Applied Principal Component Analysis with Python in Excel

Description: Principal Component Analysis (PCA) is a well-established statistical technique with many applications in investment analysis, risk management and portfolio construction. Previously not part of the built-in functionality of Microsoft Excel, Python in Excel makes PCA applications available to a wide audience while retaining the convenience and advantages of Excel. This course illustrates PCA applications with example calculations while still providing participants a thorough introduction to its mathematical foundations, which is necessary to understand its limitations in everyday use.

Target Audience: junior up to experienced investment professionals, risk managers, investment analysts, quantitative analysts, portfolio managers, IT professionals.

Materials: Participants will receive the slides presented, spreadsheets containing example calculations, important papers in PDF format.

Course Delivery: This course will be delivered online (MS Teams) in one afternoon (5h with 0.5h break). The minimum number of participants is 4.

Price: 250 CHF per participant. If more than one member of the same company participates, a discount of 10% is given on the total course fee.

The content of this program can be combined with content from other programs for customized **inhouse training** purposes. Please contact email@andreassteiner.net for details. **More information** available on www.andreassteiner.net/consulting

Course Content:

Welcome

Introduction to Python In Excel

- Python
- Microsoft Excel
- Python in Excel

Principal Component Analysis (PCA)

- Statistical interpretation of PCA: Link to Regression Analysis
- Mathematical interpretation and derivation
- Numerical Calculation of Eigenvalues and Eigenvectors: Example Calculations & Implications for Applied PCA Analysis
- Calculating and Interpreting Eigenvalues and Eigenvectors Using Python in Excel

Applications of PCA in Investment Analysis

- Portfolio Construction: Dimensionality Reduction and Equal PCA-Factor Investing
- Yield Curve Analysis
- Factor Analysis
    - Identifying equity factors
    - Interpreting factors
    - Limitation of PCA-based factor research: risk factors versus investment factors
- Concentration Risk in Ex Post Portfolio Analysis
- Market Turbulences: Using PCA to Measure Stress in Financial Markets

Summary & Outlook