The Index Investor

Invest Wisely…Get an Impartial Second Opinion.

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This Month's Issue: Key Points

Among all the asset classes we write about, none generates as many questions and debates as foreign currency bonds. And this is just as true among professional investment managers and plan sponsors as it is among individual investors. This month, we analyze its advantages and disadvantages, including the vexing question of whether and how to hedge exposure to foreign exchange risk created by investments in foreign bonds. We find that in local currency terms, returns on foreign bond markets have low correlations with each other, creating potential opportunities for gains from portfolio diversification. Moreover, the returns on foreign bonds and foreign equities usually have relatively low correlations with each other, Foreign bonds also help to diversify the risk associated with changing real interest rates. Perhaps most important, multiple analyses have shown that during bad times the correlation of returns between domestic and foreign equity markets tends to increase, while the correlation between domestic equity and foreign bonds either holds steady or declines, producing diversification benefits just when they are most needed.

We also review arguments in favor of different approaches to managing foreign exchange exposure, including 100% hedging, no hedging, and alternatives in between these two extremes. On balance, we conclude there is no "one size fits all" answer. The right

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answer ultimately comes down to an individual investor's trade-off between a desire to minimize reported portfolio volatility in the short term (which argues for 100% hedging), maximize long-run diversification benefits (which argues for no hedging), minimize cash flow risk (which argues for less than 100% hedging), and minimize potential regret (which argues for more than zero hedging). In sum, we continue to believe that foreign currency bonds have a valuable (if under-appreciated) long-term role to play in many investors' portfolios.

Our second article examines the pros and cons of investing in international commercial property. We show that, the correlations between local currency commercial property returns are also low, suggesting the existence of potential diversification benefits. We also review academic research that supports their existence. However, all these conclusions must be regarded as somewhat tentative, because of issues surrounding the quality of the data they use. Still, with products being introduced that make the foreign commercial property asset class accessible to individual investors, we will include it as a possibility in the next rebalancing of our model portfolios.

Our third article this month looks at "portable alpha" and "enhanced indexing." The former term refers to the attempt to increase the returns from taking systematic (beta) risk in one asset class (say, domestic equities) by adding to it the return earned for taking active, unsystematic risk (alpha) in another asset class (say, domestic bonds). We examine the Pimco StocksPlus Fund, a portable alpha offering that has a ten-year track record. We find that, while it delivers what it promises to institutional investors, the additional expenses charged on retail shares of this fund make realization of those same benefits to individuals less likely. We then go on to examine "enhanced indexing." This is often used interchangeably with "portable alpha" – but not always. As an example of the latter, we examine the risks and returns of one "enhanced index" strategy that is growing in popularity around the world: writing covered call options against an investment in a large cap index fund (e.g., one that tracks the S&P 500). We find that, unlike "portable alpha" strategies, that deliver slightly more return for slightly more risk, covered call writing appears to fundamentally change the returns and risks an investor should expect if an investor uses this strategy to implement his or her allocation to the domestic equity asset class. We also raise questions about whether, given the growing number of funds using the covered call approach, demand will materialize for all

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the options that are being offered for sale. If this doesn't happen, the future results of this strategy could be very different from what they have been in the past.

This Month's Letters to the Editor

How do you reconcile the favorable view of equity market neutral hedge funds expressed in last month's issue with your support for index investing? – A reader from Canada

We have often noted that, when it comes to investing, the pursuit of ideological purity is a dangerous guide for action. More specifically, given a choice between getting our asset allocation right, and implementing it via indexed or actively managed funds, we would probably choose the former over the latter. That was the context for our examination of the advantages and disadvantages of allocations to private equity and hedge funds. As you recall, with respect to the former, our assessment was less positive than what seems to be the conventional wisdom these days. Absent high confidence in one's ability to identify skilled managers, the average returns on buyout funds seemed about equal to those on the public equity market. Venture capital funds seemed appropriate only for those investors seeking very high long-term returns, and willing to take on significantly higher risk to achieve them. We also note that, subsequent to the preparation of our article, an academic paper was posted that reached an even more pessimistic conclusion about private equity (see "Performance of Private Equity Funds: Another Puzzle?" by Phalippou and Zollo).

With respect to hedge funds, we do not deny the problematic issues that they raise. Perhaps the most controversial paper on this subject is "Hedge Funds: Risk and Return" by Malkiel and Saha. The authors note the many problems with reported hedge fund returns data, which may well be considerably overstated due to self-selected reporting, backfill and survivorship biases, and the use of stale prices or fund manager valuations for certain securities (mostly derivatives) held by some funds. Moreover, Malkiel and Ssaha note that "the cross-sectional variation and the range of individual hedge fund returns [in any year] are far greater than is the case for traditional asset classes. Investors in hedge funds [therefore] take on a substantial risk of selecting a very poorly performing fund, or worse, a failing one." At the retail level, a painful example of this is the recent failure (due, it has been alleged, to

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fraudulent behavior by the manager) of Portus Alternative Asset Management, which has left 26,000 Canadian investors wondering what happened to their money.

In another excellent paper ("Where Have They Hidden My Alpha?"), Rolf Banz notes that "[active management] skill is rare. So is the reliable recognition of that skill. The emergence of hedge funds has not changed those fact." He also writes that "there are few funds that provide true market neutral returns, and even fewer that add a positive skill based alpha." However, both of these papers also make the same point we did: in spite of these problems, it remains undeniable that even small amounts of additional return that have a low correlation with returns on other asset classes provide valuable diversification benefits to a portfolio. For this reason, we have concluded that, if such products become widely available, low cost "fund-of-fund" products that bundle together underlying investments in multiple equity market neutral hedge funds would be a valuable addition to many individual investors' portfolios.

This is also consistent with the continued development of a trend that has been growing for some time in the institutional investment world, and which we write about in this month's issue: so-called "portable alpha", or the disaggregation of traditional long-only active management into its two component parts. The first of these is low cost index investments in different asset classes. These should account for the bulk of most investors' portfolios. The second is a smaller amount of higher cost investment in actively managed investment strategies whose returns are not significantly correlated with those on the asset class index funds. This approach has a two-fold benefit: not only does it avoid paying active management fees for what are largely asset class driven returns, but it should also improve overall portfolio performance. In sum, since our ultimate goal is to help readers achieve their financial goals at the lowest possible cost and risk, we do not believe that our support for sensibly structured and priced investments in market neutral hedge funds represents a contradiction of our core beliefs.

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Global Asset Class Returns

YTD 31Aug05	In USD	In AUD	In CAD	In EURO	In JPY	In GBP
Asset Held						
US Bonds	2.90%	7.08%	2.05%	12.42%	10.70%	9.22%
US Prop.	9.40%	13.58%	8.55%	18.92%	17.20%	15.72%
US Equity	2.90%	7.08%	2.05%	12.42%	10.70%	9.22%
AUS Bonds	-1.58%	2.60%	-2.43%	7.94%	6.22%	4.74%
AUS Prop.	-1.03%	3.15%	-1.88%	8.49%	6.77%	5.29%
AUS Equity	10.72%	14.89%	9.87%	20.24%	18.52%	17.04%
CAN Bonds	7.86%	12.04%	7.01%	17.38%	15.66%	14.18%
CAN Prop.	16.48%	20.66%	15.63%	26.00%	24.28%	22.80%
CAN Equity	17.99%	22.16%	17.14%	27.51%	25.78%	24.31%
Euro Bonds	-4.40%	-0.22%	-5.25%	5.12%	3.40%	1.92%
Euro Prop.	16.68%	20.86%	15.83%	26.20%	24.48%	23.00%
Euro Equity	4.13%	8.31%	3.28%	13.65%	11.93%	10.45%
Japan Bonds	-6.71%	-2.53%	-7.56%	2.81%	1.09%	-0.39%
Japan Prop.	3.12%	7.30%	2.27%	12.64%	10.92%	9.44%
Japan Equity	1.92%	6.10%	1.07%	11.44%	9.72%	8.24%
UK Bonds	-0.96%	3.22%	-1.81%	8.56%	6.84%	5.36%
UK Prop.	-1.25%	2.93%	-2.10%	8.27%	6.55%	5.07%
UK Equity	4.04%	8.21%	3.19%	13.55%	11.83%	10.35%
World Bonds	-0.75%	3.43%	-1.60%	8.77%	7.05%	5.57%
World Prop.	7.74%	11.92%	6.89%	17.26%	15.54%	14.06%
World Equity	4.35%	8.53%	3.50%	13.87%	12.15%	10.67%
Commodities	20.90%	25.08%	20.05%	30.42%	28.70%	27.22%
Timber	3.03%	7.21%	2.18%	12.55%	10.83%	9.35%
Hedge Funds	1.44%	5.62%	0.59%	10.96%	9.24%	7.76%
Volatility	-5.19%	-1.02%	-6.04%	4.33%	2.60%	1.13%
A$ Currency	-4.18%	0.00%	-5.03%	5.34%	3.62%	2.14%
C$	0.85%	5.03%	0.00%	10.37%	8.65%	7.17%
Euro	-9.52%	-5.34%	-10.37%	0.00%	-1.72%	-3.20%
Yen	-7.80%	-3.62%	-8.65%	1.72%	0.00%	-1.48%
UK£	-6.32%	-2.14%	-7.17%	3.20%	1.48%	0.00%
US$	0.00%	4.18%	-0.85%	9.52%	7.80%	6.32%

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Equity and Bond Market Valuation Update

Our market valuation analyses are based on the assumption that markets are not perfectly efficient and always in equilibrium. This means that it is possible for the supply of future returns a market is expected to provide to be higher or lower than the returns investors logically demand. In the case of an equity market, we define the future supply of returns to be equal to the current dividend yield plus the rate at which dividends are expected to grow in the future. We define the return investors demand as the current yield on real return government bonds plus an equity market risk premium. As described in our May, 2005 issue, people can and do disagree about the "right" values for these variables. Recognizing this, we present four valuation scenarios for an equity market, based on different values for three key variables. First, we use both the current dividend yield and the dividend yield adjusted upward by .50% to reflect share repurchases. Second, we define future dividend growth to be equal to the long-term rate of total (multifactor) productivity growth, which is equal to either 1% or 2%. Third, we use two different values for the equity risk premium required by investors: 2.5% and 4.0%. Different combinations of these variables yield high and low scenarios for both the future returns the market is expected to supply, and the future returns investors will demand. We then use the dividend discount model to combine these scenarios, to produce four different views of whether an equity market is over, under, or fairly valued today. These estimates are shown in the following tables, where a value greater than 100% implies overvaluation, and less than 100% implies undervaluation:

Australia	**Low Demanded Return**	**High Demanded Return**
High Supplied Return	66%	100%
Low Supplied Return	101%	141%

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Canada	**Low Demanded Return**	**High Demanded Return**
High Supplied Return	97%	163%
Low Supplied Return	184%	270%

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Eurozone	Low Demanded Return	High Demanded Return
High Supplied Return	50%	95%
Low Supplied Return	95%	149%

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Japan	Low Demanded Return	High Demanded Return
High Supplied Return	84%	180%
Low Supplied Return	221%	364%

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United Kingdom	Low Demanded Return	High Demanded Return
High Supplied Return	51%	90%
Low Supplied Return	90%	137%

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United States	Low Demanded Return	High Demanded Return
High Supplied Return	86%	152%
Low Supplied Return	169%	255%

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:

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	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	2.38%	2.96%	5.34%	5.06%	-0.28%	2.74%
Canada	1.70%	2.40%	4.10%	3.78%	-0.32%	3.11%
Eurozone	1.16%	2.37%	3.53%	3.10%	-0.43%	4.23%
Japan	0.82%	0.77%	1.59%	1.36%	-0.23%	2.30%
UK	1.41%	3.17%	4.58%	4.15%	-0.43%	4.23%
USA	1.47%	2.93%	4.40%	4.04%	-0.36%	3.54%

It is important to note some important limitations of this analysis. First, it uses the current yield on real return government bonds. Over the past forty years or so, it has averaged around 3.00%. Were we to use this rate, bond markets would generally look even more overvalued. It also uses historical inflation as an estimate of expected future inflation. This may not produce an accurate estimate.

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

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the yields on ten- year government bonds as our estimate of the likely future annual change in exchange rates between two regions. This information is summarized in the following table:

Annual Exchange Rate Changes Implied by Bond Market Yields

	To A$	To C$	To EU	To YEN	To GBP	To US$
From						
A$	0.00%	-1.28%	-1.96%	-3.70%	-0.91%	-1.02%
C$	1.28%	0.00%	-0.68%	-2.42%	0.37%	0.26%
EU	1.96%	0.68%	0.00%	-1.74%	1.05%	0.94%
YEN	3.70%	2.42%	1.74%	0.00%	2.79%	2.68%
GBP	0.91%	-0.37%	-1.05%	-2.79%	0.00%	-0.11%
US$	1.02%	-0.26%	-0.94%	-2.68%	0.11%	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

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about the asset's fair value, and through their buying and selling cause its price to adjust to that level (and eliminate the potential excess return).

We publish this table to make an important point: there is nothing unique about the various rotation strategies we describe, which are widely known by many investors. Rather, whatever active management returns (also known as "alpha") they are able to generate is directly related to how accurately (and consistently) one can forecast the turning points in the economic cycle. Regularly getting this right is beyond the skills of most investors. In other words, most of us are better off just getting our asset allocations right, and implementing them via index funds rather than trying to earn extra returns by accurately forecasting the ups and downs of different sub-segments of the U.S. equity and debt markets. That being said, the highest year-to-date returns in the table give a rough indication of how investors employing different strategies expect the economy to perform in the near future. The highest returns in a given row indicate that most investors are anticipating the economic and interest rate conditions noted at the top of the next column. Similar returns in multiple columns (within the same strategy) indicate a relative lack of agreement between investors about the most likely future state of the economy.

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

YTD 31Aug05

Economy	Bottoming	Strengthening	Peaking	Weakening
Interest Rates	Falling	Bottom	Rising	Peak
Style Rotation	Growth (IWZ) **2.43%**	Value (IWW) **4.32%**	Value (IWW) **4.32%**	Growth (IWZ) **2.43%**
Size Rotation	Small (IWM) **3.40%**	Small (IWM) **3.40%**	Large (IWB) **3.37%**	Large (IWB) **3.37%**
Style and Size Rotation	Small Growth (DSG) **4.99%**	Small Value (DSV) **2.95%**	Large Value (ELV) **1.06%**	Large Growth (ELG) **-1.10%**
Sector Rotation	Cyclicals (IYC) **-2.67%** Technology (IYW) **-0.12%**	Basic Materials (IYM) **-4.32%** Industrials (IYJ) **-1.96%**	Energy (IYE) **35.63%** Staples (IYK) **2.02%**	Utilities (IDU) **17.50%** Financials (IYF) **-2.80%**
Bond Market Rotation	High Risk (VWEHX) **2.00%**	Short Maturity (VBISX) **1.30%**	Low Risk (VIPSX) **2.70%**	Long Maturity (VBLTX) **7.70%**

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Investing in Foreign Currency Bonds

Among all the asset classes we write about, none generates as many questions and debates as foreign currency bonds. And this is just as true among professional investment managers and plan sponsors as it is among individual investors.

Let's start with some basic data. In the most recent Global Financial Stability Report, the International Monetary Fund estimated that the value of all the world's equity markets was $31.2 trillion U.S. dollars at the end of 2003. In comparison, the value of the world's debt markets was $51.3 trillion. More recent data from the Bank for International Settlements described how much debt was outstanding in different major currencies:

Currency	**Amount Outstanding in 2004 (US$ Billion)**	**Percent of Total**
Australian Dollar (AUD)	478	0.9%
Canadian Dollar (CAD)	870	1.7%
Eurozone (EUR)	15,792	29.7%
Japanese Yen (JPY)	9,398	17.7%
Swiss Franc (CHF)	488	0.9%
UK Pound (GBP)	2,025	3.8%
US Dollar (USD)	24,046	45.3%
Total	**$53,097**	**100.0%**

As you can see, from the perspective of investors located in each of these currency zones, foreign currency bonds represent a very large portion of the total universe of fixed income investment opportunities.

Now let's briefly review a very simple example of how a foreign currency investment works. An investor has a choice: In her home country, she can invest 100 of home country currency in a one year home currency (HC) denominated bond that will pay her a 3% interest rate. Alternative, she can convert 100 of home currency into 100 of foreign currency (FC) at the current 1 HC/ 1 FC exchange rate, and invest in a one-year foreign currency denominated bond that pays an interest rate of 1%. Which option should our investor choose? In theory, she should be indifferent between the two choices. Why is this? Because in theory the

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actions of arbitrageurs should ensure that the exchange rate will adjust over time to exactly offset the difference between the two countries' interest rates. If this didn't happen, there would be an opportunity to earn a higher profit by investing in the country with the highest interest rate. Technically, the absence of such profit opportunities is known as "uncovered interest parity", or "UIP".

Here is an example of how it works. If our investor buys the foreign currency bond that pays 1% interest, after one year she will have 101 in foreign currency when the bond matures. If she buys the home currency bond, she will have 103 in home currency when it matures. If UIP holds, at the time the two bonds mature the exchange rate should be 103/101 (from the perspective of the home currency), or about 1.02. Hence if our investor buys the foreign currency bond, she should earn a 1% interest return, plus a 2% gain on the exchange rate, for a total return of 3% -- just what she would have earned on the home currency bond.

Now what makes you nervous about this example? Most likely uncertainty about what the exchange rate will be when the foreign currency bond matures in one year. For example, consider two alternative outcomes to the one we had assumed. First, assume that on the day after investing in her 1% foreign currency bond, our investor sees the foreign currency interest rate rise to 2%. In theory, this should cause the exchange rate to change, so that when her bond matures it is 103/102 or about 1.01. If this happens, our investor will earn a lower total return (2% in home currency terms) on her foreign currency bond than she would have had she invested in the domestic, home currency bond. Now consider the second alternative scenario in which the home currency interest rate rises from 3% to 4%, while the foreign interest rate remains at 1%. In this case, if UIP holds, the exchange rate when our investor's foreign currency bond matures will be 104/101, or about 1.03. In this case, our foreign bond investor will earn a total return of about 4% in home currency terms, versus the 3% earned by people who invested in home currency bonds.

Is there anything our foreign bond investor can do to reduce her uncertainty about her future total returns? Yes, there is. At the time she invested in the foreign bond, she could have entered into a contract to sell the 101 in foreign currency she will receive in one year, at the expected future exchange rate of 1.02, to lock in her expected total return in home currency. However, this type of "forward" or "future" foreign exchange contract cannot purchased for free; a general rule of thumb is that hedging foreign exchange risk costs .25%

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(25/100ths of one percent, or 25 basis points) of the value of the amount hedged. In this case, our foreign investor's net return from her foreign bond investment will be equal to 2.75%.

So, where are we now? Our intrepid investor apparently has three alternatives: (1) invest only in domestic currency bonds; (2) invest in foreign currency bonds, and do not hedge the resulting foreign exchange risk; or (3) invest in foreign currency bonds, and hedge the foreign exchange risk (experienced investors will recognize a fourth possibility – hedge less than 100% of the foreign currency exposure. We'll cover that later). So why would our investor consider foreign currency bonds, assuming she is risk averse?

Our simple example suggests one possible answer, assuming for the moment that globally integrated financial markets work the way theory suggests. We have seen that when your home currency interest rate rises, your currency should depreciate, raising the total return on foreign investments (assuming no change in foreign returns caused by the change in your home country's interest rate). Now think about what else happens when your home currency interest rate increases. Rising interest rates usually cause domestic stock and bond prices (and returns) to fall. If you have foreign currency investments in your portfolio, at least some of these losses should be offset by gains on foreign currency denominated assets (assuming you have not hedged the foreign currency risk exposure).

At this point, careful readers are no doubt thinking, "ah, yes, but what about real return bonds?" Let's look at that. Remember that the nominal interest rate equals the real interest rate plus expected inflation. Remember too that there are two types of domestic bonds: real return bonds and nominal return bonds. The nominal return on the former increases with inflation, to keep the real (after inflation) return constant. On the other hand, a fixed rate, nominal return bond will go down in price (i.e., suffer a negative real return) when an increase in inflation causes an increase in the nominal interest rate. This is not to say, however, that real return bonds are without risk. Even if inflation expectations remain unchanged, nominal returns could go up because of an increase in the real rate of interest. In this case, the prices of both fixed rate real return bonds and fixed rate nominal return bonds would decline. Under this latter scenario, an investment in foreign currency assets would still be expected to benefit from the resulting change in exchange rates. This is important, because the balance of research seems to indicate that UIP applies more strongly to differences in nominal interest rates (e.g., see "Why are Real Interest Rates Not Equalized Internationally?" by Chung and

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Crowder). In sum, we should not expect domestic real return bonds to always be a perfect substitute for foreign currency assets.

However, there is another possible reason to think about investing in foreign currency bonds. If their returns (on either a hedged or unhedged basis) are not perfectly correlated with those on home currency bonds, then by diversifying her investments between them, an investor might be able to reduce the overall risk of her portfolio. It is to this important question that we now turn.

Our first challenge in assessing this issue is to set up an "apples to apples" comparison. Local bond market indexes aren't always comparable, as they contain different mixes of various kinds of debt (e.g., government, private sector, and asset backed bonds). In addition, indexes composed of just government bonds aren't always directly comparable either, because of their differing weighted maturities (durations). To overcome these shortcomings, and hopefully provide a clearer view of foreign currency bonds as an asset class, we have constructed our own simple local currency bond market indexes. They are all based on the same five year zero coupon government bond. This approach has three advantages. First, five-year government bond yield data are readily available on a monthly basis for all the regions we include in our analysis. Second, the duration on a five year zero coupon bond (which is five years) is very close to the average duration on many major national bond indexes. Finally, calculations are simplified by using zero coupon bonds. The present value of a zero coupon bond is equal to 100 divided by one plus the current five year yield, raised to the fifth power (PV = 100/[(1+yield)^5]. Changes in yield from month to month cause changes in the present value of the five year zero. And the change in the present value of the five year zero coupon bond equals its total return, since a zero coupon bond pays no interest.

Let's start with some basic data. The following table describes the performance of our five year zero coupon bonds, in their respective local currencies, between January, 1989 and December, 2004.

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Nominal Local Currency Returns	AUD	CAD	GBP	JPY	DEM / EUR*	USD	CHF
Average Annual Nominal Return, 1989 to 2004	5.62%	4.57%	3.98%	2.02%	2.21%	3.66%	1.67%
Standard Deviation of Returns (Volatility)	12.15%	11.44%	10.27%	8.28%	7.47%	8.59%	7.05%
Asymmetry (Skewness of Returns)	-0.24	-0.35	0.38	-0.32	-0.44	-0.15	-0.22
Relative Number of Extreme Returns (Kurtosis of Returns)	1.01	1.07	1.48	3.13	0.23	-0.26	0.06

*Combined series includes Germany (DEM) and Eurozone (EUR)

To briefly review the statistics in this table, the standard deviation measures the extent to which returns are dispersed around their average. A higher standard deviation means annual returns are more dispersed, which is often take as a measure of their risk. Skewness measures the extent to which returns are asymmetrically distributed around their average. A normal distribution (bell curve) has a skewness of zero, signifying that returns are evenly distributed on either side of the average. A negatively skewed distribution has relatively more returns below the average, and a positively skewed distribution relatively more above it. A negatively skewed distribution is generally considered riskier than a positively skewed distribution. A skewness of more than 1 or (1) signifies a significantly asymmetric distribution. Technically, kurtosis measures the extent to which a distribution of returns has a taller peak than would be found in a normal bell curve. If two distributions have the same average return, the one with the higher peak has a greater proportion of returns both clustered around the mean, and at the extreme ends of the two tails of the distribution. As a measure of risk, kurtosis should be viewed in conjunction with skewness. For example, an asset whose

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returns have a negative skew and high positive kurtosis (i.e., a relatively high chance of experiencing an extreme return) is riskier than one with a positive skew and negative kurtosis. As with skewness, a kurtosis value of greater than 1 or (1) is considered to be significant.

It is also important to understand the real (after inflation) returns that various local currency bonds have delivered over a longer period of time than the one we use in our analysis. The following table shows those estimated by Dimson, Marsh and Staunton in their Global Investment Returns Yearbook, which cover 1900 to 2004.

Real Returns	**AUD**	**CAD**	**GBP**	**JPY**	**DEM / EUR***	**USD**	**CHF**
Real Return 1900-2004 (GIRY)	2.20%	2.40%	2.30%	1.50%	0.60%	2.40%	2.90%
Real Standard Deviation 1900-2004 (GIRY)	13.40%	10.50%	14.30%	20.70%	15.90%	9.90%	7.90%

As noted above, a key question for an investor contemplating foreign currency bonds is the extent to which their returns are correlated with each other. The following table shows the correlation of nominal local currency returns for our five-year zero coupon bonds, between 1989 and 2004.

	AUD	**CAD**	**GBP**	**JPY**	**DEM / EUR**	**USD**	**CHF**
AUD	1.00						
CAD	0.61	1.00					
GBP	0.43	0.48	1.00				
JPY	0.25	0.25	0.27	1.00			
DEM / EUR	0.40	0.45	0.62	0.32	1.00		
USD	0.49	0.56	0.35	0.26	0.50	1.00	
CHF	0.31	0.26	0.47	0.30	0.67	0.38	1.00

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This table makes two very important points. First, the correlations of returns between most of our domestic bonds has been quite low over the 1989 to 2004 period taken as a whole. Second, this theoretically creates the potential for substantially reducing risk by holding a diversified portfolio of foreign currency bonds. Let's look at both of these issues in more detail.

What might account for the low correlations between different local currency bond returns? As previously noted, the nominal yield on our five-year government bonds theoretically reflects two factors: the level of the real rate of interest, and expected inflation. In theory, the normal risk free rate is a function of three factors. The first is investors' time preference – that is, the return they require to forego consumption today (by saving) in order to consume more in the future. The more impatient ("I want it now!") people are, the higher the rate of interest they will require to defer current consumption. While usually roughly estimated at between 1% and 3%, this rate tends not to be constant, varying not only between different situations, but also over time (see, for example, "Valuing the Future" by Pearce, Groom, Hepburn, and Koundouri, "Discount Rates for Time Versus Dates" by Robyn LeBoeuf; "Time Discounting and Time Preference" by Frederick, Loewenstein, and O'Donoghue; and "Lifecycle Changes in the Rate of Time Preference" by David Bishai).

The second factor that contributes to the real risk free rate is the rate at which productivity (generally taken to mean MFP) is increasing in the economy. As this increases, so too does the productivity of capital, and the rate of return companies can pay to people to induce them to save more (and thereby provide the funds needed for new business investments).

The third factor that drives the risk free rate is investors' average degree of risk aversion. As this increases, people hold larger precautionary savings. All else being equal, this increase in savings will tend to reduce real interest rates. Mathematically, the simple formula for the natural risk free rate of interest (there are more complicated ones) equals (Time Discount Rate + MFP Growth Rate) x (1/Risk Aversion Factor). So, for example, a Time Discount Rate of 3%, expected MFP Growth of 2.0%, and a Risk Aversion Factor of 1.75 (technically, that's Constant Relative Risk Aversion) results in a real risk free rate of 2.86, which is about equal to its 1963 to 2003 average of 2.90%.

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However, the current real rate of 1.47% in the United States is quite low by historical standards. What might account for this? If one assumes that people are less impatient today (time discount factor of 2%), more risk averse (CRRA of 2.0), and expected lower multifactor productivity growth (1.0%), this results in a real rate of interest of 1.50%. The other important point is that the factors that give rise to the real rate of interest can and do vary across countries, as evidenced by the following tables which shows current yields on real return bonds:

Currency	**Current Yield on Real Return Bonds**
AUD	2.4%
CAD	1.7%
GBP	1.4%
JPY	0.8%
EUR	1.2%
USD	1.5%
CHF*	0.8%

*10 year bond less 2006 inflation forecast

The second reason that bond yields differ across countries is differences in their respective expected inflation rates. The following table from *The Economist* shows forecast inflation rates for 2006:

Currency	**Forecast 2006 Inflation**
AUD	2.6%
CAD	2.2%
GBP	1.9%

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Currency	Forecast 2006 Inflation
JPY	0.3%
EUR	1.6%
USD	2.6%
CHF	1.1%

So far, so good. But what happens when we translate these foreign bond returns into local currency? Does this change our conclusions? The following table shows historical nominal foreign bond returns between 1989 and 2004 in Australian Dollars.

Nominal AUD Returns	AUD	CAD	GBP	JPY	DEM / EUR*	USD	CHF
Average Return	5.62%	3.94%	3.22%	0.40%	0.83%	2.96%	3.09%
Standard Deviation of Returns (Volatility)	12.15%	14.03%	17.17%	16.11%	15.36%	12.99%	16.93%
Asymmetry (Skewness of Returns)	-0.24	-0.15	0.80	-0.88	0.06	-0.06	0.08
Relative Number of Extreme Returns (Kurtosis of Returns)	1.01	0.96	3.38	2.25	0.34	0.64	0.42

The next table shows the difference between the average return and standard deviation in Australian Dollars (e.g., from an unhedged exposure to the foreign bond market) and the average return and standard deviation in local currency terms. Positive values mean that the Australian Dollar value is higher; negative values mean that the local currency value is higher.

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Nominal Return in AUD less Local Currency 89 to 04	**AUD**	**CAD**	**GBP**	**JPY**	**DEM / EUR**	**USD**	**CHF**
Difference in Average Return	0.00%	-0.63%	-0.76%	-1.61%	-1.38%	-0.70%	1.42%
Difference in Standard Deviation	0.00%	2.59%	6.90%	7.83%	7.90%	4.40%	9.88%

As you can see, moving from local currency to Australian Dollar terms tends to cause a slight reduction in returns and a rise in standard deviation. However, as the following table shows, even in Australian Dollar terms, the correlations of returns between different bond markets are still generally quite low.

Bond Market Returns in AUD
Monthly Correlations, 1989 to 2004

	AUD	**CAD**	**GBP**	**JPY**	**DEM / EUR**	**USD**	**CHF**
AUD	1.00						
CAD	0.49	1.00					
GBP	0.24	0.45	1.00				
JPY	0.10	0.34	0.39	1.00			
DEM / EUR	0.12	0.45	0.77	0.49	1.00		
USD	0.37	0.69	0.41	0.34	0.45	1.00	
CHF	0.26	0.52	0.34	0.25	0.30	0.74	1.00

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These low correlations imply that there is a significant opportunity for reducing risk through diversifying – that is, by investing in different foreign currency bond markets. This raises the question of how to weight different foreign bond markets to create an appropriate foreign currency bond market index. Three alternatives have been proposed. The most common approach is market capitalization weighting. This has three major problems. As described in our December, 2004 issue, because bonds are not residual securities, market capitalization weighting has the potential to create a perverse situation in which a heavy issuer of debt (whose creditworthiness is declining) receives a higher weight in the market cap based index. A classic example of this has been the recent heavy issuance of bonds by the Japanese government, and retirement of debt by the Australian government. At a time when Japan was arguably declining in creditworthiness, its weight in global government bond indexes was rising, while just the opposite was happening to Australia's weight.

The second problem with market capitalization based bond indexes is that because bonds trade less frequently than equities, and mostly in over the counter rather than exchange based markets, it is often hard to establish the current market price of a bond, and hence its proper weight in a market capitalization based index.

The third problem has to do with the differing mix of issuers in different national bond markets. In the United States, the proportion of non-sovereign bond issuers is considerably larger than it is in many other countries.

Two alternatives to market capitalization weighing are often proposed. The first is weighting based on share of world Gross Domestic Product. The second is equal weighting. The following table shows the different weights that each of our regions would receive under each of these approaches to creating a weighted bond index, assuming that the weights of each region we include must sum to 100%.

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Currency Region	Weight in Total Debt Outstanding (Bank for International Settlements Data)	Weight in Total Sovereign Debt Outstanding (MSCI World Sovereign Bond Index)	GDP Weight (Purchasing Power Parity Basis, from IMF)	Equal Weights
AUD	0.9%	0.4%	2.2%	14.3%
CAD	1.6%	2.0%	3.8%	14.3%
EUR	29.7%	41.0%	30.8%	14.3%
JPY	17.7%	28.8%	13.9%	14.3%
CHF	0.9%	0.8%	0.8%	14.3%
GBP	3.8%	5.5%	6.3%	14.3%
USD	45.4%	21.5%	42.2%	14.2%
Total	100.0%	100.00%	100.0%	100.0%

Since are underlying data are the returns on constant maturity five-year zero coupon government bonds, we will not consider the weighting scheme based on the market value of the total amount of public and private sector debt outstanding. However, the following table presents Australian Dollar nominal returns between 1989 and 2004 for foreign currency bond index based on the other three weighting schemes:

AUD 1989 to 2004	Sovereign Debt Weights	GDP Weights	Equal Weights
Average Return	1.37%	1.93%	2.40%
Standard Deviation	12.02%	11.39%	11.41%
Asymmetry / Skewness	-0.37	-0.34	-0.30
Likelihood of Extreme Returns / Kurtosis	1.16	1.23	1.28

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In practice, the question of how to construct a foreign currency bond index is even more complicated than in our example. Consider these issues. First, we have noted the problem caused by the rising weight given to countries whose heavy bond issuance is arguably reducing their credit quality. A second issue arises when an index includes bonds with multiple maturities. In this case, a change in the shape of different countries' yield curves (e.g., the difference between long-term and short-term bond yields) can have a significant impact on the overall index return.

A related issue is the varying duration (think of this as weighted maturity) over time of many commercial bond indexes. This is caused by two phenomena. The first is the rate at which bonds with different maturities are issued. From a corporate finance perspective, the best time to issue long-maturity debt is when rates are low, since this enables a company to "lock-in" low funding costs. However, when rates are very low (as they are today in many countries), it is more likely that they will be going up in the future, rather than further down. Unfortunately, the negative impact of an increase in interest rates on long maturity (duration) bonds is far more severe than it is on shorter maturity bonds. Under these circumstances, investors with a choice in the matter might reasonably prefer to shorten their bond portfolio's average maturity when rates are low, rather than lengthen it. Yet in market capitalization weighted indexes, too often just the opposite happens.

This problem is only made worse in those indexes that hold bonds with flexible maturities. One example of this is "callable" bonds. These give the issuer the right to redeem them before their maturity after some date in the future. Logically, the issuer would only want to do this if interest rates were lower than the bond's coupon interest rate, which would enable the called bonds to be replaced with new bonds issued at a lower cost to the issuer. Hence, at just the time an investor would prefer to hold onto her high coupon, long maturity bonds (which rise more in price for a given fall in interest rates than short maturity bonds), she is likely to see them called by their issuers. Another example of flexible maturity bonds are those backed by mortgages. When interest rates are falling, home buyers tend to refinance their mortgages. This causes the effective maturity (duration) of a security backed by mortgage loans to decline when rates are falling – just the opposite of what an investor would like to see. Moreover, the process also works in reverse. When rates are rising, fewer people

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refinance, causing the effective maturity of a mortgage backed bond to increase – again, just the opposite of what an investor would like to see.

A fourth source of variation in index returns can occur when an index contains a mix of bonds issued by governments and private sector issuers. In this case, a change in the perception of credit risk (e.g., a widening of the spread between BBB and AAA rated bonds) will affect the return on the index. The impact on index returns is only compounded when differing issuance rates by companies with different credit ratings leads to changes in the weighted credit rating of the index itself.

Given all these considerations, plus the finding (described in our December, 2004 article "Investing in Debt Markets") that a substantial amount of the variation in all bond index returns is due to changes in the yield on intermediate term government bonds, on balance, our preferred foreign currency bond index would be one that (a) uses only government bonds; (b) tries to maintain a constant maturity (duration) across countries, and (c) uses GDP weighting. This latter approach seems like a good compromise between market cap weighting that puts too much emphasis on countries with declining credit quality, and equal weighting, which makes index replication difficult because of the large role played by small issuers. In the analysis that follows, we will use our GDP weighted, constant 5-year zero coupon bond index to represent the returns on foreign currency bonds as an asset class.

Having defined the foreign currency bond index we will use, let us now turn to the subject of how this asset class interacts with other asset classes. Does it provide potential diversification benefits, on an unhedged basis? The following table shows the correlation of real returns in Australian Dollars between domestic bonds, foreign bonds, domestic equity, and foreign developed market equity between 1989 and 2004:

AUD	**Domestic Bonds**	**Foreign Bonds**	**Domestic Equity**	**Foreign Equity**
Domestic Bonds	1.00			
Foreign Bonds	0.27	1.00		
Domestic Equity	(0.07)	(0.05)	1.00	
Foreign Equity	(0.04)	0.31	0.52	1.00

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As you can see, our analysis suggests that adding unhedged foreign currency bonds to a portfolio could potentially provide diversification benefits because of their low correlations with other asset classes. Analyses by other researchers have reached similar conclusions.

For example, one widely replicated conclusion is that the correlation of returns between domestic and foreign equity markets tends to increase during bad times – just when you most need the diversification benefits provided by low correlations (e.g., see "Extreme Correlation of International Equity Markets" by Langin and Solnik, or "Commonality in the Time Variation of Stock-Stock and Stock-Bond Return Comovements" by Connolly, Stivers and Sun). In contrast, the correlation of returns between domestic and foreign bond markets does not increase in bad times. In their paper "A Conditional Assessment of the Relationship Between the Major World Bond Markets", Hunter and Simon note that "while mean and volatility spillovers exist between the major bond markets, they are much weaker than those between equity markets…The benefits of diversification across major government bond markets do not decrease during periods of extremely high bond market volatility."

In their paper "Asymmetric Dynamics in the Correlations of Global Equity and Bond Returns," Cappiello, Engle, and Sheppart also find that the linkages across bond markets are much weaker than the linkages across equity markets. Most important, they found that the lowest correlations in their study were between equity returns in one region (e.g., Asia, North America, and Europe) and bond returns in another. They note how the "flight to quality" phenomenon (moving out of equities and into bonds when the former's volatility rises) tends to maximize diversification benefits just when they are most needed by investors. A recent research paper from the Bank for International Settlements confirms and elaborates on these findings. In "Asset Market Linkages in Crisis Periods", Hartmann, Straetmans, and DeVries examine stock and bond markets in France, Germany, Japan, the United Kingdom and the United States. In particular, they use extreme value theory to examine the behavior of the tails of the distributions of stock and bond returns. They find that the probability of a simultaneous crash in two stock markets is about twice as high as the probability of a simultaneous crash in two bond markets. And, most important, they find that the probability of a simultaneous crash in a domestic equity and foreign bond market is the lowest of all.

And now we come to perhaps the most vexing question of all: should an investor hedge his or her foreign currency risk exposure when investing in foreign bonds (or, for that

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matter, foreign commercial property or foreign equities)? As we will see, reasonable people can and do disagree on the answer to this question. We will begin our discussion with a basic question: why do exchange rates change? The answer critically depends on the time frame involved.

Over the long-term, the theory of "Purchasing Power Parity" or PPP suggests that exchange rates should change so that the same basket of goods costs about the same (net of transportation and distribution costs, for example) in different countries. Moving from a static comparison to a dynamic one, this also implies that a country whose productivity is growing faster than others should see its exchange rate depreciate. An interesting question to ask in this regard is how closely correlated growth in real GDP per capita (as a proxy for productivity) has been in different countries. The following table shows this data for the period 1972 to 2003.

Real GDP per Capita, 1972 to 2003	**Aus GDP Capita**	**Can GDP Capita**	**Japan GDP Capita**	**Switz GDP Capita**	**UK GDP Capita**	**US GDP Capita**	**Ger GDP Capita**
Aus GDP Capita	1.00						
Can GDP Capita	0.68	1.00					
Japan GDP Capita	0.06	0.14	1.00				
Switz GDP Capita	0.34	0.42	0.38	1.00			
UK GDP Capita	0.41	0.56	0.39	0.25	1.00		
US GDP Capita	0.53	0.74	0.38	0.40	0.68	1.00	
Ger GDP Capita	(0.19)	(0.06)	0.47	0.25	0.02	0.18	1.00

As you can see, the historical correlations between real GDP growth rates are generally not very high. From a PPP perspective, these correlations between real GDP per capita growth rates suggests that the correlations between exchange rate changes should also be relatively low.

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In the intermediate term, theory suggests that the difference in interest rates between two countries should determine the difference in their exchange rates. This is the previously discussed theory of Uncovered Interest Parity, or UIP. As we noted, interest rates have two components: the real rate and the expected rate of inflation. The real rate of interest depends, in part, on the growth rate of productivity in the economy – hence, there is a connection between PPP and UIP. However, the bulk of the difference in interest rates usually reflects differences in expected inflation rates. The following table shows how closely correlated inflation rates have been between 1971 and 2004:

Inflation Rates, 1971 to 2004	**Australia**	**Canada**	**Japan**	**Switz-erland**	**UK**	**USA**	**Germany**
Australia	1.00						
Canada	0.86	1.00					
Japan	0.72	0.68	1.00				
Switzerland	0.51	0.60	0.73	1.00			
UK	0.83	0.82	0.79	0.55	1.00		
USA	0.71	0.88	0.69	0.56	0.84	1.00	
Germany	0.53	0.67	0.76	0.86	0.67	0.67	1.00

As you can see, there is a higher correlation between inflation rates than between real growth rates. The next table brings these two together, and shows the correlation of changes in nominal government bond yields between 1972 and 2004:

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Annual Nominal Gov't Bond Yields	**Australia**	**Canada**	**Japan**	**Switz-erland**	**UK**	**USA**	**Germany**
Australia	1.00						
Canada	0.62	1.00					
Japan	0.51	0.52	1.00				
Switzerland	0.52	0.54	0.75	1.00			
UK	0.57	0.65	0.69	0.60	1.00		
USA	0.52	0.90	0.43	0.46	0.47	1.00	
Germany	0.48	0.70	0.69	0.70	0.71	0.61	1.00

Finally, the next table shows the correlation of exchange rate changes (expressed in terms of U.S. dollars per one foreign currency unit) between 1972 and 2004:

Annual Exchange Rate Changes	**Australia**	**Canada**	**Japan**	**Switz-erland**	**UK**	**Germany**
Australia	1.00					
Canada	0.61	1.00				
Japan	0.35	0.02	1.00			
Switzerland	0.13	0.05	0.57	1.00		
UK	0.36	0.21	0.54	0.61	1.00	
Germany	0.28	0.31	0.55	0.51	0.46	1.00

A comparison of the exchange rate correlations with the yield change correlations suggests that in practice (as opposed to in theory) uncovered interest parity (UIP) doesn't always hold, at least in the short-term. In fact, many other analyses have reached this same conclusion. Researchers have tried to explain why this is the case. Possible explanations include the imperfect substitutability of bonds from different countries (see, for example, "Monetary Policy in an Equilibrium Portfolio Balance Model" by Kumhof and van

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Nieuwerburgh), transaction costs and barriers to arbitrage (e.g., "The Forward Bias Puzzle and Non-Linearity in Deviations from Uncovered Interest Parity" by Sarno, Valente, and Leon), and differences in the rate at which different foreign currencies covary with domestic consumption (e.g., "The Cross Section of Foreign Currency Risk Premia and U.S. Consumption Growth Risk" by Lustig and Verdelhan).

In point of fact, many studies have concluded that, at least in the short-term (e.g., up to three years forward), the future path of exchange rates is virtually a random walk that is impossible to accurately forecast.

With this in mind, let us now turn to three different views on whether an investor should hedge his or her foreign currency exposure. The first theory is that an investor should hedge one hundred percent of his or her portfolio's foreign currency exposure. The classic statement of this position is contained in the 1988 article, "The Free Lunch in Currency Hedging" by Perold Shulman. These authors argued that since (a) foreign currency exposure offers no expected return over time (i.e., gains and losses net out to zero), while (b) adding significant volatility, (c) fully hedging one's currency exposure should improve a portfolio's ratio of return relative to risk. Let us begin by examining the premises of this argument. The following table shows the nominal average annual returns from holding exposure to different currencies over the 1972 to 2004 period:

	Average	**Std. Deviation**	**Skewness**	**Kurtosis**
AUD/USD	1.89%	11.03%	(0.21)	(0.20)
AUD/CAD	1.14%	9.12%	(0.08)	(0.67)
AUD/JPY	5.65%	14.32%	0.90	2.30
AUD/CHF	6.52%	17.23%	0.43	0.73
AUD/GBP	1.31%	14.05%	1.42	3.98
AUD/DEM	7.30%	17.71%	1.16	2.22

As you can see, while the volatility of returns from holding different currencies has indeed been high, those returns have not, as assumed, been equal to zero.

Moreover, the impact of currency volatility on a portfolio also depends on the extent to which changes in the exchange rate are correlated with returns on a foreign currency asset

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(e.g., foreign bonds, equity, or commercial property). Even if currency returns net out to zero, if they are negatively correlated with the local currency return on the foreign asset class, this would argue for less than 100% hedging (e.g., negative correlation would mean that, when the local currency return on the foreign asset class declined, the return from holding the foreign currency would tend to rise). The following table shows the correlation between local currency bond returns (e.g., in Australia) and the change in the value of the foreign currency (e.g. the Australian Dollar) relative to the home currency between 1989 and 2004. For example, from a Swiss Franc (CHF) perspective, the correlation between the return in CHF for holding Australian Dollars, and the local currency return on an Australian Dollar 5 year zero coupon bond was (.15) between 1989 and 2004. In other words, changes in the CHF/AUD exchange rate tended to offset gains and losses on Australian Dollar bonds.

Correlations	**AUD5Zero**	**CAD5Zero**	**GBP5Zero**	**JPY5Zero**	**DEM5Zero**	**USD5Zero**	**CHF5Zero**
AUD	NA	0.00	0.13	-0.01	0.11	0.04	0.15
CAD	0.01	NA	0.14	-0.01	0.10	0.13	0.11
GBP	0.03	0.05	NA	0.03	-0.02	0.22	0.03
JPY	0.04	0.01	0.2	NA	-0.07	0.25	0.13
DEM/EUR	0.09	0.01	0.11	0.07	NA	0.28	0.08
USD	-0.06	-0.16	0.16	-0.02	0.05	NA	0.12
CHF	-0.15	-0.21	0.03	-0.06	-0.03	-0.35	NA

As you can see, these historical correlations and returns data show that, in hindsight 100% hedging of one's currency exposure on an investment in foreign bonds would not always have been optimal. However, we should also note that there is no guarantee that these historical results will be an accurate guide to the future, particularly over shorter periods during which they tend to be very unstable, and reflect the random nature of short-term exchange rate changes.

A final, important, and too often overlooked argument against 100% hedging is that while it may reduce the volatility of reported portfolio returns, it can also generate substantial cash flow problems. There are at least two reasons for this. First, most available hedging products (e.g., currency futures) cover only short periods of time. Hence, hedging a long-

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term exposure (say, a long-term investment in foreign currency bonds or equities) requires the constant "rolling over" of a series of short-term hedging contracts. Because the forward exchange rate tends to be an imperfect predictor of future spot rates, and because the future value of the foreign investment is inherently uncertain, a perfect hedge is impossible. This means that small cash flows will often be associated with the rolling over of a hedging contract. More important, since hedging contracts are usually bought on margin (i.e., the investor has to initially put down only a small percentage of the contract's future value), significant changes in exchange rates can trigger margin calls, which require the posting of more cash. In some cases, margin requirements have risen to 20% to 30% of the contract's future value (for more on this, see "Currency Hedging of Global Portfolios" by Juttner and Leung). To put it differently, 100% hedging can turn out to be anything but a "free lunch."

Let's now move on to the argument in favor of no hedging at all. In "Currency Hedging Over Long Horizons", Kenneth Froot finds that currency hedges have very different properties at long horizons compared to short horizons. The data show that while over short horizons hedging reduces reported volatility, over long horizons hedging often does not reduce risk at all. In fact, Froot shows how at long horizons, "many fully hedged international investments actually have greater return variance [i.e., volatility or risk] than their unhedged counterparts." Part of this reflects the cumulative cost of hedging, which adds up over time. But part of this also reflects that fact that the returns on foreign currency "at different horizons are driven by very different factors…At long horizons, [foreign currency] returns are dominated by fluctuations in cross-country differences in expected inflation and real interest rate differentials." Given this, "the optimal portfolio hedging strategy will depend on the investment horizon…[and]… investors with longer horizons may want to hedge much less than 100% of their [foreign currency] exposure."

Similarly, Campbell, Viceira and White (in their paper "Foreign Currency and Long Term Investors") begin by noting that the "conventional wisdom holds that investors should avoid exposure to foreign currency risk." However, they go on to argue that "the conventional wisdom may be wrong for long-term investors." They note that while uncovered interest rate parity doesn't work well in the short run (as a forecaster of future exchange rates), recent studies find support for it over longer periods. Fully hedging one's exposure to foreign currency would therefore reduce potential diversification benefits. As a result, the authors

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conclude that long-term investors should hold higher amounts of unhedged foreign currency bonds than short-term investors.

On the other hand, there is another argument against even a long-term investor leaving his or her foreign currency exposure completely unhedged. When it comes to achieving long-term goals, compound returns (also known as the geometric average) are what matter. When annual returns vary from year-to-year (i.e., are risky), compound returns will be lower than the average annual return. A rough estimate of this "volatility drag" is one half the variance of annual returns (i.e., the standard deviation squared). While unhedged exposures to foreign asset classes can provide valuable diversification benefits, they can also impose a higher volatility drag than a hedged exposure. However, a number of researchers who have studied this question have found that foreign currency exposure has to be quite large as a percentage of a portfolio before concerns about volatility drag completely offset the benefits of diversification. For example, in her excellent paper "Investing Internationally: Currency Issues for Superannuation Funds", Susan Thorp from the University of New South Wales finds that "measurable reductions in portfolio volatility resulting from currency hedging alone only emerge when portfolios are mainly invested offshore, and even then they are small."

So far, we have reviewed the arguments in favor of 100% and 0% hedging of an investor's foreign currency exposure. Common sense suggests a third alternative – might the best answer be somewhere in between these two extremes? The classic argument in favor of this proposition was made by Fischer Black, in his paper "Universal Hedging: Optimizing Currency Risk and Reward." While he concluded that neither 100% or 0% hedging was optimal, given the uncertainty associated with various inputs (e.g., volatilities and correlations are not stable over time), he could only conclude that the optimal hedging ratio plausibly lay between 30% and 77%. In practice, this range has often been interpreted to mean that a 50% hedge ratio is the best one to use. This has received two important sources of support. One group of researchers has started from the observation that the benefits from hedging tend to be non-linear. For example, in "International Benchmarks: In Support of a 50% Hedge Ratio", Gorman and Qian show how a 50% hedge ratio captures a large proportion of the potential risk reduction benefits. Another group of researchers has taken a different approach, and focused on the emotions associated with hedging, and in particular the regret an investor feels when, in hindsight, he or she realizes that her hedging decision was not optimal (i.e.,

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delivered less benefit than the best hedging decision would have produced). To put it differently, these researchers start from the proposition that a hedging decision involves three different outcomes: the impact on portfolio risk and return, the impact on cash flow, and an emotional impact. Moreover, when it comes to emotional impact, the regret associated with losses that could have been avoided is felt more strongly than the regret associated with gains that could have been achieved. A good example of this research is "Hedging Currencies with Hindsight and Regret" by Fisher and Statman. Another good example of this work is "Hedging Currency Risk: A Regret Theoretic Approach" by Michenaud and Solnik. They find that, after taking regret into consideration, the optimal hedging ratio is probably greater than 50%, but less than 100%.

On balance, there is no "one size fits all" answer to the question: how much should I hedge my foreign currency exposure? As we have shown, it ultimately comes down to an individual investor's trade-off between a desire to minimize reported portfolio volatility in the short term, maximize long-run diversification benefits, minimize cash flow risk, and minimize potential regret. From a practical point of view, when constructing our model portfolios, we have three choices: 100% hedging, 50% hedging, or 0% hedging. We have chosen to use unhedged returns because not only are there good arguments that it makes the most sense for a long-term investor, but it also avoids us having to guess at the average trade-off that investors will make between the various factors involved in the hedging decision. That being said, we recognize that individual investors may quite reasonably reach a different conclusion, and choose to hedge some of their foreign currency exposure (e.g., by investing in a foreign bond or equity fund that uses some degree of hedging).

We recognize that this approach can be challenged, in particular by investors whose performance is evaluated each year in comparison a hedged foreign bond or foreign equity benchmark. For example, in his recent book, Unconventional Success, David Swensen, the Chief Investment Officer of Yale University, makes the following argument: "Foreign bonds offer little of value to U.S. investors …An unhedged foreign currency bond consists of a U.S. dollar bond plus some foreign exchange exposure. Foreign currencies in and of themselves, provide no expected return…[and] sensible investors avoid currency speculation. In a portfolio context, foreign exchange exposure may produce the benefit of additional diversification. Even with no expected return, the lack of full correlation between currency

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movements and other asset class fluctuations reduces portfolio risk. However, investors should obtain foreign exchange exposure not through foreign bond positions, but in connection with an asset class expected to produce superior returns, namely foreign equities."

While we generally agree with Mr. Swensen's views on investing (for example, he also states in his book that "because of the enormous difficulty in identifying and engaging superior active managers, prudent investors avoid asset classes that derive returns primarily from market beating strategies"), when it comes to foreign currency bonds, we reach a different conclusion than he apparently does. While it is true that, as Swensen argues, real returns on foreign currency equities have generally been higher than those on foreign currency bonds (and our foreign bond index makes this difference appear larger than would be the case for the commercial foreign bond indexes), as we have noted, this alone does not tell the full story. First, foreign currency bonds usually have significantly less volatility than foreign equities. Moreover, the returns on foreign bonds and foreign equities usually have relatively low correlations with each other. Foreign bonds also help to diversify the risk associated with changing real interest rates. Perhaps most important, multiple analyses have shown that during bad times the correlation of returns between domestic and foreign equity markets tends to increase, while the correlation between domestic equity and foreign bonds either holds steady or declines, producing diversification benefits just when they are most needed. For all these reasons, we continue to believe that foreign currency bonds have a valuable (if under-appreciated) long-term role to play in many investors' portfolios.

Does Foreign Commercial Property Belong in Your Portfolio?

It has long been known that over half the world's commercial property, measured by value, lies outside the United States. Until recently, however, it has been hard for retail investors to access this market, with the same ease that they could invest in real estate investment trusts (REITS) in the United States. With the notable exceptions of Australia and Canada, few countries had approved the use of this type of securitized vehicle for investing in commercial property. That is now changing, at an accelerating pace. Hence more and more retail investors around the world will be confronted with two important questions: Is foreign commercial property a separate asset class, and, if it is, should I invest in it?

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Arriving at definitive answers to these questions is probably not possible, due to the limitations of the data we have to work with. There are four principal problems. First, the regional property market indexes that are available include different mixes of property types. For example, one might have a greater proportion of warehouses, while another might have relatively more industrial, retail, office, or hotel properties. Second, until the advent of securitized property investment vehicles, most of these indexes were based on directly owned property, which is only valued at irregular intervals by appraisers. While they no doubt try their best, analysis has shown that many appraisers' valuations are anchored on the most recent appraisal result. This causes successive valuations to be more closely related to each other (the technical term is "serially correlated") than is the case with securities traded in a continuous market. It also causes the actual riskiness (volatility) and correlation of returns of commercial property with other asset classes to be underestimated. While securitized vehicles correct this problem, they raise another one: the length of time that they have been available is relatively short, making it hard to draw strong conclusions from data on their returns. To some extent, this is compounded by a fourth problem, that has close parallels in other asset classes. The issue is this: due to the differing percentages of total commercial property value that has been securitized in different countries, "global" securitized property indexes may present a distorted picture of the "true" risks and returns on this asset class. For example, the global securitized property indexes published by EPRA/NAREIT and Standard and Poor's tend to give relatively more weight to Australia and less to continental Europe in comparison to proportion of the total value of the world's commercial property found in these regions. Of course, this is also true of global bond indexes (as we have described in our previous article) and equity indexes as well (where public companies account for differing percentages of the total value of corporate equity in different countries).

With those appropriate warnings, let's move on to take a look at the data. The following table shows the nominal local currency returns on securitized commercial property indexes over the 1989 to 2004 period:

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Nominal Local Currency Returns	AUD	CAD	GBP	JPY	DEM / EUR*	USD	CHF
Average Return	13.63%	-3.20%	13.59%	4.08%	11.40%	13.76%	10.08%
Standard Deviation of Returns (Volatility)	23.31%	28.25%	27.10%	42.26 %	22.55%	14.49%	18.17%
Asymmetry (Skewness of Returns)	-0.48	0.16	-0.04	0.18	0.21	0.31	0.12
Relative Number of Extreme Returns (Kurtosis of Returns)	0.59	-0.32	0.02	0.40	0.26	0.68	1.25

The next table shows the correlations between these local currency returns:

LC Property Returns, 89 to 04	AUD	CAD	EUR	JPY	GBP	CHF	USD
AUD	1.00						
CAD	0.50	1.00					
EUR	0.44	0.35	1.00				
JPY	0.24	0.18	0.27	1.00			
GBP	0.41	0.43	0.62	0.22	1.00		
CHF	0.32	0.25	0.21	0.17	0.21	1.00	
USD	0.33	0.58	0.19	0.30	0.35	0.23	1.00

The average correlation in this table is quite low, at .32, which suggests that, assuming correlations don't change dramatically over time, substantial potential exists for achieving diversification benefits by investing in foreign as well as domestic commercial property.

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Despite these apparently attractive statistics, the results of a number of analyses sound a cautionary note about the size of the potential diversification benefits from investing in foreign commercial property. All of them reach a similar conclusion: that real estate returns in different countries are driven by a mix of a global factor (generally taken to be global GDP growth) and more idiosyncratic local factors. Regarding the global factor, Edward Kane's paper asks about the late 1980s, "Has U.S. Overbuilding Affected Construction Activity Globally?" He concludes that the answer was yes. And in "The Global Real Estate Crash", Goetzmann and Wachter analyze the resulting downturn that arrived in the early 1990s. They find clear evidence that the global commercial property crash of 1992 was preceded by declining property values from the end of the 1980s, that were closely related to declines in world GDP that occurred at the same time. In a subsequent paper ("Global Real Estate Markets, Cycles and Fundamentals"), Case, Goetzmann and Rouwenhorst analyzed commercial property returns data from 22 countries between 1987 and 1997 and confirm they are affected by a common global GDP factor.

However, this is not to say that local factors are also important determinants of commercial property returns. In "A Fundamental Comparison of International Real Estate Returns", Pagliari, Webb, Canter and Lieblich analyze the office, retail and warehouse sectors in Australia, Canada, the UK and the US between 1985 and 1995. They conclude that the "space market" (as reflected in rental income) is more local in nature, while the rate at which they are capitalized to generate market values is subject to more global influences. In "Evidence of Segmentation in Domestic and International Property Markets", Wilson and Okuner use a sophisticated statistical technique (cointegration analysis) and also find that potential international diversification benefits exist. Similar conclusions are reached by Wilson and Zurbruegg in their paper "Does It Pay to Diversify Real Estate Assets?" and by Conover, Friday, and Sirmans in "Diversification Benefits From Foreign Real Estate Investments."

In light of these findings, as well as the increasing range of products that enable investors to access diversified international commercial property portfolios, we will include international commercial property as a possible asset class in the upcoming rebalancing of our model portfolios.

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What are "Portable Alpha" and "Enhanced Indexing"?

Individual investors are increasingly being offered "portable alpha" and "enhanced indexing" products. Do they make sense for your portfolio? In this article, we will briefly review the meaning of these terms, and look at the performance of two interesting offerings.

Let's start with some basic terminology. When you invest in the stock of a single company, you are taking on two types of risk. The first is risk that is specific to the company itself. This risk has many different names, including idiosyncratic risk, specific risk, and unsystematic risk. The key point to keep in mind about this type of risk is that it declines as you invest in an increasing number of companies. This is the power of diversification. At some point (between 30 to 50 companies in different industries, depending on which study you are reading), company-specific risk is eliminated, and you are left with the core risk associated with investing in equities as an asset class. This is also known as systematic, or undiversifiable risk.

The total return from investing in a single company's shares therefore has two parts, which correspond to the return from taking company-specific risk and the return from taking risk associated with equities as an asst class. The specific breakdown between these two types of return is identified through linear regression analysis, which compares the returns on the specific stock to the returns on the market as a whole over a given period of time. This produces an equation for the stock's return, that is expressed in this form: Stock Return = alpha plus (beta times Market Return). Beta is a measure of a stock's exposure to the overall risk of investing in the equity market. A stock with a beta of less than one is less risky than the overall market, while a stock with a beta greater than one is more risky. The equity market itself has a beta equal to one. Hence, another name for systematic risk is beta, which (confusingly) is also used to describe the return you earn for accepting exposure to it.

The term alpha in this equation refers to the return you earn for accepting exposure to company-specific risk. As we have already noted, in the equity market as a whole, company-specific risk is diversified away. That also means that the return associated with accepting it must be zero for the equity market as a whole. This is what people are referring to when they say "alpha is a zero sum game."

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Now let's move on to how the term "alpha" is used by professional investors. As in the example above, it refers to a return in excess of what one would have earned simply by maintaining a constant exposure to one or more asset classes. To generate alpha, an active investment manager basically has two choices. He can select securities that will perform better than the asset class average, and/or he can time his investments in different asset classes based on his forecasts for their future returns.

People who hire investment managers naturally have a great interest in whether or not the managers are generating alpha. However, measuring a manager's alpha is not as straightforward as it seems. Probably the most difficult issue is determining the market return or returns that will represent compensation for systematic (beta) risk. Now why is this a problem? Here is a simple example. Let's say you hire an active manager to outperform the S&P 500 Index. To do this, the manager consistently tilts his portfolio toward stocks with low market to book ratios, which are also known as "value" stocks. Let's also say that the past year has been one in which value stocks outperformed the S&P 500. On paper, it looks like the manager generated significant alpha for you, and deserved the high active management fees you paid him. But was this really the case? If year in and year out, the manager's investment strategy consists of nothing more than systematically tilting towards value stocks, could not an investor have done this for herself by buying a fund that tracks the S&P 500 Value Index? Put another way, shouldn't the manager's performance be compared to this index benchmark, rather than to the S&P 500? In this case, the answer is probably yes, and the active manager's S&P 500 based alpha is therefore overstated, if it exists at all (for another example of this, see "Consumer Reports is Wrong" in our February, 2004 issue).

On the other hand, if the investment manager's tilt toward value shares was actually a tactical decision (e.g., the year before his tilt was toward growth stocks), then the S&P 500 was indeed probably the right benchmark to use when evaluating his performance. The point is this: the concept of alpha is not at all straightforward. Now let's talk about what it means to make alpha "portable."

"Portable alpha" refers to the attempt to enhance the returns from taking systematic (beta) risk in one asset class (say, domestic equities) by adding to it alpha returns earned on investments in another asset class (say, domestic bonds). Here is a simple example of how this can be accomplished. Rather than simply investing $1,000 in an S&P 500 Index fund,

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our intrepid investor gives it to a manager of a "portable alpha" fund, who promises to deliver returns equal to some amount over the returns on the S&P 500. To do this, the manager first purchases $1,000 of S&P 500 futures contracts. However, since only five percent of these contracts' face value must be paid in cash, the investment manager will have $950 that can be invested elsewhere to earn alpha that can be added to the return on the S&P 500 futures. However, our active manager must also invest in such a way that he or she does not affect the investor's target allocations to different asset classes. For example, let's say our active manager plans to earn alpha in the corporate bond market, by going long bonds issued by companies whose credit quality is expected to improve (thereby triggering a reduction in these bonds' yields, and a rise in their prices) and selling short the bonds of issuers whose credit quality is forecast to worsen. To offset the increased exposure to domestic bonds in the investor's portfolio, our active manager could sell a $950 futures contact on government bonds.

So far, so good. However, our investment manager is still left with the rather large challenges associated with achieving consistent active management success. He or she must still possess either the superior information and/or the superior model that makes superior forecasting and positive alpha possible.

However, from the investor's perspective, "portable alpha" has a big advantage over the traditional choice between investing in either an index fund or an actively managed fund. By clearly separating the returns from taking systematic risk (which can be obtained at low cost via the use of index futures) from the returns from taking diversifiable risk (which logically should cost more), the investor will most likely see a significant reduction in the total amount he or she pays for investment management. This is a big improvement over traditional actively managed funds, whose high fees are assessed on the full value of the fund, even though a substantial portion of its returns come from beta risk exposure.

Let's now look at an actual example of portable alpha investing, to see how it has performed in practice. The Pimco Stocks Plus Fund has been in existence for more than ten years, and currently has nearly U.S. $1 billion in assets. Its objective is to deliver returns that are above those on the S&P 500. It generally seeks to earn alpha by investing in the bond market, where Pimco is regarded as one of the world's best active managers. The fund offers both institutional (PSTKX) and retail (PSPDX) shares. The former have an annual expense

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ratio of .65%, while the charge on the latter is 1.05%. We calculated the fund's alpha in each of the past ten years by subtracting the return on the Vanguard S&P 500 Index Fund (VFINX) from the return on PDTKX. Between 1995 and 2004, this alpha averaged .62% per year. However, additional risk was also taken on to earn that alpha. This risk is commonly measured as the standard deviation of the alphas, which is also known as "tracking error." Over the past ten years, tracking error was 1.26%. The ratio of alpha to tracking error (or return to risk) is known as the Information Ratio (IR). In this case, it is .49, which is a very respectable number. However, it is also reasonable to ask whether this performance could have been due to luck rather than the active manager's skill.

The statistic known as the "T Ratio" helps us to answer this question. A T Ratio of 2.0 or more tells us there is at least a 95% chance that the reported performance is statistically different from zero, and therefore unlikely to be due to luck alone. The T-Ratio for an IR can be roughly estimated as equal to the IR times the square root of the number of observations used to calculate the IR. In our example, we used ten years of data, so the T Ratio is equal to .49 times 3.16 (the square root of 10), or about 1.56. This isn't quite 2.0, but it is close. Based on this analysis we conclude that PSTKX has delivered what it promised to its institutional investors – slightly higher than S&P 500 returns, with just a little more risk.

But should we expect the retail shares (PSPDX) to deliver the same results to individual investors? Unfortunately, they haven't been available for as long as the institutional shares. So, to answer our question, we have subtracted the additional .40% in expense charges on PSPDX from the returns on PSTKX, and once again subtracted the return on VFINX to estimate alpha, tracking error, and the Information Ratio. It turns out that those extra 40 basis points in expense charges have a big impact on the potential attractiveness of this portable alpha strategy. Alpha drops to only .22%, and the IR to .17. Under these circumstances, you cannot say with much confidence that the returns on PSPDX are statistically different from those on VFINX. There is also one other important difference between VFINX and PSTKX. Annual turnover on the former is only 3% per year, while on the latter it is 371%. If you own both funds in a tax-advantaged account, this difference doesn't matter. However, if you are holding them in a taxable account, VFINX will generate a far lower tax liability.

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Hopefully, this example has clarified some important points. First, when offered a portable alpha investment, you should understand where the alpha is coming from, and how it is being generated. Second, you should also ask for the historical and anticipated tracking error and IR data, so that you can calculate your own T-Ratio. Finally, you should recognize the impact expenses can have on the attractiveness of a portable alpha strategy.

We have noticed that the term "enhanced indexing" is often used interchangeably with "portable alpha." In many cases, this creates no problems. However, in some cases, enhanced indexing seems to signify something quite different than earning returns slightly above an index fund by taking on slightly more risk. Let's look at an example of this. One increasingly popular "enhanced indexing" is to invest in the S&P 500 Index, and then write (sell) covered call options against it. A call option gives its holder the right, but not the obligation to buy a share at a fixed price (the "strike price") for some length of time up to a future date (at which time the option "expires"). A "covered call" option is one written on an asset that one already owns (if you don't own the asset, they are called "naked calls"). The value of a call option is primarily a function of three variables. The first is the strike price relative to the current price of the stock. The larger the positive difference between the strike price less the share price, the less valuable the call option to a buyer, because it is less likely to be exercised. When the share price is below the strike price, an option is said to be "out of the money." When the share price is above the strike price, the option is "in the money." And when the share price equals the strike price, the option is "at the money."

The second variable that affects the value of a call option is the time until it expires. The longer the time remaining until expiration, the more valuable the option, because there is a greater chance it will be in the money at some point. The third variable is the volatility of the price of the stock underlying the call option. The higher the volatility, the more valuable the option, again, because of the greater probability that at some point the call option will be in the money.

The strike price, time to expiration, and volatility of the underlying share price are all taken into account when determining the current value of a call option. This is the maximum price (or "premium") that the option buyer should pay for the option, and the minimum price the option seller should require. Since the strike price and time to expiration are clearly specified, the trading of options between buyers and sellers is logically based on their

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differing views about the volatility of the underlying share price. While historical volatility is a guide to estimating the right volatility to use when valuing an option, the inescapable fact is that volatility is not stable over time. Hence, it must be forecasted when valuing a call option, which gives rise to different views and the creation of option markets. Sellers of call options have a lower estimate for the future value of volatility than the people who buy them.

As we noted, one means of earning additional returns is to write (sell) call options on stocks that you already own. This is known as a "covered call." The economic profitability of this strategy depends on the difference between the revenue you receive in the form of options premiums, and the returns that you forego when in the money options are exercised. For example, assume you purchase a share for $100, and then write a call option on it with a strike price of $110, in exchange for which you receive an option premium of $1. Further assume that the stock price then goes to $120, and the option is exercised. The return on your original stock investment is 11% , of which $10 is the capital gain on the stock and $1 is the option premium. However, had you not written the option, your profit would have been 20%. This illustrates a key point about covered call options: while you know for sure how much you are getting from selling them ($1), you can never be sure how much you might be giving up.

On the other hand, if the stock's price had only risen to $107, your return from wring the option would have been 8%, instead of the 7% from simply holding the stock. This shows why people write covered call options: to get more cushion against potential losses, even though they may be foregoing some future gains.

The Chicago Board Options Exchange (CBOE) has formalized the covered call strategy in the form of its BuyWrite (BXM) Index, which it introduced in April, 2002. Similar indexes have been introduced in Canada (MCWX) and Australia (XBW). The BXM tracks the returns from a strategy of buying the S&P 500 and selling slightly out of the money 30-day call options against it. Since mid-2004, a number of closed end funds have been launched that use this strategy, including one (ticker BEP) that tracks the BXM index and charges .90% in annual expenses. Let's now see how this strategy has performed.

We have estimated returns on BEP by subtracting its .90% expense charge from the historical returns on BXM provided by the CBOE. Over the 1995 to 2004 period, its alpha versus VFINX was (2.85%), with a tracking error of 10.52% for an Information Ratio of

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(.27). If an investor expects an investment in BEP to add alpha to the S&P 500, it seems likely he or she will be disappointed.

However, there is another way to look at BEP. The following table compares the performance of BEP and VFINX over the 1995 to 2004 period.

	BEP (Simulated)	**VFINX**
Average Nominal Return	11.07%	13.92%
Standard Deviation	12.65%	21.07%
Correlation with BEP	1.00	.93

As you can see in this table, the covered call writing strategy substantially changes the nature of an investment made in large capitalization U.S. equities, reducing both returns and risk. We also compared the correlation of the real returns on both the BXM Index and the Wilshire 5000 Index with those on other asset classes between 1989 and 2004, and found they were generally very similar.

It therefore seems to us that, rather than being seen as an alpha adding strategy, BEP and similar funds are better seen as an alternative that could, if used as a substitute for a broad equity index fund, have a substantial impact on an investor's strategic asset allocation decision. We therefore plan to test the implications of substituting the BXM for a broad equity index (e.g., the Wilshire 5000) in the upcoming rebalancing of our model portfolios.

Finally, before using BEP or a similar fund to implement an allocation to equities, prudent investors have to ask themselves a critical question: why should we expect the attractive historical returns to continue in the future? More specifically, as the popularity of the funds based on S&P covered call writing increases, will the number of potential buyers for these call options also increase? And if this new demand fails to develop, and option premiums consequently fall, what will happen to the expected return and risk of the strategy? At this point, we don't have a clear answer to these questions, and neither does anybody else (e.g., see "Passive Options Based Investment Strategies" by Feldman and Roy).

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Model Portfolios Update

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

We use a "rule of thumb" approach (or, to use the more formal term, a "heuristic approach") to construct our benchmark portfolios. More specifically, we use three "rules of thumb" that are often cited in news stories a mix of 80% equities and 20% debt (for our high risk/high return portfolios); a mix of 60% equities and 40% debt (for our moderate risk/moderate return portfolios); and a mix of 20% equities and 80% debt (for our low risk/low return portfolios). Using different terminology, somebody else might call these three portfolios aggressive, balanced, and conservative. We implement these three rules of thumb in two different ways (to construct six different benchmark portfolios). The first uses just two asset classes: domestic investment grade bonds and domestic equity. The second uses a broader mix of asset classes: domestic and foreign investment grade bonds, and domestic and foreign (including emerging market) equity. In addition to these 80/20, 60/40, and 20/80 portfolios, we also provide our "couch potato" portfolio. This portfolio is equally allocated to all of the asset classes we use. More formally, this is known as the "1/N heuristic," which research has shown is an approach used by a significant proportion of retirement plan investors. This portfolio implicitly assumes that it is impossible to accurately forecast future asset class risk and return; consequently, the best approach is to equally divide one's exposure to different sources of return (and risk). While we disagree with this assumption, intellectual honesty compels us to include the "couch potato" portfolio as one of our benchmarks. Finally, each year we also benchmark all our portfolios against the return from holding cash. We define this return as the yield to maturity on a one-year government security purchased at the end of the previous year. For 2005, the A$ cash benchmark return is 5.06% (nominal).

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

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

Our third set of model portfolios uses a simulation optimization methodology. It assumes that an investor understands the long-term compound real rate of return he or she needs to earn on his or her portfolio to achieve his or her long-term financial goals. We use SO to develop a multi-period asset allocation solutions that are “robust”. They are intended to maximize the probability of achieving an investor’s compound annual return target under a wide range of possible future asset class return scenarios. More information about the SO methodology is available on our website. Using this approach, we produce model portfolios for three different compound annual real return targets: 7%, 5%, and 3%. We produce two sets of these portfolios: one includes hedge funds as a possible asset class, and one does not.

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

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Model Portfolios Year-to-Date Performance

These portfolios seek to maximize return while matching their benchmark's risk (standard deviation)			
	YTD 31Aug05	**Weight**	Weighted Return
	In A$		In A$
High Risk Portfolio			
Asset Classes			
Australia Benchmark			
Australian Equity	14.9%	**80%**	**11.9%**
Australian Bonds	2.6%	**20%**	**0.5%**
		100%	**12.4%**
Global Benchmark			
U.S. Equity	7.1%	**40%**	**2.8%**
Non-U.S. Equity	10.0%	**40%**	**4.0%**
U.S. Bonds	7.1%	**10%**	**0.7%**
Non-U.S. Bonds	6.2%	**10%**	**0.6%**
		100%	**8.1%**
Recommended			
Australian Equity	14.9%	**30%**	**4.5%**
Foreign Equity (US)	7.1%	**23%**	**1.6%**
Foreign Equity (EAFE)	9.1%	**18%**	**1.6%**
Australian Bonds	2.6%	**19%**	**0.5%**
Commodities	25.1%	**10%**	**2.5%**
		100%	**10.7%**

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These portfolios seek to maximize return while matching their benchmark's risk (standard deviation)			
	YTD 31Aug05	**Weight**	Weighted Return
	In A$		In A$
Medium Risk Portfolio			
Asset Classes			
Australia Benchmark			
Australian Equity	14.9%	**60%**	**8.9%**
Australian Bonds	2.6%	**40%**	**1.0%**
		100%	**10.0%**
Global Benchmark			
U.S. Equity	7.1%	**30%**	**2.1%**
Non-U.S. Equity	10.0%	**30%**	**3.0%**
U.S. Bonds	7.1%	**20%**	**1.4%**
Non-U.S. Bonds	6.2%	**20%**	**1.2%**
		100%	**7.8%**
Recommended			
Australian Equity	14.9%	**25%**	**3.7%**
Foreign Equity (US)	7.1%	**14%**	**1.0%**
Australian Bonds	2.6%	**40%**	**1.0%**
Commodities	25.1%	**10%**	**2.5%**
Foreign Equity (EAFE)	9.1%	**11%**	**1.0%**
		100%	**9.3%**

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These portfolios seek to maximize return while matching their benchmark's risk (standard deviation)			
	YTD 31Aug05	**Weight**	**Weighted Return**
	In A$		In A$
Low Risk Portfolio			
With suggested US Index Funds			
Australia Benchmark			
Australian Equity	14.9%	**20%**	**3.0%**
Australian Bonds	2.6%	**80%**	**2.1%**
		100%	**5.1%**
Global Benchmark			
Foreign Equity (US)	7.1%	**10%**	**0.7%**
Non-U.S. Equity	10.0%	**10%**	**1.0%**
U.S. Bonds	7.1%	**40%**	**2.8%**
Non-U.S. Bonds	6.2%	**40%**	**2.5%**
		100%	**7.0%**
Recommended			
Australian Equity	14.9%	**10%**	**1.5%**
Foreign Equity (US)	7.1%	**8%**	**0.6%**
Australian Bonds	2.6%	**60%**	**1.6%**
Global Bonds	3.4%	**8%**	**0.3%**
Foreign Equity (EAFE)	9.1%	**7%**	**0.6%**
Commodities	25.1%	**7%**	**1.8%**
		100%	**6.3%**
Global Bond Index = 50% US$ plus 50% Non-US$ Bonds			

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These portfolios seek to minimize risk while matching their benchmark's returns.			
	YTD 31Aug05	**Weight**	**Weighted Return**
	In A$		In A$
High Return Portfolio			
Asset Classes			
Australia Benchmark			
Australian Equity	14.9%	**80%**	**11.9%**
Australian Bonds	2.6%	**20%**	**0.5%**
		100%	**12.4%**
Global Benchmark			
U.S. Equity	7.1%	**40%**	**2.8%**
Non-U.S. Equity	10.0%	**40%**	**4.0%**
U.S. Bonds	7.1%	**10%**	**0.7%**
Non-U.S. Bonds	6.2%	**10%**	**0.6%**
		100%	**8.1%**
Recommended			
Australian Equity	14.9%	**11%**	**1.6%**
Foreign Equity (US)	7.1%	**19%**	**1.3%**
Australian Bonds	2.6%	**45%**	**1.2%**
Foreign Equity (EAFE)	9.1%	**15%**	**1.4%**
Commodities	25.1%	**10%**	**2.5%**
		100%	**8.0%**

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These portfolios seek to minimize risk while matching their benchmark's returns.			
	YTD 31Aug05	**Weight**	**Weighted Return**
	In A$		In A$
Medium Return Portfolio			
Asset Classes			
Australia Benchmark			
Australian Equity	14.9%	60.0%	8.9%
Australian Bonds	2.6%	40.0%	1.0%
		100%	10.0%
Global Benchmark			
U.S. Equity	7.1%	30%	2.1%
Non-U.S. Equity	10.0%	30%	3.0%
U.S. Bonds	7.1%	20%	1.4%
Non-U.S. Bonds	6.2%	20%	1.2%
		100%	7.8%
Recommended			
Australian Equity	14.9%	10%	1.5%
Foreign Equity (US)	7.1%	7%	0.5%
Foreign Equity (EAFE)	9.1%	5%	0.5%
Australian Bonds	2.6%	60%	1.6%
Global Bonds	3.4%	13%	0.4%
Commodities	25.1%	5%	1.3%
		100%	**5.7%**

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These portfolios seek to minimize risk while matching their benchmark's returns.			
	YTD 31Aug05	**Weight**	**Weighted Return**
	In A$		In A$
Low Return Portfolio			
Asset Classes			
Australia Benchmark			
Australian Equity	14.9%	20.0%	3.0%
Australian Bonds	2.6%	80.0%	2.1%
		100%	5.1%
Global Benchmark			
U.S. Equity	7.1%	10.0%	0.7%
Non-U.S. Equity	10.0%	10.0%	1.0%
U.S. Bonds	7.1%	40.0%	2.8%
Non-U.S. Bonds	6.2%	40.0%	2.5%
		100%	7.0%
Recommended			
Australian Equity	14.9%	12.0%	1.8%
Emerging Mkt Equity	17.7%	3.0%	0.5%
Australian Bonds	2.6%	60.0%	1.6%
Global Bonds	3.4%	25.0%	0.9%
		100%	**4.7%**
Global Bond Index = 50% US$ plus 50% Non-US$ Bonds			

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These portfolios seek to maximize the probability of achieving at least the target real return over twenty years, at the lowest possible risk.			
	YTD 31Aug05	**Weight**	**Weighted Return**
	In A$		In A$
7% Target Real Return	*YTD Returns are Nominal*		
Asset Classes			
Australian Real Return Bonds	6.6%	0%	**0.0%**
Australian Bonds	2.6%	3%	**0.1%**
Global Bonds	3.4%	7%	**0.2%**
Commercial Property	3.1%	3%	**0.1%**
Commodities	25.1%	17%	**4.3%**
Australian Equity	14.9%	25%	**3.7%**
Foreign Equity (USA)	7.1%	21%	**1.5%**
Foreign Equity (EAFE)	9.1%	16%	**1.5%**
Emerging Equity	17.7%	8%	**1.4%**
Hedge Funds	5.6%	0%	**0.0%**
		100%	**12.8%**
	YTD 31Aug05	**Weight**	**Weighted Return**
	In A$		In A$
5% Target Real Return	*YTD Returns are Nominal*		
Asset Classes			
Australian Real Return Bonds	6.6%	17%	**1.1%**
Australian Bonds	2.6%	5%	**0.1%**
Global Bonds	3.4%	2%	**0.1%**
Commercial Property	3.1%	3%	**0.1%**
Commodities	25.1%	20%	**5.0%**
Australian Equity	14.9%	18%	**2.7%**
Foreign Equity (USA)	7.1%	17%	**1.2%**
Foreign Equity (EAFE)	9.1%	13%	**1.2%**
Emerging Equity	17.7%	5%	**0.9%**
Hedge Funds	5.6%	0%	**0.0%**
		100%	**12.4%**

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	YTD 31Aug05	Weight	Weighted Return
	In A$		In A$
3% Target Real Return	*YTD Returns are Nominal*		
Asset Classes			
Australian Real Return Bonds	6.6%	56%	**3.7%**
Australian Bonds	2.6%	10%	**0.3%**
Global Bonds	3.4%	7%	**0.2%**
Commercial Property	3.1%	0%	**0.0%**
Commodities	25.1%	12%	**3.0%**
Australian Equity	14.9%	5%	**0.7%**
Foreign Equity (USA)	7.1%	6%	**0.4%**
Foreign Equity (EAFE)	9.1%	4%	**0.4%**
Emerging Equity	17.7%	0%	**0.0%**
Hedge Funds	5.6%	0%	**0.0%**
		100%	**8.7%**

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These portfolios seek to maximize the probability of achieving at least the target real return over twenty years, at the lowest possible risk.		***Unlike the other target real return portfolios, these allow investment in a hedge fund index.***	
	YTD 31Aug05	**Weight**	**Weighted Return**
	In A$		In A$
7% Target Real Return	*YTD Returns are Nominal*		
Asset Classes			
Australian Real Return Bonds	6.6%	0%	**0.0%**
Australian Bonds	2.6%	2%	**0.1%**
Global Bonds	3.4%	7%	**0.2%**
Commercial Property	3.1%	15%	**0.5%**
Commodities	25.1%	8%	**2.0%**
Australian Equity	14.9%	21%	**3.1%**
Foreign Equity (USA)	7.1%	15%	**1.1%**
Foreign Equity (EAFE)	9.1%	12%	**1.1%**
Emerging Equity	17.7%	15%	**2.7%**
Hedge Funds	5.6%	5%	**0.3%**
		100%	**11.0%**
	YTD 31Aug05	**Weight**	**Weighted Return**
	In A$		In A$
5% Target Real Return	*YTD Returns are Nominal*		
Asset Classes			
Australian Real Return Bonds	6.6%	0%	**0.0%**
Australian Bonds	2.6%	8%	**0.2%**
Global Bonds	3.4%	10%	**0.3%**
Commercial Property	3.1%	12%	**0.4%**
Commodities	25.1%	12%	**3.0%**
Australian Equity	14.9%	25%	**3.7%**
Foreign Equity (USA)	7.1%	13%	**0.9%**
Foreign Equity (EAFE)	9.1%	10%	**0.9%**
Emerging Equity	17.7%	8%	**1.4%**
Hedge Funds	5.6%	2%	**0.1%**
		100%	**11.0%**

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	YTD 31Aug05	Weight	Weighted Return
	In A$		In A$
3% Target Real Return	*YTD Returns are Nominal*		
Asset Classes			
Australian Real Return Bonds	6.6%	65%	**4.3%**
Australian Bonds	2.6%	5%	**0.1%**
Global Bonds	3.4%	3%	**0.1%**
Commercial Property	3.1%	4%	**0.1%**
Commodities	25.1%	5%	**1.3%**
Australian Equity	14.9%	3%	**0.4%**
Foreign Equity (USA)	7.1%	7%	**0.5%**
Foreign Equity (EAFE)	9.1%	6%	**0.5%**
Emerging Equity	17.7%	0%	**0.0%**
Hedge Funds	5.6%	2%	**0.1%**
		100%	**7.5%**

	YTD 31Aug05	Weight	Weighted Return
	In A$		In A$
Equally Weighted Portfolio	*YTD Returns are Nominal*		
Asset Classes			
Australian Real Return Bonds	6.6%	12.5%	**0.8%**
Australian Bonds	2.6%	12.5%	**0.3%**
Global Bonds	3.4%	12.5%	**0.4%**
Commercial Property	3.1%	12.5%	**0.4%**
Commodities	25.1%	12.5%	**3.1%**
Australian Equity	14.9%	12.5%	**1.9%**
Foreign Equity (USA)	7.1%	7.3%	**0.5%**
Foreign Equity (EAFE)	9.1%	5.2%	**0.5%**
Emerging Equity	17.7%	12.5%	**2.2%**
Total		100.0%	**10.2%**

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