INVESTMENTS 101: FIXED INCOME & PUBLIC EQUITIES
TRUSTEE EDUCATION SEMINAR

May 18, 2019
Doug Moseley, Partner
What is an asset?
- A resource with economic value that a corporation or investor owns or controls expecting that it will provide benefits in the future.
- Ownership stake or listed security
- Can be a right or claim on future cash flow

What is an asset class?
- A group of securities that have similar characteristics, act similarly and are subject to the same regulations.
- Each asset class reflects different risk and return characteristics and perform differently under various market environments.
- Assets can be broken down further within Traditional asset classes and Alternative asset classes.
<table>
<thead>
<tr>
<th>Traditional Assets</th>
<th>Alternative Assets</th>
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<tbody>
<tr>
<td>• Equity (Stocks)</td>
<td>• Private Equity</td>
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<tr>
<td>• Fixed Income (Bonds)</td>
<td>• Private Debt</td>
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<td>• Public Real Estate (REITs)</td>
<td>• Private Real Estate</td>
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<td>• Commodities</td>
<td>• Real Assets</td>
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<td>• Hedge Funds</td>
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<td>• Global Asset Allocation &amp; Risk Parity</td>
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TRADITIONAL INVESTMENTS OVERVIEW
WHY INVEST IN TRADITIONAL ASSETS?

**Diversification:**
- A mix of equity and fixed income strategies can provide diversification benefits to a total portfolio through low correlations to each other.

**Liquidity:**
- Traditional assets are generally more liquid than alternative assets, resulting in clients being able to access their capital as needed (daily or monthly basis).

**Risk-adjusted returns:**
- May provide investors with better risk-adjusted returns and a “smoother ride” through historically lower volatility and smaller drawdowns relative to other risk assets.
**EQUITY VERSUS FIXED INCOME**

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<th><strong>Equity</strong></th>
<th><strong>Fixed Income</strong></th>
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<tr>
<td><strong>Investor = Owner</strong></td>
<td><strong>Investor = Lender/Creditor</strong></td>
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<tr>
<td>Own all or part of the entity</td>
<td>Loan the entity money</td>
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<td><strong>Residual claim on earnings</strong></td>
<td><strong>Owed interest &amp; principal</strong></td>
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<td>Dividends</td>
<td>Regular interest payments (yield)</td>
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<td>Price appreciation</td>
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<td>Expected earnings</td>
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<td>Macro factors</td>
<td>Spread (over Treasury rate) change</td>
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**CORPORATE BALANCE SHEET & CAPITAL STRUCTURE**

- **Bank Loan Debt**
  - Senior and secured debt
  - Highest asset coverage
  - Lower coupon/lower risk
  - Priority of payment in event of liquidation

- **High Yield Debt**
  - Unsecured debt
  - Reduced asset coverage
  - High coupon/high risk
  - Priority over equity in event of liquidation

- **Converts [Debt + Equity]**
  - Unsecured debt
  - Coupon lower than high yield debt, but offers optionality to convert to equity

- **Preferred Equity**
  - Equity participation
  - Priority in dividend payments over common equity
  - No voting rights

- **Common Equity**
  - Most unsecured in the capital structure
  - Highest risk and reward potential
  - No rights in an event of liquidation

- **Fixed Income Funds**

- **Equity Funds**
CORPORATE CAPITAL STRUCTURE: DEBT VS. EQUITY

Investors are compensated based on the risks they are assuming in the capital structure. Capital structures vary based on many factors.

**Inv. Grade Co.**
- Common Stock
- Preferred Stock
- Subordinated Unsecured Debt
- Senior Secured Debt
- Bank Credit Facility

**High Yield Co.**
- Common Stock
- Preferred Stock
- Mezzanine Debt
- Subordinated Unsecured Debt
- Senior Secured Debt
- Bank Loans

- Claim on residual cash flows
- Higher Risk
- Higher Expected Return

- Priority claim on the Cash flows
- Lower Risk
- Lower Expected Return
FIXED INCOME
REFRESHER ON KEY FIXED INCOME MARKET TERMINOLOGY

- **Definitions**
  - **Coupon**: the interest rate state on a bond when it’s issued and paid on a regular basis
  - **Principal**: the original sum of money invested or lent, face value of bond
  - **Yield**: the income return on investment which refers to the interest paid relative to the current price of the security
  - **Spread**: Refers to the excess or incremental yield over the equivalent government bond (which represents the lowest risk alternative)
  - **Maturity**: refers to a finite time period at the end of which the financial instrument will cease to exist and the principal is repaid with interest
  - **Duration**: the weighted average term-to-maturity of a bonds cash flows. Also used as a measure of the sensitivity of the price of fixed income investment to a change in interest rates. Duration is typically expressed as a number of years.
  - **Rating**: Method of evaluating the possibility of default by a bond issuer. Standard & Poor, Moody’s and Fitch are rating agencies that analyze the financial strength of each bond issuer and assign ratings that range from - AAA (highly unlikely to default) to D (in default)
    - Investment Grade – bonds rated AAA, AA, A and BBB
    - High Yield – bonds rated BB, B, CCC, CC, C and D
TYPES OF BONDS – DIFFERENT ISSUERS AND STRUCTURES

• **Government or Sovereign debt**
  – Debt issued by a national government and denominated in a local or foreign currency
  – US Treasury Bonds
    • Guaranteed by the full faith and credit of the US government
      – **Treasury Bills** – mature in one year or less
      – **Treasury Notes** – mature in 1-7 years
      – **Treasury Bonds** – mature in over 7 years
      – **Treasury Inflation Protected Securities (TIPS)** – various maturities with principal adjusted annually for inflation

• **Quasi-Sovereign (Agency) debt**
  – Debt with explicit or implicit government guarantees (ex: Ginnie Mae)

• **Corporate Bonds (US, Foreign, Emerging)**
  – Can be secured or unsecured
  – Issued by companies of varying size & credit-quality

• **Mortgage debt**
  – A bond secured by a mortgage on a property, typically residential or commercial real estate.
  – Issued by government agencies like Fannie Mae & Freddie Mac, as well as banks and mortgage companies

• **Asset-backed Securities (ABS)**
  – Bonds that are secured by secured and unsecured claims on property or cash flows
    • Auto loans, credit cards

• **Structured debt**
  – Broader term that reflects fixed income securities structured with multiple layers or tranches
CONSIDERATIONS FOR FIXED INCOME INVESTORS

• Fixed investors must decide the following when evaluating their portfolio and individual investment:

  – In which markets to invest?
    • US vs. non-US
    • Public vs. private markets

  – What sectors & security types to consider?
    • Government vs. corporate vs. mortgage or ABS securities

  – Level of credit risk they are willing to assume?
    • Investment grade vs. High Yield
    • Maximum exposure to one issue or issuer

  – Level of liquidity risk they are willing to assume?
    • Large markets vs. niche markets or sectors
    • Large issuers vs. smaller issuers

  – Currency risk they are willing to assume?
    • Should the currency risk be avoided or hedged?
WHAT ARE THE MAIN RETURN DRIVERS FOR FIXED INCOME?

- **Fixed Income returns can be deconstructed into sub-sector building blocks or risk premia**

- **Cash**
  - Can be subdivided into both real risk-free rate and inflation

- **Term or Duration Premium**
  - Income earned by an investor in excess of cash
  - Represents the premium for lending your cash over a *maturity period*

- **Credit Spread**
  - Income earned by an investor in excess of cash and the term/duration premium
  - Represents the return premium for assuming issuer default risk

- **Changes in market Interest Rates**
  - Price change of a bond due to the change in interest rates
  - Represents a valuation input as current interest rates incorporates *expectations* of interest rate changes (forward rates) relative to economic conditions

- **Illiquidity**
  - Return associated with an illiquidity factor specific to fixed income
  - Requires a contractual lock on liquidity, generally over a 3 to 7 year period
PRIMARY RISKS ASSOCIATED WITH FIXED INCOME INVESTING

- **Interest-Rate Risk:**
  - Primary market risk assumed by fixed income investor
  - Risk that the price of a bond will fluctuate due to change in market interest rates
    - Bond prices move in the opposite direction of interest rate
  - Interest rate risk is typically expressed as duration

- **Default/Credit Risk:**
  - Defined as the risk of an entity being unable to make the required payments on their debt obligations
  - To help mitigate the impact of default/credit risk, lenders often charge rates of return that correspond with the borrowers level of default risk
    - i.e. The higher the perceived default/credit risk, the higher the rate of interest that investors will demand for lending their capital with a high Default risk should be a concern for below investment grade bonds
  - Default risk evaluated based on stability of cash flows, level of asset protection

- **Liquidity Risk:**
  - Defined as the risk of being unable to buy or sell an investment quickly enough to prevent or minimize a loss
    - Liquidity risk is minimal for govt. debt however
    - Liquidity risk is a concern for lower rated bonds, securities that were part of a small issue, or bonds that have recently had their credit rating downgraded

- **Other risks include reinvestment & currency risk**
HISTORICAL CORPORATE YIELD SPREADS – LEVEL OF COMPENSATION FOR TAKING CREDIT RISK

15-Year History of Credit Spreads By Rating *(in bps as of 12/31/18)*

(100 bps = 1.0%)

<table>
<thead>
<tr>
<th>Rating</th>
<th>12/31/2018</th>
<th>12/29/2017</th>
<th>15 YR LOW</th>
<th>15 YR HIGH</th>
<th>15 YR AVERAGE</th>
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<tbody>
<tr>
<td>US Corp IG</td>
<td>153</td>
<td>93</td>
<td>77</td>
<td>607</td>
<td>157</td>
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<td>Aaa</td>
<td>78</td>
<td>53</td>
<td>46</td>
<td>412</td>
<td>82</td>
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<tr>
<td>Aa</td>
<td>83</td>
<td>49</td>
<td>41</td>
<td>483</td>
<td>103</td>
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<tr>
<td>A</td>
<td>120</td>
<td>73</td>
<td>58</td>
<td>588</td>
<td>138</td>
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<tr>
<td>Baa</td>
<td>192</td>
<td>121</td>
<td>106</td>
<td>732</td>
<td>198</td>
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<tr>
<td>US Corp HY</td>
<td>526</td>
<td>343</td>
<td>238</td>
<td>1833</td>
<td>521</td>
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<tr>
<td>Ba</td>
<td>354</td>
<td>211</td>
<td>151</td>
<td>1278</td>
<td>365</td>
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<tr>
<td>B</td>
<td>531</td>
<td>343</td>
<td>228</td>
<td>1742</td>
<td>500</td>
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<tr>
<td>Caa</td>
<td>989</td>
<td>615</td>
<td>378</td>
<td>2606</td>
<td>833</td>
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</tbody>
</table>

Source: Barclays Capital and Loomis Sayles
RECENT RETURN COMPARISON – CREDIT QUALITY MATTERS

US Market Returns by Credit Quality (2017 vs. 2018)

Source: Barclays Capital and Loomis Sayles
HOW DO WE INVEST IN FIXED INCOME?

- Fixed income markets offer distinct sub-sectors to invest across a broad risk spectrum including various maturities and geography
  - Indices often constructed based on size: Largest debtors generally represent the biggest share of an index

![Fixed Income Market Diagram]
CORE & CORE PLUS FIXED INCOME

- “Multi-Sector” bond portfolio that is generally benchmarked to the Bloomberg Barclays Aggregate Index
  - Government bonds, corporate bonds, mortgage bonds, and other fixed income investments
  - Typically, AAA to BBB rated
    - “Core-Plus” – includes BB or lower; but average rating is “investment grade”

- Why include in a portfolio
  - Stabilizes portfolio returns
  - Low correlation to equities (diversification benefits)
  - A core holding in almost all institutional portfolios

- Managers add value by focusing on
  - Interest rate moves (Duration positioning)
  - Yield curve positioning
    - Traces yield on securities with varying maturities
    - Under “normal” conditions, long term rates should be greater than short term rates (upward sloping)
    - Inverted yield curve has short term rates greater than long term rates; considered a predictor of a recession.
  - Sector rotation
  - Issue selection: Credit research (avoiding defaults)
HIGH YIELD BONDS

• **Description**
  – Corporate bonds with credit ratings of less than BBB
    • AKA, “junk bonds”
    • Higher yields, higher default risk, lower financial stability, and/or more debt
    • Portfolios are diversified to limit default risk of a single issuer

• **Why include in a portfolio**
  – Attractive coupon yields
  – Good risk-adjusted returns
  – Diversification benefits

• **Managers add value by**
  – Credit analysis
  – Avoiding down grades and defaults
  – Identifying bonds poised for credit rating upgrade
    • Lowers spread to Treasuries and thus increases return
FOREIGN/GLOBAL BONDS

• Description
  – Dollar and Non-dollar fixed income securities issued by:
    • Foreign Governments – Sovereigns (decreasing percentage)
    • Supranationals (e.g. World Bank, IMF)
    • Foreign Companies (increasing percentage)
    • Mortgage-backed securities (occasionally)
  – Global portfolios include US securities

• Why include in a portfolio
  – Diversification
  – World’s largest investable asset class
  – Foreign/Global portfolios look different from domestic portfolios
    • Currency fluctuations, out of synch world markets, interest rate fluctuation by region, etc..

• Managers add value by
  – Same factors as US fixed income, and
  – Country/region selection
  – Currency management
INFLATION-LINKED BONDS

- **TIPS: Treasury Inflation Protection Securities**
  - Description
    - Issued by the US Treasury
    - Designed to provide investors with a real rate of return and compensation for potentially rising inflation over the life of the security
  - Why include in a portfolio
    - Provides inflation protection, as measured by CPI, through adjustment in principal
    - The real rate component of TIPS' return will move counter-cyclically with the economy, thereby providing a hedge to credit and equity market risks.
  - Managers add value by
    - Using multiple valuation factors such as inflation outlook, level of real rates, and seasonal factors to identify undervalued securities.

- **Other**
EMERGING MARKET BONDS

• **Description**
  - Debt issued by emerging market countries (Mexico, Brazil, Russia) and companies
    • External debt – issued in USD or Euros
    • Local debt – issued in local currency of the issuer
  - Local debt markets far exceeds the external debt markets

• **Why include in a portfolio**
  - Higher expected return over time
  - Diversification benefit derived from lower correlation to developed fixed income markets
  - Non-dollar exposure can protect against potential declines in the US dollar
  - Strong growth and improving stability
    • Lower levels of consumer and govt. debt, high savings rates, capacity economic growth
    • Capital inflows into EM countries continue to be strong
    • Emerging markets contributing an increasing share of Global GDP

• **Managers add value by**
  - Same as US and Foreign
  - Increased focus on inflationary environment and outlook
  - Evaluate political risks
**FIXED INCOME DERIVATIVES – TOOLS**

- **Credit Default Swaps (CDS)**
  - Buy or Sell Credit Exposure on Market, Sectors or Issues
  - Can be an efficient tool to increase or decrease credit exposure

- **Interest Rate Futures**
  - Buy or Sell Interest Rate Exposure
  - Can be an efficient tool to increase or decrease interest rate exposure

- **Other (Options, Swaps, Forward Contracts, etc.)**

**Definition:** A security whose price is dependent upon or derived from one or more underlying assets. The derivative itself is merely a contract between two or more parties. Its value is determined by fluctuations in the underlying asset. The most common underlying assets include stocks, bonds, commodities, currencies, interest rates and market indexes. Most derivatives are characterized by high leverage. (Investopedia)

Note about “high leverage”: A large “notional” exposure is achieved with little or no initial investment. Leverage does not exist if the difference (between the small/no investment and the “notional” exposure) is fully collateralized.

**Example:** $1,000,000 Futures contract
- Required investment: $100,000 (high leverage = 10X)
- Cash Collateral: $1,000,000 (no leverage)
EQUITY
“Shares in the ownership of a company’s assets and earnings.”

• **Capitalization:**
  – Price of a company’s stock X number of shares outstanding
    • **Large Cap:** Range from $10-300 B (ex: Apple Inc.)
    • **Mid Cap:** Range from $2-10 B (ex: MGM Resorts International)
    • **Small Cap:** Range usually below $2 B (ex: Weight Watchers Int’l)

• **Style:**
  – Based on the underlying fundamentals of the company
    • **Value:** Low price to earnings ratio, low price to book ratio, high dividend yield, lower earnings growth
    • **Growth:** High price to earnings ratio, high price to book ratio, low dividend yield, higher earnings growth

• **Domicile:**
  – Country of Origin
    • Domestic (US)
    • International Developed (Japan, UK, Germany) ex: Sony Corp.
    • International Emerging (Mexico, Russia, China) ex: TV AZTECA
    • Frontier (Vietnam, Colombia) ex: Bancolombia SA
WHAT ARE THE MAIN RETURN DRIVERS FOR EQUITIES?

• **Equities represent the residual ownership claim on corporate earnings**

• **Equity returns are highly cyclical as both earnings and valuation changes influence stock price movements**
  – Equity returns can be deconstructed into sub-sector building blocks or risk premia

• **Dividend Yield**
  – Divided income paid in excess of retained earnings to a stockholder
  – Dividends have historically been a large source of returns but declined in last 40 years

• **Valuation**
  – Represented by the P/E ratio or the price investors are willing to pay for earnings
  – P/E is highly cyclical in nature and influenced by investor risk appetite

• **Real Earnings Growth**
  – Growth of corporate earnings in excess of inflation
  – Earnings influenced both by changes in profit margins and economic growth cycles

• **Illiquidity**
  – Return associated with an illiquidity factor specific to equity
  – Requires a contractual lock on liquidity, generally over a 7 to 10 year period
PRIMARY RISKS ASSOCIATED WITH EQUITY INVESTING

• **Earnings Growth & Variability:**
  – Primary earnings drivers are revenue growth & profitability
  – Stock price driven by *future* expectations for growth & profitability

• **Product obsolescence and competition**
  – Risk that customers no longer want to pay for product offerings

• **Liquidity Risk:**
  – Defined as the risk of being unable to buy or sell an investment in the desired time period
  – Investors generally willing to accept a lower return for higher liquidity (and demand higher return for lower liquidity)

• **Currency Risk:**
  – Risk that currency that a stock is denominated in changes in value relative to the investors home or “base” currency (= US Dollar for US investors)
  – Risk that a company’s sales and earnings are impacted by currency value changes
    • Country where product is produced vs. sold
    • Country where key inputs or resources are derived
WHERE ARE WE INVESTING IN EQUITIES?

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<th>Developed Markets</th>
<th>Emerging Markets</th>
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<td>Source: MSCI</td>
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<td>Large Cap Value</td>
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<td><strong>Large Cap Value</strong></td>
<td>Invests in companies with market caps greater than $10 billion and low stock</td>
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<td>prices relative to underlying valuation metrics</td>
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<td><strong>Mid Cap Value</strong></td>
<td>Invests in companies with market caps between $2 billion and $10 billion and</td>
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<td>low stock prices relative to underlying valuation metrics</td>
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<tr>
<td><strong>Small Cap Value</strong></td>
<td>Invests in companies with market caps less than $2 billion and low stock prices</td>
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<td>relative to underlying valuation metrics</td>
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<td><strong>Small Cap Core</strong></td>
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<td><strong>Small Cap Growth</strong></td>
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EQUITY CHARACTERISTICS

U.S. Large Cap Equities

• Description
  – Largest U.S. companies (Exxon, Microsoft, Proctor & Gamble)

• Why include in a portfolio
  – 90% of US stock market
  – Attractive returns by investing in well-established companies
  – A core holding in almost all institutional portfolios

• Managers add value by
  – Superior selection of stocks or industry sectors through
    • Top-down analysis (identifying broad market trends)
    • Bottom-up analysis (issue by issue analysis)
    • Technical analysis (identifying trends using charts)
    • Fundamental analysis (detailed qualitative or quantitative analysis of individual company stocks)
    • Quantitative Analysis: non-fundamental

• Catch
  – More volatile than bonds, can lose money
U.S. Small and Mid Cap Equities

- **Description**
  - Smaller listed companies in the U.S.
  - Usually smaller than $10 billion

- **Why include in a portfolio**
  - Greater return potential than large companies, but more risk
  - Some diversification benefits

- **Managers add value by**
  - Discovering stocks not well covered by Wall Street analysts
  - Superior stock selection or industry sector bets through
    - Top-down analysis (identifying broad market trends)
    - Bottom-up analysis (issue by issue analysis)
    - Technical analysis (identifying trends using charts)
    - Fundamental analysis (detailed qualitative or quantitative of individual stocks)

- **Catch**
  - More risk than Large Cap, higher fees, and can lose money
**EQUITY CHARACTERISTICS**

**International Developed Market Equities**

- **Description**
  - Companies in developed foreign markets

- **Why include in a portfolio**
  - Attractive returns
  - Diversification: Lower correlations to domestic fixed income and equities

- **Managers add value by**
  - Industry and issue selection
  - Country selection (predicting which markets will outperform)
  - Currency weightings (predicting which currencies will outperform)

- **Catch**
  - More risks (lose money, currency, political)
  - Higher fees & expenses
  - Taxes
EQUITY CHARACTERISTICS

Emerging Market Equities

• Description
  – Stocks of developing countries (China, Brazil, Mexico)
  – Markets experiencing rapid economic growth, developing legal and professional infrastructure, and increased consumer spending

• Why include in a portfolio
  – Highest expected returns of any liquid public equity class; but also highest risk.
  – Diversification

• Managers add value by
  – Like international equity, superior stock, sector, and country selection
  – Avoiding submerging markets (political risk)
  – Managing trading costs and liquidity
  – More research into country (legal issues, accounting practices/transparency, company transparency)

• Catch
  – More risk than International Developed Equity (losses, currency, sovereign/political, illiquidity)
APPENDIX: ASSET CLASS ASSUMPTIONS
# Core Asset Class Return Assumptions

<table>
<thead>
<tr>
<th>Asset Class</th>
<th>5-7 Year Return</th>
<th>Change 2019-2018</th>
<th>Volatility</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cash</td>
<td>2.50%</td>
<td>+.50%</td>
<td>1.00%</td>
</tr>
<tr>
<td>US Inflation</td>
<td>2.25%</td>
<td>-0.25%</td>
<td>-</td>
</tr>
<tr>
<td>Large Cap Equities</td>
<td>6.00%</td>
<td>+0.75%</td>
<td>16.50%</td>
</tr>
<tr>
<td>International Equities (Unhedged)</td>
<td>6.75%</td>
<td>-0.75%</td>
<td>20.50%</td>
</tr>
<tr>
<td>Emerging International Equities</td>
<td>9.25%</td>
<td>+0.25%</td>
<td>28.00%</td>
</tr>
<tr>
<td>Private Equity*</td>
<td>10.01%</td>
<td>+2.01%</td>
<td>24.16%</td>
</tr>
<tr>
<td>Treasuries</td>
<td>2.50%</td>
<td>+0.25%</td>
<td>5.50%</td>
</tr>
<tr>
<td>Core Bonds*</td>
<td>3.04%</td>
<td>+0.29%</td>
<td>6.10%</td>
</tr>
<tr>
<td>Municipal Bonds (1-10 Year)</td>
<td>3.00%</td>
<td>+0.50%</td>
<td>5.50%</td>
</tr>
<tr>
<td>High Yield Bonds</td>
<td>5.25%</td>
<td>+1.50%</td>
<td>12.50%</td>
</tr>
<tr>
<td>Private Debt*</td>
<td>7.60%</td>
<td>+1.10%</td>
<td>11.97%</td>
</tr>
<tr>
<td>Commodities</td>
<td>4.25%</td>
<td>-0.50%</td>
<td>19.00%</td>
</tr>
<tr>
<td>Midstream Energy</td>
<td>8.25%</td>
<td>+1.00%</td>
<td>18.50%</td>
</tr>
<tr>
<td>REITs</td>
<td>6.75%</td>
<td>+0.25%</td>
<td>20.00%</td>
</tr>
<tr>
<td>Core Real Estate</td>
<td>6.00%</td>
<td>+0.25%</td>
<td>13.00%</td>
</tr>
<tr>
<td>US 60/40*</td>
<td>5.07%</td>
<td>+0.53%</td>
<td>10.45%</td>
</tr>
<tr>
<td>Global 60/40*</td>
<td>5.08%</td>
<td>+0.17%</td>
<td>10.95%</td>
</tr>
<tr>
<td>Hedge Funds*</td>
<td>5.74%</td>
<td>-0.09%</td>
<td>8.15%</td>
</tr>
</tbody>
</table>

*Calculated as a blend of other asset classes – see page 48 for additional details
## Rates & Credit: Assumptions

<table>
<thead>
<tr>
<th>Rate &amp; Credit Building Blocks</th>
<th>Asset Class</th>
<th>5-7 Year Return</th>
<th>Change 2019-2018</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Illiquidity Premium</strong></td>
<td>TIPS</td>
<td>3.00%</td>
<td>-0.25%</td>
</tr>
<tr>
<td></td>
<td>Treasuries</td>
<td>2.50%</td>
<td>+0.25%</td>
</tr>
<tr>
<td></td>
<td>Investment-Grade Corporate Credit</td>
<td>4.00%</td>
<td>+0.50%</td>
</tr>
<tr>
<td></td>
<td>MBS</td>
<td>2.75%</td>
<td>+0.25%</td>
</tr>
<tr>
<td></td>
<td>High-Yield Bonds</td>
<td>5.25%</td>
<td>+1.50%</td>
</tr>
<tr>
<td></td>
<td>Bank Loans</td>
<td>5.00%</td>
<td>+1.00%</td>
</tr>
<tr>
<td></td>
<td>EMD (External)</td>
<td>4.75%</td>
<td>+0.50%</td>
</tr>
<tr>
<td></td>
<td>EMD (Local Currency)</td>
<td>6.50%</td>
<td>+0.50%</td>
</tr>
<tr>
<td></td>
<td>Non-US Bonds (Unhedged)</td>
<td>0.75%</td>
<td>+0.25%</td>
</tr>
<tr>
<td></td>
<td>Municipal Bonds (1-10 Year)</td>
<td>3.00%</td>
<td>+0.50%</td>
</tr>
<tr>
<td></td>
<td>High-Yield Municipal Bonds</td>
<td>3.00%</td>
<td>-0.75%</td>
</tr>
<tr>
<td></td>
<td>Hedge Funds – Credit</td>
<td>5.50%</td>
<td>+0.50%</td>
</tr>
<tr>
<td><strong>Government Rates Price Change</strong></td>
<td>Core Bonds</td>
<td>3.04%</td>
<td>+0.29%</td>
</tr>
<tr>
<td></td>
<td>Private Debt</td>
<td>7.60%</td>
<td>+1.10%</td>
</tr>
<tr>
<td><strong>Spread Price Change</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Credit Deterioration</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Credit Spread</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Government Rates</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
CREDIT: BUILDING BLOCKS (5-7 YEARS)

**Sources of Expected Return**

- **US Treasury**: 2.50%
- **IG Credit**: 4.00%
- **MBS**: 2.75%
- **High-Yield**: 5.25%
- **Bank Loans**: 5.50%
- **EMD (USD)**: 4.75%
- **EMD (Local)**: 6.50%
- **Municipal Bond**: 7.60%
- **HY Municipal Bond**: 3.00%
- **Private Debt**: 3.00%
- **Hedge Funds - Credit**: 5.50%

---

**Source**: NEPC

*Calculated as a blend of other classes – see page 48 for additional details*
EQUITY: ASSUMPTIONS

### Equity Building Blocks

<table>
<thead>
<tr>
<th>Block</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Illiquidity</strong></td>
<td>The additional return expected for investments carrying liquidity risk</td>
</tr>
<tr>
<td><strong>Valuation</strong></td>
<td>An input representing P/E multiple contraction or expansion relative to long-term trend</td>
</tr>
<tr>
<td><strong>Inflation</strong></td>
<td>Represents market-specific inflation derived from index country revenue contribution and region-specific forecasted inflation</td>
</tr>
<tr>
<td><strong>Real Earnings Growth</strong></td>
<td>Reflects market-specific real growth for each equity asset class as a weighted-average derived from index country revenue contribution and forecasted GDP growth</td>
</tr>
<tr>
<td><strong>Dividend Yield</strong></td>
<td>Informed by current income distributed to shareholders with adjustments made to reflect market conditions and trends</td>
</tr>
</tbody>
</table>

### Asset Class Returns

<table>
<thead>
<tr>
<th>Asset Class</th>
<th>5-7 Year Return</th>
<th>Change 2019-2018</th>
</tr>
</thead>
<tbody>
<tr>
<td>US Large Cap</td>
<td>6.00%</td>
<td>+0.75%</td>
</tr>
<tr>
<td>US Small/Mid-Cap</td>
<td>6.25%</td>
<td>+0.50%</td>
</tr>
<tr>
<td>US Micro Cap</td>
<td>7.25%</td>
<td>N/A</td>
</tr>
<tr>
<td>International (Unhedged)</td>
<td>6.75%</td>
<td>-0.75%</td>
</tr>
<tr>
<td>International Small Cap</td>
<td>7.25%</td>
<td>-0.50%</td>
</tr>
<tr>
<td>Emerging International</td>
<td>9.25%</td>
<td>+0.25%</td>
</tr>
<tr>
<td>Emerging Intl. Small Cap</td>
<td>9.50%</td>
<td>+0.25%</td>
</tr>
<tr>
<td>China Local</td>
<td>9.50%</td>
<td>N/A</td>
</tr>
<tr>
<td>Hedge Funds – Long/Short</td>
<td>5.50%</td>
<td>-0.75%</td>
</tr>
<tr>
<td>Global Equity</td>
<td>6.99%</td>
<td>+0.11%</td>
</tr>
<tr>
<td>Private Equity</td>
<td>10.01%</td>
<td>+2.01%</td>
</tr>
</tbody>
</table>
EQUITY: BUILDING BLOCKS (5-7 YEARS)

Sources of Expected Return

- US Large Cap: 6.00%
- US Small/Mid Cap: 6.25%
- US Micro Cap: 7.25%
- Int'l Developed: 6.75%
- Int'l Developed Small Cap: 7.25%
- Emerging Markets: 9.25%
- EM Small Cap: 9.50%
- China Local Equity: 9.50%
- Private Equity*: 10.01%
- Global Equity*: 6.99%
- Hedge Funds - Long/Short*: 5.50%

Legend:
- Green: Real Earnings Growth
- Blue: Inflation
- Red: Dividend Yield
- Brown: Valuation
- Beige: Illiquidity Premia
- Black: Alpha
- Plus: Total Return

Source: NEPC

*Calculated as a blend of other classes – see page 48 for additional details
REAL ASSETS: ASSUMPTIONS

<table>
<thead>
<tr>
<th>Real Assets Building Blocks</th>
<th>Asset Class</th>
<th>5-7 Year Return</th>
<th>Change 2019-2018</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Illiquidity Premium</strong></td>
<td>Commodities</td>
<td>4.25%</td>
<td>-0.50%</td>
</tr>
<tr>
<td></td>
<td>Midstream Energy</td>
<td>8.25%</td>
<td>+1.00%</td>
</tr>
<tr>
<td></td>
<td>REITs</td>
<td>6.75%</td>
<td>+0.25%</td>
</tr>
<tr>
<td></td>
<td>Core Real Estate</td>
<td>6.00%</td>
<td>+0.25%</td>
</tr>
<tr>
<td></td>
<td>Non-Core Real Estate</td>
<td>7.00%</td>
<td>-</td>
</tr>
<tr>
<td></td>
<td>Private RE Debt</td>
<td>5.75%</td>
<td>N/A</td>
</tr>
<tr>
<td></td>
<td>Private Real Assets: Energy/Metals</td>
<td>9.50%</td>
<td>+1.50%</td>
</tr>
<tr>
<td></td>
<td>Private Real Assets: Infrastructure/Land</td>
<td>6.25%</td>
<td>+0.25%</td>
</tr>
</tbody>
</table>

- **Illiquidity Premium**: The additional return expected for investments carrying liquidity risk.
- **Valuation**: The expected change in price of the underlying asset reverting to a long-term real average or terminal value assumption.
- **Inflation**: Incorporates the inflation paths as defined by TIPS breakeven expectations and NEPC expected inflation assumptions.
- **Real Earnings Growth**: Reflects market-specific real growth for each equity asset class as a weighted-average derived from index country revenue contribution and forecasted GDP growth.
- **Real Income**: Represents the inflation-adjusted income produced by the underlying tangible or physical asset.
REAL ASSETS: BUILDING BLOCKS (5-7 YEARS)
GLOSSARY
GLOSSARY

• **Stock**
  – You own a little piece of a company when you invest/buy stock.

• **Bond**
  – Similar to a loan, you are borrowing from a company when you invest/buy bonds.

• **Leverage**
  – “Adding debt.” Using borrowed money/capital to increase the potential return of an investment.
  • Example: Taking out a loan to buy a house. You will need to pay off the loan plus interest, but hope that you sell the house for more than you bought it for. Thus making a higher return/capital gain.

• **Liquidity**
  – How easily you can sell or buy an asset or security in the market. Some assets have daily and monthly valuation (liquid) and others could have annual valuation or even up to 5-10 year investment periods (illiquid).

• **Custodian**
  – A financial institution that holds securities and other assets for a client. This minimizes the risk of loss or theft.

• **Volatility**
  – Measure of risk or uncertainty about the size of changes in the value of a security.

• **Capital Gain**
  – Profit from the sale of an investment; based on selling your asset/security for a higher price than you bought it for.

• **Capital Loss**
  – Loss from the sale of an investment; based on selling your asset/security for a lower price than you bought it for.
Index: A statistical composite that measures changes in the economy or in specific financial markets, usually expressed relative to a base year. Some well-known indexes include the Dow Jones, S&P 500, NASDAQ, Russell and Consumer Price Index (CPI).

Benchmark: Any basis of measurement, such as an interest rate or an index of stock performance, that is used as a reference point for purposes of comparison.

Rebalance: To sell existing investments and buy new investments in order to maintain the agreed-upon asset mix. A discipline to facilitate “buy low/sell high.”

However when you buy low the price can go lower, and you can sell high when the price ends up rising higher

However, problems can arise when:
  • You sell an investment and the price rises
  • You buy an investment and the price falls

Beta: The degree to which a portfolio moves in tandem with the benchmark index.

A measure of the overall market’s risk

  • The market’s Beta is 1.0 by definition
    • A portfolio with a beta of 0.5 is half as risky as the market
    • A portfolio with a beta of 2.0 is twice as risky as the market
• **Correlation:**  
  – A measure of the degree to which two asset classes move together

• **Expected Return:**  
  – The expected percentage change in an accounts market value over a defined period of time (evaluation period)

• **Standard Deviation**  
  – Statistical measure of the distance a quantity is likely to lie from its average value  
  – Measures an investment’s volatility or “risk”

• **Asset Allocation**  
  – An investment strategy that aims to balance risk and reward by apportioning a portfolio’s assets according to goals, risk tolerance and investment horizon.
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• The comments provided herein should be considered a general overview and do not constitute investment advice, are not predictive of any future market performance, are not provided as a sales or advertising communication, and do not represent an offer to sell or a solicitation of an offer to buy any security.

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