EUROPEAN CENTRAL BANK

EUROSYSTEM

# Monetary policy and bank equity values in a time of low interest rates

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**Bucharest, November 29th 2018**

# Motivation

- Banks' business is about interest rates: "riding the yield curve".

- Why is the effect on banks particularly relevant?
  - Bank capital –and so profitability– is necessary for lending.
  - Banks are the backbone of the mon pol transmission channel.

- New monetary policy landscape in euro area: negative rates

- Do negative rates hurt banks?

> ***"De-facto negative interest rates currently prevailing in the EU are killing the banks"***
>
> **Francisco González, BBVA CEO (24/05/16)**

## Channels from interest rates to bank profits

1. Net-interest margins: typically increase when-
   - The yield curve **steepens**: traditional banks 'lend long and borrow short' (English et al., 2014)
   - The **level** of the yield curve rises: to the extent that some deposits are paid zero or upwardly sticky interest rates (Hannan and Berger, 1991; Neumark and Sharpe, 1992)
2. Capital gains/losses on existing long-term assets as rates fall/rise
3. Effects through the general economy
   - Loan and deposit demand → volume effects!
   - Loan quality (NPLs)

- Banks may hedge risk through interest rate derivatives (Hoffmann et al., 2017)

## Channels from interest rates to bank profits

- Also need to take into account bank heterogeneity.
  - Maturity gap between assets and liabilities.
  - Interest rate pass- through.

- With **negative/low rates**: negative rates are not passed on to depositors.
  - Rate cuts become similar to a flattening of the yield curve.

# Motivation

- Convincingly quantifying the effect for each of these channels is very difficult.

- We look at **bank equity values**
  - Efficient market hypothesis
  - Stock prices as a summary measure of current and future bank profitability

- We identify unexpected component of monetary policy decisions and measure the effect of these surprises on European banks' stock prices.

- **Is the effect different during the low/negative rate period?**

# Literature review

- **Flannery and James** (1984) and subsequent studies:
  - Unexpected rise of long rates hurts bank stock returns
  - Sensitivity of the reaction depends on maturity gap between assets and liabilities.
- **Kuttner** (2001) and **Gürkaynak et al.** (2005): identification of monetary policy shocks.
- **Bernanke and Kuttner** (2005) look at impact on stock market returns, and **English et al.** (2014) look at impact on bank stock returns.
- **Borio et al.** (2015) and **Claessens et al.** (2016): negative rates hurt bank profitability.
- Euro area evidence: **Heider et al.** (2016) and **Altavilla et al.** (2017).

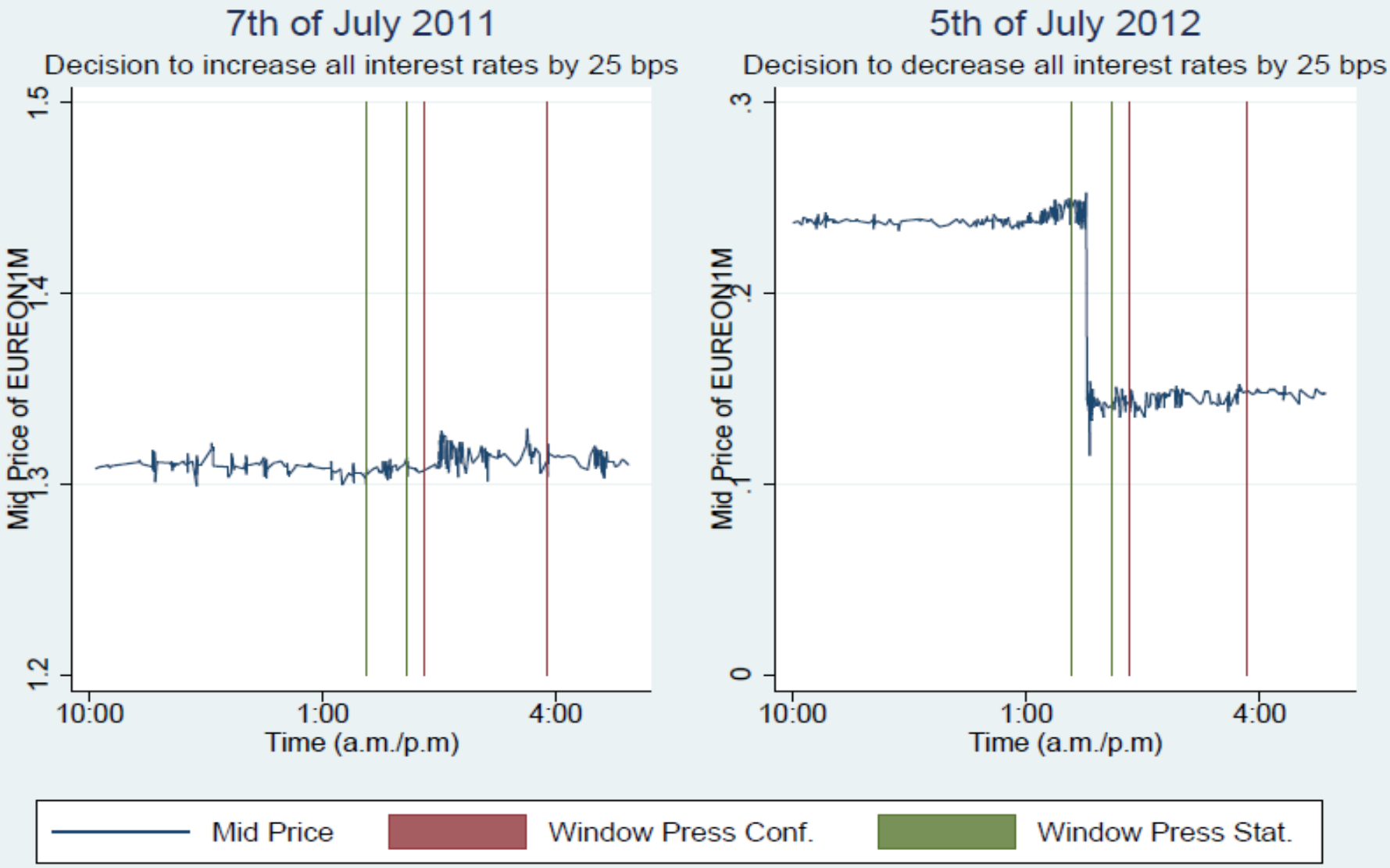
# Outline

1. **Motivation.**
2. **Identification of monetary policy shocks.**
3. **Econometric specification.**
4. **Results.**
   - Reversal rate (deposits)
   - Maturity transformation
5. **Conclusions.**

# Monetary policy shocks / Interest rate surprises

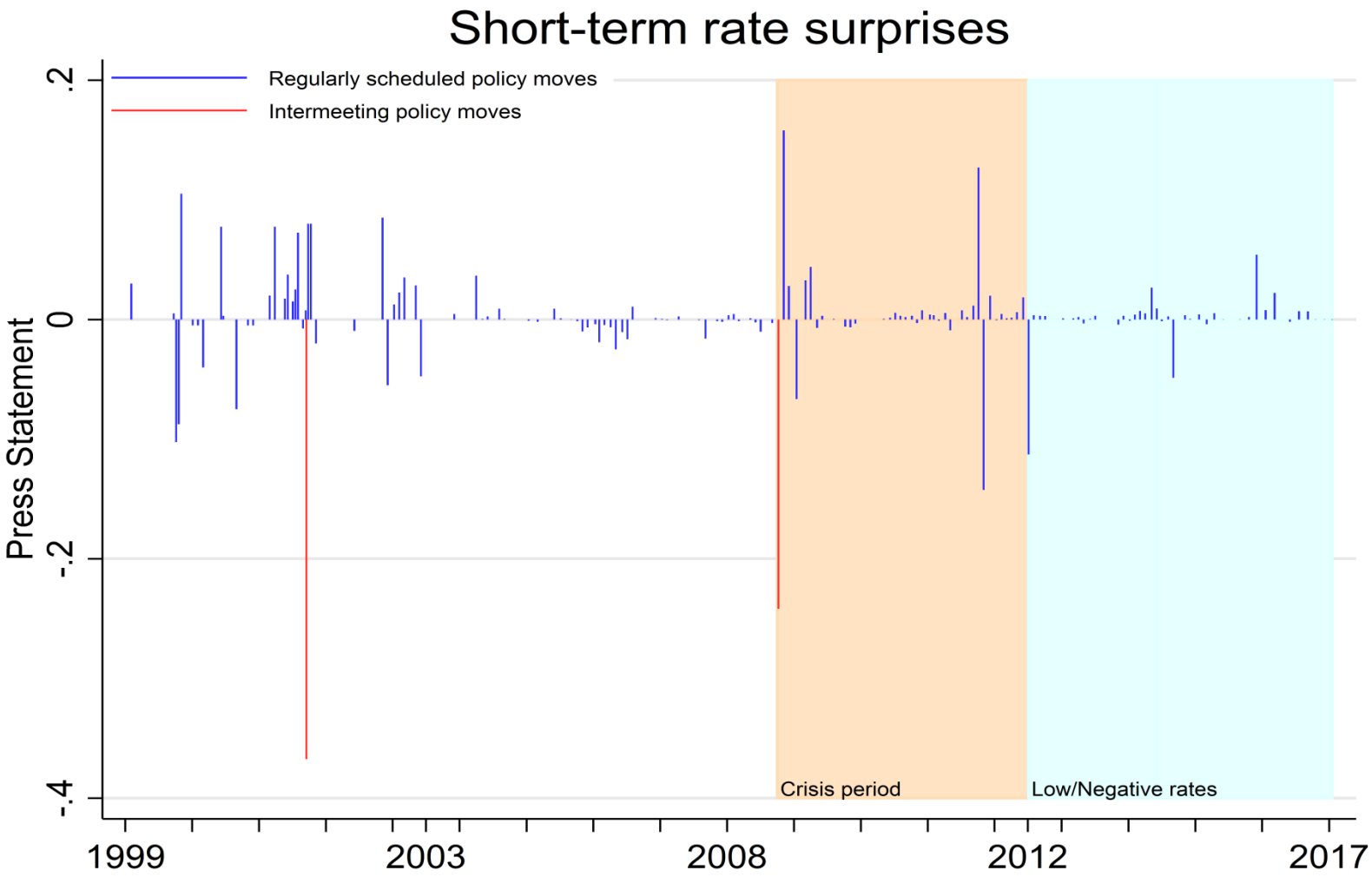
- High-frequency event study methodology (Kuttner, 2001)
- Short-term interest rate surprise: **EONIA 1 month swap contract**.
- Long-term interest rate surprise: **EONIA 2 year swap contract.**
- 30 minute window around (-10, +20) press statement and press conference.
  - Identification ensures that interest rate surprises are uncorrelated with other economic news.
- Sample period: 07/01/1999 – 19/01/2017 ➡ 245 policy meetings

# Monetary policy shocks / Interest rate surprises

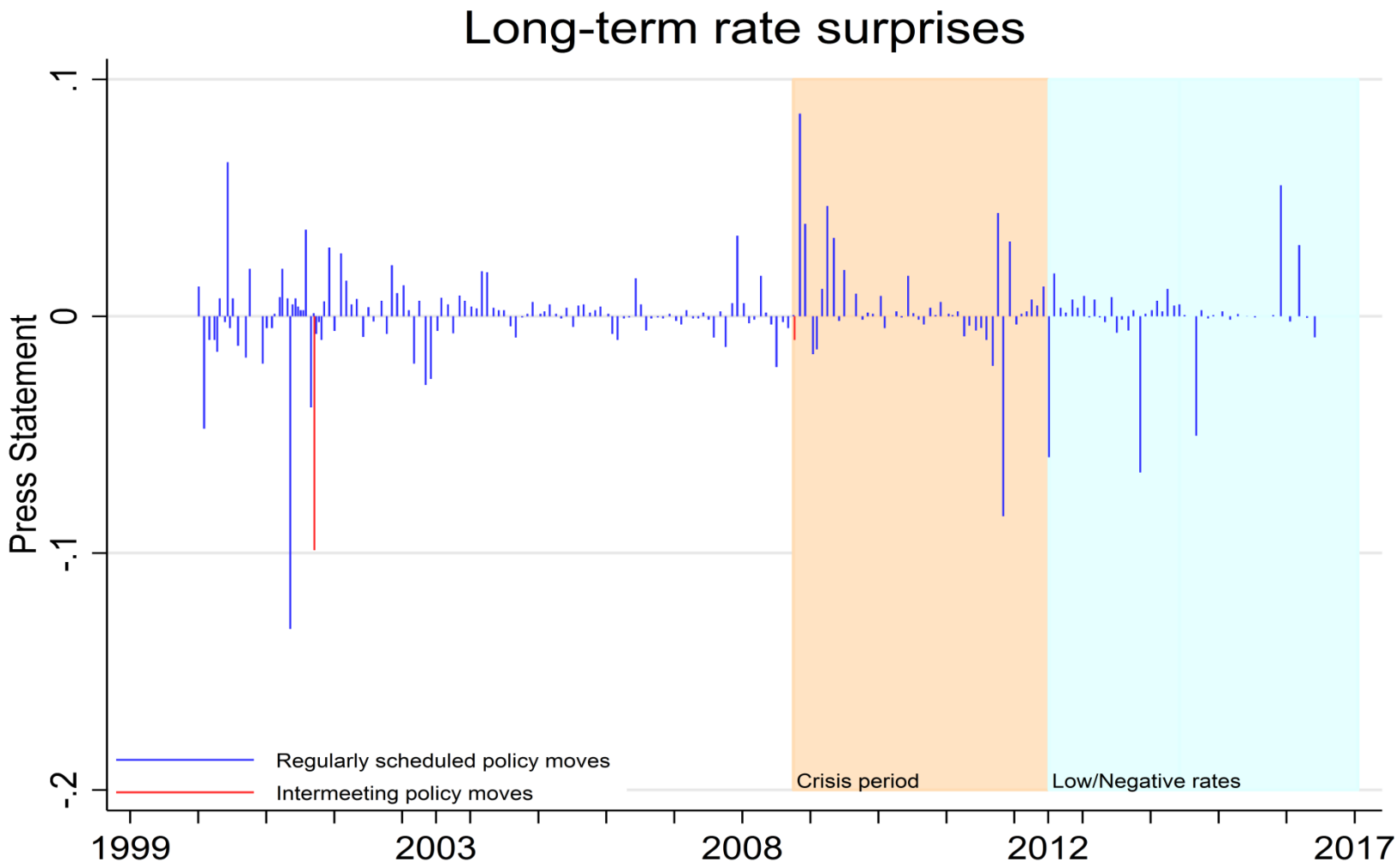



Note: Both graphs span over 30bps on the y-axis and show movementes in a comparable price range.

# Short-term interest rate surprise - press statement



# Long-term rate surprise - press statement



# Bank stock returns

- Listed euro area banks (56 banks)
- Stock return over same intraday windows as for the monetary policy shocks.
- Baseline specification:

$$R_{it} = \alpha + \beta_1 \Delta EONIA\ 1Mswap_t + \beta_2 \Delta EONIA\ 2Yswap_t + \delta LTRO_t + \varepsilon_{it}$$

Estimated by OLS

Standard errors clustered by date

$LTRO_t$: $LTRO, TLTRO$ dummies

Interpretation: $\boldsymbol{\beta_1}$**: short term surprise**

$\boldsymbol{\beta_2}$**: long term surprise**

# Baseline specification

| | Press statement | Press conference |
|---|---|---|
| **Short-term rate surprise** | -3.860*** | 6.382 |
| | (1.099) | (4.888) |
| **Long-term rate surprise** | -3.586 | -1.836 |
| | (2.308) | (1.530) |
| Observations | 6,389 | 5,957 |
| R-squared | 0.142 | 0.028 |
| Number of groups | 56 | 56 |

- **Expansive** monetary policy **boosts** banks´ stock values.

- Long-term rate surprise has also negative sign but it is not significant.

## Time-varying effects

- Pre-crisis: beginning of the sample until October 2nd 2008.
- Crisis with normal rates: October 2nd 2008 to July 5th 2012.
- Low/negative rates: July 5th 2012 until the end of the sample.

# Differential effect under negative rates

| | Pre-Crisis | Crisis | Low/negative rates |
|---|---|---|---|
| **Short-term rate surprise** | -3.040*** | -5.305*** | 8.080*** |
| | (0.894) | (0.909) | (2.489) |
| **Long-term rate surprise** | -0.858 | -3.759 | -12.27*** |
| | (1.207) | (3.432) | (1.796) |
| Observations | 2,634 | 1,963 | 1,792 |
| R-squared | 0.026 | 0.157 | 0.211 |
| Number of groups | 53 | 51 | 51 |

- In the period of low/negative rates, **expansive** monetary policy **hurts** banks´ stock values.
- The effect of the long-term rate surprise is significant and large.

# Results: Discussion

‘Sign switch’ is consistent with a ‘**reversal rate**’ –

“*The rate at which accommodative monetary policy ‘reverses’ its effect and becomes contractionary*” - Brunnermeier and Koby (2016)

- Reduction in net-interest income can outweigh capital gains when rates are pushed below a threshold level = the reversal rate.
  - ➢ Can lead to a reduction in (1) capital and (2) lending (due to a binding capital constraint).
    - Our evidence is consistent part (1); Heider et al. with (2)

- Reversal rate depends on several characteristics, including reliance on deposit funding…

# Results: Discussion

- Banks are very reluctant to ‘pay’ negative rates to customers.
  - Cash as an alternative investment
  - Costumers may find negative rates unacceptable
- Implications of a simple model with a zero lower bound on the interest rate paid to depositors ($R^D = max(R^{policy} - m^D, 0)$):

  a. Policy rate cuts boost bank profits when rates are not too low due to capital gains…

  b. …but this effect *reverses* when rates are cut below the profit margin on deposits ($= m^D$ -- this is the reversal rate)
     - Intuition: Net-interest margin get squeezed as the deposit rate cannot be lowered anymore.
     - Important caveat: model only considers net-interest margins & capital gains, not changes in asset quality or volumes

  c. This sign switch *only* occurs for banks with sufficient deposit funding, and is more pronounced the greater the reliance on deposits.

# Zero lower bound for deposits: Implications for interest rate risk

- Testable Implication:

  As rates approach zero, equity values of banks with a *high* reliance on deposits should *decline* relative to banks with little deposit funding.

  - Reversal rate is more relevant for deposit-intensive banks.

- Interactive specification:

$$R_{it} = \beta_0 + \beta_1 \Delta Swap1M_t + \beta_2 \Delta Swap2Y_t + \delta LTRO_t$$
$$+\{\gamma_0 + \gamma_1 \Delta Swap_t + \gamma_2 \Delta Swap2Y_t\} * DR_{it}$$
$$+ \{\varphi_0 + \varphi_1 \Delta Swap_t + \varphi_2 \Delta Swap2Y_t\} * LowRates_t$$
$$+ \{\theta_0 + \theta_1 \Delta Swap_t + \theta_2 \Delta Swap2Y_t\} * DR_{it} * LowRates_t + \varepsilon_{it}$$

  – $DR$ = deposits/assets
  – Bank size (log(assets)) also included in the same way as deposit ratio.
  – Crisis dummy also included in the same way as low rate dummy.

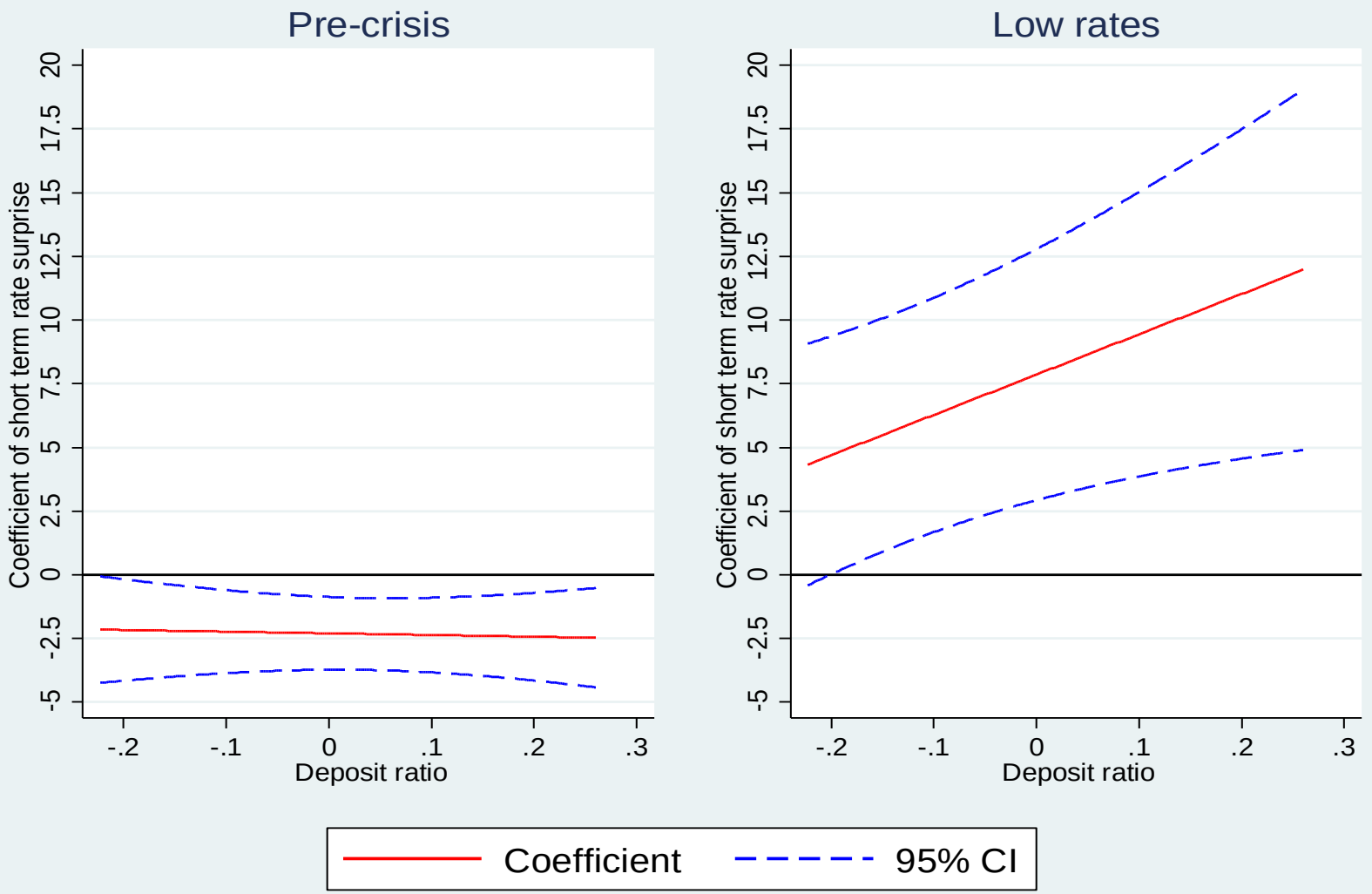
  Predictions: $\varphi_1 > 0$ and $\theta_1 > 0$
  (sign switch) (reversal more pronounced for high-deposit banks)

# Results: deposit ratio

| | Deposit ratio | Pre-crisis | Crisis | Low/negative rates |
|---|---|---|---|---|
| **Short-term rate surprise** | Low | -2.149** | -4.046*** | 4.335* |
| | | (1.066) | (0.896) | (2.419) |
| | Medium | -2.286*** | -4.654*** | 7.594*** |
| | | (0.738) | (0.864) | (2.473) |
| | High | -2.469*** | -5.472*** | 11.976*** |
| | | (0.995) | (1.307) | (3.610) |
| **Long-term rate surprise** | Low | -0.275 | -3.105 | -10.769*** |
| | | (1.637) | (3.279) | (1.718) |
| | Medium | -0.883 | -3.885 | -13.645*** |
| | | (1.096) | (3.279) | (3.294) |
| | High | -1.701 | -4.935 | -13.645*** |
| | | (1.507) | (4.091) | (3.294) |
| R-squared | | 0.059 | 0.180 | 0.214 |
| Observations | | 2622 | 1940 | 1788 |
| Swap*period | | | -2.359** | 10.441*** |
| | | | (1.157) | (2.590) |
| Swap*deposit ratio*period | | | -1.880 | 16.672** |
| | | | (4.068) | (7.795) |

- Expansionary conventional monetary policy is less beneficial to banks when rates are low, *and* this reversal is much more pronounced for banks with a high level of deposits.

# Results: deposit ratio



# Results: maturity transformation

- Degree of maturity transformation depends on loans fixation terms.
- In general terms, a balance sheet in which loans have a short fixation term (adjustable rate loans) displays less maturity transformation.
- Maturity transformation amplifies the NIM channel.
- Testing is not trivial due to data availability.

# Results: maturity transformation

| | Adjustable | Fixed |
|---|---|---|
| **Short-term rate surprise** | -3.253** | -5.321*** |
| | (1.278) | (1.186) |
| **Long-term rate surprise** | -3.776 | -3.056 |
| | (2.370) | (2.549) |
| Observations | 4,652 | 1,687 |
| R-squared | 0.117 | 0.212 |
| Number of groups | 39 | 13 |

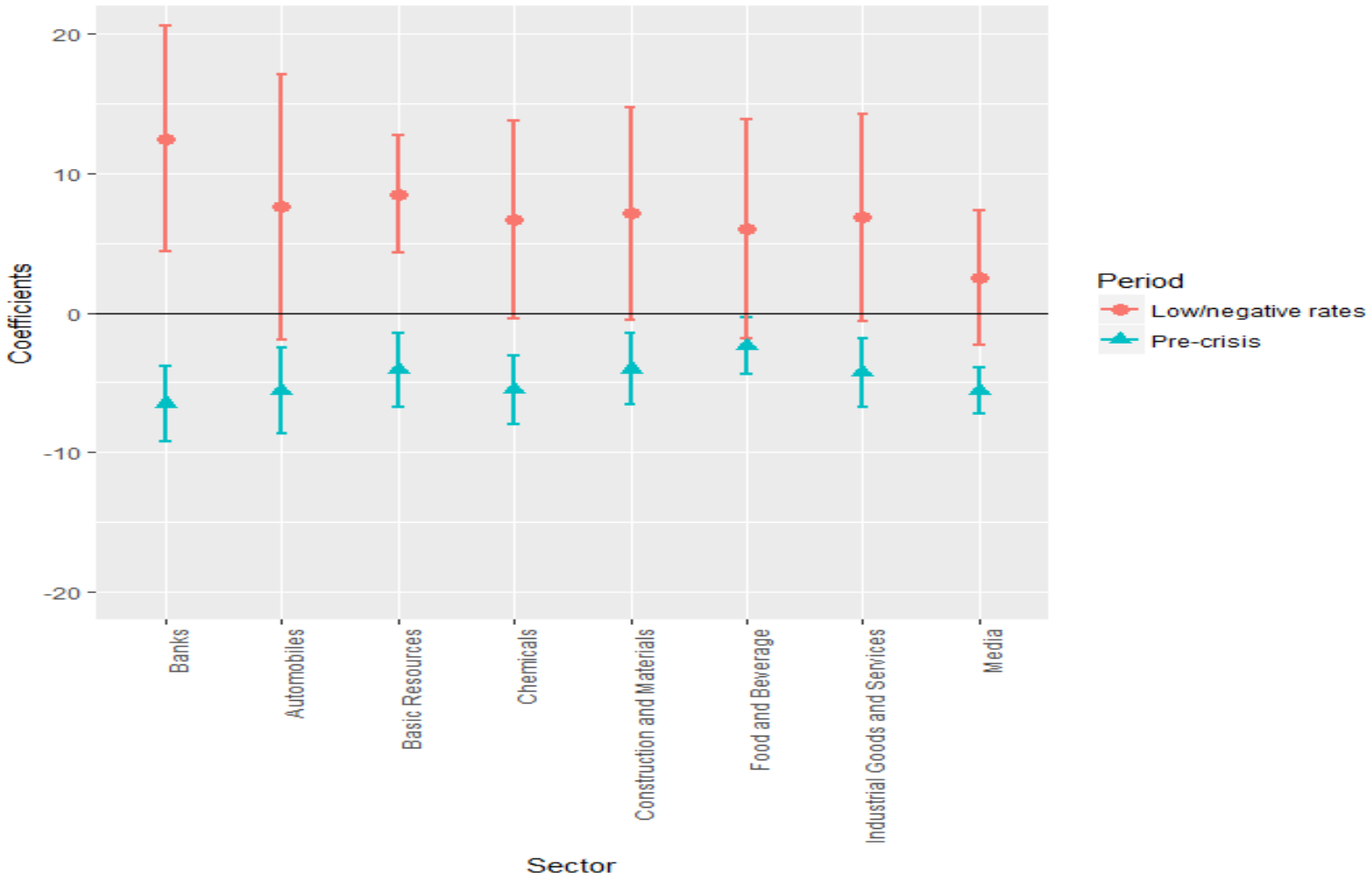
- Fixed: BE, DE, FR, NL. Adjustable: AT, CY, ES, FI, GR, IE, IT, LU, SI, PT
- **Expansive** monetary policy **boosts** banks´ stock values **more** in "fixed rate loans countries".

# Results: Comparison with the rest of the market

- Are these stock price reactions special to banks?
- Aggregate stock market drops when interest rates rise (Bernanke and Kuttner, 2005).
- Are the reactions we find special to banks?
  - Regressions using Eurostoxx sectoral indices:

$$R_t^I = \alpha + \beta_1 \Delta Swap_t^{1m} + \beta_2 \Delta Swap_t^{2y} + \delta LTRO_t + \varepsilon_{it}$$

# Results: Comparison with the rest of the market




- The reversal is more pronounced for banks than for other sectors.

# Conclusions

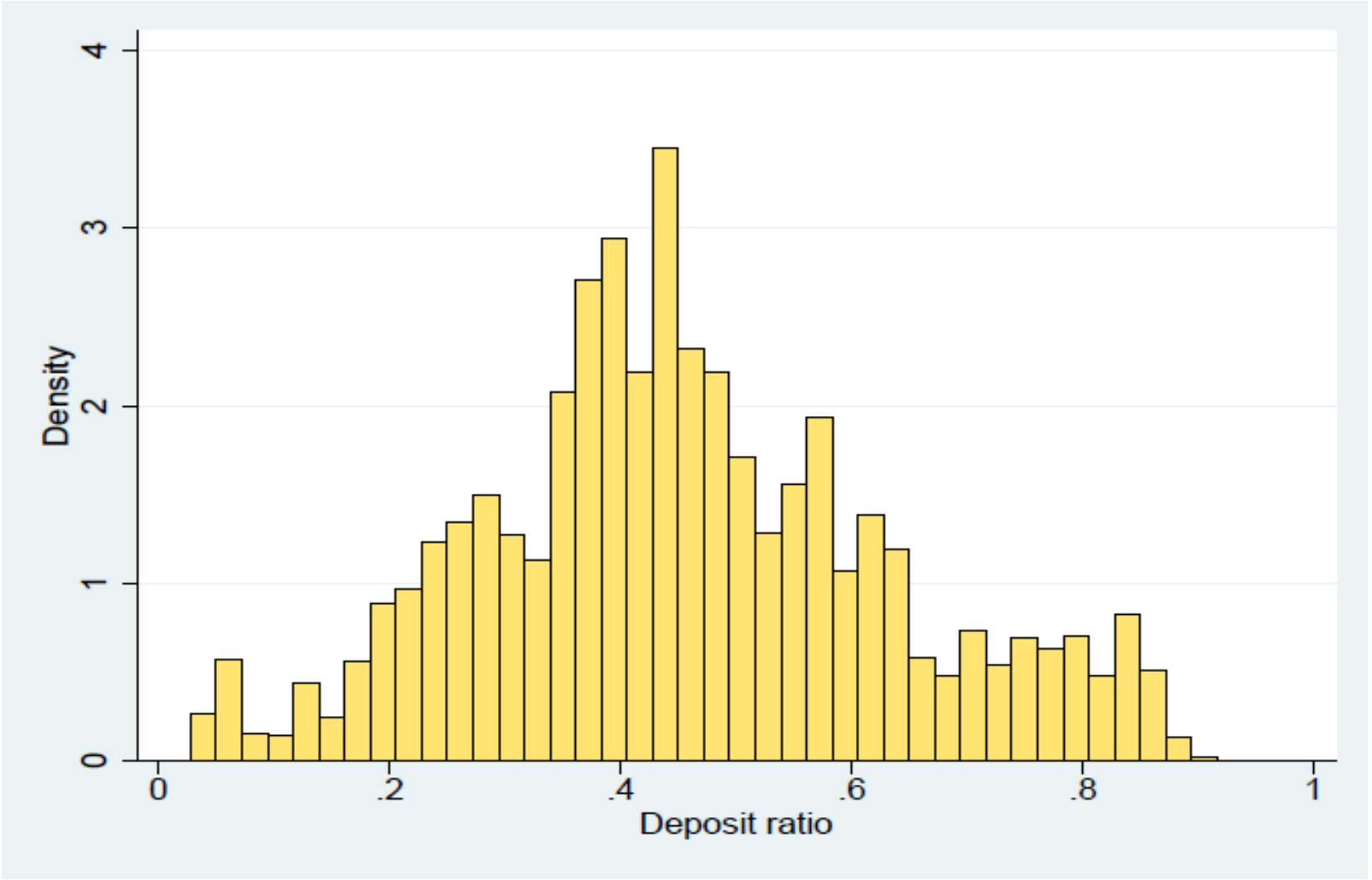
- A surprise cut by the ECB to short-term interest rates by 25 basis points increases banks' equity values by aprox. 1% on average.

- This impact reverses in the period of low and negative rates.
  - This reversal is more pronounced for banks with a high level of deposits.
  - This pattern is consistent with a reluctance of banks to pay negative interest rates on retail deposits.

- Maturity transformation amplifies the NIM channel.

# BACKGROUND SLIDES

# Deposit ratio distribution

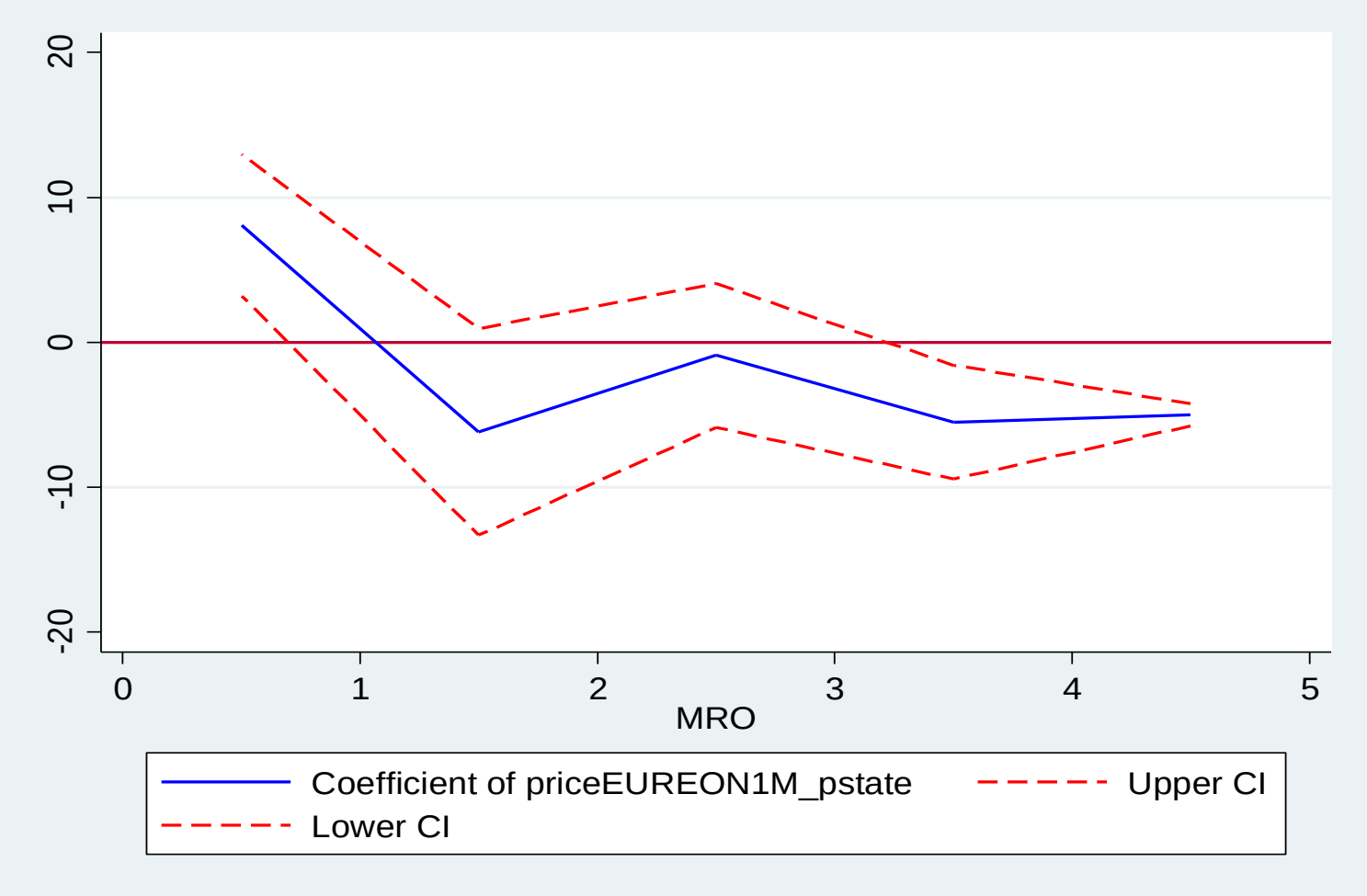


# Stock price evolution of high and low deposit ratio banks

# Orthogonal component of long term rate

| | Pre-Crisis | Crisis normal rates | Crisis low rates |
|---|---|---|---|
| **Short-term rate surprise** | -3.310*** | -6.490*** | 4.215* |
| | (0.762) | (1.104) | (2.086) |
| **Long-term rate surprise** | -0.858 | -3.759 | -12.27*** |
| | (1.207) | (3.432) | (1.796) |
| Observations | 2,634 | 1,963 | 1,792 |
| R-squared | 0.026 | 0.157 | 0.211 |
| Number of groups | 53 | 51 | 51 |

# The effect of monetary policy at different MRO levels



# Alternative instruments for long-term rate surprise

| | France | Netherlands | Italy | Spain | Bund 2y | Bund 5y | Bund 10y |
|---|---|---|---|---|---|---|---|
| **Short-term rate surprise** | -4.357*** | -4.508*** | -4.277*** | -3.723*** | -3.712*** | -4.471*** | -4.530*** |
| | (1.079) | (1.055) | (1.178) | (1.116) | (1.104) | (1.125) | (1.220) |
| **Long-term rate surprise** | -0.713 | -0.0577 | -2.719 | -2.550 | -3.308 | -0.534 | 0.212 |
| | (1.427) | (1.805) | (2.368) | (1.877) | (2.183) | (2.566) | (3.038) |
| Observations | 6,462 | 6,544 | 5,202 | 5,827 | 6,582 | 6,764 | 6,720 |
| R-squared | 0.133 | 0.133 | 0.160 | 0.147 | 0.130 | 0.122 | 0.128 |
| Number of groups | 56 | 56 | 54 | 56 | 56 | 56 | 56 |
| **Short-term rate surprise** | 4.832 | 4.264 | 7.048* | 4.295 | 4.282 | 3.536 | 2.742 |
| | (2.953) | (3.069) | (4.084) | (3.544) | (2.964) | (2.953) | (2.723) |
| **Long-term rate surprise** | -2.033 | -1.852 | -5.414*** | -4.531*** | -1.755 | -1.736 | -1.601 |
| | (1.328) | (1.366) | (1.335) | (1.599) | (1.251) | (1.489) | (1.946) |
| Observations | 5,895 | 5,968 | 4,982 | 5,175 | 6,178 | 6,268 | 6,132 |
| R-squared | 0.031 | 0.029 | 0.084 | 0.061 | 0.028 | 0.026 | 0.024 |
| Number of groups | 56 | 56 | 54 | 56 | 56 | 56 | 56 |