

Quant/Risk Presentation

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Agenda

- Overview of Our Risk Analysis Process
- How We Estimate Beta and Alpha Using CAPM in Excel
- How to Calculate Sharpe Ratio Using Excel
- Python Demo



How We Estimate Beta and Alpha Using CAPM in Excel

1. Go to Wharton Research Data Services → CRSP
2. Click Stock/Security Files → Choose either Monthly or Daily Stock File
3. Choose Data Variable → Search Name or Type Ticker
4. Choose Query Variables: Click on “Returns” and “Return on S&P Composite Index”
5. Choose Query Output → Submit Form → Download Query Output (.xlsx) and open it
6. Go back to the Home Page → Fama-French Portfolios & Factors
7. Repeat Step 3
8. Select “(rf) Risk-Free Return Rate (One Month Treasury Bill Rate)”
9. Repeat Step 5
10. Copy and Paste Risk-Free Return Rates to the first Excel File
11. Compute Stock/Portfolio Excess Return
12. Compute S&P 500 Excess Return
13. File → Options → Add-ins → Select Analysis ToolPak → Go → Ok
14. In Excel → Data → Data Analysis → Regression
15. For Y input: Select Stock/Portfolio Excess Returns
16. For X input: Select S&P 500 Returns then click Ok to run Regression
17. Intercept is your Alpha and X variable is your beta



How to Calculate Sharpe Ratio in Excel

1. Click a cell → =STDEV.S(

1. Enter Range (Stock/Portfolio Returns) → Click Enter

1. Average Stock/Portfolio Returns

1. Divide Average Stock/Portfolio Returns by Standard Deviation to get Sharpe Ratio



Python Demo

1. Clean & Normalize Holdings

- Import positions, remove cash/non-investable rows, parse weights from % or market value, and renormalize to 100%.

2. Pull 10 Years of Price Data

- Download daily adjusted prices for all tickers + SPY using yfinance; drop missing tickers and realign weights.

3. Build Portfolio Return Series

- Convert prices to daily returns and compute weighted daily portfolio returns aligned with SPY.

4. Compute Risk Metrics

- Historical & Parametric VaR (95/99%, 1-day & 1-week).
- Beta, Alpha, and R² vs SPY.
- Concentration via HHI and Top Exposures.

5. Run SPY-Only “Shadow Portfolio”

- Apply the same VaR engine to SPY alone (beta=1, alpha=0, R²=1, HHI=1).

6. Final Output Table

- Side-by-side comparison: Portfolio vs SPY risk, factor exposures, and concentration.

Using portfolio value: \$757,229.00

=== CORE RISK SUMMARY (through 2025-11-03) ===

	Metric	Value
Obs (days)	358.000000	
VaR 95% Hist (1d, \$)	-8,843.992612	
VaR 99% Hist (1d, \$)	-17,827.677988	
VaR 95% Param (1d, \$)	-11,237.069168	
VaR 99% Param (1d, \$)	-16,131.922942	
VaR 95% Hist (1w, \$)	-19,775.768673	
VaR 99% Hist (1w, \$)	-39,863.899862	
VaR 95% Param (1w, \$)	-25,126.850528	
VaR 99% Param (1w, \$)	-36,072.076306	
Beta vs SPY	0.777434	
Alpha (daily est.)	0.000289	
R^2 (market explain)	0.862385	
HHI (position-level)	0.078033	
Equity-only Beta vs SPY	0.777434	
Equity-only R^2	0.862385	

Top Exposures (after exclusions & alignment):

Symbol	Weight (%)
VEA	16.830000
VOO	11.220000
META	9.480000
WMT	7.420000
AAPL	7.180000
V	6.420000
T	4.620000
QCOM	4.390000
MMM	3.950000
LNG	3.710000

Sanity checks:

Weights sum (after alignment): 1.000000

Tickers downloaded: 27 (missing: [])

Benchmark used: SPY

=== PORTFOLIO vs SPY COMPARISON ===

	Metric	Portfolio	SPY	Difference
Obs (days)	358.000000	358.000000	358.000000	0.000000
VaR 95% Hist (1d, \$)	-8,843.992612	-12,461.241367	3,617.248755	
VaR 99% Hist (1d, \$)	-17,827.677988	-22,274.580933	4,446.902946	
VaR 95% Param (1d, \$)	-11,237.069168	-13,645.284919	2,408.215751	
VaR 99% Param (1d, \$)	-16,131.922942	-19,492.198596	3,360.275654	
VaR 95% Hist (1w, \$)	-19,775.768673	-27,864.182782	8,088.414109	
VaR 99% Hist (1w, \$)	-39,863.899862	-49,807.477137	9,943.577276	
VaR 95% Param (1w, \$)	-25,126.850528	-30,511.784651	5,384.934123	
VaR 99% Param (1w, \$)	-36,072.076306	-43,585.881092	7,513.804785	
Beta vs SPY	0.777434	1.000000	-0.222566	
Alpha (daily est.)	0.000289	0.000000	0.000289	
R^2 (market explain)	0.862385	1.000000	-0.137615	
HHI (position-level)	0.078033	1.000000	-0.921967	
Equity-only Beta vs SPY	0.777434	NaN	NaN	
Equity-only R^2	0.862385	NaN	NaN	



QUESTIONS?

