

Portfolio Analytics — PA2.py Command Reference

Purpose

Evaluate portfolio expected returns, volatility, and efficient frontiers under multiple 5-Year Macro Scenarios. Outputs include scenario-specific frontiers, allocations, sleeve stats, and optional target-volatility and overlay charts.

Command-Line Options

Flag	Type	Description	Example
--scenario	string	Macro regime to use. Choices: Base, Disinflation, Reflation, HardLanding, Stagflation, Geopolitical.	--scenario Base
--returns_basis	string	Return basis: nominal (default) or real (inflation-adjusted).	--returns_basis real
--inflation	float	Override annual CPI (e.g., 0.025). Used only if --returns_basis real.	--inflation 0.025
--target_vol	float	Target annualized volatility constraint (decimal). Example: 0.08 = 8%.	--target_vol 0.08
--overlay_all	flag	Plot all scenario frontiers on one figure.	--overlay_all

Examples — Single Scenario (Nominal)

```
/usr/local/bin/python3 PA2.py --scenario Base
/usr/local/bin/python3 PA2.py --scenario Disinflation
/usr/local/bin/python3 PA2.py --scenario Reflation
/usr/local/bin/python3 PA2.py --scenario HardLanding
/usr/local/bin/python3 PA2.py --scenario Stagflation
/usr/local/bin/python3 PA2.py --scenario Geopolitical
```

Examples — Single Scenario (Real, scenario CPI)

```
/usr/local/bin/python3 PA2.py --scenario Base --returns_basis real
/usr/local/bin/python3 PA2.py --scenario Disinflation --returns_basis real
/usr/local/bin/python3 PA2.py --scenario Reflation --returns_basis real
/usr/local/bin/python3 PA2.py --scenario HardLanding --returns_basis real
/usr/local/bin/python3 PA2.py --scenario Stagflation --returns_basis real
/usr/local/bin/python3 PA2.py --scenario Geopolitical --returns_basis real
```

Examples — Single Scenario (Real, explicit CPI override)

```
/usr/local/bin/python3 PA2.py --scenario Base --returns_basis real --inflation 0.025
/usr/local/bin/python3 PA2.py --scenario Reflation --returns_basis real --inflation 0.035
```

Examples — Target Volatility

```
/usr/local/bin/python3 PA2.py --scenario Reflation --target_vol 0.08
/usr/local/bin/python3 PA2.py --scenario HardLanding --target_vol 0.07
```

Examples — Aggregate Overlay

```
# All scenarios on one figure (Nominal)
/usr/local/bin/python3 PA2.py --overlay_all

# All scenarios on one figure (Real)
/usr/local/bin/python3 PA2.py --overlay_all --returns_basis real

# Produce both: chosen single scenario + overlay
/usr/local/bin/python3 PA2.py --scenario Reflation --target_vol 0.08 --overlay_all
```

Outputs Produced

File	Description
frontier_cvxpy_constrained_<Scenario>_<Nominal Real>.png	Efficient frontier for the selected scenario.
allocations_frontier_<Scenario>_<Nominal Real>.csv	Weights for Current, MaxSharpe, and MinVol portfolios.
sleeve_ERVol_<Scenario>_<Nominal Real>.csv	Per-sleeve expected return and volatility (annualized).
frontier_targetVol<NN>_<Scenario>_<Nominal Real>.png	Frontier with target-volatility portfolio highlighted (if used).
allocation_targetVol_<NN>_<Scenario>_<Nominal Real>.csv	Weights for target-volatility portfolio (if used).
frontier_overlay_all_scenarios_<Nominal Real>.png	All-scenario efficient frontiers (if --overlay_all given).

Key Definitions

Expected Return (%): Annualized arithmetic mean of monthly sleeve returns, adjusted per selected macro scenario and basis (Nominal/Real).

Volatility (%): Annualized standard deviation of monthly portfolio returns. Computed as $\sqrt{w' \Sigma w}$, where Σ is the annualized covariance matrix (monthly covariance $\times 12$).

Sharpe Ratio: (Expected Return – Risk-Free) / Volatility, with risk-free set in the script ($r_f = 3.5\%$).

Execution Path (your system)

```
cd /Users/tkeller/PycharmProjects/PortfolioAnalytics
/usr/local/bin/python3 PA2.py --scenario Reflation
```