CalPERS Trust Level Review

Executive Summary

• Performance
  – PERF Fiscal Year 2019 net return was 6.7%. This brings 5 and 10 year returns to 5.8% and 9.1% respectively.
    • Public Equity returned +6.1%, contributing +3.0% of total fund return
    • Income returned +9.6%, contributing +2.7% of total fund return
    • Private Equity returned +7.7% and Real Assets returned +3.7% for a combined contribution to total fund of +1.0%
    • Allocation changes during the year contributed an estimated +70 bps to fund performance (~$2.5 billion)
  – PERF Fiscal Year 2019 excess return was -42 bps
    • Real Assets contributed -34 bps
    • Allocation effects contributed -23 bps (includes impact of underweights to private assets relative to policy weight)
    • Private Equity contributed +26 bps due to strong performance relative to its lagged public equity benchmark
  – Affiliate Investment Program returns for FY2019 were in line with their respective asset allocations and closely tracked their benchmarks

• Risk
  – The plan’s risk is dominated by growth assets, with performance closely tied to the equity market
  – The current Barra risk model estimate for total plan volatility is 7.7%
    • This is a short term estimate indicative of behavior given the current environment. The bigger risk for PERF remains that of a severe and/or sustained drawdown in global equity markets which would not be predicted by the model
  – Current active volatility estimate is 0.5%, within the 1.5% limit

• Economic Update
  – There has been a slowing of economic momentum here and abroad, concentrated in goods related industries, less so in services
  – Policy shifts have promoted strong asset class performance into this slowing growth environment but their marginal effectiveness may wane
Performance
## Performance Summary (as of June 30, 2019)

<table>
<thead>
<tr>
<th>Funds Managed</th>
<th>Ending Market Value (MM)</th>
<th>10 Yr</th>
<th>5 Yr</th>
<th>3 Yr</th>
<th>1 Yr</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Net Return</td>
<td>Excess bps</td>
<td>Net Return</td>
<td>Excess bps</td>
</tr>
<tr>
<td>Public Employees' Retirement Fund</td>
<td>370,287</td>
<td>9.1%</td>
<td>(33)</td>
<td>5.8%</td>
<td>(23)</td>
</tr>
<tr>
<td>Judges' Retirement Fund</td>
<td>16</td>
<td>0.6%</td>
<td>8</td>
<td>1.0%</td>
<td>14</td>
</tr>
<tr>
<td>Judges' Retirement System II Fund</td>
<td>1,696</td>
<td>9.4%</td>
<td>32</td>
<td>5.0%</td>
<td>25</td>
</tr>
<tr>
<td>Legislators' Retirement System Fund</td>
<td>114</td>
<td>7.7%</td>
<td>50</td>
<td>4.1%</td>
<td>24</td>
</tr>
<tr>
<td>CERBT Strategy 1</td>
<td>7,877</td>
<td>9.4%</td>
<td>33</td>
<td>5.0%</td>
<td>38</td>
</tr>
<tr>
<td>CERBT Strategy 2</td>
<td>1,299</td>
<td>-</td>
<td>-</td>
<td>4.6%</td>
<td>35</td>
</tr>
<tr>
<td>CERBT Strategy 3</td>
<td>625</td>
<td>-</td>
<td>-</td>
<td>4.0%</td>
<td>33</td>
</tr>
<tr>
<td>CalPERS Health Care Bond Fund</td>
<td>478</td>
<td>4.5%</td>
<td>59</td>
<td>3.1%</td>
<td>16</td>
</tr>
<tr>
<td>Long-Term Care Fund</td>
<td>4,770</td>
<td>7.0%</td>
<td>30</td>
<td>3.4%</td>
<td>11</td>
</tr>
<tr>
<td>Terminated Agency Pool</td>
<td>168</td>
<td>-</td>
<td>-</td>
<td>3.7%</td>
<td>-</td>
</tr>
</tbody>
</table>
PERF Absolute Returns: 10-Yr Cumulative
(as of June 30, 2019)

Note: Actuarial Rate of Return was 7.75% for FYs 2007/8-12/13, 7.5% for FYs 2013/14-16/17, 7.375% for FY 2017/18, and 7.25% for FY 2018/19.
# PERF Absolute Returns: 10-Yr vs. 1-Yr
(as of June 30, 2019)

<table>
<thead>
<tr>
<th>Component</th>
<th>10-Year Total Returns</th>
<th>1-Year Total Returns</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total PERF</td>
<td>6.7%</td>
<td>9.1%</td>
</tr>
<tr>
<td>Total Public Equity</td>
<td>5.1%</td>
<td>11.1%</td>
</tr>
<tr>
<td>Cap Weighted</td>
<td>6.1%</td>
<td>11.0%</td>
</tr>
<tr>
<td>Factor Weighted</td>
<td></td>
<td>13.4%</td>
</tr>
<tr>
<td>Private Equity</td>
<td>7.7%</td>
<td>14.0%</td>
</tr>
<tr>
<td>Total Income</td>
<td>6.6%</td>
<td>9.6%</td>
</tr>
<tr>
<td>Long Spread</td>
<td>9.6%</td>
<td>9.5%</td>
</tr>
<tr>
<td>Long Treasury</td>
<td></td>
<td>10.5%</td>
</tr>
<tr>
<td>High Yield</td>
<td>8.4%</td>
<td></td>
</tr>
<tr>
<td>Real Assets</td>
<td>4.1%</td>
<td>3.7%</td>
</tr>
<tr>
<td>Liquidity</td>
<td>1.1%</td>
<td>2.6%</td>
</tr>
</tbody>
</table>

CalPERS Trust Level Review
PERF Excess Returns: Rolling 5-Yr
(as of June 30, 2019)
CalPERS Trust Level Review

PERF Excess Returns: 5-Yr and 1-Yr
(as of June 30, 2019)

- 5 Year Excess BPS
- 1-Year Excess BPS

<table>
<thead>
<tr>
<th>Category</th>
<th>5-Year Excess BPS</th>
<th>1-Year Excess BPS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Liquidity</td>
<td>10 (111)</td>
<td></td>
</tr>
<tr>
<td>Real Assets</td>
<td>-400 (283)</td>
<td>-368 (10)</td>
</tr>
<tr>
<td>Total Public Equity</td>
<td>-300 (20)</td>
<td></td>
</tr>
<tr>
<td>Cap Weighted</td>
<td>-200 (16)</td>
<td></td>
</tr>
<tr>
<td>Factor Weighted</td>
<td>-100 (8)</td>
<td></td>
</tr>
<tr>
<td>Private Equity</td>
<td>0 (80)</td>
<td></td>
</tr>
<tr>
<td>Total Income</td>
<td>0 (31)</td>
<td></td>
</tr>
<tr>
<td>Long Spread</td>
<td>0 (49)</td>
<td></td>
</tr>
<tr>
<td>Long Treasury</td>
<td>0 (40)</td>
<td></td>
</tr>
<tr>
<td>High Yield</td>
<td>0 (10)</td>
<td></td>
</tr>
<tr>
<td>Total PERF</td>
<td>0 (56)</td>
<td></td>
</tr>
<tr>
<td>Total PERF</td>
<td></td>
<td>368 (23)</td>
</tr>
</tbody>
</table>

CalPERS Investment Office
PERF Excess Return Drivers
(as of June 30, 2019)

5 Year (-23 bps annualized excess return)
- Negative contribution from private assets
- Negative contribution from underweights to private assets requiring proxying with publics
+ Positive contribution from public assets, predominantly Income

1 Year (-42 bps excess return)
- Negative contribution from Real Assets, Public Equity, Trust Level and from Allocation Management
+ Positive contribution from Private Equity & Income
Growth Assets Dominate Risk

As of June 30, 2019

Portfolio Allocation

- Public Equity - Cap Weighted, 35.5%
- Public Equity - Factor Weighted, 14.6%
- Income - Long Treasury, 10.2%
- Income - Long Spread, 15.3%
- Income - High Yield, 3.2%
- Real Assets, 11.0%
- Liquidity, 1.0%
- Trust Level, 1.9%

Forecast Contribution to Total Volatility

- Public Equity - Cap Weighted, 53.9%
- Private Equity, 11.5%
- Public Equity - Factor Weighted, 16.9%
- Income - Long Treasury, 0.3%
- Income - Long Spread, 2.5%
- Income - High Yield, 1.0%
- Real Assets, 11.9%
- Liquidity, 0.0%
- Trust Level, 2.1%

Total Fund and Performance Contribution of Growth Portfolio

Rolling 12-Month Returns

Source: BarraOne, State Street Bank
Historical Equity Market Drawdowns

- S&P composite declines from all-time highs

- Major drawdowns include:
  - Crash of 1929
  - Post-WWII Crash
  - Flash Crash of 1962
  - Volcker Tightening
  - 1987 Crash/Program Trading
  - Stagflation/Oil Embargo
  - Tech Crash of 1970
  - Tech Bubble Collapse
  - Global Financial Crisis

Source: Robert Shiller, Bloomberg, J.P. Morgan Asset Management, BarraOne
As of 6/30/19
CalPERS Trust Level Review

Strategic Asset Allocation Policy Targets

- Growth: Public Equity Cap Weighted 35%
- Income: Private Equity 8%
- Public Equity Factor Weighted 15%
- Long Treasury 10%
- Long Spread 15%
- High Yield 3%
- Real Assets 13%
- Real Assets 13%
- Liquidity 1%
- Liquidity 1%

Asset Segments
Impact of Adopted Strategic Asset Allocation

Cumulative Total Fund Performance (Benchmark)

70 bps or approximately $2.5 BN value added

Interim Strategic Asset Allocation in effect November 2017 (with Asset Classes)
Implementation of 2017 Board Adopted Strategic Asset Allocation (with Asset Segments)
Economic Update
Review: fragile macro environment here and abroad

- US and global activity have slowed, and recession risk indicators have crept higher.

- “Trade wars” and the unwind of the US fiscal stimulus have been key factors.

- To date, weakness has been concentrated in capex and goods producing industries.

- The US consumer – and jobs market - have held up well ... so far.

- Asset market returns have been prolonged by US corporate tax cuts, central bank “pivots” and China stimulus.
Outlook – risks and opportunities

- It is not clear that the easing of financial conditions here and abroad will deliver improved growth.
- Optimists say that a China trade deal would unlock pent-up activity, supplemented by a US budget deal.
  - But any incremental trade ‘truce’ is unlikely to fully allay concerns that have inhibited investment.
  - Investment is crucial, since long business cycles have depleted supplies of skilled labor.
- Thus, whilst economic growth and risk market returns are not highly correlated, this does not seem to be a promising environment for aggregate returns in the period ahead.
- The Fed has started to cut interest rates, history shows that subsequent asset price performance depends on whether that action proactively prolongs the expansion OR is too late to prevent a recession.