

Policy options at the zero lower bound

Session 5: How to implement stabilization policies with high public debt?

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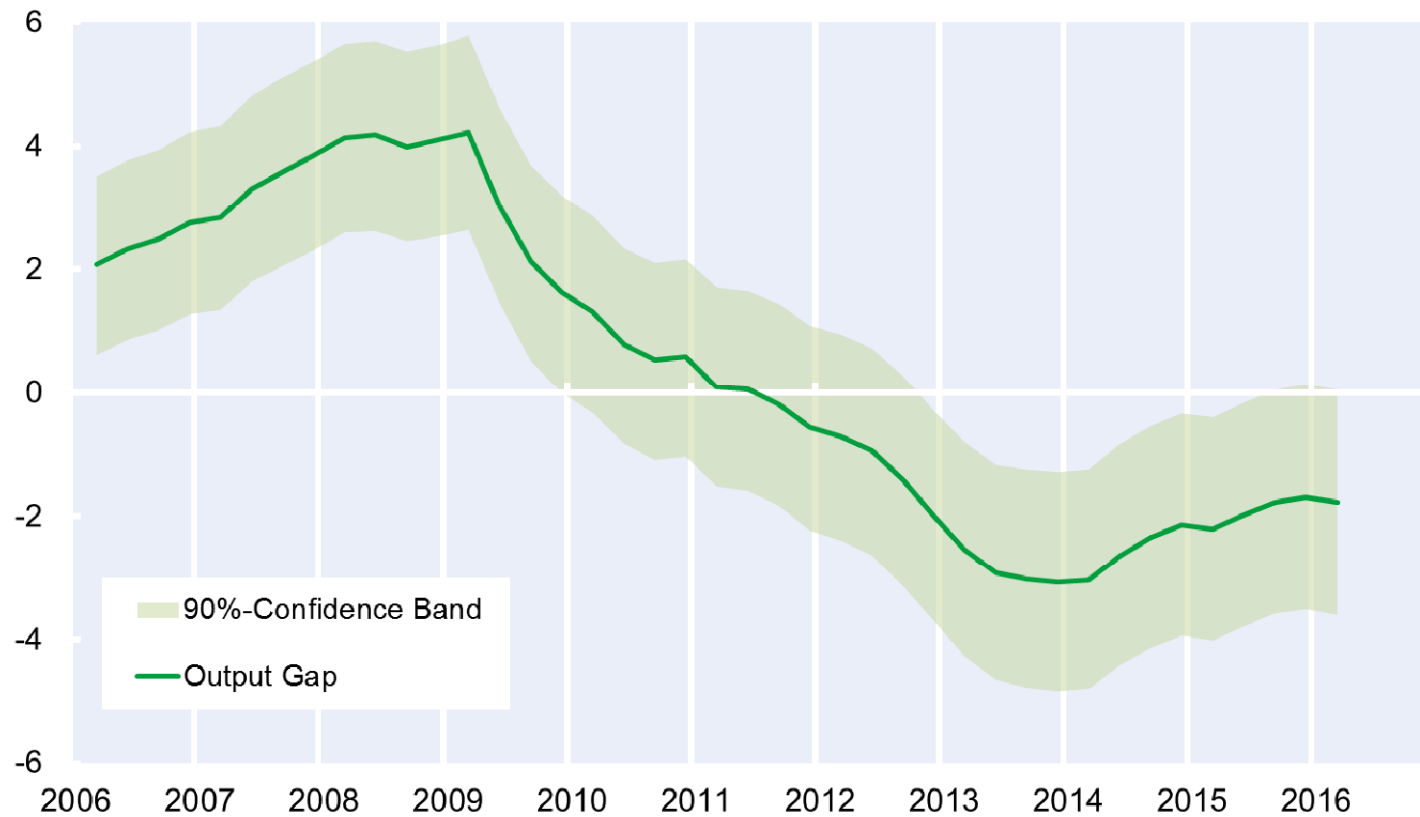


Introduction

- very weak recovery from the crisis: negative output gap

Output Gap

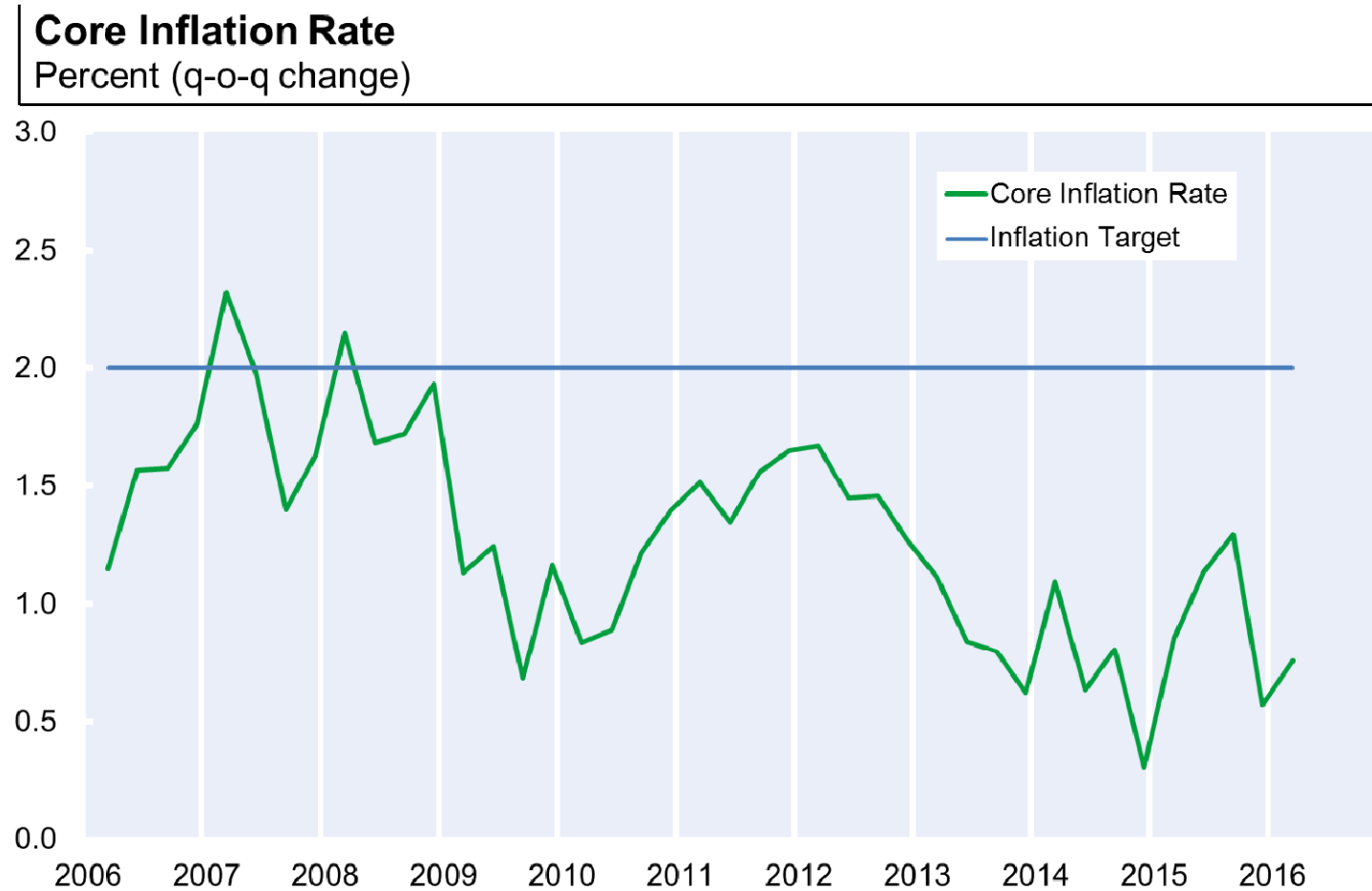
Percentage Points



Source: European Central Bank; Eurostat; Calculations of the Ifo Institute.

Introduction

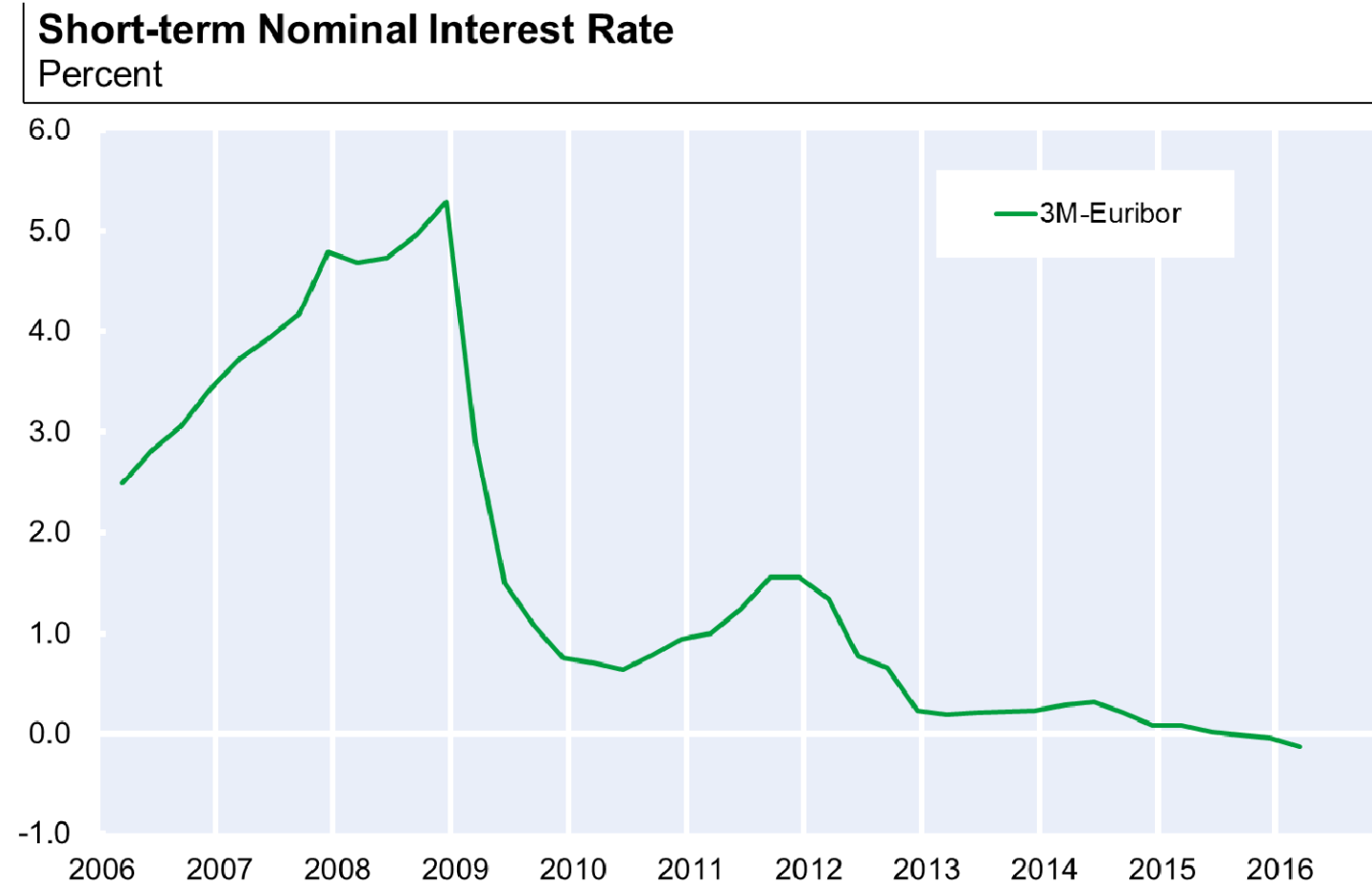
- very weak recovery from the crisis: inflation well below target



Source: European Central Bank; Eurostat; Calculations of the Ifo Institute.

Introduction

- very weak recovery from the crisis: interest rates at the ZLB



Source: European Central Bank.

Introduction

- very weak recovery from the crisis: interest rates at the ZLB
- however, the stimulus from zero interest rates does not seem to be sufficient
 - persistently negative output gap
 - inflation below target since 2009
- one explanation is that the interest rate that would be required in this situation is even lower than the actual interest rate
 - natural real interest rate is below the actual real interest rate
- this presentation
 - estimates for the natural real interest rate for the euro area
 - reasons for the low (negative) level
 - discuss policy options at the ZLB with natural real interest rate is below the actual real interest rate

Introduction

- policy recommendations for overcoming the crisis are different for an economy that is stuck at the zero lower bound
 - under normal circumstances certain policies require as optimum monetary policy response a *decrease* in the real interest rate
 - supply side policies (structural reforms, productivity increasing policies) lead to deflationary expectations
 - these policies should be accommodated by a more expansionary monetary policy
 - at the zero lower bound monetary accommodation is no longer possible
 - these policies lead to a decrease in inflation expectations and – for a given nominal interest rate $i_t = 0$ – an *increase* in the real interest rate
 - part of the real stimulus (if not all) goes lost, and the decline in inflation expectations is amplified

Concept of the natural real interest rate

- NKM

- IS equation: $\hat{y}_t = E_t \hat{y}_{t+1} - \sigma(i_t - E_t \pi_{t+1} - r_t^n)$

- MP rule: $i_t = \max(0; r_t^n + \phi_\pi \pi_t + \phi_y \hat{y}_t)$

- PC: $\pi_t = E_t \pi_{t+1} + \kappa \hat{y}_t$

- assume that an exogenous shock leads to a decrease in r_t^n

- under normal circumstances monetary policy has to become more expansionary (a cut in i_t)

- the real interest rate gap $(i_t - E_t \pi_{t+1}) - r_t^n$ is closed, the output gap \hat{y}_t is closed, and inflation π_t (as well as inflation expectations $E_t \pi_{t+1}$) is at its steady-state target (equal to zero)

Concept of the natural real interest rate

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- assume that an exogenous shock leads to a decrease in r_t^n

- at the zero lower bound, the nominal interest rate i_t cannot be lowered ($i_t = 0$)

- the real interest rate gap becomes positive (the actual real interest rate is larger than the natural real interest rate), and both, the output gap and inflation will be negative (or below target)
- if the shock is persistent then also inflation expectations $E_t \pi_{t+1}$ will fall below target, which further increases the interest rate gap

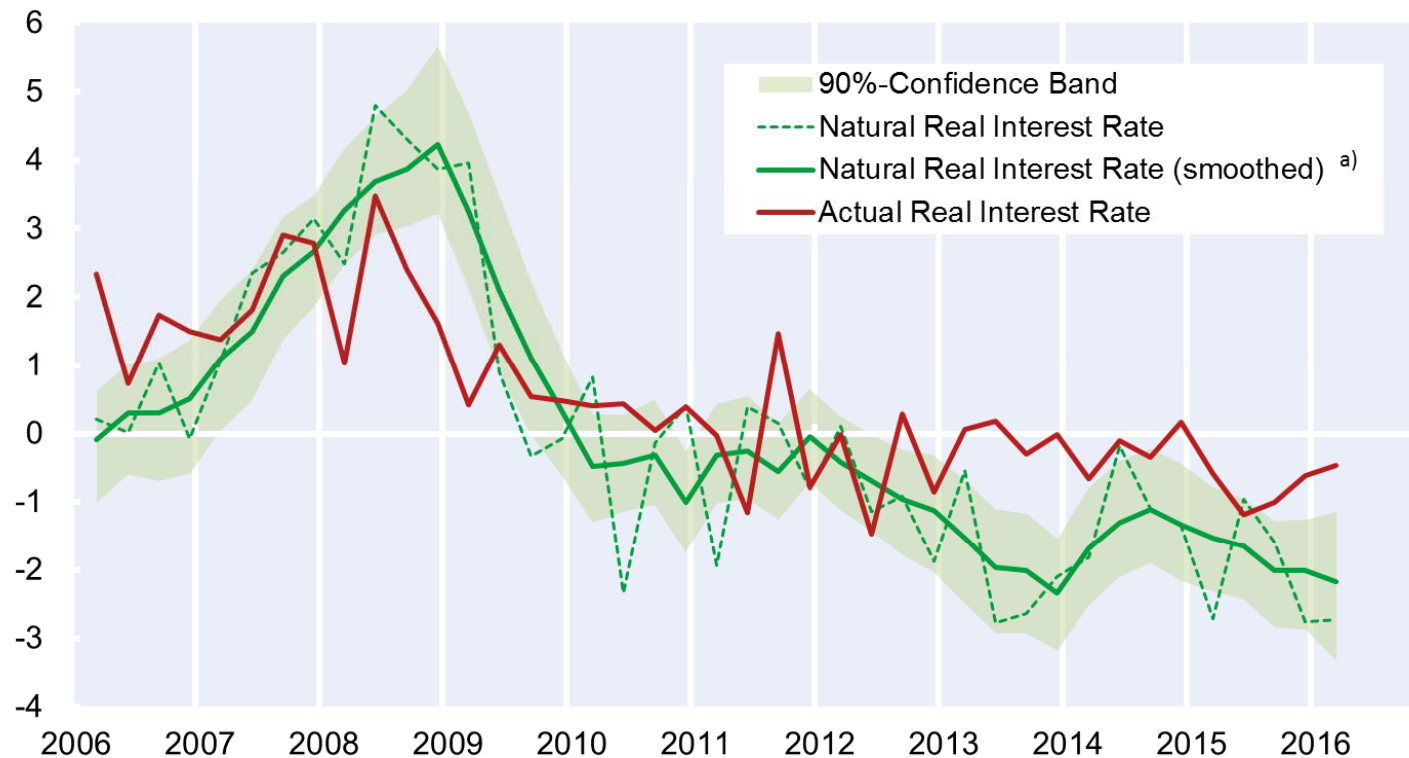
Evidence for the euro area

- What is the current level of the natural real interest rate r_t^n ?
 - estimation of a Smets-Wouters-type DSGE model for the euro area
 - Frank Smets & Rafael Wouters (2007), “Shocks and Frictions in US Business Cycles: A Bayesian DSGE Approach”, *American Economic Review*, vol. 97, no. 3, pp. 586-606
 - closed economy model with several frictions
 - estimation period 1999 q4 – 2006 q1
 - aggregate euro area data

Evidence for the euro area

- r_t^n negative / interest rate gap $(i_t - E_t\pi_{t+1} - r_t^n)$ positive

Actual and Natural Real Interest Rate
Percent



Source: European Central Bank; Eurostat; Calculations of the Ifo Institute.

^{a)} four-quarter moving average.

Concept of the natural real interest rate

- What are forces driving down the natural real interest rate r_t^n ?
- natural real interest rate $r_t^n =$
 - the real interest rate that would equilibrate the market if prices were flexible
 - it reflects the price of output / consumption today relative to tomorrow if prices were flexible
 - corresponds to the real interest rate in an RBC model
 - in equilibrium the two prices are identical
 - medium-run drivers
 - trend productivity growth, demographics
 - short-run drivers
 - temporary shocks that drive the business cycle
 - supply side: temporary productivity fluctuations

Concept of the natural real interest rate

- What are forces driving down the natural real interest rate r_t^n ?
- natural real interest rate falls with transitory productivity increases

⇒ negative correlation between r_t^n and supply shocks

– intuition:

- a temporary increase in productivity leads to a temporary increase in income today which will only be consumed today if the price of output today falls relative to its price tomorrow
- and this implies that the natural real interest rate r_t^n must fall

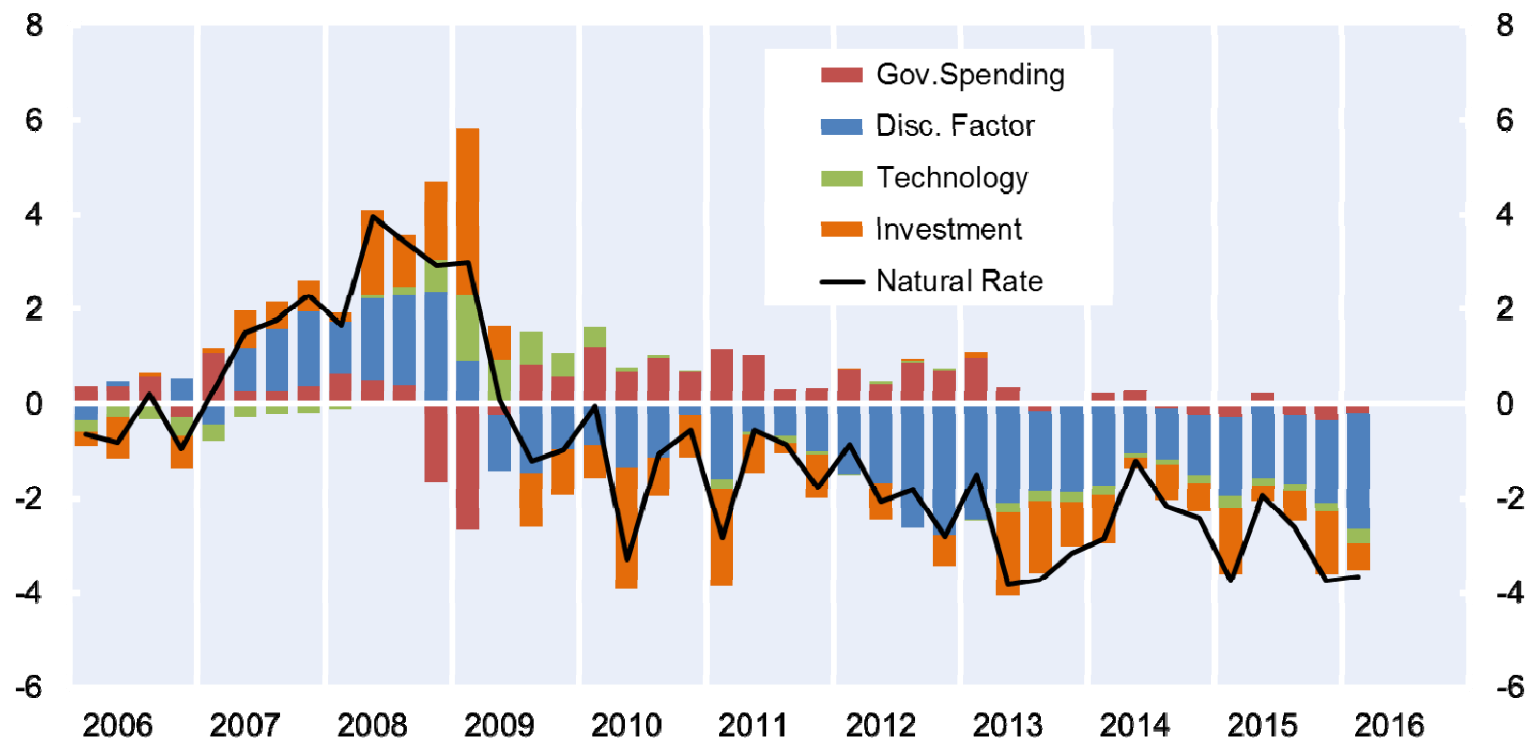
Concept of the natural real interest rate

- What are forces driving down the natural real interest rate r_t^n ?
 - natural real interest rate falls with temporary
 - reductions in government expenditure
 - decreases of the households' discount factor
 - declines of the firms' willingness to invest
- ⇒ positive correlation between r_t^n and demand shocks
- intuition:
 - all these shocks would shift demand from the present to the future
 - since everyone suddenly wants to save more, the natural real interest rate r_t^n must decline for output to stay constant

Evidence for the euro area

- natural real interest rate $\hat{r}_t^n = r_t^n - \bar{r}^n$ negative (below $\bar{r}^n \approx 1\%$)

Contributions to Changes in the Natural Rate: Extended Smets-Wouters Model
Percentage Points



Source: Calculations by the Ifo Institute.

Evidence for the euro area

- natural real interest rate r_t^n negative
 - sequence of negative discount factor shocks
 - but currently also contractionary fiscal policy
 - as well as productivity shocks (structural reforms)
 - negative investment specific shocks

Policy implications

- further lower the actual real interest rate $r_t = i_t - E_t\pi_{t+1}$
 - if the interest rate gap ($i_t - E_t\pi_{t+1} - r_t^n$) is positive, the central bank could try become more expansionary
 - conventional monetary policy is stuck at the ZLB
 - advice: go unconventional
 - unclear whether additional impulses can be created
 - unclear what kind of risks this involves in a monetary union without union-wide fiscal policy and with national fiscal policies that should be constrained by fiscal rules
- switch to policies lead to an increase in natural real interest rate r_t^n
 - i.e. polices that do not necessitate further monetary accommodation (which is impossible at the ZLB)

Policy implications

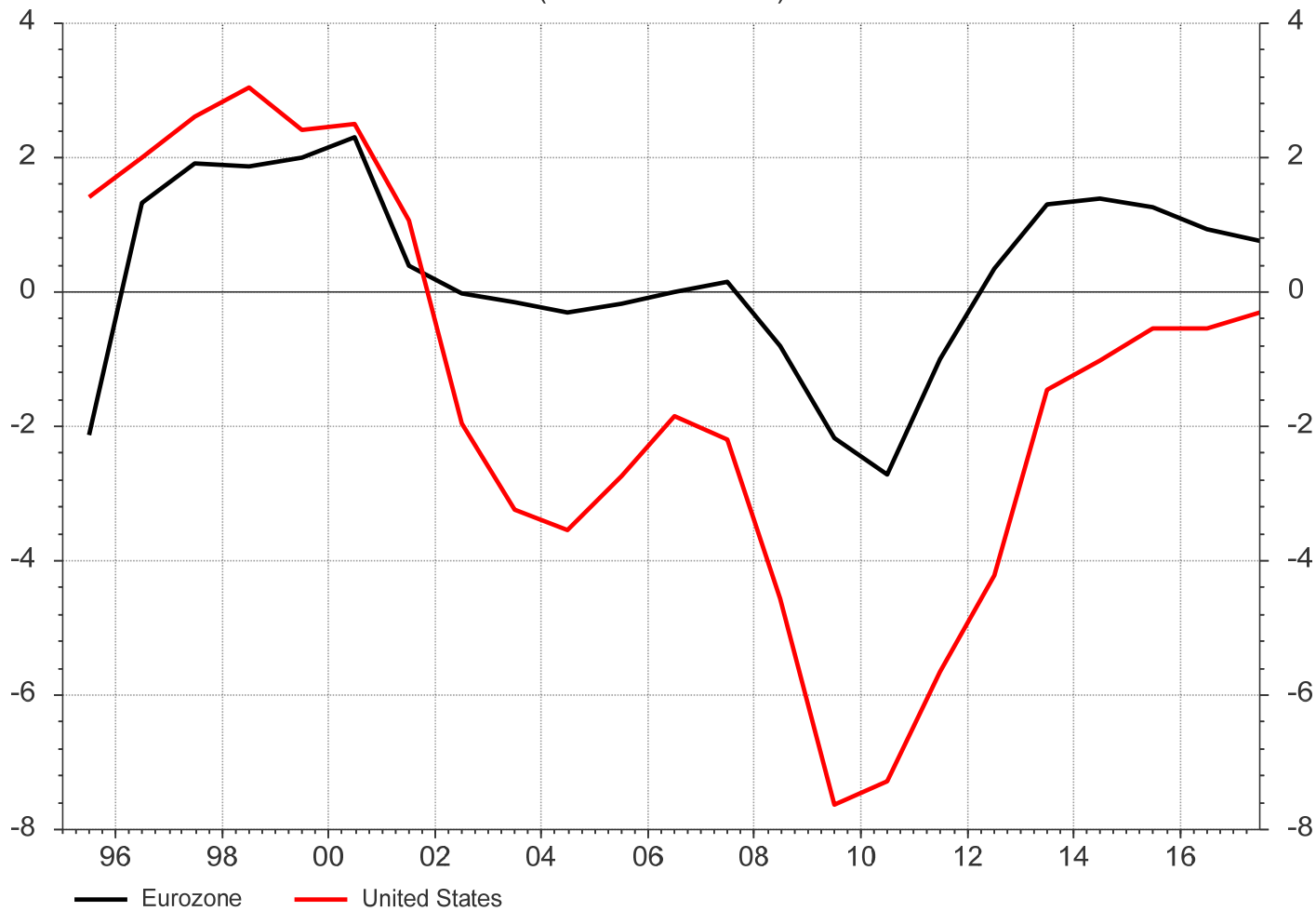
- refrain from structural reforms in product and labour markets?
 - not a good recommendation because of undoubtedly positive effects in the medium term
 - in the model: structural reforms are often implemented as mark-up reductions which entail large negative price effects (e.g. deregulation by reducing anticompetitive barriers to firm entry)
 - either clever choice of the policies (reforms with small short-term price effects)
 - reduction of the labour tax wedge
 - improvement labour market matching (active labour market policies)
 - these policies mostly involve fiscal costs
 - if no fiscal space, combine it with tax shifts to consumption
 - or combine it with inflationary (e.g. expansionary fiscal) policies
 - which compensate for the deflationary effects of structural reforms

Policy implications

- raise government expenditure
 - at the zero lower bound, fiscal expansion can be a powerful tool
 - as it closes the gap between the actual real interest rate (for a given zero nominal interest rate) and the natural real interest rate
 - by this increases the effectiveness of monetary policy
 - major handicap of the euro zone:
 - no fiscal policy at the euro-zone level
 - fiscal space at the national level limited in many countries
 - rules of the Fiscal Compact
 - this is one of the features that makes the EA very different from the US

Policy implications

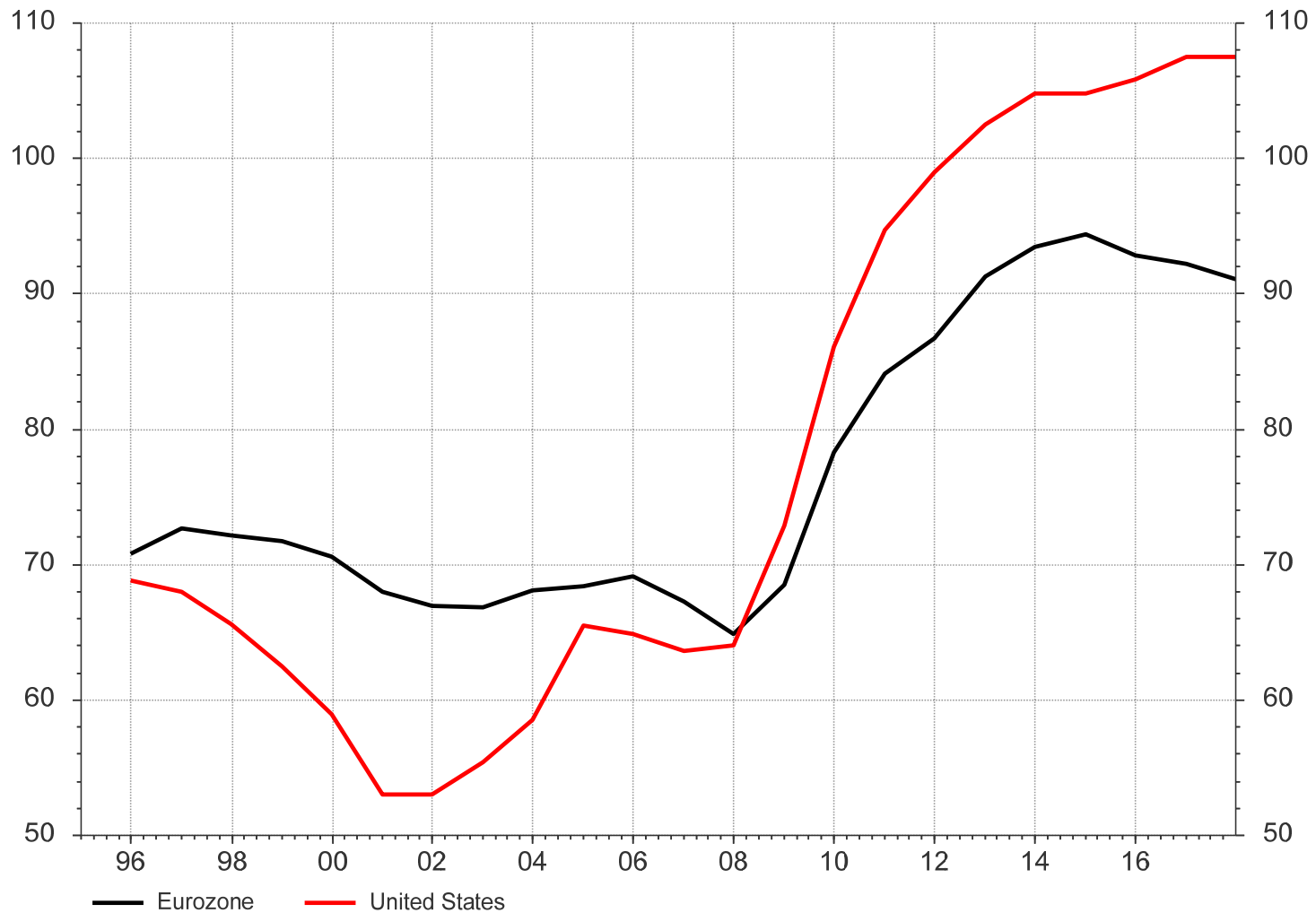
Cyclically adjusted government primary balance as % of potential GDP
(OECD estimates)



Quelle: Thomson Reuters Datastream

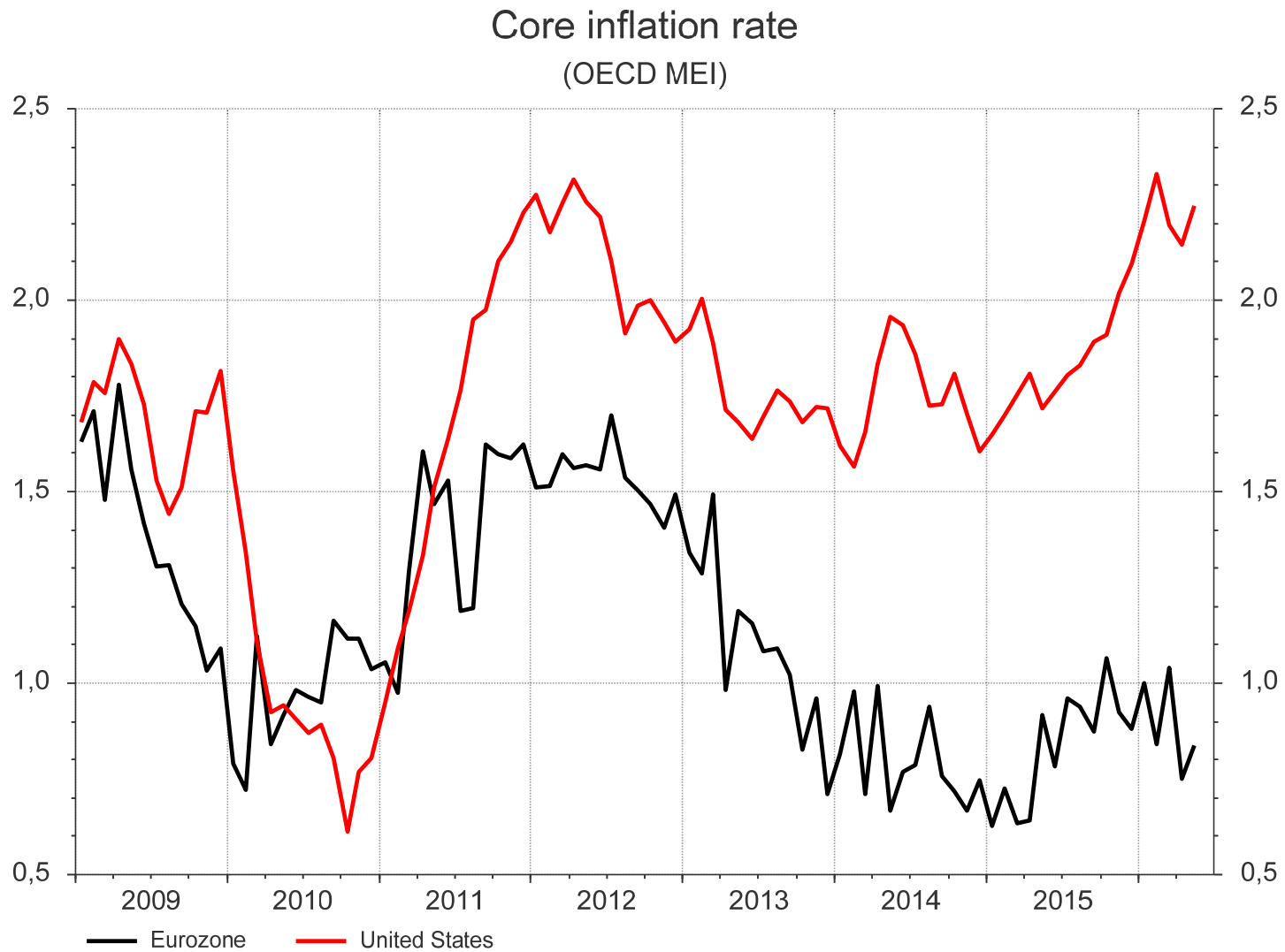
Policy implications

General government consolidated gross debt in % of GDP



Quelle: Thomson Reuters Datastream

Policy implications



Quelle: Thomson Reuters Datastream

Policy implications

- raise government expenditure
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 - by this increases the effectiveness of monetary policy
 - major handicap of the euro zone:
 - no fiscal policy at the euro-zone level
 - fiscal space at the national level limited in many countries
 - rules of the Fiscal Compact
 - this is one of the features that makes the EA very different from the US
 - should we question the rules?
 - rules that have never been observed in the past
 - rules (& sanctions) that should replace discipline imposed by the market
 - would the market sanction fiscal expansion at the ZLB

Policy implications

- improve incentives to invest
 - major obstacle for investment in many EA countries are financial constraints on the side of the firms
 - non-performing loans (NPL) as a major source of frictions

Policy implications

Table 1.3. Selected Indicators of Advanced Economy Banks

	NPL Ratio ⁶ (%)		NPL Ratio ⁶ (%)
United States	0.7	Select Euro Area	4.3
U.S. Investment Banks	0.7	Other Europe	2.2
Other U.S. Banks ^B	0.7	Nordic Banks	1.6
<i>Goldman Sachs</i>	n/a	European Investment Banks	1.5
<i>Morgan Stanley</i>	n/a	<i>Deutsche Bank</i>	1.9
<i>JPMorgan Chase</i>	0.8	<i>Credit Agricole</i>	4.7
<i>Bank of America</i>	1.0	<i>BNP Paribas</i>	5.6
<i>Citigroup</i>	0.8	<i>Societe Generale</i>	5.6
<i>Wells Fargo</i>	1.2	<i>UBS Group</i>	0.5
United Kingdom	2.8	<i>Credit Suisse Group</i>	0.7
<i>HSBC</i>	2.5	Italy	11.2
<i>RBS</i>	3.9	<i>Unicredit</i>	10.8
<i>Lloyds</i>	2.1	<i>Intesa</i>	10.7
<i>Barclays PLC</i>	1.9	Other Italian Banks ^B	12.2
<i>Standard Chartered</i>	4.8	Spain	6.7
		<i>Santander</i>	4.5
		<i>BBVA</i>	6.1
		Other Spanish Banks ^B	10.1

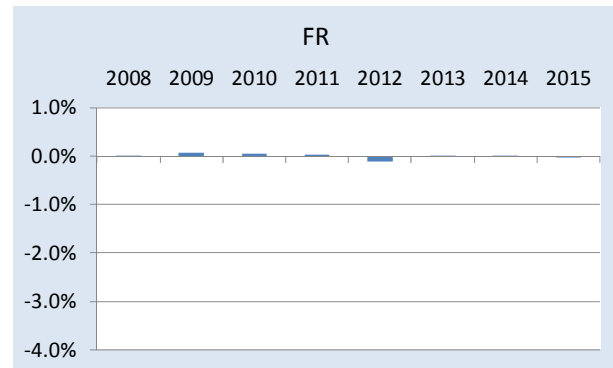
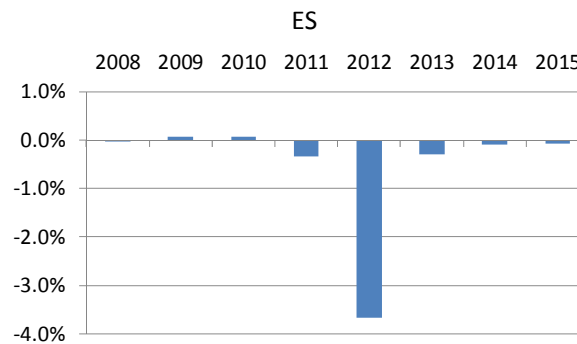
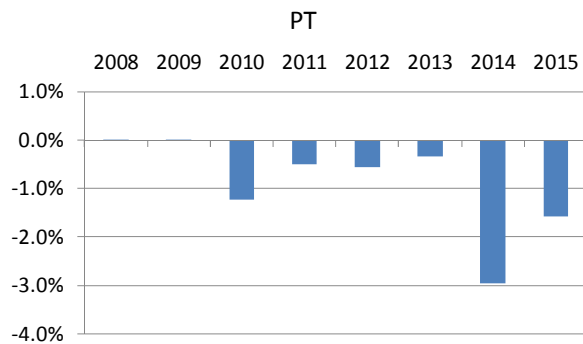
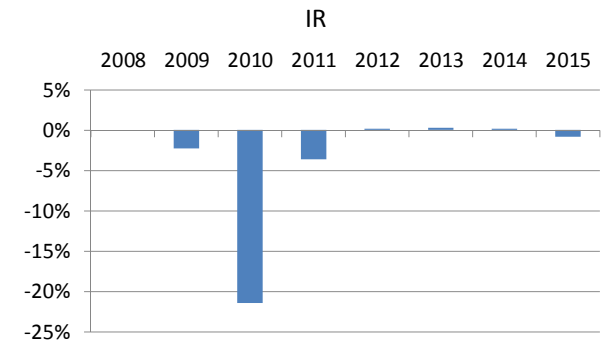
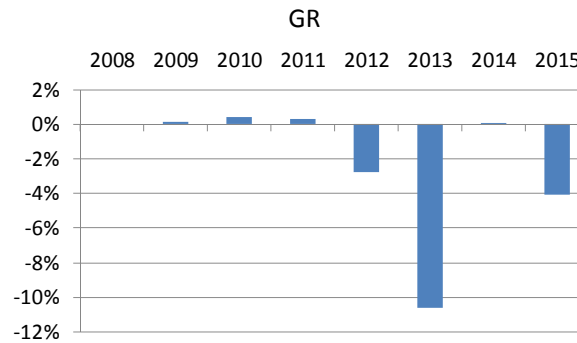
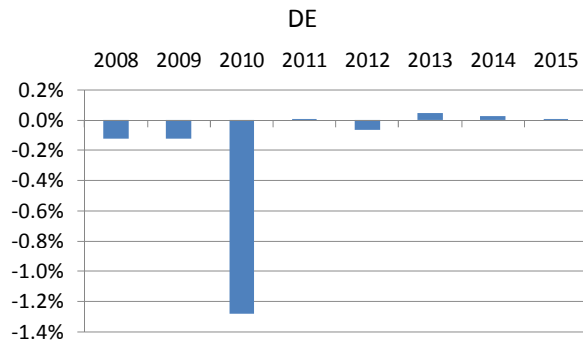
Source: IMF Global Financial Stability Report April 2016

Policy implications

- improve incentives to invest
 - major obstacle for investment in many EA countries are financial constraints on the side of the firms
 - non-performing loans (NPL) as a major source of frictions
 - limits the banks' ability to lend to the real economy
 - lower profitability (due to higher provisioning needs), higher capital requirements (NPL are risky assets), higher funding costs (market lender demand risk premia)
 - ways to reduce NPL
 - transfer of distressed assets to (publicly owned) bad banks
 - asset protection schemes to cover the losses related to a specific portfolio of assets
 - in any case fiscal support for the banking system is required
 - EAA and FMS in Germany since 2009
 - NAMA in Ireland since 2009
 - SAREB in Spain since 2012

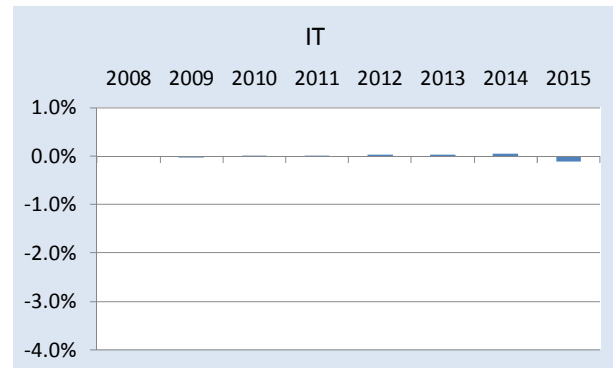
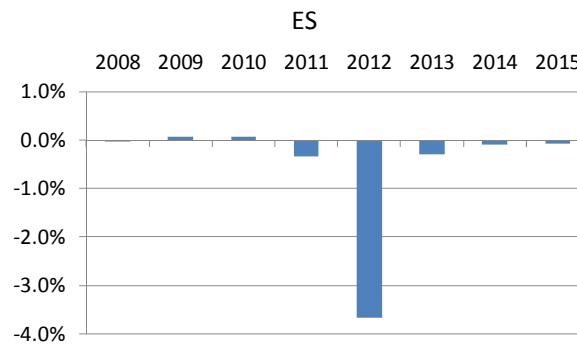
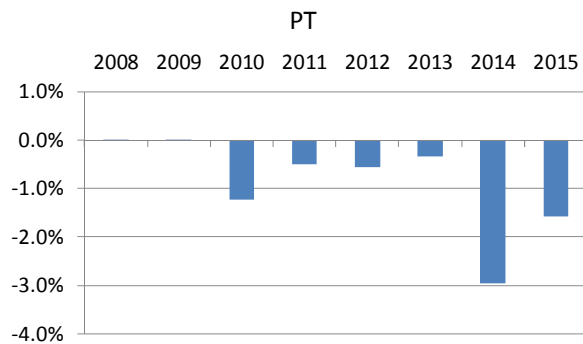
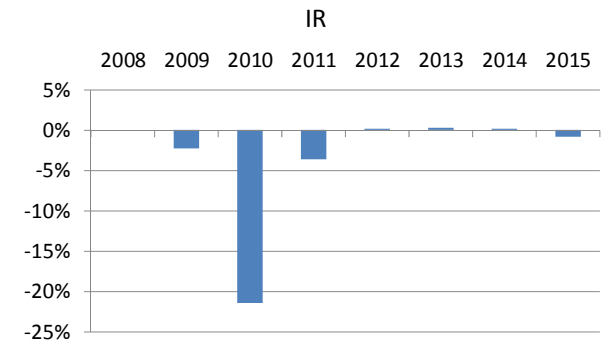
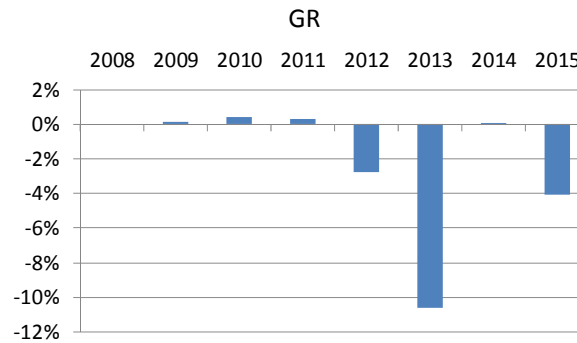
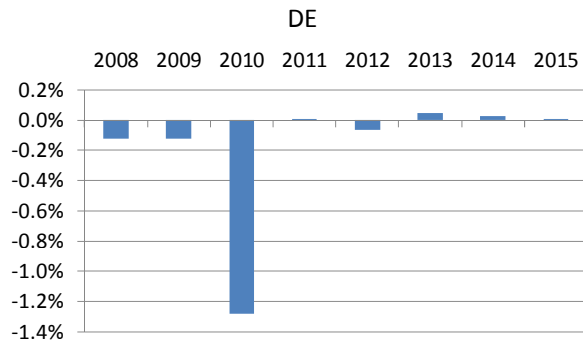
Policy implications

Government interventions to support financial institutions
(actual impact of interventions on government deficit in relation to GDP)



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(actual impact of interventions on government deficit in relation to GDP)



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Back-up slides

Smets-Wouters Model Overview

- New Keynesian DSGE model
 - continuum of households
 - supply household-specific labor in monopolistic competition
 - set wages, which are Calvo-sticky
 - own the capital stock, which they rent to the intermediate good firms
 - for given income higher investment today means lower consumption (budget constraint)
 - habit formation, investment adjustment costs, variable capital utilization
 - continuum of intermediate good firms
 - supply intermediate goods in monopolistic competition using labor and capital input
 - set prices, which are Calvo-sticky
 - final goods use intermediate goods and are produced in perfect competition
 - monetary authority follows a Taylor-type rule
 - many sources of shocks - enough to make sure the data can be matched to the model

Smets-Wouters Model Overview

- Modifications
 - estimated with employment data, instead of aggregate hours worked
 - replace the transitory technology shocks with permanent shocks in technology
 - the permanent technology follows an AR(1) in growth rates in technology
 - model extension by introducing credit frictions in the Smets-Wouters framework, using the financial accelerator mechanism proposed by Bernanke, Gertler and Gilchrist (1999)

Estimation Overview

- estimated with Bayesian techniques using 7 (or 8) data series
 - real variables
 - private consumption
 - GDP
 - investment
 - employment
 - nominal variables
 - core inflation
 - wages per capita
 - (spread between private non-financial lending rates and 10-year German government bond yield)
 - Monetary policy
 - 3-month Euribor rate
- all other (latent) model variables, including the models exogenous processes, are estimated as part of the Kalman-filter routine
- estimation period 1999q4 to 2016q1

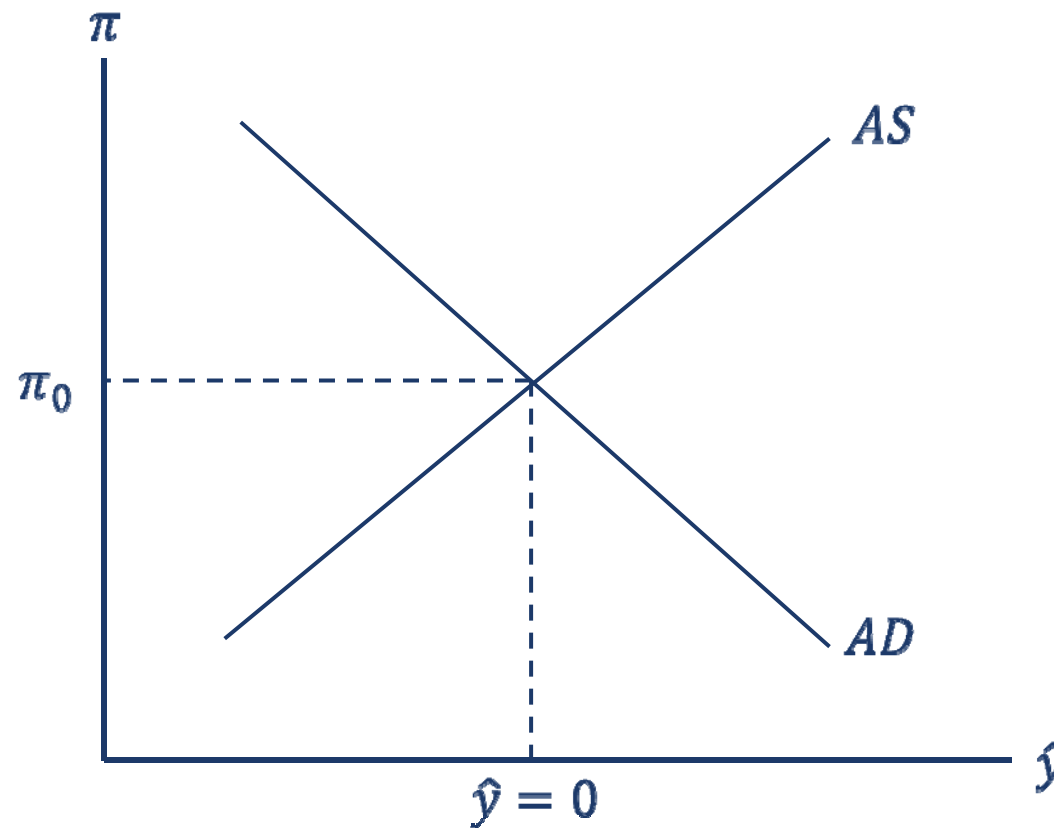
Concept of the natural real interest rate (NRIR)

- NKM

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- } \Rightarrow AD curve
- \Rightarrow AS curve

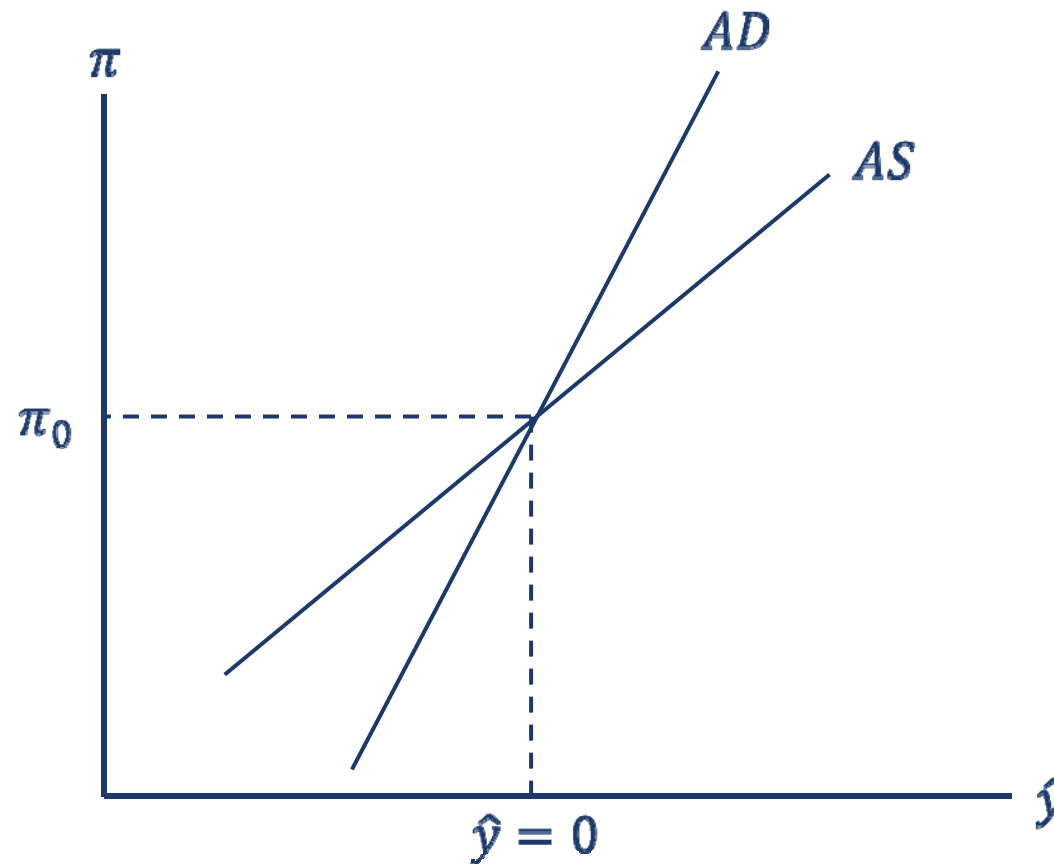
Concept of the natural real interest rate (NRIR)

- under normal circumstances



Concept of the natural real interest rate (NRIR)

- at the zero lower bound



Concept of the natural real interest rate

- NKM
 - natural real interest rate is negatively correlated with transitory productivity increases
 - intuition: a temporary increase in productivity leads to a temporary increase in income which will only be consumed today if the price of output today falls relative to its price tomorrow (and by this the natural real interest rate r_t^n must fall)
 - natural real interest rate is positively correlated with temporary increases in government expenditure
 - intuition: if the government spends more today holding spending tomorrow constant, the price of output today must rise relative to its price tomorrow (and by this the natural real interest rate r_t^n must rise)

Concept of the natural real interest rate

- NKM
 - natural real interest rate is positively correlated with households' discount factor
 - intuition: a lower discount factor in period t in the utility function means a higher preference for future consumption
 - since everyone suddenly wants to save more, the natural real interest rate r_t^n must decline for output to stay constant
 - natural real interest rate is positively correlated with the firms' willingness to invest
 - intuition: if the firms' willingness to invest declines, they will postpone investment into the future
 - the natural real interest rate r_t^n must decline for output to stay constant