EUROPEAN CENTRAL BANK

EUROSYSTEM

Monetary-Fiscal Interactions and Euro Area's Malaise

Marek Jarociński *(ECB)*

Bartosz Maćkowiak *(ECB and CEPR)*

ADEMU conference on "How much of a fiscal union for the EMU?," Madrid, May 18, 2017

Introduction

- The euro area recently experienced a period of malaise, with
  - weak economic activity,
  - inflation persistently short of the ECB objective of "below, but close to 2 percent,"
  - ECB interest rates near zero,
  - and a sovereign debt crisis.
- This model formalizes the idea that the way monetary and fiscal policy interact in the euro area was important for the recent outcomes.
- When we specify monetary and fiscal policy to capture how policy is conducted in the euro area, the model reproduces the main features of the recent data (**"baseline simulation"**).
- The model implies that an alternative configuration of monetary and fiscal policy could have led to much improved outcomes (**"policy experiment"**).

Model overview: a lower bound and defaultable public debt

- The model is based on the standard simple general equilibrium model with sticky prices.
  - Price setting firms, households who consume and supply labor, and a monetary authority.
  - The monetary authority follows a Taylor rule subject to the lower bound.
- We add to this familiar setting *N* fiscal authorities corresponding to imaginary member states of a monetary union (*N = 2*, "North" and "South").
- Each fiscal authority imposes lump-sum taxes, or makes lump-sum transfers, and issues debt that can default.
- Each household is a "European" household that consumes a union-wide basket of goods and supplies labor to firms throughout the union.
  - Each household pays taxes to the fiscal authority in North and to the fiscal authority in South.

Some details of fiscal policy

- The budget constraint of fiscal authority *n*:

$$\frac{B_{nt}}{Z_{nt}P_t} = \frac{\Delta_{nt}B_{n,t-1}}{P_t} - S_{nt}$$

- Fiscal authority *n* sets:

$$\tilde{S}_{nt} = \psi_n + \psi_B \tilde{B}_{n,t-1} + \psi_{Y_n}(Y_t - Y)$$

where $\tilde{S}_{nt} \equiv \frac{S_{nt}}{Y_t}$ and $\tilde{B}_{nt} \equiv \frac{B_{nt}}{P_t Y_t}$.

  - We make the standard assumption $\psi_B > 1/\beta - 1$, implying that $\tilde{B}_{nt}$ converges to a constant regardless of the path of the price level and output.

- **"Fiscal limit"**: If $\tilde{B}_{n,t-1} \geq \tilde{B}_{nt}^{max}$, there is default, i.e., $\Delta_{nt} = \Delta_n \in (0,1)$; otherwise $\Delta_{nt} = 1$.
  - $\tilde{B}_{nt}^{max}$ is i.i.d. uniform on $[\tilde{B}_n^a, \tilde{B}_n^b]$.
  - Default has no effect on households' wealth.
  - Fluctuations in the primary surplus have no effect on households' wealth.

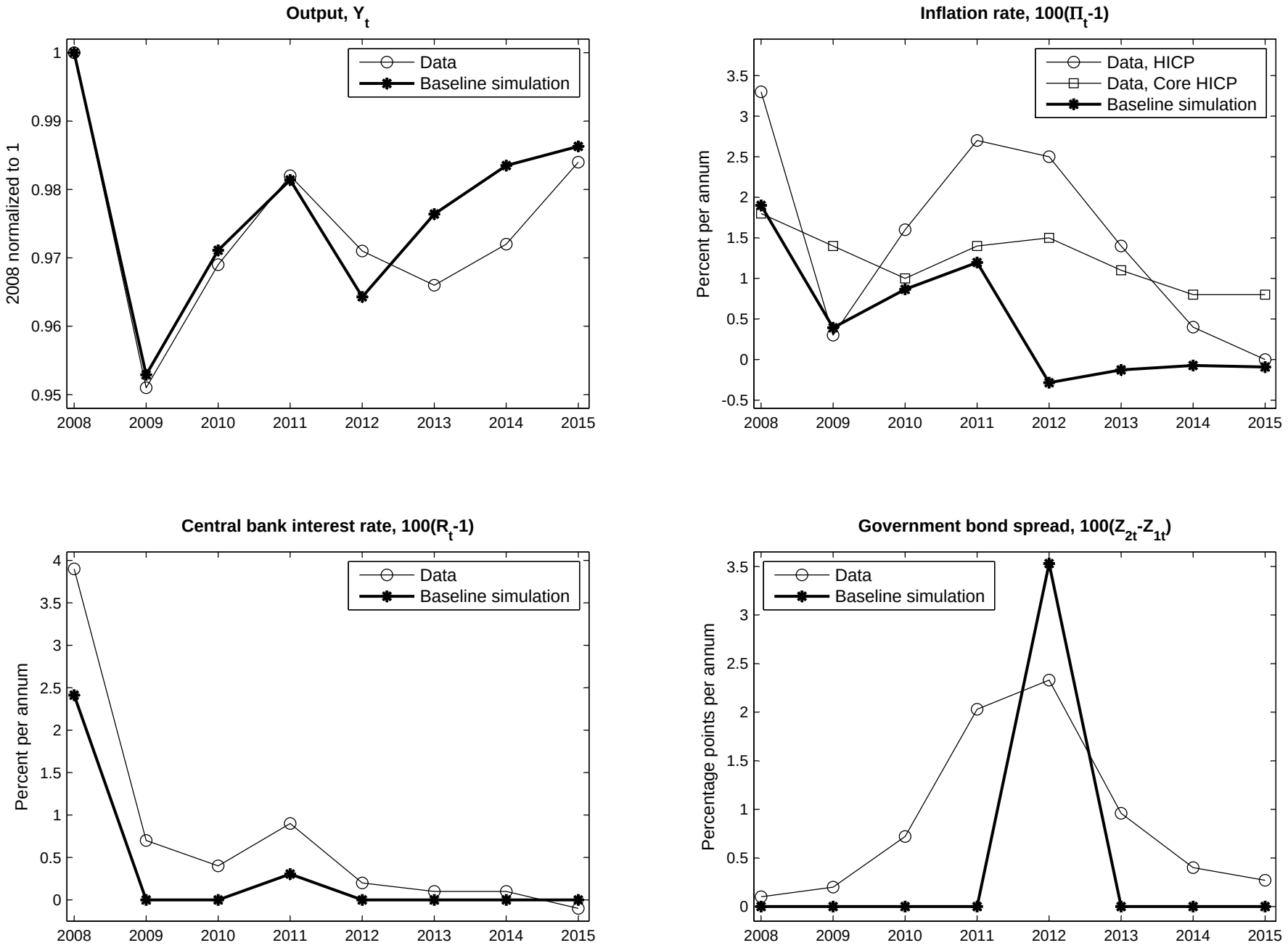
Indeterminacy

- There are two steady states: “intended” and “unintended” (Benhabib et al., 2001).
- Consider the response of the economy to a discount factor disturbance.
  - Suppose that the economy is in the intended steady state in period zero.
  - In period one, an exogenous disturbance raises the value of future consumption relative to current consumption.
  - The are multiple solutions for the path of output, inflation, and the central bank’s interest rate, $\{Y_t, \Pi_t, R_t\}_{t=1}^{\infty}$.
- In general, the default premium $Z_{nt} - R_t$ for each fiscal authority *n* is also indeterminate in every period $t \geq 1$ (cf. Calvo, 1988, Lorenzoni and Werning, 2014, and others).
  - A sovereign debt crisis can be a self-fulfilling event.

Baseline simulation: comparing the model with the data

- To solve for a unique response of the economy to the discount factor disturbance, we introduce two **sunspot shocks**. We also suppose that:
  - one period in the model is one year;
  - the discount factor disturbance occurs in 2009 (the disturbance will produce recessionary and deflationary pressure starting in that year);
  - "North" is the sum of GER, FRA, and NED, and "South" is the sum of ITA and SPA.
- A "confidence-about-inflation" sunspot shock can occur in each year starting in 2009, so long as the shock has not occurred.
  - After the shock has occurred, the economy converges to the unintended steady state.
  - The realization of the shock will produce another bout of recessionary and deflationary pressure. In the simulation, we assume that the shock occurs in 2012.
- A "confidence-about-debt" sunspot shock picks a solution for Z_{nt} when fundamentals are consistent with multiple solutions.
  - We suppose that a high yield gets selected in South in 2012.

Figure 3: The baseline simulation versus the data



Takeaways form the baseline simulation

- When monetary and fiscal policy in the model behave as in the euro area, the model reproduces the main features of the data.

- Macroeconomic outcomes in the euro area are indeterminate and subject to self-fulfilling fluctuations.
  - The euro area is a “land of indeterminacy.”

Motivation for the policy experiment

- In the baseline, an initial fall in the primary surpluses is offset by a rise in future primary surpluses and an increase in the probability of default (in South in 2012).
- In the presence of non-defaultable public debt, there would have been no need to undo the initial fiscal accommodation.
  - In a typical economy, the monetary authority supplies a fiat currency and the fiscal authority issues debt denominated in that currency.
  - The authorities can coordinate to ensure that public debt is non-defaultable, i.e., maturing government bonds are convertible into currency at par.
  - If the primary surplus falls in present value, households are wealthier at a given price level and they increase spending.
  - The price level rises and, if prices are sticky, output increases temporarily.
  - This is an attractive outcome when economic activity is weak and inflation is too low to begin with.
- However, although the euro is a fiat currency, the fiscal authorities of the member states have given up the ability to issues non-defaultable debt.

The policy experiment: a centrally-operated fund

- The fund issues non-defaultable "eurobonds" and purchases national public debt.
  - In period zero, the fund holds a fraction $\lambda \in (0, 1]$ of each national public debt.
- After the discount factor disturbance, fiscal authority *n* sets:

$$\tilde{S}^H_{nt} = \psi_n + \psi_B \tilde{B}^H_{n,t-1} + \psi_{Y_n}(1-\lambda)(Y_t - Y)$$

$$\tilde{S}^F_{nt} = \bar{\psi}_n + \psi_B \left[\tilde{B}^F_{n,t-1} - \theta_n \left(\sum_n \tilde{B}^F_{n,t-1} \right) \right] + \psi_{Y_n} \lambda (Y_t - Y)$$

where $\tilde{S}^H_{nt} + \tilde{S}^F_{nt} = \tilde{S}_{nt}$, $\tilde{B}^H_{nt} + \tilde{B}^F_{nt} = \tilde{B}_{nt}$, and $\theta_n = \tilde{B}^F_{n,0} / \left(\sum_n \tilde{B}^F_{n,0} \right)$.

- Thus, the sum of the primary surpluses backing the eurobonds does *not* respond to debt ("active fiscal policy" as in Leeper, 1991):

$$\sum_n \tilde{S}^F_{nt} = \sum_n \bar{\psi}_n + \left(\sum_n \psi_{Y_n} \right) \lambda (Y_t - Y)$$

- At the same time, an individual $\tilde{S}^F_{nt}$ *does* respond to debt (so that the share of each national bond in the fund's assets is constant in the long run).
- After the discount factor disturbance, the central bank sets an exogenous path for R_t that converges to the intended steady state ("passive monetary policy").

The policy experiment: key mechanism

- We assume that, after the discount factor disturbance, the part of each national primary surplus flowing to the fund *falls*, by 5 percent in the long run.

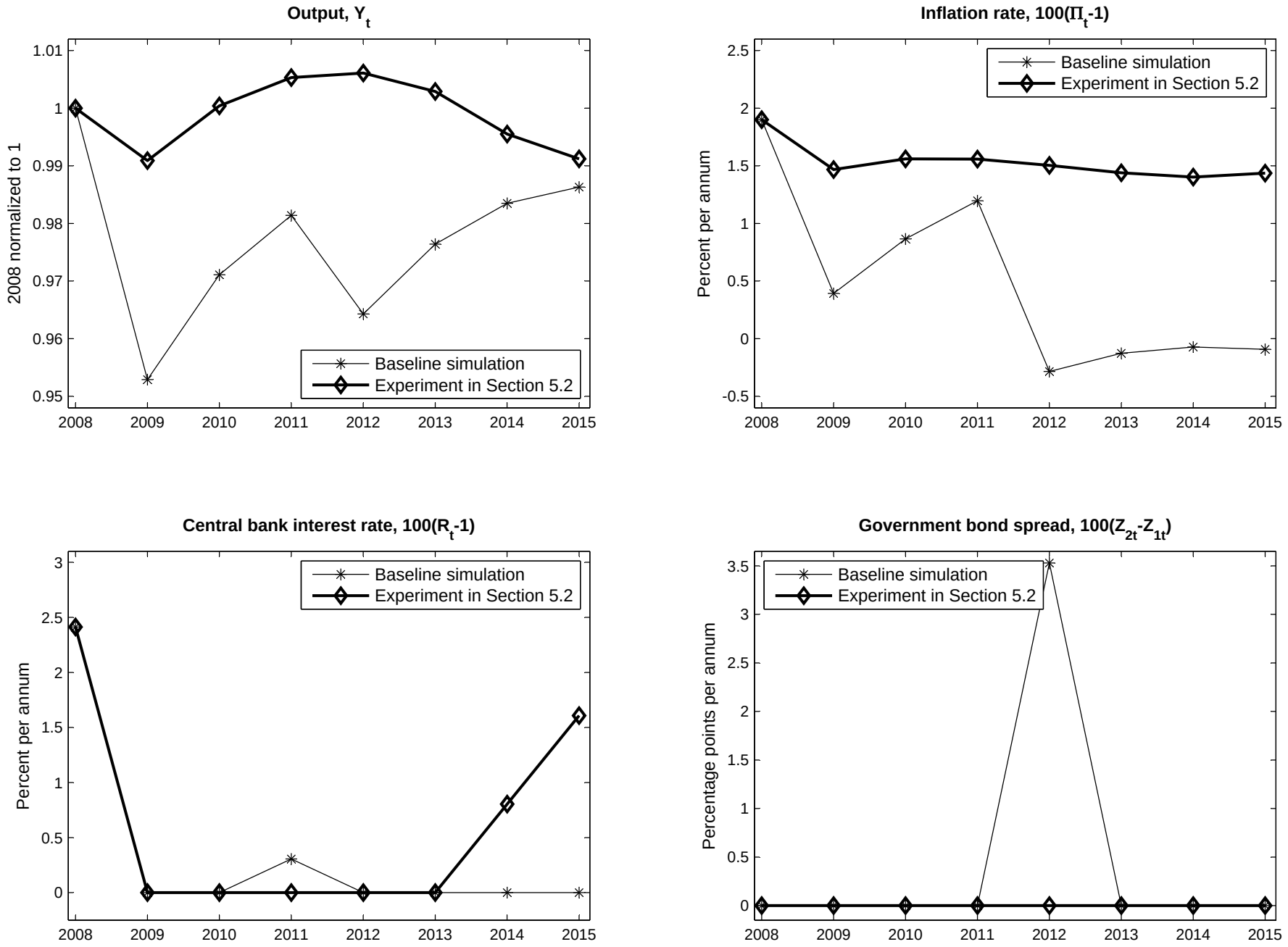
- A decrease in the present value of the primary surpluses flowing to the fund relative to the value of the eurobonds implies, since the eurobonds are non-defaultable, that households are wealthier at a given price level.
  - An increase in spending by households puts upward pressure on output and inflation.

- The forward solution of the budget constraint of the fund

$$\frac{F_{t-1}}{P_t} = \sum_{k=0}^{\infty} E_t \left[\frac{\beta^k e^{\xi_{t-k} - \xi_t} Y_t}{Y_{t+k}} \left(\sum_n S^F_{n,t+k} \right) \right]$$

lets us find a unique solution for $\{Y_t, \Pi_t, R_t\}_{t=1}^{\infty}$. The passive monetary policy ensures that inflation converges to the central bank's objective.

Figure 4: The policy experiment in Section 5.2 vs. the baseline simulation



The fund and determinacy of national bond yields

- The default premium in South disappears in the experiment, because South's debt-to-GDP ratio falls into the range consistent with a unique equilibrium with zero probability of default.
  - The accommodative policy mix, possible in the presence of the fund, increases nominal output.

- Furthermore, we obtain the following result:

- Suppose that, in the absence of the fund, there are multiple equilibria in the market for bonds of fiscal authority *n*, and in one equilibrium the probability of default is zero.

- If the fund purchases a sufficient quantity of bonds at price $1/R_t$, only one equilibrium survives, the equilibrium in which the probability of default is zero (and the bond price is $1/R_t$).
  - As the fund purchases bonds charging the price free of default premium, the quantity of bonds that must be sold to households falls, and can become insufficient to validate expectations of default.

Quantifying what happens if "things go wrong"

- We have in mind an institutional setup in which the fund would refuse to purchase debt of a national fiscal authority that has deviated from its reaction function.
  - See Corsetti, Dedola, Jarociński, Maćkowiak, and Schmidt (2016).
- We refer to a deviation as "default" and examine the consequences for inflation.
- Suppose that South delivers a fraction of the primary surpluses promised to the fund.
- E.g., if South delivers 60% of the promised primary surpluses, the inflation rate in the model jumps temporarily by 120 basis points at an annual rate, to 2.7%.
  - One reason why the inflationary effect is modest is that only South defaults and the fund holds debt of all member states.
  - Another reason is that the Phillips curve in the model is rather flat.
- As another example, the same deviation by South with a steeper Phillips curve causes inflation to jump to 5.1%.

Giving to the fund the ability to tax

- The inflationary effects of a default on the fund diminish if the fund can tax, and disappear if the fund taxes sufficiently.
- Suppose that the fund can impose a lump-sum tax uniformly throughout the union.
- The budget constraint of the fund now implies that:

$$\frac{F_{t-1}}{P_t} = \sum_{k=0}^{\infty} E_t \left[\frac{\beta^k e^{\xi_{t-k} - \xi_t} Y_t}{Y_{t+k}} \left(S^F_{t+k} + \sum_n S^F_{n,t+k} \right) \right]$$

- If South defaults, the recovery rate is 60%, and the fund holds 40% of South's debt, the necessary tax revenue is about 350 billion euros in present value terms.
  - For comparison, Corsetti et al. (2016) estimate that the present value of a 0.5 percentage point euro-area-wide VAT surcharge is equal to 1.2-1.7 trillion euros;
  - and the present value of non-inflationary seigniorage revenue in the euro area is 1.6-1.7 trillion euros.

The ECB as the fund?

- The policy experiment *can be* replicated if the ECB issues interest-bearing reserves to purchase national public debt, *so long* as the interest rate policy and fiscal policy are as assumed here.

- That said, an important difference between the fund and a central bank is that a central bank cannot tax.
  - The non-inflationary seigniorage revenue may be insufficient to cover a central bank's loss.

- Moreover, most people would probably agree that an institution such as the fund ought to be subject to more direct democratic control than a central bank.

Conclusions

- The monetary-fiscal interactions in the euro area have consequences for macroeconomic stability.
  - The euro area is exposed to self-fulfilling fluctuations.
  - Effective fiscal stimulus is unavailable in some situations.

- The recent macroeconomic outcomes could have been very different if monetary and fiscal policy had been configured differently.
  - The policy experiment in the paper requires only a fairly modest degree of centralization of fiscal decision-making among the member states.
  - Furthermore, in effect, a non-defaultable eurobond already exists.