

Speculation and Signatures

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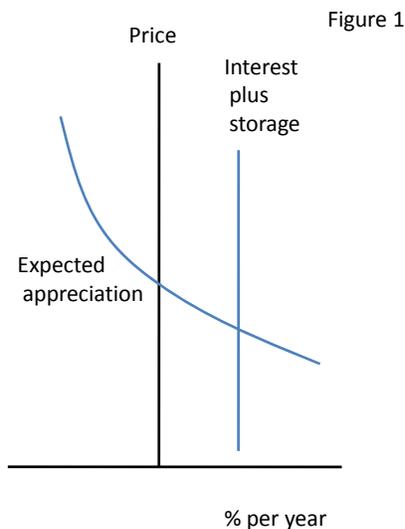
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One of the problems in the debate over the role of speculation in oil prices is that hardly anyone, even among the economists, is writing down models. As a result, it's not always clear what people are saying; and I'd argue that some of my colleagues aren't clear on the implications of their own analysis.

So here's some quick and dirty modeling that I think captures the essence of the debate.

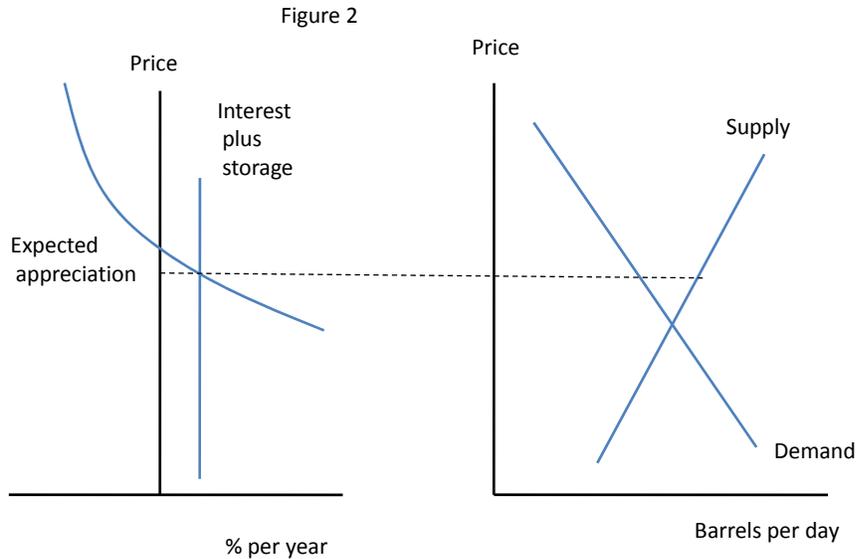
A point of agreement between Guillermo Calvo and myself is that there's a downward-sloping relationship between the current price of oil and the expected change in prices. Suppose, for example, that investors believe that the price one year from now will be PF , and they cling to that belief whatever the spot price P is. Then the expected rate of change of the oil price is $(PF - P)/P$. You don't have to believe in this specific relationship; all I need is that there is a downward-sloping relationship between the spot price and the expected rate of change in the spot price.

Figure 1 shows that relationship. It also shows the cost of holding oil in storage, which consists both of the rent on the tank, or whatever, and the interest foregone by tying up wealth in physical commodities. (Yes, the independent variable is on the Y-axis. There's a reason for that.)



Now, what Calvo and others suggest is that speculative expectations are currently determining the spot price – that the spot price is determined by the intersection of the two blue curves in Figure 1.

This certainly could happen – but only under certain circumstances. To see what those circumstances are, look at Figure 2, a back-to-back diagram that adds the *flow* supply and demand for oil – that is, the oil pumped by producers and burned by consumers.



In Figure 2, the horizontal dashed line indicates the spot price. We have a short-term equilibrium in which the quantity of oil produced exceeds the quantity consumed, but speculators are willing to buy up the excess supply and store it, believing that the spot price will rise enough to make that a good investment. In this case expected future prices – and, speaking loosely, the futures market – are determining the spot price.

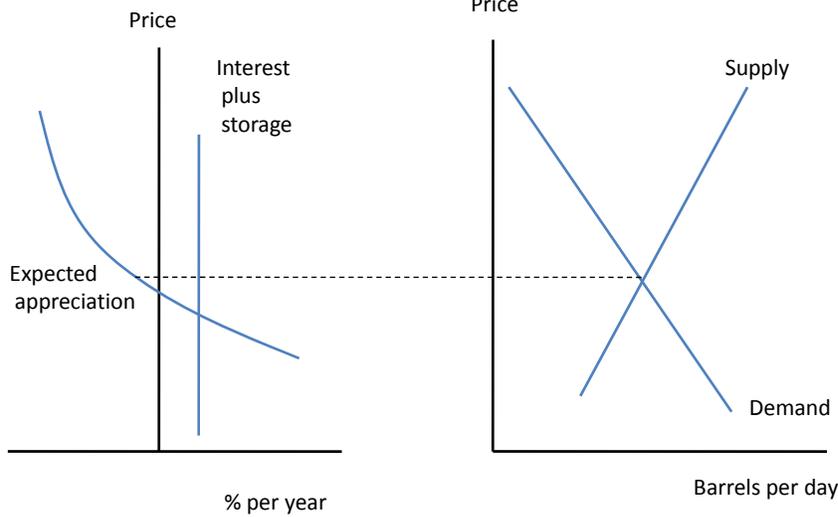
This isn't unheard of. In fact, the market for wholesale gasoline normally looks like this in the late fall, winter, and early spring, as refiners accumulate stocks for the summer driving season.

But notice that this kind of speculatively driven spot price has two “signatures” – things one should see in the markets that go along with that kind of equilibrium. First, the point I've emphasized a lot: because of the excess flow supply, somebody must be accumulating inventory.

But the second signature is probably just as important: for this kind of situation to occur, the future and spot markets have to be in “contango”: futures price above spot, sufficiently so to make storage worthwhile.

What if that's not true? Then the market looks like Figure 3:

Figure 3



Here the spot price, again indicated by the dotted line, is determined by flow supply and demand. Inventories aren't growing, and the futures market is characterized either by "backwardation" – futures price below spot – or by a contango too weak to make storage profitable.

And here's the thing: the actual data we have on crude oil don't show the signatures of a market driven by speculative demand. Inventory data don't show a big accumulation; and the market has mostly been in backwardation, not contango. It made news when, late last month, a slight contango developed – because until then there had been backwardation.

Maybe I'm misinterpreting what the advocates of a speculative story are thinking. But in that case, what are they thinking? I'm curious.