House Prices and Financial Stability Risks: the Recent Czech Experience

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Outline

- ## Recent developments

  - House prices

  - Financial stability risks

- ## Macroprudential policy reaction

- ## Analytical tools for assessing the risks

  - House prices

  - Credit risk

Residential property prices

- Exuberant house price growth in recent years…
  - COVID-19 pandemic fueled rather than stopped the housing spree.

- …came to an end in mid 2022
 - Yet sizeable price corrections are not expected (on average).

Transaction prices of residential property in the CZ
(2010 = 100; right-hand scale: %)

- House Price Index
- Year-on-year change in index (rhs)
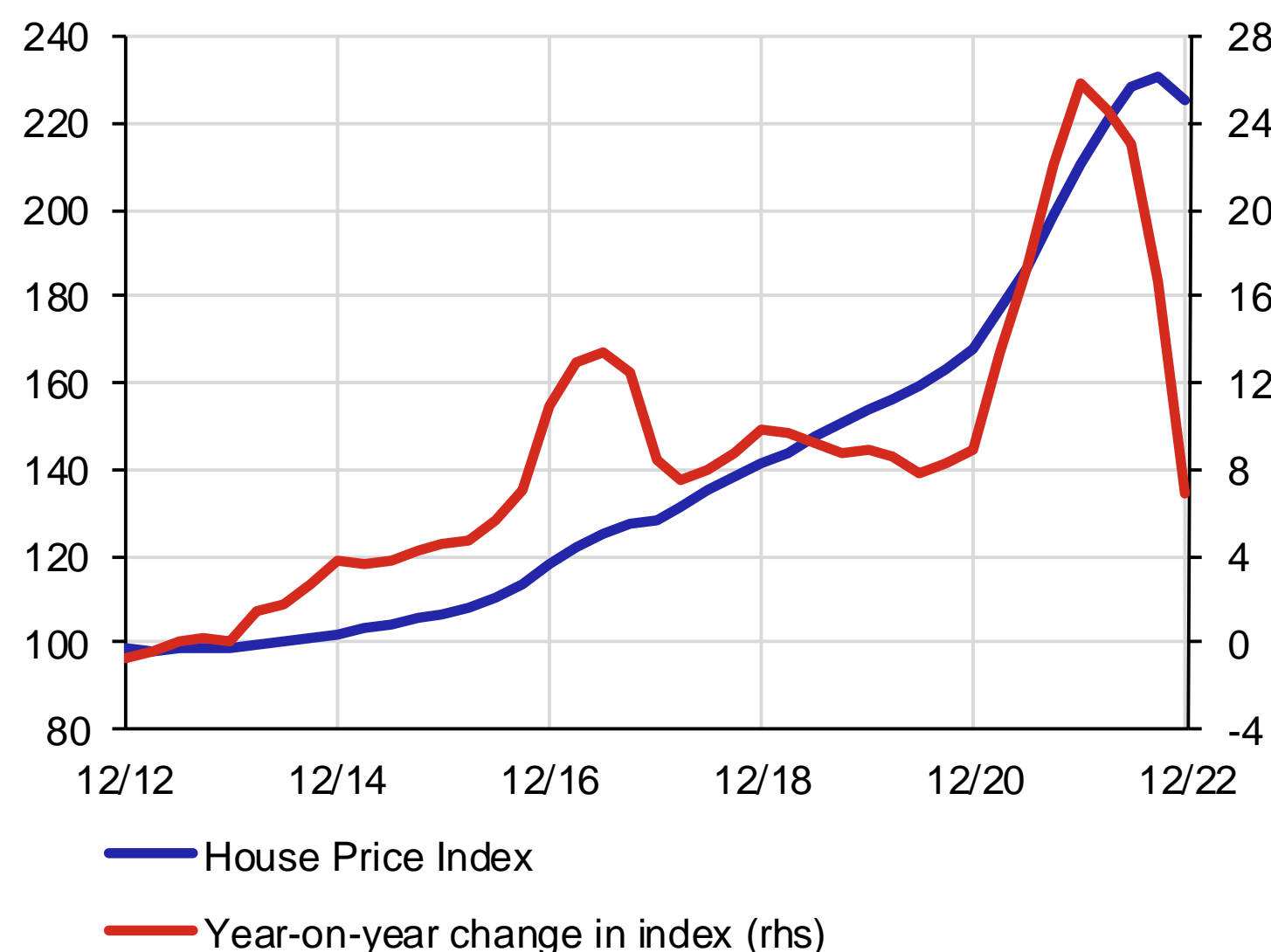
Transaction prices of apartments

(thousands of CZK per square metre)

- CZ Prague
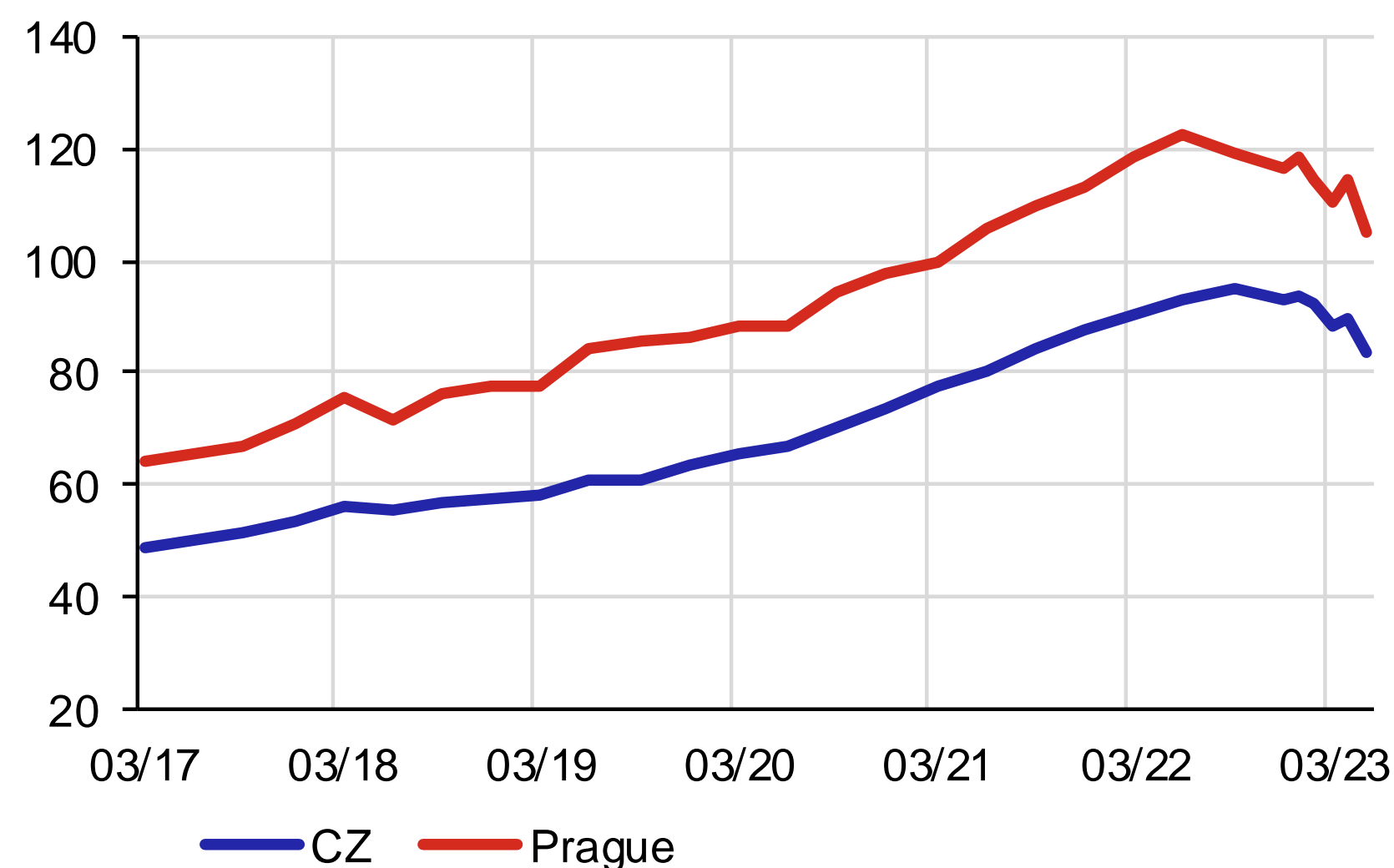
Estimated overvaluation of apartment prices
(%)

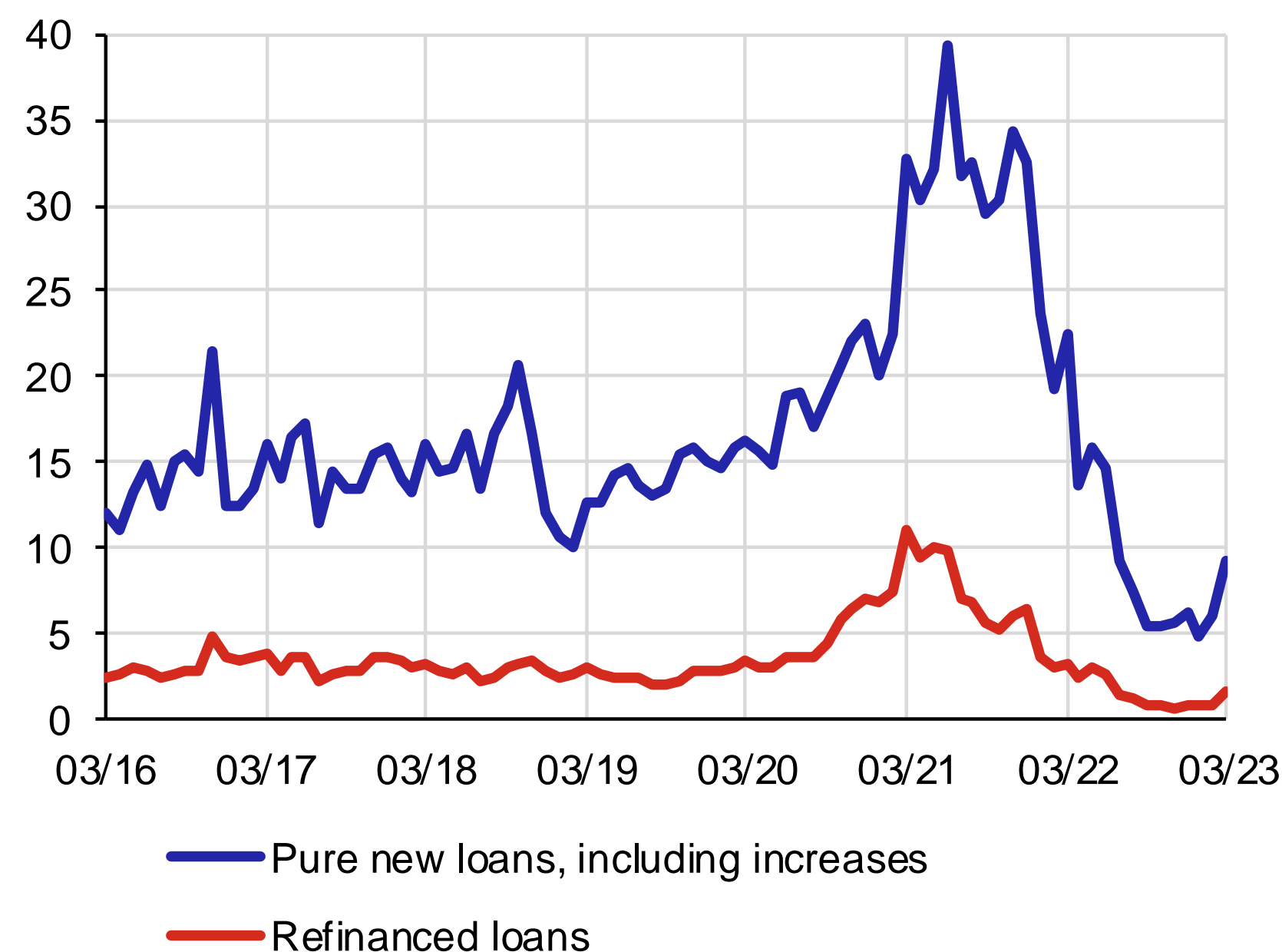- Prudential approach Valuation approach

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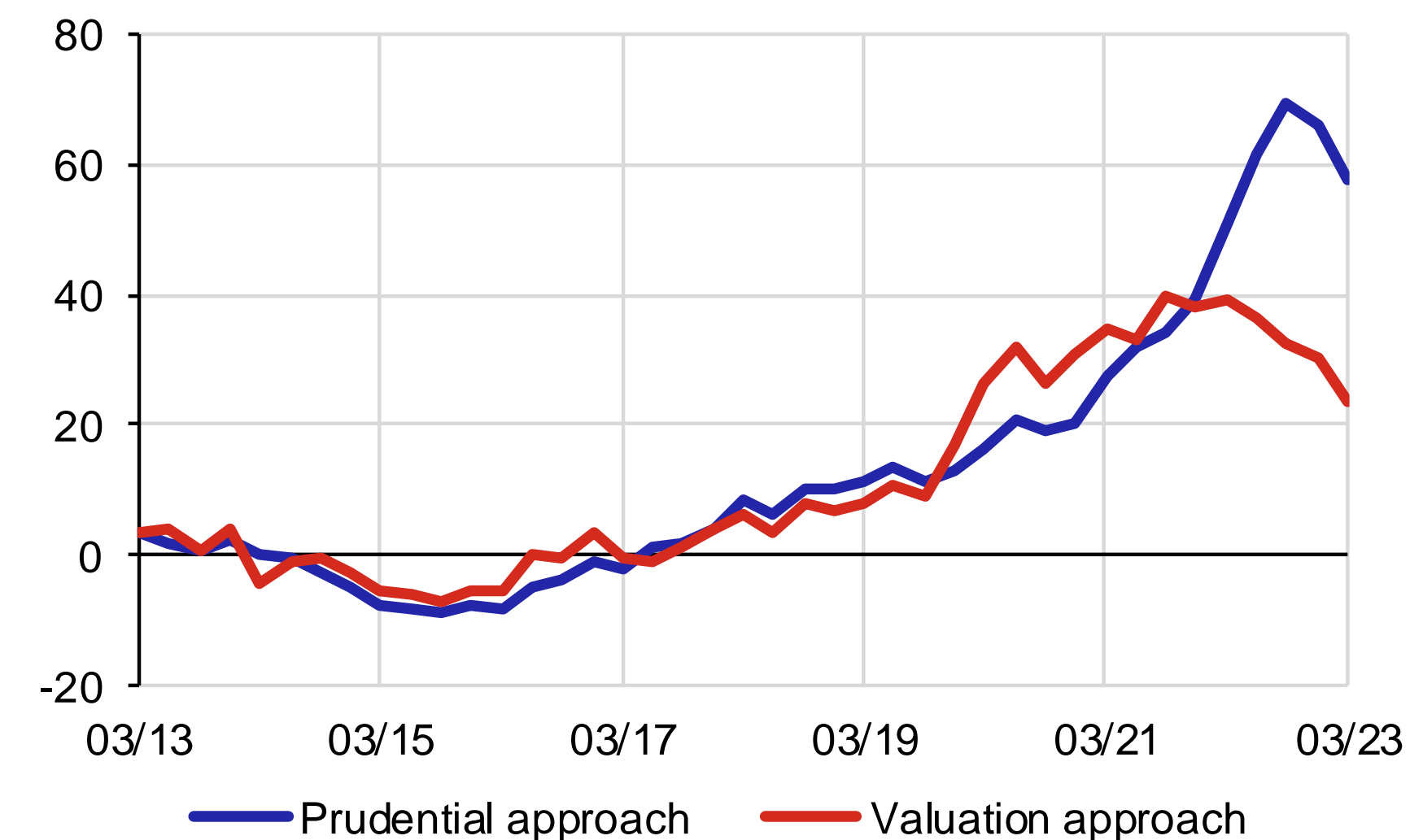
Housing Loans

- **Vicious feedback loop between property prices and debt financing**
  - Interest rate increases since the second half of 2021 caused dramatic drop in the provision of new mortgages.

New mortgage loans for house purchase
(CZK billions)

Pure new loans, including increases
Refinanced loans

Year-on-year growth in outstanding amounts of bank loans
(%)

Households – loans for house purchase
Households – loans for consumption
Total private non-financial sector
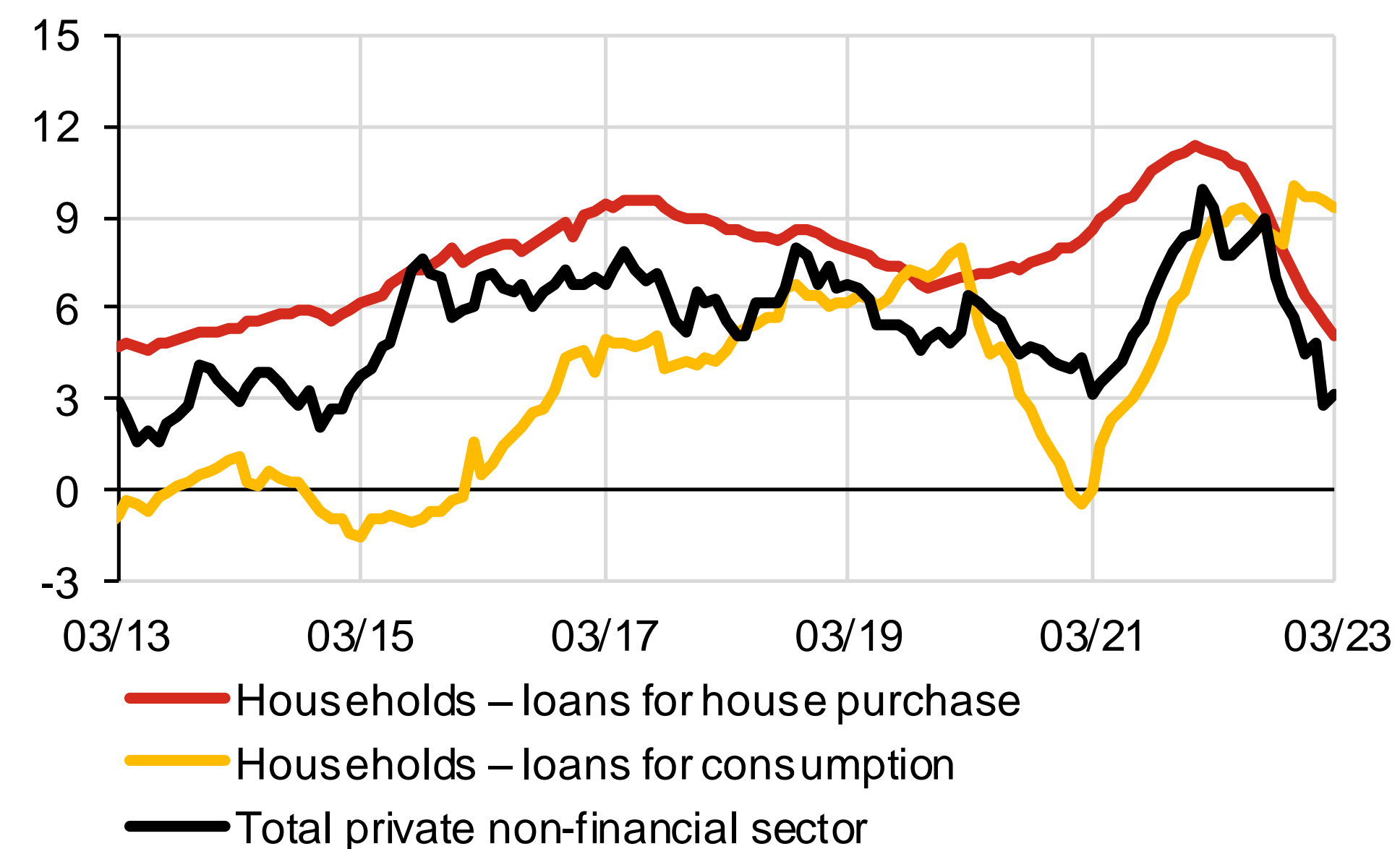
Housing Loans / Credit standards

- Vicious feedback loop between property prices and debt financing
  - Risky loans quite common in periods when the BBMs were deactivated.
  - BBM measures helped contain credit risk in the last year.

New mortgage loans with DSTIs in selected bands
(share of loans in volume provided in given quarter in %)

DSTI > 40% · DSTI > 45% · DSTI > 50%
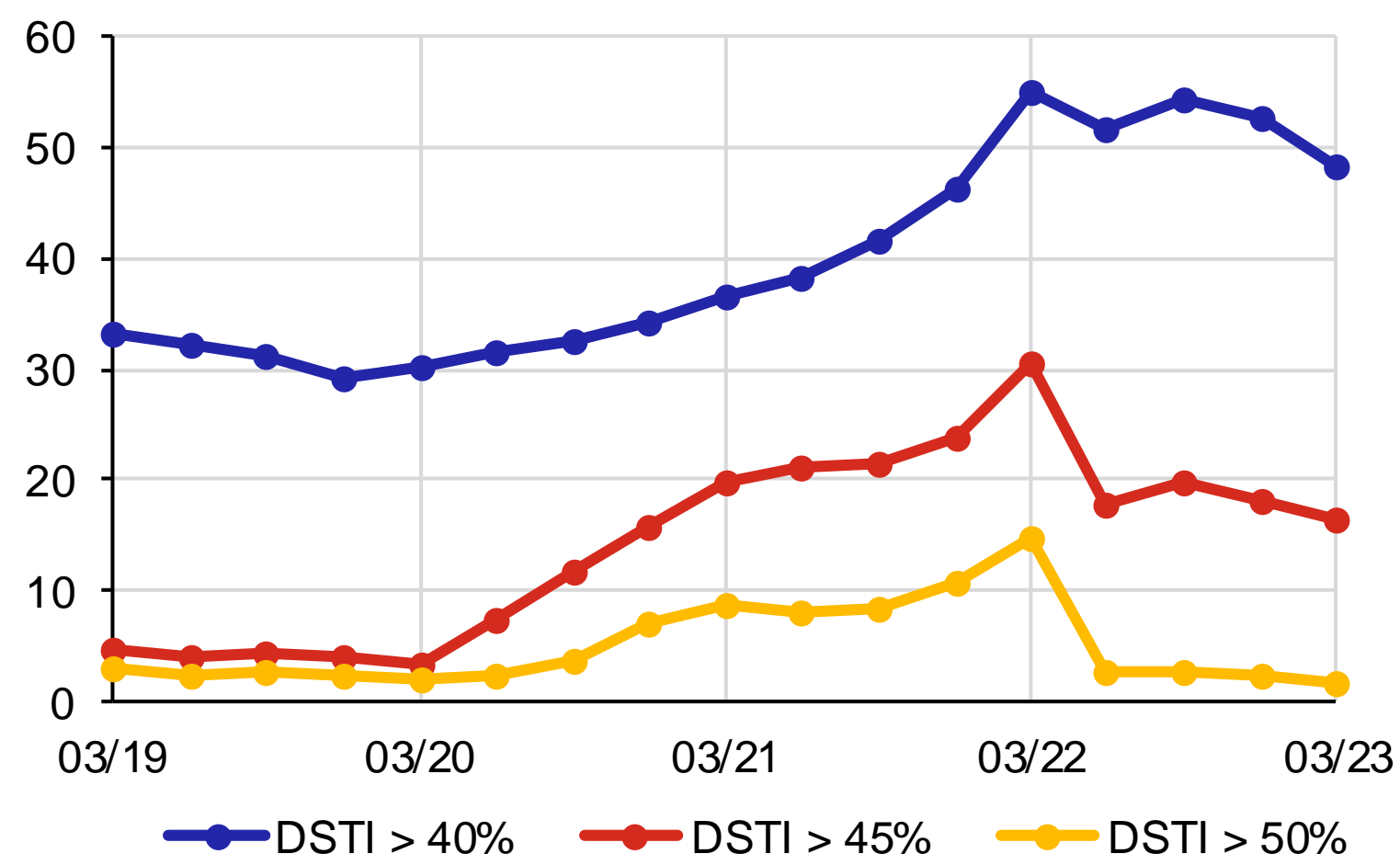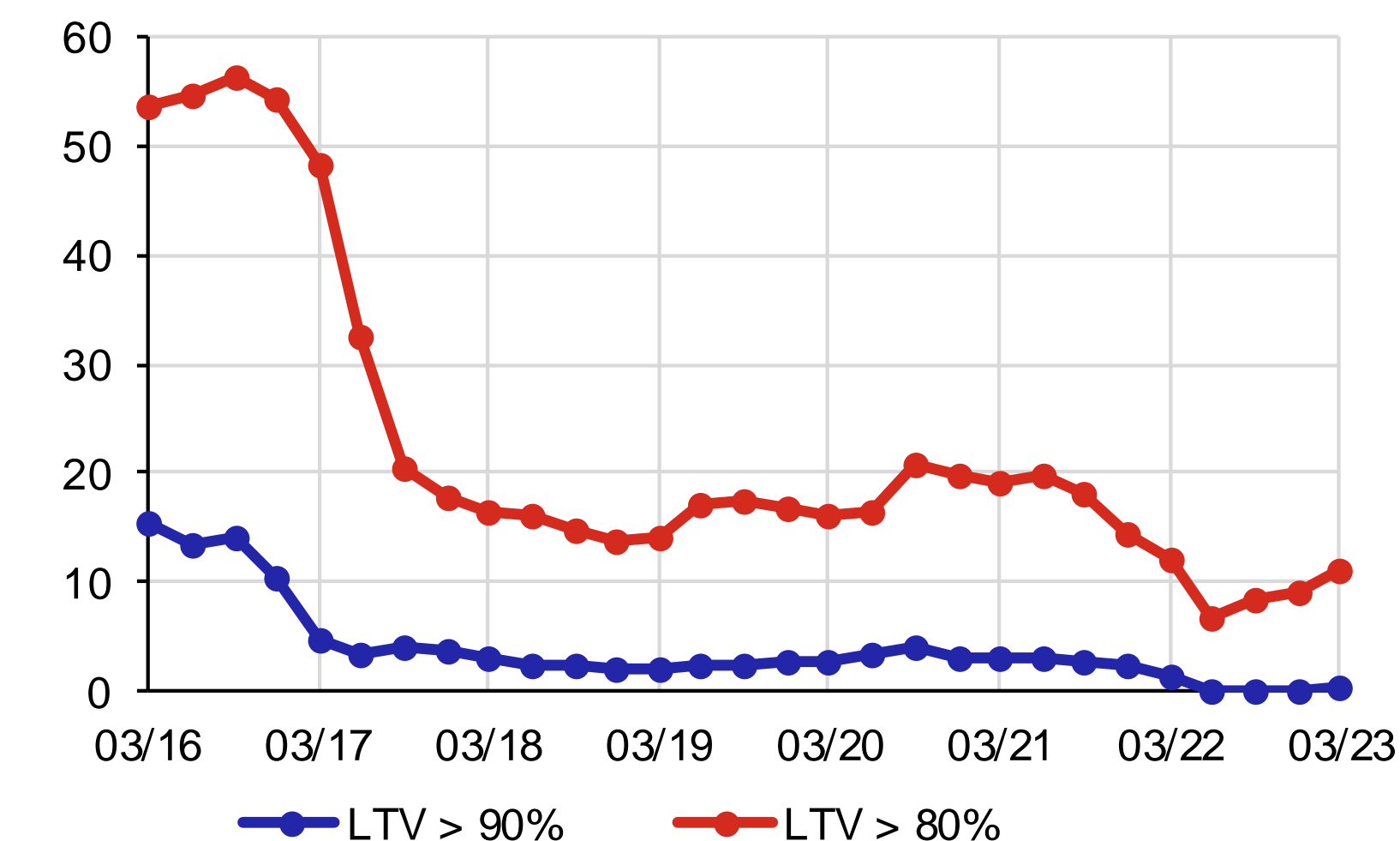
New mortgage loans with DTIs in selected bands
(share of loans in volume provided in given quarter in %)

DTI > 8 · DTI > 8.5 · DTI > 9 · DTI > 9.5
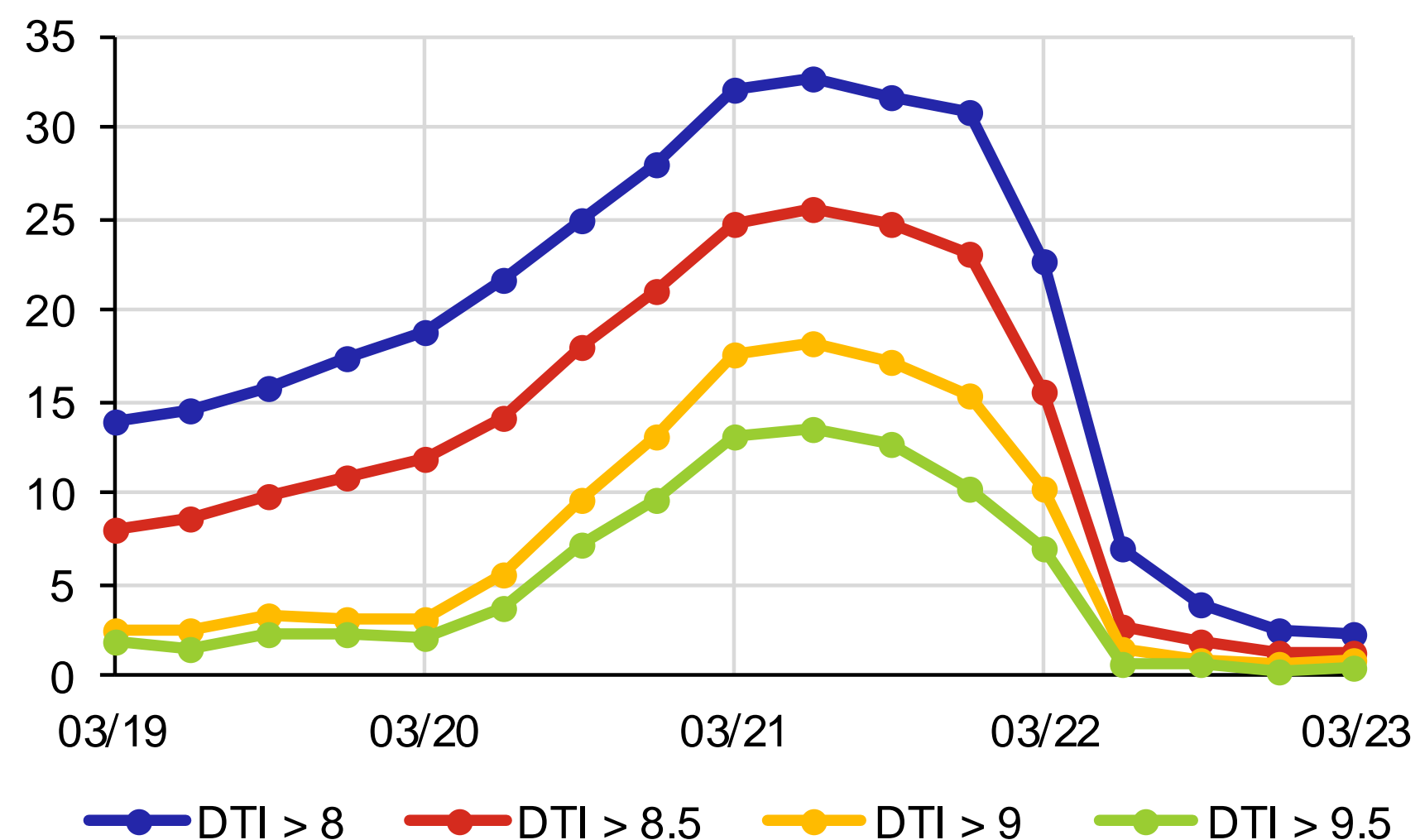
New mortgage loans with LTVs in selected bands
(share of loans in volume provided in given quarter in %)

LTV > 90% · LTV > 80%

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Current financial stability risks

Existing risks are mainly of cyclical nature

- Build-up of cyclical risks in recent years, the risks remain elevated
  - Risks have slowly been receding since mid 2022.
  - No risk materialization observed, rather a 'natural' outflow of the risks.
  - Record-high profitability of the banking sector provides comfortable cushions.
  - Risks are covered by the CCyB.
- Inflow of new risks considerably muted
  - Provision of new housing credit is well below historical averages.
  - Risky loans were confined by the binding limits (LTV, DTI, DSTI).
  - Pronounced shift of credit provision to the high-income clients.

Macroprudential policy reaction

Pending and applicable CCyB rate in the Czech Republic
(% of total risk exposure)

Pending rate — Applicable rate
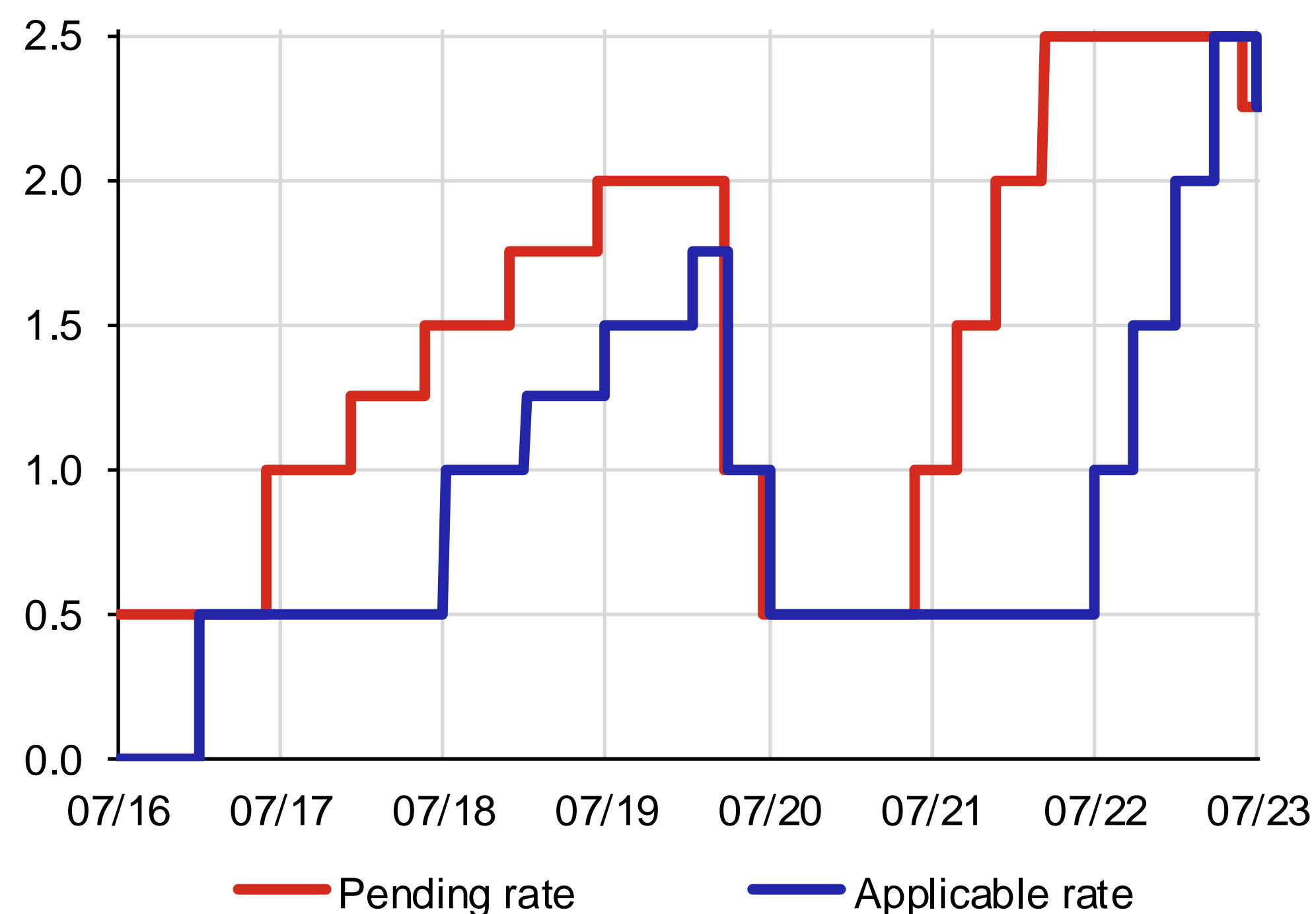
Legally binding BBM limits (December 2021 and June 2023)

DTI	**8.5**	9.5
DSTI	~~**45%**~~	~~50%~~
LTV	**80%**	90%

For applicants under 36 years if the loan is for the purchase of owner-occupied housing.

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Analytical tools – House prices

- Two distinct measures of overvaluation
  - Macroprudential approach – safely attainable prices for liquidity-constrained HHs
  - Valuation approach – valuation theory adapted to a decision problem of a small investor
- Accompanying indicators
  - Percentage of households that can safely afford to buy an 'average' apartment (using debt financing)

- 'House Prices at Risk'
  - Conditional density estimation, no quantile regressions
  - Assessing the risks of house prices falling down (but also picking up).

Analytical tools – Credit risk

- **Stress test of the household sector**
  - Loan-by-loan, debtor-by-debtor approach
  - What-if macro-financial scenarios
  - Assessment of the impact of BBMs
  - Inputs (PDs, LGDs) for the stress test of the banking sector

Analytical tools – Credit risk

- Stress test of the household sector – sensitivity checks

12M default rate on mortgage loans to households
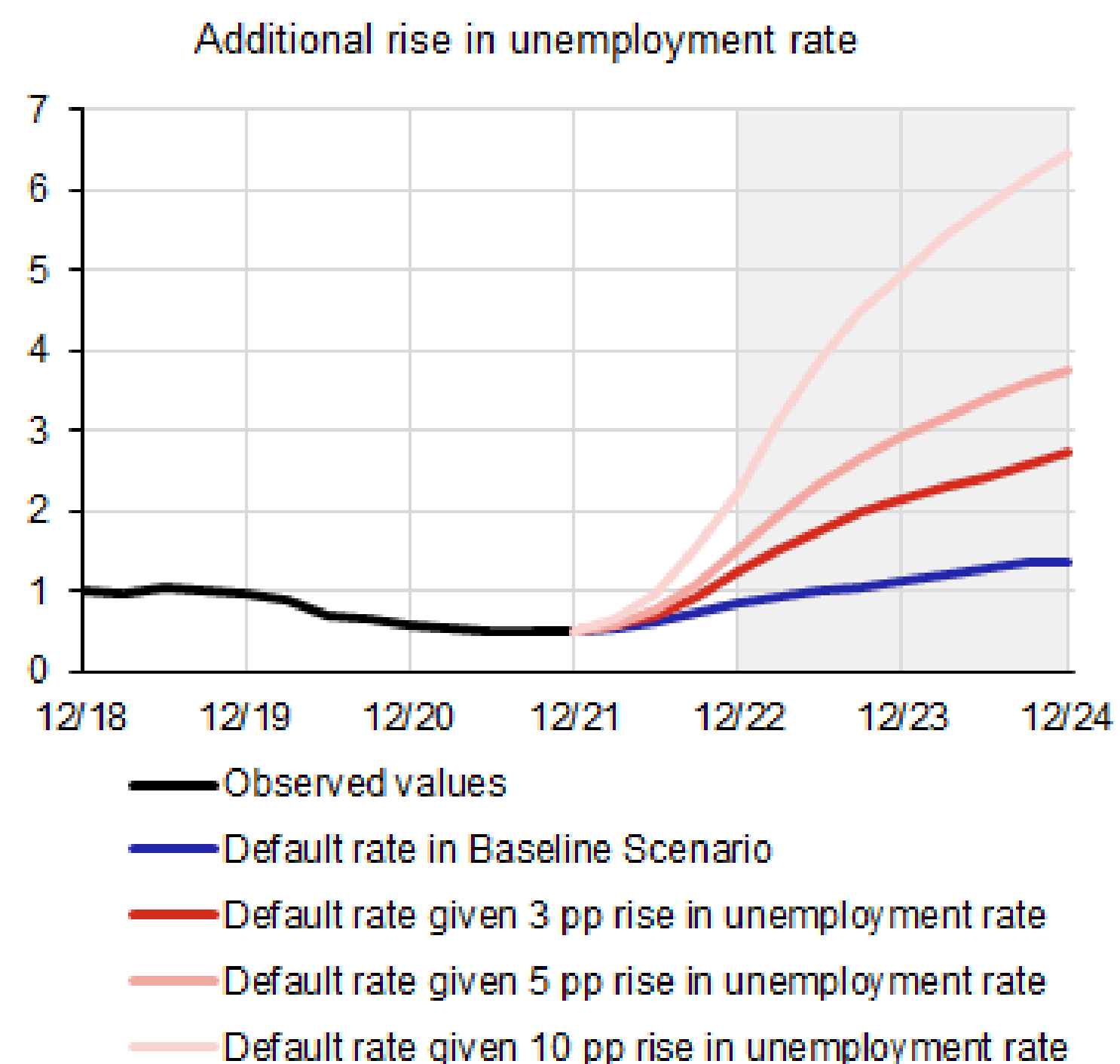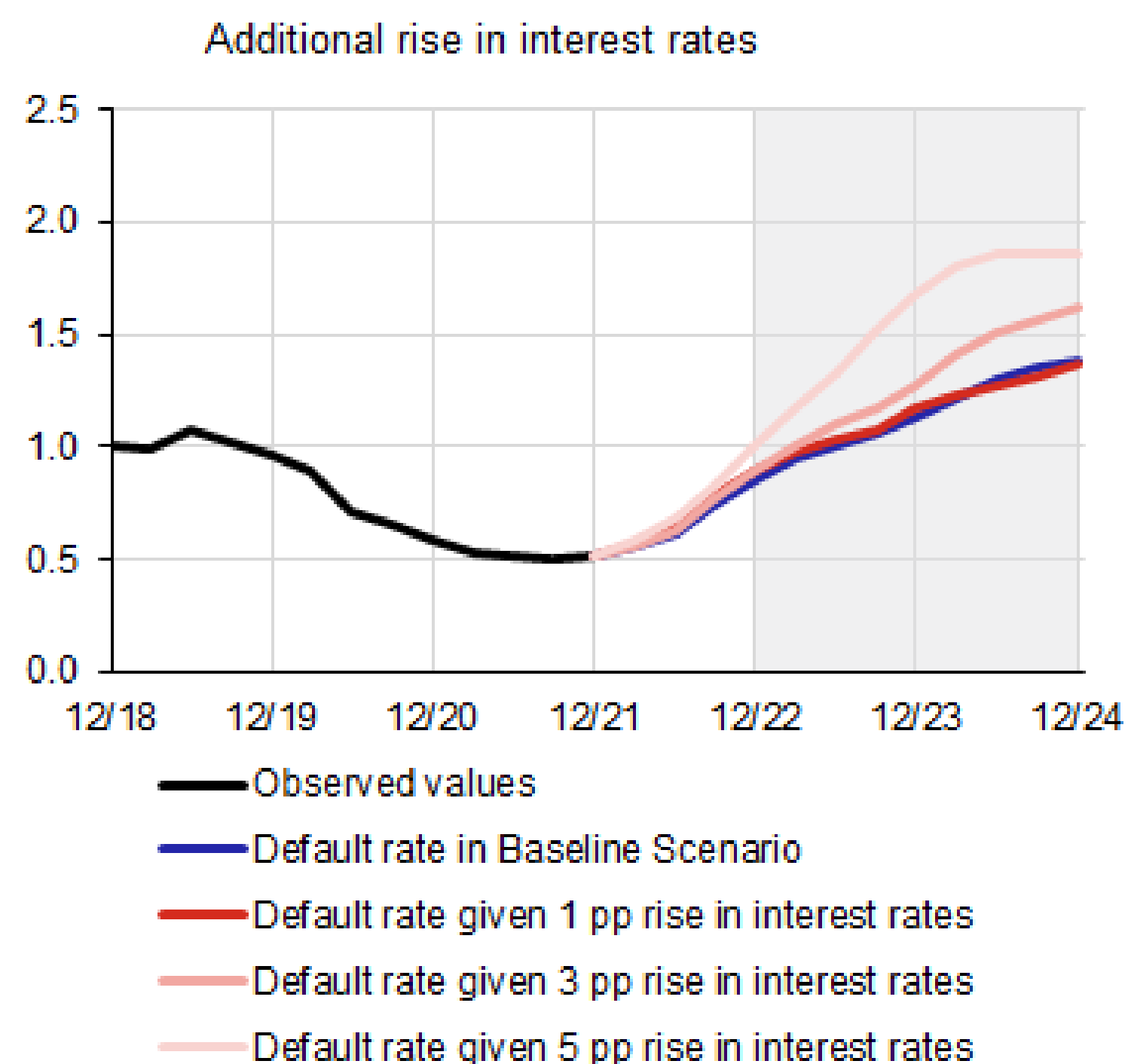
Thank you for your attention!

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Back-up slides

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Conditional density estimation – property prices

A two step procedure

- Take your favorite model, estimate "economic" shocks and obtain its empirical distribution

    - Aspects of the observed data that cannot be explained by the model dynamics, will be provided by the shock distributions to replicate the distribution of the observed data.

- Sample from the set of shocks using a „local" bootstrap

    - Assign higher probability to the shocks that are "typical" for the current state of the economy (as measured by some distance) – local resampling

Conditional density estimation – property prices

The model

- Standard macroeconomic models do not usually include prices of financial and other assets.

  - We augment a very simple semi-structural "toy" QPM model with a block of equations describing house prices.

- House-price block is based on the concept of the borrowing capacity of households (we build on our previous work on house prices…).

  - Assumption that the marginal buyer is a credit-constrained household that tries to go for a maximum attainable loan subject to disposable income, mortgage interest rates and prudent(ial) limits on DSTI or DTI, LTV and loan maturity.

Conditional density estimation – property prices

k-NN Bootstrap (local resampling)

- Virtually identical in spirit to the local bootstrap for Markov processes of Paparoditis and Politis (they provide theoretical justification of the method!).
  - Cross-sectional and temporal shock dependencies are preserved
  - Block sampling possible, but usually unnecessary

- Resampling from the set of estimated shocks also allows for non-trivial weighting of the information (e.g. discarding some periods if desirable).

Conditional density estimation – model outcome

- Predictive distributions exhibit rather complex pattern
  - Heteroscedasticity
  - Asymmetries going both ways depending on the state of the economy (note that prices are non-linear in interest rates)
  - Overall, the level of uncertainty seems to be huge.

- Results seem to be reasonable to the eyes of experts.

Predictive density (one-year-ahead growth)
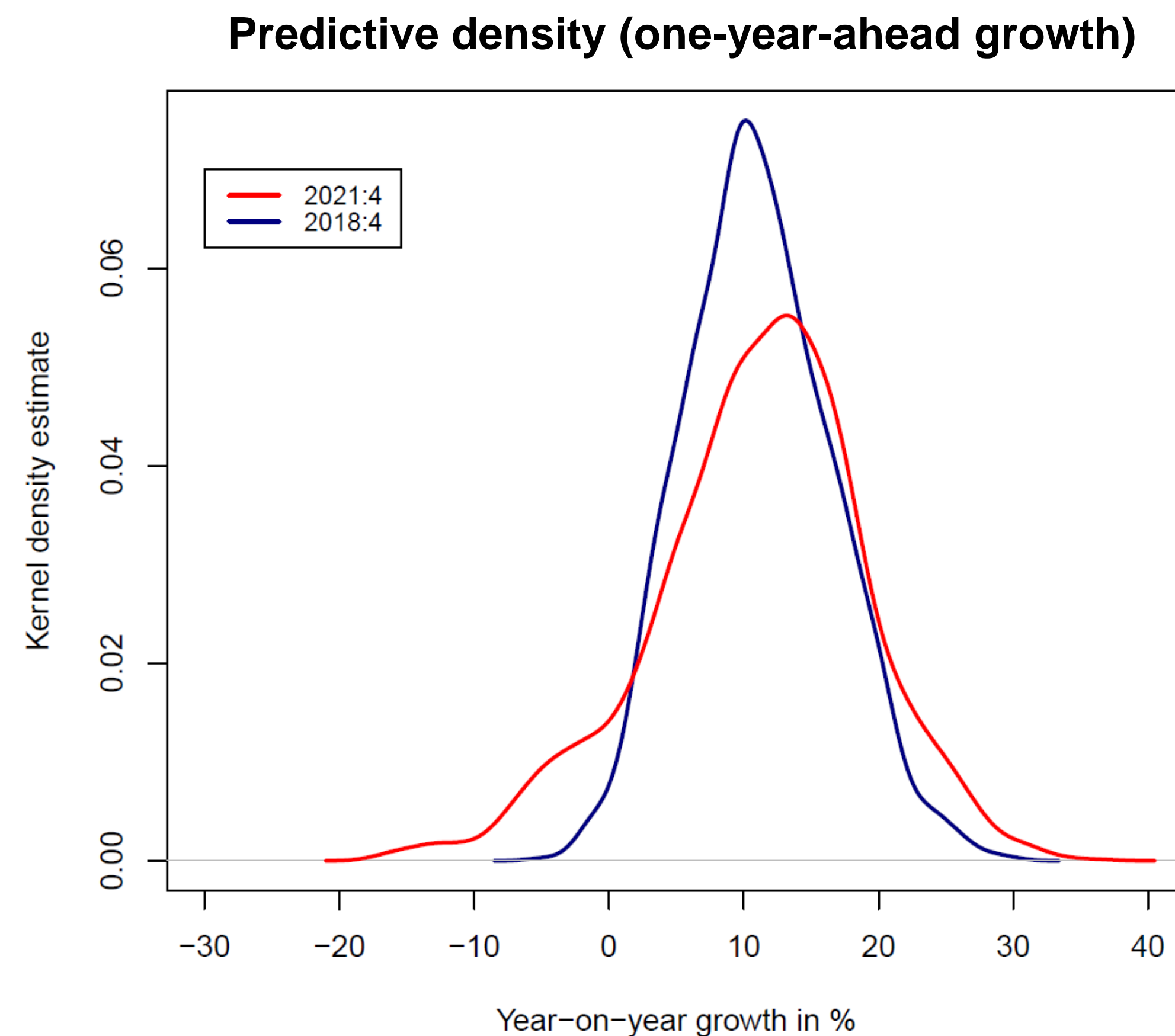
High-level overview: CCyB

- Adoption of the standard-rate concept (1%)

- Quantitative guidance ≠ Credit-to-GDP gap

- At present, the CCyB mainly covers risks stemming from the RRE sector

- „Model-based" CCyB rate determined as a sum of two effects
  - Unexpected cyclical losses ("VaR" approach, conditional distribution)
  - Cyclically-lowered risk weights (stress-testing, "VaR" approach)

- Expert judgement is an integral part of the process
  - Models were not calibrated for extreme events (Covid, war, energy prices…)
  - Decrease in the rate and its timing is perhaps harder to infer from the model outcomes

Property prices – Data

- Standard data produced by the NCIs (indices)

- Cooperation with commercial data providers (both RRE, CRE, price levels)

- Access to individual transaction data (Czech cadaster, price levels)

- Real estate listings (basic stats)

- Regional detail, break-downs by the type of property

- Size and quality of the housing stock

- Information on the new construction