



Negative Interest Rates: Taking Stock of the Experience So Far

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Motivation

- Starting 2012, various central banks have pushed key policy rates below zero
- Unprecedented policy, which raised many questions:
 - Transmission
 - Cash hoarding
 - Market functioning and financial stability
- Recovery from the COVID-19 crisis requires sustained monetary stimulus, but limited policy space
- Important to understand scope for role of NIRP in central banks' toolbox

Our paper

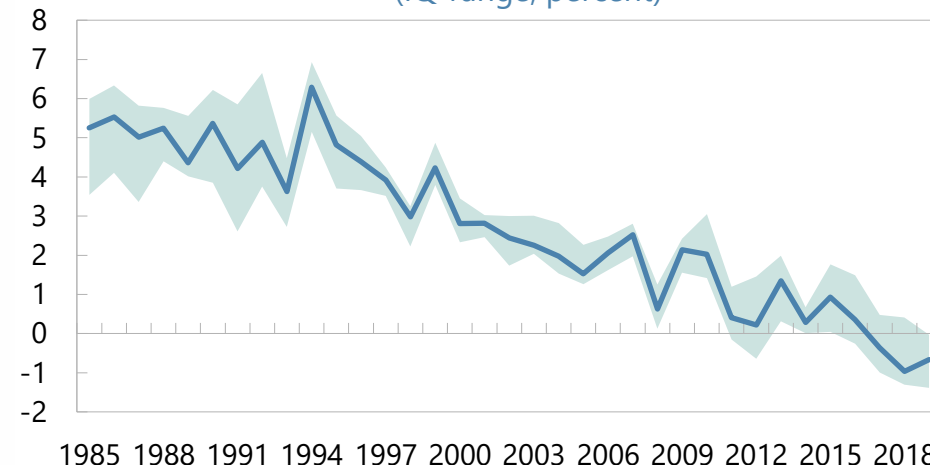
- What have we learned so far from the experience with negative interest rate policies (NIRP)?
 - Have NIRP worked?
 - Have fears about potential side effects materialized?
- Objectives of the paper:
 - Take stock of the experience via survey of the literature & country experiences;
 - Focus on aspects specific to *negative*, not low rates
- In contrast to other surveys, we focus on NIRP and cover a broad range of its effects

Why NIRP? Background

- Long-term decline in real rates. Neutral interest rates are close to zero in many economies
- Multiple potential structural drivers
 - Demographics, lower productivity growth, shift toward safe assets..
- Central banks are struggling to adapt
- Lack of conventional policy space meant central banks turned a variety of unconventional monetary policies

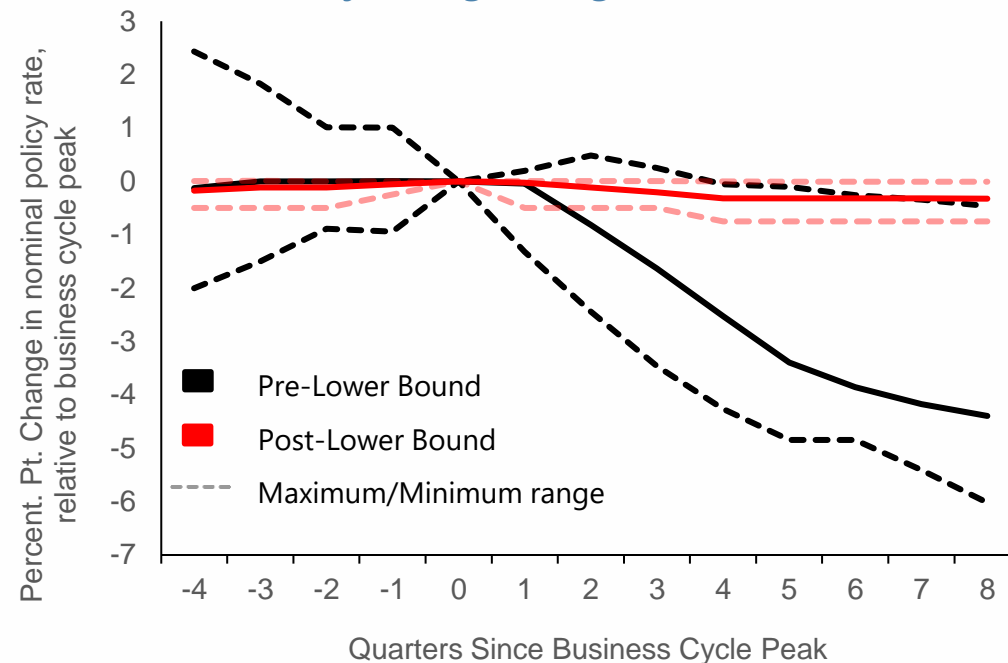
Long Term Global Real Interest Rates

(IQ-range; percent)



Source: Furceri and Tawk (2021)

Median Policy Easing during AE Recessions, 1990–20



Source: Brandao-Marques and others (2021)

NIRP as part of a policy mix

- All unconventional monetary policies have potential drawbacks
 - QE: flatter yield curve may affect bank profits, increased CB exposure to interest rate risk, financial market functioning issues, among others
- Including NIRP in the policy package can be **beneficial**, since it allows CB to:
 - rely less intensively on other tools, mitigating their side effects
 - reduce the need for FXI, especially in small open economies
 - exploit synergies between UMP measures (e.g., NIRP can reinforce forward guidance)
 - remove the zero lower bound constraint and steepen the yield curve

Concerns about NIRP

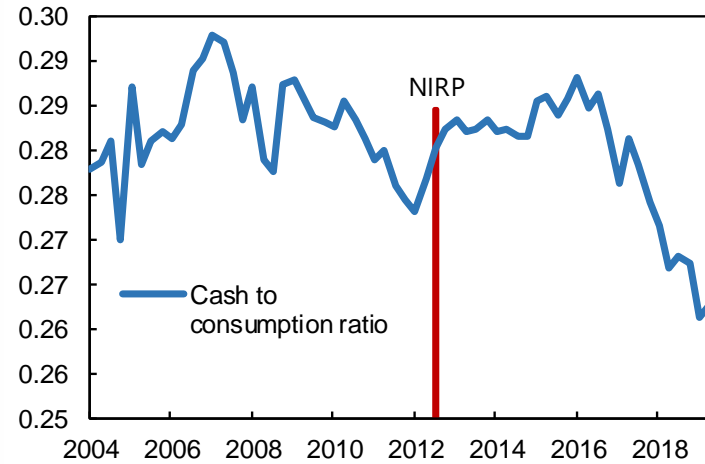
At the time of introduction, serious questions about effectiveness and potential consequences of NIRP, including:

- Would there be a flight to cash by firms, households, and banks?
- Would asset prices and exchange rates respond in desired ways?
- Would policy rates be transmitted to bank loans and deposits?
- Could NIRP lead to a sharp fall in bank profitability, harming instead of boosting credit?
- Would NIRP lead to heightened financial stability risks and yield market disruptions?

Evidence I: No cash hoarding

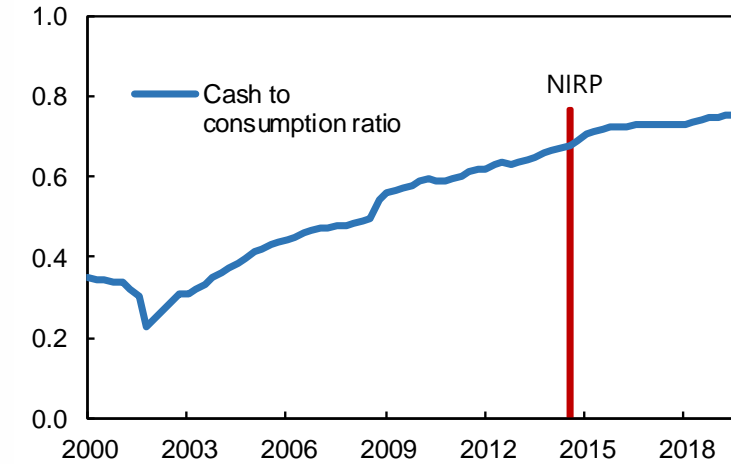
- No evidence that NIRP has led to increase in cash use
- High degree of heterogeneity in evolution of cash usage
- In most countries, introduction of NIRP has not been followed by rise in vault cash
- Estimates of Effective Lower Bound (ELB) vary

Denmark: Cash to Consumption Ratio



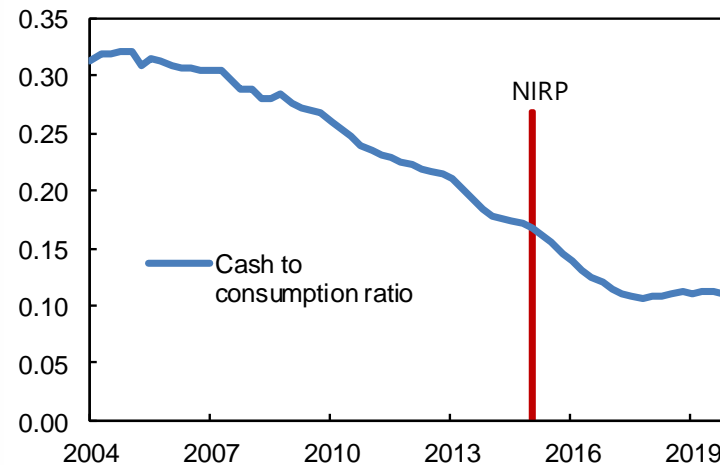
Sources: Danmarks Nationalbank/Haver Analytics

Euro Area: Cash to Consumption Ratio



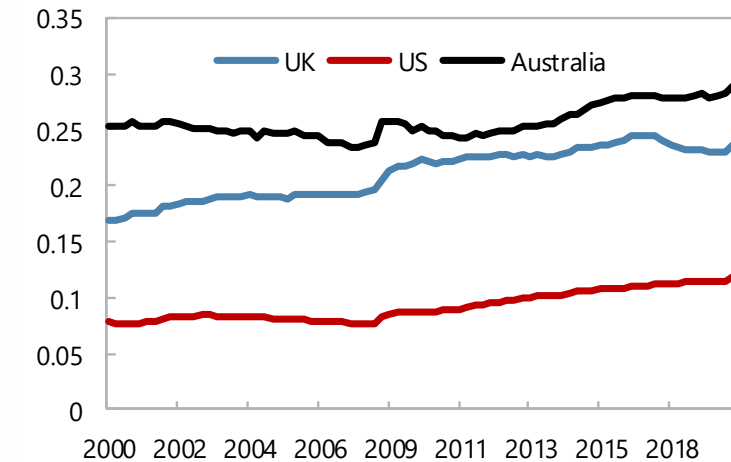
Sources: European Central Bank/Haver Analytics

Sweden: Cash to Consumption Ratio



Sources: Sveriges Riksbank/Haver Analytics

UK, US, Australia: Cash to Consumption Ratios



Source: Haver Analytics

Limits to negative rates: switch to cash

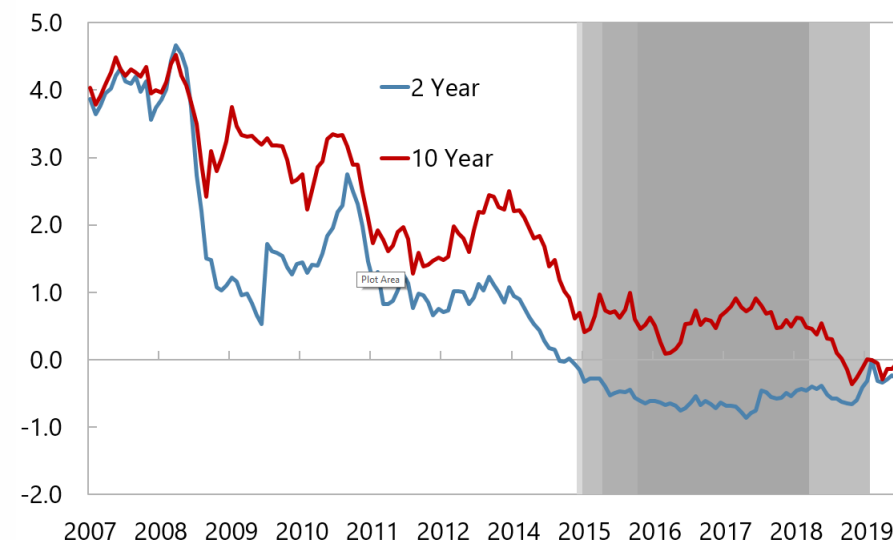
- Cash has zero nominal return
- Agents may switch to cash
- Estimated Effective Lower Bound (ELB) slightly below zero
- Likely to vary across countries

Estimates of the Effective Lower Bound		
Country	Estimate (in percent)	Source
Canada	-0.25 to -0.75	Witmer and Yang (2016)
Czech Republic	-0.2 to -0.6	Kolcunová and Havránek (2018)
Denmark	-1.5	Source in Rostagno and others (2016)
Euro area	-0.7	Source in Rostagno and others (2016)
Sweden	-1.6	Source in Rostagno and others (2016)
Switzerland	-0.5	Source in Rostagno and others (2016)
United States	-0.35	Burke and others (2010)

Evidence II: Strong transmission to asset prices

- Money market rates responded almost one-to-one
- Yields fell across the term structure as policy rates went negative and general stock prices rose
- Exchange rates responded as expected: significant ease of appreciating pressure (DK, CH)

Sweden: Negative Interest Rates and Govt Bond Yield



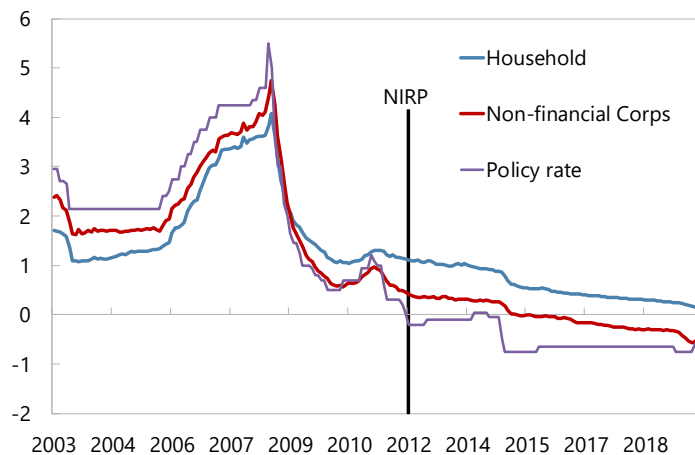
Sources: Bloomberg; Sveriges Riksbank

Note: Shaded area indicates negative interest rates; darker shading means lower rates

Evidence III: Some transmission to deposit rates

- Lending rates to both households and corporates fell following the adoption of NIRP
- Deposit rates also declined. Negative rates partly transmitted to firms (Altavilla et al., 2019, Deutsche Bundesbank, 2020), but less so to retail customers. Fee increases for retail customers (e.g., Bottero and others 2019)
- Overall, no clear evidence for NIRP changing transmission from policy rates to bank rates

Denmark: Bank Deposit Rates

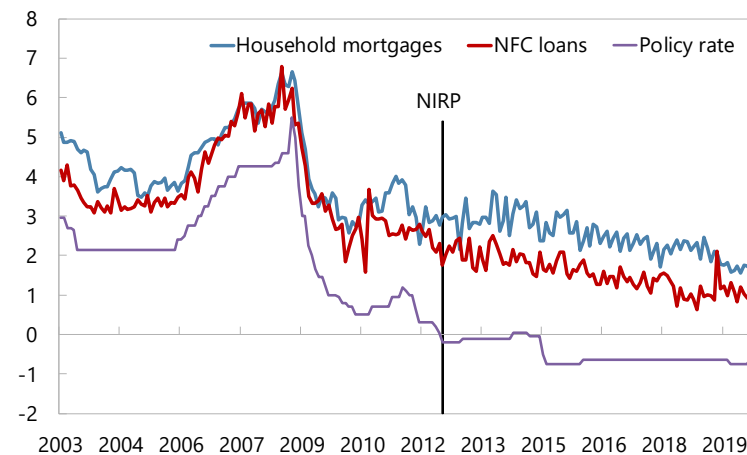


Sources: Danmarks Nationalbank; Haver Analytics

Evidence IV: Decline in mortgage and loan rates

- Lending rates to both households and corporates fell following the adoption of NIRP
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Denmark: Bank Lending Rates



Sources: Danmarks Nationalbank; Haver Analytics

Estimating the pass-through to bank rates

- We look for structural breaks in the transmission of policy to bank rates after the adoption of NIRP.
- We test whether the coefficients from the following regression are stable:

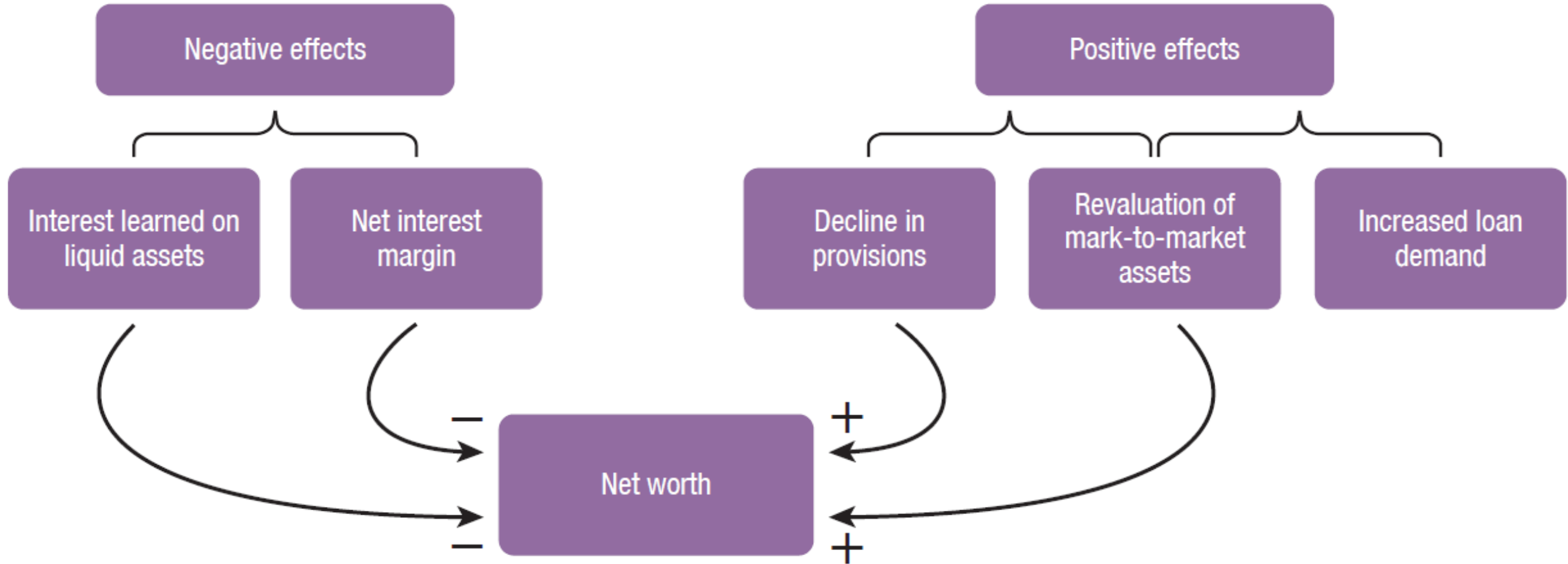
$$\Delta i_t^b = \beta_0 + \beta_1 \Delta i_t^p + \beta_2 \Delta i_{t-1}^p + \beta_3 \Delta i_{t-2}^p + \varepsilon_t,$$

	Deposit rates		Lending rates	
	Nonfinancial Firms	Households	Nonfinancial Firms	Households
Denmark	..	Oct/07-Nov/08, May/09-Aug/09, Jul/12-Feb/13
Euro area	..	Oct-08	Dec-11	..
Japan
Sweden
Switzerland

Evidence V: No adverse effects on bank lending

- Banks with more liquid assets increase lending more after NIRP (Bottero et al. 2019; Basten and Mariathasan, 2019; Demiralp et al. 2019)
- Evidence on the role of funding structure is mixed:
 - Some studies find that a stronger response by banks with higher wholesale funding (Heider et al., 2019; Lopez et al., 2020)
 - Other studies suggests a higher share of deposits leads to a higher increase in bank lending (Tan, 2019; Schelling and Towbin 2020)
- Banks take on more risk following the adoption of NIRP
- Increase in ex-ante risk-taking does not translate into higher NPLs

Potential side effects/limits of NIRP: Effects on banks



Evidence VI: Bank profits broadly resilient

- Bank profits have not significantly deteriorated despite lower net interest margins
- Profits benefited from fees on deposit accounts, capital gains, and lower provisions (Lopez, et al. 2020, Urbschat 2019)
- Smaller and more specialized banks appear to have been adversely affected (Molyneux et al. 2019)
- Bank stocks suffered, however (Ampudia and Van den Heuvel, 2018)

Evidence VII: Similar findings for non-banks

- Academic papers, and even policy studies, dealing with this type of institutions are relatively scarce.
- Money market funds, face particular exposure to negative rates because they hold mostly short-term assets whose returns are closely linked to policy.
- However, the performance of euro area MMFs has held up well.
- Pension funds and insurers in some areas have sought to hold internationally more diversified portfolios following NIRP.

Evidence VIII: NIRP supported inflation and output

- Direct evidence on the overall effects of NIRP on inflation and output is scarce
- Indirect evidence via the impact of NIRP on asset prices, exchange rates, and long-term yields suggests a substantial impact on inflation and output (Rostagno et al. 2019, Honda and Inoue, 2019)
- Model-based analysis suggests the macroeconomic impact of policy rate cuts into negative rate territory is similar to that of the same sized cuts in conventional positive territory (Ulate, 2021)

Implementation: tiering reserve regimes

- Several central banks have introduced a tiering reserve regime:
 - interest rate on a share of reserves higher than the marginal policy rate
 - operational aspects vary across countries
- Tiering involves trade-off:
 - share of exempt reserves large enough to support bank profits
 - exemption small enough to prevent money market rates from drifting away
- So far, the experience with tiering reserve regimes seems positive

Implementation: communication challenges

- Central banks adopting NIRP have emphasized transmission mechanisms and research backing it
- Other central banks have stressed adverse effects on financial markets to reject NIRP
- CBs adopting NIRP should:
 1. Explain expected benefits and potential side-effects of NIRP
 2. Stress that they will monitor potential side-effects and act to alleviate them with adequate instruments (e.g., tiering reserve regimes)
 3. Highlight difference between nominal and real interest rates
- CBs that have not yet adopted NIRP should not rule it out

Conclusions and open questions

- Largely effective transmission to asset prices and other rates, and likely positive impact on inflation and economic activity, but further research needed
- Net benefit of NIRP likely depends on structure of financial system
- Adverse effects may still materialize, especially if interest rates become deeply negative
- Literature has largely overlooked some aspects of NIRP:
 - Impact on nonbanks
 - Role of bank competition and relationship banking
 - Cross-border spillovers