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

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*The views expressed are the authors' and do
not necessarily reflect official positions of DNB*

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DeNederlandscheBank
EUROSYSTEEM

Motivation

- Investors incorporate expectations on monetary policy in asset prices

  – monetary policy ⇨ 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 ⇨ 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

Preview of results

- 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

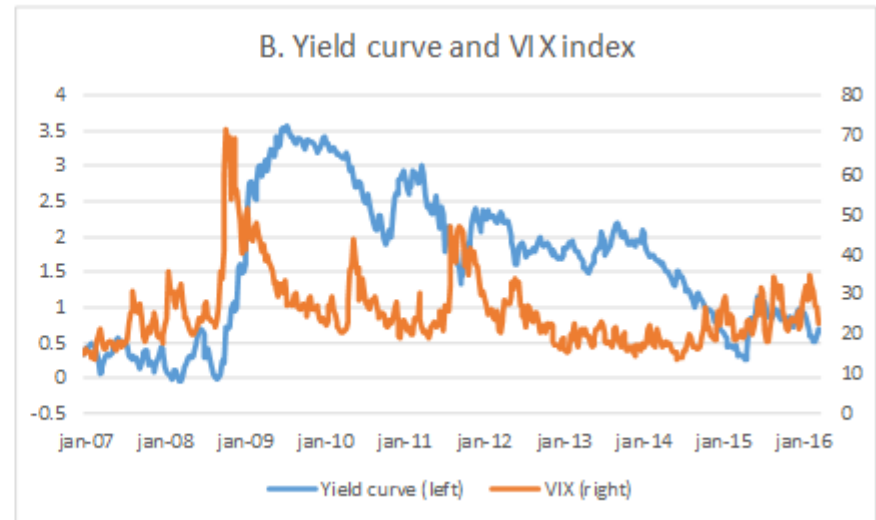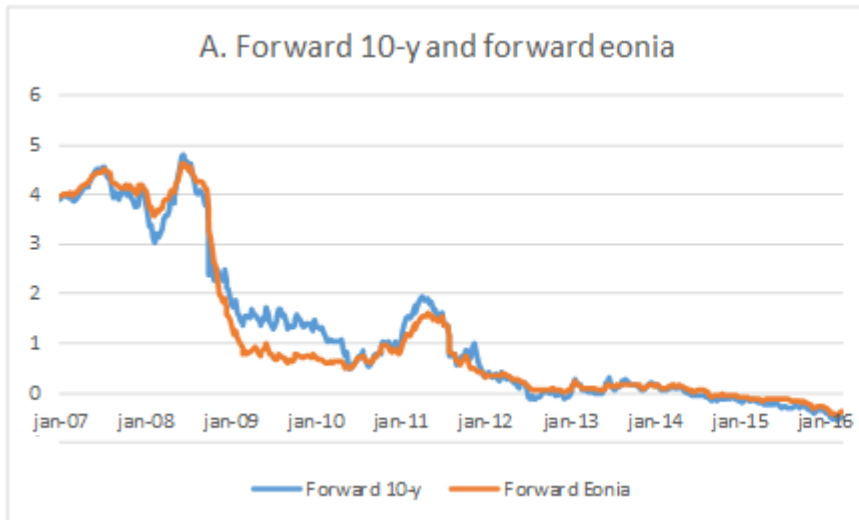# Monetary policy

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

A. Balance sheet total of the Eurosystem

B. Number of monetary policy decisions
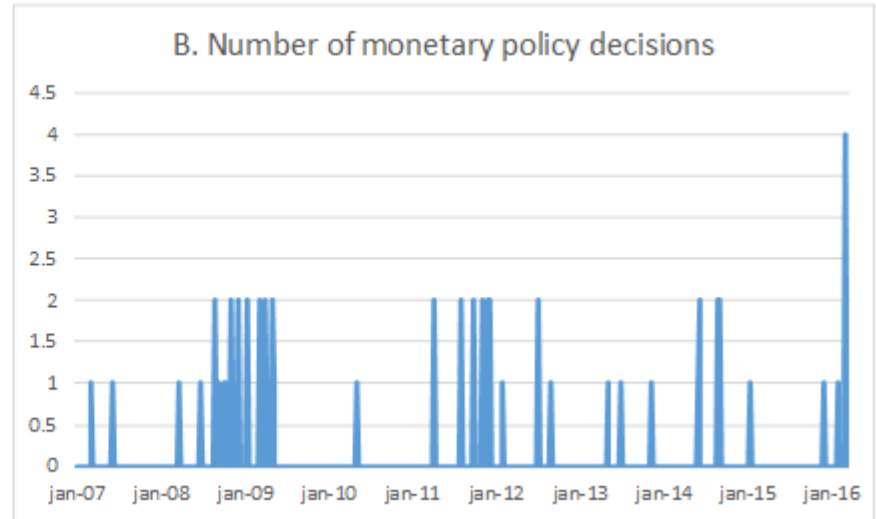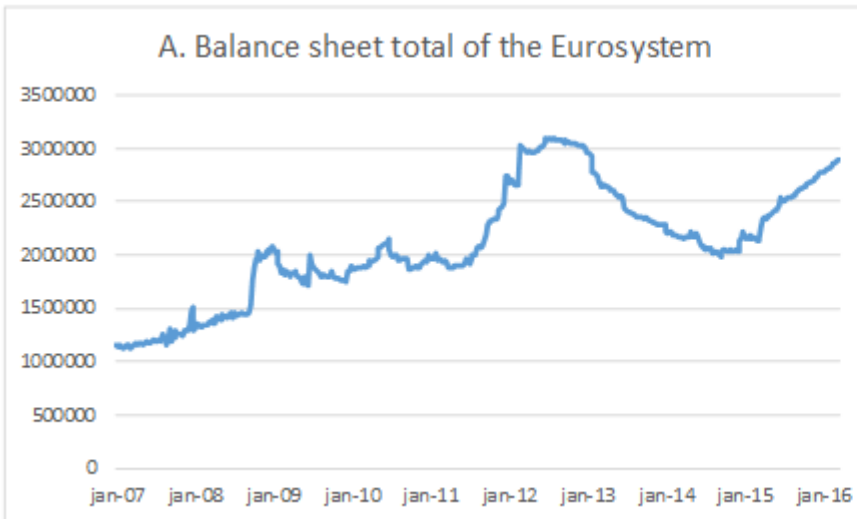
Market expectations

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

A. Forward 10-y and forward eonia

B. Yield curve and 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)

- proportion of Bloomberg news articles containing 'unconventional monetary policy', 'asset purchases', 'SMP', 'fixed rate full allotment', 'TLTRO', 'VLTRO', 'APP', or 'quantitative easing, alongside key words 'euro area', 'ECB', or 'Draghi'
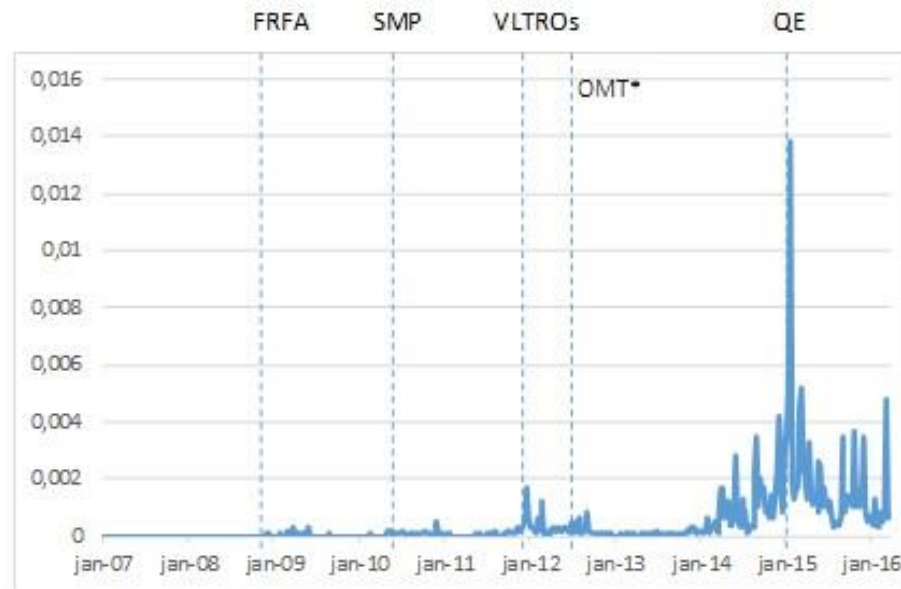
* OMT refers to the 'whatever it takes' speech by Draghi, July 2012.

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: Yieldcurve 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)
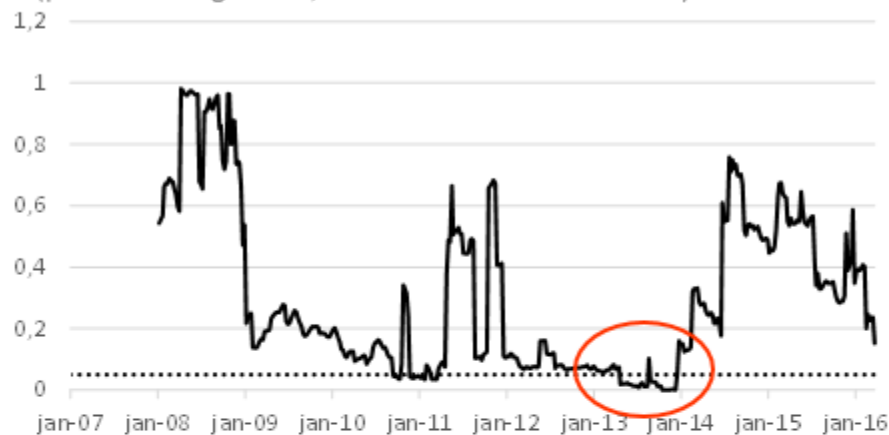
B. H0: Yieldcurve does not cause decision
(p-value Granger test, variables in first differences)
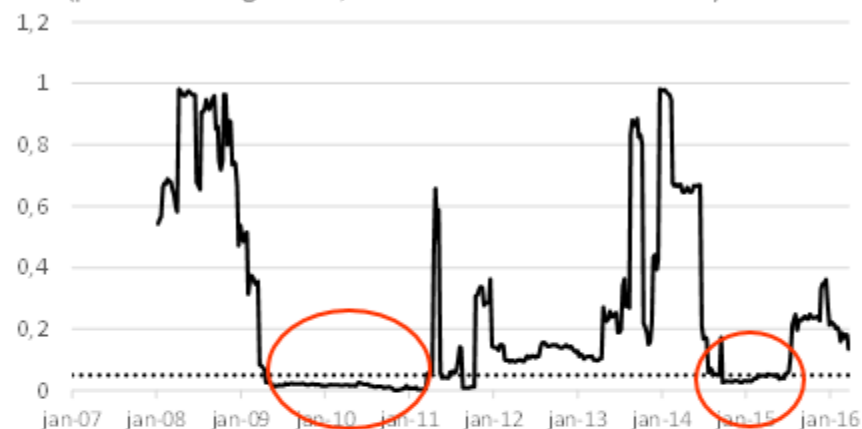
C. H0: Eonia forward rate does not cause decision
(p-value Granger test, variables in first differences)
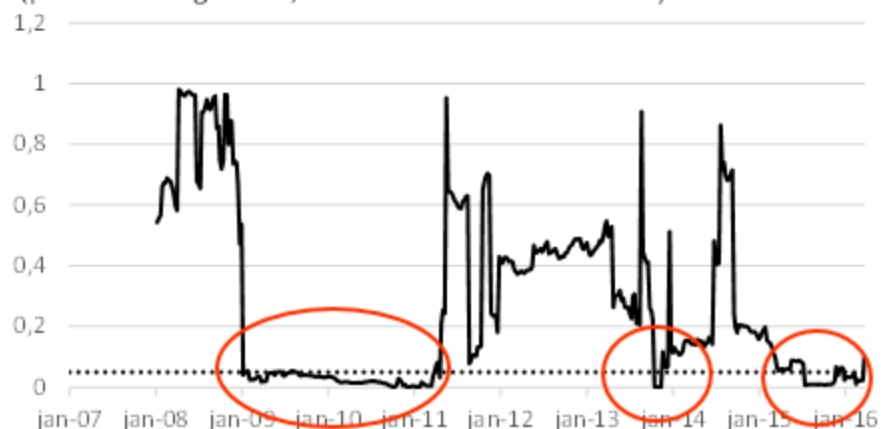
D. H0: VIX index does not cause decision
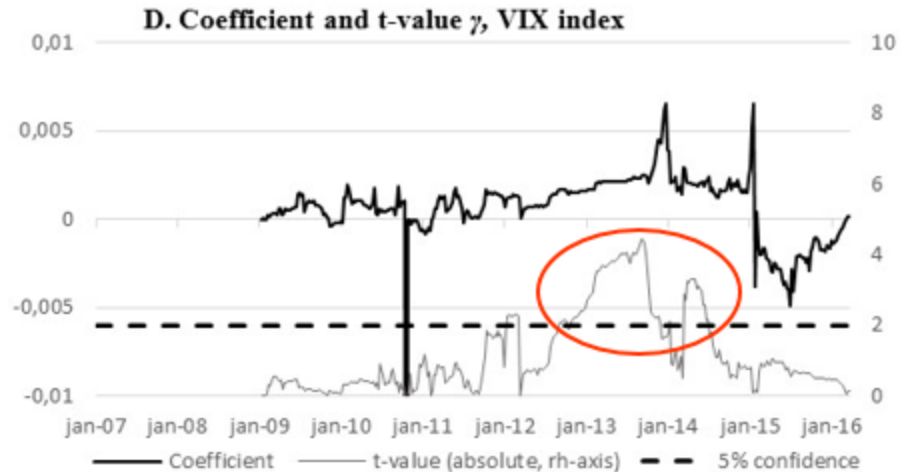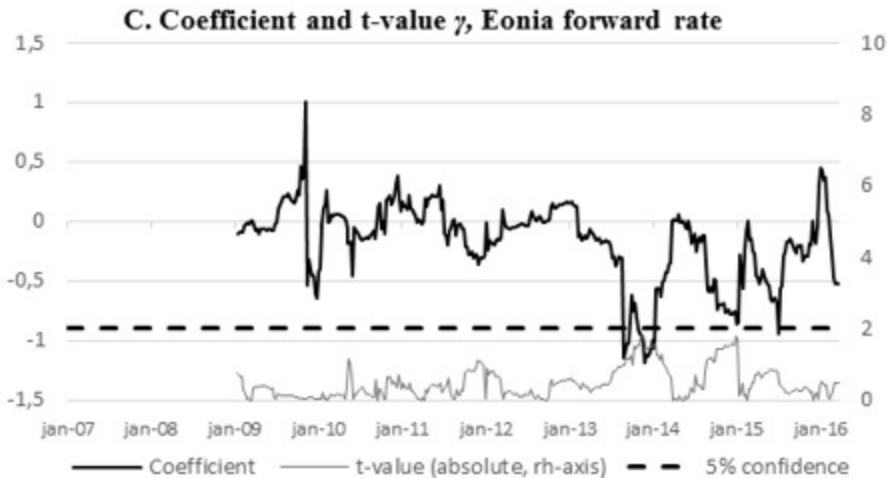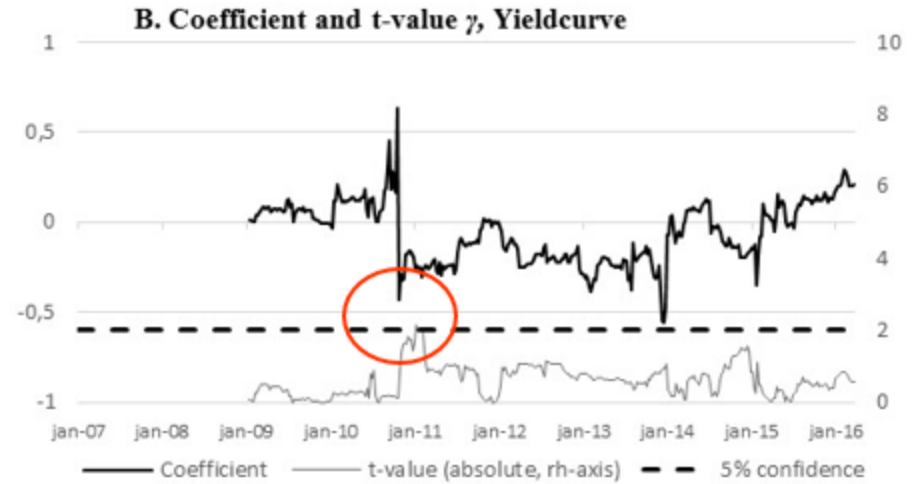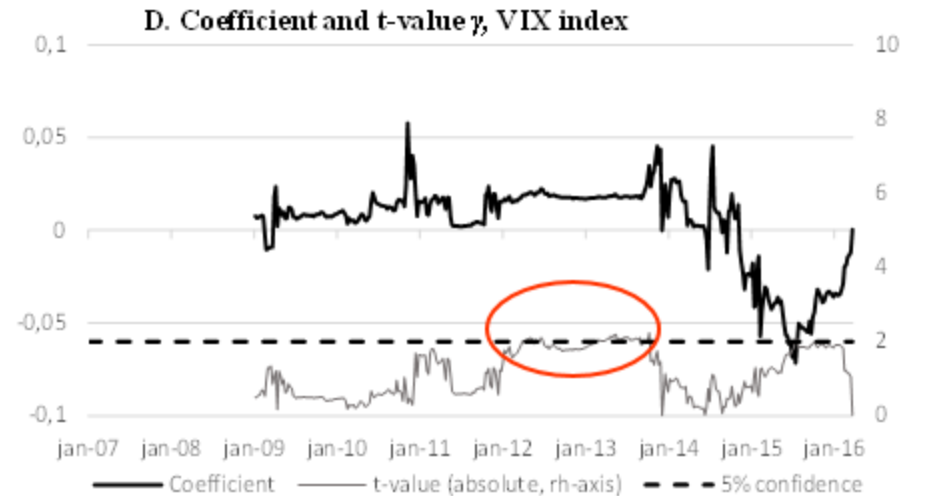(p-value Granger test)
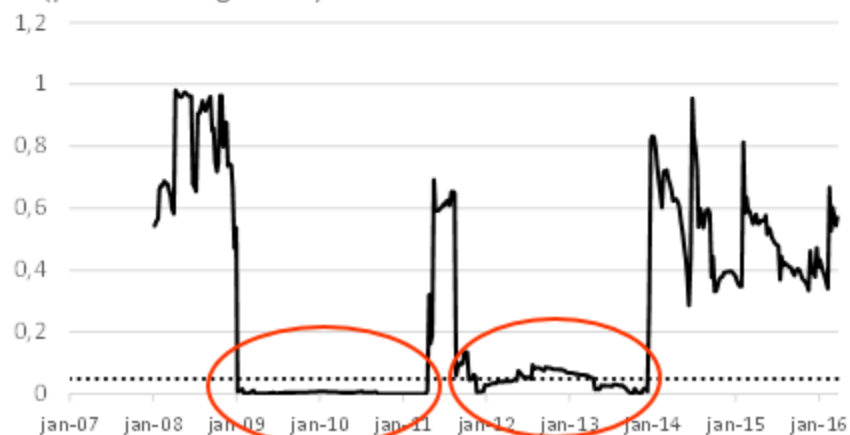
Regression model

$$Mon\ policy = \alpha + \beta\ Mon\ policy_{t-1} + \gamma\ Market\ price_{t-1} + \lambda\ News_{t-1} + \varphi\ Inf_{t-1} + \varepsilon_t$$

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

- News ($News_{t-1}$) & Inflation expectations (Inf_{t-1}) as control variables

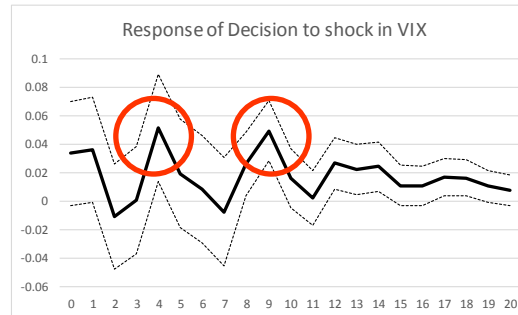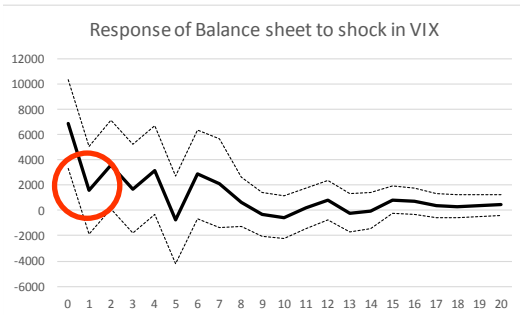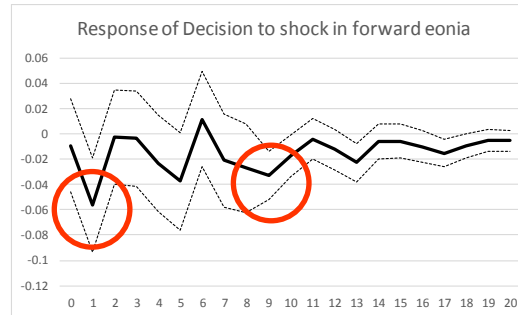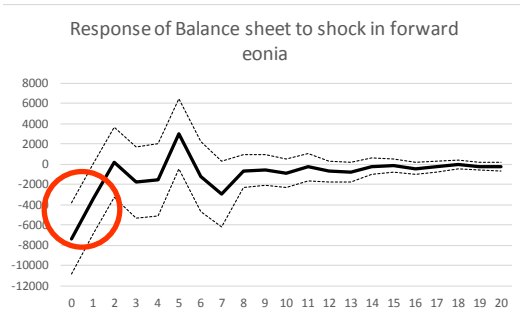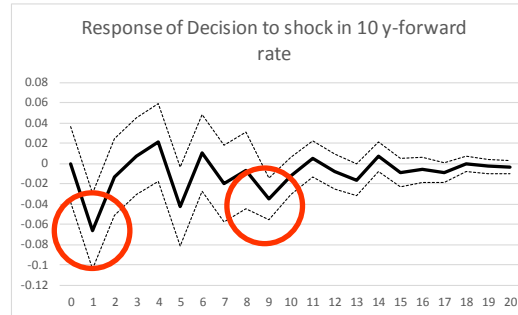# Outcome regression model with Balance sheet total

Outcome regression model with Decision variable

A. Coefficient and t-value γ, 10 yr forward rate

B. Coefficient and t-value γ, Yieldcurve

C. Coefficient and t-value γ, Eonia forward rate

D. Coefficient and t-value γ, VIX index
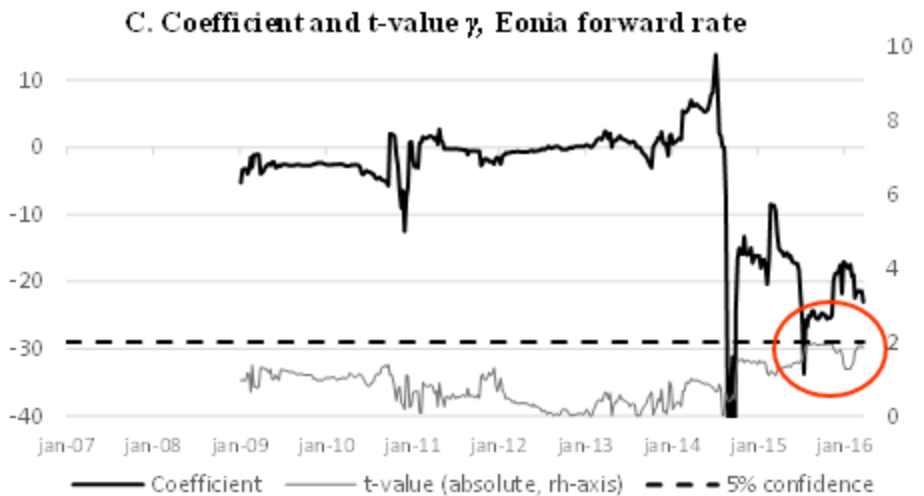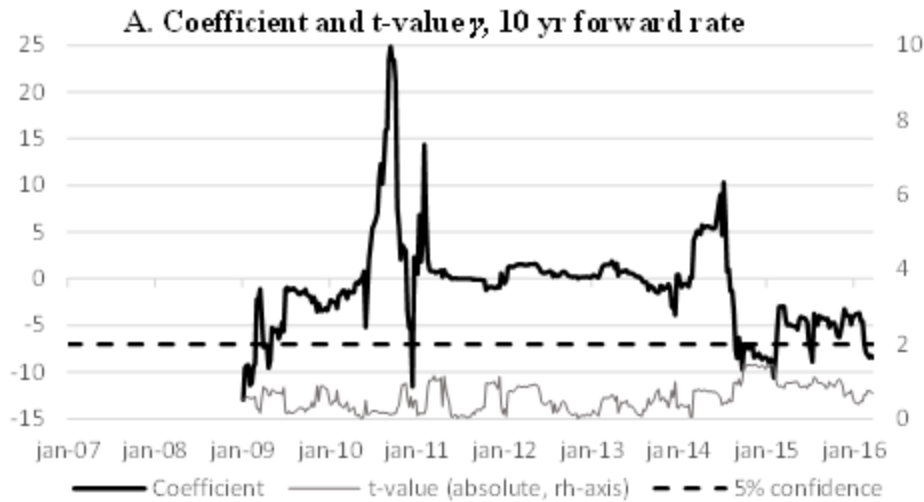
VAR model

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

- 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 Decision to shock in yield curve

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

Response of Decision to shock in 10 y-forward rate

Response of Balance sheet to shock in forward eonia

Response of Decision to shock in forward eonia

Response of Balance sheet to shock in VIX

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 foward rate
(8 weeks cumulative impulse response)

IRF (cumulative) .... 5% interval .... 95% interval
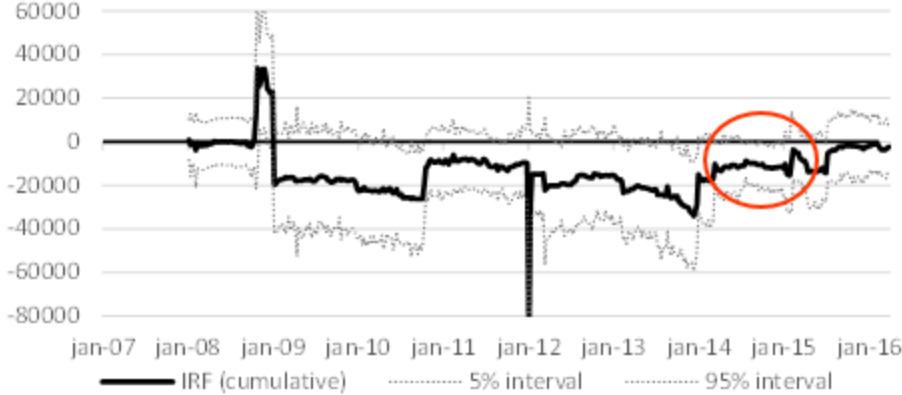
B. VAR, response Balance sheet to shock Yieldcurve
(8 weeks cumulative impulse response)

IRF (cumulative) .... 5% interval .... 95% interval
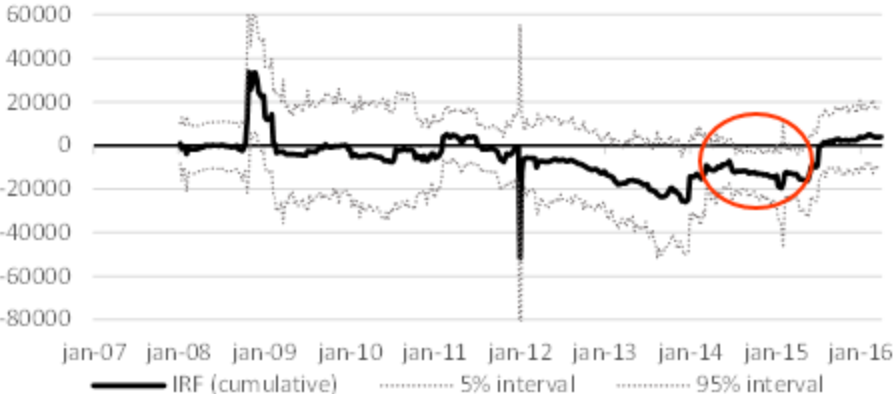
C. VAR, response Balance sheet to shock EONIA foward rate
(8 weeks cumulative impulse response)

IRF (cumulative) .... 5% interval .... 95% interval

D. VAR, response Balance sheet to shock VIX index
(8 weeks cumulative impulse response)

IRF (cumulative) .... 5% interval .... 95% interval

Impulse responses Decision indicator, VAR with rolling window coefficients

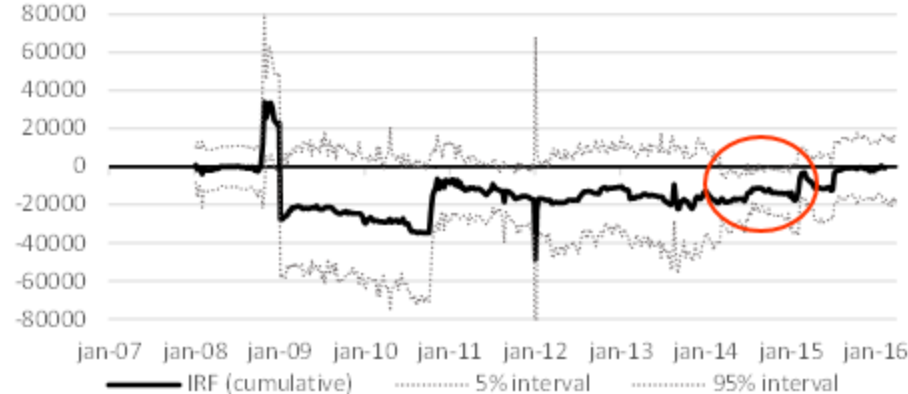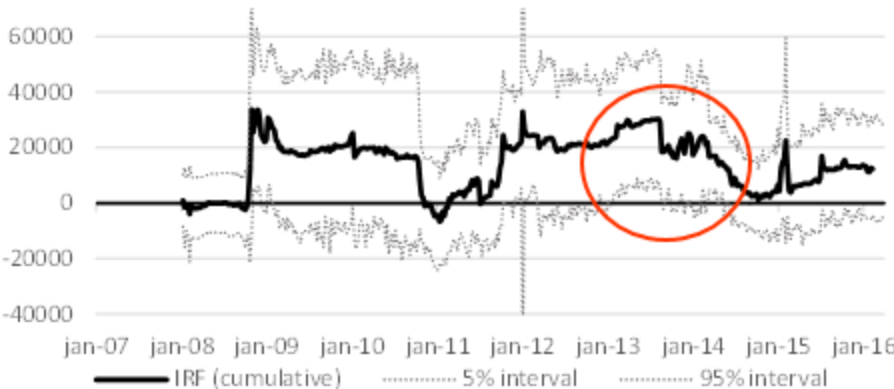**A. VAR, response Decision to shock 10-yr foward rate**
(8 weeks cumulative impulse response)

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

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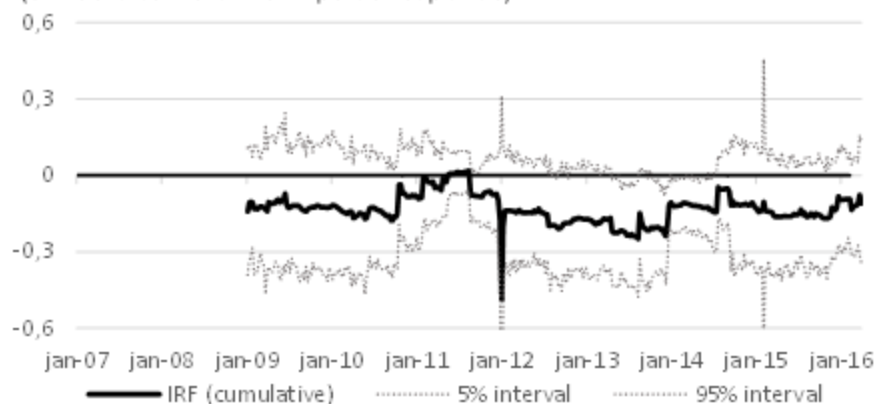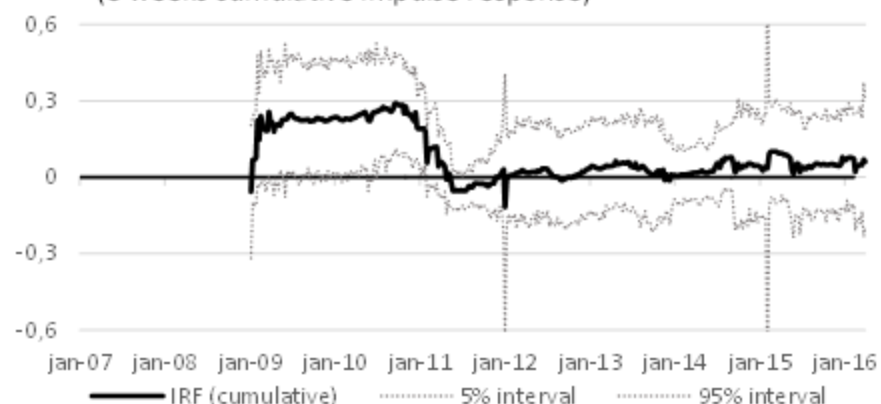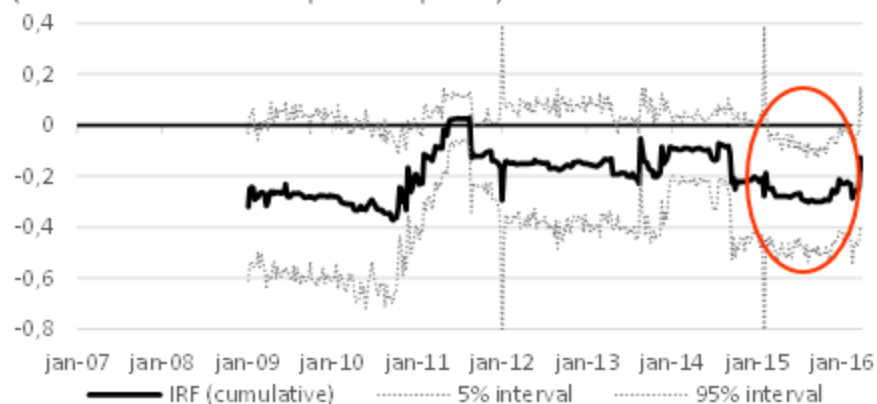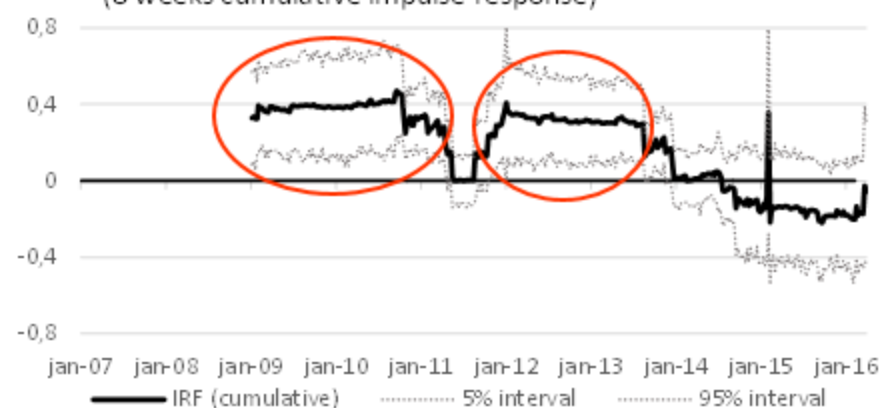(8 weeks cumulative impulse response)

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