Discussion of “CDS Auctions”
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• Summary

• The auction

• Under/overpricing Intuition

• Empirics

• Is it the auction design?

• Conclusion
Main Findings

- Analyze CDS settlement auctions both theoretically and empirically.

- Propose a theoretical model for the CDS auction:
  - Prove conditions under which over or under pricing equilibria can arise in the current auction process.
  - Theory predicts that magnitude of underpricing should be related to ratio of Net Open Interest (NOI) to cash-settled CDS positions carried into second auction round.
  - Propose various mechanism to improve efficiency of the auction.

- Analyze empirically all auctions that have occurred:
  - Find V-shaped pattern: bond prices decrease 30% 10 days prior to the auction and recover thereafter.
  - Underpricing (estimated at 10% relative to pre-auction day) seems related to NOI and consistent with theory.
Why do we need an auction?

- In a CDS contract the protection buyer (PB) makes payment to the protection seller (PS) until maturity or a credit event occurs.
- When a credit event occurs PB hands over a bond (of defaulted company) to PS in exchange for its par value (physical settlement).
- If all CDS trades were physically settled, there would be no settlement issue.
- A settlement issue arises if a PB cannot deliver a bond to the PS.
  - More CDS protection has been written than there are outstanding bonds.
  - Secondary market for bonds may be very illiquid (especially around a default event).
  - An investor has setup ‘naked’ short on the name via CDS to hedge a position in stocks, and/or options, or simply to speculate.
  - An investor may have an exposure to a name through a CDS index trade.
  - Many derivatives trader are not ‘setup’ to trade physical bonds.
- Further, to avoid recovery ‘basis risk’ it is useful to offer the option to cash-settle to all investors and establish one unique reference price for the settlement of all CDS contracts.
  - Recovery basis risk arises when an investor has several positions (e.g, an index trade and a single name trade), that should, in theory, perfectly compensate.
- This is the objective of the CDS settlement auction, which has now been hardwired into standard CDS contracts.
A two stage auction process

- The price determined in the second stage ($P^A$), will be used to cash-settle all CDS.
  - PB (PS) receive (pay) $100 - P^A$.
- CDS investors have still the option to replicate a physical settlement, by requesting (at the first stage) to buy/sell bonds in the second round auction (effectively submitting market orders).
  - PB (PS) submit market sell (buy) orders, thus receiving (paying) $P^A$ from market order.

⇒ Note that the sum of the cash-settlement plus the market order replicates the physical settlement (independent of $P^A$)!

Q? How do we determine $P^A$?

- In first stage:
  - PB (PS) submit market sell (buy) orders (capped by the size of their CDS position)
  - Net sum of market orders establishes Net Open Interest (NOI).
  - At same time, dealers submit indicative bid/ask quotes for a small quantity ($5mm) and fixed bid-ask (2%) to establish a reference Mid-point ($P^M$).
- In Second stage,
  - Any investor can submit limit orders to buy (sell) if NOI is to sell (buy).
  - Run through the limit order book from best (highest buy or lowest sell) to worst until NOI is absorbed. Last limit price used to clear NOI is $P^A$.
  - If NOI not cleared, then $P^A$ is set to zero (100) if NOI is to sell (buy).
  - $P^A$ is capped at $P^M + 1\%$ ($P^M - 1\%$) if NOI is to sell (buy).
Describing the auction mechanism

Q? Who cares about $P^A$?

- Clearly, any PB (PS) who replicates physical settlement by entering market order does not!
- PS (PB) who chooses to cash-settle by not entering market orders, wants highest (lowest) $P^A$.

Q? Who can affect $P^A$?

- Only an investor who participates in second stage auction, can bid up (down) $P^A$ if NOI is to sell (buy) by putting aggressive limit orders.

⇒ If NOI is to sell (buy) a PS (PB) can gain on his CDS position by aggressive bidding up (down) the settlement price.

⇒ The PS (PB) will gain only if his CDS position is larger than the NOI (else the gain on the CDS position cash-settlement payoff is offset by the loss on the limit order purchase (sale)).

⇒ Over (under) pricing can occur if the NOI to sell (buy) is smaller than the net naked outstanding CDS position held by PS (PB).
Describing the auction mechanism

- Of course, since the derivative market is a zero-sum game, and investors can always mimic the physical settlement payoff (which is independent of $P^A$), there always exists an equilibrium, where, absent frictions, (i) $\text{NOI}=0$ and $P^A = \nu$, or (ii) $\text{NOI} \geq 0$ and $P^A \in (\nu, 100]$ where PB use physical settlement and PS cash-settle, or (iii) $\text{NOI} \leq 0$ and $P^A \in [0, \nu)$ where PS use physical settlement and PB cash-settle. In all cases agents obtain same payoff (proposition 4).

- Whence, authors introduce asymmetry/frictions:
  - Limits to physical ownership of bonds by agents
  - Short-sell constraints.

- With friction 1, authors construct equilibria where second stage price will be linear in $\text{NOI} > 0$: $P^A = \nu - \delta \text{NOI}$ for $\delta > 0$ (underpricing).

- With friction 2, construct equilibrium where (as long as some investor has large enough CDS position relative to physical bond position), there exists an equilibrium with $\text{NOI} > 0$, such that $P^A = 100$ (overpricing).
Empirical Evidence

- Merge 86 (L)CDS auctions with TRACE data to obtain 23 auctions.
- Define true value $v$ as pre-auction day TRACE price ($p^{-1}$).
- Ideally, to test the theory would like to compare NOI to cash-settled CDS position of agents that participate in second stage auction.
- Since data on individual CDS position is not available, look at ratio of NOI to Notional Amount of Deliverable bond (NAB) in the regression:

$$\frac{p^A}{p^{-1}} = \alpha + \beta \frac{NOI}{NAB} + \epsilon$$

- Find $\alpha \approx 1$ and $\beta = -1.19$ consistent with average underpricing and negative relation to (positive) NOI, consistent with some of their theory.
- Find also tremendous price impact around auction day

![Figure 5: Price Impact](image-url)
Evidence on price pressure around Treasury Auctions

- Lou, Yan, Zhang (2011) find systematic price patterns around regularly scheduled Treasury auction dates from 1980 to 2008:
  - Prices of 2, 5 and 10 year Treasury notes drop a few days before regularly scheduled auction dates and recover a few days after.
  - The average yield difference between newly auctioned note and outstanding (similar maturity note) is around 2 to 4bps for on the run (slightly less for first off the run)

- A trading strategy going long the 2-year note and short the duration matched 0.5 and 10 year notes in the 10 days prior to each auction and reversing for the 10 days post-auction yields a Sharpe of 1.44 pre-tcosts and .9 post t-costs (for last 10 years, and sharpe of 1 full sample)
Similar evidence on price pressure around Corporate Bond issuance

- ‘New-Issuance’ Risk also found for Corporate Bonds (Newman Rierson (2004)):
  - Focus on Telecom Bond issuances in the European bond market from 1999-2001
  - Find large impact of bond issuance own and other (close substitute) bond yields
  - Impact occurs in 15 days window and peak at issuance date (and not announcement date!).
  - Propose a (search-theoretical) model of risk-averse intermediaries who take time to find end buyers that explains phenomena

![Figure 3. The Cumulative Impact of Debt Issuance on Other-Bond Yield Spreads](image-url)
Implications

- Significant evidence of price impact upon issuance across markets (corporate bond, IPOs, Treasury auctions).

- Why? price concession to intermediaries because of finite risk-bearing capacity? Or implicit collusion/non-competitive dealer behavior?

- Trading Anecdote from Dealer intermediated market
  1. Price-impact of settlement trades in LIBOR-swaption market disappeared with ‘threat’ of taking physical delivery:
     - Short put, payoff \(- \max(K - S, 0)\)
     - At maturity, when cash-settling, observe ‘price impact’: the underlying \(S\) decreases around settlement date, so losses on short exacerbated (forced to ‘buy’ at \(K\) something ‘worth’ \(S\)).
     - Ask for physical delivery, i.e., actually buy at \(K\) and receive \(S\) (not just cash-settling)
       \(\Rightarrow\) price impact disappears!

- Suggestions:
  - Think more about the initial reference price \(P_M\) set by dealer quotes.
  - Current model has ‘utility’ function for dealers justiied by reputation concerns, that pushes them to set the reference price as close as possible to true value.
  - Given cap in second round, large underpricing must mean reference price \(P_M\) is set too low.
  - What role do dealers play in the second stage auction?
  - Do they take on a large part of the trades onto their balance sheet (provide ‘liquidity’)?
Conclusion

- Nice combination of theory and empirics.
- Auction theoretic model does a great job trying to stay close to market mechanism.
- Results are quite provocative and suggestions are made to improve design, that dealers should think about.
- Empirical results are less convincing (as validation of theory).
- Mostly, data is limited and we miss the right information (on CDS positions). Can the DTCC data be used?
- Magnitude of the price action around auction seems too large (in magnitude and duration) to be solely due to auction design flaw.
- Instead, seems consistent with ‘price concessions’ observed around issuances or auctions in other markets
  - equity IPO
  - index reconstitutions
  - Treasury auctions
  - corporate bond issuances
  - futures rolls