Credit Derivatives and the Default Risk of Large Complex Financial Institutions

Discussion by
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Agenda as stated by authors

- In authors' own words, the paper addresses the empirical questions:
  1. "Were the banks most affected by the current crisis most affected by the current crisis identifiable under normal market measures, using the CD market as a sensitivity factor?"
  2. "What was the role of CDX index markets in the destabilization of banks' balance sheets?"
  3. "Could these market measures be used to assist in the identification of other possible casualties as the crisis continues?"
- "Our distinctive contribution in this paper is to provide empirical evidence to illustrate the effect of fluctuations in the CDS index market on systemic risk"
- "...exploring the intuition that equity option prices and CD premia are univariate timely indicators of information pertinent to systemic risk"

Agenda here

- More concretely, the paper does the following
- It sets up a model for estimating jointly the CDX North Americam index, the iTraxx Europe index, asset values and asset volatilities of 16 major banks
- It concludes that there is significant correlation between these four variables and that it increases with the crisis
- Extensive impulse response functions are also reported graphically, but at this point not interpreted in detail
- This is viewed as 'strong evidence of detrimental volatility transmission between the evolution of the indices and the equity of all banks included in the study'
- I am not convinced that we are not 'just' seeing the 'usual' increased correlation in downturns in these data. Hard to argue that the volatility increase in bank asset value would have been absent without the index and CDS markets
- The paper also uses a stochastic volatility estimation procedure to assess distance to default and comment on under-capitalization of banks

Some suggestions for next version

- The paper is still fairly preliminary, and I would need more guidance on the econometric methodology
- In particular, the methods for computing Distance-to-Default are hard to follow
- Formulate and motivate the precise mechanism by which derivatives are detrimental
- Motivate the choice of econometric model (which is complex!) and explain from which parameters we should look for guidance
- There are few interpretation of estimation results and some are indeed very general: ('...the transmission of shocks between the various banks' equity returns and the log-difference of the CDX-indices is highly significant in a variety of directions'
- In newer version: 'The vast majority of estimated coefficients are statistically significant and there is no evidence of statistical misidentification'
- Again, we need more guidance!
- The paper may want to choose between the distance-to-default story and the detrimental CD market story

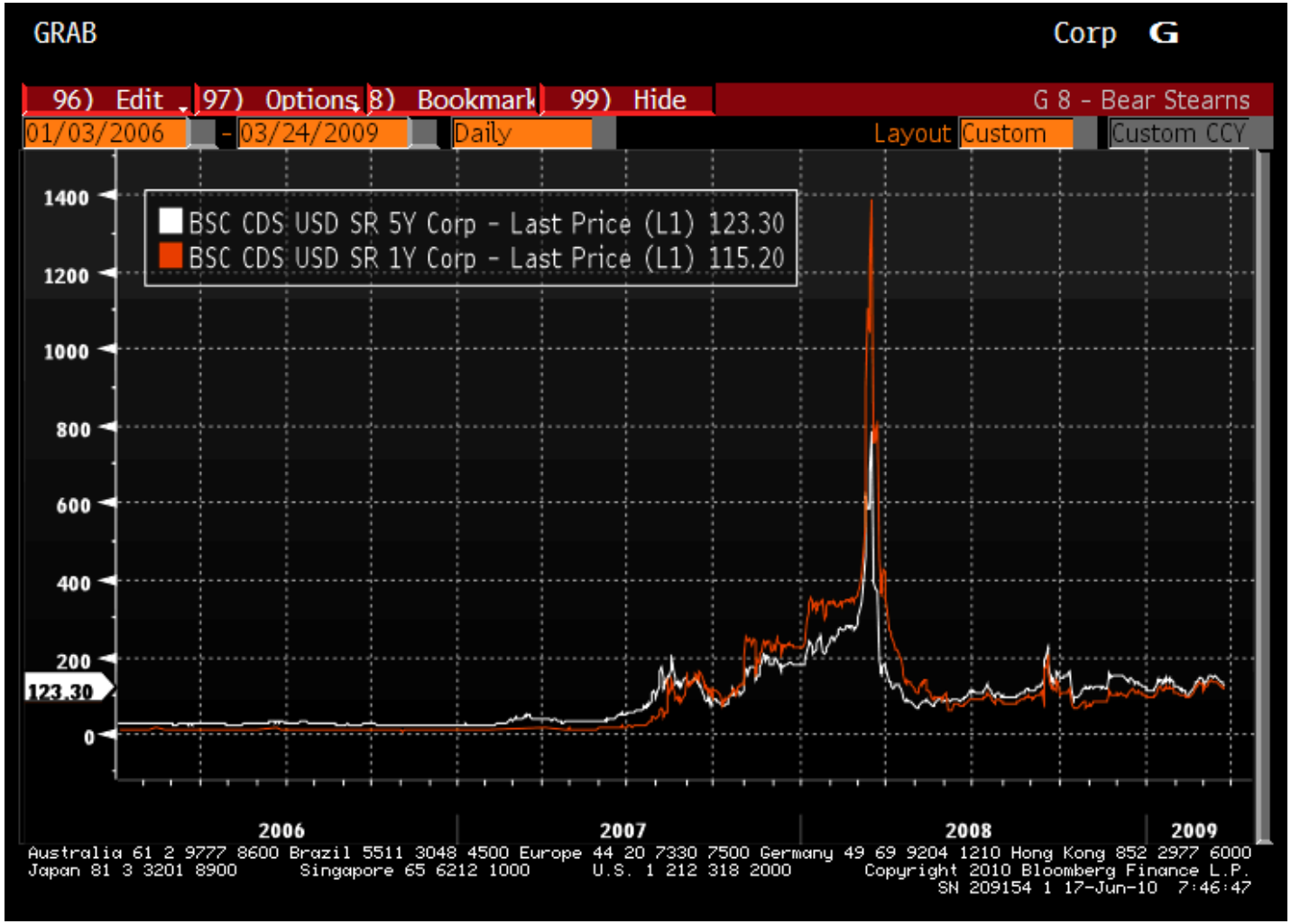
This discussion

- I will not focus so much on methodology but more on the basic assumption that CD markets are detrimental
- The paper makes the statement that the information content of the CDS index markets would have let us to predict the demise of bear Sterns and Lehman
- Perhaps the CDS market is a more clean indicator and do we need a model to see this?
- To me, the detrimental nature is not at all clear looking at some examples from the CDS market and the synthetic CDO markets

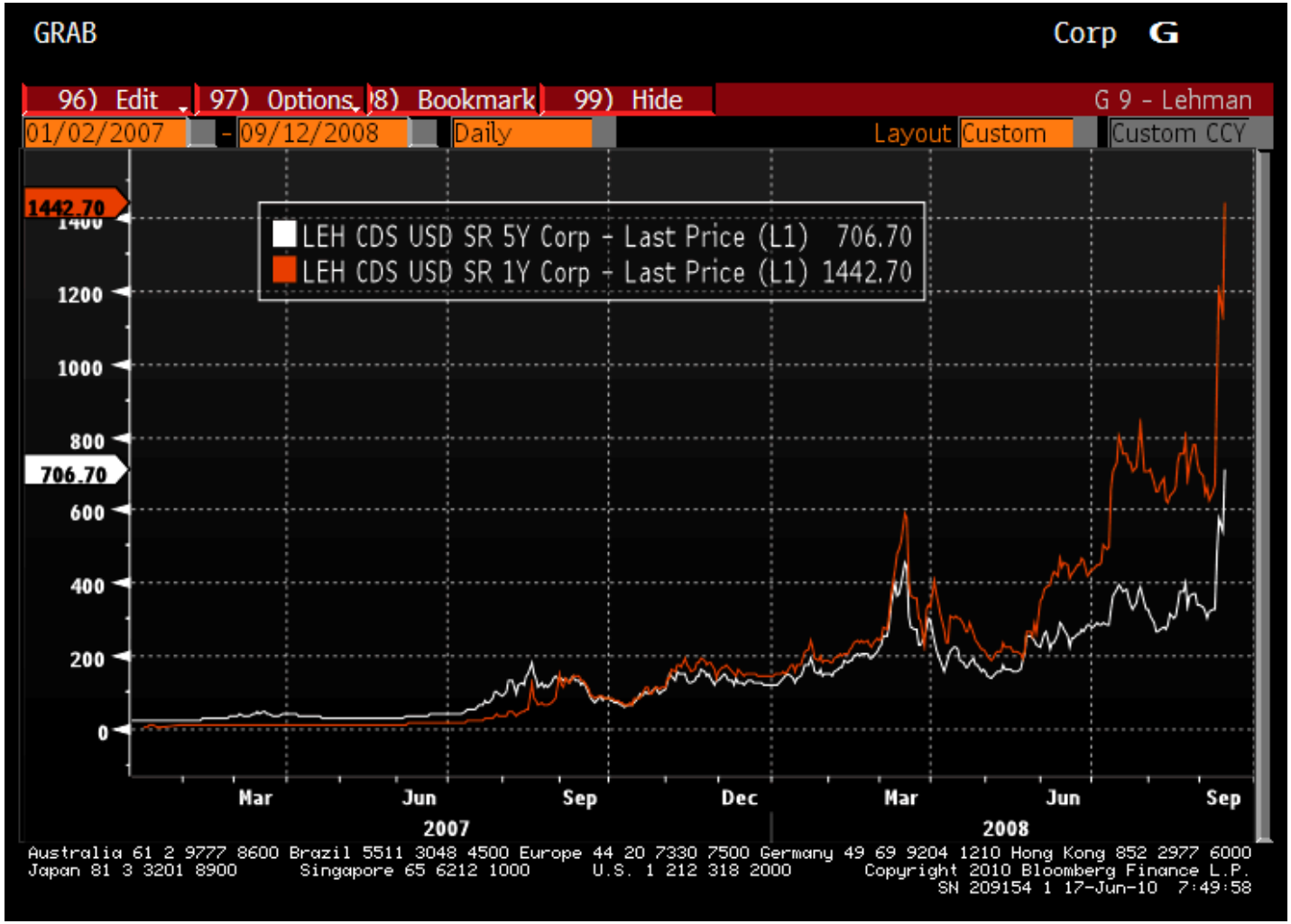
A look at early warnings for Kaupthing

- CDS markets often viewed as the root of the problem
- But if corporate credit quality is something we want to monitor, CDS markets are probably the most accurate
- In fact, we have many examples that CDS markets carried the warning signals better than other markets
- This applies both to raw CDS premia and to ratings implied from CDS spreads
- For CDS spreads not only rising levels but also spread curve 'inversion', i.e. short spread higher than long spread - a sign of distress

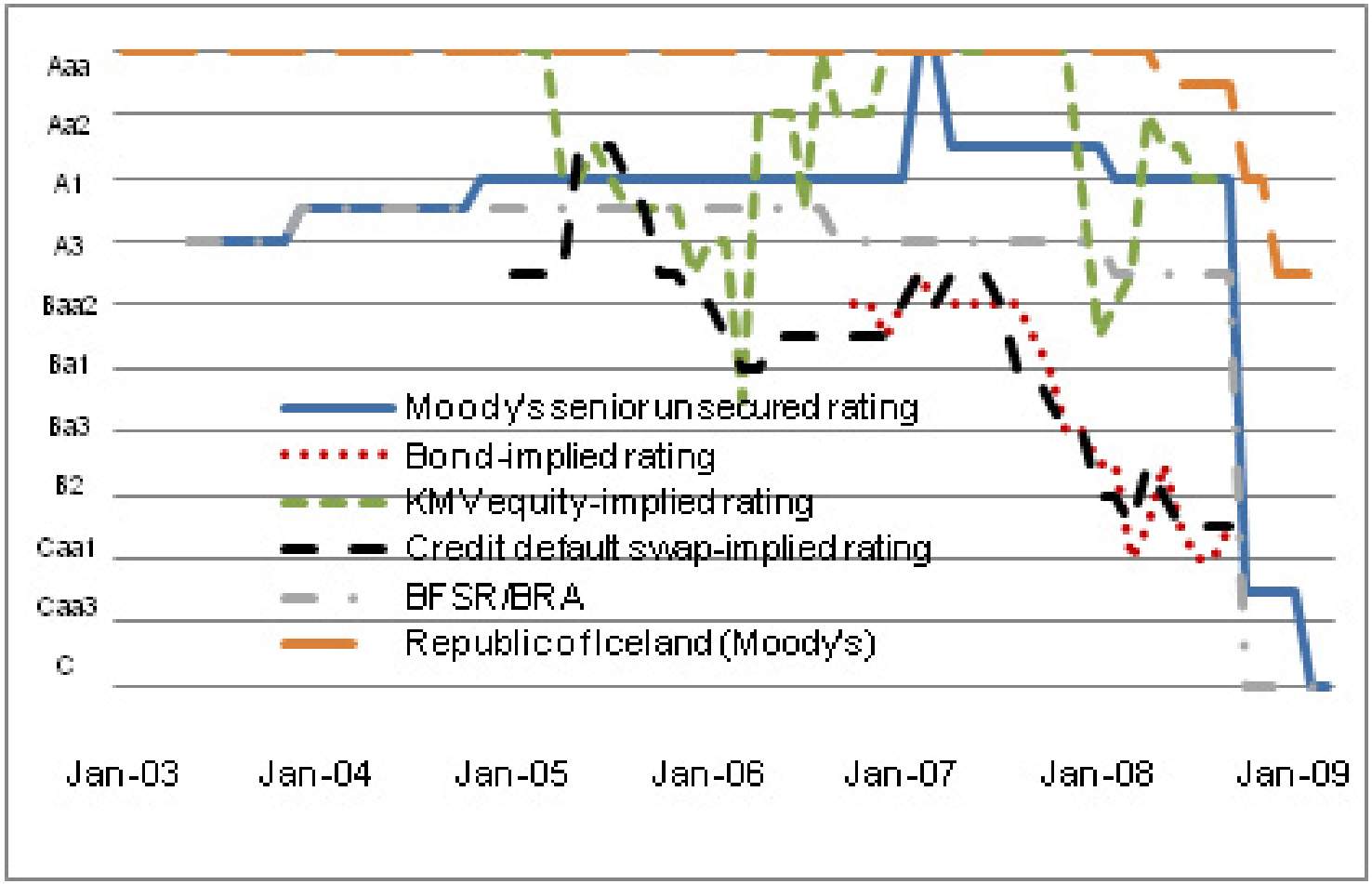
Bear Sterns 1 and 5 yr CDS



Lehman brothers 1 and 5 yr CDS



Ratings Iceland



Information in index

- Mortensen (2006) worked on estimating 'factor intensity models' for pricing CDO tranches
- Think of these as modeling individual firm default intensities as sums of a firm specific intensity and a common intensity (times a loading)
- Advantage of these models (as opposed to copula models) is that here are built around fundamental modeling of individual firms' default intensities and hence the CDS premia)
- One goal was to counter the criticism against intensity models that they cannot generate the correlation needed to price more senior tranches correctly
- August 23, 2004, iTraxx index was trading at 39 bps (today as is closer to 150 bps)

Information in index

- To jointly calibrate model for pricing tranches on the iTraxx IGindex, he needed a model with
- 1.7% probability in a year of seeing a 660 bp jump in firm default intensities
- This would imply a 335 bp change in 5-yr CDS spreads (mean reversion, recovery plays a role here)
- More importantly, to fit the tranches he needed an 83 probability that the jump was simultaneous across all firms in the index
- Was this 'unrealistic'? At the time it seemed harder to believe
- The point is, that perhaps the market in some ways did price at least some of the tail risk and did not completely rule out the extreme events
- This is useful!

iTraxx

Other suggestions

- Is there contagion through counterparty risk in CDS markets?
- The premia for this risk seems to be very small - see Arora, Gandhi and Longstaff (2010)
- They find, that "an increase in the dealers credit spread of 645 basis points only translates into a one basis point decline on average in the dealers spread for selling credit protection"
- Are volumes in iTraxx and CDX large enough to believe in strong influence on asset values?
- Losses from CDS that hit AIG were mainly in constructions involving subprime mortgages - and not standardized index contracts
- In general, the exact nature of how the markets are detrimental need elaboration. Remember zero-net supply

On distance-to-default

- The paper has a separate story on distance-to-default, i.e. the measures that uses a Merton type model to infer 'implied' asset value and asset volatility, and use this to define the distance to a default barrier
- This measure is used in a non-parametric regression to get default probabilities form a large data base
- D-D is useful in the literature on default probability estimation (credit scoring) and in the literature dealing with risk premia in credit risk markets, where it is a natural choice to capture the 'physical' default probabilities of firms
- Two new approaches - but perhaps different in two versions? The new versions speaks of equity options, i.e. a compound option?
- Classical approach uses a Merton-type model
- Estimates can be found using maximum-likelihood or using iterative approach (clearer conceptually than the 'two equations in two unknowns' since equity vol is really a stochastic process, not a constant
- Evidence that the measures have better default prediction properties?
- Moody's KMV uses separate methodology for financial institutions whose balance sheet adjustments can be forced upon the bank by regulators.
- Also, liabilities can be reduced by cutting down on deposits, and asset side can be reduced by non-renewal of loans etc.

Concluding remarks

- Lot of work needed to explain implementation. Do step-by-step explanation
- The link between correlation finding and conclusion CD markets are detrimental is not obvious
- CDS markets, perhaps with central clearing, bcan convey useful information on levels of default risk and index CDOs convey useful information on the systemic nature of the risk
- Should DD-story really be a separate story?