Title: Back to the Basics: Extrinsic Value and Option Selling
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Theta comes from the decay of extrinsic value over time. But why do options have extrinsic value? How do we profit from it?

Futures don't have extrinsic value. *Ignoring interest rates, cost of carry, etc*, futures always trade at the exact same price as the underlying stocks because otherwise, traders would buy the cheap one and sell the expensive one as an arbitrage. Notice that the stock's direction and whatnot are not priced into futures because you can hedge with stock.

Now, how are options priced? Let's look at [Investopedia's example of a simple Binomial Model.](https://www.investopedia.com/articles/investing/021215/examples-understand-binomial-option-pricing-model.asp)

Let's say SPY is $100 right now. Tomorrow, it'll be either $110 or $90. There's a $100 SPY put option expiring tomorrow. How much is it worth? Well, we can first construct a "risk-free" portfolio that has a fixed PnL. What happens when we are short one put and short half a share of stock as a hedge?

1. If SPY is worth $90 tomorrow, your short put lost $10. Oops. However, you've shorted half a share of stock, which earns you $5. Your total loss is now only $5.
2. If SPY is worth $110 tomorrow, your short put doesn't lose any money. Luckily, your half share of short stock has decided to be helpful and lose money. You lose $5 in total.

We see that no matter what happens, we're guaranteed to lose $5. *(Even without the stock hedge, short options will be ITM some % of the time and therefore have a negative expected value.)*

This is why there's extrinsic value and theta. Sellers of options lose money, so ***the premium compensates them for those losses***. As an options seller knowing the "risk-free" portfolio loses $5, we'd want at least $5 in premium for the ATM put.

How do we make money then?

Well, it's obvious. Let's just get more money from options premium than we lose from being short options then.

First, we assume we don't know which way the stock's going. It's a coinflip whether the market goes up or down. We can make money by selling the $100 put (and hedging by shorting the stock) if the actual volatility of the stock is less than the market thought it would be.

What happens if you sold a hedged put for $5, but the stock only moves $2? After collecting the premium:

1. When the stock goes down by $2, your put loses $2, but you make $1 from the half share of stock.
2. When the stock goes up by $2, your put loses nothing, but your stock loses $1.

Either way, you pocket the $5 in premium and only lose $1 of it. You've made money "shorting volatility", and you get to keep a nice chunk of premium. And in reality, options are generally overpriced; options imply volatility greater than what actually happens, which intuitively makes sense - who would sell options expecting to break even?

[The 30-Day IV \(green\) for SPY is usually above the realized volatility \(blue\)](https://preview.redd.it/khzupqkassz71.png?width=2588&format;=png&auto;=webp&s;=5cf787ec1d7a3db591a7c94b874c0fcbd6796c2b)

This is known as the volatility risk premium. Option sellers are compensated for risks of being short options by being paid more than the option is actually worth.

But it's not a coinflip that the market goes up or down, is it?

We can make money by having delta exposure. *(Not the covid variant. That sucks.)*

We can make money selling puts and hedging by shorting shares, but ... what if we just didn't hedge?

If we sold puts that are priced fairly, we'd expect to break even since we lose $5 no matter which direction SPY goes. However, SPY tends to go up, so our hedge (we short half a share of SPY) tends to lose money. If we don't hedge, we lose the full $10 when SPY falls $10, but we don't lose money when SPY goes up. And since we know that SPY tends to go up more than it goes down, the put will lose less than $5 on average, but we'll still keep the full $5 in premium.

"Archegos, did you really make me read 650 words telling me selling SPY puts could make money?"

Yes. And hopefully, now you know why.

The key takeaway from this post:

We can't tell if an option is a "Buy" or a "Sell" based on implied volatility alone. There are lots of high IV options that have a lot of extrinsic value, but that's because the underlying stock moves a lot and we can lose a lot of money. We only make money if the stock ends up moving less than implied volatility. Otherwise, we have to be right about the direction of the stock.