Comments on “The Dynamic Effects of Forward Guidance Shocks”

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• Responses of fed funds futures and Treasury to FOMC announcements is multidimensional
  – Gürkaynak, Sack and Swanson (IJCJ, 2005); Campbell, Evans, Fisher, and Justiniano (BPEA, 2012); Bauer (JMCB, 2015)

• Signaling future intentions matters in addition to current target level (forward guidance)
• This paper treats as one-dimensional during the ZLB
  – Empirical: response of fed funds futures after 7th-upcoming FOMC meeting
  – Theory: Shock to serially-correlated residual in a shadow-rate Taylor Rule
• Striking coherence between theoretical prediction and empirical finding
• Theory: a change to the future monetary policy rule may be single most effective tool for monetary policy at the ZLB
  – Krugman (BPEA, 1999); Eggertsson and Woodford (BPEA, 2003)

• Practice: how does today’s Fed change the future monetary policy rule?
• FOMC statement Aug 9, 2011:
  – “The Committee currently anticipates that economic conditions—including low rates of resource utilization and a subdued outlook for inflation over the medium run—are likely to warrant exceptionally low levels for the federal funds rate at least through mid-2013.”
Blue Chip expectations of time until Fed liftoff

Note: Number of quarters until federal funds rate expected to rise above 37.5 basis points.
Source: Swanson and Williams (2014a), from Blue Chip Consensus Survey data.
• Is this Odyssean?
  – Fed is tying its hands preventing itself from acting before 2013

• Or is it Delphic?
  – Fed is predicting the future value of its policy shock or future value of economic conditions

• If Delphic and Fed has superior information about economy, the statement would depress rates
• Beginning of August Blue Chip 3-quarter-ahead forecast:
  – Unemployment 8.8%, inflation 1.8%
• Beginning of September forecast:
  – Unemployment 9.0%, inflation 1.7%
• Consistent with Delphic gloom
• Campbell, et al. studied correlation between rate changes in 30-minute interval around FOMC statement and month-to-month change in Blue Chip forecast.

• A statement that decreased interest rates was associated with market expectations of decreased inflation and increased unemployment.

• Typically we observe Delphic component.
\( f_{t-}^n = n\)-period futures price just before statement in month \( t \)

\( f_{t+}^n = n\)-period futures price just after statement

\( y_t^h = h\)-quarter-ahead Blue Chip forecast at beginning of month \( t \)

\( y_{t+1}^h = h\)-quarter ahead forecast at beginning of \( t + 1 \)

\( y_{t+1}^h - y_t^h = \alpha + \beta(f_{t+}^n - f_{t-}^n) + \varepsilon_{t+1} \)

Campbell et al. found \( \beta < 0 \) for unemployment and \( \beta > 0 \) for inflation
Bundick and Smith suggest we should instead estimate

\[ y_{t+1}^n = \alpha + \rho_1 y_t^n + \rho_2 y_{t-1}^n + \rho_3 y_{t-2}^n + \rho_4 y_{t-3}^n + \beta M_t + \varepsilon_{t+1} \]

\[ M_t = \sum_{\tau=0}^{t} (f_{\tau+}^n - f_{\tau-}^n) \]
But economic theory suggests the original specification is correct.
\[ y_{t+1}^h - y_t^h = \alpha + \beta(f_{t+}^n - f_{t-}^n) + \varepsilon_{t+1} \]
\[ f_{t+}^n - f_{t-}^n \] should be martingale-difference sequence due to short time interval.
\[ y_{t+1}^h - y_t^h \] should be martingale-difference sequence if Blue Chip rational.
Empirically: \[ y_{t+1}^h - y_t^h \] indeed appears to be white noise
- Krane (AEJ Macro, 2011); Campbell et al. (BPEA, 2012)
If \( y_{t+1}^{h} - y_{t}^{h} = \alpha + \beta(f_{t+}^{n} - f_{t-}^{n}) + \varepsilon_{t+1} \) is correct then level form is misspecified

\[
y_{t+1}^{n} = \alpha + \rho_{1} y_{t}^{n} + \rho_{2} y_{t-1}^{n} + \rho_{3} y_{t-2}^{n} + \rho_{4} y_{t-3}^{n} + \beta M_{t} + \varepsilon_{t+1}
\]

Regression wants to set \( \rho_{1} + \cdots + \rho_{4} \approx 1 \)

But \( M_{t} \sim I(1) \)
Truth:
\[ y_{t+1}^h - y_t^h = -0.21(f_{t+1}^n - f_{t-1}^n) + \varepsilon_{t+1} \]
\[ f_{t+1}^n - f_{t-1}^n \sim N(0, \sigma^2) \]
\[ \varepsilon_{t+1} \sim N(0, \sigma^2) \]

Estimate:
\[ y_{t+1}^h = \alpha + \rho_1 y_t^h + \beta M_t + e_{t+1} \quad t = 1, \ldots, 72 \]
Blue: density of $\hat{\beta}$ when estimated in differences
Red: density of $\hat{\beta}$ when estimated in levels
True value of $\beta = -0.21$
Levels estimation significantly biased upwards
Could fix the worst of the problem by including lag of $M_{t-1}$

\[ y^h_{t+1} = \alpha + \rho_1 y^h_t + \beta M_t + \beta_1 M_{t-1} + e_{t+1} \]

But why intentionally create an $I(1)$ variable in order to force regression to undo?

Better to use $f^n_{t+} - f^n_{t-}$ as shock rather than $M_t$
Interpreting futures in theoretical model:
Better to view as essentially a forward contract

\[ f^n_t = \text{price I agree at date } t \text{ to pay you at } t + n \]

- no money changes hands at \( t \)
- at \( t + n \) my cash flow is \( f^n_t - r_{t+n} \) for \( r_{t+n} \) actual value

FOC: \[ 0 = E_t[\beta^n \lambda_{t+n}(f^n_t - r_{t+n})] \]
• Adding margin requirement to futures does not change this as long as I would have held margin asset anyway
• Adding mark-to-market dimension of futures contract does not matter much quantitatively
  – (Piazzesi and Swanson, NBER 2004)