

Inflation Targeting & Comparison to Other Strategies

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Academic Papers *versus* Central Bankers



theory
assumptions
models
simulations

policy
facts
judgment
decisions

Science *versus* Art

Good Economists and Researchers Build a Bridge Between the Two Camps



**information and
tools for central
bankers**

**important problems
to solve for
researchers**



Starting On the More Familiar Side: Inflation Targeting in Academic Papers

- **loss functions and optimisations:**
 - **Svensson 1996: Inflation Forecast Targeting**
 - **Svensson 2000: Open Economy Inflation Targeting**
- **simple policy rules and simulations:**
 - **Batini, Haldane 1999: Optimal Targeting Horizon, Optimal Degree of Aggressiveness**
 - **Mahadeva, Smidkova 2001: Optimal Speed of Disinflation**

Svensson's World

two-period model:

$$\pi_{t+1} = \pi_t + \alpha_1 \cdot y_t + \alpha_2 \cdot X_t + \varepsilon_{t+1}^\pi$$

$$y_{t+1} = \beta_1 \cdot y_t - \beta_2 \cdot (R_t - \pi_t) + \beta_3 \cdot X_t + \varepsilon_{t+1}^y$$

$$X_{t+1} = \gamma \cdot X_t + \varepsilon_{t+1}^x$$

loss-function of a central bank:

$$L(\pi_t) = 1/2 \cdot (\pi_t - \pi^*)^2$$

optimisation problem for year t :

$$\min E_t \delta^2 L(\pi_{t+2})$$

$$R_t$$

Policy, Forecast & Inflation In Svensson's World

F.O.C.: $\pi_{t+2/t} = \pi^*$

two-year inflation forecast:

$$\pi_{t+2/t} = a_1 \cdot \pi_t + a_2 \cdot y_t + a_3 \cdot x_t - a_4 \cdot R_t$$

a_i derived during optimisation

optimal reaction function:

$$R_t = \pi_t + b_1 \cdot (\pi_t - \pi^*) + b_2 \cdot y_t + b_3 \cdot x_t$$

b_i derived during optimisation

actual inflation in time t+2:

$$\pi_{t+2} = \pi^* + \varepsilon^{\pi}_{t+1} + \varepsilon^{\pi}_{t+2} + \alpha_1 \cdot \varepsilon^y_{t+1} + \alpha_2 \cdot \varepsilon^x_{t+1}$$

Inflation Targeting In Svensson's World

- if policy is optimal, inflation is **NOT** equal to the target in time $t+2$

- there is a forecasting error

$$\pi_{t+2} - \pi^* = \varepsilon^{\pi}_{t+1} + \varepsilon^{\pi}_{t+2} + \alpha_1 \cdot \varepsilon^y_{t+1} + \alpha_2 \cdot \varepsilon^x_{t+1}$$

- observed deviations are due to the shocks (not necessarily due to a policy errors) !

- inflation forecast becomes an intermediate goal (*forecast* inside the loss function), and hence it is *inflation-forecast targeting*

$$L(\pi_{t+2/t}) = 1/2 \cdot (\pi_{t+2/t} - \pi^*)^2$$

Batini&Haldane's World

model:

$$\pi_{t+1} = \pi_t + \alpha_1 \cdot y_t + \alpha_2 \cdot X_t + \varepsilon_{t+1}^{\pi}$$

$$y_{t+1} = \beta_1 \cdot y_t - \beta_2 \cdot (R_t - \pi_t) + \beta_3 \cdot X_t + \varepsilon_{t+1}^y$$

$$X_{t+1} = \gamma \cdot X_t + \varepsilon_{t+1}^x$$

simple policy rule:

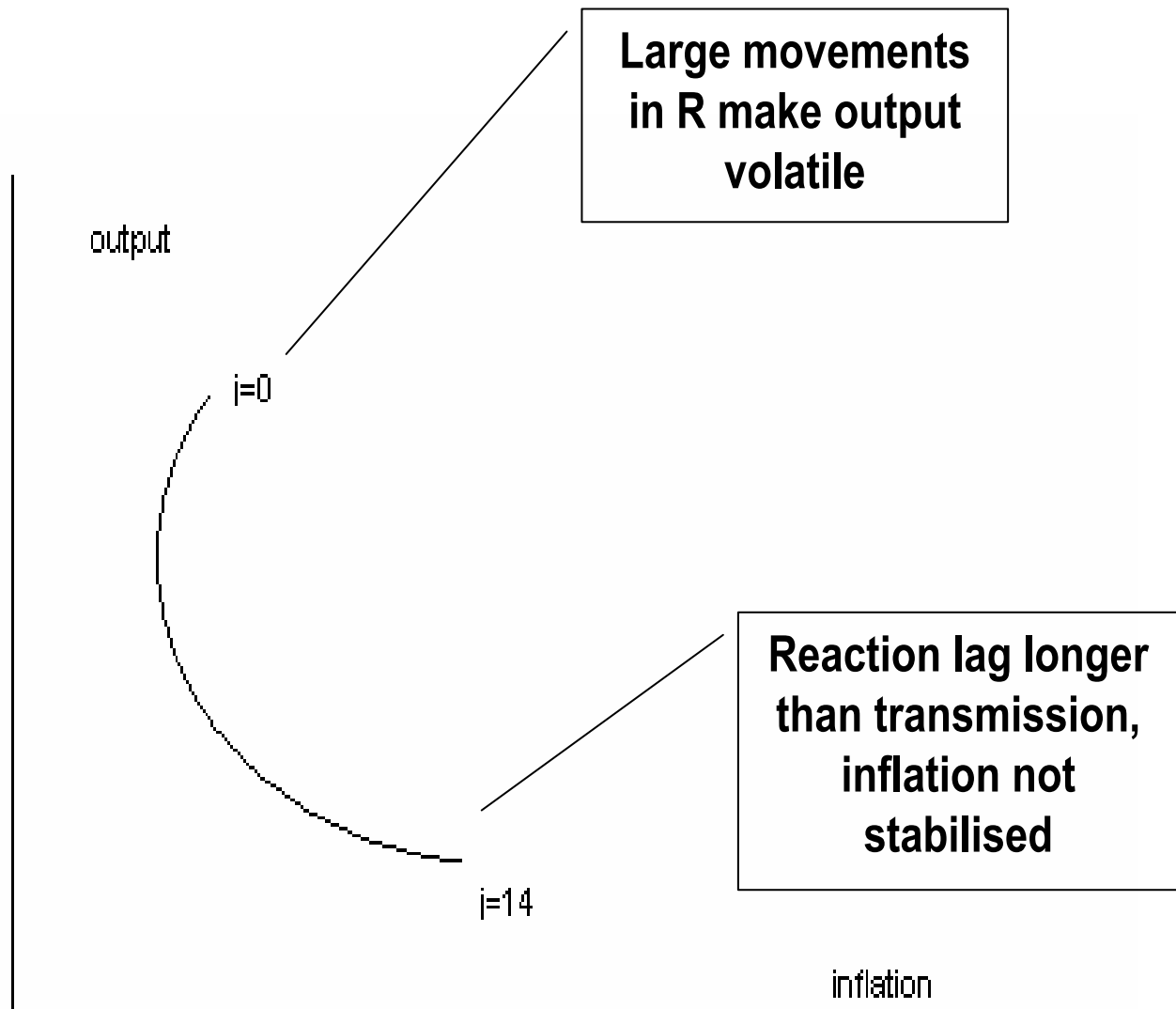
$$R_{t+1} = R_t + \alpha \cdot (\pi_{t+j/t+1} - \pi^*)$$

policy frontiers obtained from two simulation exercises:

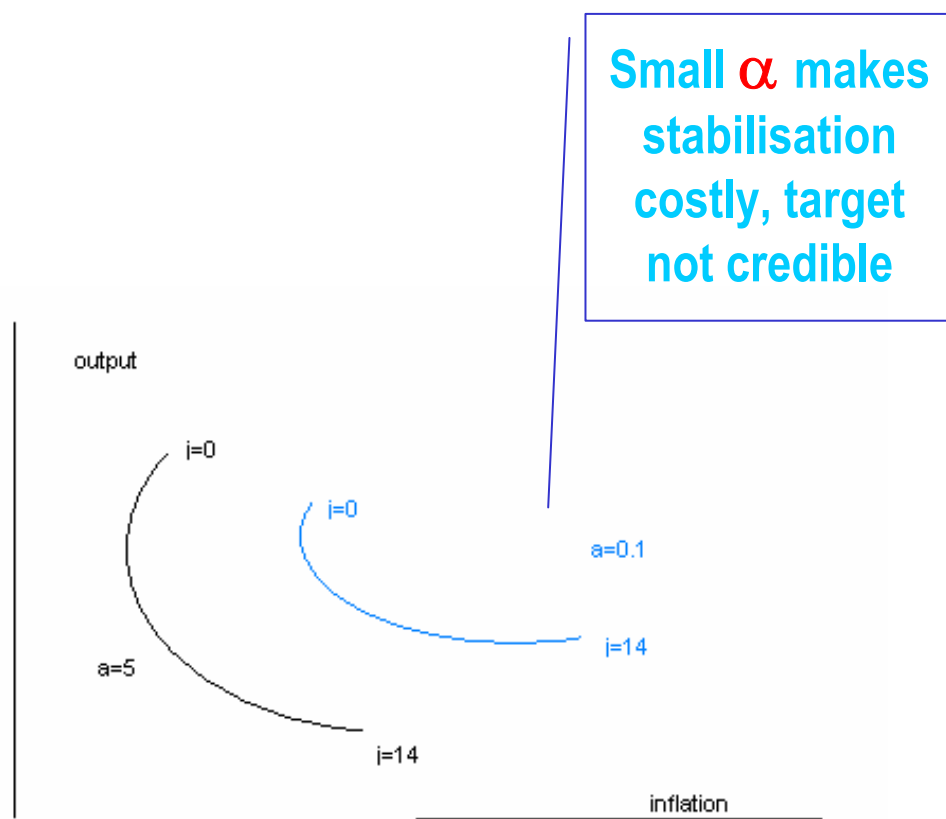
changing the parameters α and j

- j : 0...16 (quarters)
- α : 0.1...5

Policy Frontier j In Batini&Haldane's World



Policy Frontier α In Batini&Haldane's World



Inflation Targeting In Batini&Haldane's World

- what is the optimum time horizon? (how much forward-looking should a central bank be?): **2 years ahead ($j = 12$ quarters) for UK**
- what is the optimum degree of aggressiveness ? (how much should a central bank change interest rates?): **try to hit the target fast (α high) for UK**

Variations of the Basic Inflation Targeting Set-Up

	Loss function
Pure inflation targeting	$L(\pi_t) = 1/2 \cdot (\pi_t - \pi_t^*)^2$
Flexible inflation targeting	$L(\pi_t) = 1/2 \cdot ((\pi_t - \pi_t^*)^2 + \lambda \cdot y_t^2)$
Open economy inflation targeting	$L(\pi_t) = 1/2 \cdot ((\pi_t - \pi_t^*)^2 + \lambda \cdot x_t^2)$

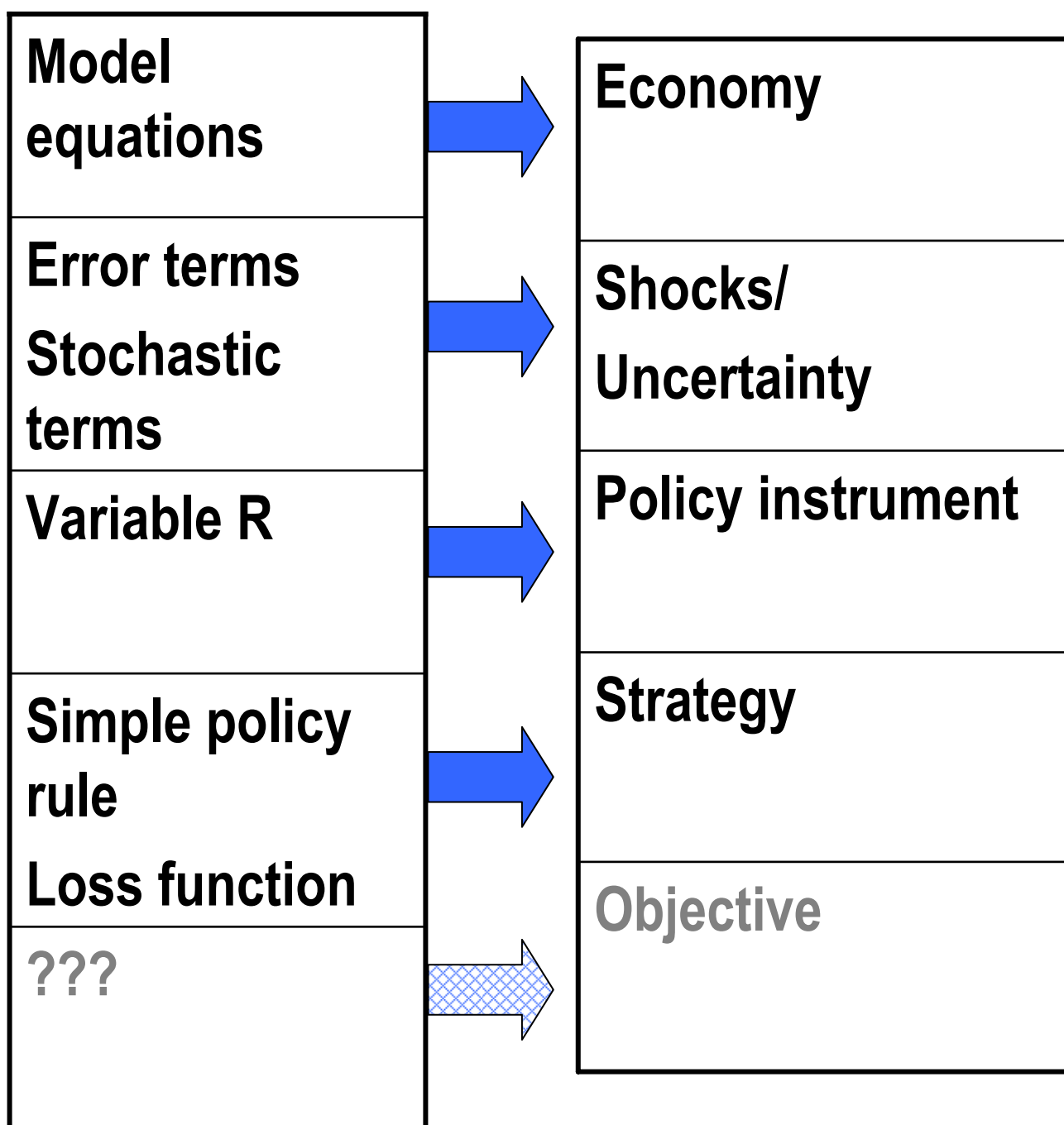
*optimal policy rules obtained by
minimizing these loss functions subject
to model equations*

Other Strategies In Models

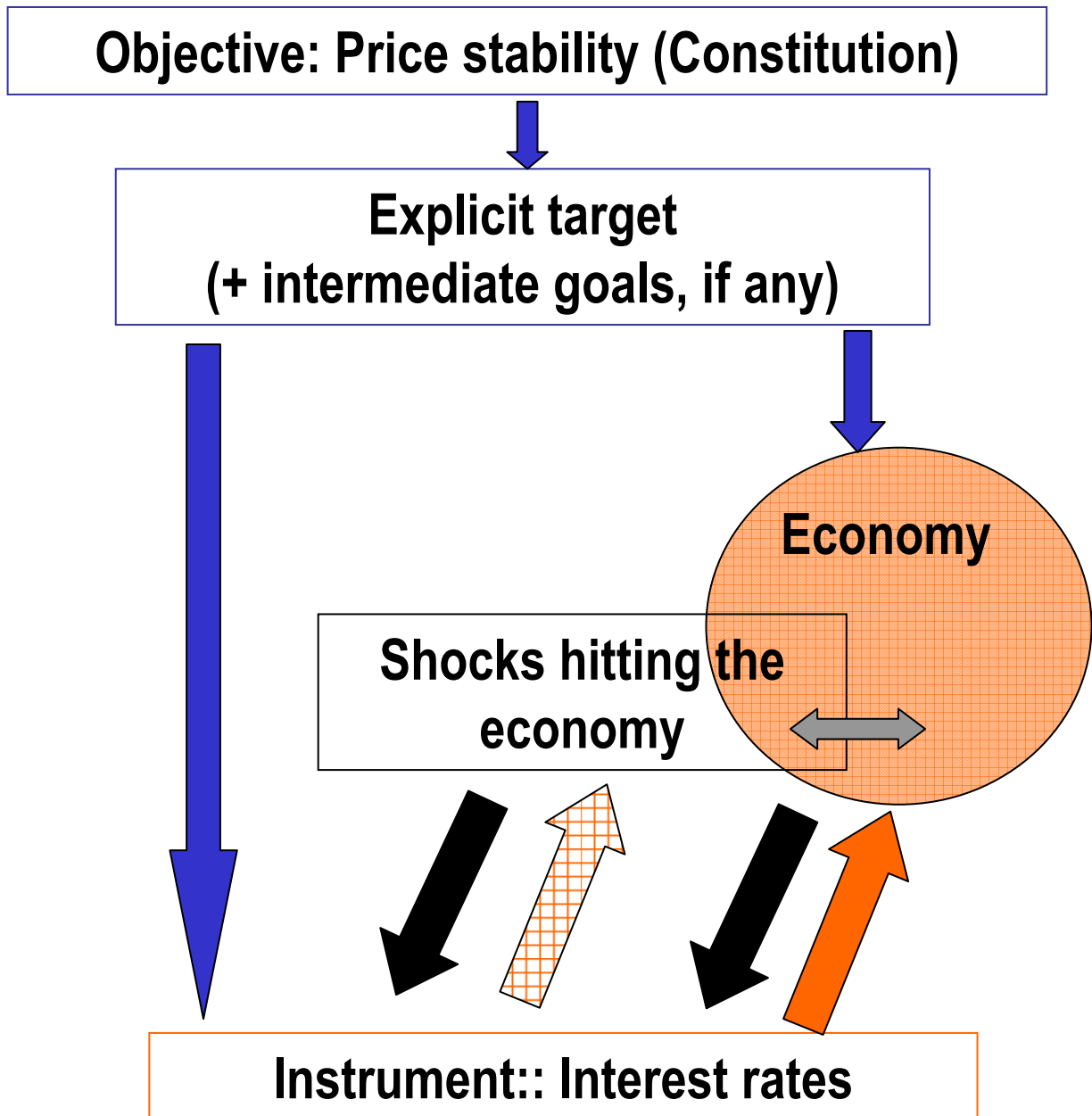
	Simple policy rules
Money targeting	$R_{t+1} = R_t + \alpha \cdot (\Delta m_{t+1} - \Delta m^*_{t+1})$
EX rate targeting	$R_{t+1} = R_t + \alpha \cdot (x_{t+1} - x^*_{t+1})$
Just do it	$R_{t+1} = R_t + a \cdot y_{t+1} + b \cdot \pi_{t+1}$ <i>Taylor rule</i>
Inflation targeting	$R_{t+1} = R_t + \alpha \cdot (\pi_{t+j/t+1} - \pi^*_{t+j})$ <i>In Svensson's world j=2</i>

α represents aggressiveness of monetary policy

Crossing the Bridge to the Other Side



The „Mainstream“ Monetary Policy Strategy



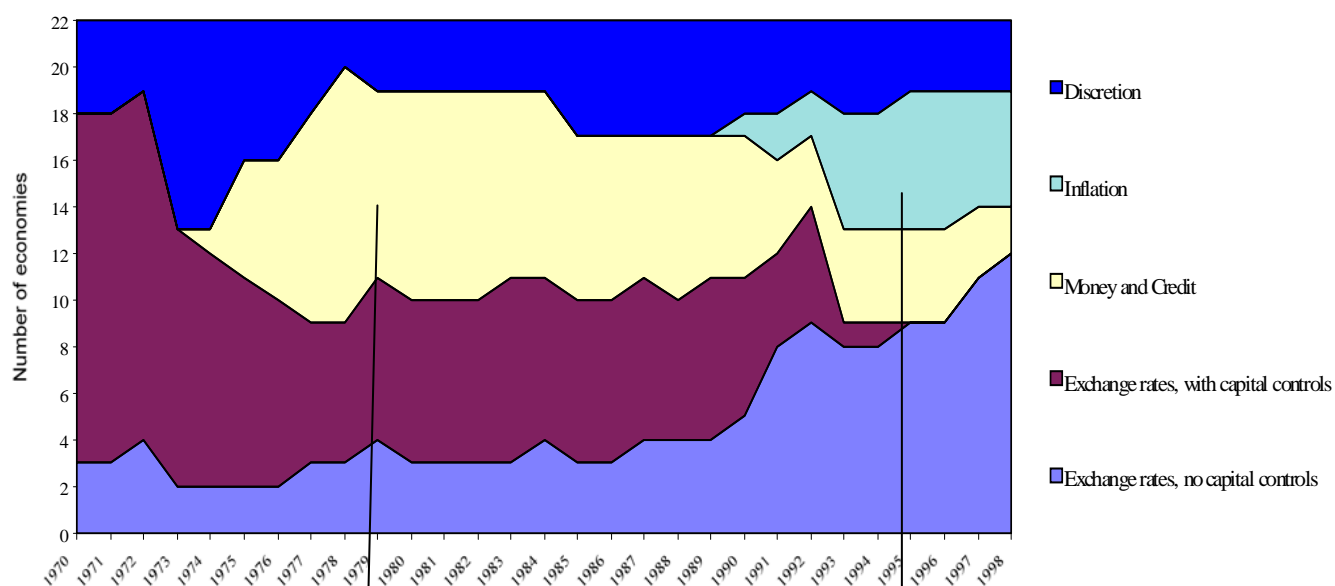
Monetary Policy Strategy: Four Options

Strategy	Example
Money targeting	Bundesbank, Czech Republic in early 1990's
EX rate targeting	Denmark, Czech Republic in early 1990's
Just do it	FED
Inflation targeting	BoE, Czech Republic in late 1990's

Strategies: Developed Countries

CCBS Survey, 1999

Distribution of monetary frameworks in industrialised economies



Source: Cottarelli and Giannini (1997), extended by authors.

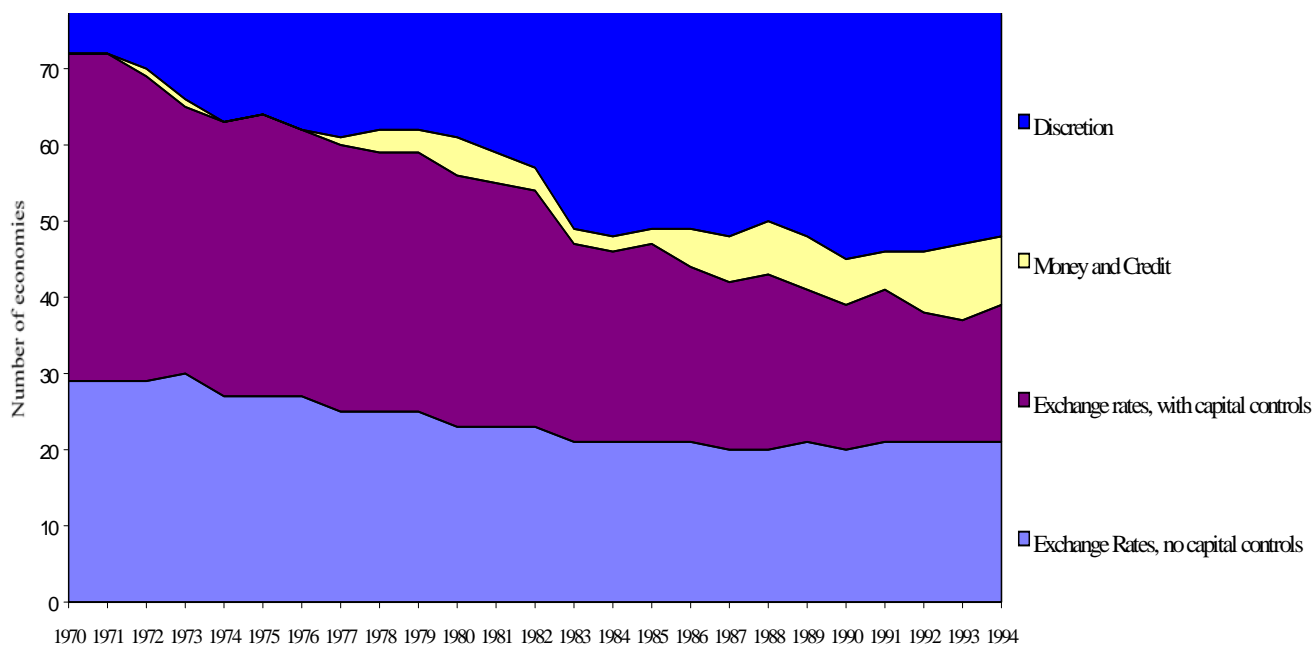
Rise of money targeting

Fall of money targeting and rise of IT

Strategies: Developing Countries

CCBS Survey, 1999

Distribution of Monetary Frameworks in Developing Economies



Source: Cottarelli and Giannini (1997), extended by authors.

Comparing the Four Strategies

	Objective
Money targeting	Price stability (and employment)
EX rate targeting	Stability of a currency (internal and external)
Just do it	Price stability (and employment)
Inflation targeting	Price stability

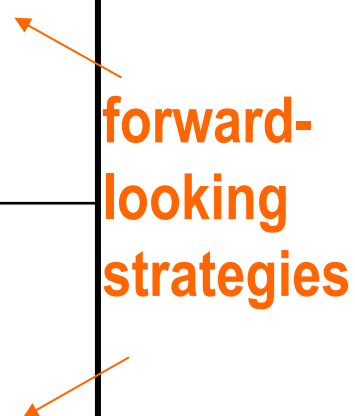
Comparing the Four Strategies

	Explicit Target
Money targeting	In some cases (rate of growth for broad money aggregate)
EX rate targeting	In some cases (fixed rate with zero band)
Just do it	non
Inflation targeting	Inflation target

Comparing the Four Strategies

	Intermediate goal(s)
Money targeting	Narrow money (growth rate)
EX rate targeting	Exchange rate (level or growth rate)
Just do it	Set of indicators (current and forecasted values)
Inflation targeting	Inflation forecast

forward-looking strategies



Comparing the Four Strategies

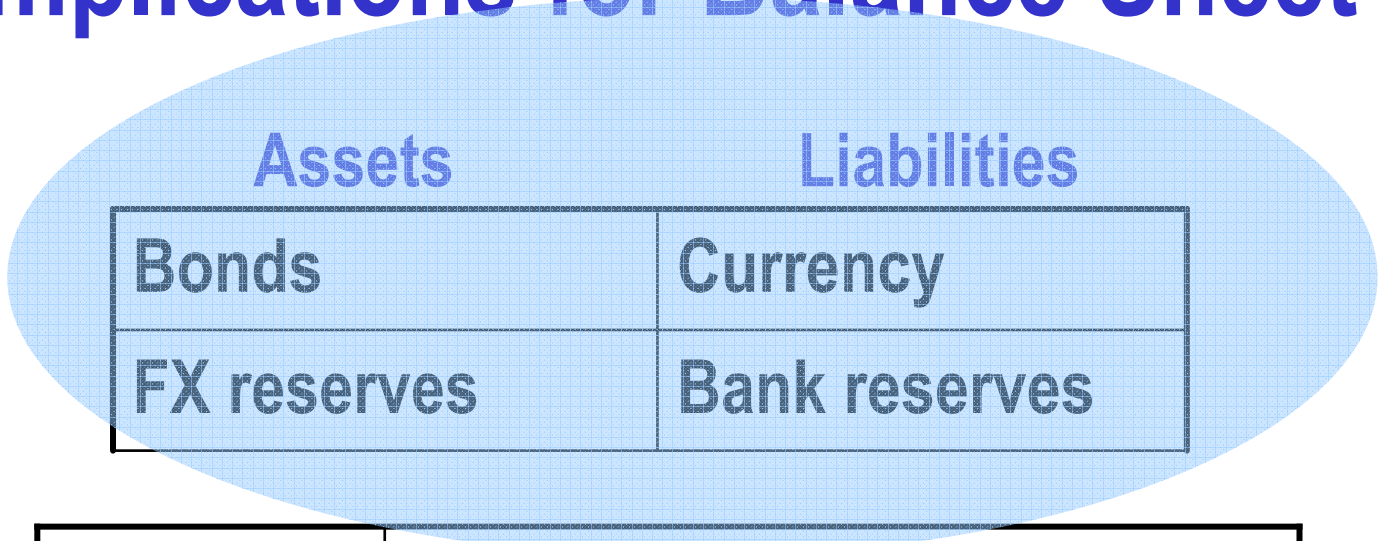
	Instrument(s)
Money targeting	OMO
EX rate targeting	FX interventions
Just do it	Interest rates
Inflation targeting	Interest rates

Conducting the Four Strategies

Assets	Liabilities
Bonds	Currency
FX reserves	Bank reserves

	Important Steps
Money targeting	Set target → buy and sell bonds (issue currency, set reserve requirements) accordingly
EX rate targeting	Set exchange rate → buy and sell FX reserves according to market
Just do it	Set repo rate → buy and sell bonds according to market
Inflation targeting	Set repo rate → buy and sell bonds according to market

Implications for Balance Sheet



	Implications
Money targeting	Balance sheet targeted
EX rate targeting	Balance sheet volatile
Just do it	Balance sheet volatile
Inflation targeting	Balance sheet volatile

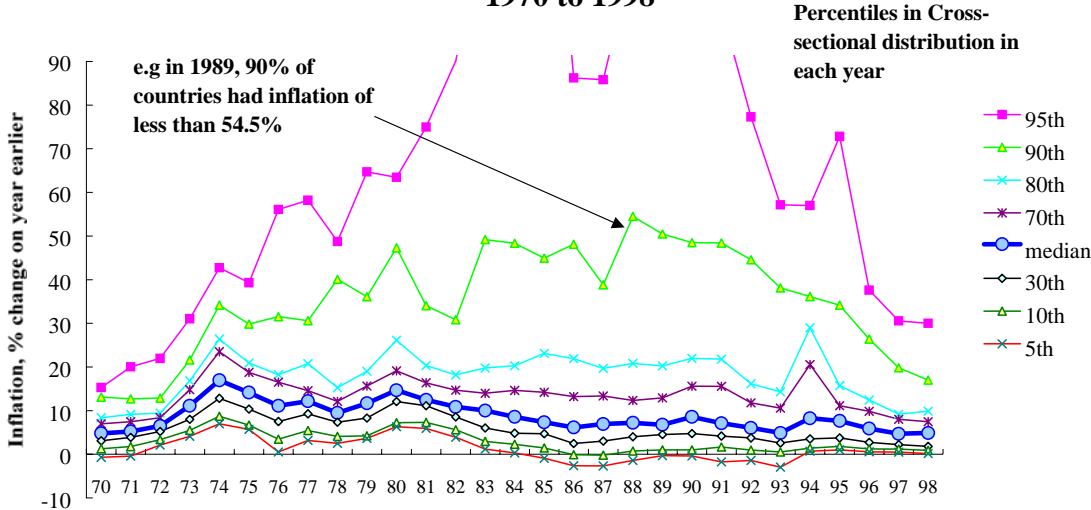
Evaluating the Four Strategies

	+/-
Money targeting	+ Strong link OMO-money - Weak link prices-money
EX rate targeting	+ No know-how required - No flexibility
Just do it	+ Flexibility - Low transparency
Inflation targeting	+ Transparency - Know-how intensive

Living On the Other Side: Central Banker's Problem

infdi98b

**Cross-Sectional distribution of inflation rates in 91 economies,
1970 to 1998**



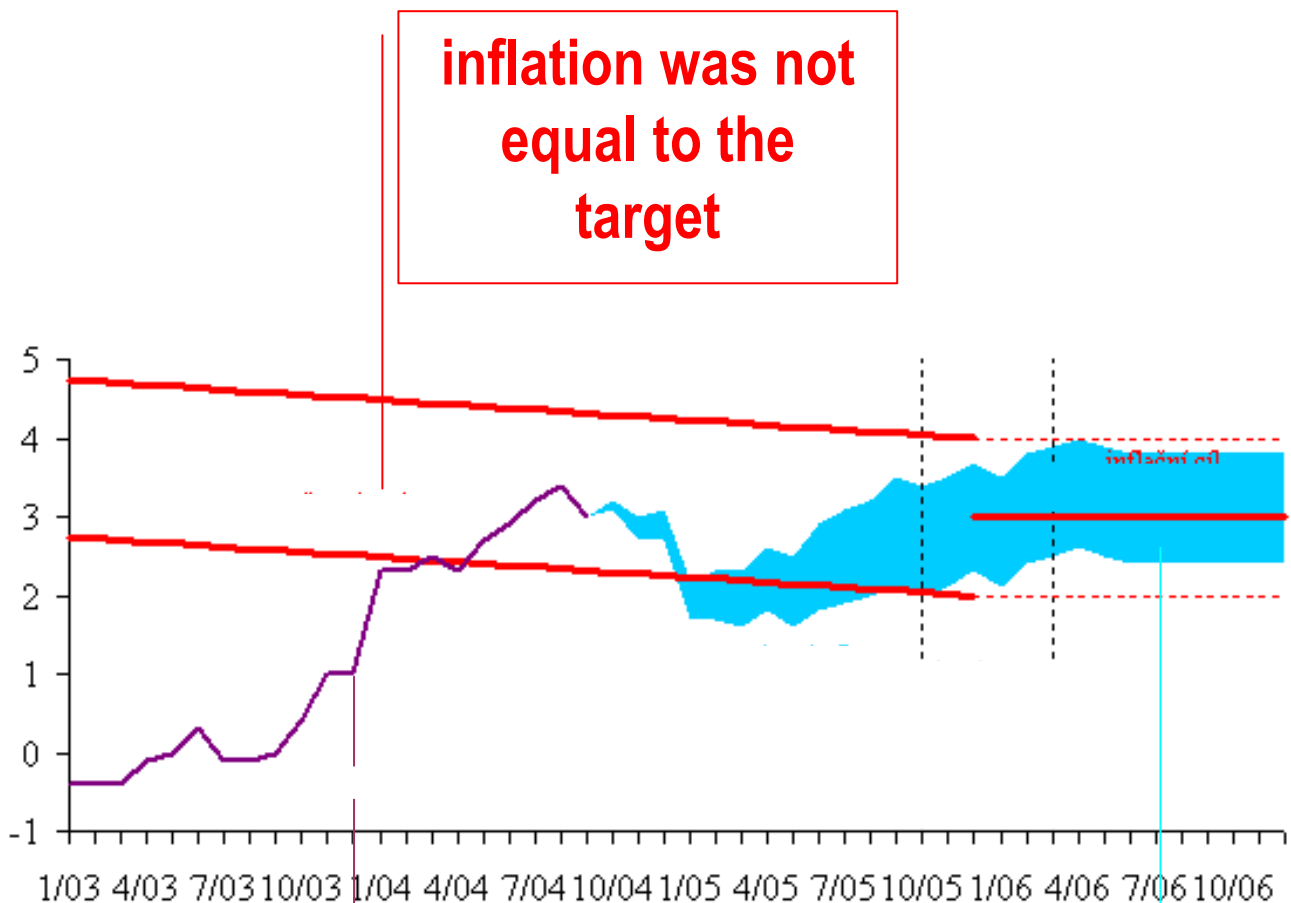
Note: Data taken from 91 developing and industrialised economies that have data in each year from 1970 to 1998

Price Stability: Not So Good Track Record CCBS Survey, 1999

Designing Inflation Targeting

- **Preconditions**
 - well-developed financial markets
 - good forecasting know-how
- **Target specification**
 - time horizon
 - interval versus point
 - which price index (asset prices?)
- **Institutional framework**
 - Independence
 - Accountability
 - Transparency
- **Decision-Making Framework**
 - Which Forecasting models
 - Who Owns The Forecast
 - Who Decides About Interest Rates
- **Caveats**
 - ex ante caveats
 - ex post explanations

IT: The Czech Experience



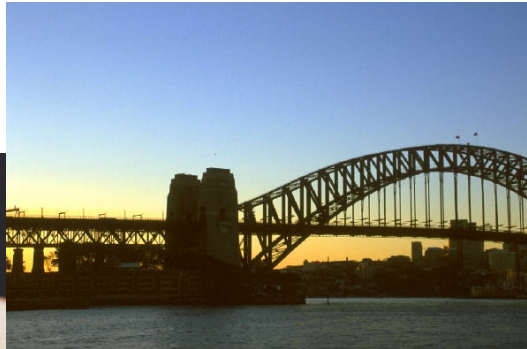
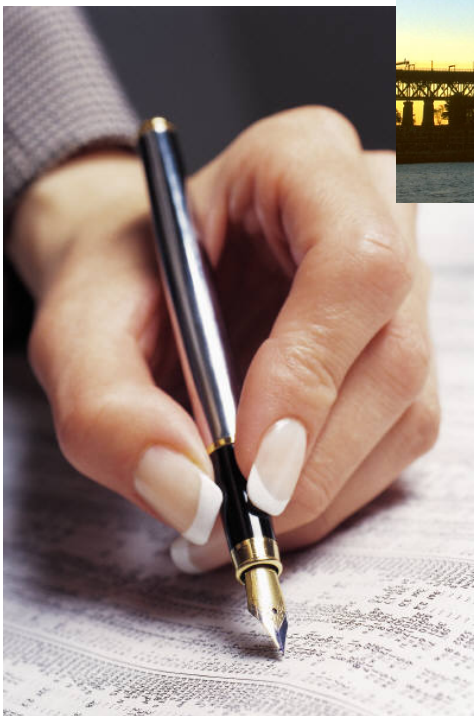
CPI inflation deviated from the target due to an external shock

inflation forecast is equal to the target in the horizon of the most effective transmission of monetary policy

Major Differences Between The Two Sides

Models Simple, results model-dependent	Economy Complex, model- universal
Stochastic terms Normally distributed	Uncertainty Difficult to represent (not M)
Variable R One or few R for the whole model	Policy instrument Transmission matters: different Rs
Simple policy rule Loss function Point target One central banker Model is his own Knows horizon No caveats	Strategy Interval target More bankers vote Model is not theirs Do not know horizon precisely Use of caveats

What Have They Learnt from Each Other Recently?



**how to work with more models than one (robust control)
how to work with other distributions (Bayesian fancharts)**

normally distributed shocks are not good representation of uncertainty (reviving Knight)

References

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- Mahadeva L., Šmídková K. (2001) *What is the Optimal Rate of Disinflation to Be Targeted in the Czech Economy?* Prague economic papers, Vol X, No: 2.
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