

# What's Wrong with Inflation?

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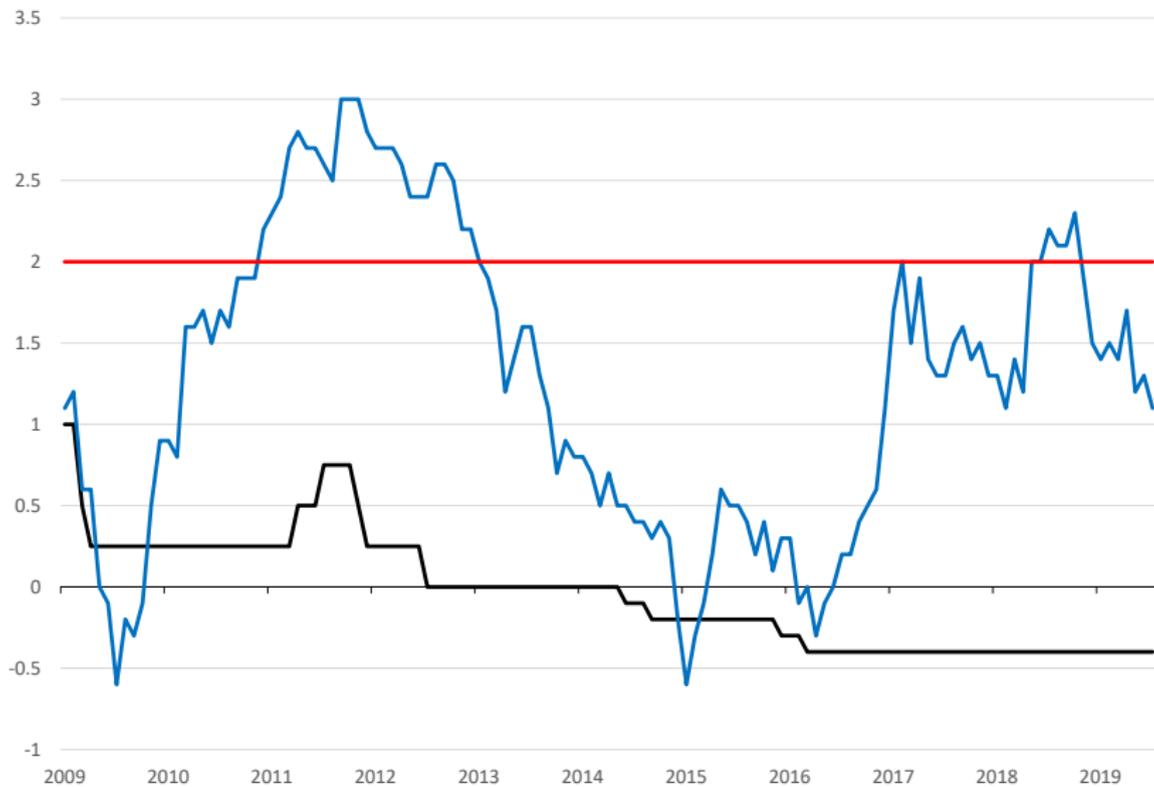
University of Virginia

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Conference, Geneva

September 2019

# What's Wrong with These Pictures?

Euro Area Monetary Policy & Inflation



Policy rate, inflation rate & target inflation rate

# What's Wrong with These Pictures?

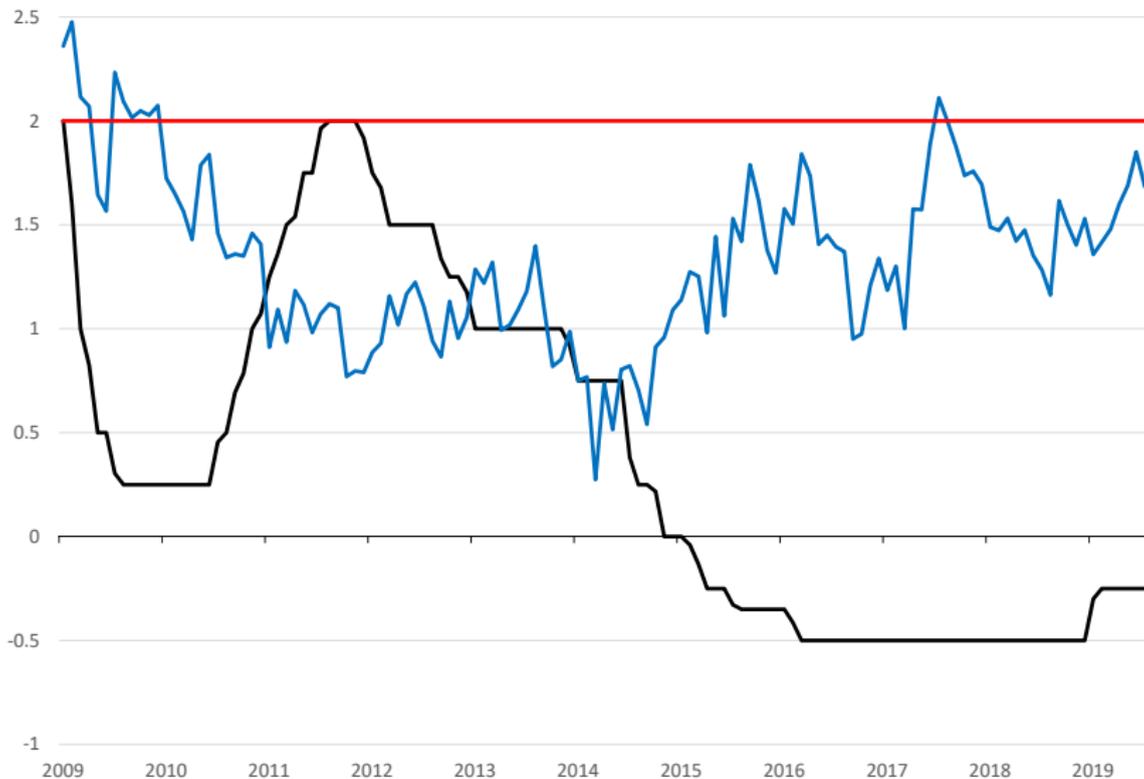
Swiss Monetary Policy & Inflation



Policy rate, inflation rate & target inflation rate

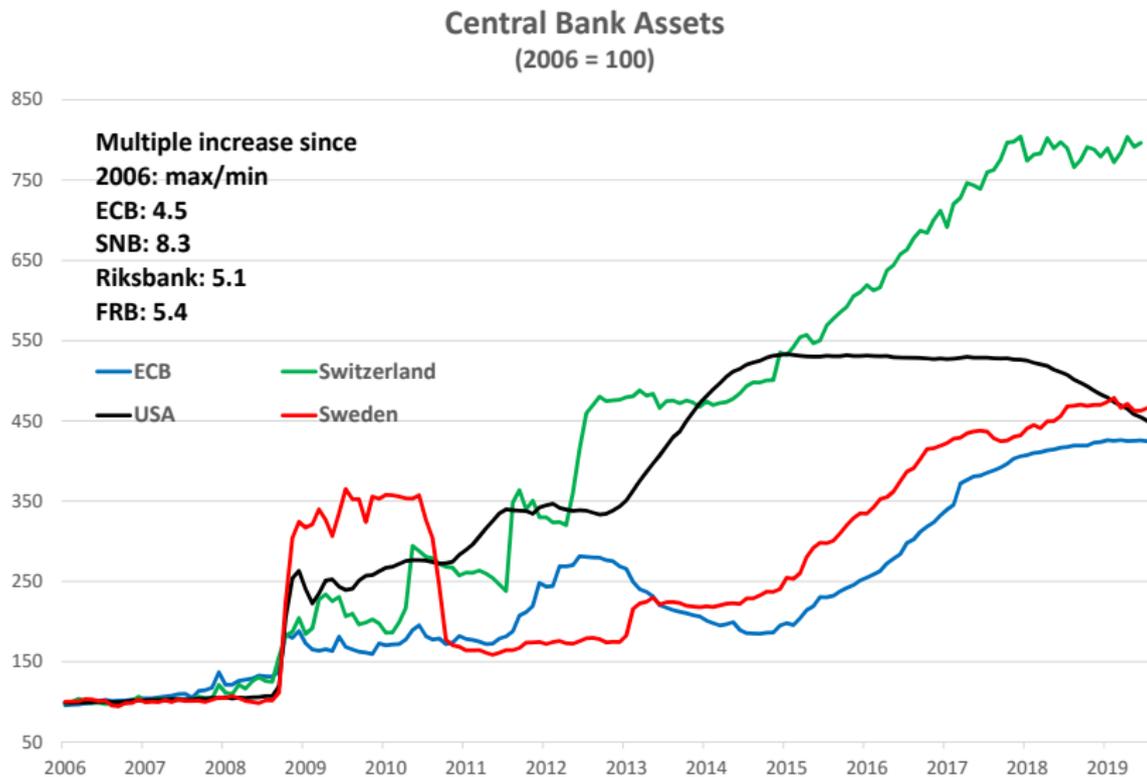
# What's Wrong with These Pictures?

Swedish Monetary Policy & Inflation



Policy rate, inflation rate & target inflation rate

# What's Wrong with These Pictures?



Many fold increases in central bank balance sheets

# What's Wrong with These Pictures?

- ▶ I will frame my talk around these regions/countries
- ▶ Points I make are more general
- ▶ Apply to all the fiscal rules being adopted in Europe & elsewhere
- ▶ Message:

For monetary policy to successfully target inflation, fiscal policy must provide “appropriate backing”

- ▶ I ask: Do these regions have perverse fiscal backing?

# Intuition

- ▶ In formal models, macro policy has two prime objectives
  1. uniquely determine inflation
  2. stabilize government debt
- ▶ Inflation-targeting regimes clearly assign tasks
  1. monetary policy determines inflation
  2. fiscal policy stabilizes debt
- ▶ These assignments hide a dirty little secret:

While stabilizing debt, fiscal policy must also back monetary policy

# Institutional Designs Deny the Secret



Monetary  
Policy

Fiscal  
Policy

# The Nature of Fiscal Backing

- ▶ Monetary ease must be followed by fiscal ease
- ▶ Mechanism...
  - ▶ lower policy rate tends to reduce government bond yields & debt service
  - ▶ debt held by public declines
  - ▶ without fiscal backing, bond holders' wealth falls
  - ▶ reduces aggregate demand
  - ▶ counteracts impacts of monetary ease
- ▶ With fiscal backing, future taxes decline
  - ▶ eliminates wealth effects of monetary policy
- ▶ Absence of fiscal backing can create problems for existence of equilibrium in the rational expectations models central banks employ

# Illustrative Model

- ▶ Representative household lives forever
  - ▶ receives constant endowment of goods,  $y$ , each period
  - ▶ chooses consumption & bonds to maximize  $\mathbb{E}_0 \sum_{t=0}^{\infty} \beta^t u(c_t)$
  - ▶ bonds sell at  $P_t^b$  & pay geometrically decaying coupons of  $\rho^{j-1}$ , for a  $j$ -period bond
- ▶ Two equilibrium conditions

Fisher Equation  $\frac{1}{R_t} = \beta \mathbb{E}_t \frac{1}{\pi_{t+1}}$

Term Structure  $P_t^b = \mathbb{E}_t R_t^{-1} (1 + \rho P_{t+1}^b)$

# Illustrative Model

- ▶ Model designed to examine how fiscal policy reacts to monetary policy actions
- ▶ Monetary policy: sets short-term interest rate,  $R_t$

Monetary Policy 
$$\frac{1}{R_t} = \frac{1}{R^*} + \alpha \left( \frac{1}{\pi_t} - \frac{1}{\pi^*} \right) + \varepsilon_t$$

- ▶  $\varepsilon_t$ : temporary deviation from pure inflation targeting,  $\mathbb{E}_t \varepsilon_{t+j} = 0, j > 0$
- ▶ positive  $\varepsilon_t$  is expansionary monetary policy
- ▶ when  $\alpha > 0$ , above-target inflation brings higher  $R_t$
- ▶  $\alpha > 1$ : the Taylor principle

# Illustrative Model

- ▶ Fiscal policy: sets primary surplus,  $s_t$

Fiscal Policy 
$$s_t = s^* + \gamma \left( \frac{P_{t-1}^b B_{t-1}}{P_{t-1}} - b^* \right)$$

- ▶ when  $\gamma > 0$ , above-target debt bring higher  $s_t$
  - ▶ to return debt to target, surplus must respond enough to cover interest payments & retire some debt
  - ▶ this requires  $\gamma > r$ ,  $r$  is the real interest rate
- 
- ▶ But notice: fiscal rule entails direct response to price level when  $\gamma > 0$ 
    - ▶ higher  $P_t$  leads to lower  $s_{t+1}$

# One Type of Policy Coordination

- ▶ Choices of policy parameters,  $(\alpha, \gamma)$ , determine **joint monetary-fiscal regime**
- ▶ Two distinct policy mixes achieve prime objectives
  1. uniquely determine inflation
  2. stabilize government debt
- ▶ I focus only on the conventional inflation-targeting regime
  - ▶ monetary policy satisfies Taylor principle,  $\alpha > 1$
  - ▶ fiscal policy returns debt to target,  $\gamma > r$
- ▶ **Even in this IT regime, fiscal policy must support monetary policy**

# Equilibrium Inflation

- ▶ In this monetary-fiscal regime

Equilibrium Inflation  $\frac{1}{\pi_t} = \frac{1}{\pi^*} - \frac{1}{\alpha} \varepsilon_t$

- ▶ If no shocks, inflation always on target
- ▶ Positive shock—expansion—raises inflation
- ▶ Tempting to infer. . .
  - ▶ only monetary policy choices— $\pi^*$ ,  $\alpha$ ,  $\varepsilon_t$ —matter for inflation
  - ▶ fiscal policy irrelevant for inflation

Do not submit to temptation

# What Is Fiscal Policy Doing?

- ▶ Full equilibrium requires stable debt
- ▶ Examine debt dynamics
- ▶ Shock is transitory, so bond prices do not change
- ▶ Use fiscal rule & inflation solution in government's budget identity

$$\frac{P^b B_t}{P_t} + s^* - \gamma b^* = \left[ R^b \left( \frac{1}{\pi^*} - \frac{1}{\alpha} \varepsilon_t \right) - \gamma \right] \frac{P_{t-1}^b B_{t-1}}{P_{t-1}}$$

- ▶ Monetary expansion,  $\varepsilon_t > 0$ , raises inflation, which reduces real debt service,  $R^b / \pi_t$ 
  - ▶ real value of debt held by the public,  $P^b B_t / P_t$ , falls
  - ▶ impact amplified by high levels of debt
- ▶ Fiscal rule: lower real debt service produces lower future primary surpluses

# What Is Fiscal Policy Doing?

A monetary expansion that raises inflation is backed by a fiscal expansion that returns debt to target

- ▶ Fiscal policy performs two distinct tasks
  1. it stabilizes debt
  2. it backs monetary expansion with fiscal expansion
- ▶ But don't have to think in terms of “backing”
- ▶ Instead ask: **What ensures the bond market clears?**
- ▶ (We usually—uncritically—apply Walras' law)

# A Different Perspective

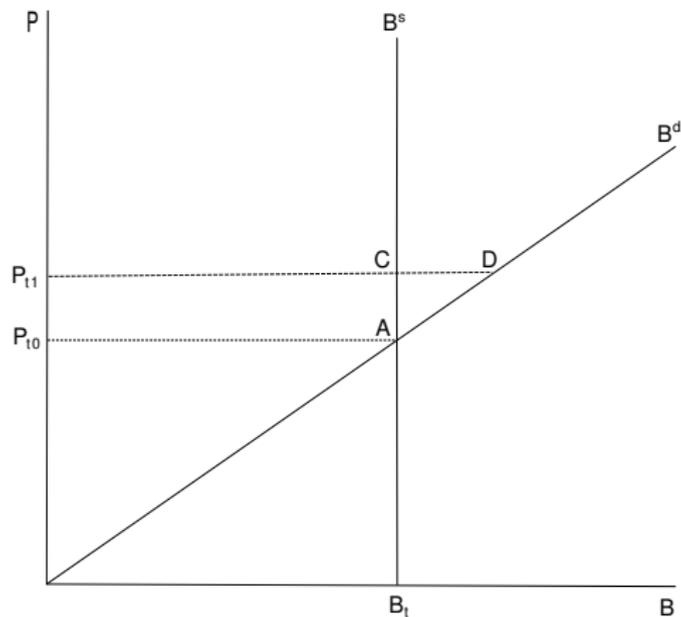
- ▶ In this model, demand for bonds is very simple
  - ▶ bonds are nominal, so demand is homogeneous of degree 1 in  $P_t$
  - ▶ demand is decreasing in bond price,  $P_t^b$
  - ▶ bonds derive value from discounted stream of cash flows—primary surpluses
  - ▶ nominal demand for the government bond portfolio,  $B_t^d$

$$\begin{aligned} B_t^d &= \frac{1}{P_t^b} P_t \mathbb{E}_t \sum_{j=1}^{\infty} \beta^j s_{t+j} \\ &= \frac{1}{P_t^b} P_t \mathbb{E}_t PV(S_{t+1}) \end{aligned}$$

# Bond Market Equilibrium

- ▶ Economy initially in equilibrium at price level  $P_{t0}$
- ▶ Monetary expansion raises inflation for a single period
- ▶ Price level is at the permanently higher level  $P_{1t}$

# Bond Market Equilibrium



At new price level,  $CD$  is excess demand for bonds  
 $B^s$  can rise, fall, stay unchanged, depending on  $s_t$   
Figure drawn for  $s_t = 0$

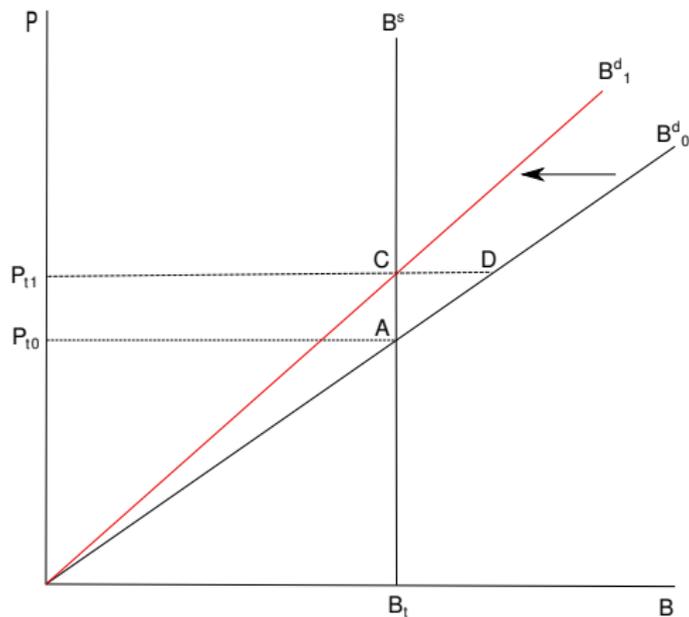
# Discussion

- ▶ Excess demand for bonds arises for clear reasons
- ▶ Monetary expansion reduces the real value of bonds
- ▶ If the expected cash flows—surpluses—do not fall. . .
  - ▶ the goods cost of a bond has fallen
  - ▶ but the goods payoff—surpluses—is unchanged
  - ▶ makes bonds attractive
  - ▶ individuals want to substitute out of goods and into bonds
  - ▶ reduces aggregate demand for goods
- ▶ Bond market behavior runs exactly counter to the aims of monetary policy to raise aggregate demand

# Bond Market Equilibrium

- ▶ Models resolve this conflict with a convenient, **completely untested** assumption
- ▶ Models typically assume  $\gamma > r$ , so ...
- ▶ Lower real value of debt brings forth lower  $\mathbb{E}_t PV(S_{t+1})$
- ▶ To reduce bond demand **exactly enough** to clear the bond market at the new higher price level
- ▶ This is the magic of Ricardian equivalence

# Bond Market Equilibrium



$\mathbb{E}_t PV(S_{t+1})$  falls by exactly enough to eliminate excess demand

$B^s$  can rise, fall, stay unchanged, depending on  $s_t$

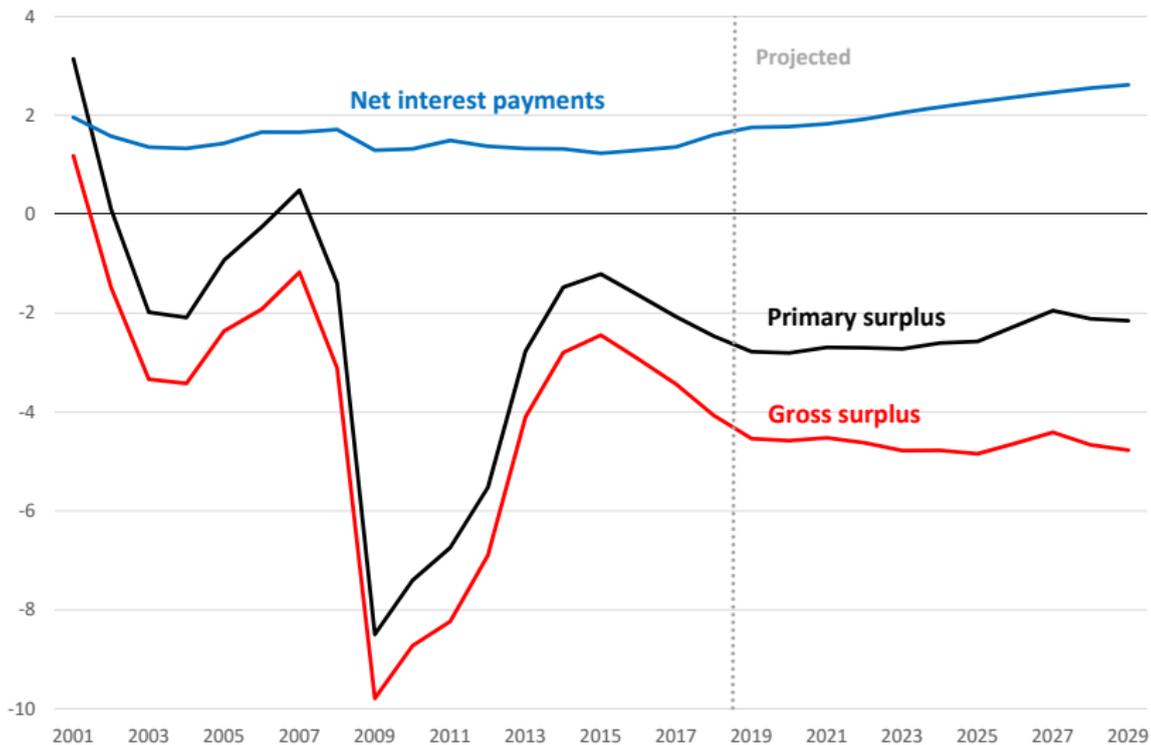
Figure drawn for  $s_t = 0$

# How Have Fiscal Policies Responded to Monetary Ease?

- ▶ Take the United States first
- ▶ Within a week of passing stimulus package in 2009, Obama pledged to reduce deficits
  - ▶ there was a period of fiscal consolidation
- ▶ Trump has since fixed that with tax cut & spending increases
- ▶ No downward trend in U.S. government debt
- ▶ Declining debt service followed by lower surpluses
- ▶ U.S. fiscal policy roughly follows a rule that backs monetary expansion
- ▶ No claim of policy coherence: pure serendipity

# U.S. Fiscal Patterns

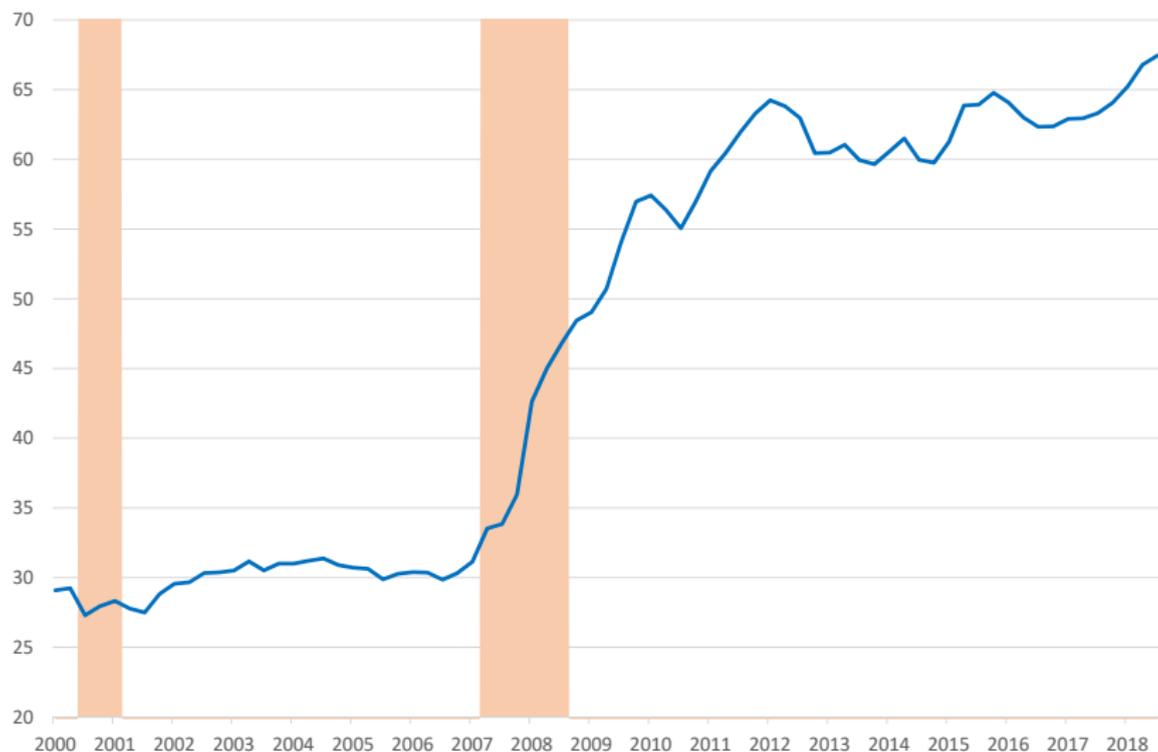
U.S.: Surpluses & Debt Service  
(% GDP)



Initial post-crisis consolidation followed by expansion  
Projections from Congressional Budget Office

# U.S. Fiscal Patterns

U.S. Market Value Privately-Held Debt  
(% GDP)



Debt remains at post-crisis elevated level

# U.S. Monetary Policy

U.S. Monetary Policy & Inflation



Policy rate, inflation rate & target inflation rate

# How Have Fiscal Policies Responded to Monetary Ease?

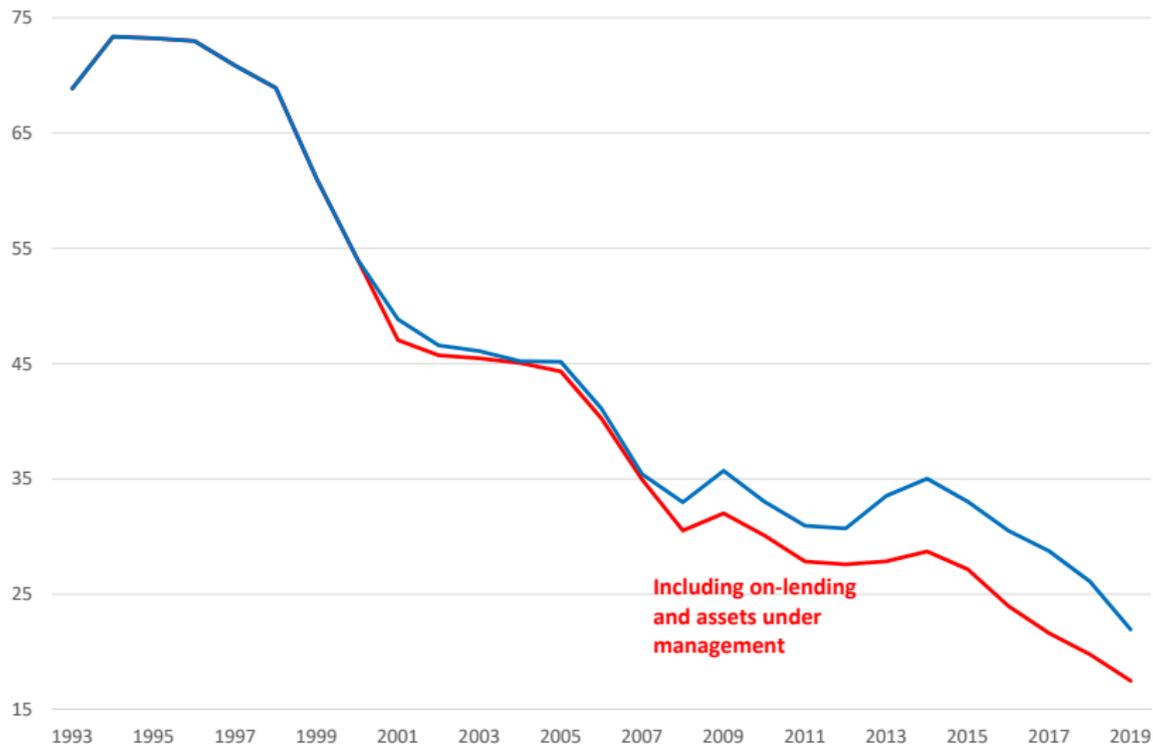
- ▶ Fiscal responses in Europe have been rather different
- ▶ Consolidations began as early as 2010 and really kicked in after sovereign debt troubles
- ▶ Governments have adopted aggressive rules that...
  - ▶ aim primarily at reducing government debt & running primary surpluses
  - ▶ with some provisions for countercyclical actions
- ▶ Rules designed primarily to solve **political problems**
  - ▶ certainly a legitimate concern
- ▶ But may inadvertently create economic problems

# The Swedish Case

- ▶ Sweden's *Fiscal Framework* emerged after the crisis in early 1990s
  - ▶ all political parties buy into it
  - ▶ but are free to choose details of implementation
- ▶ Has been operating almost 20 years
  - ▶ set net lending target—now 0.33%, from 2% initially
  - ▶ expenditure ceilings
  - ▶ debt anchor at 35%
  - ▶ local government balanced budgets
  - ▶ fiscal policy council
- ▶ By most observers' reckonings, it “works”
  - ▶ success judged by declining debt-GDP

# Government Debt

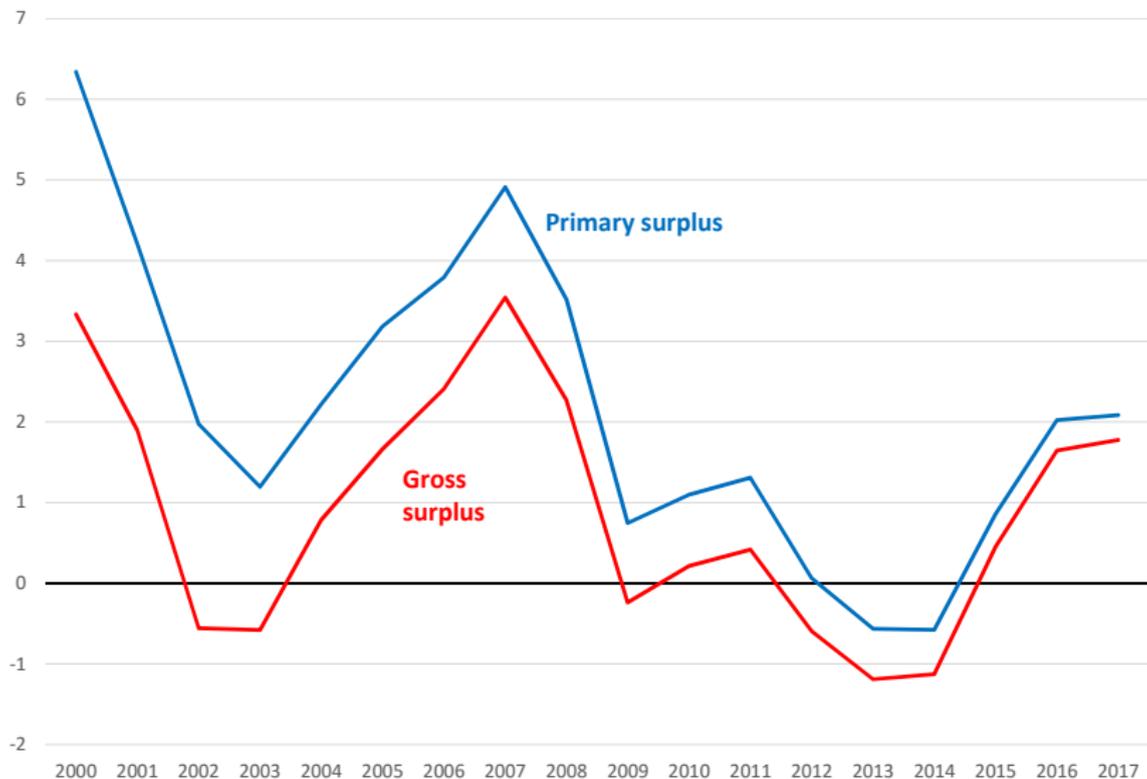
Swedish Central Government Debt  
(% GDP)



Now well below the 35% debt anchor

# Budget Surpluses

## Swedish Budget Surpluses



Now well above the 0.33% net lending target

# The Swedish Case

- ▶ Argument for low debt anchor is it provides “room” for policy to act boldly if needed
- ▶ Envisioning crisis responses
- ▶ I am concerned about **routine** policy actions
- ▶ While Sveriges Riksbank has been easing. . .
- ▶ Fiscal policy has been contracting

# European Fiscal Rules

- ▶ It is perfectly possible for fiscal policy to stabilize debt, but not back monetary policy
- ▶ Set  $\gamma = 0$  in fiscal rule, so  $s_t = s^*$
- ▶ This will stabilize debt at

$$\frac{P_t^b B_t}{P_t} = \frac{s^*}{r}$$

Nail target  $b^*$  by setting target  $s^*$  appropriately

- ▶ Only one problem: in equilibrium,  $P_t$  &  $P_t^b$  must satisfy

$$\frac{P_t}{1 + \rho P_t^b} = \left( \frac{r}{1 + r s^*} \right) B_{t-1}$$

- ▶  $P_t^b$  reflects expected inflation & real rates

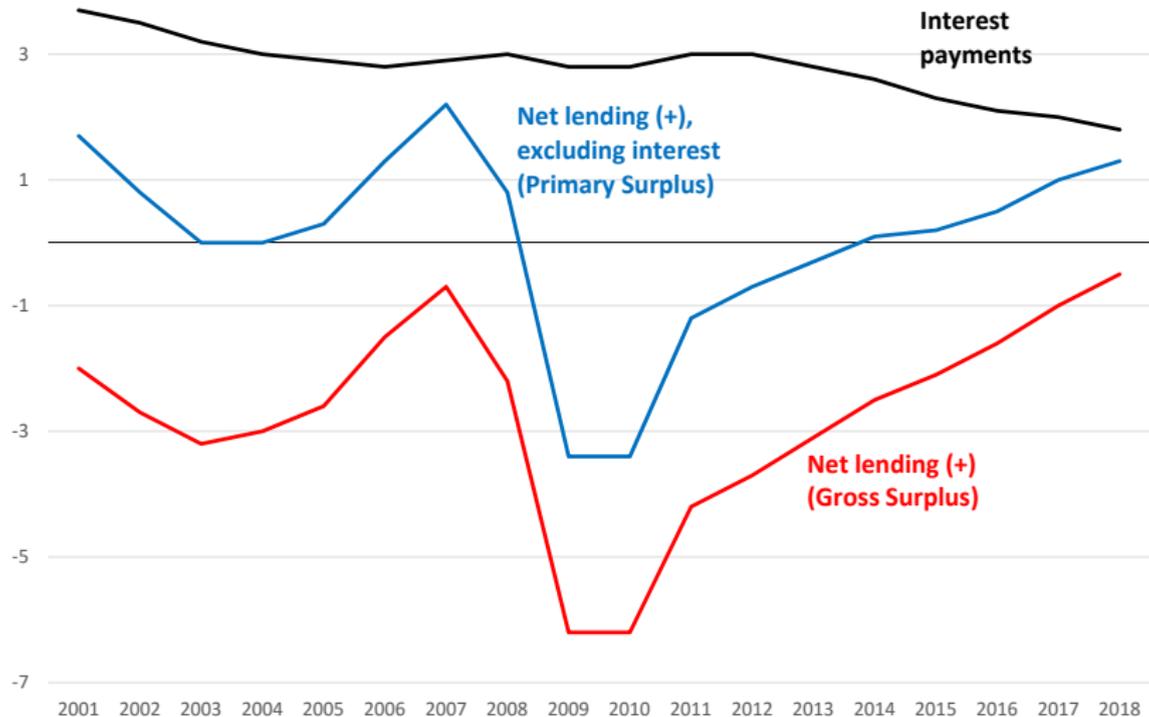
Monetary policy can choose **timing** of inflation but not entire inflation path

# Problematic Fiscal Rules

- ▶ The essence of fiscal support for monetary policy is that surpluses must respond to the price level
  - ▶ abstractly, a *nominal* impact induces a *real* response
- ▶ Fiscal rules based entirely on reacting to real variables will fail to back monetary policy
- ▶ We see this in the euro area & Switzerland

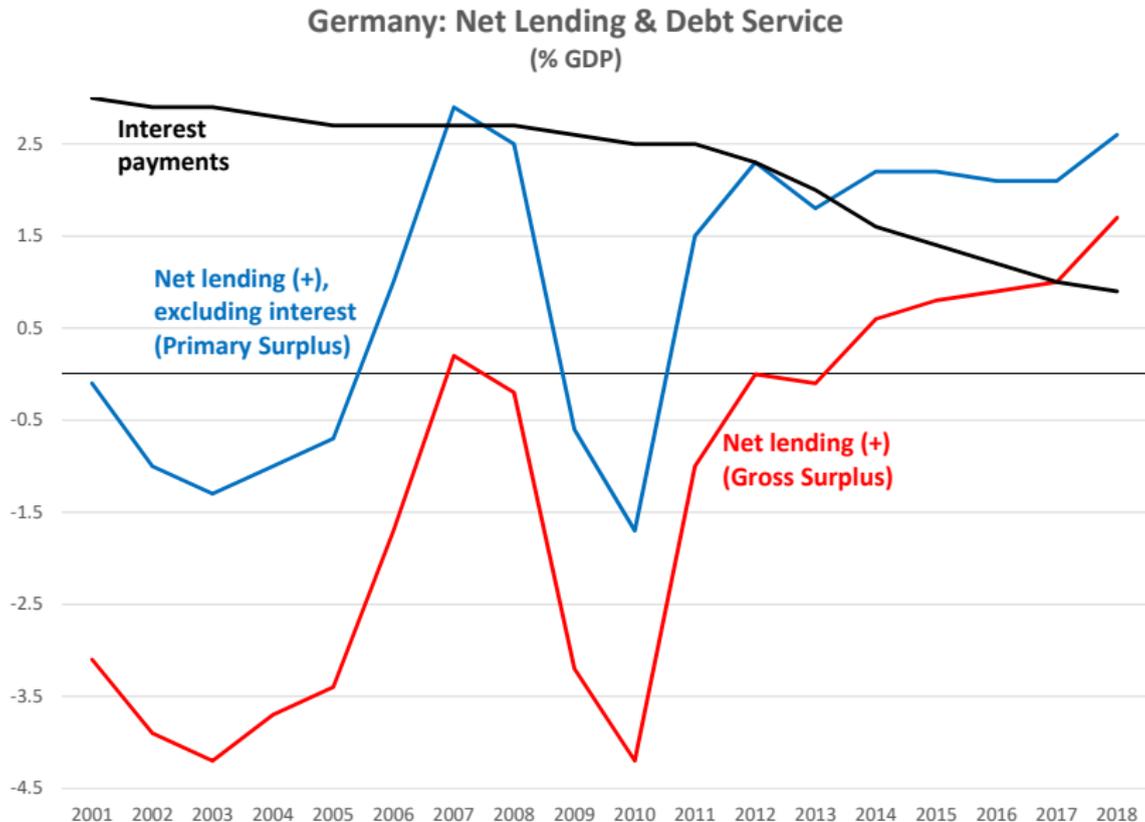
# Budget Surpluses

Euro Area: Net Lending & Debt Service  
(% GDP)



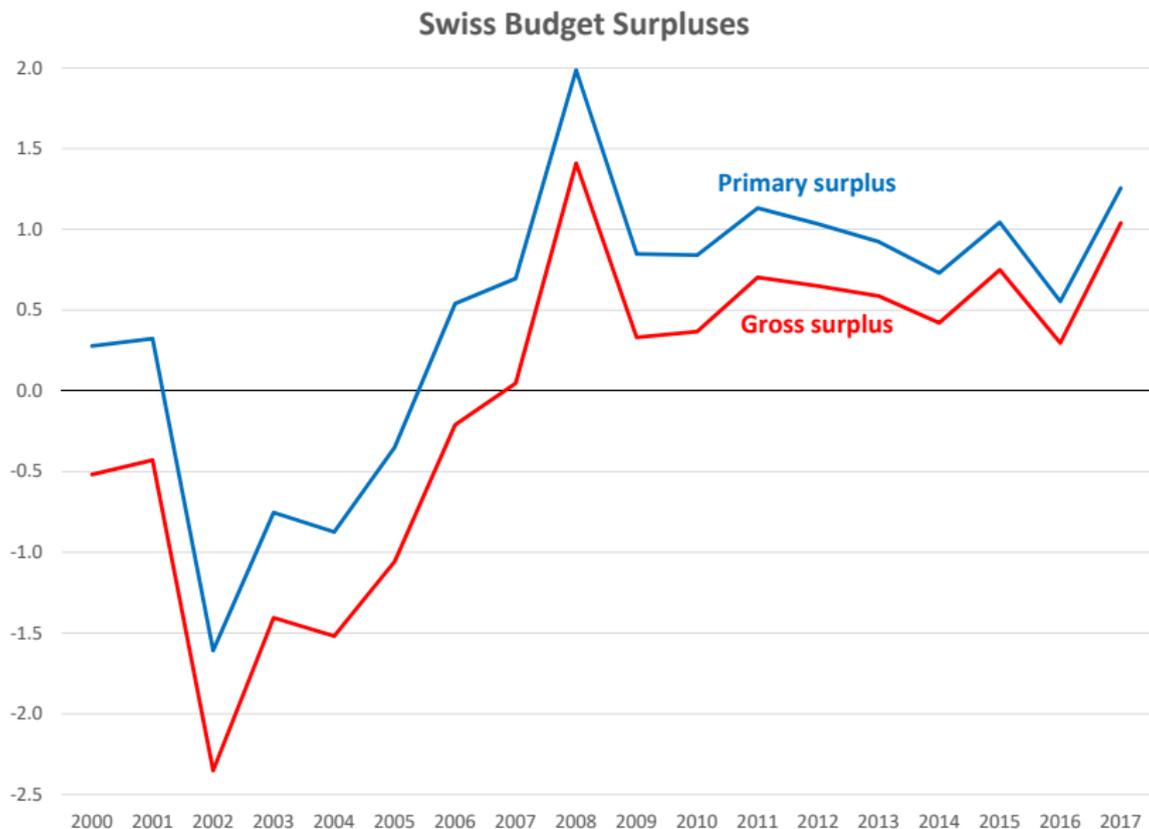
Declining debt service & rising surpluses

# Budget Surpluses



Rapidly declining debt service & rapidly rising surpluses

# Budget Surpluses



Surpluses since before the global financial crisis

# European Fiscal Rules

- ▶ I've read some of the EC's material on rules
- ▶ Fiscal Rule Strength Index...
  - ▶ only one criterion is about macroeconomic considerations
  - ▶ “resilience to shocks outside control of government”
  - ▶ only one of the four components of that criterion might refer to fiscal backing for monetary policy
  - ▶ “Are there exclusions from the rule in the form of items that fall outside authorities' control at least in the short term (e.g. interest payments, unemployment benefits)?”
- ▶ Does this permit routine fiscal support for monetary policy?

# Designing Fiscal Rules

- ▶ To answer this question, need richer models
- ▶ What does fiscal backing look like when...
  - ▶ monetary policy reacts to a range of non-policy shocks?
  - ▶ monetary policy takes unconventional actions (e.g., QE)?
  - ▶ monetary policy is at the effective lower bound?
  - ▶ there is a single monetary authority & many fiscal authorities?
  - ▶ when monetary policy pegs the exchange rate?
  - ▶ the economy is close to its fiscal limit?
- ▶ Need to address these questions before can design fiscal rules that assure backing

# Wrap Up

- ▶ I am not calling to abandon fiscal rules
- ▶ I am calling to design rules with monetary-fiscal interactions in mind
- ▶ There is no conflict between rules that . . .
  - ▶ stabilize debt at sensible levels and
  - ▶ ensure fiscal backing for monetary policy
  - ▶ possible to address political & economic problems simultaneously
- ▶ Key lies in understanding that monetary & fiscal policies **necessarily interact**
- ▶ Denying this fact is religion, not science