Investments 101 and 201: Fixed Income, Public Equities & Alternatives

2018 Trustee Educational Seminar
May 12 – 13
New York, NY
Session Overview

- About Your Instructor
- Focus on the Fundamentals
- Traditional Asset Class Review
- Alternative Asset Class Review
About Your Instructor

Kevin joined NEPC in 2007 and his career in the financial services industry began in 1991 and the investment consulting industry in 1994. His consulting responsibilities and background include servicing public pension plans, Taft-Hartley pension funds, hospital, endowments, and foundations. Kevin is the team leader for the NEPC Public Fund Consulting Practice and is also a member of NEPC’s Due Diligence Committee and Large Cap Equity Research Advisory Committee.

Prior to joining NEPC, Kevin was a Vice President/Partner at Segal Advisors. Prior to working at Segal Advisors, he was a Consultant at The Hannah Consulting Group, and worked at State Street Bank and Trust Company.

Kevin received his B.A. in Business Management from Assumption College. He served on the Board of Directors for the Massachusetts Public Pension Forum and is a frequent speaker at educational conferences and association seminars. Kevin was recognized as the 2012 Public Plan Consultant of the Year by Money Management Intelligence. Kevin was also a nominee for the same award in 2011.
About NEPC

NEPC, LLC is an independent, full service investment consulting firm, providing asset allocation, manager search, performance evaluation, and investment policy services. We work with discerning investors on both an advisory and discretionary basis. We service 355 retainer relationships, representing assets of $984 billion, from our offices in Boston, Atlanta, Charlotte, Chicago, Detroit, Las Vegas, Portland and San Francisco. (Data as of 6/30/2017)

• Our goal is to produce great investment ideas for our clients
• The collaboration between NEPC and our clients leads to inspired thinking
• Our success as a firm is fueled by our love for this business
• We invest heavily in research and people

We have a long and proud heritage of industry awards, but it’s what our clients say about us that means the most.

We were named a Greenwich Quality Leader for 2016 and have met the criteria in 11 of the last 14 years

• Greenwich Associates is an independent research firm. Their rankings do not represent an endorsement of NEPC.
• Past performance is no guarantee of future results.
• See Disclosures for important disclosures that should be viewed in connection with this exhibit.
FOCUS ON THE FUNDAMENTALS
Maximize the probability (while taking prudent risk) that benefit payments are delivered to current and future retirees of the Plan.
Asset Allocation is the Most Important Decision

Be Dynamic
Build a long-term strategic allocation that can meet long-term objectives

Look for medium-term "opportunistic ideas" to tilt away from the strategic allocation to add value, protect against drawdowns, and take advantage of short-term market dislocations

Build a Mosaic
No single asset allocation approach or model has all the answers

Minimize exposure to the shortcomings of any individual approach by using multiple perspectives and approaches

All analytical tools have the potential to provide useful insights but also including shortcomings
## Multiple Tools are Used in Contemplating Asset Allocation

<table>
<thead>
<tr>
<th>Approach</th>
<th>Advantages</th>
<th>Shortcomings</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mean-Variance</td>
<td>• Calculates most efficient portfolio for given volatility</td>
<td>• Relies on static assumptions and assumes normal distribution</td>
</tr>
<tr>
<td></td>
<td>• Produces range of portfolios</td>
<td>• Chosen constraints can drive results</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Limits risk definition to volatility</td>
</tr>
<tr>
<td>Liquidity Analysis</td>
<td>• Recognizes a &quot;risk&quot; not captured in traditional tools: illiquidity</td>
<td>• Requires portfolio specific cash flow and partnership details</td>
</tr>
<tr>
<td></td>
<td>• Highlights impact of changing cash flows (both investment-driven and exogenous)</td>
<td>• Long-term planning tool – cannot easily adjust portfolio or compare different portfolios</td>
</tr>
<tr>
<td>Scenario Analysis</td>
<td>• Focuses on low-probability, high magnitude economic environments (tail risks)</td>
<td>• Offers opportunity to test risk tolerance to various outcomes but should not be used to construct best portfolio for each environment</td>
</tr>
<tr>
<td></td>
<td>• Recognizes environmental biases of each asset class</td>
<td></td>
</tr>
<tr>
<td>Risk Budgeting</td>
<td>• Provides risk allocations</td>
<td>• Relies on mean-variance optimization assumptions</td>
</tr>
<tr>
<td></td>
<td>• Recognizes that less efficient portfolios may have better risk balance</td>
<td>• Defines risk as standard deviation</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Ignores tail risks</td>
</tr>
<tr>
<td>Factor Analysis</td>
<td>• Recognizes underlying economic drivers of asset class volatility</td>
<td>• Requires intuitive belief of asset class relationships to underlying factors – less quantitative and more qualitative</td>
</tr>
<tr>
<td></td>
<td>• Can identify risk concentrations across asset classes</td>
<td></td>
</tr>
<tr>
<td>Active Risk Budgeting</td>
<td>• Assesses which managers are driving risk-budget and calculates correlation of alpha’s across manager line-up</td>
<td>• Relies on historical manager returns to set expectations of risk and correlation</td>
</tr>
<tr>
<td>Stochastic Forecasting</td>
<td>• Shows range of results based on Monte Carlo simulation</td>
<td>• Percentiled results show ranges but not reasons</td>
</tr>
<tr>
<td></td>
<td>• Includes natural feedback loops</td>
<td>• Each simulated trial represents a possible but highly unlikely path</td>
</tr>
</tbody>
</table>
A traditional asset class is a grouping of similar types of investments that invests across a broad range of long only securities to earn a return.

An alternative investment vehicle accessed by accredited investors that invests across a broad range of securities using leverage, shorting, and/or locked-up capital to earn active return.

### Traditional Assets vs Alternative Assets

<table>
<thead>
<tr>
<th>Traditional Assets</th>
<th>Alternative Assets</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Equity (Stocks)</td>
<td>• Hedge Funds</td>
</tr>
<tr>
<td>• Fixed Income (Bonds)</td>
<td>• Private Equity</td>
</tr>
<tr>
<td>• Public Real Estate (REITs)</td>
<td>• Private Debt</td>
</tr>
<tr>
<td>• Commodities</td>
<td>• Real Assets</td>
</tr>
<tr>
<td>• TIPS</td>
<td>• Private Real Estate</td>
</tr>
<tr>
<td></td>
<td>• Global Asset Allocation &amp; Risk Parity</td>
</tr>
</tbody>
</table>
Asset Classes Reflect Different Ways of Packaging

Beta

Combining vertical expertise in asset classes with dynamic market views to provide optimal portfolio implementation.
TRADITIONAL ASSETS REVIEW
## Equity Overview

<table>
<thead>
<tr>
<th>Asset Type Description</th>
<th>Source of Returns</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Owner</strong></td>
<td>• Equity returns are highly cyclical as both earnings and valuation changes influence stock price movements</td>
</tr>
<tr>
<td>- Own part of the entity</td>
<td>- Equity returns can be deconstructed into sub-sector building blocks or risk premia</td>
</tr>
<tr>
<td><strong>Residual claim on earnings</strong></td>
<td>• Dividend income paid in excess of retained earnings to a stockholder</td>
</tr>
<tr>
<td>- Dividends</td>
<td>- Dividends have historically been a large source of returns but declined in last 40 years</td>
</tr>
<tr>
<td>- Price appreciation</td>
<td>• Valuation represented by the P/E ratio or the price investors are willing to pay for earnings</td>
</tr>
<tr>
<td><strong>Price changes</strong></td>
<td>- P/E is highly cyclical in nature and influenced by investor risk appetite</td>
</tr>
<tr>
<td>- Expected earnings</td>
<td>• Real Earnings Growth</td>
</tr>
<tr>
<td>o Macro factors</td>
<td>- Growth of corporate earnings in excess of inflation</td>
</tr>
<tr>
<td>o Company factors</td>
<td>- Earnings influenced both by changes in profit margins and economic growth cycles</td>
</tr>
</tbody>
</table>
Mapping U.S. Equity Indices

The Russell index suite is the most common set of domestic (U.S.) equity indices.
- The indices are broken out by style (core, value and growth)
# Mapping International Equity Indices

<table>
<thead>
<tr>
<th>Index Name &amp; Description</th>
<th>Developed Country Exposure</th>
<th>Emerging Country Exposure</th>
</tr>
</thead>
</table>
| **MSCI ACWI ex US**      | • Europe: Austria, Belgium, Denmark, Finland, France, Germany, Ireland, Israel, Italy, Netherlands, Norway, Portugal, France, Spain, Sweden, Switzerland, UK  
  • Americas: Canada  
  • Pacific: Australia, Hong Kong, Japan, New Zealand, Singapore | • Americas: Brazil, Chile, Colombia, Mexico, Peru  
  • Middle East/Europe/Africa: Czech Republic, Egypt, Greece, Hungary, Poland, Qatar, Russia, South Africa, Turkey, UAE  
  • Asia: China, India, Indonesia, Korea, Malaysia, Philippines, Taiwan, Thailand |
| **MSCI EAFE**            | • Europe: Austria, Belgium, Denmark, Finland, France, Germany, Ireland, Israel, Italy, Netherlands, Norway, Portugal, France, Spain, Sweden, Switzerland, UK  
  • Americas: Canada  
  • Pacific: Australia, Hong Kong, Japan, New Zealand, Singapore | None |
| **MSCI Emerging Market** | None                       | None                      |

Consists of 23 countries representing 10% of the world market capitalization, covers approximately 85% of the free float-adjusted market capitalization in each of the 23 countries.

Source: MSCI
# Fixed Income Overview

<table>
<thead>
<tr>
<th>Asset Type Description</th>
<th>Source of Returns</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Creditor</strong></td>
<td>• Cash&lt;br&gt;− Can be subdivided into both real risk-free rate and inflation</td>
</tr>
<tr>
<td></td>
<td>• Term Premium&lt;br&gt;− Income earned by an investor in excess of cash&lt;br&gt;− Represents the premium for lending your cash over a maturity period</td>
</tr>
<tr>
<td><strong>Owed interest &amp; principal</strong></td>
<td>• Credit Spread&lt;br&gt;− Income earned by an investor in excess of cash and the credit spread&lt;br&gt;− Represents the return premium for assuming issuer default risk</td>
</tr>
<tr>
<td></td>
<td>• Changes in Interest Rates (Valuation)&lt;br&gt;− Price change of a bond due to the change in interest rates&lt;br&gt;− Represents a valuation input as current interest rates incorporate expectations of interest rate changes (forward rates) relative to economic conditions</td>
</tr>
</tbody>
</table>

- **Asset Type Description**
  - **Creditor**
    - Loan the entity money
  - **Owed interest & principal**
    - Regular interest payments (yield)
    - Zero coupon (interest and principal at maturity)
  - **Price Changes**
    - Interest rate change
    - Spread (over Treasury rate) change
    - Credit quality change
      - Estimate probability of:
        1. Default
        2. Recovery

- **Source of Returns**
  - **Cash**
  - **Term Premium**
  - **Credit Spread**
  - **Changes in Interest Rates (Valuation)**
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.
# Description of Fixed Income Securities

<table>
<thead>
<tr>
<th>Type</th>
<th>Description</th>
<th>Why Include in a Portfolio</th>
<th>Managers Add Value by</th>
</tr>
</thead>
</table>
| Core Fixed Income     | 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” | • Stabilizes portfolio returns  
• Low correlation to equities (diversification benefits)  
• A core holding in almost all institutional portfolios                                                                 | • Interest rate moves (Duration positioning)  
• Yield curve positioning  
• Capturing yield on securities with varying maturities  
• Sector diversification  
• Issue selection: Credit research (avoiding defaults) |
| High Yield            | Corporate bonds with credit ratings of less than BBB. Typically have higher yields, higher default risk, lower financial stability, and/or more debt Portfolios are diversified to limit default risk of a single issuer | • Attractive coupon yields, Good risk-adjusted returns, Diversification benefits                              | • Credit analysis  
• Avoiding downgrades and defaults  
• Identifying securities poised for credit rating upgrade  
• Holding bonds with spreads narrowing to Treasuries                                                      |
| TIPS                  | 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 | • Inflation protection, as measured by CPI  
• Real rate component of TIPS’ return will move counter-cyclically with the economy                           | • Using multiple valuation factors such as inflation outlook, level of real rates, and seasonal factors to identify undervalued securities.|
| International/Global  | Dollar and Non-dollar fixed income securities issued by foreign governments/sovereigns, supranational, foreign companies, mortgage-backed securities. Global portfolios include US securities | • Diversification  
• World’s largest investable asset class  
• Foreign/Global portfolios look different from domestic portfolios  
• Currency fluctuations, out of sync world markets, interest rate fluctuation by region, etc.            | • Duration and curve management  
• Credit analysis  
• Sector selection  
• Country/region selection  
• Currency management                                                                                     |
| Emerging Market       | Debt issued by emerging market countries 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                                                 | • Diversification  
• Non-dollar exposure can protect against potential declines in the US dollar  
• Emerging markets to contribute up to approx. 50% of Global GDP in the coming years                      | • Duration and curve management  
• Credit analysis  
• Sector selection  
• Country/region selection  
• Currency management  
• Avoiding political risks                                                                                 |
ALTERNATIVE ASSETS REVIEW
Hedge Fund Overview

• Diversification:
  − Hedge funds can provide diversification benefits to a total portfolio through historically low correlations to traditional asset classes

• 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

• Access to non-traditional strategies:
  − Hedge funds utilize strategies and implementation tools less available to traditional investment vehicles
    • Broad flexible mandates or specialized niche strategies
    • Use of shorting and leverage
    • Illiquid investments
Hedge Funds vs Long-Only Funds

<table>
<thead>
<tr>
<th></th>
<th>Long-Only Funds</th>
<th>Hedge Funds</th>
</tr>
</thead>
<tbody>
<tr>
<td>Value proposition</td>
<td>Market dependent/Benchmark oriented</td>
<td>Skill based/Benchmark agnostic</td>
</tr>
<tr>
<td>Type of exposure</td>
<td>Long-only</td>
<td>Flexible exposure: long/short, market neutral</td>
</tr>
<tr>
<td>Investing style</td>
<td>Style constraints (value, growth, etc.)</td>
<td>Broad guidelines, few constraints</td>
</tr>
<tr>
<td>Instruments traded</td>
<td>Predominately publicly traded stocks and bonds</td>
<td>Stocks, bonds, derivatives (futures, swaps, options), privates</td>
</tr>
<tr>
<td>Leverage employed</td>
<td>Usually none</td>
<td>Can employ leverage</td>
</tr>
<tr>
<td>Liquidity</td>
<td>Frequent liquidity</td>
<td>Restricted liquidity</td>
</tr>
</tbody>
</table>

- Typically owned and managed by private partnerships, hedge funds are generally less transparent and have fewer regulations than traditional investments.
- Compensation structure: managers are paid a management fee (1.0% to 2.0% of the Fund NAV annually) and a performance fee (usually 10% to 20% of profits). Typically, hedge fund managers report returns net of fees.
- Hedge funds can provide diversification benefits to a total portfolio through historically low correlations to traditional asset classes.
### Types of Hedge Fund Strategies

<table>
<thead>
<tr>
<th>Strategy</th>
<th>Definition</th>
</tr>
</thead>
</table>
| **Equity-Linked** | • Managers combine a long portfolio with the short sale of stocks  
• Portfolios range from net short to net long, depending on market conditions  
• Aggressive funds may capture returns by exceeding 100% exposure while conservative funds mitigate market risk by maintaining net exposures of between 0-50%  

| **Credit-Linked** | • Managers invest across the spectrum of fixed-income/credit assets ranging from sovereign bonds and corporate debt to securitized products, seeking to capitalize on both yield/income and capital appreciation.  
• Strategies utilize quantitative and qualitative analysis to identify mispricings  
• Can be directional (focused on a single security) or relative value (focused on relationship between securities)  
• Examples include credit long/short, capital structure arbitrage, convertible arbitrage, and fixed income arbitrage; some overlap with distressed-oriented event-driven strategies  

| **Event-Driven** | • Managers invest in situations with the expectation that a near term event will act as a catalyst changing the market’s perception of a company, thereby increasing or decreasing the value of its equity or debt  
• Events include, bankruptcies, financial restructurings, mergers, acquisitions and spin-offs  
• Three types of event disciplines: merger arbitrage, distressed securities and special situations  

| **Global Macro** | • Trade highly liquid instruments, long and short, including currencies, commodities, fixed income instruments and equity indices  
• Low correlation to traditional and alternative asset classes  
• Discretionary strategies employ broad analysis of economic, financial and political data to identify themes  
• Systematic strategies use algorithmic models to analyze historical data, both technical and fundamental  

| **Multi-Strategy** | • Managers employ a diversified portfolio with various investment approaches  
• Strategies may include convertible arbitrage, merger arbitrage, and fixed income arbitrage positions  
• Managers can over or under-weight different strategies to capitalize best on current investment opportunities   


Private Equity Overview

• Private Equity is a source of investment capital provided by institutions and high net worth individuals for the purposes of acquiring interests in companies and/or products.

• Its role in a portfolio is as a return enhancer, with the premium earned over other investment options serving to compensate for the liquidity risk.

• **Large investable universe**
  – Over $400 billion raised annually across strategies in each of the last three years
  – Over $3 trillion in assets under management, including portfolio value and un-invested capital

• **Two components of private equity/private debt return:**
  – *Capital Appreciation:* Derived from an increase in the value of an asset between acquisition and sale
  – *Current Income:* Derived from portfolio company operations, loans and leases

• **Investment diversification**
  – Not fully correlated with public equities
  – Access to smaller companies and wider range of strategies
Mechanics of Investing in Private Equity
## Spectrum of Private Equity Strategies

<table>
<thead>
<tr>
<th>Asset Class</th>
<th>Strategy Focus</th>
<th>Typical Return Targets</th>
<th>Time Horizon</th>
</tr>
</thead>
<tbody>
<tr>
<td>Venture</td>
<td>Early stage innovative / disruptive companies</td>
<td>15% - 20% IRR, 2.0x TVPI</td>
<td>6-10 years</td>
</tr>
<tr>
<td>Growth Equity</td>
<td>Expansion capital for small, growing businesses</td>
<td>15% - 20% IRR, 1.7x TVPI</td>
<td>3-6 years</td>
</tr>
<tr>
<td>Buyouts</td>
<td>Investments to restructure or expand established companies</td>
<td>17% – 20% IRR, 1.8x TVPI</td>
<td>4-6 years</td>
</tr>
<tr>
<td>Special Situations</td>
<td>Investments in mature businesses that may be profitable or unprofitable</td>
<td>15% – 20% IRR, 1.8x TVPI</td>
<td>3-6 years</td>
</tr>
<tr>
<td>Mezzanine</td>
<td>Subordinated debt to grow or restructure companies</td>
<td>8% -12% IRR, 1.4x TVPI</td>
<td>5-7 years</td>
</tr>
<tr>
<td>Opportunistic Credit</td>
<td>Investment strategy involving various credit-linked opportunities</td>
<td>13% - 17% IRR, 1.3x-1.8x TVPI</td>
<td>1-4 years</td>
</tr>
<tr>
<td>Direct Lending</td>
<td>Primarily floating rate senior and/or unitranche (senior and subordinated debt in one instrument) debt capital used for various situations</td>
<td>8% - 12% IRR, 1.3x-1.5x TVPI</td>
<td>2-4 years</td>
</tr>
<tr>
<td>Distressed Debt</td>
<td>Companies with bad balance sheets</td>
<td>10% - 20% IRR, 1.7x TVPI</td>
<td>2-4 years</td>
</tr>
<tr>
<td>Secondaries</td>
<td>Exchange of Limited Partnership interest in established PE partnerships</td>
<td>10% - 15% IRR, 1.5x TVPI</td>
<td>2-3 years</td>
</tr>
</tbody>
</table>
Real Estate Overview

- Institutional quality/commercial real estate is property intended to generate a return from rental income and/or capital appreciation
  - Can be publicly traded or privately held
  - Strategies exist spanning the risk/return spectrum from stabilized core real estate to development-oriented opportunistic real estate
  - Main property types include apartments, office buildings, shopping centers, hotels, industrial properties, etc.

- Two components of real estate return:
  - Current Income: Derived from tenant rents/leases that typically increase with inflation
  - Capital Appreciation: Increase in the value of an asset between acquisition and sale

- Large real estate investable universe
  - Over $525 billion of privately-owned institutional quality real estate in the US
  - Over $1.1 trillion of total capital raised by closed-end fund managers since 2005
  - US publicly-traded REITs with an aggregate market cap of over $950 billion

- Leverage can amplify (both positively and negatively) returns from current income and capital appreciation
# Spectrum of Real Estate Investment Strategies

<table>
<thead>
<tr>
<th>Core Strategies</th>
<th>Investment Strategy</th>
<th>Portfolio Role</th>
<th>Considerations</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Real Estate Investment Style / Overview</strong></td>
<td><strong>Investment Strategy</strong></td>
<td><strong>Portfolio Role</strong></td>
<td><strong>Considerations</strong></td>
</tr>
</tbody>
</table>
| Core | Return driver: income  
Primary vehicle: open-end funds  
Historical avg. returns: 7-8%  
Leverage: 15-30%  
Hold period: long-term | Stabilized income producing assets | Current income  
Broad exposure to commercial real estate (asset class beta)  
Inflation protection | Vehicles are semi-liquid (entrance/exit queues)  
Limited alpha producing opportunities |
| REITs | Return driver: income  
Primary vehicle: REIT funds  
Historical avg. returns: 7-9%  
Leverage: 30-50%  
Hold period: long-term | Stabilized income producing assets | Current income (dividends)  
Long-term exposure to commercial real estate (beta)  
Long-term inflation protection | Volatility  
Equity correlation |

<table>
<thead>
<tr>
<th>Value-Add</th>
<th>Investment Strategy</th>
<th>Portfolio Role</th>
<th>Considerations</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Real Estate Investment Style / Overview</strong></td>
<td><strong>Investment Strategy</strong></td>
<td><strong>Portfolio Role</strong></td>
<td><strong>Considerations</strong></td>
</tr>
</tbody>
</table>
| Value-Add | Return driver: income/appreciation  
Primary vehicle: varies  
Historical avg. returns: 8-10%  
Leverage: 40-70%  
Hold period: 3-5 years | Properties requiring lease-up, repositioning, renovation or rehabilitation | Provides part current income and capital appreciation  
Some inflation protection | Vehicles are semi-liquid or illiquid  
Vintage year is important  
Higher leverage vs core  
Poor benchmarks |

<table>
<thead>
<tr>
<th>Opportunistic</th>
<th>Investment Strategy</th>
<th>Portfolio Role</th>
<th>Considerations</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Real Estate Investment Style / Overview</strong></td>
<td><strong>Investment Strategy</strong></td>
<td><strong>Portfolio Role</strong></td>
<td><strong>Considerations</strong></td>
</tr>
</tbody>
</table>
| Opportunistic | Return driver: appreciation  
Primary vehicle: closed-end funds  
Historical avg. returns: 10-12%  
Leverage: 60%+  
Hold period: varies | Distressed investments, recapitalizations, development, etc. | Real estate alpha through capital appreciation with minimal current income | Vehicles are illiquid  
Vintage year is important  
High leverage  
Poor benchmarks |

<table>
<thead>
<tr>
<th>Non-Core Strategies</th>
<th>Investment Strategy</th>
<th>Portfolio Role</th>
<th>Considerations</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Real Estate Investment Style / Overview</strong></td>
<td><strong>Investment Strategy</strong></td>
<td><strong>Portfolio Role</strong></td>
<td><strong>Considerations</strong></td>
</tr>
</tbody>
</table>
| Real Estate Debt | Return driver: varies  
Primary vehicle: closed-end funds  
Historical avg. returns: 8-10%  
Leverage: varies  
Hold period: varies | Varying risk/return profiles (senior loans to higher risk structures) | Mixed strategies:  
Current income w/downside protection  
Higher risk opportunistic/mezz. debt strategies | Limited return upside (asymmetric risk profile)  
Minimal inflation protection  
Vintage year is important  
Poor benchmarks |
Real Assets Overview

- **What are Real Assets?**
  - Real Estate
  - Commodities
  - Timber
  - Inflation-linked products

- **Why invest in Real Assets?**
  - Diversification
  - Offers “real” (after inflation) return

- **Challenges**
  - Liquidity – depends on the strategy
    - Liquidity can also impact the correlation to periods of rising inflation
  - Return expectations
    - Generally have lower expected returns than equities
  - Can underperform traditional markets for extended periods of time
    - Is now the right time for inflation protection?

<table>
<thead>
<tr>
<th>Sector</th>
<th>Example Property Types</th>
<th>Key Return Drivers</th>
</tr>
</thead>
</table>
| Core Infrastructure | • Roads/Parking  
                      • Ports  
                      • Midstream Energy/Utilities  
                      • Water/Waste Water           | • GDP growth  
                      • Monopolistic markets with high barriers to entry which limits competition |
| Farmland        | • Row Crops  
                      • Permanent Crops  
                      • Protein  
                      • Dairy                   | • Biological growth  
                      • Crop prices  
                      • Land value               |
| Timber          | • Timberland – diversified by region and species          | • Biological Growth  
                      • Timber price  
                      • Land value               |
Relative Expected Risk Return Profile of Real Asset Sectors
# Role of Private Real Assets in a Portfolio

NEPC believes that Real Asset investments can play an important role as part of an overall investment plan.

## Real Asset Benefits

<table>
<thead>
<tr>
<th>Benefits</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Low historical correlation</strong> to stocks and bonds and should provide diversification benefits to the overall portfolio</td>
</tr>
<tr>
<td>Provides both <strong>current income</strong> and the potential for <strong>capital appreciation</strong> (each of which can be enhanced with leverage)</td>
</tr>
<tr>
<td>Over the long term, should provide a <strong>hedge against inflation</strong> as components of real assets are sensitive to inflation, especially unexpected inflation</td>
</tr>
<tr>
<td>Offers a <strong>spectrum of investment strategies</strong> (providing different return and risk expectations) that can be customized to meet different objectives</td>
</tr>
</tbody>
</table>

## Real Asset Considerations

<table>
<thead>
<tr>
<th>Considerations</th>
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</thead>
<tbody>
<tr>
<td>Investments may be <strong>illiquid</strong>, particularly during falling markets (excluding public investments)</td>
</tr>
<tr>
<td><strong>Limited and imperfect benchmarks</strong> exist to gauge investment performance</td>
</tr>
<tr>
<td>Valuations are based on underlying transaction markets which have <strong>limited transparency</strong> and asset appraisals can <strong>lag</strong> real-time market valuations</td>
</tr>
<tr>
<td>Real Asset strategies are affected by <strong>macroeconomic factors</strong> and are <strong>cyclical by nature</strong></td>
</tr>
<tr>
<td>The use of <strong>leverage amplifies negative performance</strong></td>
</tr>
</tbody>
</table>
DISCLAIMERS AND DISCLOSURES
• Past performance is no guarantee of future results.

• The opinions presented herein represent the good faith views of NEPC as of the date of this report and are subject to change at any time.

• Data used to prepare this report was obtained directly from various sources. While NEPC has exercised reasonable professional care in preparing this report, we cannot guarantee the accuracy of all source information contained within.

• NEPC may provide background information on fund structures or the impact of taxes but you should contact your legal counsel or tax professional for specific advice on such matters.
It is important that investors understand the following characteristics of non-traditional investment strategies including hedge funds and private equity:

1. Performance can be volatile and investors could lose all or a substantial portion of their investment
2. Leverage and other speculative practices may increase the risk of loss
3. Past performance may be revised due to the revaluation of investments
4. These investments can be illiquid, and investors may be subject to lock-ups or lengthy redemption terms
5. A secondary market may not be available for all funds, and any sales that occur may take place at a discount to value
6. These funds are not subject to the same regulatory requirements as registered investment vehicles
7. Managers may not be required to provide periodic pricing or valuation information to investors
8. These funds may have complex tax structures and delays in distributing important tax information
9. These funds often charge high fees
10. Investment agreements often give the manager authority to trade in securities, markets or currencies that are not within the manager’s realm of expertise or contemplated investment strategy
Greenwich Associates

Greenwich Associates (“Greenwich”) is an independent research firm that has surveyed plan sponsors with assets in excess of $150 million for many years to document their opinions of their investment consulting relationships.

- The 2016 survey is based on interviews with 1,216 plan sponsors, 81 of whom retained NEPC.
- See table for more details

NEPC receives the survey results in exchange for providing Greenwich with evaluations of investment managers. NEPC does not pay Greenwich any compensation for inclusion in this study.

- The Greenwich Quality Index is based on collective client ratings over a number of qualitative categories known as “Key Success Factors”, which represent client perceptions of NEPC’s investment counseling, manager selection, client service and commercial arrangement (fees). More details are available upon request.
- Study participants are asked to provide qualitative and quantitative evaluations of their consultants. Based on those responses, Greenwich Associates calculates a score on the Greenwich Quality Index for each consultant named. Consultants with scores that top those awarded to competitors by a statistically significant margin are named Greenwich Quality Leaders. Only three large consultants (defined as the 10 firms with the most citations) received this recognition in 2016.
- The rankings are not necessarily representative of any single client’s experience since such rankings reflect the average of client responses to the survey.
- The rankings do not represent an endorsement of NEPC and should not be viewed as an indication of NEPC’s future performance.