

The Index Investor

Invest Wisely...Get an Impartial Second Opinion.

Contents

| | |
|---|----|
| This Month's Issue: Key Points | 1 |
| This Month's Letters to the Editor | 2 |
| Global Asset Class Returns | 9 |
| Equity and Bond Market Valuation Update | 10 |
| March 2006 Economic Outlook..... | 17 |
| Product and Strategy Notes | 35 |
| 2006-2007 Model Portfolios Update..... | 41 |

This Month's Issue: Key Points

Every March we present our Annual Economic Outlook. We conclude that while the economy and asset class valuations appear quite robust today, the underlying situation is increasingly fragile. While all natural systems resist going over the “tipping point” into a chaotic region, we do not believe that the global economy can resist this much longer. Four assumptions underlie the case for a smooth adjustment of the unprecedented imbalances that currently exist in the world economy. They include much faster domestic demand growth in Japan and the Eurozone, a substantial shift of Chinese demand away from investment and exports and toward domestic consumption, a sharp depreciation of the U.S. dollar against Asian currencies, and prolonged slow growth in the United States. We believe the joint probability of all these occurring is very low. Assuming the global economy enters a period of chaos, we review two scenarios to which it could be attracted, with one characterized by cooperative solutions and the other by growing conflict. We focus on the three key groups – the American middle class, Chinese peasants, and young Iranians – who will likely determine the future course of events.

As a practical matter, at this point we would still refrain from a major reallocation of one's portfolio toward short-term government bonds (i.e., cash), real return bonds, foreign currency bonds (i.e., foreign government bonds), gold and other commodities (including timber). Instead, as an interim measure, we would overweight these asset classes (e.g., in the

course of normal rebalancing or contributions to the portfolio) relative to riskier bonds, property, and equity asset classes.

Elsewhere in this issue, we review the different (and often confusing) meanings of “return on investment”, evaluate new TRAKR futures contracts based on the Rogers International Commodities Index (we’re not sold on it), review new research that delivers more bad news for active managers, and celebrate the arrival of residential property indexes in the United States.

This Month’s Letters to the Editor

What is the difference between real returns and excess returns?

What is the difference between a target return and an absolute return?

We have received a number of questions similar to these two, so let’s quickly review the many different, yet equally accurate, ways you can answer the question, “what was the return on my portfolio?” To make this easy to follow, we’ll use the example described in this table:

| | Year 1 | Year 2 | Year 3 | Year 4 | Year 5 | Simple Average | Std. Dev. |
|--|--------|--------|--------|--------|--------|----------------|-----------|
| Nominal Return on Asset Class | 3.0% | 4.0% | -2.0% | 10.0% | 4.0% | 3.8% | 4.3% |
| Inflation | 2.0% | 3.0% | 4.0% | 2.0% | -1.0% | 2.0% | 1.9% |
| Nominal Return on Short Term Government Security | 2.1% | 3.0% | 4.2% | 2.0% | 0.5% | 2.4% | 1.4% |
| Real Return | 1.0% | 1.0% | -6.0% | 8.0% | 5.0% | 1.8% | 5.3% |
| Excess Return | 0.9% | 1.0% | -6.2% | 8.0% | 3.5% | 1.4% | 5.2% |
| Nominal Value of Initial 1,000 Investment | 1,030 | 1,071 | 1,050 | 1,155 | 1,201 | | |
| Real Value of Initial 1,000 Investment | 1,010 | 1,020 | 959 | 1,036 | 1,087 | | |
| Compound Annual Nominal Return | | | | | 3.73% | | |

| | | | | | | | |
|--------------------------------|--|--|--|--|-------|--|--|
| Compound Annual Real Return | | | | | 1.69% | | |
|--------------------------------|--|--|--|--|-------|--|--|

The first row shows the “nominal return” on an asset class. This return is composed of two parts: the “real return”, which is the return in the absence of inflation, and the effect of inflation on the reported “nominal” return. There are two ways to remove the affect of inflation from the reported nominal return, in order to calculate the “real return.” The easy approach is to simply subtract inflation from the nominal rate of return. This is the one we use in the table. However, if you assume that, during the course of a year, inflation accumulates at the same rate as the real return, then you should (to be technically correct) divide (1+Nominal Return) by (1+Inflation) and then subtract one to obtain a more accurate measure of real return. The difference between the two approaches is usually insignificant.

As you can see in the column labeled “Year 5”, the nominal versus real return issue can get quite confusing when the overall price level is falling (deflation) rather than rising (inflation). Since you subtract the change in the price level from the nominal return to obtain the real return, deflation produces real returns that are higher than the reported nominal return. In contrast, under inflation, real returns are lower than nominal returns.

In contrast to real return, “excess return” is the additional return on an asset class above the return on a short-term risk free government security. Excess return is the same whether the asset class and government security returns are expressed in nominal or real terms. Since the return on short-term government securities tends to track inflation quite closely (but not perfectly), the “real return” and “excess” return on an asset class will typically be quite similar.

Now let’s move on to the subject of averaging returns. As shown in the column labeled “Simple Average”, the simple or “arithmetic” average is calculated by adding up the annual returns and dividing this by the number of observations (i.e., five in our example). The standard deviation is a measure of how widely the individual returns are distributed around this average. The higher the standard deviation, the wider the dispersion of returns around the average (also known as the mean). Assuming the distribution is normally shaped (i.e., it looks like the familiar bell-shaped curve), about sixty seven percent of the annual returns should fall within the range defined by the average plus or minus one standard

deviation. About ninety five percent of the time, the annual return on the asset class should be within the average plus or minus two standard deviations.

In contrast to the simple (arithmetic) average, the compound average measures the annualized change in the value of an investment over a specified period of time. To put it differently, if the arithmetic return measures the average return in any one year, the compound return measures the return you actually received over a multi-year holding period. The compound return is also known as the “geometric average” return. Just to make matters even more confusing, it is also sometimes referred to as the “annualized” or “internal” rate of return.

If an investment is held for just one year, then the average annual return equals the compound annual return. In addition, if the standard deviation of returns for an investment equals zero, then over any multi-year period the average annual return and the compound average return will also be the same.

However, in the presence of risk (a non-zero standard deviation), the compound average return will always be lower than the simple average annual return, as shown in the table above. For example, the simple average real return is 1.8%. In contrast, the compound average real return is 1.69%. The difference between the simple and compound average return is caused by the variability of returns. For example, if the simple average annual real return (1.8%) was earned every year for five years, the future value of 1,000 would be about 1,093 ($1,000 \cdot 1.018^5$). However, as you can see in the table, the actual final value is only 1,087. A quick way to estimate the future compound annual return for an asset class is to subtract one half of the square of the standard deviation from the simple average annual return. For example, the simple average annual return in our example is 1.8%, with a standard deviation of 5.3%. The square of this number is 0.28%, and half that is 0.14%. Finally, 1.8% less 0.14% is about 1.66%, which is about equal to the actual compound annual real return of 1.69%.

So what, then, does “absolute return” mean? As you have, by now, no doubt come to expect, there isn’t a simple answer to this question. Quite a few hedge fund managers refer to themselves as “absolute return” managers. However, what this often means in practice is that they are seeking to deliver at least a minimum return above short term government securities, under all different kinds of market conditions – what we would refer to as “excess return.” In

their view, this differentiates them from active mutual fund managers, whose objective is usually to outperform a comparable asset class index – say, the S&P 500 or Wilshire 5000 for an equity fund.

In contrast, our target real return model portfolios are also seeking to deliver an “absolute return.” However, in our case, the absolute return in question is the minimum compound annual real rate of return needed to fund an investor’s liabilities (e.g., to have accumulated a target amount of money at the end of a defined period of time).

If all this seems more than a little confusing, that’s because, unfortunately, it is. The financial services industry still has a long way to go when it comes to using clear language that average investors can understand. But hopefully this brief overview has helped to cut through the confusion and enabled you to decipher the multiple possible meanings of “the return on my portfolio.”

With more people investing in commodities, do you think their correlation of returns with bonds and equities will rise in the future?

As we wrote last month, higher investor interest in commodity futures index funds, should, in the absence of increased hedging demand depress the insurance return from investing in this asset class. In addition, assuming at least some of these new investors are momentum players, it should also make returns from unexpected changes in spot prices more volatile. As we noted, it is for this reason that in our asset allocation analysis we conservatively assumed that the future return on commodities would equal only four percent over real return bonds, which is about equal to the historical return due to the diversification benefits generated by the structure of the commodities index itself (as a side note, this is the key reason we prefer the Dow Jones AIG Index, which has a more balanced weighting across more commodities than the GSCI).

The correlation of returns (i.e., the extent to which they move together) question is harder to answer. The approach we took was to look at how different macroeconomic changes might affect returns on the three asset classes you used in your question -- a commodity futures index fund, domestic investment grade bonds and domestic equities.

(1) Unexpected increase in real economic growth. This probably leads to higher spot commodity prices (which raises the return on commodities), reduces default risk (which raises the return on bonds), and raises expected equity cash flow (which raises the return on equities). Since all are moving in the same direction, this would also raise the correlation of returns between all three asset classes.

(2) Unexpected increase in the real risk free rate of interest. This would generally cause equity and bond prices to fall. However, impact on a commodity futures index fund isn't as clear. Higher real rate would generate higher return on collateral. On the other hand, to the extent that it reduced economic demand, it would also cause spot prices to fall, perhaps by an unexpected amount. In this case, the correlation of returns between commodities and the two other asset classes would be lower.

(3) Unexpected increase in inflation. This would cause bond prices to fall (with longer maturities suffering the greatest declines). Its impact on equities is unclear, but probably negative due to a higher nominal risk free rate and perhaps higher risk premium for holding equities (which together raise rate at which future dividends are discounted to their present value). For some equities, higher inflation might also reduce expected future dividend growth, which would also cause equity prices to decline. For commodities, all else being equal, the impact of an unexpected jump in inflation would generally be a rise in spot prices and collateral yields. In short, an unexpected increase in inflation would tend to reduce correlations across the three asset classes, and certainly between commodities and the other two.

(4) Unexpected increase in investor risk aversion. All else being equal, this would be positive for commodities, in that it would lead to higher insurance returns (i.e., widen the gap between spot and futures prices). For bonds, an increase in risk aversion would be negative, due to a higher required default risk premium. It would also be negative for equities, due to a higher equity risk premium. Again, the impact on the correlation of commodities' returns with equities and bonds would be negative.

So where does this leave us? It suggests that recent macroeconomic conditions -- rising economic growth, real rate surprises on the downside (which reinforce economic growth), and generally flat to falling inflation and investor risk aversion have been tailor made to produce an increase in the correlation of returns between commodities and those on bonds

and equities. On the other hand, it is also easy to see how future surprises would cause this higher correlation to decline back towards historically low levels.

Is there a conflict between the advice often given to investors to regularly rebalance their portfolios, but also to sell their losers quickly, while letting their winners run?

Rebalancing -- selling apparent winners and buying apparent losers -- is first and foremost a risk management strategy. In its strictest form (rebalance annually back to target weights), it won't add anything to portfolio return, but it will keep that portfolio close to its target risk (volatility) level.

On the other hand, if you assume, as we do, that financial markets aren't perfectly efficient, then asset class valuations will (due, for example, to the presence of momentum investors) overshoot, and sometimes be above or below their "fair" level. This argues, as you point out, for letting your winners run, and cutting your losses early, in order to boost returns.

This short summary suggests a way to reconcile these two apparently conflicting points of view, and, may, in fact, point towards a compromise solution. First, the reconciliation. Rebalancing is about minimizing risk; letting winners ride is about maximizing returns. For each, you pay a price: in the case of the former, foregone returns; in the case of the latter, more volatility than you might like (e.g., due to liquidity risk if everybody decides that a winner is about to reverse, and tries to sell at the same time). Rebalancing is more of a passive strategy; letting winners ride, and cutting losses early is more of an active approach (since both decisions require forecasting). One could even go so far as to say that rebalancing is an investing rule of thumb, while letting winners ride and cutting losses early is more of a trading rule of thumb.

And now the compromise: we have analyzed the impact of delaying a rebalancing until an asset class is above its target weight by different percentages (e.g., 5%, 10%, 15%, or 20%). We found that the impact of these different "triggers" on expected return and standard deviation does not scale linearly. Broadly speaking (since this differs across portfolios) the optimal trigger level (subject, as always, to the potential errors in our model design and parameter estimates) seems to be around 10%. This maximizes the additional return benefit (from letting one's winners run) relative to the additional risk taken on.

I am a U.K. Pounds Sterling based investor, who has invested in a Taiwan stock fund whose shares are denominated in U.S. Dollars. I share your concern about the future value of the U.S. Dollar versus the Pound. How would a fall in the Dollar versus the Pound affect the value of my Taiwan fund?

The best way to answer this question is with an example that illustrates the underlying principles involved. Let's say the Taiwan equity index, in local currency (NT\$) increases by 20% in a given year. During the same period, the NT\$ appreciates by a further 10% against the USD. For a USD investor, the total return on the Taiwan equity investment is therefore 30% (approximately; we could get fancier about the XR calculations by making the interaction between the XR and the domestic equity market continuous, but the additional maths don't add anything to the answer).

Now let us further assume that, as we also expect, the USD takes a dive against the GBP, say by (25%). The return to a UK investor who purchased a USD denominated Taiwan equity fund would be 30% less 25% equals 5% in GBP.

By way of comparison, what would the return be on a GBP denominated Taiwan equity fund? Well, the change in the NT\$ versus the GBP would be 10% less 25% equals (15%). The return on the Taiwan equity investment in NT\$ was 20%. So the return in GBP would be 20% less 15% or 5%.

Theoretically, it doesn't matter whether the Taiwan equity investment is denominated in USD or GBP — the return in GBP should be the same. In practice, however, the foreign exchange transactions and translations can get rather messy, so perfect equivalence usually doesn't hold, though arbitrage ensures that returns remain quite close to what theory predicts.

Global Asset Class Returns

| <i>YTD 31Mar06</i> | <u>In USD</u> | <u>In AUD</u> | <u>In CAD</u> | <u>In EURO</u> | <u>In JPY</u> | <u>In GBP</u> | <u>In CHF</u> | <u>In INR</u> |
|---------------------|---------------|---------------|---------------|----------------|---------------|---------------|---------------|---------------|
| Asset Held | | | | | | | | |
| US Bonds | -0.70% | 1.56% | -0.25% | -3.07% | -0.89% | -1.63% | -1.41% | -1.92% |
| US Prop. | 14.80% | 17.06% | 15.25% | 12.43% | 14.61% | 13.87% | 14.09% | 13.58% |
| US Equity | 5.40% | 7.66% | 5.85% | 3.03% | 5.21% | 4.47% | 4.69% | 4.18% |
| | | | | | | | | |
| AUS Bonds | -4.33% | -2.07% | -3.88% | -6.70% | -4.52% | -5.26% | -5.04% | -5.55% |
| AUS Prop. | 1.82% | 4.08% | 2.27% | -0.55% | 1.63% | 0.89% | 1.11% | 0.60% |
| AUS Equity | 6.43% | 8.70% | 6.89% | 4.06% | 6.24% | 5.50% | 5.72% | 5.22% |
| | | | | | | | | |
| CAN Bonds | -0.55% | 1.71% | -0.10% | -2.92% | -0.74% | -1.48% | -1.26% | -1.77% |
| CAN Prop. | 6.68% | 8.94% | 7.13% | 4.30% | 6.49% | 5.75% | 5.97% | 5.46% |
| CAN Equity | 7.90% | 10.16% | 8.35% | 5.53% | 7.71% | 6.97% | 7.19% | 6.68% |
| | | | | | | | | |
| Euro Bonds | 0.82% | 3.08% | 1.27% | -1.55% | 0.63% | -0.11% | 0.11% | -0.40% |
| Euro Prop. | 25.07% | 27.33% | 25.52% | 22.69% | 24.88% | 24.14% | 24.36% | 23.85% |
| Euro Equity | 12.23% | 14.50% | 12.69% | 9.86% | 12.05% | 11.30% | 11.53% | 11.02% |
| | | | | | | | | |
| Japan Bonds | -1.27% | 0.99% | -0.82% | -3.64% | -1.46% | -2.20% | -1.98% | -2.49% |
| Japan Prop. | 10.79% | 13.05% | 11.24% | 8.42% | 10.60% | 9.86% | 10.08% | 9.57% |
| Japan Equity | 6.51% | 8.77% | 6.96% | 4.14% | 6.32% | 5.58% | 5.80% | 5.29% |
| | | | | | | | | |
| UK Bonds | 0.47% | 2.73% | 0.92% | -1.90% | 0.28% | -0.46% | -0.24% | -0.75% |
| UK Prop. | 17.86% | 20.12% | 18.31% | 15.49% | 17.67% | 16.93% | 17.15% | 16.64% |
| UK Equity | 8.50% | 10.77% | 8.96% | 6.13% | 8.32% | 7.57% | 7.80% | 7.29% |
| | | | | | | | | |
| World Bonds | -0.10% | 2.16% | 0.35% | -2.47% | -0.29% | -1.03% | -0.81% | -1.32% |
| World Prop. | 13.31% | 15.57% | 13.76% | 10.94% | 13.12% | 12.38% | 12.60% | 12.09% |
| World Equity | 7.45% | 9.71% | 7.90% | 5.08% | 7.26% | 6.52% | 6.74% | 6.23% |
| Commodities | -5.70% | -3.44% | -5.25% | -8.07% | -5.89% | -6.63% | -6.41% | -6.92% |
| Timber | 7.16% | 9.42% | 7.61% | 4.79% | 6.97% | 6.23% | 6.45% | 5.94% |
| EqMktNeutral | 2.50% | 4.76% | 2.95% | 0.13% | 2.31% | 1.57% | 1.79% | 1.28% |
| Volatility | -5.63% | -3.37% | -5.18% | -8.01% | -5.82% | -6.56% | -6.34% | -6.85% |
| Currency | | | | | | | | |
| AUD | -2.26% | 0.00% | -1.81% | -4.64% | -2.45% | -3.19% | -2.97% | -3.48% |
| CAD | -0.45% | 1.81% | 0.00% | -2.83% | -0.64% | -1.38% | -1.16% | -1.67% |
| EUR | 2.37% | 4.64% | 2.83% | 0.00% | 2.18% | 1.44% | 1.66% | 1.16% |
| JPY | 0.19% | 2.45% | 0.64% | -2.18% | 0.00% | -0.74% | -0.52% | -1.03% |
| GBP | 0.93% | 3.19% | 1.38% | -1.44% | 0.74% | 0.00% | 0.22% | -0.29% |
| USD | 0.00% | 2.26% | 0.45% | -2.37% | -0.19% | -0.93% | -0.71% | -1.22% |
| CHF | 0.71% | 2.97% | 1.16% | -1.66% | 0.52% | -0.22% | 0.00% | -0.51% |
| INR | 1.22% | 3.48% | 1.67% | -1.16% | 1.03% | 0.29% | 0.51% | 0.00% |

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. The specific formula is $(\text{Current Dividend Yield} \times 100) \times (1 + \text{Forecast Productivity Growth})$ divided by $(\text{Current Yield on Real Return Bonds} + \text{Equity Risk Premium} - \text{Forecast Productivity Growth})$. Our valuation estimates are shown in the following tables, where a value greater than 100% implies overvaluation, and less than 100% implies undervaluation:

| <i>Australia</i> | Low Demanded Return | High Demanded Return |
|-----------------------------|----------------------------|-----------------------------|
| High Supplied Return | 71% | 109% |
| Low Supplied Return | 112% | 157% |

| <i>Canada</i> | Low Demanded Return | High Demanded Return |
|-----------------------------|----------------------------|-----------------------------|
| High Supplied Return | 73% | 126% |
| Low Supplied Return | 134% | 199% |

| <i>Eurozone</i> | Low Demanded Return | High Demanded Return |
|-----------------------------|----------------------------|-----------------------------|
| High Supplied Return | 77% | 130% |
| Low Supplied Return | 138% | 203% |

| <i>Japan</i> | Low Demanded Return | High Demanded Return |
|-----------------------------|----------------------------|-----------------------------|
| High Supplied Return | 102% | 215% |
| Low Supplied Return | 292% | 477% |

| <i>United Kingdom</i> | Low Demanded Return | High Demanded Return |
|-----------------------------|----------------------------|-----------------------------|
| High Supplied Return | 50% | 92% |
| Low Supplied Return | 92% | 141% |

| <i>United States</i> | Low Demanded Return | High Demanded Return |
|-----------------------------|----------------------------|-----------------------------|
| High Supplied Return | 125% | 192% |
| Low Supplied Return | 222% | 309% |

| <i>Switzerland</i> | Low Demanded Return | High Demanded Return |
|-----------------------------|----------------------------|-----------------------------|
| High Supplied Return | 82% | 155% |
| Low Supplied Return | 175% | 244% |

| <i>India</i> | Low Demanded Return | High Demanded Return |
|-----------------------------|----------------------------|-----------------------------|
| High Supplied Return | 79% | 155% |
| Low Supplied Return | 177% | 280% |

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 | 2.27% | 2.96% | 5.23% | 5.43% | 0.20% | -1.92% |
| Canada | 1.58% | 2.40% | 3.98% | 4.27% | 0.29% | -2.76% |
| Eurozone | 1.71% | 2.37% | 4.08% | 3.79% | -0.29% | 2.79% |
| Japan | 0.86% | 0.77% | 1.63% | 1.78% | 0.15% | -1.50% |
| UK | 1.27% | 3.17% | 4.44% | 4.40% | -0.04% | 0.42% |
| USA | 2.30% | 2.93% | 5.23% | 4.86% | -0.37% | 3.62% |
| Switz. | 1.19% | 2.03% | 3.22% | 2.49% | -0.73% | 7.36% |
| India | 2.06% | 7.57% | 9.63% | 7.56% | -2.07% | 21.00% |

*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% | -1.16% | -1.64% | -3.65% | -1.03% | -0.57% | -2.94% | 2.13% |
| CAD | 1.16% | 0.00% | -0.48% | -2.49% | 0.13% | 0.59% | -1.78% | 3.29% |
| EUR | 1.64% | 0.48% | 0.00% | -2.01% | 0.61% | 1.07% | -1.30% | 3.77% |
| JPY | 3.65% | 2.49% | 2.01% | 0.00% | 2.62% | 3.08% | 0.71% | 5.78% |
| GBP | 1.03% | -0.13% | -0.61% | -2.62% | 0.00% | 0.46% | -1.91% | 3.16% |
| USD | 0.57% | -0.59% | -1.07% | -3.08% | -0.46% | 0.00% | -2.37% | 2.70% |
| CHF | 2.94% | 1.78% | 1.30% | -0.71% | 1.91% | 2.37% | 0.00% | 5.07% |
| INR | -2.13% | -3.29% | -3.77% | -5.78% | -3.16% | -2.70% | -5.07% | 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 most 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 31Mar06

| <i>Economy</i> | Bottoming | Strengthening | Peaking | Weakening |
|---------------------------------------|---|--|---|--|
| <i>Interest Rates</i> | Falling | Bottom | Rising | Peak |
| <i>Style Rotation</i> | Growth (IWZ) 4.24% | Value (IWW) 6.50% | Value (IWW) 6.50% | Growth (IWZ) 4.24% |
| <i>Size Rotation</i> | Small (IWM) 14.12% | Small (IWM) 14.12% | Large (IWB) 4.81% | Large (IWB) 4.81% |
| <i>Style and Size Rotation</i> | Small Growth (DSG) 13.58% | Small Value (DSV) 11.39% | Large Value (ELV) 5.00% | Large Growth (ELG) 3.57% |
| <i>Sector Rotation</i> | Cyclicals (IYC) 3.76% Technology (IYW) 5.11% | Basic Materials (IYM) 8.65% Industrials (IYJ) 8.38% | Energy (IYE) 7.45% Staples (IYK) 1.07% | Utilities (IDU) -0.39% Financials (IYF) 4.07% |
| <i>Bond Market Rotation</i> | High Risk (VWEHX) 1.60% | Short Maturity (VBISX) 0.10% | Low Risk (VIPSX) -2.10% | Long Maturity (VBLTX) -3.40% |

YTD 31Mar06

| 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 |

March 2006 Economic Outlook

What do middle class Americans, Chinese peasants, and young Iranians have in common? Any or all of them could have a very big impact on your portfolio's returns in the next few years. In this quarter's economic outlook, we'll explain why, and highlight the early warning indicators we will monitor in the months ahead.

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

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

In our basic model, the top layer – the object of the forecast – are current asset class valuations, and their expected future returns. When asset class valuations are above their historical averages, future returns are typically below them. We review these each month in our asset class valuation update. Our current conclusion is that many, if not most asset classes are fully or overvalued today, and, with a few exceptions (which we will discuss at the end of

this article), their future returns are therefore likely to be lower than they have been over the last ten years.

Asset class returns result from a complex set of inputs, which one can organize in different layers. Right below asset class returns lies investor behavior. As we have discussed in previous articles, before deciding whether to buy or sell an asset, an investor has to not only assess whether he or she believes it is under, fully, or overvalued, but also assess how he or she expects other investors to behave. For example, a “value investor” will place heavy emphasis on whether his or her forecasting model indicates the asset is undervalued; in contrast, a “momentum” investor will focus on his or her forecast for future investor behavior. Broadly speaking, there is a documented tendency for many investors to be overoptimistic about future valuations, and overconfident about the accuracy of their forecasts, whether about future dividend growth or the future actions of other investors. For example, almost everyone believes they will be smart enough to “get out at the top,” even though history shows that few people do. Other analyses have identified the existence of a “cynical bubble” in the last years of the technology boom, in which professional investment managers, while aware of extreme overvaluations, hesitated to sell too soon because their compensation was tied to their annual returns compared to indexes and other fund managers. Sad though it is to admit, we may well be seeing a repeat of this today. Of course, this begs the question of why many asset classes may be overvalued today. The answer to that question lies in the deeper layers of our model.

Below investor behavior lies policy decisions made by monetary authorities. A key driver of today’s high valuations has been the sharp fall in global interest rates in recent years. Taking a long view of this, we go back to the late 1970s, when U.S. Federal Reserve Chairman Paul Volker raised interest rates to historically high levels to quell the sharp rise in inflation that had developed as a result of the monetary expansion that accompanied the “guns and butter” deficit financing of the Vietnam War and the 1973 and 1979 oil price shocks. In 1982, the resulting global economic slowdown triggered a crisis in developing countries that had financed growing current account deficits with short term foreign currency bank loans. Developing countries’ inability to repay or rollover their loans threatened the solvency of many of the world’s banks, and raised the specter of a severe global depression triggered by a debt implosion. Faced with this threat, central banks reversed their tight money supply

policies and lowered interest rates, which enabled banks to rebuild their capital and developing countries to restructure their loans. Falling rates also contributed mightily to a twenty year bull market in bonds and equities. However, one can also argue that monetary loosening made a substantial contribution to the development of the massive property bubble in Japan. And we all know what happened when that collapsed: Japan has been in a prolonged deflationary recession for the better part of the last fifteen years.

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

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

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

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

While these developments were occurring in their respective private sectors, western governments were gradually facing up to an even bigger problem: the enormous liabilities they face as their populations age (for more on this, see “Who’s Going Broke? Rising Health Care Costs in Ten OECD Countries” by Hagist and Kotlikoff). As many writers have noted, there are a limited number of ways to deal with this problem, including substantial increases

in taxes, and/or household savings, and/or economic growth, and/or cuts in state benefits provided to retirees. In addition, the fiscal impact of this fundamental challenge was further complicated by other problems. In Japan, it was the need to run large deficits in a pro-longed attempt to use higher government spending to lift the economy out of its prolonged recession; in the Eurozone, it was a need to run countercyclical government deficits, as a reluctance to pursue politically difficult structural reforms led to weak private sector growth; in the United States, it was a Lyndon Johnson-like political desire to avoid a sharp tax increase to pay for the rapidly rising cost of the Iraq war. The net result of these problems has been substantial public sector deficits in Japan, the Eurozone and the United States.

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

In our March, 2004 Economic Review, we presented an in-depth analysis of China's goals, strategy, and risks. We will begin now as we did then, with an assumption about China's grand strategy, as summed up in the 2002 Report to Congress by the U.S. China Security Review Commission: "It is clear that China anticipates America's decline and is working to shape a world with a weaker United States and stronger competing poles of power where it can play a central role. China's strategy to achieve this objective appears to include biding its time by avoiding confrontation with the United States, and meanwhile gaining access to American investment, technology and know-how...Economic growth is a central

pillar of Chinese power. The Chinese government and its industries share an overwhelming and driving goal to increase the power and international standing of China as a nation-state.”

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

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

However, the Chinese growth model is now coming under increasing stress, from many different directions. These include rising domestic dissatisfaction with corruption by party leaders, increasing discontent among peasants at seizures of land (usually without compensation) for urban expansion, growing environmental problems, continued failure to reform a very inefficient and ineffective domestic banking system, overinvestment and overcapacity in many industries, and increasing difficulty in limiting the domestic monetary impact (e.g., the expansion of credit and bad loans at state-owned banks) caused by the enormous increase in its foreign exchange reserves that result from its rising current account surplus. And yet the Chinese leaders know that if the economy fails to keep growing, their hold on power could rapidly dissipate, or lead to an increase in external tensions, if they choose to use nationalism and an external threat to retain their control of the country. The

most recent problem added to this mix has been a sharp rise in tensions with the United States.

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

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

In sum, we believe that the apparently healthy condition of the world economy today, with very high growth in China and the rest of Asia, recovery in Japan, hints of rising domestic demand in Europe, continued growth in the United States, and fully or overvalued

(yet still strangely rising) asset class values around the world is far more fragile than it appears. To be sure, we would be the first to point out that complex adaptive systems like the global economy have an amazing ability to adapt themselves and thus stay in a relatively fragile state far longer than one might first imagine. For example, there were plenty of people who thought equity markets looked overvalued in 1998; however, the crash didn't come until 2001. As those who study complexity like to point out, natural systems can exist in three states. One is excessively stable, one is chaotic, and one exists between the first two, and marks the system's region of maximum adaptability. Clearly, the economic and financial events of the past few years paint a convincing picture of a system struggling to avoid tipping over into the chaotic region. And yet we strongly believe that is where we will end up in the not-too-distant future.

To understand this argument, let's start with the following table, which shows key economic data for a number of countries and regions:

| | Pct of World GDP* | 2006 GDP Growth | Household Consumption Pct. Of Nat'l GDP | Private Sector Balance Pct. Of Nat'l GDP | Public Sector Balance Pct. Of Nat'l GDP | Current Account Balance Pct. Of Nat'l GDP | Current Account Balance Pct. Of World GDP |
|--------------|--------------------------|------------------------|--|---|--|--|--|
| Australia | 1.10% | 3.20% | 60% | -6.10% | 1.10% | -5.00% | -0.06% |
| Canada | 1.80% | 3.20% | 56% | 1.40% | 0.30% | 1.70% | 0.03% |
| Eurozone | 14.70% | 1.80% | 59% | 3.30% | -3.10% | 0.20% | 0.03% |
| Japan | 6.60% | 2.00% | 57% | 9.20% | -6.20% | 3.00% | 0.20% |
| Switzerland | 0.40% | 1.80% | 61% | 12.50% | -1.20% | 11.30% | 0.05% |
| U.K. | 3.00% | 2.20% | 66% | 1.60% | -3.40% | -1.80% | -0.05% |
| USA | 20.60% | 3.30% | 71% | -2.20% | -3.90% | -6.10% | -1.26% |
| India | 6.20% | 6.30% | 65% | 6.00% | -8.00% | -2.00% | -0.12% |
| China | 14.00% | 8.20% | 40% | 7.60% | -2.00% | 5.60% | 0.78% |
| Asian NICs** | 3.50% | 5.60% | 56% | -0.20% | 2.60% | 2.40% | 0.08% |

* At purchasing power parity values

** Newly Industrialized Countries (Hong Kong, Singapore, South Korea, Taiwan)

This table highlights a number of important points. The first is the extent to which global economic growth has become heavily dependent on the American consumer and continuing investment in China. The second is the record size of the resulting current account imbalances that need to be financed. As shown in the rightmost column, today these current account imbalances primarily belong to the United States and China. However, the unwinding of these imbalances implies that other nations will have to generate faster domestic growth, and accept larger current account deficits. The third point is the potential size of the required changes. For example, while the Eurozone and Japan combined account for about the same percentage of global GDP as the United States, their growth rates have been slower, and their combined current account surplus amounts to only .23 percent of global GDP, compared to a United States current deficit that amounts to (1.26)% of global GDP. Even adding India to this mix hardly makes a dent on the balance of payments front.

That is a very sobering thought, when you consider that a spending slowdown by overleveraged U.S. consumers is inevitable (likely due to rising interest rates weakening the housing market, as has already occurred in Australia and the U.K.), as is reduced investment in China, which faces growing concerns about overcapacity and domestic deflation in many industries. In short, the current system's days seem numbered.

To be sure, there is another story taking shape, that claims to describe how a major global economic disruption – or, as we have described it, a trip into the chaotic region – could be avoided. It involves four key changes: (1) faster domestic demand growth in Japan and the Eurozone (due to accelerating structural economic reforms); (2) a shift to lower savings, higher domestic consumption and lower investment in China; (3) depreciation of the U.S. dollar versus Asian currencies; and (4) a prolonged reduction in U.S. economic growth rates.

In order to avoid a severe economic disruption, all four shifts need to happen reasonably close together. However, there are good reasons to believe this won't happen. With aging populations and state pension and health systems in questionable fiscal health, there is limited scope for increases in personal consumption (which means reduced savings) and domestic demand growth in Japan and Europe. Moreover, faster domestic demand growth also depends on more progress toward structural reforms, for which political support today seems uneven at best (rising in Germany, falling in France, and uncertain in Japan).

In China, it is hard to envision a substantial reduction in savings and rise in domestic consumption as long as its state pension and health care systems are not trusted by the population. In addition, given the critical link between political stability and economic growth in China, and given the low probability of smoothly shifting its economy away from exports and towards increased domestic consumption, it also appears that it will be hard to achieve a coordinated depreciation of the U.S. dollar versus Asian currencies. Finally, given the erosion of U.S. export capacity in recent years, as well as its increased reliance on imports (particularly for many consumption goods), it is impossible to reduce the U.S. current account deficit to a sustainable level only through faster growth abroad and dollar depreciation. The painful – and politically unpalatable -- truth of the matter is that correcting the enormous imbalances that have built up in the global economy will require a prolonged period of slower growth in the United States.

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

Chaotic change, however, is not quite the same as random change. While their actions are basically impossible to forecast, systems operating in the chaotic region typically vacillate unpredictably between two or more poles, or, as they are technically called, “attractors” before returning to the adaptive or stable zones. For our purposes here, we will consider as attractors two familiar themes for all complex social systems: conflict and cooperation.

Let us now look more closely at possible conflict-driven and cooperative scenarios for the three groups that we believe could have a great impact on a global economy operating in the chaotic zone: the American middle class, Chinese peasants, and Iranian students.

The American middle class is barely hanging on today. Health insurance, education for their children, and a secure retirement all seem increasingly out of reach. Leveraged up to

their eyeballs with mortgage, auto, and credit card debt, they are working harder than ever, but with a growing fear of losing their job and lifestyle due to outsourcing, corporate consolidation, or increased foreign competition.

In this context, the prolonged period of low U.S. growth needed to unwind our current global imbalances will create a head on collision between orthodox economics and political reality.

In this case, the conflict-driven outcome would see waves of middle class families declaring bankruptcy, losing their homes, and becoming easy prey to demagogic calls for protectionism and higher inflation, along with much higher taxes on corporations and rich CEOs who “sold out American workers.” Once this dynamic gets going, there is no telling where it will end.

Now consider the alternative: a cooperative solution that involves a more controlled form of populism.

Such a movement might offer a return to a secure middle class existence, to be obtained by forsaking the excessive “borrow and buy” consumerism of the last twenty years, while accepting a larger role for government and tilt back towards community and away from radical individualism.

Specifically, a new populist agenda might start with a change in bankruptcy law that makes it easier for people to shed their credit card debts while allowing them to stay in their homes. Given the extremely high real interest rates earned by credit card companies in recent years, this seems likely to garner wide political support after the economy enters its inevitably sharp and prolonged downturn.

On the health insurance front, a Swiss or Australian style single payer plan should also prove popular with American voters. As in the case of the current Medicare program for senior citizens, government would provide a basic health insurance policy to all citizens. To prevent over-utilization of expensive health care services, the single payer policy would carry an annual deductible that could be scaled by income and tied to the tax system. Services would be provided by competing private sector organizations, both for and not-for profit. Elective surgery and other “luxury” items could be covered by additional health insurance policies sold by private companies.

A similar plan could be used to pay for higher education, with government providing a fixed annual loan to students, with repayments tied to the student's post-graduation income, and collections integrated into the tax system. To strengthen retirement security, the new populist agenda might call for an Australian-style mandatory defined contribution pension plan for all workers, based on a prudent mix of low-cost index funds, with required conversion to a real life annuity upon retirement. Additional retirement income could come from voluntary saving and a means-tested minimum social security benefit.

Last but not least, a new middle class populist agenda in the United States might replace the current income tax system with one that progressively taxes consumption. This would not only encourage savings, but also discourage the destructive and divisive "keep up with the Joneses" conspicuous consumption that has driven the overleveraging of the American middle class.

Many of you reading these proposals are no doubt shaking your heads and saying, "impossible." And under normal political and economic conditions, you would be quite right. However, it is becoming increasingly clear that what we consider "normal conditions" are illusory, and will radically change whenever foreign institutions and/or governments believe it economically (or, more accurately, politically) expedient to stop their lending to the United States.

When that day comes, it is not inaccurate to say that "all hell will break loose", which will confront U.S. political leaders with a choice. They can either go down in history as the people who presided over the destruction of the American middle class, or they can propose and support a bold new populist agenda that will mitigate some of the pain that must accompany the elimination of the extraordinary imbalances that have built up in the world economy. Only time will tell which choice they will make (for another good paper on this issue, see "Is the U.S. Bankrupt?" by Laurence Kotlikoff).

Let us now move on to Chinese peasants. Their future role is likely to be critical because of China's history of peasant revolts, and the current leadership's fear of seeing that happen again. A recent report from the RAND Corporation ("China's Internal Security Strategy" by Murray Scott Tanner) provided an insightful view of the problem faced by the Chinese leadership, and the ways they are attempting to respond to it.

Tanner notes that “beginning in about 1998-1999, Beijing’s internal security experts launched a serious search for a more sophisticated strategy for dealing with the persistent increases in popular protest that had begun in the early 1990s. Security officials and analysts had begun to recognize that it was probably no longer possible to force protests back down to the very low rates China witnessed in the years immediately following the 1989 Beijing massacre. These security experts explicitly recognized that growing numbers of citizens had legitimate complaints about unemployment, layoffs, illegal taxes and fees, corruption, and numerous other developmental problems that China could not solve anytime soon. Consequently, their new implicit goal was to forge an internal security strategy that would permit them to effectively contain unrest, address some of its underlying economic and policy-related causes, and prevent it from becoming a major threat to the regime’s stability...”

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

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

after a sudden drop in Chinese economic growth, lots of things could happen, and few of them are good from a global economic perspective.

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

However, this looks easy in comparison to resolving the challenge Iran currently poses to the global economy. Work on this country’s nuclear program sharply accelerated following the “911 attacks” in the United States and the subsequent American-led regime change in Afghanistan, and later Iraq. This program is under the control of the Revolutionary Guards, who, in their wide involvement in commerce (both legal and otherwise), desire for ideological purity, and apparently ambivalent relationship with supreme leader Ali Khamenei bear a more than passing resemblance to the Chinese People’s Liberation Army. With the 2005 election of Mahmoud Ahmadinejad, a stridently anti-western former Revolutionary Guard as president of Iran, it seems increasingly clear that, as Frederic Tellier noted in his recent paper “The Iranian Moment”, the country is in the middle of a transition fraught with danger. On the one hand, the political power of the Islamic ideology that dominated the country since the 1979 revolution is giving way to a new leadership philosophy based on nationalism, economic development, and (for the Guards, at least) political authoritarianism (again, the similarities with China are clear). On the other hand, though a large number of reformist candidates were disqualified before the last election by the Governing Council (headed by Khamenei), there still lurks beneath the surface of Iranian society a strong desire for reform, with half the population under 25, and many familiar with and attracted to Western culture.

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

Unfortunately, the easiest scenario to envision is the one driven by conflict, with the Iranian leadership seeking to exploit a global economic crisis (and perhaps their deepening relationship with China) to accelerate their progress toward acquiring a nuclear weapon. To say that such a move would carry with it a very high risk of violent consequences with incalculable negative results (e.g. significant disruption of energy markets, or worse) is probably an understatement.

On the other hand, one can, albeit dimly, also perceive the outlines of a cooperative scenario. In this case, young Iranians would organize and protest, not to change the regime, but rather to clearly convey to the leadership their preference for accelerating economic development (which requires rising engagement with Western Europe, and probably the United States) rather than a dramatic fall in their standard of living – or worse. Unfortunately, if it is hard to predict how the Chinese leadership will respond to the choices forced on them

by a global economic crisis, it seems infinitely more difficult to predict how Ahmadinejad and his colleagues will react.

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

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

If all four of the major changes needed to avert a crisis are executed, or, once we have entered the chaotic zone, middle class Americans, Chinese peasants and young Iranians all take the cooperative approach to the ensuing crisis, then it is likely that the inevitable global adjustment we face could take place without major long-term damage to a well-diversified portfolio. Under these circumstances, our basic advice to diversify across asset classes that perform well under inflation, normal conditions and deflation would still apply.

However, if this isn't the case – that is, if the global economic system enters the chaotic region and one or more groups pursues a conflict-driven approach, then, as they say, all normal bets are off. Despite the strong recent performance of the global economy and many asset classes, we reiterate the fragility of the current situation. The world economy is in uncharted waters, and substantial deviations from equilibrium are a distinct possibility. The

potentially severe consequences that would accompany uncontrolled rage on the part of the American middle class, Chinese peasants, and/or young Iranians would, should they occur, justify a substantial reallocation of one's portfolio toward short term government bonds (i.e., cash), real return bonds, foreign currency bonds (i.e., foreign government bonds), gold and other commodities (including timber) whose value should remain fairly stable in comparison to bonds, property, and equity which should suffer more in a prolonged global recession.

What then, are the early warning indicators one should monitor in the months ahead?

We suggest the following:

| Indicator | Dangerous Trend | Recent Observations |
|---|--|---|
| Real Return Bond Yields | Declining (lack of investment relative to savings) | After long decline, a slight uptick recently |
| Yield on Nominal Return Ten Year U.S. Treasury Bond | Rising (increases probability of rising mortgage rates, weakening housing markets, and economic recession) | Rising |
| Oil Prices | Historically high (Since oil price functions as a tax on consumers, higher prices raise probability of economic slowdown) | Current oil prices are high relative to recent past. |
| U.S. /Euro Exchange Rate | Weakening (should lead to higher U.S. interest rates, and economic slowdown) | Down 2.4% since 31Dec05 |
| Domestic Private Demand (consumption and investment) Growth in Japan and Eurozone | Weakening (world growth remains overdependent on U.S. consumer spending) | Rising in Japan, some indicators of increase in Eurozone |
| Private Consumption Spending in China | No Increase (world remains overdependent on U.S. consumers; danger of overinvestment and deflationary pressure in many industries) | While acknowledged as a priority by Chinese leaders, no progress yet. |
| Political Instability and Increased Repression in China | Increase signifies higher probability of sharp economic slowdown in | Increasing |

| Indicator | Dangerous Trend | Recent Observations |
|--|--|--|
| | China and/or higher global tensions | |
| Iranian Rhetoric and Actions on Nuclear Issue | Aggressive rhetoric and actions raise probability of dangerously destabilizing military clash between Iran and West. | Recent testing of new nuclear capable missile raised tensions |
| Policy Solutions Gaining Popularity with American Middle Class | Protectionist trade measures and punitive taxes increase likelihood of a longer and deeper economic slowdown | Grassley-Baucus and Schumer-Graham bills, if passed, will sharply raise tensions with China |
| Human-to-Human Transmission of H5N1 Virus, and Associated Mortality Rate | Easier human-to-human transmission without a significant decline in the current mortality rate | No strong evidence of increased transmission rates; however, expected arrival of H5N1 in US later this year should still cause some problems for economy |

As you can see, the general trend of our warning indicators is negative; they suggest a rising probability that, at some point in the future, the global economy will enter the chaotic zone. However, as we noted, nobody can tell in advance when this will occur. All natural systems are remarkably resilient, particularly when it comes to avoiding chaos; to use an analogy, this could be either 1998 or 2000. More important, perhaps, our indicators also provide signals (albeit weaker ones) that, once in the chaotic zone, the initial attractors (scenarios) are more likely to be driven by conflict rather than cooperation. As a practical matter, at this point we would still refrain from a major reallocation of one's portfolio toward short-term government bonds (i.e., cash), real return bonds, foreign currency bonds (i.e., foreign government bonds), gold and other commodities (including timber). Instead, as an interim measure, we would overweight these asset classes (e.g., in the course of normal rebalancing or contributions to the portfolio) relative to riskier bonds, property, and equity asset classes.

Tom Coyne
Editor

Product and Strategy Notes

Rogers International Commodity Index TRAKRS

In November, 2005 Merrill Lynch launched new TRAKRS (Total Return Asset Contracts) futures contracts linked to the performance of the Rogers International Commodities Index (RICI). TRAKRS differ from other futures contracts in that they are not leveraged (you must put down their full value when buying them) and (in the United States) they may be held in a regular brokerage account rather than a special futures account. These latest TRAKRS mature on October 26, 2010. At that date, the value of the TRAKR will equal the accumulated value of the Rogers Index, less a 1.95% per year fee (similar to an expense charge on a mutual fund or ETF). If it is held in a taxable, account, any capital gains taxes will be due when the TRAKR matures. If an investor wished to maintain his or her investment in the commodities asset class, he or she will then have to either roll the after-tax proceeds into another commodities TRAKR (if one has been issued by Merrill Lynch), or another commodities ETF or mutual fund product.

So, how does this new product compare with existing commodity index products? Let's start with the underlying indices. The following table shows the weights of major commodity groups in four different commodities indices.

| | Goldman Sachs Commodities Index (GSCI) | Deutsche Bank Liquid Commodities Index (DBLCI) | Rogers International Commodities Index (RICI) | Dow Jones AIG Commodities Index (DJAIG) |
|--------------|---|---|--|--|
| Energy | 73.0% | 55.0% | 44.0% | 33.0% |
| Agricultural | 16.0% | 22.5% | 35.0% | 41.0% |
| Metals | 11.0% | 22.5% | 21.0% | 26.0% |
| Total | 100.0% | 100.0% | 100.0% | 100.0% |

The next table shows the annual expense charges on index products that track these four commodity indices:

| | Goldman Sachs Commodities Index (GSCI) | Deutsche Bank Liquid Commodities Index (DBLCI) | Rogers International Commodities Index (RICI) | Dow Jones AIG Commodities Index (DJAIG) |
|------------------|--|---|---|---|
| Product (Ticker) | Oppenheimer Real Assets Fund QRAAX (Mutual Fund) | Deutsche Bank Commodities Fund DBC (ETF) | RCI TRAKR (Chicago Mercantile Exchange Futures Contract) | Pimco Commodities Real Return Fund PCRD (Mutual Fund) |
| Expenses | 1.32% | 1.30% (as of 2Mar06 8K Filing) | 1.95% | 1.25% |

In terms of long-term return correlations, the four indexes are quite similar to each other, as shown in the following table. However, as you can also see, the RICI and DJAIG, with their lower energy weightings, were considerably less volatile than the GSCI and DBLCI.

1994-2004 Return Correlations and Standard Deviation of Nominal Returns

| | GSCI | DBLCI | RICI | DJAIG |
|---------------------------|-------------|--------------|-------------|--------------|
| GSCI | 1.00 | | | |
| DBLCI | .92 | 1.00 | | |
| RICI | .92 | .96 | 1.00 | |
| DJAIG | .90 | .85 | .91 | 1.00 |
| Standard Deviation | 19.6% | 19.7% | 14.9% | 12.8% |

We have not included average returns for the simple reason that, depending on the period chosen, it is easy to show any of the four indices outperforming the others.

We wrote about the new U.S. ETF that tracks the DBLCI in our January 2006 issue. To make a long article short, we found no compelling reason to prefer it to our first choice, PCRDX. When it comes to the RICI versus DJAIG index comparison, both are preferable in our mind to either GSCI or DBLCI. Both RICI and DJAIG offer a more balanced exposure to different commodities, while GSCI and DBLIC have quite heavy energy weightings. This is important, because the diversification return is an important source of the total return on a commodities index (see our February 2006 issue for more on this). However, the RICI TRAKR carries a heavier expense load and will, if held in a taxable account, be subject to capital gains taxes when it matures in 2010. For this reason, we continue to prefer PCRDX as our vehicle for implementing an allocation to the commodities asset class.

New Findings on Indexing Versus Active Management

Three new pieces of research were recently released which shed further light on the argument between proponents of index investing and active management. The first two were released by Standard and Poor's. Their U.S. SPIVA Report for the fourth quarter of 2005 showed that, over the past five years, 63% of active large cap, 73% of mid cap, and 67% of small cap actively managed funds (on an asset weighted basis) were outperformed by index funds tracking, respectively, the S&P 500, 400, and 600 indices.

Supporters of active management will no doubt point to data in the same report that showed many actively managed sector funds (with the notable exceptions of REITs and Information Technology) outperforming their index counterparts over the past three and five years. So, does that lead to the conclusion that sector investors should prefer actively managed funds?

The real story isn't that simple, for two reasons. First, a closer look at the S&P data shows that a major source of the actively managed funds' outperformance may have been their lack of so-called "style consistency". In other words, over time, and unlike sector index funds, these actively managed funds tended to invest in areas outside their specified sector, whether in cash or in companies whose business was only tenuously connected to the sector in question. However, the second aspect of the story is even more important. Even if an investor assumes that an active sector manager will outperform a sector index fund, how does he or she choose the sectors in which to invest? This is a critical question; over the five years ended in December, 2005, the compound annual nominal return on the S&P 1500 (their equivalent to a "total market" fund) was 1.48%. In contrast, the compound annual return on all sector funds (weighted by their assets under management) was only 0.41% -- more than a one percent per year difference. Once again, we reach a familiar conclusion: absent superior forecasting skill, an investor is better off investing in a broad market index.

The second report was the 2005 year-end SPIVA Report for Canada. Once again, over the last five years, the broad S&P/TSX Composite Index outperformed 69% of actively managed Canadian Equity funds, while the capped S&P/TSX Composite outperformed 74% of actively managed funds.

The third report is "Survivor Bias and Improper Management: How the Mutual Fund Industry Inflates Actively Managed Fund Performance", by Barrett and Brodeski. It is an excellent report, and we recommend it to our subscribers. The authors describe "survivor bias" as "a kind of grade inflation for mutual funds that occurs when the funds with the worst performance are made to disappear from the database while strong performers move forward. The result: skewed performance numbers that make the remaining active managers look better [relative to index funds] since poor performers vanish before they can drag down the overall performance numbers for the indexes." Their key conclusion is that "when the "survivor bias" factor is taken into account, actively managed mutual funds in all nine of the Morningstar Principia® "style boxes" lagged their related indexes from 1995-2004. In all but

one of the 42 narrower Morningstar fund categories, the survivor bias effect worked to inflate [actively managed] fund returns...The purging of the weakest funds from the Morningstar database boosted apparent returns on average by 1.6 percent *per year* over the 10-year period.” After the report was released, Morningstar appeared to concede its main point in a press release, which said, “we’re in complete agreement that survivorship-bias-free data merits further study.” However, they disputed another conclusion reached by the authors, claiming “there is absolutely no evidence that survivorship bias has prompted investors to shy away from index funds.” Hmm...Does anybody reading this believe that no investor has ever chosen a mutual fund (be it indexed or actively managed) based on a Morningstar ranking?

More Traps for Active Managers

A number of other recent studies raise further cautions for investors contemplating the use of a high percentage of actively managed funds to implement their asset allocation strategy.

In “Do Investors Capture the Value Premium?” Houge and Loughram find that most investors do not. They show that there is a big difference between investing in real funds and academic studies based on index returns, and conclude that “it seems highly unlikely investors can generate abnormal performance from a value strategy.” Similarly, in “Is Size Dead? A Review of the Size Effect in Equity Returns”, Mathijs van Dijk reviews twenty five years of research since the size effect was popularized in 1981. He concludes that “a quarter century after its discovery, the outlook for the size effect seems bleak.”

Well, if not style-based active investing, what about socially responsible investing? In “Is Ethical Money Financially Smart?” Renneboog, ter Horst, and Zhang find that, “in contrast to conventional investors, SRI investors are not sensitive to past risks nor to the fund fees (i.e. management fees and load fees), which may encourage fund management companies to enter the SRI niche.” The authors also find that ethical investors also chase returns: “SRI funds with better past returns or higher return rankings attract higher money-inflows.” However, this turns out to be a self-defeating strategy, since “SRI funds receiving most of the money inflows perform worse in the future, which is consistent with theories of decreasing returns to scale in the mutual fund industry.”

This underperformance is also consistent with the findings from another paper, “Does Past Success Lead Analysts to Become Overconfident?” by Hilary and Menzly. The authors find that, “analysts who forecast earnings more accurately than the median analyst in the previous four quarters tend to be relatively less accurate and further from the consensus forecast in their subsequent earnings prediction. This result is consistent with analysts becoming overconfident in their ability to forecast future earnings after experiencing a short series of successful predictions.” In short, for active managers forecasting success seems to carry with it the seeds of its own destruction.

Finally! Residential Property Indices in the U.S.

At long last, the United States will soon have not one, but two new series of residential property indexes. For now, they will be linked to futures and options contracts; in the future, we hope to see them embodied in Exchange Traded Funds. The Chicago Board Options Exchange will trade contracts on four regional house price indices (and one national composite index) published by the National Association of Realtors. The Chicago Mercantile Exchange will trade ten new city specific indices that will be known as the S&P/Case-Shiller Metro Home Price Indices. These new indices, and the products we hope they will spawn, will make it much easier to integrate residential property into investors’ asset allocation analyses. You can be sure we’ll be writing a lot more about this soon. And we also hope that S&P quickly takes this concept to other countries.

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 Euro cash benchmark is 2.89% (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.

| | | | |
|---|--------------------------------|---------------|----------------------------|
| <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 31Mar06 | Weight | Weighted Return |
| | In Euro | | In Euro |
| 7% Target Real Return | <i>YTD Returns are Nominal</i> | | |
| <i>Asset Classes</i> | | | |
| Eurozone Real Return Bonds | -3.0% | 0.0% | 0.0% |
| Eurozone Bonds | -1.6% | 0.0% | 0.0% |
| Global Bonds | -2.5% | 2.5% | -0.1% |
| Domestic Commercial Property | 22.7% | 0.0% | 0.0% |
| Foreign Commercial Property | 10.1% | 7.5% | 0.8% |
| Commodities | -8.1% | 10.0% | -0.8% |
| Timber | 4.8% | 7.5% | 0.4% |
| Eurozone Equity | 9.9% | 47.5% | 4.7% |
| Foreign Equity (US) | 3.0% | 10.0% | 0.3% |
| Foreign Equity (UK) | 6.1% | 2.0% | 0.1% |
| Foreign Equity (Pacific) | 4.1% | 3.0% | 0.1% |
| Emerging Equity | 8.8% | 10.0% | 0.9% |
| Equity Market Neutral | 0.1% | 0.0% | 0.0% |
| | | 100.0% | 6.4% |

| | | | |
|------------------------------|--------------------------------|---------------|----------------------------|
| | YTD 31Mar06 | Weight | Weighted Return |
| | In Euro | | In Euro |
| 6% Target Real Return | <i>YTD Returns are Nominal</i> | | |
| <i>Asset Classes</i> | | | |
| Eurozone Real Return Bonds | -3.0% | 0.0% | 0.0% |
| Eurozone Bonds | -1.6% | 7.5% | -0.1% |
| Global Bonds | -2.5% | 0.0% | 0.0% |
| Domestic Commercial Property | 22.7% | 7.5% | 1.7% |
| Foreign Commercial Property | 10.1% | 10.0% | 1.0% |
| Commodities | -8.1% | 10.0% | -0.8% |
| Timber | 4.8% | 2.5% | 0.1% |
| Eurozone Equity | 9.9% | 37.5% | 3.7% |
| Foreign Equity (US) | 3.0% | 10.0% | 0.3% |
| Foreign Equity (UK) | 6.1% | 2.0% | 0.1% |
| Foreign Equity (Pacific) | 4.1% | 3.0% | 0.1% |
| Emerging Equity | 8.8% | 10.0% | 0.9% |
| Equity Market Neutral | 0.1% | 0.0% | 0.0% |
| | | 100.0% | 7.0% |

| | YTD 31Mar06 | Weight | Weighted Return |
|------------------------------|--------------------------------|---------------|----------------------------|
| | In Euro | | In Euro |
| 5% Target Real Return | <i>YTD Returns are Nominal</i> | | |
| <i>Asset Classes</i> | | | |
| Eurozone Real Return Bonds | -3.0% | 2.5% | -0.1% |
| Eurozone Bonds | -1.6% | 25.0% | -0.4% |
| Global Bonds | -2.5% | 0.0% | 0.0% |
| Domestic Commercial Property | 22.7% | 10.0% | 2.3% |
| Foreign Commercial Property | 10.1% | 5.0% | 0.5% |
| Commodities | -8.1% | 10.0% | -0.8% |
| Timber | 4.8% | 10.0% | 0.5% |
| Eurozone Equity | 9.9% | 12.5% | 1.2% |
| Foreign Equity (US) | 3.0% | 10.0% | 0.3% |
| Foreign Equity (UK) | 6.1% | 2.0% | 0.1% |
| Foreign Equity (Pacific) | 4.1% | 3.0% | 0.1% |
| Emerging Equity | 8.8% | 10.0% | 0.9% |
| Equity Market Neutral | 0.1% | 0.0% | 0.0% |
| | | 100.0% | 4.6% |

| | YTD 31Mar06 | Weight | Weighted Return |
|------------------------------|--------------------------------|---------------|----------------------------|
| | In Euro | | In Euro |
| 4% Target Real Return | <i>YTD Returns are Nominal</i> | | |
| <i>Asset Classes</i> | | | |
| Eurozone Real Return Bonds | -3.0% | 0.0% | 0.0% |
| Eurozone Bonds | -1.6% | 32.5% | -0.5% |
| Global Bonds | -2.5% | 10.0% | -0.2% |
| Domestic Commercial Property | 22.7% | 15.0% | 3.4% |
| Foreign Commercial Property | 10.1% | 0.0% | 0.0% |
| Commodities | -8.1% | 12.5% | -1.0% |
| Timber | 4.8% | 7.5% | 0.4% |
| Eurozone Equity | 9.9% | 2.5% | 0.2% |
| Foreign Equity (US) | 3.0% | 10.0% | 0.3% |
| Foreign Equity (UK) | 6.1% | 2.0% | 0.1% |
| Foreign Equity (Pacific) | 4.1% | 3.0% | 0.1% |
| Emerging Equity | 8.8% | 5.0% | 0.4% |
| Equity Market Neutral | 0.1% | 0.0% | 0.0% |
| | | 100.0% | 3.2% |

| | | YTD 31 Mar 06 | YTD 31 Mar 06 | Weight | Weight | Weighted Return | Weighted Return |
|------------------------------|-------------------------------|-------------------------|------------------|--------|--------|--------------------|--------------------|
| | | In Euro | In Euro | | | In Euro | In Euro |
| | Equally 3% Target Real Return | YTD Returns are Nominal | | | | | |
| | Asset Classes | | | | | | |
| Eurozone Real Return Bonds | | -3.0% | -3.0% | 10.0% | 2.5% | -0.3% | -0.1% |
| Eurozone Bonds | | -1.6% | -1.6% | 10.0% | 5.0% | -0.2% | -0.7% |
| Global Bonds | | -2.5% | -2.5% | 10.0% | 0.0% | -0.2% | -0.2% |
| Domestic Commercial Property | | 22.7% | 22.7% | 10.0% | 2.5% | 2.3% | 2.8% |
| Foreign Commercial Property | | 10.1% | 10.1% | 10.0% | 0.0% | 1.0% | 0.0% |
| Commodities | | -8.1% | -8.1% | 10.0% | 0.0% | -0.8% | -0.8% |
| Timber | | 4.8% | 4.8% | 10.0% | 5.0% | 0.5% | 0.2% |
| Eurozone Equity | | 9.9% | 9.9% | 10.0% | 0.0% | 1.0% | 0.0% |
| Foreign Equity (US) | | 3.0% | 3.0% | 7.0% | 6.0% | 0.2% | 0.2% |
| Foreign Equity (UK) | | 6.1% | 6.1% | 1.0% | 2.0% | 0.1% | 0.1% |
| Foreign Equity (Pacific) | | 4.1% | 4.1% | 2.0% | 2.0% | 0.1% | 0.1% |
| Emerging Equity | | 8.8% | 8.8% | 10.0% | 5.0% | 0.9% | 0.4% |
| Equity Market Neutral | | | 0.1% | 100.0% | 0.0% | 4.5% | 0.0% |
| | | | | | 100.0% | | 2.1% |

| | YTD 31 Mar 06 | Weight | Weighted Return |
|------------------------------|-------------------------|--------|--------------------|
| | In Euro | | In Euro |
| | 2% Target Real Return | | |
| | YTD Returns are Nominal | | |
| | Asset Classes | | |
| Eurozone Real Return Bonds | -3.0% | 35.0% | -1.0% |
| Eurozone Bonds | -1.6% | 25.0% | -0.4% |
| Global Bonds | -2.5% | 7.5% | -0.2% |
| Domestic Commercial Property | 22.7% | 10.0% | 2.3% |
| Foreign Commercial Property | 10.1% | 0.0% | 0.0% |
| Commodities | -8.1% | 10.0% | -0.8% |
| Timber | 4.8% | 2.5% | 0.1% |
| Eurozone Equity | 9.9% | 5.0% | 0.5% |
| Foreign Equity (US) | 3.0% | 0.0% | 0.0% |
| Foreign Equity (UK) | 6.1% | 0.0% | 0.0% |
| Foreign Equity (Pacific) | 4.1% | 0.0% | 0.0% |
| Emerging Equity | 8.8% | 5.0% | 0.4% |
| Equity Market Neutral | 0.1% | 0.0% | 0.0% |
| | | 100.0% | 0.9% |

| | YTD 31Mar06 | Weight | Weighted Return |
|-----------------------------------|--------------------------------|---------------|----------------------------|
| | In Euro | | In Euro |
| Equally Weighted Portfolio | <i>YTD Returns are Nominal</i> | | |
| <i>Asset Classes</i> | | | |
| Eurozone Real Return Bonds | -3.0% | 10.0% | -0.3% |
| Eurozone Bonds | -1.6% | 10.0% | -0.2% |
| Global Bonds | -2.5% | 10.0% | -0.2% |
| Domestic Commercial Property | 22.7% | 10.0% | 2.3% |
| Foreign Commercial Property | 10.1% | 10.0% | 1.0% |
| Commodities | -8.1% | 10.0% | -0.8% |
| Timber | 4.8% | 10.0% | 0.5% |
| Eurozone Equity | 9.9% | 10.0% | 1.0% |
| Foreign Equity (US) | 3.0% | 7.0% | 0.2% |
| Foreign Equity (UK) | 6.1% | 1.0% | 0.1% |
| Foreign Equity (Pacific) | 4.1% | 2.0% | 0.1% |
| Emerging Equity | 8.8% | 10.0% | 0.9% |
| | | 100.0% | 4.5% |

| | | | |
|---|--------------------------------|---|------------------------|
| <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>Unlike the other target return portfolios, these allow investment in uncorrelated alpha (equity market neutral) funds.</i> | |
| | YTD 31Mar06 | Weight | Weighted Return |
| | In Euro | | In Euro |
| 7% Target Real Return | <i>YTD Returns are Nominal</i> | | |
| <i>Asset Classes</i> | | | |
| Eurozone Real Return Bonds | -3.0% | 0.0% | 0.0% |
| Eurozone Bonds | -1.6% | 0.0% | 0.0% |
| Global Bonds | -2.5% | 0.0% | 0.0% |
| Domestic Commercial Property | 22.7% | 10.0% | 2.3% |
| Foreign Commercial Property | 10.1% | 5.0% | 0.5% |
| Commodities | -8.1% | 10.0% | -0.8% |
| Timber | 4.8% | 7.5% | 0.4% |
| Eurozone Equity | 9.9% | 37.5% | 3.7% |
| Foreign Equity (US) | 3.0% | 10.0% | 0.3% |
| Foreign Equity (UK) | 6.1% | 2.0% | 0.1% |
| Foreign Equity (Pacific) | 4.1% | 3.0% | 0.1% |
| Emerging Equity | 8.8% | 10.0% | 0.9% |
| Equity Market Neutral | 0.1% | 5.0% | 0.0% |
| | | 100.0% | 7.5% |

| | YTD 31Mar06 | Weight | Weighted Return |
|------------------------------|--------------------------------|--------|-----------------|
| | In Euro | | In Euro |
| 6% Target Real Return | <i>YTD Returns are Nominal</i> | | |
| <i>Asset Classes</i> | | | |
| Eurozone Real Return Bonds | -3.0% | 0.0% | 0.0% |
| Eurozone Bonds | -1.6% | 10.0% | -0.2% |
| Global Bonds | -2.5% | 0.0% | 0.0% |
| Domestic Commercial Property | 22.7% | 10.0% | 2.3% |
| Foreign Commercial Property | 10.1% | 5.0% | 0.5% |
| Commodities | -8.1% | 10.0% | -0.8% |
| Timber | 4.8% | 7.5% | 0.4% |
| Eurozone Equity | 9.9% | 27.5% | 2.7% |
| Foreign Equity (US) | 3.0% | 10.0% | 0.3% |
| Foreign Equity (UK) | 6.1% | 2.0% | 0.1% |
| Foreign Equity (Pacific) | 4.1% | 3.0% | 0.1% |
| Emerging Equity | 8.8% | 10.0% | 0.9% |
| Equity Market Neutral | 0.1% | 5.0% | 0.0% |
| | | 100.0% | 6.3% |

| | YTD 31Mar06 | Weight | Weighted Return |
|------------------------------|--------------------------------|--------|-----------------|
| | In Euro | | In Euro |
| 5% Target Real Return | <i>YTD Returns are Nominal</i> | | |
| <i>Asset Classes</i> | | | |
| Eurozone Real Return Bonds | -3.0% | 0.0% | 0.0% |
| Eurozone Bonds | -1.6% | 17.5% | -0.3% |
| Global Bonds | -2.5% | 5.0% | -0.1% |
| Domestic Commercial Property | 22.7% | 10.0% | 2.3% |
| Foreign Commercial Property | 10.1% | 5.0% | 0.5% |
| Commodities | -8.1% | 10.0% | -0.8% |
| Timber | 4.8% | 10.0% | 0.5% |
| Eurozone Equity | 9.9% | 12.5% | 1.2% |
| Foreign Equity (US) | 3.0% | 10.0% | 0.3% |
| Foreign Equity (UK) | 6.1% | 2.0% | 0.1% |
| Foreign Equity (Pacific) | 4.1% | 3.0% | 0.1% |
| Emerging Equity | 8.8% | 10.0% | 0.9% |
| Equity Market Neutral | 0.1% | 5.0% | 0.0% |
| | | 100.0% | 4.7% |

| | YTD 31Mar06 | Weight | Weighted Return |
|------------------------------|--------------------------------|--------|-----------------|
| | In Euro | | In Euro |
| 4% Target Real Return | <i>YTD Returns are Nominal</i> | | |
| <i>Asset Classes</i> | | | |
| Eurozone Real Return Bonds | -3.0% | 0.0% | 0.0% |
| Eurozone Bonds | -1.6% | 32.5% | -0.5% |
| Global Bonds | -2.5% | 10.0% | -0.2% |
| Domestic Commercial Property | 22.7% | 15.0% | 3.4% |
| Foreign Commercial Property | 10.1% | 0.0% | 0.0% |
| Commodities | -8.1% | 12.5% | -1.0% |
| Timber | 4.8% | 7.5% | 0.4% |
| Eurozone Equity | 9.9% | 2.5% | 0.2% |
| Foreign Equity (US) | 3.0% | 10.0% | 0.3% |
| Foreign Equity (UK) | 6.1% | 2.0% | 0.1% |
| Foreign Equity (Pacific) | 4.1% | 3.0% | 0.1% |
| Emerging Equity | 8.8% | 5.0% | 0.4% |
| Equity Market Neutral | 0.1% | 0.0% | 0.0% |
| | | 100.0% | 3.2% |

| | YTD 31Mar06 | Weight | Weighted Return |
|------------------------------|--------------------------------|--------|-----------------|
| | In Euro | | In Euro |
| 3% Target Real Return | <i>YTD Returns are Nominal</i> | | |
| <i>Asset Classes</i> | | | |
| Eurozone Real Return Bonds | -3.0% | 2.5% | -0.1% |
| Eurozone Bonds | -1.6% | 45.0% | -0.7% |
| Global Bonds | -2.5% | 10.0% | -0.2% |
| Domestic Commercial Property | 22.7% | 12.5% | 2.8% |
| Foreign Commercial Property | 10.1% | 0.0% | 0.0% |
| Commodities | -8.1% | 10.0% | -0.8% |
| Timber | 4.8% | 5.0% | 0.2% |
| Eurozone Equity | 9.9% | 0.0% | 0.0% |
| Foreign Equity (US) | 3.0% | 6.0% | 0.2% |
| Foreign Equity (UK) | 6.1% | 2.0% | 0.1% |
| Foreign Equity (Pacific) | 4.1% | 2.0% | 0.1% |
| Emerging Equity | 8.8% | 5.0% | 0.4% |
| Equity Market Neutral | 0.1% | 0.0% | 0.0% |
| | | 100.0% | 2.1% |

| | YTD 31Mar06 | Weight | Weighted Return |
|------------------------------|--------------------------------|--------|-----------------|
| | In Euro | | In Euro |
| 2% Target Real Return | <i>YTD Returns are Nominal</i> | | |
| <i>Asset Classes</i> | | | |
| Eurozone Real Return Bonds | -3.0% | 35.0% | -1.0% |
| Eurozone Bonds | -1.6% | 25.0% | -0.4% |
| Global Bonds | -2.5% | 7.5% | -0.2% |
| Domestic Commercial Property | 22.7% | 10.0% | 2.3% |
| Foreign Commercial Property | 10.1% | 0.0% | 0.0% |
| Commodities | -8.1% | 10.0% | -0.8% |
| Timber | 4.8% | 2.5% | 0.1% |
| Eurozone Equity | 9.9% | 5.0% | 0.5% |
| Foreign Equity (US) | 3.0% | 0.0% | 0.0% |
| Foreign Equity (UK) | 6.1% | 0.0% | 0.0% |
| Foreign Equity (Pacific) | 4.1% | 0.0% | 0.0% |
| Emerging Equity | 8.8% | 5.0% | 0.4% |
| Equity Market Neutral | 0.1% | 0.0% | 0.0% |
| | | 100.0% | 0.9% |