2019 Annual Seminar

Presentations Available at www.tmrs.com/ats.php
Teamwork in Investments

Presenters: T.J. Carlson, Chief Investment Officer
Chris Schelling, Director of Private Equity
Outline

Part I. Due Diligence
• What is it?
• Why do it?
• Key considerations
• Pipeline
• Process
• How it’s done
• Monitoring
• Risk Management

Part II. Asset Class Overview
• Total Portfolio
• Asset Classes
  • Global Equity
  • Core Fixed Income
  • Non-Core Fixed Income
  • Real Estate
  • Real Return
  • Private Equity
  • Absolute Return
• Compliance
• Risk Management
Part I. Due Diligence
What Is Due Diligence?

• Due diligence is a process of researching and questioning meant to address an investment thesis, strategy, or specific manager to help decide why you might add the specific thesis, strategy, or manager to your portfolio, and to identify any potential risks to doing so.

• Main issues considered
  • The strengths of the firm – team, organization, and strategy
  • Risks and issues to watch that could impact the outcome

• Principles-based framework
  • The Five P’s of Due Diligence

• Continuous, systematized process

“Diligence is the mother of good fortune.”
— Miguel De Cervantes
Why Do Diligence?

Practitioner Research

Time Spent in Due Diligence and Percent of Returns

Source: AIPP | fundify.com
## Why Do Diligence?

### Practitioner Research

<table>
<thead>
<tr>
<th>Number of hours in Due Diligence</th>
<th>Average early stage VC MOIC</th>
</tr>
</thead>
<tbody>
<tr>
<td>Less than 5 hours</td>
<td>0.8x</td>
</tr>
<tr>
<td>5 to 15 hours</td>
<td>1.3x</td>
</tr>
<tr>
<td>15 to 40 hours</td>
<td>3.9x</td>
</tr>
<tr>
<td>More than 40 hours</td>
<td>7.1x</td>
</tr>
</tbody>
</table>

Source: AIPP | fundify.com
What Are Some Key Considerations?

Differences between public and private markets

• Significant differences between public and private markets
  • Micro-structural (manager dynamics)
    • Competitive balance – less efficient markets
    • Less transparency, less information
    • Greater dispersion in returns/higher return to manager selection
  • Macro-structural (asset class dynamics)
    • Regulatory differences
    • Liquidity differences
    • Different risk profiles

• Requires different sets of diligence practices
Terms and Fees

• Fees almost always include incentive fee
  • Mutual funds: 1.0% of assets
  • Private funds: 2.0% of assets or 20% of profits

• Committed vs. invested capital
  • Institution commits to invest $10 million in a fund
  • Private equity manager calls capital up to five years after commitment

• Term structure
  • Open-end fund lives can be perpetual
  • Closed-end, private equity funds typically 10 years
Liquidity Restrictions

- As opposed to traditional investments, many diversifying investment products will have limited liquidity. This lack of liquidity can be an important source of returns.

- Some hedge funds will have a lock-up period of between one and three years
  - Shorter lock-ups for liquid products like stocks or futures
  - Longer lock-ups for less liquid products, like unlisted stock or distressed debt
  - During a hard lock-up period, withdrawals are prohibited
  - During a soft lock-up period, withdrawals are subject to a liquidity fee, often 1% to 3% of the withdrawal amount

- Private equity and real estate products often have long lock-ups, with fund lives that can last ten years or longer

- Receive the majority of returns after the fund has exited the investment as opposed to recording changes every day

- This means selling a building, merging a company, or floating an IPO and distributing the proceeds to investors
The Annual Pipeline

Sourcing: Develop & Maintain Pipeline

Research: Preliminary Due Diligence and Prioritization

Research: Comprehensive Due Diligence

Selection: Formal Recommendation and Negotiations

Execution & Funding

- 3000 decks (est.)
- 1500 meetings (actual)
- 100’s of on-site meetings
- 25-35 recommendations
What is the Process?

Due diligence is a large part of the investment process. Getting allocated is time-consuming, and much of the work involves both automated and manual processes. Due diligence should be thought of as a “cradle-to-the-grave” process, where managers go through multiple rigorous steps — not merely “picking managers.”
How Is Diligence Done?

The Five P’s

1. Performance
2. People
3. Portfolio
4. Process
5. Philosophy
The Five P’s – *Performance*

• Analysis of historical performance is almost always a first stop in due diligence. Researchers will tend to look for evidence of acceptable returns before allocating additional resources.

• Important to be aware of naïve performance-chasing.

• Hedge fund performance analysis involves separating alpha from beta, multiple risk adjusted performance metrics, and investigating conditional returns (up/down ratios), among others.

• Private market return analysis can include IRR (internal rate of returns), TVPI (total value to paid in), DPI (distributed to paid in), on both realized and unrealized bases.

• More complicated than traditional asset classes.
The Five P’s — People

• It’s all about people!
• While past performance is no guarantee of future results, past behavior is the strongest predictor of future behavior.

• 3 I’s
  • Integrity
  • Intelligence
  • Intensity

“Somebody once said that in looking for people to hire, you look for three qualities: integrity, intelligence, and energy. And if you don’t have the first, the other two will kill you.”

— Warren Buffett
The Five P’s – People

- Who are the key decision makers?
- What is their experience? What is their background, prior work history, education? Don’t be blinded by pedigree.
- How many people support the strategy? Investment team, operations support?
- Who owns the firm? What are their incentives?
- The people ultimately will establish the philosophy, or investment strategy, and firm culture.
The Five P’s – Philosophy

• What is the strategy, and what are the overall firm resources deployed to managing it? How does that compare to competitors?
• What is the fund size and capacity for the strategy?
• What other products are offered or competing business lines does the manager have? Asset gatherer vs. performance shop?
• Who are other investors and what are their expectations? How much is internally invested?
• What are the terms? Partnership or transaction?
The Five P’s – Process

• The philosophy is operationalized via the investment process.

• How are investments researched and selected for inclusion in the portfolio?

• How is the portfolio constructed and risk managed? Key man versus committee approach?

• How does the manager create value or generate returns?

• How are sell decisions implemented?

• What resources are dedicated to managing investment operations?

• What is the fund manager’s benchmark, if any?

• How do all of these compare to their closest peers?
The Five P’s — Portfolio

- As philosophy leads to process, process creates the portfolio!
- What would a typical portfolio look like? What has the portfolio looked like in the past? Is past consistent with expectations?
- How many investments would the fund have?
- Typical structure — debt, equity, any derivative exposure? Any hedges?
- Position sizes and portfolio concentrations?
- Geographic or sector exposure limits?
- Leverage utilization or credit facilities?
The Five P’s –

Performance

- Portfolio leads right back to performance.
- How the portfolio is built will be more impactful on returns than what it was in the past.
- However, past performance is only relevant to the extent the prior portfolio can be expected to resemble the portfolio in the future.
- Prior performance is no guarantee of future returns, but past behavior is the best predictor of future behavior.
- Performance allows people to be compensated, and retained.
- Integrated understanding all of the Five P’s allows us to evaluate...
The Sixth “P” — *Price!*
The Sixth “P” – Price!

- What are the fees? Management fee, incentive allocation, expense ratio, etc.
- How does fee structure compare to net returns, compare to peers, compare to overall risk profile, and relevant public/liquid assets?
- What is the fund legal structure, liquidity profile, term? Where is it domiciled?
- What is the capacity?
- What are limited partners’ rights (if any), and what governance/protections are afforded?
Checks & Checklists

- In person meetings, onsite meetings
- Media checks
- Reference calls
- Marketing and document reviews
- Operational review and vendor checks
- Performance analytics
- Background checks
- Personality tests
- Legal document review and negotiation
- Consultant support
- Formal recommendations and checklists
Monitoring

• The process of monitoring a manager post-closing should not really be thought of as a separate step, but continual ongoing reassessment of the five Ps that led to the investment decision in the first place.

• Changes to ownership or attrition on the investment team, process changes, style drift, or portfolio developing in unexpected ways, performance outside the range of expectations, for good or bad.

• Outcomes must be consistent with expectations!

• Monitoring is always important but particularly important in diversifying strategies because the incentives can create a greater motivation for untoward behavior when greater discretion is given to the manager.
Risks and Risk Management

- **Investment Risk**
  - Decision making process
  - Market risk and exposure
  - Idiosyncratic or security risk
  - Statistics — volatility, beta, VaR, drawdown, skew, etc.

- **Operational Risk**
  - Execution delays or errors
  - Lack of appropriate support or resourcing
  - Weak risk management and/or oversight

- **Business and Legal Risk**
  - Fraud
  - Lawsuits, or headline risk
  - Business continuity

- At some point, all risks become an investment risk
Part II. Asset Class Overview
TMRS Investment Portfolio Asset Allocation and Performance

As of 6/30/2019

<table>
<thead>
<tr>
<th>Asset Class</th>
<th>Allocation</th>
<th>Target Allocation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Global Equity</td>
<td>36.3%</td>
<td>35.0%</td>
</tr>
<tr>
<td>Core Fixed Income</td>
<td>14.1%</td>
<td>10.0%</td>
</tr>
<tr>
<td>Non-Core Fixed Income</td>
<td>18.7%</td>
<td>20.0%</td>
</tr>
<tr>
<td>Real Estate</td>
<td>9.1%</td>
<td>10.0%</td>
</tr>
<tr>
<td>Real Return</td>
<td>11.1%</td>
<td>10.0%</td>
</tr>
<tr>
<td>Private Equity</td>
<td>2.4%</td>
<td>5.0%</td>
</tr>
<tr>
<td>Absolute Return</td>
<td>7.8%</td>
<td>10.0%</td>
</tr>
<tr>
<td>Cash</td>
<td>.4%</td>
<td>.0%</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th></th>
<th>Market Value ($)</th>
<th>Quarter</th>
<th>YTD</th>
<th>One Year</th>
<th>Five Years</th>
<th>Ten Years</th>
<th>Since Incep.</th>
<th>Inception Date</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total Plan</td>
<td>29,984,231,161</td>
<td>2.58</td>
<td>9.07</td>
<td>5.36</td>
<td>5.40</td>
<td>7.14</td>
<td>8.42</td>
<td>1/1/1989</td>
</tr>
<tr>
<td>Total Plan Benchmark</td>
<td>2.46</td>
<td>8.75</td>
<td>5.26</td>
<td>5.11</td>
<td>6.81</td>
<td>7.88</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Difference</td>
<td>0.12</td>
<td>0.32</td>
<td>0.10</td>
<td>0.29</td>
<td>0.33</td>
<td>0.54</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
## Global Equity Asset Allocation and Performance

As of 6/30/2019

<table>
<thead>
<tr>
<th></th>
<th>Quarter</th>
<th>YTD</th>
<th>One Year</th>
<th>Three Years</th>
<th>Five Years</th>
<th>Seven Years</th>
<th>Ten Years</th>
<th>Since Incep.</th>
<th>Inception Date</th>
</tr>
</thead>
<tbody>
<tr>
<td>Global Equity</td>
<td>3.63</td>
<td>16.44</td>
<td>4.06</td>
<td>11.40</td>
<td>6.64</td>
<td>10.54</td>
<td>10.73</td>
<td>5.32</td>
<td>1/1/2008</td>
</tr>
<tr>
<td>Global Equity Benchmark</td>
<td>3.37</td>
<td>16.08</td>
<td>4.84</td>
<td>11.75</td>
<td>6.70</td>
<td>10.56</td>
<td>10.73</td>
<td>5.30</td>
<td></td>
</tr>
<tr>
<td>Difference</td>
<td>0.26</td>
<td>0.36</td>
<td>-0.78</td>
<td>-0.35</td>
<td>-0.06</td>
<td>-0.02</td>
<td>0.00</td>
<td>0.02</td>
<td></td>
</tr>
</tbody>
</table>

### Market Value

- **Global Core Component**: $6,344,959,912
- **Global Satellite Component**: $4,368,168,937

### Allocation

- **Global Core Component**: 59.73%
- **Global Satellite Component**: 40.77%
Core Fixed Income Asset Allocation and Performance
As of 6/30/2019

<table>
<thead>
<tr>
<th>Market Value ($)</th>
<th>Allocation (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>3,064,747,346</td>
<td>73.77</td>
</tr>
<tr>
<td>1,089,543,145</td>
<td>26.23</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Fund Type</th>
<th>Quarter</th>
<th>YTD</th>
<th>One Year</th>
<th>Three Years</th>
<th>Five Years</th>
<th>Seven Years</th>
<th>Ten Years</th>
<th>Since Incep.</th>
<th>Inception Date</th>
</tr>
</thead>
<tbody>
<tr>
<td>Core Fixed Income</td>
<td>3.07</td>
<td>6.46</td>
<td>8.06</td>
<td>2.62</td>
<td>3.10</td>
<td>2.77</td>
<td>4.14</td>
<td>7.51</td>
<td>1/1/1989</td>
</tr>
<tr>
<td>Core Fixed Income Benchmark</td>
<td>3.08</td>
<td>6.11</td>
<td>7.87</td>
<td>2.31</td>
<td>2.95</td>
<td>2.62</td>
<td>3.90</td>
<td>6.98</td>
<td></td>
</tr>
<tr>
<td>Difference</td>
<td>-0.01</td>
<td>0.35</td>
<td>0.19</td>
<td>0.31</td>
<td>0.15</td>
<td>0.15</td>
<td>0.24</td>
<td>0.53</td>
<td></td>
</tr>
</tbody>
</table>

$4,154,290,492
Non-Core Fixed Income Asset Allocation and Performance
As of 6/30/2019

$5,511,218,994

<table>
<thead>
<tr>
<th>Market Value ($)</th>
<th>Allocation (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1,181,661,346</td>
<td>21.44</td>
</tr>
<tr>
<td>1,765,877,808</td>
<td>32.04</td>
</tr>
<tr>
<td>661,416,423</td>
<td>12.00</td>
</tr>
<tr>
<td>755,550,588</td>
<td>13.71</td>
</tr>
<tr>
<td>1,146,762,828</td>
<td>20.81</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Non-Core Fixed Income</th>
<th>Quarter</th>
<th>YTD</th>
<th>One Year</th>
<th>Three Years</th>
<th>Five Years</th>
<th>Seven Years</th>
<th>Ten Years</th>
<th>Since Incep.</th>
<th>Inception Date</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>1.79</td>
<td>4.49</td>
<td>5.49</td>
<td>6.07</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td>4.41</td>
<td>10/1/2014</td>
</tr>
<tr>
<td>Non-Core Fixed Income Benchmark</td>
<td>1.85</td>
<td>3.86</td>
<td>5.20</td>
<td>5.31</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td>3.98</td>
<td></td>
</tr>
<tr>
<td>Difference</td>
<td>-0.06</td>
<td>0.63</td>
<td>0.29</td>
<td>0.76</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td>0.43</td>
<td></td>
</tr>
</tbody>
</table>
Real Estate Asset Allocation and Performance
As of 6/30/2019

<table>
<thead>
<tr>
<th></th>
<th>Quarter YTD</th>
<th>One Yr</th>
<th>Three Yrs</th>
<th>Five Yrs</th>
<th>Seven Yrs</th>
<th>Ten Yrs</th>
<th>Since Incep.</th>
<th>Inception Date</th>
</tr>
</thead>
<tbody>
<tr>
<td>Real Estate</td>
<td>1.63</td>
<td>3.58</td>
<td>9.14</td>
<td>10.10</td>
<td>11.42</td>
<td>11.50</td>
<td>N/A</td>
<td>10.87</td>
</tr>
<tr>
<td>Real Estate Benchmark</td>
<td>1.41</td>
<td>3.18</td>
<td>7.49</td>
<td>7.96</td>
<td>10.16</td>
<td>10.76</td>
<td>N/A</td>
<td>11.11</td>
</tr>
<tr>
<td>Difference</td>
<td>0.22</td>
<td>0.40</td>
<td>1.65</td>
<td>2.14</td>
<td>1.26</td>
<td>0.74</td>
<td>N/A</td>
<td>-0.24</td>
</tr>
</tbody>
</table>

Market Value ($):
- Core Real Estate: 1,791,473,674 (66.43%)
- Value Added: 397,208,524 (22.15%)
- Opportunistic: 307,933,969 (11.42%)

$2,696,616,167
# Real Return Asset Allocation and Performance

As of 6/30/2019

![Pie chart showing asset allocation]

- **Market Value ($):** $3,286,344,686
- **Allocation (%):**
  - Diversified Liquid Real Return: 52.24
  - Mining: 3.94
  - Agriculture: 3.58
  - Energy: 4.11
  - Inflation Linked Debt: 20.90
  - Infrastructure: 7.55
  - Public Real Return: 7.68

<table>
<thead>
<tr>
<th></th>
<th>Quarter</th>
<th>YTD</th>
<th>One Year</th>
<th>Three Years</th>
<th>Five Years</th>
<th>Seven Years</th>
<th>Ten Years</th>
<th>Since Incep.</th>
<th>Inception Date</th>
</tr>
</thead>
<tbody>
<tr>
<td>Real Return</td>
<td>2.17</td>
<td>9.93</td>
<td>5.52</td>
<td>4.21</td>
<td>2.34</td>
<td>2.98</td>
<td>N/A</td>
<td>3.67</td>
<td>2/1/2011</td>
</tr>
<tr>
<td>Real Return Benchmark</td>
<td>1.98</td>
<td>9.60</td>
<td>5.32</td>
<td>4.82</td>
<td>2.89</td>
<td>2.86</td>
<td>N/A</td>
<td>3.94</td>
<td></td>
</tr>
<tr>
<td>Difference</td>
<td>0.19</td>
<td>0.33</td>
<td>0.20</td>
<td>-0.61</td>
<td>-0.55</td>
<td>0.12</td>
<td>N/A</td>
<td>-0.27</td>
<td></td>
</tr>
</tbody>
</table>
Private Equity Asset Allocation and Performance

As of 6/30/2019

<table>
<thead>
<tr>
<th>Market Value ($)</th>
<th>Allocation (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>279,512,830</td>
<td>38.83</td>
</tr>
<tr>
<td>293,821,064</td>
<td>40.82</td>
</tr>
<tr>
<td>146,426,050</td>
<td>20.34</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Quarter</th>
<th>YTD</th>
<th>One Year</th>
<th>Three Years</th>
<th>Five Years</th>
<th>Seven Years</th>
<th>Ten Years</th>
<th>Since Incep.</th>
<th>Inception Date</th>
</tr>
</thead>
<tbody>
<tr>
<td>Private Equity</td>
<td>2.44</td>
<td>4.11</td>
<td>17.51</td>
<td>25.23</td>
<td>N/A</td>
<td>N/A</td>
<td>17.17</td>
<td>12/1/2015</td>
</tr>
</tbody>
</table>
Absolute Return Asset Allocation and Performance

As of 6/30/2019

<table>
<thead>
<tr>
<th></th>
<th>Quarter</th>
<th>YTD</th>
<th>One Year</th>
<th>Three Years</th>
<th>Five Years</th>
<th>Seven Years</th>
<th>Ten Years</th>
<th>Since Incep.</th>
<th>Inception Date</th>
</tr>
</thead>
<tbody>
<tr>
<td>Absolute Return</td>
<td>1.42</td>
<td>3.16</td>
<td>2.27</td>
<td>6.22</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td>4.14</td>
<td>8/1/2014</td>
</tr>
<tr>
<td>Absolute Return Benchmark</td>
<td>0.93</td>
<td>2.93</td>
<td>0.08</td>
<td>3.45</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td>1.91</td>
<td></td>
</tr>
<tr>
<td>Difference</td>
<td>0.49</td>
<td>0.23</td>
<td>2.19</td>
<td>2.77</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td>2.23</td>
<td></td>
</tr>
</tbody>
</table>
Compliance Overview

• IPS Objectives
  • The primary objective of Compliance is to implement a detailed compliance program that uses a combination of daily, weekly, and monthly testing of all testable parameters of the Investment Policy Statement and all Manager guidelines at the Manager, asset class, and total fund level, as appropriate.
  • Testing may be completed either through systematic resources (automated custodial compliance) or manually if necessary.
  • Compliance personnel shall create and present a quarterly report to the Board with the results of the testing performed during each period.
## Investment Guideline Compliance – Quarter-End June 2019

<table>
<thead>
<tr>
<th>Policy Guidelines</th>
<th>Core Fixed Income</th>
<th>Non-Core Fixed Income</th>
<th>Real Return</th>
<th>Domestic Equity</th>
<th>Global Equity</th>
</tr>
</thead>
<tbody>
<tr>
<td>Permitted/Prohibited Investments</td>
<td>✔</td>
<td>✔</td>
<td>✔</td>
<td>✔</td>
<td>✔</td>
</tr>
<tr>
<td>Account Holdings/Position Limits</td>
<td>✔</td>
<td>✔</td>
<td>✔</td>
<td>✔</td>
<td>✔</td>
</tr>
<tr>
<td>Credit Quality/Market Capitalization</td>
<td>✔</td>
<td>✔</td>
<td>✔</td>
<td>✔</td>
<td>✔</td>
</tr>
<tr>
<td>Concentration Risk</td>
<td>✔</td>
<td>✔</td>
<td>✔</td>
<td>✔</td>
<td>✔</td>
</tr>
<tr>
<td>Issue/Issuer</td>
<td>✔</td>
<td>✔</td>
<td>✔</td>
<td>✔</td>
<td>✔</td>
</tr>
<tr>
<td>Asset Class/Security Type/Sector</td>
<td>✔</td>
<td>✔</td>
<td>✔</td>
<td>✔</td>
<td>✔</td>
</tr>
<tr>
<td>Currency/Country/Region</td>
<td>✔</td>
<td>✔</td>
<td>✔</td>
<td>✔</td>
<td>✔</td>
</tr>
<tr>
<td>Liquidity/Cash Management</td>
<td>✔</td>
<td>✔</td>
<td>✔</td>
<td>✔</td>
<td>✔</td>
</tr>
<tr>
<td>Interest Rate Risk</td>
<td>✔</td>
<td>✔</td>
<td>✔</td>
<td>N/A</td>
<td>N/A</td>
</tr>
<tr>
<td>Default Risk</td>
<td>✔</td>
<td>✔</td>
<td>✔</td>
<td>N/A</td>
<td>N/A</td>
</tr>
</tbody>
</table>

- State Street Bank weekly automated GX Compliance tests completed through June 2019.
- State Street Bank monthly automated GX Compliance tests completed through June 2019.
- TMRS bi-monthly manual guideline compliance tests of all separately managed account portfolios completed through June 2019.
- There were no material violations of TMRS investment management guidelines.
Risk Management Overview
Q1 2019

Risk Report Highlights:

- Forward looking Portfolio Volatility (6.7%) and Benchmark Volatility (6.8%) are continuing to increase given recent market behavior.
- Current market volatility and short term forward looking volatility expectations still remain significantly lower than our long term assumptions.
- Forward looking Tracking Error is nearly the same as last quarter with a decreasing contribution from pending policy allocation decisions and an increasing contribution from investment allocation decisions.

Risk Management Objective:
- Managing the risk of not achieving TMRS investment objectives

Risk Management Responsibilities:
- Ensuring that investment risk management policy is defined and documented
- Analytical tools for investment risk management
- Reporting on investment risk to the Board

Activity Update

<table>
<thead>
<tr>
<th>Investment Technology</th>
<th>Types of Investment Data maintained in the Data Warehouse and automation of internal analytical reporting continues to expand.</th>
</tr>
</thead>
</table>
| Research               | • Developing portfolio simulation model based on combination of the Ortec Scenario Model, TMRS’s Private Market Funds Cash Flow Model and rebalancing rules integrated with private fund cash flows. This model will allow TMRS to answer risk (magnitude and probability) and expected cost questions regarding illiquid investments.  
  • Monitoring industry advances in investment risk analysis and quantitative investment strategies for opportunities to improve TMRS risk adjusted returns |
| Analysis and Reporting | Private Funds Cash Flow forecasting model is being updated quarterly to support long term cash flow planning and pacing of new commitments. |
Implementation Risk Ranges Implied by IPS Asset Class Guidelines
March 2019

Based on current as-invested strategy allocations and Investment Department long-term assumptions regarding each strategy

The risk range implied by the IPS Rebalancing Policy includes the ability to allocate 0-10% to Cash.
Questions?

Presentations Available at www.tmrs.com/ats.php
Disclosures

TMRS periodically discloses public information that is not excepted from disclosure under Section 552.0225(b) of the Texas Public Information Act. Information provided by a manager, a Managing General Partner (GP), any of its Associates or other data provider to TMRS or a TMRS service provider, and contained in these materials (i) may have been independently produced or modified by TMRS or the TMRS service provider; (ii) has not been reviewed or approved by the manager, Managing GP or any of its Associates; and (iii) may not reflect the historical performance or asset value reflected in the manager’s, Managing GP’s or any of its Associates’ records and, therefore, should not be used for comparative purposes.