

# The Effects of Fiscal Policy in an Estimated DSGE Model - The Case of the German Stimulus Packages during the Great Recession

Andrej Drygalla, Oliver Holtemöller and Konstantin Kiesel  
Halle Institute for Economic Research (IWH)

## Motivation

- ▶ Did the German fiscal measures during the recession had an impact at all? Can we quantify it?
- ▶ What are the channels?
- ▶ Challenge: Disentangle discretionary fiscal policies and automatic stabilizers

## Introduction

### A Brief Literature Review:

- ▶ *(Open) economy models:*  
Christiano et al. (2005), Smets and Wouters (2003, 2007), Gali and Monacelli
- ▶ *Rule-of-thumb consumers:*  
Zeldes (1989), Angeletos et al. (2001), Campbell and Mankiw (1989, 1990, 1991), Carroll (2001), Carroll and Kimball (2008), Coenen and Straub (2005)
- ▶ *Domestic effects of fiscal stimulus packages:*  
Coenen, Straub and Trabandt (2012), Coenen, Erceg, Freedman, Furceri, Kumhof, Lalonde, Laxton, Lindé, Mourougane, Muir et al. (2012)

## Model

- ▶ Medium-scale DSGE model based on Smets and Wouters (2003)
- ▶ Introduction of fiscal sector:
  - ▶ **Fiscal variables:** government consumption, investment and transfers, consumption, labor and capital tax rates, government debt
  - ▶ **Fiscal policy rules:** spending variables and tax rates evolve according to reaction functions to output and government debt, allowing for persistence and pre-announcement effects (Leeper et al. (2009))
  - ▶ *Spending rule:*

$$g_t^x = \rho_{gx} g_{t-1}^x + \varphi_{gx,y} y_t + \rho_{gx,b} b_{t-1} + (1 - \psi_{gx}) \eta_{gx,t} + \psi_{gx} \eta_{gx,t-1}$$

- ▶ *Tax rule:*

$$\tau_t^x = \rho_{\tau x} \tau_{t-1}^x + \varphi_{\tau x,y} y_t + \rho_{\tau x,b} b_{t-1} + (1 - \psi_{\tau x}) \eta_{\tau x,t} + \psi_{\tau x} \eta_{\tau x,t-1}$$

- ▶ **Automatic stabilizers:** covered by reaction coefficients to output fluctuations
- ▶ Productive public capital
- ▶ Non-Ricardian households: share  $\mu$  of private households, consume entire disposable income (labor income/transfers)
- ▶ International linkages via trade and Euro area-wide monetary policy:
  - ▶ Interest rate set according to a Taylor (1993)-type rule
  - ▶ Target variables are GDP-weighted averages of Germany and the rest of the euro area

## Data and Estimation

### Data

- ▶ 13 domestic time series
  - ▶ GDP, private and government consumption, private and government investment, government transfers, effective tax rates for consumption, labor and capital income, hours, wages, CPI inflation and short-term interest rate
- ▶ 2 rest of the euro area time series (GDP-weighted aggregate output and inflation)
- ▶ Effective tax rates are calculated following Mendoza (1994)
- ▶ Series are linearly detrended to extract their cyclical components
- ▶ Sample period from 1999Q1 till 2012Q4

### Bayesian estimation

- ▶ Steady state parameters set according to empirical evidence
- ▶ Choices of priors motivated by comparable studies and methods presented therein (e.g. ratio of non-Ricardian to Ricardian consumption  $\geq 0.75$ )
- ▶ Identification of (fiscal policy) shocks

## Results

### Estimated parameter values

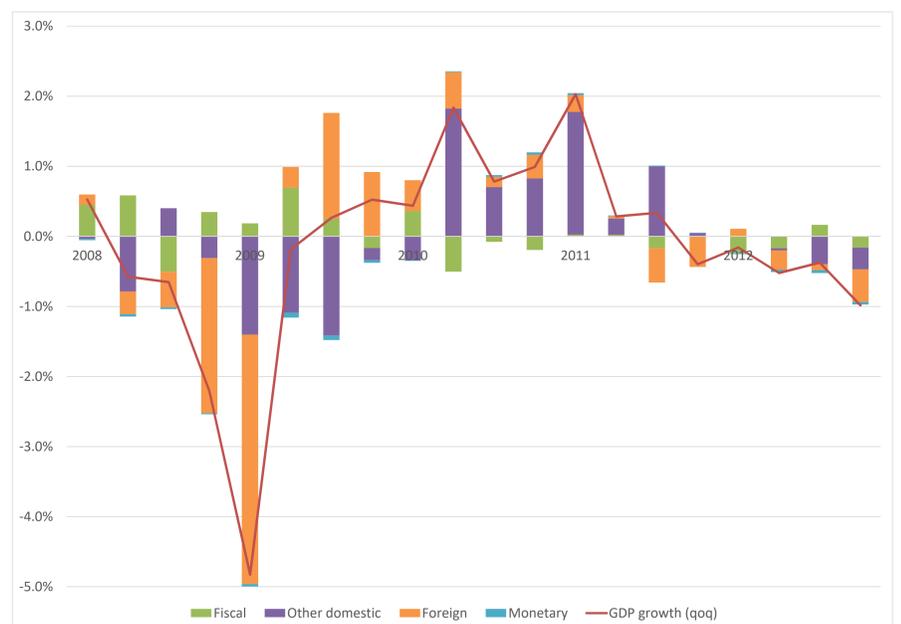
- ▶ Non-Ricardian households (38%) receive 60% of total transfers and consume 91% of optimizers
- ▶ High persistence in fiscal, especially spending variables (AR coefficients  $> 0.75$ )
- ▶ High relevance of pre-announcement effects (except government consumption and capital tax rate)
- ▶ Systematic stabilization of output via government transfers
- ▶ No systematic stabilization of government debt via fiscal policy rules

### Smoothed fiscal shocks

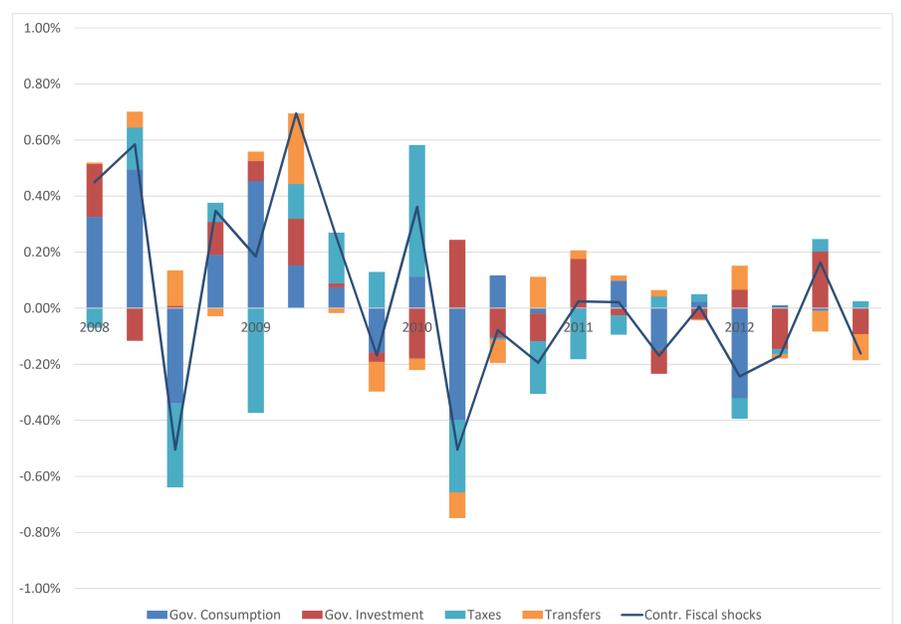
- ▶ Sizeable impulses from government investment, albeit low importance in GDP
- ▶ Moderate impulses from government consumption and transfers
- ▶ Negligible impulses from revenue side

### Effects on GDP growth

- ▶ Positive effects of fiscal policy shocks in three quarters of 2009 and the beginning of 2010
- ▶ Overall impact on GDP growth relatively small (cumulative contribution 0.5 pps)



- ▶ Largest positive effects from government consumption and capital tax rate, smaller from government investment and transfers
- ▶ Fiscal stimulus largest in 2009Q2 (contribution to qoq GDP growth of 0.7 pps)



## Conclusion

- ▶ Estimated DSGE model for Germany with a detailed fiscal sector
- ▶ Downturn and subsequent upturn primarily driven by foreign shocks as well as domestic preference and risk premium shocks
- ▶ Positive small overall impact of fiscal shocks on GDP in 2009-2010
- ▶ Fiscal policy measures have prevented a larger downturn and stabilized economic activity, however no contribution to its acceleration throughout 2010