

# Internet Appendix for “Value and Momentum Everywhere”\*

This Appendix contains additional analysis and robustness results.

- Table IA.I reports the correlation of returns between portfolios formed on BE/ME and portfolios formed on the negative of past five year returns.
- Figure IA.1 plots the model fit and pricing errors for the AMP three-factor model on decile portfolios of value and momentum sorts in individual stocks.
- Table IA.II reports the average of the individual (pair-wise) correlations among value and momentum strategy returns across markets and asset classes.
- Table IA.III reports the average correlation among value and momentum strategies across markets and asset classes, where the value measures are computed using prices lagged by one year.
- Table IA.IV reports the average correlation among value and momentum strategies across markets and asset classes, where the value measure used is the negative of the past five-year return for all assets.
- Table IA.V reports the average correlation of 50/50 value/momentum portfolio combinations across markets and asset classes.
- Table IA.VI reports the performance of value and momentum equity portfolios across markets using decile sorts.
- Table IA.VII reports the average correlation among value and momentum strategies across markets and asset classes for portfolios formed from decile sorts.
- Table IA.VIII reports the performance of value and momentum equity portfolios across markets, where the portfolios are scaled to the same ex ante volatility estimate.

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\*Citation format: Asness, Cliff, Tobias J. Moskowitz, and Lasse H. Pedersen, Internet Appendix for “Value and Momentum Everywhere,” *Journal of Finance* [10.1111/jofi.12025]. Please note: Wiley-Blackwell is not responsible for the content or functionality of any supporting information supplied by the authors. Any queries (other than missing material) should be directed to the authors of the article.

**Table IA.I**

**Correlation of returns between *BE/ME* versus past five year return sorted portfolios**

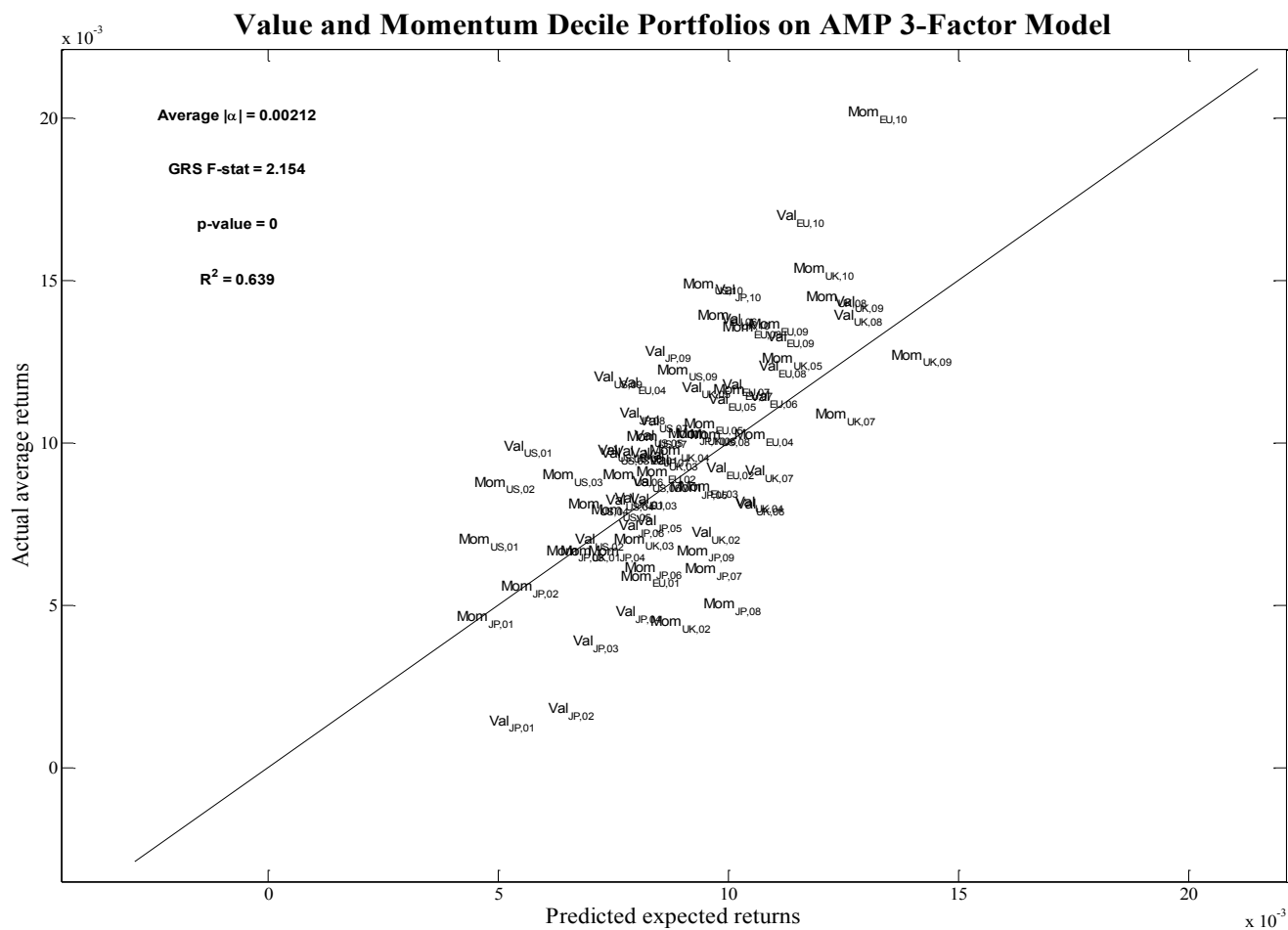
Reported are the pair-wise correlations between the zero cost signal weighted value strategy returns formed on book-to-market equity ratios (*BE/ME*) and the negative of the past five year return for each stock market (the U.S., the U.K., Europe, Japan) as well as globally across all equity markets.

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|               | Correlation ( <i>BE/ME</i> returns, -1,60 returns) |
|---------------|--|
| U.S. stocks   | 0.83   |
| U.K. stocks   | 0.78   |
| Europe stocks | 0.68   |
| Japan stocks  | 0.82   |
| Global stocks | 0.86   |

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**Figure IA.1. Global value and momentum decile portfolios.** Plotted are the pricing errors of value decile and momentum decile portfolios in each of the four international stock markets we study – the U.S., the U.K., Europe, and Japan – under the three-factor global model, consisting of a global market factor (MSCI stock index), a value everywhere factor, and a momentum everywhere factor. The pricing errors of the 80 portfolios are alphas from time-series regressions of each of the portfolios on the factor models, plotted below as the actual average return on each portfolio relative to their predicted expected returns from the model. A 45-degree line passing through the origin is added to highlight the pricing errors (vertical distances to the 45-degree line), where each model is forced to also price the equity premium. Also reported on each graph are the average absolute value of the alphas,  $F$ -statistic and  $p$ -value from the Gibbons, Ross, and Shanken (1989) test, and the cross-sectional  $R^2$ .



**Table IA.II****Correlation of value and momentum strategies—average of individual correlations**

Reported are the average of the individual correlations of value and momentum strategies across markets and asset classes, where we first compute the pairwise correlation of all individual strategies (e.g., U.S. individual stock value strategy returns with Japan individual stock value strategy returns) and then take the average of these pairwise correlations for each group. Excluded are the correlation of each strategy with itself (e.g., removing the 1s) and the correlation of each strategy with all other strategies within the same market. Correlations are computed from quarterly returns to mitigate the influence of non synchronous trading across markets.

|                    | AVERAGE OF INDIVIDUAL CORRELATIONS |                 |                |                    |
|--------------------|------------------------------------|-----------------|----------------|--------------------|
|                    | Stock value                        | Non-stock value | Stock momentum | Non-stock momentum |
| Stock value        | <b>0.57*</b>                       | <b>0.12</b>     | <b>-0.46*</b>  | <b>-0.17</b>       |
| Non-stock value    |                                    | <b>0.03</b>     | <b>-0.13*</b>  | <b>-0.11</b>       |
| Stock momentum     |                                    |                 | <b>0.54*</b>   | <b>0.25*</b>       |
| Non-stock momentum |                                    |                 |                | <b>0.15*</b>       |

**Table IA.III****Correlation of value and momentum strategies across markets and asset classes—value lagged a year**

Reported are the results of Table II in the paper for the average correlations among all value and momentum strategies across markets and asset classes, where the value measure *BE/ME* is lagged an additional year (i.e., market value is lagged to coincide with book value and both are taken from the most recent year-end rather than quarter-end). Panel A reports the average of the individual correlations, where we first compute the pairwise correlation of all individual strategies and then take the average of these pairwise correlations for each group. Panel B reports the correlations of the average return series, where we first compute the average return series for a group and then compute the correlation between the two average return series. The diagonal elements in Panel B are computed as the average correlation between each market's return series and the average of all other return series in other markets, excluding the market itself. Both panels exclude the correlation of each strategy with itself (e.g., removing the 1s) and exclude the correlation of each strategy with all other strategies within the same market. Correlations are computed from quarterly returns to mitigate the influence of non synchronous trading across markets.

|                    | PANEL A: AVERAGE OF INDIVIDUAL CORRELATIONS |                 |                |                    | PANEL B: CORRELATION OF AVERAGE RETURN SERIES |                 |                |                    |
|--------------------|---|-----------------|----------------|--------------------|---|-----------------|----------------|--------------------|
|                    | Stock value                                 | Non-stock value | Stock momentum | Non-stock momentum | Stock value                                   | Non-stock value | Stock momentum | Non-stock momentum |
| Stock value        | <b>0.50</b>                                 | <b>0.06</b>     | <b>-0.28</b>   | <b>-0.06</b>       | <b>0.62</b>                                   | <b>0.05</b>     | <b>-0.28</b>   | <b>-0.08</b>       |
| Non-stock value    |   | <b>0.03</b>     | <b>-0.13</b>   | <b>-0.11</b>       |   | <b>0.07</b>     | <b>-0.20</b>   | <b>-0.15</b>       |
| Stock momentum     |   |                 | <b>0.54</b>    | <b>0.25</b>        |   |                 | <b>0.65</b>    | <b>0.41</b>        |
| Non-stock momentum |   |                 |                | <b>0.15</b>        |   |                 |                | <b>0.21</b>        |

**Table IA.IV**

**Correlation of value and momentum strategies across markets and asset classes—value measured as past five-year return**

Reported are the results of Table II in the paper for the average correlations among all value and momentum strategies across markets and asset classes, where the value measure is the past five year (60 months) return on the security for every asset class. Panel A reports the average of the individual correlations, where we first compute the pairwise correlation of all individual strategies and then take the average of these pairwise correlations for each group. Panel B reports the correlations of the average return series, where we first compute the average return series for a group and then compute the correlation between the two average return series. The diagonal elements in Panel B are computed as the average correlation between each market's return series and the average of all other return series in other markets, excluding the market itself. Both panels exclude the correlation of each strategy with itself (e.g., removing the 1s) and exclude the correlation of each strategy with all other strategies within the same market. Correlations are computed from quarterly returns to mitigate the influence of non synchronous trading across markets.

|                    | PANEL A: AVERAGE OF INDIVIDUAL CORRELATIONS |                 |                |                    | PANEL B: CORRELATION OF AVERAGE RETURN SERIES |                 |                |                    |
|--------------------|---|-----------------|----------------|--------------------|---|-----------------|----------------|--------------------|
|                    | Stock value                                 | Non-stock value | Stock momentum | Non-stock momentum | Stock value                                   | Non-stock value | Stock momentum | Non-stock momentum |
| Stock value        | <b>0.48</b>                                 | <b>0.18</b>     | <b>-0.42</b>   | <b>-0.23</b>       | <b>0.60</b>                                   | <b>0.27</b>     | <b>-0.48</b>   | <b>-0.38</b>       |
| Non-stock value    |   | <b>0.08</b>     | <b>-0.10</b>   | <b>-0.13</b>       |   | <b>0.13</b>     | <b>-0.21</b>   | <b>-0.23</b>       |
| Stock momentum     |   |                 | <b>0.54</b>    | <b>0.27</b>        |   |                 | <b>0.65</b>    | <b>0.45</b>        |
| Non-stock momentum |   |                 |                | <b>0.15</b>        |   |                 |                | <b>0.21</b>        |

**Table IA.V**

**Correlation of value/momentum combination strategies across markets and asset classes**

Reported are the results of Table II in the paper for the average correlations among the value/momentum 50/50 combination strategies across markets and asset classes. Panel A reports the average of the individual correlations, where we first compute the pairwise correlation of all individual strategies and then take the average of these pairwise correlations for each group. Panel B reports the correlations of the average return series, where we first compute the average return series for a group and then compute the correlation between the two average return series. The diagonal elements in Panel B are computed as the average correlation between each market's return series and the average of all other return series in other markets, excluding the market itself. Both panels exclude the correlation of each strategy with itself (e.g., removing the 1s). Correlations are computed from quarterly returns to mitigate the influence of non synchronous trading across markets.

|                 | PANEL A: AVERAGE OF INDIVIDUAL CORRELATIONS |                 | PANEL B: CORRELATION OF AVERAGE RETURN SERIES |                 |
|-----------------|---|-----------------|---|-----------------|
|                 | Stock combo                                 | Non-stock combo | Stock combo                                   | Non-stock combo |
| Stock combo     | <b>0.43</b>                                 | <b>0.10</b>     | <b>0.55</b>                                   | <b>0.22</b>     |
| Non-stock combo |   | <b>0.00</b>     |   | <b>0.04</b>     |

**Table IA.VI**

**Performance of value and momentum portfolios across markets and asset classes—decile portfolios**

Reported are the average raw excess (of the one-month U.S. T-bill rate) return, *t*-statistic of the average return (in parentheses), standard deviation of returns, and Sharpe ratio of each value, momentum, and equal-weighted 50/50 value and momentum combination strategy in each equity market we study: U.S. stocks, U.K. stocks, Europe stocks, and Japan stocks. Also reported are the intercepts or alphas, and their *t*-statistics (in parentheses) from a time-series regression of each return series on the return of the market index for each asset class. The market index for the stock strategies is the MSCI equity index for each country for all of the individual stock strategies. In each market the universe of securities is first sorted by either value or momentum and then broken into 10 equal groups based on those sorts to form decile portfolios P1, P2, . . . P10. Stocks within the portfolios are value weighted by their beginning-of-month capitalization. Reported are the returns to P1, P5, and P10 as well as the high minus low spread in returns (P10-P1). For comparison, the rank-weighted factor portfolio (“Factor”), which is a zero-investment portfolio that weights each asset in proportion to its rank based on either value or momentum (following equation (1)) is also reported (same numbers as in Table I of the paper). The 50/50 value/momentum combination strategies are an equal weighted average of the value and momentum spread strategies (P10-P1 and Factor) for each market. Results are also reported for an average of all individual stock strategies across all stock markets (“Global stocks”), where average return series are computed using equal volatility weights across the markets to account for differences in volatility. Finally, the last row for each market reports the correlation between value and momentum zero-cost residual returns from the benchmark in each market or asset class. Statistics are computed from monthly return series but are reported as annualized numbers.

| INDIVIDUAL STOCK DECILE PORTFOLIOS |                   |                   |                         |         |               |               |                     |         |         |               |               |                   |               |               |
|------------------------------------|-------------------|-------------------|-------------------------|---------|---------------|---------------|---------------------|---------|---------|---------------|---------------|-------------------|---------------|---------------|
|                                    |                   | Value portfolios  |                         |         |               |               | Momentum portfolios |         |         |               |               | 50-50 Combination |               |               |
|                                    |                   | P1                | P5                      | P10     | P10 - P1      | Factor        | P1                  | P5      | P10     | P10 - P1      | Factor        | P10 - P1          | Factor        |               |
| U.S. stocks                        | mean              | 10.5%             | 11.8%                   | 13.5%   | <b>3.0%</b>   | <b>4.1%</b>   | 6.6%                | 8.9%    | 18.3%   | <b>11.7%</b>  | <b>7.8%</b>   | <b>7.4%</b>       | <b>5.9%</b>   |               |
|                                    | ( <i>t</i> -stat) | (2.92)            | (4.45)                  | (4.30)  | <b>(0.91)</b> | <b>(1.71)</b> | (1.65)              | (3.58)  | (4.60)  | <b>(2.71)</b> | <b>(2.80)</b> | <b>(4.46)</b>     | <b>(5.40)</b> |               |
|                                    | stdev             | 22.4%             | 16.5%                   | 19.6%   | <b>20.8%</b>  | <b>15.0%</b>  | 24.9%               | 15.5%   | 24.8%   | <b>26.9%</b>  | <b>17.2%</b>  | <b>10.3%</b>      | <b>6.8%</b>   |               |
|                                    | 01/1972 -         | Sharpe            | 0.47                    | 0.71    | 0.69          | <b>0.15</b>   | <b>0.28</b>         | 0.27    | 0.57    | 0.74          | <b>0.44</b>   | <b>0.45</b>       | <b>0.71</b>   | <b>0.87</b>   |
|                                    | 06/2010           | alpha             | -1.6%                   | 1.7%    | 2.8%          | <b>4.4%</b>   | <b>5.9%</b>         | -6.4%   | -0.6%   | 6.5%          | <b>12.8%</b>  | <b>8.7%</b>       | <b>8.6%</b>   | <b>7.3%</b>   |
|                                    |                   | ( <i>t</i> -stat) | (-0.75)                 | (1.60)  | (1.56)        | <b>(1.33)</b> | <b>(2.50)</b>       | (-2.56) | (-0.57) | (2.32)        | <b>(2.99)</b> | <b>(3.16)</b>     | <b>(5.31)</b> | <b>(6.99)</b> |
|                                    |                   |                   | Correlation (Val,Mom) = |         |               |               |                     |         |         |               |               |                   | -0.65         | -0.65         |
| U.K. stocks                        | mean              | 10.6%             | 13.8%                   | 17.3%   | <b>6.7%</b>   | <b>5.6%</b>   | 10.0%               | 15.2%   | 16.6%   | <b>6.6%</b>   | <b>7.2%</b>   | <b>8.2%</b>       | <b>7.3%</b>   |               |
|                                    | ( <i>t</i> -stat) | (2.60)            | (3.49)                  | (3.87)  | <b>(1.58)</b> | <b>(2.08)</b> | (2.21)              | (3.89)  | (3.73)  | <b>(1.51)</b> | <b>(2.94)</b> | <b>(3.10)</b>     | <b>(5.74)</b> |               |
|                                    | stdev             | 22.1%             | 21.4%                   | 24.2%   | <b>22.9%</b>  | <b>14.6%</b>  | 28.4%               | 24.4%   | 27.8%   | <b>27.2%</b>  | <b>15.2%</b>  | <b>14.4%</b>      | <b>6.8%</b>   |               |
|                                    | 01/1972 -         | Sharpe            | 0.48                    | 0.64    | 0.71          | <b>0.29</b>   | <b>0.39</b>         | 0.35    | 0.62    | 0.60          | <b>0.24</b>   | <b>0.47</b>       | <b>0.57</b>   | <b>1.06</b>   |
|                                    | 06/2010           | alpha             | 2.7%                    | 5.6%    | 9.0%          | <b>6.3%</b>   | <b>4.9%</b>         | -2.3%   | 3.4%    | 5.5%          | <b>7.7%</b>   | <b>8.0%</b>       | <b>8.5%</b>   | <b>7.3%</b>   |
|                                    |                   | ( <i>t</i> -stat) | (1.03)                  | (2.44)  | (2.95)        | <b>(1.50)</b> | <b>(1.86)</b>       | (-0.86) | (2.02)  | (1.85)        | <b>(1.79)</b> | <b>(3.27)</b>     | <b>(3.19)</b> | <b>(5.74)</b> |
|                                    |                   |                   | Correlation (Val,Mom) = |         |               |               |                     |         |         |               |               |                   | -0.40         | -0.62         |
| Europe stocks                      | mean              | 11.9%             | 14.1%                   | 20.6%   | <b>8.8%</b>   | <b>5.4%</b>   | 7.2%                | 11.2%   | 24.8%   | <b>17.6%</b>  | <b>10.0%</b>  | <b>11.8%</b>      | <b>7.0%</b>   |               |
|                                    | ( <i>t</i> -stat) | (2.95)            | (4.06)                  | (4.68)  | <b>(2.66)</b> | <b>(3.03)</b> | (1.70)              | (3.68)  | (6.14)  | <b>(4.08)</b> | <b>(4.64)</b> | <b>(4.99)</b>     | <b>(6.49)</b> |               |
|                                    | stdev             | 21.8%             | 18.8%                   | 23.9%   | <b>17.9%</b>  | <b>9.7%</b>   | 25.8%               | 18.5%   | 24.5%   | <b>26.1%</b>  | <b>13.1%</b>  | <b>12.9%</b>      | <b>5.8%</b>   |               |
|                                    | 01/1974 -         | Sharpe            | 0.54                    | 0.75    | 0.86          | <b>0.49</b>   | <b>0.56</b>         | 0.28    | 0.61    | 1.01          | <b>0.67</b>   | <b>0.76</b>       | <b>0.92</b>   | <b>1.20</b>   |
|                                    | 06/2010           | alpha             | -2.6%                   | 1.3%    | 5.3%          | <b>7.9%</b>   | <b>4.3%</b>         | -6.7%   | 0.0%    | 12.7%         | <b>19.4%</b>  | <b>11.0%</b>      | <b>12.7%</b>  | <b>7.3%</b>   |
|                                    |                   | ( <i>t</i> -stat) | (-1.27)                 | (0.79)  | (2.17)        | <b>(2.40)</b> | <b>(2.44)</b>       | (-2.68) | (0.03)  | (4.64)        | <b>(4.54)</b> | <b>(5.11)</b>     | <b>(5.35)</b> | <b>(6.79)</b> |
|                                    |                   |                   | Correlation (Val,Mom) = |         |               |               |                     |         |         |               |               |                   | -0.39         | -0.55         |
| Japan stocks                       | mean              | 2.0%              | 8.9%                    | 18.2%   | <b>16.2%</b>  | <b>10.5%</b>  | 7.6%                | 11.2%   | 13.6%   | <b>6.0%</b>   | <b>2.0%</b>   | <b>10.8%</b>      | <b>5.9%</b>   |               |
|                                    | ( <i>t</i> -stat) | (0.40)            | (2.07)                  | (3.99)  | <b>(3.44)</b> | <b>(4.24)</b> | (1.71)              | (2.99)  | (2.94)  | <b>(1.27)</b> | <b>(0.73)</b> | <b>(4.72)</b>     | <b>(4.70)</b> |               |
|                                    | stdev             | 27.2%             | 23.5%                   | 24.7%   | <b>25.5%</b>  | <b>13.4%</b>  | 26.8%               | 22.8%   | 28.1%   | <b>28.7%</b>  | <b>16.7%</b>  | <b>12.4%</b>      | <b>6.8%</b>   |               |
|                                    | 01/1974 -         | Sharpe            | 0.07                    | 0.38    | 0.73          | <b>0.63</b>   | <b>0.79</b>         | 0.28    | 0.49    | 0.48          | <b>0.21</b>   | <b>0.12</b>       | <b>0.87</b>   | <b>0.87</b>   |
|                                    | 06/2010           | alpha             | -6.9%                   | 0.1%    | 10.4%         | <b>17.3%</b>  | <b>11.1%</b>        | -2.3%   | 1.7%    | 3.6%          | <b>5.9%</b>   | <b>2.1%</b>       | <b>11.3%</b>  | <b>6.2%</b>   |
|                                    |                   | ( <i>t</i> -stat) | (-2.29)                 | (-0.06) | (3.53)        | <b>(3.71)</b> | <b>(4.49)</b>       | (-0.82) | (1.03)  | (1.21)        | <b>(1.24)</b> | <b>(0.76)</b>     | <b>(4.93)</b> | <b>(4.96)</b> |
|                                    |                   |                   | Correlation (Val,Mom) = |         |               |               |                     |         |         |               |               |                   | -0.61         | -0.64         |
| Global stocks                      | mean              | 9.5%              | 12.3%                   | 16.8%   | <b>7.3%</b>   | <b>5.0%</b>   | 8.4%                | 11.9%   | 19.2%   | <b>10.8%</b>  | <b>6.8%</b>   | <b>8.7%</b>       | <b>5.4%</b>   |               |
|                                    | ( <i>t</i> -stat) | (2.83)            | (4.40)                  | (5.16)  | <b>(2.64)</b> | <b>(3.28)</b> | (2.47)              | (4.70)  | (5.73)  | <b>(3.25)</b> | <b>(4.22)</b> | <b>(5.70)</b>     | <b>(7.49)</b> |               |
|                                    | stdev             | 18.2%             | 15.2%                   | 17.6%   | <b>15.0%</b>  | <b>9.4%</b>   | 20.7%               | 15.3%   | 20.3%   | <b>20.1%</b>  | <b>10.1%</b>  | <b>8.3%</b>       | <b>4.4%</b>   |               |
|                                    | 01/1972 -         | Sharpe            | 0.52                    | 0.81    | 0.95          | <b>0.49</b>   | <b>0.53</b>         | 0.41    | 0.77    | 0.94          | <b>0.54</b>   | <b>0.68</b>       | <b>1.05</b>   | <b>1.21</b>   |
|                                    | 06/2010           | alpha             | -2.1%                   | 1.9%    | 5.7%          | <b>7.7%</b>   | <b>5.1%</b>         | -4.6%   | 1.0%    | 7.3%          | <b>11.9%</b>  | <b>7.7%</b>       | <b>9.5%</b>   | <b>5.9%</b>   |
|                                    |                   | ( <i>t</i> -stat) | (-1.21)                 | (2.15)  | (3.54)        | <b>(2.80)</b> | <b>(3.39)</b>       | (-2.51) | (1.27)  | (3.49)        | <b>(3.60)</b> | <b>(4.80)</b>     | <b>(6.29)</b> | <b>(8.36)</b> |
|                                    |                   |                   | Correlation (Val,Mom) = |         |               |               |                     |         |         |               |               |                   | -0.65         | -0.64         |



**Table IA.VII****Correlation of value and momentum strategies across markets and asset classes—decile portfolios**

Reported are the results of Table II in the paper for the average correlations among all value and momentum strategies across markets and asset classes, where value and momentum strategies in equities are the difference in returns between the top and bottom decile portfolios (P10-P1) sorted on value and momentum measures. Panel A reports the average of the individual correlations, where we first compute the pairwise correlation of all individual strategies and then take the average of these pairwise correlations for each group. Panel B reports the correlations of the average return series, where we first compute the average return series for a group and then compute the correlation between the two average return series. The diagonal elements in Panel B are computed as the average correlation between each market's return series and the average of all other return series in other markets, excluding the market itself. Both panels exclude the correlation of each strategy with itself (e.g., removing the 1s) and exclude the correlation of each strategy with all other strategies within the same market. Correlations are computed from quarterly returns to mitigate the influence of non synchronous trading across markets.

|                    | PANEL A: AVERAGE OF INDIVIDUAL CORRELATIONS |                 |                |                    | PANEL B: CORRELATION OF AVERAGE RETURN SERIES |                 |                |                    |
|--------------------|---|-----------------|----------------|--------------------|---|-----------------|----------------|--------------------|
|                    | Stock value                                 | Non-stock value | Stock momentum | Non-stock momentum | Stock value                                   | Non-stock value | Stock momentum | Non-stock momentum |
| Stock value        | <b>0.51</b>                                 | <b>0.12</b>     | <b>-0.47</b>   | <b>-0.17</b>       | <b>0.68</b>                                   | <b>0.20</b>     | <b>-0.54</b>   | <b>-0.28</b>       |
| Non-stock value    |   | <b>0.03</b>     | <b>-0.11</b>   | <b>-0.11</b>       |   | <b>0.07</b>     | <b>-0.19</b>   | <b>-0.13</b>       |
| Stock momentum     |   |                 | <b>0.50</b>    | <b>0.25</b>        |   |                 | <b>0.65</b>    | <b>0.38</b>        |
| Non-stock momentum |   |                 |                | <b>0.15</b>        |   |                 |                | <b>0.21</b>        |

**Table IA.VIII**  
**Performance of value and momentum portfolios across markets and asset classes—**  
**volatility adjusted portfolios**

Reported are the average raw excess (of the one-month U.S. T-bill rate) return, *t*-statistic of the average return (in parentheses), standard deviation of returns, and Sharpe ratio of the zero cost returns (P3-P1) as well as a rank-weighted factor portfolio (“Factor”), which is a zero-investment portfolio that weights each asset in proportion to its rank based on either value or momentum (following equation (1)) for each market and asset class we study: U.S. stocks, U.K. stocks, Europe stocks, Japan stocks, country index futures, currencies, fixed income government bonds, and commodities. Also reported are the intercepts or alphas and their *t*-statistics (in parentheses) from a time-series regression of each return series on the return of the market index for each asset class, which is the MSCI equity index for each country for all of the individual stock strategies, the MSCI world index for strategies of country index futures, and an equal-weighted basket of securities in each asset class for currencies, fixed income, and commodities. The 50/50 value/momentum combination strategies are an equal-weighted average of the value and momentum spread strategies. The first two columns in each panel report results for the volatility adjusted portfolios, where portfolios are scaled to have an ex ante volatility of 2% per annum using a rolling volatility estimate of daily returns data over the past three years. The second two columns in each panel report the results for the unadjusted portfolios from Table I. Results are also reported for an average of all individual stock strategies across all stock markets (“Global stocks”), across all non stock asset classes (“Global other asset classes”), and across all markets and asset classes (“Global all asset classes”), where average return series are computed using equal volatility weights across the markets and asset classes to account for the large differences in volatility across asset classes. The last row for each asset class reports the correlation between value and momentum zero cost residual returns from the benchmark in each market or asset class. Statistics are computed from monthly return series but are reported as annualized numbers.

| PANEL A: INDIVIDUAL STOCK PORTFOLIOS         |                   |                     |               |               |               |                     |               |               |               |                     |               |               |               |
|--|-------------------|---------------------|---------------|---------------|---------------|---------------------|---------------|---------------|---------------|---------------------|---------------|---------------|---------------|
|  |                   | Value               |               |               |               | Momentum            |               |               |               | 50-50 Combination   |               |               |               |
|  |                   | Volatility Adjusted |               | Unadjusted    |               | Volatility Adjusted |               | Unadjusted    |               | Volatility Adjusted |               | Unadjusted    |               |
|  |                   | P3 - P1             | Factor        | P3 - P1       | Factor        | P3 - P1             | Factor        | P3 - P1       | Factor        | P3 - P1             | Factor        | P3 - P1       | Factor        |
| <b>U.S. stocks</b><br>01/1972 -<br>07/2011   | mean              | 0.2%                | 0.1%          | 3.7%          | 3.9%          | 0.8%                | 1.3%          | 5.4%          | 7.7%          | 1.0%                | 1.8%          | 4.6%          | 5.8%          |
|  | ( <i>t</i> -stat) | (0.55)              | (0.36)        | (1.83)        | (1.66)        | (2.27)              | (3.34)        | (2.08)        | (2.84)        | (2.87)              | (4.87)        | (3.98)        | (5.40)        |
|  | stdev             | 2.2%                | 2.3%          | 12.8%         | 14.8%         | 2.2%                | 2.3%          | 16.4%         | 17.0%         | 2.2%                | 2.2%          | 7.2%          | 6.8%          |
|  | Sharpe            | <b>0.09</b>         | <b>0.06</b>   | <b>0.29</b>   | <b>0.26</b>   | <b>0.38</b>         | <b>0.55</b>   | <b>0.33</b>   | <b>0.45</b>   | <b>0.48</b>         | <b>0.81</b>   | <b>0.63</b>   | <b>0.86</b>   |
|  | alpha             | 0.5%                | 0.5%          | 5.3%          | 5.8%          | 0.7%                | 1.2%          | 6.0%          | 8.7%          | 1.3%                | 2.2%          | 5.7%          | 7.2%          |
|  | ( <i>t</i> -stat) | <b>(1.43)</b>       | <b>(1.28)</b> | <b>(2.66)</b> | <b>(2.49)</b> | <b>(1.95)</b>       | <b>(3.04)</b> | <b>(2.30)</b> | <b>(3.22)</b> | <b>(3.62)</b>       | <b>(6.06)</b> | <b>(5.05)</b> | <b>(7.06)</b> |
|  |                   |                     |               |               |               |                     |               |               | -0.58         | -0.72               | -0.53         | -0.65         |               |
| <b>U.K. stocks</b><br>01/1972 -<br>07/2011   | mean              | 0.4%                | 0.7%          | 4.5%          | 5.5%          | 1.1%                | 1.7%          | 6.0%          | 7.2%          | 1.7%                | 2.5%          | 6.3%          | 7.2%          |
|  | ( <i>t</i> -stat) | (0.89)              | (1.66)        | (1.83)        | (2.10)        | (2.98)              | (4.40)        | (2.37)        | (3.00)        | (3.95)              | (5.58)        | (4.23)        | (5.85)        |
|  | stdev             | 2.1%                | 2.3%          | 13.4%         | 14.4%         | 2.2%                | 2.3%          | 15.9%         | 15.0%         | 2.2%                | 2.3%          | 8.1%          | 6.7%          |
|  | Sharpe            | <b>0.17</b>         | <b>0.32</b>   | <b>0.33</b>   | <b>0.38</b>   | <b>0.49</b>         | <b>0.73</b>   | <b>0.38</b>   | <b>0.48</b>   | <b>0.76</b>         | <b>1.07</b>   | <b>0.77</b>   | <b>1.07</b>   |
|  | alpha             | 0.2%                | 0.5%          | 3.5%          | 4.4%          | 1.2%                | 1.9%          | 6.7%          | 8.0%          | 1.6%                | 2.4%          | 6.0%          | 7.2%          |
|  | ( <i>t</i> -stat) | <b>(0.45)</b>       | <b>(1.10)</b> | <b>(1.47)</b> | <b>(1.74)</b> | <b>(3.39)</b>       | <b>(5.07)</b> | <b>(2.66)</b> | <b>(3.36)</b> | <b>(3.75)</b>       | <b>(5.47)</b> | <b>(4.05)</b> | <b>(5.84)</b> |
|  |                   |                     |               |               |               |                     |               |               | -0.39         | -0.62               | -0.43         | -0.62         |               |
| <b>Europe stocks</b><br>01/1974 -<br>07/2011 | mean              | 0.5%                | 0.5%          | 4.8%          | 5.2%          | 1.6%                | 2.1%          | 8.1%          | 9.8%          | 1.9%                | 2.6%          | 5.9%          | 6.9%          |
|  | ( <i>t</i> -stat) | (1.15)              | (1.07)        | (2.32)        | (2.95)        | (4.05)              | (5.19)        | (3.37)        | (4.59)        | (4.37)              | (6.06)        | (4.77)        | (6.55)        |
|  | stdev             | 2.5%                | 2.4%          | 11.5%         | 9.7%          | 2.3%                | 2.4%          | 14.7%         | 13.1%         | 2.2%                | 2.3%          | 6.8%          | 5.8%          |
|  | Sharpe            | <b>0.22</b>         | <b>0.21</b>   | <b>0.42</b>   | <b>0.54</b>   | <b>0.69</b>         | <b>0.89</b>   | <b>0.55</b>   | <b>0.75</b>   | <b>0.84</b>         | <b>1.17</b>   | <b>0.87</b>   | <b>1.20</b>   |
|  | alpha             | 0.1%                | 0.1%          | 3.5%          | 4.0%          | 1.7%                | 2.2%          | 9.1%          | 10.7%         | 1.9%                | 2.6%          | 6.1%          | 7.1%          |
|  | ( <i>t</i> -stat) | <b>(0.32)</b>       | <b>(0.27)</b> | <b>(1.71)</b> | <b>(2.32)</b> | <b>(4.24)</b>       | <b>(5.43)</b> | <b>(3.88)</b> | <b>(5.05)</b> | <b>(4.43)</b>       | <b>(6.08)</b> | <b>(4.88)</b> | <b>(6.77)</b> |
|  |                   |                     |               |               |               |                     |               |               | -0.56         | -0.64               | -0.52         | -0.55         |               |
| <b>Japan stocks</b><br>01/1974 -<br>07/2011  | mean              | 1.7%                | 1.9%          | 12.0%         | 10.2%         | 0.2%                | 0.2%          | 1.7%          | 2.2%          | 2.0%                | 2.2%          | 6.4%          | 5.9%          |
|  | ( <i>t</i> -stat) | (3.88)              | (4.27)        | (4.31)        | (4.22)        | (0.59)              | (0.64)        | (0.57)        | (0.81)        | (4.56)              | (4.86)        | (4.28)        | (4.80)        |
|  | stdev             | 2.3%                | 2.3%          | 15.3%         | 13.2%         | 2.3%                | 2.2%          | 18.6%         | 16.5%         | 2.2%                | 2.3%          | 8.1%          | 6.7%          |
|  | Sharpe            | <b>0.75</b>         | <b>0.82</b>   | <b>0.79</b>   | <b>0.77</b>   | <b>0.10</b>         | <b>0.11</b>   | <b>0.09</b>   | <b>0.13</b>   | <b>0.88</b>         | <b>0.93</b>   | <b>0.78</b>   | <b>0.88</b>   |
|  | alpha             | 1.8%                | 1.9%          | 13.0%         | 10.7%         | 0.3%                | 0.3%          | 1.7%          | 2.2%          | 2.1%                | 2.3%          | 6.8%          | 6.1%          |
|  | ( <i>t</i> -stat) | <b>(4.11)</b>       | <b>(4.30)</b> | <b>(4.71)</b> | <b>(4.47)</b> | <b>(0.65)</b>       | <b>(0.76)</b> | <b>(0.54)</b> | <b>(0.84)</b> | <b>(4.98)</b>       | <b>(5.32)</b> | <b>(4.63)</b> | <b>(5.05)</b> |
|  |                   |                     |               |               |               |                     |               |               | -0.59         | -0.64               | -0.60         | -0.64         |               |
| <b>Global stocks</b><br>01/1972 -<br>07/2011 | mean              | 0.5%                | 0.6%          | 4.8%          | 4.8%          | 0.9%                | 1.3%          | 5.3%          | 6.8%          | 1.3%                | 1.8%          | 4.7%          | 5.3%          |
|  | ( <i>t</i> -stat) | (2.18)              | (2.22)        | (3.62)        | (3.25)        | (3.60)              | (4.81)        | (3.40)        | (4.29)        | (5.70)              | (7.26)        | (6.37)        | (7.58)        |
|  | stdev             | 1.4%                | 1.5%          | 8.4%          | 9.3%          | 1.6%                | 1.7%          | 9.8%          | 9.9%          | 1.3%                | 1.5%          | 4.6%          | 4.4%          |
|  | Sharpe            | <b>0.36</b>         | <b>0.37</b>   | <b>0.58</b>   | <b>0.52</b>   | <b>0.60</b>         | <b>0.80</b>   | <b>0.54</b>   | <b>0.68</b>   | <b>0.94</b>         | <b>1.20</b>   | <b>1.01</b>   | <b>1.21</b>   |
|  | alpha             | 0.4%                | 0.5%          | 4.9%          | 5.0%          | 0.9%                | 1.3%          | 6.0%          | 7.6%          | 1.2%                | 1.8%          | 5.0%          | 5.8%          |
|  | ( <i>t</i> -stat) | <b>(1.97)</b>       | <b>(2.00)</b> | <b>(3.65)</b> | <b>(3.33)</b> | <b>(3.73)</b>       | <b>(5.02)</b> | <b>(3.85)</b> | <b>(4.86)</b> | <b>(6.08)</b>       | <b>(7.89)</b> | <b>(6.87)</b> | <b>(8.44)</b> |
|  |                   |                     |               |               |               |                     |               |               | -0.63         | -0.73               | -0.54         | -0.64         |               |

PANEL B: OTHER ASSET CLASS PORTFOLIOS

|   |          | Value               |               |               |               | Momentum            |               |                |               | 50-50 Combination   |               |               |               |
|---|----------|---------------------|---------------|---------------|---------------|---------------------|---------------|----------------|---------------|---------------------|---------------|---------------|---------------|
|   |          | Volatility Adjusted |               | Unadjusted    |               | Volatility Adjusted |               | Unadjusted     |               | Volatility Adjusted |               | Unadjusted    |               |
|   |          | P3 - P1             | Factor        | P3 - P1       | Factor        | P3 - P1             | Factor        | P3 - P1        | Factor        | P3 - P1             | Factor        | P3 - P1       | Factor        |
| Country indices<br>01/1978 -<br>07/2011               | mean     | 1.1%                | 1.1%          | 6.0%          | 5.7%          | 1.8%                | 1.5%          | 8.7%           | 7.4%          | 2.2%                | 2.0%          | 7.3%          | 10.6%         |
|   | (t-stat) | (2.86)              | (2.91)        | (3.45)        | (3.40)        | (4.52)              | (3.87)        | (4.14)         | (3.57)        | (5.91)              | (5.30)        | (6.62)        | (5.72)        |
|   | stdev    | 2.1%                | 2.1%          | 9.8%          | 9.5%          | 2.3%                | 2.3%          | 11.9%          | 11.8%         | 2.1%                | 2.2%          | 6.3%          | 10.6%         |
|   | Sharpe   | <b>0.50</b>         | <b>0.51</b>   | <b>0.61</b>   | <b>0.60</b>   | <b>0.79</b>         | <b>0.68</b>   | <b>0.73</b>    | <b>0.63</b>   | <b>1.04</b>         | <b>0.93</b>   | <b>1.16</b>   | <b>1.00</b>   |
|   | alpha    | 1.0%                | 1.0%          | 5.9%          | 5.3%          | 1.7%                | 1.5%          | 8.2%           | 7.1%          | 2.0%                | 1.8%          | 7.1%          | 10.0%         |
|   | (t-stat) | <b>(2.77)</b>       | <b>(2.66)</b> | <b>(3.45)</b> | <b>(3.24)</b> | <b>(4.32)</b>       | <b>(3.72)</b> | <b>(4.00)</b>  | <b>(3.47)</b> | <b>(5.62)</b>       | <b>(4.94)</b> | <b>(6.49)</b> | <b>(5.47)</b> |
|   |          |                     |               |               |               |                     |               |                | -0.37         | -0.38               | -0.34         | -0.37         |               |
| Currencies<br>01/1979 -<br>07/2011                    | mean     | 0.7%                | 1.0%          | 3.3%          | 3.9%          | 1.1%                | 1.0%          | 3.5%           | 3.0%          | 1.3%                | 1.4%          | 3.4%          | 5.6%          |
|   | (t-stat) | (1.72)              | (2.37)        | (1.89)        | (2.47)        | (2.51)              | (2.29)        | (1.90)         | (1.77)        | (3.73)              | (3.93)        | (3.51)        | (3.89)        |
|   | stdev    | 2.4%                | 2.4%          | 9.7%          | 9.0%          | 2.4%                | 2.4%          | 10.3%          | 9.6%          | 2.0%                | 2.0%          | 5.4%          | 8.0%          |
|   | Sharpe   | <b>0.31</b>         | <b>0.42</b>   | <b>0.34</b>   | <b>0.44</b>   | <b>0.45</b>         | <b>0.41</b>   | <b>0.34</b>    | <b>0.32</b>   | <b>0.67</b>         | <b>0.70</b>   | <b>0.63</b>   | <b>0.69</b>   |
|   | alpha    | 0.8%                | 1.0%          | 3.4%          | 4.1%          | 1.1%                | 1.0%          | 3.6%           | 3.1%          | 1.4%                | 1.4%          | 3.5%          | 5.7%          |
|   | (t-stat) | <b>(1.85)</b>       | <b>(2.50)</b> | <b>(2.04)</b> | <b>(2.63)</b> | <b>(2.61)</b>       | <b>(2.37)</b> | <b>(1.99)</b>  | <b>(1.84)</b> | <b>(4.00)</b>       | <b>(4.15)</b> | <b>(3.83)</b> | <b>(4.11)</b> |
|   |          |                     |               |               |               |                     |               |                | -0.44         | -0.45               | -0.42         | -0.43         |               |
| Fixed income<br>01/1982 -<br>07/2011                  | mean     | 0.6%                | 0.5%          | 1.1%          | 0.5%          | 0.0%                | 0.3%          | 0.4%           | 1.0%          | 0.2%                | 0.4%          | 0.8%          | 0.7%          |
|   | (t-stat) | (1.52)              | (1.35)        | (0.97)        | (0.39)        | -(0.01)             | (0.75)        | (0.35)         | (0.88)        | (0.50)              | (0.97)        | (1.03)        | (1.08)        |
|   | stdev    | 2.1%                | 2.1%          | 6.3%          | 6.4%          | 2.1%                | 2.1%          | 6.0%           | 5.8%          | 2.2%                | 2.2%          | 4.0%          | 3.5%          |
|   | Sharpe   | <b>0.29</b>         | <b>0.25</b>   | <b>0.18</b>   | <b>0.07</b>   | <b>0.00</b>         | <b>0.14</b>   | <b>0.06</b>    | <b>0.17</b>   | <b>0.09</b>         | <b>0.18</b>   | <b>0.19</b>   | <b>0.20</b>   |
|   | alpha    | 1.0%                | 0.9%          | 1.9%          | 1.4%          | -0.2%               | 0.0%          | -0.3%          | 0.1%          | 0.3%                | 0.5%          | 0.8%          | 0.7%          |
|   | (t-stat) | <b>(2.51)</b>       | <b>(2.51)</b> | <b>(1.68)</b> | <b>(1.21)</b> | <b>(-0.56)</b>      | <b>(0.00)</b> | <b>(-0.29)</b> | <b>(0.08)</b> | <b>(0.75)</b>       | <b>(1.20)</b> | <b>(1.10)</b> | <b>(1.15)</b> |
|   |          |                     |               |               |               |                     |               |                | -0.12         | -0.29               | -0.17         | -0.35         |               |
| Commodities<br>01/1972 -<br>07/2011                   | mean     | 0.6%                | 0.8%          | 6.3%          | 7.3%          | 1.4%                | 1.3%          | 12.4%          | 11.5%         | 1.5%                | 1.7%          | 9.4%          | 17.1%         |
|   | (t-stat) | (1.70)              | (2.03)        | (1.61)        | (1.92)        | (3.67)              | (3.40)        | (3.29)         | (3.14)        | (4.12)              | (4.70)        | (4.42)        | (4.78)        |
|   | stdev    | 2.4%                | 2.4%          | 24.2%         | 23.7%         | 2.3%                | 2.4%          | 23.4%          | 22.8%         | 2.3%                | 2.2%          | 13.1%         | 22.2%         |
|   | Sharpe   | <b>0.27</b>         | <b>0.33</b>   | <b>0.26</b>   | <b>0.31</b>   | <b>0.59</b>         | <b>0.55</b>   | <b>0.53</b>    | <b>0.51</b>   | <b>0.67</b>         | <b>0.76</b>   | <b>0.71</b>   | <b>0.77</b>   |
|   | alpha    | 0.8%                | 0.9%          | 7.7%          | 8.2%          | 1.2%                | 1.1%          | 11.4%          | 10.5%         | 1.5%                | 1.7%          | 9.5%          | 17.1%         |
|   | (t-stat) | <b>(2.10)</b>       | <b>(2.31)</b> | <b>(2.02)</b> | <b>(2.19)</b> | <b>(3.36)</b>       | <b>(3.08)</b> | <b>(3.06)</b>  | <b>(2.89)</b> | <b>(4.21)</b>       | <b>(4.72)</b> | <b>(4.57)</b> | <b>(4.82)</b> |
|   |          |                     |               |               |               |                     |               |                | -0.34         | -0.39               | -0.39         | -0.46         |               |
| Global other<br>asset classes<br>01/1972 -<br>07/2011 | mean     | 0.6%                | 0.7%          | 2.8%          | 2.9%          | 0.7%                | 0.7%          | 3.9%           | 3.6%          | 0.9%                | 1.0%          | 3.4%          | 5.4%          |
|   | (t-stat) | (3.36)              | (3.72)        | (3.35)        | (3.54)        | (3.51)              | (3.59)        | (4.17)         | (4.05)        | (5.17)              | (5.67)        | (6.90)        | (7.46)        |
|   | stdev    | 1.1%                | 1.1%          | 5.3%          | 5.0%          | 1.2%                | 1.2%          | 5.8%           | 5.6%          | 1.1%                | 1.1%          | 3.0%          | 4.5%          |
|   | Sharpe   | <b>0.54</b>         | <b>0.60</b>   | <b>0.54</b>   | <b>0.57</b>   | <b>0.56</b>         | <b>0.58</b>   | <b>0.67</b>    | <b>0.65</b>   | <b>0.83</b>         | <b>0.91</b>   | <b>1.11</b>   | <b>1.20</b>   |
|   | alpha    | 0.7%                | 0.7%          | 3.1%          | 3.1%          | 0.6%                | 0.6%          | 3.7%           | 3.4%          | 0.9%                | 1.0%          | 3.4%          | 5.4%          |
|   | (t-stat) | <b>(3.77)</b>       | <b>(4.21)</b> | <b>(3.75)</b> | <b>(3.87)</b> | <b>(3.12)</b>       | <b>(3.17)</b> | <b>(3.97)</b>  | <b>(3.81)</b> | <b>(5.14)</b>       | <b>(5.59)</b> | <b>(7.01)</b> | <b>(7.49)</b> |
|   |          |                     |               |               |               |                     |               |                | -0.37         | -0.45               | -0.40         | -0.47         |               |
| Global all asset<br>classes<br>01/1972 -<br>07/2011   | mean     | 0.6%                | 0.6%          | 3.4%          | 3.4%          | 0.7%                | 0.8%          | 4.2%           | 4.4%          | 1.0%                | 1.2%          | 3.7%          | 5.4%          |
|   | (t-stat) | (3.84)              | (4.14)        | (4.50)        | (4.56)        | (4.12)              | (4.59)        | (4.77)         | (5.07)        | (6.49)              | (7.53)        | (8.46)        | (9.02)        |
|   | stdev    | 0.9%                | 0.9%          | 4.7%          | 4.7%          | 1.1%                | 1.1%          | 5.5%           | 5.4%          | 0.9%                | 1.0%          | 2.7%          | 3.7%          |
|   | Sharpe   | <b>0.62</b>         | <b>0.66</b>   | <b>0.72</b>   | <b>0.73</b>   | <b>0.66</b>         | <b>0.74</b>   | <b>0.76</b>    | <b>0.81</b>   | <b>1.04</b>         | <b>1.21</b>   | <b>1.36</b>   | <b>1.45</b>   |
|   | alpha    | 0.6%                | 0.7%          | 3.5%          | 3.5%          | 0.7%                | 0.8%          | 4.3%           | 4.5%          | 1.0%                | 1.2%          | 3.8%          | 5.5%          |
|   | (t-stat) | <b>(4.02)</b>       | <b>(4.40)</b> | <b>(4.67)</b> | <b>(4.73)</b> | <b>(3.91)</b>       | <b>(4.39)</b> | <b>(4.85)</b>  | <b>(5.19)</b> | <b>(6.58)</b>       | <b>(7.70)</b> | <b>(8.64)</b> | <b>(9.19)</b> |
|   |          |                     |               |               |               |                     |               |                | -0.45         | -0.54               | -0.46         | -0.55         |               |