



# Unconventional monetary policy in the euro area

Macroeconomic context, effectiveness, unintended consequences, and normalization

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*Central Bank of Malta, Valletta, 29 October 2018*



Similarly to other central banks, in the last few years the ECB resorted to a number of extraordinary measures.

- Why were they needed?
- Did they deliver what they were meant to deliver?
- Are they having, or could they have in the future, unintended consequences?
- What next?

# Secondary aim of today's lecture

In a central bank, research is particularly relevant and useful when the central bank sails in uncharted waters

*“[...] the past ten years show how indebted the former [policymakers] are to the latter [researchers]”*

Draghi (2017)

*“monetary policy cannot wait until sufficient information accumulate that may cast full light on the new mechanisms at work,” so that, when exceptional circumstances occur, research in central bank becomes a ‘rush against time’*

Visco (2016)

- 1** The context: disinflation and its risks
- 2** The monetary policy response and its effects on the macroeconomy
- 3** Unintended consequences of unconventional monetary policies?
- 4** Normalization: so far
- 5** Normalization: what next?
- 6** Envoi: challenges ahead

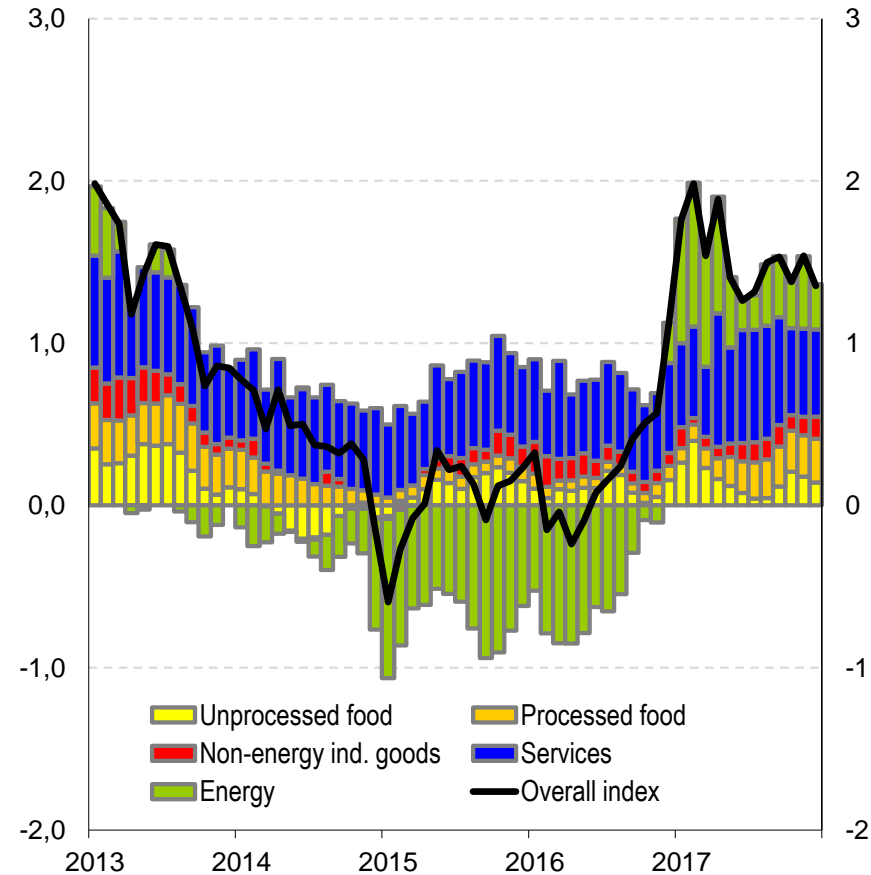
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# Large, rapid and persistent fall in inflation: oil only part of the story

## Headline and core HICP inflation, 1999-2017

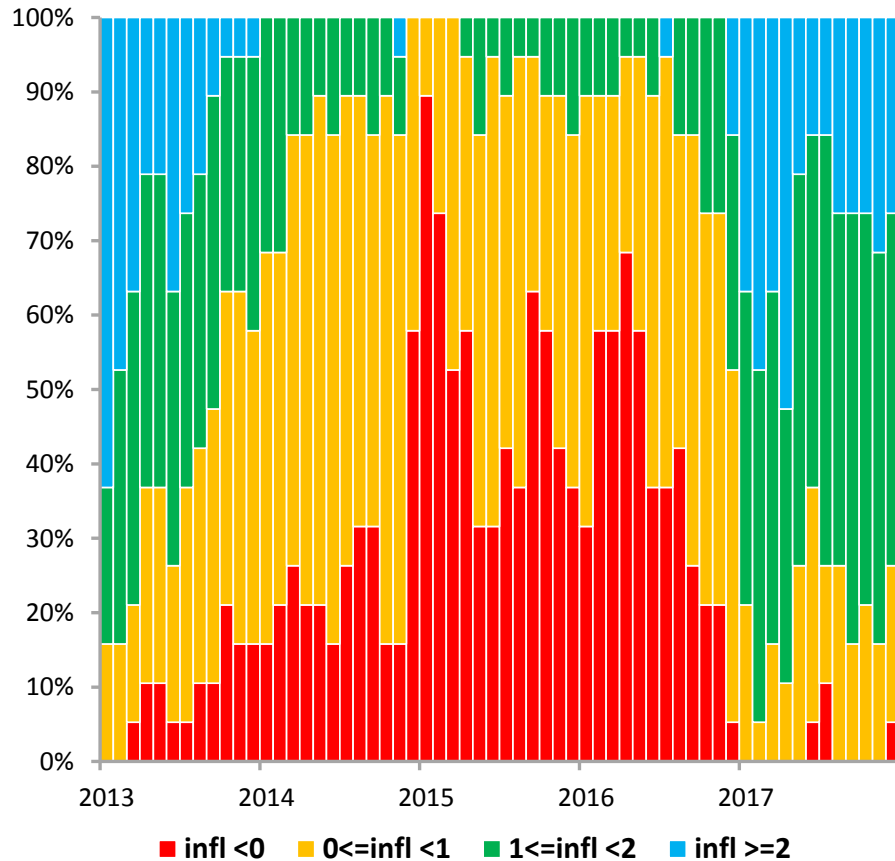


## Main HICP components, 2013-17

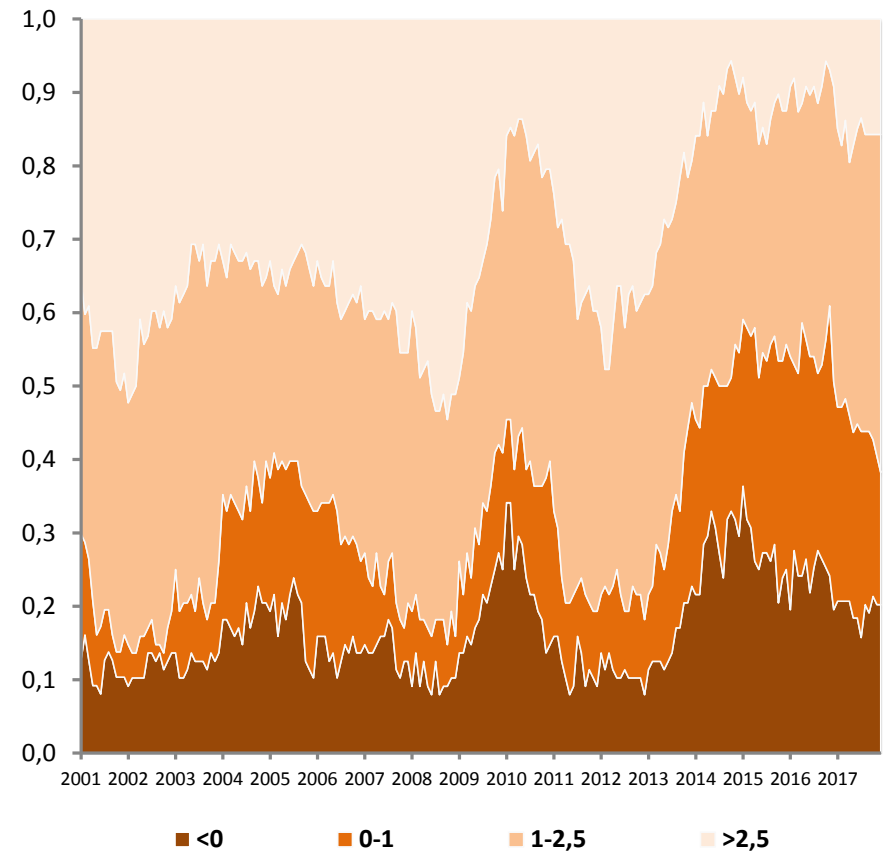


# Inflation fall was widespread, across both countries and items

Number of countries with annual percentage changes of the HICP within given bounds



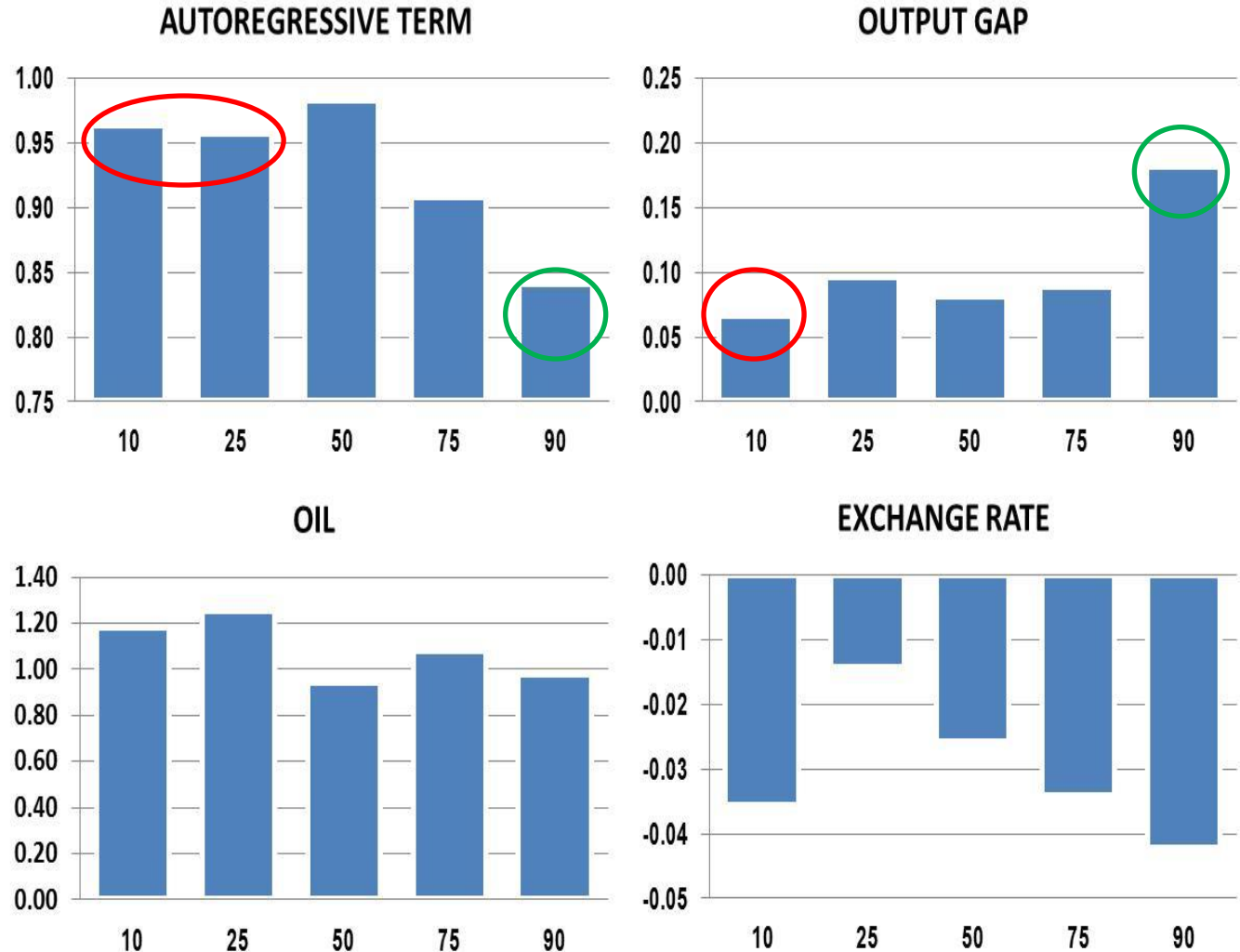
Shares of items in the HICP with annual percentage changes within given bounds



# Low inflation is more resilient, and less sensitive to gap

Quantile regressions show that, when inflation is historically low (lower deciles of its distribution), price changes are:

- more persistent (autoregressive terms in lower deciles of the distribution of inflation are larger), and
- less sensitive to changes to cyclical conditions, such as the output gap (coefficient on output gap is lower).



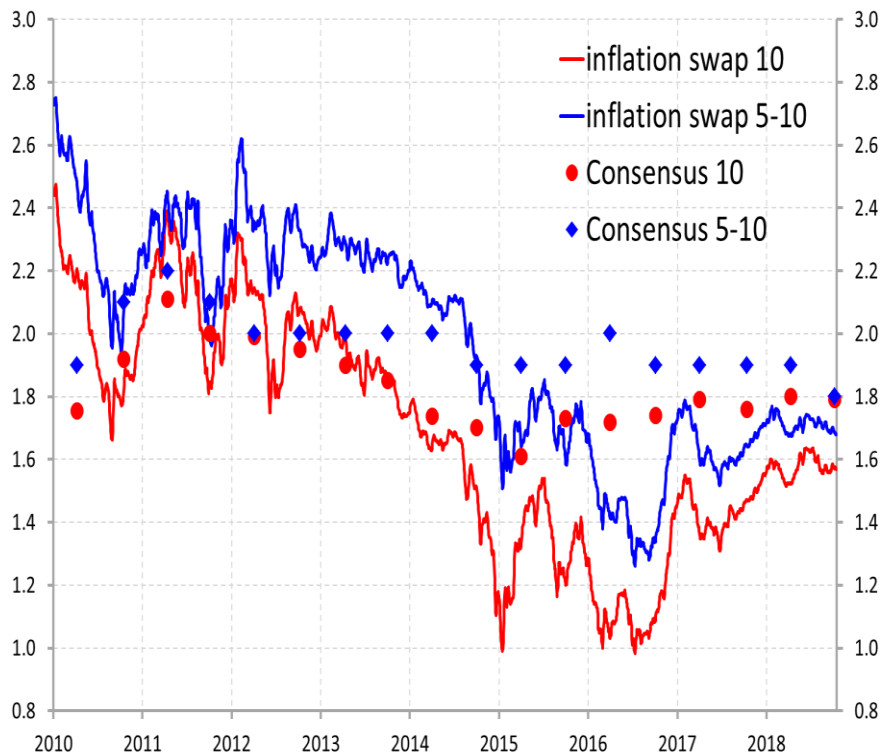
details

# Increasing signs of possible de-anchoring of expectations

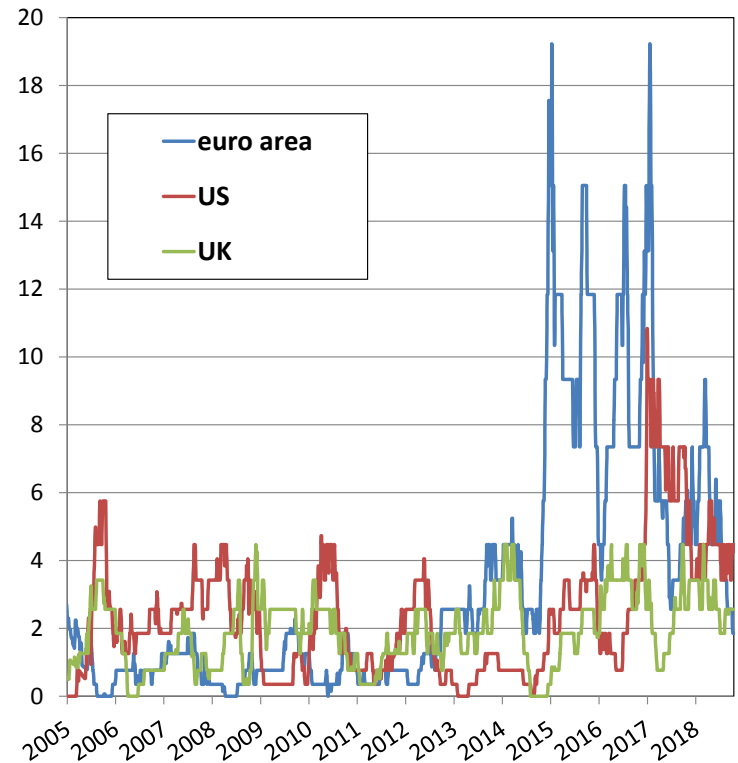
In 2013-16 growing signs of de-anchoring of long-term inflation expectations from levels consistent with the definition of price stability:

- Inflation expectations declined at all horizons
- Natoli and Sigalotti (2017) look at the reaction of short- and long-term inflation expectations when the former are hit by extreme negative shocks: correlation of long- and short-term expectations increased since late 2014

**Inflation expectations in the euro area**  
(Consensus survey and Inflation swaps)



**Co-movements of short and long-term inflation expectations**



# De-anchoring of expectations when agents learn

Moving beyond the (standard) assumption of rational expectations, Buseti, Delle Monache, Gerali & Locarno (2015) consider a small-scale DSGE model in which agents learn from actual outcomes and adjust their estimate of the inflation target accordingly.

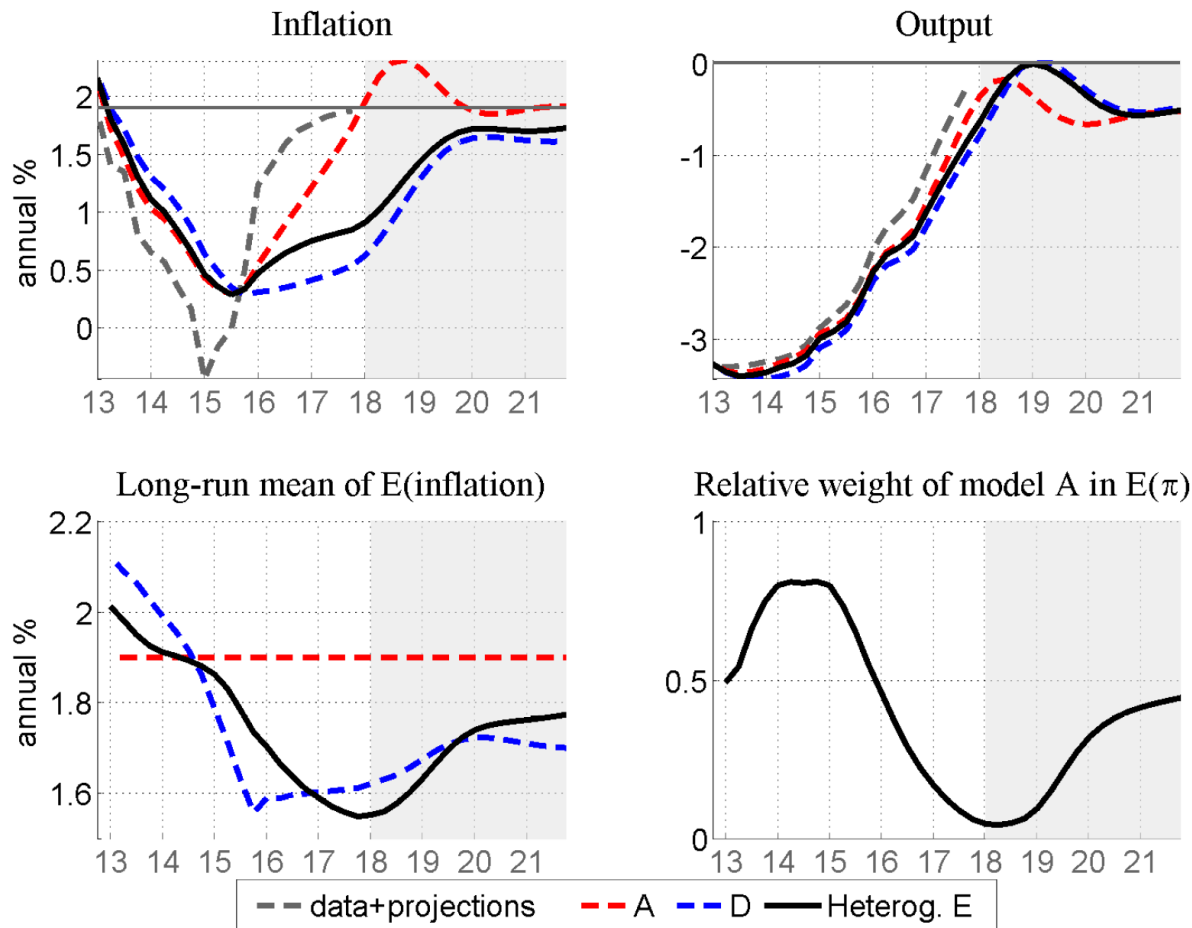
The model allows for heterogeneous expectations: agents switch back and forth between an inflation prediction model in which agents attach full credibility to the central bank inflation aim (model A: anchored) to a model in which agents learn from the data the actual central bank inflation aim (model D: de-anchored); the decision to switch from one model to another is a stochastic function of their relative forecast performance.

Experiment:

- fit the model to data and compute forecasts for 2013Q1-2017Q4
- recover structural shocks
- re-simulate the model with the same structural shocks but replacing the assumption of rational expectations with that of learning

# Negative inflation surprises create self-reinforcing downward spiral

## Inflation expectations and price stability in the euro area Rational expectations vs. adaptive learning (Busetti et al. 2015)



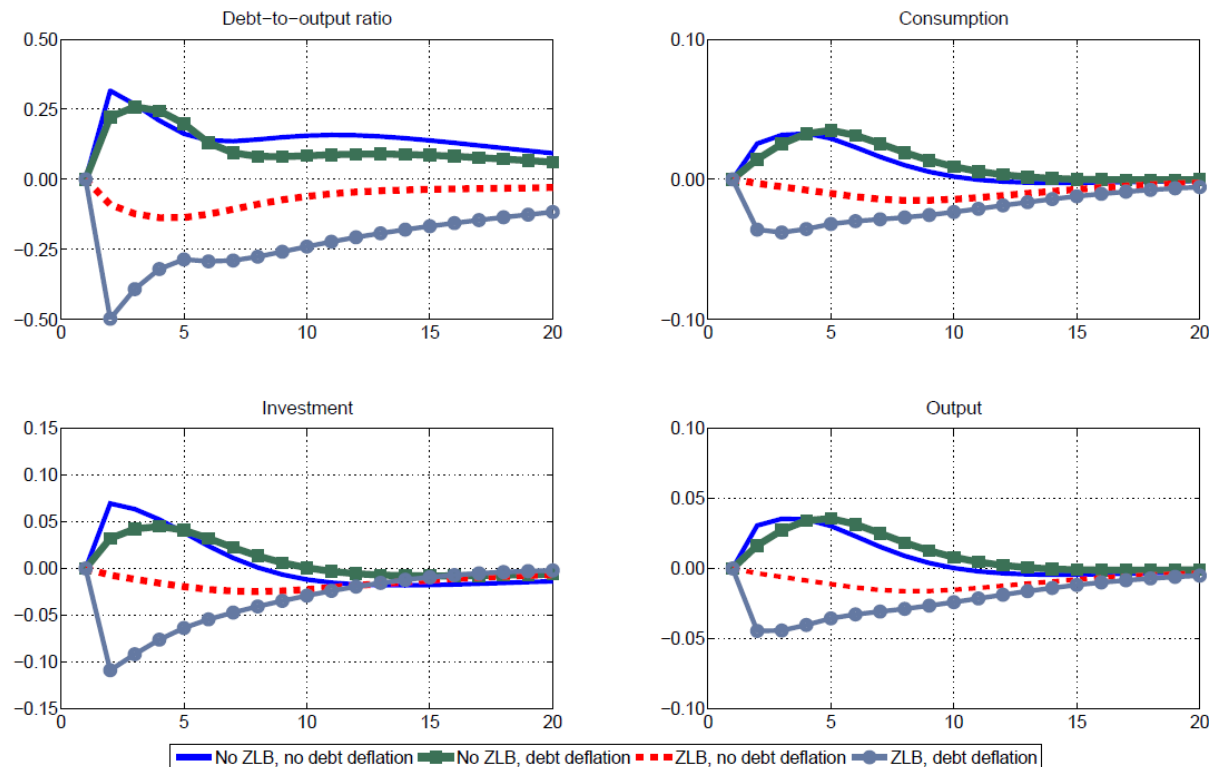
A: anchored  
D: (possibly) de-anchored  
E: endogenous mix of A & D

# The dark side of “good” lowflation at the ZLB when nominal debt is high

A negative cost-push shock is normally deemed to have a favorable effect on the macroeconomy.  
But what if the shock takes place when (as in the current circumstances) the economy is characterized by:

- interest rates at the ZLB
- and a non-negligible amount of private-sector nominal debt?

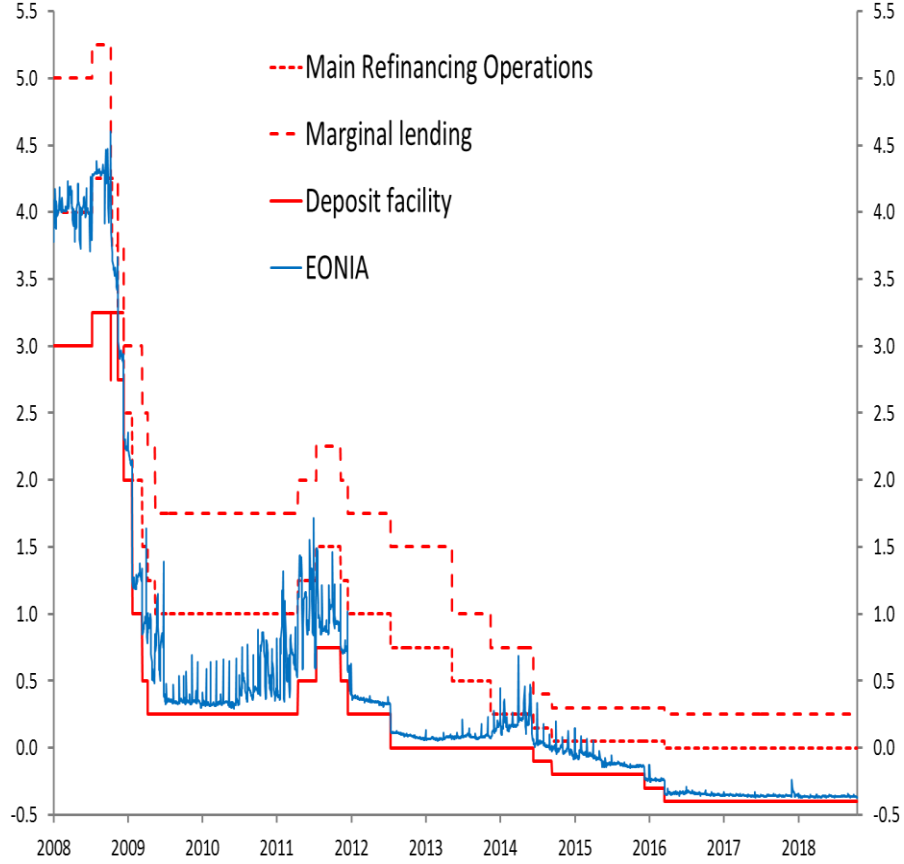
Neri & Notarpietro (2015) investigate this question using a DSGE model with collateral constraints on households



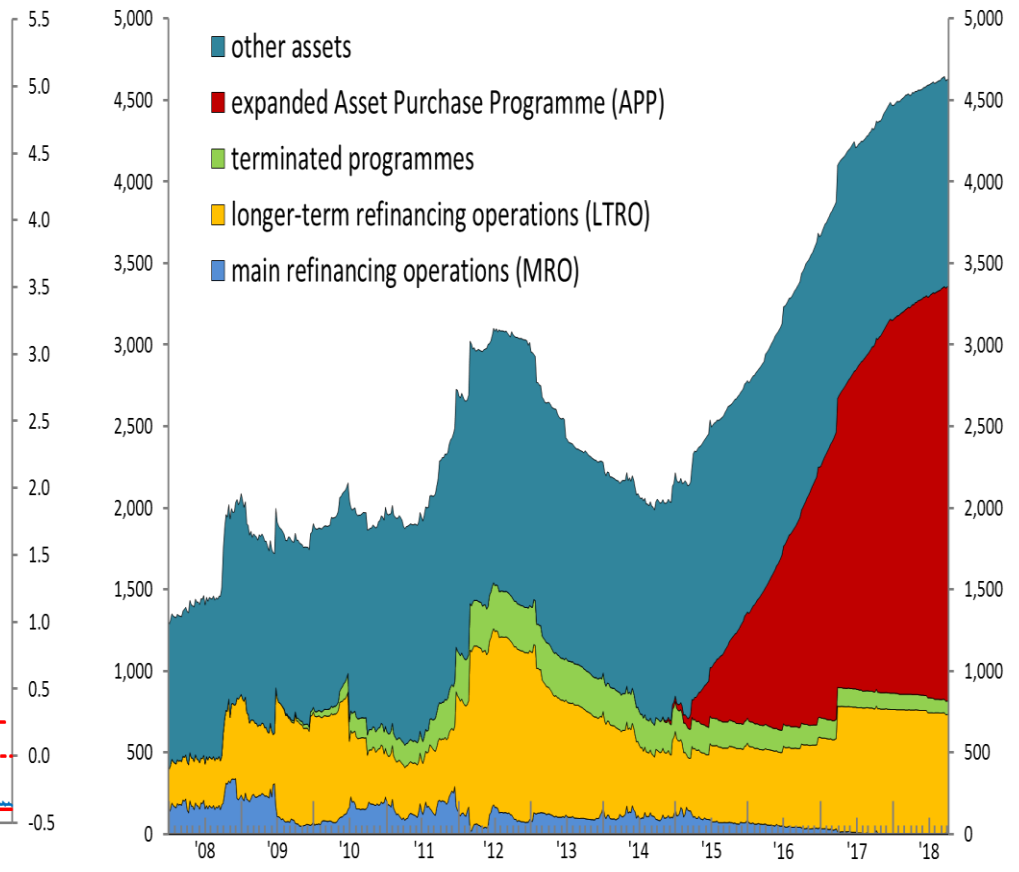
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# Monetary policy actions

ECB key interest rates (per cent)



Eurosystem balance sheet (billion €)



ECB responded to consequences of financial crisis by reducing policy rates, supporting banks' liquidity and preserving proper functioning of MTM.

With policy rates close to their lower bound, ECB introduced asset purchases to further reduce the risk-free rate, lower the term premium and raise inflation back to its objective

# Are unconventional monetary policy (UMP) measures effective?

## Early criticisms:

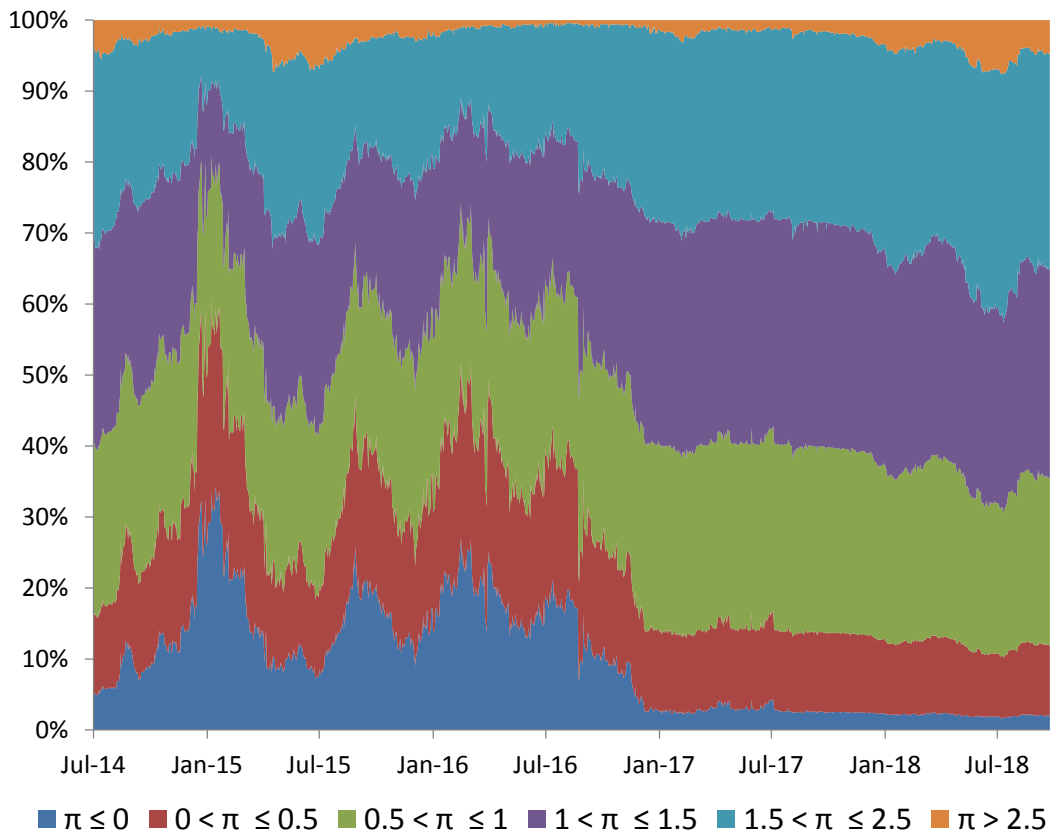
- 'Sharp' No: "Economic activity has not vigorously picked up; inflation expectations still below target."
- 'Mild' No: "Ok, they have been effective, but (maybe) with diminishing returns."

## Evidence:

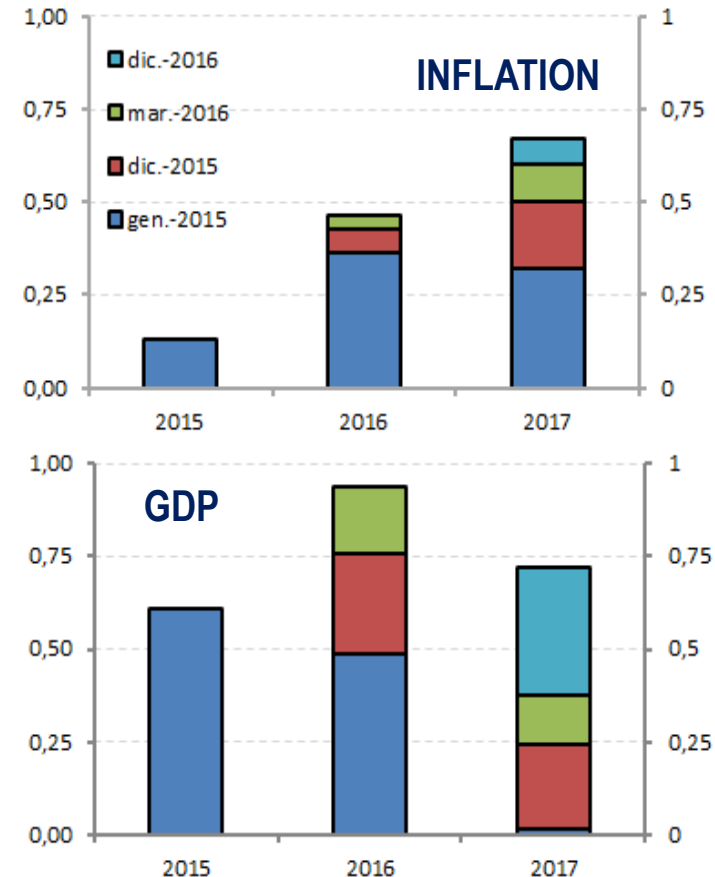
- Yes!

# Deflation worries have abated, growth and inflation received major boosts

Option-implied (risk-neutral) probability distribution of average inflation over a 5-year horizon



Impact of APP on GDP and inflation

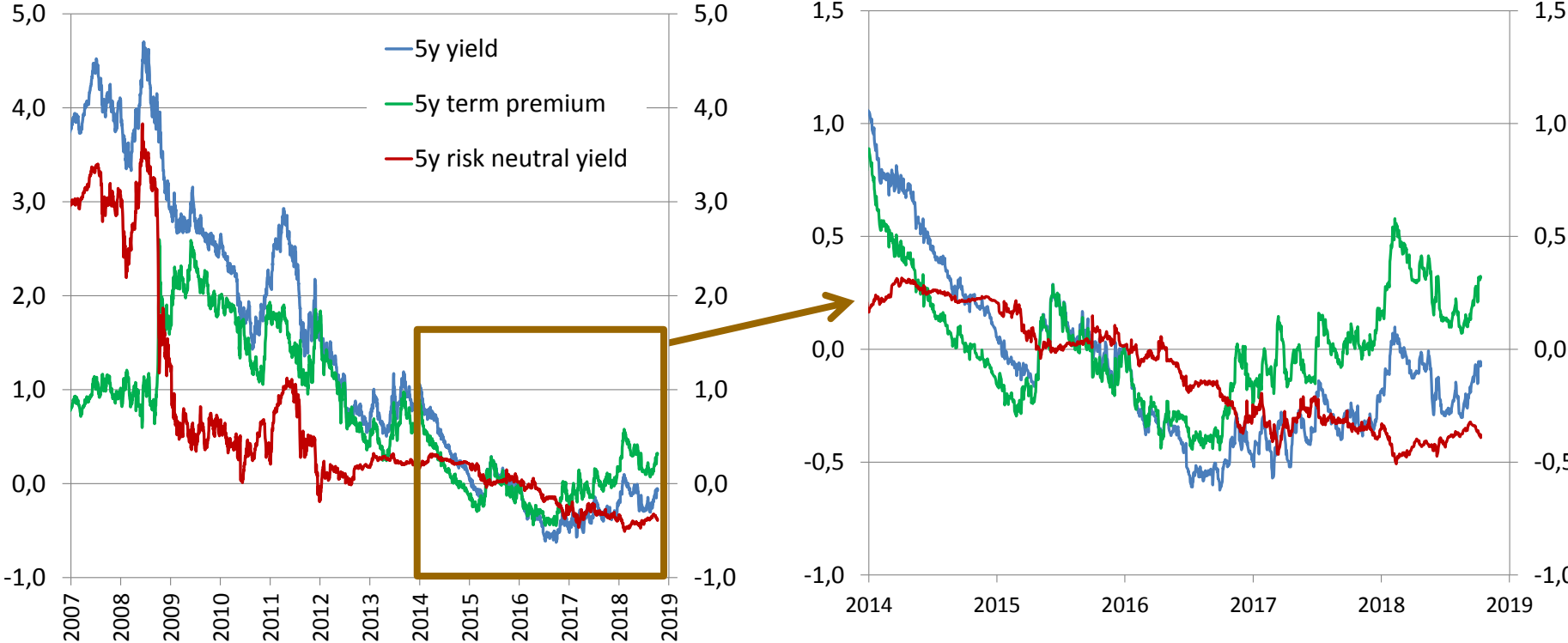


Source: based on Cecchetti, Natoli & Sigalotti (2015).

Source: estimates by Banca d'Italia staff.

# Bond yields and term premiums

Five-year nominal bond yields and term premia in the euro area (per cent)

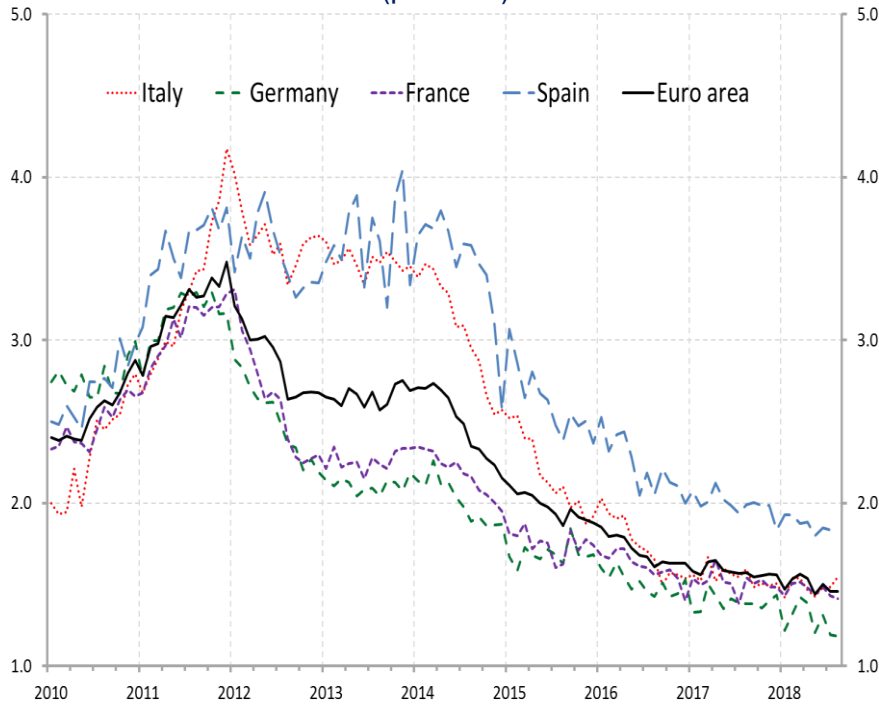


Note: the figure presents the 5-year zero-coupon interest rate for the euro area implied in government bonds with rating AAA, the corresponding expected short-term interest rate over a five-year horizon and the corresponding 5-year term premium; these last two variables are computed with an affine term structure model with five factors.  
Based on: Pericoli & Taboga (2008) [Same approach as in: T. Adrian, R.K. Krump and E. Moench, *Pricing the term structure with linear regressions*, Journal of Financial Economics, 110, 110-138, 2013.]

- Expectations of further quantitative measures in Autumn 2014 and introduction of PSPP in January 2015 compressed term premiums and lowered expected short-term interest rates.
- Term premiums currently stand at low levels, but above the minima reached in the summer of 2016.

# Impact on cost of new loans

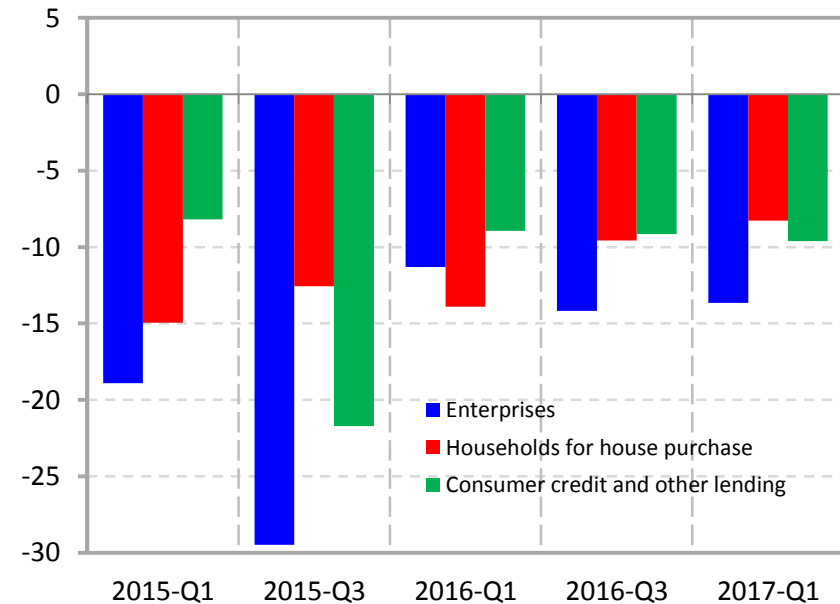
**Rates on new loans to non-financial corporations**  
(per cent)



- Cost of new loans has reached historical lows in all countries.
- Cross-country dispersion has declined.

- APP has exerted a significant downward pressure on lending rates; impact on credit standards has been less pronounced.
- Targeted longer term refinancing operations have contributed too.

**Impact of APP on terms and conditions (net %)**



Source: Eurosystem Bank Lending Survey.

Note: The net percentages are defined as the difference between the sum of the percentages for "tightened considerably" and "tightened somewhat" and the sum of the percentages for "eased somewhat" and "eased considerably".

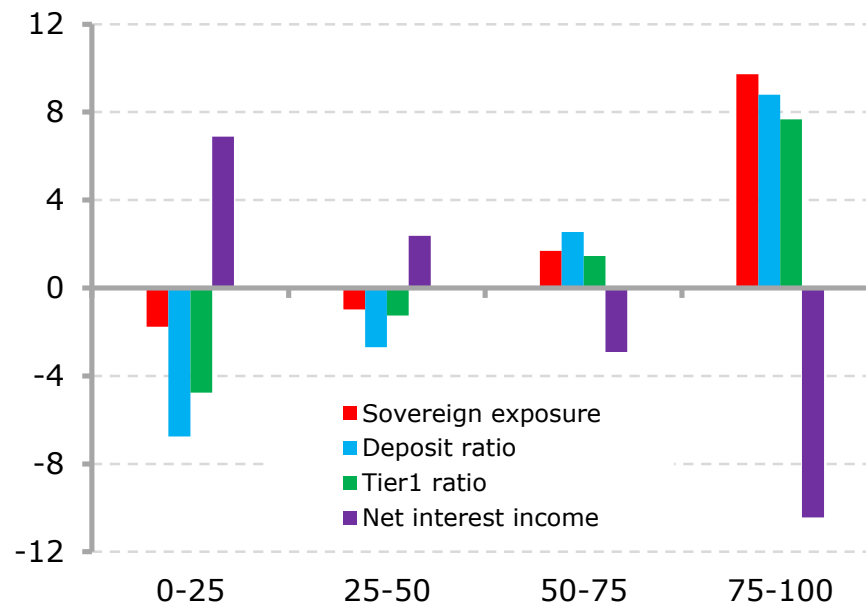
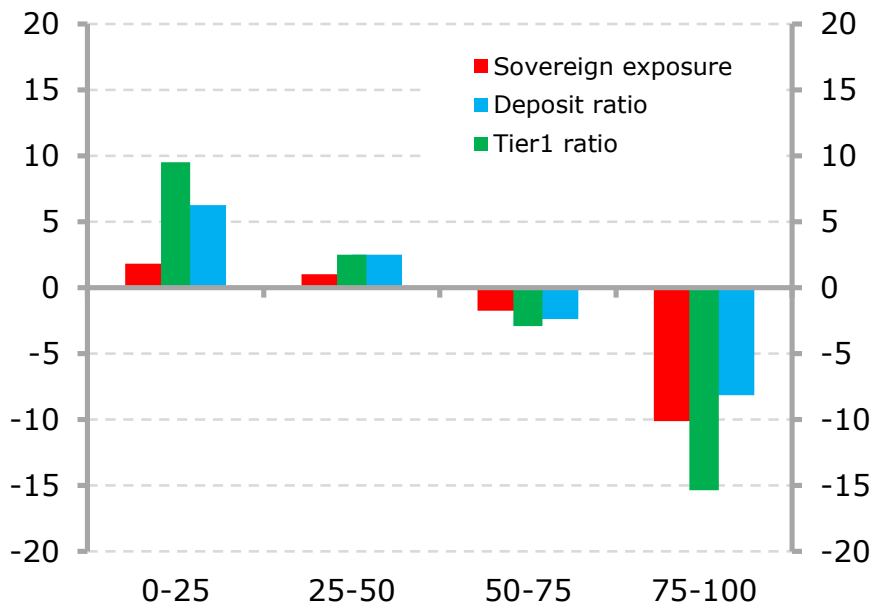
# The APP and the bank-lending channel

## Difference in long-run pass-through on lending rates

(deviation from median bank, basis points, by quartiles of bank characteristics identified by colours)

**Conventional MP**  
(MRO rate)

**Unconventional MP**  
(Shadow rate-MRO spread)



Note: each bar reports the pass-through for a bank with the mean value of the characteristic in each bucket.

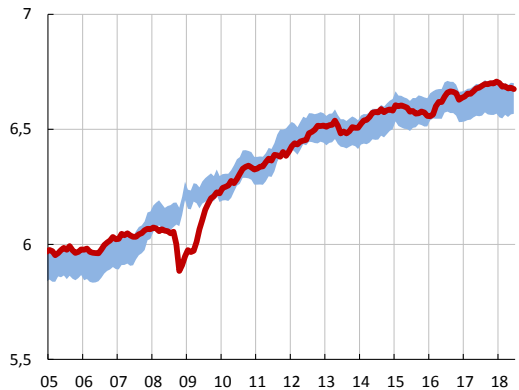
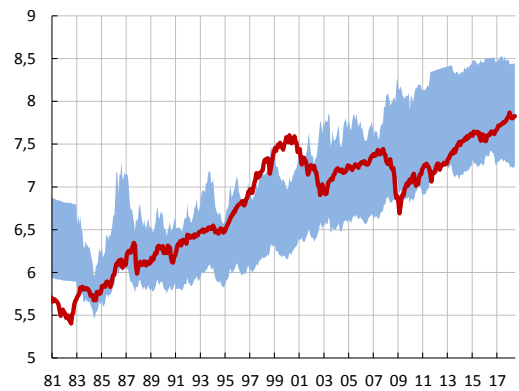
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Debate around APP often points to four main potential unintended side-effects:

- Over-valuation of financial assets and excessive risk-taking
- Negative impact on bank profitability and banks balance sheet adjustment
- Increasing inequality
- Delay of fiscal consolidation and structural reforms

# Risks of overevaluation?

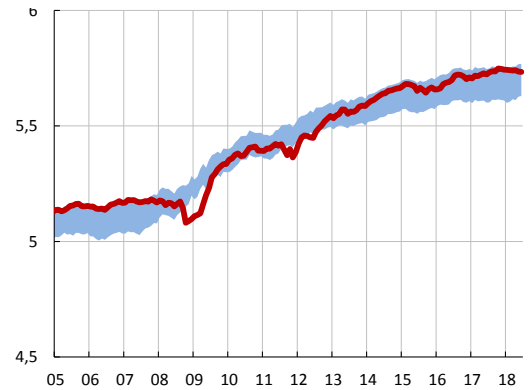
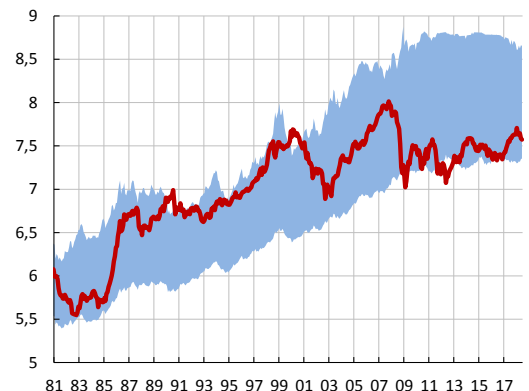
## US



S  
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## Euro area



- Recent Bank of Italy research found no evidence of price distortions from accommodative policies in financial market.
- Country-specific tensions can and should be dealt with using country-specific macroprudential measures.

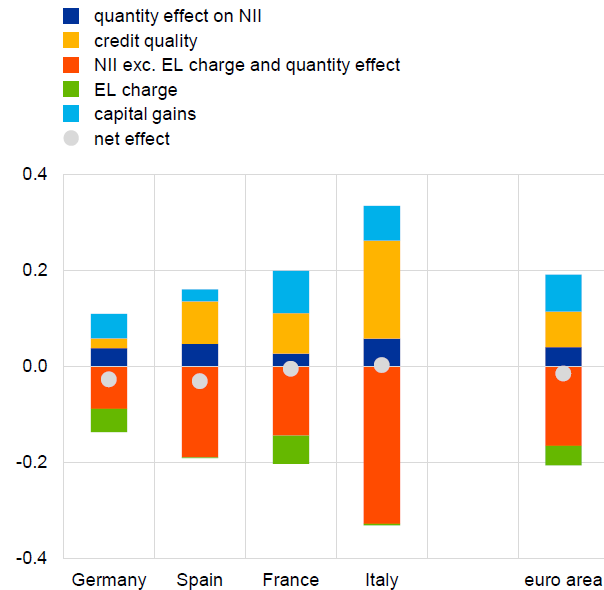
Source: Cecchetti & Taboga (2017).

# APP and negative interest rates: impact on bank profits

The overall impact of non-standard monetary policy measures on bank profitability is expected to be modest

## Estimated effect of monetary policy on bank profitability over the period 2014-17

(percentage point contribution to return on assets)



Sources: European Banking Authority, ECB and ECB estimates.

Notes: Capital gains based on data on a consolidated basis for 68 euro area banking groups included in the list of significant institutions under direct ECB supervision and in the 2014 EU-wide stress test. Euro area figures calculated as the weighted average for the countries included in the sample using the ECB's CBD data for the weight of each country's banking system in the euro area aggregate. NII stands for net interest income and EL for excess liquidity.

Source: ECB, Financial Stability Review, November 2016.

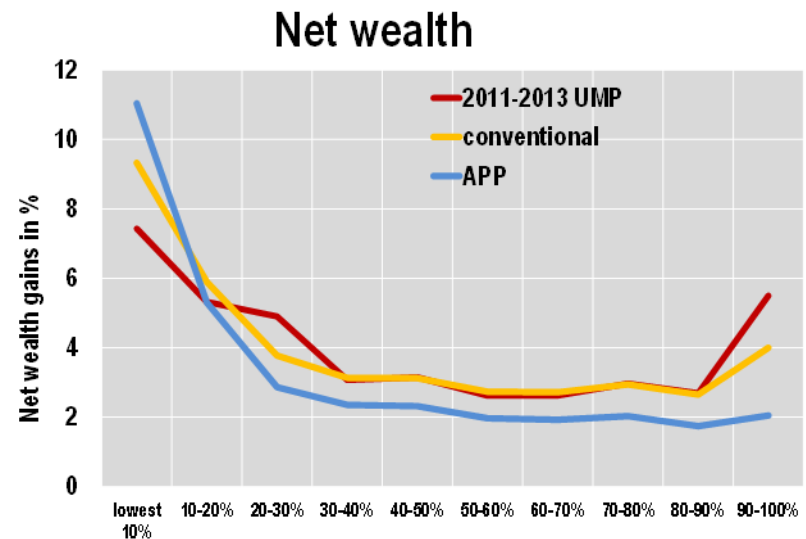
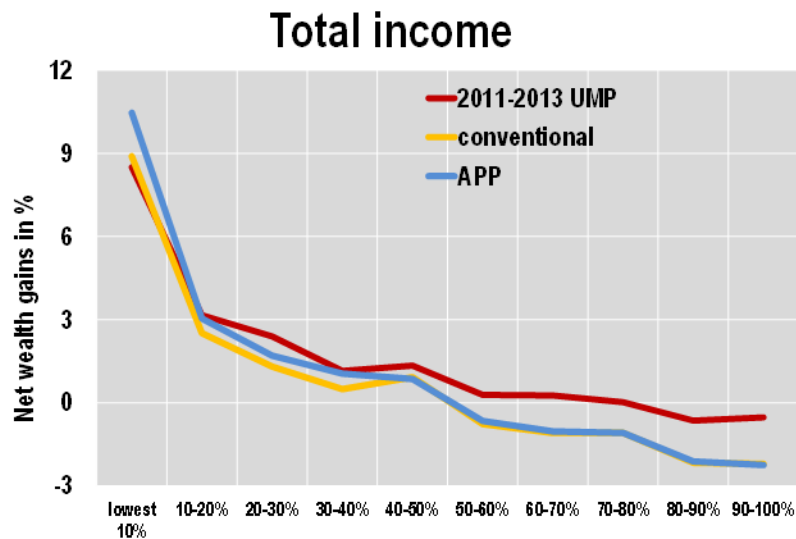
According to evidence published by the ECB in its November 2016 FSR, the overall impact of UMP measures on bank profitability is basically negligible both in the euro area as a whole and in all major countries (assessment may change if interest rates remain negative for very long).

Our analyses for Italy yield similar results.

For a broader analysis of the determinants of Italian banks' profitability, capitalization and bad debts: U. Albertazzi, A. Notarpietro and S. Siviero, *An inquiry into the determinants of the profitability of Italian banks*, Banca d'Italia, Quaderni di Economia e Finanza (Occasional Papers), 364, 2016.

# Monetary policy and inequality

## Distributional effects of conventional and unconventional monetary policy expansions (household groups within income distribution)



- Conclusions based on the inspection of a single channel of transmission in isolation (e.g. changes in asset prices) are misleading.
- In Italy (conventional and unconventional) monetary policy benefited poorer households, as their labour income is more sensitive to macroeconomic conditions.
- The overall short-term impact of monetary policy on inequality indexes is almost always negligible (see also BuBa Bulletin Sept./16).

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# Inflationary pressures gradually building up

New indicator built at the Bank of Italy provides a synthetic measure of inflationary pressures and can be interpreted as the probability that inflation will be 1.9 per cent or higher within a given time horizon  $h$  (12 months ahead in the chart).

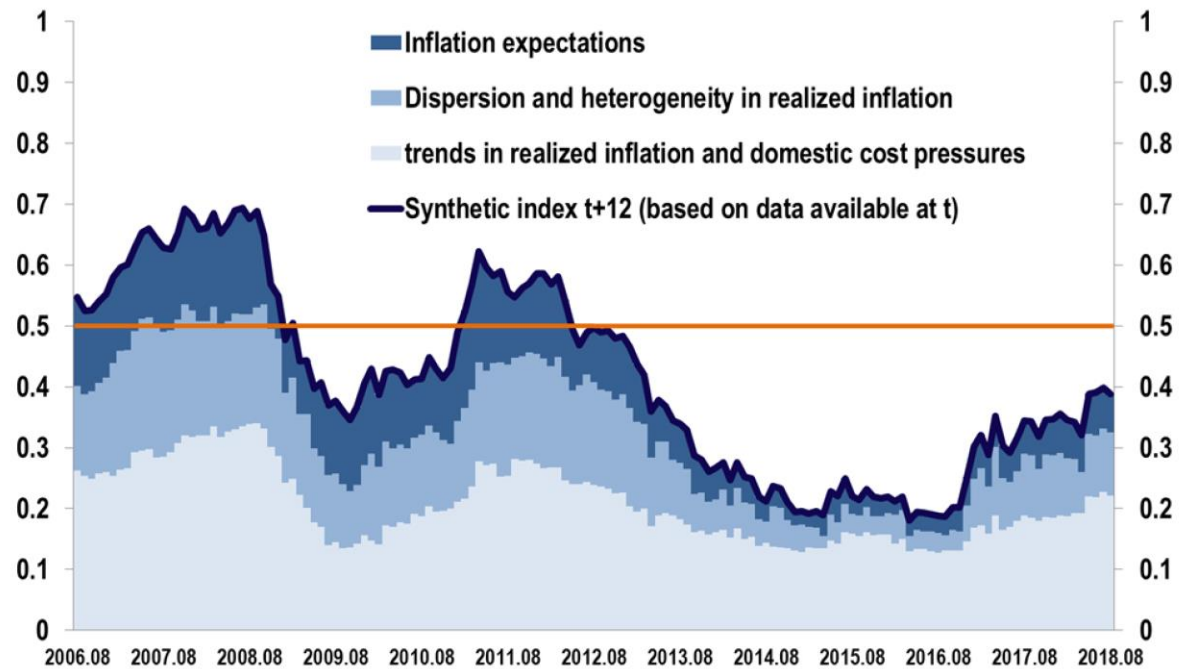
15 inflation-related indicators, grouped in 4 categories:

1. Past realized inflation
2. Dispersion in realized inflation
3. Inflation projections
4. Expectations

The synthetic indicator is given by the principal components of the fitted values of the 15 separate regressions run for each of those 15 indicators.

Contribution of each of the 4 categories to the evolution of the indicator may be easily computed (using loadings).

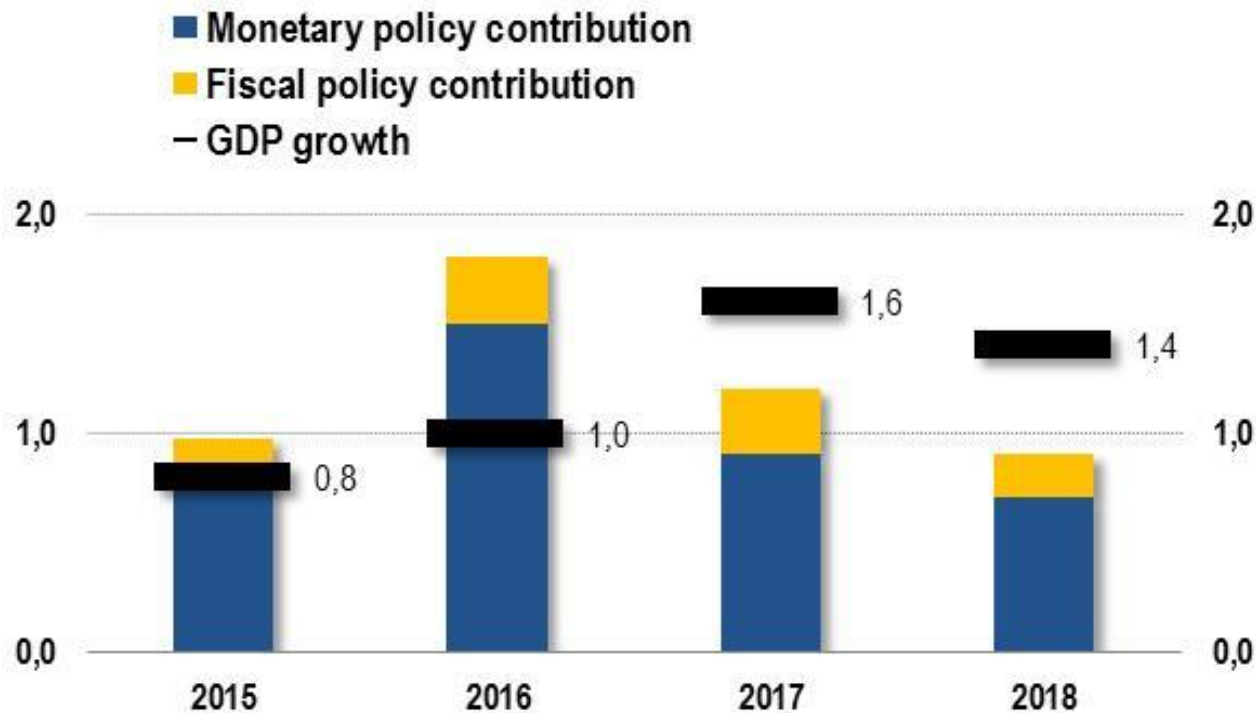
## Synthetic indicator of the probability that inflation 12 months ahead exceeds 1.9%



(\*) The vertical axis shows the composite index, constructed as the aggregate of the probabilities, derived from the components, of inflation of 1.9% or more at T+12 based on the information available at T; the horizontal axis shows actual T.

# Growth is becoming increasingly self-sustained (example: Italy)

## Contribution of economic policies to Italian GDP growth (percentage points and per cent)



Source: Annual Report, May 2018.

# Monetary policy recalibration on-going for almost two years now

## Recalibration started two years ago and gradually involved all monetary policy tools:

- December 2016 Monthly purchases down from 80 to 60 bln (starting April 2017)
- June 2017 Easing bias on policy rates is removed
- October 2017 Monthly purchases down from 60 to 30 bln (starting January 2018); statement on reinvestment
- March 2018 Easing bias on APP (possibility of increasing purchases in case of unfavorable developments) is removed

# Net asset purchases: going, going, ... gone

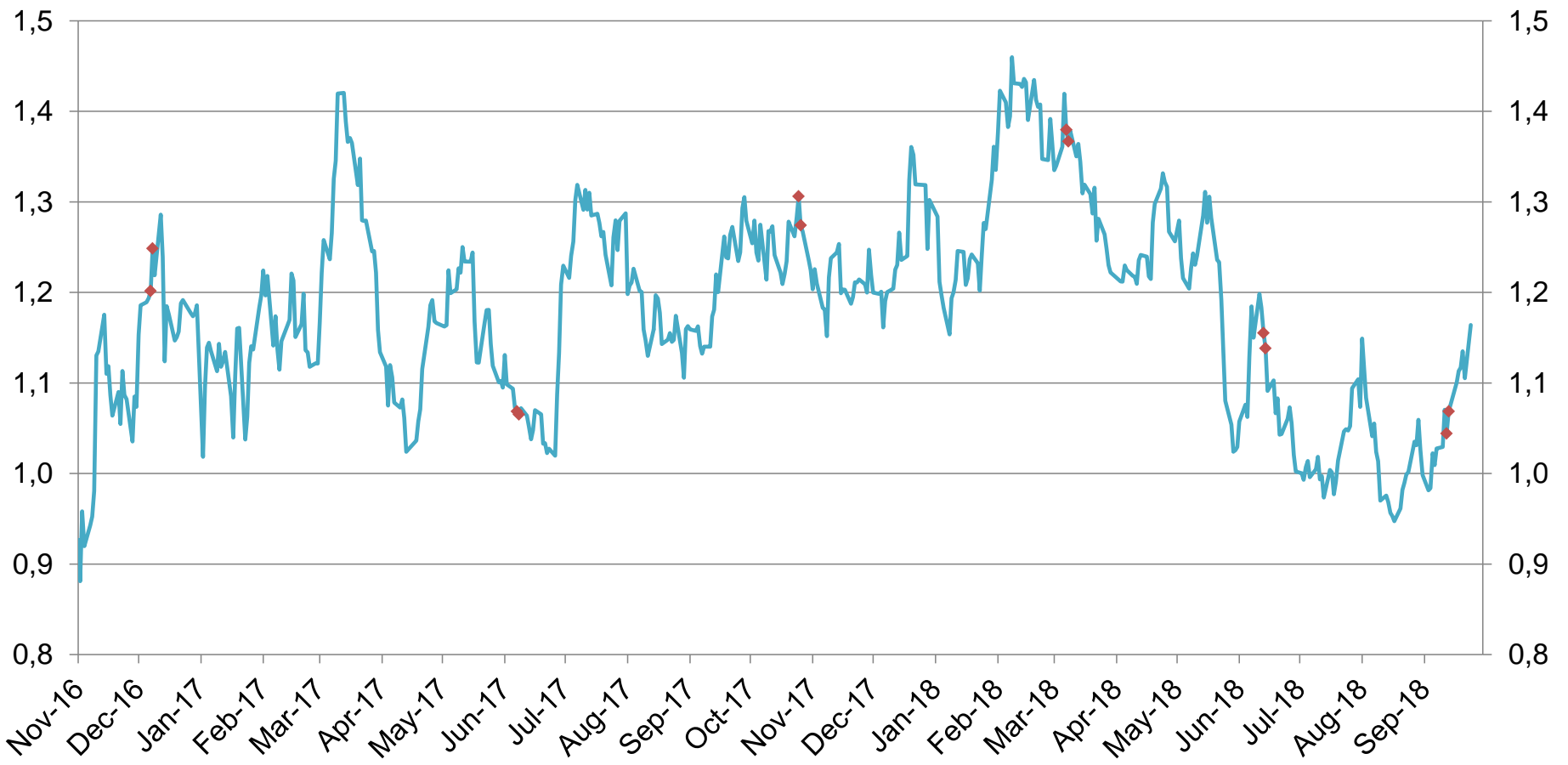
- June 2018 “We anticipate that, after September 2018, subject to incoming data confirming our medium-term inflation outlook, we will reduce ... monthly ... purchases to €15 billion until the end of December 2018 and then end the purchases.”
- September 2018 “After September 2018, we will reduce the monthly pace of the net asset purchases to €15 billion until the end of December 2018 and we anticipate that, subject to incoming data confirming our medium-term inflation outlook, we will then end net purchases.”

At the same time, it was stated over and over again that “**an ample degree of monetary accommodation is still necessary** for the continued sustained convergence of inflation to levels that are below, but close to, 2% over the medium term.”

ECB monetary policy will keep being guided by the same principles that have been guiding it in the recent past: “For ... a rising inflation path to materialise, we need to remain **patient, prudent and persistent**” (Draghi, European Parliament, 24 September 2018).

# Market reactions have remained muted

## Differential between euro area 10-year yield (AAA average) and 3 month Euribor (p.p.)



◆ Monetary policy recalibrations (day before & day of the announcement)

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- ❑ High uncertainty surrounds a number of key factors (e.g.: level of the natural rate of interest; size of output gap and labor market slack).
- ❑ There is a material risk of undermining ongoing economic upswing; and, an imprudent early exit from the expansionary stance could backfire and would eventually require more accommodation.
- ❑ Fewer tools will be available to central banks to combat such eventuality, and there would be a reputational damage.
- ❑ By contrast, many tools are at the disposal of central banks to tackle price pressures if exit is delayed.
- ❑ Macro prudential policies could also be activated to contrast local financial imbalances.

# Main monetary policy tools going forward

**Two main levers** (including “enhanced forward guidance” on both):

## LEVERS

- Policy rates
- Reinvestment: “We intend to reinvest the principal payments from maturing securities purchased under the APP for an extended period of time after the end of our net asset purchases, and in any case for as long as necessary to maintain favourable liquidity conditions and an ample degree of monetary accommodation.”

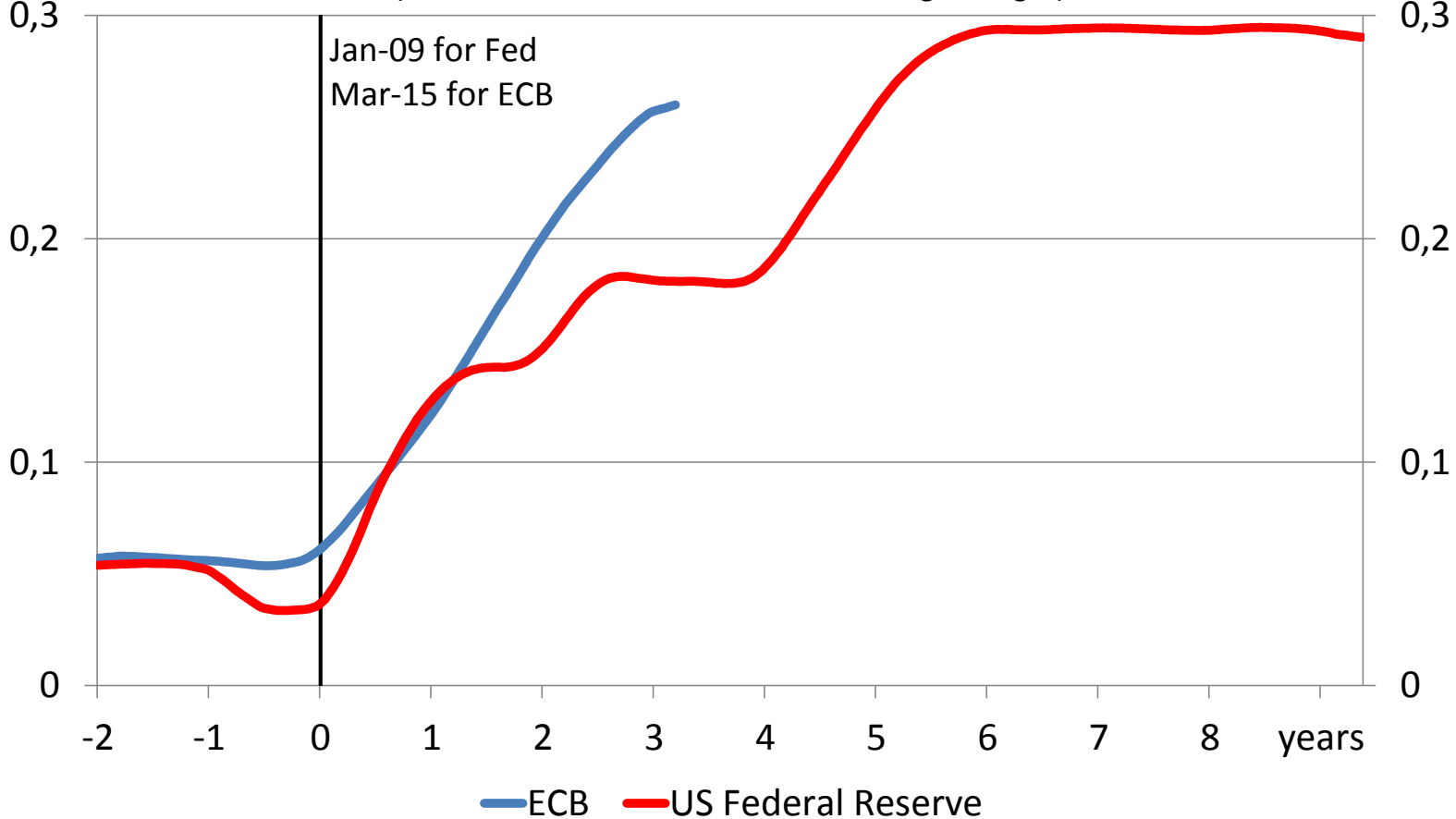
## MARKET EXPECTATIONS

- *EONIA swaps signal first 10 bp increase in deposit rate in 2019Q3. About 3/4 of Bloomberg & Reuters samples expect 15 bp increase in 2019Q3; almost all expect it by end-2019. More forward guidance expected (almost 3/4 expect it in 2019Q2).*
- *Bloomberg: virtually all analysts expect reinvestment to continue for at least two years after the end of net purchases (53% think two; 19% three; 28% more than three).*

# Length of reinvestment: lessons from the Fed

## Central bank's bonds holdings

(w.r.t. GDP at the start of QE/APP; moving averages)

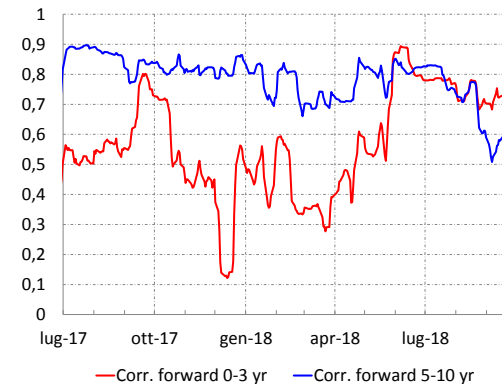


Brainard (2017): “for a foreign economy that is at the effective lower bound, tightening in the home country through balance-sheet policy will be less welcome than through short-term rates.”

**Advanced economies:** Term premia drive the high correlation in DE and US long rates (e.g., Pericoli, 2014); causality can go both ways (Taper Tantrum vs. Bund Tantrum).

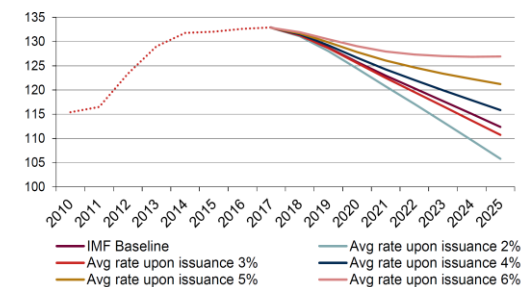
**Italy:** increase in yields is NOT *PER SE* a source of risk for debt sustainability (decline in primary surplus and fall in GDP growth are much bigger risks).

**EMEs:** until recently, stress in EMEs was limited; it has risen sharply in last few weeks, but cannot be compared with the abrupt corrections in capital flows and asset prices at the time of taper tantrum (for now).



EA and US  
rate  
comovement

Fig. 1: Italian debt/GDP projections under different funding rate scenarios & based on IMF growth/surplus forecasts

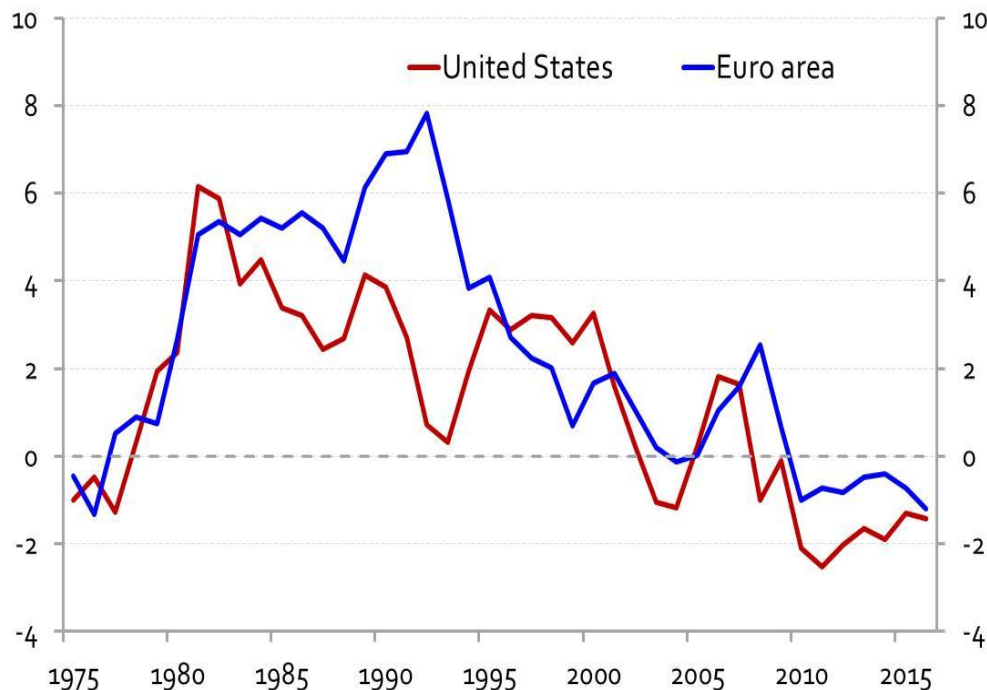


Source: Nomura, IMF

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# Are structural factors putting downward pressure on interest rates?

**Estimates of the natural rate of interest**  
(percentage points)



Source: Gerali and Neri (2017)

- Estimates of the natural rate of interest for the euro area and US (e.g.: Gerali and Neri, 2017) suggest a trend decrease since the 1980s and point towards negative values in recent years.
- If the natural rate of interest were to stay around zero, even if inflation returns to levels consistent with the definition of price stability, the ECB main policy rate should be around 2 percent in steady state (i.e., when the output gap is 0), which may not give enough leeway to cut policy rates in response to future recession.
- In that environment, asset purchases may become one of the main ways to provide monetary policy accommodation.
- In that case, going back to the previous size of the balance sheet might not even be possible.

- Which strategy: Back-to-normal? Higher inflation target? Move to (temporary?) price level targeting? Other?
- Which instruments should be retained: QE, TLTRO, negative rates? What is their optimal mix?
- Which operational target(s) and framework: Corridor vs. floor systems? Large vs. lean balance sheet?

Answers to these issues should take into account the experience of the long crisis but also structural changes to economy and financial markets (banks vs. financial markets); regulation (e.g., possible impact on LCR to CB balance sheet); lack of safe assets; and more (see, e.g., next slide).

*“[...] the past ten years show how indebted the former [policymakers] are to the latter [researchers]” Draghi (2017), with a lot of “practice ahead of / hand-in-hand with theory”*

Will the next ten years be a re-run?

*Thanks for your attention*



# Impact of inflation determinants may depend on the level of inflation itself

- Busetti, Caivano and Rodano (2015) use quantile regression to estimate and forecast the conditional distribution of euro-area inflation
  - Quantile regressions model the relation between a set of explanatory variables and specific quantiles of the endogenous variables, i.e., they provide indications on the importance of the various factors when the endogenous variable is in specific regions of its distribution.
- As in a standard Phillips Curve, inflation quantiles are assumed to depend on past inflation, output gap and other determinants (namely oil prices and the exchange rate)
- Quantile regressions are found to describe the distribution of inflation better than a benchmark univariate trend-cycle model with stochastic volatility
- Out-of-sample predictions based on quantile regressions are overall superior

# Non-linear pass-through indicator of de-anchoring

Natoli and Sigalotti (2017):

1. take 1y1y and 5y5y inflation swaps (in first differences) as proxy of daily revisions in short- and long-term inflation expectations
2. define left-tail revisions (e.g. negative revisions below the 10<sup>th</sup> percentile) and group left-tail and non-left tail ones.
3. Estimate a logit model in which  $y$  (long-term) and  $x$  (short-term) are dummies equal to 1 if the daily revision is left-tail, and equal to 0 otherwise

$$p(y_t = 1|x_t) = \frac{e^{\alpha + \beta x_t}}{1 + e^{\alpha + \beta x_t}}$$

4. The indicator of left-tail pass-through is then defined as

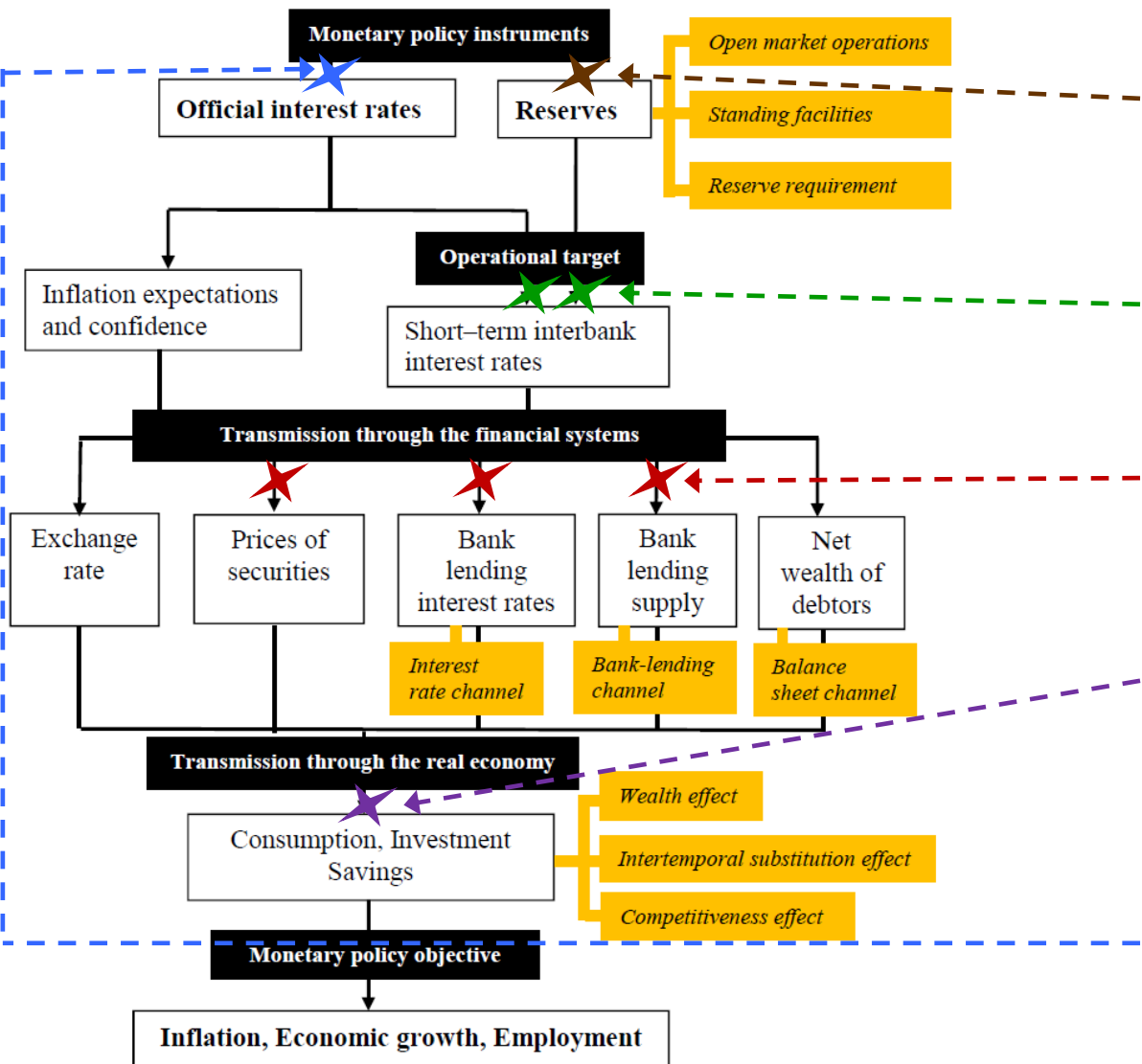
$$LTPT_t = e^{\beta t} = \frac{p_t(y = 1|x = 1)}{p_t(y = 0|x = 1)} \bigg/ \frac{p_t(y = 1|x = 0)}{p_t(y = 0|x = 0)}$$

# The ECB's reaction to the Sovereign debt crisis

The ECB's prompt reaction was aimed at restoring a correct and homogeneous transmission of the monetary policy impulse

- May 2010: *Securities Markets Programme (SMP)*
- October 2011: *Second covered bond purchase program (CBPP2)*
- End 2011/Early 2012: *Two 3-year refinancing operations (LTRO)*
- End 2011: *MRO rate lowered from 1.5 to 1.0 per cent*
- July 2012: *Draghi's «Bumblebee Speach» (“whatever it takes”)*
- August 2012: *Outright Monetary Transactions (OMT) are announced*
- July 2014: *Targeted long-term (4 y.) refinancing operations (TLTRO)*
- September 2014: *ABS purchase program and Third covered bond purchase program (CBPP3)*

# Disruptions in monetary policy transmission during a financial crisis



- (i) volatility of demand for reserves in open market operations
- (ii) limited redistribution of reserves in interbank markets
- (iii) disruptions in other segments of financial markets
- (iv) uncertainty and deleveraging hamper the transmission to the real economy
- (v) effective lower bound of policy rates

- When the central bank purchases asset A, the deposit of the seller is increased...
- ... unless that deposit is regarded as a perfect substitute for the asset sold (asset A), ...
- ... the seller will rebalance his portfolio by buying asset B that is a closer substitute (in terms of liquidity, maturity and counterparty risk) for the asset that he has sold (asset A).
- That shifts the deposit to the seller of asset B who will, in turn, attempt to rebalance his portfolio by buying other assets – and so on.

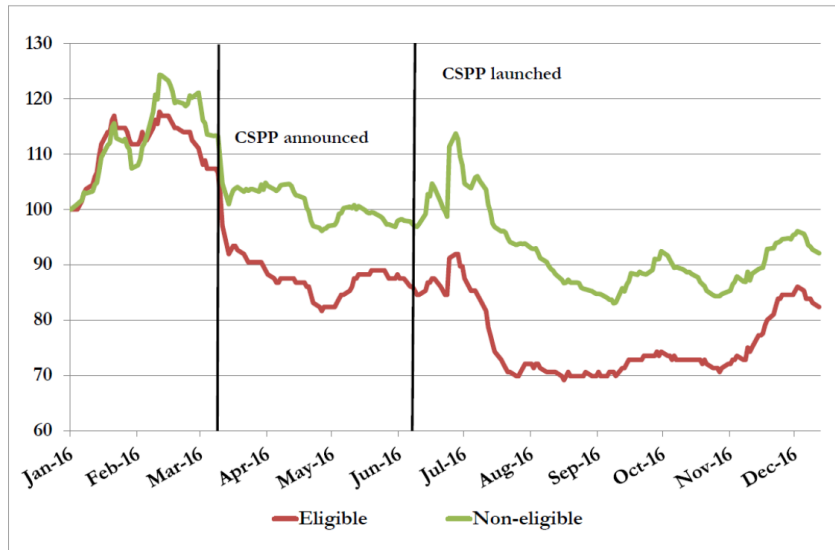
- Degree of (**imperfect**) **substitutability** among private sector's balance sheet items, which arises in the presence of economic frictions (e.g. asymmetric information, limited commitment and limited participation) or balance sheet's constraints
- Impact that changes in the supply of private assets and liabilities have on individual decisions, which implies that net relative amount of securities in the market is a determinant of their relative yields
- Hence, the heterogeneity of economic agents is an important factor

By providing more explicit information on the future path of policy interest rates or other policy instruments, conditional on the state of the economy, the Central bank aims at:

- preventing market volatility from influencing the monetary policy stance in undesired directions and hampering the transmission of the monetary accommodation
- introducing greater monetary policy accommodation and therefore favoring a solid anchoring of inflation expectations

# APP: effects of the CSPP, 1/2

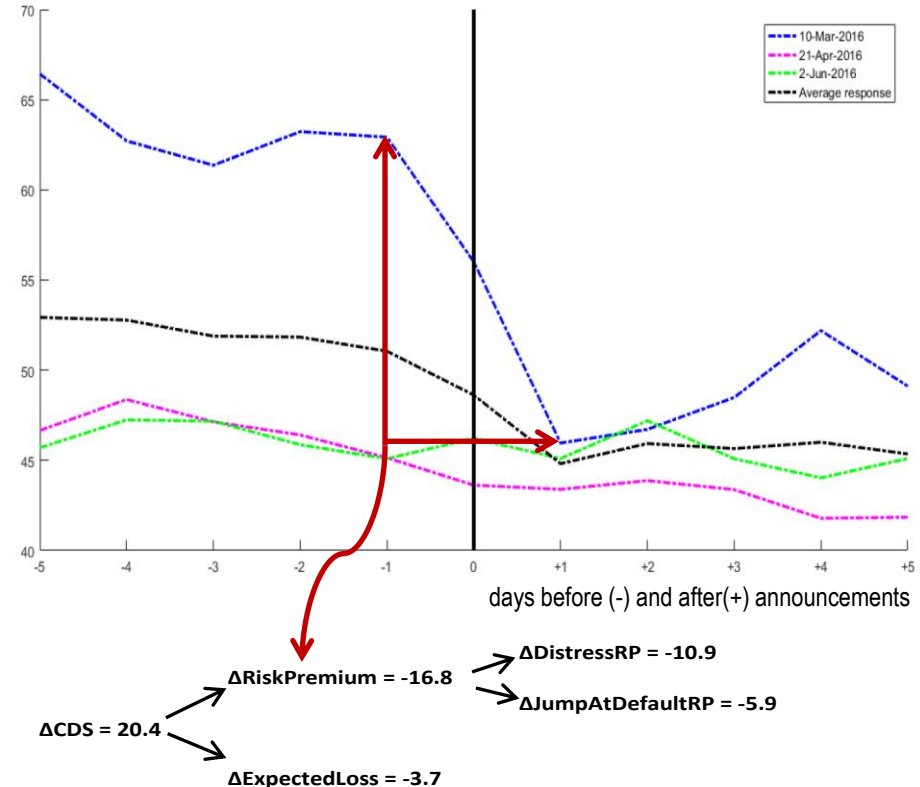
## Spread of euro area bonds (secondary market)



Source: Thomson Reuters. 1) Index: 100=1/1/2016; the index Eligible is the BofA-Merrill Lynch Index EUR non-financial corporations; the index Non-eligible is the simple average of BofA-Merrill Lynch Index EUR High yield and BofA-Merrill Lynch Index EUR financial corporations (banking).

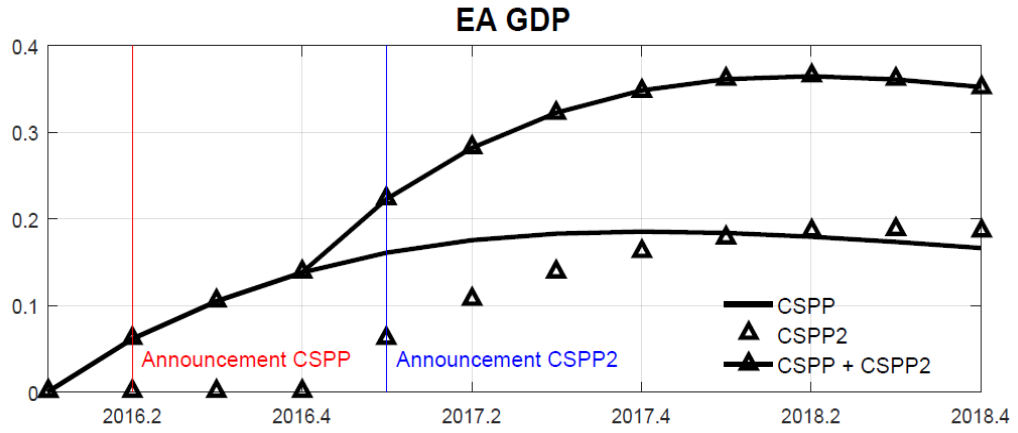
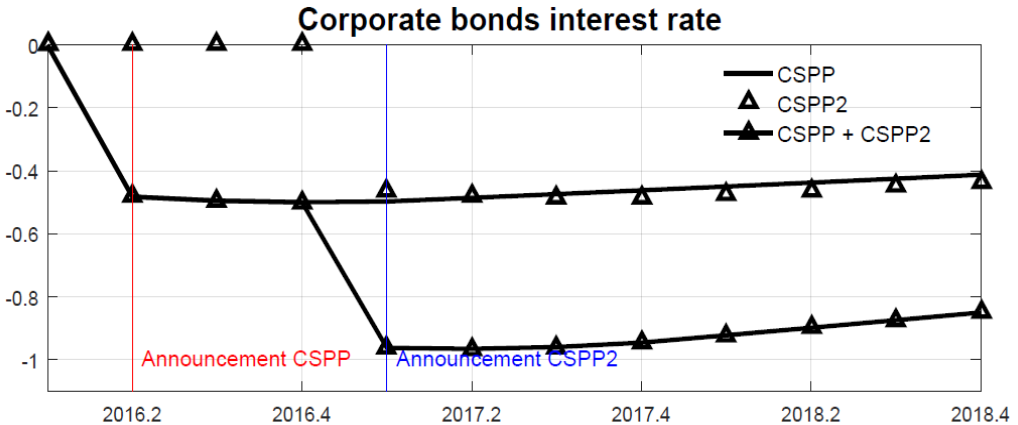
For similar issue and issuer characteristics, the yield at issuance of non-eligible bonds has exceeded the yield at issuance of eligible bonds by about 50 bp. However, the former have declined too.

## Excess risk premium around ECB announcements (bp)



ECB EB (5, 2016): «the announcement of the CSPP on 10 March was followed by a significant contraction in the spread between yields on bonds issues by non-financial corporations and a risk-free rate».

## Combined impact of CSPP and CSPP'2'



Source: Bartocci, Burlon, Notarpietro & Pisani (forthcoming).

# Where is the euro area along the path to a sustained adjustment in price dynamics?

- Probit regression (1 when inflation 3, 6, ..., 24 months later > 1.9%, 0 when < 1.9%) on each of those indicators.
- The synthetic indicator aggregates the estimated probability computed through univariate probit models on a wide range of indicators:

$$Pr(y_{t,h} = 1 | x_{t,i}) = F(x_{t,i}, \beta_{i,h}) \quad \text{with} \quad y_{t,h} = \begin{cases} 1 & \text{if } \pi_{t+h} \geq 1.9 \\ 0 & \text{otherwise} \end{cases}$$

- The indicators  $x_{t,i}$  include measures of (i) past inflationary trends, (ii) inflation dispersion and heterogeneity across countries/components, (iii) past forecast errors, (iv) inflation expectations.

# A relevant source of uncertainty: secular stagnation or financial cycle?

- ❑ Uncertainty about the natural rate relates to the ongoing debate about the underlying causes of low interest rates (Ferrero and Neri, 2017).
- ❑ Secular-stagnation view: permanent decline in the natural rate due to demographic and technological factors (Buseti and Caivano, 2017; Ferrero, Gross and Neri, 2017).
- ❑ Financial-cycles view: the fall in long rates albeit persistent is temporary, being linked to cyclical and financial factors (Borio, 2014).
- ❑ The two views, however, might not be in conflict, with the demographic cycle triggering the financial cycle (Ferrari, 2017).
- ❑ In the short term, a gradual exit is consistent with both views (supporting structural reforms or/and deleveraging), and allows us to learn which explanation prevails.