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A discussion on

A Black Swan in the Money Market

by J. Taylor & J. William

Summary of the Paper

- ## Theoretical propositions
  - ### Credit risk is part of the Libor-OIS spread
    - Widely accepted
  - ### No liquidity premium in the Libor-OIS spread
    - Based on Ang and Piazzesi (2003)
  - ### TAF has no effects on Libor-OIS spread
    - Fed total reserve remained unchanged

- ## Empirical observations
  - ### CD rates move along with Libor
    - There is no liquidity premium in CD rates.
  - ### Regression: $S(t) = \alpha + \beta \cdot CRD(t) + \gamma \cdot TAF(t) + \varepsilon(t)$
    - Credit spread is significant
    - TAF is insignificant
    - Result of McAndrews, Sarkar, Wang (2008) is not robust.

What I like and agree in this paper

- A very important topic
  - Both LIBOR and OIS are important considerations in the design and operation of the Term Auction Facility at NY Fed.
  - The LIBOR-OIS spread is part of the important barometers for measuring the stress in banking industry.

- A very timely paper
  - At NY Fed, we have been internally analyzing the effects of TAF since the first TAF auction.
  - John's paper brought the effectiveness of TAF to wide attention and interests in industry.

- Credit risk is very important in LIBOR-OIS spread.
  - The recent financial crisis is entirely caused by credit risk.

A few questions

for all of us

to think

Should there be a liquidity risk factor?

- Ang & Piazzesi's model for default-free debts
- The model is employed in this paper to price LIBOR with the assumption of credit risk.

$$r(t,T) = -\frac{1}{T}\log P(t,T) \qquad\qquad P(t,T) = E_t[m(t,T)P(t,T)]$$

$$m(t,T) = \exp\left(- r(t,t) - 0.5\lambda^2(t) - \lambda(t)\,\varepsilon(t)\right)$$

$$\lambda(t) = -\gamma_0 - \gamma_1 x(t)$$

- $x(t)$ is the vector of risk factors
- What are the risk factors? Interest risk, credit risk, ...
- Why can't there be a factor for liquidity risk?

Does reserve-neutrality preclude TAF effect?

- In a "perfect" market, term spread reflects
  - Expectation of future short rate
  - Premium on interest risk

- In the money market, term spread also reflects
  - Different exposures to credit risk
  - Different exposures to non-credit risk

- What does the total reserve do?
  - An increase of reserve reduces short (or overnight) rate
  - then brings down term rate, if expectation & risk unchanged

- Fed wants to use TAF
  - to reduce term spread but not short rate

Is there liquidity premium in CD rate?

- Supply curve of CD must have an upward slope.
  - Depositors have alternative business opportunities.
- Demand curve of CD must have a downward slope.
  - (We all know the reason.)
- Even if we assume that depositors are not exposed to funding risk,
  - as borrowers are willing to pay a liquidity premium,
  - equilibrium rate may still contain the premium.
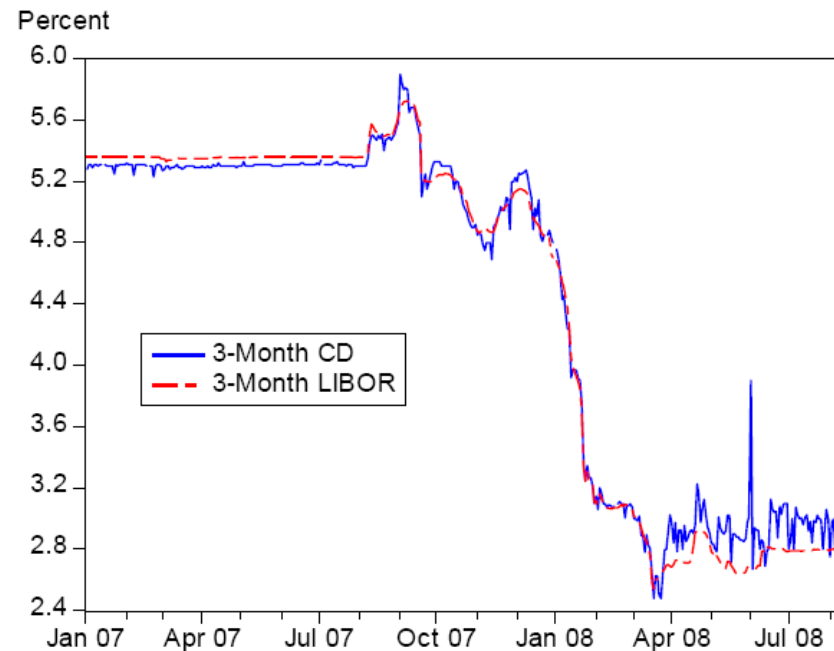
- Why is CD rate much *higher* than LIBOR recently?
 - Are CDs exposed to higher credit risk than inter-bank loans are?

What should be the correct regression?

- If TAF(t) is dummy variable, should the level of spread S(t) be the dependent variable?
  - Even if S(t) = STEP(t) + ε(t)
    - γ cannot be significant.
  - TAF(t) can be significant if
    - S(t) = INST(t) + ε(t)
    - Only one-day effect?
  - Change of S(t) should be used.

- Another problem with level
  - Is S(t) stationary? It does not seem to pass unit root tests.
  - If not, t-stats are not applicable.
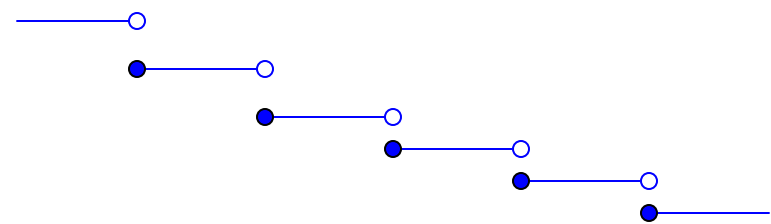 - Change of S(t) should be the dependent variable.

TW's regression:

$$S(t) = \alpha + \beta \cdot \mathrm{CRD}(t) + \gamma \cdot \mathrm{TAF}(t) + \varepsilon(t)$$
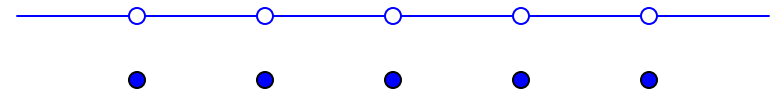
Variable TAF(t):
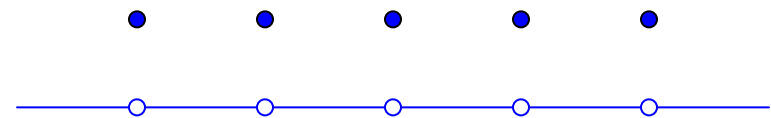
Variable STEP(t):

Variable INST(t):

A reasonable regression might be:

$$\Delta S(t) = \alpha + \beta \cdot \Delta\mathrm{CRD}(t) + \gamma \cdot \mathrm{TAF}(t) + \varepsilon(t)$$

To conclude

- The points all of us should take from the paper:
  - A nice overview of the recent development in money market.
  - A timely discussion on the effectiveness of TAF.
  - A confirmation on the importance of counterparty risk.
- The questions all of us should think more:
  - What are the risk factors affecting LIBOR-OIS spread?
  - How do reserve and its allocation affect interest rates?
  - Why were CD rates below LIBOR but jump above recently?
  - Which econometric specification is proper for TAF?
- A challenging task for future research:
  - What is the optimal response to financial stress?