LGIMA’s Index Insights
Q4 2018 Index Market Overview

US traditional weighted benchmark performance
- Large cap US outperforms small cap in 2018
- All market cap indexes are down in 2018
- Value stocks outperform growth for first time in 80s
- Growth was the top performer for the year and outperforms across all other time periods
- SP600 continues to outperform R2000 across all time periods

<table>
<thead>
<tr>
<th>Benchmark</th>
<th>Q4 2018</th>
<th>3-yr</th>
<th>5-yr</th>
<th>10-yr</th>
<th>1-yr Vol</th>
<th>3-yr Vol</th>
<th>5-yr Vol</th>
<th>10-yr Vol</th>
</tr>
</thead>
<tbody>
<tr>
<td>S&amp;P 400</td>
<td>-17.28</td>
<td>-11.08</td>
<td>7.66</td>
<td>6.03</td>
<td>13.68</td>
<td>17.50</td>
<td>13.50</td>
<td>12.69</td>
</tr>
<tr>
<td>Russell 1000</td>
<td>-13.82</td>
<td>-4.78</td>
<td>9.09</td>
<td>8.21</td>
<td>13.28</td>
<td>15.34</td>
<td>11.11</td>
<td>11.01</td>
</tr>
<tr>
<td>Russell 1000 Growth</td>
<td>-15.89</td>
<td>-1.51</td>
<td>11.15</td>
<td>10.40</td>
<td>15.29</td>
<td>17.44</td>
<td>12.30</td>
<td>11.17</td>
</tr>
<tr>
<td>Russell 2000</td>
<td>-20.20</td>
<td>-11.01</td>
<td>7.36</td>
<td>4.41</td>
<td>11.97</td>
<td>19.33</td>
<td>16.01</td>
<td>15.43</td>
</tr>
<tr>
<td>Russell 3000</td>
<td>-14.30</td>
<td>-5.24</td>
<td>8.97</td>
<td>7.91</td>
<td>13.18</td>
<td>15.52</td>
<td>11.34</td>
<td>11.17</td>
</tr>
<tr>
<td>Russell 3000 Value</td>
<td>-12.24</td>
<td>-8.58</td>
<td>7.01</td>
<td>5.77</td>
<td>11.12</td>
<td>14.21</td>
<td>11.21</td>
<td>11.01</td>
</tr>
<tr>
<td>MSCI USA</td>
<td>-13.68</td>
<td>-4.50</td>
<td>9.12</td>
<td>8.34</td>
<td>13.15</td>
<td>15.32</td>
<td>11.03</td>
<td>10.99</td>
</tr>
</tbody>
</table>

Global traditional weighted benchmark performance
- International underperforms US in 2018
- ACWI outperforms ACWI IMI for year
- Emerging and developed small cap underperform large cap for 2018
- Developed small cap weakness comes after a strong run of outperformance

<table>
<thead>
<tr>
<th>Benchmark</th>
<th>Q4 2018</th>
<th>3-yr</th>
<th>5-yr</th>
<th>10-yr</th>
<th>1-yr Vol</th>
<th>3-yr Vol</th>
<th>5-yr Vol</th>
<th>10-yr Vol</th>
</tr>
</thead>
<tbody>
<tr>
<td>MSCI ACWI ex USA IMI</td>
<td>-11.88</td>
<td>-14.76</td>
<td>4.39</td>
<td>0.85</td>
<td>6.97</td>
<td>12.64</td>
<td>11.63</td>
<td>11.84</td>
</tr>
<tr>
<td>MSCI ACWI ex USA</td>
<td>-11.46</td>
<td>-14.20</td>
<td>4.48</td>
<td>0.68</td>
<td>6.57</td>
<td>12.72</td>
<td>11.54</td>
<td>11.92</td>
</tr>
<tr>
<td>MSCI World ex USA</td>
<td>-12.78</td>
<td>-14.09</td>
<td>3.11</td>
<td>0.34</td>
<td>6.24</td>
<td>12.37</td>
<td>11.22</td>
<td>11.66</td>
</tr>
<tr>
<td>MSCI World ex USA Small</td>
<td>-16.16</td>
<td>-18.07</td>
<td>3.85</td>
<td>2.25</td>
<td>10.06</td>
<td>12.71</td>
<td>12.74</td>
<td>11.99</td>
</tr>
<tr>
<td>MSCI EAFE</td>
<td>-12.54</td>
<td>-13.79</td>
<td>2.87</td>
<td>0.53</td>
<td>6.32</td>
<td>12.43</td>
<td>11.40</td>
<td>11.78</td>
</tr>
<tr>
<td>Emerging Markets Small Cap</td>
<td>-7.18</td>
<td>-18.59</td>
<td>3.68</td>
<td>0.95</td>
<td>9.87</td>
<td>15.81</td>
<td>14.21</td>
<td>14.11</td>
</tr>
<tr>
<td>MSCI Frontier Markets</td>
<td>-4.33</td>
<td>-16.41</td>
<td>4.21</td>
<td>0.67</td>
<td>4.75</td>
<td>14.32</td>
<td>12.00</td>
<td>12.03</td>
</tr>
</tbody>
</table>

All “Traditional Weighted” benchmarks above have at least 10 years of actual performance that can be verified by accessing the provider’s website for further information. All “Alternatively Weighted” benchmarks include hypothetical back-tested information in the performance provided for the years where actual performance did not exist. LGIMA has obtained this information from the index provider and recommends that all information be verified on the provider’s website. Index provider information has not been independently verified by LGIMA for its accuracy or completeness, therefore the information obtained from third party sources cannot be guaranteed. Please refer to the disclosures at the end of this presentation for more information.
US alt. weighted benchmark performance

- Low volatility strategies performed very well in Q4, leading them to be best factor in 2018
- U.S. low volatility was the only positive factor for 2018
- Value was the worst factor in US for 2018
- Defensive factors such as quality and dividend yield outperformed market cap
- Diversification did not work as exhibited by equal weight underperformance vs. market cap for Q4 and 2018

<table>
<thead>
<tr>
<th>Benchmark</th>
<th>Q4</th>
<th>2018</th>
<th>3-yr</th>
<th>5-yr</th>
<th>10-yr</th>
<th>1-yr Vol</th>
<th>3-yr Vol</th>
<th>5-yr Vol</th>
<th>10-yr Vol</th>
</tr>
</thead>
<tbody>
<tr>
<td>MSCI USA</td>
<td>-13.68</td>
<td>-4.50</td>
<td>9.12</td>
<td>8.34</td>
<td>13.15</td>
<td>15.32</td>
<td>11.03</td>
<td>10.99</td>
<td>13.60</td>
</tr>
<tr>
<td>SciBeta USA Low Vol DMS</td>
<td>-9.08</td>
<td>-1.88</td>
<td>9.33</td>
<td>10.03</td>
<td>14.13</td>
<td>12.61</td>
<td>9.43</td>
<td>9.29</td>
<td>11.05</td>
</tr>
<tr>
<td>MSCI USA Min Vol</td>
<td>-7.51</td>
<td>1.55</td>
<td>10.23</td>
<td>10.52</td>
<td>13.41</td>
<td>12.21</td>
<td>9.11</td>
<td>9.02</td>
<td>10.73</td>
</tr>
<tr>
<td>MSCI USA Risk Weighted</td>
<td>-11.34</td>
<td>-5.19</td>
<td>8.61</td>
<td>8.34</td>
<td>14.14</td>
<td>13.81</td>
<td>10.46</td>
<td>10.23</td>
<td>12.42</td>
</tr>
<tr>
<td>MSCI USA Value</td>
<td>-10.56</td>
<td>-7.18</td>
<td>7.77</td>
<td>6.62</td>
<td>11.13</td>
<td>13.78</td>
<td>10.42</td>
<td>10.50</td>
<td>14.04</td>
</tr>
<tr>
<td>MSCI USA Quality</td>
<td>-13.74</td>
<td>-2.65</td>
<td>9.82</td>
<td>9.65</td>
<td>14.55</td>
<td>15.18</td>
<td>11.11</td>
<td>11.06</td>
<td>12.48</td>
</tr>
<tr>
<td>MSCI USA Momentum</td>
<td>-15.58</td>
<td>-1.61</td>
<td>12.55</td>
<td>12.31</td>
<td>15.13</td>
<td>17.82</td>
<td>12.27</td>
<td>11.87</td>
<td>13.57</td>
</tr>
<tr>
<td>SciBeta USA Momentum DMS</td>
<td>-15.80</td>
<td>-7.37</td>
<td>6.36</td>
<td>7.17</td>
<td>12.62</td>
<td>15.87</td>
<td>11.20</td>
<td>10.82</td>
<td>12.95</td>
</tr>
<tr>
<td>MSCI USA Equal Weighted</td>
<td>-14.72</td>
<td>-8.05</td>
<td>7.80</td>
<td>6.72</td>
<td>14.39</td>
<td>15.38</td>
<td>11.96</td>
<td>11.59</td>
<td>15.40</td>
</tr>
</tbody>
</table>

Global developed ex USA alt. weighted benchmark performance

- Low volatility strategies were the best performers in 2018
- Defensive factors such as quality and dividend yield outperformed market cap
- Momentum showing weakness after a strong run
- Diversification did not work as exhibited by equal weight underperformance vs. market cap for Q4 and 2018

<table>
<thead>
<tr>
<th>Benchmark</th>
<th>Q4</th>
<th>2018</th>
<th>3-yr</th>
<th>5-yr</th>
<th>10-yr</th>
<th>1-yr Vol</th>
<th>3-yr Vol</th>
<th>5-yr Vol</th>
<th>10-yr Vol</th>
</tr>
</thead>
<tbody>
<tr>
<td>MSCI World ex USA</td>
<td>-12.78</td>
<td>-14.09</td>
<td>3.11</td>
<td>0.34</td>
<td>6.24</td>
<td>12.37</td>
<td>11.22</td>
<td>11.66</td>
<td>16.12</td>
</tr>
<tr>
<td>MSCI World ex USA Min Vol</td>
<td>-7.61</td>
<td>-6.23</td>
<td>4.78</td>
<td>4.90</td>
<td>7.96</td>
<td>8.99</td>
<td>8.69</td>
<td>9.02</td>
<td>11.53</td>
</tr>
<tr>
<td>MSCI World ex USA Value</td>
<td>-12.05</td>
<td>-15.06</td>
<td>3.36</td>
<td>0.73</td>
<td>5.69</td>
<td>13.07</td>
<td>12.07</td>
<td>12.42</td>
<td>17.45</td>
</tr>
<tr>
<td>FTSE RAFI Developed ex USA 1000</td>
<td>-12.86</td>
<td>-15.04</td>
<td>4.25</td>
<td>0.33</td>
<td>6.68</td>
<td>13.18</td>
<td>12.14</td>
<td>12.50</td>
<td>18.68</td>
</tr>
<tr>
<td>SciBeta Dev ex USA Value Multi-Strat</td>
<td>-12.82</td>
<td>-16.34</td>
<td>3.94</td>
<td>1.59</td>
<td>7.49</td>
<td>12.46</td>
<td>11.84</td>
<td>11.76</td>
<td>16.32</td>
</tr>
<tr>
<td>MSCI World ex USA Quality</td>
<td>-11.58</td>
<td>-10.76</td>
<td>3.33</td>
<td>1.63</td>
<td>7.81</td>
<td>11.76</td>
<td>10.86</td>
<td>11.50</td>
<td>15.04</td>
</tr>
<tr>
<td>MSCI World ex USA Momentum</td>
<td>-15.09</td>
<td>-13.74</td>
<td>3.05</td>
<td>1.02</td>
<td>6.39</td>
<td>13.64</td>
<td>11.42</td>
<td>11.09</td>
<td>14.62</td>
</tr>
<tr>
<td>MSCI World ex USA High Dividend Yield</td>
<td>-10.57</td>
<td>-13.04</td>
<td>3.29</td>
<td>0.70</td>
<td>6.77</td>
<td>12.07</td>
<td>10.84</td>
<td>11.89</td>
<td>17.04</td>
</tr>
<tr>
<td>MSCI World ex USA Equal Dividend Yield</td>
<td>-13.31</td>
<td>-14.61</td>
<td>4.53</td>
<td>1.96</td>
<td>7.78</td>
<td>12.25</td>
<td>11.54</td>
<td>11.67</td>
<td>16.11</td>
</tr>
</tbody>
</table>

Hypothetical performance results have many inherent limitations and no representation is being made that any account will or is likely to achieve profits or losses similar to those shown. In fact, there are frequently sharp differences between hypothetical performance results and the actual results subsequently achieved by any particular trading program. Please refer to the disclosures at the end of this presentation for more information.
### Emerging markets alternative weighted benchmark performance
- Low volatility strategies performed very well in 2018 leading them to be best factor
- Factors worked well in EM arena in Q4 and 2018
- Value worked in emerging markets in 2018, but didn’t in other regions
- Momentum was the worst factor in 2018
- Defensive factors such as quality and dividend yield outperformed market cap
- Diversification did not add value in the EM space

<table>
<thead>
<tr>
<th>Benchmark</th>
<th>Q4</th>
<th>2018</th>
<th>3-yr</th>
<th>5-yr</th>
<th>10-yr</th>
<th>1-yr Vol</th>
<th>3-yr Vol</th>
<th>5-yr Vol</th>
<th>10-yr Vol</th>
</tr>
</thead>
<tbody>
<tr>
<td>MSCI EM</td>
<td>-7.47</td>
<td>-14.58</td>
<td>9.25</td>
<td>1.65</td>
<td>8.02</td>
<td>15.45</td>
<td>14.81</td>
<td>15.19</td>
<td>19.27</td>
</tr>
<tr>
<td>MSCI EM Mn Vol</td>
<td>-4.43</td>
<td>-5.78</td>
<td>7.45</td>
<td>1.98</td>
<td>10.02</td>
<td>11.95</td>
<td>11.08</td>
<td>11.84</td>
<td>14.97</td>
</tr>
<tr>
<td>MSCI EM Risk Weighted</td>
<td>-2.19</td>
<td>-13.41</td>
<td>5.97</td>
<td>0.45</td>
<td>8.51</td>
<td>13.37</td>
<td>13.45</td>
<td>13.45</td>
<td>17.70</td>
</tr>
<tr>
<td>Sci Beta EM Low Vol DMS</td>
<td>-6.05</td>
<td>-10.39</td>
<td>5.33</td>
<td>1.39</td>
<td>10.15</td>
<td>12.47</td>
<td>11.82</td>
<td>11.90</td>
<td>15.14</td>
</tr>
<tr>
<td>MSCI EM Value</td>
<td>-6.75</td>
<td>-10.74</td>
<td>9.52</td>
<td>0.51</td>
<td>6.99</td>
<td>16.00</td>
<td>15.28</td>
<td>16.11</td>
<td>19.94</td>
</tr>
<tr>
<td>SciBeta EM Value DMS</td>
<td>-7.11</td>
<td>-11.55</td>
<td>8.48</td>
<td>1.17</td>
<td>8.77</td>
<td>15.34</td>
<td>14.28</td>
<td>14.84</td>
<td>18.23</td>
</tr>
<tr>
<td>MSCI EM Quality</td>
<td>-0.11</td>
<td>-16.49</td>
<td>6.11</td>
<td>1.59</td>
<td>9.54</td>
<td>12.67</td>
<td>13.23</td>
<td>13.09</td>
<td>17.09</td>
</tr>
<tr>
<td>SciBeta EM Momentum DMS</td>
<td>-7.25</td>
<td>-16.54</td>
<td>3.95</td>
<td>0.01</td>
<td>9.38</td>
<td>13.12</td>
<td>13.02</td>
<td>12.68</td>
<td>16.58</td>
</tr>
<tr>
<td>MSCI EM Dividend Yield</td>
<td>-6.09</td>
<td>-7.56</td>
<td>9.89</td>
<td>0.07</td>
<td>7.66</td>
<td>15.12</td>
<td>13.74</td>
<td>15.84</td>
<td>18.93</td>
</tr>
<tr>
<td>MSCI EM Equal Weighted</td>
<td>-5.88</td>
<td>-17.43</td>
<td>5.45</td>
<td>-0.41</td>
<td>7.82</td>
<td>14.93</td>
<td>14.95</td>
<td>15.03</td>
<td>20.36</td>
</tr>
</tbody>
</table>

### Environmental and Socially Responsible weighted benchmark performance
- ESG outperforms market cap in 2018
- Climate indices closely track market cap
- Russell climate slightly outperforms in 2018

<table>
<thead>
<tr>
<th>Benchmark</th>
<th>Q4</th>
<th>2018</th>
<th>3-yr</th>
<th>5-yr</th>
<th>10-yr</th>
<th>1-yr Vol</th>
<th>3-yr Vol</th>
<th>5-yr Vol</th>
<th>10-yr Vol</th>
</tr>
</thead>
<tbody>
<tr>
<td>Russell 1000 ESG</td>
<td>-13.82</td>
<td>-4.78</td>
<td>9.09</td>
<td>8.21</td>
<td>13.28</td>
<td>15.34</td>
<td>11.11</td>
<td>11.01</td>
<td>13.76</td>
</tr>
<tr>
<td>MSCI World Low Carbon Trgt</td>
<td>-13.41</td>
<td>-8.92</td>
<td>6.00</td>
<td>4.58</td>
<td>13.56</td>
<td>10.53</td>
<td>10.79</td>
<td></td>
<td></td>
</tr>
<tr>
<td>MSCI World SRI</td>
<td>-12.26</td>
<td>-6.72</td>
<td>7.49</td>
<td>4.90</td>
<td>9.74</td>
<td>13.84</td>
<td>10.70</td>
<td>10.83</td>
<td>14.45</td>
</tr>
<tr>
<td>FTSE 4Good Developed</td>
<td>-12.62</td>
<td>-8.24</td>
<td>6.84</td>
<td>5.04</td>
<td>10.07</td>
<td>13.26</td>
<td>10.64</td>
<td>10.91</td>
<td>15.28</td>
</tr>
<tr>
<td>Russell 1000 Climate</td>
<td>-13.90</td>
<td>-4.60</td>
<td>9.00</td>
<td>8.30</td>
<td>16.90</td>
<td>12.10</td>
<td>11.00</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### Fixed income benchmark performance
- Global Agg outperforms the US Agg for 2018
- US IG underperforms high yield for 2018
-Intermediate Treasury was the strongest performing sector for the year
-EM had poor performance for 2018 after a strong run

<table>
<thead>
<tr>
<th>Benchmark</th>
<th>Q4</th>
<th>2018</th>
<th>3-yr</th>
<th>5-yr</th>
<th>10-yr</th>
<th>1-yr Vol</th>
<th>3-yr Vol</th>
<th>5-yr Vol</th>
<th>10-yr Vol</th>
</tr>
</thead>
<tbody>
<tr>
<td>Barclays Global Agg</td>
<td>1.20</td>
<td>-1.20</td>
<td>2.70</td>
<td>1.08</td>
<td>2.49</td>
<td>3.74</td>
<td>4.97</td>
<td>4.46</td>
<td>5.14</td>
</tr>
<tr>
<td>Barclays US Agg</td>
<td>1.64</td>
<td>0.01</td>
<td>2.06</td>
<td>2.52</td>
<td>3.48</td>
<td>3.12</td>
<td>2.88</td>
<td>2.79</td>
<td>2.84</td>
</tr>
<tr>
<td>iBoxx US Investment Grade</td>
<td>-0.54</td>
<td>-3.69</td>
<td>3.21</td>
<td>3.47</td>
<td>5.71</td>
<td>4.08</td>
<td>4.57</td>
<td>4.50</td>
<td>5.17</td>
</tr>
<tr>
<td>iBoxx US High Yield</td>
<td>-4.24</td>
<td>-1.51</td>
<td>6.50</td>
<td>3.22</td>
<td>9.33</td>
<td>3.59</td>
<td>4.19</td>
<td>5.01</td>
<td>7.65</td>
</tr>
<tr>
<td>Barclays US TIPS</td>
<td>-0.42</td>
<td>-1.26</td>
<td>2.11</td>
<td>1.69</td>
<td>3.64</td>
<td>2.85</td>
<td>3.10</td>
<td>3.57</td>
<td>4.89</td>
</tr>
<tr>
<td>Barclays US Treasury</td>
<td>2.57</td>
<td>0.86</td>
<td>1.40</td>
<td>2.01</td>
<td>2.08</td>
<td>3.61</td>
<td>3.41</td>
<td>3.23</td>
<td>3.66</td>
</tr>
<tr>
<td>Barclays US Treasury: Inter</td>
<td>2.24</td>
<td>1.41</td>
<td>1.20</td>
<td>1.47</td>
<td>1.79</td>
<td>2.41</td>
<td>2.30</td>
<td>2.16</td>
<td>2.51</td>
</tr>
<tr>
<td>Barclays US Treasury: Long</td>
<td>4.19</td>
<td>-1.84</td>
<td>2.58</td>
<td>5.93</td>
<td>4.09</td>
<td>10.07</td>
<td>9.69</td>
<td>10.01</td>
<td>11.29</td>
</tr>
<tr>
<td>JPM Emerging Market Global Core</td>
<td>-1.61</td>
<td>-5.17</td>
<td>4.89</td>
<td>4.59</td>
<td>8.05</td>
<td>5.89</td>
<td>5.95</td>
<td>5.76</td>
<td>7.03</td>
</tr>
</tbody>
</table>

Hypothetical performance results have many inherent limitations and no representation is being made that any account will or is likely to achieve profits or losses similar to those shown. In fact, there are frequently sharp differences between hypothetical performance results and the actual results subsequently achieved by any particular trading program. Please refer to the disclosures at the end of this presentation for more information.
**REITS, Infrastructure, and Commodity benchmark**

- S&P GSCI continues to underperform BBG Commodity with a heavier exposure to energy
- US Dollar index showed positive returns in 2018 vs. global currencies
- Defensive sectors such as US REITs and infrastructure outperformed in 2018

<table>
<thead>
<tr>
<th>Benchmark</th>
<th>Q4 2018</th>
<th>3-yr</th>
<th>5-yr</th>
<th>10-yr</th>
<th>1-yr Vol</th>
<th>3-yr Vol</th>
<th>5-yr Vol</th>
<th>10-yr Vol</th>
</tr>
</thead>
<tbody>
<tr>
<td>BBG Commodity</td>
<td>-8.60</td>
<td>-8.91</td>
<td>2.50</td>
<td>-8.17</td>
<td>-1.69</td>
<td>9.18</td>
<td>10.14</td>
<td>12.38</td>
</tr>
<tr>
<td>S&amp;P GSCI</td>
<td>-22.94</td>
<td>-13.82</td>
<td>0.50</td>
<td>-14.52</td>
<td>-5.78</td>
<td>17.88</td>
<td>15.59</td>
<td>18.76</td>
</tr>
<tr>
<td>US Dollar Index</td>
<td>1.09</td>
<td>4.40</td>
<td>-0.84</td>
<td>3.74</td>
<td>1.69</td>
<td>5.55</td>
<td>6.19</td>
<td>6.75</td>
</tr>
<tr>
<td>FTSE EPRA Nareit Dv REITs USA</td>
<td>-5.97</td>
<td>-3.90</td>
<td>2.42</td>
<td>7.65</td>
<td>12.03</td>
<td>16.02</td>
<td>13.61</td>
<td>14.01</td>
</tr>
<tr>
<td>FTSE EPRA Nareit Americas</td>
<td>-5.90</td>
<td>-4.12</td>
<td>2.85</td>
<td>6.70</td>
<td>11.43</td>
<td>15.02</td>
<td>13.16</td>
<td>13.38</td>
</tr>
<tr>
<td>FTSE EPRA Nareit Dv ex US REITs</td>
<td>-4.98</td>
<td>-5.89</td>
<td>4.22</td>
<td>4.30</td>
<td>9.74</td>
<td>8.85</td>
<td>10.65</td>
<td>10.96</td>
</tr>
<tr>
<td>FTSE EPRA Nareit Global REITs</td>
<td>-5.66</td>
<td>-4.94</td>
<td>3.02</td>
<td>6.21</td>
<td>10.97</td>
<td>11.98</td>
<td>11.44</td>
<td>11.76</td>
</tr>
<tr>
<td>FTSE Dvp Core Infrastructure</td>
<td>-4.12</td>
<td>-0.48</td>
<td>9.36</td>
<td>7.00</td>
<td>9.72</td>
<td>10.03</td>
<td>8.98</td>
<td>9.26</td>
</tr>
<tr>
<td>FTSE Global Core Infrastructure</td>
<td>-3.67</td>
<td>-0.91</td>
<td>9.40</td>
<td>6.84</td>
<td>9.74</td>
<td>9.49</td>
<td>8.79</td>
<td>9.19</td>
</tr>
<tr>
<td>MSCI ACWI Infrastructure</td>
<td>-3.60</td>
<td>-6.46</td>
<td>3.82</td>
<td>1.77</td>
<td>5.05</td>
<td>9.88</td>
<td>9.29</td>
<td>9.50</td>
</tr>
<tr>
<td>MSCI USA Infrastructure</td>
<td>-3.78</td>
<td>-2.13</td>
<td>6.85</td>
<td>5.24</td>
<td>8.01</td>
<td>10.60</td>
<td>10.64</td>
<td>9.66</td>
</tr>
</tbody>
</table>

**Multi-Factor benchmark performance**

- The inclusion of quality and a higher factor intensity led the SciBeta 6F HFI index to outperform the standard SciBeta 4F EW index
- SciBeta exhibits lower volatility across all time segments

<table>
<thead>
<tr>
<th>Benchmark</th>
<th>Q4 2018</th>
<th>3-yr</th>
<th>5-yr</th>
<th>10-yr</th>
<th>1-yr Vol</th>
<th>3-yr Vol</th>
<th>5-yr Vol</th>
<th>10-yr Vol</th>
</tr>
</thead>
</table>

- US factor based strategies lagged market cap in 2018
- More defensive, low beta multi-factor based methodologies performed better for the quarter and year

<table>
<thead>
<tr>
<th>Benchmark</th>
<th>Q4 2018</th>
<th>3-yr</th>
<th>5-yr</th>
<th>10-yr</th>
<th>1-yr Vol</th>
<th>3-yr Vol</th>
<th>5-yr Vol</th>
<th>10-yr Vol</th>
</tr>
</thead>
<tbody>
<tr>
<td>Russell 1000 Comprhnsve Factor</td>
<td>-14.11</td>
<td>-8.68</td>
<td>7.47</td>
<td>7.78</td>
<td>15.06</td>
<td>14.67</td>
<td>10.91</td>
<td>10.54</td>
</tr>
</tbody>
</table>

- Defensive tilted strategies outperformed market cap

<table>
<thead>
<tr>
<th>Benchmark</th>
<th>Q4 2018</th>
<th>3-yr</th>
<th>5-yr</th>
<th>10-yr</th>
<th>1-yr Vol</th>
<th>3-yr Vol</th>
<th>5-yr Vol</th>
<th>10-yr Vol</th>
</tr>
</thead>
<tbody>
<tr>
<td>MSCI World ex USA</td>
<td>-12.78</td>
<td>-14.09</td>
<td>3.11</td>
<td>0.34</td>
<td>6.24</td>
<td>12.37</td>
<td>11.22</td>
<td>11.66</td>
</tr>
<tr>
<td>MSCI World ex USA DMF</td>
<td>-14.46</td>
<td>-15.58</td>
<td>2.78</td>
<td>2.73</td>
<td>9.19</td>
<td>13.22</td>
<td>11.77</td>
<td>11.23</td>
</tr>
</tbody>
</table>

- Factors worked very well in the EM space in 2018, especially those with low volatility factors
- Factor based outperformance in 2018 comes after a period of underperformance for factors
- Higher beta strategies underperformed the market through the course of the year

<table>
<thead>
<tr>
<th>Benchmark</th>
<th>Q4 2018</th>
<th>3-yr</th>
<th>5-yr</th>
<th>10-yr</th>
<th>1-yr Vol</th>
<th>3-yr Vol</th>
<th>5-yr Vol</th>
<th>10-yr Vol</th>
</tr>
</thead>
<tbody>
<tr>
<td>SciBeta EM HFI 6F EW</td>
<td>-6.87</td>
<td>-12.46</td>
<td>5.74</td>
<td>1.37</td>
<td>10.79</td>
<td>13.14</td>
<td>12.42</td>
<td>12.38</td>
</tr>
<tr>
<td>FTSE EM Comprehensive Factor</td>
<td>-6.28</td>
<td>-14.18</td>
<td>6.48</td>
<td>1.32</td>
<td>10.26</td>
<td>14.01</td>
<td>14.25</td>
<td>14.16</td>
</tr>
</tbody>
</table>

Hypothetical performance results have many inherent limitations and no representation is being made that any account will or is likely to achieve profits or losses similar to those shown. In fact, there are frequently sharp differences between hypothetical performance results and the actual results subsequently achieved by any particular trading program. Please refer to the disclosures at the end of this presentation for more information.
Multi-Factor year-by-year returns
Back-tested returns vs. live returns
- High beta strategies fared poorly due to lack of low volatility factors, underperforming other Multi-Factor strategies in 2018 and Q418.

<table>
<thead>
<tr>
<th>Yearly Returns</th>
<th>MSCI ACWI</th>
<th>SciBeta Global MBMS 4F EW</th>
<th>MSCI ACWI DMF</th>
<th>FTSE AW Comprehensive Factor</th>
<th>SciBeta Global High-Factor Intensity MBMS 6F EW</th>
</tr>
</thead>
<tbody>
<tr>
<td>2003</td>
<td>33.99</td>
<td>37.52</td>
<td>42.35</td>
<td>38.06</td>
<td>34.92</td>
</tr>
<tr>
<td>2004</td>
<td>15.23</td>
<td>25.21</td>
<td>26.92</td>
<td>27.12</td>
<td>26.72</td>
</tr>
<tr>
<td>2005</td>
<td>10.84</td>
<td>16.15</td>
<td>19.97</td>
<td>20.66</td>
<td>15.56</td>
</tr>
<tr>
<td>2006</td>
<td>20.95</td>
<td>24.77</td>
<td>29.31</td>
<td>26.81</td>
<td>26.49</td>
</tr>
<tr>
<td>2007</td>
<td>11.66</td>
<td>10.08</td>
<td>12.41</td>
<td>14.76</td>
<td>11.30</td>
</tr>
<tr>
<td>2008</td>
<td>-42.19</td>
<td>-38.76</td>
<td>-43.04</td>
<td>-36.84</td>
<td>-33.81</td>
</tr>
<tr>
<td>2009</td>
<td>34.63</td>
<td>31.07</td>
<td>40.39</td>
<td>35.38</td>
<td>28.09</td>
</tr>
<tr>
<td>2010</td>
<td>12.67</td>
<td>19.42</td>
<td>19.29</td>
<td>18.20</td>
<td>20.23</td>
</tr>
<tr>
<td>2011</td>
<td>-7.35</td>
<td>-4.69</td>
<td>-3.86</td>
<td>-2.43</td>
<td>-0.49</td>
</tr>
<tr>
<td>2012</td>
<td>16.13</td>
<td>16.73</td>
<td>16.20</td>
<td>18.22</td>
<td>15.76</td>
</tr>
<tr>
<td>2013</td>
<td>22.80</td>
<td>23.30</td>
<td>26.38</td>
<td>22.08</td>
<td>24.34</td>
</tr>
<tr>
<td>2015</td>
<td>-2.36</td>
<td>0.48</td>
<td>1.61</td>
<td>-0.33</td>
<td>3.04</td>
</tr>
<tr>
<td>2016</td>
<td>7.86</td>
<td>6.03</td>
<td>5.67</td>
<td>6.18</td>
<td>6.11</td>
</tr>
<tr>
<td>2017</td>
<td>23.97</td>
<td>23.41</td>
<td>29.44</td>
<td>25.45</td>
<td>22.86</td>
</tr>
<tr>
<td>Q4 2018</td>
<td>-12.75</td>
<td>-12.47</td>
<td>-14.25</td>
<td>-11.69</td>
<td>-11.79</td>
</tr>
</tbody>
</table>

Outperform ACWI  Live track record  Underperform ACWI

US and global market cap weighted valuations
Chart plots the referenced statistics based on monthly P/B ratios for previous 15 years.
- US large cap still above historical norms
- Small / Midcap dip below historical averages
- Growth P/B pulls back a bit, but still much higher than historical
- Global stocks drop below averages

Sources: LGIMA, MSCI, S&P, Bloomberg

Hypothetical performance results have many inherent limitations and no representation is being made that any account will or is likely to achieve profits or losses similar to those shown. In fact, there are frequently sharp differences between hypothetical performance results and the actual results subsequently achieved by any particular trading program. Please refer to the disclosures at the end of this presentation for more information.
**Currency summary—MSCI Global Indices**

- Japanese Yen was the best performing currency in Q4 and 2018
- All other developed market currencies were negative vs. US Dollar in 2018
- Turkish Lira’s extremely poor performance for 2018 amid political turmoil

<table>
<thead>
<tr>
<th>Index</th>
<th>USD Return %</th>
<th>Local Return %</th>
<th>Currency Impact %</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>3M</td>
<td>1-yr</td>
<td>3M</td>
</tr>
<tr>
<td>MSCI ACWI ex US</td>
<td>-11.46%</td>
<td>-14.20%</td>
<td>-10.89%</td>
</tr>
<tr>
<td>MSCI USA</td>
<td>-13.68%</td>
<td>-4.50%</td>
<td>-13.68%</td>
</tr>
<tr>
<td>MSCI World ex US</td>
<td>-12.78%</td>
<td>-14.09%</td>
<td>-12.05%</td>
</tr>
<tr>
<td>MSCI EAFE</td>
<td>-12.54%</td>
<td>-13.79%</td>
<td>-12.20%</td>
</tr>
<tr>
<td>MSCI Canada</td>
<td>-15.30%</td>
<td>-17.20%</td>
<td>-10.50%</td>
</tr>
<tr>
<td>MSCI EM</td>
<td>-7.47%</td>
<td>-14.58%</td>
<td>-7.43%</td>
</tr>
<tr>
<td>MSCI Frontier Markets</td>
<td>-4.33%</td>
<td>-16.41%</td>
<td>-3.98%</td>
</tr>
</tbody>
</table>

Sources: LGIMA, MSCI, S&P, Bloomberg

**One year currency risk/return**

Hypothetical performance results have many inherent limitations and no representation is being made that any account will or is likely to achieve profits or losses similar to those shown. In fact, there are frequently sharp differences between hypothetical performance results and the actual results subsequently achieved by any particular trading program. Please refer to the disclosures at the end of this presentation for more information.
SciBeta USA Factor Indexes Periodic Table Investment Returns
Single Factor Indexes based on SciBeta’s diversified multi-strategy scheme methodology

- Low Vol strategies were strongest performing in 2018
- 6F HFI outperforms 4F EW and market cap due to higher tilt to defensive factors
- Value continues poor performance as worst performing factor three of last four years

Sources: LGIMA, Scientific Beta, Morningstar Direct

Hypothetical performance results have many inherent limitations and no representation is being made that any account will or is likely to achieve profits or losses similar to those shown. In fact, there are frequently sharp differences between hypothetical performance results and the actual results subsequently achieved by any particular trading program. Please refer to the disclosures at the end of this presentation for more information.
SciBeta Developed xUSA Factor Indexes Periodic Table Investment Returns

Single Factor Indexes based on SciBeta’s diversified multi-strategy scheme methodology

- Low Vol strategies were strongest performing in 2018
- Defensive Factors outperform market cap in 2018
- 6F HFI outperform 4F EW and market cap due to higher tilt to defensive factors

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Momentum</td>
<td>21.38</td>
<td>35.97</td>
<td>13.17</td>
<td>24.40</td>
<td>18.97</td>
<td>18.49</td>
<td>23.98</td>
<td>2.89</td>
<td>5.93</td>
<td>3.24</td>
<td>31.95</td>
<td>-0.84</td>
<td>-0.15</td>
<td>1.53</td>
<td>-0.18</td>
<td>-9.91</td>
<td></td>
</tr>
<tr>
<td>Value</td>
<td>20.31</td>
<td>31.92</td>
<td>12.44</td>
<td>33.67</td>
<td>18.38</td>
<td>16.99</td>
<td>23.22</td>
<td>0.92</td>
<td>4.75</td>
<td>2.81</td>
<td>28.30</td>
<td>-0.96</td>
<td>-0.62</td>
<td>1.31</td>
<td>-5.46</td>
<td>-2.51</td>
<td></td>
</tr>
<tr>
<td>Size</td>
<td>18.69</td>
<td>31.70</td>
<td>11.43</td>
<td>12.46</td>
<td>18.12</td>
<td>17.93</td>
<td>22.89</td>
<td>0.73</td>
<td>4.45</td>
<td>2.80</td>
<td>28.30</td>
<td>-0.96</td>
<td>-0.62</td>
<td>1.31</td>
<td>-5.46</td>
<td>-2.51</td>
<td></td>
</tr>
<tr>
<td>4F EW</td>
<td>18.27</td>
<td>31.02</td>
<td>11.93</td>
<td>12.46</td>
<td>18.12</td>
<td>17.93</td>
<td>22.89</td>
<td>0.73</td>
<td>4.45</td>
<td>2.80</td>
<td>28.30</td>
<td>-0.96</td>
<td>-0.62</td>
<td>1.31</td>
<td>-5.46</td>
<td>-2.51</td>
<td></td>
</tr>
<tr>
<td>HFI 6F</td>
<td>17.66</td>
<td>30.04</td>
<td>10.39</td>
<td>15.86</td>
<td>15.87</td>
<td>15.87</td>
<td>21.41</td>
<td>0.86</td>
<td>3.89</td>
<td>1.21</td>
<td>27.68</td>
<td>-1.09</td>
<td>-0.85</td>
<td>0.97</td>
<td>-12.82</td>
<td>-14.51</td>
<td></td>
</tr>
<tr>
<td>Quality</td>
<td>15.97</td>
<td>29.49</td>
<td>9.23</td>
<td>13.74</td>
<td>16.63</td>
<td>16.31</td>
<td>21.62</td>
<td>0.84</td>
<td>3.55</td>
<td>1.06</td>
<td>27.54</td>
<td>-1.21</td>
<td>-0.87</td>
<td>0.87</td>
<td>-12.97</td>
<td>-14.63</td>
<td></td>
</tr>
<tr>
<td>MSCI World xUS</td>
<td>14.47</td>
<td>29.34</td>
<td>7.90</td>
<td>27.89</td>
<td>12.45</td>
<td>16.41</td>
<td>21.62</td>
<td>0.84</td>
<td>3.55</td>
<td>1.06</td>
<td>27.54</td>
<td>-1.21</td>
<td>-0.87</td>
<td>0.87</td>
<td>-12.97</td>
<td>-14.63</td>
<td></td>
</tr>
<tr>
<td>Low Vol</td>
<td>12.83</td>
<td>25.71</td>
<td>7.53</td>
<td>26.59</td>
<td>8.95</td>
<td>16.34</td>
<td>21.62</td>
<td>1.30</td>
<td>4.32</td>
<td>1.64</td>
<td>24.01</td>
<td>-0.51</td>
<td>-0.34</td>
<td>0.85</td>
<td>-13.21</td>
<td>-16.34</td>
<td></td>
</tr>
</tbody>
</table>

Sources: LGIMA, Scientific Beta, Morningstar Direct

Hypothetical performance results have many inherent limitations and no representation is being made that any account will or is likely to achieve profits or losses similar to those shown. In fact, there are frequently sharp differences between hypothetical performance results and the actual results subsequently achieved by any particular trading program. Please refer to the disclosures at the end of this presentation for more information.
Saudi Arabia - Promotion to Emerging Market Status

Scientific Beta
In December 2018, ERI Scientific Beta announced it had promoted Saudi Arabia to become part of its emerging markets universe. This change will be effective in June 2019. Justifying this decision, Scientific Beta highlighted a number of recent market developments: market size, liquidity, and market structure enhancements. Developments that were mentioned include the move to a T+2 settlement cycle, the introduction of delivery versus payment settlement, proper fail trade management, and the establishment of securities lending and borrowing.

FTSE Russell
In March 2018, FTSE Russell announced the promotion of Saudi Arabia to Secondary Emerging status within its FTSE Global Equity Index Series (GEIS).

FTSE Russell mentioned the recent developments in the Saudi market as basis for the recategorization. FTSE Russell uses a matrix of 21 criteria upon which to classify stock markets. Criteria that are evaluated include size, liquidity, stability, and accessibility.

Based on data from February 2018, the size of Saudi Arabia in the FTSE Emerging Index would be 2.7%, and would be the tenth largest stock market in the index. FTSE will phase the inclusion of Saudi Arabia over five tranches beginning in March 2019 and finishing in December 2019.

MSCI
In June 2018, MSCI announced that Saudi Arabia would be included in the MSCI Emerging Markets index, with the implementation occurring in two tranches in 2019 (at the May and August index reviews). Like other index providers, MSCI highlighted market accessibility, regulatory and operational developments as well as broad support of institutional investors.

Saudi Arabia: Index Timeline 2019

<table>
<thead>
<tr>
<th>Time</th>
<th>Event Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>March: FTSE</td>
<td>Tranche 1: 10%</td>
</tr>
<tr>
<td>May (Review):</td>
<td>MSCI Tranche 1</td>
</tr>
<tr>
<td>April:</td>
<td>FTSE Tranche 2: 15%</td>
</tr>
<tr>
<td>June:</td>
<td>FTSE Tranche 3: 25% SciBeta: Eligible for entry</td>
</tr>
<tr>
<td>Sept:</td>
<td>FTSE Tranche 4: 25%</td>
</tr>
<tr>
<td>Aug:</td>
<td>MSCI Tranche 2</td>
</tr>
<tr>
<td>Dec:</td>
<td>FTSE Tranche 5: 25%</td>
</tr>
</tbody>
</table>

Contributors

Contact LGIMA
Follow us on LinkedIn
http://www.lgima.com/
DISCLOSURES

Disclosures: This is not a solicitation to purchase any product and is not intended as a solicitation to buy or sell any securities or other financial instruments or to provide any investment advice or service.

The performance set forth below does not represent the results of actual trading, but rather was achieved by means of the retroactive application of a model designed with the benefit of hindsight.

Index provider information has not been independently verified by LGIMA for its accuracy or completeness, therefore the information obtained from third party sources cannot be guaranteed. Accordingly, the information herein should not be relied on in making any investment decision, as an investment always carries with it the risk of loss and the vulnerability to changing economic, market or political conditions, including but not limited to changes in interest rates, issuer, credit and inflation risk, foreign exchange rates, securities prices, market indexes, operational or financial conditions of companies or other factors. Past performance should not be taken as an indication or guarantee of future performance and no representation, express or implied, is made regarding future performance or that LGIMA’s investment or risk management process will be successful.

Hypothetical performance results have many inherent limitations and no representation is being made that any account will or is likely to achieve profits or losses similar to those shown. In fact, there are frequently sharp differences between hypothetical performance results and the actual results subsequently achieved by any particular trading program.

One of the limitations of hypothetical performance results is that they are generally prepared with the benefit of hindsight. In addition, hypothetical trading does not involve financial risk, and no hypothetical trading record can completely account for the impact of financial risk in actual trading. For example, the ability to withstand losses or to adhere to a particular trading program in spite of trading losses are material points which can also adversely affect actual trading results. There are numerous other factors related to the markets in general or to the implementation of any specific trading program which cannot be fully accounted for in the preparation of hypothetical performance results and all of which can adversely affect actual trading results.

The use of hypothetical performance is subject to inherent limitations derived from the reliance on historical data and the benefit of hindsight. All trading strategies applied to the analysis were available throughout the performance period. However, the analysis includes certain assumptions where actual performance could be different from the hypothetical performance presented.

In order to match the index returns a fund would need to track the security weightings in a way that would exactly match the Index and that the economic and market conditions were sufficient to have allowed effective execution of replicate the risk and return characteristics of the index. There are a number of factors that could reduce our ability to track index positions perfectly, including small position sizes and/or available liquidity in some securities. We estimate the net effects of index- and trading-related factors on the passive components of the strategy would affect performance either favorably or unfavorably depending on the size of the portfolio.

A review of the ERI Scientific Beta index methodology has been conducted by: a) comparing in and out of sample performance of the hypothetical back-tested information provided by Scientific Beta; b) testing the returns against the intended factor biases; c) conducting a comparison of similar multi-factor indices to Scientific Beta’s multi-factor index; and d) reviewing the reasonability of portfolio characteristics. The output of the indices appears reasonable given the methodology and targeted portfolio risk biases and opinions expressed herein are as of October 2018 and may change based on market and other conditions. The material contained here is confidential and intended for the person to whom it has been delivered and may not be reproduced or distributed. The material is for informational purposes only and is not intended as a solicitation to buy or sell any securities or other financial instrument or to provide any investment advice or service. Legal & General Investment Management America, Inc. does not guarantee the timeliness, sequence, accuracy or completeness of information included. Past performance should not be taken as an indication or guarantee of future performance and no representation, express or implied, is made regarding future performance.