

# **OIL PRICES AND THE WORLD ECONOMY**

**Ray Barrell and Olga Pomerantz**

**NIESR**

**November 2004**

# Introduction

- Oil price increases and inflation were associated in the 1970's and 1980's
  - What factors affect oil prices
  - What makes oil prices 'cause' inflation
  - How do higher oil prices affect the level of output
- Why is the world different

# What affects output and inflation

- The oil intensity of production
- Nominal inertia in wages and prices
- The monetary policy response
- The speed of recycling oil revenues into demand
- Patterns of trade have an important influence

# What should modellers and forecasters look at

- Temporary and permanent shocks differ
  - Expectations influence the impact of shocks
  - The effects on long term interest rates differ
- The use of oil revenues influences outcomes
  - Oil shocks redistribute income flows
  - The effects on trade in goods and services determine the pattern of effects
  - So include oil producers and trade in services

# The Role of OPEC

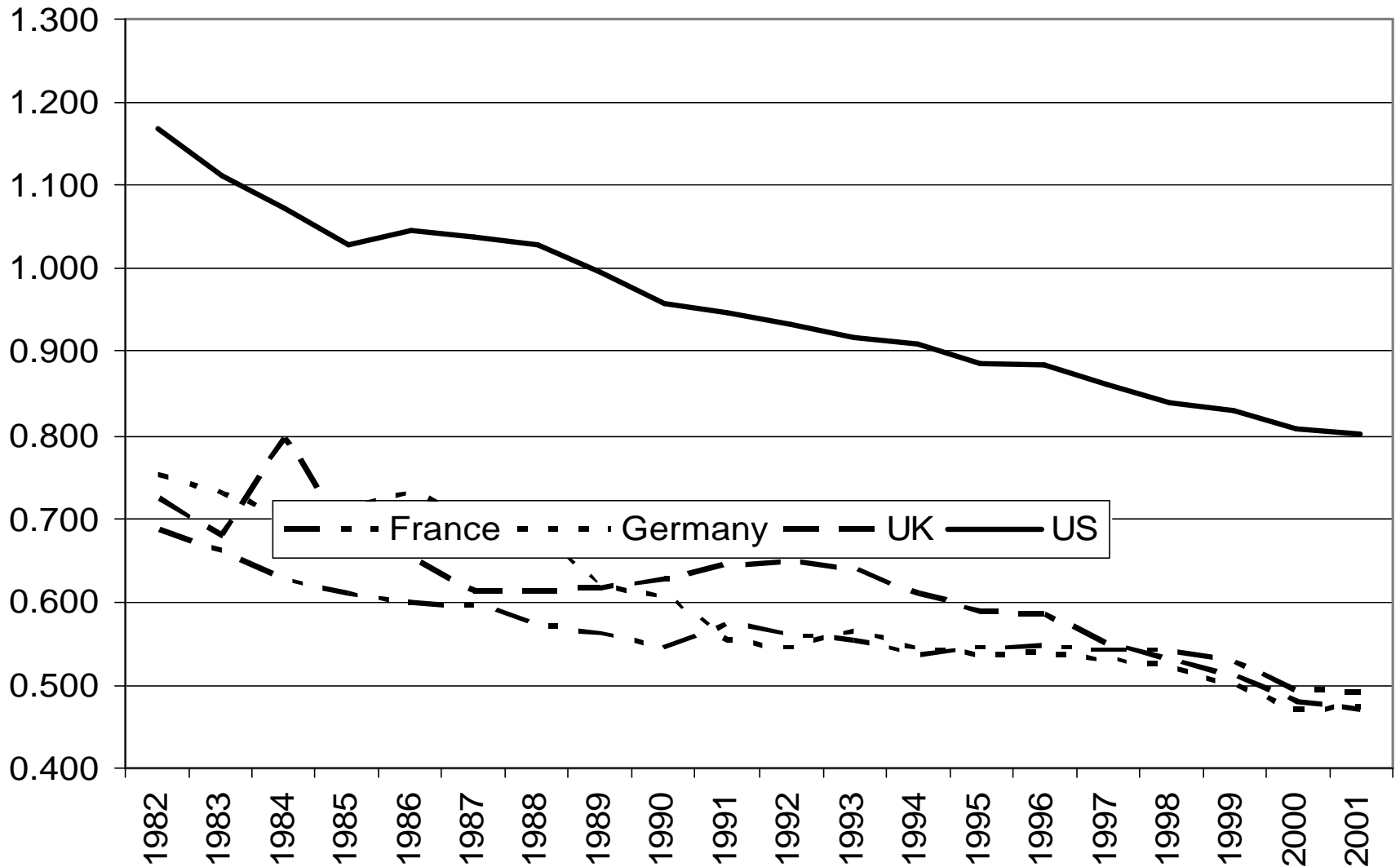
- OPEC is a lead producer, but it only sets a floor to prices
  - A positive output gap in the OECD puts upward pressure on prices
- Real oil prices display dollar inertia because OPEC sets dollar prices
  - The real oil price is influenced by movements in the dollar real exchange rate
  - Recent price increases have been much less marked in euros

# Oil Intensity

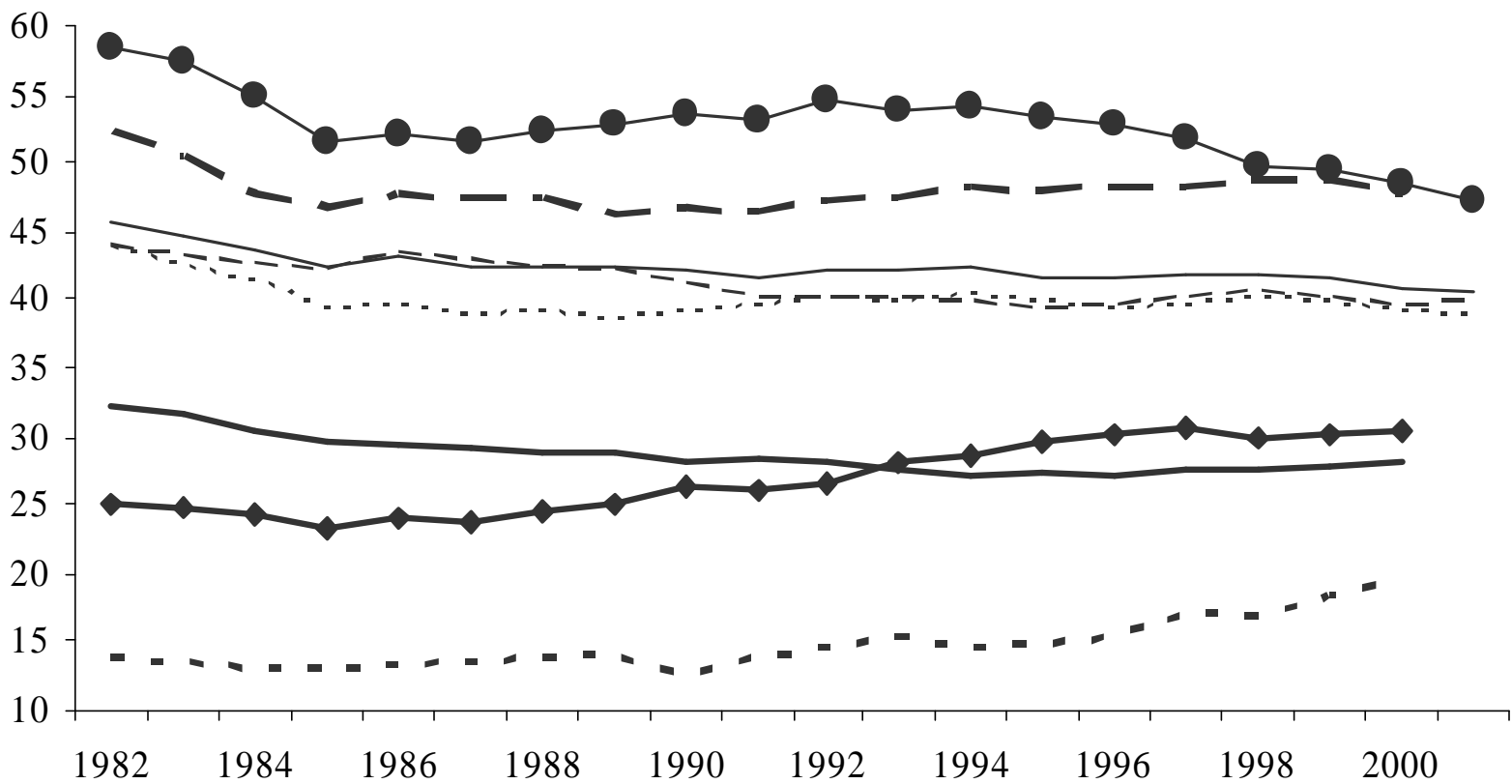
- The amount of oil per unit of GDP has been falling since 1975
  - In Europe oil intensity has fallen by one third since 1982
  - In the US oil intensity has fallen by as much
- Oil intensity is now 60 per cent higher in the US than in the major Euro Area countries
- The first round effect on output and prices must be higher in the US

# Oil Intensity of Output

(barrels of oil per unit of real output at 1994 PPPs)



# Oil as per cent of total energy supply



— OECD      - - - - North America      ······ Europe      —●— Pacific  
 — non-OECD      - - - - China      —◆— Other Asia      — Latin America

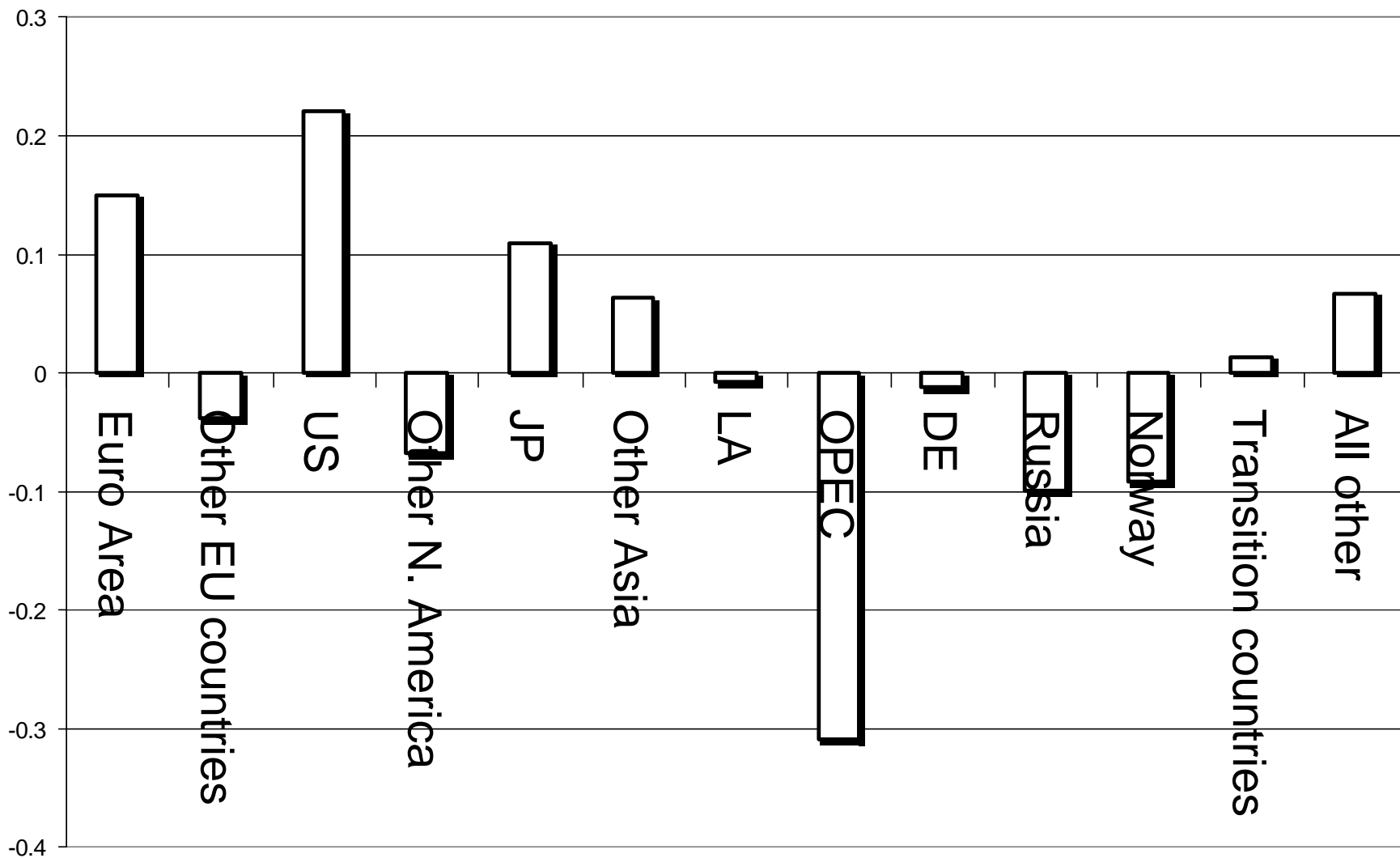


# Oil Prices and Trade

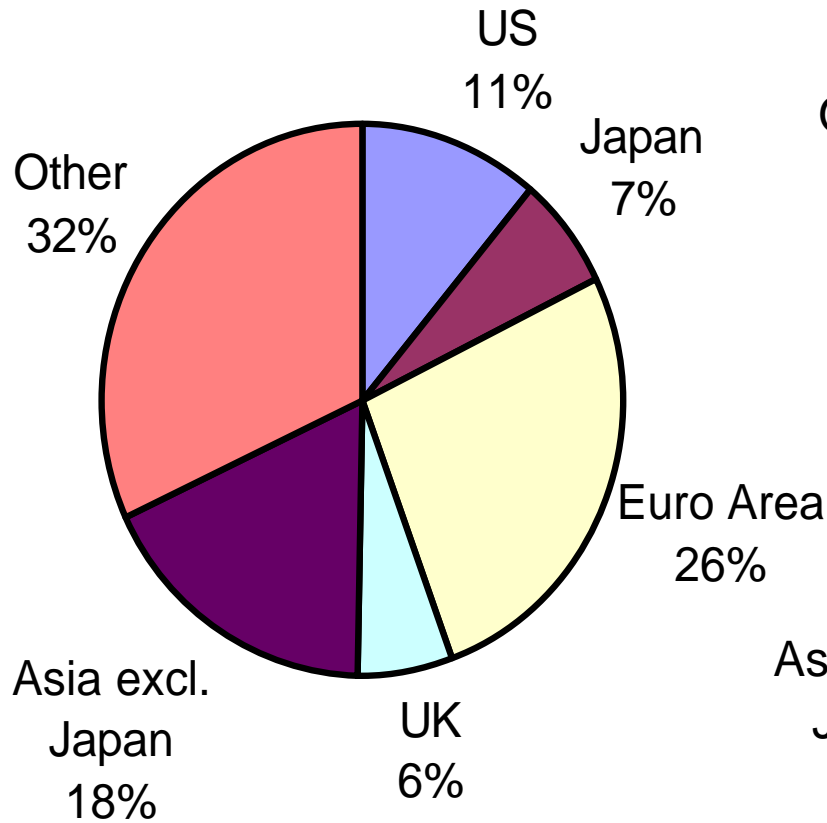
- Oil prices affect the terms of trade
  - Higher dependence on oil imports raises the impact on GDP
    - The impact on saving and investment is greater
    - Tax revenues and solvency are affected
- Patterns of OPEC (Russian, Norwegian) imports affect the pattern of trade impacts
  - The US has 22% of world GDP but only 11 percent of major oil exporters imports

# World Trade in Oil

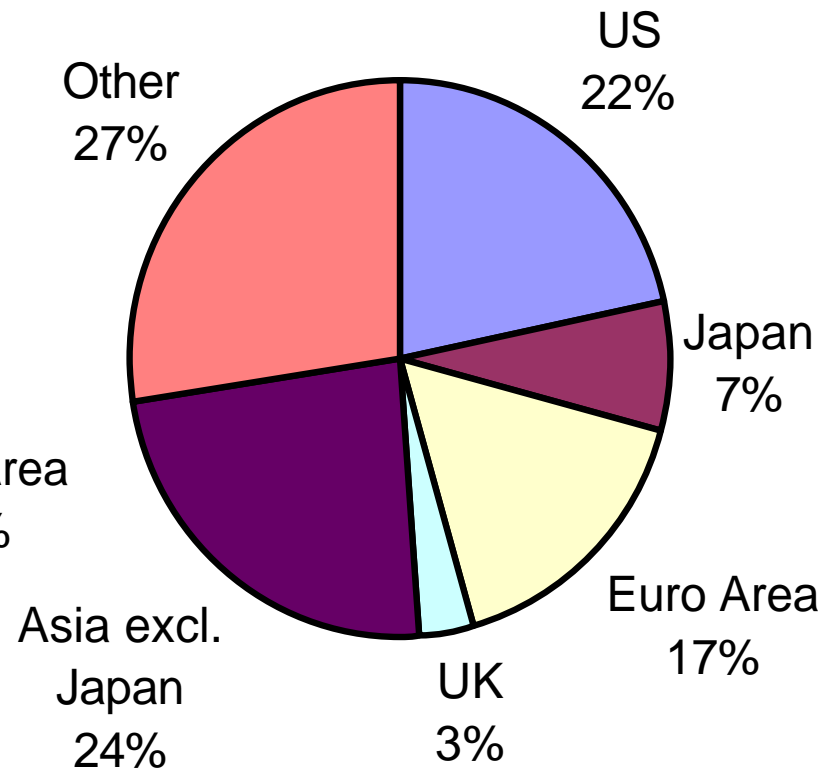
import share less export share



# Share of Oil Producers' Imports, 2000



# Share of World GDP (at PPPs), 2000



# The role of the labour market

- An increase in the oil price reduces equilibrium income for each level of output
- Real wages need to fall
  - Bargaining institutions may resist and induce a recession
  - The central bank may allow inflation to reduce output costs
  - There may be asymmetries between upward and downward shocks
- Labour market institutions are now more flexible than in the 1970s because of reforms
- Bargainers realise that real wages must change
- Hunt and Laxton NIER 2002 discuss these issues

# Oil Prices and NiGEM

- The model is an estimated new Keynesian description of the world economy
  - Almost all OECD countries are covered
  - OPEC, and other regions are included
  - Trade and financial markets cover the world
  - Each country has a demand and supply structure with a government sector
  - Financial, exchange rate and labour markets have forward looking expectations

# Monetary Policy Rules

- All countries must have monetary policy
- We have an ECB strategy with a nominal aggregate and inflation as targets

$$r_t = \mathbf{g}_1 (\log(P_t Y_t) - \log(P_t Y_t)^*) + \mathbf{g}_2 (\Delta \log P_{t+j} - \Delta \log P_{t+j}^*)$$

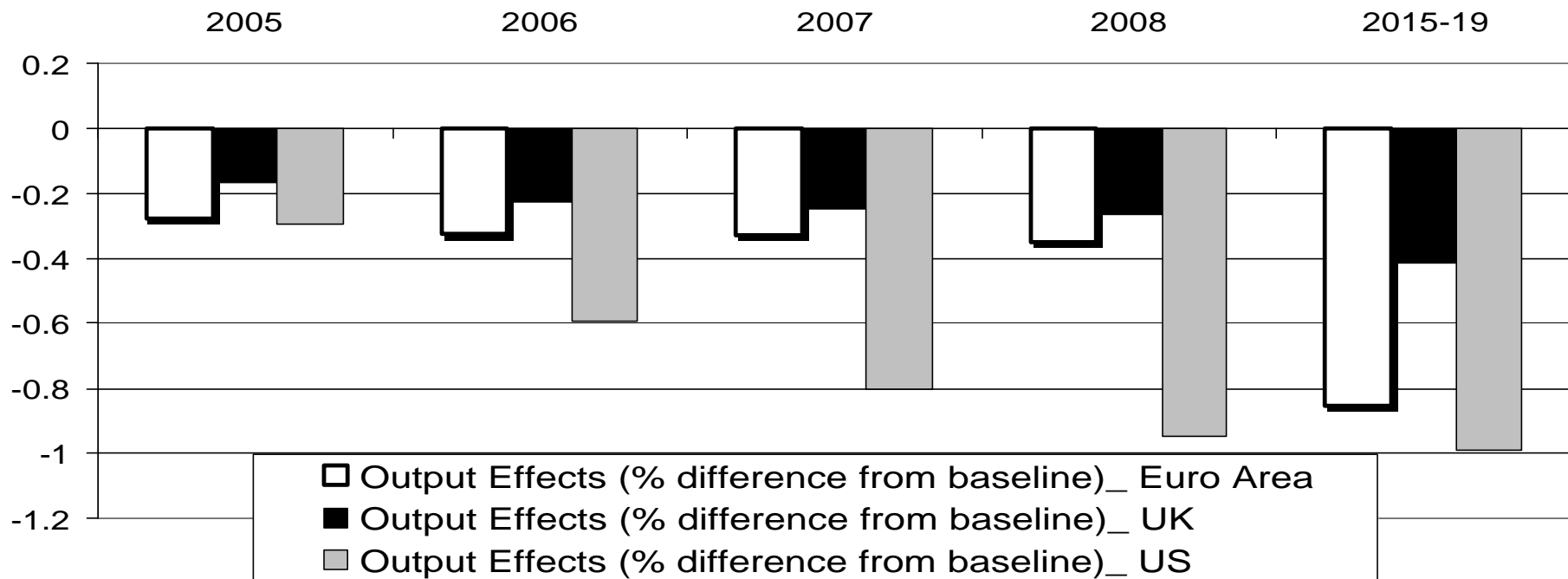
- We also have a Taylor Rule (TR) whose coefficients can change

$$r_t = \mathbf{g}_1 (\log Y_t - \log Y_t^*) + \mathbf{g}_2 (\Delta \log P_{t+j} - \Delta \log P_{t+j}^*) + \mathbf{g}_0$$

- They have different implications for prices as TR treats inflation misses as a bygone

# A permanent 25% rise in oil prices

- Output effects are similar in the long run for the US and the Euro Area
- Short run effects depend on oil intensity, trade links and labour markets

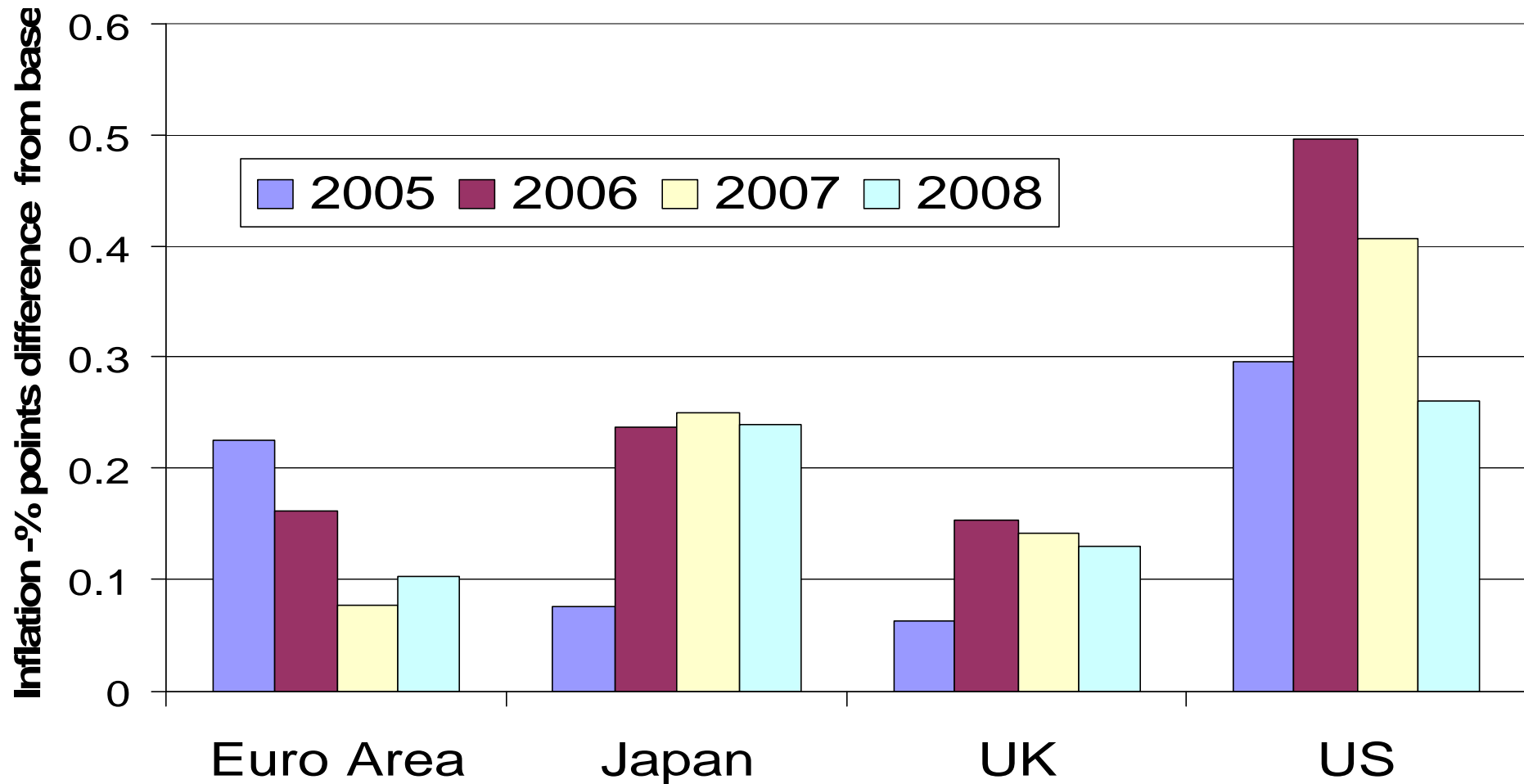


# Impacts on Output of a 25% permanent rise in oil prices





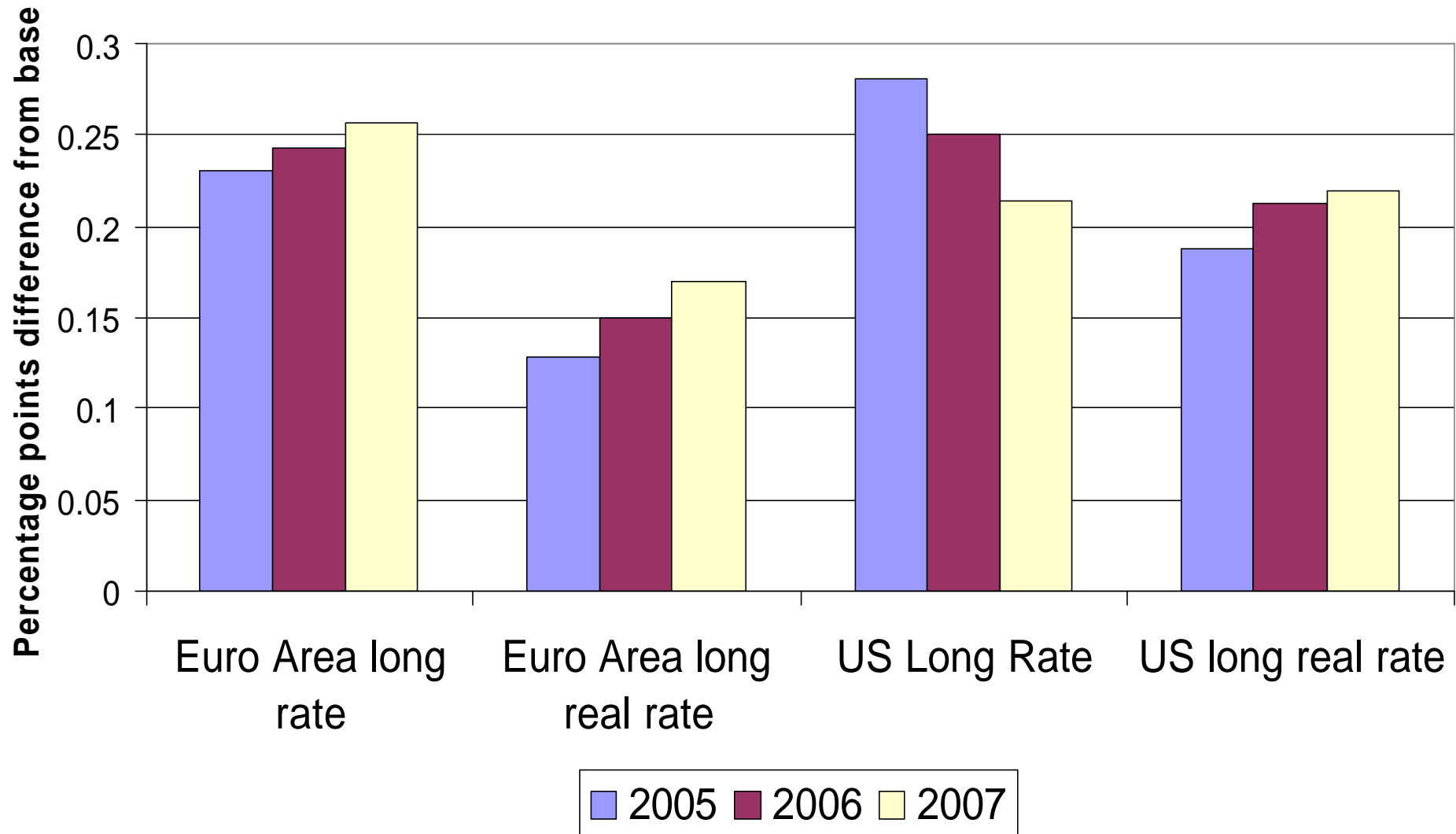
# Impacts on Inflation of a 25% permanent rise in oil prices



# Long term effects of a 25% permanent rise in real oil prices

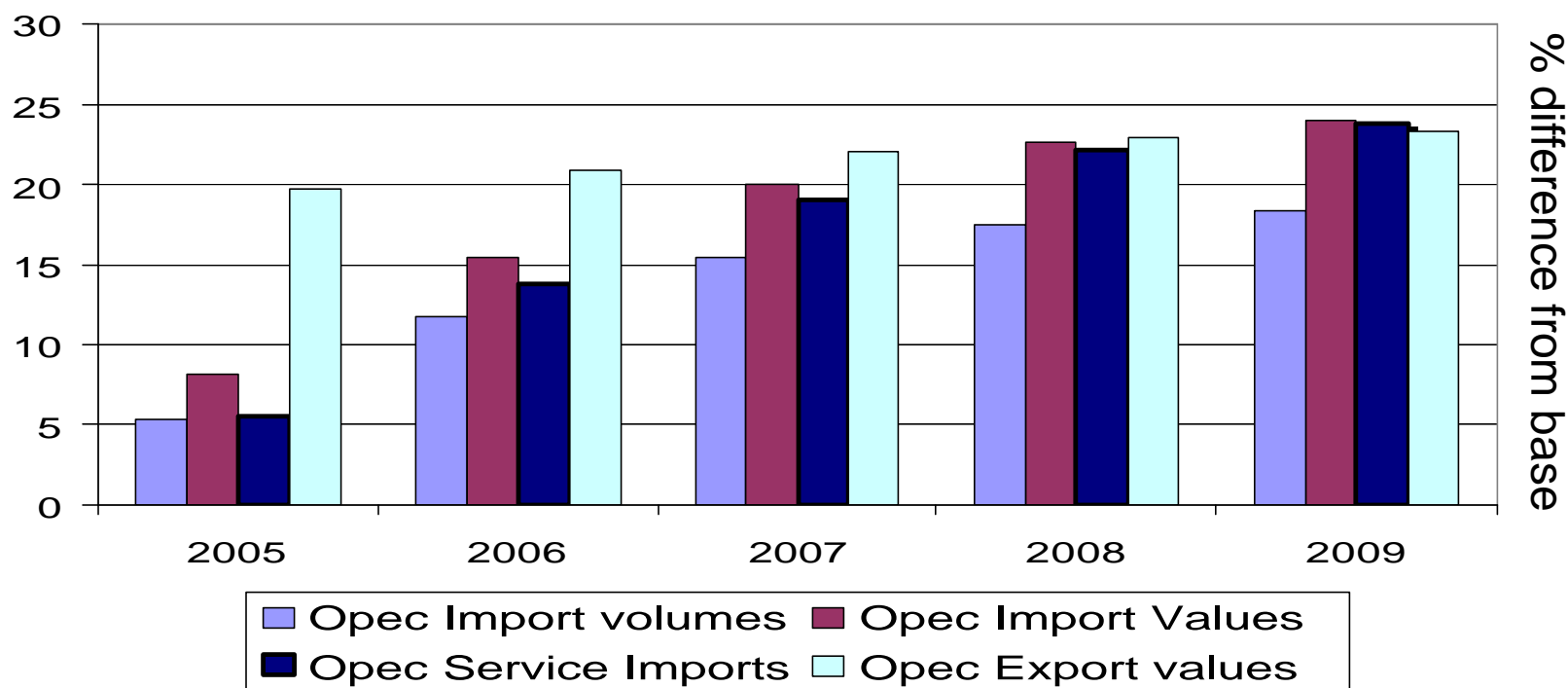
- Higher oil prices change the terms of trade for the OECD as a whole
- The saving investment balance has to change
- Real interest rates have to rise, and output will be lower in the long run
- The rise in long term real interest rates will affect output now

# The impact of a 25% permanent real oil price increase on long rates



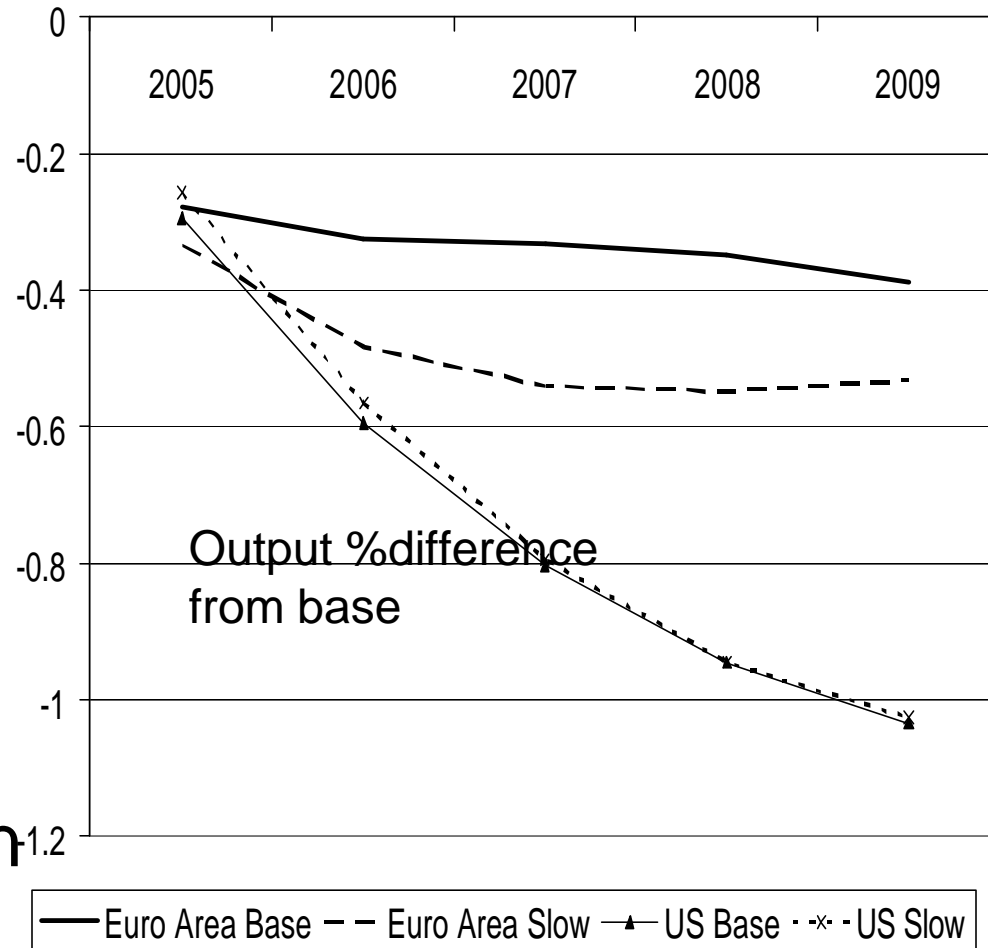
# Spending oil revenues

- Increased oil receipts are spent on goods and services imports, but only with a lag
- In the first two years aggregate demand is likely to be lower as OPEC adjusts
- Impacts of a 25% permanent increase in real oil prices

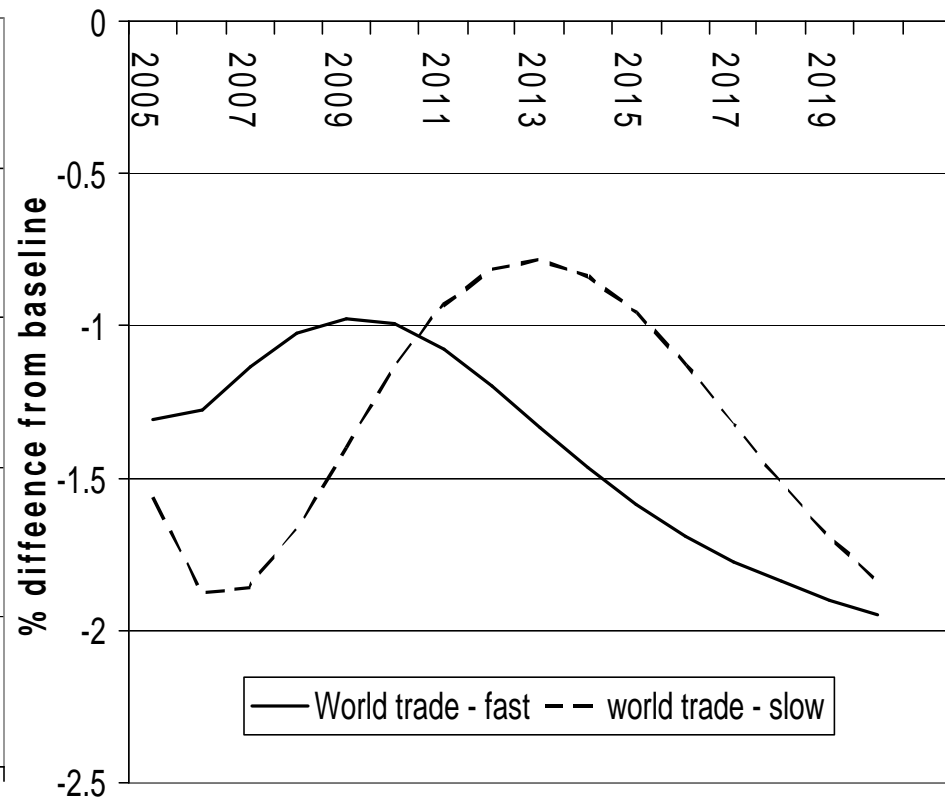
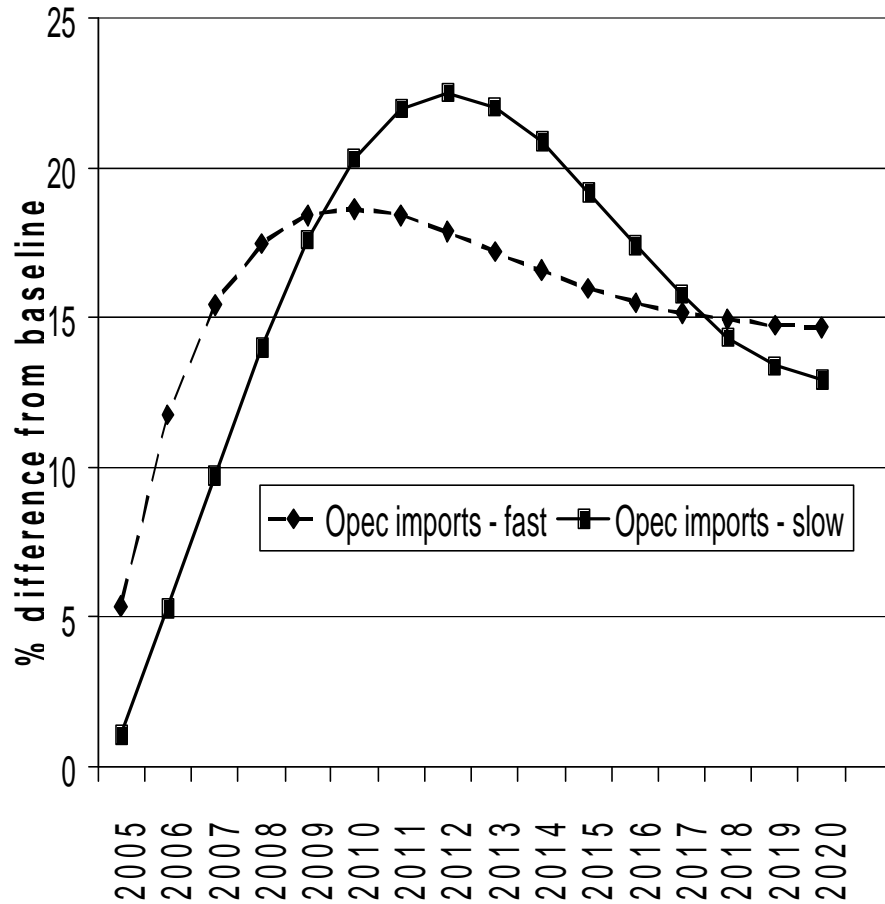


# Slower spending of oil receipts

- Until 1985 OPEC recycled money into goods at half the speed they now spend at so we cut the speed of reaction to half its level
- Output effects of an oil price shock increase, especially in inertial Europe



# Impact of slower spending of oil revenues of trade



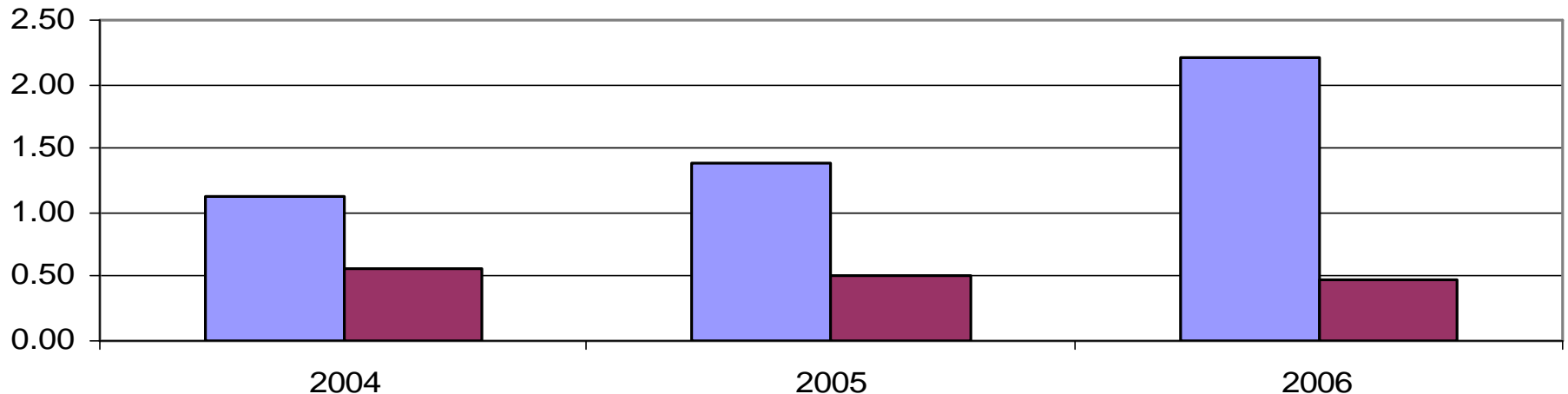
# The role of monetary policy

- Short run effects on output also depend on policy – a looser monetary stance can half the impact on output
- Inflation effects depend on wage price flexibility and the policy rule
  - A looser monetary stance must mean a greater price impact
  - More real wage inflexibility raises the costs of keeping price effects small

# Changing Policy in the US

- We compare our default with a looser response and output effects are smaller in the short run
- Inflation effects are larger after the first year and the price level is noticeably higher in the long run than in the default

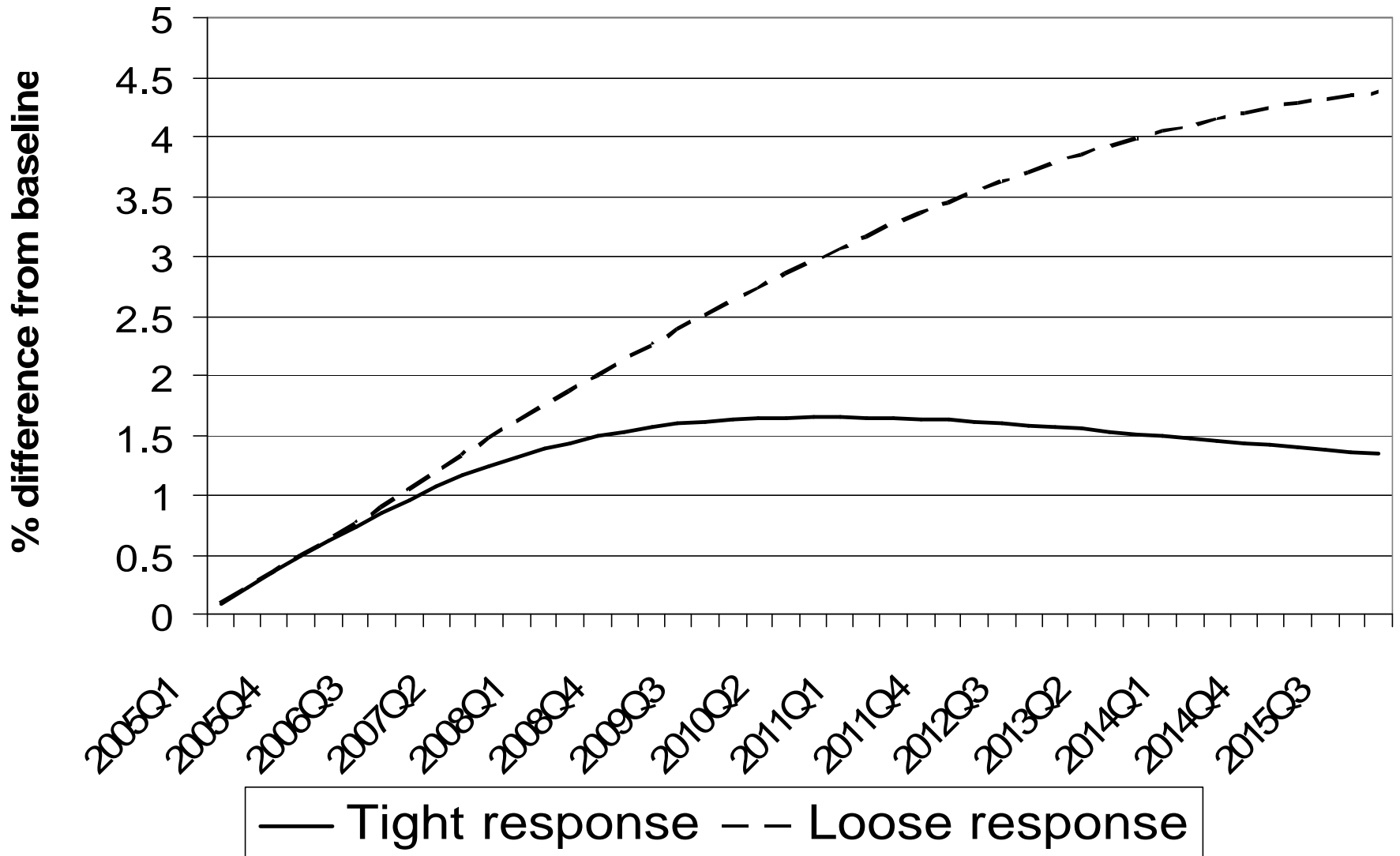
**Looser Monetary Policy in the US**  
**Ratio of loose to tight**



■ Effects of Loosening policy (loose/tight) Inflation ■ Effects of Loosening policy (loose/tight) Output

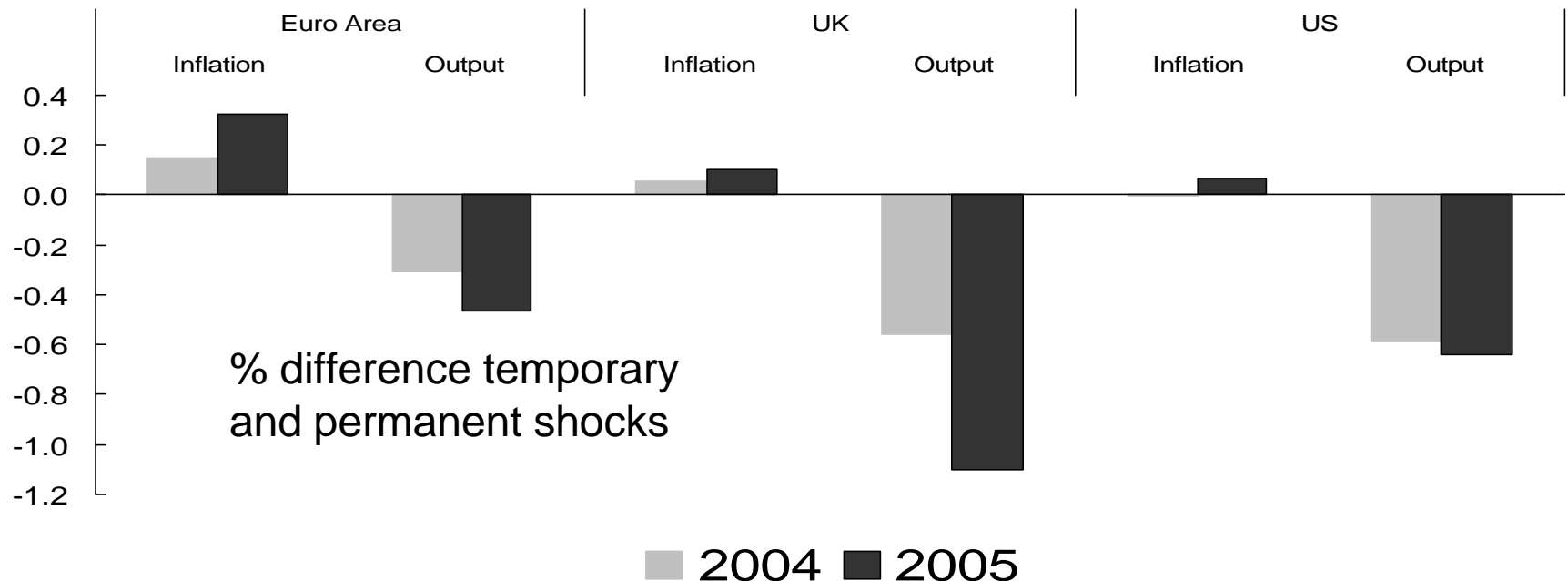


# Long Run Impacts on US prices



# Are temporary shocks different

- We compare a permanent shock to a 2 year shock under the same rules
- Temporary shocks have less output effects because real interest rates do not rise
- Inflation effects can be larger as a result



# Conclusions

- Higher oil prices lead to higher prices
  - Output should fall in the short and long run
  - Real interest rates should rise
- Wage price spirals worsen problems
- Oil intensity is important for output effects
- Inflation depends on the central bank
  - Output effects can be reduced in the short run
- The speed of re-spending revenues on goods and services affects the impacts on output

# Sources

Much of the argument is contained in

Barrell and Pomerantz '*Oil Prices and the World Economy*' NIESR Discussion Paper July 2004.

available at [www.niesr.ac.uk](http://www.niesr.ac.uk)

Al Eyd et al 'The world economy' in *National Institute Economic Review* July and October

Information available at [www.niesr.ac.uk](http://www.niesr.ac.uk)

Contact Ray Barrell (rbarrell), Ian Hurst (aihurst) or Olga Pomerantz (opomerantz) @niesr.ac.uk for details