Implications of Financial Architecture Change

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Introduction

Financial architecture in flux: CBDC, crypto assets, …

- Macro implications?
- General mechanisms?

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- Macro implications?
- General mechanisms?

Neutrality benchmark

- CBDC

  Fundamental sources of nonneutrality
- Private cryptocurrency
- Value of LoLR guarantees, bank funding costs

Literature

- Modigliani and Miller (1958), Barro (1974), Wallace (1981), Bryant (1983), Chamley and Polemarchakis (1984), Sargent (1987, 5.4), ...
- CBDC, see below
- Gonzalez-Eiras and Niepelt (2015), Brunnermeier and Niepelt (2019)

The Model

General framework

- Households, firms, banks, government, foreigners
- Arbitrary types, shocks, assets, preferences, constraints
- Equilibrium, competitive or not

Neutral Regime Change

Regime change

- Change in balance sheet positions
- Possibly accompanied by transfers

Neutrality

- Essentially unchanged equilibrium after regime change

Sufficient conditions for neutral regime change

i. Individually feasible given constraints

   Asset swap, transfers satisfy budget, other constraints

ii. Private sector objectives not affected, choice sets not enlarged

   Unchanged wealth

   Constraints not relaxed

iii. Aggregate consistency

CBDC

Swap $m \leftrightarrow n$

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   Asset swap, transfers satisfy budget, other constraints

   HH: $n \downarrow, m \uparrow$, Bank: $n \downarrow, r \downarrow, \ell \uparrow$, Govt: $m \uparrow, r \downarrow, \ell \uparrow$

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Sufficient conditions for neu[illegible] change

Swap $m \leftrightarrow n$

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   HH: linear in m, n

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   HH: linear in m, n, Bank: $\ell(\cdot)$, maintain r/n, [same assets!]

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   Constraints not relaxed

   HH: linear in m, n, Bank: $\ell(\cdot)$, maintain r/n, [same assets!]

iii. Aggregate consistency: (n, r) vs. m: Same resources/liquidity

Swap $m \leftrightarrow n$

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Fundamental sources of nonneutrality

Swap $m \leftrightarrow n$

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Nonlinear liquidity benefits (e.g., CES)

Brunnermeier and Niepelt (2019)

Burlon et al. (2022) …

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Unequal resource costs

Piazzesi and Schneider (2022)
Abad et al. (2023), Lamersdorf et al. (2023)

Niepelt (2024)

Swap $m \leftrightarrow n$

Sufficient conditions for neutral regime change

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   Asset swap, transfers satisfy budget,

CBDC injection by transfer

Keister and Sanches (2023)

Chiu et al. (2023)

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Swap $m \leftrightarrow n$

Sufficient conditions for neutral regime change

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   Asset swap, transfers satisfy l

CBDC injection by "QE for the masses"

Kumhof and Noone (2021)

Barrdear and Kumhof (2022)

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Complementarities, "specialness" of n

Regulatory constraints
Collateral requirements for CB loan
Williamson (2022)
Böser and Gersbach (2020)

[Whited et al. (2023)]

Swap $m \leftrightarrow n$

Sufficient conditions for neutral regime change with sequential policy choice

i. Individually feasible given constraints

   Asset swap, transfers satisfy budget, other constraints

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iii. Aggregate consistency

   Conditions on state variables

Different (evolution of) states

Political economy
Tucker (2017), Cecchetti and Schoenholtz (2018)
Information constraints

Keister and Monnet (2022)

Taking Stock

Key plausible sources of nonneutrality

- Resource requirements deposits, reserves vs. CBDC
- "Specialness" of deposits
- Government, political-economy

Neutrality $\perp$ Pareto improvability

Private Cryptocurrency

Private currency = CBDC + incentive constraints

- Profit motive
- Harder to "sterilize" private cryptocurrency than CBDC
- Except: Competitive stablecoin without operating costs, intrinsic liquidity

Bubbly crypto assets

- Cannot generate liquidity benefits (Tirole, 1985)
- Change allocation

Value of Lender-of-Last-Resort Guarantees

Deposit franchise lowers bank financing costs

- Liquidity rents

  Due to LoLR guarantees?

- Naïve measure

$$n\frac{R^f - R^n}{R^f}$$

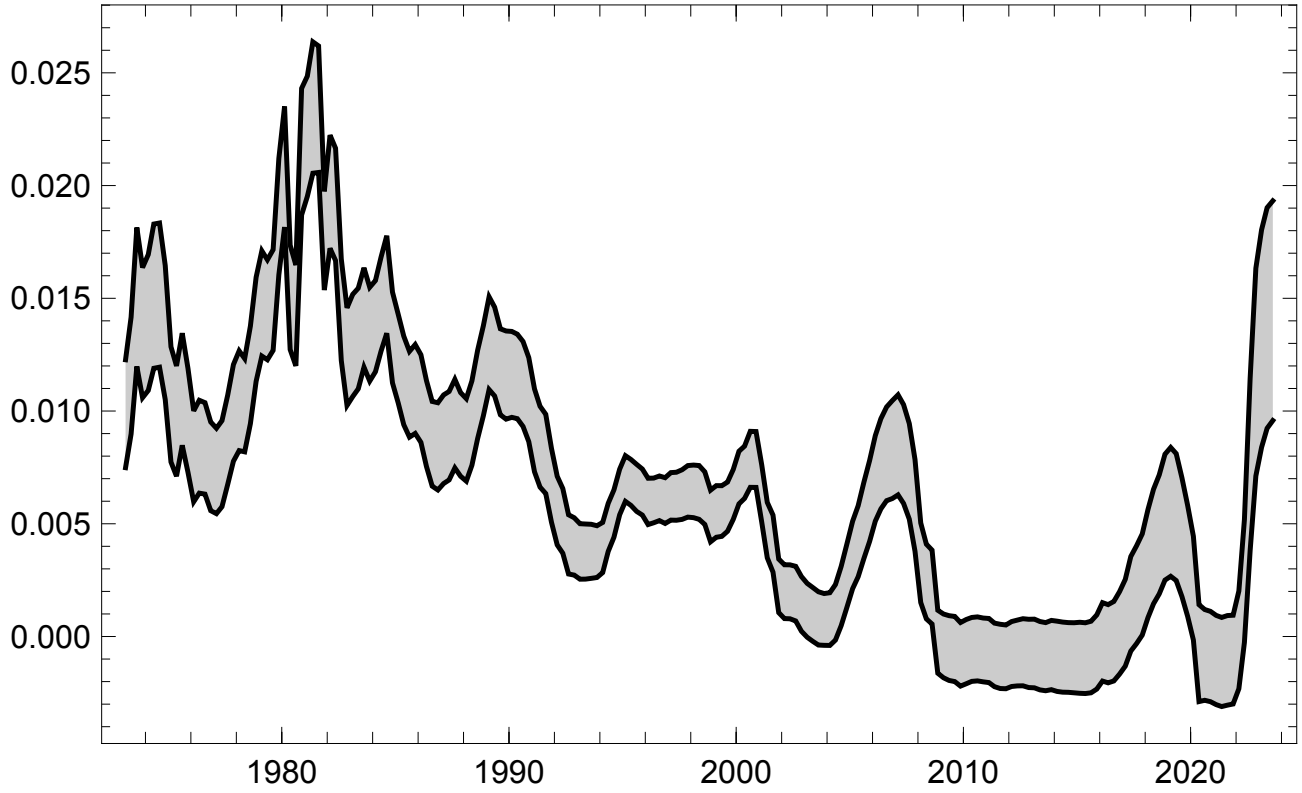

Figure 1: Bounds for deposit-to-GDP ratio times deposit spread, annualized.

Corrections

- Deposits require reserves
- Operating costs

Corrected measure

- Based on equivalence relations
- Funding cost = cb loan $\cdot$ cb loan rate

$$n(1-\zeta)\cdot R^{\ell}$$

- Liquidity rents = cb loan $\cdot$ discount relative to market rate

$$n(1-\zeta)\frac{R^{f}-R^{\ell}}{R^{f}}$$

Results

- Liquidity rents, assuming isoelastic demand

$$n(1-\zeta)\frac{R^f - R^\ell}{R^f} = \psi \cdot \underbrace{n\frac{R^f - R^n}{R^f}}_{\text{naive measure}}$$

- $\psi \approx 1/3$ (Drechsler et al., 2017; Wang et al., 2020; Pasqualini, 2021; Niepelt, 2024)
- Liquidity rents average 0.25% of GDP

Conclusion

Conditions for neutral financial architecture change

- Looser for CBDC than for private cryptocurrencies

  Central banks can largely insulate economy from CBDC

  CBDC to defend monetary sovereignty?
- Would central banks *want* to insulate banks?

  CBDC could raise bank funding costs by 0.25% of GDP

Data

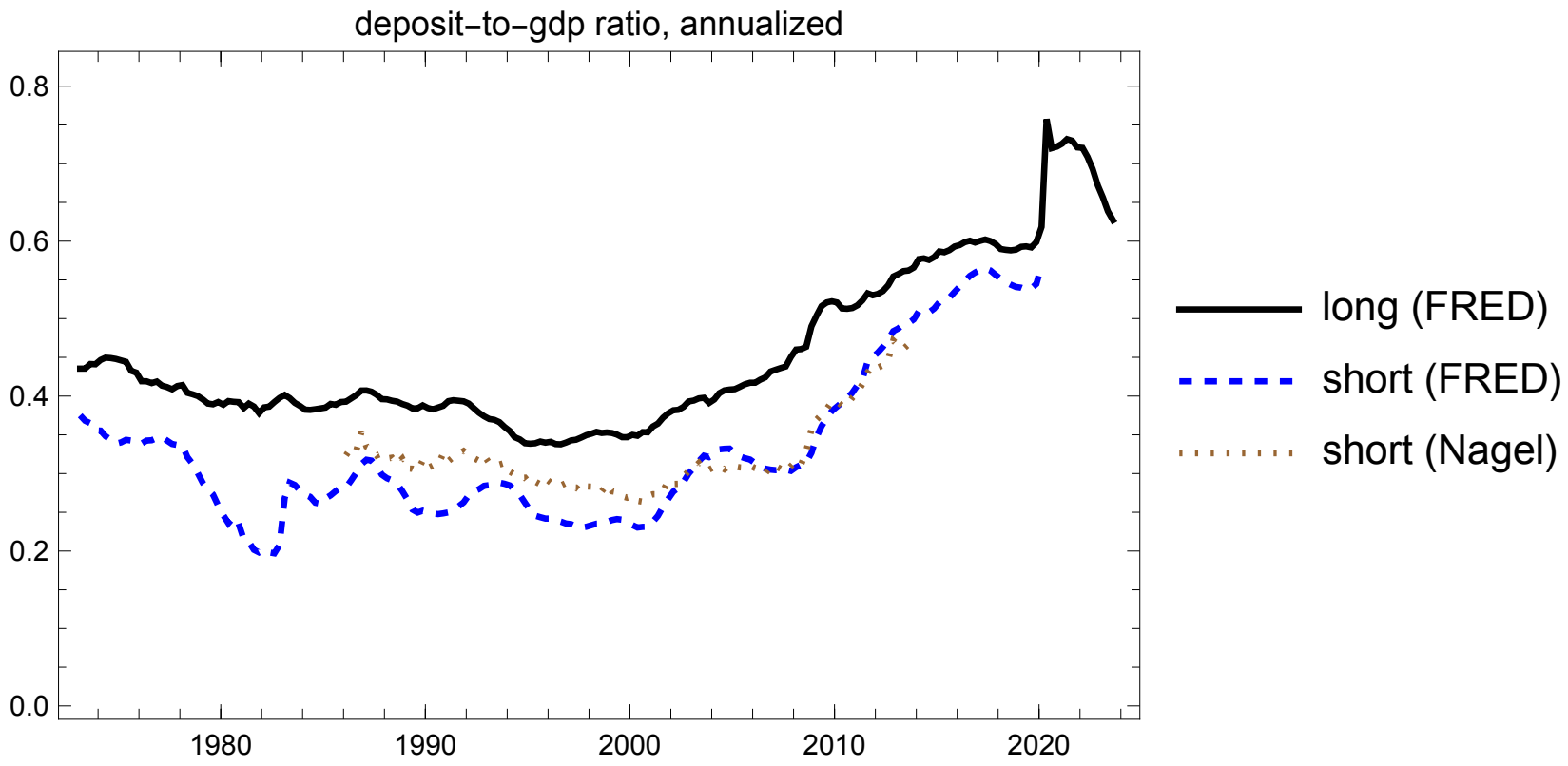

Figure 2: Measures of the deposit-to-GDP ratio.

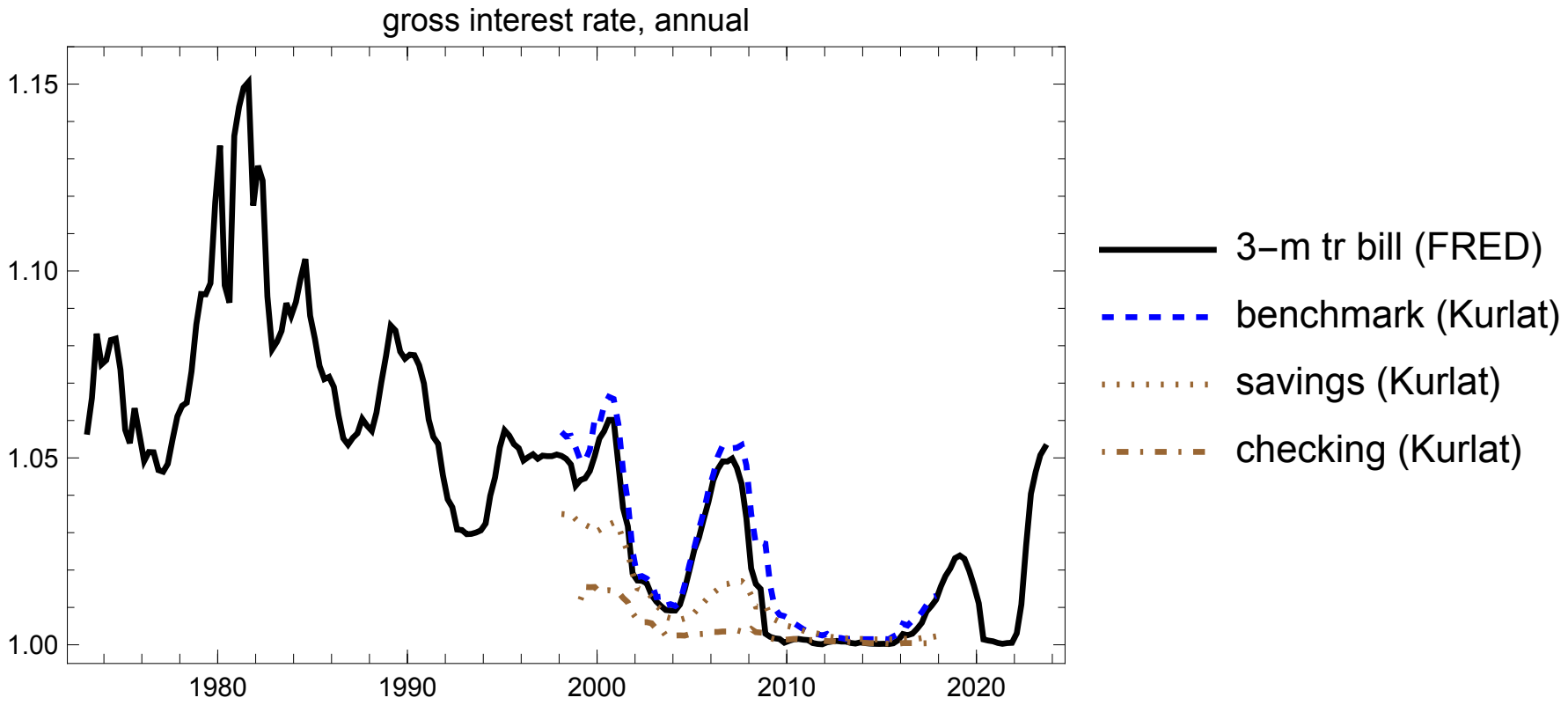

Figure 3: Measures of gross interest rates.

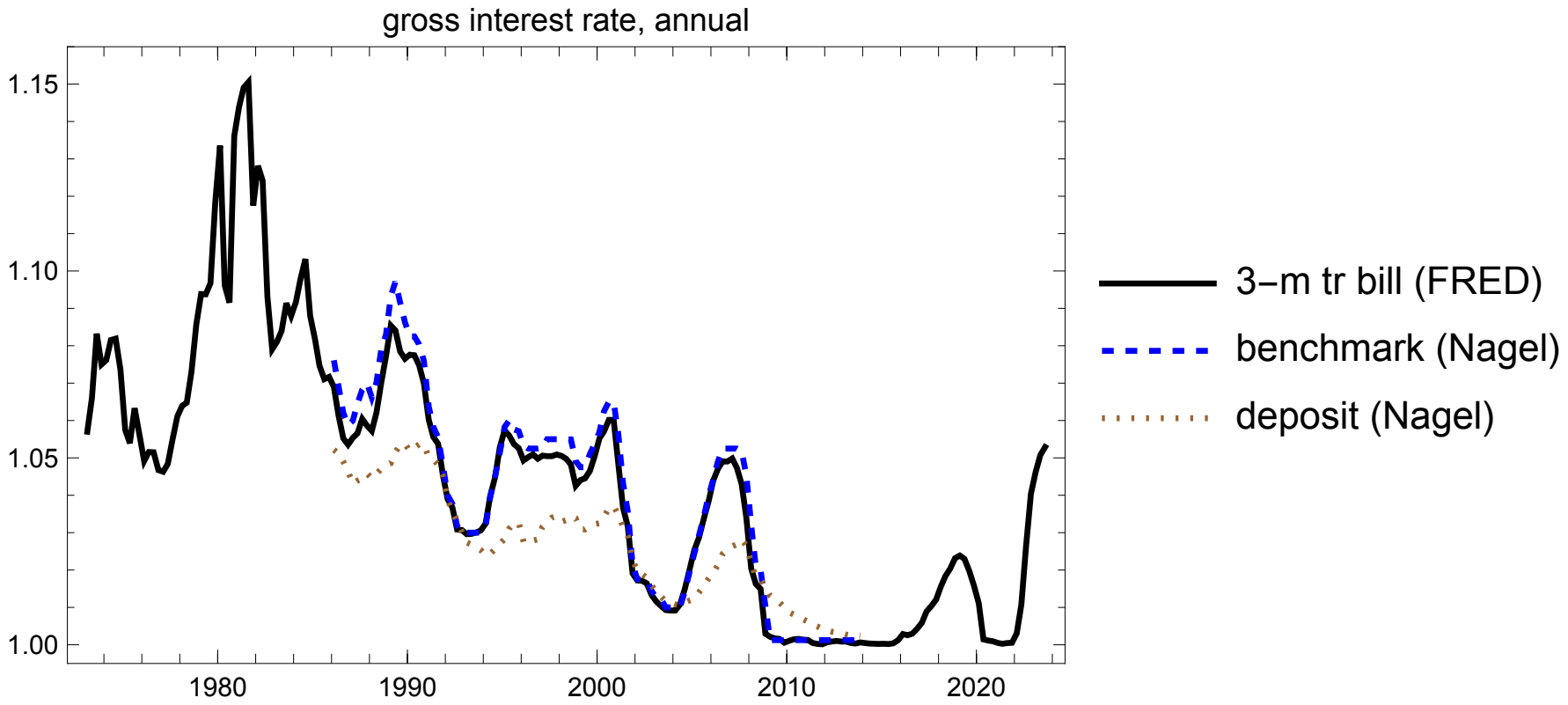

Figure 4: Measures of gross interest rates.

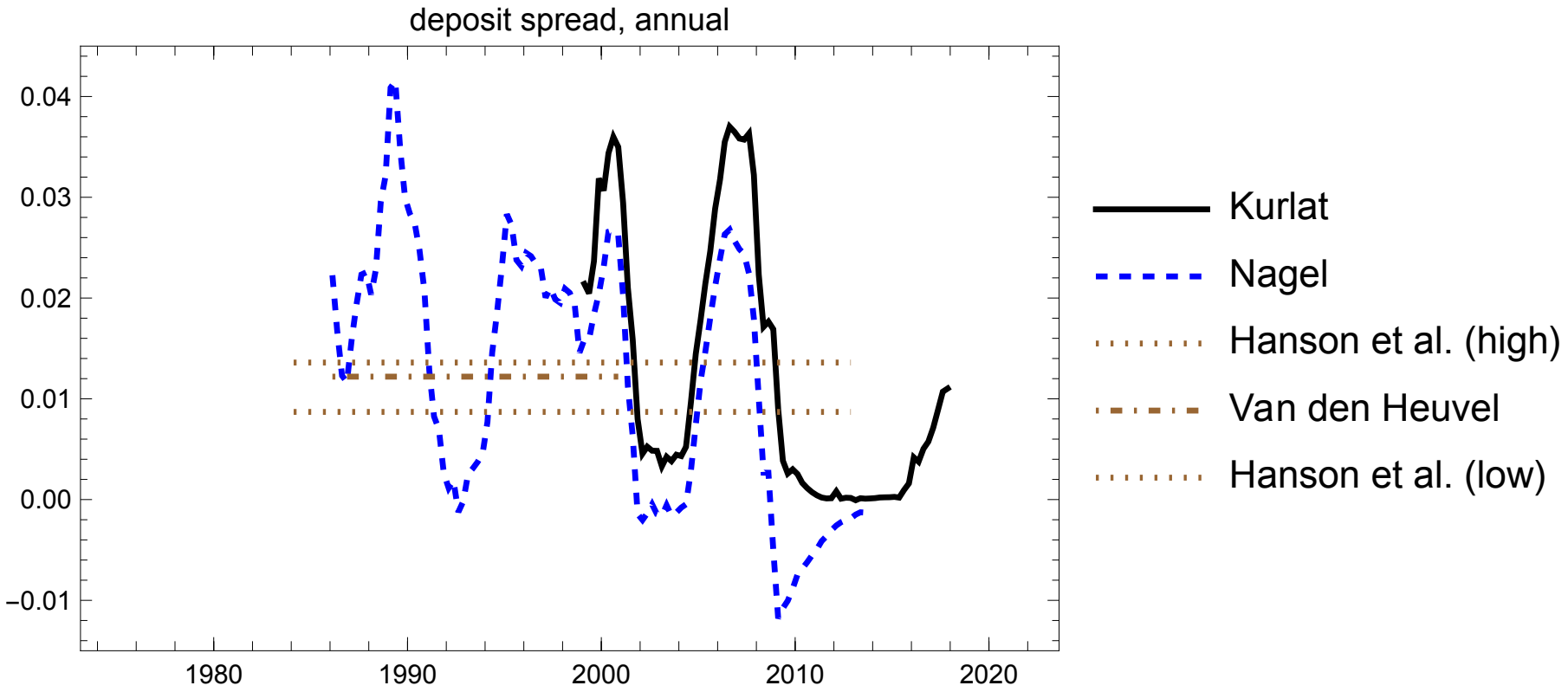

Figure 5: Measures of the deposit spread.

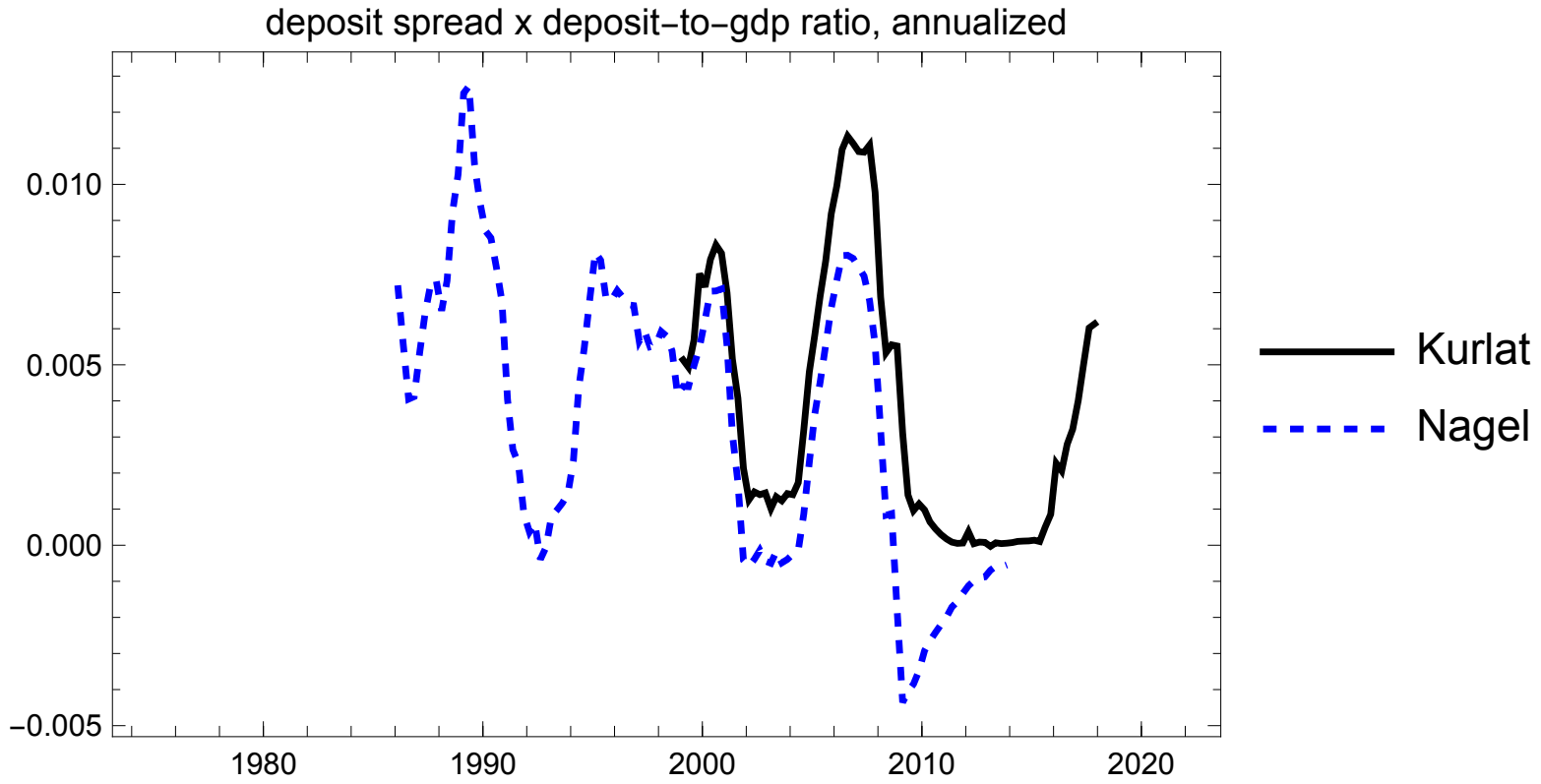

Figure 6: Measures of the deposit spread times the deposit-to-GDP ratio.

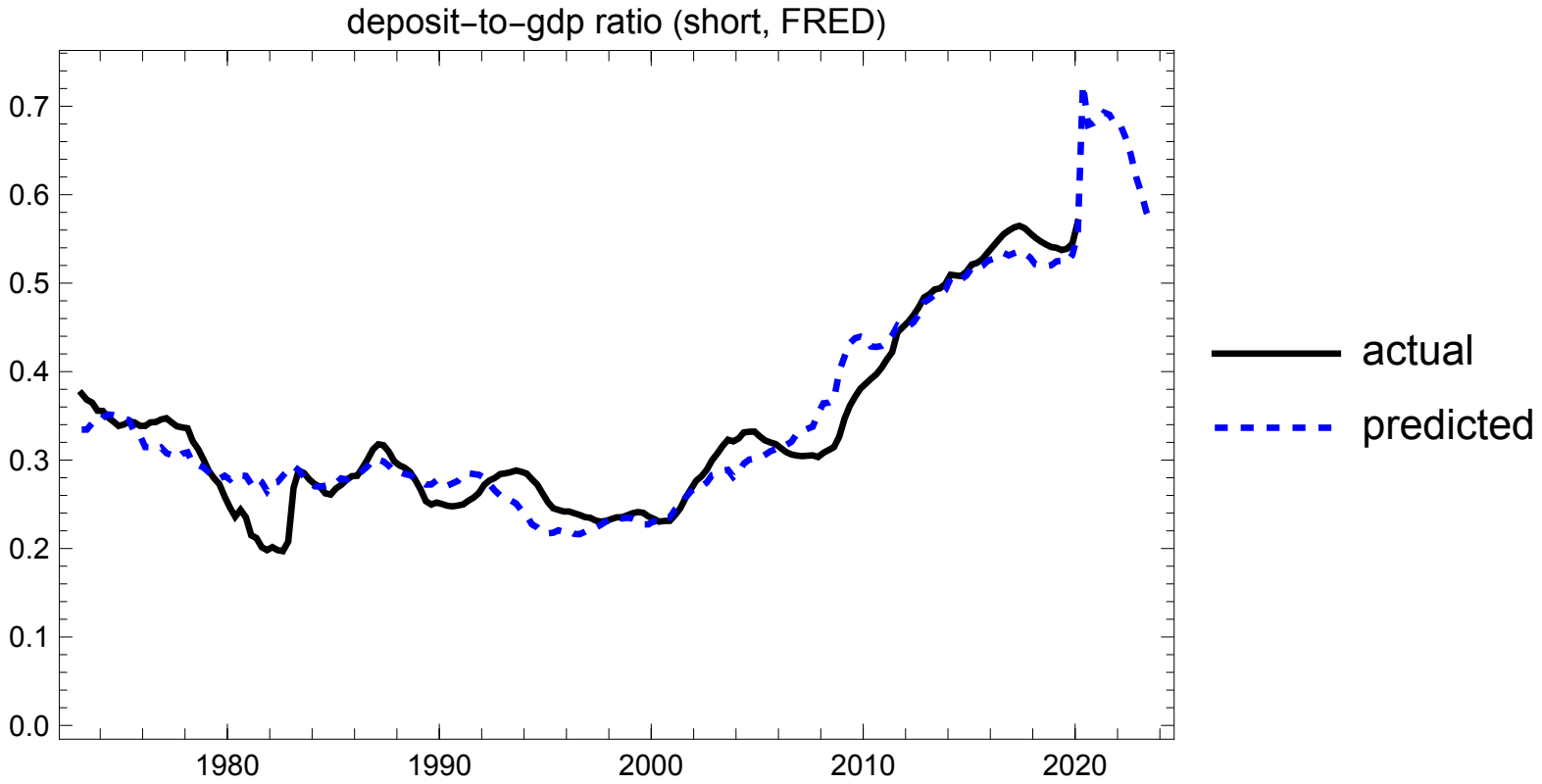

Figure 7: Actual and predicted deposit-to-GDP ratio (short, FRED).

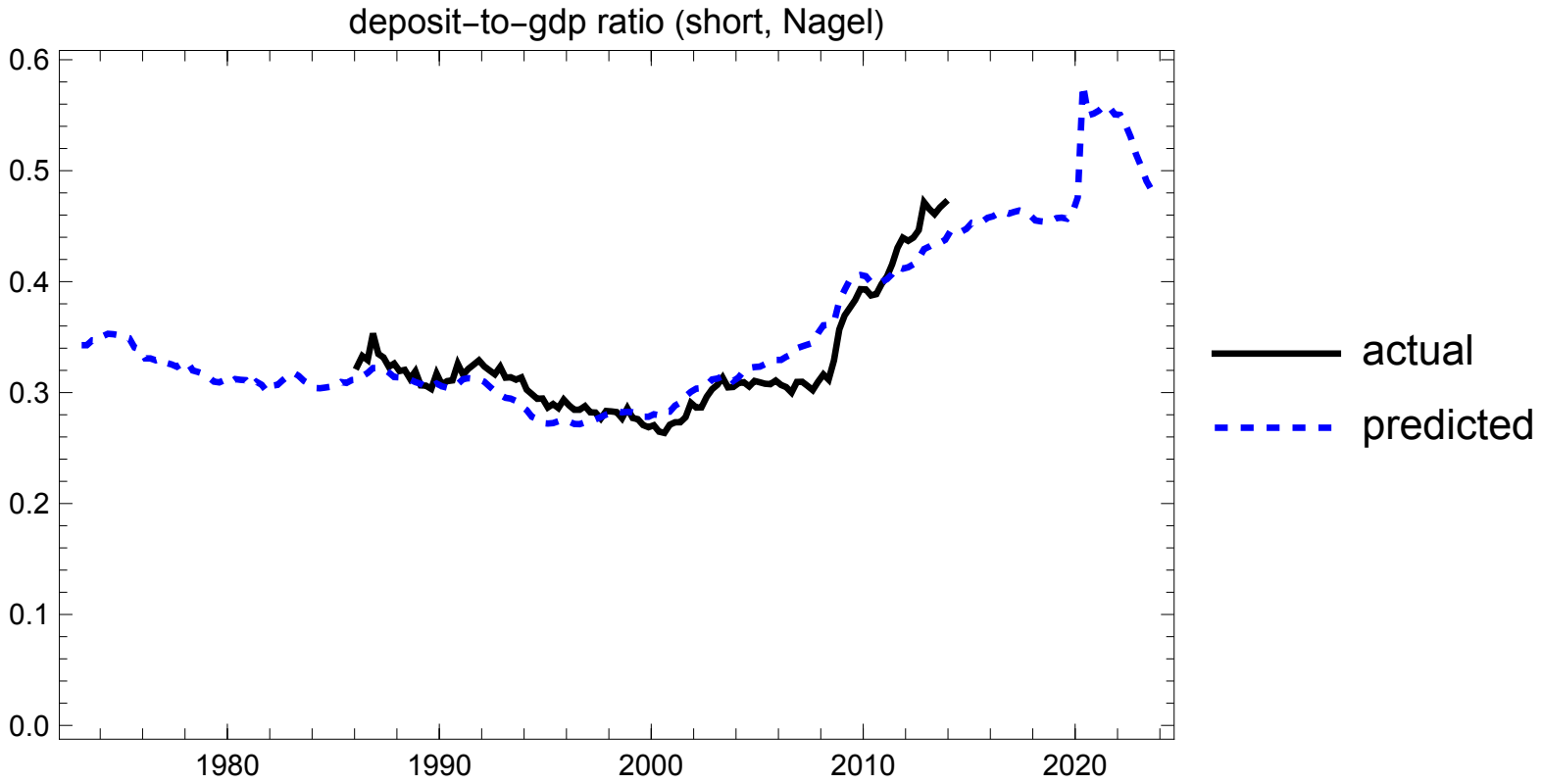

Figure 8: Actual and predicted deposit-to-GDP ratio (short, Nagel).

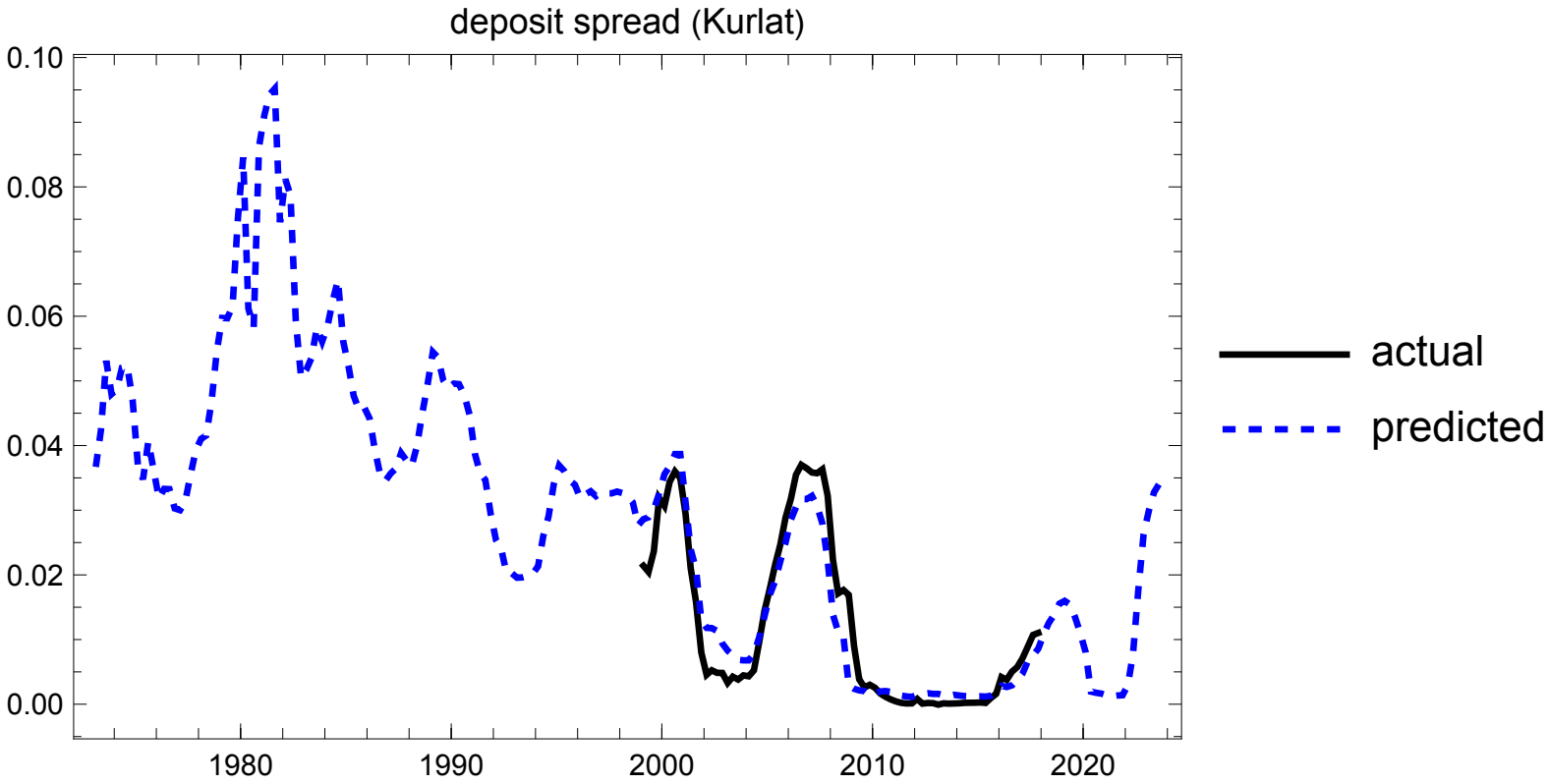

Figure 9: Actual and predicted deposit spread (Kurlat).

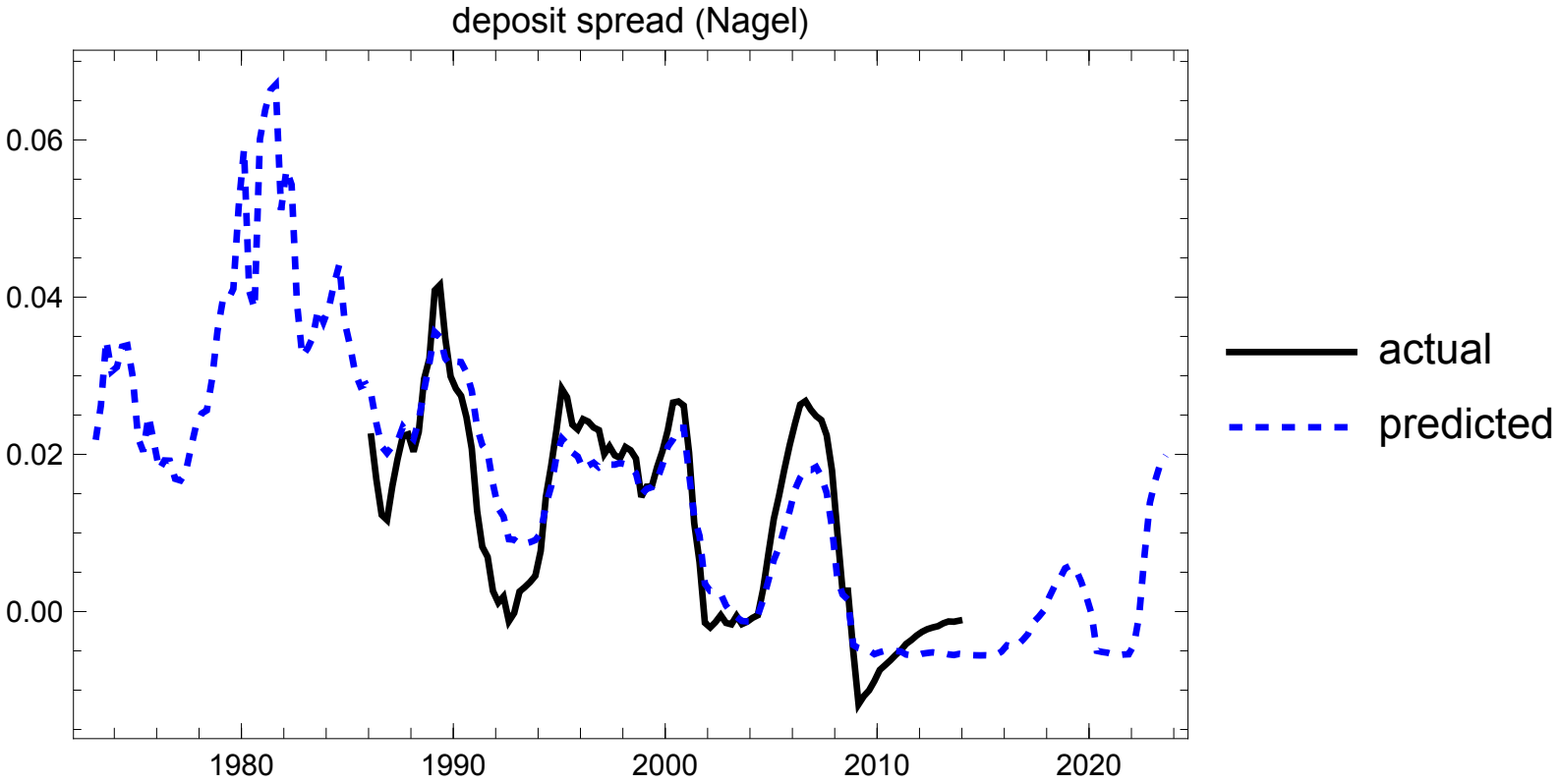

Figure 10: Actual and predicted deposit spread (Nagel).

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