<https://www.alumneye.fr/5-questions-a-thibaut-ducheix-equity-derivatives-trader/>

<https://quantnet.com/threads/a-day-in-the-life-of-an-exotic-derivatives-trader.10057/?utm_source=chatgpt.com>

<https://www.ft.com/content/5f80017c-680c-4c91-ad91-176b0575a2e0?utm_source=chatgpt.com>

Thank you for clarifying your requirements:

1. **No Lookahead Bias:**

* All signals and backtests must be strictly walk-forward, using only information available up to each point in time.
* No future data should be used in any signal or trade decision.

1. **Backtrader as Trading Engine (if possible):**

* You prefer to use Backtrader for the actual backtest execution, but you understand that for simple signal-based strategies, a DataFrame-based approach may be more practical.
* If Backtrader can be used without introducing lookahead bias and without excessive complexity, it should be used.

**Plan**

* **Refactor the backtest logic** so that:
* All signals are calculated using only past and current data (no future leakage).
* The backtest loop (trade simulation) is strictly walk-forward.
* If possible, use Backtrader for both technical and momentum strategies. If not, use a robust DataFrame-based walk-forward simulation.
* **Expose all results as functions** that return DataFrames for direct use in the Streamlit app.

**Next Steps:**

1. Refactor the technical and momentum backtest functions to ensure strict walk-forward logic and no lookahead bias.
2. Use Backtrader for the trade simulation if feasible, otherwise use a safe DataFrame approach.
3. Expose a function (e.g., run\_all\_backtests()) that returns all summary and equity curve DataFrames.
4. Update the Streamlit app to use these functions directly.

**Defense stocks derivatives project**

This project models the construction, pricing, and dynamic hedging of equity derivatives portfolios centered on European defense stocks. The selected underlyings include Dassault Aviation (AM.DSF), Rheinmetall AG (ETR:RHM), BAE Systems (LSE:BA.), and Thales Group (EPA:HO) — all highly sensitive to macroeconomic policy shifts, geopolitical developments, and cyclical defense expenditure patterns.

The framework is developed in Python and replicates a professional equity derivatives desk’s workflow, covering the full cycle of:

* Option pricing and Greeks estimation
* Strategy structuring and execution
* Daily risk management through delta/gamma hedging
* Performance diagnostics under real-world event volatility

At the core of the system is a modular options engine built on the Black–Scholes model, extended with volatility surface inputs and skew dynamics. The platform computes and tracks full Greek exposures — delta, gamma, vega, theta — for each position, as well as aggregated book-level sensitivities.

A dynamic hedging routine rebalances delta and gamma exposure on a daily basis, using underlying equity positions or, when necessary, sector-index proxies and futures (e.g., Euro STOXX Defense components or sector ETFs). Hedging decisions are optimized around market liquidity, spread sensitivity, and transaction costs.

The model features a dedicated event-analysis layer, focusing on predefined catalysts such as earnings reports, government spending announcements, and NATO or EU policy summits. For each event window, the system:

* Estimates the implied move from IV levels
* Simulates structured strategies (e.g., ATM straddles, directional spreads)
* Compares realized price impact to market expectation
* Evaluates strategy effectiveness and hedge precision

To assess the portfolio’s risk-adjusted performance, the model tracks:

* Rolling PnL and mark-to-market returns
* Hedging error and net Greek deviation
* Slippage, cost of carry, and implied volatility decay (IV crush)
* Sharpe ratio and maximum drawdown across rebalancing cycles

The system is designed to emulate the analytical discipline and risk sensitivity required on institutional equity derivatives desks. Emphasis is placed on timing asymmetry, volatility mispricing, and event-linked convexity management, all grounded in sector-specific equity flow.

This framework provides a realistic environment for stress-testing volatility-based strategies and simulating the operational demands of maintaining a delta/gamma-neutral options book in high-beta, low-liquidity European names.

Stock Universe Selection – European Defense Sector

The underlying assets selected for this project are listed European defense companies that combine:

* Sufficient options market activity (where available)
* Exposure to geopolitical and macro-sensitive volatility
* A mix of liquidity profiles and regional diversification

This creates a portfolio of structurally different equities that respond to asymmetric risks — ideal for testing derivatives strategies under real market stress and opportunity.

**1. Dassault Aviation (AM.DSF – Euronext Paris)**

* A key player in European military aircraft (e.g., Rafale), with contracts tied to France’s defense budget and foreign government orders.
* Prone to large price swings around geopolitical developments (e.g., sales to India, UAE) and long-cycle procurement news.
* Options liquidity is limited but sufficient for simulation. Ideal for modeling event-driven directional trades.

**2. Rheinmetall AG (ETR:RHM – Xetra)**

* Germany’s largest defense contractor, with rising exposure due to the €100bn defense modernization plan.
* Highly reactive to news flow around NATO contributions, tank deliveries to Ukraine, and EU military coordination.
* High realized and implied volatility, making it an excellent candidate for volatility and IV crush strategies.

**3. BAE Systems (LSE:BA. – London Stock Exchange)**

* One of the most liquid and institutionally held defense equities in Europe.
* Broad global footprint across aerospace, naval, and cyberdefense.
* Strong dividend and stable options chain — valuable for building hedging structures and vertical spreads.

**4. Thales Group (EPA:HO – Euronext Paris)**

* Dual exposure to civil and military systems (radar, avionics, space, cybersecurity).
* Often used in pairs with Dassault to assess sector dispersion around policy announcements.
* Options show moderate liquidity, good for constructing neutral gamma strategies.

Summary of Selection Rationale

| Ticker | Country | Role in Portfolio | Why Selected |
| --- | --- | --- | --- |
| AM.DSF | France | Directional / Geopolitical convexity | Long-cycle contracts, large defense orders |
| RHM.DE | Germany | High-vol macro responder | NATO exposure, political sensitivity |
| BA.L | UK | Liquidity anchor / spread builder | Liquid options, broad industrial defense exposure |
| HO.PA | France | Dispersion hedge / mixed sensitivity | Civil/military blend, event-pairing potential |

These names offer a representative cross-section of European defense risk, balancing:

* Macro-event sensitivity
* Diverse liquidity conditions
* Options pricing structure
* And realistic hedging dynamics

This makes them ideal for building and stress-testing derivatives strategies across real institutional scenarios.