## Question 6: Portfolio Construction

## Gabriella Neilon<sup>a</sup>

<sup>a</sup>Stellenbosch University

## Abstract

The portfolio construction adheres to a structured framework encompassing a long-only strategy and employs covariance and mean forecasts derived from a look-back period not exceeding 3 years. Assets lacking a minimum of 3 years' returns data are excluded from consideration. The portfolio is subject to quarterly rebalancing to maintain alignment with predefined exposure thresholds, including a 25% limit on Bonds and credit instruments, a maximum of 60% exposure to Equities, and a cap of 40% on single asset exposure. Utilizing monthly data, a covariance matrix has been estimated using datasets available post-2010 for analytical purposes.

The table showcases a Simple Covariance Matrix applied with linear constraints for portfolio weight allocation. Due to time constraints, I couldn't implement these optimized weights to construct the portfolio returns. Ideally, I intended to compare the performance of this idealized portfolio against the benchmark returns.

## Correlation with Exchange Rate

| Tickers                          | mv         | minvol     | erc        | riskeff    |
|----------------------------------|------------|------------|------------|------------|
| Asia_dollar_Idx                  | 0.07692308 | 0.25000000 | 0.13024451 | 0.07692308 |
| $Bbg\_EUCorpCred\_Unhedged\_USD$ | 0.07692308 | 0.09895195 | 0.12605474 | 0.07692308 |
| $Bbg\_EuroBonds\_UnhedgedEUR$    | 0.07692308 | 0.01000000 | 0.10454889 | 0.07692308 |
| $Bbg\_GlBonds\_HedgedUSD$        | 0.07692308 | 0.25000000 | 0.17007816 | 0.07692308 |
| $Bbg\_GlCorpCred\_Hedged\_USD$   | 0.07692308 | 0.01000000 | 0.09237409 | 0.07692308 |
| $Bbg\_USBonds\_UnhedgedUSD$      | 0.07692308 | 0.13685281 | 0.13985367 | 0.07692308 |
| $Bbg\_USCorpCred\_Unhedged\_USD$ | 0.07692308 | 0.01000000 | 0.07223162 | 0.07692308 |
| $Commod\_Idx$                    | 0.07692308 | 0.01741990 | 0.04251138 | 0.07692308 |
| Dollar_Idx                       | 0.07692308 | 0.17677535 | 0.01000000 | 0.07692308 |
| MSCI_ACWI                        | 0.07692308 | 0.01000000 | 0.02931999 | 0.07692308 |
| MSCI_Jap                         | 0.07692308 | 0.01000000 | 0.02853624 | 0.07692308 |
| MSCI_RE                          | 0.07692308 | 0.01000000 | 0.02389699 | 0.07692308 |

<sup>\*</sup>Corresponding author: Gabriella Neilon

Email address: 22581340@sun.ac.za (Gabriella Neilon)

| MSCI_USA                         | 0.07692308 | 0.01000000 | 0.03034972 | 0.07692308 |
|----------------------------------|------------|------------|------------|------------|
| Asia_dollar_Idx                  | 0.07692308 | 0.25000000 | 0.13024451 | 0.07692308 |
| $Bbg\_EUCorpCred\_Unhedged\_USD$ | 0.07692308 | 0.09895195 | 0.12605474 | 0.07692308 |
| $Bbg\_EuroBonds\_UnhedgedEUR$    | 0.07692308 | 0.01000000 | 0.10454889 | 0.07692308 |
| $Bbg\_GlBonds\_HedgedUSD$        | 0.07692308 | 0.25000000 | 0.17007816 | 0.07692308 |
| $Bbg\_GlCorpCred\_Hedged\_USD$   | 0.07692308 | 0.01000000 | 0.09237409 | 0.07692308 |
| $Bbg\_USBonds\_UnhedgedUSD$      | 0.07692308 | 0.13685281 | 0.13985367 | 0.07692308 |
| $Bbg\_USCorpCred\_Unhedged\_USD$ | 0.07692308 | 0.01000000 | 0.07223162 | 0.07692308 |
| Commod_Idx                       | 0.07692308 | 0.01741990 | 0.04251138 | 0.07692308 |
| Dollar_Idx                       | 0.07692308 | 0.17677535 | 0.01000000 | 0.07692308 |
| MSCI_ACWI                        | 0.07692308 | 0.01000000 | 0.02931999 | 0.07692308 |
| MSCI_Jap                         | 0.07692308 | 0.01000000 | 0.02853624 | 0.07692308 |
| MSCI_RE                          | 0.07692308 | 0.01000000 | 0.02389699 | 0.07692308 |
| MSCI_USA                         | 0.07692308 | 0.01000000 | 0.03034972 | 0.07692308 |
| Asia_dollar_Idx                  | 0.07692308 | 0.25000000 | 0.13024451 | 0.07692308 |
| Bbg_EUCorpCred_Unhedged_USD      | 0.07692308 | 0.09895195 | 0.12605474 | 0.07692308 |
| Bbg_EuroBonds_UnhedgedEUR        | 0.07692308 | 0.01000000 | 0.10454889 | 0.07692308 |
| $Bbg\_GlBonds\_HedgedUSD$        | 0.07692308 | 0.25000000 | 0.17007816 | 0.07692308 |
| $Bbg\_GlCorpCred\_Hedged\_USD$   | 0.07692308 | 0.01000000 | 0.09237409 | 0.07692308 |
| $Bbg\_USBonds\_UnhedgedUSD$      | 0.07692308 | 0.13685281 | 0.13985367 | 0.07692308 |
| $Bbg\_USCorpCred\_Unhedged\_USD$ | 0.07692308 | 0.01000000 | 0.07223162 | 0.07692308 |
| Commod_Idx                       | 0.07692308 | 0.01741990 | 0.04251138 | 0.07692308 |
| Dollar_Idx                       | 0.07692308 | 0.17677535 | 0.01000000 | 0.07692308 |
| MSCI_ACWI                        | 0.07692308 | 0.01000000 | 0.02931999 | 0.07692308 |
| MSCI_Jap                         | 0.07692308 | 0.01000000 | 0.02853624 | 0.07692308 |
| MSCI_RE                          | 0.07692308 | 0.01000000 | 0.02389699 | 0.07692308 |
| MSCI_USA                         | 0.07692308 | 0.01000000 | 0.03034972 | 0.07692308 |
| Asia_dollar_Idx                  | 0.07692308 | 0.25000000 | 0.13024451 | 0.07692308 |
| Bbg_EUCorpCred_Unhedged_USD      | 0.07692308 | 0.09895195 | 0.12605474 | 0.07692308 |
| $Bbg\_EuroBonds\_UnhedgedEUR$    | 0.07692308 | 0.01000000 | 0.10454889 | 0.07692308 |
| $Bbg\_GlBonds\_HedgedUSD$        | 0.07692308 | 0.25000000 | 0.17007816 | 0.07692308 |
| $Bbg\_GlCorpCred\_Hedged\_USD$   | 0.07692308 | 0.01000000 | 0.09237409 | 0.07692308 |
| $Bbg\_USBonds\_UnhedgedUSD$      | 0.07692308 | 0.13685281 | 0.13985367 | 0.07692308 |
| Bbg_USCorpCred_Unhedged_USD      | 0.07692308 | 0.01000000 | 0.07223162 | 0.07692308 |
| Commod_Idx                       | 0.07692308 | 0.01741990 | 0.04251138 | 0.07692308 |
| Dollar_Idx                       | 0.07692308 | 0.17677535 | 0.01000000 | 0.07692308 |
| MSCI_ACWI                        | 0.07692308 | 0.01000000 | 0.02931999 | 0.07692308 |
| MSCI_Jap                         | 0.07692308 | 0.01000000 | 0.02853624 | 0.07692308 |
| MSCI_RE                          | 0.07692308 | 0.01000000 | 0.02389699 | 0.07692308 |
|                                  |            |            |            |            |

| MSCI_USA                         | 0.07692308 | 0.01000000 | 0.03034972 | 0.07692308 |
|----------------------------------|------------|------------|------------|------------|
| Asia_dollar_Idx                  | 0.07692308 | 0.25000000 | 0.13024451 | 0.07692308 |
| $Bbg\_EUCorpCred\_Unhedged\_USD$ | 0.07692308 | 0.09895195 | 0.12605474 | 0.07692308 |
| $Bbg\_EuroBonds\_UnhedgedEUR$    | 0.07692308 | 0.01000000 | 0.10454889 | 0.07692308 |
| $Bbg\_GlBonds\_HedgedUSD$        | 0.07692308 | 0.25000000 | 0.17007816 | 0.07692308 |
| $Bbg\_GlCorpCred\_Hedged\_USD$   | 0.07692308 | 0.01000000 | 0.09237409 | 0.07692308 |
| $Bbg\_USBonds\_UnhedgedUSD$      | 0.07692308 | 0.13685281 | 0.13985367 | 0.07692308 |
| $Bbg\_USCorpCred\_Unhedged\_USD$ | 0.07692308 | 0.01000000 | 0.07223162 | 0.07692308 |
| Commod_Idx                       | 0.07692308 | 0.01741990 | 0.04251138 | 0.07692308 |
| Dollar_Idx                       | 0.07692308 | 0.17677535 | 0.01000000 | 0.07692308 |
| MSCI_ACWI                        | 0.07692308 | 0.01000000 | 0.02931999 | 0.07692308 |
| MSCI_Jap                         | 0.07692308 | 0.01000000 | 0.02853624 | 0.07692308 |
| MSCI_RE                          | 0.07692308 | 0.01000000 | 0.02389699 | 0.07692308 |
| MSCI_USA                         | 0.07692308 | 0.01000000 | 0.03034972 | 0.07692308 |
| Asia_dollar_Idx                  | 0.07692308 | 0.25000000 | 0.13024451 | 0.07692308 |
| Bbg_EUCorpCred_Unhedged_USD      | 0.07692308 | 0.09895195 | 0.12605474 | 0.07692308 |
| Bbg_EuroBonds_UnhedgedEUR        | 0.07692308 | 0.01000000 | 0.10454889 | 0.07692308 |
| $Bbg\_GlBonds\_HedgedUSD$        | 0.07692308 | 0.25000000 | 0.17007816 | 0.07692308 |
| $Bbg\_GlCorpCred\_Hedged\_USD$   | 0.07692308 | 0.01000000 | 0.09237409 | 0.07692308 |
| $Bbg\_USBonds\_UnhedgedUSD$      | 0.07692308 | 0.13685281 | 0.13985367 | 0.07692308 |
| $Bbg\_USCorpCred\_Unhedged\_USD$ | 0.07692308 | 0.01000000 | 0.07223162 | 0.07692308 |
| Commod_Idx                       | 0.07692308 | 0.01741990 | 0.04251138 | 0.07692308 |
| Dollar_Idx                       | 0.07692308 | 0.17677535 | 0.01000000 | 0.07692308 |
| MSCI_ACWI                        | 0.07692308 | 0.01000000 | 0.02931999 | 0.07692308 |
| MSCI_Jap                         | 0.07692308 | 0.01000000 | 0.02853624 | 0.07692308 |
| MSCI_RE                          | 0.07692308 | 0.01000000 | 0.02389699 | 0.07692308 |
| MSCI_USA                         | 0.07692308 | 0.01000000 | 0.03034972 | 0.07692308 |
| Asia_dollar_Idx                  | 0.07692308 | 0.25000000 | 0.13024451 | 0.07692308 |
| Bbg_EUCorpCred_Unhedged_USD      | 0.07692308 | 0.09895195 | 0.12605474 | 0.07692308 |
| $Bbg\_EuroBonds\_UnhedgedEUR$    | 0.07692308 | 0.01000000 | 0.10454889 | 0.07692308 |
| $Bbg\_GlBonds\_HedgedUSD$        | 0.07692308 | 0.25000000 | 0.17007816 | 0.07692308 |
| $Bbg\_GlCorpCred\_Hedged\_USD$   | 0.07692308 | 0.01000000 | 0.09237409 | 0.07692308 |
| $Bbg\_USBonds\_UnhedgedUSD$      | 0.07692308 | 0.13685281 | 0.13985367 | 0.07692308 |
| Bbg_USCorpCred_Unhedged_USD      | 0.07692308 | 0.01000000 | 0.07223162 | 0.07692308 |
| Commod_Idx                       | 0.07692308 | 0.01741990 | 0.04251138 | 0.07692308 |
| Dollar_Idx                       | 0.07692308 | 0.17677535 | 0.01000000 | 0.07692308 |
| MSCI_ACWI                        | 0.07692308 | 0.01000000 | 0.02931999 | 0.07692308 |
| MSCI_Jap                         | 0.07692308 | 0.01000000 | 0.02853624 | 0.07692308 |
| MSCI_RE                          | 0.07692308 | 0.01000000 | 0.02389699 | 0.07692308 |
|                                  |            |            |            |            |

| MSCI_USA                         | 0.07692308 | 0.01000000 | 0.03034972 | 0.07692308 |
|----------------------------------|------------|------------|------------|------------|
| Asia_dollar_Idx                  | 0.07692308 | 0.25000000 | 0.13024451 | 0.07692308 |
| $Bbg\_EUCorpCred\_Unhedged\_USD$ | 0.07692308 | 0.09895195 | 0.12605474 | 0.07692308 |
| $Bbg\_EuroBonds\_UnhedgedEUR$    | 0.07692308 | 0.01000000 | 0.10454889 | 0.07692308 |
| $Bbg\_GlBonds\_HedgedUSD$        | 0.07692308 | 0.25000000 | 0.17007816 | 0.07692308 |
| $Bbg\_GlCorpCred\_Hedged\_USD$   | 0.07692308 | 0.01000000 | 0.09237409 | 0.07692308 |
| $Bbg\_USBonds\_UnhedgedUSD$      | 0.07692308 | 0.13685281 | 0.13985367 | 0.07692308 |
| $Bbg\_USCorpCred\_Unhedged\_USD$ | 0.07692308 | 0.01000000 | 0.07223162 | 0.07692308 |
| Commod_Idx                       | 0.07692308 | 0.01741990 | 0.04251138 | 0.07692308 |
| Dollar_Idx                       | 0.07692308 | 0.17677535 | 0.01000000 | 0.07692308 |
| MSCI_ACWI                        | 0.07692308 | 0.01000000 | 0.02931999 | 0.07692308 |
| MSCI_Jap                         | 0.07692308 | 0.01000000 | 0.02853624 | 0.07692308 |
| MSCI_RE                          | 0.07692308 | 0.01000000 | 0.02389699 | 0.07692308 |
| MSCI_USA                         | 0.07692308 | 0.01000000 | 0.03034972 | 0.07692308 |
| Asia_dollar_Idx                  | 0.07692308 | 0.25000000 | 0.13024451 | 0.07692308 |
| Bbg_EUCorpCred_Unhedged_USD      | 0.07692308 | 0.09895195 | 0.12605474 | 0.07692308 |
| Bbg_EuroBonds_UnhedgedEUR        | 0.07692308 | 0.01000000 | 0.10454889 | 0.07692308 |
| $Bbg\_GlBonds\_HedgedUSD$        | 0.07692308 | 0.25000000 | 0.17007816 | 0.07692308 |
| $Bbg\_GlCorpCred\_Hedged\_USD$   | 0.07692308 | 0.01000000 | 0.09237409 | 0.07692308 |
| $Bbg\_USBonds\_UnhedgedUSD$      | 0.07692308 | 0.13685281 | 0.13985367 | 0.07692308 |
| $Bbg\_USCorpCred\_Unhedged\_USD$ | 0.07692308 | 0.01000000 | 0.07223162 | 0.07692308 |
| Commod_Idx                       | 0.07692308 | 0.01741990 | 0.04251138 | 0.07692308 |
| Dollar_Idx                       | 0.07692308 | 0.17677535 | 0.01000000 | 0.07692308 |
| MSCI_ACWI                        | 0.07692308 | 0.01000000 | 0.02931999 | 0.07692308 |
| MSCI_Jap                         | 0.07692308 | 0.01000000 | 0.02853624 | 0.07692308 |
| MSCI_RE                          | 0.07692308 | 0.01000000 | 0.02389699 | 0.07692308 |
| MSCI_USA                         | 0.07692308 | 0.01000000 | 0.03034972 | 0.07692308 |
| Asia_dollar_Idx                  | 0.07692308 | 0.25000000 | 0.13024451 | 0.07692308 |
| Bbg_EUCorpCred_Unhedged_USD      | 0.07692308 | 0.09895195 | 0.12605474 | 0.07692308 |
| $Bbg\_EuroBonds\_UnhedgedEUR$    | 0.07692308 | 0.01000000 | 0.10454889 | 0.07692308 |
| $Bbg\_GlBonds\_HedgedUSD$        | 0.07692308 | 0.25000000 | 0.17007816 | 0.07692308 |
| $Bbg\_GlCorpCred\_Hedged\_USD$   | 0.07692308 | 0.01000000 | 0.09237409 | 0.07692308 |
| $Bbg\_USBonds\_UnhedgedUSD$      | 0.07692308 | 0.13685281 | 0.13985367 | 0.07692308 |
| Bbg_USCorpCred_Unhedged_USD      | 0.07692308 | 0.01000000 | 0.07223162 | 0.07692308 |
| Commod_Idx                       | 0.07692308 | 0.01741990 | 0.04251138 | 0.07692308 |
| Dollar_Idx                       | 0.07692308 | 0.17677535 | 0.01000000 | 0.07692308 |
| MSCI_ACWI                        | 0.07692308 | 0.01000000 | 0.02931999 | 0.07692308 |
| MSCI_Jap                         | 0.07692308 | 0.01000000 | 0.02853624 | 0.07692308 |
| MSCI_RE                          | 0.07692308 | 0.01000000 | 0.02389699 | 0.07692308 |
|                                  |            |            |            |            |

| MSCI_USA                         | 0.07692308 | 0.01000000 | 0.03034972 | 0.07692308 |
|----------------------------------|------------|------------|------------|------------|
| Asia_dollar_Idx                  | 0.07692308 | 0.25000000 | 0.13024451 | 0.07692308 |
| $Bbg\_EUCorpCred\_Unhedged\_USD$ | 0.07692308 | 0.09895195 | 0.12605474 | 0.07692308 |
| $Bbg\_EuroBonds\_UnhedgedEUR$    | 0.07692308 | 0.01000000 | 0.10454889 | 0.07692308 |
| $Bbg\_GlBonds\_HedgedUSD$        | 0.07692308 | 0.25000000 | 0.17007816 | 0.07692308 |
| $Bbg\_GlCorpCred\_Hedged\_USD$   | 0.07692308 | 0.01000000 | 0.09237409 | 0.07692308 |
| $Bbg\_USBonds\_UnhedgedUSD$      | 0.07692308 | 0.13685281 | 0.13985367 | 0.07692308 |
| $Bbg\_USCorpCred\_Unhedged\_USD$ | 0.07692308 | 0.01000000 | 0.07223162 | 0.07692308 |
| Commod_Idx                       | 0.07692308 | 0.01741990 | 0.04251138 | 0.07692308 |
| Dollar_Idx                       | 0.07692308 | 0.17677535 | 0.01000000 | 0.07692308 |
| MSCI_ACWI                        | 0.07692308 | 0.01000000 | 0.02931999 | 0.07692308 |
| MSCI_Jap                         | 0.07692308 | 0.01000000 | 0.02853624 | 0.07692308 |
| MSCI_RE                          | 0.07692308 | 0.01000000 | 0.02389699 | 0.07692308 |
| MSCI_USA                         | 0.07692308 | 0.01000000 | 0.03034972 | 0.07692308 |
| Asia_dollar_Idx                  | 0.07692308 | 0.25000000 | 0.13024451 | 0.07692308 |
| $Bbg\_EUCorpCred\_Unhedged\_USD$ | 0.07692308 | 0.09895195 | 0.12605474 | 0.07692308 |
| $Bbg\_EuroBonds\_UnhedgedEUR$    | 0.07692308 | 0.01000000 | 0.10454889 | 0.07692308 |
| $Bbg\_GlBonds\_HedgedUSD$        | 0.07692308 | 0.25000000 | 0.17007816 | 0.07692308 |
| $Bbg\_GlCorpCred\_Hedged\_USD$   | 0.07692308 | 0.01000000 | 0.09237409 | 0.07692308 |
| $Bbg\_USBonds\_UnhedgedUSD$      | 0.07692308 | 0.13685281 | 0.13985367 | 0.07692308 |
| $Bbg\_USCorpCred\_Unhedged\_USD$ | 0.07692308 | 0.01000000 | 0.07223162 | 0.07692308 |
| Commod_Idx                       | 0.07692308 | 0.01741990 | 0.04251138 | 0.07692308 |
| Dollar_Idx                       | 0.07692308 | 0.17677535 | 0.01000000 | 0.07692308 |
| MSCI_ACWI                        | 0.07692308 | 0.01000000 | 0.02931999 | 0.07692308 |
| MSCI_Jap                         | 0.07692308 | 0.01000000 | 0.02853624 | 0.07692308 |
| MSCI_RE                          | 0.07692308 | 0.01000000 | 0.02389699 | 0.07692308 |
| MSCI_USA                         | 0.07692308 | 0.01000000 | 0.03034972 | 0.07692308 |
| Asia_dollar_Idx                  | 0.07692308 | 0.25000000 | 0.13018129 | 0.07692308 |
| $Bbg\_EUCorpCred\_Unhedged\_USD$ | 0.07692308 | 0.09664046 | 0.12550626 | 0.07692308 |
| $Bbg\_EuroBonds\_UnhedgedEUR$    | 0.07692308 | 0.01000000 | 0.10393248 | 0.07692308 |
| $Bbg\_GlBonds\_HedgedUSD$        | 0.07692308 | 0.25000000 | 0.16958916 | 0.07692308 |
| $Bbg\_GlCorpCred\_Hedged\_USD$   | 0.07692308 | 0.01000000 | 0.09218877 | 0.07692308 |
| $Bbg\_USBonds\_UnhedgedUSD$      | 0.07692308 | 0.13796361 | 0.14092431 | 0.07692308 |
| $Bbg\_USCorpCred\_Unhedged\_USD$ | 0.07692308 | 0.01000000 | 0.07229310 | 0.07692308 |
| Commod_Idx                       | 0.07692308 | 0.01754134 | 0.04271704 | 0.07692308 |
| Dollar_Idx                       | 0.07692308 | 0.17785458 | 0.01000000 | 0.07692308 |
| MSCI_ACWI                        | 0.07692308 | 0.01000000 | 0.02931152 | 0.07692308 |
| $MSCI\_Jap$                      | 0.07692308 | 0.01000000 | 0.02934088 | 0.07692308 |
| MSCI_RE                          | 0.07692308 | 0.01000000 | 0.02392647 | 0.07692308 |

| MSCI_USA                         | 0.07692308 | 0.01000000 | 0.03008872 | 0.07692308 |
|----------------------------------|------------|------------|------------|------------|
| Asia_dollar_Idx                  | 0.07692308 | 0.25000000 | 0.13042759 | 0.07692308 |
| $Bbg\_EUCorpCred\_Unhedged\_USD$ | 0.07692308 | 0.09316072 | 0.12527482 | 0.07692308 |
| $Bbg\_EuroBonds\_UnhedgedEUR$    | 0.07692308 | 0.01000000 | 0.10359585 | 0.07692308 |
| $Bbg\_GlBonds\_HedgedUSD$        | 0.07692308 | 0.25000000 | 0.16936120 | 0.07692308 |
| $Bbg\_GlCorpCred\_Hedged\_USD$   | 0.07692308 | 0.01000000 | 0.09194663 | 0.07692308 |
| $Bbg\_USBonds\_UnhedgedUSD$      | 0.07692308 | 0.13875249 | 0.14104229 | 0.07692308 |
| $Bbg\_USCorpCred\_Unhedged\_USD$ | 0.07692308 | 0.01000000 | 0.07211603 | 0.07692308 |
| Commod_Idx                       | 0.07692308 | 0.01699899 | 0.04332610 | 0.07692308 |
| Dollar_Idx                       | 0.07692308 | 0.18108780 | 0.01000000 | 0.07692308 |
| MSCI_ACWI                        | 0.07692308 | 0.01000000 | 0.02935096 | 0.07692308 |
| MSCI_Jap                         | 0.07692308 | 0.01000000 | 0.02958107 | 0.07692308 |
| MSCI_RE                          | 0.07692308 | 0.01000000 | 0.02394817 | 0.07692308 |
| MSCI_USA                         | 0.07692308 | 0.01000000 | 0.03002928 | 0.07692308 |
| Asia_dollar_Idx                  | 0.07692308 | 0.25000000 | 0.13219776 | 0.07692308 |
| $Bbg\_EUCorpCred\_Unhedged\_USD$ | 0.07692308 | 0.08995457 | 0.12563515 | 0.07692308 |
| $Bbg\_EuroBonds\_UnhedgedEUR$    | 0.07692308 | 0.01000000 | 0.10200023 | 0.07692308 |
| $Bbg\_GlBonds\_HedgedUSD$        | 0.07692308 | 0.25000000 | 0.16661255 | 0.07692308 |
| $Bbg\_GlCorpCred\_Hedged\_USD$   | 0.07692308 | 0.01000000 | 0.09193137 | 0.07692308 |
| $Bbg\_USBonds\_UnhedgedUSD$      | 0.07692308 | 0.14009190 | 0.14090445 | 0.07692308 |
| $Bbg\_USCorpCred\_Unhedged\_USD$ | 0.07692308 | 0.01000000 | 0.07212412 | 0.07692308 |
| Commod_Idx                       | 0.07692308 | 0.01737911 | 0.04423643 | 0.07692308 |
| Dollar_Idx                       | 0.07692308 | 0.18257442 | 0.01000000 | 0.07692308 |
| MSCI_ACWI                        | 0.07692308 | 0.01000000 | 0.02984653 | 0.07692308 |
| MSCI_Jap                         | 0.07692308 | 0.01000000 | 0.02992945 | 0.07692308 |
| MSCI_RE                          | 0.07692308 | 0.01000000 | 0.02433992 | 0.07692308 |
| MSCI_USA                         | 0.07692308 | 0.01000000 | 0.03024203 | 0.07692308 |
| Asia_dollar_Idx                  | 0.07692308 | 0.25000000 | 0.13460482 | 0.07692308 |
| $Bbg\_EUCorpCred\_Unhedged\_USD$ | 0.07692308 | 0.08623910 | 0.12545631 | 0.07692308 |
| $Bbg\_EuroBonds\_UnhedgedEUR$    | 0.07692308 | 0.01000000 | 0.10342427 | 0.07692308 |
| $Bbg\_GlBonds\_HedgedUSD$        | 0.07692308 | 0.25000000 | 0.16488213 | 0.07692308 |
| $Bbg\_GlCorpCred\_Hedged\_USD$   | 0.07692308 | 0.01000000 | 0.09133662 | 0.07692308 |
| $Bbg\_USBonds\_UnhedgedUSD$      | 0.07692308 | 0.14298226 | 0.13828888 | 0.07692308 |
| $Bbg\_USCorpCred\_Unhedged\_USD$ | 0.07692308 | 0.01000000 | 0.07154649 | 0.07692308 |
| Commod_Idx                       | 0.07692308 | 0.01624742 | 0.04476684 | 0.07692308 |
| Dollar_Idx                       | 0.07692308 | 0.18453122 | 0.01000000 | 0.07692308 |
| MSCI_ACWI                        | 0.07692308 | 0.01000000 | 0.03042100 | 0.07692308 |
| $MSCI\_Jap$                      | 0.07692308 | 0.01000000 | 0.03001792 | 0.07692308 |
| MSCI_RE                          | 0.07692308 | 0.01000000 | 0.02469315 | 0.07692308 |

| MSCI_USA                         | 0.07692308 | 0.01000000 | 0.03056158 | 0.07692308 |
|----------------------------------|------------|------------|------------|------------|
| Asia_dollar_Idx                  | 0.07692308 | 0.25000000 | 0.13528066 | 0.07692308 |
| $Bbg\_EUCorpCred\_Unhedged\_USD$ | 0.07692308 | 0.08202807 | 0.12562656 | 0.07692308 |
| $Bbg\_EuroBonds\_UnhedgedEUR$    | 0.07692308 | 0.01000000 | 0.10364815 | 0.07692308 |
| $Bbg\_GlBonds\_HedgedUSD$        | 0.07692308 | 0.25000000 | 0.16451028 | 0.07692308 |
| $Bbg\_GlCorpCred\_Hedged\_USD$   | 0.07692308 | 0.01000000 | 0.09119479 | 0.07692308 |
| $Bbg\_USBonds\_UnhedgedUSD$      | 0.07692308 | 0.14545698 | 0.13808628 | 0.07692308 |
| $Bbg\_USCorpCred\_Unhedged\_USD$ | 0.07692308 | 0.01000000 | 0.07142744 | 0.07692308 |
| Commod_Idx                       | 0.07692308 | 0.01592576 | 0.04498207 | 0.07692308 |
| Dollar_Idx                       | 0.07692308 | 0.18658919 | 0.01000000 | 0.07692308 |
| MSCI_ACWI                        | 0.07692308 | 0.01000000 | 0.03039756 | 0.07692308 |
| MSCI_Jap                         | 0.07692308 | 0.01000000 | 0.02992417 | 0.07692308 |
| MSCI_RE                          | 0.07692308 | 0.01000000 | 0.02461264 | 0.07692308 |
| MSCI_USA                         | 0.07692308 | 0.01000000 | 0.03030939 | 0.07692308 |
| Asia_dollar_Idx                  | 0.07692308 | 0.25000000 | 0.13619080 | 0.07692308 |
| $Bbg\_EUCorpCred\_Unhedged\_USD$ | 0.07692308 | 0.08349612 | 0.12500334 | 0.07692308 |
| $Bbg\_EuroBonds\_UnhedgedEUR$    | 0.07692308 | 0.01000000 | 0.10492051 | 0.07692308 |
| $Bbg\_GlBonds\_HedgedUSD$        | 0.07692308 | 0.25000000 | 0.16384289 | 0.07692308 |
| $Bbg\_GlCorpCred\_Hedged\_USD$   | 0.07692308 | 0.01000000 | 0.09069379 | 0.07692308 |
| $Bbg\_USBonds\_UnhedgedUSD$      | 0.07692308 | 0.14404104 | 0.13702662 | 0.07692308 |
| $Bbg\_USCorpCred\_Unhedged\_USD$ | 0.07692308 | 0.01000000 | 0.07102362 | 0.07692308 |
| Commod_Idx                       | 0.07692308 | 0.01546050 | 0.04548535 | 0.07692308 |
| Dollar_Idx                       | 0.07692308 | 0.18700234 | 0.01000000 | 0.07692308 |
| MSCI_ACWI                        | 0.07692308 | 0.01000000 | 0.03060607 | 0.07692308 |
| MSCI_Jap                         | 0.07692308 | 0.01000000 | 0.03017363 | 0.07692308 |
| MSCI_RE                          | 0.07692308 | 0.01000000 | 0.02467726 | 0.07692308 |
| MSCI_USA                         | 0.07692308 | 0.01000000 | 0.03035612 | 0.07692308 |
| Asia_dollar_Idx                  | 0.07692308 | 0.25000000 | 0.13624246 | 0.07692308 |
| $Bbg\_EUCorpCred\_Unhedged\_USD$ | 0.07692308 | 0.08477688 | 0.12526572 | 0.07692308 |
| $Bbg\_EuroBonds\_UnhedgedEUR$    | 0.07692308 | 0.01000000 | 0.10596387 | 0.07692308 |
| $Bbg\_GlBonds\_HedgedUSD$        | 0.07692308 | 0.25000000 | 0.16343540 | 0.07692308 |
| $Bbg\_GlCorpCred\_Hedged\_USD$   | 0.07692308 | 0.01000000 | 0.09045352 | 0.07692308 |
| $Bbg\_USBonds\_UnhedgedUSD$      | 0.07692308 | 0.14255961 | 0.13620445 | 0.07692308 |
| $Bbg\_USCorpCred\_Unhedged\_USD$ | 0.07692308 | 0.01000000 | 0.07076218 | 0.07692308 |
| Commod_Idx                       | 0.07692308 | 0.01510740 | 0.04596744 | 0.07692308 |
| Dollar_Idx                       | 0.07692308 | 0.18755612 | 0.01000000 | 0.07692308 |
| MSCI_ACWI                        | 0.07692308 | 0.01000000 | 0.03061235 | 0.07692308 |
| $MSCI\_Jap$                      | 0.07692308 | 0.01000000 | 0.03035320 | 0.07692308 |
| MSCI_RE                          | 0.07692308 | 0.01000000 | 0.02453953 | 0.07692308 |

| MSCI_USA                         | 0.07692308 | 0.01000000 | 0.03019989 | 0.07692308 |
|----------------------------------|------------|------------|------------|------------|
| Asia_dollar_Idx                  | 0.07692308 | 0.25000000 | 0.13600817 | 0.07692308 |
| $Bbg\_EUCorpCred\_Unhedged\_USD$ | 0.07692308 | 0.08336692 | 0.12517707 | 0.07692308 |
| $Bbg\_EuroBonds\_UnhedgedEUR$    | 0.07692308 | 0.01000000 | 0.10601030 | 0.07692308 |
| $Bbg\_GlBonds\_HedgedUSD$        | 0.07692308 | 0.25000000 | 0.16345691 | 0.07692308 |
| $Bbg\_GlCorpCred\_Hedged\_USD$   | 0.07692308 | 0.01000000 | 0.09040596 | 0.07692308 |
| $Bbg\_USBonds\_UnhedgedUSD$      | 0.07692308 | 0.14347242 | 0.13620546 | 0.07692308 |
| $Bbg\_USCorpCred\_Unhedged\_USD$ | 0.07692308 | 0.01000000 | 0.07074021 | 0.07692308 |
| Commod_Idx                       | 0.07692308 | 0.01461731 | 0.04611618 | 0.07692308 |
| Dollar_Idx                       | 0.07692308 | 0.18854335 | 0.01000000 | 0.07692308 |
| MSCI_ACWI                        | 0.07692308 | 0.01000000 | 0.03065533 | 0.07692308 |
| MSCI_Jap                         | 0.07692308 | 0.01000000 | 0.03047166 | 0.07692308 |
| MSCI_RE                          | 0.07692308 | 0.01000000 | 0.02450319 | 0.07692308 |
| MSCI_USA                         | 0.07692308 | 0.01000000 | 0.03024957 | 0.07692308 |
| Asia_dollar_Idx                  | 0.07692308 | 0.25000000 | 0.13596548 | 0.07692308 |
| Bbg_EUCorpCred_Unhedged_USD      | 0.07692308 | 0.08339446 | 0.12537972 | 0.07692308 |
| Bbg_EuroBonds_UnhedgedEUR        | 0.07692308 | 0.01000000 | 0.10592098 | 0.07692308 |
| $Bbg\_GlBonds\_HedgedUSD$        | 0.07692308 | 0.25000000 | 0.16350603 | 0.07692308 |
| $Bbg\_GlCorpCred\_Hedged\_USD$   | 0.07692308 | 0.01000000 | 0.09030432 | 0.07692308 |
| $Bbg\_USBonds\_UnhedgedUSD$      | 0.07692308 | 0.14265395 | 0.13633859 | 0.07692308 |
| $Bbg\_USCorpCred\_Unhedged\_USD$ | 0.07692308 | 0.01000000 | 0.07061690 | 0.07692308 |
| Commod_Idx                       | 0.07692308 | 0.01384568 | 0.04607234 | 0.07692308 |
| Dollar_Idx                       | 0.07692308 | 0.19010591 | 0.01000000 | 0.07692308 |
| MSCI_ACWI                        | 0.07692308 | 0.01000000 | 0.03055342 | 0.07692308 |
| MSCI_Jap                         | 0.07692308 | 0.01000000 | 0.03074696 | 0.07692308 |
| MSCI_RE                          | 0.07692308 | 0.01000000 | 0.02446097 | 0.07692308 |
| MSCI_USA                         | 0.07692308 | 0.01000000 | 0.03013427 | 0.07692308 |
| Asia_dollar_Idx                  | 0.07692308 | 0.25000000 | 0.13445081 | 0.07692308 |
| Bbg_EUCorpCred_Unhedged_USD      | 0.07692308 | 0.09212323 | 0.12636679 | 0.07692308 |
| $Bbg\_EuroBonds\_UnhedgedEUR$    | 0.07692308 | 0.01000000 | 0.10672978 | 0.07692308 |
| $Bbg\_GlBonds\_HedgedUSD$        | 0.07692308 | 0.25000000 | 0.16491344 | 0.07692308 |
| $Bbg\_GlCorpCred\_Hedged\_USD$   | 0.07692308 | 0.01000000 | 0.09010400 | 0.07692308 |
| $Bbg\_USBonds\_UnhedgedUSD$      | 0.07692308 | 0.13545848 | 0.13523417 | 0.07692308 |
| Bbg_USCorpCred_Unhedged_USD      | 0.07692308 | 0.01000000 | 0.07018461 | 0.07692308 |
| Commod_Idx                       | 0.07692308 | 0.01369250 | 0.04607439 | 0.07692308 |
| Dollar_Idx                       | 0.07692308 | 0.18872579 | 0.01000000 | 0.07692308 |
| MSCI_ACWI                        | 0.07692308 | 0.01000000 | 0.03051494 | 0.07692308 |
| MSCI_Jap                         | 0.07692308 | 0.01000000 | 0.03100816 | 0.07692308 |
| MSCI_RE                          | 0.07692308 | 0.01000000 | 0.02460539 | 0.07692308 |
|                                  |            |            |            |            |

| MSCI_USA                         | 0.07692308 | 0.01000000 | 0.02981352 | 0.07692308 |
|----------------------------------|------------|------------|------------|------------|
| Asia_dollar_Idx                  | 0.07692308 | 0.25000000 | 0.13565937 | 0.07692308 |
| $Bbg\_EUCorpCred\_Unhedged\_USD$ | 0.07692308 | 0.09346760 | 0.12580410 | 0.07692308 |
| $Bbg\_EuroBonds\_UnhedgedEUR$    | 0.07692308 | 0.01000000 | 0.10562985 | 0.07692308 |
| $Bbg\_GlBonds\_HedgedUSD$        | 0.07692308 | 0.25000000 | 0.16480791 | 0.07692308 |
| $Bbg\_GlCorpCred\_Hedged\_USD$   | 0.07692308 | 0.01000000 | 0.09017268 | 0.07692308 |
| $Bbg\_USBonds\_UnhedgedUSD$      | 0.07692308 | 0.13578143 | 0.13650478 | 0.07692308 |
| $Bbg\_USCorpCred\_Unhedged\_USD$ | 0.07692308 | 0.01000000 | 0.07045005 | 0.07692308 |
| Commod_Idx                       | 0.07692308 | 0.01332100 | 0.04570426 | 0.07692308 |
| Dollar_Idx                       | 0.07692308 | 0.18742996 | 0.01000000 | 0.07692308 |
| MSCI_ACWI                        | 0.07692308 | 0.01000000 | 0.03023986 | 0.07692308 |
| MSCI_Jap                         | 0.07692308 | 0.01000000 | 0.03105743 | 0.07692308 |
| MSCI_RE                          | 0.07692308 | 0.01000000 | 0.02458909 | 0.07692308 |
| MSCI_USA                         | 0.07692308 | 0.01000000 | 0.02938062 | 0.07692308 |
| Asia_dollar_Idx                  | 0.07692308 | 0.25000000 | 0.13539771 | 0.07692308 |
| $Bbg\_EUCorpCred\_Unhedged\_USD$ | 0.07692308 | 0.09541809 | 0.12567751 | 0.07692308 |
| $Bbg\_EuroBonds\_UnhedgedEUR$    | 0.07692308 | 0.01000000 | 0.10531089 | 0.07692308 |
| $Bbg\_GlBonds\_HedgedUSD$        | 0.07692308 | 0.25000000 | 0.16510829 | 0.07692308 |
| $Bbg\_GlCorpCred\_Hedged\_USD$   | 0.07692308 | 0.01000000 | 0.09025081 | 0.07692308 |
| $Bbg\_USBonds\_UnhedgedUSD$      | 0.07692308 | 0.13521556 | 0.13697280 | 0.07692308 |
| $Bbg\_USCorpCred\_Unhedged\_USD$ | 0.07692308 | 0.01000000 | 0.07060828 | 0.07692308 |
| Commod_Idx                       | 0.07692308 | 0.01290046 | 0.04540883 | 0.07692308 |
| Dollar_Idx                       | 0.07692308 | 0.18646589 | 0.01000000 | 0.07692308 |
| MSCI_ACWI                        | 0.07692308 | 0.01000000 | 0.03022034 | 0.07692308 |
| MSCI_Jap                         | 0.07692308 | 0.01000000 | 0.03117801 | 0.07692308 |
| MSCI_RE                          | 0.07692308 | 0.01000000 | 0.02457792 | 0.07692308 |
| MSCI_USA                         | 0.07692308 | 0.01000000 | 0.02928861 | 0.07692308 |
| Asia_dollar_Idx                  | 0.07692308 | 0.25000000 | 0.13482994 | 0.07692308 |
| $Bbg\_EUCorpCred\_Unhedged\_USD$ | 0.07692308 | 0.09545600 | 0.12580096 | 0.07692308 |
| $Bbg\_EuroBonds\_UnhedgedEUR$    | 0.07692308 | 0.01000000 | 0.10519214 | 0.07692308 |
| $Bbg\_GlBonds\_HedgedUSD$        | 0.07692308 | 0.25000000 | 0.16498643 | 0.07692308 |
| $Bbg\_GlCorpCred\_Hedged\_USD$   | 0.07692308 | 0.01000000 | 0.09022040 | 0.07692308 |
| $Bbg\_USBonds\_UnhedgedUSD$      | 0.07692308 | 0.13450374 | 0.13747814 | 0.07692308 |
| $Bbg\_USCorpCred\_Unhedged\_USD$ | 0.07692308 | 0.01000000 | 0.07058368 | 0.07692308 |
| Commod_Idx                       | 0.07692308 | 0.01320457 | 0.04563172 | 0.07692308 |
| Dollar_Idx                       | 0.07692308 | 0.18683569 | 0.01000000 | 0.07692308 |
| MSCI_ACWI                        | 0.07692308 | 0.01000000 | 0.03008184 | 0.07692308 |
| $MSCI\_Jap$                      | 0.07692308 | 0.01000000 | 0.03166230 | 0.07692308 |
| MSCI_RE                          | 0.07692308 | 0.01000000 | 0.02451731 | 0.07692308 |

| MSCI_USA                         | 0.07692308 | 0.01000000 | 0.02901512 | 0.07692308 |
|----------------------------------|------------|------------|------------|------------|
| Asia_dollar_Idx                  | 0.07692308 | 0.25000000 | 0.13447042 | 0.07692308 |
| Bbg_EUCorpCred_Unhedged_USD      | 0.07692308 | 0.09659550 | 0.12597012 | 0.07692308 |
| $Bbg\_EuroBonds\_UnhedgedEUR$    | 0.07692308 | 0.01000000 | 0.10575287 | 0.07692308 |
| $Bbg\_GlBonds\_HedgedUSD$        | 0.07692308 | 0.25000000 | 0.16531051 | 0.07692308 |
| $Bbg\_GlCorpCred\_Hedged\_USD$   | 0.07692308 | 0.01000000 | 0.09013968 | 0.07692308 |
| $Bbg\_USBonds\_UnhedgedUSD$      | 0.07692308 | 0.13403036 | 0.13739447 | 0.07692308 |
| $Bbg\_USCorpCred\_Unhedged\_USD$ | 0.07692308 | 0.01000000 | 0.07051520 | 0.07692308 |
| Commod_Idx                       | 0.07692308 | 0.01302516 | 0.04553793 | 0.07692308 |
| Dollar_Idx                       | 0.07692308 | 0.18634898 | 0.01000000 | 0.07692308 |
| MSCI_ACWI                        | 0.07692308 | 0.01000000 | 0.02992049 | 0.07692308 |
| MSCI_Jap                         | 0.07692308 | 0.01000000 | 0.03180481 | 0.07692308 |
| MSCI_RE                          | 0.07692308 | 0.01000000 | 0.02439318 | 0.07692308 |
| MSCI_USA                         | 0.07692308 | 0.01000000 | 0.02879031 | 0.07692308 |
| Asia_dollar_Idx                  | 0.07692308 | 0.25000000 | 0.13435645 | 0.07692308 |
| $Bbg\_EUCorpCred\_Unhedged\_USD$ | 0.07692308 | 0.09750370 | 0.12591628 | 0.07692308 |
| $Bbg\_EuroBonds\_UnhedgedEUR$    | 0.07692308 | 0.01000000 | 0.10609014 | 0.07692308 |
| $Bbg\_GlBonds\_HedgedUSD$        | 0.07692308 | 0.25000000 | 0.16570992 | 0.07692308 |
| $Bbg\_GlCorpCred\_Hedged\_USD$   | 0.07692308 | 0.01000000 | 0.09005510 | 0.07692308 |
| $Bbg\_USBonds\_UnhedgedUSD$      | 0.07692308 | 0.13324662 | 0.13748276 | 0.07692308 |
| $Bbg\_USCorpCred\_Unhedged\_USD$ | 0.07692308 | 0.01000000 | 0.07047390 | 0.07692308 |
| Commod_Idx                       | 0.07692308 | 0.01300259 | 0.04551096 | 0.07692308 |
| Dollar_Idx                       | 0.07692308 | 0.18624709 | 0.01000000 | 0.07692308 |
| MSCI_ACWI                        | 0.07692308 | 0.01000000 | 0.02977322 | 0.07692308 |
| MSCI_Jap                         | 0.07692308 | 0.01000000 | 0.03169204 | 0.07692308 |
| MSCI_RE                          | 0.07692308 | 0.01000000 | 0.02428159 | 0.07692308 |
| MSCI_USA                         | 0.07692308 | 0.01000000 | 0.02865766 | 0.07692308 |
| Asia_dollar_Idx                  | 0.07692308 | 0.25000000 | 0.13476361 | 0.07692308 |
| $Bbg\_EUCorpCred\_Unhedged\_USD$ | 0.07692308 | 0.09691857 | 0.12577535 | 0.07692308 |
| $Bbg\_EuroBonds\_UnhedgedEUR$    | 0.07692308 | 0.01000000 | 0.10552715 | 0.07692308 |
| $Bbg\_GlBonds\_HedgedUSD$        | 0.07692308 | 0.25000000 | 0.16573784 | 0.07692308 |
| $Bbg\_GlCorpCred\_Hedged\_USD$   | 0.07692308 | 0.01000000 | 0.08999612 | 0.07692308 |
| $Bbg\_USBonds\_UnhedgedUSD$      | 0.07692308 | 0.13314758 | 0.13797312 | 0.07692308 |
| $Bbg\_USCorpCred\_Unhedged\_USD$ | 0.07692308 | 0.01000000 | 0.07045117 | 0.07692308 |
| Commod_Idx                       | 0.07692308 | 0.01234616 | 0.04543643 | 0.07692308 |
| Dollar_Idx                       | 0.07692308 | 0.18758769 | 0.01000000 | 0.07692308 |
| MSCI_ACWI                        | 0.07692308 | 0.01000000 | 0.02955266 | 0.07692308 |
| $MSCI\_Jap$                      | 0.07692308 | 0.01000000 | 0.03227302 | 0.07692308 |
| MSCI_RE                          | 0.07692308 | 0.01000000 | 0.02413188 | 0.07692308 |

| MSCI_USA                         | 0.07692308 | 0.01000000 | 0.02838164 | 0.07692308 |
|----------------------------------|------------|------------|------------|------------|
| Asia_dollar_Idx                  | 0.07692308 | 0.25000000 | 0.13544084 | 0.07692308 |
| $Bbg\_EUCorpCred\_Unhedged\_USD$ | 0.07692308 | 0.08801206 | 0.12457907 | 0.07692308 |
| $Bbg\_EuroBonds\_UnhedgedEUR$    | 0.07692308 | 0.01000000 | 0.10415124 | 0.07692308 |
| $Bbg\_GlBonds\_HedgedUSD$        | 0.07692308 | 0.25000000 | 0.16641868 | 0.07692308 |
| $Bbg\_GlCorpCred\_Hedged\_USD$   | 0.07692308 | 0.01000000 | 0.08985005 | 0.07692308 |
| $Bbg\_USBonds\_UnhedgedUSD$      | 0.07692308 | 0.13936805 | 0.14015731 | 0.07692308 |
| $Bbg\_USCorpCred\_Unhedged\_USD$ | 0.07692308 | 0.01000000 | 0.07053416 | 0.07692308 |
| Commod_Idx                       | 0.07692308 | 0.01105641 | 0.04559561 | 0.07692308 |
| Dollar_Idx                       | 0.07692308 | 0.19156348 | 0.01000000 | 0.07692308 |
| MSCI_ACWI                        | 0.07692308 | 0.01000000 | 0.02924317 | 0.07692308 |
| MSCI_Jap                         | 0.07692308 | 0.01000000 | 0.03205321 | 0.07692308 |
| MSCI_RE                          | 0.07692308 | 0.01000000 | 0.02397183 | 0.07692308 |
| MSCI_USA                         | 0.07692308 | 0.01000000 | 0.02800484 | 0.07692308 |
| Asia_dollar_Idx                  | 0.07692308 | 0.25000000 | 0.13439889 | 0.07692308 |
| $Bbg\_EUCorpCred\_Unhedged\_USD$ | 0.07692308 | 0.08821563 | 0.12449551 | 0.07692308 |
| $Bbg\_EuroBonds\_UnhedgedEUR$    | 0.07692308 | 0.01000000 | 0.10576337 | 0.07692308 |
| $Bbg\_GlBonds\_HedgedUSD$        | 0.07692308 | 0.25000000 | 0.16872457 | 0.07692308 |
| $Bbg\_GlCorpCred\_Hedged\_USD$   | 0.07692308 | 0.01000000 | 0.08956201 | 0.07692308 |
| $Bbg\_USBonds\_UnhedgedUSD$      | 0.07692308 | 0.13463832 | 0.14065509 | 0.07692308 |
| $Bbg\_USCorpCred\_Unhedged\_USD$ | 0.07692308 | 0.01000000 | 0.07027498 | 0.07692308 |
| Commod_Idx                       | 0.07692308 | 0.01000000 | 0.04471642 | 0.07692308 |
| Dollar_Idx                       | 0.07692308 | 0.19714605 | 0.01000000 | 0.07692308 |
| MSCI_ACWI                        | 0.07692308 | 0.01000000 | 0.02876989 | 0.07692308 |
| MSCI_Jap                         | 0.07692308 | 0.01000000 | 0.03145651 | 0.07692308 |
| MSCI_RE                          | 0.07692308 | 0.01000000 | 0.02369128 | 0.07692308 |
| MSCI_USA                         | 0.07692308 | 0.01000000 | 0.02749149 | 0.07692308 |
| Asia_dollar_Idx                  | 0.07692308 | 0.25000000 | 0.13201015 | 0.07692308 |
| $Bbg\_EUCorpCred\_Unhedged\_USD$ | 0.07692308 | 0.08753933 | 0.12491774 | 0.07692308 |
| $Bbg\_EuroBonds\_UnhedgedEUR$    | 0.07692308 | 0.01000000 | 0.10659016 | 0.07692308 |
| $Bbg\_GlBonds\_HedgedUSD$        | 0.07692308 | 0.25000000 | 0.16943397 | 0.07692308 |
| $Bbg\_GlCorpCred\_Hedged\_USD$   | 0.07692308 | 0.01000000 | 0.08918193 | 0.07692308 |
| $Bbg\_USBonds\_UnhedgedUSD$      | 0.07692308 | 0.12626874 | 0.14064674 | 0.07692308 |
| $Bbg\_USCorpCred\_Unhedged\_USD$ | 0.07692308 | 0.01000000 | 0.06983652 | 0.07692308 |
| Commod_Idx                       | 0.07692308 | 0.01000000 | 0.04474167 | 0.07692308 |
| Dollar_Idx                       | 0.07692308 | 0.20619194 | 0.01000000 | 0.07692308 |
| MSCI_ACWI                        | 0.07692308 | 0.01000000 | 0.02878354 | 0.07692308 |
| $MSCI\_Jap$                      | 0.07692308 | 0.01000000 | 0.03244771 | 0.07692308 |
| MSCI_RE                          | 0.07692308 | 0.01000000 | 0.02367795 | 0.07692308 |

| MSCI_USA                         | 0.07692308 | 0.01000000 | 0.02773192 | 0.07692308 |
|----------------------------------|------------|------------|------------|------------|
| Asia_dollar_Idx                  | 0.07692308 | 0.25000000 | 0.13097070 | 0.07692308 |
| $Bbg\_EUCorpCred\_Unhedged\_USD$ | 0.07692308 | 0.08209691 | 0.12532586 | 0.07692308 |
| $Bbg\_EuroBonds\_UnhedgedEUR$    | 0.07692308 | 0.01000000 | 0.10766632 | 0.07692308 |
| $Bbg\_GlBonds\_HedgedUSD$        | 0.07692308 | 0.25000000 | 0.17045726 | 0.07692308 |
| $Bbg\_GlCorpCred\_Hedged\_USD$   | 0.07692308 | 0.01000000 | 0.08876085 | 0.07692308 |
| $Bbg\_USBonds\_UnhedgedUSD$      | 0.07692308 | 0.12146664 | 0.14085485 | 0.07692308 |
| $Bbg\_USCorpCred\_Unhedged\_USD$ | 0.07692308 | 0.01000000 | 0.06934377 | 0.07692308 |
| Commod_Idx                       | 0.07692308 | 0.01000000 | 0.04447106 | 0.07692308 |
| Dollar_Idx                       | 0.07692308 | 0.21643645 | 0.01000000 | 0.07692308 |
| MSCI_ACWI                        | 0.07692308 | 0.01000000 | 0.02861860 | 0.07692308 |
| MSCI_Jap                         | 0.07692308 | 0.01000000 | 0.03256776 | 0.07692308 |
| MSCI_RE                          | 0.07692308 | 0.01000000 | 0.02348866 | 0.07692308 |
| MSCI_USA                         | 0.07692308 | 0.01000000 | 0.02747430 | 0.07692308 |
| Asia_dollar_Idx                  | 0.07692308 | 0.25000000 | 0.13166546 | 0.07692308 |
| Bbg_EUCorpCred_Unhedged_USD      | 0.07692308 | 0.08334296 | 0.12558352 | 0.07692308 |
| Bbg_EuroBonds_UnhedgedEUR        | 0.07692308 | 0.01000000 | 0.10733348 | 0.07692308 |
| $Bbg\_GlBonds\_HedgedUSD$        | 0.07692308 | 0.25000000 | 0.17139633 | 0.07692308 |
| $Bbg\_GlCorpCred\_Hedged\_USD$   | 0.07692308 | 0.01000000 | 0.08786160 | 0.07692308 |
| $Bbg\_USBonds\_UnhedgedUSD$      | 0.07692308 | 0.11365349 | 0.13890867 | 0.07692308 |
| $Bbg\_USCorpCred\_Unhedged\_USD$ | 0.07692308 | 0.01000000 | 0.06835231 | 0.07692308 |
| Commod_Idx                       | 0.07692308 | 0.01000000 | 0.04505669 | 0.07692308 |
| Dollar_Idx                       | 0.07692308 | 0.22250467 | 0.01000000 | 0.07692308 |
| MSCI_ACWI                        | 0.07692308 | 0.01000000 | 0.02864033 | 0.07692308 |
| MSCI_Jap                         | 0.07692308 | 0.01049888 | 0.03450363 | 0.07692308 |
| MSCI_RE                          | 0.07692308 | 0.01000000 | 0.02361864 | 0.07692308 |
| MSCI_USA                         | 0.07692308 | 0.01000000 | 0.02707934 | 0.07692308 |
| Asia_dollar_Idx                  | 0.07692308 | 0.25000000 | 0.13534733 | 0.07692308 |
| Bbg_EUCorpCred_Unhedged_USD      | 0.07692308 | 0.06831372 | 0.12451820 | 0.07692308 |
| $Bbg\_EuroBonds\_UnhedgedEUR$    | 0.07692308 | 0.01000000 | 0.10686766 | 0.07692308 |
| $Bbg\_GlBonds\_HedgedUSD$        | 0.07692308 | 0.25000000 | 0.16985506 | 0.07692308 |
| $Bbg\_GlCorpCred\_Hedged\_USD$   | 0.07692308 | 0.01000000 | 0.08723321 | 0.07692308 |
| $Bbg\_USBonds\_UnhedgedUSD$      | 0.07692308 | 0.12175459 | 0.13865649 | 0.07692308 |
| Bbg_USCorpCred_Unhedged_USD      | 0.07692308 | 0.01000000 | 0.06782849 | 0.07692308 |
| Commod_Idx                       | 0.07692308 | 0.01000000 | 0.04559978 | 0.07692308 |
| Dollar_Idx                       | 0.07692308 | 0.22830594 | 0.01000000 | 0.07692308 |
| MSCI_ACWI                        | 0.07692308 | 0.01000000 | 0.02852439 | 0.07692308 |
| MSCI_Jap                         | 0.07692308 | 0.01162575 | 0.03557614 | 0.07692308 |
| MSCI_RE                          | 0.07692308 | 0.01000000 | 0.02338751 | 0.07692308 |
|                                  |            |            |            |            |

| MSCI_USA                         | 0.07692308 | 0.01000000 | 0.02660574 | 0.07692308 |
|----------------------------------|------------|------------|------------|------------|
| Asia_dollar_Idx                  | 0.07692308 | 0.25000000 | 0.13661905 | 0.07692308 |
| $Bbg\_EUCorpCred\_Unhedged\_USD$ | 0.07692308 | 0.07103612 | 0.12405161 | 0.07692308 |
| $Bbg\_EuroBonds\_UnhedgedEUR$    | 0.07692308 | 0.01000000 | 0.10730041 | 0.07692308 |
| $Bbg\_GlBonds\_HedgedUSD$        | 0.07692308 | 0.25000000 | 0.17176543 | 0.07692308 |
| $Bbg\_GlCorpCred\_Hedged\_USD$   | 0.07692308 | 0.01000000 | 0.08606201 | 0.07692308 |
| $Bbg\_USBonds\_UnhedgedUSD$      | 0.07692308 | 0.12054030 | 0.13898031 | 0.07692308 |
| $Bbg\_USCorpCred\_Unhedged\_USD$ | 0.07692308 | 0.01000000 | 0.06670365 | 0.07692308 |
| Commod_Idx                       | 0.07692308 | 0.01000000 | 0.04534212 | 0.07692308 |
| Dollar_Idx                       | 0.07692308 | 0.22622352 | 0.01000000 | 0.07692308 |
| MSCI_ACWI                        | 0.07692308 | 0.01000000 | 0.02815724 | 0.07692308 |
| MSCI_Jap                         | 0.07692308 | 0.01220005 | 0.03574449 | 0.07692308 |
| MSCI_RE                          | 0.07692308 | 0.01000000 | 0.02314076 | 0.07692308 |
| MSCI_USA                         | 0.07692308 | 0.01000000 | 0.02613291 | 0.07692308 |
| Asia_dollar_Idx                  | 0.07692308 | 0.25000000 | 0.13896783 | 0.07692308 |
| $Bbg\_EUCorpCred\_Unhedged\_USD$ | 0.07692308 | 0.07270979 | 0.12305241 | 0.07692308 |
| $Bbg\_EuroBonds\_UnhedgedEUR$    | 0.07692308 | 0.01000000 | 0.10824639 | 0.07692308 |
| $Bbg\_GlBonds\_HedgedUSD$        | 0.07692308 | 0.25000000 | 0.17386859 | 0.07692308 |
| $Bbg\_GlCorpCred\_Hedged\_USD$   | 0.07692308 | 0.01000000 | 0.08492055 | 0.07692308 |
| $Bbg\_USBonds\_UnhedgedUSD$      | 0.07692308 | 0.12119652 | 0.14018244 | 0.07692308 |
| $Bbg\_USCorpCred\_Unhedged\_USD$ | 0.07692308 | 0.01000000 | 0.06563979 | 0.07692308 |
| Commod_Idx                       | 0.07692308 | 0.01000000 | 0.04398008 | 0.07692308 |
| Dollar_Idx                       | 0.07692308 | 0.22369915 | 0.01000000 | 0.07692308 |
| MSCI_ACWI                        | 0.07692308 | 0.01000000 | 0.02738071 | 0.07692308 |
| MSCI_Jap                         | 0.07692308 | 0.01239454 | 0.03562288 | 0.07692308 |
| MSCI_RE                          | 0.07692308 | 0.01000000 | 0.02296761 | 0.07692308 |
| MSCI_USA                         | 0.07692308 | 0.01000000 | 0.02517072 | 0.07692308 |
| Asia_dollar_Idx                  | 0.07692308 | 0.25000000 | 0.14312429 | 0.07692308 |
| $Bbg\_EUCorpCred\_Unhedged\_USD$ | 0.07692308 | 0.07657947 | 0.12159156 | 0.07692308 |
| $Bbg\_EuroBonds\_UnhedgedEUR$    | 0.07692308 | 0.01000000 | 0.10813783 | 0.07692308 |
| $Bbg\_GlBonds\_HedgedUSD$        | 0.07692308 | 0.25000000 | 0.17460930 | 0.07692308 |
| $Bbg\_GlCorpCred\_Hedged\_USD$   | 0.07692308 | 0.01000000 | 0.08395623 | 0.07692308 |
| $Bbg\_USBonds\_UnhedgedUSD$      | 0.07692308 | 0.12105264 | 0.14131224 | 0.07692308 |
| $Bbg\_USCorpCred\_Unhedged\_USD$ | 0.07692308 | 0.01000000 | 0.06482714 | 0.07692308 |
| Commod_Idx                       | 0.07692308 | 0.01000000 | 0.04375687 | 0.07692308 |
| Dollar_Idx                       | 0.07692308 | 0.22037304 | 0.01000000 | 0.07692308 |
| MSCI_ACWI                        | 0.07692308 | 0.01000000 | 0.02647834 | 0.07692308 |
| $MSCI\_Jap$                      | 0.07692308 | 0.01199484 | 0.03540831 | 0.07692308 |
| MSCI_RE                          | 0.07692308 | 0.01000000 | 0.02256366 | 0.07692308 |

| 0.07692308 | 0.01000000   | 0.02423423   | 0.07692308  |
|------------|--|--|---|
| 0.07692308 | 0.25000000   | 0.14308506   | 0.07692308  |
| 0.07692308 | 0.07410844   | 0.12171386   | 0.07692308  |
| 0.07692308 | 0.01000000   | 0.10814246   | 0.07692308  |
| 0.07692308 | 0.25000000   | 0.17528510   | 0.07692308  |
| 0.07692308 | 0.01000000   | 0.08366472   | 0.07692308  |
| 0.07692308 | 0.11950274   | 0.14232239   | 0.07692308  |
| 0.07692308 | 0.01000000   | 0.06448803   | 0.07692308  |
| 0.07692308 | 0.01000000   | 0.04335089   | 0.07692308  |
| 0.07692308 | 0.22383607   | 0.01000000   | 0.07692308  |
| 0.07692308 | 0.01000000   | 0.02613829   | 0.07692308  |
| 0.07692308 | 0.01255275   | 0.03562481   | 0.07692308  |
| 0.07692308 | 0.01000000   | 0.02232417   | 0.07692308  |
| 0.07692308 | 0.01000000   | 0.02386022   | 0.07692308  |
| 0.07692308 | 0.25000000   | 0.14305862   | 0.07692308  |
| 0.07692308 | 0.07451818   | 0.12140644   | 0.07692308  |
| 0.07692308 | 0.01000000   | 0.10897413   | 0.07692308  |
| 0.07692308 | 0.25000000   | 0.17660184   | 0.07692308  |
| 0.07692308 | 0.01000000   | 0.08305284   | 0.07692308  |
| 0.07692308 | 0.11640442   | 0.14330329   | 0.07692308  |
| 0.07692308 | 0.01000000   | 0.06390042   | 0.07692308  |
| 0.07692308 | 0.01000000   | 0.04301023   | 0.07692308  |
| 0.07692308 | 0.22661000   | 0.01000000   | 0.07692308  |
| 0.07692308 | 0.01000000   | 0.02567065   | 0.07692308  |
| 0.07692308 | 0.01246740   | 0.03559052   | 0.07692308  |
| 0.07692308 | 0.01000000   | 0.02204897   | 0.07692308  |
| 0.07692308 | 0.01000000   | 0.02338205   | 0.07692308  |
| 0.07692308 | 0.25000000   | 0.14324006   | 0.07692308  |
| 0.07692308 | 0.07281444   | 0.12131779   | 0.07692308  |
| 0.07692308 | 0.01000000   | 0.10907297   | 0.07692308  |
| 0.07692308 | 0.25000000   | 0.17764824   | 0.07692308  |
| 0.07692308 | 0.01000000   | 0.08254786   | 0.07692308  |
| 0.07692308 | 0.11548330   | 0.14405441   | 0.07692308  |
| 0.07692308 | 0.01000000   | 0.06341905   | 0.07692308  |
| 0.07692308 | 0.01000000   | 0.04317307   | 0.07692308  |
| 0.07692308 | 0.22883768   | 0.01000000   | 0.07692308  |
| 0.07692308 | 0.01000000   | 0.02523850   | 0.07692308  |
| 0.07692308 | 0.01286458   | 0.03559292   | 0.07692308  |
| 0.07692308 | 0.01000000   | 0.02176189   | 0.07692308  |
|            | 0.07692308 | 0.07692308         0.25000000           0.07692308         0.07410844           0.07692308         0.25000000           0.07692308         0.25000000           0.07692308         0.11950274           0.07692308         0.01000000 <t< td=""><td>0.07692308         0.25000000         0.14308506           0.07692308         0.07410844         0.12171386           0.07692308         0.01000000         0.10814246           0.07692308         0.25000000         0.17528510           0.07692308         0.01000000         0.08366472           0.07692308         0.01000000         0.06448803           0.07692308         0.01000000         0.04335089           0.07692308         0.01000000         0.02613829           0.07692308         0.01000000         0.02613829           0.07692308         0.01000000         0.02613829           0.07692308         0.01000000         0.02386022           0.07692308         0.01000000         0.02386022           0.07692308         0.01000000         0.02386022           0.07692308         0.01000000         0.14305862           0.07692308         0.07451818         0.12140644           0.07692308         0.01000000         0.1897413           0.07692308         0.01000000         0.18305284           0.07692308         0.01000000         0.06390042           0.07692308         0.01000000         0.06390042           0.07692308         0.01000000         0.02567065&lt;</td></t<> | 0.07692308         0.25000000         0.14308506           0.07692308         0.07410844         0.12171386           0.07692308         0.01000000         0.10814246           0.07692308         0.25000000         0.17528510           0.07692308         0.01000000         0.08366472           0.07692308         0.01000000         0.06448803           0.07692308         0.01000000         0.04335089           0.07692308         0.01000000         0.02613829           0.07692308         0.01000000         0.02613829           0.07692308         0.01000000         0.02613829           0.07692308         0.01000000         0.02386022           0.07692308         0.01000000         0.02386022           0.07692308         0.01000000         0.02386022           0.07692308         0.01000000         0.14305862           0.07692308         0.07451818         0.12140644           0.07692308         0.01000000         0.1897413           0.07692308         0.01000000         0.18305284           0.07692308         0.01000000         0.06390042           0.07692308         0.01000000         0.06390042           0.07692308         0.01000000         0.02567065< |

| MSCI_USA                         | 0.07692308 | 0.01000000 | 0.02293324 | 0.07692308 |
|----------------------------------|------------|------------|------------|------------|
| Asia_dollar_Idx                  | 0.07692308 | 0.25000000 | 0.14578081 | 0.07692308 |
| $Bbg\_EUCorpCred\_Unhedged\_USD$ | 0.07692308 | 0.06337902 | 0.12004182 | 0.07692308 |
| $Bbg\_EuroBonds\_UnhedgedEUR$    | 0.07692308 | 0.01000000 | 0.10797622 | 0.07692308 |
| $Bbg\_GlBonds\_HedgedUSD$        | 0.07692308 | 0.25000000 | 0.17743117 | 0.07692308 |
| $Bbg\_GlCorpCred\_Hedged\_USD$   | 0.07692308 | 0.01000000 | 0.08172058 | 0.07692308 |
| $Bbg\_USBonds\_UnhedgedUSD$      | 0.07692308 | 0.11746228 | 0.14533145 | 0.07692308 |
| $Bbg\_USCorpCred\_Unhedged\_USD$ | 0.07692308 | 0.01000000 | 0.06279507 | 0.07692308 |
| $Commod\_Idx$                    | 0.07692308 | 0.01000000 | 0.04261185 | 0.07692308 |
| Dollar_Idx                       | 0.07692308 | 0.23562991 | 0.01000000 | 0.07692308 |
| MSCI_ACWI                        | 0.07692308 | 0.01000000 | 0.02536117 | 0.07692308 |
| MSCI_Jap                         | 0.07692308 | 0.01352879 | 0.03604160 | 0.07692308 |
| MSCI_RE                          | 0.07692308 | 0.01000000 | 0.02172785 | 0.07692308 |
| MSCI_USA                         | 0.07692308 | 0.01000000 | 0.02318040 | 0.07692308 |
| Asia_dollar_Idx                  | 0.07692308 | 0.25000000 | 0.14741844 | 0.07692308 |
| $Bbg\_EUCorpCred\_Unhedged\_USD$ | 0.07692308 | 0.05650453 | 0.11958193 | 0.07692308 |
| $Bbg\_EuroBonds\_UnhedgedEUR$    | 0.07692308 | 0.01000000 | 0.10784067 | 0.07692308 |
| $Bbg\_GlBonds\_HedgedUSD$        | 0.07692308 | 0.25000000 | 0.17787354 | 0.07692308 |
| $Bbg\_GlCorpCred\_Hedged\_USD$   | 0.07692308 | 0.01000000 | 0.08125752 | 0.07692308 |
| $Bbg\_USBonds\_UnhedgedUSD$      | 0.07692308 | 0.11905404 | 0.14596058 | 0.07692308 |
| $Bbg\_USCorpCred\_Unhedged\_USD$ | 0.07692308 | 0.01000000 | 0.06242530 | 0.07692308 |
| Commod_Idx                       | 0.07692308 | 0.01000000 | 0.04231556 | 0.07692308 |
| Dollar_Idx                       | 0.07692308 | 0.24030888 | 0.01000000 | 0.07692308 |
| MSCI_ACWI                        | 0.07692308 | 0.01000000 | 0.02502479 | 0.07692308 |
| MSCI_Jap                         | 0.07692308 | 0.01413254 | 0.03595138 | 0.07692308 |
| MSCI_RE                          | 0.07692308 | 0.01000000 | 0.02151920 | 0.07692308 |
| MSCI_USA                         | 0.07692308 | 0.01000000 | 0.02283108 | 0.07692308 |
| Asia_dollar_Idx                  | 0.07692308 | 0.25000000 | 0.15350012 | 0.07692308 |
| $Bbg\_EUCorpCred\_Unhedged\_USD$ | 0.07692308 | 0.05330029 | 0.11821963 | 0.07692308 |
| $Bbg\_EuroBonds\_UnhedgedEUR$    | 0.07692308 | 0.01000000 | 0.10686086 | 0.07692308 |
| $Bbg\_GlBonds\_HedgedUSD$        | 0.07692308 | 0.25000000 | 0.17753000 | 0.07692308 |
| $Bbg\_GlCorpCred\_Hedged\_USD$   | 0.07692308 | 0.01000000 | 0.08009634 | 0.07692308 |
| $Bbg\_USBonds\_UnhedgedUSD$      | 0.07692308 | 0.11897331 | 0.14554595 | 0.07692308 |
| $Bbg\_USCorpCred\_Unhedged\_USD$ | 0.07692308 | 0.01000000 | 0.06150359 | 0.07692308 |
| Commod_Idx                       | 0.07692308 | 0.01000000 | 0.04272619 | 0.07692308 |
| Dollar_Idx                       | 0.07692308 | 0.24356990 | 0.01000000 | 0.07692308 |
| MSCI_ACWI                        | 0.07692308 | 0.01000000 | 0.02464456 | 0.07692308 |
| MSCI_Jap                         | 0.07692308 | 0.01415650 | 0.03581395 | 0.07692308 |
| MSCI_RE                          | 0.07692308 | 0.01000000 | 0.02116703 | 0.07692308 |
|                                  |            |            |            |            |