Fiscal Policy and the "Great Recession" in the Euro Area

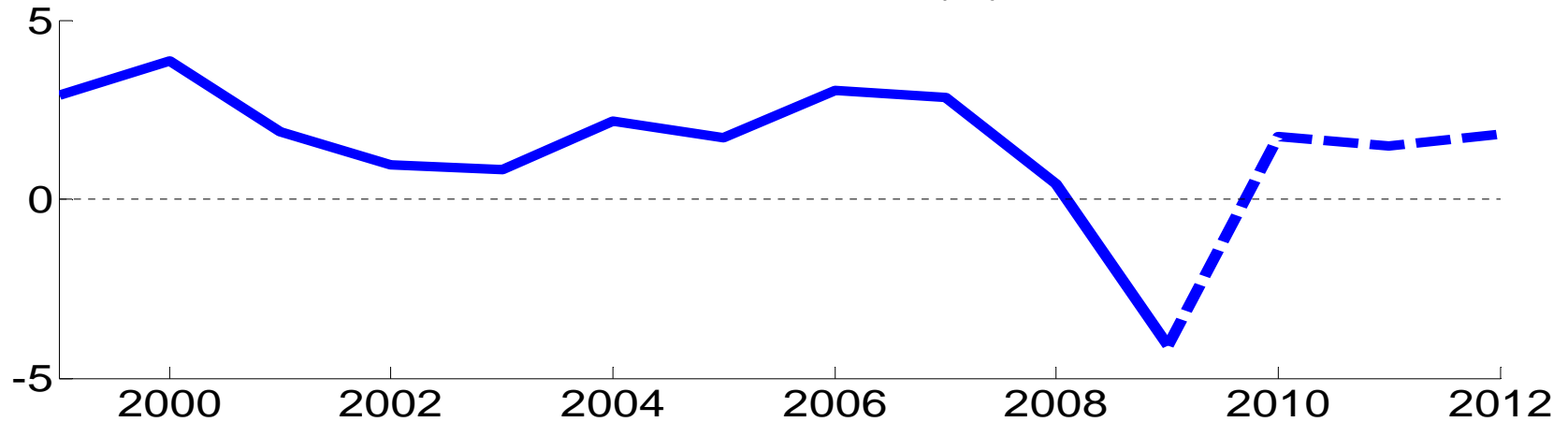## G. Coenen, M. Kirchner, R. Straub, M. Trabandt

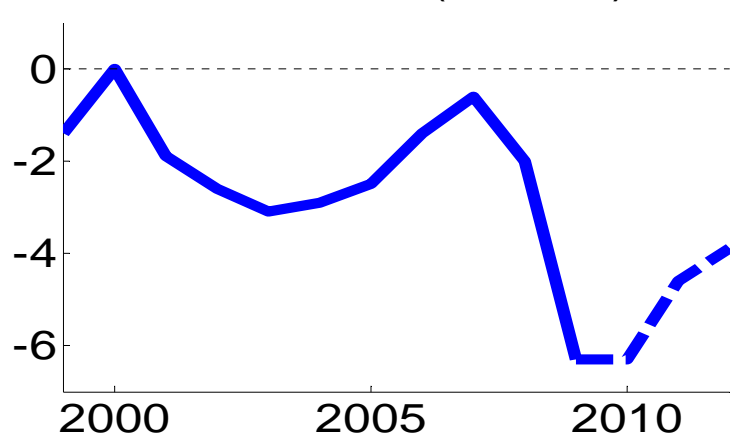Frankfurt/Main, December 3rd, 2010

Introduction

- **Current crisis triggered large-scale fiscal policy response in the euro area:**
  - **Automatic stabilizers**
  - **Discretionary fiscal policy**
    - **EERP of 2% of GDP in 2009-10**
    - **Financial market support measures**

- **A consequence: strong deterioration of euro area public finances**

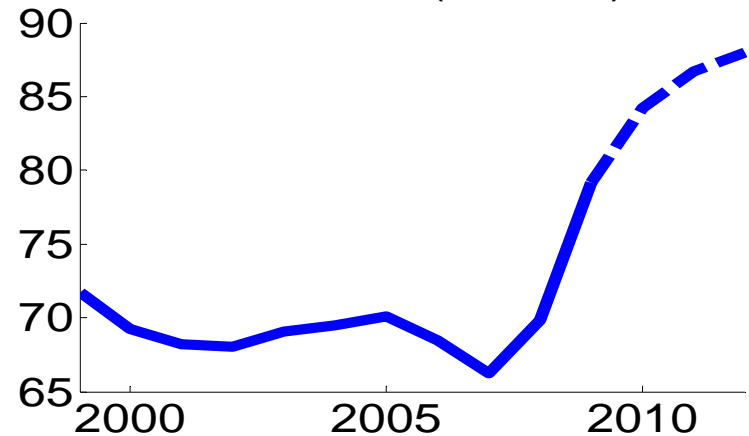# The Crisis and Euro Area Public Finances

Introduction

- **Current crisis triggered large-scale fiscal policy response in the euro area:**
  - **Automatic stabilizers**
  - **Discretionary fiscal policy**
    - **EERP of 2% of GDP in 2009-10**
    - **Financial market support measures**

- **A consequence: strong deterioration of euro area public finances**
  - **How much did fiscal policy contribute to GDP growth?**

Introduction

- **Discussion about size/sign of fiscal multipliers**
  - **<u>Plethora of issues</u> - empirical, model-based, zero lower bound …**
  - **<u>Focus on part of full fiscal policy response to the crisis</u> - single instrument, no-automatic stabilizers …**

- **This presentation: model-based accounting exercise of the crisis to answer question:**
  - **What did fiscal policy actually do to euro area GDP in the crisis, <u>quantitatively</u>?**

What we do

- **Employ ECB's New Area-Wide Model (NAWM) for crisis accounting exercise**

- **Point of departure: estimated version of NAWM used for forecasting and policy analysis (simplified version of calibrated model with richer fiscal sector)**

  - **Small open economy version of CEE (2005) and SW (2003, 2007)**

  - **Stylized fiscal sector:**

    - **constant taxes, balanced budget, exogenous government consumption (only fiscal observable)**

What we do

- **NAWM Fiscal: extension of baseline NAWM to allow for broader scope of fiscal policy**

  - **Empirical extensions:**
    - **measure in total 8 fiscal time series**

  - **Theoretical extensions:**
    - **rule-of-thumb consumers, public capital, time-to-build, complementarities, fiscal rules, automatic stabilizers, pre-announcement, …**
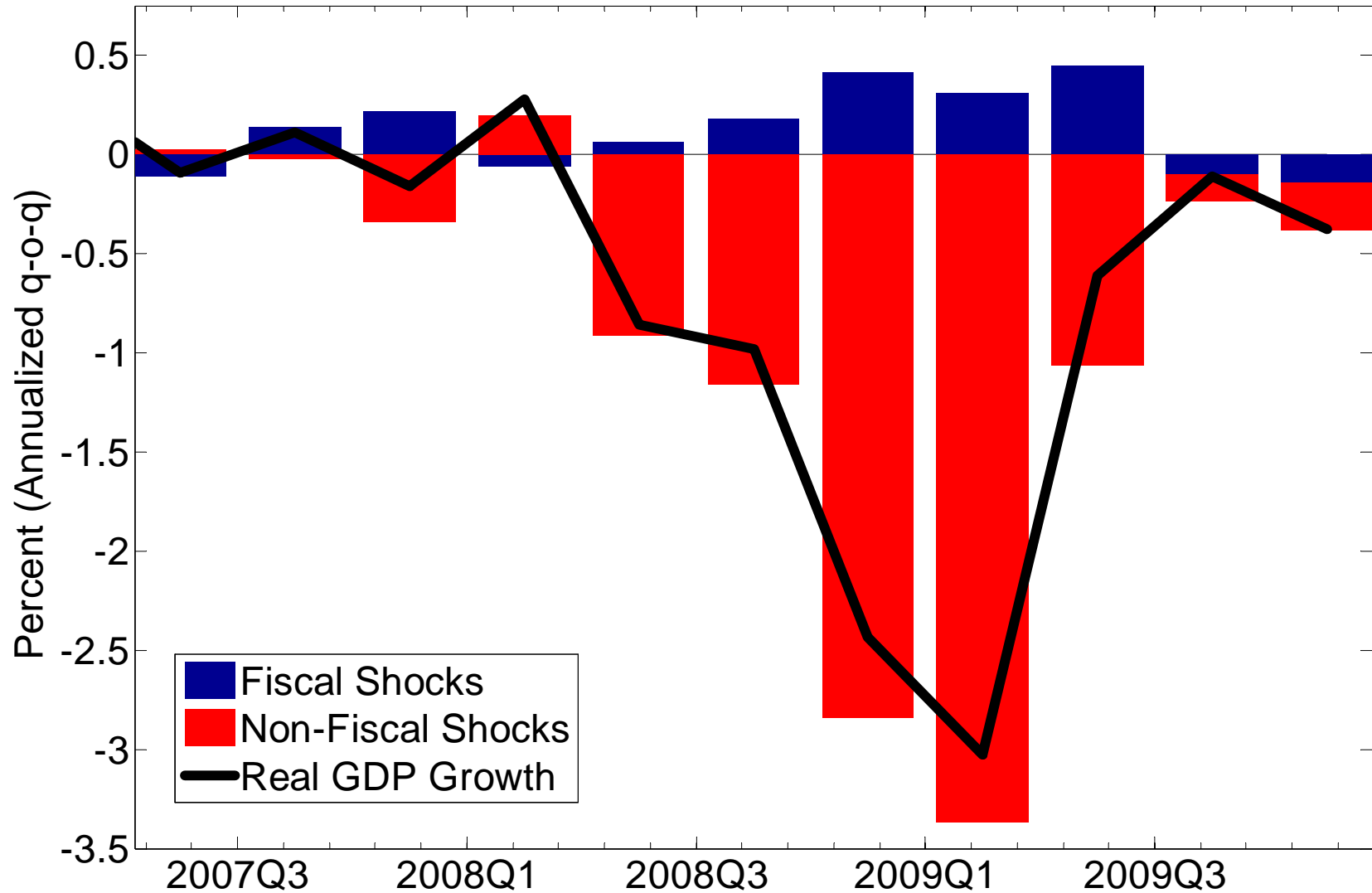
Preview: Baseline NAWM

Real GDP Growth Euro Area - Historical Decomposition
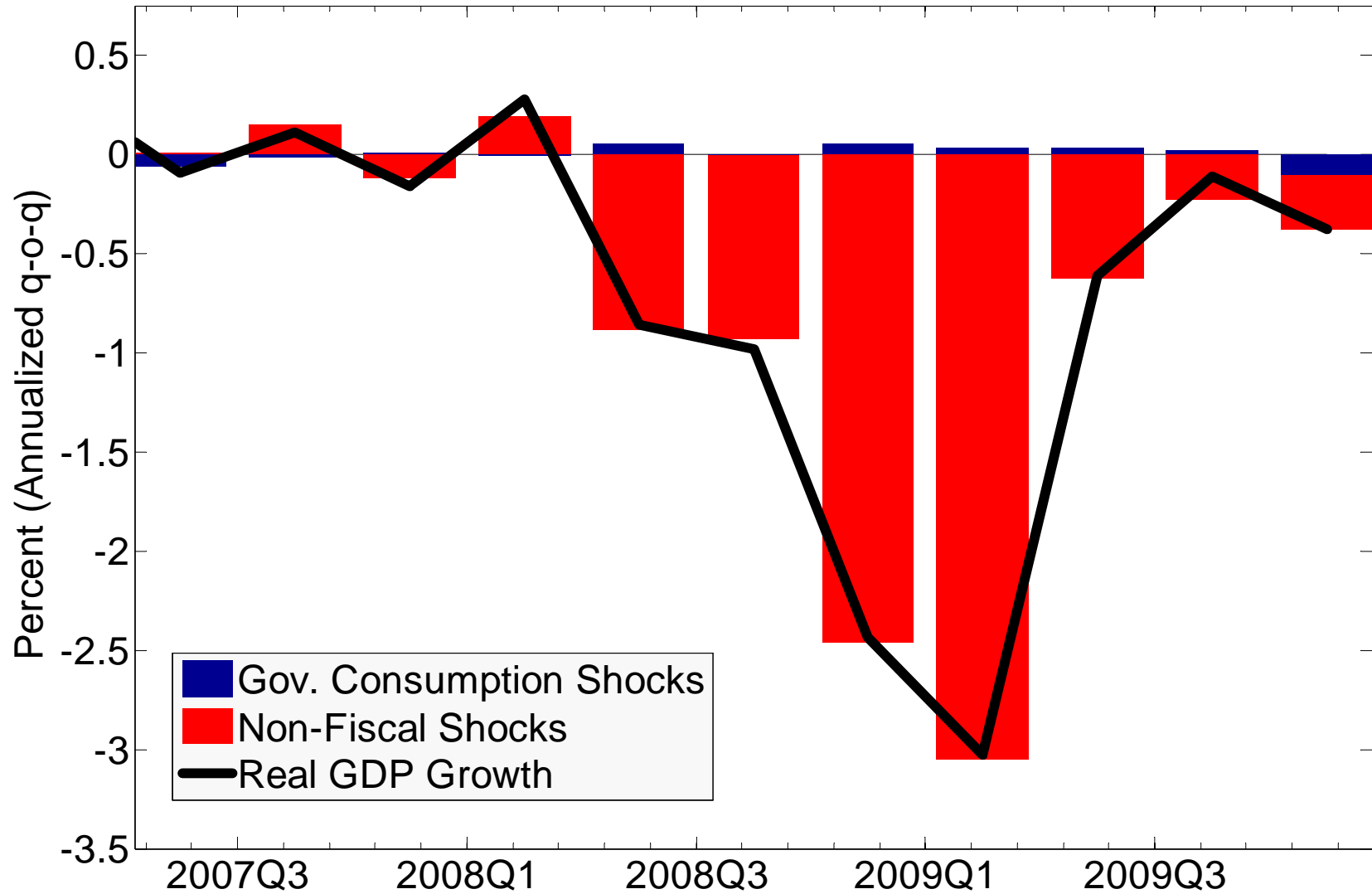
Real GDP Growth Euro Area - Historical Decomposition

Outline

- **Introduction**

- **Baseline New Area-Wide Model (NAWM)**

- **NAWM Fiscal: Theoretical Extensions**

- **NAWM Fiscal: Empirical Extensions**

- **Results**

- **Conclusions & Outlook**

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Baseline New Area-Wide Model (NAWM)

- **Micro-founded estimated DSGE model for euro area**
  - **Christoffel-Coenen-Warne (2008)**

- **Four types of agents:**
  - **Optimizing private households & firms**
  - **Monetary and fiscal authority (balanced budget)**

- **Wealth of nominal and real rigidities (habit preferences, adjustment costs, sticky prices and wages….)**

- **Estimated on 18 euro area time series**
  - **Government consumption only fiscal observable**

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NAWM Fiscal: Rule-of-Thumb Consumers

- **Gali/Lopez-Salido/Valles (2007); Coenen/Straub (2005); Coenen/McAdam/Straub (2008)**

- **Share ω of non-optimizing consumers *J***
  - **Identical wage and labor supply across groups**
  - **Rule-of thumb consumption:**

$$(1 + \tau_t^c) P_{C,t} C_{J,t} = (1 - \tau_t^N - \tau_t^{W_h}) W_{J,t} N_{J,t} + TR_{J,t}$$

- **Aggregate consumption:** $C_t = (1 - \omega) C_{I,t} + \omega C_{J,t}$

- **Steady state:** $c_J / c_I \approx 0.8$

- **Transfers (dynamics) allocated ≈ 3:1 to non-Ricardians**

NAWM Fiscal: Public capital

- **Public capital stock for intermediate goods production:**

$$Y_{f,t} = \varepsilon_t \left(\tilde{K}^s_{f,t} \right)^{\alpha} (z_t N_{f,t})^{1-\alpha} - z_t \psi$$

- **Composite capital stock (CES):**

$$\tilde{K}^s_{f,t} = \left(\alpha_K{}^{\frac{1}{v_K}} \left(K^s_{f,t} \right)^{\frac{v_K-1}{v_K}} + (1 - \alpha_K)^{\frac{1}{v_K}} (K_{G,t})^{\frac{v_K-1}{v_K}} \right)^{\frac{v_K}{v_K-1}}$$

- **Government maintains public capital stock**

- **Gov. investment subject to time-to-build constraints**

- **Budget authorization and actual outlays may differ (depending on estimated parameter)**

NAWM Fiscal: Valued Gov. Consumption

- **Households utility function:**

$$\mathrm{E}_t\left[\sum_{k=0}^{\infty}\beta^k\left(\epsilon_{t+k}^C\ln(\tilde{C}_{h,t+k}-\kappa\tilde{C}_{t+k-1})-\frac{\epsilon_{t+k}^N}{1+\zeta}(N_{h,t+k})^{1+\zeta}\right)\right]$$

- **Composite consumption (CES):**

$$\tilde{C}_{h,t}=\left(\alpha_G^{\frac{1}{vG}}C_{h,t}^{\frac{v_G-1}{v_G}}+(1-\alpha_G)^{\frac{1}{vG}}G_t^{\frac{v_G-1}{v_G}}\right)^{\frac{v_G}{v_G-1}}$$

- **Private consumption response after gov. consumption shock depends on degree of complementarity**

- **Feedback rules for fiscal instruments**
    - **gov. consumption, investment, transfers,**
    - **distortionary tax rates on consumption, labour income, employer and employee social security contributions and lump-sum taxes**

Debt Stabilization, Automatic Stabilizers

- **Example:** Lagged response

$$g_t = \rho^G g_{t-1} - \theta_{GB} b_{t-1} - \theta_{GY} y_{t-1} + (1 - \psi^G)\eta_t^G + \psi^G \eta_{t-1}^G$$

with Discretionary policy (possibly pre-announced)

$$\eta_t^G \sim \text{iid } N(0, \sigma^G); \ \rho^G, \psi^G \in (0, 1); \ \theta_{GB}, \theta_{GY} \geq 0$$

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NAWM Fiscal: Empirical Extensions

- **Macro Data:**
  - **17 euro area macro time series of baseline NAWM**
  - **Area-Wide model database (www.eabcn.org)**
  - **Y, C, I, X, IM, P_y, P_c, P_{im}, E, W, R, S, Y*, P^*_y, R*, P^*_x, P_{oil}**

- **Fiscal Data:**
  - **8 euro area fiscal time series**
  - **Newly available quarterly fiscal database by Paredes/Pedregal/Perez (2009) available at: euro_area.fiscal_database@ecb.europa.eu**

NAWM Fiscal: Empirical Extensions

- **Fiscal Data (continued):**
  - **Government consumption (GCR)**
  - **Government investment (GIR)**
  - **Government transfers to households (THR)**

  - **Indirect tax revenues net of subsidies (TIR-SIN)**
  - **Direct tax revenues (DTX)**
  - **Employee social security contributions (SCE)**
  - **Employer social security contributions (SCR)**

  - **Government debt (GDN)**

NAWM Fiscal: Empirical Specification

- **Sample period: 1980Q2 to 2009Q4**

- **Data treatment:**
  - **Expenditure and debt data in real terms**
  - **Revenue data as a ratio to consumption or wage income**
  - **Linear trend removed (if any)**
  - **Small calibrated measurement errors**

- **Bayesian estimation**

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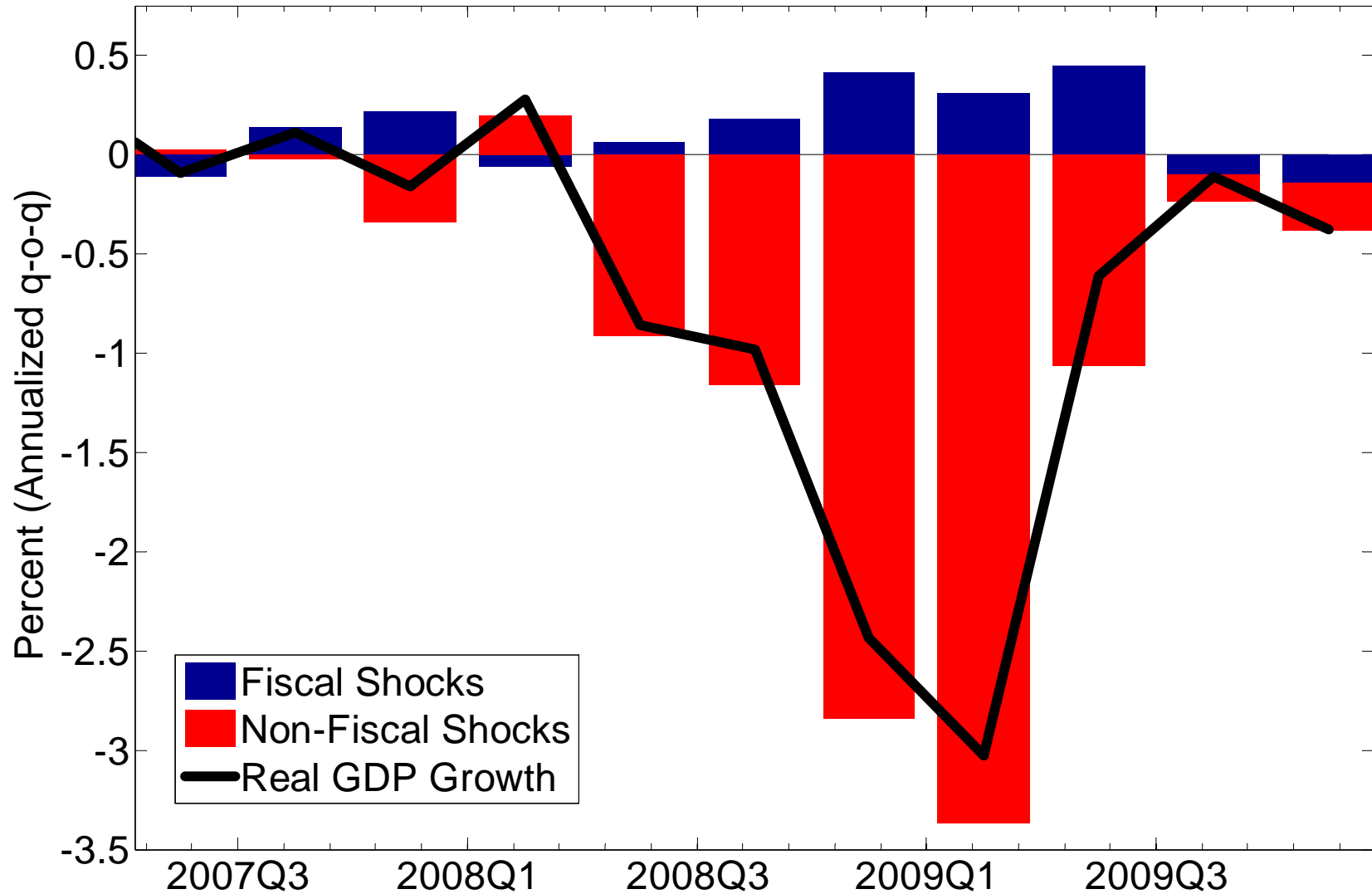
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A Selection of Estimated Parameters

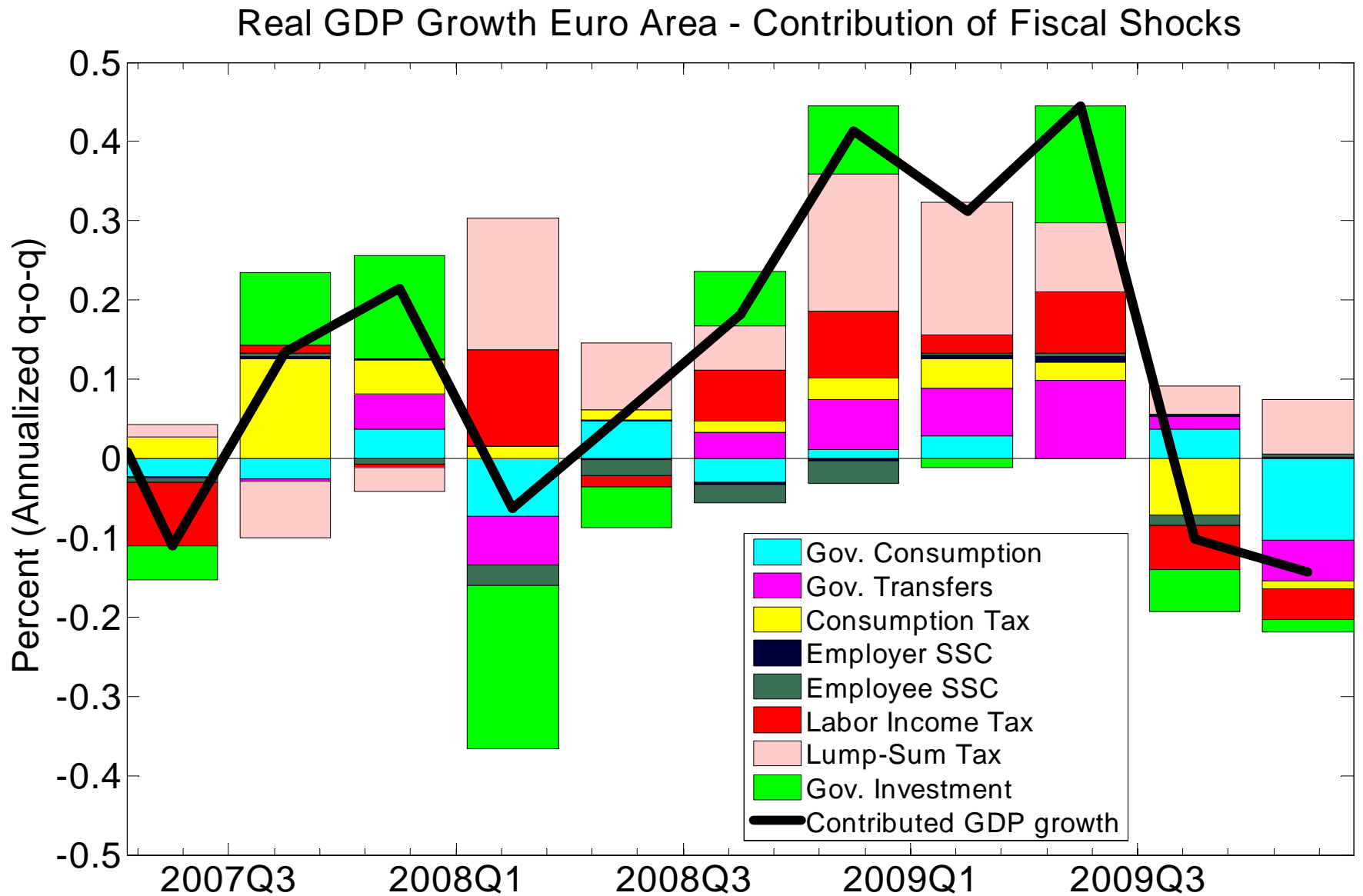|	Prior	Posterior Mode	Description
ω	B(0.5,0.2)	**0.21 (0.02)**	Share of rule-of-thumb consumers
υ_G	IG(0.3,2)	**0.26 (0.03)**	CES priv.-public consumption
υ_K	IG(0.3,2)	**0.11 (0.02)**	CES priv.-public capital
α_G	B(0.9,0.05)	**0.73 (0.02)**	CES share priv.-public consumption
α_K	B(0.9,0.05)	**0.71 (0.002)**	CES share priv.-public capital
b_0	B(0.5,0.2)	**0.06 (0.01)**	Share of initial gov. investment outlays
ψ^G	B(0.5,0.2)	**0.87 (0.01)**	Weight pre-announced gov. consumption
θ_{GB}	IG(0.1,2)	**0.07 (0.01)**	Debt feedback gov. consumption
θ_{GY}	IG(0.1,2)	**0.09 (0.01)**	Output feedback gov. consumption

- **Note: total of 93 estimated parameters (structural, shocks)**

Historical Decomposition: NAWM Fiscal

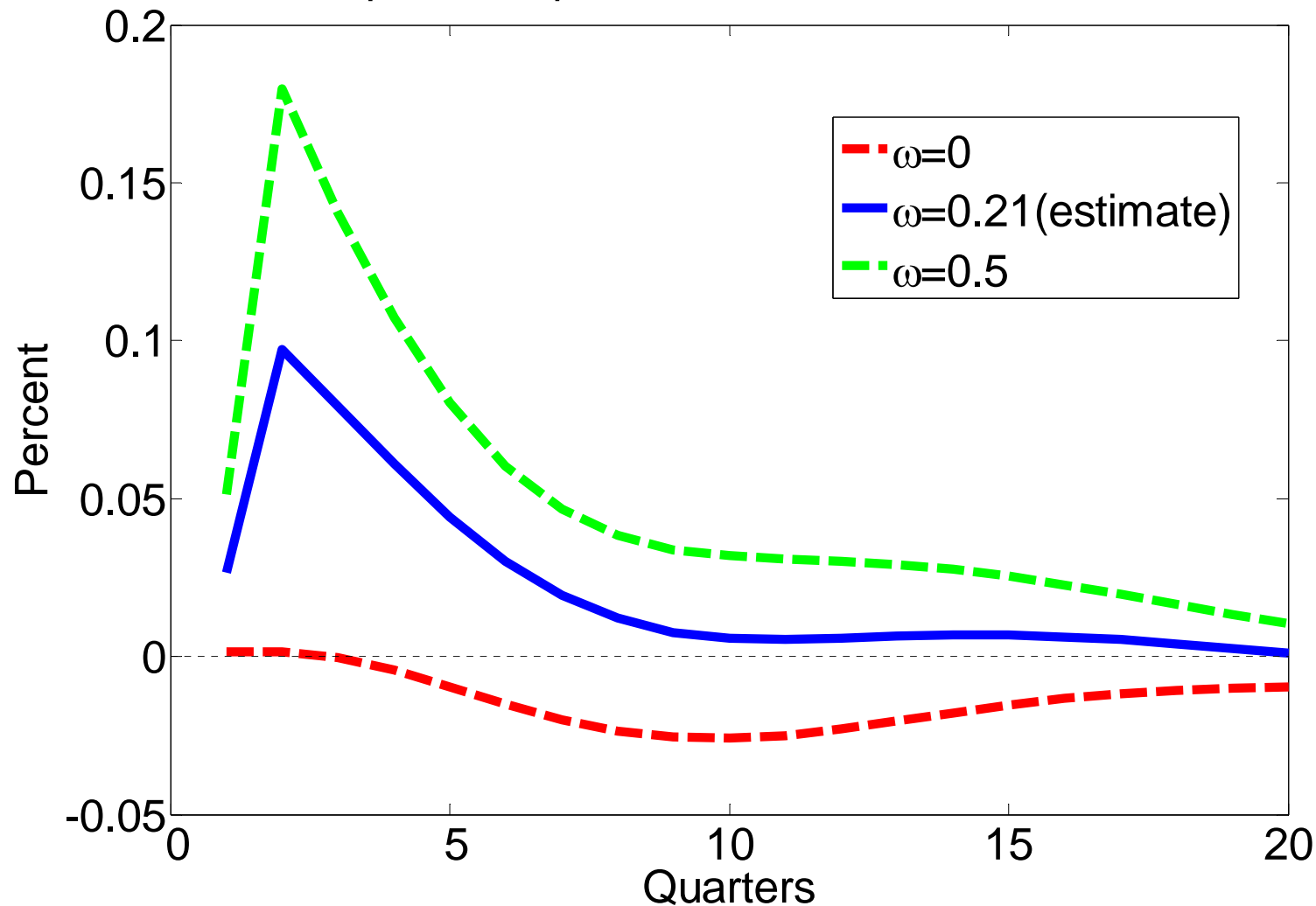Real GDP Growth Euro Area - Historical Decomposition
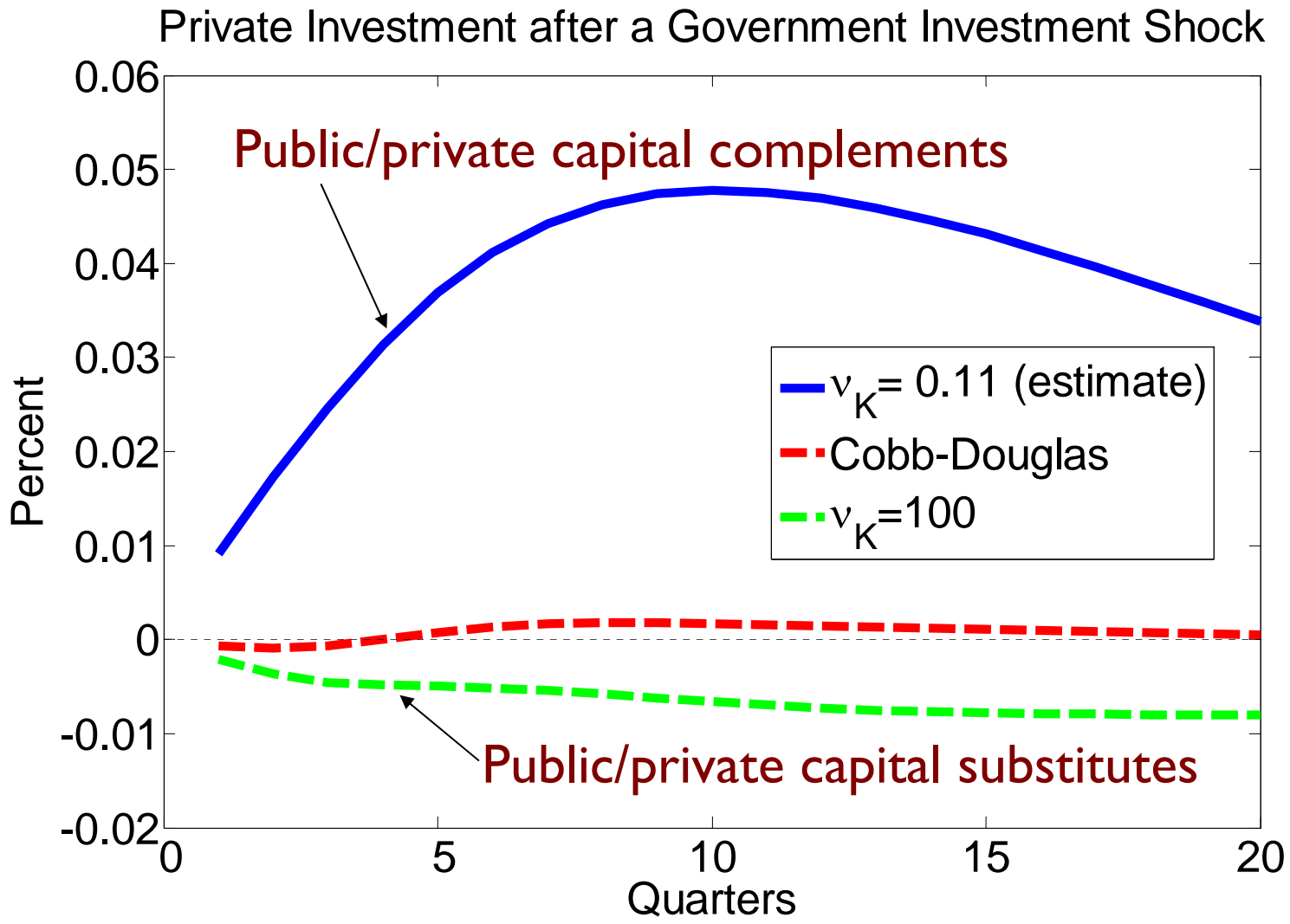
Contribution of Individual Fiscal Shocks

Real GDP Growth Euro Area - Contribution of Fiscal Shocks

Legend:
- Gov. Consumption
- Gov. Transfers
- Consumption Tax
- Employer SSC
- Employee SSC
- Labor Income Tax
- Lump-Sum Tax
- Gov. Investment
- Contributed GDP growth

Private Consumption Response after a Government Transfers Shock

Legend:
- ω=0 (red dash-dot)
- ω=0.21(estimate) (blue solid)
- ω=0.5 (green dash-dot)

Axes: Percent (vertical), Quarters (horizontal)

Private Investment after a Government Investment Shock

Public/private capital complements

ν_K= 0.11 (estimate)
Cobb-Douglas
ν_K=100

Public/private capital substitutes

Percent

Quarters

Private Consumption Response after a Gov. Consumption Shock

Public/private consumption complements

Public/private cons. substitutes

Legend:
- Non-valued Gov. Cons.
- $\nu_G = 0.26$ (estimate)
- $\nu_G = 3$
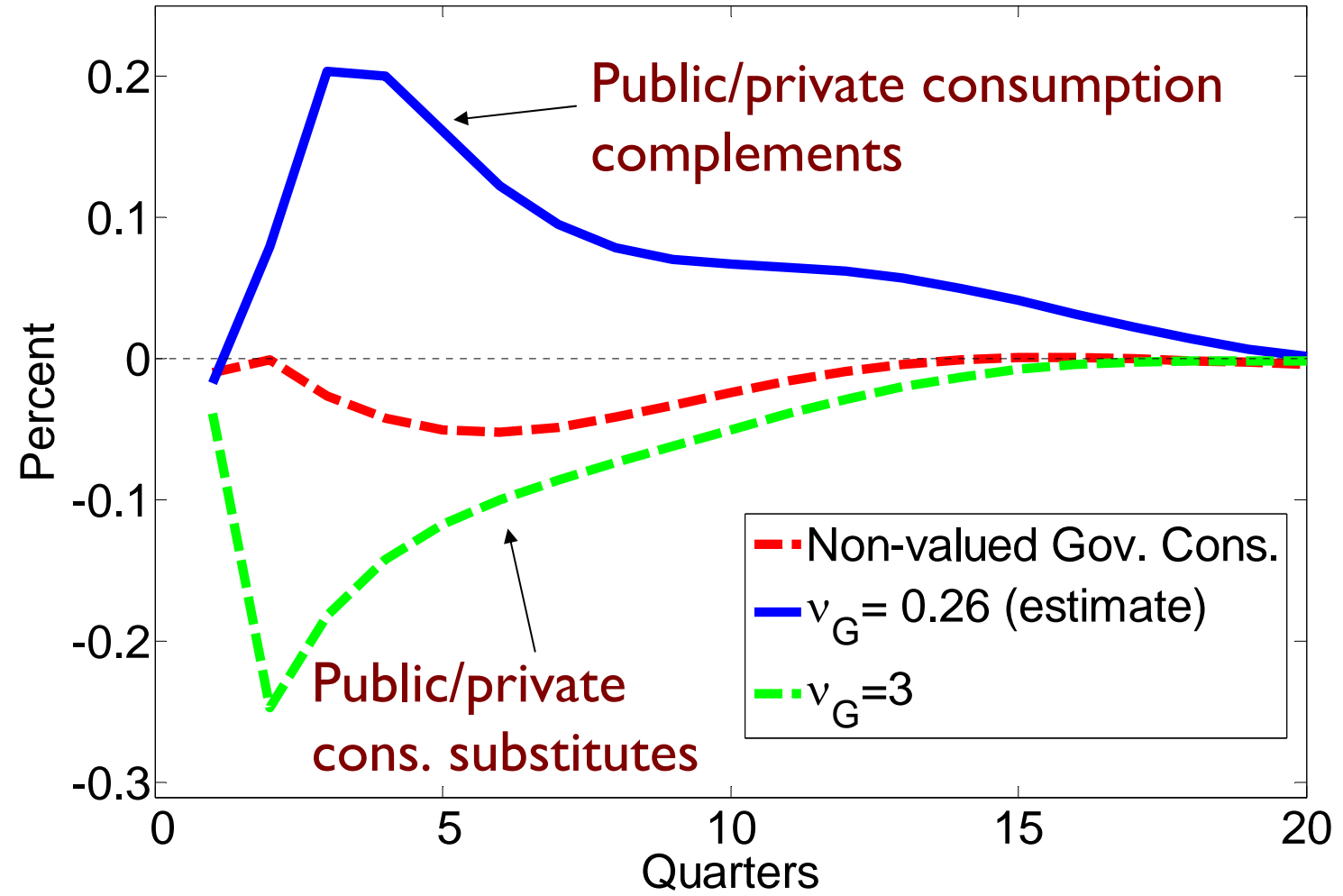
Fiscal GDP Multipliers

Instrument	Impact	2years	Long-run
Gov. Expenditures			
Consumption	**0.48**	**1.38**	**1.53**
Investment	**0.32**	**1.06**	**4.48**
Transfers	**0.24**	**0.13**	**-0.06**
Gov. Revenues			
Consumption tax	**0.25**	**0.26**	**0.14**
Labour income tax	**0.07**	**0.06**	**0.02**
Employee SSC	**0.20**	**0.10**	**0.11**
Employer SSC	**0.03**	**-0.03**	**-0.07**
Lump-sum tax	**0.00**	**0.31**	**0.80**

- **Notes: present value multiplier at estimated posterior mode, no monetary accommodation**

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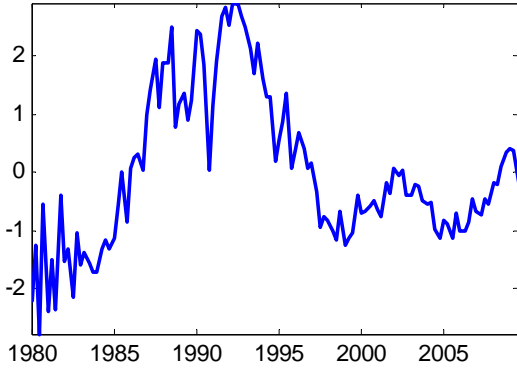
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Conclusions

- **Current crisis triggered large-scale fiscal policy response in the euro area**

- **Question: How much did expansionary fiscal policy contribute to GDP growth?**

- **Answer: Up to 1/2 p.p. higher GDP growth**

- **Important:**
  - **Incorporate (lots of) fiscal data**
  - **Detailed modelling of the fiscal sector**

Outlook

- **More sensitivity checks**

- **ARRA/EERP evaluations**
  - **All stimulus instruments; take full anticipation into account**

- **Isolate fiscal transmission channels**
  - **trade-off between transparency - complexity/realism**

- **Fiscal-financial linkages**
  - **Explicit private and public sector financial frictions, credit, spreads, sovereign risk premia …**

- **…**

Annex
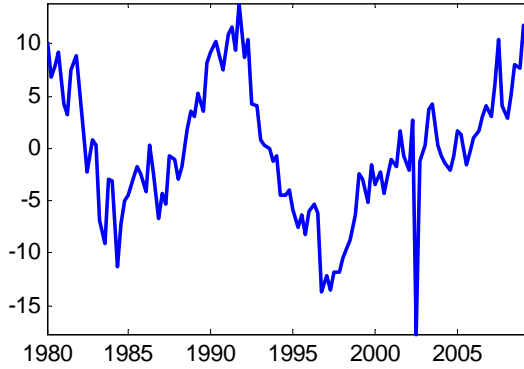
Contribution of Non-Fiscal Shocks

Real GDP Growth Euro Area - Contribution of Non-Fiscal Shocks

Legend:
- Domestic Risk Premium
- Foreign Risk Premium
- Permanent Technology
- Transitory Technology
- Invest. Specific Tech.
- Wage Markup
- Domestic Markup
- Export Markup
- Import Markup
- Import Demand
- Export Preference
- Monetary Policy
- Foreign Inflation
- Foreign Demand
- Foreign Interest Rate
- Oil Price
- Export Prices
- Contrib. to GDP Growth

Y-axis: Percent (Annualized q-o-q)

X-axis: 2007Q3, 2008Q1, 2008Q3, 2009Q1, 2009Q3
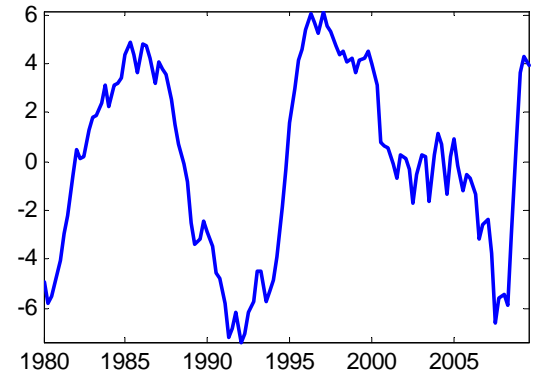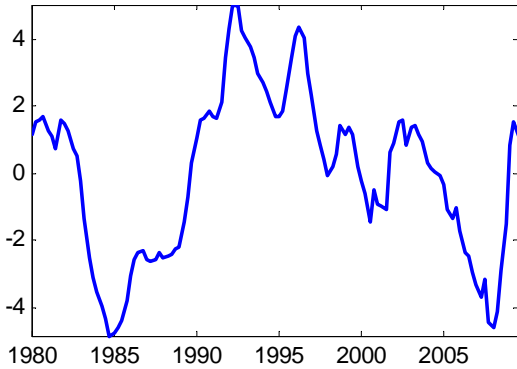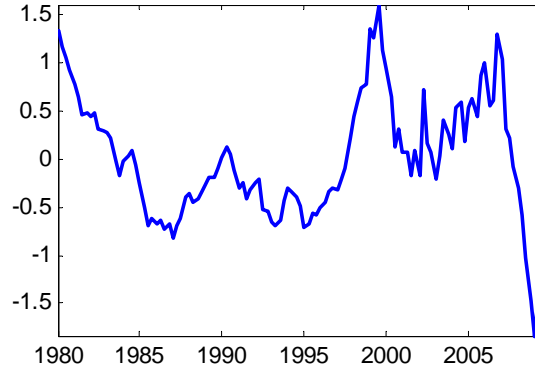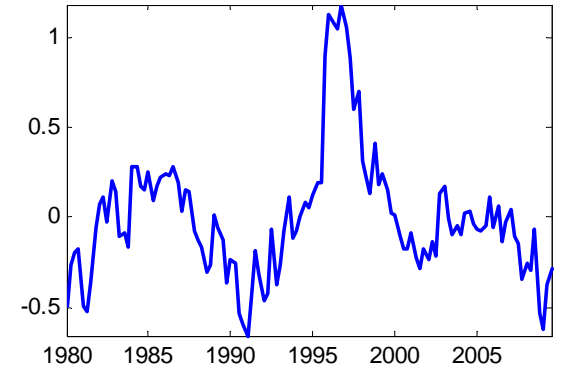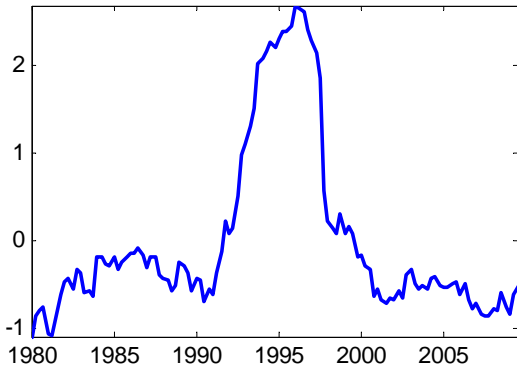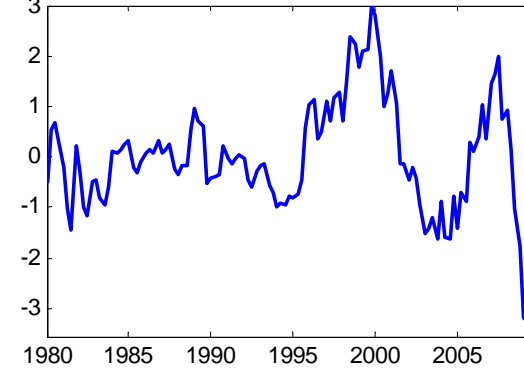
Mean or linear trend removed from data

Real GDP Growth Euro Area - Historical Decomposition

Real GDP Growth Euro Area - Contribution of Fiscal Shocks