

# **Shocks, Structures or Monetary Policy? The Euro Area and US After 2001**

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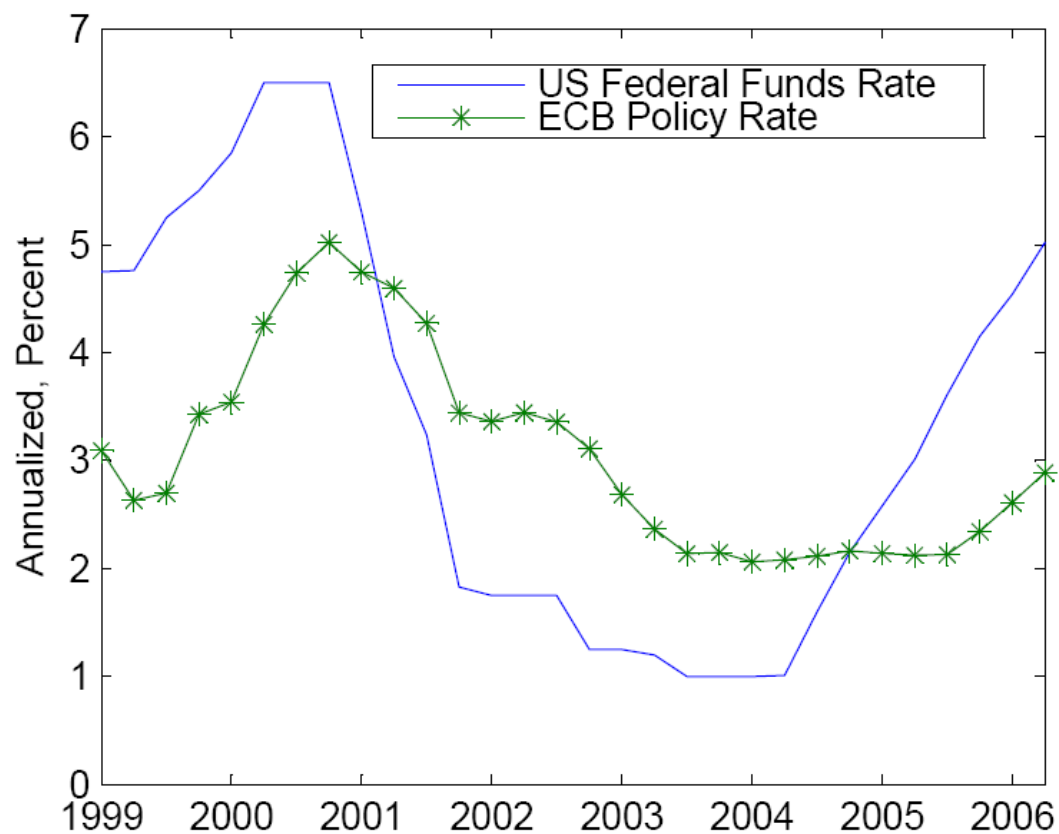
**CEMLA Monetary Policy Meeting**

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The views expressed are those of the authors only

# Motivation: 'Too Little, Too Late?'

- ◆ During loosening cycle 550 bp cut in US and 275 bp cut in EA



# Motivation: 'Too Little, Too Late?'

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- ◆ Critics argue:
  - ECB did 'too little, too late'
  - Thus, EA economy remained weaker for longer
  - Fed spared economy from deeper recession and led to fast recovery

# Shocks, Structure, Policy

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- ◆ Misleading to focus on number and size of policy moves
- ◆ Need to consider:
  - Nature and size of shocks
  - Structure of economy
  - Features of policy (eg. benefits of policy inertia)

# Our Results

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- ◆ ECB policy is more persistent
  - Smaller but persistent moves more stabilizing
- ◆ Shocks are different
  - Timing
  - Nature
- ◆ Economic structures are different
  - Prices and wages more flexible in US

# Methodology

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- ◆ Take a DSGE model
- ◆ Estimate it on EA and US
- ◆ Recover the shocks (and policy/rigidity parameters)
- ◆ Carry out counterfactual:
  - Swapping shocks
  - Swapping structures
  - Swapping policy

# Model

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- ◆ Account for volatility of financial markets
- ◆ Extend the model we used to study Great Depression
- ◆ Core model:
  - Christiano, Eichenbaum and Evans (2005)
- ◆ Banking system:
  - Chari, Christiano and Eichenbaum (1995)
- ◆ Financial frictions:
  - Bernanke, Gertler and Gilchrist (1999)

# Model Overview

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## Households

- **Portfolio (currency, demand deposits, saving deposits, time deposits)**
- Sticky Wages
- Labor supply
- Consumption

## Entrepreneurs

- **Equity + Loans**
- **Ownership of capital stock**
- **Rent out capital services**

## Monetary and Fiscal Authorities

## Firms

- Monopolistic competition
- Sticky prices
- **Financing working capital**

## Capital producers

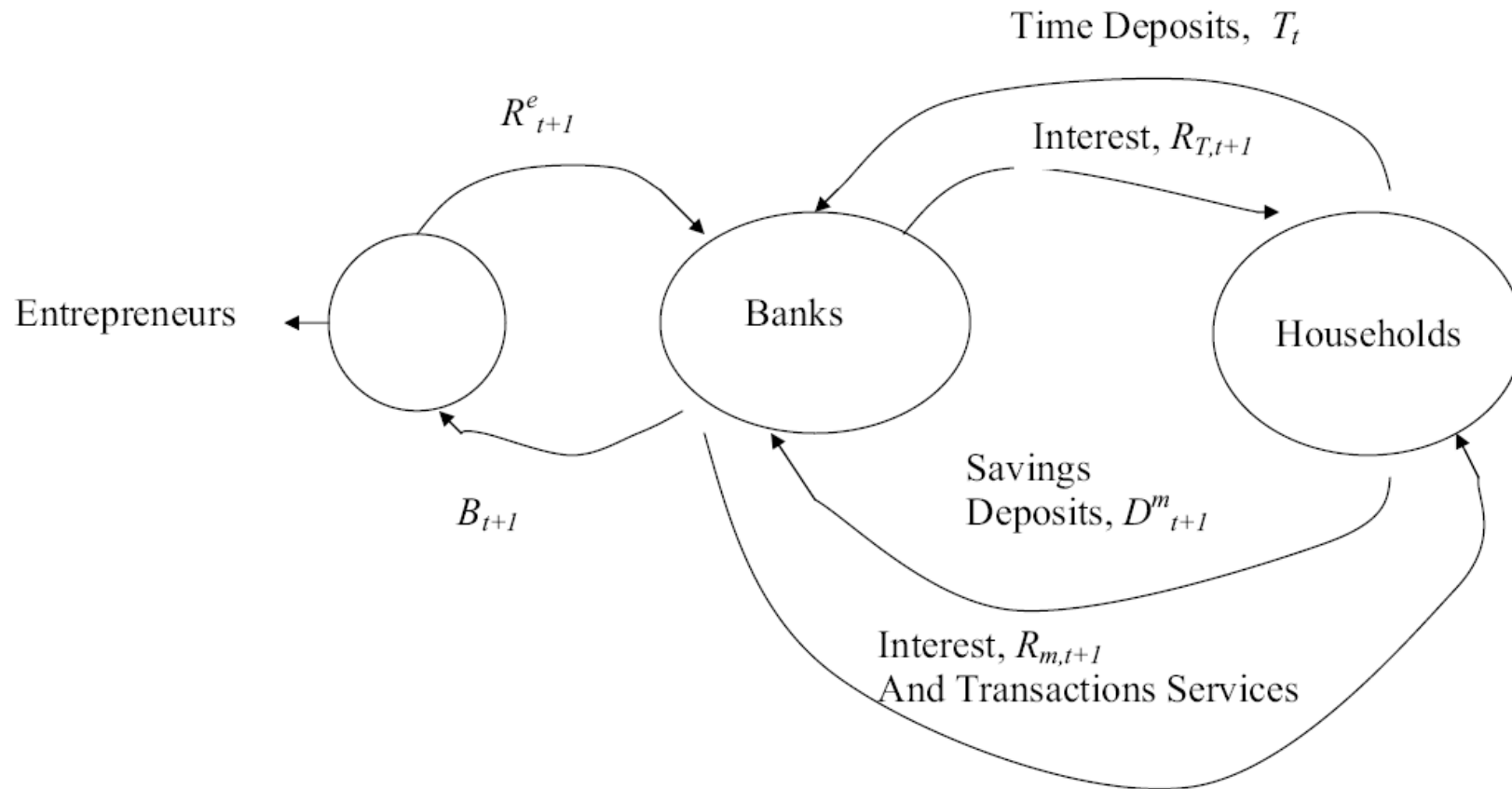
- **Combine old capital with investment**
- **Produce New Capital**

## Banks

- **Intermediate Between Households and Firms & Entrepreneurs**
- **Financial imperfections (agency costs)**

# Financing

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# External Finance Premium

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In the standard model

$$E_t (1 + R_{t+1}^k) = (1 + R_t^e)$$

With financial frictions

$$(1 + R_t^k) = \frac{\frac{q_{t-1}\bar{k}_t - n_t}{q_{t-1}k_t}}{\underbrace{\Gamma(\bar{\omega}_t, \sigma_{t-1}) - \mu G(\bar{\omega}_t, \sigma_{t-1})}_{>1}} (1 + R_t^e)$$

# Banks

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- ◆ Banks are in two businesses:
  - Intermediation of “long-term” loans to Entrepreneurs
  - Extension of working-capital loans to firms and provision of liquidity services (to households/firms)

Short-term Assets	Short-term Liabilities
- Reserves	- Household demand deposits
$A_t$	$D_t^h = A_t$
- Short-term Working Capital Loans	- Firm demand deposits
$S_t^w$	$D_t^f = S_t^w$
<b>"Long-term" loans (to entrepreneurs)</b>	<b>"Long-term" Liabilities (to households)</b>
$B_t$	$T_{t-1}$
	$D_t^m$

# Monetary Policy

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## ◆ Monetary policy reaction function

$$R_t = \rho R_{t-1} + (1 - \rho)\pi_t^* + (1 - \rho) [\pi_t^* + \alpha_\pi (\pi_t - \pi_t^*) + \alpha_y y_t] \\ + (1 - \rho) \left[ \alpha_M \left( \frac{M_{3,t}}{M_{3,t-1}} \right) + \alpha_C \left( \frac{PL_t}{PL_{t-1}} \right) \right] + \varepsilon_t$$

# Indexation

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- ◆ Time-varying inflation objective and indexation parameters are estimated

$$\tilde{\pi}_t = \left(\pi_t^{target}\right)^{\iota_1} \left(\pi_{t-1}\right)^{1-\iota_1}$$

# Estimation

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- ◆ US and EA data
- ◆ Sample 1983-2006
- ◆ 15 variables, ranging from national accounts to stock market, premium, monetary aggregates
- ◆ 15 shocks

# Policy Parameters

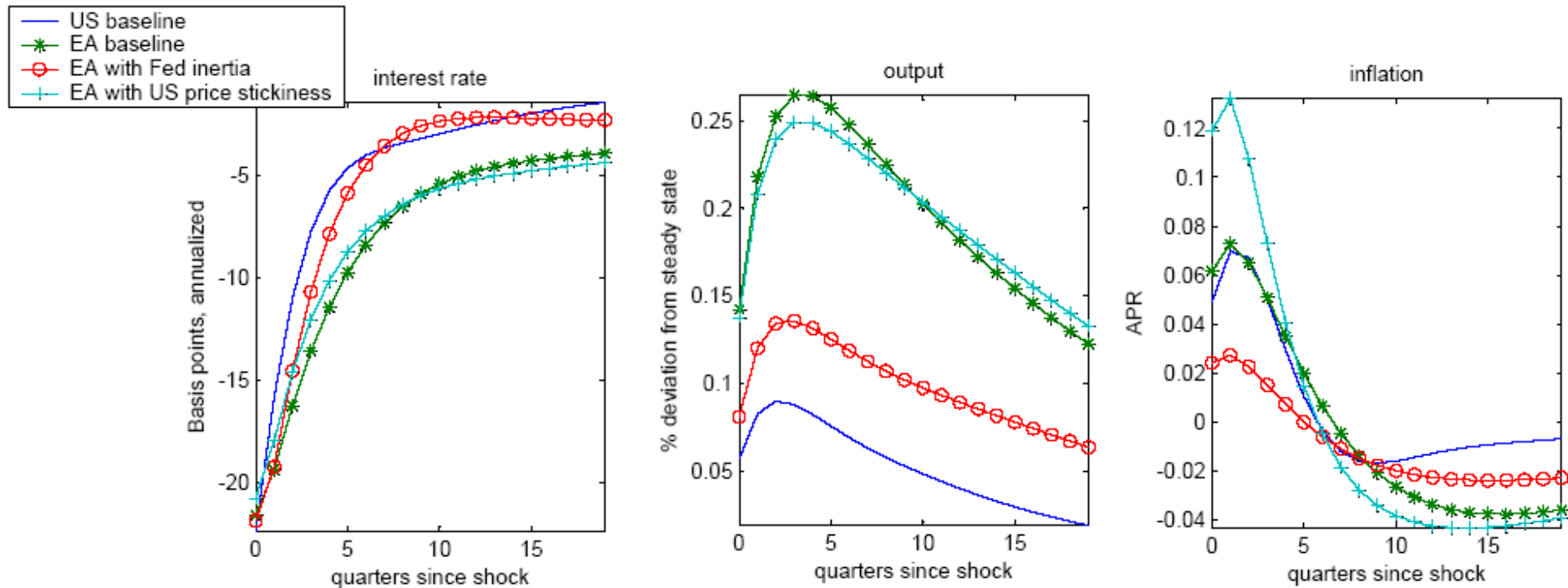
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US:  $\rho_i = 0.82, \alpha_\pi = 1.93, \alpha_y = 0.17, \alpha_M = 0$

EA:  $\rho_i = 0.91, \alpha_\pi = 1.58, \alpha_y = 0.19, \alpha_M = 0.031$

- ◆ ECB more inertial
- ◆ Response to inflation is different but probably overstated (ECB reacts also to money growth)
- ◆ Response to output is similar
- ◆ Inflation objective more volatile in US (see Gurkaynak et al., 2005)

# Dynamic Response to Policy Shock



- ◆ Real activity response in EA is stronger
- ◆ Mainly due to more inertial policy

# Shocks after 2001

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- ◆ Shocks are different in the two areas
  - Timing: almost one year earlier in US
  - Nature: technological shocks are pro-cyclical in EA and counter-cyclical in US
- ◆ Monetary policy shocks: in both areas we find deviations from estimated rule as soon as bad shocks hit the economy

# Data Decomposition

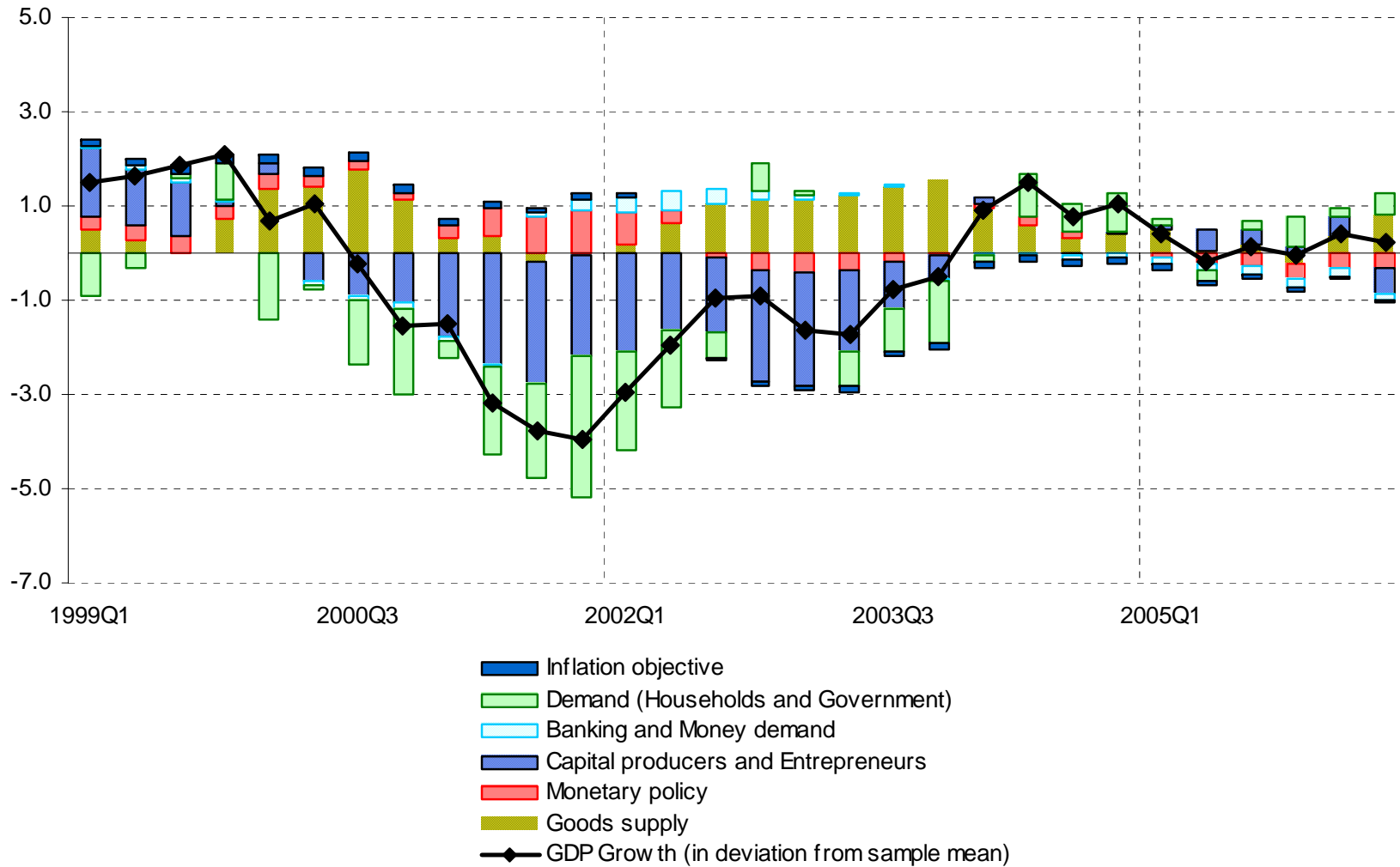
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## ◆ Categories of shocks

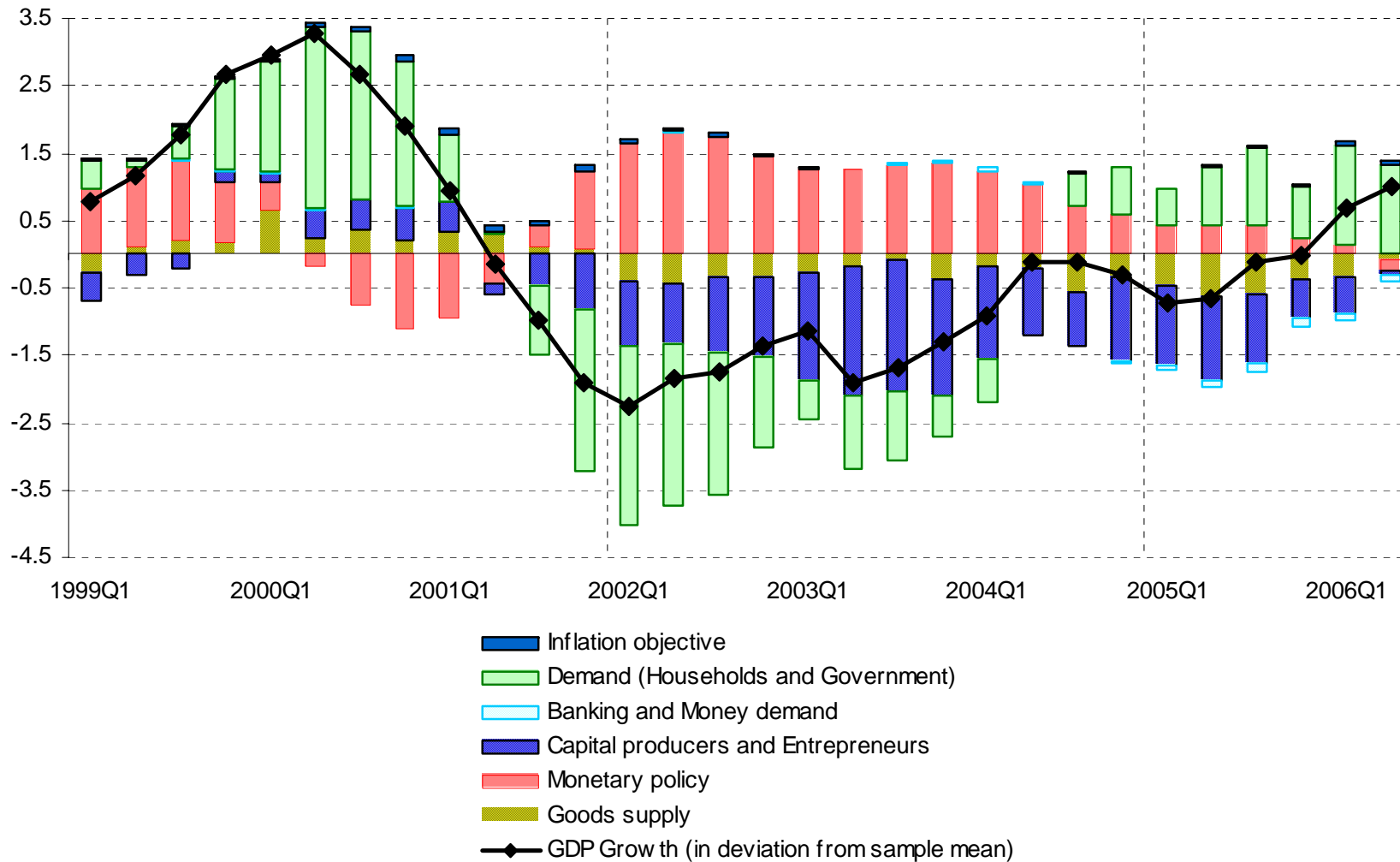
- Goods supply (i.e. productivity shocks)
- Capital producers and entrepreneurs (i.e. capital deepening shocks)
- Demand
- Banking and money demand
- Monetary Policy (transitory deviation from estimated rule)
- Inflation objective

## ◆ Estimated time series of shocks provide additive (due to linearity) decomposition of data

# US GDP Growth Decomposition

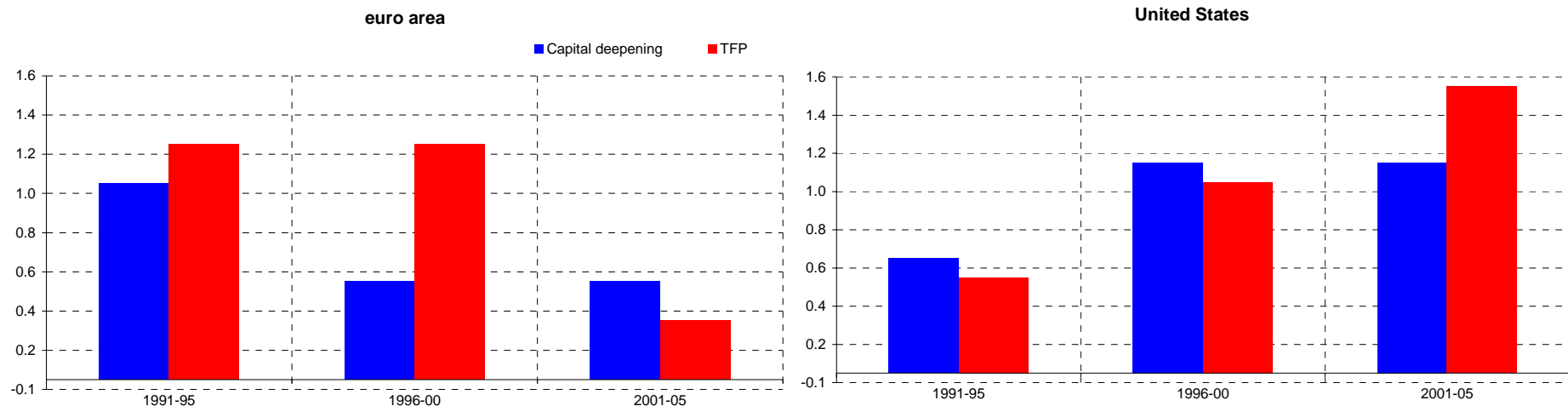


# EA GDP Decomposition



# Supply-Side Developments

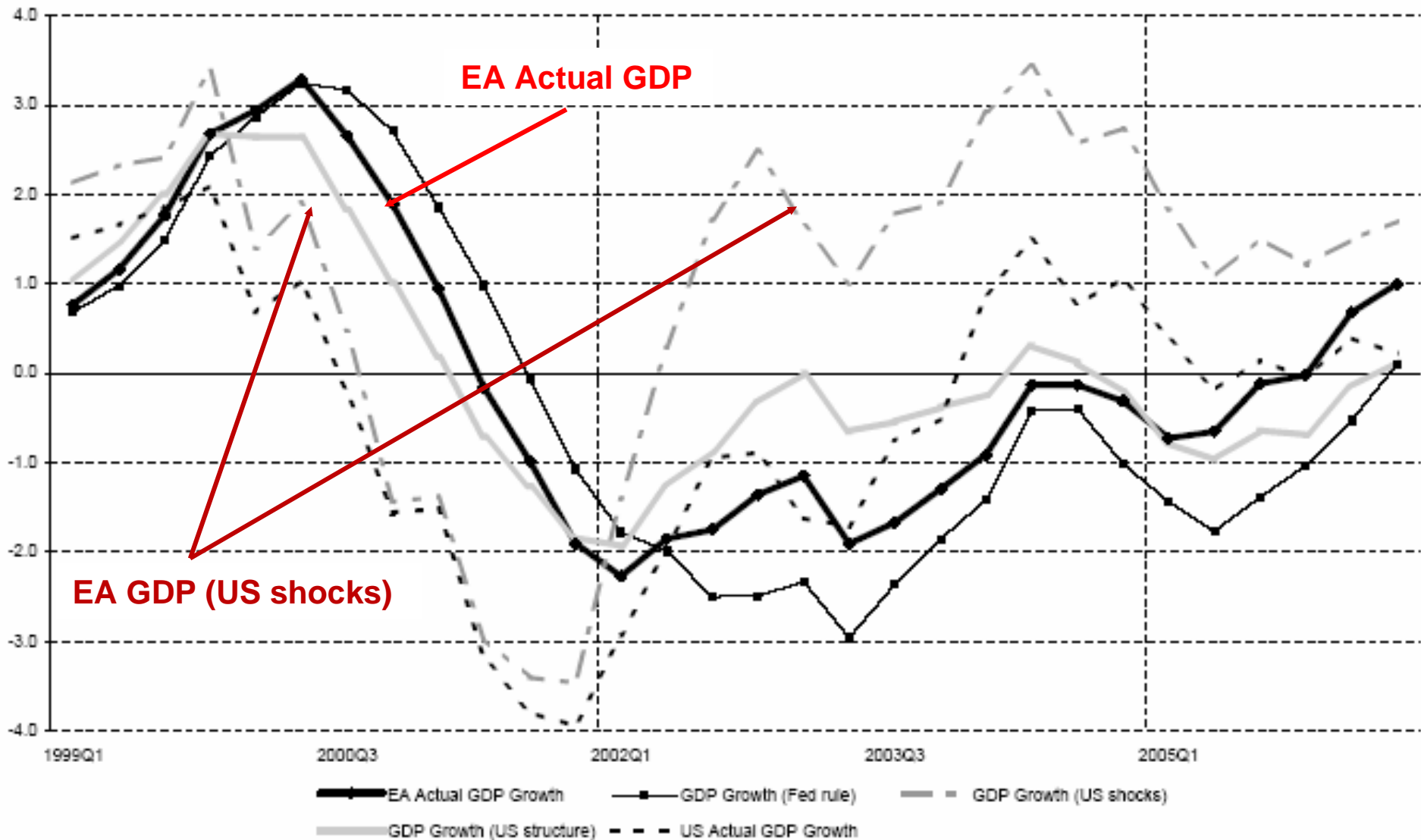
Contribution of capital deepening and TFP to the growth rate of labour productivity



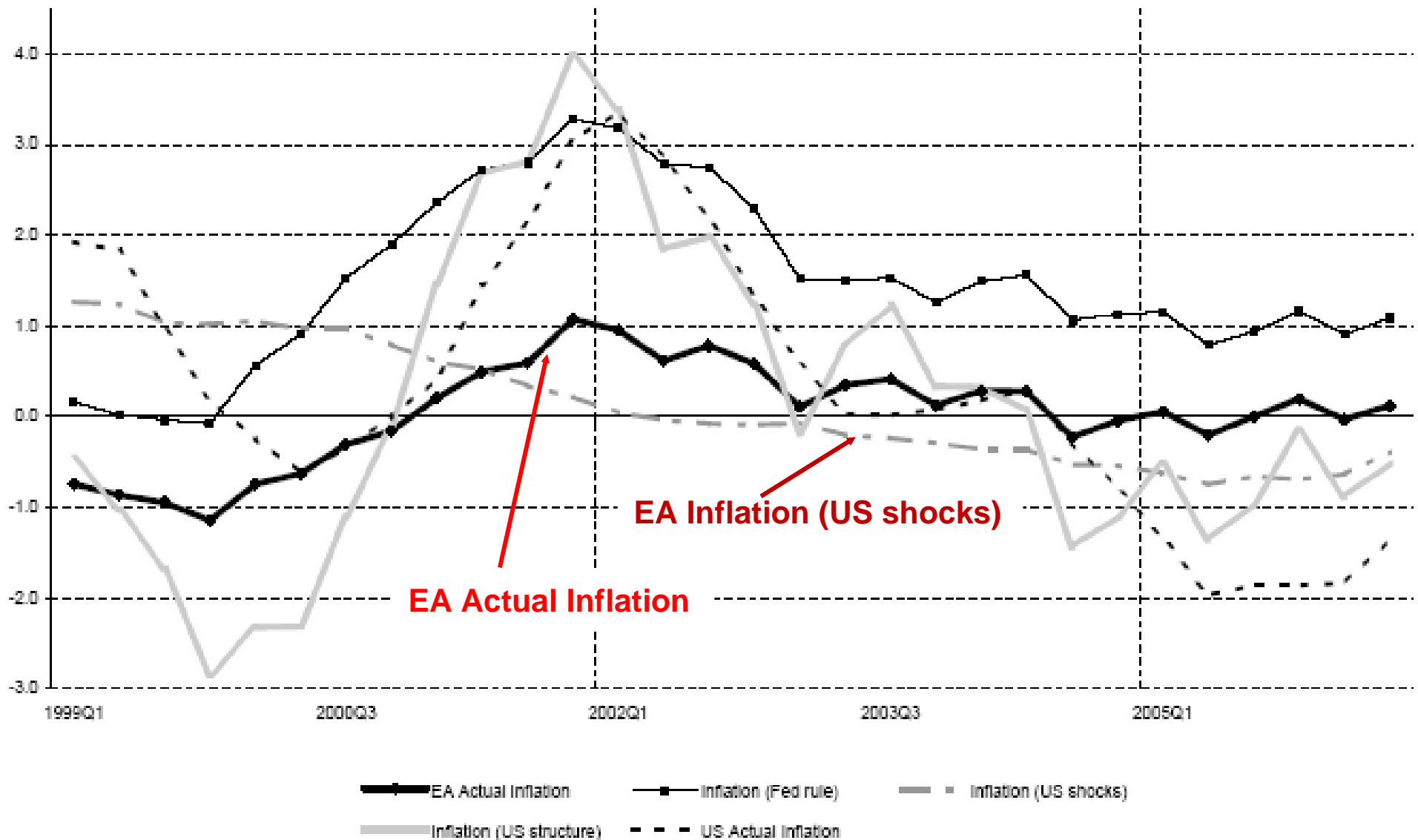
Source: G. Gomez-Salvador, A. Musso, M. Stocker and J. Turunen, "Labour productivity developments in the euro area", ECB Occasional Paper (forthcoming).

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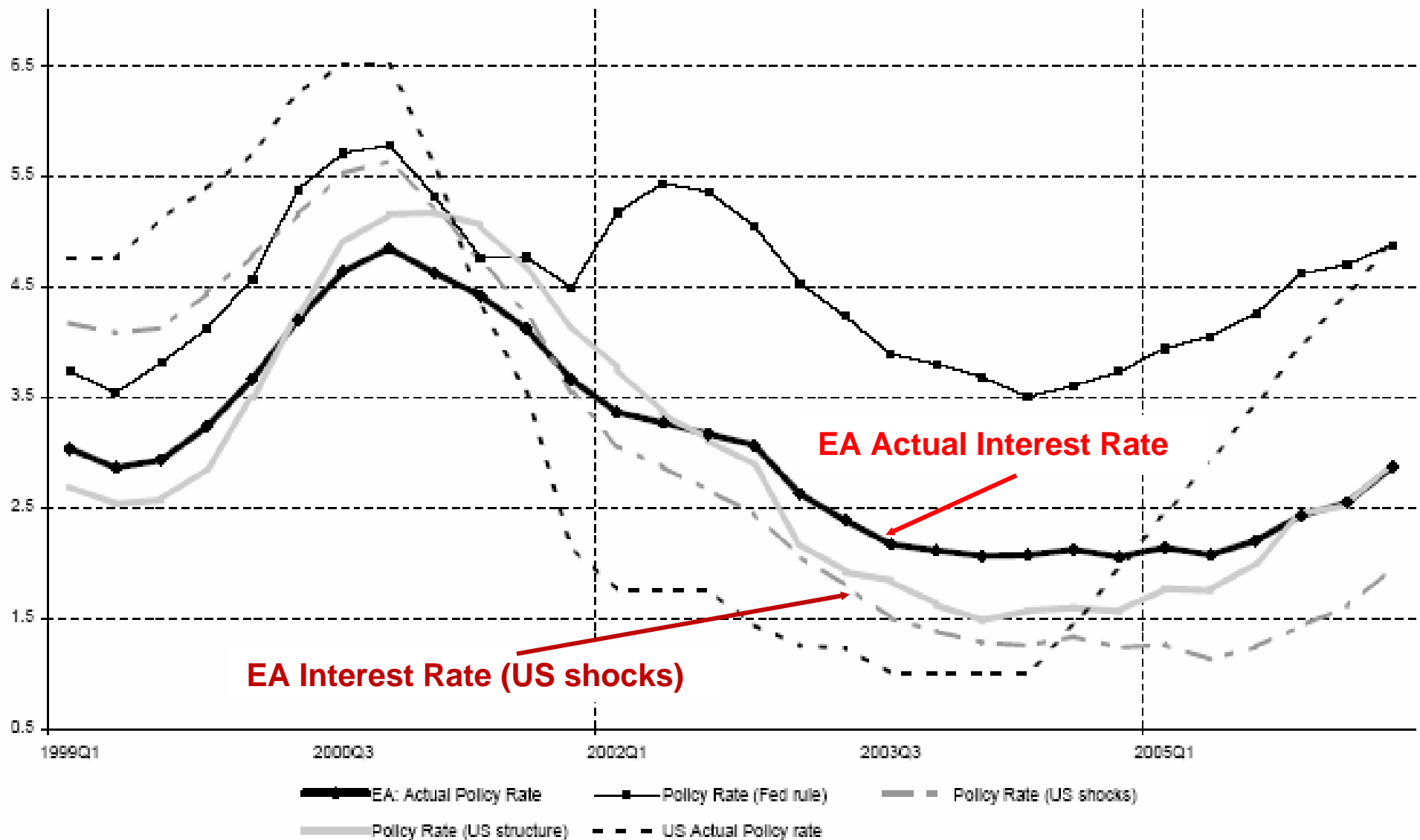
# EA GDP Counterfactual: US Shocks (with exception of policy shocks)



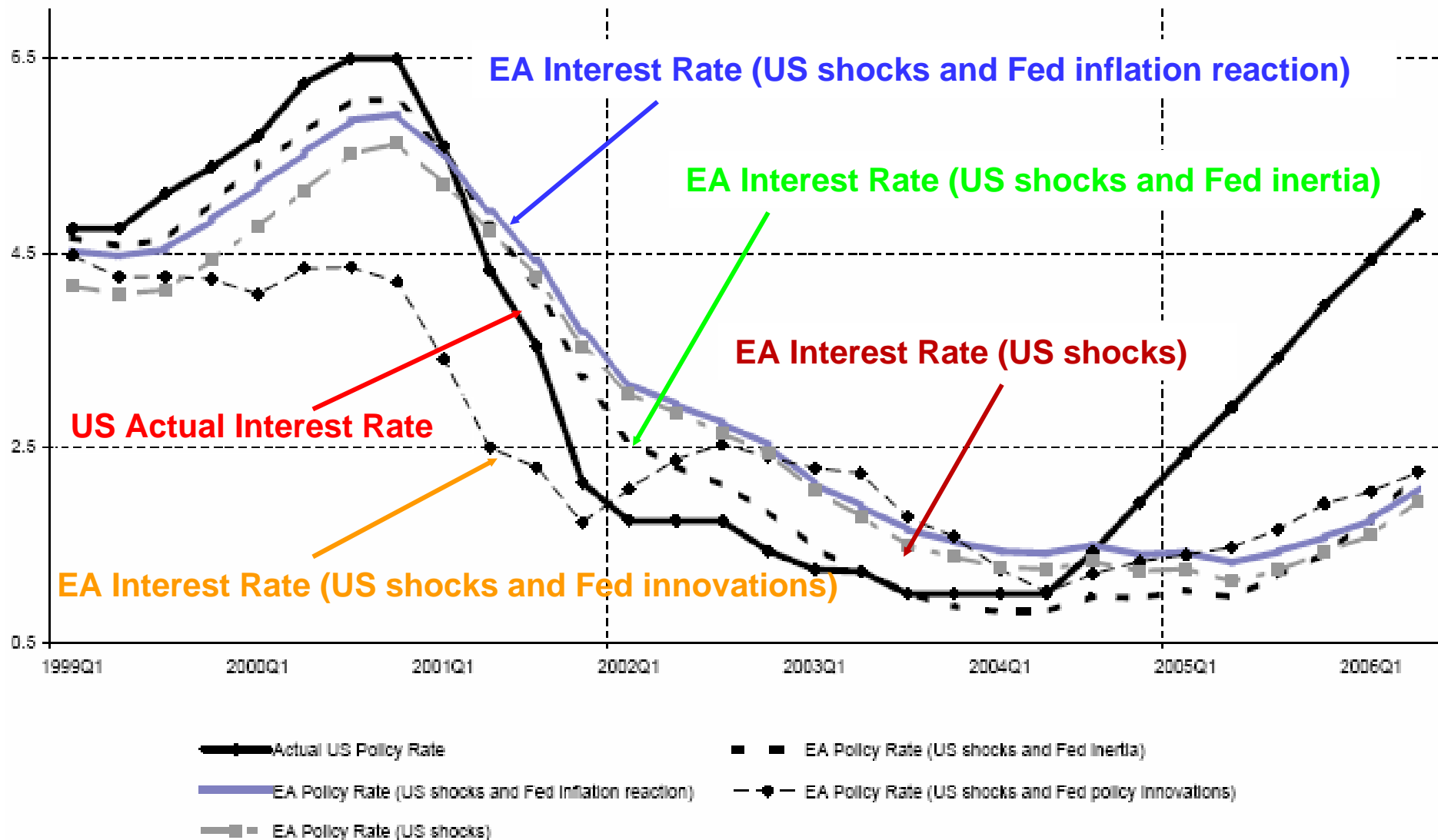
# EA Inflation Counterfactual: US Shocks (with exception of policy shocks)



# EA Interest Rate Counterfactual: US Shocks (with exception of policy shocks)



# EA Interest Rate Counterfactual: US Shocks (with exception of policy shocks). Further Analysis



# EA GDP Counterfactual: US Structure

euro area	Duration of prices = 5.3 quarters	Duration of wages = 5.9 quarters
United States	Duration of prices = 2.7 quarters	Duration of wages = 5.0 quarters

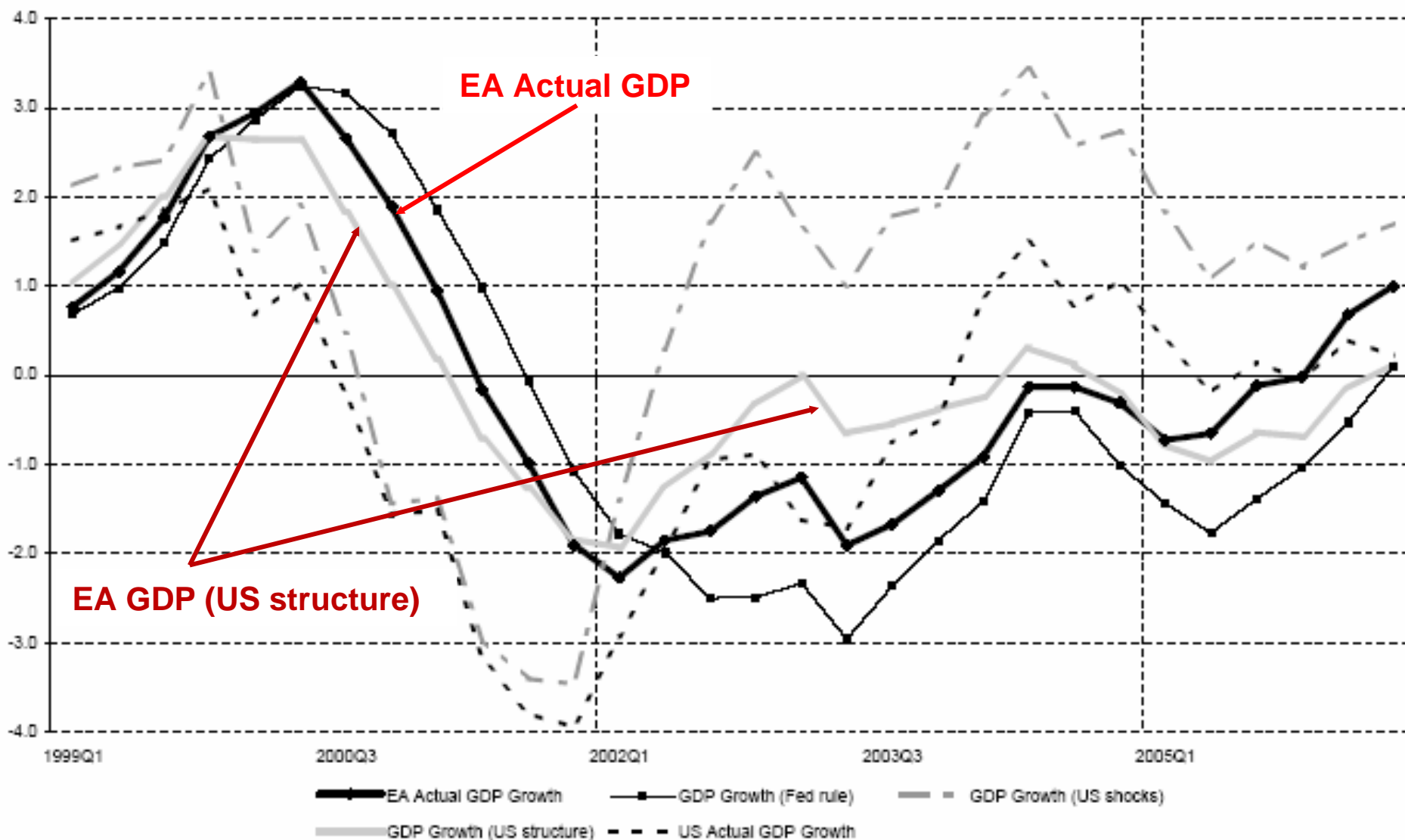
$$\tilde{\pi}_t = (\pi_t^{target})^{\iota_1} (\pi_{t-1})^{1-\iota_1}$$

$$\text{EA} = 0.70$$

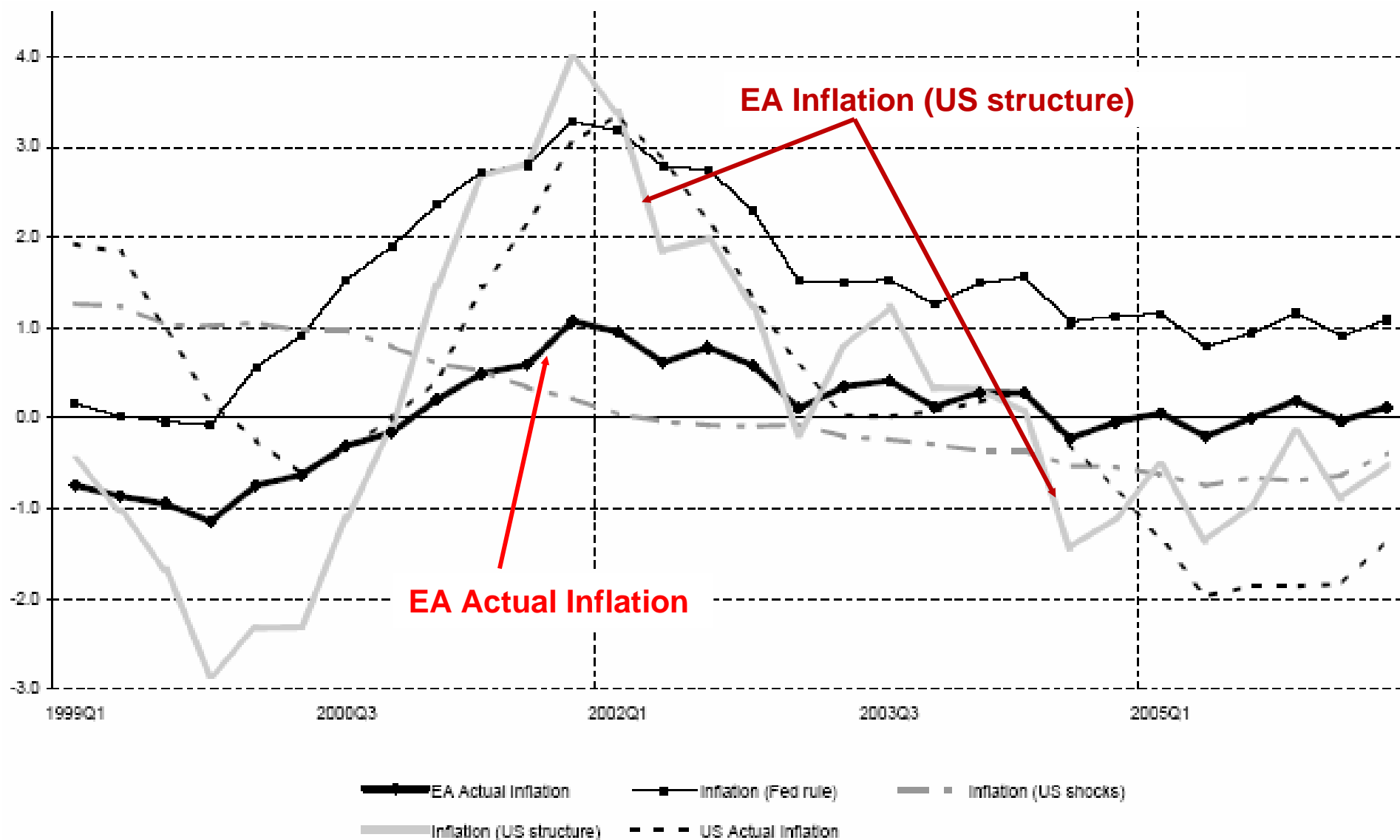
$$\text{US} = 0.16$$

- ◆ Indexation parameters may reflect the fact that ECB provides numerical definition of price stability objective

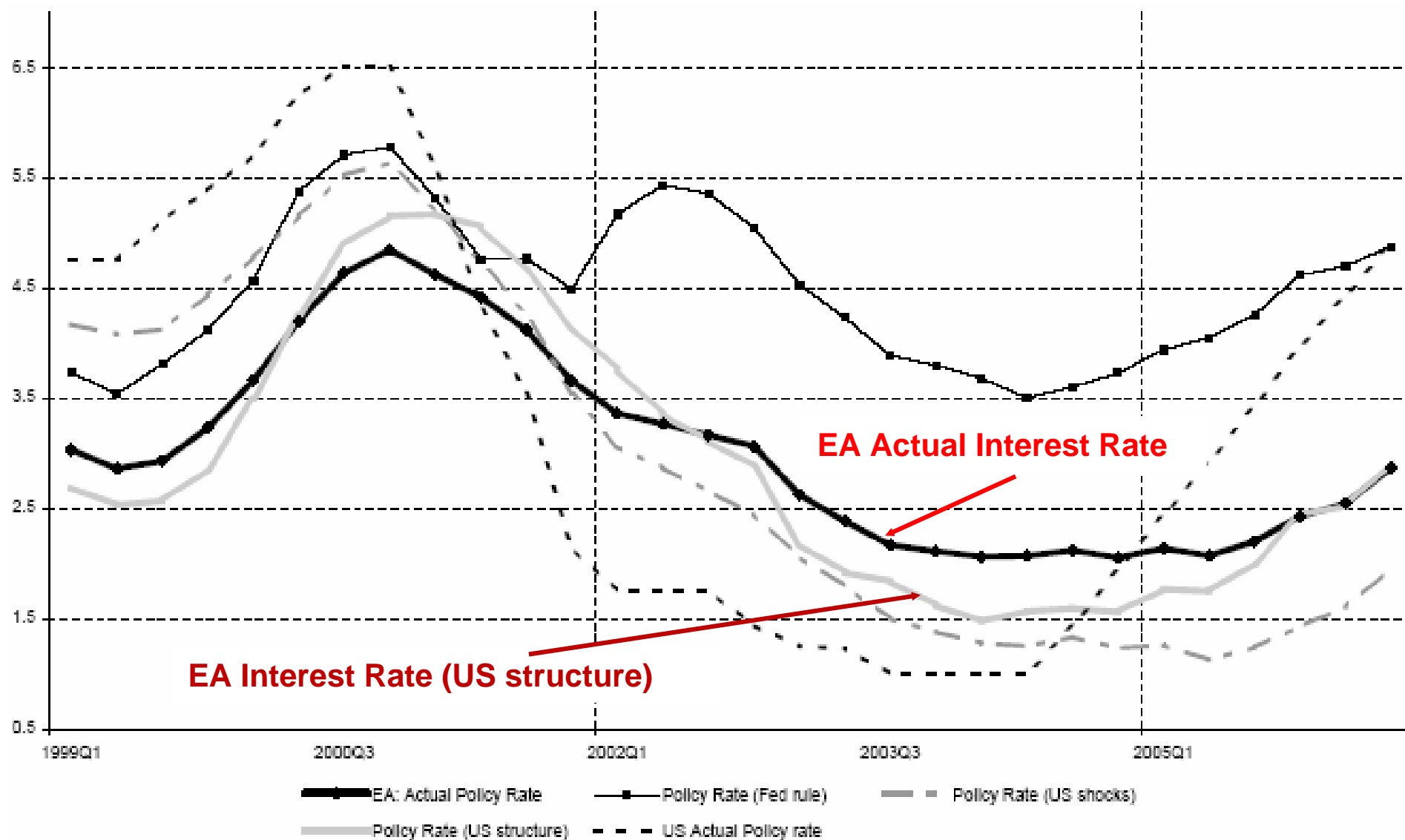
# EA GDP Counterfactual: US Structure



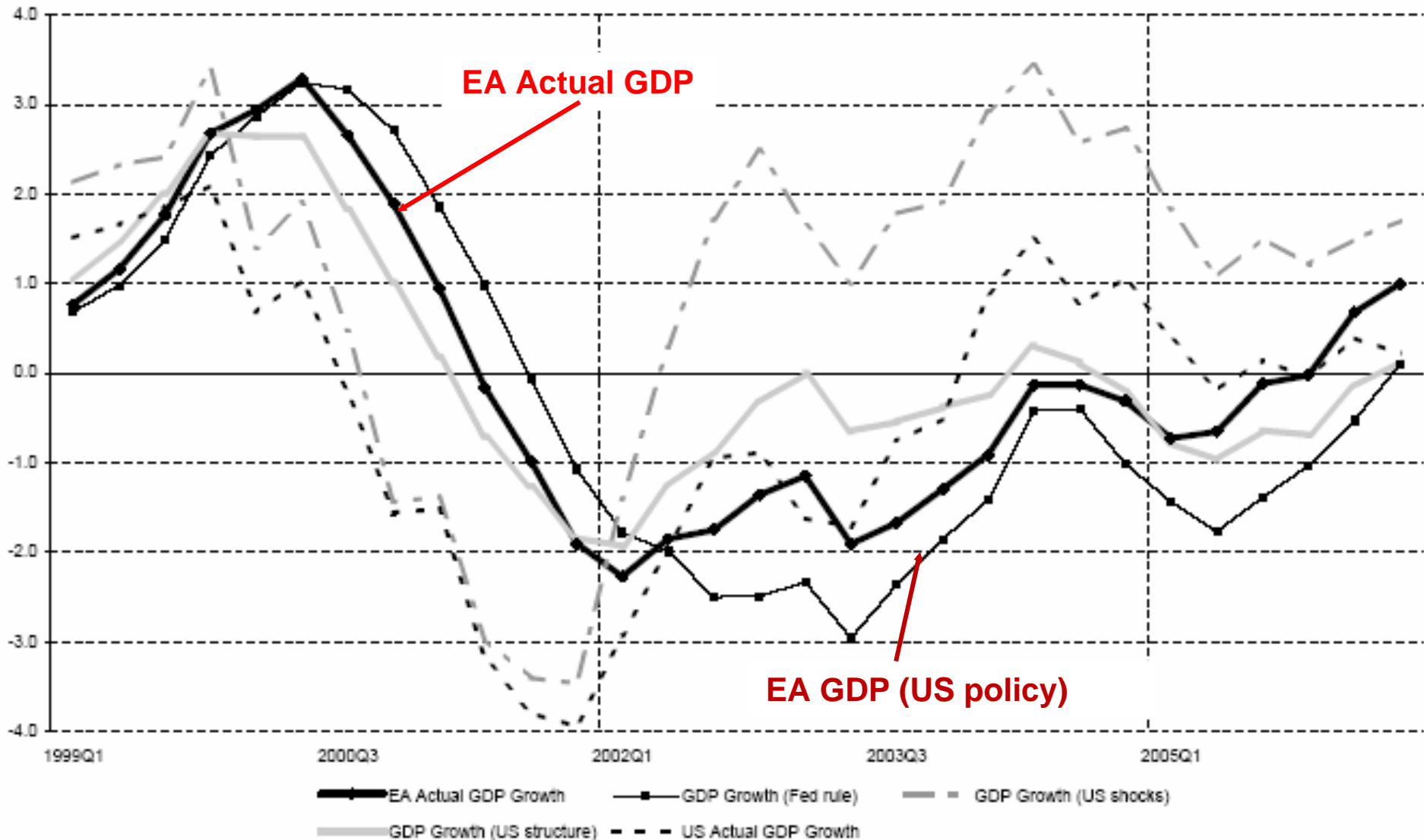
# EA Inflation Counterfactual: US Structure



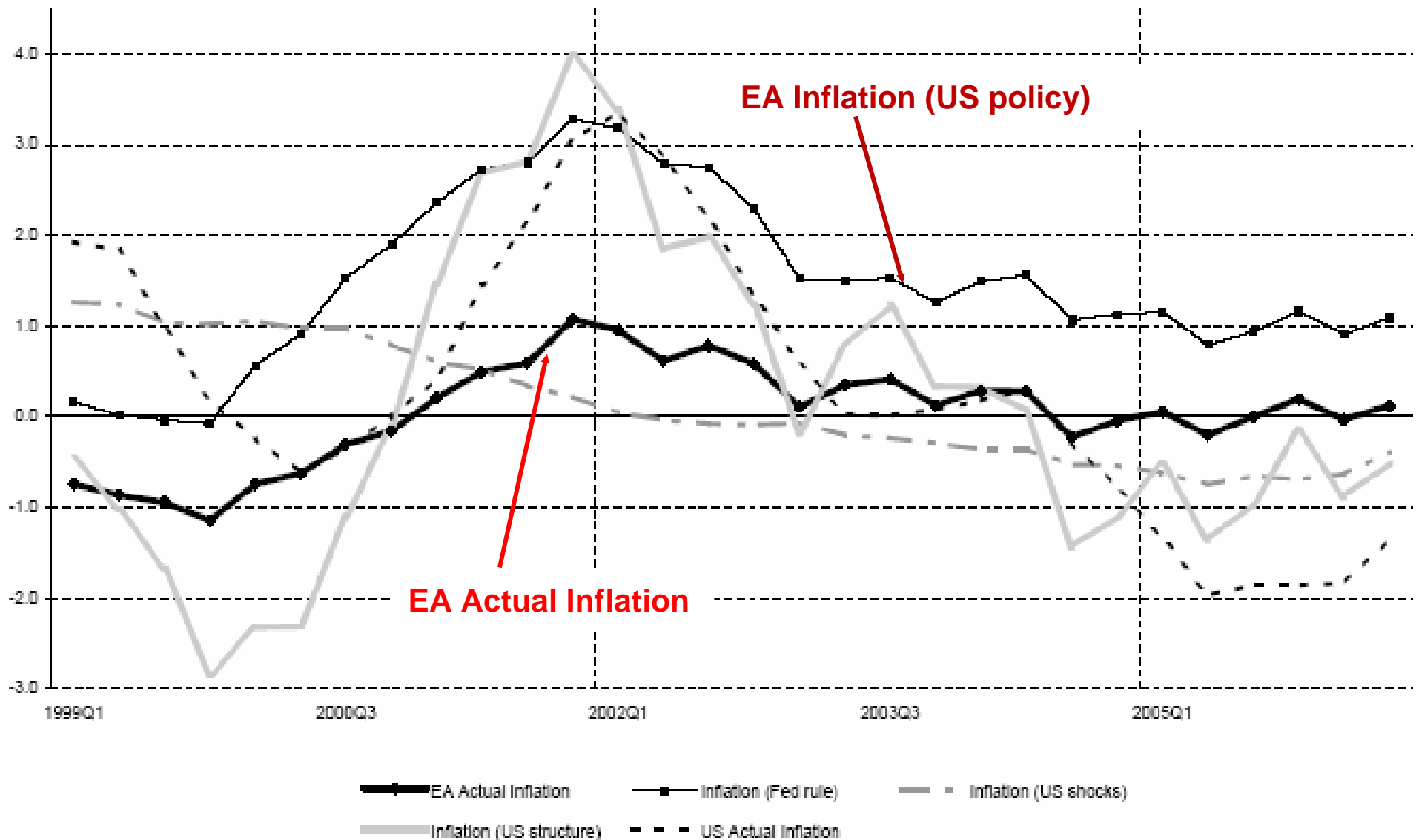
# EA Interest Rate Counterfactual: US Structure



# EA GDP Counterfactual: US Policy Rule (including US policy shocks)



# EA GDP Counterfactual: US Policy Rule (including US policy shocks)



# Conclusions

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Difference in policy behaviour after 2001 is explained by:

- ◆ Higher policy inertia in EA

- a given policy shock has stronger effect on activity in EA

- ◆ Difference in shocks

- Timing: bad shocks occurred one year earlier in US
- Nature: negative supply-side shocks in EA represented constant drag on activity and source of upward pressure on inflation

- ◆ Difference in structure of economy

- Prices and wages more rigid in EA: has imparted less volatility in inflation and interest rate. EA rate would have been lower otherwise

# Conclusions

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- ◆ Had ECB followed Fed rule and Fed shocks:
  - output lower and inflation higher

Further research:

- ◆ Increase our understanding of policy shocks in estimated reaction functions