to equally divide one's exposure to different sources of return (and risk). While we disagree with this assumption, intellectual honesty compels us to include the "couch potato" portfolio as one of our benchmarks. Finally, each year we also benchmark all our portfolios against the return from holding cash. We define this return as the yield to maturity on a one-year government security purchased at the end of the previous year. For 2005, the U.S. cash benchmark return is 2.75% (nominal).

The goal of our second set of model portfolios is to either deliver more return than the domestic benchmark portfolios, while taking on no more risk, or to deliver the same level of return while taking on less risk. To develop these model portfolios, we use a methodology known as "mean/variance optimization" or MVO. This approach uses three variables for each asset class (its expected return, standard deviation of returns, and correlation of returns with other asset classes) to construct different combinations of portfolios which maximize return

per unit of risk (another way of looking at this is that they minimize risk per unit of return). The MVO technique has some significant limitations. While it is a good approach to single year portfolio optimization problems, in multiyear settings it fails to adequately take into account the fact that poor portfolio performance in early years can substantially reduce the probability of achieving long term goals. It also fails to adequately account for most people's intuitive understanding of risk: what's important isn't standard deviation (the dispersion of annual returns around their mean), but rather the chance that I will fall short of my long-term goals. Given these limitations, our MVO portfolios are most appropriate for managers whose performance is evaluated on an annual basis in comparison to one of our benchmarks.

Our third set of model portfolios uses a simulation optimization methodology. It assumes 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 a 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 three different compound annual real return targets: 7%, 5%, and 3%. We produce two sets of these portfolios: one includes hedge funds as a possible asset class, and one does not.

The year-to-date results for all these model portfolios are shown in the tables on the following pages.

Model Portfolios Year-to-Date Performance

<i>These portfolios seek to maximize return while matching their benchmark's risk (standard deviation)</i>			
	YTD 30Jun05	Weight	Weighted Return
	In U.S. \$		In U.S. \$
High Risk/Return Portfolio			
<i>Asset Classes</i>			
<i>U.S. Benchmark</i>			
U.S. Equity	-0.3%	80%	-0.24%
U.S. Bonds	2.5%	20%	0.50%
		100%	0.26%
<i>Global Benchmark</i>			
U.S. Equity	-0.3%	40%	-0.12%
Non-U.S. Equity	-0.8%	40%	-0.32%
U.S. Bonds	2.5%	10%	0.25%
Non-U.S. Bonds	-5.7%	10%	-0.57%
		100%	-0.76%
<i>Recommended</i>			
U.S. Equity	-0.3%	55%	-0.17%
Foreign Equity (EAFE)	-1.5%	25%	-0.38%
Emerging Mkts Equity	5.2%	7%	0.36%
Commercial Property	6.2%	3%	0.19%
Commodities	7.7%	10%	0.77%
		100%	0.78%

<i>These portfolios seek to maximize return while matching their benchmark's risk (standard deviation)</i>			
Medium Risk/Return Portfolio			
<i>Asset Classes</i>			
<i>U.S. Benchmark</i>			
U.S. Equity	-0.3%	60%	-0.180%
U.S. Bonds	2.5%	40%	1.000%
		100%	0.820%
<i>Global Benchmark</i>			
U.S. Equity	-0.3%	30%	-0.09%
Non-U.S. Equity	-0.8%	30%	-0.24%
U.S. Bonds	2.5%	20%	0.50%
Non-U.S. Bonds	-5.7%	20%	-1.14%
		100%	-0.97%
<i>Recommended</i>			
U.S. Equity	-0.3%	47%	-0.14%
Foreign Equity (EAFE)	-1.5%	10%	-0.15%
U.S. Bonds	2.5%	12%	0.30%
U.S. High Yield Bonds	0.8%	5%	0.04%
Non-U.S. Bonds	-5.7%	5%	-0.29%
Commercial Property	6.2%	6%	0.37%
Emerging Mkts Equity	5.2%	5%	0.26%
Commodities	7.7%	10%	0.77%
		100%	1.17%

<i>These portfolios seek to maximize return while matching their benchmark's risk (standard deviation)</i>			
Low Risk/Return Portfolio			
<i>Asset Classes</i>			
<i>U.S. Benchmark</i>			
U.S. Equity	-0.3%	20%	-0.06%
U.S. Bonds	2.5%	80%	2.00%
		100%	1.94%
<i>Global Benchmark</i>			
U.S. Equity	-0.3%	10%	-0.03%
Non-U.S. Equity	-0.8%	10%	-0.08%
U.S. Bonds	2.5%	40%	1.00%
Non-U.S. Bonds	-5.7%	40%	-2.28%
		100%	-1.39%
<i>Recommended</i>			
U.S. Equity	-0.3%	16%	-0.05%
U.S. Bonds	2.5%	55%	1.38%
U.S. High Yield Bonds	0.8%	3%	0.02%
Real Return Bonds	2.5%	10%	0.25%
Commercial Property	6.2%	5%	0.31%
Foreign Equity (EAFE)	-1.5%	6%	-0.09%
Commodities	7.7%	5%	0.39%
		100%	2.21%

<i>These portfolios seek to minimize risk while matching their benchmark's returns.</i>			
	YTD 30Jun05	Weight	Weighted Return
	In U.S. \$		In U.S. \$
High Risk/Return Portfolio			
<i>Asset Classes</i>			
<i>U.S. Benchmark</i>			
U.S. Equity	-0.3%	80%	-0.24%
U.S. Bonds	2.5%	20%	0.50%
		100%	0.26%
<i>Global Benchmark</i>			
U.S. Equity	-0.3%	40%	-0.12%
Non-U.S. Equity	-0.8%	40%	-0.32%
U.S. Bonds	2.5%	10%	0.25%
Non-U.S. Bonds	-5.7%	10%	-0.57%
		100%	-0.76%
<i>Recommended</i>			
U.S. Bonds	2.5%	5%	0.13%
Commercial Property	6.2%	10%	0.62%
U.S. Equity	-0.3%	58%	-0.17%
Foreign Equity (EAFE)	-1.5%	17%	-0.26%
Commodities	7.7%	10%	0.77%
		100%	1.09%

<i>These portfolios seek to minimize risk while matching their benchmark's returns.</i>			
Medium Risk/Return Portfolio			
<i>Asset Classes</i>			
<i>U.S. Benchmark</i>			
U.S. Equity	-0.3%	60%	-0.18%
U.S. Bonds	2.5%	40%	1.00%
		100%	0.82%
<i>Global Benchmark</i>			
U.S. Equity	-0.3%	30%	-0.09%
Non-U.S. Equity	-0.8%	30%	-0.24%
U.S. Bonds	2.5%	20%	0.50%
Non-U.S. Bonds	-5.7%	20%	-1.14%
		100%	-0.97%
<i>Recommended</i>			
U.S. Equity	-0.3%	45%	-0.14%
Foreign Equity (EAFE)	-1.5%	10%	-0.15%
U.S. Bonds	2.5%	29%	0.73%
U.S. High Yield Bonds	0.8%	5%	0.04%
Commercial Property	6.2%	6%	0.37%
Commodities	7.7%	5%	0.39%
		100%	1.24%

Low Risk/Return Portfolio			
<i>Asset Classes</i>			
<i>U.S. Benchmark</i>			
U.S. Equity	-0.3%	20%	-0.06%
U.S. Bonds	2.5%	80%	2.00%
		100%	1.94%
<i>Global Benchmark</i>			
U.S. Equity	-0.3%	10%	-0.03%
Non-U.S. Equity	-0.8%	10%	-0.08%
U.S. Bonds	2.5%	40%	1.00%
Non-U.S. Bonds	-5.7%	40%	-2.28%
		100%	-1.39%
<i>Recommended</i>			
U.S. Equity	-0.3%	10%	-0.03%
Foreign Equity (EAFE)	-1.5%	8%	-0.12%
Commercial Property	6.2%	4%	0.25%
U.S. Bonds	2.5%	40%	1.00%
Real Return Bonds	2.5%	25%	0.63%
U.S. High Yield Bonds	0.8%	8%	0.06%
Commodities	7.7%	5%	0.39%
		100%	2.17%

<i>These portfolios seek to maximize the probability of achieving at least the target real return over twenty years, at the lowest possible risk.</i>			
	YTD 30Jun05	Weight	Weighted Return
	In US\$		In US\$
7% Target Real Return	<i>YTD Returns are Nominal</i>		
<i>Asset Classes</i>			
Real Return Bonds	2.5%	3%	0.08%
U.S. Bonds	2.5%	3%	0.08%
Non-U.S. Bonds	-5.7%	29%	-1.65%
Commercial Property	6.2%	10%	0.62%
Commodities	7.7%	13%	1.00%
U.S. Equity	-0.3%	25%	-0.08%
Foreign Equity (EAFE)	-1.5%	0%	0.00%
Emerging Mkt. Equity	5.2%	17%	0.88%
Hedge Funds	0.0%	0%	0.00%
		100%	0.93%
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	YTD 30Jun05	Weight	Weighted Return
	In US\$		In US\$
5% Target Real Return	<i>YTD Returns are Nominal</i>		
<i>Asset Classes</i>			
Real Return Bonds	2.5%	2%	0.05%
U.S. Bonds	2.5%	15%	0.38%
Non-U.S. Bonds	-5.7%	22%	-1.25%
Commercial Property	6.2%	13%	0.81%
Commodities	7.7%	6%	0.46%
U.S. Equity	-0.3%	27%	-0.08%
Foreign Equity (EAFE)	-1.5%	5%	-0.08%
Emerging Mkt. Equity	5.2%	10%	0.52%
Hedge Funds	0.0%	0%	0.00%
		100%	0.80%

	YTD 30Jun05	Weight	Weighted Return
	In US\$		In US\$
3% Target Real Return	<i>YTD Returns are Nominal</i>		
<i>Asset Classes</i>			
Real Return Bonds	2.5%	40%	1.00%
U.S. Bonds	2.5%	25%	0.63%
Non-U.S. Bonds	-5.7%	8%	-0.46%
Commercial Property	6.2%	8%	0.50%
Commodities	7.7%	7%	0.54%
U.S. Equity	-0.3%	7%	-0.02%
Foreign Equity (EAFE)	-1.5%	3%	-0.05%
Emerging Mkt. Equity	5.2%	2%	0.10%
Hedge Funds	0.0%	0%	0.00%
		100%	2.24%

<i>These portfolios seek to maximize the probability of achieving at least the target real return over twenty years, at the lowest possible risk.</i>		<i>These portfolios are the same as our other target real return portfolios, except that they can also invest in hedge fund index products.</i>	
	YTD 30Jun05	Weight	Weighted Return
	In US\$		In US\$
7% Target Real Return	<i>YTD Returns are Nominal</i>		
<i>Asset Classes</i>			
Real Return Bonds	2.5%	3%	0.08%
U.S. Bonds	2.5%	0%	0.00%
Non-U.S. Bonds	-5.7%	27%	-1.54%
Commercial Property	6.2%	13%	0.81%
Commodities	7.7%	10%	0.77%
U.S. Equity	-0.3%	20%	-0.06%
Foreign Equity (EAFE)	-1.5%	0%	0.00%
Emerging Mkt. Equity	5.2%	12%	0.62%
Hedge Funds	0.0%	15%	0.00%
		100%	0.68%
	YTD 30Jun05	Weight	Weighted Return
	In US\$		In US\$
5% Target Real Return	<i>YTD Returns are Nominal</i>		
<i>Asset Classes</i>			
Real Return Bonds	2.5%	5%	0.13%
U.S. Bonds	2.5%	20%	0.50%
Non-U.S. Bonds	-5.7%	22%	-1.25%
Commercial Property	6.2%	7%	0.43%
Commodities	7.7%	10%	0.77%
U.S. Equity	-0.3%	20%	-0.06%
Foreign Equity (EAFE)	-1.5%	0%	0.00%
Emerging Mkt. Equity	5.2%	6%	0.31%
Hedge Funds	0.0%	10%	0.00%
		100%	0.83%

	YTD 30Jun05	Weight	Weighted Return
	In US\$		In US\$
3% Target Real Return	<i>YTD Returns are Nominal</i>		
<i>Asset Classes</i>			
Real Return Bonds	2.5%	42%	1.05%
U.S. Bonds	2.5%	16%	0.40%
Non-U.S. Bonds	-5.7%	11%	-0.63%
Commercial Property	6.2%	10%	0.62%
Commodities	7.7%	7%	0.54%
U.S. Equity	-0.3%	7%	-0.02%
Foreign Equity (EAFE)	-1.5%	2%	-0.03%
Emerging Mkt. Equity	5.2%	2%	0.10%
Hedge Funds	0.0%	3%	0.00%
		100%	2.04%

	YTD 30Jun05	Weight	Weighted Return
	In US\$		In US\$
Equally Weighted Portfolio	<i>YTD Returns are Nominal</i>		
<i>Asset Classes</i>			
Real Return Bonds	2.5%	12.5%	0.31%
U.S. Bonds	2.5%	12.5%	0.31%
Non-U.S. Bonds	-5.7%	12.5%	-0.71%
Commercial Property	6.2%	12.5%	0.78%
Commodities	7.7%	12.5%	0.96%
U.S. Equity	-0.3%	12.5%	-0.04%
Foreign Equity (EAFE)	-1.5%	12.5%	-0.19%
Emerging Mkt. Equity	5.2%	12.5%	0.65%
		100.0%	2.08%