

Issues in contract design

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Outline

- The challenge of contract design
- Market manipulation 101: The short squeeze
- Cash settlement vs. physical settlement
- The importance of arbitrage
- Tight definition vs. loose definition

Part I

The challenge of contract design

Designing contracts is hard

- It sounds easy - the big underlyings in currencies, fixed income, equities, commodities, credit risk. Talk to a few potential users and launch a contract.
- It is not.
- *Most contracts launched worldwide have failed.*

Success or failure

- The market is relatively unforgiving
- Some contracts take off, and then liquidity begets liquidity
- When a contract fails to take off, it gains a reputation of illiquidity
- Then it is in a death spiral for nobody wants to touch it, and then it becomes more illiquid
- It is very hard to make changes once a contract has failed.

How to play it?

1. Think hard about contract design
2. There is more to it than what potential users think
3. Scoring early success is very important
4. Put all financial and other resources on the table up front, plan and prepare the pre-launch process meticulously, to try to make it take off in the first few weeks
5. Education, systems development, preparation: this should happen before launch date.
6. A core community of stakeholders who want to make the contract work, and are willing to fight for liquidity and arbitrage in the first few weeks, are very useful.
7. Rules and restrictions by a government are very damaging. Don't launch a contract and plan to cleanup the constraints later. First remove the constraints and then launch the contract. Once a contract goes into a death spiral, it is hard to then rescue.

Part II

Market manipulation 101: The short squeeze

A normal well-functioning futures contract

- The futures price spikes up
- A speculator thinks “that’s too high!”
- He sells futures
- He has no goods in hand; he has no intention of doing delivery upon expiration; he has no intention of holding this position until expiration.
- The speculator has confidence that the market will revert to the fair price which is lower.
- When that happens, he closes out his position and makes a profit.
- Sell at 102, buy back at 100, and he’s square, holding a profit of 2.

The short squeeze

- A manipulator starts buying futures and buying up goods on the spot market.
- At first, the shorts don't understand this.
- They see the price spiking up, they think “That's too high!” and they sell futures.
- They're hoping matters will correct themselves soon and they'll square off holding a profit.

The shorts get squeezed

- Expiration date starts approaching
- The exchange will have a stringent penalty if, at expiration, a short position doesn't yield delivery.
- The shorts don't have goods and can't make delivery.
- They find spot prices have also gone up and it's very costly to buy goods on the spot so as to make delivery.
- Their only option: to come back to the futures market and try to square off their position.
- How is that done? By purchasing futures!
- By now, the market is scared and few people are shorting futures.
- Purchase of futures drives up the price further.

How the manipulator benefits

- Prices go up sharply on both spot and futures
- The manipulator has a buy position on both physical goods and on futures
- He makes profits on both legs.

This is a serious challenge

- The short squeeze is a serious threat on all futures markets
- The determined manipulator builds up market power
- All notions of financial markets discovering fair prices go out of the window
- A great deal of regulatory functions centres on identifying and blocking short squeezes
- (A considerable amount of knowledge exists on how to do this.)

Part III

Cash settlement vs. physical settlement

The idea of cash settlement

- A forward contract can lead to settlement at date T , where the buyer brings money and the seller brings goods.
- Some underlyings can't be physically settled. Example: Stock market index.
- Hence, the forward position is merely cash settled.
- Suppose L agrees to buy Nifty at date T for 5000. Suppose Nifty turns out to be 5500 on date T . Then cash settlement merely involves S paying 500 to L .
- This is tantamount to doing physical settlement, and immediately liquidating on the spot market.
- Cash settlement is essential when doing (say) a futures on the monsoon. It is a design decision when doing (say) a stock futures.

This often runs into legal problems

- Cash settlement often runs afoul of wagering laws.
- A cash settled contract is often considered wagering and is hence unenforceable.
- All countries that have faced this constraint have gone through legislative activism to ensure enforceability of derivatives contracts.

Misconceptions about cash settlement

- Many people believe that cash settlement is wrong.
- It is believed that only by physical settlement can you get convergence of the futures price to the spot price at expiration date.
- **This is wrong.**
- All index futures contracts are cash settled. The futures prices converge quite fine.
- Arbitrage induces convergence. It is quite possible to arbitrage a cash settled product.

When is cash settlement superior?

Cash settlement is better when:

- There are fears of a short squeeze
- The spot price is well measured. This requires (a) Liquidity of the underlying spot market and (b) Transparency so as to read data off the spot market accurately.
(Building a derivatives market is, then, enabled by improving the mechanisms for measuring the spot price).

Physical settlement is better when the spot price is hard to measure. But it requires putting in a barrage of effort on blocking a short squeeze.

Part IV

The importance of arbitrage

Basis risk

- Recall: Basis = $F - S$
- In an ideal world, F comes out of a clear formula for cost of carry
- In that case, F should be steadily above S by a fixed percentage markup.
- Suppose that doesn't happen.
- Fluctuations of the basis are termed “basis risk”

Implications

- Suppose the spot moves from 100 to 104
- Suppose the fair price of the futures should have moved from 104 to 108
- But things go wrong - instead the futures goes from 104 to 100.
- This is basis risk.
- This is a disaster for the speculator
- This is a disaster for the hedger.

Importance of basis risk

- The usefulness of a futures market for speculators and hedgers critically relies on low basis risk
- The unhedged position suffers price risk; the hedged position suffers basis risk.
- How to measure basis risk: Look at the correlation between daily returns on the futures and daily returns on the spot. (Be sure to use synchronous prices!). In a well functioning contract, this correlation should be above 0.98.

Who fights basis risk?

- Who keeps the futures price and the spot price in correct alignment
- This janitorial service is performed by the arbitrageur
- Active, vigorous, ample arbitrage is required to continually ensure the cost of carry model holds.
- Foster arbitrage
 - deviations are swiftly detected and removed
 - basis risk will be low
 - the contract will deliver the goods for speculators and hedgers.
- Arbitrage is the foundation on top of which the superstructure of hedging and speculation can flourish.

Part V

Tight definition vs. loose definition

How tightly is the product defined?

- A bond futures contract is supposed to be delivered using bonds with 10 year maturity
- Tight definition: Anything from 9.9 to 10.1 years is acceptable
- Loose definition: Anything from 9 to 11 years is acceptable (with some correction factors).
- What do you do?

Particularly important with commodities

- Do you define exactly one tightly defined grade, or do you define a range of acceptable grades (with some correction factors)?
- Do you define exactly one delivery point or do you permit several delivery points?

Tight definition is good for the arbitrageur

- For the arbitrageur, a tight definition of the spot clarifies his mind. He knows what to buy on the spot, and accurately predict what returns will come out of the arbitrage.

But tight definition can be dangerous

- With a tight definition, the 'floating stock' is low
- There's only a small pool of deliverable supply
- This is vulnerable to a short squeeze.

Tension in contract design

- Tight definition is good for arbitrage, and arbitrage is the foundation
- But this can get you into a short squeeze
- Loose definition eases that risk, but then there is basis risk
- Cash settlement is one technology that can help. But there is no general answer.

Summary: Jargon

contract design • cash settlement • physical settlement • short squeeze • market power • basis risk

Thank you.