

# THC MARKET BULLETIN

May 6, 2010

THC Financial Engineering

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## Tail Risk of the Basis Trade Bulletin 32

The deteriorating financial crisis in Greece and increasing volatility in US Treasuries potentially created a profit opportunity in the benchmark basis trade on the morning of May 5, 2010. This bulletin uses THC Decisions™ to discover and demonstrate how to capture profit potential in volatile markets. The Basis Trade is constructed by minimizing the tail risk in the hedged 5-year On-the-Run (OTR) and 10-year June contract (TYM0).

### Tail Risk of the Basis Trade

Using the DV01 measure, the hedge is determined to be \$10MM 5-year OTR and short \$6.5MM TYM0 (See Appendix on last page). The tail risk has a DV01 of -\$38.6 so that one bpt fall in the yield curve would result in a drop of \$38.6 value on the trade. The trade is also exposed to the basis risk between the 5-year and 7-year rates. The figure below shows the key rate DV01s of the 5-year and 7-year equal \$3,500 in absolute value. That is, whenever the 7-year rate rises 1 bpts more than the 5-year rate, the position gains \$3,500.

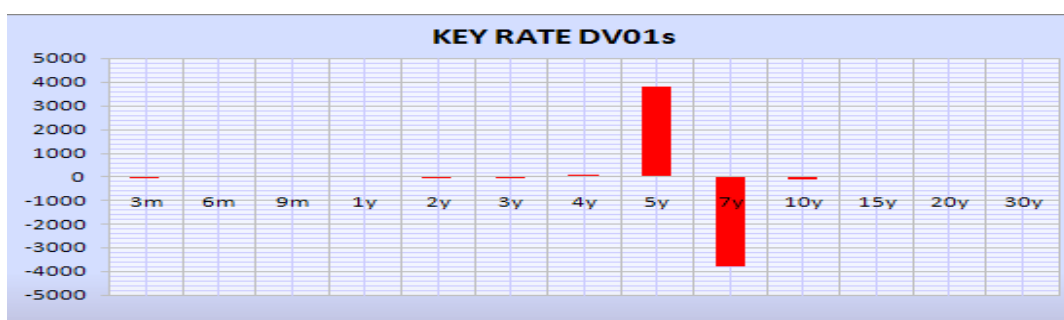


Figure 1. Key Rate DV01 of the Benchmark Basis Trade

Characterizing the tail risk in this fashion contributes significant implications to trading performance for the May 4<sup>th</sup> and 5<sup>th</sup> period. During this period, the 7-year rate fell over 17 basis points, with much of the fall (12 bpts) occurring on the morning of May 5<sup>th</sup>.

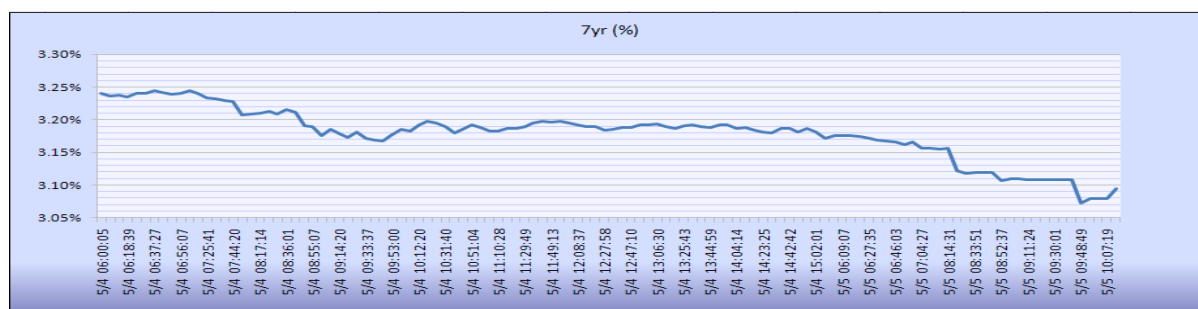


Figure 2. 7-year Rate Trend

### Impact of the Rate Movements on the Trade Performance

The basis risk in the 5-year vs 7-year was significant during the sample period, particularly on May 5<sup>th</sup>. At 8:00am, the curve flattened significantly and reverted to the spread at the start of the day by 10:00am. The spread ended at the same level as the initial spread (Figure 3).

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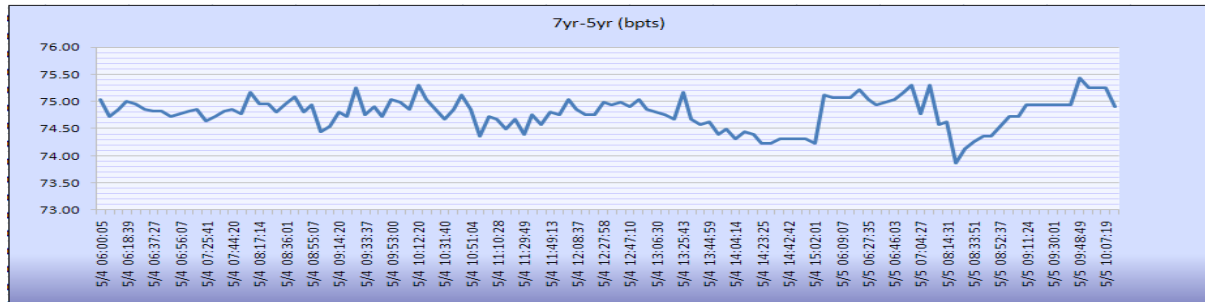


Figure 3. 5-year and 7-year Rate Trend

Cointegration results are interpreted along with the rate movements (Figure 4). The green and yellow bars represent the interest rate returns and the cheap/rich returns respectively. They added up to the P/L of the trade (the blue line).

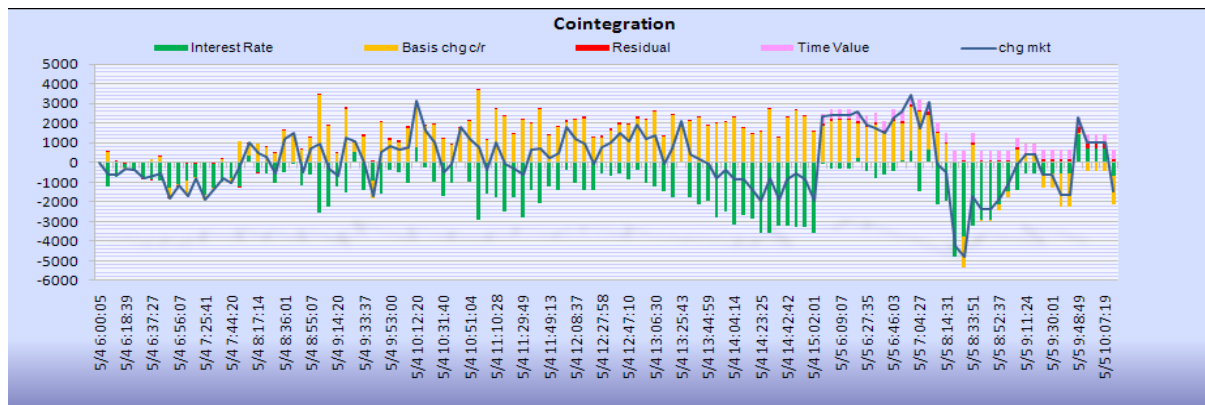


Figure 4. Cointegration of the Basis Trade

## Results

The impact of the spreads on performance of the benchmark basis trade is striking. Figures 3 and 4 indicate a high correlation in interest rate returns. Note that the cumulative interest rate returns over the period are negligible (green bars); hence, consistent with the observation that spreads will return to their initial level.

Using cointegration, it can be shown:

- How to exploit mean-reversion movements in the cheap/rich by buying or selling the basis trade. For example,
  - At 12:00pm when the trade became rich, short the trade and hedge the yield curve risk.
  - At 1:00pm use 7-year OTR instead of the 10-year futures and short the trade.
  - These trades can be repeated at 8:00 am on May 5<sup>th</sup>.
- How to deconstruct cheap/rich movements into components attributed to the futures and to the cheapest-to-deliver bonds (thus, allowing cheap/rich mean reversion movements to be analyzed on a deeper level).
- How to manage tail risk using alternative approaches. For example,

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- Buy/sell more FVMO to adjust the DV01, depending on the expectation of the rate to rise or fall.
- Manage the yield curve shape movement risk by taking DV01 neutral 2-year and 5-year futures positions (see Bulletin 33).
- Manage the spread risk between the 5-year and 7-year rates using a butterfly trading position, and neutralizing the risks of the yield curve shape movements.

## Conclusions

The cointegration approach enables traders to take an active view of the basis trade, reacting to the changes in the market dynamically. For example,

- Change the tail risk exposure in rate level and spreads, and
- Enter and exit the trade depending on the cheap/rich level

This approach may be used in conjunction with the hedge ratio determined empirically (see Bulletin 25) on the empirical hedge ratio method. The cointegration approach provides traders information continually, so that the hedge ratios can be adjusted in real time. The empirical hedge ratio provides the longer term perspective of the trade. These methods need not be mutually exclusive.

## Appendix

The THC Hedge Ratio sheet shows a hedge ratio of 0.6447.

### Futures/Cash Hedge Ratios

Principal(\$MM)			2y- Jun10	3y- Jun10	5y- Jun10	10y- Jun10
			1.000	1.000	1.000	1.000
Instrument name	DV01		201.67	316.41	477.93	728.79
usg_02Y	1.000	196.67	0.9752	0.6216	0.4115	0.2699
usg_03Y	1.000	288.90	1.4326	0.9130	0.6045	0.3964
usg_05Y	1.000	469.85	2.3298	1.4849	0.9831	0.6447

By entering \$10MM for the 5-year OTR (912828MZ0) in the Positions-Risk sheet, the resulting position DV01 was \$4,698.53. A corresponding short position of 65 TYM0 contracts results in a net DV01 of -\$38.60 (see below). Thus, the negative DV01 exposes the tail to some falling rate risk.

### Risk-Position Sheet

	DV01
Futures portfolio	-4737.13
Cash bond portfolio	4698.53
Total	-38.60

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