Unconventional monetary policy and market expectations: some evidence for the euro area

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Motivation

• Investors incorporate expectations on monetary policy in asset prices
  – monetary policy $\Rightarrow$ market expectations
    (Sack, 2010; Tang, 2014; Creel et al., 2016; Altavilla and Giannone, 2016; Cesa-Bianchi et al., 2016)

• Causality may be the reverse when central bank reacts to market expectations
  - market expectations $\Rightarrow$ monetary policy
Why react to market expectations?

- Central bank may not wish to disappoint markets, cause set-back in asset prices

- Wish to be consistent with communications prior to monetary policy decision
  - central bank may create market expectations it subsequently wishes to fulfill
What are the risks?

- Central bank may become prisoner of financial markets
  - market might implicitly dictate monetary policy decisions (Blinder, 2016)

- ‘Market dominance’ instead of monetary dominance
Empirical method

• Rolling Granger causality tests

• Regression analysis (GMM)

• VAR models
  – fixed coefficients
  – rolling window estimates
• Eurosystem has reacted to market expectations
  – in particular in periods when unconventional measures were introduced
    • Both with announcement of Asset Purchase Programme (APP) and Outright Monetary Transactions (OMTs)
Data
Monetary policy

We use two monetary policy indicators
- Eurosystem’s balance sheet total
- Number of monetary policy decisions taken
Market expectations

And three market expectations variables
- forward rates
- yield curve
- VIX index
Anticipation effects

• Control for possibility that financial markets anticipate monetary policy decisions

• When anticipation effect is present, it may seem as if central bank responds to market expectations…

• … while market may move because it discounts monetary measures in advance
Anticipation effects

We control for anticipation effect by using a News variable (Middeldorp and Wood, 2016)


* OMT refers to the ‘whatever it takes’ speech by Draghi, July 2012.
Controling for expectations on macroeconomic fundamentals

We use expected inflation (based on inflation linked swaps) as proxy for:

• expectations on output & inflation gap
• central bank reaction function
Stationarity

- VIX, News, Decision indicator $I(0)$

- All other series $I(1)$, therefore first differenced
Empirical results
4 x 2 x 4 = 32 models

1. Causality tests
2. Regression model
3. VAR analysis
   a) Fixed coefficients
   b) Rolling window coefficients

Dependent variables
1. Balance sheet total
2. Decision variable

Market variables
1. Eonia forward rate
2. 10 yr forward rate
3. Yield curve
4. VIX index
Granger causality test

\[ y_t = a_0 + a_1 y_{t-1} + \ldots + a_m y_{t-m} + b_p x_{t-p} + \ldots + b_q x_{t-q} + \varepsilon_t \]

- \( a \) and \( b \) are coefficients, \( t \) is time (weekly), \( m,p,q \) are lags
- Rolling window (2 years, weekly obs.)
- H0: market expectations \((x_{t-p} \ldots x_{t-q})\) do not cause monetary policy decisions \((y_t)\)
Granger causality with Balance sheet total

A. H₀: 10 years forward rate does not cause balance sheet
(p-value Granger test, variables in first differences)

B. H₀: Yield curve does not cause balance sheet
(p-value Granger test, variables in first differences)

C. H₀: Eonia forward rate does not cause balance sheet
(p-value Granger test, variables in first differences)

D. H₀: VIX index does not cause balance sheet
(p-value Granger test)
Granger causality with Decision indicator

A. H₀: 10 years forward rate does not cause decision
   (p-value Granger test, variables in first differences)

B. H₀: Yield curve does not cause decision
   (p-value Granger test, variables in first differences)

C. H₀: Eonia forward rate does not cause decision
   (p-value Granger test, variables in first differences)

D. H₀: VIX index does not cause decision
   (p-value Granger test)
Regression model

\[ Mon\ policy = \alpha + \beta \text{ Mon policy}_{t-1} + \gamma \text{ Market price}_{t-1} + \lambda \text{ News}_{t-1} + \varphi \text{ Inf}_{t-1} + \epsilon_t \]

- Long-term & short-term forward rates, Yield curve, VIX index as variables for market expectations (Market price\text{ }_{t-1})

- News (News\text{ }_{t-1}) & Inflation expectations (Inf\text{ }_{t-1}) as control variables
Outcome regression model with Balance sheet total

A. Coefficient and t-value $\gamma$, 10 yr forward rate

B. Coefficient and t-value $\gamma$, Yieldcurve

C. Coefficient and t-value $\gamma$, Eonia forward rate

D. Coefficient and t-value $\gamma$, VIX index
Outcome regression model with Decision variable

A. Coefficient and t-value $\gamma$, 10 yr forward rate

B. Coefficient and t-value $\gamma$, Yieldcurve

C. Coefficient and t-value $\gamma$, Eonia forward rate

D. Coefficient and t-value $\gamma$, VIX index
VAR model

\[ z_t = c + A_1 z_{t-1} + A_2 z_{t-2} + \ldots + A_p z_{t-p} + e_t \]

- \( z_t \) is vector containing variables \( x \) (market expectations, controls) and \( y \) (monetary policy)

- We present impulse-response functions

- Choleski decomposition. Ordering: (1) financial market variable (forward rates, yield curve or VIX index), (2) News, (3) inflation expectations, (4) monetary policy variable (balance sheet total, or decision indicator)
Response of Balance sheet to shock in yield curve

Response of Balance sheet to shock in 10y-forward rate

Response of Balance sheet to shock in forward eonia

Response of Balance sheet to shock in VIX

Response of Decision to shock in yield curve

Response of Decision to shock in 10y-forward rate

Response of Decision to shock in forward eonia

Response of Decision to shock in VIX
Impulse responses Balance sheet total, VAR with rolling window coefficients

A. VAR, response Balance sheet to shock 10-yr forward rate (8 weeks cumulative impulse response)

B. VAR, response Balance sheet to shock Yield curve (8 weeks cumulative impulse response)

C. VAR, response Balance sheet to shock EONIA forward rate (8 weeks cumulative impulse response)

D. VAR, response Balance sheet to shock VIX index (8 weeks cumulative impulse response)
Impulse responses Decision indicator, VAR with rolling window coefficients

A. VAR, response Decision to shock 10-yr forward rate  
(8 weeks cumulative impulse response)

B. VAR, response Decision to shock Yieldcurve  
(8 weeks cumulative impulse response)

C. VAR, response Decision to shock EONIA forward rate  
(8 weeks cumulative impulse response)

D. VAR, response Decision to shock VIX index  
(8 weeks cumulative impulse response)
Conclusions

- Eurosystem has reacted to market expectations … … particularly in periods when unconventional monetary policy measures were introduced

- Asset Purchase Programme (APP) significantly reacted to forward rates & yield curve (end 2014 / early 2015)

- Eurosystem significantly reacted to market stress (VIX) by announcing OMTs in 2012