Retired Investor

Invest Wisely…Get an Impartial Second Opinion.

This Month's Issue: Key Points

In this month's letters to the editor column, we respond to a number of emails we received on the DFA versus Vanguard issue. We are also asked why we don't include the Rogers Raw Materials Fund as one of our recommended commodities index products. The main reason is that this fund isn't available to retail investors. We also compare the composition and performance of the Rogers Raw Materials Index to the Goldman Sachs Commodities Index and to the Dow Jones/AIG Commodities Index. We find that retail investors aren't missing much by not being able to invest in the Rogers index. We also respond to a question about how one can invest in the global commercial property market. We note that while there are at least three good global property securities indexes available, there are as yet no funds that track them. However, outside the U.S. investors have a relatively large number of actively managed global property funds to chose from. In the U.S., the best approach seems to be a 50/50 combination of the new Fidelity International Real Estate Fund (FIREX) and a low cost domestic real estate index fund.

Our main feature article this month is a thorough review of debt market investing. Based on our analysis, we have come to the following conclusions: (1) We believe that a number of different debt market asset classes should be considered in any asset allocation analysis. These include real return bonds, domestic investment grade bonds, foreign currency bonds, and bank loans. We will incorporate bank loans into our biannual asset allocation review later this year. (2) Assuming an investor finds the underlying credit risk of the wrap provider acceptable, a stable value fund can substitute for an allocation to domestic investment grade bonds. (3) We also believe that the weight of evidence supports a tilt toward intermediate duration bonds within the domestic investment grade and foreign currency bonds' asset classes. (4) We do not believe that an investment in either high yield bonds or emerging markets bonds makes sense for most investors' portfolios. While both asset classes appear attractive in terms of expected returns and standard deviations, the data series upon which

these statistics are based are quite short. In addition the distribution of returns for both asset classes is far from normal. In both cases, an investor has a significantly higher than normal chance of realizing large negative returns (a risk that is not captured by standard deviation, but rather by statistical measures of skewness and kurtosis). We recognize that if an investor's objective is to outperform a benchmark over a one year time horizon this may not matter too much (e.g., this would be the case for an investment manager whose performance is evaluated annually by his or her clients). However, for an investor whose time horizon stretches over many years (i.e., an investor whose goal is to achieve the minimum compound annual return needed to fund her long-term liabilities), this elevated level of "extreme event risk" is an important consideration when determining a portfolio's asset allocation. A substantial loss early in the time horizon can materially reduce the probability of achieving the long-term portfolio return target. For this reason, we have not included high yield or emerging markets bonds in our long-term target real return portfolios.

(5) On the issue of passive versus active implementation of portfolio allocations to debt asset classes, we recognize that the arguments for active management, particularly of intermediate duration funds, appear to be stronger than they are in the case of equities. Still, it is a very close call, and an active fund's costs are critical. In our model portfolios, we'll be sticking with VBMFX. We also believe that the future introduction of better bond indexes (equally weighted, with relatively few, highly liquid issues) and new products based on these new indexes will weaken the argument for active management (as evidenced by the success of the LQD ETF which tracks the equally weighted Goldman Sachs InvestTop Index). However, given the current absence of such indexes in key segments of the debt market (e.g., foreign currency bonds and bank loans), we will continue to search for and use some high quality actively managed funds in our model portfolios.

Last but not least, this month's issue also includes a new column from our financial humorist, Hesh Reinfeld.

This Month's Letters to the Editor

Why don't you include the Rogers Raw Materials Fund in your list of commodity funds?

We have not included this fund in our recommended list because it is not available to retail investors. However, to put this issue in perspective, the following table compares the weightings given to different commodities in the three commodities indexes that are tied to different index funds. The Goldman Sachs Commodities Index (GSCI) is tracked by the Oppenheimer Real Assets Fund (QRAAX), which, in U.S. dollar terms, was up 32.14% through the end of November, 2004. The Dow Jones AIG Commodities Index is tracked by the PIMCO Commodities Real Return Fund (PCRDX). Through the end of November, it was up 20.50%. The main cause of the difference was the relatively lower weight of energy commodities in the DJ/AIG Index. In contrast, according to www.rogersrawmaterials.com, the RRM Index was up 27.11% through the end of November (the latest data available on the website). Unsurprisingly, its energy weighting is in between those of the GSCI and the DJ/AIG. Should a reasonably priced individual investor-oriented fund that tracks the RRM Index ever come to market, we will include it among our recommended commodity index funds.

Commodity	**DJ/AIG**	**GSCI**	**RRM**
Natural Gas	12.3%	11.3%	3.00%
Crude oil	12.8%	39.9%	35.00%
Unleaded Gas	4.1%	7.5%	3.00%
Heating Oil/GasOil	3.9%	13.0%	3.00%
Live Cattle/Feeder Cattle	6.2%	4.4%	2.00%
Lean Hogs	4.4%	2.2%	1.00%
Wheat	4.9%	4.0%	7.00%
Corn	5.9%	2.8%	4.00%
Soybeans	7.6%	1.7%	3.15%
Soybean/Palm Oil	2.7%	0.0%	2.00%
Canola	0.0%	0.0%	0.67%
Orange Juice	0.0%	0.0%	0.66%
Rice	0.0%	0.0%	2.00%
Azuki Beans	0.0%	0.0%	1.00%
Barley	0.0%	0.0%	0.77%
Oats	0.0%	0.0%	0.50%

Commodity	DJ/AIG	GSCI	RRM
Aluminum	7.1%	3.1%	4.00%
Tin	0.0%	0.0%	1.00%
Copper	5.9%	2.4%	4.00%
Lead	0.0%	0.3%	2.00%
Zinc	2.7%	0.6%	2.00%
Nickel	2.6%	0.8%	1.00%
Gold	6.0%	2.1%	3.00%
Silver	2.0%	0.2%	2.00%
Platinum	0.0%	0.0%	1.80%
Palladium	0.0%	0.0%	0.30%
Sugar	2.9%	1.5%	1.00%
Cotton	3.2%	1.0%	3.00%
Cocoa	0.0%	0.3%	1.00%
Coffee	3.0%	0.8%	2.00%
Rubber	0.0%	0.0%	1.00%
Wool	0.0%	0.0%	1.00%
Silk	0.0%	0.0%	0.15%
Lumber	0.0%	0.0%	1.00%
	100.0%	100.0%	100.00%

Is there an index fund that tracks global commercial property?

Unfortunately, to our knowledge there is not yet such a product available. On the other hand, if you live in Australia, Canada, the Eurozone, or the U.K., you have a pretty decent choice of actively managed funds that invest in the equity securities of global property companies. However, if you live in the United States, your choices are far more limited. While there are a number of index mutual funds and ETFs that track domestic commercial property (REIT) indexes, the only globally focused funds are actively managed. These include the ABM Amro Real Estate Fund (ARFCX, expense ratio 1.37%), the ING Global Real Estate Fund (IGCAX, expense ratio 2.50%), and the ING Clarion Global Real Estate Income Fund (a closed end fund, IGR). It is important to note, however, that the holding of the first two funds seem to be tilted more towards U.S. investments relative to the U.S. weighting in global commercial property indexes. From a marketing point of view, this may make sense, if they are trying to stay reasonably close to domestic REIT returns. However, investors can buy these more cheaply via a domestic index fund. The good news in this story is that Fidelity has just launched the Fidelity International Real Estate Fund (FIREX, expense ratio 1.45%). We

like this fund because it is explicitly focused on real estate securities in markets outside the United States, which collectively account for roughly half of the total market capitalization of the global real estate securities market.

While the three major global property indexes are somewhat different in their coverage of this market, all three show that global commercial property delivered excellent returns, and probably outpaced the U.S. in 2004:

Global Property Index	Number of Stocks Included	2004 Return in USD
FTSE	102	37.6%
EPRA/NAREIT	250	30.9%
S&P Citigroup BMI	About 350	36.6%
-- U.S. REITS (VGSIX)	121	30.7%

To conclude, for U.S. investors, the best way today to invest in the global commercial property market seems to be a 50/50 mix of FIREX plus a U.S. real estate index fund.

And finally, a follow up to last month's DFA versus Vanguard article…

We'd like to thank everyone who emailed us following last month's article on DFA versus Vanguard. For those of you who haven't noticed, we've posted a revised version of the article that incorporates many of them. As always, your comments were a mix of some points we agreed with, and some we didn't. The good news was that the criticisms seemed balanced -- some thought we had been too hard on DFA, and some thought we weren't hard enough! Needless to say, we certainly confirmed that if you want to strike up a heated conversation with a group of index investors, all you have to do is mention three letters: D-F-A!

Our original inspiration for writing the article was an email we received from a subscriber, who was considering signing on with a financial adviser. She told us said adviser wanted her to sell her current holdings (which included a number of Vanguard index funds with large unrealized capital gains) and move them into DFA funds. She asked a simple question: did it make sense to do so? Obviously, as we're not an RIA we couldn't answer that question. We did, however, promise that we would write about the general issue she raised. This brings us to the question about the fees charged by advisers who use DFA funds. Many of you wrote to say that you did not charge the one percent we cited in our article, or at least not on the full amount of a client's assets. We recognize that there are a wide range of fee

agreements in use. However, the one percent fee came from a survey published by DFA. More to the point, since DFA funds are only available through advisers, and since advisers all charge some type of fee, we had to somehow incorporate this important difference versus Vanguard funds, which an investor can buy directly without paying a fee to an adviser. However, we did try to be fair and show the DFA fund returns both before and after the adviser fee.

Some readers wrote and essentially argued that they believe that the value and small cap effects are both behaviorally based anomalies, in the sense that they represented an opportunity to earn additional return without taking on additional risk (versus a broad market index). While we respect the arguments made by the behavioral finance school, we reiterate the point that the persistence of such anomalies requires not only systematic mistakes on the part of some investors, but also the presence of long-term barriers that prevent arbitrage from eliminating the anomalous returns they generate. We have yet to see a convincing argument that these barriers are sufficiently large and durable to sustain over time a situation in which some investors are consistently earning extra returns without taking on extra risks. We therefore tend to agree with DFA's Gene Fama, who argues that the value and small cap effects are efficient market phenomena that reflect additional return premia that compensate investors for taking on additional risk in addition to the market factor.

We were also asked if the fund return and volatility differences we cited were statistically significant. We had considered running tests to see if they were. However, given that in some cases only three years of comparable data were available, and in others the index tracked by the fund had recently changed, we decided not to run these tests because they would only produce a partial comparison. We agree, however, that with a better set of data, this would be an interesting subject for a future article. Finally, we will reiterate what we still believe is the most important point in this debate: the great majority of people would be better off with either DFA or Vanguard funds than they would with actively managed products, and indeed than with many other indexed products too. As we said, DFA versus Vanguard is a comparison of one all-star to another.

Global Asset Class Returns

YTD 31Dec04	In USD	In AUD	In CAD	In EURO	In JPY	In GBP
Asset Held						
US Bonds	4.20%	0.08%	-3.99%	-3.86%	-0.58%	-3.30%
US Prop.	30.70%	26.58%	22.51%	22.64%	25.92%	23.20%
US Equity	12.50%	8.38%	4.31%	4.44%	7.72%	5.00%
AUS Bonds	6.81%	2.69%	-1.39%	-1.26%	2.03%	-0.70%
AUS Prop.	29.88%	25.77%	21.69%	21.82%	25.11%	22.38%
AUS Equity	29.30%	25.19%	21.11%	21.24%	24.53%	21.80%
CAN Bonds	15.58%	11.46%	7.39%	7.52%	10.80%	8.08%
CAN Prop.	18.88%	14.77%	10.69%	10.82%	14.10%	11.38%
CAN Equity	22.72%	18.61%	14.53%	14.66%	17.95%	15.22%
Euro Bonds	16.10%	11.98%	7.91%	8.04%	11.32%	8.60%
Euro Prop.	51.09%	46.97%	42.89%	43.02%	46.31%	43.58%
Euro Equity	20.65%	16.54%	12.46%	12.59%	15.87%	13.15%
Japan Bonds	5.35%	1.23%	-2.84%	-2.71%	0.57%	-2.15%
Japan Prop.	33.07%	28.96%	24.88%	25.01%	28.30%	25.57%
Japan Equity	14.17%	10.05%	5.98%	6.11%	9.39%	6.67%
UK Bonds	14.33%	10.21%	6.14%	6.27%	9.55%	6.83%
UK Prop.	54.18%	50.07%	45.99%	46.12%	49.41%	46.68%
UK Equity	18.32%	14.21%	10.13%	10.26%	13.55%	10.82%
World Bonds	7.80%	3.68%	-0.39%	-0.26%	3.02%	0.30%
World Prop.	37.60%	33.48%	29.41%	29.54%	32.82%	30.10%
World Equity	16.65%	12.53%	8.46%	8.59%	11.87%	9.15%
Commodities	15.80%	11.68%	7.61%	7.74%	11.02%	8.30%
Hedge Funds	3.67%	-0.45%	-4.52%	-4.39%	-1.11%	-3.83%
A$	4.12%	0.00%	-4.08%	-3.95%	-0.66%	-3.39%
C$	8.19%	4.08%	0.00%	0.13%	3.41%	0.69%
Euro	8.06%	3.95%	-0.13%	0.00%	3.28%	0.56%
Yen	4.78%	0.66%	-3.41%	-3.28%	0.00%	-2.73%
UK£	7.50%	3.39%	-0.69%	-0.56%	2.73%	0.00%
US$	0.00%	-4.12%	-8.19%	-8.06%	-4.78%	-7.50%

Equity and Bond Market Valuation Update

Our equity market valuation analysis rests on two fundamental assumptions. The first is that the long term real equity risk premium is 4.0% per year. The second is the average rate of productivity growth an economy will achieve in the future. Because future growth rates are uncertain, we use both high and a low productivity growth assumptions for each region. Given these assumptions, here is our updated market valuation analysis at the end of last month:

Country	Real Risk Free Rate Plus	Equity Risk Premium Equals	Required Real Return on Equities	Expected Real Growth Rate* plus	Dividend Yield Equals	Expected Real Equity Return**
Australia	2.77%	4.00%	6.77%	4.90%	3.60%	8.50%
Canada	2.06%	4.00%	6.06%	2.10%	1.70%	3.80%
Eurozone	1.57%	4.00%	5.57%	2.50%	2.60%	5.10%
Japan	0.55%	4.00%	4.55%	2.70%	1.00%	3.80%
U.K.	1.67%	4.00%	5.67%	2.50%	3.10%	5.60%
U.S.A.	1.66%	4.00%	5.66%	4.50%	1.60%	6.10%

**High Productivity Growth Scenario..*
*** When required real equity return is greater than expected real equity return, theoretical index value will be less than actual index value – i.e., the market will appear to be overvalued.*

Country	Implied Index Value[1]	Current Index Value	Current to Implied Value Under High Growth Scenario[2]	Current to Implied Value Under Low Growth Scenario
Australia	192.31	100.00	52%	80%
Canada	42.97	100.00	233%	292%
Eurozone	84.66	100.00	118%	176%
Japan	57.08	100.00	175%	275%
U.K.	97.88	100.00	102%	151%
U.S.A.	137.46	100.00	73%	135%

[1]High productivity growth scenario. *[2]Values below 100% indicate undervaluation; more than 100% indicates overvaluation*

Our valuation estimate is based on the relationship between the returns an equity market is expected to supply, and those investors are likely to demand. The rate of return the equity market is expected to supply in the future equals current dividend yield plus the expected rate of real long-term economic growth. To be sure, changes in the market price/dividend (or price/earnings) ratio also affect the returns supplied. However, because this is driven by psychological factors which we have no basis for predicting, we do not include future price/dividend ratio changes in our analysis.

We define the future equity market return that investors demand to be equal to the current yield on long term real return bonds, plus a four percent long term equity market risk premium. As you can see, the good news is that two of the factors in our model -- current dividend yields and the real bond return -- are easily obtained from the daily paper. The bad news is that the other two -- the expected rate of dividend growth and the "correct" equity market risk premium -- are two of the most contentious issues in finance. However, if you assume that an equity market is currently in equilibrium (that is, neither under or overvalued), by assuming a value for one of these variables, you can derive an estimate of the market's current expectation for the other. Specifically, the market's current implied rate of future dividend growth equals the current real bond yield plus the four percent equity market risk premium less the current dividend yield. Similarly, the market's current implied equity market risk premium equals the current dividend yield plus our estimated future growth rate less the current real bond yield. These estimates are shown in the following table:

	Current Dividend Yield	Current Real Bond Yield	Implied Future Real Growth Rate, Assuming 4% ERP	Implied ERP, Assuming Low Future Growth Scenario	Implied ERP, Assuming High Future Growth Scenario
Australia	3.60%	2.77%	3.17%	4.73%	5.73%
Canada	1.70%	2.06%	4.36%	0.74%	1.74%
Eurozone	2.60%	1.57%	2.97%	2.03%	3.53%
Japan	1.00%	0.55%	3.55%	2.25%	3.25%
United Kingdom	3.10%	1.67%	2.57%	2.43%	3.93%
United States	1.60%	1.66%	4.06%	3.44%	4.44%

Our bond market valuation update is based on the same supply and demand methodology we use for our equity market valuation update. In this case, the supply of future fixed income returns is equal to the current nominal yield on ten-year government bonds. The demand for future returns is equal to the current real bond yield plus the historical average inflation premium (the difference between nominal and real bond yields) between 1989 and 2003. To estimate of the degree of over or undervaluation for a bond market, we use the rate of return supplied and the rate of return demanded to calculate the present values of a ten year zero coupon government bond, and then compare them. If the rate supplied is higher than the rate demanded, the market will appear to be undervalued. This information is contained in the following table:

	Current Real Rate	**Average Inflation Premium (89-03)**	**Required Nominal Return**	**Nominal Return Supplied (10 year Govt)**	**Return Gap**	**Asset Class Over or (Under) Valuation, based on 10 year zero**
Australia	2.77%	2.96%	5.73%	5.33%	-0.40%	3.88%
Canada	2.06%	2.40%	4.46%	4.30%	-0.16%	1.51%
Eurozone	1.57%	2.37%	3.94%	3.68%	-0.26%	2.55%
Japan	0.55%	0.77%	1.32%	1.43%	0.11%	-1.06%
UK	1.67%	3.17%	4.84%	4.54%	-0.30%	2.88%
USA	1.66%	2.93%	4.59%	4.22%	-0.37%	3.65%

It is important to note that 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).

Finally, for an investor contemplating the purchase of foreign bonds or equities, the expected future annual percentage change in the exchange rate is also important. Study after

study has shown that there is no reliable way to forecast this. At best, you can make an estimate that is justified in theory, knowing that in practice it will not turn out to be accurate. That is what we have chosen to do here. Specifically, we have taken the difference between the yields on ten- year government bonds as our estimate of the likely future annual change in exchange rates between two regions. This information is summarized in the following table:

Annual Exchange Rate Changes Implied by Bond Market Yields

	To A$	To C$	To EU	To YEN	To GBP	To US$
From						
A$	0.00%	-1.03%	-1.65%	-3.90%	-0.79%	-1.11%
C$	1.03%	0.00%	-0.62%	-2.87%	0.24%	-0.08%
EU	1.65%	0.62%	0.00%	-2.25%	0.86%	0.54%
YEN	3.90%	2.87%	2.25%	0.00%	3.11%	2.79%
GBP	0.79%	-0.24%	-0.86%	-3.11%	0.00%	-0.32%
US$	1.11%	0.08%	-0.54%	-2.79%	0.32%	0.00%

Sector and Style Rotation Watch

The following table shows a number of classic style and sector rotation strategies that attempt to generate above index returns by correctly forecasting turning points in the economy. This table assumes that active investors are trying to earn high returns by investing today in the styles and sectors that will perform best in the next stage of the economic cycle. The logic behind this is as follows: Theoretically, the fair price of an asset (also known as its fundamental value) is equal to the present value of the future cash flows it is expected to produce, discounted at a rate that reflects their relative riskiness. Current economic conditions affect the current cash flow an asset produces. Future economic conditions affect future cash flows and discount rates. Because they are more numerous, expected future cash flows have a much bigger impact on the fundamental value of an asset than do current cash flows. Hence, if an investor is attempting to earn a positive return by purchasing today an asset whose value (and price) will increase in the future, he or she needs to accurately forecast the future value of that asset. To do this, he or she needs to forecast future economic

conditions, and their impact on future cash flows and the future discount rate. Moreover, an investor also needs to do this before the majority of other investors reach the same conclusion about the asset's fair value, and through their buying and selling cause its price to adjust to that level (and eliminate the potential excess return).

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

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

Economy	Bottoming	Strengthening	Peaking	Weakening
Interest Rates	Falling	Bottom	Rising	Peak
Style Rotation	Growth (IWZ) **6.37%**	Value (IWW) **16.53%**	Value (IWW) **16.53%**	Growth (IWZ) **6.37%**
Size Rotation	Small (IWM) **17.95%**	Small (IWM) **17.95%**	Large (IWB) **10.87%**	Large (IWB) **10.87%**
Style and Size Rotation	Small Growth (DSG) **14.79%**	Small Value (DSV) **17.95%**	Large Value (ELV) **13.02%**	Large Growth (ELG) **5.24%**

Economy	Bottoming	Strengthening	Peaking	Weakening
Interest Rates	Falling	Bottom	Rising	Peak
Sector Rotation	Cyclicals (IYC) **10.71%**	Basic Materials (IYM) **12.09%**	Energy (IYE) **31.57%**	Utilities (IDU) **22.67%**
	Technology (IYW) **1.34%**	Industrials (IYJ) **16.27%**	Staples (IYK) **11.90%**	Financials (IYF) **12.89%**
Bond Market Rotation	High Risk (VWEHX) **8.50%**	Short Maturity (VBISX) **1.70%**	Low Risk (VIPSX) **6.70%**	Long Maturity (VBLTX) **8.40%**

Investing in Debt Markets

For many people, "investing" means equities. However, since the world's debt markets are worth about twice as much as the world's equity markets, smart investors also need to understand them too. With any luck, this article will help you to do that. Here is how we will proceed: we'll start with a review of the basic building blocks of the debt market -- that is, with the specific risk factors which drive the return on debt investments. We'll then move on to the different forms those instruments can take in the derivatives, securities, and loan markets. Our next step will be a review of the size of the global debt market, and its major segments and asset classes. This will lead to a discussion of the indexes that track this global market, and the challenges they present. We'll then ask the next logical question: does it make sense to be an index investor in the debt markets, or should one take an active approach?

The Building Blocks

Broadly speaking, the debt markets compensate investors for taking at least eight different types of risk.

Duration

Let's start with some basic concepts. Like any other investment, the present value of a debt instrument is equal to the stream of future cash flows it will produce, discounted at an appropriate rate. This discount rate is often referred to as a bond's "yield to maturity" (YTM). Unfortunately, this term is often a source of confusion among investors. A comparison to equity market terms may be helpful. In the equity market, we speak of a company's "required rate of return." This is the minimum rate of return that investors believe will fairly compensate them for bearing the non-diversifiable (that is, the systematic) risk inherent in a company's stock. YTM is the bond market equivalent. Just as investors require a higher rate of return to hold the stock of a riskier company, so too they require a higher YTM to hold its bonds. The key point -- and it is one that too many investors either overlook or wish away -- is that a high YTM isn't a "free lunch." Rather, it is compensation for accepting a higher level of risk. As we will soon see, in the world of debt market investing, this is an absolutely central, and critical, point.

While both required rate of return and YTM are "today looking forward" returns, "total return" is a "tomorrow looking backward" measure of the return an investor actually realizes on a bond or stock. Because the future is inherently uncertain, realized total rates of return often deviate from required rates of return for investments in individual stocks or bonds. In contrast, over long periods of time, the two returns tend to be much closer aligned for investments in broad asset class indexes.

Now let's look at an example. The YTM of a fixed rate bond is roughly equal to its coupon rate (the amount of interest it promises to pay each year) divided by the price at which you purchased it (the exact YTM calculation is more calculated, and involved, for example, accrued interest). Bonds are usually issued in $1,000 denominations, but are often purchased for prices different than this face value. If you use the current YTM to discount a bond's coupon payments (and principal payment at maturity) to their present value, you get an estimate of its current fair price.

As the YTM (discount rate) rises (e.g., due to a rise in overall market rates), a dollar received today increases in value relative to a dollar received tomorrow (because it can earn relatively more if it is reinvested). It is for this reason that a bond that pays a fixed rate of

interest (and principal at maturity) declines in value when interest rates rise, and increases in value when they fall. It is also for this reason that a bond with a short time to maturity (that is, to the date on which its principal is repaid) will be less sensitive to changes in interest rates than a long-term bond. In other words, a one percent change in interest rates will have a much greater impact on the value (and price) of a long-term bond than a short-term bond.

The fancy word for the maturity of a bond is its "duration." This is a mathematical measure of the number of years before an investor recovers (from interest and principal payments received) an amount equal (in present value terms) to the price paid for the bond. A bond's duration increases as its maturity lengthens. To a lesser extent, duration also increases as a bond's coupon rate declines. However, for all bond except zero coupons (which pay no interest, but instead are purchased at a deep discount to face value), duration is shorter than the years remaining to maturity. For zero coupon bonds, duration and maturity are the same. An interesting wrinkle here is a "callable" bond. This bond gives the issuer the right, but not the obligation to redeem the bonds (at a stated price) before their maturity date (logically, this happens when the issuer can refinance them at a lower rate, which means that the investor loses). In exchange for providing the issuer with this type of flexible duration (i.e., duration can be calculated to the call date or to maturity), investors receive a somewhat higher rate of return.

Another useful feature of duration is that it corresponds to the percentage change in the price of a bond that occurs when its yield changes by one percent. For example, a bond with a five-year duration would see its price increase by 5% in response to a 1% decrease in its yield. "Duration risk" refers to the fact that (as noted above) the value of a debt instrument becomes more sensitive to changes in market yields as its maturity lengthens. In other words, if two bonds have exactly equal exposures to all other forms of risk except duration, a bond with the longer duration would be riskier than a bond with shorter duration. Finally, we should also note another wrinkle in the duration equation. Some bonds (known as floating rate notes) and most commercial loans have floating rather than fixed rates that are periodically readjusted as market rates change. As a practical matter, the effective duration on such a bond is very short, extending only to the next date on which its interest rate is adjusted. Hence its duration risk is also low, even though it may have a longer stated maturity.

Uncertainty About the Real Time Value of Money

When you save and invest, you forgo consumption until a later date. At the most basic level, people want to be compensated for this delay. In aggregate, the return they require to delay their consumption should be equal to the rate at which real output grows in the economy during this period. Thus, in equilibrium, this real "time value of money" or rate of interest should be equal to the expected real growth rate of the economy (which is equal to the expected growth in the labor force times the expected growth in labor productivity). Unfortunately, while the economy is always attracted to it, in the real world equilibrium is never attained, because people lack perfect information and sometimes act irrationally. For example, in an over-stimulated economy where demand is growing faster than supply, the real rate of interest may be higher than the long-term growth rate of the economy. Alternatively, if demand is growing slower than supply, the real rate of interest may be below its long-term equilibrium rate. As a result, the prevailing real rate of interest reflects two factors: the expected supply/demand balance in the real economy over a given future period, plus an additional premium to compensate for the inherently uncertain (i.e., risky) nature of this estimate.

Liquidity Risk

If there is any chance that you will have to sell a debt instrument before it matures, you are potentially exposed to liquidity risk. Broadly speaking, there are two aspects to it: a) will there be someone there to buy your instrument if you have to sell, and, if so, b) how much will it cost you to access this liquidity (e.g., how much of a discount to the market price will the person providing the liquidity offer for your debt instrument?). As anyone who lived through the 1987 or 1998 market meltdowns can tell you, assuming the constant availability of liquid markets for financial assets is a convenient assumption to make in theory, but a dangerous one to make in practice. (For a good recent overview of this issue, see "Commonality in Liquidity Shocks and Market Collapse" by Fernando, Herring, and Subrahmanyam).

Moreover, even when it is available, liquidity -- especially in the debt markets -- usually isn't cheap. For example, a recent study ("Corporate Bond Market Transparency and Transaction Costs" by Edwards, Harris, and Piwowar) found that the "round trip" (i.e., a matched sell and buy order) cost for a "retail" sized corporate bond transaction (U.S. $20,000) averaged 1.38% of its value. Three other data points help put this in perspective. The authors also found that the round trip cost for an institutional size corporate bond trade was only .54%, and that the average cost for a round trip retail equity trade was only .40%. In a separate study ("The Municipal Bond Liquidity Study" by Harris and Piwowar) the authors found that the average cost for a retail municipal bond trade was even higher, at a whopping 1.98% of its value. Considering that the current YTM on a 10-year, AAA rated Muni is just 3.72%, these costs are enormous.In exchange for bearing this liquidity risk, investors logically demand some additional return premium on debt instruments.

Inflation Risk

When the supply of money grows faster than real output, the price of something (goods and services or financial and real assets) will go up. This is called inflation. To preserve the real purchasing power of their investment, people holding assets with returns that are stated in nominal terms require some additional compensation to reflect not only expected inflation, but also the uncertainty (risk) of their estimate of its future level.

Default or Credit Risk

Because debt owners' claims on a firm's assets are senior to those of its shareholders, debt is theoretically less risky, and earns lower returns than equity. However, unlike equities, the distribution of possible future returns on debt instruments is decidedly asymmetric (i.e., tilted in one direction). At best, an investor who holds a debt instrument can expect to receive her money back with interest (we'll leave convertible bonds out of this for now). At worst, she can lose everything. The probability that the latter can happen is known as "default" or "credit" risk.

There are five key elements to default risk. First, there is a system-wide component that affects all firms (e.g., this could be related to the overall level of interest rates or the state of the business cycle). Second, there is a component that is firm-specific (e.g., related to the amount of debt relative to equity in the firm's capital structure, and the volatility of the cash flows it generates from its operations). Third, there is an element related to what happens if a firm cannot make its scheduled debt payments; that is, what happens when a so-called "event of default" occurs. This has two sub-elements. The first is the amount by which the price of a firm's debt will decline when the market becomes aware of its problem. The second is the amount of the debt principal that investors will eventually recover (e.g., as the result of a bankruptcy proceeding). This latter consideration is related to the fourth element, which is integral to the design of a specific security. For example, securities can have different collateral or levels of seniority (or, alternately, subordination) within an issuer's capital structure. In the event of default, collateral can be liquidated to repay the debt obligation to which it is attached. Also, in the case of default, senior debt obligations are repaid before subordinated obligations. Finally, there is the very important portfolio issue of the extent to which defaults on different types of securities are correlated with each other. Unfortunately, because the currently available data series on defaults is relatively limited, there is still a lot of uncertainty involved in estimating this critical variable. In sum, credit risk is a very complicated subject.

Debt rating agencies (e.g., Standard and Poor's, Moody's and Fitch) assess the first three types of risk, and rate them using different letter grades. For example, at S&P, debt instruments with grades AAA, AA, A, and BBB are called "investment grade", and are estimated to have lower default risk than so-called "speculative" (or "high yield") instruments with grades BB, B, CCC, CC, and C. Through the end of 2002, cumulative default rates after ten years on differently rated instruments were as follows:

AAA	AA	A	BBB	BB	B	CCC
0.48%	0.85%	1.82%	6.68%	20.82%	35.87%	57.21%

As you can see, when you get into speculative grade debt instruments, default becomes much more probable. When this happens, the shareholders in a defaulting firm often lose most of their investment when the debt holders convert their loans or bonds into equity. For this

reason, as you move down in the debt ratings, the distinction between debt and equity -- at least in the economic sense -- becomes hazier. For example, in the United States between 1971 and 2002, the correlation of real annual returns between the equity market (measured by the Wilshire 5000 Index) and the investment grade bond market was .22, while the correlation between equities and high yield bonds was .56.

Logically, investors require additional compensation to bear default risk. This includes not only its expected level (e.g., as evidenced by an S&P rating, or by the estimate made by a default prediction model), but also its expected correlation with other default risks and the uncertainty associated with both of these estimates. In recent years, this last element has been of growing importance, as credit downgrades have sharply outnumbered upgrades as many companies have (a) taken on more debt to boost their returns on equity, and (b) faced increasingly intense global competition in their industries.

Prepayment and Extension Risk

One of the largest segments in the global debt market is comprised of mortgages -- that is, loans secured against (usually residential) property. Many of these mortgage loans are structured with monthly repayment schedules, with said payments containing not only interest but also a portion of principal repayment. Many of these loans also allow the borrower to repay in full before the loan's scheduled maturity date. Given this structure, they involve another type of risk called either "prepayment" or "prepayment and extension" risk.

If you are a holder of a portfolio of mortgage loans, you expect some percentage of them to be repaid earlier than expect (e.g., due to a borrower moving to another city and selling her house). However, this behavior is also affected by the level of interest rates. When interest rates fall, relatively more borrowers refinance their mortgages (i.e., take out a new lower cost mortgage and use it to prepay a higher cost one). Conversely, when interest rates rise, fewer borrowers than normal refinance. Now consider what happens with a portfolio of mortgage loans. When interest rates increase, their effective maturity grows longer because prepayments fall below their expected level (i.e., more borrowers than usual "extend" their mortgage). In other words, the mortgage portfolio owner gets hit with a double whammy: lengthening maturity accentuates the negative impact on value of rising rates. The

exact opposite happens when rates fall: prepayments increase, and the effective maturity of the mortgage portfolio grows shorter (which offsets the positive impact on value of falling rates). Unfortunately, prepayment risk is not at all easy to quantify, and any estimate of it is subject to quite a bit of uncertainty (see, for example, "What Constitutes a Good Model? An Analysis of the Models for Mortgage Backed Securities" by Heidari and Wu). Unsurprisingly, a key focus of people who invest in mortgages has been the estimation and pricing of prepayment risk.

Currency Risk

When an investor buys a debt instrument that is denominated in something other than his functional currency, there is a chance that future exchange rate changes will make it worth much more or less than an equivalent investment in the functional currency itself. Theoretically, in an efficient market exchange rate changes will offset any difference in the interest rates on two equivalent debt investments (e.g. a ten-year U.S. government bond and a ten-year Japanese government bond). However, study after study has shown that the real world isn't this efficient (or at least not over short time frames), and that investors consequently earn additional returns (or suffer losses) because of exchange rate changes. Logically, an investor wants to be compensated for this risk.

Country Risk

Country risk is distinct from default and exchange rate risk in the following sense. Assume that you have made a loan to a Venezuelan company (as I once did), and the company has the local currency available to pay you back (on time, and with interest, of course). Further assume that said loan was denominated in U.S. dollars, so that you didn't take any currency risk. What do you call it when the Venezuelan government closes the free foreign exchange market, and limits the supply of dollars that can be purchased by local companies wishing to repay their loans? Country risk. In our experience, the distinction between default risk and country risk is the inability versus the unwillingness to pay (aided and abetted in the latter case by the protection of sovereign immunity that makes it very hard to use the courts to

compel payment of the underlying debt.) We should also point out that country risk is not limited to emerging market countries. For example, consider the situation now faced by foreign holders of U.S. government bonds. As we have noted in our economic updates, there is a limit on how much longer the United States can serve as the world's growth engine by running large current account deficits, increasing its ratio of external debt to gross domestic product. At some point, this will force either a large fall in the value of the U.S. dollar, and/or a rise in U.S. inflation and/or a prolonged slowdown in the U.S. economy. In the case of the latter, foreign owners of U.S. assets will not suffer (but millions of voters will). In the former cases, the U.S. will force its external creditors to share some of the suffering. Which outcome will occur depends in no small measure on political factors. That is also a case of country risk. Unfortunately, from an investor's point of view, country risk defined in this manner is extremely difficult to quantify and price accurately.

Summary: The Risk Grid

An easy way to think about the risks involved in debt investing is in the form of a grid. Your total risk exposure increases both as you move along the horizontal access (i.e., take on more different types of risk), and as you move up the vertical access (i.e., increase the duration of your risk exposure). Or, to put it differently, there is a world of difference between a one-year real return bond issued by your national government and a 30 year, local currency mortgage backed bond issued in Venezuela.

Long Duration							*Highest Risk*
Intermediate Duration							
Short Duration	*Lowest Risk*						
	Real Return Risk	Liquidity Risk	Inflation Risk	Credit Risk	Prepayment Risk	Currency Risk	Country Risk

Combining Building Blocks Into Debt Instruments

The basic building blocks of risk factors and associated return premiums can be combined in different ways to produce the range of instruments that collectively make up the debt market. In the next sections, we'll look at three broad groups: derivative instruments, securities, and loans.

Derivative Contracts

The value of instruments traded in the derivative markets are based on the values of instruments traded in the primary currency, securities and loan markets. Derivative markets are important for three reasons. First, whereas traditional debt instruments (e.g., bonds and loans) bundle together different risks, derivative markets allow them to be separated and priced independently (and presumably more accurately). Second, derivatives make the financial markets more efficient by enabling the transfer of risks to the parties willing to bear them at the lowest return. Finally, because derivatives are leveraged instruments (that is, they can be purchased for an up-front payment equal to a fraction of their face or "notional" value), they substantially increase market liquidity for different types of risk.

However, we should also note that many writers have raised caution flags about how the growth of derivative markets may have achieved these benefits only by raising the overall level of systematic risk (e.g., see "The Liquidity of Bank Assets and Banking Stability" by Wolf Wagner of Cambridge for a discussion of how the existence of credit default swaps may cause banks to take on more risk). Specifically, analysts have noted that the ultimate stability of the derivative markets rests on the willingness and ability of the parties on the losing end of derivative contracts to make good on the payments they owe. Pointing out that many of the big financial blowups in recent years have involved derivatives (e.g., China Aviation Oil, Barings, Orange County (CA), Metalgesselschaft, Long Term Capital Management), as well as the heavy trading of these instruments by many hedge funds, they wonder if the financial system has adequate capital to withstand the sharp price changes that would accompany a major macroeconomic change (e.g., as might be caused when foreign investors stop financing the U.S. current account deficit). Unfortunately, the only honest answer is, "nobody really knows."

Broadly speaking, there are three types of derivative instruments. A "swap" represents the exchange of two payment streams. For example, in an interest rate swap, Bayer, AG could agree to pay an amount equal to 5% of a notional principal of $10 million for five years (i.e., $500,000 per year) to Standard Chartered Bank. In exchange, the bank would agree to pay Bayer an amount equal to a prevailing floating "reference rate" (e.g., the London Interbank Offer Rate, or LIBOR, is the most popular) on the same notional principal. In a currency swap, Bayer would agree to pay Euro 400,000 per year to J.P. Morgan and receive back $500,000.

A forward contract (which is known as a futures contract if it is traded on an exchange) obligates its owner to either buy or sell a fixed amount of underlying assets at a predetermined price at a predetermined date in the future. Forwards can be used to either hedge an existing risk exposure or to speculate in the underlying asset.

Finally, an option contract gives the holder the right, but not the obligation, to buy or sell a specified amount of an underlying asset at a specified price on or before a specified date in the future. Like futures, options can be used to either hedge or to speculate.

Swaps, forwards, and options are available on some, but not all of our underlying building block risks. As noted, currency contracts have been traded for years in many forms. Unfortunately, there is as yet no exchange traded instrument directly tied to the real rate of interest or future real GDP growth. However, a futures contract tied to U.S. inflation is traded on the Chicago Mercantile Exchange, and over-the-counter inflation swaps have been rapidly growing in recent years. Thus, by combining these with derivatives tied to nominal rates, one can construct a so-called "synthetic" real rate derivative contract. Unfortunately, no direct contracts exist for country or liquidity risk. The use of derivatives to hedge prepayment risk is possible, but complicated.

However, by far the most important development in recent years in derivative markets has been the rapid growth of so called "credit default swaps." Actually, these aren't swaps at all, but rather a form of insurance contract. A simple CDS (and there are many forms of these) gives its owner the right to receive a certain amount if a specified "credit event" occurs at a specific borrower over a specified period of time (five years is the most common). According to one estimate by the British Bankers Association, the outstanding notional principal amount in this market will soon surpass U.S. $8 trillion. This market has become so important to the

pricing and transfer of credit risk that changes in it now lead changes in bond prices and credit rating changes (see "The Relationship Between CDS Spreads, Bond Yields, and Credit Rating Announcements" by Hull, Predescu, and White).

Securities

Before the growth of derivative markets, most building block risks and returns were bundled into different types of debt securities (notes have maturities of ten years or less, while bonds have longer maturities).

Real Return Government Bonds

One of the fastest growing segments of the debt markets is real return bonds, which are mostly issued by governments. These promise to pay the holder a guaranteed real rate of interest over the life of the bond. In some cases (e.g., Series I Savings Bonds in the United States), this is accomplished by adjusting interest payments to reflect changes in the rate of inflation. In other cases (e.g., U.S. Treasury Inflation Protected Securities) the same goal is accomplished by varying the capital value of the bond. Real return bonds have proven to be very popular because they insulate the investor from inflation and credit risk (the latter assumes that government bonds are free of credit risk). This is not to say that these bonds are entirely free of risk: the investor still faces duration risk, real return risk, liquidity risk (more of a problem when they were first launched, but declining as more are issued and the markets for them become deeper). In addition, there are two other issues that investors need to keep in mind when considering real return bonds. The first is the way they would adjust in the event of a prolonged period of deflation. Some bonds (e.g., in the U.S. and some European countries) are structured so that their capital value never falls below a certain amount. This creates the possibility of capital gains in the event of deflation. Others (e.g, in the U.K., Canada, and Australia) do not contain this possibility. The second consideration is the complicated tax treatment of real return bonds. For example, in the U.S. changes in the capital value of the bond are treated as an original issue discount, and counted as income,

even though no cash is received. For this reason, we suggest getting tax advice about the best way to hold these instruments (e.g., in a tax-advantaged account).

Nominal Return Government Bonds

These bonds essentially add inflation risk to duration, real return and liquidity risk. However, because of different expectations for future real rates of return and inflation, different degrees of uncertainty about these factors, and different levels of concern with liquidity risk, the yields on government bonds will differ across the maturity (or duration) spectrum. This creates the familiar "government yield curve." This brings us to a key difference between the debt markets and the equity markets. In the latter, the risk of a stock can be divided into two parts: the portion that is systematic (that is, common to all stocks) and the portion that is unique to a specific company (or industry, or some other grouping that is smaller than the market as a whole). In the equity markets, firm specific risks account for a substantial proportion of the total risk of most stocks. However, these risks can be diversified away by holding a large enough portfolio of stocks (within which the firm specific risks will offset each other. Of course, the flip side of this is that there is also a substantial upside ("alpha") if you can accurately forecast future security returns, and tilt your portfolio away from the market index to capture them.

In the debt markets, you can think of "systematic risk" as that related to changes in the nominal government bond yield curve, and "issuer specific" risk as that related to all the other risk factors we have noted. In the debt markets, systematic risk accounts for a much larger portion of the total risk of most instruments than is the case in the equity market. In fact, as Ron Ryan (creator of the original Lehman bond indexes, later founder of Ryan Labs, and a very smart guy) likes to point out, the returns on most segments of the U.S. bond market have very high (.86 to .98 for the ten years ended in December, 2003) correlations with the returns on just one point on the government yield curve: the five year zero coupon bond. In other words, a central fact about the investment grade, nominal return, domestic debt market is that the scope for earning additional returns ("alpha") by tilting your portfolio away from the market index (either government bonds, or, as Ron Ryan might put it, the five year zero coupon bond) is much more limited than it is in the equity markets. It is for this reason that

the distance between the average return of the median active manager and a top quartile active manager is much greater in the equity market than it is in the investment grade debt market. And it is also for this reason that, given the scarcity of alpha, cost control (i.e., low fund expenses) is, relatively speaking, much more important in the debt markets than it is in the equity markets (on the other hand, the level of company specific risk is much higher with speculative grade, high yield bonds, so there is more scope for diversification benefits in this segment of the market).

One final point about the nominal government bond yield curve. It is often asserted that the difference between the yield on government real return bonds and nominal return bonds of equal duration is a good proxy for the future expected rate of inflation. In fact, the difference between the two is at best only a rough estimate of future inflation. As noted in two recent papers ("Real Return Bonds, Inflation Expectations, and the Breakeven Inflation Rate" by Christensen, Dion, and Reid from the Bank of Canada, and "Can TIPS Help Identify Inflation Expectations?" by Shen and Corning from the U.S. Federal Reserve), there are a number of reasons for this. These include higher premiums for liquidity risk demanded by owners of real return bonds, time varying expectations for real returns and inflation, and an additional premium demanded by owners of nominal return bonds to compensate them for uncertainty about future inflation. As always, making accurate forecasts remains a difficult task.

We should also mention Federal Agency Securities in this section. In the United States these are issued by government sponsored enterprises such as the Student Loan Marketing Association, the Federal Farm Credit System, the Federal National Mortgage Association, the Federal Home Loan Bank System, and the Tennessee Valley Authority. While these entities are sponsored by the federal government, their securities do not carry a "full faith and credit" government guarantee. They therefore exist in a gray area between government debt and private sector debt (which clearly involve credit risk). Because of their never-never land status, investors require yields on agency bonds that are slightly higher than those on Treasury bonds of equivalent duration.

Domestic Bonds and Loans With Credit Risk

Bonds and loans to domestic non-government (or government-guaranteed) organizations embody not only duration, real return, liquidity and inflation risk, but also credit risk. This category includes an extremely wide variety of instruments. However, in broad terms, they fall into three asset classes: investment grade bonds, high yield (speculative grade) bonds, and bank loans. The main differences between these are as follows. First, investment grade borrowers often issue bonds in larger amounts, which often leads to relatively more liquid markets for them. Second, they usually have relatively few covenants (that is, legal limitations, specified in the bond offering documents, that limit the issuer's ability to take certain actions), and are usually not backed by any collateral or guarantees (technically, this type of bond is called a "debenture"). Third, they are often issued with a fixed coupon (that is, with a fixed rate of interest on the bond). This creates duration risk for the investor.

We have previously noted how high yield bonds have much higher credit risk than investment grade bonds. More specifically, about 33% of high yield bonds are rated BB, 50% B, and 17% CCC or below. These bonds are also more likely than investment grade bonds to include mechanisms designed to control credit risk, including covenants (e.g., setting a minimum level for the cash flow to interest payments ratio, below which a default is triggered) and sinking funds (i.e., the mandatory repurchase by the issuer of fixed amounts of outstanding bonds at regular intervals).

Bank loans are sufficiently different from investment grade and high yield bonds that they constitute, in our opinion, a distinct asset class. Because investment grade issuers can often borrow more cheaply by issuing bonds than by getting a loan, banks' portfolios today contain many loans to speculative grade companies. However, the credit risk on these loans is much lower than the risk on high yield bonds. First, covenants on bank loans are typically more numerous, more strict, and more aggressively managed by the lender. Second, bank loans are often collateralized, and usually senior securities in the issuer's capital structure. Third, bank loans usually carry floating rather than fixed rates. Of course, this latter feature implicitly carries with it a trade-off between duration risk and credit risk. For example, in a rising interest rate environment, a company with a floating rate loan may find itself struggling to pay before one whose debt is at a lower fixed rate. However, this risk is substantially

mitigated by the bank's relatively aggressive management of credit risk, and the relative ease (compared to bonds) with which the terms of a bank loan can be restructured to help a borrower through difficult times. In recent years, bank loans have increasingly been traded on the secondary market, rather than held in banks' portfolios to maturity. This has led to the development of indexes that track returns on these assets. While the data series are still short, and of varying quality, they tell an interesting story. For example, for the ten years ended in March, 2004, the correlation between the total returns on one loan index (the CSFB Leveraged Loan Index, which tracks bank loans to speculative rated borrowers), and the Lehman Brothers Aggregate (a broad measure of U.S. investment grade bonds) was only .21. On the other hand, the correlation with a high yield bond index was much higher, at .71.

Mortgage Bonds and Asset Backed Securities

Broadly speaking, there are two types of mortgage backed bond. In the first type, a pool of mortgage loans is purchased by a securitizing entity, which then issues a bond backed by them. This type of mortgage bond is known as a "pass-through" security because the interest and principal payments received by the mortgage servicing agent are passed through to the bond holders. As previously noted, pass-through mortgage bonds contain not only duration, real return, liquidity, inflation, and credit risk, but also prepayment risk. In some cases, the bonds receive extra credit risk protection in the form of "overcollateralization" (that is, being backed by mortgages with an aggregate face value in excess of the bond's face value) or a guarantee from another entity. For example, in the United States, mortgage backed bonds issued by the Government National Mortgage Association (GNMA) carry the full faith and credit guarantee of the U.S. government, and therefore have minimal credit risk. However, due to the prepayment risk they contain, these GNMA MBS carry higher yields than Treasury Bonds of equivalent duration.

In the early 1980s, it became apparent that a reluctance to take prepayment risk was limiting the growth of the mortgage securities market. Then a (very) colorful genius from Salomon Brothers named Lew Ranieri invented the Collateralized Mortgage Obligation. Rather than simply passing through mortgage payments to bondholders, in a CMO they flow to a company specially set up to receive them. The company now has a pool of cash that can

be used to service not just one, but many different classes of bonds, each of which has different risk characteristics. For example, a CMO might issue one tranche of highly rated, fixed rate senior bonds, that has first call on the cash flows received from the mortgage pool. Below this tier might be another one or two tranches of lower rated subordinated debt. And finally, at the bottom of the pile is what is known as the "equity tranche" (or, more colorfully, the "toxic waste" tranche) that essentially bears most of the mortgage pool's credit and prepayment risk (but which also offers the highest returns for bearing this risk).

The CMO structure proved to be the key to the rapid expansion of the mortgage backed securities market in the United States. Consequently, the same structure has subsequently been used to securitize (that is, convert into different classes of bonds) the cash flows from other pools of loans, including auto loan receivables, credit card receivables, student loans, home equity loans, equipment leases, and, most recently, bank loans (in so called "Collateralized Debt Obligations, or CDO's).

Credit derivative instruments have also been used in combination with the CMO structure to create what are known as "Synthetic CDO's". In this case, the special purpose entity (a) issues multiple tranches of bonds; (b) invests the proceeds in AAA rated bonds, and (c) sells credit default swaps to earn a return above that on the AAA bonds. As long as no payments have to be made under the credit default swaps, everyone makes money. And if payments have to be made, it is the holders of the lower-rated CDO tranches who bear most of the pain. Like we said, in the world of debt, "it's complicated out there."

Guaranteed Investment Contracts and Stable Value Funds

At this point we should also mention guaranteed investment contracts (GICs) and stable value funds, which are two other financially engineered products that are often found in defined contribution pension plans' lists of "fixed income" investment options. Their unique feature (and benefit) is their promise to maintain constant book value (like a very short-term money market fund) for a fixed period of time, even while offering rates of return more comparable to intermediate term bonds along with low correlations with the returns on other asset classes. For example, between 1983 and 2002, the average (nominal) return on the Deutsche Asset Management 5 year GIC index was 8.85% per year, with a standard deviation of just 2.34%.

This compared quite favorably to the average 8.89% return and 4.99% standard deviation over the same period on the Lehman Brothers Intermediate Term Government/Credit Index.

Sounds great, right? Unfortunately, as is the case elsewhere in life, you don't get something for nothing. Technically, a GIC is a type of group annuity contract sold by a life insurance company to a qualified pension plan (which allows the plan to mark its value to market). The contract guarantees a fixed return over a fixed period with no risk to principal. The insurance company that sells it to the pension plan invests the proceeds in a portfolio of debt instruments, and assumes all the risk on them. In exchange, the pension plan pays the life insurance company a fee which covers both the insurance company's administrative costs as well as the cost of the book value insurance. A stable value fund is quite similar. The fund issues shares to investors, and invests the proceeds either in GICs or in a portfolio of high grade bonds. In the latter case, it also purchases an insurance policy (known as a "wrapper") that guarantees the stability of the bonds' value, regardless of changes in market yields.

Given the development of debt derivative markets (which are, in essence, a parallel insurance market), one key question is whether there are cheaper ways (e.g., through purchasing a series of interest rate options) to achieve the same economic benefit promised by a GIC or stable value fund (high returns with stable principle value). However, the more point is that most GIC and stable value fund investors (at least at the plan participant level) probably don't understand that they are also taking credit risk, in the form of the insurance company's ability to make any payments called for under the insurance contract. Unfortunately, the 1990s (ancient history in the minds of too many investors today) saw a number of high profile insurance company defaults, including Executive Life, Mutual Benefit Life, and Confederated Life, which resulted in substantial losses for GIC and stable value investors. The underlying cause of these problems was that, in order to make good on their GIC and stable value promises, these insurance companies made some very risky investments (e.g., in high yield debt). Unfortunately, the same factors that caused these investments to drop in value (rising rates and a declining economy) were also ones that triggered outflows from the stable value funds (and into higher yielding investments) and payments under the insurance wrapper. It was not a good combination. As always, the lesson remains the same: financial engineering can't make risk disappear; all it does it disaggregate it, price it more transparently, and, hopefully, transfer it to the parties who can bear it most efficiently.

Foreign Currency Bonds

As previously noted, these bonds combine either duration, real return, liquidity, inflation, currency and country risk (in the case of foreign government bonds), or all of these plus credit and/or prepayment risk (in the case of foreign currency corporate or mortgage bonds). As we have repeatedly noted in our writing, the great advantage of foreign currency bonds is their low or negative correlations with most countries' domestic equity markets. For example, a recent study by the European Central Bank ("Asymmetric Dynamics in the Correlations of Global Equity and Bond Returns" by Cappiello, Engle, and Sheppard) reached the following conclusion: "Conditional equity correlation[s] among regional [country] groups is found to increase dramatically when bad news hit financial markets. This is an important implication for international investors; diversification sought by investing in multiple markets is likely to be lowest when it is most desirable. However, [we also found that] conditional correlation between equity and bond returns usually declines when stock markets suffer from financial turmoil, an indication of a 'flight to quality phenomenon', where investors move capital from equities to safer assets. In other words, not only is equity-bond correlation typically low, it actually is lower during periods of financial turmoil…[Finally] the lowest correlations we found were typically between equity returns in one country and bond returns in another. This unsurprising yet undocumented observation should provide guidance for investors seeking to maximize diversification."

Emerging Market Bonds

Emerging markets bonds are those that have been issued by so-called "developing" countries. In some cases, these bonds have been issued in U.S. dollars, or another major currency. In a smaller number of cases, the bonds in question have been issued in the country's own currency. In the both cases, the bonds in question are riskier than bonds from developed country issuers. In the case of the dollar denominated emerging markets bonds, there is a higher level of country risk, or willingness to pay. In the case of local currency denominated bonds, there is a higher level of currency risk (e.g., of extreme depreciation caused by high domestic inflation). The root cause of these elevated risk levels is the relatively undeveloped

and unstable nature of political and governmental institutions in these countries and the means they have chosen to finance their development (e.g., external capital versus domestic savings). A recent paper ("Serial Default and the "Paradox" of Rich-to-Poor Capital Flows" by Reinhart and Rogoff) summarized this issue quite well: "Lightning may never strike in the same place, but the same cannot be said of sovereign default. Throughout history, governments have demonstrated that "serial default" is the rule, not the exception. Argentina has famously defaulted on five occasions since its birth in the 1820's. However, Argentina's record is surpassed by many countries in the New World (Brazil, Mexico, Uruguay, Venezuela, and Ecuador) and by almost as many in the Old World (France, Germany, Portugal, and Turkey)…The all-time post-1500 record holder, however, appears to be Spain, which has clocked a remarkable 13 defaults."

On the other hand, the authors also note that "a smaller and dwindling number of developing countries such as India, Korea, Malaysia, Mauritius, Singapore and Thailand have yet to default, despite being tested by severe turmoil, including the Asian crisis of the late 1990's…The fact that sovereign defaults tend to recur like clockwork in some countries, while being absent in others, suggests that there must be a significant explanation."

In a related paper ("Debt Intolerance", by Reinhart, Rogoff, and Savastano), the authors provide their view on what this explanation entails: "History matters: a country's record at meeting its debt obligations and managing its macroeconomy in the past is relevant to forecasting its ability to sustain moderate to high levels of indebtedness, both domestic and internal, for many years into the future… "Debt intolerance" (drawing an analogy to, for example, "lactose intolerance") manifests itself in the extreme duress many emerging market economies experience at overall debt levels that would seem quite manageable by the standards of the advanced industrial economies. For external debt, "safe" thresholds for highly debt intolerant emerging markets appear to be surprisingly low, perhaps as low as 15 to 20 percent of GNP in many cases [the level in several non-defaulting countries], and these thresholds depend heavily on the country's record of default and inflation. Debt intolerance is indeed intimately linked to the pervasive phenomenon of serial default that has plagued so many countries over the past two centuries. Debt intolerant countries tend to have weak fiscal structures and weak financial systems. Default often exacerbates these problems, making these same countries more prone to future default…A country's current level of debt

intolerance can be approximated empirically as the ratio of the long-term average of its external debt (scaled by GNP or exports) to an index of default risk."

[While] "other factors, such as the degree of dollarization, indexation to inflation or short-term interest rates, and the maturity structure of a country's debt, are also relevant to assessing a country's vulnerability to symptoms of debt intolerance… these factors are different manifestations of the same underlying institutional weaknesses. Indeed, unless these weaknesses are addressed, the notion that the "original sin" of serial defaulters can be extinguished through some stroke of financial engineering, allowing these countries to borrow in the same amounts, relative to GNP, as more advanced economies, much less at the same interest rates, is sheer folly." Considering that the most widely used emerging markets bond index recently assigned quite high weights to some countries with less than sterling track records (e.g., Brazil, 20%; Mexico, 13%; Russia, 13%, Turkey, 7%, Philippines, 5%, and Venezuela 5%), the same might be said of those investors who blindly plunge into the emerging markets debt market in search of high yields, without considering the many risks involved.

The Size and Structure of the Debt Market

Armed with a better understanding of the risks and instruments that make it up, the next logical question to ask is, "So how big is the debt market?" Surprisingly, that is not an easy question to answer. Unlike the equity markets, bonds and loans are not traded on a central exchange. Moreover, the requirements for reporting over-the-counter trades are uneven, as is compliance with them. Last but not least, there are many more bonds and loans outstanding than there are equities, of which many are relatively small in size and infrequently traded. And to top things off, their cash flow profiles are constantly changing, due to interest payments, calls, defaults and the like. The bottom line is that any estimate of the size of the debt market contains not a little uncertainty.

So then, how big is it, more or less? The most recent estimate of the size of the global bond market comes from the Bank for International Settlements. As of June, 2004, they estimated its size at U.S. $64.6 trillion, or about twice the size of global GDP and the combined market value of the world's equity markets. The BIS characterizes the market's

major issuer segments as governments (41%), financial institutions (including mortgage bonds and collateralized bonds) (47%), and corporates (12%). Estimates of the size of the loan market are even more difficult to make. While the global banking assets were reported (by the IMF) to be worth $40.6 trillion in 2002, there is some double counting as banks hold debt securities in their portfolios as well as loans.

Another recent estimate by the Bond Market Association looked at the relative size of different segments of the U.S. bond market. It is also interesting:

Municipal Bonds	8.7%
U.S. Treasury Bonds	16.5%
Federal Agency Bonds	12.1%
Mortgage Related Bonds	23.4%
Corporate Bonds	19.9%
Asset Backed Bonds	7.8%
Money Market Instruments/Bonds Within One Year of Maturity	11.7%
Total ($23.1 Trillion)	100.0%

The breakdown of the asset-backed securities based on the underlying collateral was also interesting:

Home Equity Loans	24.1%
Credit Card Loans	21.8%
Collateralized Debt Obligations	14.5%
Auto Loans	12.9%
Student Loans	6.3%
Equipment Leases	3.9%
Manufactured Housing Receivables	2.5%
All Others	14.0%
Total	100.0%

As we have previously noted, based on our assessment of the underlying return generating processes as well as historical correlations of returns, there are at least six different asset classes within the overall debt market. These include (1) real return bonds; (2) domestic investment grade bonds; (3) domestic high yield bonds; (4) bank loans; (5) foreign currency bonds; and (6) emerging markets bonds.

Bond Indexing

Let's now move on to a look at index investing in the debt markets. We'll begin with a discussion of the issues related to the construction of bond indexes. As we have already noted, just the data management challenge involved is enormous, given the size and fragmented nature of the market. However, given the ever-growing number of bond indexes available, it is a challenge that more than a few firms are ready to meet. However, bond indexing also raises some even more fundamental issues.

In general, financial market indexes are constructed with one or two goals in mind. The first is to measure the amount of economic value being created (or destroyed) in a given asset class. The second is to provide a benchmark for measuring the performance of active investment managers. With respect to both goals, one question is how many bonds must be included in an index to provide an accurate basis for measuring either asset class value creation or the performance of active managers. The relatively high level of systematic to issuer-specific risk (at least in the investment grade segment of the market) already mentioned in this article suggests that relatively few bonds need to be included in an index to estimate asset class value changes with reasonable accuracy. Moreover, limiting the number of bonds included in the index to large, liquid issues (which, theoretically, would be easy to replicate in an index fund) also makes any performance comparisons more realistic.

In practice, this is a major point of distinction between the producers of bond indexes. For example, in its InvesTop Index (which covers investment grade U.S. corporate bonds), Goldman Sachs includes just 100 bonds, while the Dow Jones Corporate Bond Index includes just 96. At the other extreme, the Lehman Brothers Aggregate Bond Index, which tracks the performance of investment grade U.S. bonds (including corporates, governments, agencies, mortgages, and asset backed bonds) includes over 5,000 bonds (but still captures well under half the total capitalization of the U.S. bond market). By definition, including this many bonds in an index forces any fund trying to track it to use a sampling strategy rather than outright replication. However, doing this almost certainly results in higher tracking error (i.e., deviation of fund performance from the index it is trying to track).

A closely related issue in an index that contains many bonds is the accuracy of the prices that are used to calculate index returns. With a smaller number of highly liquid issues,

there is higher confidence in the prices used, and thus in the index returns and in any conclusions that are drawn from them.

Another important issue is whether the bonds included in an index should be weighted by market capitalization, or by some other scheme (e.g., equal weighting, or, for global indexes, by the relative size of each country's bond market or gross domestic product). Market capitalization weighting is most commonly used in equity indexes, so it is a good place to start. For example, consider the case of market with two issuers (A and B) and two bonds. Assume they mature in ten years, and have a 5% coupon and a 5% yield. Their present value is equal to their face value of $1,000, and the index value is equal to $2,000. Now assume that a year later, the yield on company B's bonds rises to 6.0% due to an increase in the perceived riskiness of the issuer. This causes the bond's market value to fall to about $932 dollars, and the value of the index to fall to $1,932. So far, so good -- market capitalization weighting appears to capture the change in economic value that has happened in our small bond market. Now let's further assume that both of our two issuers decide to expand their businesses. However, company A decides to finance this by selling $1,000 worth of stock, while company B issues $1,000 worth of 10 year, 6% coupon bonds (since their coupon is equal to the current yield on B's bonds, their present value is also $1,000). However, because company A now has relatively more equity in its capital structure, it is perceived to be less risky, so the yield on its bonds falls to 4%, and their value rises to $1,074. The net impact of these changes causes the total market capitalization of our little bond market to rise to $3,006.

Meanwhile, let's take a look at what's happened in the equity market. Assume both companies started with revenue of $100, operating expense of $10 (hey, they're profitable businesses!), and interest expense (which is based on the coupon rate) of $50 each. This means they both have cash profits of $40. However, since company B is perceived to be slightly more risky, its cost of equity is 11%, versus only 10% at company A. At the end of the first year, the market value of A is ($40/10%) or $400, and B is ($40/11%) or $364. Our equity index is worth $764. Now let's look at the end of year two. Assume their respective expansions have doubled revenues and costs at both companies. However, because A financed its expansion with equity, its interest expense is still $50. Its profit is therefore $200-$20-$50 = $130. At its 10% cost of equity, this results in a market value of $1,300, or an

increase of 225%. Now consider the situation over at company B. Because of its rising debt costs, its profits are lower: $200-$20-$110 = $70. Moreover, because of its rising debt levels, its equity investors perceive it to be riskier, and require a 12% return. The value of its equity is therefore ($70/12%) = $583. Over the year, the market value of its equity increased by 60%. At the end of the year, the overall equity index had increased from $764 to $1,883, or by 147%.

Now let's ask a simple question: what has happened to our bond and equity market indexes? In the equity market, the answer is easy: the company that has created the most value has increased its weight in the index. If I am an investor in a fund that tracks this index, I consider this performance satisfying. If I am an active manager whose performance is measured against the index, I probably consider it a fair benchmark.

However, in the bond market the answer isn't so clear-cut. In this case, the company that is perceived to be riskier now accounts for a greater share of the index. As an investor in a bond index fund, I'm not sure I'm comfortable with this result. On the other hand, as an active manager, I might not complain too much, assuming I had over-weighted company A's bonds over the past year.

Unfortunately, this is not just a theoretical exercise. Consider two examples: since the early 1990s, the sector weights in the Lehman Brothers Aggregate Bond Index have shifted quite dramatically, with Treasury Bonds declining, and mortgage and corporate bonds increasing their shares. As a result the index has become riskier overall. Similarly, the past decade has also seen a dramatic change in the country composition of global bond indexes. The U.S. share has declined (thanks to those current account surpluses in the late 1990s) while the Japanese share has risen as that country issued debt to finance government spending in an attempt to get the economy out of its prolonged deflation. In other words, investors in market cap weighted global bond indexes found their exposure to Japan increasing at the very time that its credit quality was declining, while just the opposite was happening with respect to their exposure to U.S. Treasuries (or, more recently, to their exposure to Canadian and Australian Treasuries).

At this point, somebody will ask whether the same thing didn't happen to the weight of technology stocks in equity indexes during the internet boom. In our opinion, there is an important difference between the two situations. One can make an argument that the high

values of internet companies reflected not irrationality (or at least not just irrationality), but genuine uncertainty about the eventual economic impact of the new technologies they were bringing to market. As these uncertainties were resolved, equity values fell (aided no doubt, by a switch in emotional orientation from greed to fear). This is just the opposite of the argument for why Microsoft's market capitalization remained small in its early years -- investors just didn't realize the amount of value its business model eventually would create. In contrast, can anyone claim that Japan's growing weight in market capitalization-weighted indexes reflected investor uncertainty or irrationality?

From our perspective, it seems clear that market capitalization weighting works best in the case of residual claims like equity; when the claims are fixed in nature, market capitalization weighting has some pretty clear drawbacks.

What then, are the alternatives to it? Basically, there are two: equal weighting, and, in the case of international indexes, weighting based on relative shares of world gross domestic product.

As previously noted, both the Goldman Sachs InvestTop Index (which is the basis for the LQD exchange traded fund) and the Dow Jones Corporate Bond Index use equal weighting. The latter offers a further advantage, in that it is constructed as a yield curve, which facilitates the consistent comparison of the risk/reward ratios of corporate versus government bonds. If applied to a broader spectrum of the bond market, it seems to us that this type of indexing approach would do a superior job of measuring changes in economic value creation for different combinations of duration and other types of risk. For this reason, it might be more attractive to bond index investors, and if not always more acceptable to them (because it raises the bar), at least a more accurate basis for evaluating active managers' performance.

Let's now look at how GDP weighting would change international index weights. The following table shows the shares of five key countries, plus the Eurozone, in world GDP (as measured by the IMF), world equity market capitalization (as measured by the Standard and Poor's Citigroup Broad Market Index), world bond market capitalization (as measured by the BIS), and in two major global bond indexes: the MSCI World Sovereign Bond Index and the Lehman Brothers Global Aggregate Index (which includes only investment grade debt.

	Pct of GDP	Pct of Equity Market Cap	Pct of Debt Mkt Cap (1)	Pct of MSCI World Sovereign Index	Pct of Lehman Brothers Global Aggregate (1)
Australia	1.6%	2.2%	0.6%	0.4%	0.4%
Canada	2.7%	3.0%	1.2%	1.9%	1.9%
Eurozone	25.4%	13.9%	21.0%	41.2%	31.7%
Japan	13.3%	9.2%	13.7%	28.8%	18.1%
UK	5.6%	10.1%	3.5%	4.9%	4.7%
USA	34.1%	50.2%	35.4%	19.8%	40.6%
Total	*82.8%*	*88.7%*	*75.3%*	*96.9%*	*97.4%*

(1) by currency

As you can see, there are some significant differences between the six areas' weightings on different criteria. First, by comparing an area's weighting on debt and equity, you can see how the preferred financing approach differs around the world. In broad terms, equity is the preferred vehicle in the Anglosphere, while debt is preferred elsewhere. Second, you can see that the debt market weightings used in the two bond indexes differ from the weights calculated by the BIS. This is because the two indexes leave out important segments of the world's debt markets. To varying degrees, these are covered by other indexes, including tax-advantaged municipal government bonds (in the U.S.), real return bonds, high yield bonds, and emerging markets bonds. You can also see the size of the "Japan problem", which is most significant in the Sovereign Bond Index. Similarly, the relative importance of different bond market segments (e.g., government versus non-government) in different countries is apparent from a comparison of the Sovereign Bond to the Global Aggregate Index. Non-government bonds (including high yield bonds) play a much larger role in the U.S. bond market than they do elsewhere. Finally, you can see the potential impact of a switch to global GDP weighting, which would significantly reduce Japan's weight in a bond index, and increase Australia's and Canada's weights.

Should You Be an Index Investor in Debt Markets?

The problems we have just described raise a logical question: should you be an passive investor in debt markets, or should you take an active approach? Let's look at the arguments on both sides of this issue.

First, we need to clarify what we mean by passive bond investing. Broadly speaking, this can take two forms: either investing in a bond index fund, or managing your own "bond ladder." This involves buying bonds of different durations, and then over time reinvesting the proceeds of maturing bonds into new bonds with long duration. Most often, this is done with high quality municipal (tax advantaged) or federal government bonds, so that the investor can minimize transaction costs and avoid having to actively manage credit quality issues.

Regardless of the passive approach taken, there are good arguments against active bond management. To begin with, we need to distinguish between taking a tilt within a given bond asset class (e.g., giving relatively more weight to corporate bonds than they have in a broad index) and genuine active management skill. In an efficient market, taking a permanent tilt away from a broad index should produce either more return with more risk than the index, or less return with less risk. True active management skill would involve some combination of keeping the same segment weights as the broad index (e.g., in governments, mortgages, corporates and asset-backed securities), but earning higher returns due to superior bond selection within these segments (e.g., due to better understanding of credit or prepayment risk), or, alternatively, tactically changing segment weights.

However, as previously noted, the inescapable fact is that the great majority of investment grade bond returns are due to systematic interest rate risk -- that is, they are due to changes in the level or shape of the government yield curve. Consequently, the potential gains from successful active management are small relative to what the additional active risk taken on can produce in other asset classes. These potential gains look even smaller after taking into account the additional costs (in the form of annual expense charges and front-end sales loads) that are charged by actively managed funds. Moreover, studies have shown that bond fund managers' ability to accurately forecast interest rate changes is not good. This causes a substantial percentage of active managers to underperform (even poorly structured)

indexes (see, for example, "The Timing Ability of Fixed Income Mutual Funds" by Chen, Ferson and Peters, and "Evaluating Government Bond Fund Performance with Stochastic Discount Factors" by Ferson, Henry and Kisgen).

Now let's look at the arguments against passive bond investing. The first is the poor quality the underlying market capitalization based indexes tracked by many bond index funds. Second, there are some very well known active bond managers, who have been able to sustain superior performance even as their funds have grown in size. Consider the following table, which compares the five year performance of Vanguard's actively managed investment grade bond funds to the performance of its index funds (which track the Lehman Government/Credit Short, Intermediate, and Long-Term Indexes). We have also included PIMCO's Total Return Fund, one of the best of the large actively managed bond funds, as well as the Vanguard index fund that tracks the broad Lehman Brothers Aggregate Bond Index:

Short Term Funds
Five Years Ended November, 2004

	Index Fund (VBISX)	Active Fund (VFSTX)
Average Annual Return	5.65%	5.48%
Standard Deviation	2.58%	2.17%
Return/Risk	2.19	2.53
Expense Ratio	.20%	.21%

Intermediate Term Funds
Five Years Ended November, 2004

	Index Fund (VBIIX)	Active Fund (VFICX)	Aggregate Index Fund (VBMFX)	PIMCO Total Return (PTTDX)*
Average Annual Return	8.23%	7.90%	6.92%	7.85%
Standard Deviation	6.08%	5.06%	4.15%	4.52%
Return/Risk	1.35	1.56	1.67	1.74
Expense Ratio	.20%	.20%	.22%	.75%

· The "D" shares do not have a sales load

Long Term Funds
Five Years Ended November, 2004

	Index Fund (VBLTX)	Active Fund (VWESX)
Average Annual Return	9.69%	9.14%
Standard Deviation	9.48%	9.09%
Return/Risk	1.02	1.01
Expense Ratio	.20%	.28%

These tables make three important points. First, it is clear that active manager's true advantage seems to lie in the area of controlling risk rather than forecasting returns. This is evidenced by the fact that even though their returns aren't all that different from the corresponding index funds', their standard deviations are significantly lower. It is also consistent with our previous criticism of market capitalization weighted bond indexes. Second, this ability to reduce standard deviation seems to be maximized at intermediate durations; it is much smaller in the short and long-duration funds. Third, despite the apparent advantages of active management in different duration categories, you still have to admit that the performance of the broadest index fund (VBMFX) looks pretty darned good.

Our final argument against debt market indexing is a practical one: for whatever reason, few, if any index funds exist in some key segments of the debt market, including real return bonds, foreign currency bonds, bank loans, high yield bonds, and emerging markets bonds.

So Where Do We Stand?

Based on our analysis, we have come to the following conclusions:

1. We believe that a number of different debt market asset classes should be considered in any asset allocation analysis. These include real return bonds, domestic investment grade bonds, foreign currency bonds, and bank loans. We will incorporate bank loans into our biannual asset allocation review later this year.

2. Assuming an investor finds the underlying credit risk of the wrap provider acceptable, a stable value fund can substitute for an allocation to domestic investment grade bonds.

3. We also believe that the weight of evidence supports a tilt toward intermediate duration bonds within the domestic investment grade and foreign currency bonds' asset classes.

4. We do not believe that an investment in either high yield bonds or emerging markets bonds makes sense for most investors' portfolios. While both asset classes appear attractive in terms of expected returns and standard deviations, the data series upon which these statistics are based are quite short. In addition the distribution of returns for both asset classes is far from normal. In both cases, an investor has a significantly higher than normal chance of realizing large negative returns (a risk that is not captured by standard deviation, but rather by statistical measures of skewness and kurtosis). We recognize that if an investor's objective is to outperform a benchmark over a one year time horizon this may not matter too much (e.g., this would be the case for an investment manager whose performance is evaluated annually by his or her clients). However, for an investor whose time horizon stretches over many years (i.e., an investor whose goal is to achieve the minimum compound annual return needed to fund her long-term liabilities), this elevated level of "extreme event risk" is an important consideration when determining a portfolio's asset allocation. A substantial loss early in the time horizon can materially reduce the probability of achieving the long-term portfolio return target. For this reason, we have not included high yield or emerging markets bonds in our long-term target real return portfolios.

5. On the issue of passive versus active implementation of portfolio allocations to debt asset classes, we recognize that the arguments for active management, particularly of intermediate duration funds, appear to be stronger than they are in the case of equities. Still, it is a very close call, and an active fund's costs are critical. In our model portfolios, we'll be sticking with VBMFX. We also believe that the future introduction of better bond indexes and new products based on these new indexes will weaken the argument for active management (as evidenced by the success of the LQD ETF which tracks the

equally weighted Goldman Sachs InvestTop Index). However, given the current absence of such indexes in key segments of the debt market (e.g., foreign currency bonds, bank loans), we will continue to search for and use some high quality actively managed funds in our model portfolios.

Financial Humor from Hesh

With the Valentine's Day approaching some of our readers have inquired if we could recommend an appropriate gift (i.e., an antique, art work, a collectable) that would increase in value over time and also be agood alternative to their current portfolio of assets. Initially we were very reluctant to respond. Obviously this is not our area of expertise. However, our humorist Hesh Reinfeld said that his family has had much success in this asset class and that he would be happy to share his insights with our readers. Enjoy.

The Ultimate Collectible: Sign-In Sheets

Dad was a collector. Mom said it was all junk. Sotheby was about to prove dad right and mom wrong.

My Dad was definitely not an entrepreneur. True he had worked for Donald Trump and Donald knew my dad by his first name, but that was only because dad worked the security desk in Trump Towers. Sir Donald would say hello every morning. (He really is a nice guy.)

All of my relatives used to ask dad if he ever got any stock market advice from Donald. No, my dad was content with his job. It was steady and he got home at 5.30 every evening.

Looking back, I can't even say that dad had a knack for collecting the right stuff when he was younger. Sure as a kid, he collected bottle caps and baseball cards and as a teenager, 45 records and Miss NY subway posters but they never were worth much. And for grandma, it was just more junk in their Bronx apartment.

One night dad brought home an autograph of Barbara Streisand. Actually I would not call it an autograph. It was the sign-in sheet from Trump Towers. Barbara had visited Sir Donald and, as was the requirement, she had signed in at the front desk. Dad decided to show it off to his brother in law, my uncle Bernie. There definitely were a number of oows and

ahhs from the relatives but it still could not compete with the SAT scores my cousins were announcing at the Sabbath dinner table.

One of dad's few business accomplishments was that he organized the union of doorman and maintenance workers at New York's fanciest buildings. Soon dad's colleagues were sending him their sign-in sheets. Didn't anyone ever ask where the old sign sheets were? No, they just seemed to collect in basement file cabinets through out the city. Well dad started collecting them. The only problem was that his pals would give him five cartons of sign-in sheets and tell him that somewhere inside were the autographs of the Beatles when they entered the CBS studio to perform on the Ed Sullivan show.

So the stuff started collecting in our house, not only in the basement but also in every room, including the bathroom. My job and my brother's were to diligently go through the papers and catalogue the famous signatures (and my wife wants to know why we both became accountants).

As security increased in every venue of the country, my dad's collection grew. He started developing special market niches. His favorite, as a New Yorker, was the sign-in sheet from the final game the Dodgers played in Ebbets Field in 1957. Each player had to return the five towels he had received at the beginning of the season or pays a fine of $2.25 per towel. Looks like Mr. O'Malley collected an additional $25 dollars and change.

After dad retired from Trump Towers, he became an expert in the value of the sign-in sheet as a method of tracing the history of our country. One of his pride achievements was obtaining for the Library of Congress a collection of sign in sheets utilized by the White House commissary. Each U.S. President was asked to sign in at the beginning of his term of office and sign out upon his completion four years later. It had actually evolved from a cost cutting practice of President Polk. (He required his personal signature on all deliveries over five dollars to the White House.) Dad had the August 1974 sign-in sheet where Richard Nixon had signed out at 11.58 am and Gerald Ford had signed in at 12:02 pm. Nixon had left a message next to his signature, "I am not a crook."

Dad's collection was the next item up for bid. I had just returned by limo from an interview on the Today Show. Mom was on Letterman the night before. My brother, of course, was holding out for Saturday Night Live. The auctioneer knew his business. He had

incased dad's memorabilia under some type of bulletproof glass, and had an inert gas blown in. The frame looked like it had last hugged the Mona Lisa.

"Ladies and gentleman, please take a look at the close circuit TV's through out the ballroom. The camera will focus on the famous signatures before you." No need to squint, the camera had blown it up ten-fold. There were the signatures of the astronauts of Apollo 13 on the sign-in sheet used just before they entered the Apollo spacecraft. The bidding started at $2500 and quickly shot up to $25,000. The final bid at $37,250 was from a sci-fi crazed rock star.

My favorite was next. Dad had also become an expert in deciphering handwriting. He had testified under oath that Marilyn Monroe had actually signed in and out of the White House one evening in 1962 using the name Marcia Muscovitz. Would you believe this signature brought in more money then Monroe's sequined dress that she wore when she sang "Happy Birthday, Mr. President."

My dad had stated in his will that each grandchild equally share in the proceeds of the Sotheby auction. My Wharton MBA daughter had already committed her inheritance to continue her grandpa's obsession, except within a 21st century paradigm. (She wrote a business plan and is actively seeking angel investors if you are interested). Think about this. When you call your credit card company, or just about any business, a voice tells you that your call may be recorded for quality assurance. That's right, she has first option on purchasing all the tapes. So don't forget to speak clearly. Your inane question is being captured for an eternity.

Hesh1@comcast.net

Model Portfolios Year-to-Date Nominal Returns

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

1. The target annual income an investor wants her or his portfolio to produce, expressed as a percentage of the starting capital. There are eight options for this input, ranging from 3 to 10 percent.
2. The investor's desired savings and/or bequest goal. This is defined as the multiple of starting capital that one wants to end up with at the end of the chosen expected life. There are five options for this input, ranging from zero (effectively equivalent to converting one's starting capital into a self-managed annuity) to two.
3. The investor's expected remaining years of life. There are nine possible values for this input, ranging from 10 to 50 years.

We use a simulation optimization process to produce our model portfolio solutions. A detailed explanation of this methodology can be found on our website. To briefly summarize its key points, in order to limit the impact of estimation error, our assumptions about future asset class rates of return, risk, and correlation are based on a combination of historical data (from 1971 to 2002) and the outputs of a forward looking asset pricing model. For the same reason, we also constrain the maximum weight that can be given to certain asset classes in a portfolio. These maximums include 20% for foreign bonds and foreign equities, and 10% each for commercial property, commodities, and emerging markets equities. There are no limits on the weight that can be given to real return and domestic bonds, and to domestic equities.

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

portfolio. And (d) the probability that the solution will achieve the specified income and savings/bequest goals over the specified time frame.

The following tables show how asset allocations with different target compound annual rate of return objectives have performed year-to-date:

	YTD 31Dec04	Weight	Weighted Return
	In US$		In US$
7% Target Real Return	*YTD Returns are Nominal*		
Asset Classes			
Real Return Bonds	8.3%	0%	**0.0%**
U.S. Bonds	4.2%	0%	**0.0%**
Non-U.S. Bonds	11.4%	20%	**2.3%**
Commercial Property	30.7%	10%	**3.1%**
Commodities	15.8%	10%	**1.6%**
U.S. Equity	12.5%	50%	**6.3%**
Foreign Equity (EAFE)	20.2%	0%	**0.0%**
Emerging Mkt. Equity	26.1%	10%	**2.6%**
		100%	**15.8%**

.

	YTD 31Dec04	Weight	Weighted Return
	In US$		In US$
6% Target Real Return	*YTD Returns are Nominal*		
Asset Classes			
Real Return Bonds	8.3%	0%	**0.0%**
U.S. Bonds	4.2%	0%	**0.0%**
Non-U.S. Bonds	11.4%	20%	**2.3%**
Commercial Property	30.7%	10%	**3.1%**
Commodities	15.8%	10%	**1.6%**
U.S. Equity	12.5%	45%	**5.6%**
Foreign Equity (EAFE)	20.2%	5%	**1.0%**
Emerging Mkt. Equity	26.1%	10%	**2.6%**
		100%	**16.2%**

.

	YTD 31Dec04	Weight	Weighted Return
	In US$		In US$
5% Target Real Return	*YTD Returns are Nominal*		
Asset Classes			
Real Return Bonds	8.3%	0%	**0.0%**
U.S. Bonds	4.2%	0%	**0.0%**
Non-U.S. Bonds	11.4%	20%	**2.3%**
Commercial Property	30.7%	10%	**3.1%**
Commodities	15.8%	10%	**1.6%**
U.S. Equity	12.5%	30%	**3.8%**
Foreign Equity (EAFE)	20.2%	20%	**4.0%**
Emerging Mkt. Equity	26.1%	10%	**2.6%**
		100%	**17.3%**

.

	YTD 31Dec04	Weight	Weighted Return
	In US$		In US$
4% Target Real Return	*YTD Returns are Nominal*		
Asset Classes			
Real Return Bonds	8.3%	5%	**0.4%**
U.S. Bonds	4.2%	35%	**1.5%**
Non-U.S. Bonds	11.4%	20%	**2.3%**
Commercial Property	30.7%	10%	**3.1%**
Commodities	15.8%	10%	**1.6%**
U.S. Equity	12.5%	5%	**0.6%**
Foreign Equity (EAFE)	20.2%	10%	**2.0%**
Emerging Mkt. Equity	26.1%	5%	**1.3%**
		100%	**12.8%**

.

	YTD 31Dec04	Weight	Weighted Return
	In US$		In US$
3% Target Real Return	*YTD Returns are Nominal*		
Asset Classes			
Real Return Bonds	8.3%	75%	**6.2%**
U.S. Bonds	4.2%	0%	**0.0%**
Non-U.S. Bonds	11.4%	10%	**1.1%**
Commercial Property	30.7%	10%	**3.1%**
Commodities	15.8%	5%	**0.8%**
U.S. Equity	12.5%	0%	**0.0%**
Foreign Equity (EAFE)	20.2%	0%	**0.0%**
Emerging Mkt. Equity	26.1%	0%	**0.0%**
		100%	**11.2%**

.

	YTD 31Dec04	Weight	Weighted Return
	In US$		In US$
2% Target Real Return	*YTD Returns are Nominal*		
Asset Classes			
Real Return Bonds	8.3%	85%	**7.1%**
U.S. Bonds	4.2%	0%	**0.0%**
Non-U.S. Bonds	11.4%	10%	**1.1%**
Commercial Property	30.7%	5%	**1.5%**
Commodities	15.8%	0%	**0.0%**
U.S. Equity	12.5%	0%	**0.0%**
Foreign Equity (EAFE)	20.2%	0%	**0.0%**
Emerging Mkt. Equity	26.1%	0%	**0.0%**
		100%	**9.7%**