
Price Level Targeting with Imperfect Rationality: A Heuristic Approach

Vojtěch Molnár

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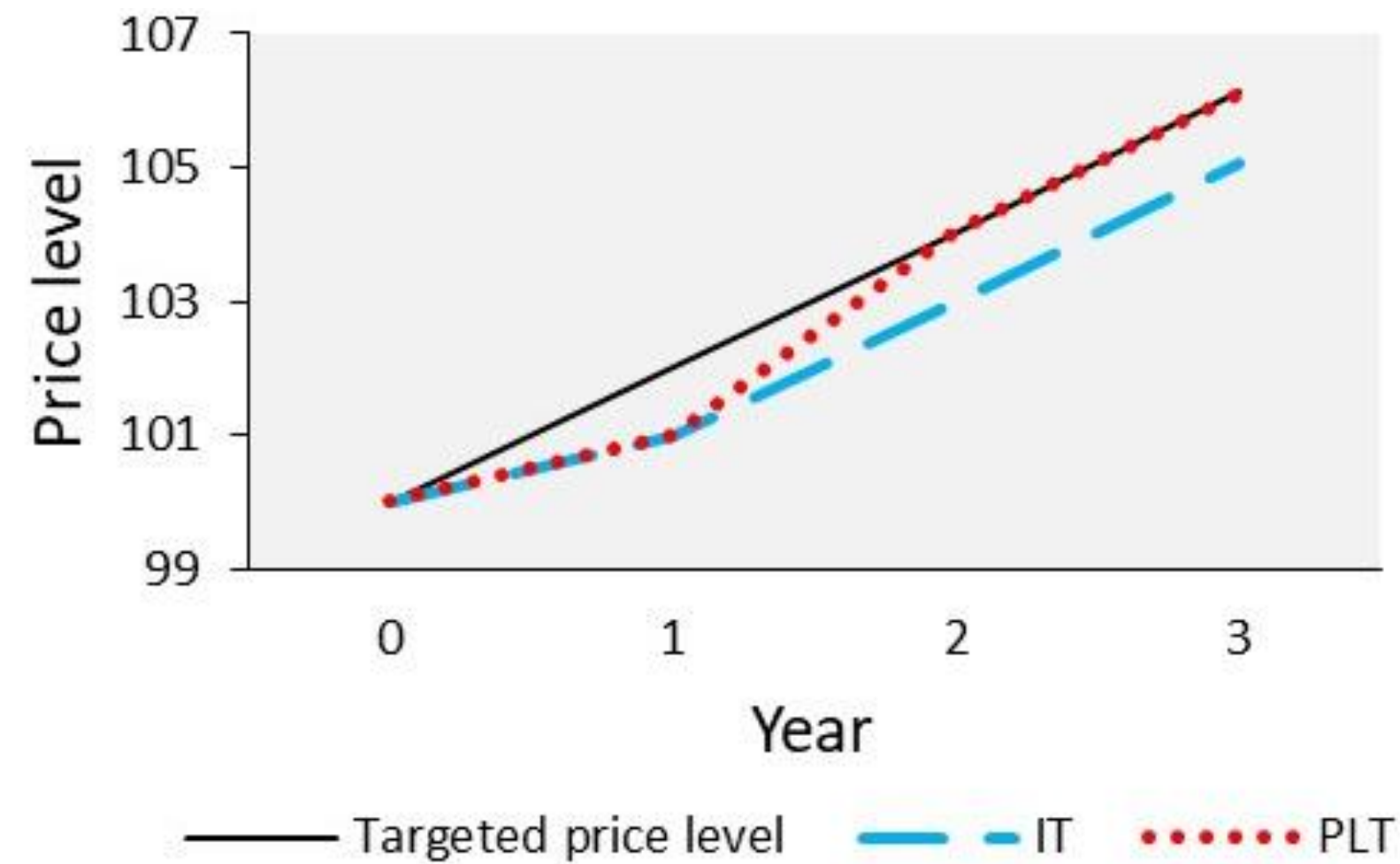
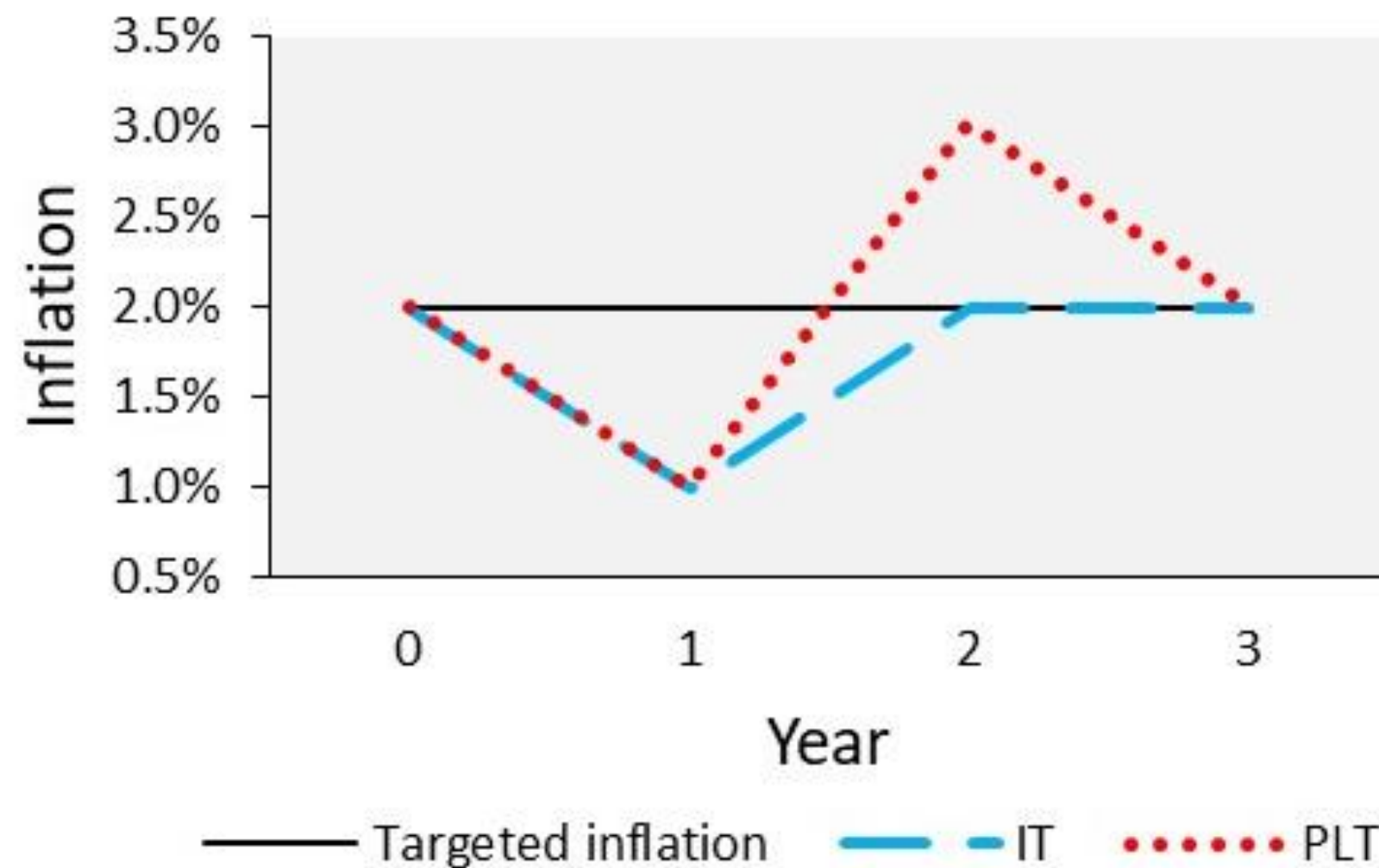
Outline

1. PLT and motivation of the paper
2. Literature review
3. Methodology
4. Results
5. Conclusion



1. Price level targeting (PLT)

- Alternative MP regime to inflation targeting (IT)
- Under PLT, central bank targets price level, which can easily increase over time – concept relatively similar to IT
 - Difference: PLT compensates for deviations of inflation from (long-term) targeted rate



Motivation

- Substantial support for PLT in theoretical literature
 - Lower economic volatility – favourable behaviour of inflation expectations
- Theoretical support of PLT crucially depends on:
 - Rational expectations of economic agents
 - Full credibility of central bank

→ Strong assumptions, often considered as too restrictive in this context
- Very rare historical experience
- **The goal of the paper: to compare the regimes without rational expectations hypothesis**

2. Literature review

- **Svensson's (1999) free lunch:** under certain assumptions, PLT leads to lower economic volatility
- Subsequent literature provided further support for PLT:
 - E.g. Woodford (2003); Eggertsson & Woodford (2003) – in presence of zero lower bound; Vestin (2006)
 - Many other papers also favor PLT in different models and examining different aspects (e.g. financial frictions, model uncertainty, exchange rate volatility, forward guidance effectiveness) – literature review provided by Ambler (2009)

Abandoning rational expectations

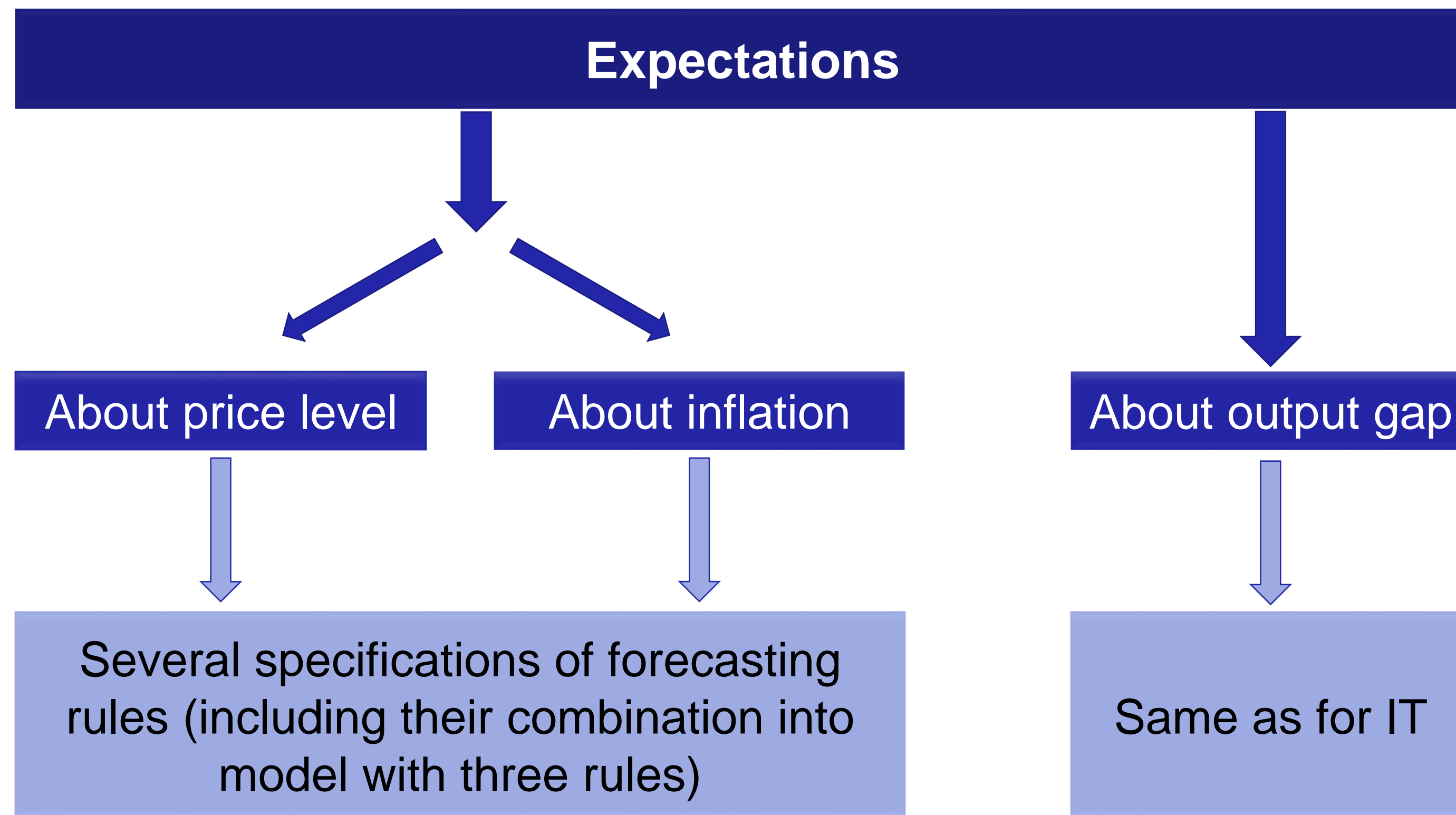
- Several – but not many – attempts to model PLT without rational expectations, with **mixed results**
 - Yetman (2005)
 - Introduces rule-of-thumb forecasting
 - Even small portion of rule-of-thumb consumers reverses optimality of PLT
 - Honkapohja & Mitra (2019)
 - Adaptive learning
 - If there is at least some initial credibility of PLT, it outperforms IT during a liquidity trap, while IT is superior without binding ZLB constraint
 - **Ho et al. (2019)**
 - Heuristic forecasting (but only one specific case is examined)
 - Compares several monetary policy regimes, PLT is found to be optimal

3. Methodology

- Small model corresponding to standard New Keynesian model, but...
- Rational expectations replaced by **heuristics**
 - Based on De Grauwe (2012)
 - **Fundamentalist** and **extrapolative** rule for inflation and output gap
 - Choice between the rules based on past forecasting performance (weighted MSFE)
- Simulations in Matlab with 1000 time periods
- Comparison of performance under IT and PLT
- IT forecasting rules:

$$\tilde{E}_t^f y_{t+1} = 0 \quad \tilde{E}_t^e y_{t+1} = y_{t-1} \quad \tilde{E}_t^{f,IT} \pi_{t+1} = \pi^* \quad \tilde{E}_t^{e,IT} \pi_{t+1} = \pi_{t-1}$$

Price level targeting - cases



PLT – forecasting rules

- About price level

$$\tilde{E}_t^{f,PLT} p_{t+1} = \bar{p}_{t+1}$$

$$\tilde{E}_t^{e,PLT} p_{t+1} = p_{t-1} + 2 * \pi_{t-1}$$

- About inflation

$$\tilde{E}_t^{e,PLT} \pi_{t+1} = \pi_{t-1}$$

$$\tilde{E}_t^{f,PLT} \pi_{t+1} = \bar{p}_{t-1} - p_{t-1} + \pi^* \quad \text{OR} \quad \tilde{E}_t^{f,PLT} \pi_{t+1} = \frac{\bar{p}_{t+1} - p_{t-1}}{2} \quad (\text{OR both})$$

4. Results

Exp. about price level

- PLT outperforms IT for most time
- But PLT diverges in 21.3% simulations, while IT is stable
- Alternative version with three forecasting rules: PLT clearly superior

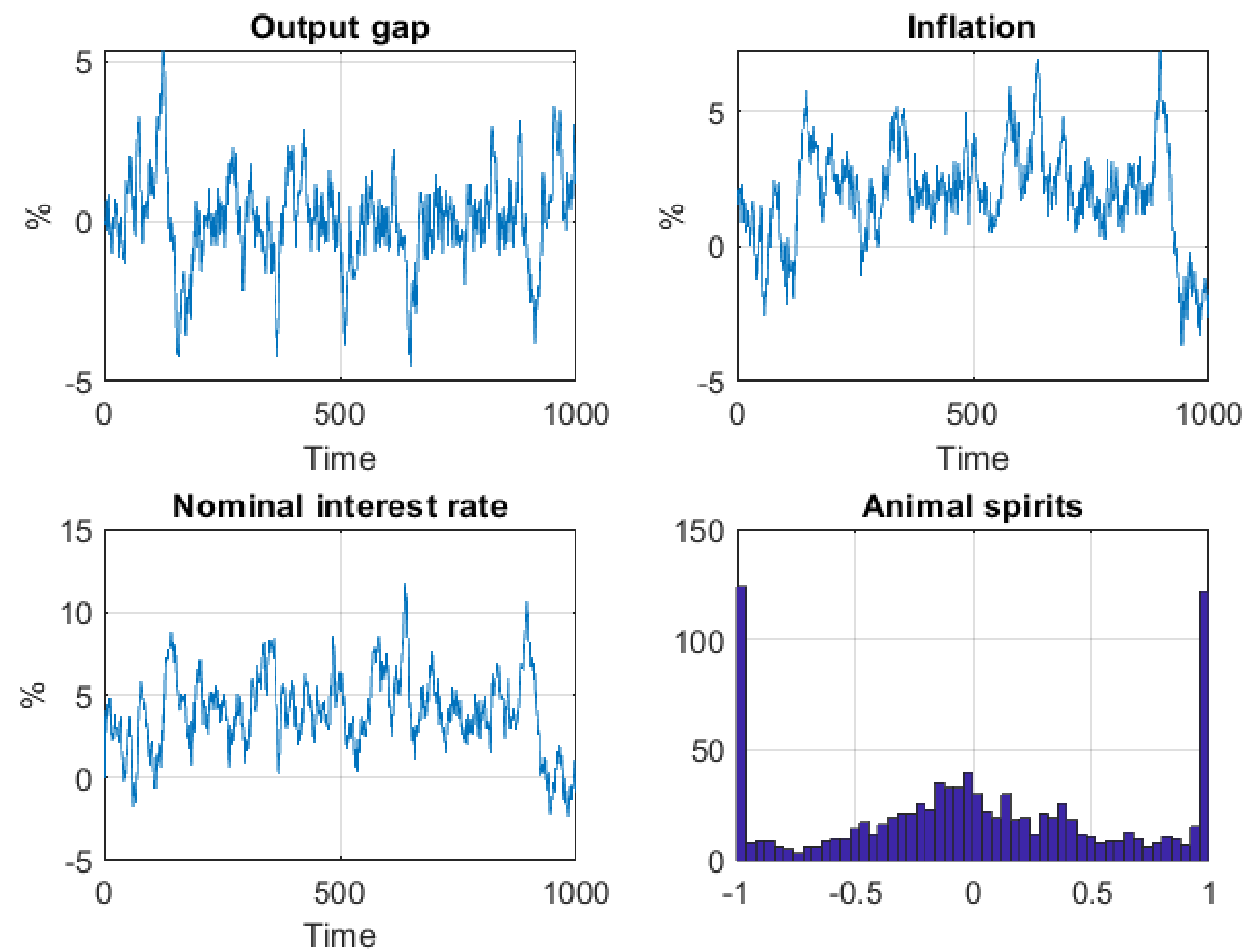
Exp. about inflation

- PLT diverges in all simulations regardless of particular specification of forecasting rules
- IT performs reasonably well (as before)

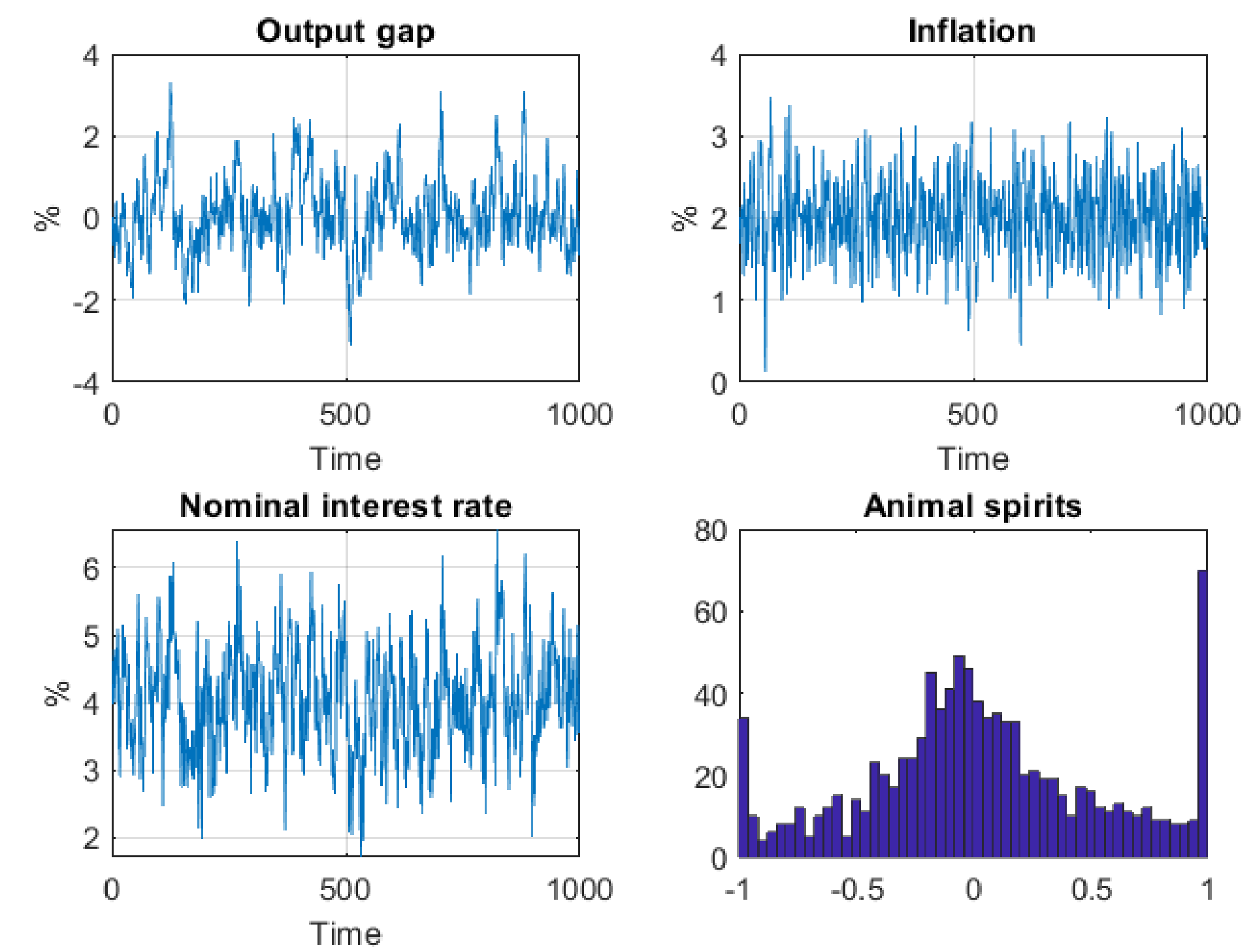
PLT is more prone than IT to lose credibility (extrapolative rule prevails), and at the same time it behaves unstably under the extrapolative rule

➡ divergence

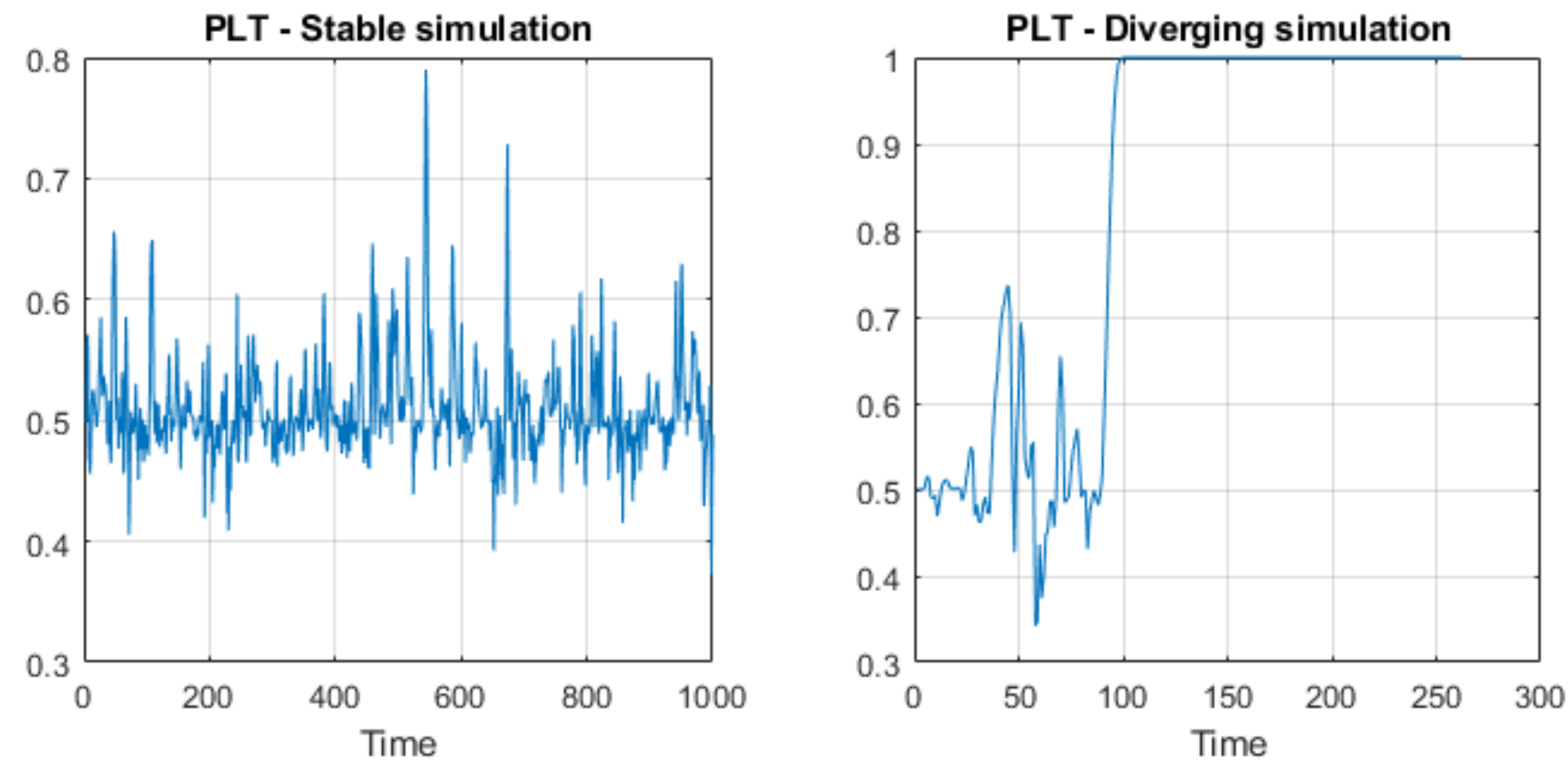
Inflation targeting



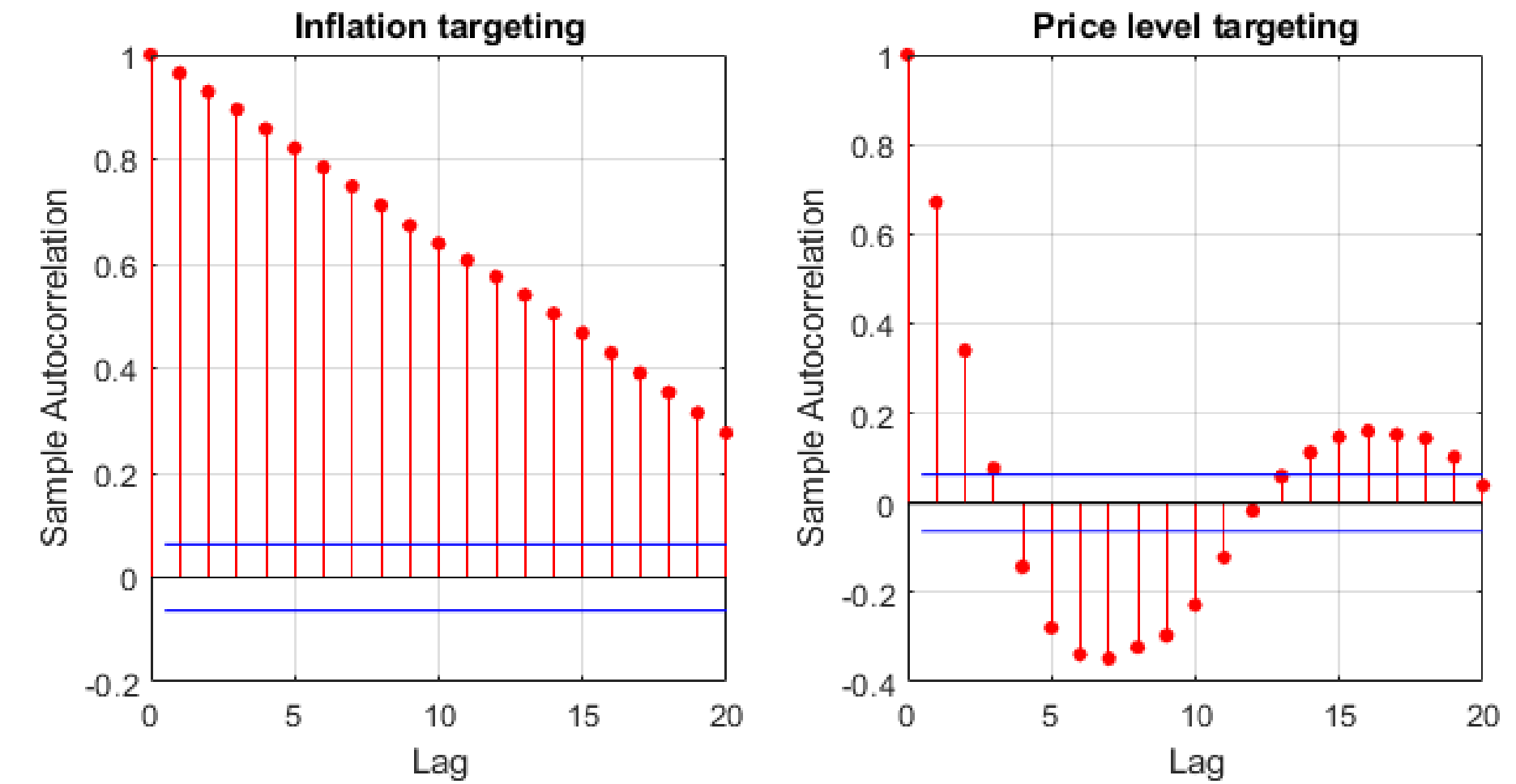
Price level targeting



Share of extrapolative agents



Inflation autocorrelation function



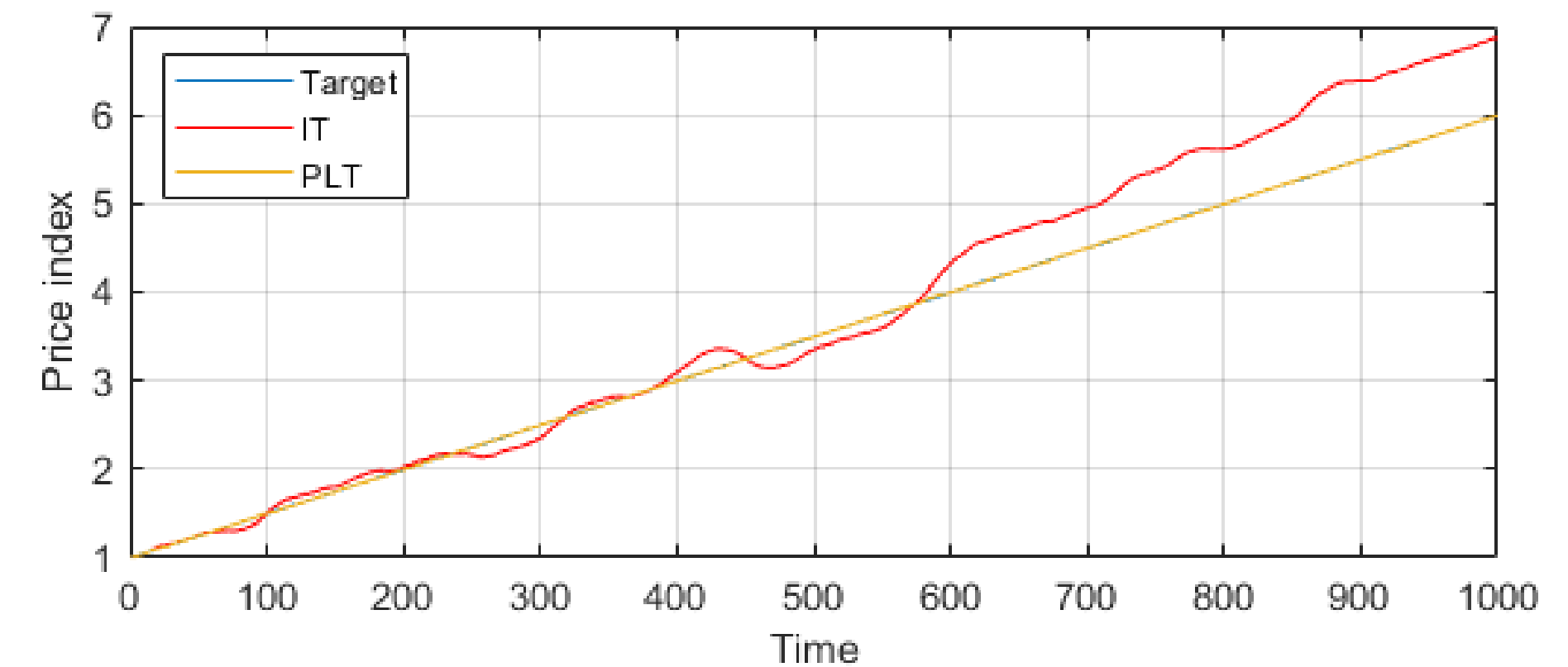
Overview of results

Table 2: Comparison of the Regimes

	IT	PLT
Divergence	0	21.3%
Mean loss (all simulations)	0.41	n/a
Mean loss (stable simulations)	0.39	0.04
Higher loss	78.7%	0%
Standard deviation of inflation (all simulations)	0.018	n/a
Standard deviation of inflation (stable simulations)	0.018	0.005
Standard deviation of the output gap (all simulations)	0.014	n/a
Standard deviation of the output gap (stable simulations)	0.014	0.009

Note: The mean of inflation and that of the output gap are not shown here, as when there are over 1000 simulations they just correspond directly to their equilibrium values in both policy regimes.

Development of price level



5. Conclusion

- PLT outperforms IT under certain specific assumptions (consistent with prevailing literature), but it is prone to divergence in other cases
- IT functions stably and is more robust policy choice (consistent with policymakers' intuition)
- Results in general not sensitive to individual model parameters

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