

CONTEXT

My friend recently presented this example in our groupchat, and it was such an unfamiliar perspective that I initially rejected it outright. (In fact, even he asked us “Am I missing something?”.) In the below, disregard basis risk (the risk that your hedging asset does not move 1-for-1 with your hedged asset) and assume that the financing rate is equal to the risk-free rate which is zero. In each scenario, we start out with \$1M of cash.

HEDGING THE PRESENT

This is how a hedge works:

- Today:
 - You buy a house for \$1M
 - You go short \$1M worth of Case-Shiller index futures (for free)
- In a year:
 - Case 1: The house falls -\$200k, to \$800k. Your futures position expires worth +\$200k, which you receive in cash. You own \$800k worth of house and \$200k worth of cash, and thus your terminal portfolio is worth \$1M, exactly the same as your initial portfolio.
 - Case 2: The house rises +\$200k, to \$1.2M. Your futures position expires worth -\$200k, which you receive in cash. You own \$1.2M worth of house and owe \$200k worth of cash, and thus your terminal portfolio is worth \$1M, exactly the same as your initial portfolio.

HEDGING THE FUTURE

Here is an equivalent but bizarre perspective on this. Compare strategy A above with an alternative strategy B of waiting a year then buying the house¹

- Case 1: The house falls -\$200k to \$800k.
 - Under strategy A: You end the year with one house and \$200k of cash (from the futures contract).
 - Under strategy B: You end the year with one house and \$200k of cash (leftover in your savings account).
- Case 2: The house rises +\$200k to \$1.2M.
 - Under strategy A: You end the year with one house and -\$200k of cash (payable to your counterparty from the futures contract).
 - Under strategy B: You end the year with one house and -\$200k of cash (owed to the bank in the form of a mortgage).

So, the two strategies are equivalent... We usually think of hedging as “protecting the value of your asset against moves up or down”, but have just shown that you can equivalently think of hedging as “allowing yourself to buy the asset in a year, but start enjoying its convenience yield immediately”!

The relevance of this is that my friend—who, let’s pretend for simplicity, is crashing at my place for free and may do so for the rest of the year if he wants—thinks that houses in the neighborhood he wants to move into, despite selling for \$1M today, will be selling for \$800k next year. So, he’d like to buy at next year’s price. However, he *would* like to move in and live in his own house even during the interim period. And nobody is offering him that deal. But, he can synthesize that deal using strategy A!

Alas, it is not a free lunch. If you deferred your house hunt for a year and just sat on your cash in the meantime, you might find that the house you’re eyeing has actually begun to sell for \$1.2M, at which price it’s not worthwhile to you, and therefore decide not to buy it after all. But in strategy A, you don’t have the option of not buying. So above I said strategy A is like “allowing yourself to buy the asset in a year, but start enjoying its convenience yield immediately”, but a more precise formulation would replace “allowing” with “committing”.

EDIT: THE PRINCIPLE STANDS, BUT THIS WAS A BAD EXAMPLE

The point of this was more of a “here’s a weird way of thinking about hedging” than a “here’s a recommended strategy for homebuyers”, but sadly it turns out that the reality is more extreme: This is *only* the former, and *not at all* the latter. (Cont’d...)

¹Strategy B is *not* a futures contract! Strategy B entails committing to buying the house in one year at the spot price P_1 observed at that time. A futures contract would entail committing to buying the house in one year at some fixed strike price K prearranged and agreed-upon *today*. (In particular, K must be the futures price F_0^1 which must in a zero-rate environment be equal to today’s spot price P_0 .) If you didn’t understand this that’s fine, this footnote is more intended to set straight non-finance people who haven’t learned enough finance to understand this either, but *have* learned enough to get themselves in trouble.

To wit: The underlying index here, the Case-Shiller index, is a "virtual index": It is just a calculation, and does not represent the spot price of a single security or basket of securities. (To "trade" the underlying, you'd have to somehow own a minuscule fraction of every house in the country, which isn't possible.) Therefore, the spot-futures no-arbitrage relationship does not hold.

Now consider the fact that, because every homeowner in America is "naturally long" the index, there is much more demand to go short these contracts than go long. So, the futures price is in practice much lower than the F_0^1 implied by P_0 . Suppose for simplicity that interest rates are zero, then usually, if the spot price at the end of the year P_1 was the same as the spot price today P_0 , no money would change hands. But for these contracts, you'd actually owe your counterparty money. So you'd better be very damn confident that the market is grossly overvaluing houses and there is a catalyst to make prices fall by the end of the year if you hope to make money off your short.

It's kind of like how most institutional investors are long SPX, so they buy SPX puts to protect themselves on the downside, and the demand imbalance causes option premia to be "unfairly" high relative to volatility. In case of a severe downturn the investors are indeed protected, but on average they will lose money.