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Overview

• Do Euribor futures “efficiently” forecast future interest rates?
  – In general, yes.

• What is the impact of ECB policy decisions on expectations of future interest rates, as measured by Euribor futures?
  – Not much, usually; but sometimes a lot.
  – Interesting implications for “transparency.”
Efficient Markets Tests with Overlapping Data, “Small $T$” and “Large $N$”
Conventional efficient markets tests

- $r_{t+1} = \text{spot rate}, \quad f^1_t = 1\text{-period-ahead futures rate}$
- Efficient markets $\Rightarrow f^1_t = E_t r_{t+1}$
- Long time series on $r$ and $f$ are available
- Regress: $r_{t+1} = \alpha + \beta f^1_t + \gamma x_t + \varepsilon_{t+1}$
- Test $\alpha = 0, \beta = 1, \gamma = 0$
- Example: Krueger & Kuttner (1996), Fed funds futures.
Challenges for Euroland data

• Short time series: March 1999 to March 2002.
  – Scope for updating dataset, increasing sample size by 33%.

• Contracts settle 4 times a year.
  – FF futures settle every month, easier to work with.

• Sophisticated econometrics required to maximize utilization of the data.
The panel data setup

- Let \( t \) index contract (March 2000, June 2000, etc)
- Let \( i \) index days until contract settlement (1-183)
- Choose horizon \( N = 31, 61, 91, 122, 153, 183 \)
- \( r_t = \alpha_i + \beta f_{i,t} + \gamma x_{i,t} + \varepsilon_{i,t} \)
- 13 “cross sections” of up to 131 “individuals” each (depending on horizon)
- Overlapping data \( \Rightarrow \) correlation across “individuals” for a given \( t \)
Econometric complications

- Stack model by unit, let $\mathbf{y} = \text{vector of errors}$.
- $\mathbb{E}(\mathbf{y}\mathbf{y}^\prime) = \mathbf{\Omega} \otimes \mathbf{I}_T$
- For $N = 183$, $\mathbf{\Omega}$ is a $131 \times 131$ matrix with 8,646 unique elements!
- With $N > T$, sample estimate of $\mathbf{\Omega}$ will be singular (rank $T$). GLS not feasible.
- Solution: OLS, with standard errors based on estimated $\mathbf{\Omega}$. 
Main result

• Efficiency is only rejected for:
  – 4, 5, and 6 month horizons,
  – with $x_{i,t}$ = change in futures rate from previous day.

• Estimated $\beta$s are very close to 1.
Comments (1)

• Why is the horizon defined to include all forecast intervals from 1 to $N$ days?
  – For example: 6-month horizon ($N = 183$) includes 2-day-ahead up to 183-day-ahead forecasts.
  – Motivation for looking at different horizons: forecasting performance diminishes as time to expiration increases.
  – Suggests analyzing non-overlapping horizons (e.g., up to 1 month, 1-2 months, 3-4 months, etc.)
Comments (2)

• The correlation across “individuals” (i.e., adjacent days’ forecast errors) is very high.
  – How much additional information does daily data add?
  – The econometric approach used imposes no structure on the pattern of contemporaneous correlations.
  – Possible to parameterize contemporaneous correlations, e.g. as a function of the number of days of overlap?
The use of daily data limits the data that can be used to test “semi-strong” form efficiency.

Even so, there are many more variables that could be included in $x_{i,t}$: any financial market data available at a daily frequency.

- Interest rate spreads are obvious candidates.
The surprise element of ECB actions (and inactions)
Alternative approaches

• One way to gauge the predictability of monetary policy: see how well financial market data can forecast changes in the policy rate.

• This paper’s approach: look at the response of interest rate futures to monetary policy actions (and inactions).
Defining “surprises”

• In US, Fed funds futures allow precise calculation of surprise element of policy actions.

• Not possible with 3-month Euribor futures.

• Revision in interest rate expectation as a measure of volatility: \( |f_{i,t} - f_{i-1,t}| \)

• Ex post change in forecast error as a measure of information: \( |r_t - f_{i,t}| - |r_t - f_{i-1,t}| \). Negative ⇒ announcements improve forecasts.
Main results

• Most ECB announcements are “not too surprising.”
  – On average, higher volatility on days of Governing Council meetings (controlling for day of week).
  – Most meetings exhibit normal volatility.
  – A number moved expectations considerably.

• Policy announcements do nothing to improve interest rate forecasts.

• Monthly bulletin contains no information!
The pattern of volatility

- The *pattern* of volatility contains information.
- A large “surprise” in one month is often followed by another “surprise” in the next.
  - May 2000 “no change” → +50 bp in June
  - April 2001 “no change” → −25 bp in May
- Impact on expected Euribor rate months in the future ⇒ not merely a “timing” surprise.
- Does the effect vary across contracts?
- More work to be done.
Interpretation of results

• Volatility measures are hard to interpret on their own. Comparisons with other countries would be useful.

• Are surprises always to be avoided?
  – Asymmetric information versus transparency?
  – Policymakers may want to “get the market’s attention.”
  – The answer may depend on the impact of the surprise on expectations, and whether future policy is consistent with those revised expectations.
Conclusions

• Nicely done paper.
• Uses a novel adaptation of panel data methods to the analysis of futures data.
• Shows that futures data can provide a useful way to gauge the impact of monetary policy on interest rate expectations.