

Massimo Rostagno

# A Tale of Two Decades: the ECB's Monetary Policy at 20

*M. Rostagno, C. Altavilla, G. Carboni, W. Lemke, R. Motto, A. Saint Guilhem, J. Yiangou*

**ECB Conference on Monetary Policy: Bridging  
Science and Practice**

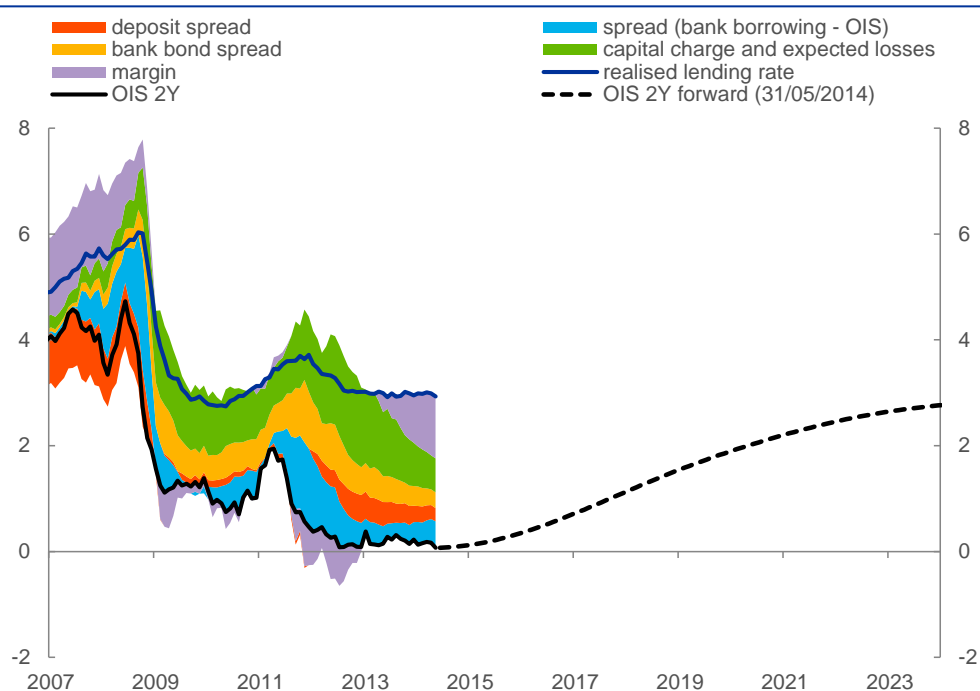
Frankfurt, 8 October 2019

***The views expressed in this presentation are those of the authors and do not necessarily reflect those of the ECB or the Eurosystem***

- **Retrospective view over the past 20 years of ECB monetary policy strategy:** from the 1998 definition of the ECB's price stability framework, to its review in 2003, to the crisis years and their aftermath
- **Two decades, two inflation regimes:** one marked by a distribution of shocks to inflation predominantly tilted to the upside; the second – starting well into the post-Lehman period – in which the distribution of shocks switches from inflationary to strongly and persistently disinflationary
- **ECB price stability definition (positive inflation *below 2%*) worked effectively under the first regime:** 2% ceiling of the price stability zone acted as a stabilising mechanism in the face of inflationary shocks, kept inflation expectations and realised inflation in check
- **Under the second regime, the 2% ceiling became slack:** so could not be counted on to stabilise expectations
- **The “*below but close to 2%*” qualification of the ECB strategy in 2003** helped orient policy in the face of persistent disinflation and deflation risks
- **A more diverse assortment of instruments** than used elsewhere became necessary to prevent inflation de-anchoring
- **Today:** we concentrate on the 4 instruments – NIRP, FG, APP, TLTRO – and how they jointly worked toward nudging inflation back to levels closer to 2%

## The euro area intermediation wedge in 2014

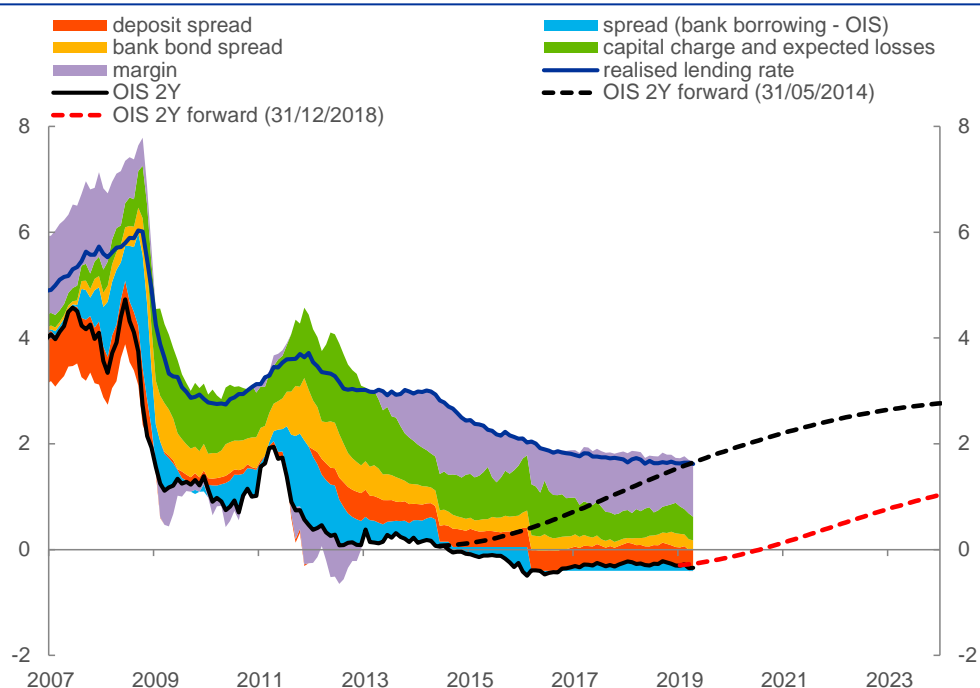
(percentages per annum)



Notes: The intermediation wedge is the distance from the base rate (OIS 2Y, black solid line) to the realized lending rate, as measured by the observed lending rate for NFCs. The blue area shows the spread between the rate faced by banks from borrowing from MFIs, including the Eurosystem, and the swap rate. As a proxy for the most relevant borrowing rate, we consider the Euribor before June 2014, the MRO until March 2016, and subsequently the DFR. The red area and yellow areas comprise respectively the bank deposit and bank bond spreads, both weighted by their share as funding sources in banks' balance sheets. The components of the green area are computed based on Basel II risk weights, with probability of default (PD) proxied by Moody's expected default frequencies (EDF). The margin is the residual between observed lending rates and all other components, including the floor given by the OIS 2Y rate.

## The euro area intermediation wedge in 2019

(percentages per annum)



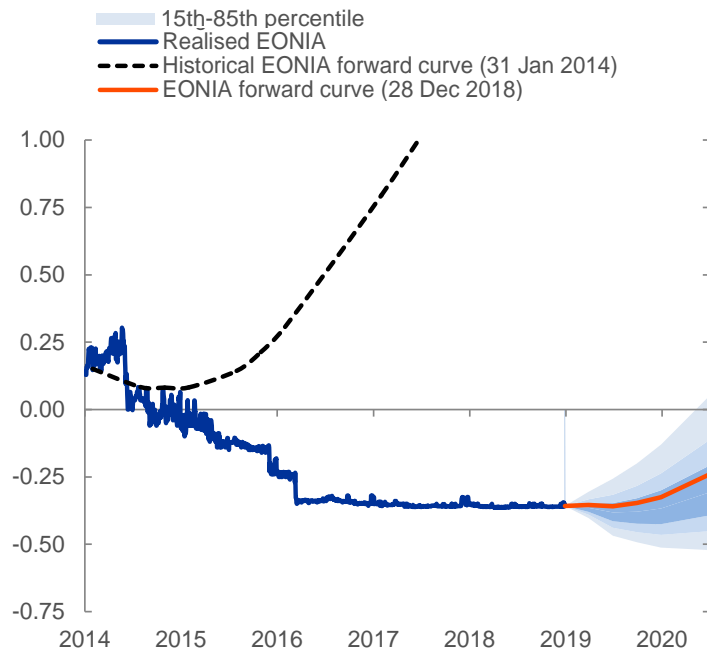
Notes: The intermediation wedge is the distance from the base rate (OIS 2Y, black solid line) to the realized lending rate, as measured by the observed lending rate for NFCs. The blue area shows the spread between the rate faced by banks from borrowing from MFIs, including the Eurosystem, and the swap rate. As a proxy for the most relevant borrowing rate, we consider the Euribor before June 2014, the MRO until March 2016, and subsequently the DFR. The red area and yellow areas comprise respectively the bank deposit and bank bond spreads, both weighted by their share as funding sources in banks' balance sheets. The components of the green area are computed based on Basel II risk weights, with probability of default (PD) proxied by Moody's expected default frequencies (EDF). The margin is the residual between observed lending rates and all other components, including the floor given by the OIS 2Y rate.

## Four instruments

- **Negative rate policy (NIRP):** to pin down the *level* of the term structure of interest rates
- **Purchases of dated assets (APP):** to control the *slope* of the term structure of interest rates
- **Forward guidance (FG):** to orient expectations of the purchase and rate policies
- **Targeted longer-term refinancing operations (TLTRO):** to influence banks' lending rates by compressing the cost components of loan creation

## Expectations of future short-term rates

(percentages per annum)

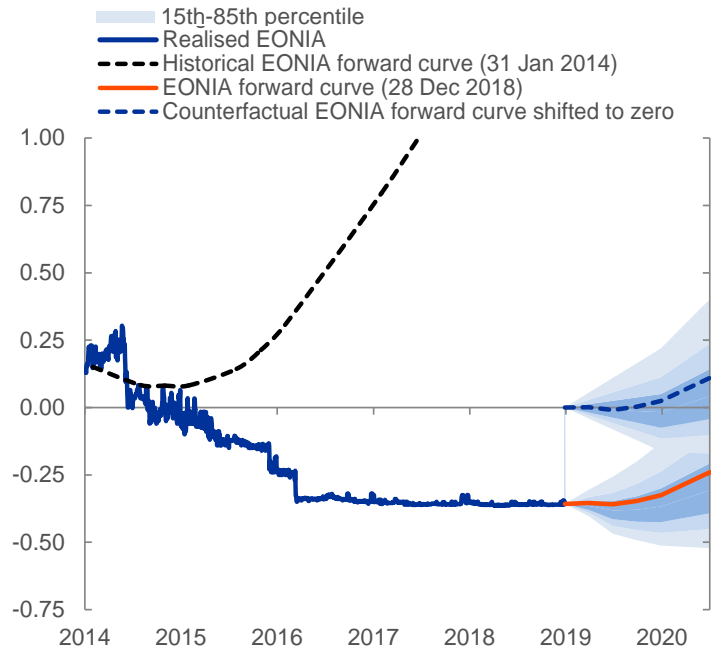


Notes: Evolution of the OIS forward curve from pre-policy package (black-dotted line) to post-policy package (red line), together with risk neutral option-implied distributions (Euribor 3m – spread adjusted).

## Identification strategy

- **Start from the option-based risk-neutral densities of forward rate paths:** probability-weighted bundle of expected rate paths in the market. Eonia forward curve is the risk-neutral mean of those paths

## Expectations of future short-term rates (percentages per annum)

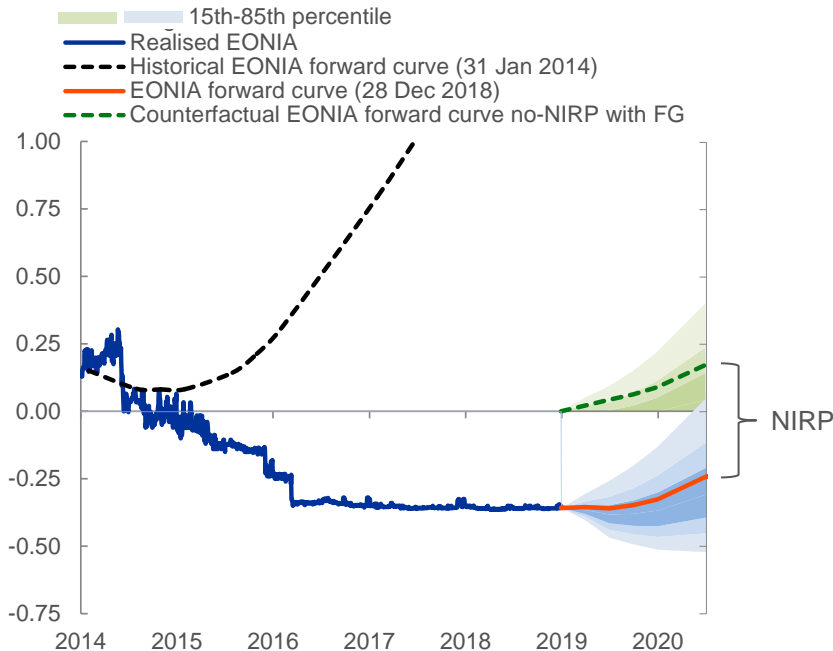


Notes: Evolution of the OIS forward curve from pre-policy package (black-dotted line) to post-policy package (red line), together with risk neutral option-implied distributions (Euribor 3m – spread adjusted). The density surrounding the blue-dashed line results from shifting the lower density up by the distance between the (negative) level of EONIA and zero.

## Identification strategy

- **Start from the option-based risk-neutral densities of forward rate paths:** probability-weighted bundle of expected rate paths in the market. Eonia forward curve is the risk-neutral mean of those paths
- **Step 1:** parallel upward shift of observed densities from negative to zero Eonia

## Expectations of future short-term rates (percentages per annum)



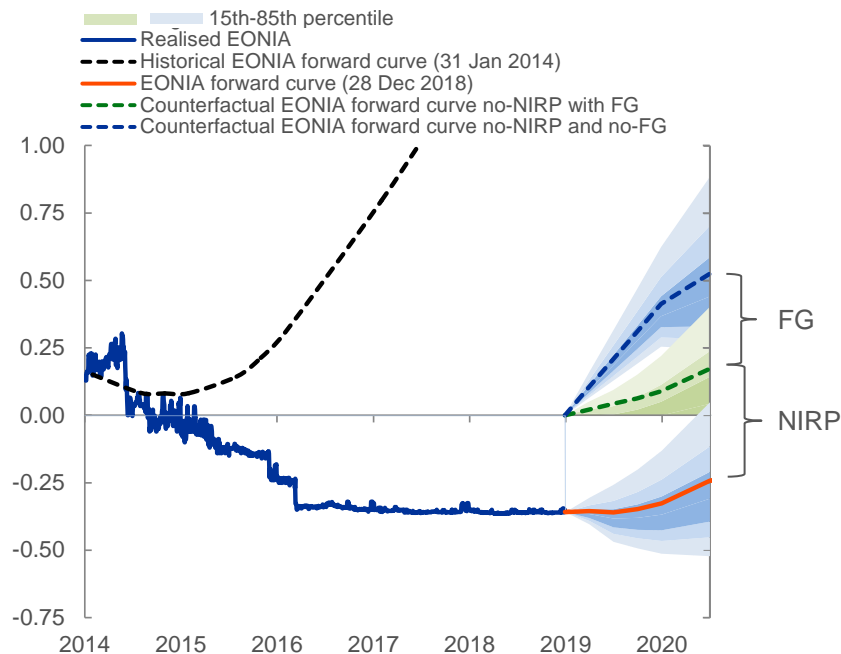
Notes: Evolution of the OIS forward curve from pre-policy package (black-dotted line) to post-policy package (red line), together with risk neutral option-implied distributions (Euribor 3m – spread adjusted). The green density arises from the blue density of the previous slide by censoring the probability mass below zero and assigning it to zero.

## Identification strategy

- **Start from the option-based risk-neutral densities of forward rate paths:** probability-weighted bundle of expected rate paths in the market. Eonia forward curve is the risk-neutral mean of those paths
- **Step 1:** parallel upward shift of observed densities from negative to zero Eonia
- **Step 2:** censor the displaced distributions at zero, as negative rate realizations are counterfactual in a *no-NIRP / with FG* world, where the ECB would have indicated a zero policy path moving forward. Resulting Eonia forward curves are steeper than in history

## Expectations of future short-term rates

(percentages per annum)



Notes: Evolution of the OIS forward curve from pre-policy package (black-dotted line) to post-policy package (red line), together with risk neutral option-implied distributions (Euribor 3m – spread adjusted). The density surrounding the blue dashed line arises from the green density by shifting up its percentiles as indicated by the forward guidance impact estimated by the regression of percentiles on a forward guidance factor extracted from the term structure of interest rates following Altavilla et al. (2019).

## Identification strategy

- **Start from the option-based risk-neutral densities of forward rate paths:** probability-weighted bundle of expected rate paths in the market. Eonia forward curve is the risk-neutral mean of those paths
- **Step 1:** parallel upward shift of observed densities from negative to zero Eonia
- **Step 2:** censor the displaced distributions at zero, as negative rate realizations are counterfactual in a *no-NIRP / with FG* world where the ECB would have indicated a zero policy path moving forward. Resulting Eonia forward curves are steeper than in history
- **Step 3:** run regressions of rate density percentiles on a ‘FG factor’:  

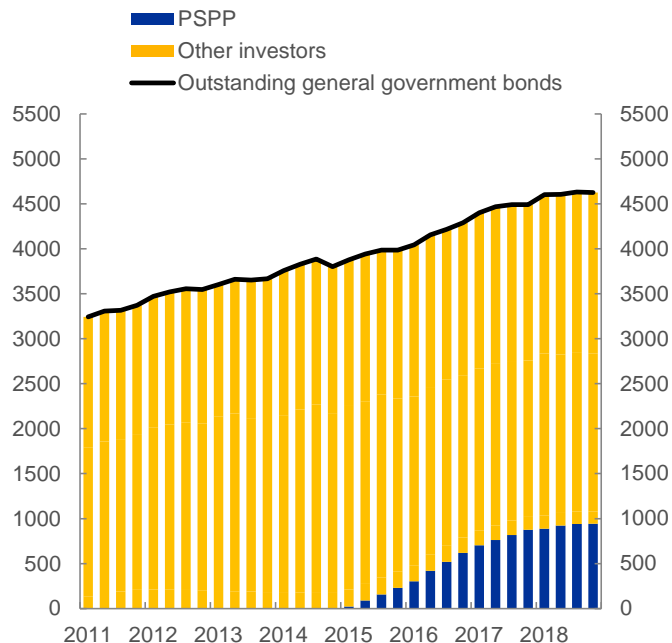
$$f_{t,h}^{(q)} = \alpha_h^{(q)} + \beta_h^{(q)} FG_t + \epsilon_{t,h}^{(q)}$$
 and remove the effect of forward guidance from the green density’s percentiles



# APP identification: duration effect

## Outstanding quantity of duration: PSPP and other investors

(€bn 10-year equivalents)



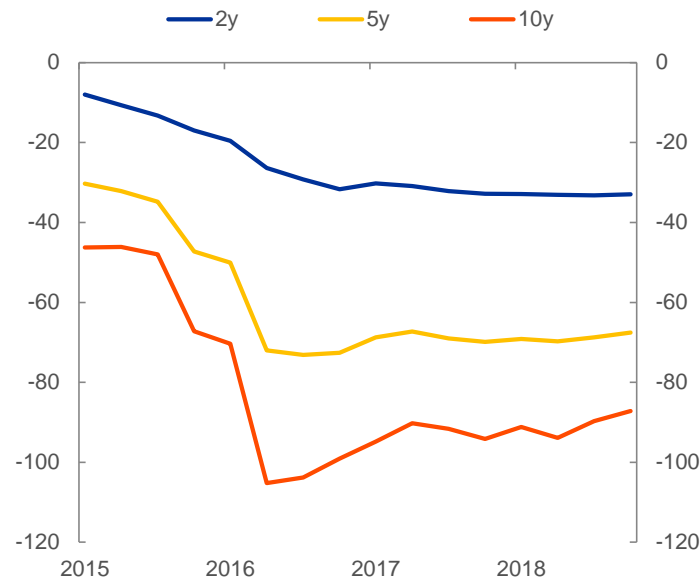
Sources: Securities Holdings Statistics, GFS, ECB calculations.

Notes: The charts show the stock of debt securities issued by each general government of the four largest euro area jurisdictions, and the Public Sector Purchase Programme (PSPP) portfolio for the same jurisdictions in terms of 10-year equivalents. "Other investors" comprise all other financial and non-financial investors.

Latest observation: 2018Q4.

## APP impact on euro area sovereign term premia

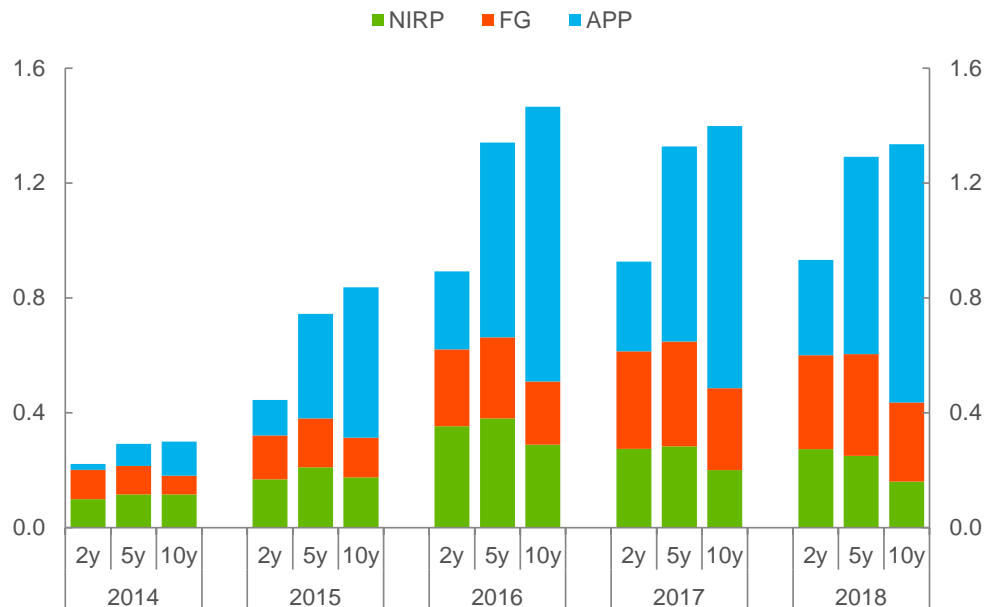
(basis points)



Notes: Evolution of the impact of the APP on euro area sovereign term premia at selected maturities. The impact is derived on the basis of an arbitrage-free affine model of the term structure with a quantity factor (see Eser et al, 2019). The model results are derived using GDP-weighted average of the yields of the big-four sovereign issuers (DE, FR, IT, ES).

## Impact of ECB non-standard measures on 2-year, 5-year and 10-year sovereign yields over 2014-2018

(percentage points per annum)

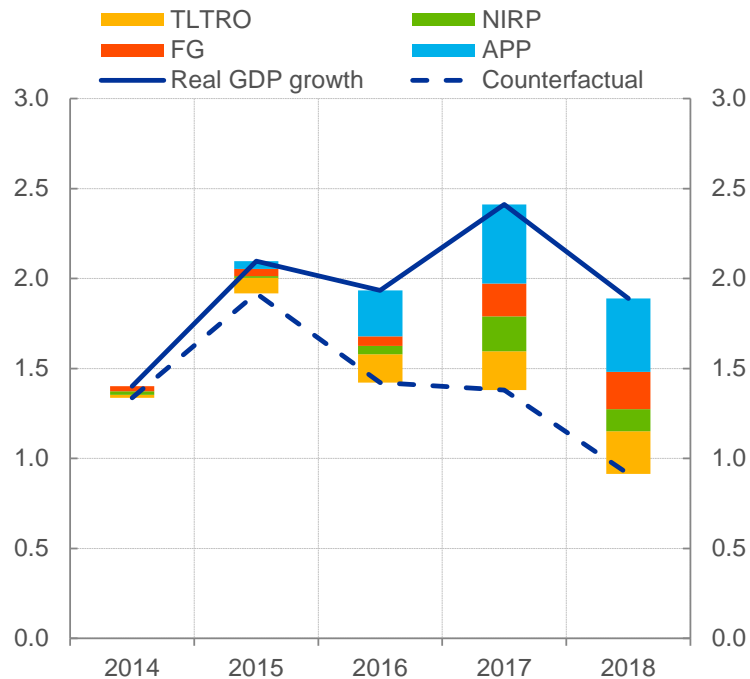


Notes: The chart shows the impact of ECB non-standard measures on the GDP-weighted aggregate of euro area sovereign bond yields. The APP impact is due to Eser, Lemke, Nyholm, Radde, and Vladu (2019). The impact of NIRP and forward guidance is derived from counterfactual analysis of OIS forward rates based on the option-implied densities shown on previous slides.

# Estimated macro impacts of policy measures

## Contribution of ECB non-standard measures to real GDP growth 2014-2018

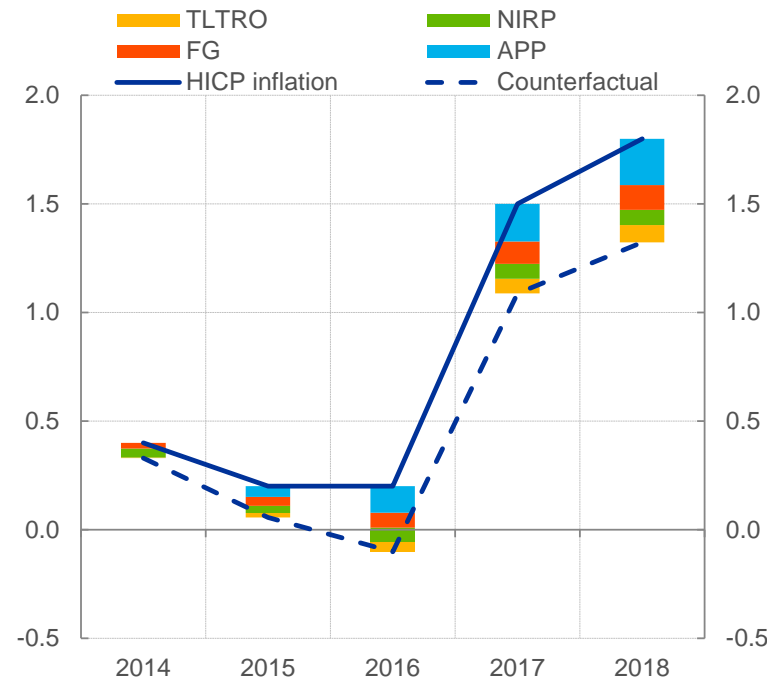
(annual % changes)



Notes: The chart shows the impact of ECB non-standard measures on real GDP growth based on a macroeconomic model with financial variables conditioning on the yield curve impact shown on the previous slide.

## Contribution of ECB non-standard measures to HICP inflation 2014-2018

(annual % changes)

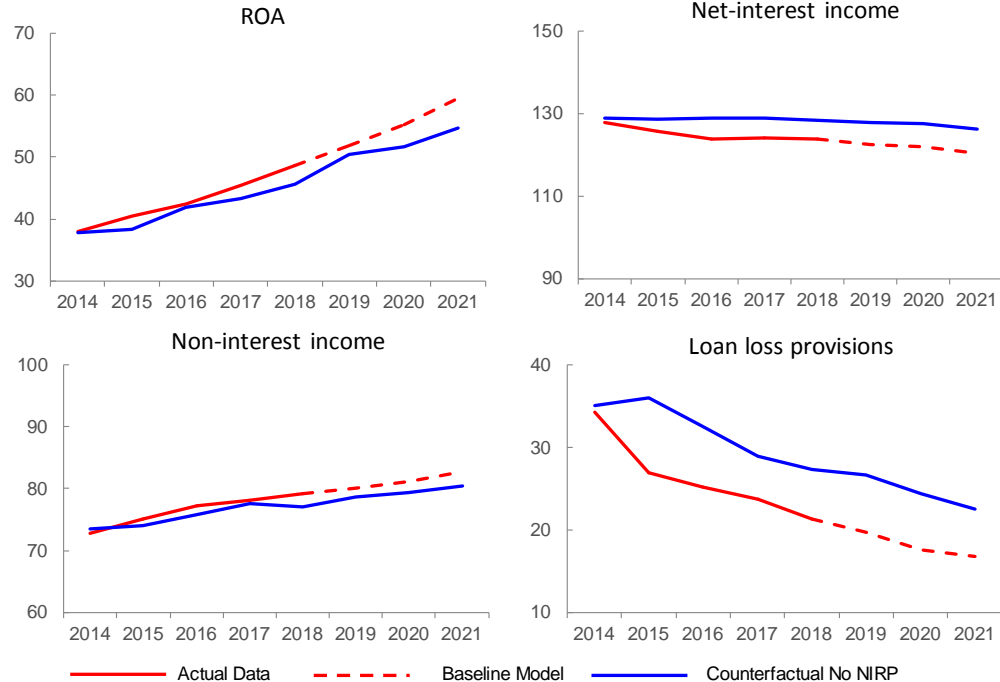


Notes: The chart shows the impact of ECB non-standard measures on HICP inflation based on a macroeconomic model with financial variables conditioning on the yield curve impact shown on the previous slide.

# The cost side: Did NIRP hurt banks?

## ROA and its components: Baseline and *no*-NIRP world

(basis points of total assets)



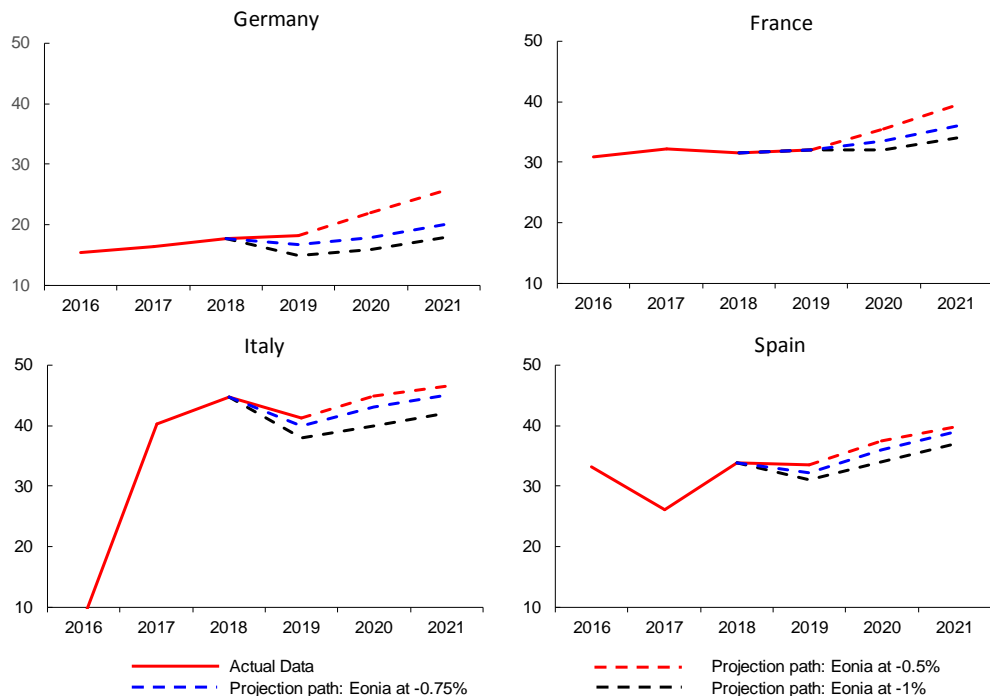
Notes: The analysis is based on a BVAR model. The baseline scenario is constructed as a conditional forecast, where the bank profitability indicators are projected for a 3-year horizon conditional on the path of interest rates and the macroeconomic outlook consistent with the June 19 BMPE. The no-NIRP scenario is given by the forecast of the BVAR model conditional on the assumption that the ZLB would be enforced at all times, therefore preventing the term structure to assume negative values across all maturities.

## NIRP and the *reversal rate*

- **Facts:** despite a slight decline of the net interest income in 2015, ROA has been growing, not falling, since 2014 due to a steep decline in loss loan provisions and a sustained increase in other income components
- **NIRP** has been supportive through general equilibrium channels, by boosting the size and improving the quality of banks' assets

## ROA under different scenarios

(basis points of total assets)



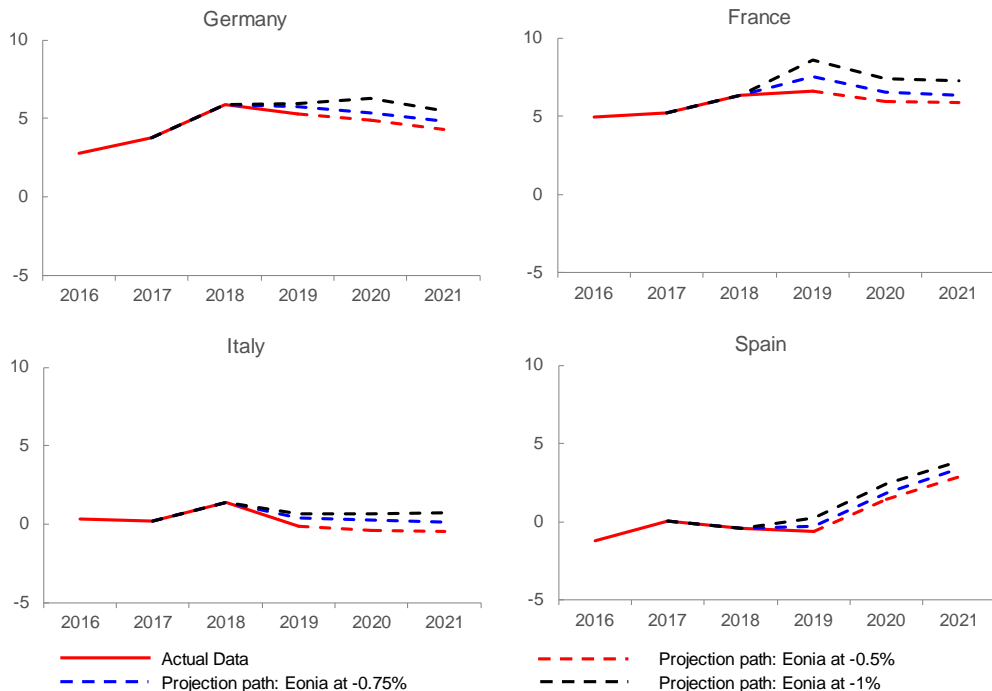
Notes: The chart reports the observed (median) return on assets (ROA) for the largest four euro area countries (red solid lines), as well as projections for ROA under alternative scenarios. These scenarios assume that the overnight rates decrease to -0.5% (red dashed line), -0.75% (dashed blue line) and -1% (black solid line), and that the deposit rate and the loan loss provision are kept content at the level observed in December 2018. The model used in the simulation is a dynamic VAR model that uses individual balance sheet data from the IBSI dataset matched with Supervisory and SNL data. The variables included in the model are: ROA, net-interest income, non-interest income, provisions, lending rates, deposit rates, loan volumes, real GDP growth, inflation rate, Eonia, and interest rates with a remaining maturity of 2-, 5-, and 10-years.

## NIRP and the reversal rate

- **Facts:** despite a slight decline of the net interest income in 2015, ROA has been growing, not falling, since 2014 due to a steep decline in loss loan provisions and a sustained increase in other income components
- **NIRP** has been supportive through general equilibrium channels, by boosting the size and improving the quality of banks' assets
- **ROA** would be hit by very negative rates ...

## Loan growth under different scenarios

(annual % changes)



Notes: The chart reports the observed NFC loan growth for the largest four euro area countries (red solid lines), as well as projections for lending under alternative scenarios. These scenarios are described in the note to the previous chart.

## NIRP and the reversal rate

- **Facts:** despite a slight decline of the net interest income in 2015, ROA has been growing, not falling, since 2014 due to a steep decline in loss loan provisions and a sustained increase in other income components
- **NIRP** has been supportive through general equilibrium channels, by boosting the size and improving the quality of banks' assets
- **ROA** would be hit by very negative rates ...
- ... **But loan growth would keep expanding**, as lending would remain a relatively more attractive use of capital for banks

- **The ECB’s “*combined arms strategy*” has done a solid job** of revitalising the economy and laying down the conditions for inflation to return to its medium-term norm
- **Despite using a methodology that requires minimal priors on the underlying macroeconomic structure, and on the power of central bank pronouncements to influence agents’ expectations, our estimates of impacts are sizeable:** Comparing our estimates with the range of estimates produced by a coordinated Eurosystem-staff assessment group, our results lie at the upper edge of the range for real GDP growth, and at mid-to-lower part of the range for inflation
- **NIRP:** because it shatters the notion of a ZLB on policy rates, the probability distribution of future short-term rates loses the upward tilt that it typically acquires when investors anticipate a non-negativity restriction to bind in future. In addition, the fee charged on commercial banks’ reserve holdings acts as *Gesell tax* and promotes *tax-avoidance practices* among banks: escaping the tax means more powerful portfolio rebalancing. Accordingly, its pattern of transmission is qualitatively different from that of rate adjustments in positive territory, with an impact on longer-term interest rate that is 4 to 5 times stronger
- **FG:** somewhat weaker effects than in other studies
- **APP:** lion’s share of the overall effects; impact within the range of estimates from other studies
- **TLTRO:** compresses all the funding cost components of the “*intermediation wedge*” by offering euro area banks a way to replace more expensive sources of funding with more affordable long-term borrowing from the ECB
- **Reversal rate:** over range of rates arguably above ELB, doesn’t seem to be a relevant frontier, unless  $r^*$  falls further