Hedging and Risk Management

Currencies, commodities and interest rates: tools, costs and limits

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A hedge reduces a specific risk; it does not eliminate losses. Vigo's hedging programs focus on the currency, commodity and interest-rate exposures that businesses and investors carry through their revenues, costs, debts and holdings. Each hedge is sized to the exposure, not to a market view.

Start with the exposure

1. **Name the risk:** what could go wrong, in which currency, commodity or rate, and over what period.
2. **Set the tolerance:** how large a loss, or how much higher a cost, the business or portfolio can absorb before it matters.
3. **Choose the tool:** match the instrument to the exposure, the horizon and the budget.
4. **Plan the review:** hedges expire, roll and drift, so each one has review dates and exit rules.

Currencies

Who carries the risk: a business that pays suppliers or earns revenue in another currency, an investor holding assets abroad, or a borrower with debt in a foreign currency.

- **Forwards and futures** fix an exchange rate for a future date. The rate builds in the interest-rate difference between the two currencies, which can add to or reduce the cost.
- **Call options** cap the cost of a currency you must buy, for a premium paid up front; call spreads cost less but cover a rise only up to the higher strike.
- **Put options** set a floor under the value of a currency you will receive; put spreads cost less but protect only down to the lower strike.
- **Collars** buy one option and pay for it by selling another, giving up favorable moves beyond a set level.

Watch for: cash flows that change in size or timing, which can leave a hedge larger or smaller than the exposure, and counterparty risk on forwards.

Commodities

Who carries the risk: a buyer of fuel, metals or agricultural inputs, a producer whose revenue depends on a commodity price, or a holder of inventory.

- **Futures** lock in a price for a future month.
- **Call options** cap the cost of an input while keeping the benefit of lower prices; call spreads cost less but cover a rise only up to the higher strike.

- **Put options** set a floor under the price a producer receives; put spreads cost less but protect only down to the lower strike.
- **Butterflies and broken-wing butterflies** are lower-cost structures that pay most if the price ends within a target range. A broken wing shifts the cost and the risk toward one side.

Watch for: basis risk when the exposure is priced differently from the benchmark contract, roll costs as positions move from one contract month to the next, and delivery terms.

Interest rates

Who carries the risk: a borrower with floating-rate debt (rising rates), an investor or treasury with cash to reinvest (falling rates), or a bond portfolio whose value moves with rates.

- **Interest-rate futures,** such as SOFR and Treasury futures, lock in or offset a level of rates.
- **Options on rate futures,** such as calls and puts, cap or floor the rate for a premium, keeping the benefit if rates move the other way; spreads cost less but cover only part of the move.
- **Combinations** such as collars and butterflies lower the premium by giving up part of the cover, or by limiting it to a range.

Watch for: differences between the benchmark and the rate actually paid, mismatched dates, and margin calls.

The hedge ratio

A perfect hedge, one that offsets every move in the exposure, is rare in commodities. The fuel, metal or crop a business buys or sells usually differs from the exchange contract in grade, location or timing, so the two prices don't move exactly together. The hedge ratio, or hedging coefficient, sets how much futures exposure to hold for each unit of exposure hedged, and for commodities it is often below 1.

The ratio that minimizes risk equals the correlation between price changes in the exposure and in the futures contract, multiplied by the exposure's volatility divided by the futures' volatility. Ederington (1979) showed it can be estimated by regressing price changes in the exposure on those in the futures. With a correlation of 0.9 and equal volatilities, the ratio is 0.9, or about 90 cents of futures per dollar of exposure. That hedge removes about 81% of the variance (0.9 squared). The rest is basis risk, and contracts beyond 0.9 would add risk rather than remove it.

What the research shows:

- **Published estimates:** a review of 1,699 published commodity hedge ratios found raw averages of about 0.6 in studies based on price changes or returns, lower for energy; after correcting for publication bias, the authors put typical ratios at roughly 0.6 to 1.2 (Białkowski, Bohl and Perera, 2023).
- **Uncertain quantities:** a producer doesn't know its output in advance, and prices often rise when output falls. McKinnon (1967) and, for cocoa producers, Rolfo (1980) showed that the best hedge can be well below expected output.
- **Funding:** Metallgesellschaft hedged long-term supply contracts one for one with short-dated futures and swaps, and faced large margin calls in 1993, long before the hedged sales arrived. Edwards and Canter (1995) concluded that a variance-minimizing hedge would have been smaller, though the strategy's merits are still debated.

- **Cost:** when many producers hedge and speculators have less capital, futures prices move against hedgers and hedging costs more (Acharya, Lochstoer and Ramadorai, 2013).

Correlations and volatilities change, so the ratio is reviewed regularly and hedges rebalanced; time-varying correlation models such as Engle's (2002) are widely used for this. The ratio can exceed 1 when the exposure is more volatile than the contract, so it is estimated rather than assumed. For an equity portfolio hedged with index futures, the ratio rests on the portfolio's beta to the index.

Options for exposure

Separately from hedging, calls and call spreads on currencies, commodities or rates can add exposure with less capital than buying the asset outright. That is a market view rather than a hedge: it adds leverage, the whole premium can be lost, and it stays within the limits of the client's mandate.

Liquidity management

Hedges need cash for option premiums, futures margin and settling forwards. A short-duration reserve in cash and government securities helps meet margin calls, reduces the risk of forced selling and keeps capital available for rebalancing.

What hedging costs

- Option premiums, which lose value as expiry approaches.
- Forward points and roll costs, which reflect interest-rate differences and the shape of futures curves.
- Trading spreads and commissions.
- Margin: cash tied up, and calls that can arrive at the worst moment.
- Opportunity cost: futures, forwards and collars give up favorable moves.
- Basis risk: the hedge may move differently from the exposure.
- Taxes and accounting, which can treat the hedge and the hedged item differently.

A useful test is to compare a hedge's expected cost over a year with the loss it would limit in the scenario that matters most.

Governance

- Each program has a written mandate setting out the exposure, limits, instruments and review dates.
- In its hedging programs, Vigo mainly uses exchange-listed futures and options, and may use equity index options such as S&P 500 (SPX) and Nasdaq-100 (NDX) options. For commodities, currencies and rates, it may also use over-the-counter options and forwards, which are available only to eligible clients and depend on the counterparty. ETFs and options on ETFs are possible but unlikely.
- Hedges are reported with the rest of the portfolio, so hedge and exposure are seen together.
- For businesses, programs follow the company's treasury policy and approval process.

Risks

- Futures, options and other derivatives involve substantial risk of loss and are not suitable for all investors.
- A hedge can lose money and may not offset losses on the hedged exposure.

- Leverage and margin can magnify losses, and positions may have to be closed at a loss to meet margin calls.
- In stressed markets, liquidity can disappear, widening spreads or preventing exits.
- Forwards and other over-the-counter contracts depend on the counterparty performing.
- A hedge that expires or is rolled at the wrong moment can leave the exposure uncovered.
- Options bought for a hedge or for exposure can expire worthless, losing the whole premium.
- Multi-leg structures such as butterflies pay off only in narrow ranges and can be costly to unwind.

Hedging an equity portfolio

For investors who also want to limit equity risk, the same discipline applies.

- **Diversification comes first.** Equities are expected to earn a risk premium over cash over time. A hedge passes part of that risk to its seller, who is paid with part of the premium. A portfolio balanced across economic environments, the idea behind 60/40 and risk parity, reduces risk at little cost, so it is usually the first line of defense. Diversification has limits, though: assets can fall together, as in 2022, and a balanced portfolio can lag for years. Vigo's Resilient Beta framework (Guide 1) rests on the same idea.
- **If you want a floor, buy it on a schedule.** A passive program keeps protection in place and avoids decisions under pressure, though each roll costs what options cost at the time. One example is six-month index puts rolled each quarter, on fixed dates set alongside rebalancing and tax planning, whatever the market is doing.
- **Protection has a real cost.** Puts, like other volatility products, tend to lose money against cash over time, because the buyer pays someone else to carry the risk. Out-of-the-money puts usually cost more than equally distant calls (the skew), reflecting steady demand for protection. Andy Constan's analysis suggests that buying puts passively gives up a significant part of the equity risk premium.
- **Timing hedges takes a real edge.** Buying protection only when a fall is expected, and earning back its cost, requires skill in predicting prices, volatility or both. If the view is about price rather than volatility, reducing exposure with low-cost index futures is usually cheaper than buying options.
- **Don't buy protection in a panic.** In market stress, option prices and trading costs jump, as buyers compete with forced hedgers. If risk must come down then, selling or moving to cash is usually cheaper than buying puts. Better still is a portfolio that doesn't force you to hedge in a panic.

Apart from the Resilient Beta reference, this section draws on "Hedging 101" by Andy Constan of Damped Spring Advisors (@dampedspring). He is not affiliated with Vigo Capital and has not reviewed or endorsed this guide.

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