COMMON INVESTMENT MEETING
Public Session

THE CITY OF NEW YORK
OFFICE OF THE COMPTROLLER

December 11, 2017
PERFORMANCE REPORTING
Third Quarter 2017
## Market Returns: Q3-2017

<table>
<thead>
<tr>
<th>Asset Class</th>
<th>Index</th>
<th>Third Quarter 2017</th>
<th>Fiscal Year End 6/30/17</th>
<th>3 Year</th>
<th>5 Year</th>
<th>Expected*</th>
</tr>
</thead>
<tbody>
<tr>
<td>Equities - U.S.</td>
<td>Russell 3000</td>
<td>4.6%</td>
<td>18.5%</td>
<td>10.7%</td>
<td>14.2%</td>
<td>7.8%</td>
</tr>
<tr>
<td>Equities - Developed Intl</td>
<td>MSCI EAFE</td>
<td>5.4%</td>
<td>20.3%</td>
<td>5.0%</td>
<td>8.4%</td>
<td>8.9%</td>
</tr>
<tr>
<td>Equities - Emerging Intl</td>
<td>MSCI EMF</td>
<td>7.9%</td>
<td>23.8%</td>
<td>4.9%</td>
<td>4.0%</td>
<td>11.0%</td>
</tr>
<tr>
<td>Debt - US Govt Long Duration</td>
<td>Citigroup Treasury 10+</td>
<td>0.6%</td>
<td>-7.4%</td>
<td>4.9%</td>
<td>2.9%</td>
<td></td>
</tr>
<tr>
<td>Debt - US Government</td>
<td>NYC Treas/Agency +5</td>
<td>0.5%</td>
<td>-4.6%</td>
<td>3.5%</td>
<td>1.9%</td>
<td>2.8%</td>
</tr>
<tr>
<td>Debt - Investment Grade</td>
<td>NYC IG Credit</td>
<td>1.2%</td>
<td>1.9%</td>
<td>3.8%</td>
<td>3.2%</td>
<td>3.4%</td>
</tr>
<tr>
<td>Debt - High Yield</td>
<td>Citigroup BB &amp; B</td>
<td>2.0%</td>
<td>11.5%</td>
<td>5.3%</td>
<td>5.8%</td>
<td>6.1%</td>
</tr>
</tbody>
</table>

*Average of consultant long-term arithmetic expected returns, as of 2016

Source: State Street
The drivers of continued strong market returns include:

1) Strong equity earnings growth

<table>
<thead>
<tr>
<th>Index</th>
<th>2Q 2017</th>
<th>1Q 2017</th>
</tr>
</thead>
<tbody>
<tr>
<td>Russell 3000</td>
<td>10.6</td>
<td>9.18</td>
</tr>
<tr>
<td>MSCI EAFE</td>
<td>12.51</td>
<td>8.55</td>
</tr>
<tr>
<td>MSCI EMF</td>
<td>7.81</td>
<td>7.81</td>
</tr>
</tbody>
</table>
2) Combination of low inflation, low yields and global quantitative easing

<table>
<thead>
<tr>
<th></th>
<th>US</th>
<th>Europe</th>
<th>Japan</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Inflation:</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Q2</td>
<td>1.4%</td>
<td>1.3%</td>
<td>0.4%</td>
</tr>
<tr>
<td>Q3</td>
<td>1.7%</td>
<td>1.5%</td>
<td>0.7%</td>
</tr>
<tr>
<td><strong>30 Year Yields:</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Q2</td>
<td>2.84</td>
<td>1.24*</td>
<td>0.85</td>
</tr>
<tr>
<td>Q3</td>
<td>2.86</td>
<td>1.29*</td>
<td>0.86</td>
</tr>
<tr>
<td><strong>QE:</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Q2</td>
<td>0</td>
<td>€180B ($200B)</td>
<td>¥16.8T ($146B)</td>
</tr>
<tr>
<td>Q3</td>
<td>0</td>
<td>€180B ($200B)</td>
<td>¥13.3T ($125B)</td>
</tr>
</tbody>
</table>

*German yields
US QE – reinvestment only, both Q2 and Q3
Market Returns: Q3-2017

- Aggregate Global Quantitative Easing

Figure 1: G-4 central bank balance sheet

Trillion USD  12m chg, tn USD

Source: Fed, ECB, BoJ, BoE, J.P. Morgan.
3) Geopolitical concerns, but limited impact on economic growth and in financial markets

- North Korea, continued concerns.
- German election – 9/24, Merkel re-elected, AfD influence.
- China economic and political concerns – 19th Party Congress concluded with President Xi with unprecedented control.
  Deleveraging continues.
- Brexit – negotiations ongoing, EU Summit planned for 12/14-12/15.
- Oil – prices stable to higher on back of OPEC/Russia production cuts.
• Change in Global QE
  – ECB announced on 10/26 reduction of QE program, reducing monthly purchases from €60B to €30B, beginning 1/1/18 through 9/30/18. No decision on QE post this time period.

• Policy Rate Increases
  – Fed – raised rates 25bp on 9/21, expected to raise another 25bp on 12/13 FOMC meeting
  – Bank of Canada – raised rates 25bp in both July and September
  – Bank of England – raised rates 25bp in November
Update on Potential Regime Shift in Interest Rates

- Change in amount of Global Quantitative Easing

Figure 1: G-4 central bank balance sheet

Source: Fed, ECB, BoJ, BoE, J.P. Morgan.
Update on Potential Regime Shift in Interest Rates

• Monthly change in Global Quantitative Easing

Source: Fed, BoJ, ECB, BoE, Haver Analytics, DB Global Markets Research
Probable impact on growth and markets include
- Stronger GDP growth in 2018 and 2019
- Higher inflation in ’18 and ’19, given economy currently growing above trend and full employment
- Larger budget deficit and increase in UST issuance
- Higher interest rates
- Higher earnings, particularly for companies who currently pay high tax rates (banks, retailers, domestic-based manufacturers)

Source: Morgan Stanley
### Total NYC Pension Fund Net Performance as of 9/30/2017

<table>
<thead>
<tr>
<th>NYC Pension System</th>
<th>Portfolio Std Dev - 1 yr.</th>
<th>Fiscal YTD</th>
<th>One Year Trailing</th>
<th>Three Year Trailing</th>
</tr>
</thead>
<tbody>
<tr>
<td>BERS</td>
<td>3.3%</td>
<td>4.5%</td>
<td>15.2%</td>
<td>8.2%</td>
</tr>
<tr>
<td>TRS</td>
<td>3.1%</td>
<td>3.6%</td>
<td>12.5%</td>
<td>7.2%</td>
</tr>
<tr>
<td>FIRE</td>
<td>2.9%</td>
<td>3.9%</td>
<td>12.9%</td>
<td>7.4%</td>
</tr>
<tr>
<td>POLICE</td>
<td>2.8%</td>
<td>3.9%</td>
<td>13.2%</td>
<td>7.7%</td>
</tr>
<tr>
<td>NYCERS</td>
<td>2.8%</td>
<td>3.7%</td>
<td>12.9%</td>
<td>7.4%</td>
</tr>
<tr>
<td>Public Mkt Equiv 35 (43/22/35 index)</td>
<td></td>
<td>3.4%</td>
<td>12.0%</td>
<td>6.8%</td>
</tr>
<tr>
<td>Median Fund - TUCS</td>
<td>3.6%</td>
<td>12.8%</td>
<td></td>
<td>7.3%</td>
</tr>
</tbody>
</table>

Net of fees in public asset classes are recorded on an accrual basis. Private markets data is reported on a lagged basis with fees recorded on a cash basis.

Source: State Street
Asset Allocation 9/30/2017 - Growth

Relative Mix to Adjusted New Policy Weights

Policy vs Actual Asset Allocation - Growth

Source: State Street
Asset Allocation 9/30/2017 – Inflation Protection

Relative Mix to Adjusted New Policy Weights

Policy vs Actual Asset Allocation - Inflation Protection

Source: State Street
Asset Allocation 9/30/2017 - Deflation Protection

Relative Mix to Adjusted New Policy Weights

Policy vs Actual Asset Allocation - Deflation Protection

Source: State Street
Treasury Duration Actual Vs. Target as of 9/30/17

Source: State Street
Fiscal Year to Date Return as of 9/30/17 – Total Portfolio

Basis Points of Excess Return (SSB F p.12; N p.15; T p.16; P p.17; B p.19)

Source: State Street
Fiscal Year to Date as of 9/30/17 Excess Return – Total Portfolio

Basis Points of Excess Return (SSB F p.12; N p.15; T p.16; P p.17; B p.19)

Source: State Street
Fiscal Year to Date as of 9/30/17 Manager Value Added - Total Portfolio

Basis Points of Excess Return (SSB F p.13; N p.16; T p.17; P p.18; B p.20)

Source: State Street
Value Added – Total U.S. Equities

Basis Points of Excess Return (SSB F p.24; N p.27; T p.28; P p.29; B p.31)

Source: State Street

Weights as of 9/30/2017
- TRS: 30.28%
- NYCERS: 31.5%
- POLICE: 35.07%
- FIRE: 31.88%
- BERS: 36.28%

OFFICE OF NEW YORK CITY COMPTROLLER SCOTT M. STRINGER | Bureau of Asset Management
Value Added – Total Small Cap

Basis Points of Excess Return (SSB F p.24; N p.27; T p.28; P p.29; B p.31)

Source: State Street
Value Added – Total International Equities

Basis Points of Excess Return (SSB F p.26; N p.29; T p.30; P p.31; B p.33)

- TRS: 22.78%
- NYCERS: 22.43%
- POLICE: 16.16%
- FIRE: 16.49%
- BERS: 22.44%

Weights as of 9/30/2017

Source: State Street
<table>
<thead>
<tr>
<th>Manager Name</th>
<th>Investment Mandate</th>
<th>Benchmark</th>
<th>Strategy</th>
<th>Q3 2017 Excess in Bps:</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>TRS</td>
</tr>
<tr>
<td>ACADIAN</td>
<td>Developed Small Cap</td>
<td>S&amp;P EPAC Small Cap USD NET</td>
<td>Active</td>
<td>180</td>
</tr>
<tr>
<td>Baillie Gifford</td>
<td>Developed Growth</td>
<td>MSCI EMERGING MARKETS</td>
<td>Active</td>
<td>541</td>
</tr>
<tr>
<td>Sprucegrove MTA</td>
<td>Developed Value</td>
<td>NYC Developed Value Benchmark</td>
<td>Active</td>
<td>244</td>
</tr>
<tr>
<td>PYRAMIS</td>
<td>Developed Small Cap</td>
<td>S&amp;P EPAC Small Cap USD NET</td>
<td>Active</td>
<td>(179)</td>
</tr>
</tbody>
</table>

For further details on Manager performance please refer to: Overview Appendix B Public Markets Manager Performance Detail.

Source: State Street
Value Added – High Yield

Basis Points of Excess Return (SSB F p.30; N, T p.33; P, B p.35)

Source: State Street
Value Added – Bank Loans

Basis Points of Excess Return (SSB F p.31; N, T p.33; B p.35; P p.36)

Weights as of 9/30/2017
- TRS: 2.45%
- NYCERS: 1.76%
- POLICE: 1.58%
- FIRE: 1.54%
- BERS: 2.07%

Source: State Street
Value Added - Hedge Funds

Basis Points of Excess Return (SSB F p.55; N p.56; P p.58)

Source: State Street

Weights as of 9/30/2017

- TRS: 0%
- NYCERS: 0.15%
- POLICE: 5.21%
- FIRE: 5.25%
- BERS: 0%
# Hedge Fund Partnership Snapshot; FYTD 9/30/17 Excess in Basis Points

<table>
<thead>
<tr>
<th>Portfolio</th>
<th>Fund Name</th>
<th>Strategy</th>
<th>3 Month</th>
<th>3 Month HFRI FOF Composite Index + 1%</th>
<th>3 Month Excess amount</th>
<th>3 month Excess in Bps</th>
</tr>
</thead>
<tbody>
<tr>
<td>NYC FIRE/POLICE</td>
<td>CCP Quantitative Fund LP</td>
<td>Tactical Trading</td>
<td>11.40%</td>
<td>2.52%</td>
<td>8.88%</td>
<td>888</td>
</tr>
<tr>
<td>NYC FIRE/POLICE</td>
<td>SRS Partners US, LP - Class B - 1</td>
<td>Long/Short Equity</td>
<td>10.46%</td>
<td>2.52%</td>
<td>7.94%</td>
<td>794</td>
</tr>
<tr>
<td>NYC FIRE/POLICE</td>
<td>Pharo Gaia Fund, LTD.</td>
<td>Tactical Trading</td>
<td>7.29%</td>
<td>2.52%</td>
<td>4.78%</td>
<td>478</td>
</tr>
<tr>
<td>NYC FIRE/POLICE</td>
<td>AlphaQuest Original LLC</td>
<td>Tactical Trading</td>
<td>-4.09%</td>
<td>2.52%</td>
<td>-6.60%</td>
<td>(660)</td>
</tr>
<tr>
<td>NYC FIRE/POLICE</td>
<td>Key Square Partners LP</td>
<td>Tactical Trading</td>
<td>-1.86%</td>
<td>2.52%</td>
<td>-4.38%</td>
<td>(438)</td>
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<tr>
<td>NYC FIRE/POLICE</td>
<td>Altimeter Partners Fund LP</td>
<td>Long/Short Equity</td>
<td>-1.74%</td>
<td>2.52%</td>
<td>-4.26%</td>
<td>(426)</td>
</tr>
</tbody>
</table>

Source: State Street
Fees Compression Chart

Asset Weighted Performance and Management Fees

Source: Aksia
PRIVATE MARKET DATA
Value Added – Private Equity

Basis Points of Cumulative IRR above Public Market Equivalent

Excess Return Since Inception; The PE Benchmark is the Russell 3000 + 300 bps as of 6/30/17

The PME Spread is the difference between the IRR and the PME Benchmark.
Value Added – Opportunistic Fixed Income (OFI)

Basis Points of Cumulative IRR above Public Market Equivalent

Excess Return Since Inception; PME Benchmark: 50% JP Morgan Global High Yield 50% CS Leveraged Loans as of 9/30/17

The PME Spread is the difference between the IRR and the PME Benchmark.

Source: State Street
Value Added – Private Real Estate - Core

Basis Points of Cumulative IRR above Public Market Equivalent

The PME Spread is the difference between the IRR and the PME Benchmark.

Inception Date
- TRS - 12/6/2002
- NYCERS - 12/6/2002
- Police - 12/6/2002
- Fire - 12/6/2002
- BERS - 12/13/2010

Source: State Street

Excess Return Since Inception; Core = 40% Equities- Russell 3000 /60% BarAgg as of 6/30/17
Value Added – Private Real Estate – Non-Core

Basis Points of Cumulative IRR above Public Market Equivalent

Excess Return Since Inception; Non-core = 60% Equities- Russell 3000/40% BarcAgg as of 6/30/17

The PME Spread is the difference between the IRR and the PME Benchmark.

Source: State Street
Value Added - Infrastructure

Basis Points of Cumulative IRR above Public Market Equivalent

The PME Spread is the difference between the IRR and the PME Benchmark.

Excess Return Since Inception; PME Benchmark: 50% R3000 & 50% Barclays Agg. as of 6/30/17

Source: StepStone Group
QUESTIONS?