Monetary-fiscal policy interaction and fiscal inflation: A tale of three countries

Martin Kliem[1] Alexander Kriwoluzky[2] Samad Sarferaz[3]

[1]Deutsche Bundesbank [2]MLU Halle-Wittenberg and IWH [3]ETH Zürich

Central banks and crises - historical perspectives

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Motivation

Characteristics of the current crisis:

- main monetary policy instrument at zero lower bound
- increasing sovereign debt and high fiscal deficits

Theories which model explicitly the interaction between monetary and fiscal policy are in the center of the policy debate.

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Evidence in favor of this model (especially changing policy regimes) is scarce:

- U.S. data: Leeper, Bianchi and Ilut, Bhattarai, Lee, and Park

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- provide further evidence for models with changing monetary and fiscal policy interaction

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Our approach

1. cross-country analysis
   - contrast the US experience with two other countries:

     Italy and Germany
   - countries are similar (all G7-countries) and have been subject to similar shocks
   - narrative sources indicate differences in monetary and fiscal policy interaction

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2. TVP-VAR model
   - employ a more elaborate and parsimonious time series model
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2. TVP-VAR model
3. DSGE model
    - structural interpretation of the findings

Measure of monetary and fiscal interaction

We focus on the low-frequency relationship between inflation and fiscal stance:

1. relationship between inflation and fiscal stance captures the interaction between monetary and fiscal policy
2. Lucas (1980): systematic change recovered best beyond business cycle frequency at low frequencies
3. DSGE model and different policy regimes:

   different shocks drive the low-frequency relationship between deficits and inflation

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Measuring fiscal stance

- debt growth before interest payments
- it measures the change of outstanding liabilities due to fiscal policy
- it is defined as primary deficits relative to debt (Sims (2011, EER))

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Narrative analysis

TVP-VAR model

Structural interpretation

Conclusion

Narrative evidence and first pass at the data

Following Lucas (1980):

1. filter the data
2. run a regression of filtered inflation $\tilde{\pi}$ on filtered deficits over debt:

$$\tilde{\pi}_t = \beta \frac{\tilde{PrimDef}_t}{\tilde{Debt}_{t-1}} + error$$

Monetary/fiscal policy in the US

- Narrative evidence: In the 70s: Federal reserve bank acts as the "junior partner" (Alan Meltzer) to the fiscal authority. The fiscal authority was not concerned with inflation.
- Well established policy change (Clarida et.al. (QJE, 2000), Lubik and Schorfheide (AER, 2004), Bianchi and Ilut (2012))
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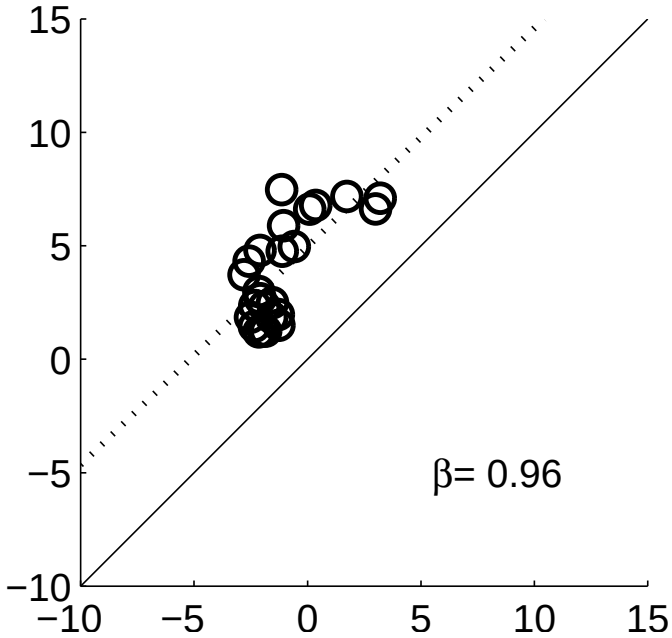
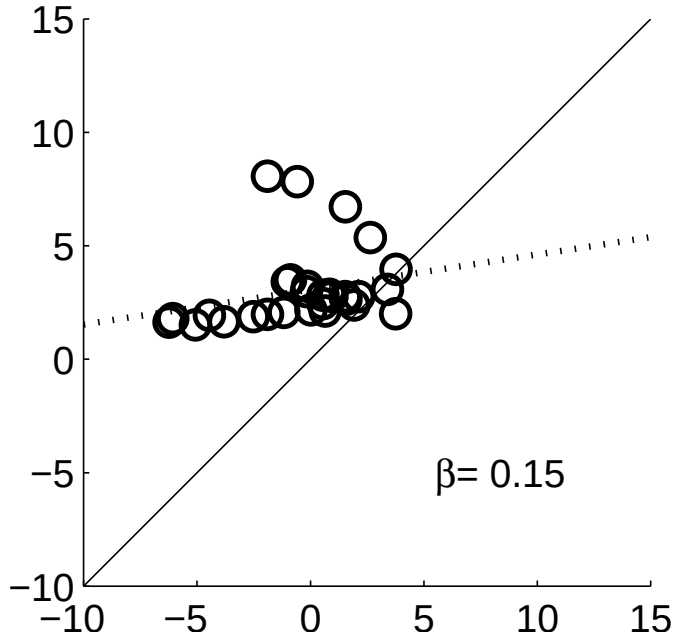
Low-frequency relationship U.S.



(a) US:1955-1979



(b) US:1980-2009

Monetary/fiscal policy in Germany

- Hyperinflation of the Weimarer Republik 1923
- Bundesbank independent and pledged to controlling inflation rate (Beyer, Gaspar, Gerberding, and Issing (2013))
- No strong attempts of the fiscal authority to weaken the independence of the Bundesbank
- **No breakpoint:** stable monetary-fiscal policy interaction over time

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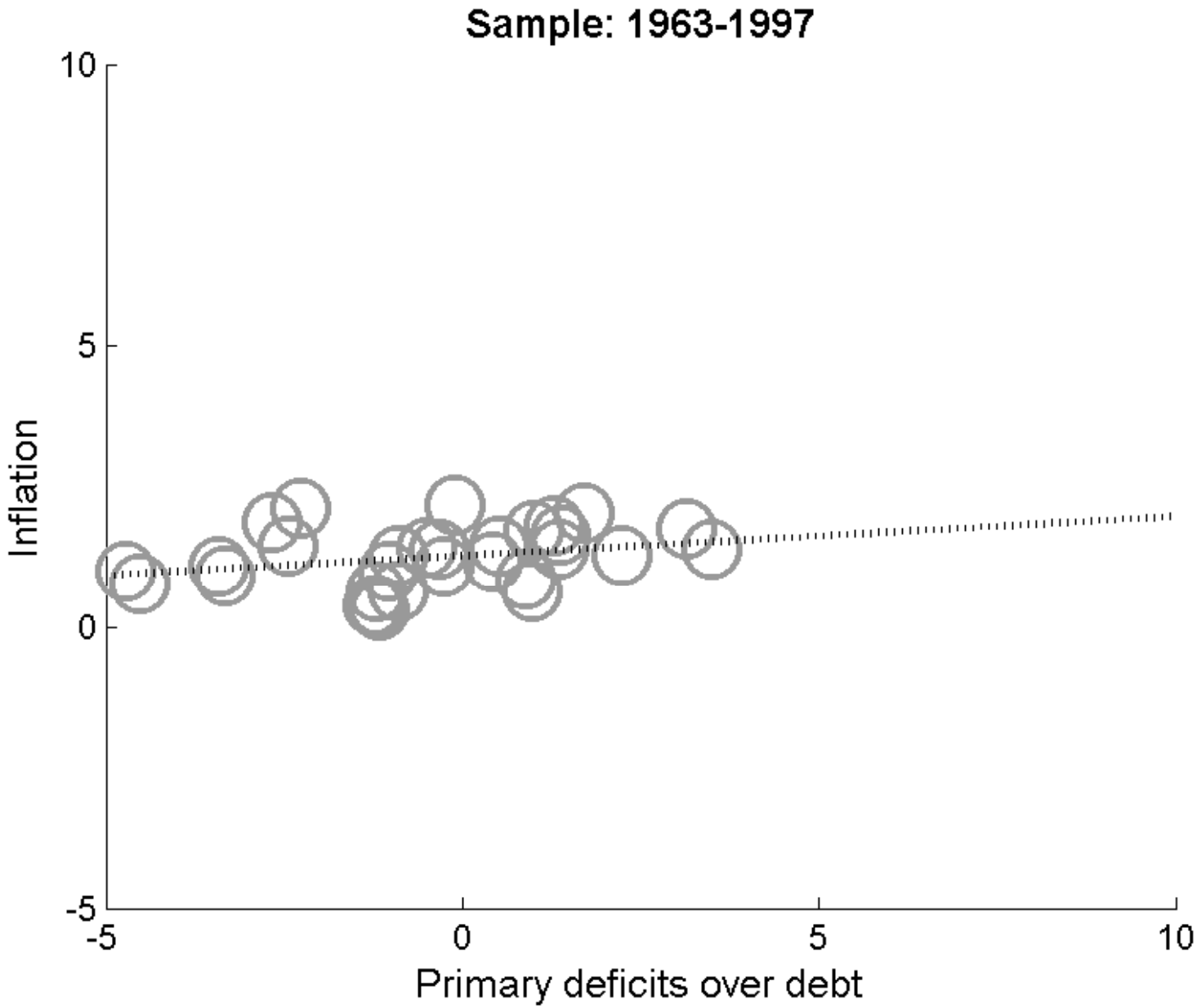

Monetary/fiscal policy in Italy

- in the 1970s, Banca d' Italia had to stand ready as residual buyer at government bond auctions (Bordo and Siklos, 2014)
- "Divorce" of Banca d' Italia and the Tesoro beginning of 80s
- Worsening of fiscal balance during 1980s (Bartoletto et al, 2013)
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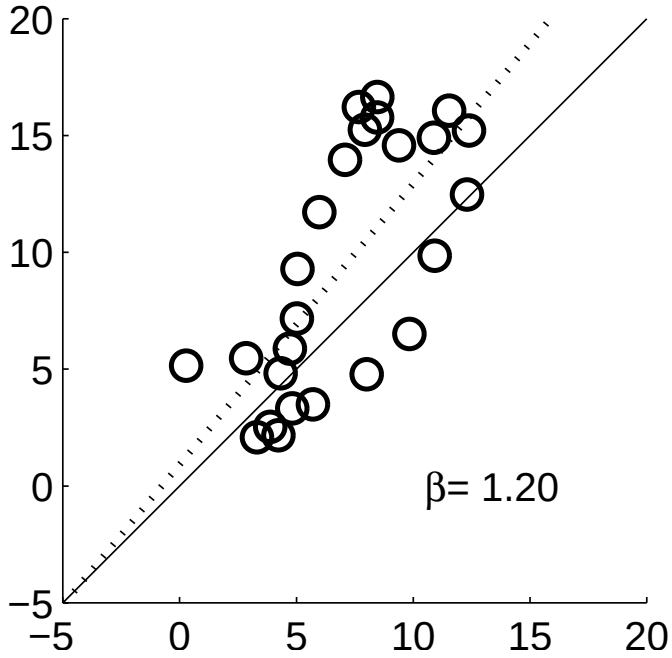
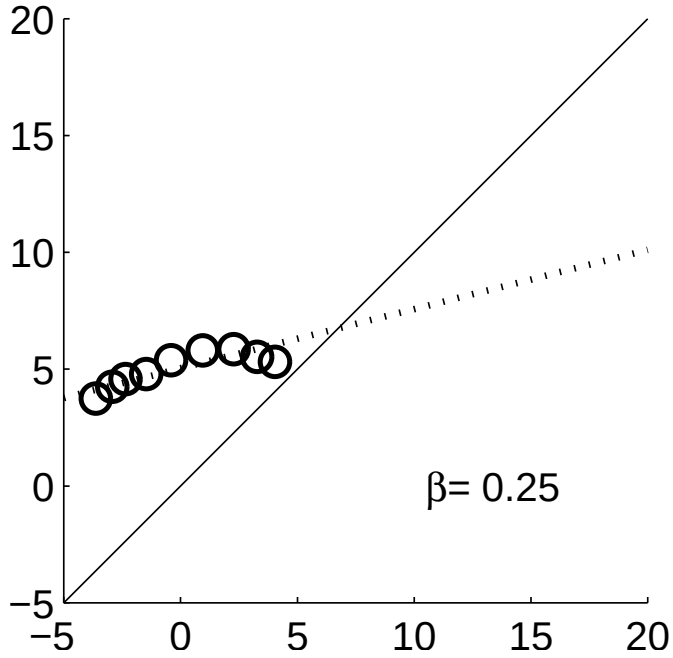


(c) Italy:1963-1989



(d) Italy:1990-2009

Summary narrative analysis

Low-frequency relationship between inflation and debt growth before interest payment:

- is time-varying
- is different for different countries at the same time
- (tentatively) depends on the interaction between monetary and fiscal policy

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A TVP-VAR model

- No exogenous break points
- No filtering of the data
- Additional variables: money growth, nominal interest rates, output growth

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From a VAR model with unfiltered data to β

1. Estimate the TVP-VAR model

2. Compute the spectral density at frequency zero

3. Whiteman (1984): Approximate the slope coefficient β as the cross-spectral density $S_{\pi d}$ and the spectral density S_d at frequency zero:

$$\beta \approx \frac{S_{\pi d}(0)}{S_d(0)} \tag{1}$$

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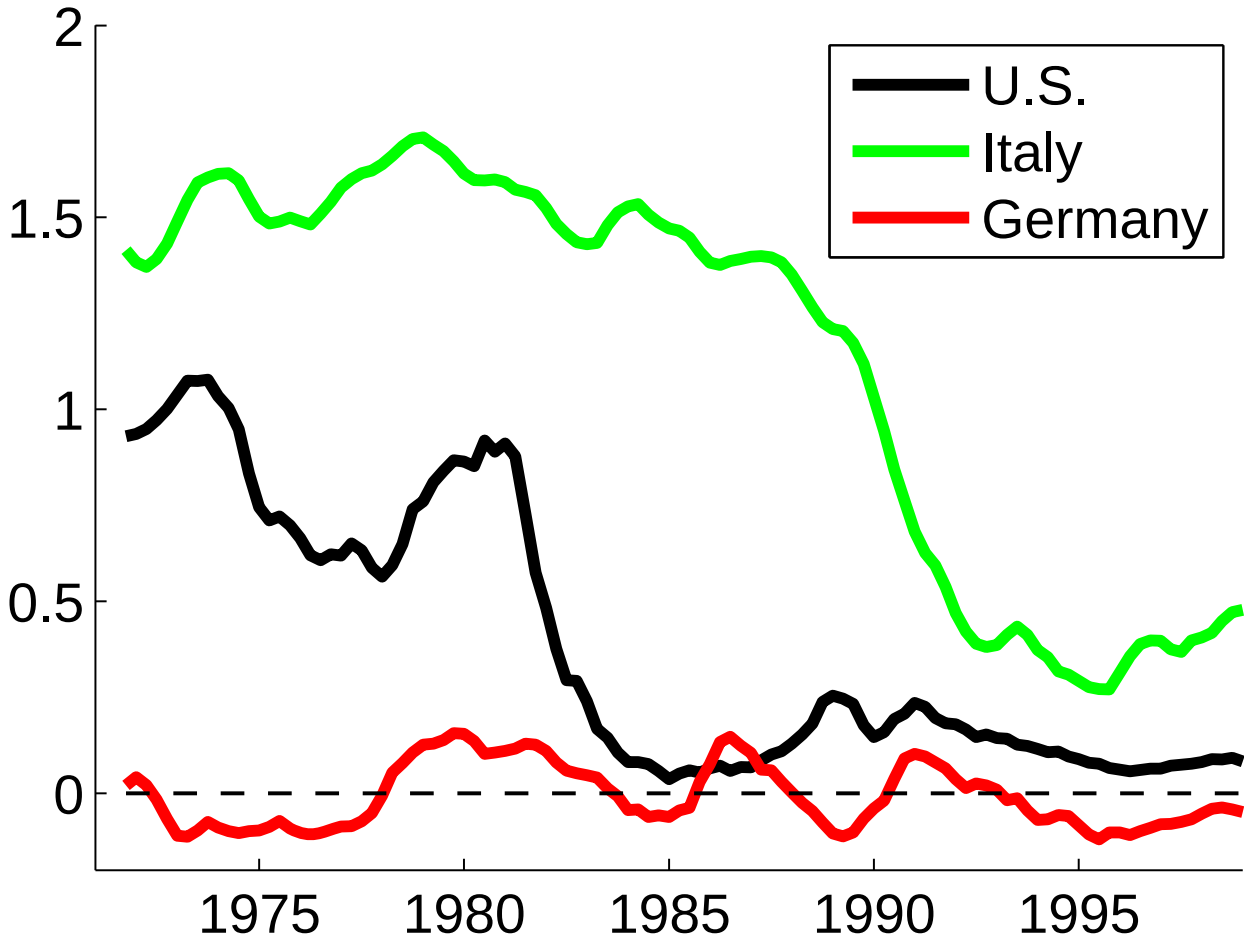
Median estimates low-frequency relationship



▸ Details with probability bands

Counterfactuals

Our VAR model consists of:

$$y_t = c_t + \sum_{j=1}^{p} A_{j,t} y_{t-j} + B_t \epsilon_t \quad \epsilon_t \sim \mathcal{N}(0, H_t) \tag{2}$$

- coefficient matrices A_t , B_t **(systematic response of the economy)**
- variances of the error term H_t

What would have been the estimate of the low-frequency relationship if the systematic response of the economy had been the same as in year XX in all years?

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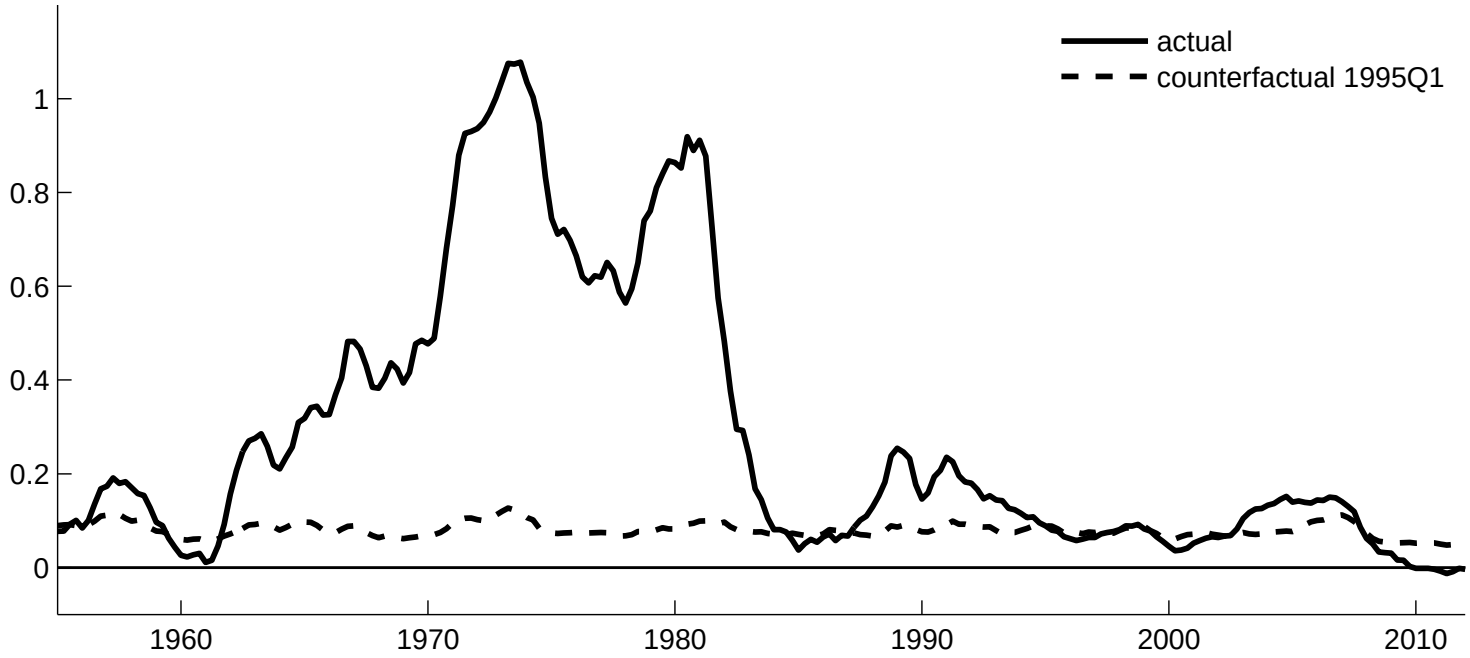
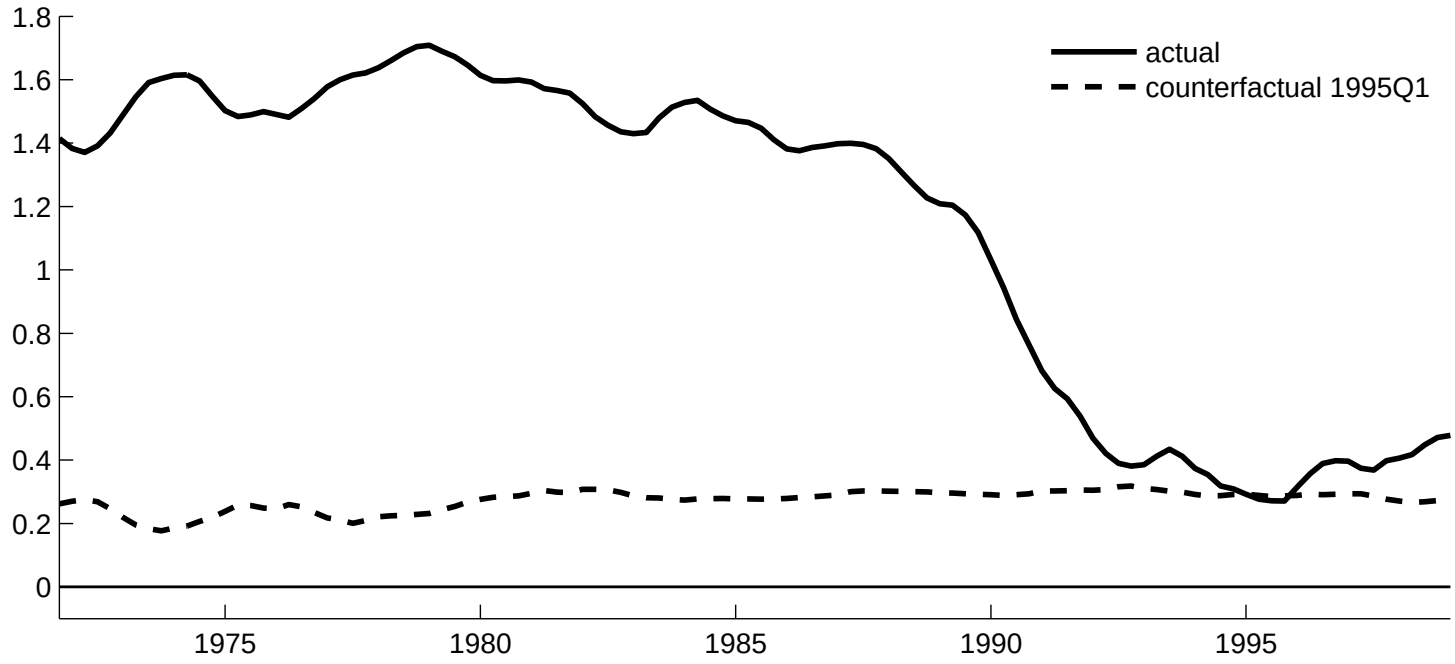
Counterfactual: US fixed to 1995.1



- Low-frequency relationship disappears during 70s

Counterfactual: Italy fixed to 1995.1

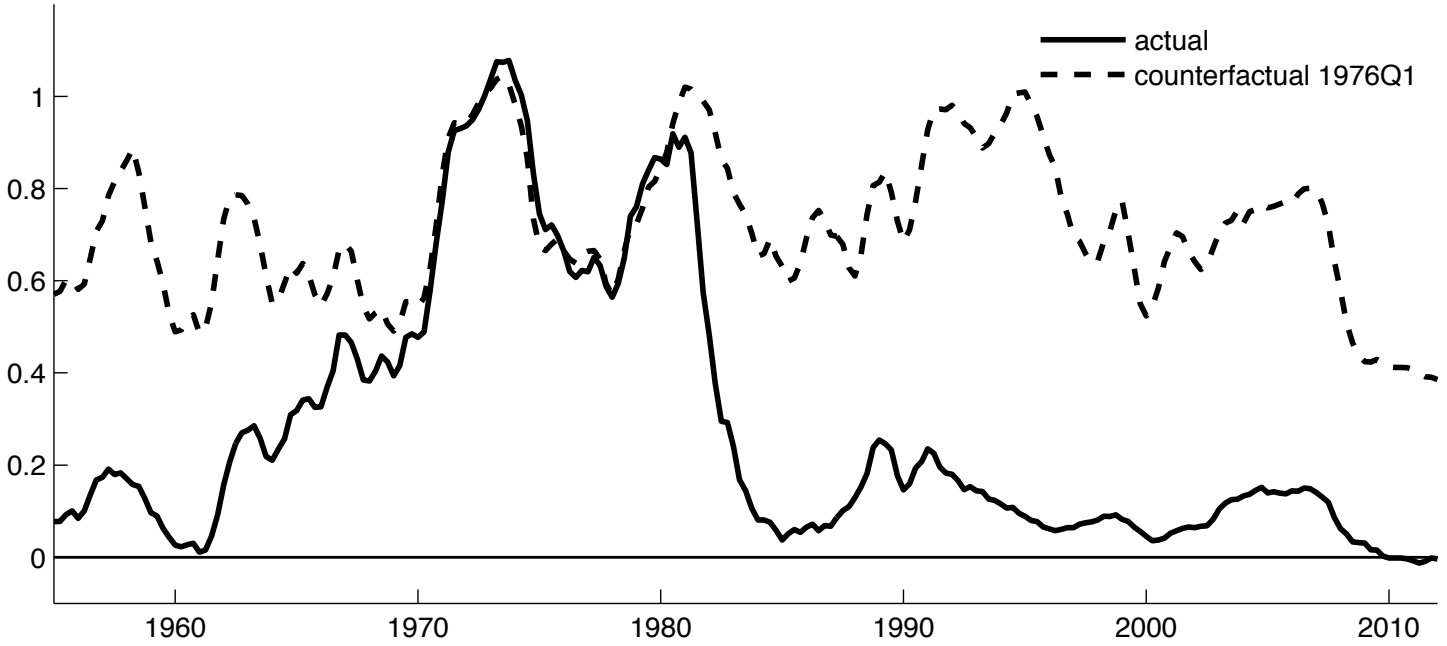


- Very weak low-frequency relationship during 70s and 80s

Counterfactual II

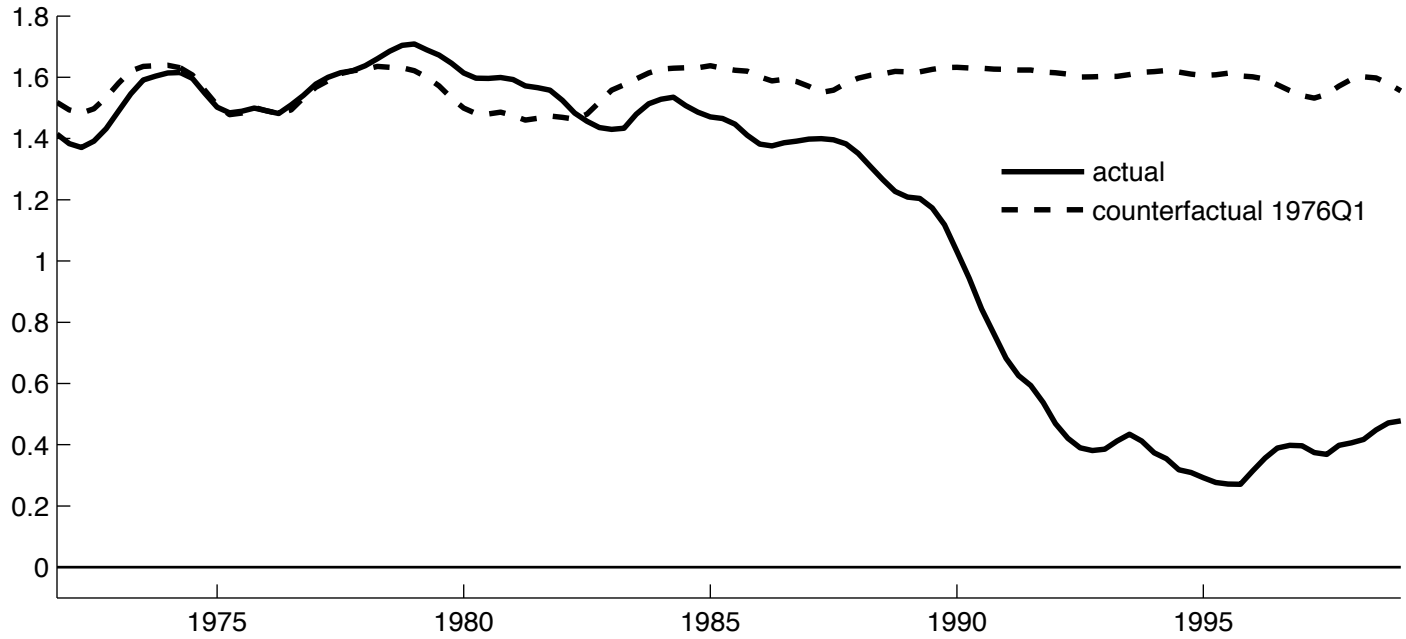
What would have been the estimate of the low-frequency relationship if the systematic response of the economy had been the same as in year **1976.1** in all years?

Counterfactual: US fixed to 1976.1



- Low-frequency relationship stays constant

Counterfactual: Italy fixed to 1976.1



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Summary TVP-VAR analysis

- Results do not depend on fix break point
- Responsible for change in the low-frequency relationship:
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The DSGE Model

- We set up a simple standard closed-economy New Keynesian DSGE model
  - habit formation
  - sticky prices with indexation
  - stochastic growth
- We estimate the model for US data between 1982:Q4 and 2008:Q2
- We run counterfactual experiment regarding monetary/fiscal policy regime

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Policy regimes

- Policy is modeled by feedback rules
- Policy regimes are determined by feedback coefficients:
  - ϕ_b: response of taxes to changes in debt
  - ϕ_π: response of nominal interest rates to a change in inflation

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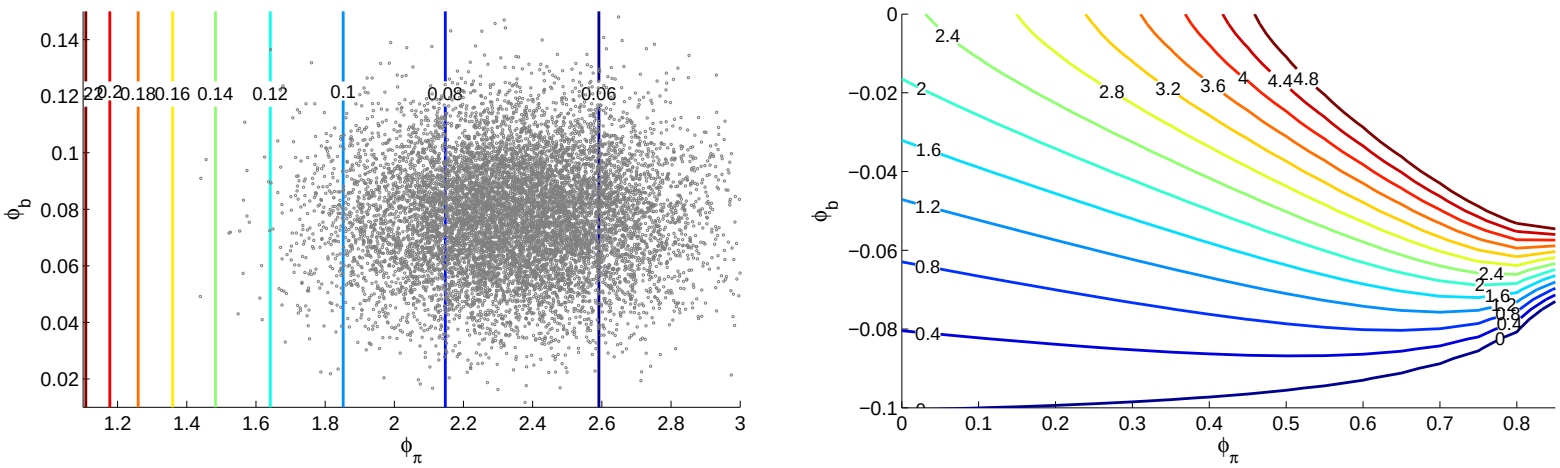

(e) Active Money / Passive Fiscal

(f) Passive Money / Active Fiscal

Figure: Low-frequency relationship between primary deficits over debt and inflation.

Conclusion

We establish "stylized" facts about low-frequency relationship between fiscal deficits and inflation

- variation across time and countries
- narrative evidence suggests dependence on monetary and fiscal policy interaction

Structural interpretation using a DSGE model:

- changing interaction between monetary and fiscal policy can explain low-frequency movements of fiscal stance and inflation

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Fiscal stance

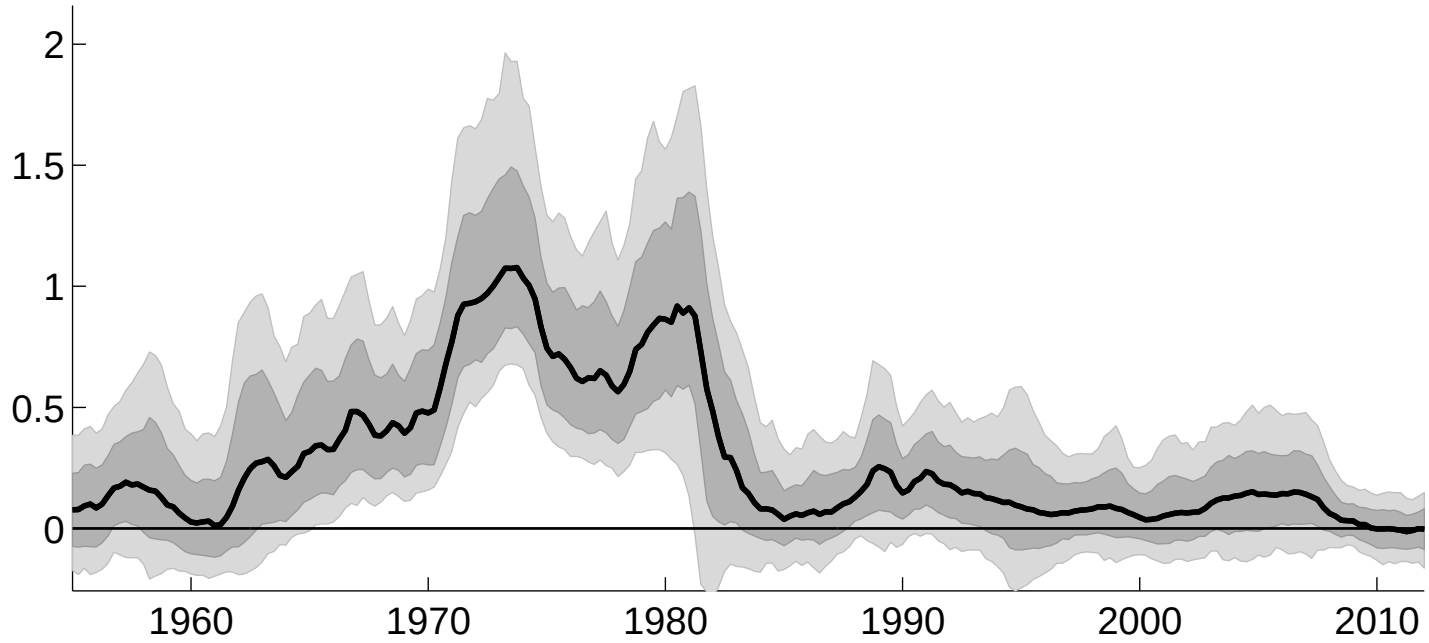
- Surplus over debt:

$$\frac{s_t}{b_{t-1}} = \left((1 + r_t) - \frac{b_t}{b_{t-1}} \right) \tag{3}$$

- Interpretation: net return on the investment due to interest and retirement of bonds.
- In steady state this is the real interest rate.
- A change measures reduction in future obligations.
- Deficits are the opposite, i.e. a increase in future obligations.

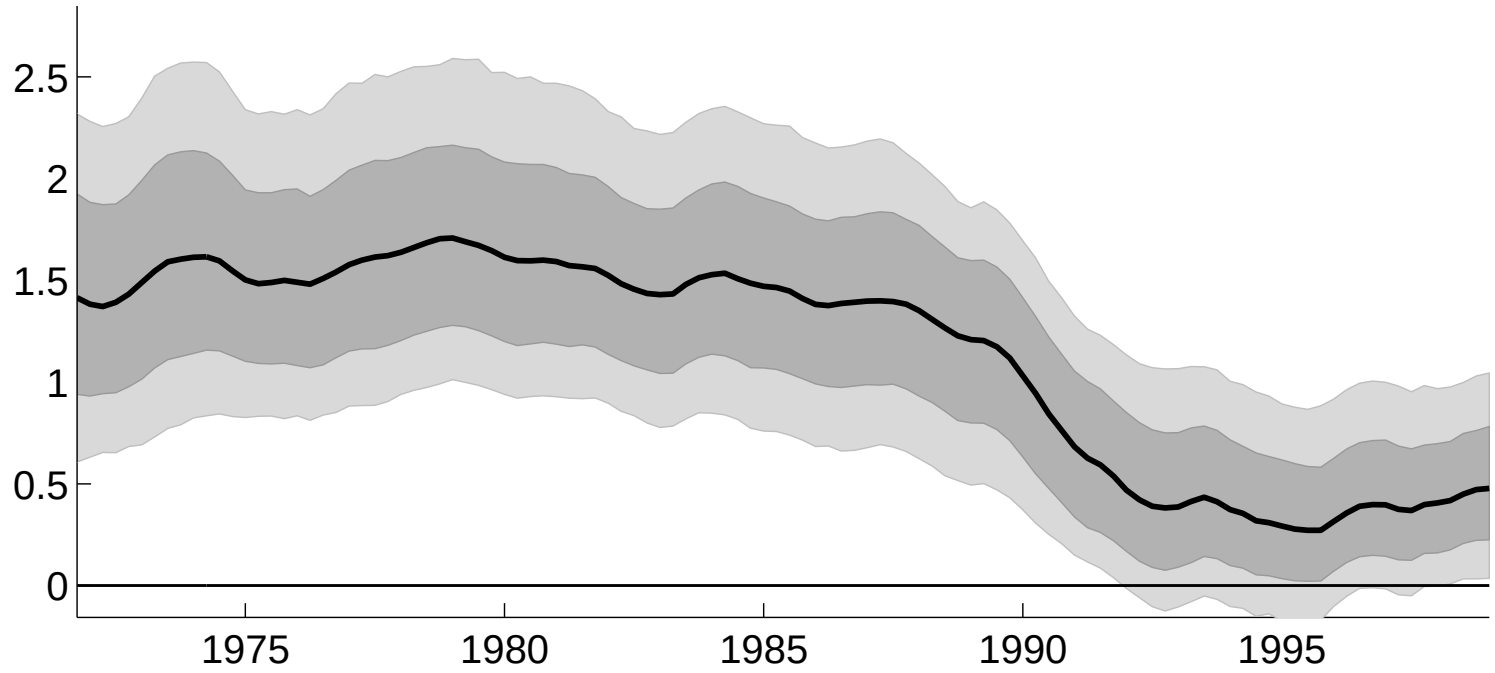
Back

Time-varying β for the U.S.



back

Time-varying β for Italy



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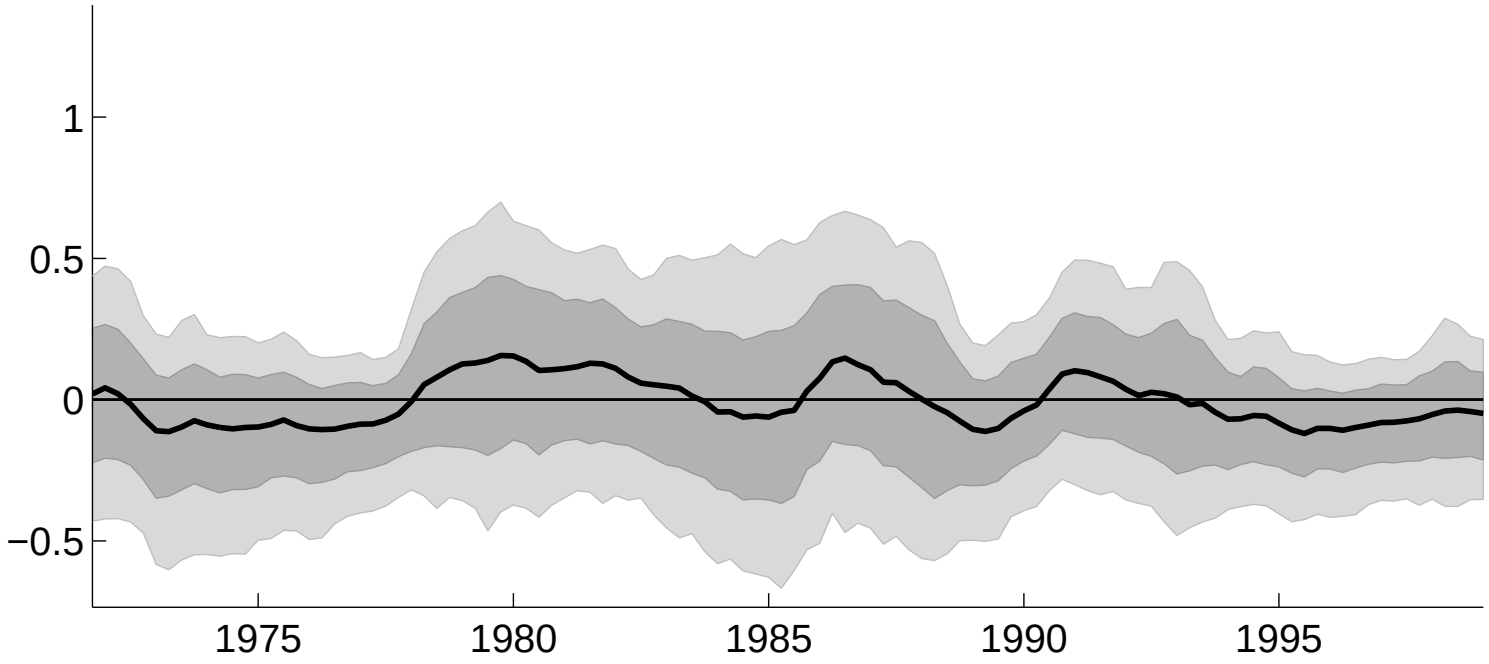
Time-varying β for Germany



back

Policy rules in the model

fiscal policy rule:

$$\tilde{\tau}_t = \rho_\tau \tilde{\tau}_{t-1} + (1-\rho_\tau)\,\phi_b \tilde{b}_{t-1} + \epsilon_{\tau,t}$$

monetary policy rule:

$$\hat{r}_t = \rho_R \hat{r}_{t-1} + (1-\rho_R)\left(\phi_\pi \hat{\pi}_t + \phi_y \left(\hat{y}_t - \hat{y}_t^N\right)\right) + \epsilon_{R,t}$$

$\rightarrow$ ϕ_b and ϕ_π determine the policy regime:

	active monetary	passive monetary
passive fiscal	**DETERMINACY**	indeterminacy
active fiscal	no solution	**DETERMINACY**

back