

# The fiscal impact on euro area inflation

Giovanni Callegari, Keith Kuester, Francesco Drudi

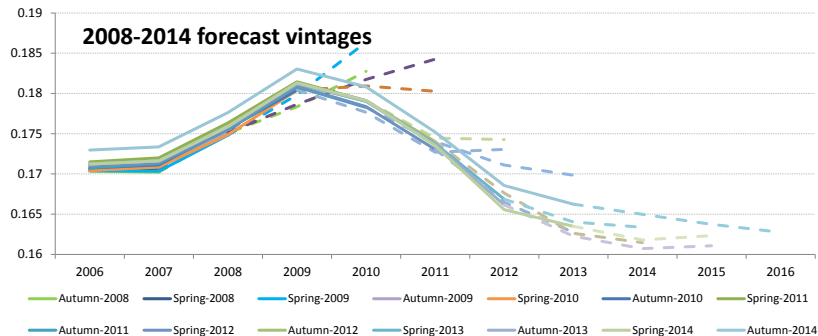
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**Preliminary**

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<sup>1</sup>The views expressed are those of the authors. They do not necessarily coincide with those of the ECB. Any errors and omissions are the sole responsibility of the authors.

# Expectations on government consumption



Periphery countries, Govt consumption-to-GDP ratio. Solid line: historical data; dashed line: forecasts

Source: European Commission

# Motivation

- ▶ Expectations on how public debt innovations are financed are crucial to understand contribution of fiscal development to economic dynamics
- ▶ At the lower bound, policy changes effective to the extent they affect fiscal expectations.
  - ▶ Short- and medium-term: fiscal plans
  - ▶ Long-term: SGP
- ▶ What is missing, is a quantitative assessment of how changes in fiscal expectations affect:
  - ▶ debt,
  - ▶ inflation,
  - ▶ output.
- ▶ And how they interact with changes in the perceived sovereign risk.
- ▶ We provide such an assessment in a calibrated two-country model of the euro area.

# Main questions

- ▶ How have fiscal expectations evolved in the EA since the beginning of the crisis?
- ▶ How have the expected composition of fiscal plans affected the output and price dynamics?
- ▶ What was the role of the changes in the risk profile?

# What we do I

- ▶ Take fiscal forecasts, vintage by vintage. Today: European Commission.
- ▶ Condense the information in these forecasts into the evolution of forecast sequences for tax rates and gov't consumption expenditures.
- ▶ This gives us point forecasts of “fiscal plans.”
- ▶ Treat (Average) tax rates as the instruments that affect economic choices (along the lines of Mendoza et al. 1994).

## What we do II

- ▶ Treat these fiscal plans, as embedded in the forecasts, as the information about the fiscal outlook available to the agents in the economy.
- ▶ Assess the fiscal plans' output and inflation effect through the lens of a model.
- ▶ New Keynesian two-country, currency union model with frictional intermediation and sovereign risk (an extended version of Corsetti et al. (2014)).
- ▶ Use this to conduct counterfactuals. How would the evolution of inflation and economic activity have looked like under alternative plans, for example, a no-change in fiscal policy?

## What we don't do

- ▶ Fiscal monetary interaction depending on different long-run expectations
- ▶ Account for the role of uncertainty. Both in short- and medium-term.
- ▶ Only tradable goods
- ▶ No investment in the model
- ▶ No normative considerations.
- ▶ No strategic default.
- ▶ Impact of monetary policy non-standard measures (other than captured in spreads).

## Preview of results

- ▶ Significant shifts in forecasts over time.
- ▶ Spending-based consolidation in the periphery
- ▶ Higher tax rates and spending in the core:
- ▶ Keeping things at pre-crisis levels (no-change fiscal policy) scenario:
  - ▶ Euro area inflation and output dynamics would have been similar, less divergence between core and periphery countries
  - ▶ Debt/GDP by about 15pp. lower in the periphery, and 5 pp. lower in the core
  - ▶ But the effort to do so on the revenue side would have been substantial
- ▶ Spending (and tax) multipliers can be strongly affected by sovereign risk.
- ▶ Important role of the expected persistency of the fiscal shocks



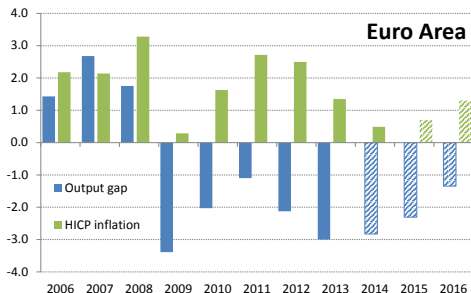
## Literature

- ▶ Expected fiscal policy changes, spending reversals: Corsetti, Meier and Mueller (2012)
- ▶ Impact of the fiscal stimulus in the euro area: Coenen, Straub and Trabandt (2013).
- ▶ Fiscal consolidation in the euro area: in 't Veld (2013).
- ▶ Fiscal consolidation in monetary union: Erceg/Lindé (2013, 2014).
- ▶ Multipliers at ZLB: Christiano/Eichenbaum/Rebelo (2011), Woodford (2011).
- ▶ Fiscal spillovers in a currency union: Blanchard, Erceg and Lindé (2014).
- ▶ Model sovereign default and interest rate spillover: Arellano (2008), Mendoza/Yue (2011).
- ▶ Identification of fiscal shocks through forecast revisions: Ricco (2014), Ramey (2011).

# Stylized facts and data

# Euro area since the beginning of the financial crisis I

- ▶ Four different phases of economic activity
  - ▶ Phase 1: Rising output gap and collapse of inflation (2009).
  - ▶ Phase 2: Gap narrows and inflation recovers (2010-2011).
  - ▶ Phase 3: Double-dip (2013).
  - ▶ Phase 4: Gradual convergence/recovery (projected).
- ▶ Fiscal stimulus-consolidation-stabilisation



Source: ECB December BMPE and AMECO, Autumn 2014

# How to account for fiscal developments I

- ▶ European Commission macroeconomic and fiscal forecasts (AMECO)
  - ▶ Bi-annual releases (Spring and Autumn forecasts, 14 vintages).
  - ▶ 2-years (Spring) and 3-year horizon (Autumn)
  - ▶ Very detailed forecasts, definitions aligned with national accounts.
  - ▶ Future changes in instruments included if either legislated or laid out in sufficient detail, and considered likely to be adopted.

## How to account for fiscal developments II

- ▶ EC forecasts perhaps reasonably good approximation of agents' fiscal expectations.
- ▶ Forecast revisions as a way to capture the timing of policy changes.
- ▶ Based on the fiscal and macro EC forecasts, we construct historical and forecasted average taxes on labour and consumption, and government consumption ratios.

# Informational content of forecast revisions

- ▶ Forecast revisions of tax rates and government consumption ratios are due to:
  - ▶ Adoption of discretionary policy measures
  - ▶ Revisions of the sensitivity of taxes to the macro base due to:
    - ▶ Progressive of the taxation system
    - ▶ Behavioral changes of economic agents
    - ▶ Changes in compliance rates
  - ▶ Revisions of historical variables
- ▶ No role for ex-post revisions (only current forecasted values are input to the model simulations).
- ▶ No differentiation between the reasons behind forecast revisions.

## Average tax rate on labour income

- ▶ Mendoza et al. (1994) and Leeper, Plante and Traum (2010)
- ▶ First step: average tax rate on household income

$$\tau_{t+s|t}^h = \frac{THC_{t+s|t}}{GDI_{t+s|t} + THC_{t+s|t}}. \quad (1)$$

*THC*: Taxes paid by households; *GDI*: gross disposable income of households

- ▶ Average tax on labor income:

$$\tau_{t+s|t}^l = \frac{\tau_{t+s|t}^h [WGS_{t+s|t} + OHH_{t+s|t}/2] + SSC_{t+s|t}}{COE_{t+s|t} + OHH_{t+s|t}/2}. \quad (2)$$

Half of HH's operating income, *OHH*, account as labour income of self-employed.

## Average tax rate on consumption

$$\tau_{t+s|t}^c = \frac{\text{TIN}_{t+s|t}}{\text{PCE}_{t+s|t} + \text{INC}_{t+s|t} + \text{GIN}_{t+s|t} - (\text{TIN}_{t+s|t})}. \quad (3)$$

- ▶ It refers to total indirect taxes (VAT, taxes on imports, excise and energy taxes).
- ▶ The macro tax base includes
  - ▶ Household final consumption expenditures (PCE)
  - ▶ Government intermediate consumption *INC*
  - ▶ Government investment *GIN*.



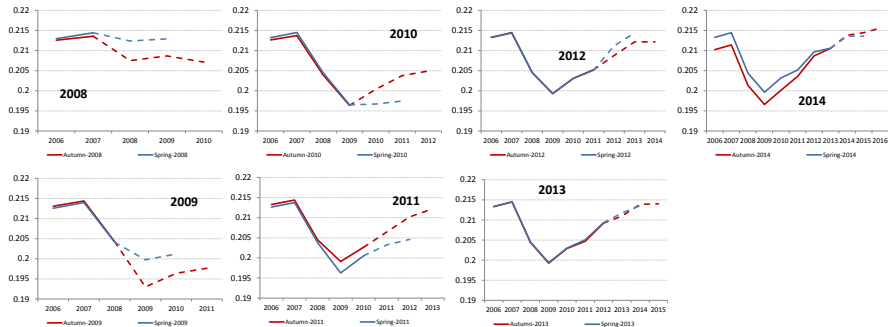
# Government consumption and transfers

- ▶ Gov't consumption is expressed as a ratio of potential GDP
  - ▶ We use the EC Spring 2014 potential GDP (to avoid the impact of ESA2010 methodological changes).
- ▶ Transfers arise endogenously in the model, as a function of debt and output.

## Four phases in fiscal projections in the Euro area

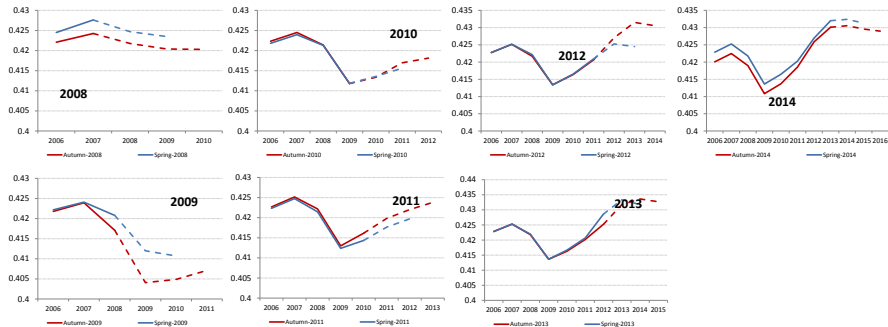
1. Stimulus (2008-2009, as forecasted in 2008 and 2009).  
Characterized by a reduction in the average effective tax rates and increases in government consumption and transfers.
2. Stabilization (2010, as forecasted in 2009 and in the Spring 2010 EC forecast). Both the tax rates and the spending are expected to stabilize at the levels observed in 2009.
3. Consolidation (2010-2013, predicted starting from the Autumn 2010 EC forecast). Tax rates are projected to increase and spending to stabilize at the levels observed in 2009.
4. Second stabilization period (2014-2016), in which the tax rates are expected to stabilize and the spending levels to slightly increase.

# Indirect tax rate - Euro area



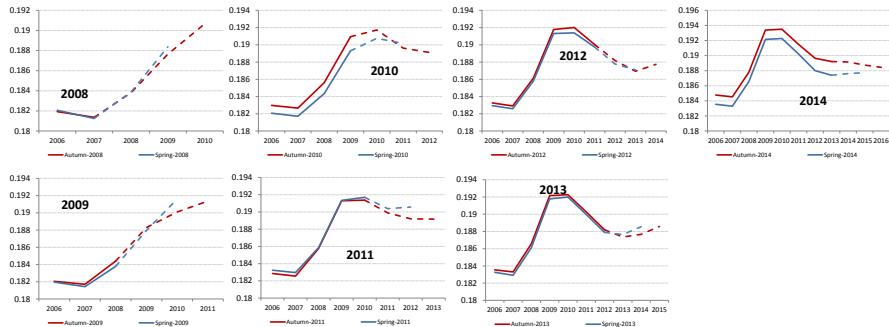
Euro area, average effective indirect tax rates. Solid line: historical data; dashed line: forecasts

# Labour tax rate - Euro area



Euro area, average effective labour tax rates. Solid line: historical data; dashed line: forecasts

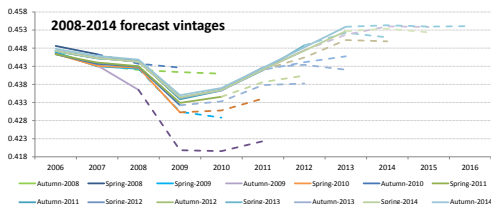
# Government consumption - Euro area



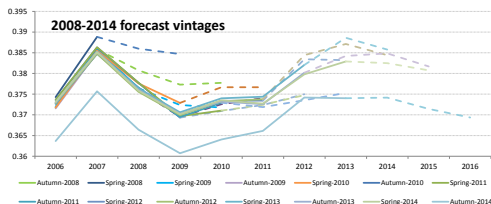
Euro area, govtn consumption to GDP ratio. Solid line: historical data; dashed line: forecasts

# Core and periphery - Labour taxes

Different profile in the changes in labour taxes



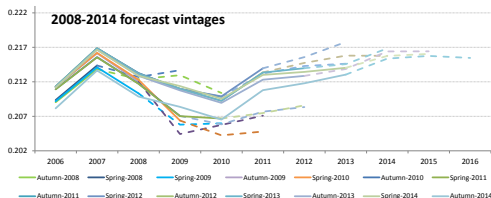
Core countries, Average labour tax rate. Solid line: historical data; dashed line: forecasts



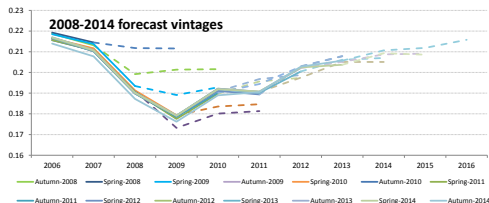
Periphery countries, Average labour tax rate. Solid line: historical data; dashed line: forecasts

# Core and periphery - Indirect taxes

Indirect tax rates stable in core but very volatile in the periphery



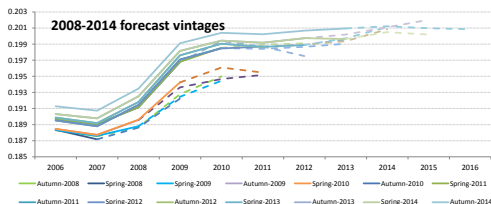
Core countries, Average indirect tax rate. Solid line: historical data; dashed line: forecasts



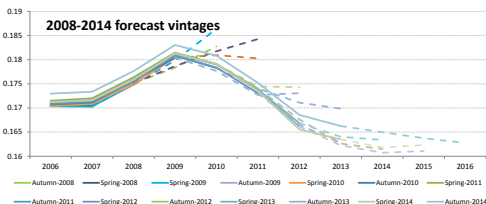
Periphery countries, Average indirect tax rate. Solid line: historical data; dashed line: forecasts

# Core and periphery - Government consumption

Post-stimulus stabilization in core - Adjustment in periphery



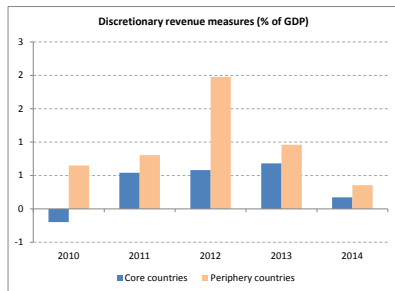
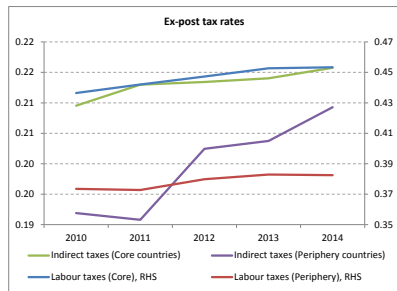
Core countries, Govt consumption-to-GDP ratio. Solid line: historical data; dashed line: forecasts



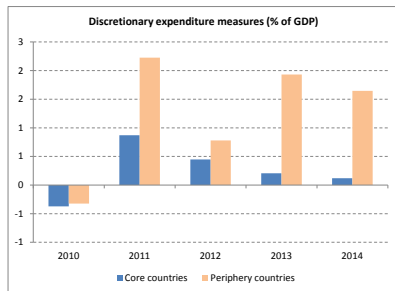
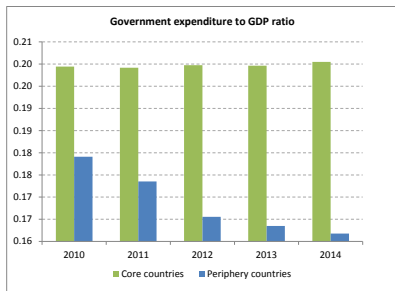
Periphery countries, Govt consumption-to-GDP ratio. Solid line: historical data; dashed line: forecasts



# Tax rates and discretionary revenue measures



# Expenditure ratios and discretionary expenditure measures



# Model

## New Keynesian model with sovereign risk channel II

- ▶ Monetary union comprised of two countries: Home and Foreign H and F
- ▶ Countries only differ in size and fiscal policy settings, (otherwise symmetric).
- ▶ Agents have a preference for domestic goods (home bias in private spending).
- ▶ Home and Foreign goods are produced by H and F firms, using domestic labor only.
- ▶ Prices of individual goods are sticky (Calvo): output is demand-determined.
- ▶ Habit persistence in consumption
- ▶ Real wages are sticky, too (quadratic adjustment costs).
- ▶ Gov't consumption falls on domestic goods only.
- ▶ Sovereign stress transmits to corporate borrowing conditions

# Household types

- ▶ Households are indexed by type and country of residence.
- ▶ Can be borrowers ( $b$ ) or savers ( $s$ ).
- ▶ Savers can put their savings into
  - ▶ risky domestic government bonds or
  - ▶ one-period risk-free deposits with a union-wide financial intermediary.
- ▶ Borrowers obtain funds from financial intermediaries. Borrowing rates are subject to country-specific spreads.
- ▶ Possibility of sovereign default with haircuts ( $\theta_t$ ) on government bonds
  - ▶ Risk premia depends on the debt level (and distance from a stochastically determined fiscal limit)
  - ▶ The sensitivity of risk premia to the debt level can be made time-varying

# Insurance and heterogeneity I

- ▶ At the beginning of period, a share  $(1 - \delta)(1 - \pi)$ ,  $\delta \in (0, 1)$ ,  $\pi \in (0, 1)$  of household members redraw their type  $(b, s)$ .
- ▶ A share  $(1 - \delta)\pi$ , of household members redraws both type and location  $(b, s)$ .
- ▶ This keeps heterogeneity in check.
- ▶ Type changers
  - ▶ are assigned a country of residence: Home with probability  $\theta$ ; Foreign with probability  $1 - \theta$ .
  - ▶ conditional on residence, with probability  $\pi_b$  the type changer ends up with a borrower's preferences. With probability  $\pi_s = 1 - \pi_b$ , a saver.
- ▶ The type-location changing mechanism *partially* insures households across types, by making changes in wealth levels temporary.

# Insurance and heterogeneity II

- ▶ NB: these assumptions also ensure stationarity of net foreign assets.
- ▶ Nevertheless, financial conditions will differ in the short and medium run, thus affecting the consumption and labor supply decisions of the different types of households.

# Financial intermediaries

Perfectly competitive, risk neutral intermediaries take on deposits and provide loans (no equity); lending rate is risk-free policy rate, borrowing rate depends on country of borrower;

$$(1 + \omega_t)(1 + i_t^d) = 1 + i_t^b$$

Costs of intermediation due to loan losses/“fraud”  $\chi_t b_t$

Profit maximization subject to financing constraint  $d_t > b_t(1 + \omega_t)$  gives optimality condition

$$\omega_t = \chi_t$$

**Our assumption** (“jurisdiction risk”, e.g. Mendoza-Yue):

$$\chi_t = \chi_\psi \left( \frac{1 + i_t^g}{1 + i_t^d} \right)^{\alpha_\psi} - 1$$

same for  $\omega_t^*$  and  $\chi_t^*$ .



# Fiscal policy

Four specific fiscal instruments:

- ▶ Government consumption  $g_t$
- ▶ Labour taxes  $\tau_l$
- ▶ Consumption (indirect) taxes  $\tau_c$
- ▶ Lump-sum transfers  $T_g$
- ▶ Losses are compensated with transfers:

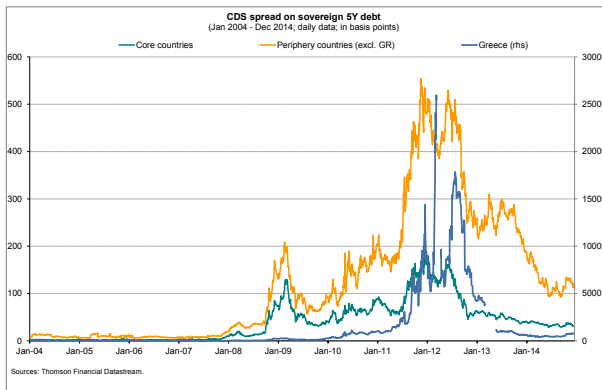
$$T_t^c = \vartheta_t B_{t-1}^g (1 + i_{t-1}^g).$$

$$B_t^g = B_{t-1}^g (1 + i_{t-1}^g) + P_{H,t} g_t - (P_t c_t \tau_t^c + P_t w_t h_t \tau_t^l + T_t^g).$$

$$\frac{f_t}{P_t} - f_t = \phi_{f_t, y} (y_{H,t} - y_H) + \phi_{f_t, b^g} (b_{t-1}^g - b^g).$$

where  $f_t \in g_t, \tau_l, \tau_c, T_g$ . We set  $\phi_{f_t, y} = 0$  except for transfers.

# Risk premia in periphery and core countries



# Monetary policy and equilibrium

Interest rate rule

$$\begin{aligned} \log(1 + i_t^{d, target}) = & \log(1 + i^d) + \phi_{\Pi} \frac{1}{2} [\log(\Pi_t / \Pi) + \log(\Pi_t^* / \Pi)] \\ & - \phi_{\omega} \frac{1}{2} [\log((1 + \omega_t) / (1 + \omega)) + \log((1 + \omega_t^*) / (1 + \omega))] \end{aligned}$$

- ▶ Plus an interest smoothing term.
- ▶  $\phi_{\Pi}$  large.
- ▶  $1 > \phi_{\omega} \geq 0$ , set so as to roughly neutralize effect of spreads on aggregates.

# Quantitative assessment

# Elements of rough first calibration I

- ▶  $\theta = 1/3$ : size of “periphery.”
- ▶ Mass of borrowers and savers:  $\pi_b = \pi_s - 0.5$ .
- ▶ Prob of staying type for sure:  $\delta = 0.95$ .
- ▶ Prob of drawing new location:  $(1 - \delta)\pi = 0.05 \cdot .25$ .

## Elements of rough first calibration II

- ▶  $\phi_{T,y} = \phi_{T,y^*} = 0.25$ .
- ▶ Debt target:  $0.6 \cdot 4$ ;
- ▶ Long-run labor tax rate:  $\tau^L = 0.42$  (EA average pre crisis).
- ▶ Long-run VAT rate:  $\tau^C = 0.22$  (EA average pre crisis).
- ▶ Long-run  $g = 0.18$ .

## Elements of rough first calibration III

- ▶ Central bank targets inflation (net of VAT shocks):
  - ▶ Taylor rule with  $\phi_\pi = 1000$ ,  $\rho_R = 0.7$ .
  - ▶ Response to spread: 0.75 (cushion effect of spread on aggregate in normal times).

## Elements of rough first calibration IV

- ▶ Moderate home bias: periphery accounts for 25% of core's consumption basket, core for 50% of periphery's.
- ▶ Trade elasticity:  $\phi = 1$ .
- ▶ NKPC flat as in standard estimates of slope of the NKPC. Calvo parameter of 0.9 (Erceg, Lindé, CKMM).
- ▶ partial indexation of PPI inflation to past domestic inflation rate (0.7),
- ▶ Wages stickiness parameter resembles Calvo wages with average duration of about a year.
- ▶ Elasticities of intertemporal substitution chosen to replicate log case in the aggregate and to have  $h_b = h_s$  (both work the same hours).



## Elements of rough first calibration V

- ▶ Frisch elasticity (labor supply):  $1/\eta = 1/4$ .
- ▶ Consumption habit parameter=0.5
- ▶ Parameters that govern private risk-premium (financial friction) set to get spread between borrowing and deposit rate  $400 * (i^b - i^d) = 2.5$  (2.5 percent ann.)

# Caveats

- ▶ We will present a stylized scenario, in a rough calibration (more to do. Private debt, net foreign asset response, ...).
- ▶ Full pass-through of VAT to CPI
- ▶ Results will depend on the exact adjustment path (timing, size, ...). We show one (although, by no means picked with result in mind).
- ▶ Law of one (producer-)price.
- ▶ We do not have a lot of internal propagation (other than through inflation and debt).

# Baseline – setup I

- ▶ Iterated perfect foresight solution of the model.

## Baseline – setup II

- ▶ Sequence of unanticipated shocks to the natural rate of interest (discount-factor shocks):
  - ▶ Push central bank to the ZLB, and keep it there.
  - ▶ Half-life of shock: 10 quarters.

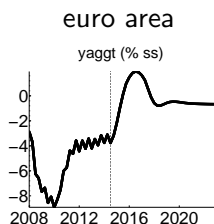
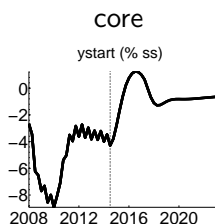
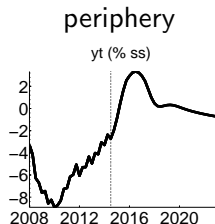
## Baseline – setup III

- ▶ Simulations start in 2008Q1, from steady-state with 2007 debt levels (core: 62% to GDP, periphery: 75% to GDP).
- ▶ Iterated perfect foresight projections for fiscal paths.
- ▶ Feed in fiscal projections for first 12 qtrs.
- ▶ Starting with qtr 13, fiscal instruments react to the actual debt level (Maastricht criteria  $\Rightarrow$  target of 60% debt/GDP).
- ▶ Gov't consumption falls on domestic goods only.

## Baseline – setup IV

- ▶ Sovereign spreads:
  - ▶ in 2008Q1 no sovereign spread (agents perceive no default risk).
  - ▶ then, perception of default risk gradually returns through 2010Q1.
  - ▶ full perception of sovereign risk remains through 2012Q3, when it is significantly reduced (“do whatever it takes”).

# Baseline evolution

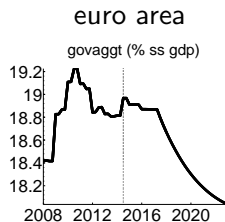
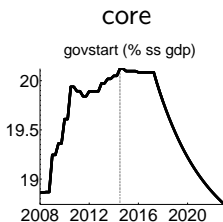
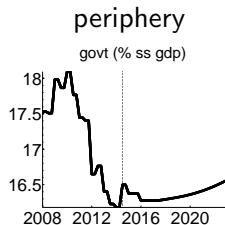


## Gross domestic product

- ▶ Symmetric shock to natural real rate causes deep recession in both core and periphery (symmetric shock).



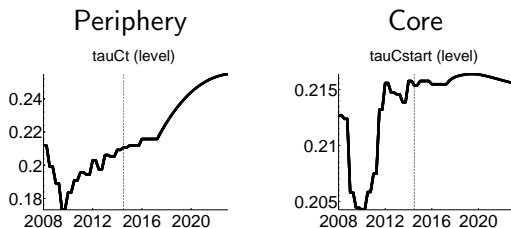
# Gov't consumption



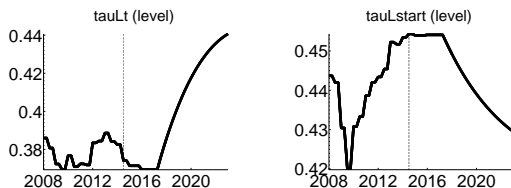
## Gov't consumption

- ▶ Phases in periphery.
- ▶ Easing 2008/09, austerity 2010 ff.
- ▶ Stimulus in core throughout
- ▶ Persistent stimulus on the aggregate level.

# Tax rates



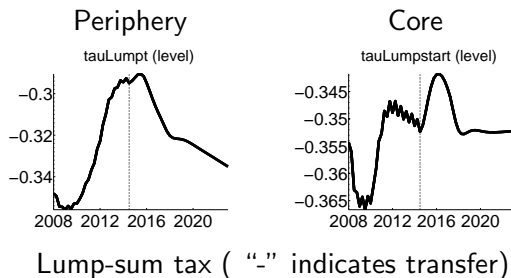
## Consumption tax rate



## Labor tax rate

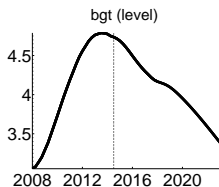
- ▶ Three phases: stimulus 2008/09, tightening 2011/12, partial easing 2013.

# Implied transfers

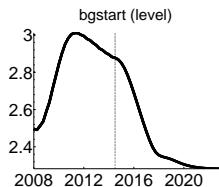


- ▶ Cut back of transfers to in periphery to stabilize debt.

# Government debt



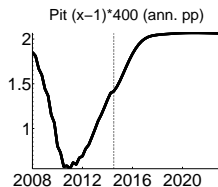
Gov't debt periphery



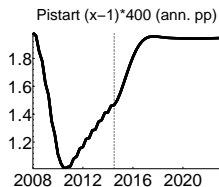
Gov't debt core

- ▶ Debt over qtrly st.-st. GDP.
- ▶ Debt in periphery rises to 115 percent of steady-state GDP.
- ▶ Debt in core rises to 72 percent of steady-state GDP.

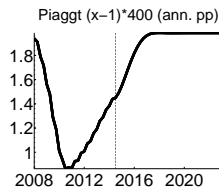
# Inflation consumer prices (net of VAT)



periphery



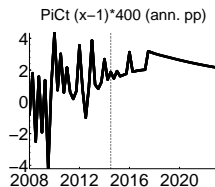
core



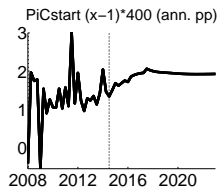
euro area

- ▶ Inflation falls as marginal costs fall with economic activity.

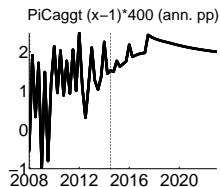
# Inflation consumer prices (HICP, incl. VAT)



periphery



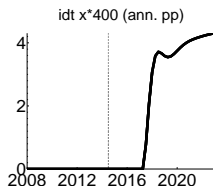
core



euro area

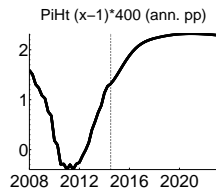
- ▶ Inflation falls as marginal costs fall with economic activity.

## Deposit rate (CB target)

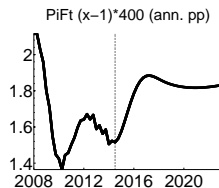


- ▶ EONIA forward curve as of Dec 8, 2014 implies zero rate through 2017Q1.

# Inflation: producer prices



periphery

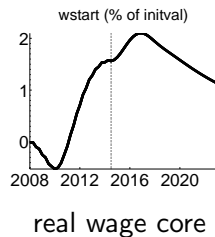
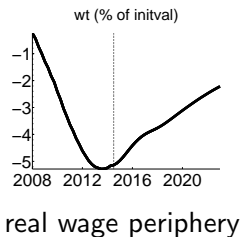


core

- ▶ Low inflation falls mainly on periphery's goods  $\Rightarrow$  terms of trade improve.



# Real wages

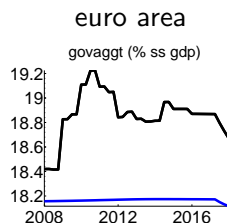
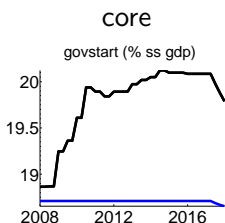
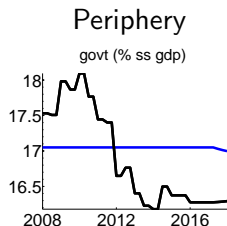


- ▶ Periphery's wage falls relative to core's.

# Decomposing the effects I

- ▶ compare baseline paths with:
- ▶ no change in instruments (apart from transfers) throughout (red – ). Remain at levels of 2007.
- ▶ the following paths show the instruments in levels.
- ▶ all other charts show the difference between the counterfactual and baseline.
- ▶ in all these cases, agents expect the consolidation rules to be active starting 12 qtrs from now.

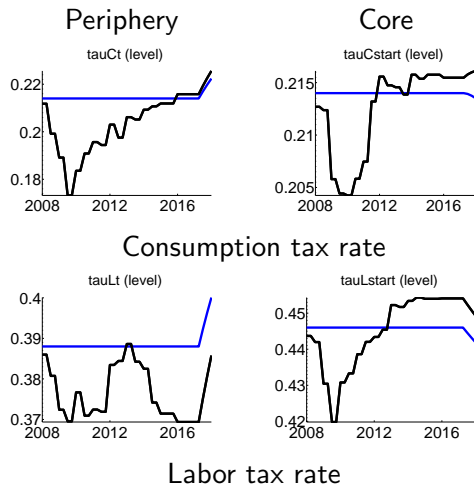
# Gov't consumption



Gov't consumption

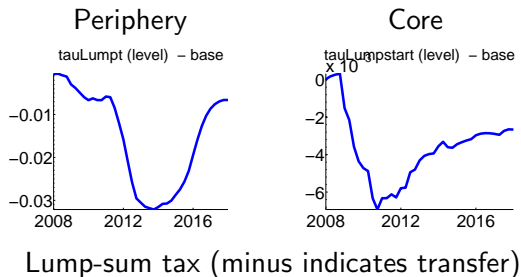
- ▶ **blue:** difference between evolution under the constant-instrument counterfactual and the baseline.

# Taxes



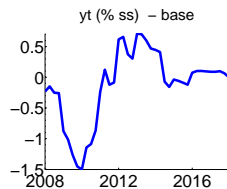
- **blue:** difference between evolution under the constant-instrument counterfactual and the baseline.

# Implied transfers

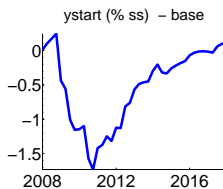


- ▶ **blue**: difference between evolution under the constant-instrument counterfactual and the baseline.

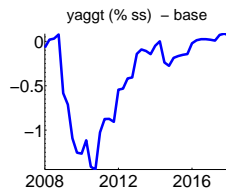
# GDP



GDP periphery



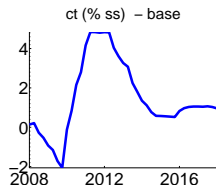
GDP core



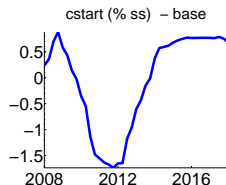
GDP euro area

- ▶ **blue:** difference between evolution under the constant-instrument counterfactual and the baseline.

# Consumption



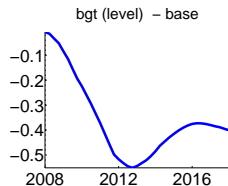
Consumption periphery



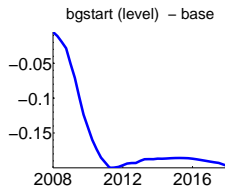
Consumption core

- ▶ **blue**: difference between evolution under the constant-instrument counterfactual and the baseline.

# Government debt



Gov't debt periphery

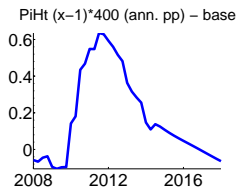


Gov't debt core

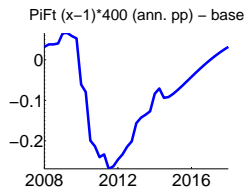
- ▶ **blue**: difference between evolution under the constant-instrument counterfactual and the baseline.



# Inflation: PPI



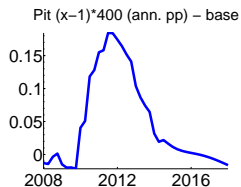
PPI inflation periphery



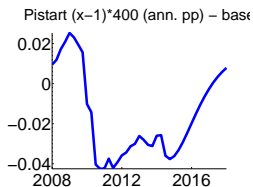
PPI inflation core

- ▶ **blue:** difference between evolution under the constant-instrument counterfactual and the baseline.

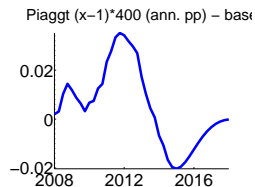
# Consumer price inflation (net of VAT)



Inflation periphery



Inflation core

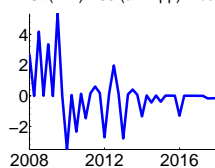


euro area

- ▶ **blue**: difference between evolution under the constant-instrument counterfactual and the baseline.
- ▶ Effect “small” in the aggregate.
- ▶ Note: inflation and output “responses” need not follow demand-side logic at ZLB. Timing of shocks (and anticipation/or lack thereof) matters (to be explored in more depths).

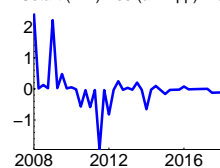
# Consumer price inflation (HICP, incl. VAT)

$PiCt(x-1)*400$  (ann. pp) – base



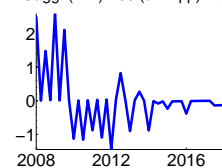
Inflation periphery

$PiCstart(x-1)*400$  (ann. pp) – base



Inflation core

$PiCaggt(x-1)*400$  (ann. pp) – base



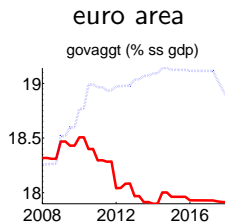
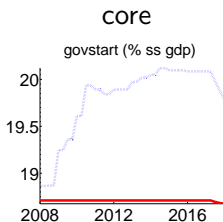
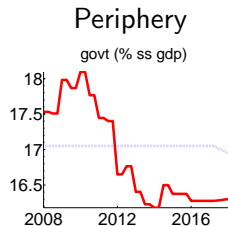
euro area

- ▶ **blue:** difference between evolution under the constant-instrument counterfactual and the baseline.
- ▶ HICP path strongly influenced by VAT (according to model; PPI sticky!).

# Decomposing the effects II

- ▶ how contractionary is the path of gov spending in periphery?
- ▶ how important is core's stimulus?
- ▶ compare baseline paths with:
  - ▶ no change in gov't cons. periphery throughout (blue :).
  - ▶ no change in gov't cons. core throughout (red -)
- ▶ shown below is, again, the difference between counterfactual and baseline. The instruments are shown in levels.
- ▶ in all these cases, agents continue to expect the consolidation rules to be active starting 12 qtrs from now.

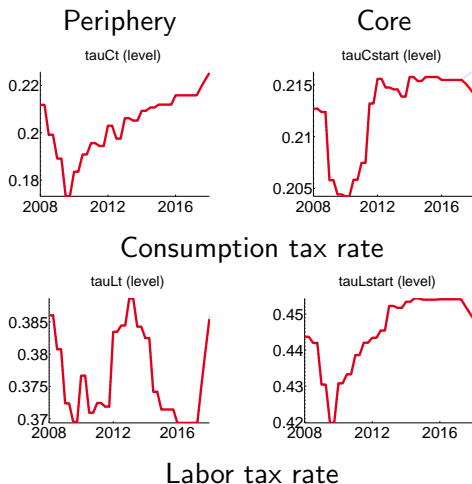
# Gov't consumption



Gov. consumption

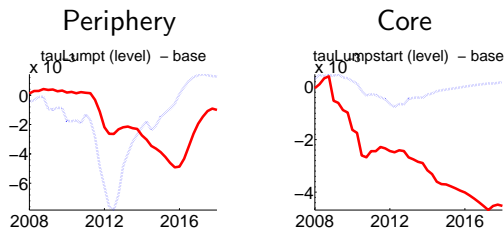
- ▶ **blue**: gov't consumption periphery constant.
- ▶ **red**: gov't consumption core constant.

# Taxes – as in baseline by construction



- ▶ **blue:** gov't consumption periphery constant.
- ▶ **red:** gov't consumption core constant.

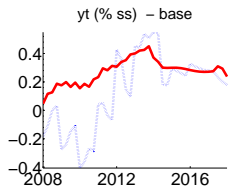
# Implied transfers



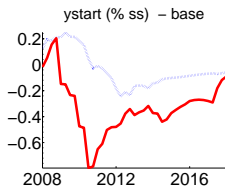
Lump-sum tax (- indicates transfer)

- ▶ **blue**: gov't consumption periphery constant.
- ▶ **red**: gov't consumption core constant.

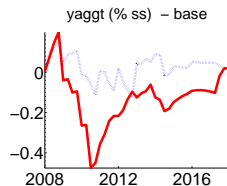
# GDP



GDP periphery



GDP core

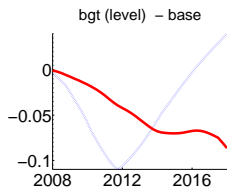


euro area

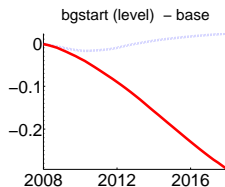
- ▶ **blue**: gov't consumption periphery constant.
- ▶ **red**: gov't consumption core constant.



# Government debt



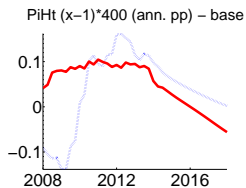
Gov. debt periphery



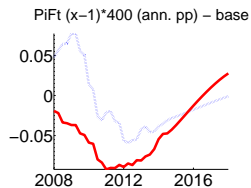
Gov. debt core

- ▶ **blue**: gov't consumption periphery constant.
- ▶ **red**: gov't consumption core constant.

# Inflation: PPI



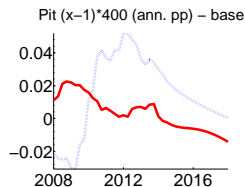
PPI inflation periphery



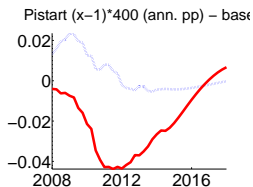
PPI inflation core

- ▶ **blue**: gov't consumption periphery constant.
- ▶ **red**: gov't consumption core constant.

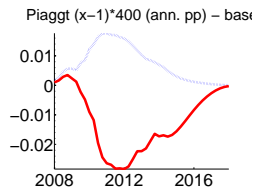
# CPI Inflation (net of VAT)



Inflation periphery



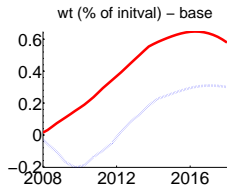
Inflation core



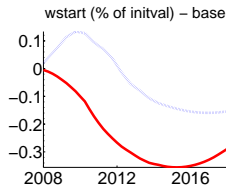
euro area inflation

- ▶ **blue**: gov't consumption periphery constant.
- ▶ **red**: gov't consumption core constant.

# Wages



Inflation periphery



Inflation core

- ▶ **blue**: gov't consumption periphery constant.
- ▶ **red**: gov't consumption core constant.

# Why are the results so “beggar-thy neighbor”? I

- ▶ Seemingly seems to run counter to intuition in CKMM. But,
- ▶ Persistence of spending:
  - ▶ Higher government consumption in CORE after ZLB crowds out consumption in PERIPHERY (inflationary effect means real rate will rise once out of the ZLB).  $\Rightarrow$  gov. spending increase not well targeted to be effective only at ZLB.
  - ▶ For a spending increase in PERIPHERY, PERIPHERY gets direct effect + the reversal effect induced by SGP.

## Why are the results so “beggar-thy neighbor”? II

- ▶ Price stickiness: here:  $\alpha = 0.9$  (still reasonable slope of NKPC, but close to the empirical boundaries).
  - ▶ The more sticky prices are, the more will future count
  - ▶ if effect of spending on inflation is persistent, mp will accommodate less.
  - ▶ inflation persistence is important for the above results (persistence of 0.7) for the same reason.
- ▶ Trade elasticity matters, too. Here: unitary elasticity. The higher the elasticity, naturally, the more positive are the spillovers.

## Why are the results so “beggar-thy neighbor”? III

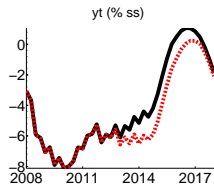
- ▶ Last, interest sensitivity of demand likely a factor. Not yet explored in detail.

# The effect of a fall in risk-premia

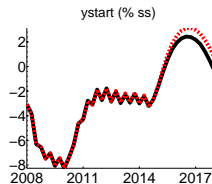


- ▶ Suppose that spreads had not been reduced as in the baseline.
  - ▶ **black**: baseline paths of risk spreads
  - ▶ **red** —: persistently high spreads post-2012.
- 
- ▶ The effect of the reduction in spreads on stabilizing output and inflation is big.

# GDP



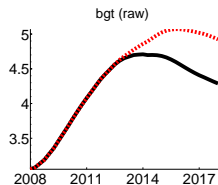
GDP periphery



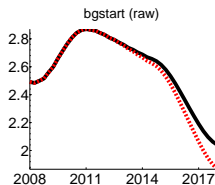
GDP core

- ▶ **black:** baseline.
- ▶ **red:** no “OMT.”

# Government debt



Gov. debt periphery



Gov. debt core

- ▶ **black**: baseline.
- ▶ **red**: no "OMT."

# Conclusion I

- ▶ How has the (evolving) short-to-medium term fiscal outlook over the last six years affected inflation and activity in euro area?
- ▶ To answer this, we build real-time measures of fiscal expectations of average tax rates, spending (and in future versions, transfers and corporate taxes).
- ▶ We then feed this sequence of shocks into a New Keynesian model of a currency union. Captures what we consider important elements of the crisis:
  - ▶ sovereign risk and an effect thereof on real activity.
  - ▶ household borrowing (and deleveraging).
  - ▶ imperfect substitutability of HOME and FOREIGN goods.

## Conclusion II

- ▶ We document that:
  - ▶ – overall – the fiscal mix in the euro area since 2008 has benefit area-wide economic activity.
  - ▶ With little effect on net on inflation, however.
  - ▶ Under some of the scenarios (with, overall, higher taxes), debt might have fallen faster.
- ▶ Going forward:
  - ▶ Report the change model-based projections associated with each change in fiscal paths in the medium-term.
  - ▶ What is the role of the timing in shaping the EA experience.
  - ▶ SGP suggests fiscal adjustments will come. But, little info about composition of adjustments going forward  $\Rightarrow$  sensitivity analysis.
  - ▶ Last, fiscal policy and long-run growth.