Equity volatility targeting

George Dharma

A five-percentage-point trading band almost halves turnover while preserving most of the loss control of a daily volatility target. Across 5,031 US trading sessions, the band reduced annual turnover from 196% to 108%. Its largest drawdown was 21.5%, close to the daily rule's 21.4%.

Both rules aim for 10% annual volatility and hold uninvested cash in Treasury bills. The daily rule adjusts its equity weight every session. The band waits until the desired equity weight differs from the portfolio's existing weight by at least five percentage points. A move from 61% equity to a 65% target would trigger no trade.[1]

Trading frequency and the outcome for an investor

Policy	Net annual growth	Annual volatility	Worst drawdown	Turnover / year
Daily target	7.58%	10.59%	-21.4%	196%
Weekly target	7.55%	10.75%	-21.9%	130%
Five-point band	**7.68%**	**10.67%**	**-21.5%**	**108%**
60% equity / 40% cash	7.74%	11.84%	-35.6%	52%
Full equity	11.14%	19.74%	-54.6%	5%

The band grew at 7.68% a year after costs. The fixed 60% equity portfolio grew at 7.74% and lost 35.6% at its deepest drawdown. The case for volatility targeting here rests on how much loss an investor could endure along the way.[2]

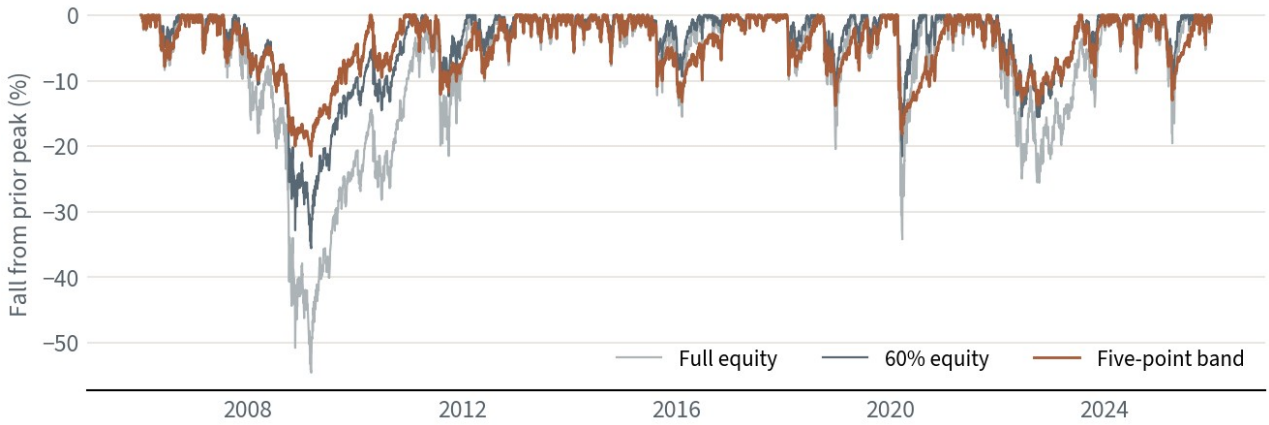
1 Kenneth R. French, US daily factors and Treasury-bill returns

2 George Dharma, Equity volatility targeting, Excel workbook, Policy study.

What the trading band changes

All three targeting rules use exactly the same market signal. They differ only in when they trade. Costs therefore fall when a rule avoids small adjustments that would produce little change in portfolio risk.

For each session I estimate volatility from 63 daily equity returns ending two sessions earlier. I divide the 10% annual target by that estimate and cap equity exposure at 100%. The rule then either trades or retains its drifted weight. A 5 bp cost applies to the equity actually bought or sold. Each trade is paid out of the portfolio.[3]



Drawdowns are measured from the highest earlier portfolio value. The series includes the initial capital and daily trading fees.[4]

At the specified trading cost the daily rule spends 9.81 basis points a year, the weekly rule 6.51 and the band 5.40. The 4.41 bp fee reduction accounts for part of the growth difference. The rest comes from holding different positions while prices move.

3 Kenneth R. French, US daily factors and Treasury-bill returns · Alan Moreira and Tyler Muir, Volatility-Managed Portfolios

4 George Dharma, Equity volatility targeting, Excel workbook, Active daily and Policy study.

Where the result holds up

The turnover reduction appears in both decades. The band traded about 108% of portfolio value a year in each half of the sample. Whether it also improved investment performance depended on the period.

Scored period	Policy	Net growth	Worst drawdown	Sharpe ratio
2006–2015	Daily target	6.03%	-21.4%	0.50
2006–2015	Five-point band	6.02%	-21.5%	0.50
2006–2015	60% equity	5.47%	-35.6%	0.40
2016–2025	Daily target	9.16%	-17.9%	0.67
2016–2025	Five-point band	9.37%	-18.2%	0.69
2016–2025	60% equity	10.05%	-21.6%	0.72

Maximum drawdown by risk target and lookback

Annual target	42 sessions	63 sessions	126 sessions
8%	17.3%	17.7%	18.1%
10%	22.8%	**21.5%**	22.9%
12%	28.2%	25.8%	26.6%

The grid shows peak-to-trough losses for the five-point band, with a 5 bp trading cost and a two-session signal lag. The outlined cell is the 10% target and 63-session case.

The standard deviation of daily returns annualised to 10.67% for the band, slightly above its 10% target. A sudden change in volatility can affect the portfolio before the lagged signal and trading threshold respond. The band is an implementation choice for an investor willing to accept that delay.

I would use the five-point band for this allocation if trading volume and drawdown control are the priorities. The evidence for higher growth is weaker. The workbook makes it possible to change trading costs, the risk target, the lookback or the band and follow every resulting trade.[5]

5 George Dharma, Equity volatility targeting, Excel workbook, Controls, Active daily and Sensitivity.