Short Term Trading Strategies from Mean Reversion of Yield Curve

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Mean Reverting Yield Curve Trading Strategies

- Historically, the US Yield Curve mean-reverts to an unconditional curve.
- Deviations in the level, slope, and curvature from historical patterns can be exploited via mean-reverting trading strategies.
- The trading strategies we consider are:
  - Bullet strategy: trading bonds with maturities concentrated in a part of the yield curve
  - Ladder strategy: trading bonds across a range of maturities
  - Barbell strategy: go long (short) bonds at the ends of the yield curve, and short (long) a bond in middle portion of the yield curve

Investment Universe and Traded Securities

- The investment universe consists of the:
  - US T-bills and US T-bonds with tenors between 2mo and 60mo
- The strategies:
  - Take long and short positions in bonds with different maturities
  - Trade and hold positions in a one month period

Implementation Overview

- Strategies and implementation introduced by Chua et al (2005)
- Construct yield curves (zero curves) and corresponding forward curves on data available from 1990-01-01 to 2022-12-16
- Calculate indicators based on forward curves
- Simulate trading strategies based on indicators

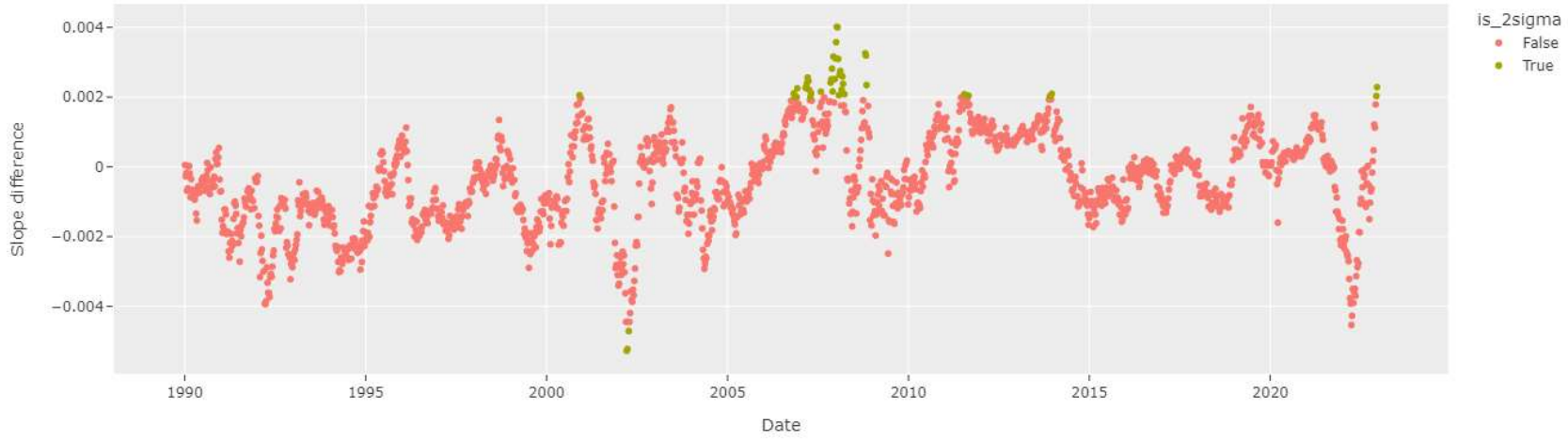
Trading Strategies

	Strategy 1-A		Strategy 2-A		Strategy 3-A	
	Level		Slope		Curvature	
Event	$\bar{r}_{yc} < \overline{F_{1mo}}$	$\bar{r}_{yc} > \overline{F_{1mo}}$	$\bar{r}_{yc} < F_{59,1mo} - F_{1,1mo}$	$\bar{r}_{yc} > F_{59,1mo} - F_{1,1mo}$	$c(X,Y,Z) < c_{yc}$	$c(X,Y,Z) > c_{yc}$
Expectation	$F_{1mo} \downarrow$	$F_{1mo} \uparrow$	$slope_{yc} \downarrow$	$slope_{yc} \uparrow$	$c_{F_{1mo}} \uparrow$	$c_{F_{1mo}} \downarrow$
Trading	Go long bonds with maturities > 1mo	Short bonds with maturities > 1mo	Go long the 60mo bond and short the 2mo bond	Short the 60mo bond and go long the 2mo bond	Go long the 2mo and 60mo bonds, and short the 30mo bond	Short the 2mo and 60mo bonds, and go long the 30mo bond

$\bar{r}_{yc} = average\ level\ of\ unconditional\ yield\ curve$
$\overline{F_{1mo}} = average\ level\ of\ 1mo\ forward\ yield\ curve$
$F_{59,1mo} - F_{1,1mo} = the\ 1mo\ forward\ yield\ spread\ (for\ the\ 59mo\ and\ 1mo\ bonds)$
$slope_{yc} = slope\ of\ unconditional\ yield\ curve$
$c(X,Y,Z) = curvature\ of\ yield\ curve\ determined\ by\ bonds\ X,Y,Z$
$c_{yc} = curvature\ of\ unconditional\ yield\ curve$
$c_{F_{1mo}} = curvature\ of\ 1mo\ forward\ yield\ curve$

Preliminary Investigation

- Our preliminary investigations confirm that the yield curve has mean reverting properties in level, slope, and curvature. The graph below demonstrates the mean reverting property in the curvature.



Performance & Analysis

- We intend to carry out thorough analyses of the distribution of returns, profit, considerations of leverage and transactions costs in our final presentation.
- Some other extensions we may include are varying the trading frequency, expanding to international bond markets or using derivatives to reduce transaction costs.
- We'll also further this analysis by comparing against benchmarks such as the Bloomberg U.S. Aggregate Bond Index and the S&P 500 Index.
- This pitchbook is only a preliminary view of our project and will be further supplemented in the final draft.

References

- Chua, Choong Tze; Koh, Winston T. H.; and Ramaswamy, Krishna. Profiting from Mean-Reverting Yield Curve Trading Strategies. (2005). Financial Management Association European Conference, Siena, August 2005. 1-40. Research Collection Lee Kong Chian School Of Business. Available at: http://ink.library.smu.edu.sg/lkcsb_research/2489