From SPX option prices to structured-product insight.

An S&P 500-linked product can look simple on a term sheet and behave very differently as markets move. A coupon may depend on an index observation; missed coupons may be carried forward; a recovery may trigger early repayment. At maturity, a weak market may expose the investor's principal to losses.

Our research connects a clear description of these contractual promises with a mathematical account of how the market can evolve. SPX options and memory-coupon autocalls provide a practical application.

Two questions, one coherent valuation

What does the contract promise? SHTAR is a financial product definition language. It describes the observations, conditions and payments that govern a product throughout its life. The rules belong to the contract and remain explicit when the market model changes.

How can the market evolve? The pricing engine supplies possible market paths, informed by observed option prices and research into volatility dynamics. Applying the contract's rules along those paths connects market uncertainty to future cashflows and their present value.

Why the journey matters

An autocall can repay early when its contractual conditions are met. A memory-coupon feature can release previously missed coupons after a recovery. The timing and sequence of observations therefore matter: **the same final index level need not produce the same payments**.

For example, an early recovery may release coupon memory and redeem a note. A later recovery may leave that note outstanding for longer, with different payment dates and continuing downside exposure. The actual outcome follows the particular term sheet.

From market evidence to a reusable application

1. **Define the product.** Make its promises, observation dates and remaining obligations clear.
2. **Connect it to the market.** Use observed options to inform the model of future index behaviour.
3. **Evaluate the consequences.** Value the resulting cashflows and examine how the product responds to changes in market conditions.

This separation makes the application reusable: different products can share the market model, and different models can be examined against the same contractual definition. It is a foundation for more consistent pricing and risk analysis across bespoke products.

A working research application

The prototype brings together market-calibrated dynamics, European option pricing and memory-coupon autocall examples. Its purpose is to demonstrate the connection between contract definition and valuation. The broader integrated workflow for valuation and hedge construction remains in development.

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