MERCER

Consulting. Outsourcing. Investments.

MARSH MERCER KROLL
GUY CARPENTER OLIVER WYMAN

May 28, 2008

Investment Topics
Ohio Bureau of Workers' Compensation (BWC)

Kristin Finney-Cooke
Guy M. Cooper
Kweku Obed

Agenda

1. **Fixed Income**

2. **Asset and Liability Matching – Discussion of basic concepts**

3. **U.S. Equity**
   - Active Management Styles

4.. **Non U.S. Equity**
   - International and Emerging Markets

5. **Active vs. Passive Management**

6. **Diversification – Correlation**

Fixed Income

Important Characteristics of a Bond

- Bonds provide income while stocks provide capital gains.
- The income offered by bonds is the ‘bird in the hand’ while the capital gains offered by stocks is the ‘two in the bush’.
- When you invest in bonds, you expect that most of what you will earn is the promised interest payment. Stocks do pay dividends but they are not ‘guaranteed’, and dividends are not generally an important part of what you earn when you invest in stocks.
- There are risks to the promised interest income payment of bonds. These include:
  - Credit risk – the risk that interest payments will not be made
  - Inflation risk – the risk that, although interest is paid, it is worth less because prices have gone up
  - Re-investment rate risk – the risk that when interest is received there are not good alternatives for re-investing the interest.
- Bond prices also fluctuate and this presents significant risks.

Terminology

- A bond is a loan from a lender to a borrower.
  - The lender is usually called the investor.
  - The borrower may be called the **issuer**.
- As with any loan, the borrower and lender must agree on:
  - **Maturity:** the length of time of the loan before it must be repaid.
  - **Coupon:** the amount of interest the borrower will pay the lender. Originally bond holders physically presented coupons on the semi-annual payment date to receive the interest due to them.
  - **Interest period:** how often the borrower pays interest to the lender. By convention, this is every six months for the most common bonds.
- **Yield:** the yield of a bond is a calculation of the percentage rate of return of the bond. There are actually many ways to compute a bond's yield depending on one's purpose. Common terms are:
  - **Current yield, book yield, yield-to-maturity** and **yield-to-worst**

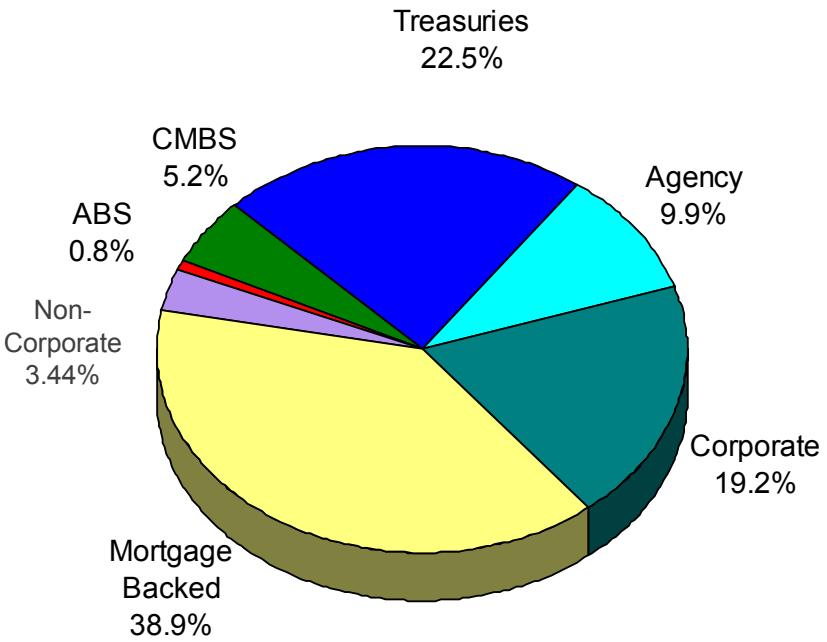
Common Types of Bonds (as classified by type of borrower)

- U.S. Government Bonds
- Corporate Bonds
  - Investment Grade (Typical Credit Quality grades: AAA, AA, A, Baa)
  - Non-Investment Grade (High Yield, Junk, ratings below Baa)
- Mortgages and Mortgage-Backed Securities
- Other Collateralized Instruments
- TIPS
- Yankee Bonds
  - Foreign entities issue bonds payable in US dollars
- Non-Dollar Payees
  - Foreign Governments (Developed and Emerging Countries)
  - Foreign Corporations
- Synthetic Bonds (Futures and Swaps)

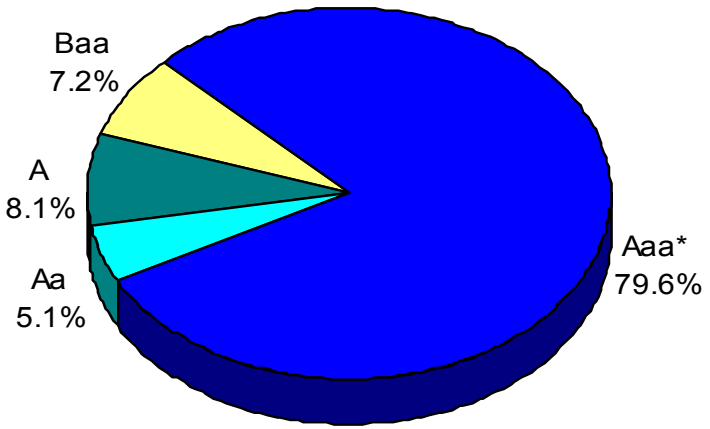
Fixed Income
US Investment Grade Fixed Income Market

Lehman Brothers Aggregate Bond Index
As of March 31, 2008

Sector Breakdown
% Market Value



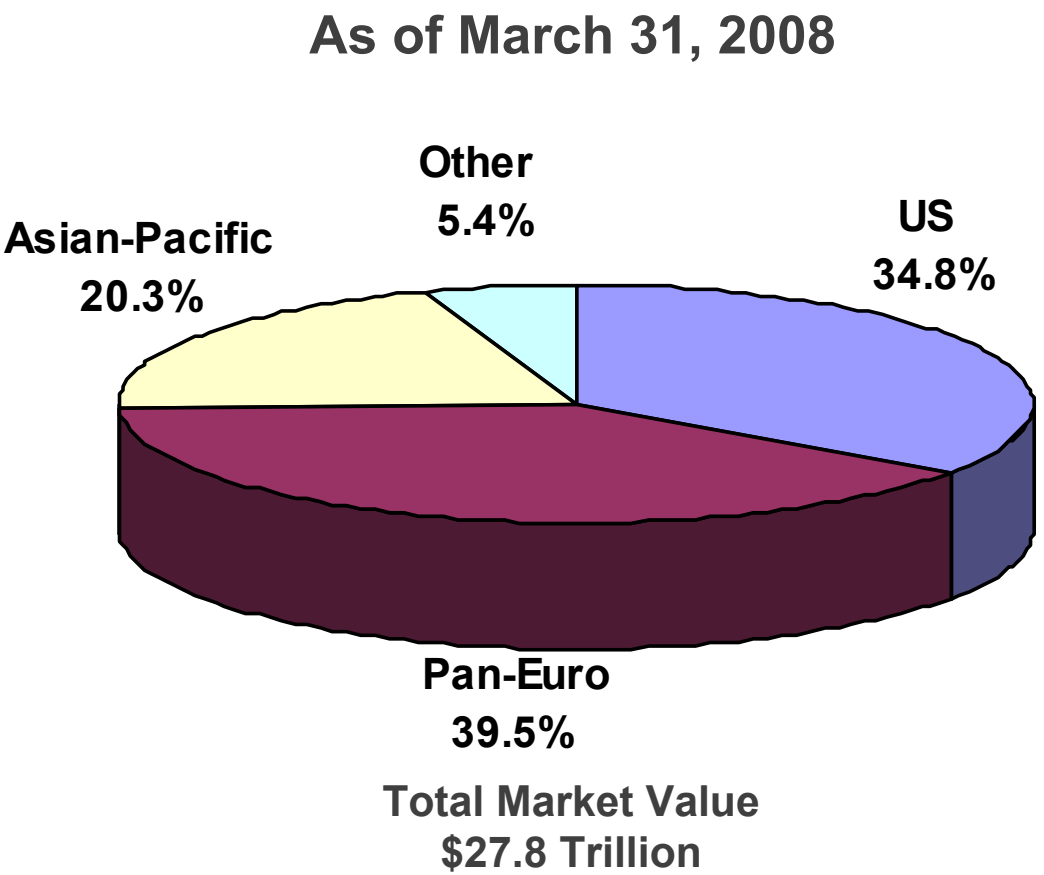
Quality Breakdown
% Market Value



* Aaa includes Treasuries (23.29%), Agency (52.64%) and Credit (3.54%).

Source: Lehman Brothers

Fixed Income
World Bond Market by Sector



*Other includes Eurodollar and Euro-Yen corporate bonds, Canadian government, agency and corporate securities, and USD investment grade 144A securities.

Source: Lehman Brothers

Common Types of Bonds (as classified by length of borrowing)

- Very short (maturity less than 90 days)
- Short (maturity between 90 days and 1 year)
- Intermediate (maturity between 1 and 10 years)
- Long (maturity between 10 and 30 years)

Any length of bond may be associated with any borrower type.

The Value of a Bond – Example

- Suppose the following offer: The U.S. Government offers to pay you $500 every year for 5 years and $10,000 at the end of the 5 years.
- How much would you pay for this?
  - What if the offer was for $500 every year for the next 15 years with $10,000 at the end of the 15 years?
  - What if the offer was $600 every year for 5 years?
  - What if the offer came from a person off the street that you didn't know?

The Value of a Bond – Math

- The price of a bond is determined by a complex mathematical formula.
- Each type of bond may have a different formula, and usually Board members do not need to know the precise formula – computers and spreadsheets suffice for that.
- The formula for determining the price of a bond depends on five quantities:
  1. The coupon paid by the bond
  2. How often the coupon is paid (usually semi-annually)
  3. How long the coupon is going to be paid (i.e. the maturity)
  4. The yield-to-maturity of the bond
  5. Who the issuer is…
- Of these the most important is the yield-to-maturity. It is the only one of the quantities that changes from day to day and after you buy the bond.

Fundamental Theorem of Bond Valuation – Example

- Suppose you buy a 5 year $50,000 Certificate of Deposit from Bank ABC that is paying 5% interest.
- The next week you notice that Bank ABC is offering a 6% interest rate on 5 year Certificates of Deposit?
- If you had to or wanted to sell it, what is your 5% Certificate of Deposit worth?
- What would your 5% Certificate of Deposit be worth, do you think, if Bank ABC was offering only 4% on new Certificates of Deposit?

Fundamental Theorem of Bond Valuation – Math

- The price of a bond moves in the opposite direction to the bond's yield-to-maturity.
- If the bond's yield-to-maturity goes up, the bond's price goes down.
- If the bond's yield-to-maturity goes down, the bond's price goes up.
- A bond's yield-to-maturity is just the interest rate prevailing in the market that investors are willing to accept for that particular type of bond. As these rates change, which they do every minute, the price of the bond changes.
- Thus the value of a portfolio of bonds fluctuates as interest rates fluctuate, rising when interest rates go down, and falling when interest rates go up.

Duration – Common Sense Definitions

- Duration, like maturity, is a measure of the length of time of a bond. Duration is stated in years. It is almost always less than maturity.
- Duration measures the sensitivity of a bond to interest rate changes. Duration determines how much a bond will change in price when interest rates change.
- Facts about Duration:
  - The higher a bond's duration, the greater its sensitivity to a change in interest rates.
  - The higher a bond's duration, the more the bond will fall in price if interest rates go up.
  - The higher a bond's duration the more the price changes as interest rate changes – a form of risk.
  - The lower the duration, the less impact a change in interest rates will have on the value of your bonds.
  - Low (or short) duration can mean less than 3. High (or long) duration means 8-12.

Duration – Math

- Duration provides a useful formula that relates what happens to the price of a bond when interest rates change:
  - Percentage change in bond price = Percentage Point change in Yield times the Duration of the bond.
- Example: A bond with a duration of 5 years will decrease in value by 5% if interest rates rise 1% and increase in value by 5% if interest rates fall 1%.
- Mathematically, duration is the weighted average maturity of a bond's cash flows. But it is more intuitive to think of duration as the link between changes in interest rates and changes in bond prices.
- Duration is stated in years. It is always less than maturity, except for zero coupon bonds, where maturity and duration are the same.

Value of a $100 Bond after Interest Rate Changes

Interest Rates Decline by 1%:		
Asset Duration	5 yrs	10 yrs
Assets	$105	$110
Interest Rates Increase by 1%:		
Asset Duration	5 yrs	10 yrs
Assets	$95	$90

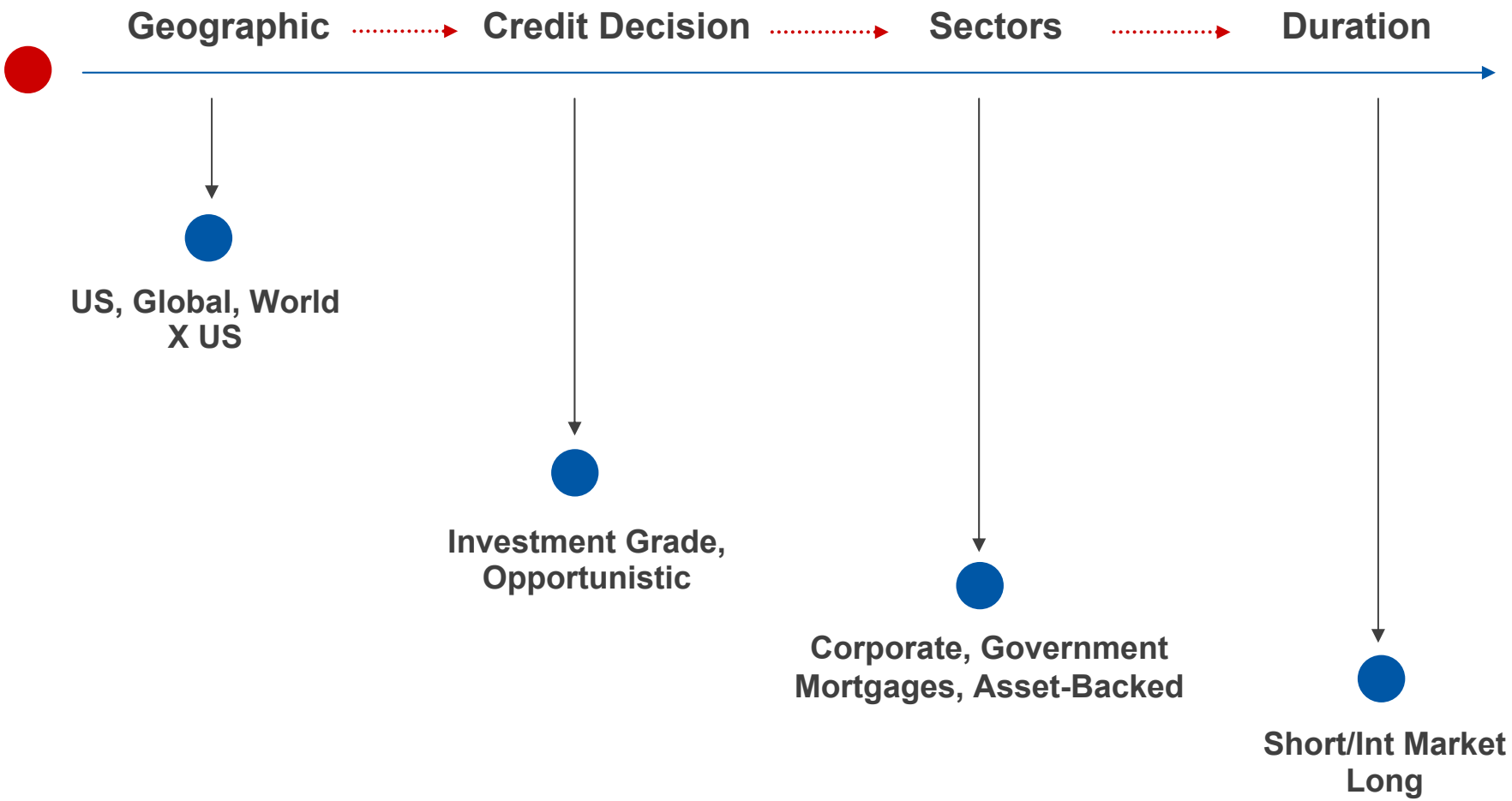
Treasury Inflation Protected Securities (TIPS)

- TIPS can be viewed as a special type of Treasury note or bond that offers protection from inflation.
- Like other Treasuries, these inflation-indexed securities pay interest every six months and pay the principal when the security matures. *The difference is that the coupon payments and underlying principal are automatically increased to compensate for inflation as measured by the consumer price index (CPI).*
- TIPS maintain an investor's real rate of return by guaranteeing their purchasing power.
- TIPS are seen as 'double-safe' investments as they are guaranteed by the US Treasury *and* because they guarantee purchasing power;
- Due to their relative safety, TIPS offer a relatively lower return for investors (in normal market conditions).

Convexity

- Convexity is a term that will be used frequently by investment managers and bond practitioners .
- Convexity refers to a mathematical property of the equation that relates a bond's price to changes interest rates.
- Gives a higher degree of accuracy in the pricing of bonds.
- In the normal course of your duties as a trustee, it is usually not necessary to know what the term convexity means.

Bond Portfolio Management
Choices



The Important role of Credit Analysis

- Since a bond derives its value from the promise of the issuer to pay periodic interest, it is critical to determine whether the issuer is likely to actually make the promised interest and principal payments for the life of the bond.
- Only the United States Government is deemed default free and immune from ever failing to pay the interest and principal that is due to investors in its bonds.
- All other issuers are rated by independent rating agencies on various scales indicating their creditworthiness. A typical scale is AAA, AA, A, and BBB, with BB, B, C, and NR reserved for lower credit rated issuers.
- Investment management firms who invest in bonds also typically have significantly sized staffs devoted to analyzing the creditworthiness of the bond issuers they own or might own.
- Some bonds are backed by collateral – assets specifically pledged to provide security for the promised payments. All mortgages are bonds backed by the collateral of the property the mortgage covers.

Common Portfolio Strategies
Core and Core Plus Strategies

Core Strategy

- A Core Bond strategy will seek both current income and the growth of capital through exposure to US government and corporate investment-grade obligations.

Core Plus Strategy

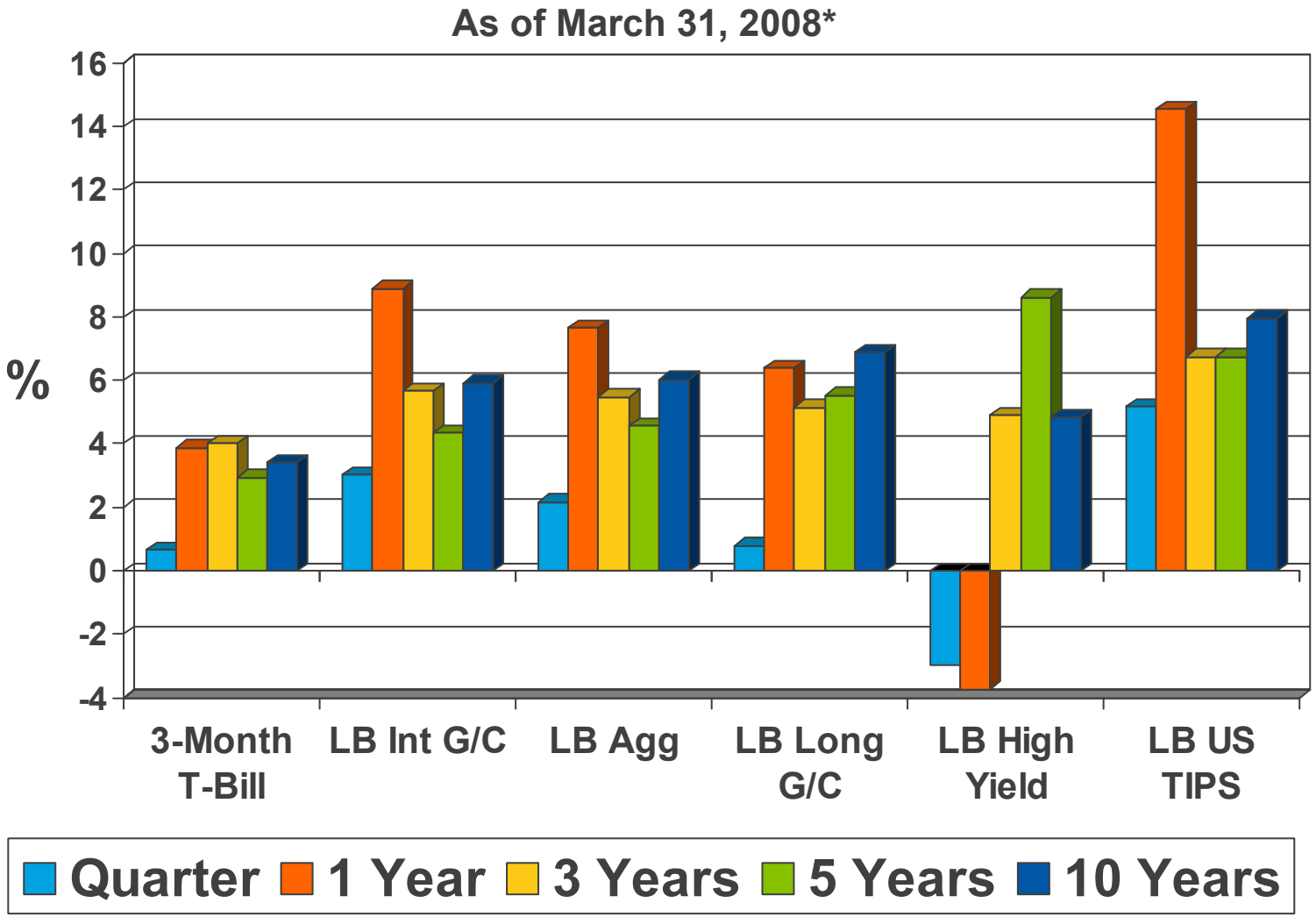
- A Core Plus strategy permits managers to add instruments with greater risk and greater potential return (high-yield, global and emerging market debt, for example) to core portfolios of investment-grade bonds.

Passive Fixed Income Strategies

- A Passive Fixed Income strategy seeks to replicate the characteristics and performance of one or more generally accepted indices of the overall bond market.

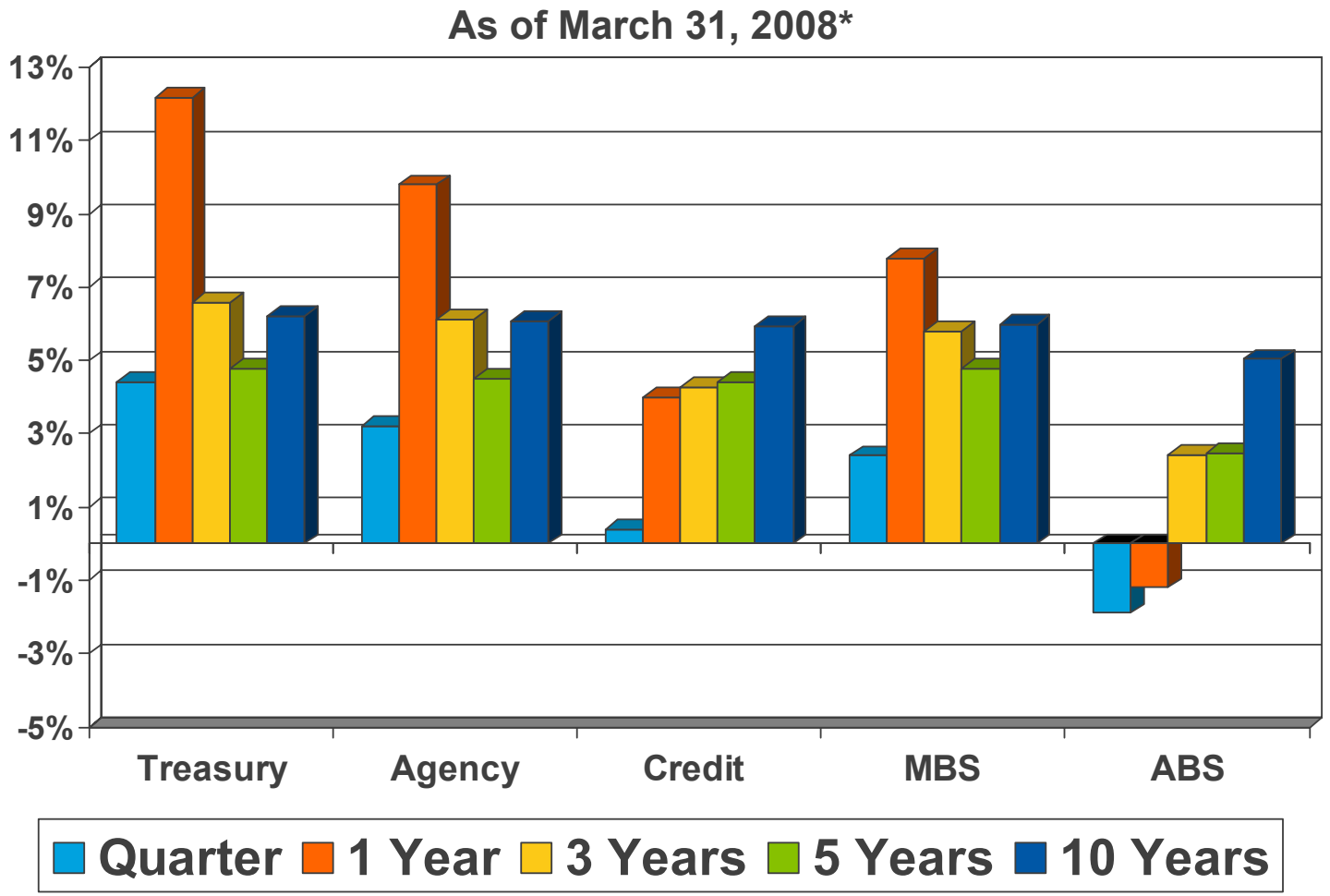
Fixed Income

Annualized Returns by Maturity and Sector



* Performance for one year or longer has been annualized.

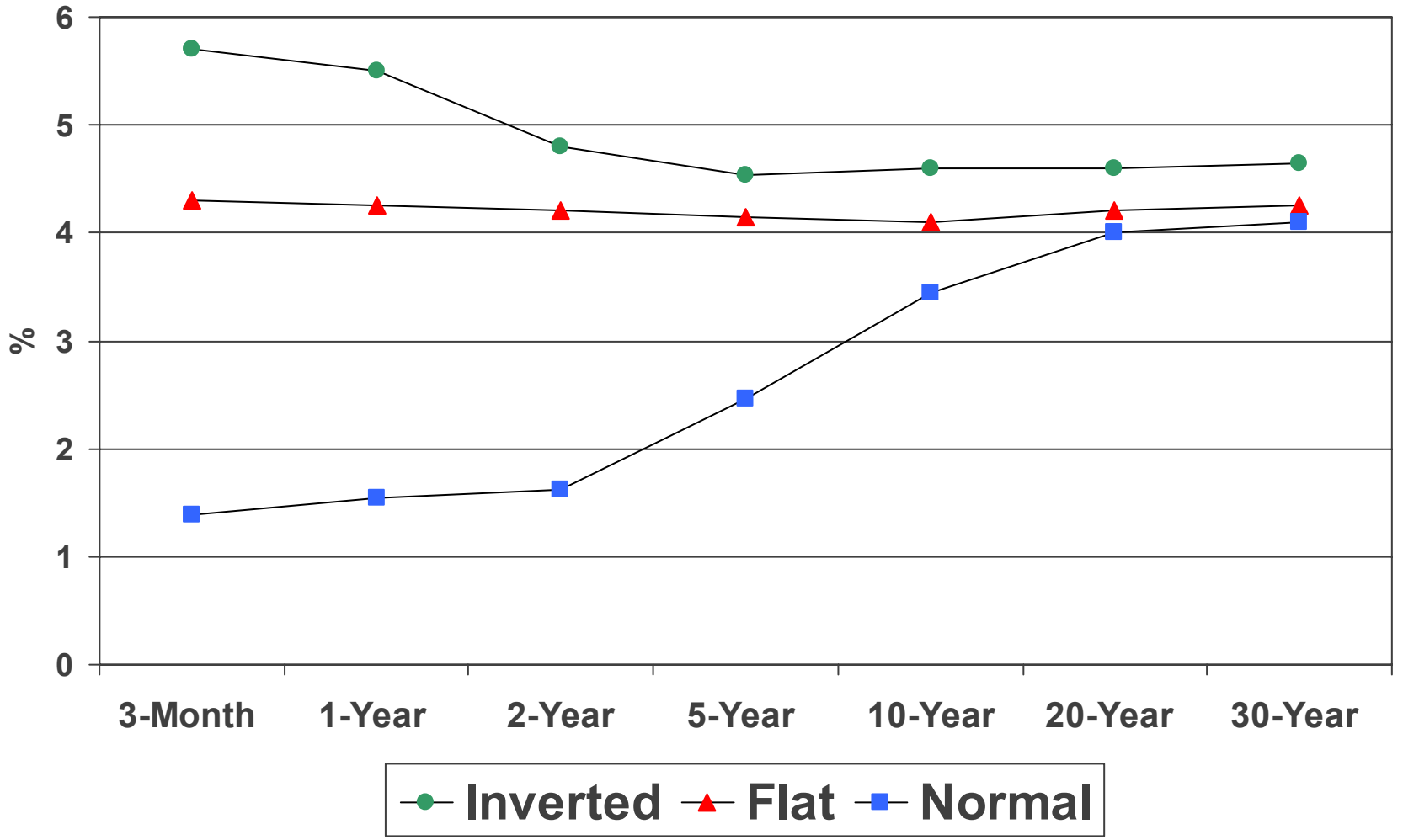
Fixed Income
Performance by Issuer



Source: Lehman Brothers

* Performance for one year or longer has been annualized.

Fixed Income
Yield Curve



Asset and Liability Matching

ALM – Asset and Liability M…

- ALM can mean:
- Asset and Liability **Modeling** – a computer exercise of determining how assets and liabilities behave in the future in various scenarios.
  - Example: What is the likely return over the next 20 years of an investment strategy that is invested 20% in equities and 80% in bonds? What is likely to be the worst that can happen in any one year over the 20 years?
- Asset and Liability **Management** – the general practice of paying attention to how both assets and liabilities behave
- Asset and Liability **Matching** – one of several approaches to matching assets to liabilities in an attempt to manage surplus
- All three of these will be important exercises in steps 3 – 5 of our Five Step Decision Making Framework.
  - 3. Setting Investment Objectives
  - 4. Determining Asset Allocation
  - 5. Establishing acceptable Risk Tolerances

ALM and Surplus Management

- Surplus equals Assets minus Liabilities
- If either Assets or Liabilities change, Surplus changes
- To manage Surplus, both Assets and Liabilities must be managed. It is not enough to just manage the assets.
- ALM in practice means designing an asset portfolio that behaves like the liabilities so that changes in assets are tracked by changes in liabilities.

The Market Value of Liabilities

- If we have to make a payment of $1,000,000 10 years from now, we would need $613,913 today to be sure we could pay that payment, if interest rates were 5%.
- If, tomorrow, interest rates were to rise to 6%, we would need less money to meet that ten year obligation. We would only need $558,395.
- If, tomorrow, interest rates were to fall to 4% we would need more money to meet that ten year obligation. We would need $675,564.
- In each case, we call the amount of money needed to cover a future liability the market value of the liability. The market value of a liability changes as interest rates change reflecting the fact that the cost of meeting that liability changes.
- Note that the market value of a liability is just the discounted value of a future expected payment.

The Market Value of Assets

- If interest rates were 5%, and we invested $613,913 in a bond asset with a duration of 10 years, we would be assured of that asset being worth $1,000,000 in ten years.
- If, tomorrow, interest rates were to rise to 6%, that asset would be worth only $558,395. But we would still be assured of that asset being worth $1,000,000 in ten years.
- If, tomorrow, interest rates were to fall to 4%, that asset would be worth only $675,564. And we would still be assured of that asset being worth $1,000,000 in ten years.

Summary: Market Value of Asset = Market Value of Liability

- We began, with interest rates at 5%, with the market value of our asset equal to the market value of our liability ($613,913).
- If interest rates rise to 6%, the market value of our asset still equals to the market value of our liability ($558,395).
- If interest rates fall to 4%, the market value of our asset still equals to the market value of our liability ($675,564).

Summary: Market Value of Asset = Market Value of Liability

Four things have happened:

1. Our surplus (assets minus liabilities) began at zero and remains unchanged at zero no matter what happens to interest rates.
2. We are assured of having a million dollars at the end of ten years to meet our liability
3. We are immune and indifferent to changes in the level of interest rates.
4. We are also immune and indifferent to changes in the stock market.

The Fundamental Theorem of Asset and Liability Matching

To achieve a perfect guarantee of meeting a future expected payment:

1. Match the market value of your asset to the market value of your liability
2. Match the duration of your asset to the duration of your liability

ALM in practice

- A number of real world complications arise in achieving the perfect asset and liability match.
- A future liability is not known with certainty. Estimates of what the liability may be might be wildly off, particularly if the future liability is subject to a high degree of uncertainty such as medical inflation.
- Typical coupon bonds do not have durations over 15. To match long liabilities we must use exotic instruments or U.S. Government zero-coupon bonds.
- ALM is expensive. This is because ALM relies on bonds which we expect to earn less than other asset classes, particularly stocks. In effect, ALM purchases safety and certainty at an expensive price.
- The theory of duration-matching makes several assumptions, which may not hold in practice: parallel shifts in yield curves, small changes in yields only, bonds cannot be called and do not contain other optionality.

ALM for the BWC

- Surplus equals Assets minus Liabilities
- The BWC does not mark its liabilities to market as interest rates change (or they do so to a limited degree). This is a consequence of the discount rate that is fixed for a twelve month period and perhaps of the actuarial smoothing of liabilities.
- With liabilities largely fixed, managing surplus at the Bureau is equivalent to managing assets. There is arguably no need or role for an asset strategy that tries to mimic the volatility of the liabilities.
- We have asked Deloitte to consider these questions of surplus management and a final determination of what the role of ALM for the BWC should be awaits their views.

U.S. Equity

U.S. Equity
Characteristics of Equity Market Investing

Common Stock or Equity Securities

- Represents ownership shares in a corporation. Each share of common stock typically entitles its owner to one vote.
- Residual claim and limited liability
- Generate returns from dividends and/or appreciation in the value of the stock price
- Returns are not guaranteed, as a stock investor can lose money if the stock price declines in value below the amount paid

U.S. Equity
Characteristics of Equity Market Investing

How your Portfolio Manager (PM) Invests in the Equity Market

- The portfolio manager invests in the stock market for clients by identifying a basket of securities to purchase.
- The basket of securities referred to as the portfolio will be identified through various types of analysis – in hopes that the portfolio will outperform a stated benchmark.
- The portfolio manager will stay within the guidelines set forth by the client as it relates to capitalization ranges (Large, Midcap or Small) and style (Growth, Value or Core).
- The portfolio will be measured against a stock market index (benchmark), which is defined as a method of measuring the stock market as a whole. The market can be Canadian stocks, American stocks, Bio-tech stocks, small-cap stocks, growth stocks, or any other market of interest.

U.S. Equity
Characteristics of Equity

Types of Stocks

Cyclical

- A cyclical stock is a stock that has a strong correlation with the movement of the general economy (business cycle) i.e. it will appreciate quickly when economic growth is strong and fall rapidly when growth is slowing.
- Automobile stocks are a good example of a cyclical stock; as economic growth slows, consumers have less disposable income to spend on new cars and vice versa.

U.S. Equity
Characteristics of Equity

Types of Stocks

Non-cyclical

- Non-cyclical securities, also called defensive stocks, are anticipated to experience profit regardless of economic conditions as non-cyclical firms produce or distribute essential goods or services that we demand regardless of the business cycle.
- The classic example of a non-cyclical stock is a food or household products stock (P&G) as consumers and businesses need household supplies regardless of the direction of the economy.
- When the economy is growing, non-cyclical stocks tend to lag behind cyclical stocks as they have a low correlation with the business cycle.

U.S. Equity
Characteristics of Equity

Types of Stocks

Standard & Poor's classifies stocks into 10 sectors:

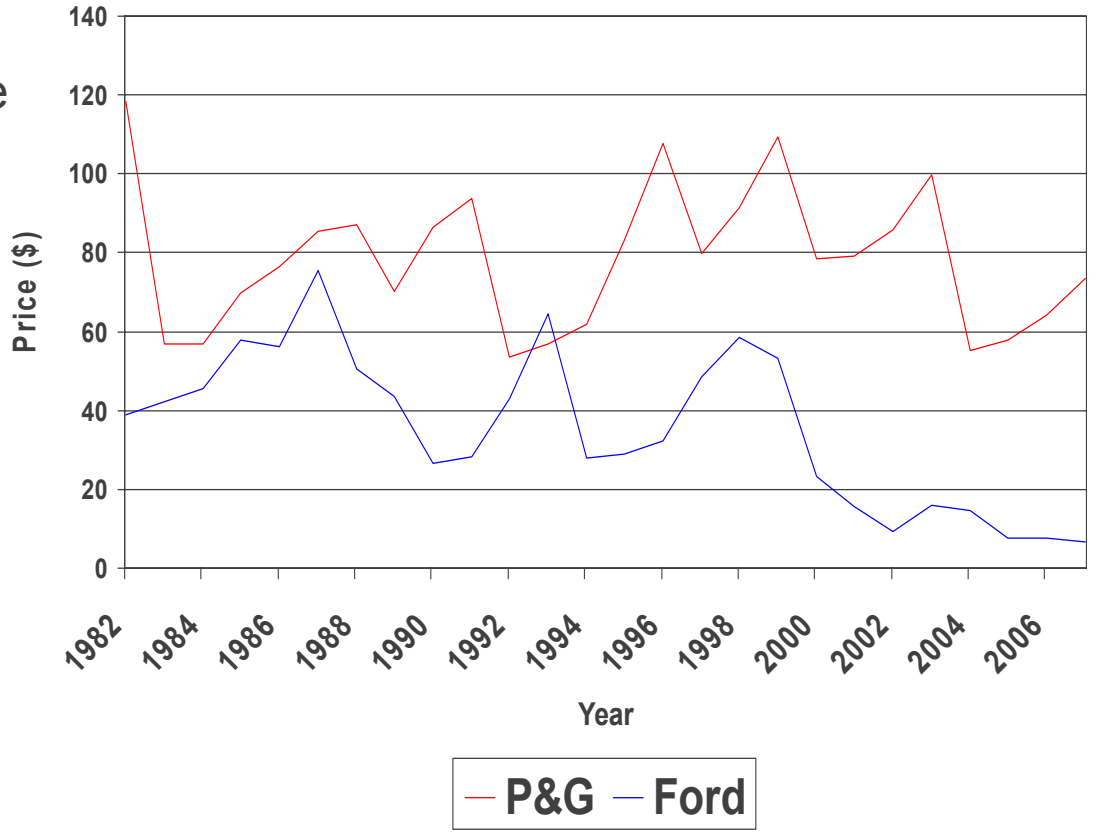
- **Consumer Discretionary**
- **Consumer Staples**
- **Energy**
- **Financials**
- **Health Care**
- **Industrials**
- **Information Technology**
- **Materials**
- **Telecommunication Services**
- **Utilities**

All of the sectors are cyclical with the exception of (3) Consumer Staples, Health Care and Utilities.

U.S. Equity
Characteristics of Equity

Types of Stocks

- The chart shows the performance of a highly cyclical company, the Ford Motor Co. (blue line), and a non-cyclical company, Proctor & Gamble (P&G) (red line).
- This chart clearly demonstrates how each company's share price reacts to downturns in the economy.
- You will see that the downturn in the economy from 2000 to 2002 drastically reduced Ford's share price, whereas P&G share price remained within its normal price range during the slowdown.



Domestic Equity
Market Capitalizations

The total market value of a company's outstanding common stock is calculated by multiplying the market price per share by the number of shares outstanding.

Market Capitalization = (# shares) x (price)

Example: Marsh & McLennan -MMC

$24.37 billion = 800 million shares x $30.47

U.S. Equity
Market Capitalization

Broad Market Index (Example: Russell 3000)

- Represents largely entire market, which includes all capitalization ranges (large, mid and small companies)
- Range from $468B – $261M with the average market capitalization at $82.8B
- An example of a broad index is the Russell 3000, which is often used as a proxy for the entire market

As of March 31, 2008

% of Total	Russell 3000
Large Cap	39.9%
Mid/Large Cap	26.8%
Mid Cap	17%
Small/Mid Cap	9.3%
Small Cap	7%

U.S. Equity
Market Capitalization Ranges

Large Cap

- Largest stocks in the broad market
- Range from $468B – $2.5B with the average market capitalization at $90.5B
- An example of a large cap index is the Russell 1000 Index, which is often used as the large cap benchmark that large cap portfolios are compared

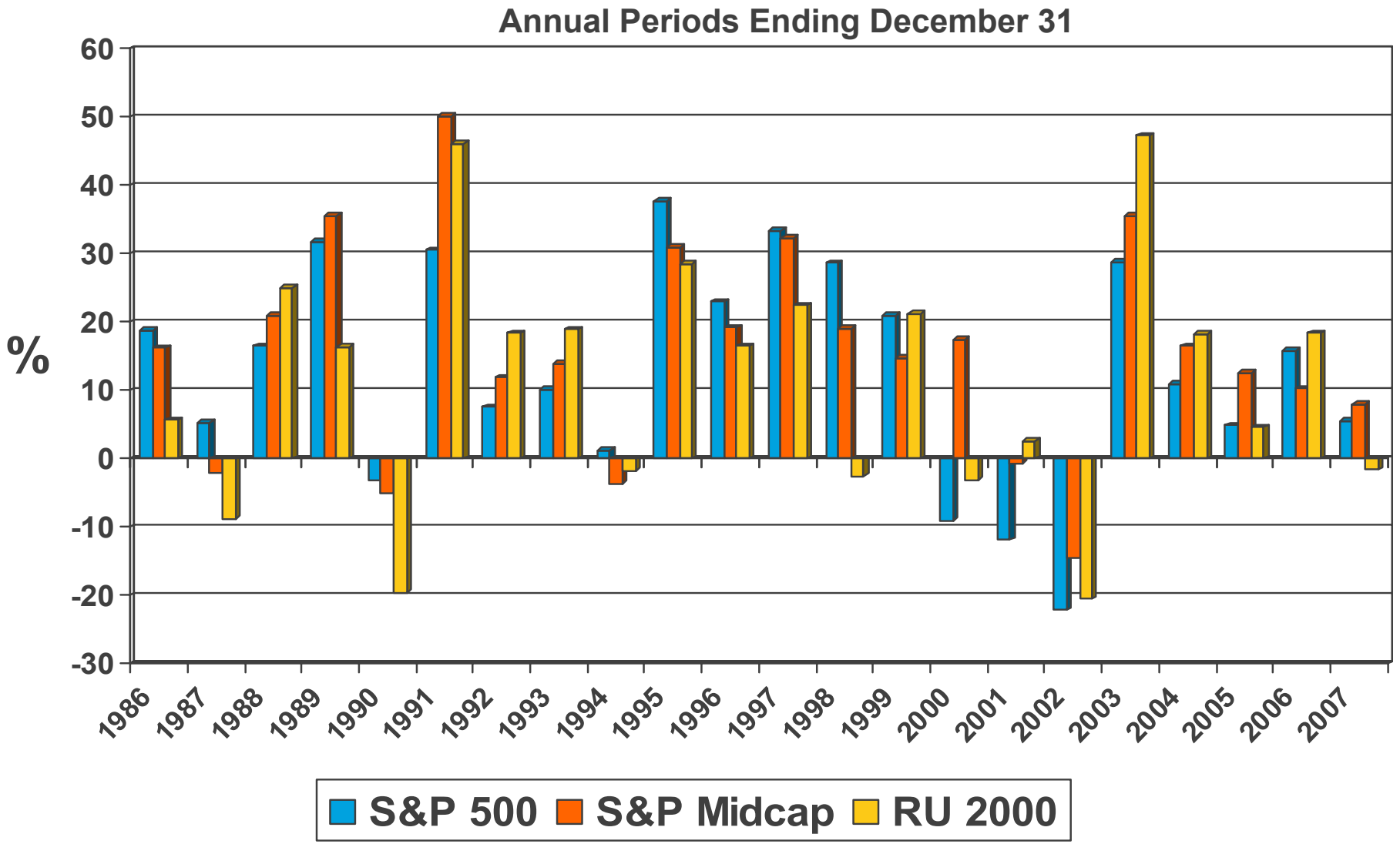
Mid Cap

- Stocks that fall in the middle of the capitalization range
- Range from $18.3B – $2.5B with the average market capitalization at $9.1B
- An example of a mid cap index is the Russell Mid Cap Index

Small Cap

- Smallest stocks in the broad market
- Range from $2.5B – $261M with the average market capitalization at $1.3B
- An example of a small cap index is the Russell 2000 Index

U.S. Equity
Performance by Capitalization



U.S. Equity
Methods of Investing

Passively Managed Portfolio

- A strategy of holding a well – diversified portfolio of securities without attempting to outperform other investors (defined as the broad market index, hence the benchmark)
- The PM will create a portfolio of securities that holds close to the same weightings of sectors (financials, technology, healthcare, etc.) as their specific benchmark

Active Managed Portfolio

- A strategy of creating a portfolio of securities selected by the “skill” of the portfolio manager with the goal of outperforming the broad market
- The term Alpha is typically used when discussing active management – Alpha is the excess returns generated by a portfolio due to the “skill” of the portfolio manager

U.S. Equity
Active Management Styles

Top-Down Investing

- A active management style that generally begins with an assessment of the economic environment. Typically, as a result of this macroeconomic analysis, specific industrial groups or geographical regions are identified for investment.

Bottom-Up Investing

- A active management style that focuses on the analysis of individual companies, utilizing fundamental, analytical techniques in an attempt to select superior performing issues.

U.S. Equity
Active Management Styles

Quantitative Strategies

- Most quantitative strategies rely heavily on computer simulations. A quantitative strategy must be based on a sound theory about why the strategy has worked in the past and why it should work in the future.

Fundamental Strategies

- Any investment strategy which is not based on quantitative techniques is based on fundamental techniques. A fundamental strategy is based on detailed industry and/or company research. It may be top-down or bottom-up in nature.

Domestic Equity
Active Management Styles

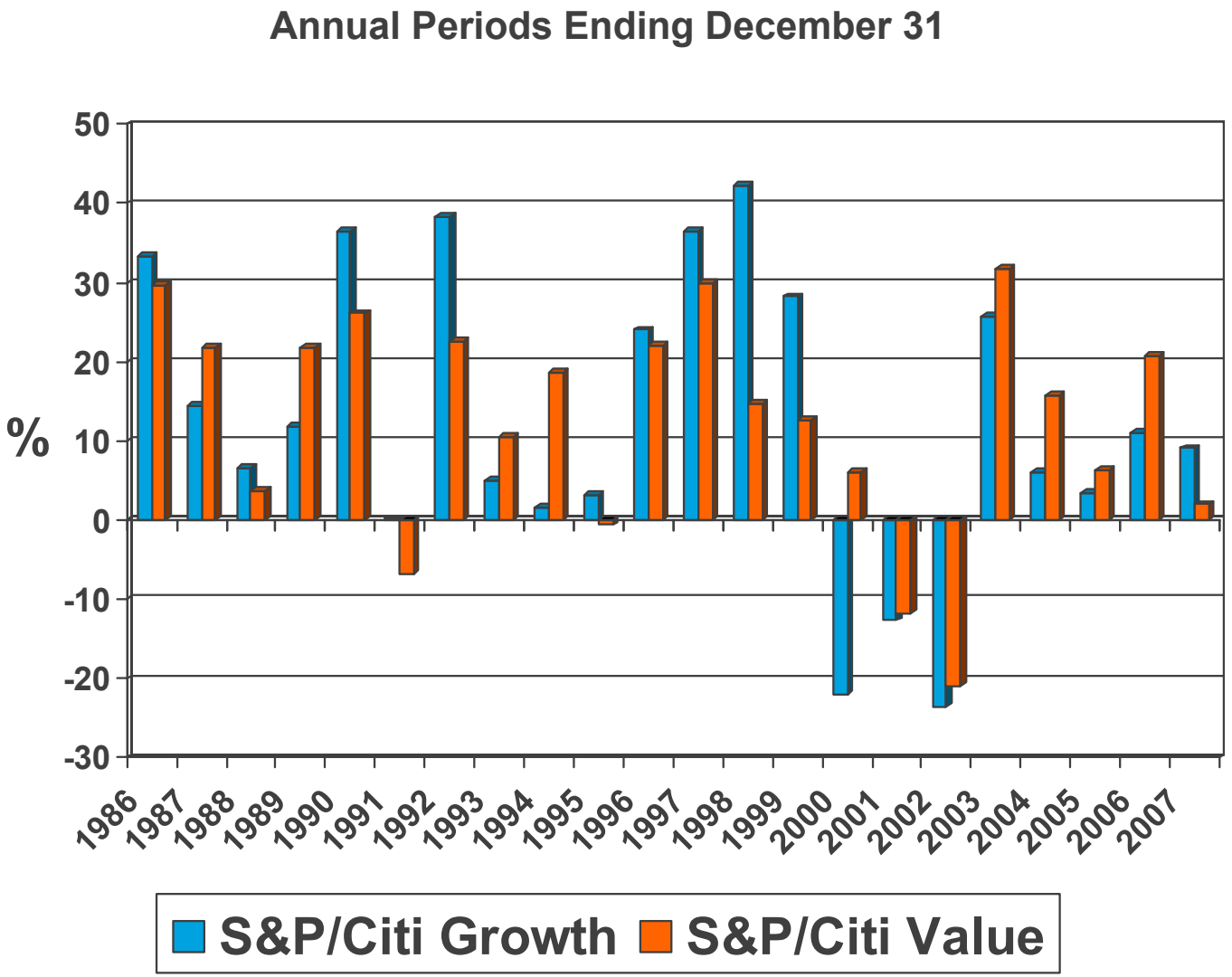
Value focused portfolios include:

- Companies viewed as having market prices which are undervalued. That is, the market has not properly recognized future earnings streams.
- Earnings are generally distributed to equity holders.
- Price to earnings ratio is generally, but not always, lower.
- Examples: Limited Brands and Heinz

Growth focused portfolios include:

- Companies whose sales and earnings are expanding faster than the general market and/or the industry average.
- Earnings are often plowed back into operations; therefore, dividend yield tends to be lower.
- Often the company maintains a solid position within an expanding part of the market.
- Generally characterized by price volatility as actual earnings are not always in line with expected earnings.
- Example: Google and Intel

U.S. Equity
S&P/ Citi Growth vs. S&P/ Citi Value



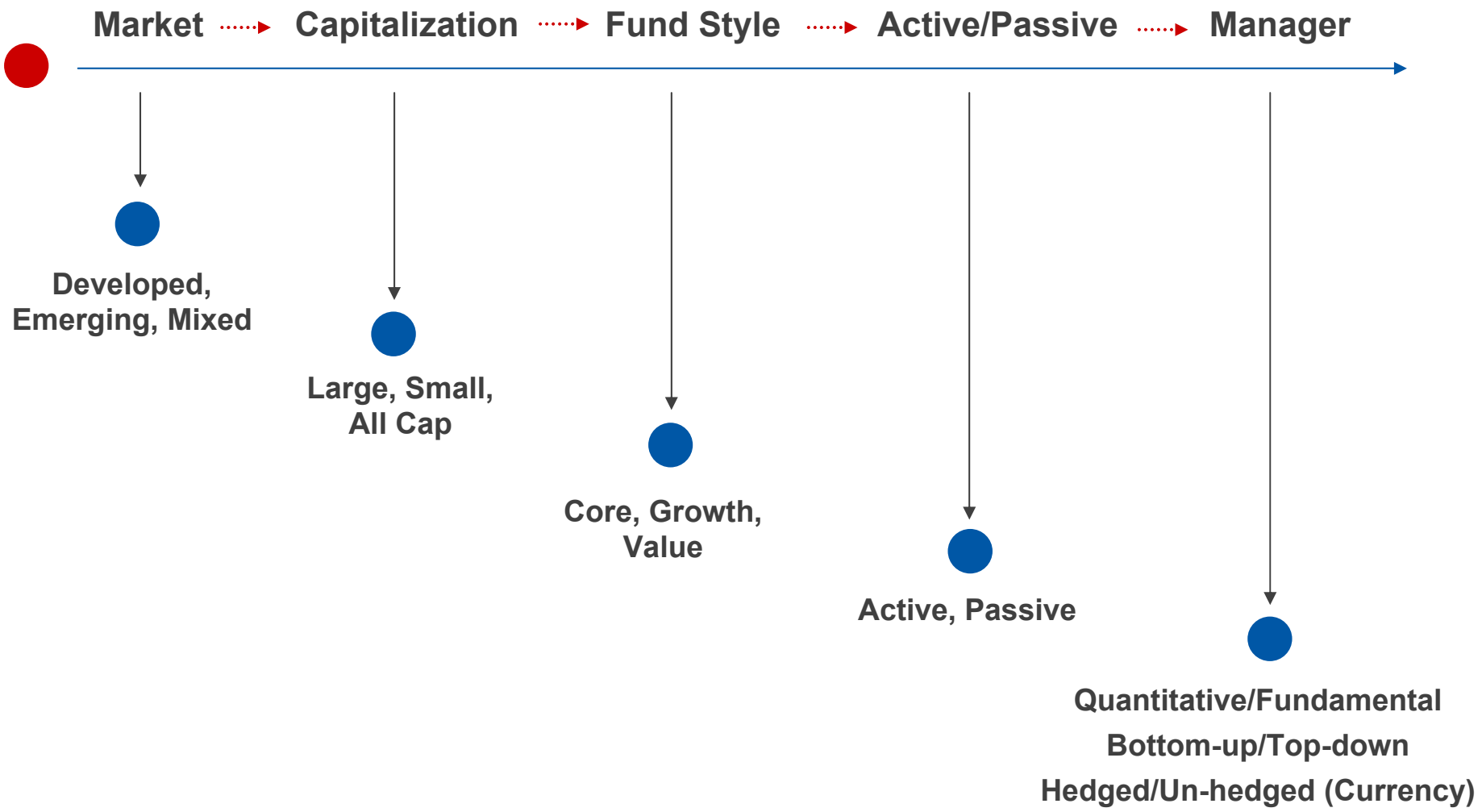
Non U.S. Equity

Non U.S. Equity
Economic Landscape

The Global Environment Has Changed Over Time:

- Historically the US dominated the world's economy
- Today more than 50% of the world's economy (stock investing opportunities) is outside of the US
- MSCI ACWI: Index of global stock opportunities, which includes 55 country indices (23 developed and 33 emerging market indices)
- Emerging market economies are playing an increasing role in the global economy

Non U.S. Equity

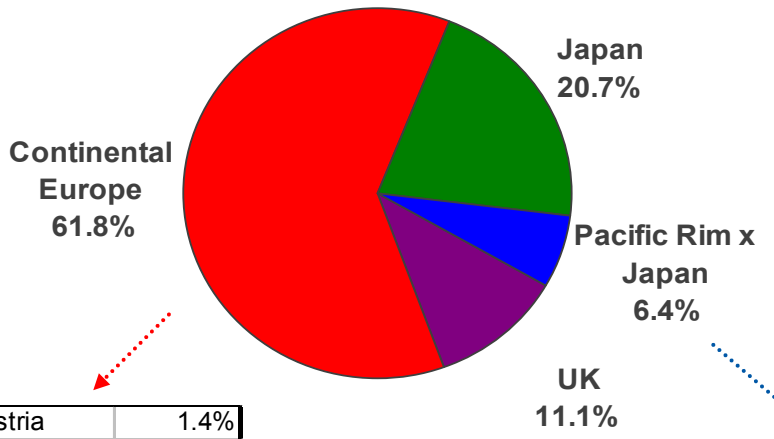


Non U.S. Equity
EAFE Country Allocation (Developed)

Developed Markets

- Large, liquid capital markets.
- Generally politically stable.
- Stable economic growth.
- Governmental departments responsible for investor protection.

MSCI EAFE Index
As of Mar 31, 2008



Austria	1.4%
Belgium	2.1%
Denmark	1.6%
Finland	1.2%
France	11.8%
Germany	16.2%
Greece	1.6%
Ireland	0.9%
Italy	9.2%
Netherlands	2.7%
Norway	1.8%
Portugal	0.9%
Spain	6.6%
Sweden	1.8%
Switzerland	2.0%

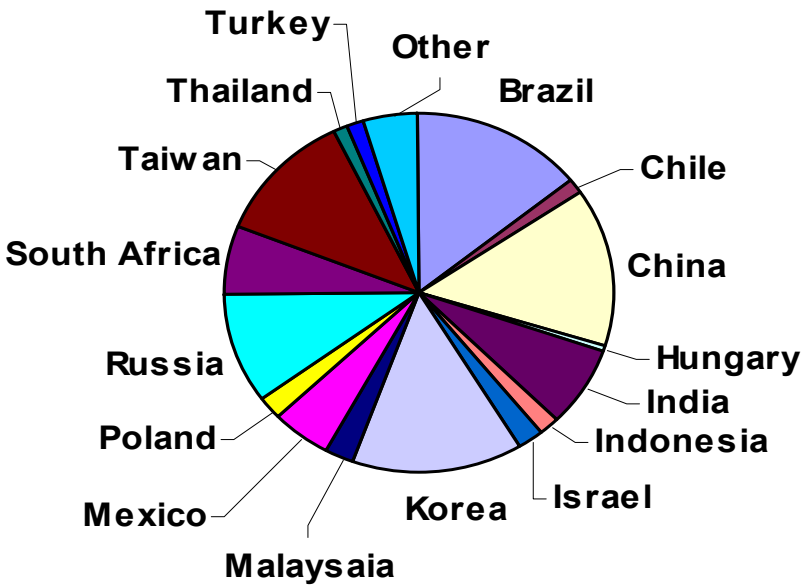
Hong Kong	1.2%
Singapore	0.7%
Australia	4.1%
New Zealand	0.4%

Non U.S. Equity
MSEMF Country Allocation (Emerging)

Emerging Markets

- Smaller, less liquid capital markets.
- Less politically stable and exhibit higher, more volatile economic growth.
- Less market regulation. Weak bankruptcy laws. Generally not as shareholder friendly due to capital controls.
- Higher expected returns over time, mediated by higher political and market risk.
- Not all are equal - some countries are more “developed” than others.

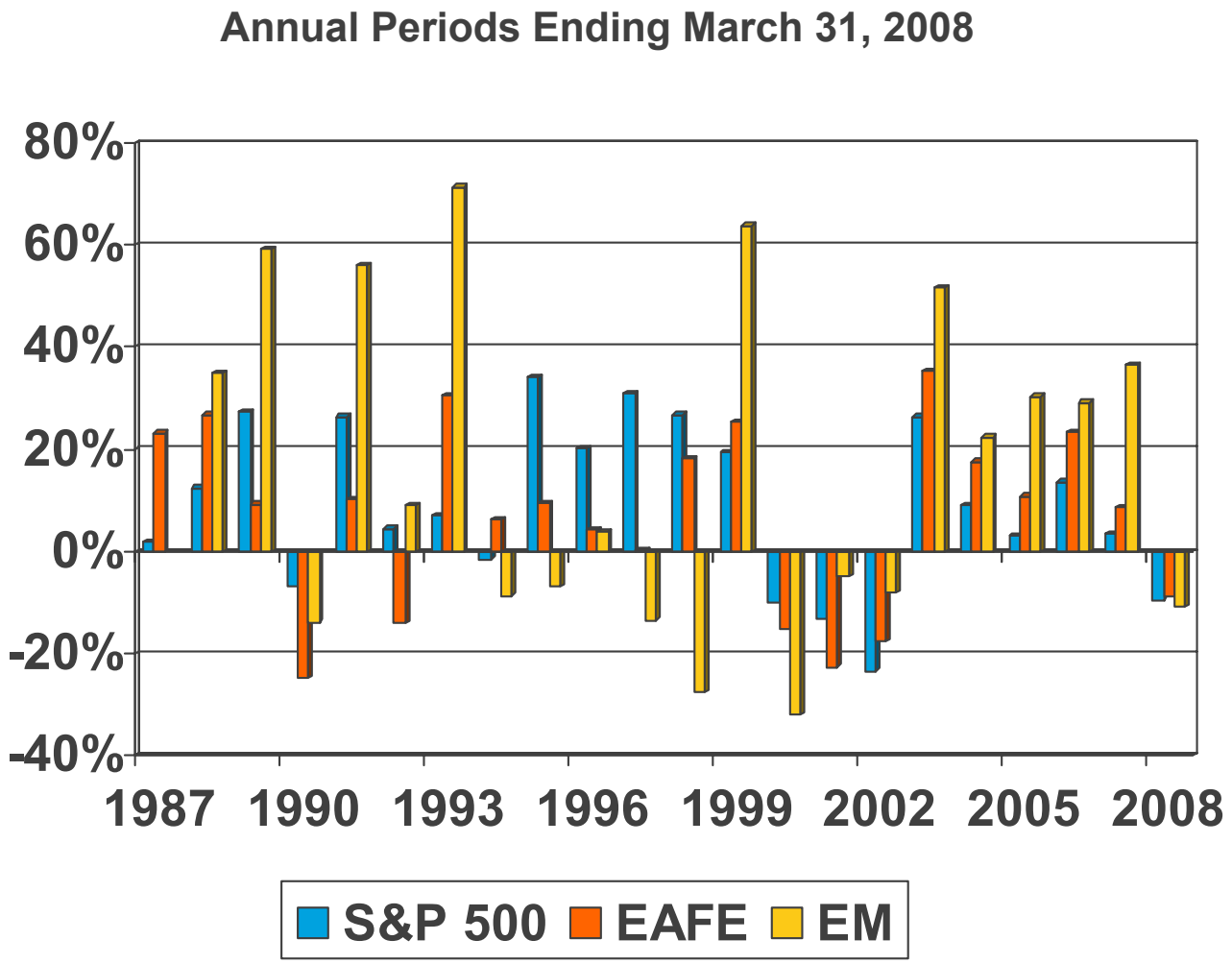
MS Emerging Market Free Index
As of Mar 31, 2008



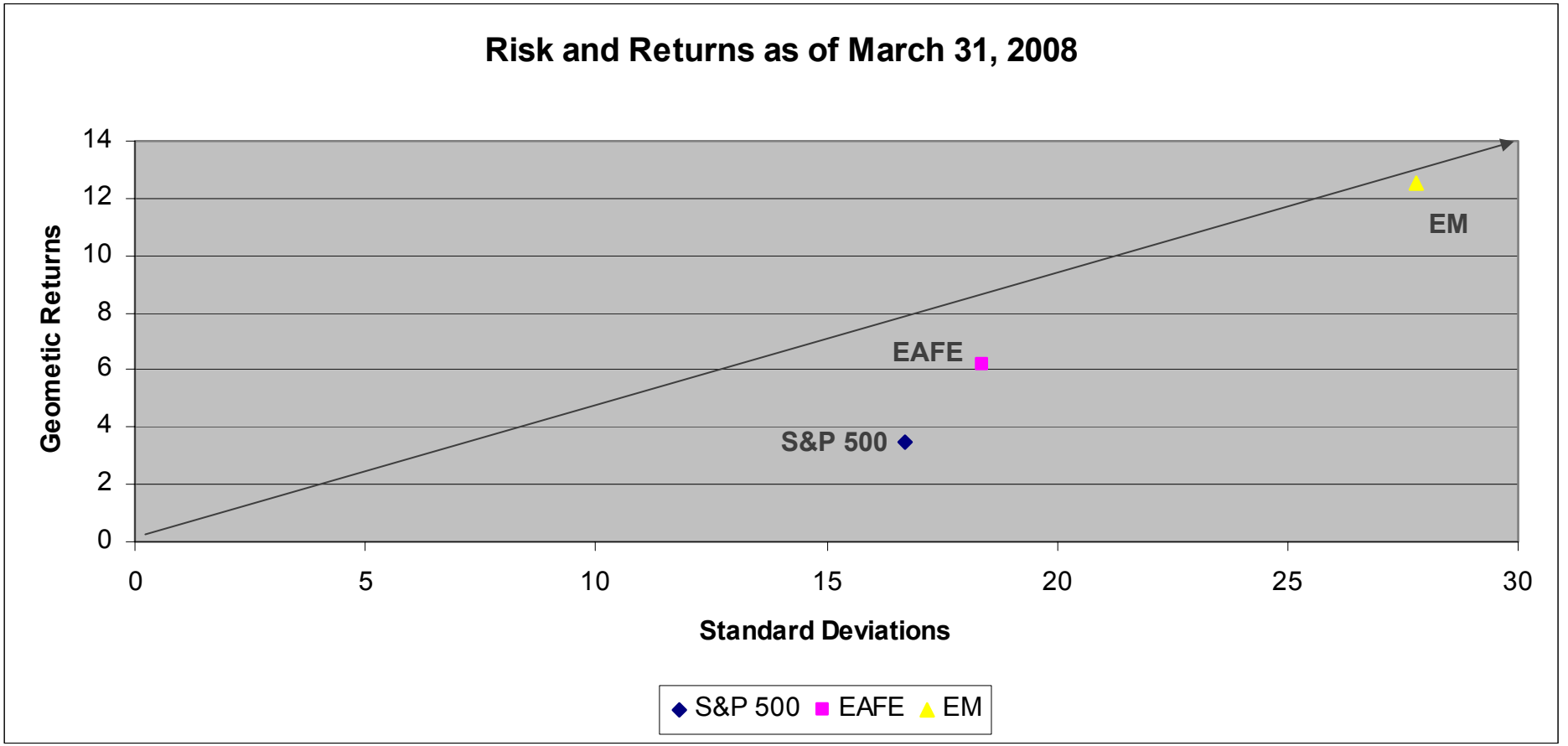
Source: MSCI

Non U.S. Equity

Developed versus Emerging Market returns



Non U.S. Equity
Risk and Return



Non U.S. Equity
Key Drivers – Emerging Market Equity

Performance of this sub-asset class can be attributed to the following factors, which give it potential to add value in an international portfolio:

- Expectations for global growth
- Developing market consumption
- Movements in commodity cycle
- Global and regional interest rates
- Improvements in EM balance sheet
- Increasing liquidity

Active vs. Passive Management

Active vs. Passive Management

Let us agree on what we are debating, discussing and disagreeing about: active vs. passive management:

Active management is the art of stock picking and market timing. Passive management refers to a buy-and-hold approach to money management. It can be applied to any asset class: big stocks, small stocks, value or growth, foreign or domestic can all be accessed by passive techniques.

Neither label, "active" or "passive," is perfect, and there will not always be a complete dichotomy between them. In any event, this is a debate about both market behavior and investor behavior.

Rex A. Sinquefield, October 1995

Active vs. Passive Management
Active Management

- A money management approach that aims to generate alpha i.e. outpace the 'market' as measured by a particular benchmark or index (e.g. the S&P 500, the Russell 1000, the Lehman Aggregate or the Intermediate Lehman Brothers U.S. Government / Credit)
- Prevailing market trends, the economy, political and other current events, and company-specific factors (such as projected earnings growth or interest rates / duration) will influence an active manager's decisions
- Active management includes a wide variety of strategies for identifying portfolio securities that are believed to offer above-average prospects for outperforming:
  - *As an example, some equity managers look for Value, while others search for Growth. Some fixed income providers are Core managers while others are High Yield investors.*
  - *Some managers focus on current and projected Fundamentals while others adopt a model-centric / quantitative approach*
  - *Some managers are Top-Down investors while others view stocks or bond credits from the Bottom-Up*
- Regardless of their individual approach, all active managers share a common thread - they buy and sell securities selectively, based on a forecast of future conditions.

Active vs. Passive Management

Passive Management

- Passive management is more commonly called ‘indexing’. Index managers generally believe that it is difficult to beat the market.
- Index managers essentially offer asset class performance that closely matches an index for investors who are unwilling to assume the risks of active management.
- This management style is considered passive because portfolio managers do not make decisions about which securities to buy and sell (they simply replicate or mirror the composition of the index by purchasing or sampling the same securities included in a particular stock or bond market index).

Active vs. Passive Management
Alpha and Tracking Error

- Active management is simply an attempt to “outperform" the market as measured by a particular benchmark or index (e.g. the S&P 500 or the Lehman Aggregate).
- Beating the market is analogous to ‘generating positive alpha’ (e.g. if an active manager generates a 7% return while their appropriate benchmark generates a return of 5%, the manager has an excess return or alpha of 2% or 200 basis points over the index).
- Tracking error (also called active risk) is a measure of how closely a portfolio follows the index to which it is benchmarked.
- An index fund should have a tracking error close to zero.
- All active managers must exhibit some level of tracking error against their target benchmark (if they do not, they would be managing an index fund, thus we would question whether paying active manager fees is appropriate).

Active vs. Passive Management
Beta

Active management exposes a portfolio to beta risk (or market risk) and to alpha risk (deviations from the market that the active manager takes).

By definition beta is a quantitative measure of the volatility of a given portfolio, relative to the overall market. The broad market beta is equal to 1. A beta above 1 is more volatile than the overall market, while a beta below 1 is less volatile so for example if the market returns +/- 5%:

- A portfolio with a beta of 1.5 will return +/-7.5%
- A portfolio with a beta of 2 will return +/- 10%
- A portfolio with a beta of 0.5 will return +/- 2.5%

An index fund should have a beta of approximately 1 while an actively managed fund should have a beta that is greater or smaller than 1

Active vs. Passive Management
Standard Deviation

A manager's alpha risk or active risk is measured by standard deviation

The standard deviation is often used by investors to measure the risk of a stock. The basic idea is that the standard deviation is a measure of volatility i.e. the more a stock's returns vary from the stock's average return, the more volatile the stock. Consider the following two stock portfolios and their respective returns over the last six months:

	Stock A			Stock B		
Month	Value	Return	Final Value	Value	Return	Final Value
1	1000	0.75%	1008	1000	1.50%	1015
2	1008	1%	1018	1015	5%	1066
3	1018	3%	1048	1066	12%	1194
4	1048	-1.5%	1032	1194	-9%	1086
5	1032	0.50%	1038	1086	-4%	1043
6	1038	2%	1058	1043	1.5%	1058

Both stocks end up increasing in value from $1,000 to $1,058. However, both stocks differ in volatility. Stock A's monthly returns range from -1.5% to 3% whereas Stock B's range from -9% to 12%.

The standard deviation of the returns is a better measure of volatility than the range of returns because it takes all the values into account. The standard deviation of the six returns for Stock A is 1.52; for Stock B it is 7.24

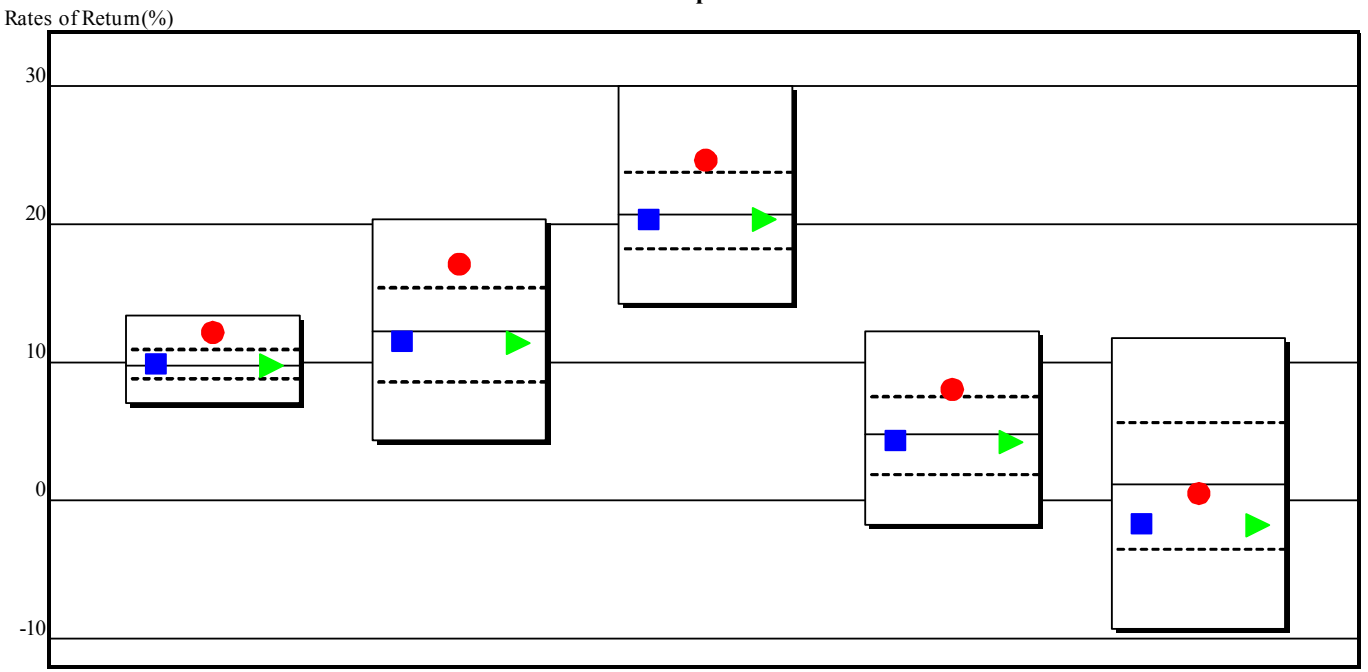
Equity Active vs. Passive Management

Generally speaking, in strong markets, we would expect an active manager to outperform the benchmark (while the index manager will approximate the benchmark's returns)

Equity Active vs. Passive

Comparison with the Mercer US Equity Large Cap Equity Universe

Performance before fees for periods ended December 2004



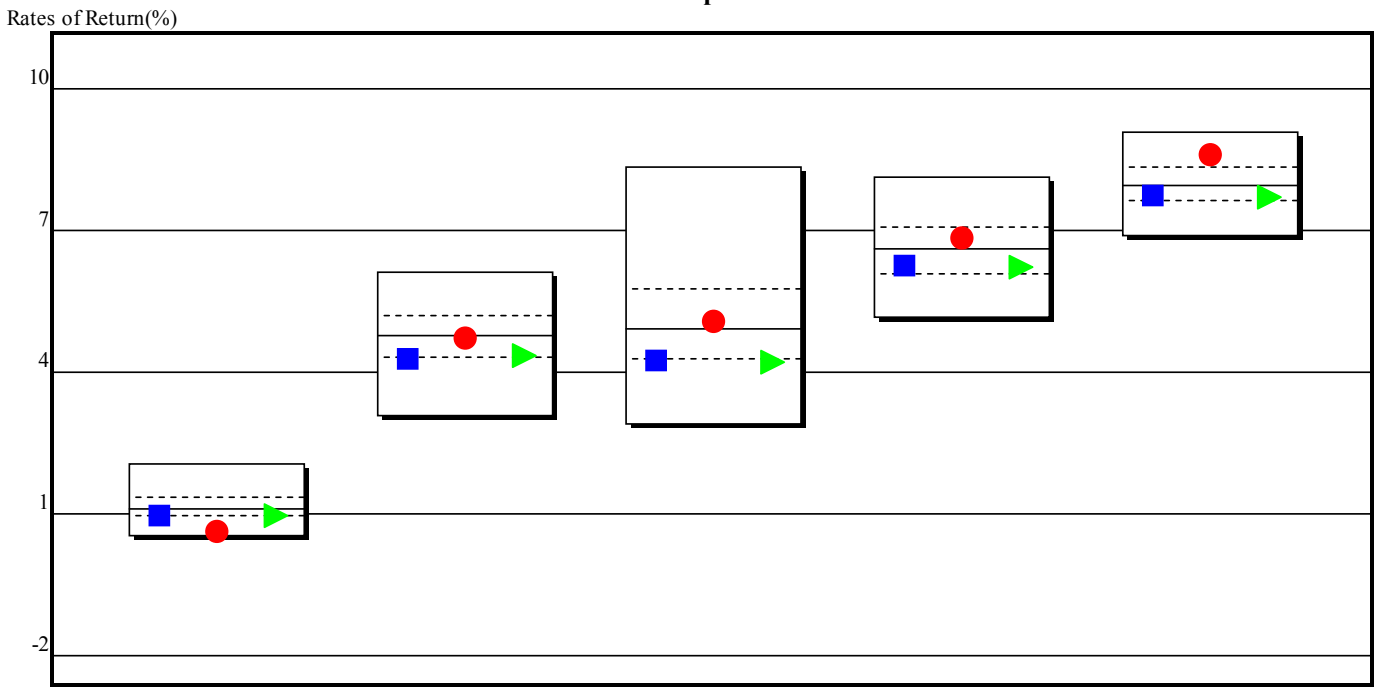
	3 Months (%)	1 Year (%)	2 Years (% pa)	3 Years (% pa)	5 Years (% pa)
Passive	9.8 *(49)*	11.5 *(56)*	20.4 *(53)*	4.4 *(54)*	-1.7 *(66)*
Active	12.1 *(12)*	17.2 *(15)*	24.6 *(20)*	8.1 *(20)*	0.5 *(53)*
Benchmark	9.8	11.4	20.3	4.3	-1.8
5th Percentile	13.3	20.2	29.9	12.1	11.7
Upper Quartile	10.9	15.4	23.7	7.5	5.6
Median	9.8	12.2	20.7	4.8	1.1
Lower Quartile	8.8	8.6	18.2	1.8	-3.6
95th Percentile	7.0	4.3	14.2	-1.9	-9.4
Number of Funds	1282	1231	1151	1081	903

Fixed Income Active vs. Passive Management

Generally speaking, in strong markets, we would expect an active manager to outperform the benchmark (while the index manager will approximate the benchmark's returns)

Fixed Income Active vs. Passive

Comparison with the Mercer US Fixed Core Universe
Performance before fees for periods ended December 2004



	3 Months (%)	1 Year (%)	2 Years (% pa)	3 Years (% pa)	5 Years (% pa)
Passive	0.9 *(73)*	4.3 *(76)*	4.2 *(77)*	6.2 *(66)*	7.7 *(66)*
Active	0.6 *(92)*	4.7 *(51)*	5.1 *(44)*	6.8 *(35)*	8.6 *(11)*
Benchmark	1.0	4.3	4.2	6.2	7.7
5th Percentile	2.0	6.1	8.3	8.1	9.1
Upper Quartile	1.3	5.2	5.7	7.1	8.3
Median	1.1	4.8	4.9	6.6	7.9
Lower Quartile	0.9	4.3	4.3	6.1	7.6
95th Percentile	0.5	3.1	2.9	5.1	6.9
Number of Funds	359	353	344	332	311

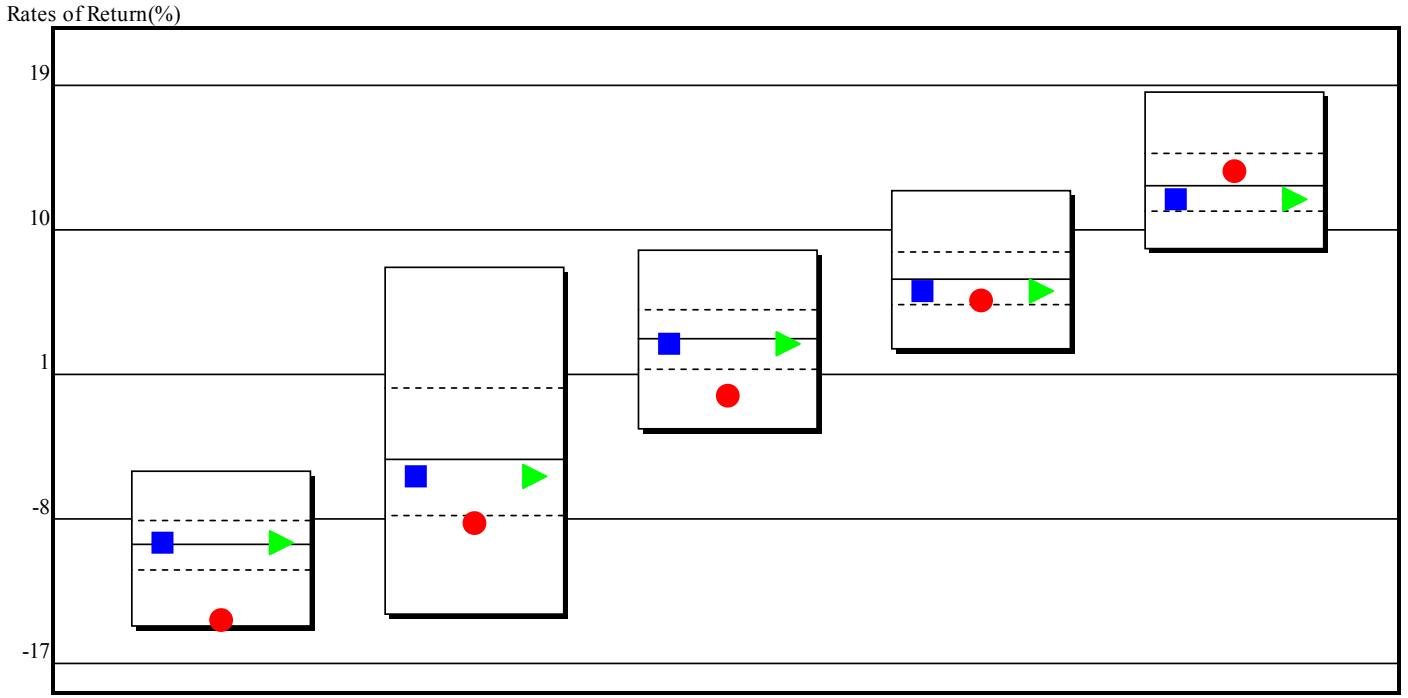
Equity Active vs. Passive Management

In weaker markets, less skillful active managers may fail to outperform the benchmark (while the index manager will approximate the benchmark's returns)

Equity Active vs. Passive

Comparison with the Mercer US Equity Large Cap Equity Universe

Performance before fees for periods ended March 2008



	3 Months (%)	1 Year (%)	2 Years (% pa)	3 Years (% pa)	5 Years (% pa)
Passive	-9.5 *(47)*	-5.4 *(59)*	2.9 *(54)*	6.2 *(59)*	11.9 *(64)*
Active	-14.3 *(93)*	-8.3 *(77)*	-0.3 *(88)*	5.7 *(70)*	13.7 *(37)*
Benchmark	-9.5	-5.4	2.9	6.2	11.9
5th Percentile	-5.1	7.6	8.7	12.4	18.5
Upper Quartile	-8.2	0.1	5.0	8.5	14.7
Median	-9.6	-4.4	3.2	6.8	12.7
Lower Quartile	-11.3	-7.8	1.3	5.3	11.2
95th Percentile	-14.8	-14.1	-2.5	2.5	8.8
Number of Funds	1136	1091	1021	956	862

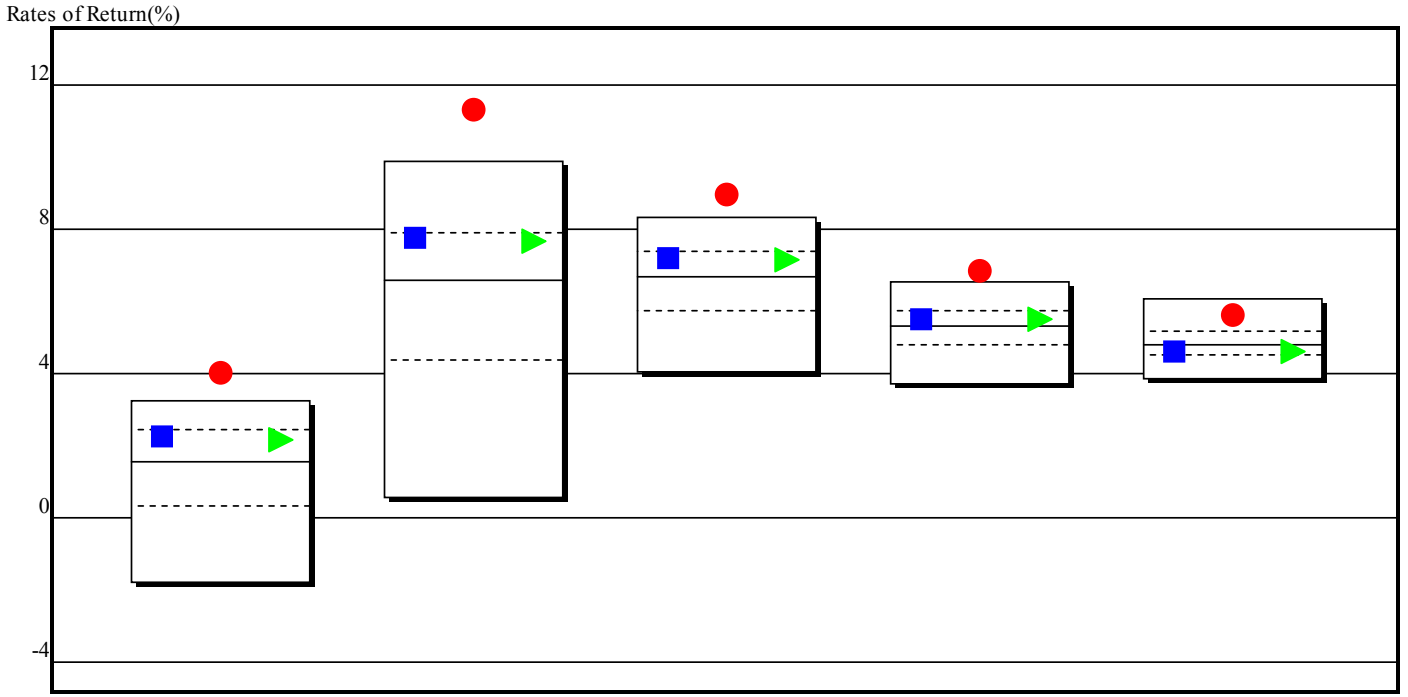
Fixed Income Active vs. Passive Management

In weaker markets the index manager will approximate the benchmark's returns, while you may see an out-performance of active fixed income managers

Fixed Income Active vs. Passive

Comparison with the Mercer US Fixed Core Universe

Performance before fees for periods ended March 2008



	3 Months (%)	1 Year (%)	2 Years (% pa)	3 Years (% pa)	5 Years (% pa)
Passive	2.2 (30)	7.8 (28)	7.2 (32)	5.5 (40)	4.6 (68)
Active	4.0 (3)	11.3 (4)	8.9 (3)	6.9 (4)	5.6 (9)
Benchmark	2.2	7.7	7.1	5.5	4.6
5th Percentile	3.2	9.9	8.3	6.5	6.1
Upper Quartile	2.4	7.9	7.4	5.7	5.1
Median	1.5	6.6	6.7	5.3	4.8
Lower Quartile	0.3	4.3	5.7	4.8	4.5
95th Percentile	-1.8	0.5	4.0	3.7	3.8
Number of Funds	289	275	271	268	254

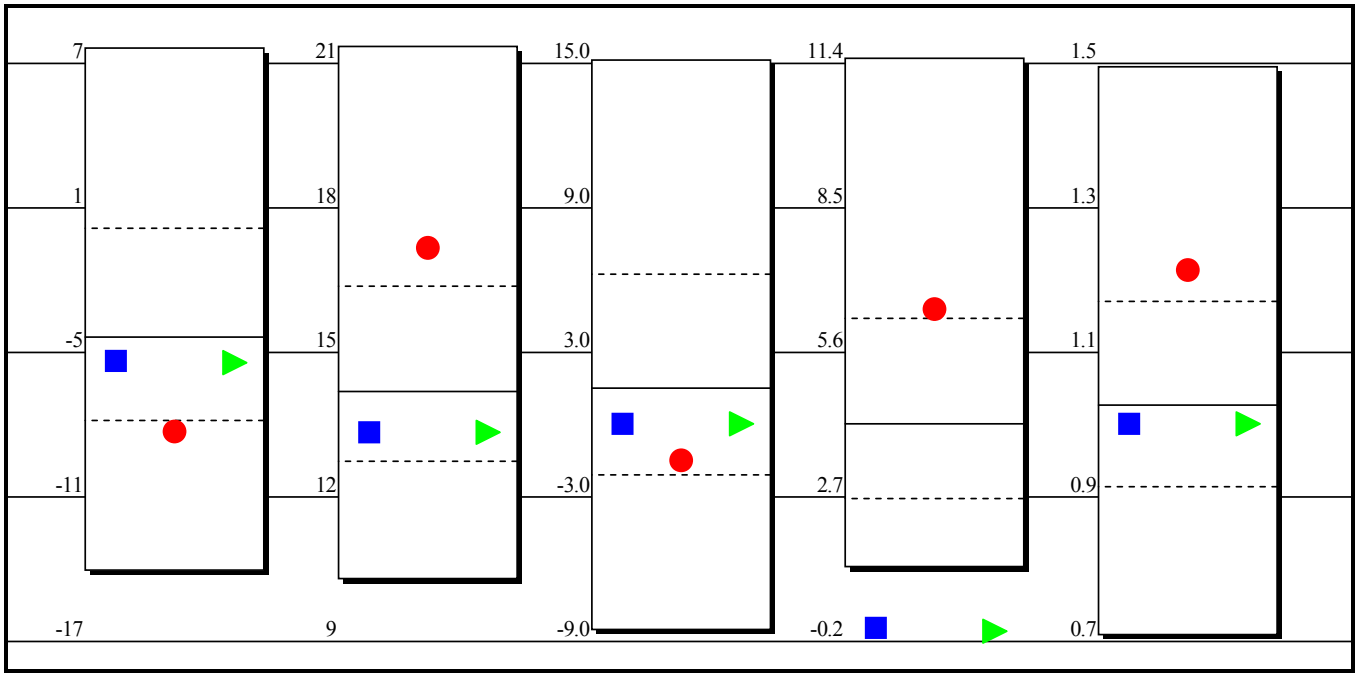
Equity Active vs. Passive Management

As expected the passive manager will have a similar risk and return profile as the benchmark while the active manager will have a more aggressive profile (due to a higher tracking error).

Equity Active vs. Passive

Comparison with the Mercer US Equity Large Cap Equity Universe

Risk and Return Characteristics (calculated quarterly) versus Benchmark for the period from Jun 2007 to Mar 2008



	Return (% pa)	Std Deviation (% pa)	Alpha (% pa)	Tracking Error (% pa)	Beta
Passive	-5.4 *(59)*	13.3 *(64)*	0.0 *(61)*	0.1 *(100)*	1.0 *(57)*
Active	-8.3 *(77)*	17.2 *(19)*	-1.5 *(71)*	6.5 *(23)*	1.2 *(20)*
Benchmark	-5.4 *(59)*	13.3 *(65)*	0.0 *(61)*	0.0 *(100)*	1.0 *(58)*
5th Percentile	7.6	21.3	15.1	11.5	1.5
Upper Quartile	0.1	16.4	6.2	6.3	1.2
Median	-4.4	14.2	1.5	4.1	1.0
Lower Quartile	-7.8	12.7	-2.1	2.6	0.9
95th Percentile	-14.1	10.3	-8.6	1.3	0.7
Number of Funds	1091	1091	1091	1091	1091

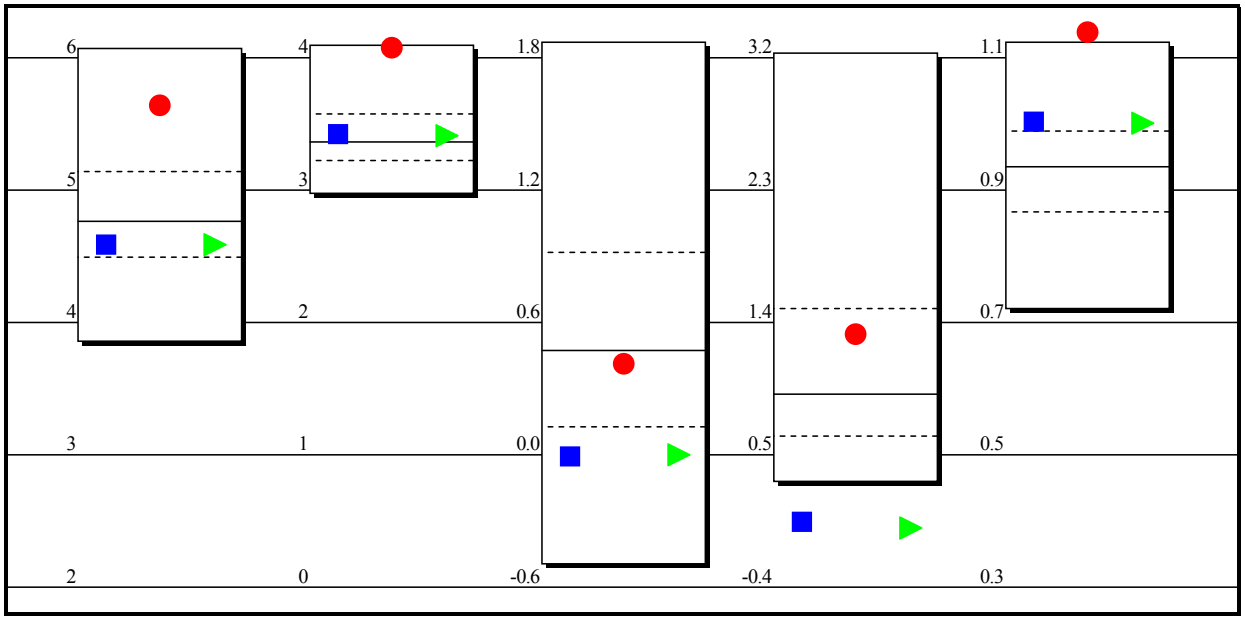
Fixed Income Active vs. Passive Management

As expected the passive manager will have a similar risk and return profile as the benchmark while the active manager will have a more aggressive profile (due to a higher tracking error).

Fixed Income Active vs. Passive

Comparison with the Mercer US Fixed Core Universe

Risk and Return Characteristics (calculated quarterly) versus Benchmark for the period from Jun 2003 to Mar 2008



	Return (% pa)	Std Deviation (% pa)	Alpha (% pa)	Tracking Error (% pa)	Beta
Passive	4.6 *(68)*	3.4 *(39)*	0.0 *(82)*	0.0 *(100)*	1.0 *(21)*
Active	5.6 *(9)*	4.1 *(6)*	0.4 *(57)*	1.3 *(34)*	1.1 *(4)*
Benchmark	4.6 *(68)*	3.4 *(42)*	0.0 *(82)*	0.0 *(100)*	1.0 *(23)*
5th Percentile	6.1	4.1	1.9	3.2	1.1
Upper Quartile	5.1	3.6	0.9	1.5	1.0
Median	4.8	3.4	0.5	0.9	0.9
Lower Quartile	4.5	3.2	0.1	0.6	0.9
95th Percentile	3.8	3.0	-0.5	0.3	0.7
Number of Funds	254	254	254	254	254

Active vs. Passive Management

Active Management (Advantages & Disadvantages)

Advantages

- Expert analysis - Seasoned managers make informed decisions based on experience, judgement, and prevailing market trends.
- Possibility of higher-than-index returns. Managers aim to beat the performance of the index, which means they strive for higher returns than the index delivers.
- Defensive measures - Managers can make changes if they believe the market may take a downturn. As an example, in the fixed income portfolio an active manager can easily adjust their duration whereas a passive manager must imitate the index.

Disadvantages

- Higher fees and operating expenses.
- Mistakes may happen. There is always the risk that managers may make unwise choices on behalf of investors, which could reduce returns.
- Style issues may interfere with performance. At any given time, a manager's style may be in or out of favor with the market, which could reduce returns.

Active vs. Passive Management

Passive Management (Advantages & Disadvantages)

Advantages

- Low operating expenses.
- Market performance - Investors can be assured that index funds will perform on par with the indexes.
- There is no action required by the fund. There is no decision-making required by the manager or the investor as the portfolio closely replicates the characteristics of the index.

Disadvantages

- Performance is dictated by the index. Investors must be satisfied with market returns because that is the best any index fund can and should produce.
- A lack of control - Managers cannot take action. Index fund managers are usually prohibited from using defensive measures, such as moving out of stocks, if the manager thinks stock prices are going to decline.
- Bonds purchased in an indexed portfolio are held through all yield curve changes. So, if the yield curve becomes inverted and 2-Year bonds offer a higher yield than 5-Year bonds, the indexed portfolio cannot take advantage of the more attractive risk/return relationship of the 2-Year bond without exceeding its stated target tracking error target versus the benchmark.

Active vs. Passive Management
Conclusions

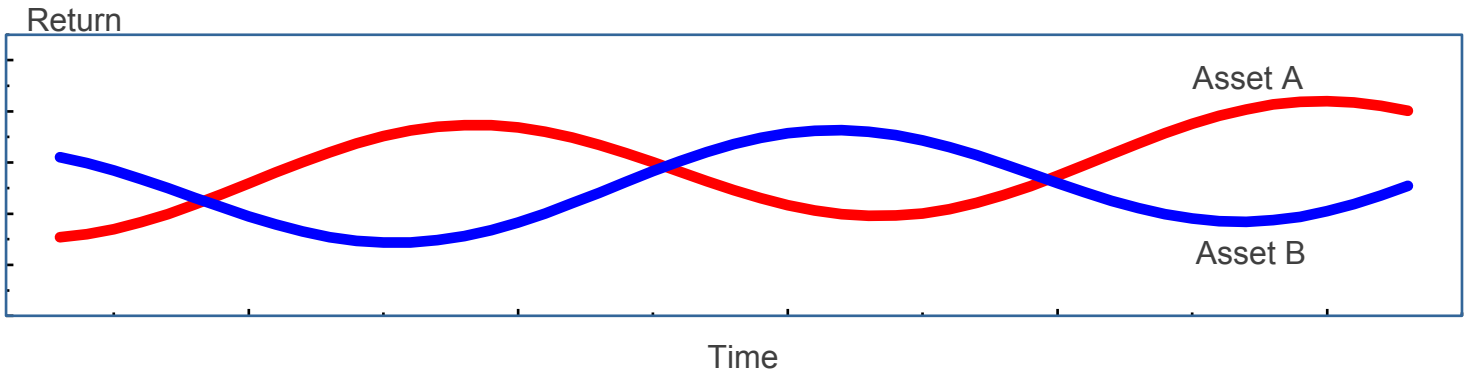
There are advantages and disadvantages to using both active and passive strategies. It is important that the debate of active vs. passive management should not be taken out of the context of an investors' goals and objectives. A risk budget analysis should be performed to determine the appropriate utilization of active and passive strategies within their portfolio.

Diversification

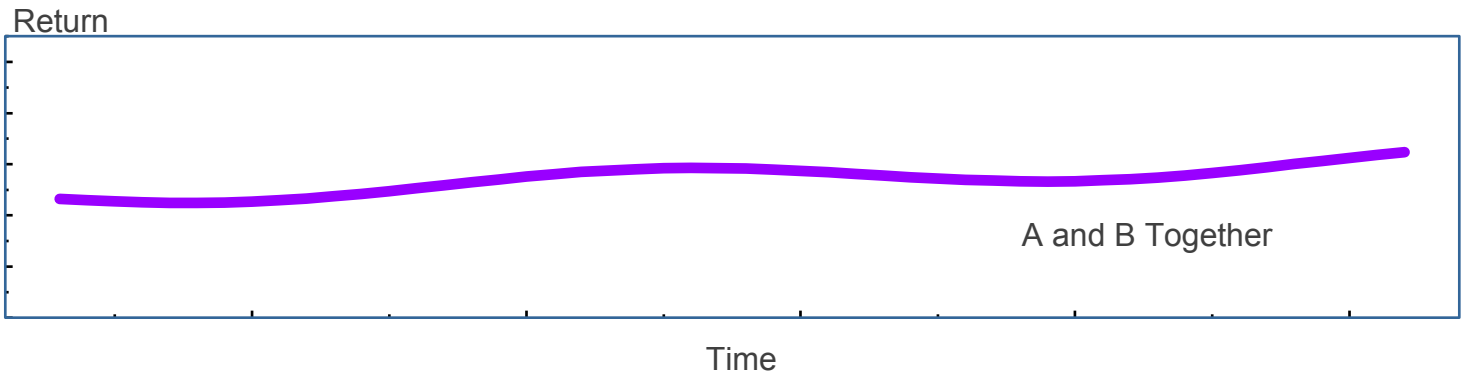
General Investment Theory
What is Diversification?

Diversification is the practice of holding a large number of assets or asset classes in a portfolio so as to reduce the portfolio's sensitivity to the return of an individual asset (or class of assets). Diversification can produce a more optimal risk/return relationship.

Assets A and B have low correlations

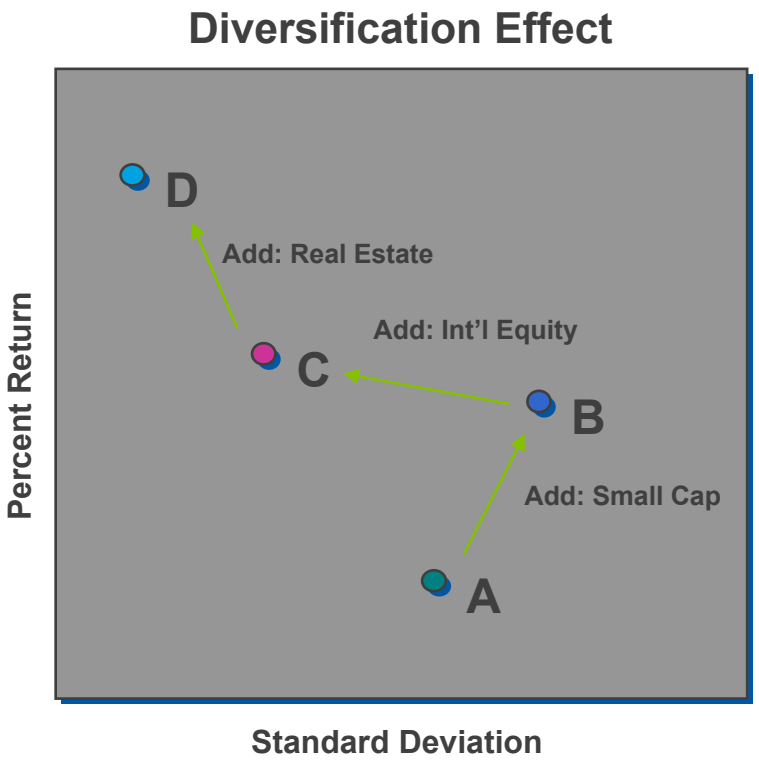


... so investing in both of them together smoothes results



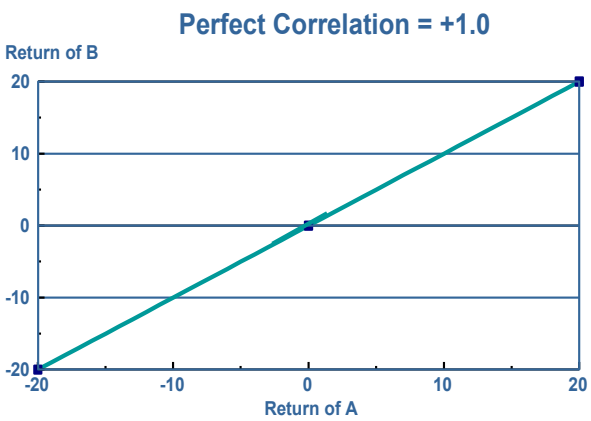
General Investment Theory
Diversification and Risk

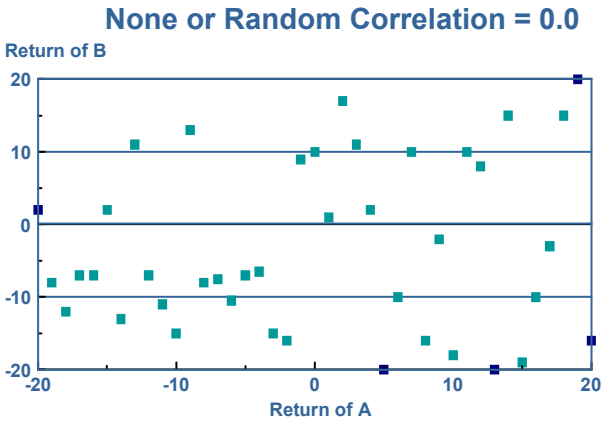
The following chart shows the diversification effect of different portfolio asset mixes. Although diversification is usually thought of in terms of risk reduction, it equivalently can be viewed in terms of return enhancement.

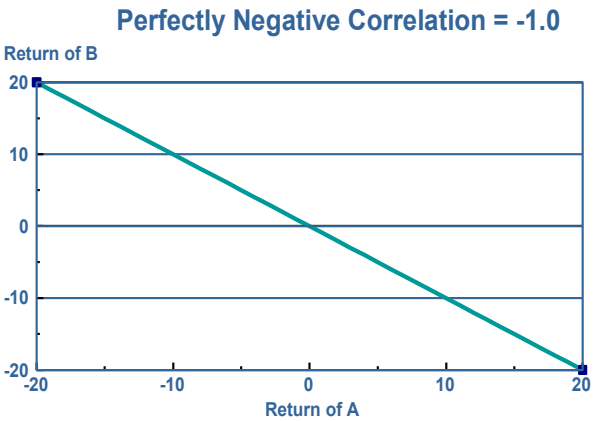


	Diversification: Least → Most			
	A	B	C	D
Cash	10%	10%	10%	5%
Bonds	30%	30%	30%	25%
Large Cap Stock	60%	50%	40%	40%
Small Cap Stock		10%	10%	10%
International Stock			10%	10%
Real Estate				10%
	100%	100%	100%	100%

General Investment Theory
Asset Class Correlations







For statistics in between the extremes, the interpretation is one of degree. For example, a correlation of 0.90 would be strongly positive while a correlation of -0.10 would be closer to random.

Correlation - Statistical measure of the degree to which the movement of two asset classes are related. Correlations of 1 means that assets move together. A correlation of 0 suggests that there is no relationship between assets (Random relationship). And a less than 1.0 correlation indicates a less than perfectly positive relationship, hence the potential for diversification benefits.

General Investment Theory
Nominal Correlations with asset classes

		Domestic Equity-Large Cap	Domestic Equity-Small Cap	International Equity	International Eq-Emerging Mkts	Fixed Income-Aggregate	Fixed Income-Long G/C	Inflation-Indexed Bonds	Cash
		1	2	3	4	5	6	7	8
1	Domestic Equity-Large Cap	1.00							
2	Domestic Equity-Small Cap	0.85	1.00						
3	International Equity	0.75	0.60	1.00					
4	International Eq-Emerging Mkts	0.50	0.45	0.55	1.00				
5	Fixed Income-Aggregate	0.20	0.20	0.10	0.00	1.00			
6	Fixed Income-Long G/C	0.25	0.15	0.15	0.00	0.95	1.00		
7	Inflation-Indexed Bonds	0.15	0.15	0.10	0.10	0.60	0.60	1.00	
8	Cash	0.00	0.00	0.00	0.00	0.10	0.10	0.30	1.00

MERCER

MARSH MERCER KROLL
GUY CARPENTER OLIVER WYMAN

Services provided by Mercer Investment Consulting, Inc.