Discussion: Two Papers on Common Shocks and Bond Markets

"CDS and Sovereign Bond Market Liquidity"
By Batchimeg Sambalaibat

"Exploring the Sources of Default Clustering"
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Naked CDS: What Happened?

- Germany temporarily banned buying naked CDS protection on EU bonds in 2010.
- EU permanently banned buying naked CDS protection on EU bonds in 2011.

Paper: A natural experiment for long-term and short-term effect of such bans generally.

- Short term bans leads to greater liquidity in non-banned market (substitution effect).
- Long term bans leads to less liquidity in both markets (complementarity effect).

My Main Big-Picture Comment

Hard to make two generalizations from two data points. In particular:

- German short-term ban probably signaled German willingness to bail out other sovereigns in the EU but not bail out naked CDS speculators.
- Ban signaled ECB would intervene, perhaps increasing liquidity.
- Permanent ban may have signalled ECB was going to "corner the market" in debt of weak countries.
- CDS "auctions" do not eliminate the possibility of corners and squeezes. Example: When Fannie Mae and Freddie Mac bonds defaulted, government guarantee meant government was ready to corner by bidding par for them.
- Cash settlement at auction does not eliminate corner problem. Dealers have good position in auctions.

Is the Idea New?

Issue is well-known in commodity markets, perhaps also in literature on futures markets.

- Having futures contracts based on Chicago delivery points increases liquidity in Chicago grains, unless there is a corner or squeeze going on, in which case the reverse happens.
- In Treasury bond futures, liquidity of deliverable bonds increases, but shifts from bond to bond due to the way "cheapest-to-deliver" is defined.
- In limit-up, limit-down markets, limits sometimes do not apply to spot month. Therefore, liquidity of spot month goes up on limit up or limit down days. Issue widely discussed for financial futures. Higher volume in spot month when limits binding in other months.
- Cross-listing of stocks (ADRs): Does it increase liquidity or decrease liquidity of underlying?

Ambitious Construction of Paper

- Theoretical model: Endogenous choice to enter search market, like Afonso (2011), with new point that traders can choose either CDS market or bond (underlying, cash) market. Also in the spirit of Jeongmin Lee (2103).
- Empirical study: Difference-in-difference regressions to examine how liquidity (defined as quoted bid-ask spreads) responded to Germany's temporary ban and EU's permanent ban.

Comment on Theoretical Model

- Paper: Model assumes shorting can only occur in CDS market. After temporary ban, longs with positions to sell can go to CDS market and find short who buys back positions.
- Comment 1: It is possible to short bonds. Shorts may have tried to move to bond market. But ECB and EU governments may have tried to disrupt shorting in bond market by holding collateral off the market.
- Comment 2: Nevertheless, the idea that there are different types of participants who react to policy changes differently is a good idea.

Theoretical Model: Economic Mechanism

Paper's theory suggests mechanism is trading volume: More participants searching generate higher trading volume and lower spreads.

Past literature not exactly search model but something similar:

- Telser, Lester G. "Why there are organized futures markets." Journal of Law and Economics (1981): 1-22.
- Telser, Lester G., and Harlow N. Higinbotham. "Organized futures markets: costs and benefits." The Journal of Political Economy (1977): 969-1000.

My Own Recent Research

Kyle and Obizhaeva research on "market microstructure invariants" suggest specific formula for measuring bid-ask spreads based on information, not search.
Bid-ask spreads are inversely proportional to magic "liquidity" measure L, measured in basis points, defined by

$$\frac{1}{L} = const \cdot \left(\frac{Percentage\ Returns\ Variance}{Dollar\ Volume} \right)^{1/3}$$

- Liquidity a function of both volume and volatility. Paper's theoretical model could have concept of volatility as well.
- German and EU policies had direct effects on volatility as well as volume.
- Liquidity related to time. Haircuts on repo proportional to $1/L$.

Paper's Empirical Approach

Left-side variable is percentage bid-ask spread. Explain bid-ask spreads as function of various variables:

- Variable of interest is dummy variable for CDS ban.
- Time and country dummies.
- Other economic variables: CDS price, measures of debt.
- Control variables.

Comment: Economic Issue

- Should put economic determinants of spread on right side:
  - Dollar Volume (not open interest or quantity outstanding) and Volatility.
- Does policy operate through effect on volume, effect on volatility, or through some other mechanism?
  - Might put volume and volatility on right side of regression.

Comment: Regression Set-up

- Since percentage spread is on right side, have heteroscedasticity problem: Weak countries generate errors of large magnitude. Learn very little from strong countries.
- Paper deals with this issue by leaving out Greece.
- Suggestion: Let log of percentage spread be left-side variables, not percentage spread itself. Similarly, put lot of CDS price (spread) on right side; also log of trading volume (not open interest). This would effectively put components of $1/L$ on right side, with specification conforming to invariance theory.
- Better to use interactions with CDS price or dummy variable like paper? (I am not sure.)

Minor Point

Paper says bonds in fixed supply but CDS are derivatives in unconstrained supply.

- This does not apply to sovereign debt! Countries to try to sell as much sovereign debt as they like, as Greece did. Limit on size is willingness of buyers to pay. This is same as for derivatives.
- Real issue is whether supply is being squeezed or not.

Cost of CDS

- Interesting finding that sovereign CDS have higher spreads than underlying bonds.
- Might be different for corporate bonds, where CDS may have higher liquidity.
- Why: Are sovereign CDS more for speculation and corporate CDS more for hedging?
- If liquidity vehicle for sovereign debt is needed, perhaps it is a futures contract, not a CDS. Different from corporate bonds.

Paper on Bond Defaults: Ad-hoc Reduced-From Model

Log of Poisson default probabilities (hazard rate) is function of logs of

- Observable macro variables ("doubly stochastic").
- History of observed defaults ("self-exciting" Hawkes process).
- Latent unobserved stochastic factor ("frailty"). Not doubly stochastic since unobserved.

Comment

Provide intuition on what "doubly stochastic" means intuitively.

- Warren Buffett: "When the tide goes out, you find out who is swimming naked." Are hazard rates (probabilities of observing the truth) rising as tide goes out, consistent with doubly stochastic intuition?
- Random rate of getting infected after exposure to disease with known incubation period.
- Predicting lightning strikes based on arrival of "unobserved" thunderstorm.
- Panics induce short-term creditors to pull credit. This is a way of collecting information quickly. It uncovers ponzi schemes.

Maybe model with unobserved factors is very general, if complexities of hazard rates properly understood.

Summary of Results

- If only observable macro variables used, model is too sluggish. Does not fit bursts of defaults highly autocorrelated over short periods of time.
- Adding history of observed defaults improves performance of model dramatically.
- Distribution default (over- and under-dispersion) match predictions when hazard rates used as time deformation. Nice econometric theory.
- Adding latent factor instead of default history does not work as well as default history.
- Adding latent factor to both macro variables and default history is statistically insignificant and does not affect coefficients of default history much.

Technical Comment

Is it possible that numerical estimate of latent factor did not converge to correct value? Suggestion:

- Fix different mean reversion parameters and see what happens to log-likelihoods.

Another Technical Comment

Instead of square root model for latent frailty factor, why not log follows AR-1?

- This might generated an even fatter tail of very bad events.

What Model Does Not Do?

Model is limited in its structure:

- Does not forecast defaults on individual bonds.
- Paper does not attempt to forecast defaults by "adding up" information on individual bonds, other than default events and amounts defaulted.

Comment on Empirical Variables

Paper uses "funny" macro variables: return on stock market for previous year. BAA-AAA spread is reasonable but limited.
Other possibilities:

- Market to book ratio, earnings yield, or ratio of corporate cash flow to GDP.
- Corporate accounting data: Debt-to-book ration, debt-to-market value ration, interest coverage ratios.
- Replicate ratings using econometric approach like, e.g., Aysun Alp (JF). Ratings themselves change slowly but model can be replicated quarterly.
- Housing prices?

These might better indicators of cash flows needed to avoid default.

My Main Comment

Paper does not explicitly attempt to use "market probabilities" to forecast number of defaults. My idea of a methodology:

- Calculate yields (spreads) for all bonds. Adding up yields gives revenue market needs to pay for default losses.
- Might add a variable like market-to-book ratio for banks. (Problem is that banks might expect bailouts, in which case "consistency" of bank stock prices with bank debt prices might be relevant—or maybe not.)
- Might look at term structure of implied default rates (hazard rates) to see if consistent with model.

Of course, need to ask whether market's risk premium is changing. Might be correlated with volatility (VIX).

Practical Application of Model

"Our results suggest it is necessary to address the frailty and contagion channels of clustering when measuring correlated default risk and estimating risk capital. Accounting for the effects of frailty and contagion will lead to more accurate risk assessments and more adequate capital buffers."

Specifically, set risk capital to assume a very bad scenario for frailty and contagion, unfolding over a period of time during which capital could not be raised easily. Capital cannot be raised once bad events are operating.

Practical Application of Model (continued)

- Not realistic to ask banks to raise more capital as bursts of correlated defaults begin to happen.
- Need a model which predicts probability of horrible scenarios, then set capital requirements to survived horrible scenarios well before they begin to unfold.
- How bad can correlated defaults get? Model uncertainty about parameters in Hawkes process might be more important than point estimates.

Practical Application of Model (continued-2)

- For frailty factor, model uncertainly related to how the bad tail is modeled, e.g., square root versus log is AR-1. How accurately is the reduce-form-approach of this paper capturing this? Probably not at all since frailty factor not significant.
- Model seems to assume that macro factors, frailty, and default history are independently distributed. What if frailty is correlated with default history? (Predicting uncertainty about lightning strikes when observed lightning strikes are only indicator of thunderstorm). Model suggests it is a "result" that factors are independent; paper might formalize this.

What Uncertainty is Unfolding as Defaults are Observed?

Financial firms are different from non-financial firms.

- Government gives banks capital, then lets banks play with it.
- At what point will government insistent on higher capital requirements?
- Will government bail out creditors, or let them default?
- Uncertainty about this government behavior is being resolved over time. Observed defaults provide some information.

Summary

Both papers make the good point that common shocks are important in bond markets.

- Paper on naked CDS proposes interesting economic mechanism (theoretical model), but it does not try enough to estimate how this mechanism works empirically.
- Paper on bond default counts proposes interesting reduced-form estimates of how the mechanism works, but it does not tell us much about the economic mechanism behind the estimates.

Combining theory with empirical work remains a very interesting topic for future research.
Both papers have added to our knowledge in this area.