# The Macroeconomic Effects of Social Security Contributions and Benefits – Evidence from Germany

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## Motivation

- Multiplier effects of social security changes "relative unknowns of fiscal policy" (Romer and Romer, 2016)
- Identification problem (endogeneity of the budget to business cycle fluctuations)
  - Cyclical Adjustment Approach (Blanchard and Perotti, 2002) (BP)
  - Narrative Approach (Romer and Romer, 2010) (RR)

## Contribution of the Paper

- Constructs a narrative quarterly series of social security contribution and benefit shocks for Germany
- Estimates their respective GDP effects
  - ...based on the proxy SVAR specification of Mertens and Ravn (2014) (MR) (rule out model friction)
  - ...compares narrative MR/RR specification with BP specification

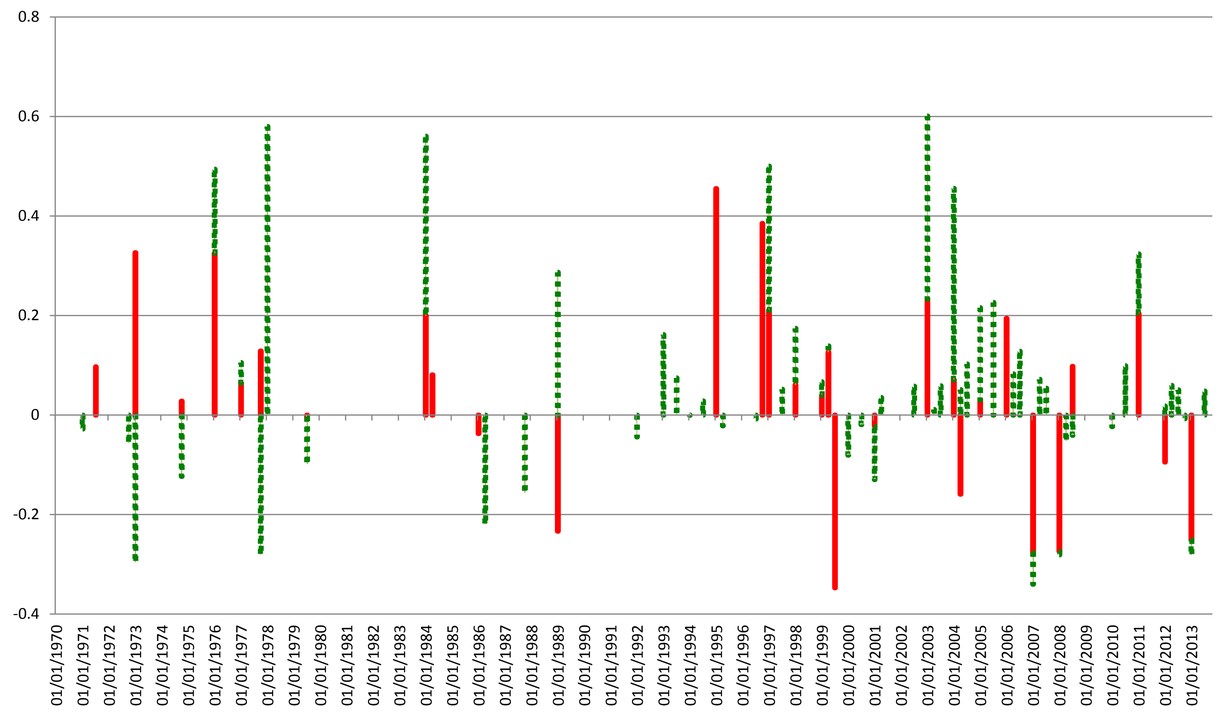
## Constructing the Shock Series

- Period 1970q1-2013q4
- Shock series covers changes in transfers and social security contributions for pensions, health care, long-term care and unemployment insurance on the German federal level
- Sources:
  - Chronicles from Federal Ministry of Labour and Social Affairs, German Statutory Pension Insurance Scheme, Steffen (2013)
  - Historical records of draft legislations and legislative texts from Bundestag (Federal Parliament) and Bundesrat (Federal Council)

→ Provide size, timing and motivation of the shock

- Size
  - Expected amount of full-year budgetary effect of the measure (without macroeconomic feedback), % of annual GDP
- Timing
  - Shocks are timed at the implementation date of the discretionary measure
  - But we also test with announcement dates, non-anticipated shocks (fiscal foresight)
- Motivation
  - Exogenous: structural and ideological reasons, budget consolidation, rulings of the court
  - Endogenous: counter-/procyclical policies, contemp. macroeconomic shocks, spending-driven / revenue-driven

Figure 1: Exogenous Shocks to Social Security at Implementation Date (% GDP) (>0 = consolidation shock)




## Reduced-form VAR model

identical for both MR and BP approaches:

$$X_t = \mathbf{\Gamma}(L)X_{t-1} + v + u_t \quad (1)$$

$$X_t = \left[g_t\ y_t\ \tau_t\right]' \quad (2)$$

... more specifically:
4 lags
$g_t$ = general gov't spending on consumption and capital formation
$y_t$ = GDP
$\tau_t$ = social security revenues or expenditures
all log real per capita levels (robustness: growth rates)
$v$ = constant, linear time trend, re-unification dummy and financial crisis dummy

## Identification (AB model)

$$\boldsymbol{A}X_t = \boldsymbol{A}\mathbf{\Gamma}(L)X_{t-1} + \boldsymbol{A}v + \boldsymbol{B}\varepsilon_t \quad (3)$$

$$u_t = \boldsymbol{A}^{-1}\boldsymbol{B}\varepsilon_t \quad (4)$$

$$\Sigma_u = \boldsymbol{A}^{-1}\boldsymbol{B}\Sigma_\varepsilon\boldsymbol{B}'(\boldsymbol{A}^{-1})' \quad (5)$$

$$\Sigma_\varepsilon = \boldsymbol{I}$$

$$\boldsymbol{A}_{MR} = \begin{bmatrix} 1 & -\bar{\alpha}_{gy} & -\bar{\alpha}_{g\tau} \\ -\alpha_{yg} & 1 & -\bar{\alpha}_{y\tau} \\ -\bar{\alpha}_{\tau g} & -\alpha_{\tau y} & 1 \end{bmatrix} \qquad \boldsymbol{A}_{BP} = \begin{bmatrix} 1 & -\bar{\alpha}_{gy} & -\bar{\alpha}_{g\tau} \\ -\alpha_{yg} & 1 & -\alpha_{y\tau} \\ -\bar{\alpha}_{\tau g} & -\bar{\alpha}_{\tau y} & 1 \end{bmatrix}$$

$$\boldsymbol{B} = \begin{bmatrix} \beta_{gg} & 0 & \bar{\beta}_{g\tau} \\ 0 & \beta_{yy} & 0 \\ \beta_{\tau g} & 0 & \beta_{\tau\tau} \end{bmatrix}$$

## Identifying Restrictions

MR approach:
$\bar{\alpha}_{ji}$ – technical 0/1 restrictions
$\bar{\alpha}_{y\tau}$ – IV estimation

$$\hat{u}_t^y = \mu^y + \alpha_{y\tau}^{IV}\bar{u}_t^\tau + \zeta_t^y \quad (6)$$

$$\hat{u}_t^\tau = \mu^\tau + \gamma m_t + \omega_t^\tau = \bar{u}_t^\tau + \omega_t^\tau \quad (7)$$

BP approach:
$\bar{\alpha}_{ji}$ – technical 0/1 restrictions
$\bar{\alpha}_{\tau y}$ – elasticities of social security benefits and contributions (Price et al., 2014)

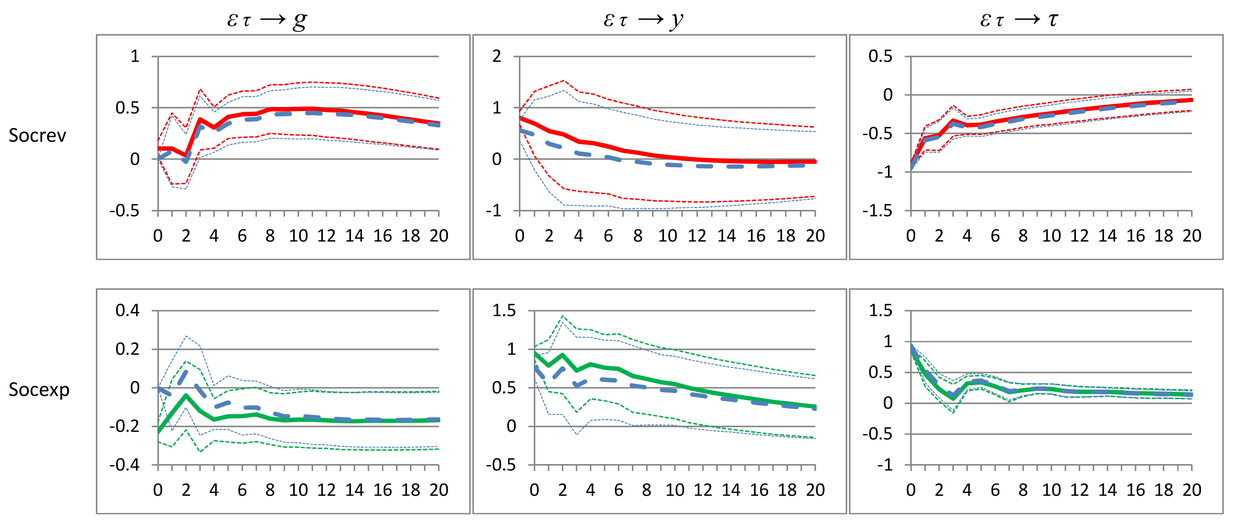
Table 1: Elasticities imposed and estimated for the BP and MR models in levels

| | Socrev | Socexp |
|---|---|---|
| $\alpha_{\tau y}$ | | |
| (1) BP imposed | 0.60 | -0.50 |
| (2) MR implied | 0.74 (0.43, 1.04) | -0.74 (-1.14, -0.34) |
| $\alpha_{y\tau}$ | | |
| (3) BP implied | -0.09 (-0.18, 0) | 0.15 (0.07, 0.23) |
| (4) MR imposed | -0.13 | 0.20 |

95% confidence bounds for implied elasticities in parentheses.

## Results

Figure 2: IRF for MR (solid red or green) and BP (dashed blue) identification - expansionary shock to contributions or benefits (tau) sized to 1% of GDP, log levels, 2-SE confidence bands




## Results are robust to ...

- non-anticipated shocks only
- original MR B-model specification
- extended 5-variable VAR
- big vs. small shocks (for revenues big shocks have lower multiplier)
- ...

## Central Findings

1. Revenues: Impact multiplier of ≈ 0.8, effect dies out quickly
2. Benefits: Impact multiplier of ≈ 0.9, effect much more persistent
3. No significant difference between MR/RR and BP approach

→ Social security shocks push GDP only mildly, middle of the range of multipliers
→ Redistribution from rich to poor (higher contributions + higher transfers) might have positive net effect in the medium run