How the Subprime Crisis Went Global: Evidence from Bank Credit Default Swap Spreads.

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Summary

Q? How did the subprime crisis, a problem in a small corner of the US financial markets, affect the entire global system?

A! Look at sample of 45 banks' CDS spreads from July 2002 to November 2008:

- Extract major principal components from those spreads.
- Show how correlation between these PC and various predictors evolve as crisis progresses.

- Conclude that
  - Importance of common factors increased substantially during the crisis.
  - Pre-Bear Stearns Rescue they reflected more a bank-sector specific credit risk premium.
  - Post Lehman bankruptcy, common factors remained major drivers of spreads, but increasingly linked to funding risk measures and general real economy factors, as evidence of global economic recession mounted.

Methodology

- Predictor variables checked for correlation with common PC factors:
  - real economy: High yield spread, S&P 500, VIX
  - funding cost: LIBOR-OIS, OIS-Treasury Bill, ABCP spread.
- Periods/breakpoints considered:
  - pre-subprime crisis: July 2002-July 2007
  - subprime crisis-Bear Stearns Rescue: July 2007-March 2008
  - Bear Stearns-Lehman Bankruptcy: March 2008-September 2008
  - Post Lehman: September 2008-November 2008
- Approach:
  - Principal Components extracted recursively using expanding window.
  - Correlation are computed using expanding window.
  - Plot time series of correlation estimates.

- Results:
  - First four PC explain about 60% of movements in banks CDS spreads.
  - First PC explains as much as 40% pre-subprime crisis, but increases to 56% by March 2008 and 65% by Sept 2008.
  - Correlation with real economy declined at onset of subprime crisis and until Lehman Bankruptcy.
  - Instead, Correlation with funding cost variables (in particular credit risk LIBOR-OIS spread) rose steadily up until Bear Stearns bankruptcy.
  - After the Lehman bankruptcy, correlation with funding costs increased to unprecedented levels. Correlation with real economy increased as well, in particular with SP500 returns.
- Interpretation:
  - In normal times much common variation in Bank CDS spreads explained by common factor tied to real economy (i.e., HYS).
  - From outset of Subprime crisis until Bear stearns, market worried primarily about financial sector solvency. Importance of real economy for common factor dropped in favor of bank credit risk.
  - After Lehman bcy, concerns about the global economy reappears as a major driver in addition to heightened funding risk.

Comments on approach

- Are changes in correlation across 'regimes' statistically significant?
- Is this (i.e., expanding window correlation) the right approach to analyze time-variation in correlations?
  - Why not use model with truly dynamic correlation, e.g., Engle's DCC, or latent variable model.
- Account for Stochastic Volatility?
  - Bias in estimation of Principal components?
  - Bias in estimation of correlation between PC and observable economic variables?
    (Changes in correlation between two series could be due to increases in volatility of the common factor.)
- Is it possible to estimate the break/regime shift in correlation if any?

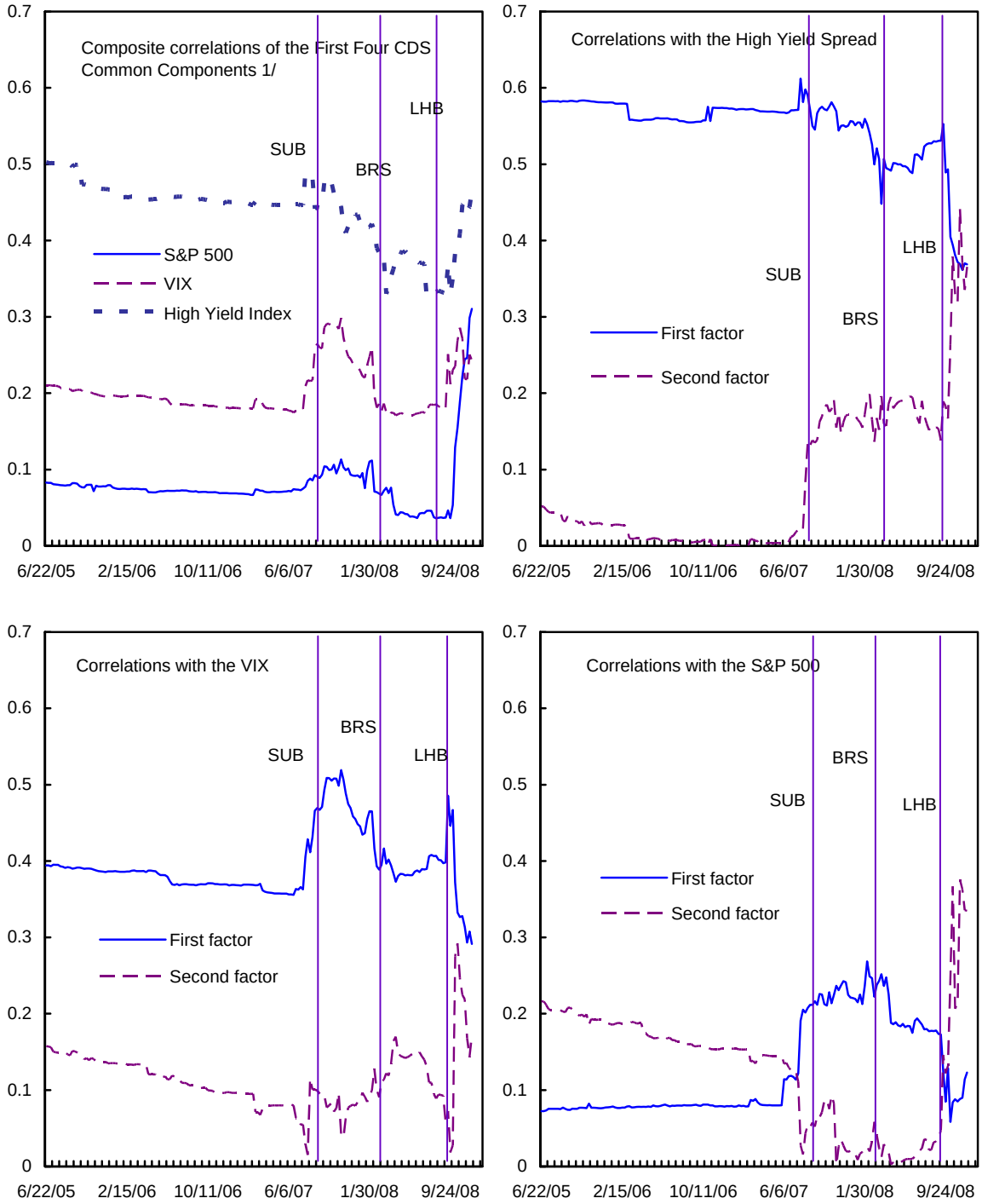
Interpretation of results

- Graphs of correlations are not unambiguous to interpret (e.g., impact of the real economy).
- How does the evidence presented help answer the initial question: How did the Subprime Crisis Go global?

→ Not clear the correlation analysis in the paper helps distinguish various economic mechanisms for transmission of the crisis.
For example, consider two different stories:

- Subprime crisis → Losses in banking sector → financial accelerator → Global recession.
- Global savings glut → over investment and excess leverage → real estate bubble burst → losses in financial sector and Global recession.

Figure 5. Correlation of Common Components with the "Real Economy"



1/ Based on the R-squared criterion as discussed in the text.

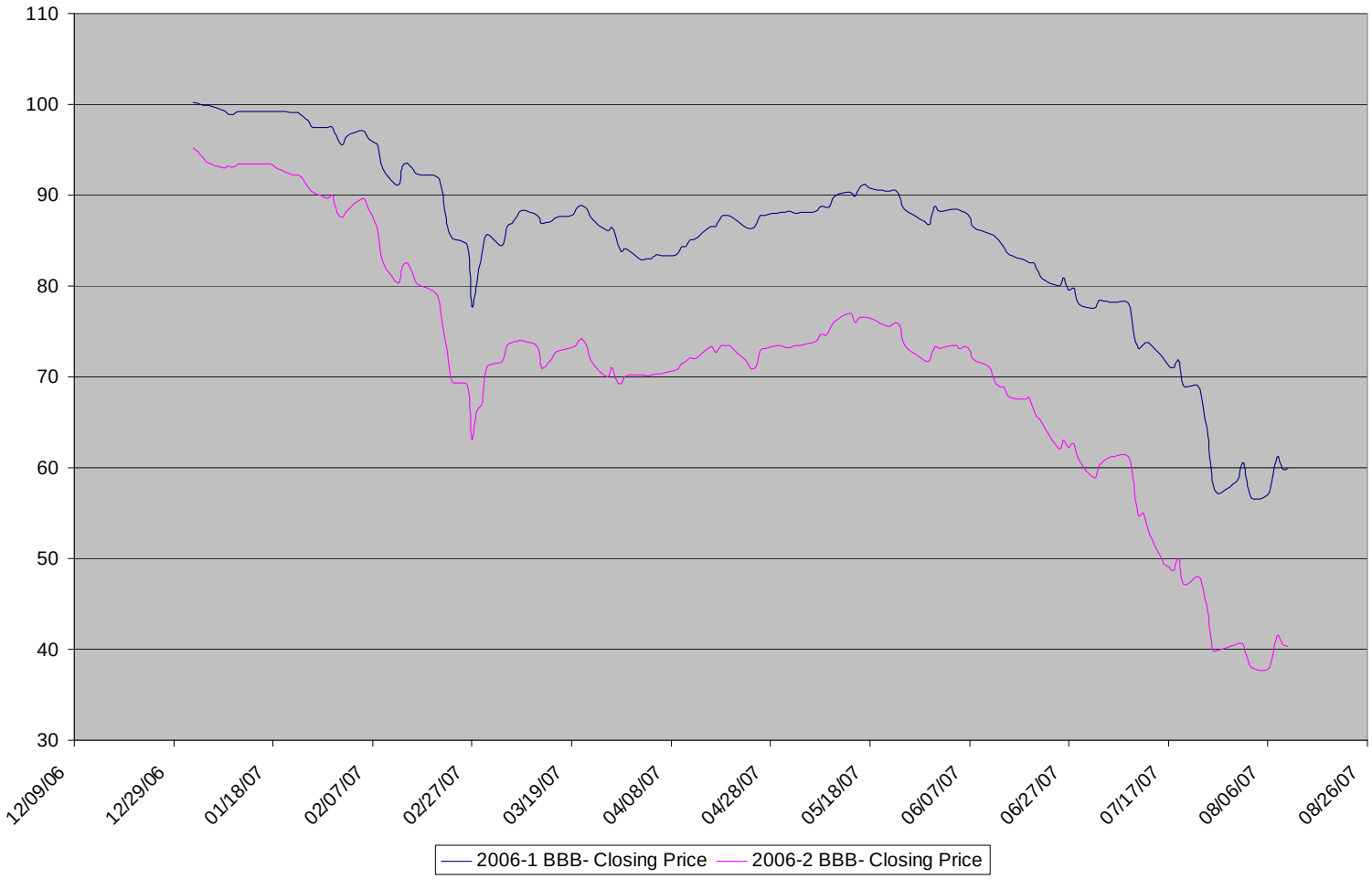
Legend for vertical line indicators:
SUB = Start of Subprime crisis; BRS=Rescue of Bear Stearns; LHB=Failure of Lehman Brothers

Conclusion

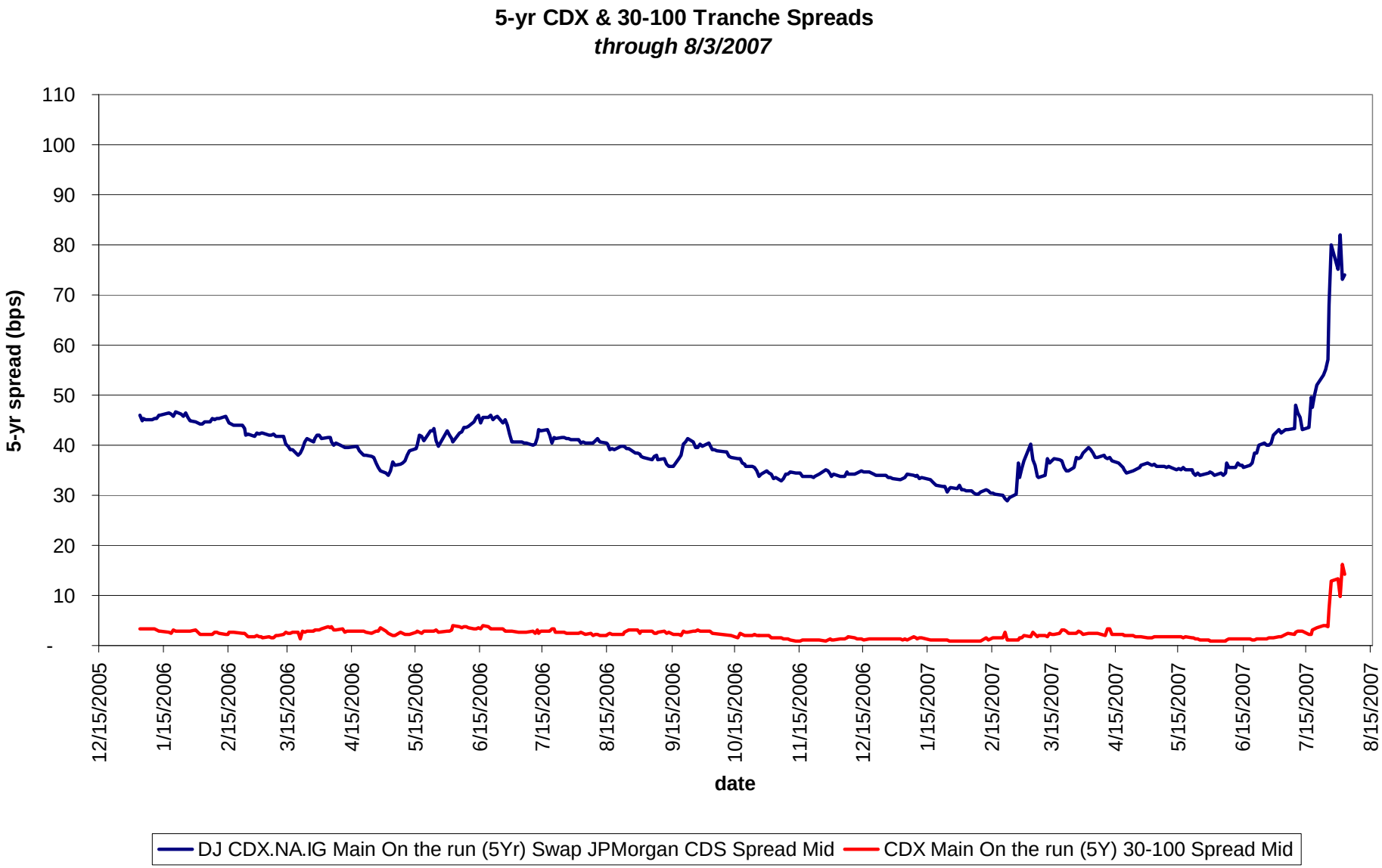
- Interesting description of major drivers of bank credit spread factors through the crisis.
- While the interpretation of the authors is plausible, there is also plenty of evidence that the market was very much concerned about a global recession as early as July 2007.
- Certainly the crisis had already spread to sectors outside of the direct banking sector (e.g., Quant hedge-funds, corporate credit market, CDO markets) as early as July-August 2007.
- If the purpose of the analysis is to document heightened correlation and warn regulators about market participants expectation about systemic/recession risk, then an equally useful tool maybe to simply look at predictions of correlation markets.

Losses in Subprime accelerate in June-July

(Bear Stearns hedge funds bankruptcy announced June 16-17)



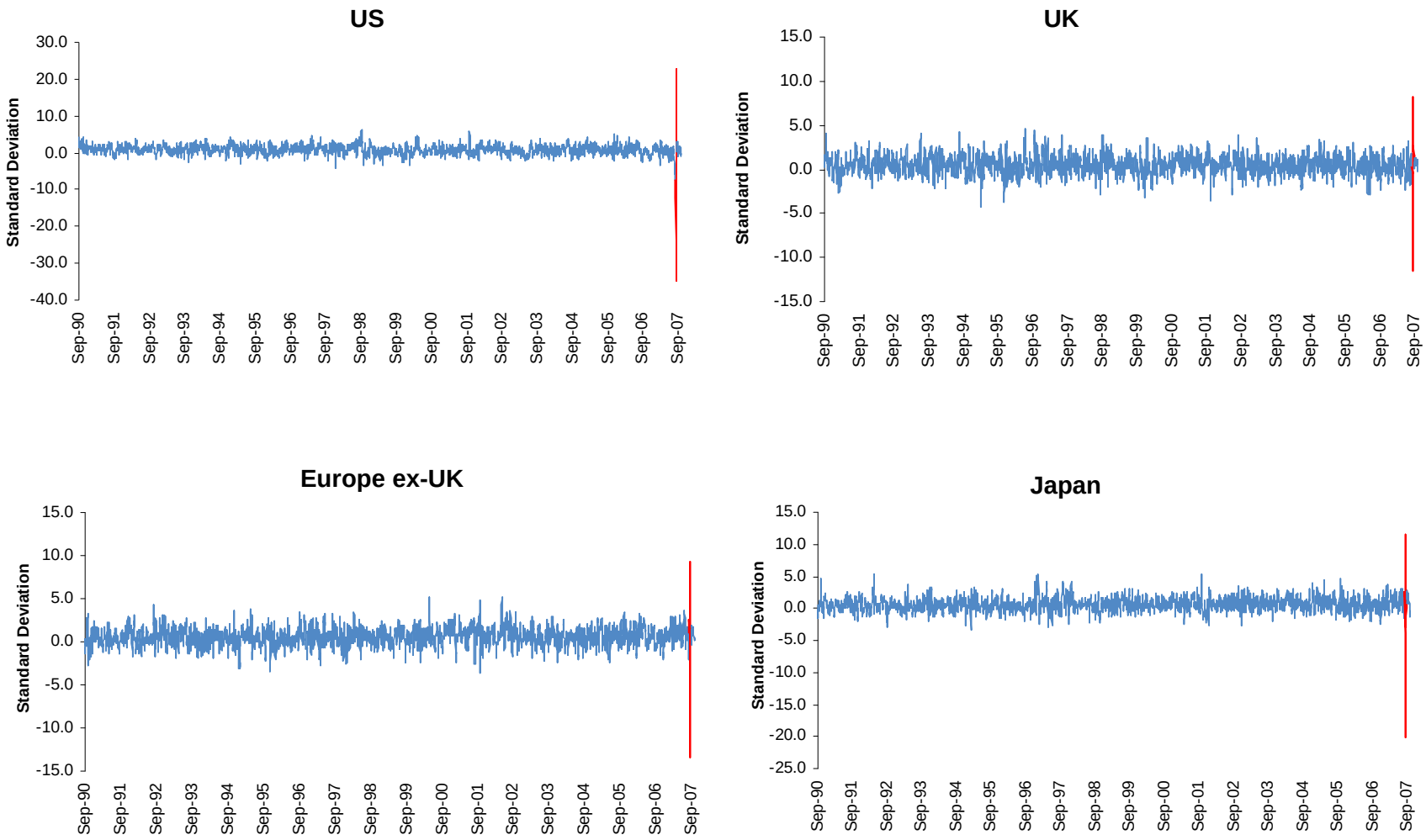
Corporate IG spreads widen on July 16 to July 30



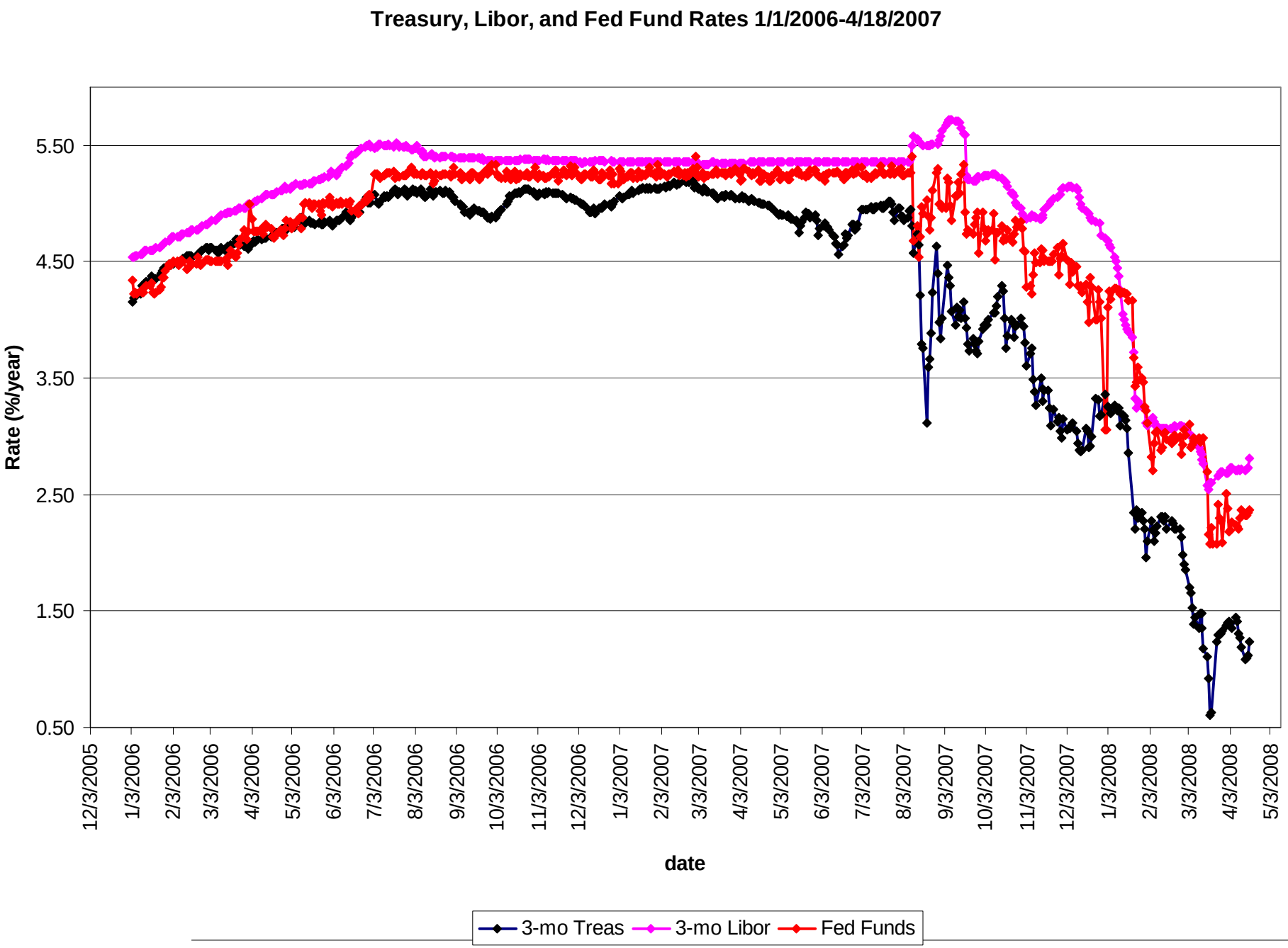
How unusual was the event for Quant strategies?

Cumulative 5-day standardized returns

Quant models experienced extraordinary drawdowns in the same week



These performance results are backtested based on an analysis of past market data with the benefit of hindsight, do not reflect the performance of any GSAM product and are being shown for informational purposes only. Please see additional disclosures. Source: Goldman Sachs.


Treasury, Libor, and Fed Fund Rates 1/1/2006-4/18/2007
Rate (%/year)
5.50
4.50
3.50
2.50
1.50
0.50
12/3/2005
1/3/2006
2/3/2006
3/3/2006
4/3/2006
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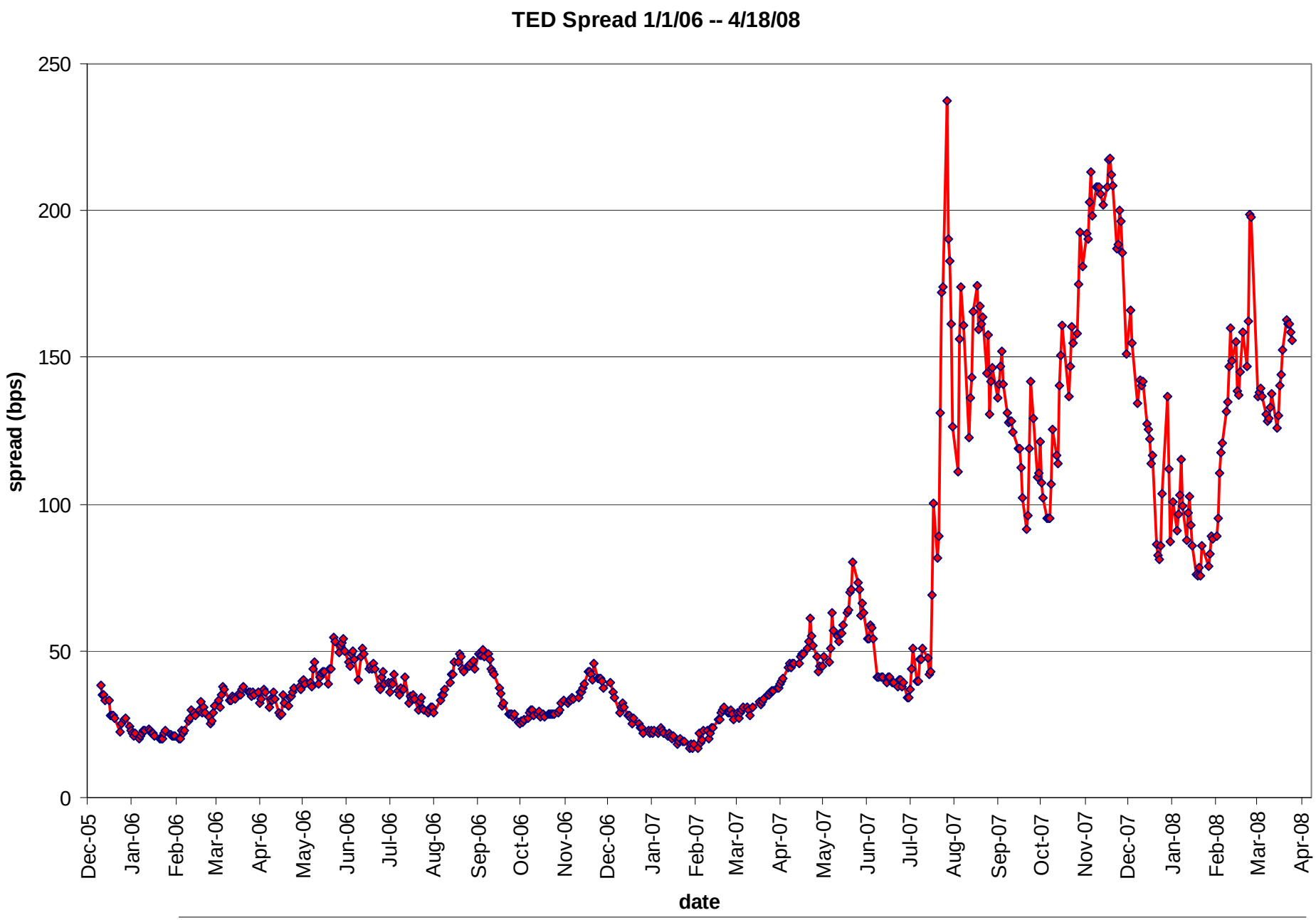
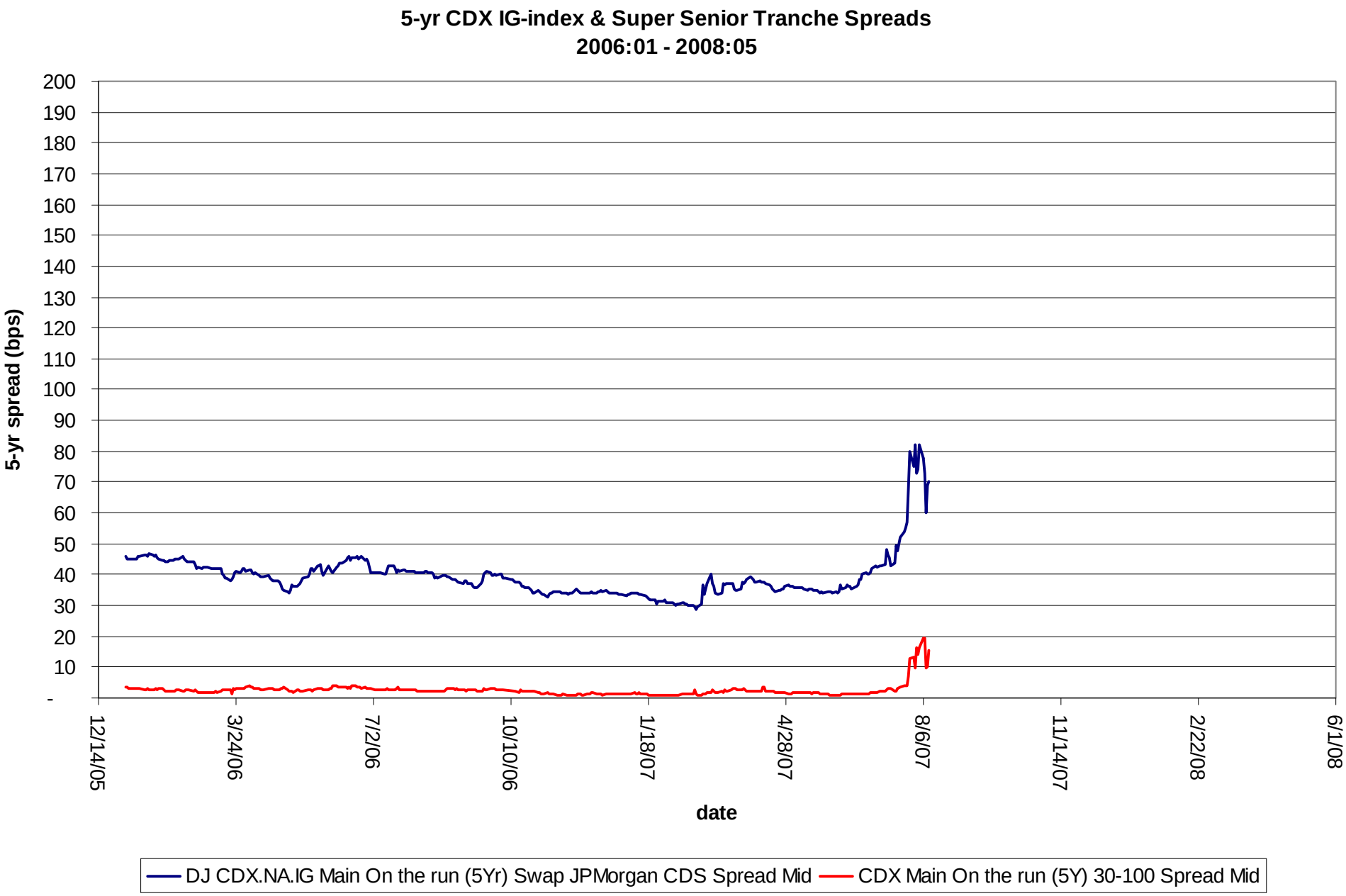
Problems in Interbank Market worsened




5-yr CDX IG-index & Super Senior Tranche Spreads
2006:01 - 2008:05
5-yr spread (bps)
200
190
180
170
160
150
140
130
120
110
100
90
80
70
60
50
40
30
20
10
-
12/14/05
3/24/06
7/2/06
10/10/06
1/18/07
4/28/07
8/6/07
11/14/07
2/22/08
6/1/08
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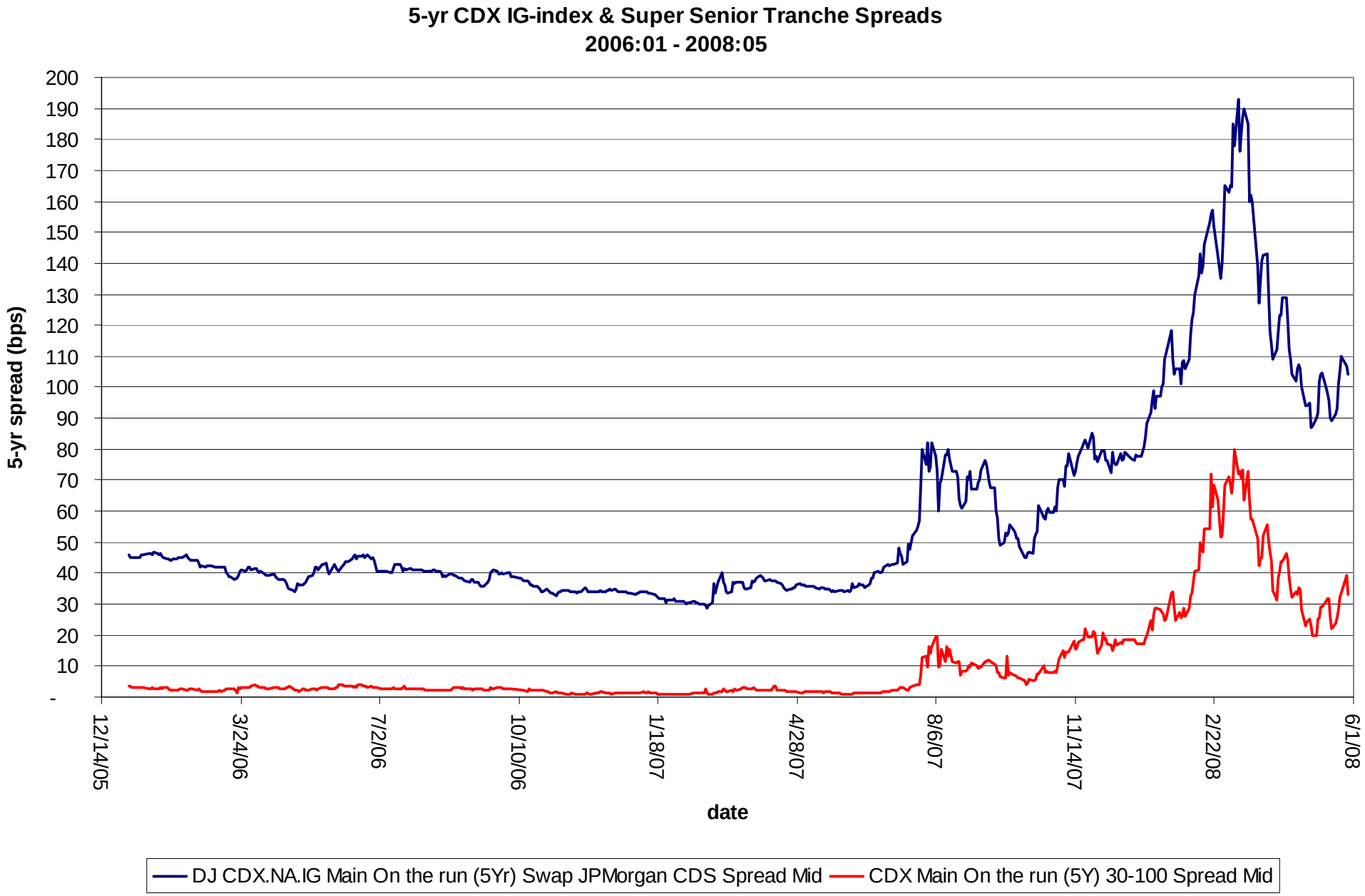
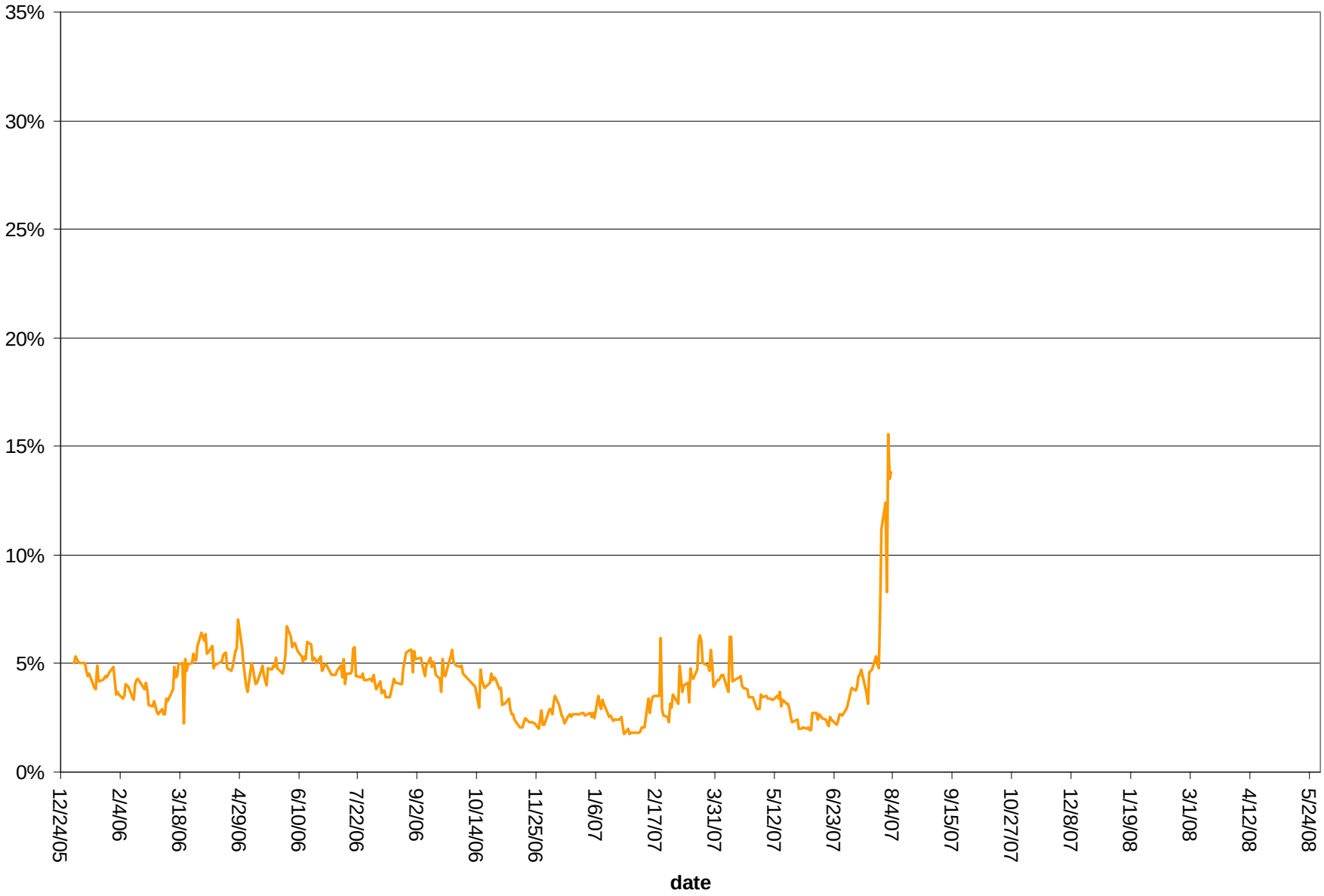
CDX Main On the run (5Y) 30-100 Spread Mid

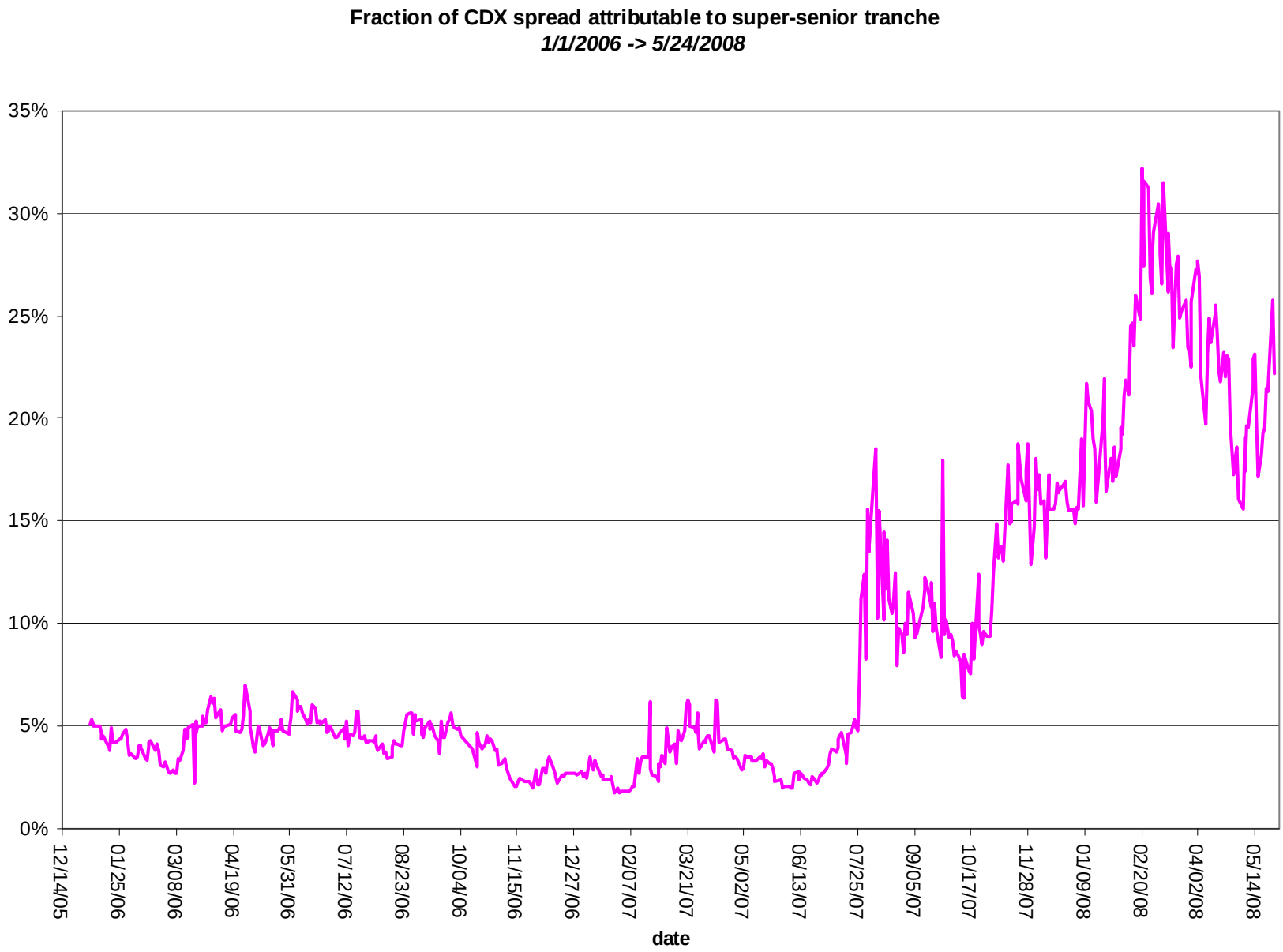
Credit conditions worsened



Fraction of CDX Index Spread attributable to Expected Loss implied by Super-Senior Tranche
-- through August 3, 2007 --



(Implied) Systemic Risk on the rise



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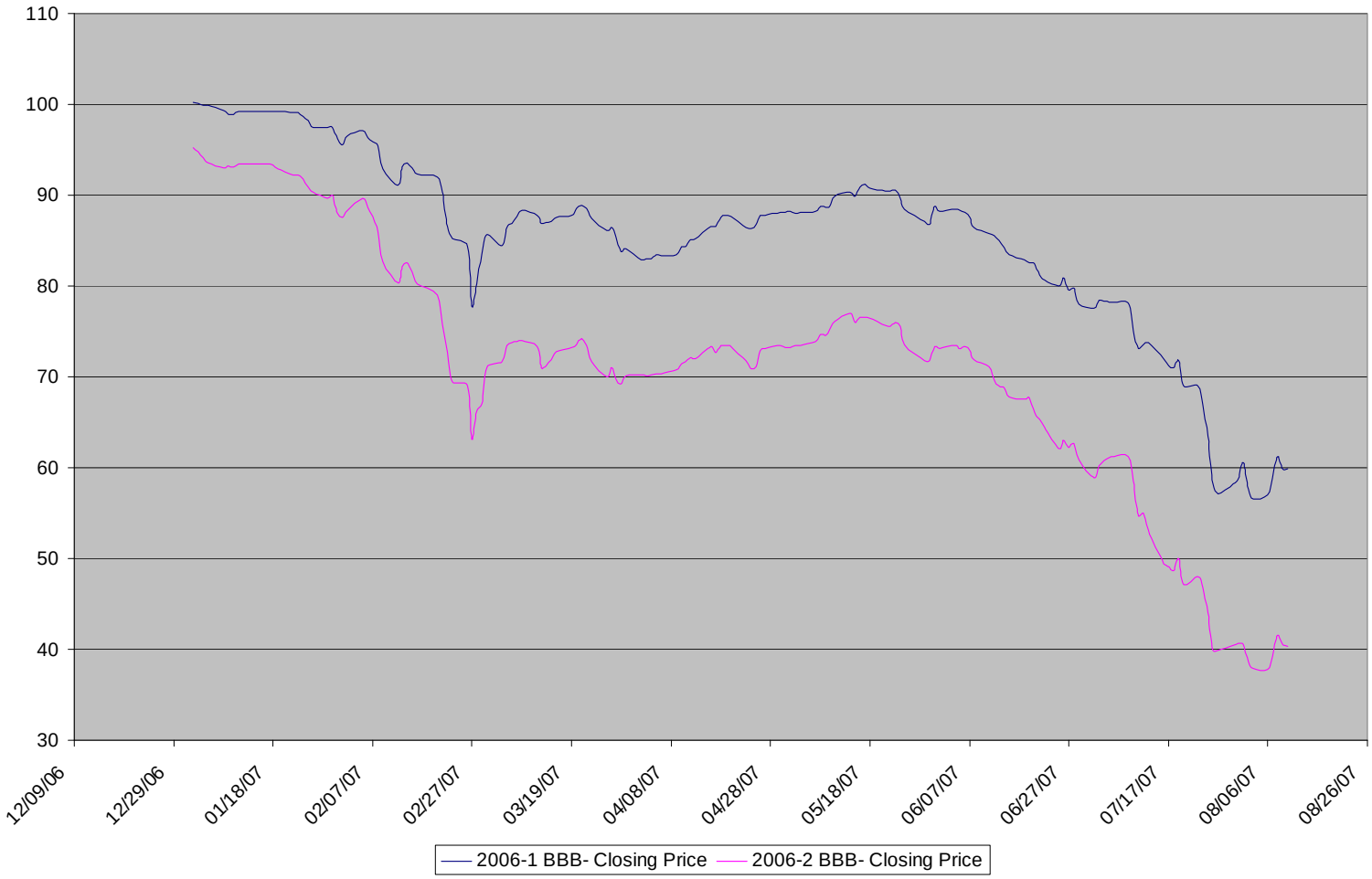

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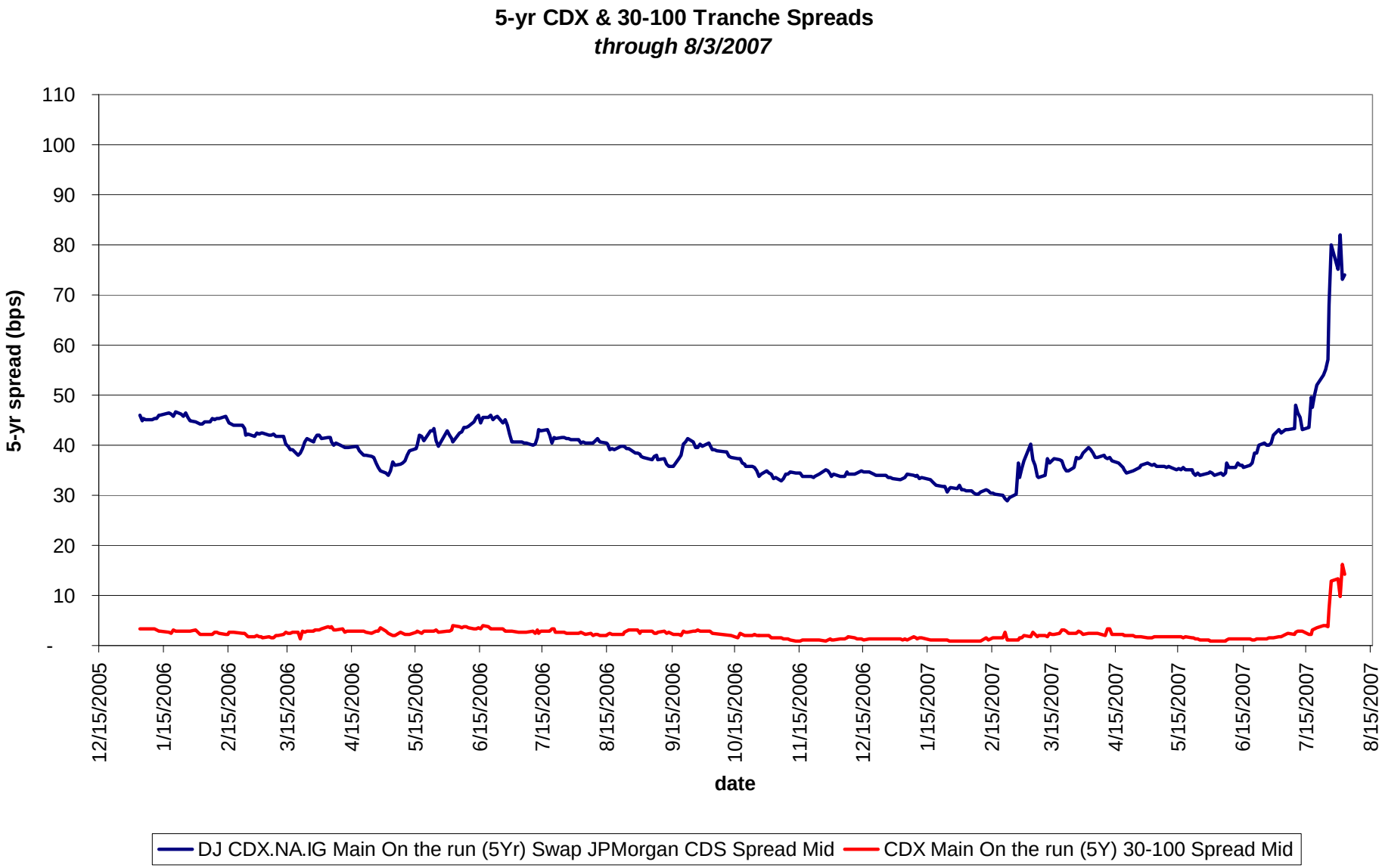

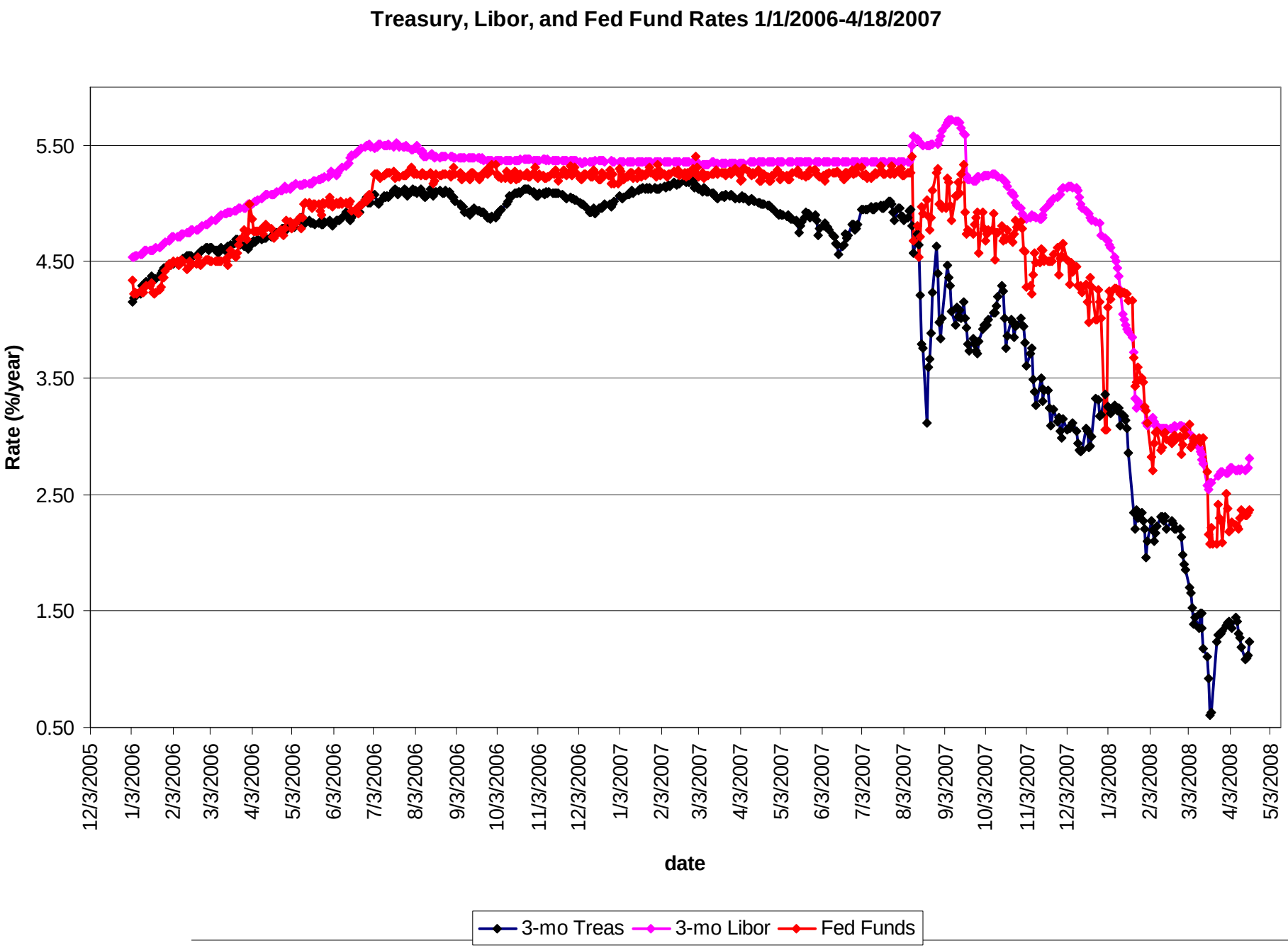
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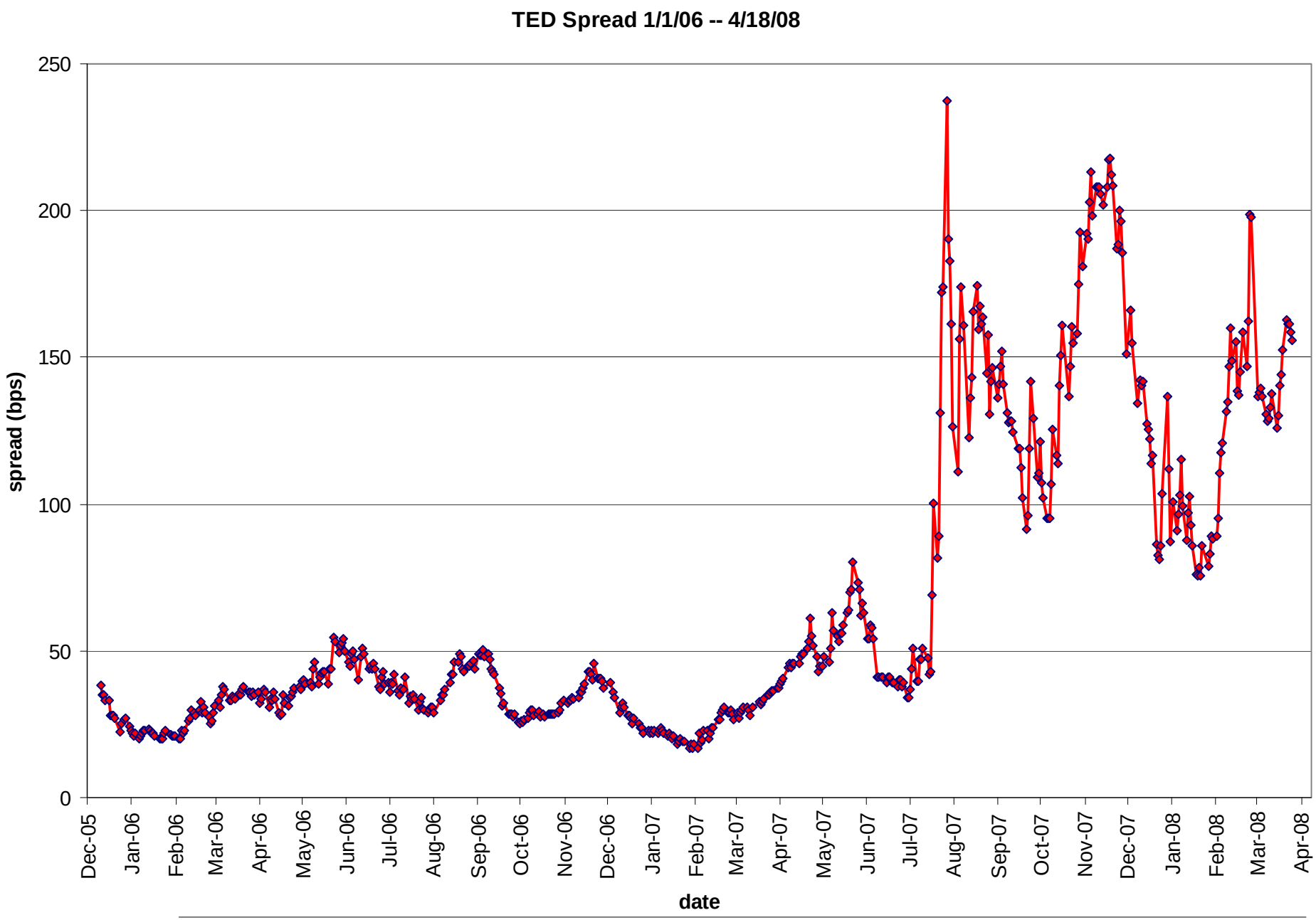

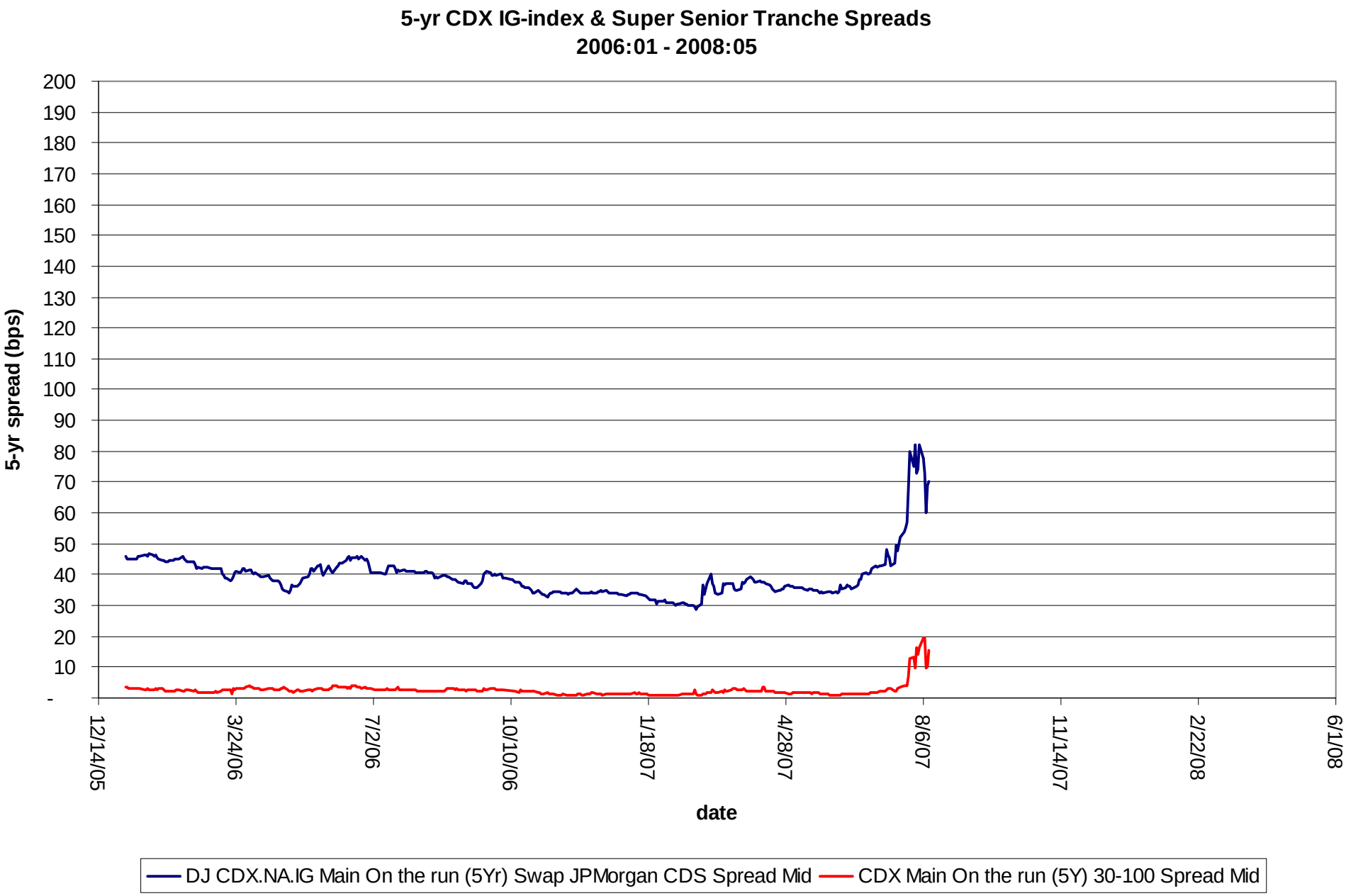
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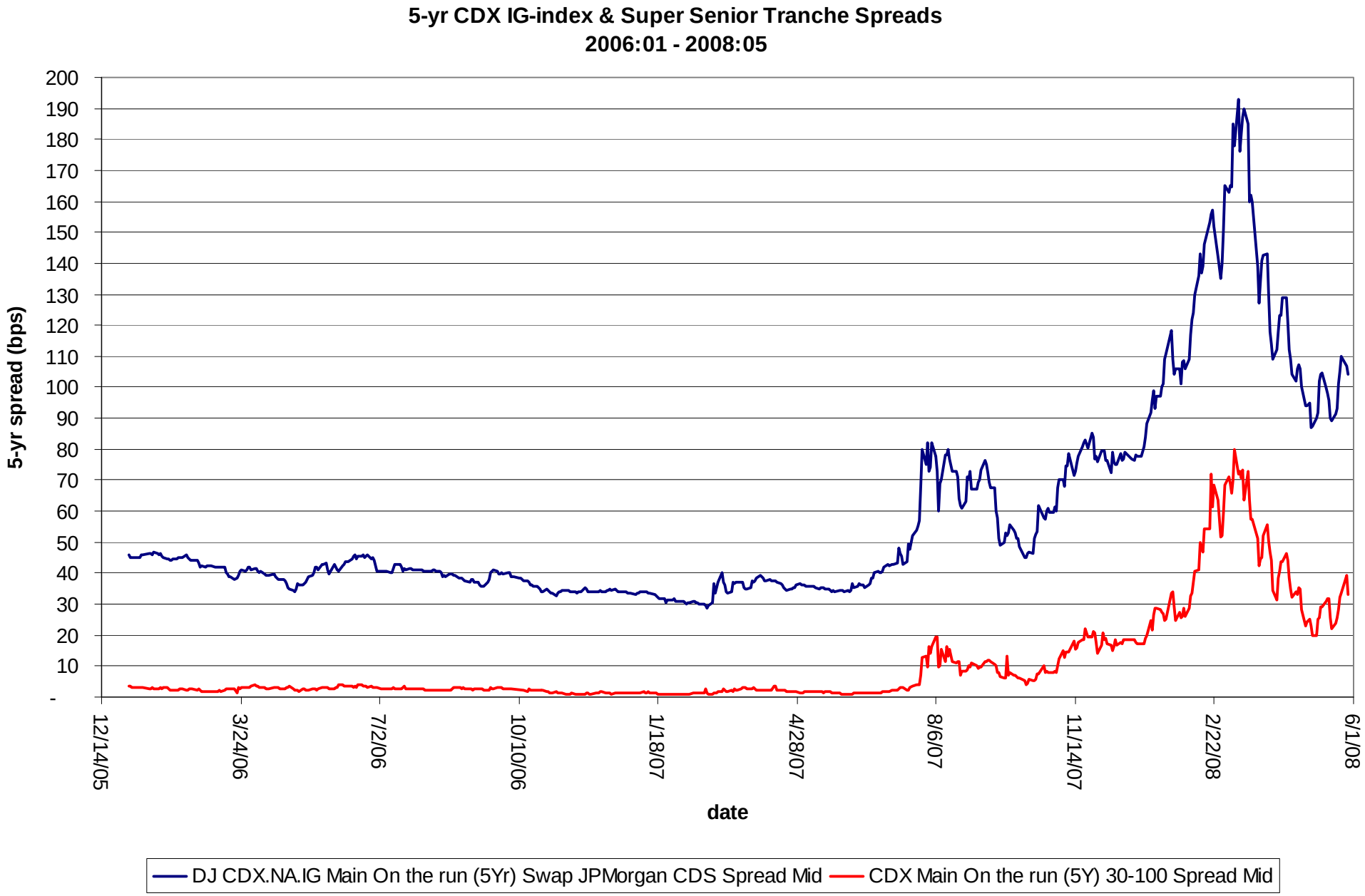

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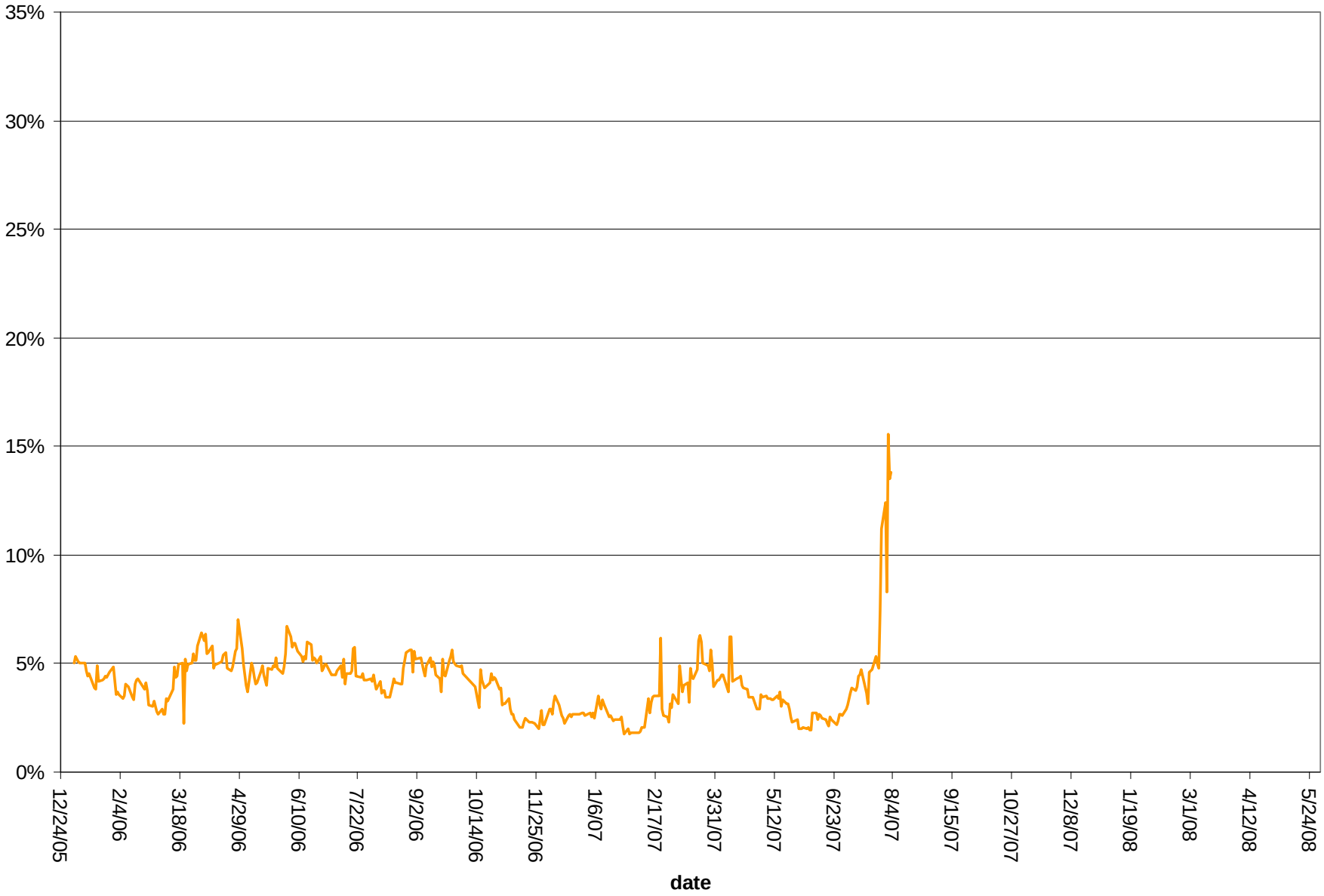

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