Matti Viren

University of Turku

Sensitivity of fiscal-policy effects to policy coordination and business cycle conditions

Purpose of the paper

- Consider the effectiveness of fiscal policy; evaluate the size of fiscal multipliers by taking into account the size of the country, and nature of fiscal stimulus/fiscal consolidation

- Evaluate eventual gains from fiscal policy coordination

- Compare (results from) different models

Relevant references

- Alesina and Ardagna (2010)
- Auerbach and Gorodnichenko, (2012)
- Corsetti, Meier and Muller (2012)
- Devries, Guajardo, Leigh and Pescatori (2011),
- Guajardo, Leigh and Pescatori (2011)
- Ilzetzki, Mendoza and Vegh (2009)
- IMF (2010) *World Economic Outlook*

The models to be used

- A simple VAR model for output growth, deficit and real interest rate

- A structural multi-country macroeconomic model (NiGEM)

- A reduced form output growth model for fiscal consolidations

- Fiscal policy "reaction functions"

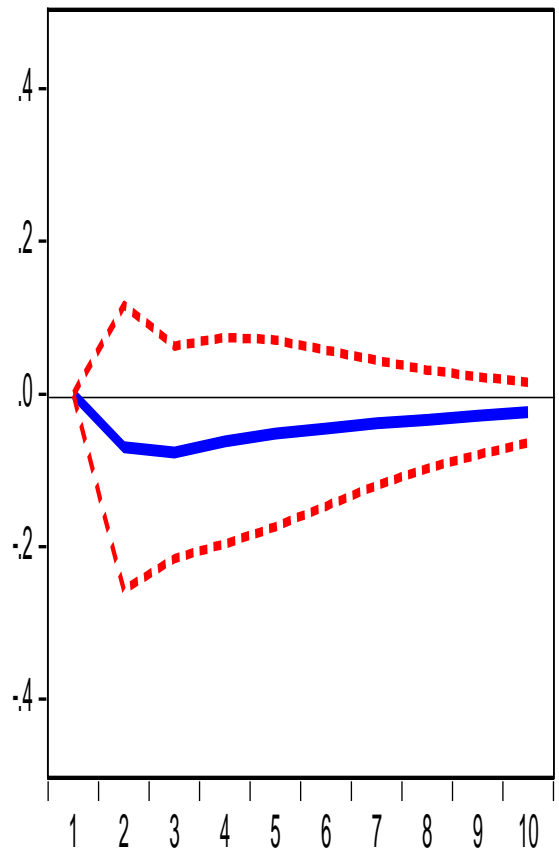- All models make use of cross-country time-series data
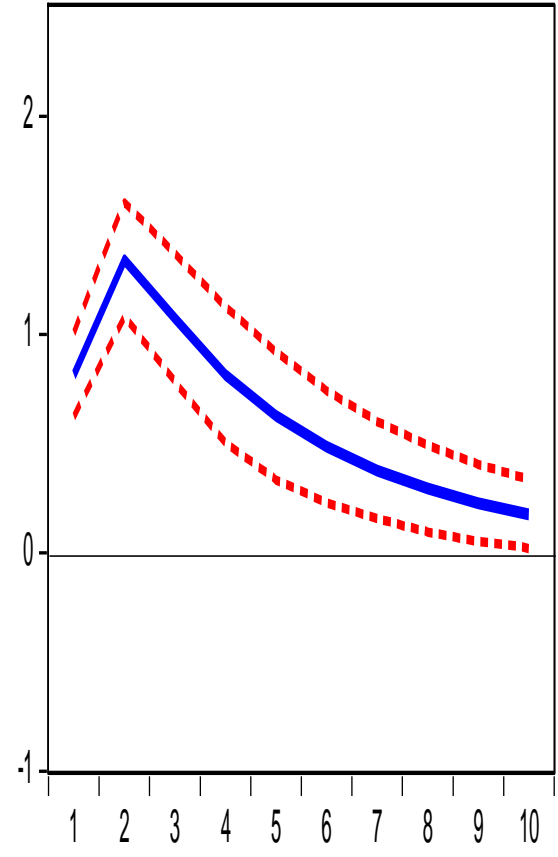
Use of a simple VAR for the aggregate EU15 data
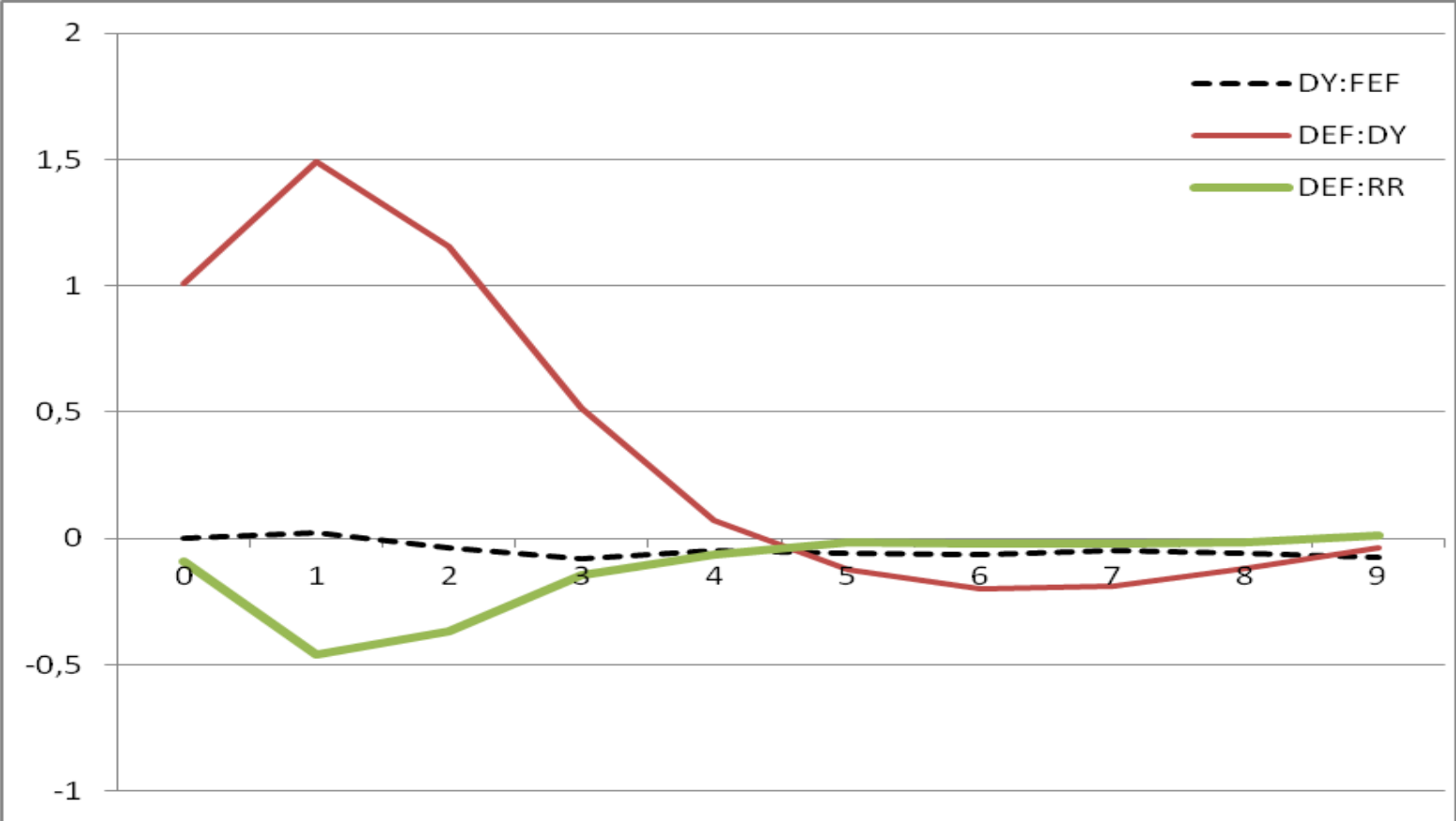
Average values from individaul country data; positive values of DEF
are surpluses

Response to Cholesky One S.D. Innovations±2 S.E.
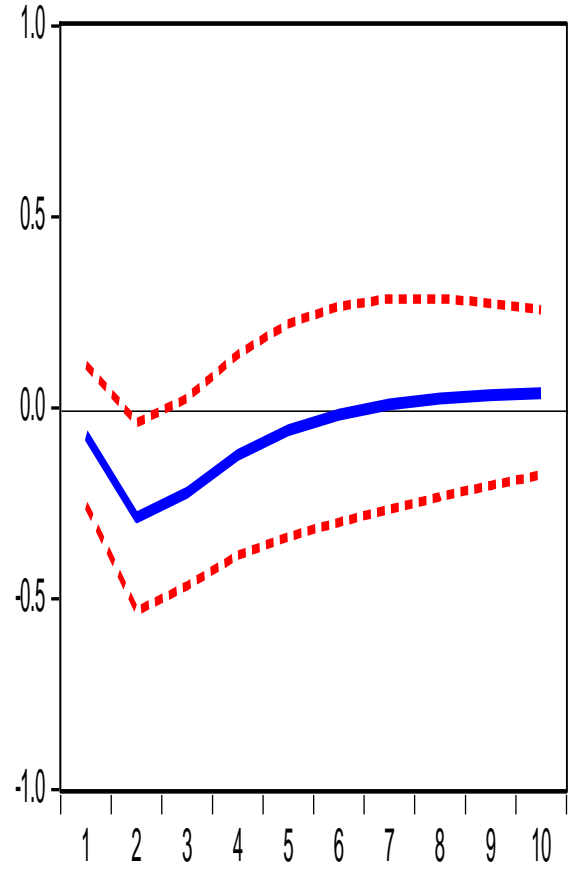
Response of DY to DEF

Response of DEF to DY

Response of DEF to RR

Accumulated LR impuse of Δy to Def = 0.55

Caveat: the IRF's are very different for different countries and different phases of business cycle

- The average values of correlation coefficients are strikingly low – except for the impulse response of deficits w.r.t output growth

- Δy: DEF = 0.011

- Δy: rr = 0.144

- DEF: rr = 0.268

- DEF: Δy = 0.779

- Fiscal multipliers appear to be **relatively small** and **time-variant**. Thus for $\Delta y > 0$ the value (of the cumulative response) is only 0.11 while for $\Delta y < 0$, it is 1.18.

Move to the NiGEM model: A summary of the public consumption simulation   Multipliers
c = coordination

|	y4	y8	yc4	yc8	ymax	ycmax	def	defc	**ym**	**ymc**
Austria	0.059	0.042	0.162	0.143	0.107	0.279	–0.154	–0.075	**0.574**	**1.489**
Belgium	0.099	0.074	0.233	0.208	0.113	0.239	–0.220	–0.107	**0.536**	**1.131**
Finland	0.124	0.151	0.175	0.228	0.159	0.268	–0.117	–0.050	**0.741**	**1.251**
France	0.273	0.261	0.333	0.332	0.274	0.339	–0.168	–0.144	**1.130**	**1.398**
Germany	0.224	0.156	0.304	0.224	0.299	0.374	–0.167	–0.130	**1.574**	**1.967**
Ireland	0.065	0.054	0.232	0.189	0.066	0.233	–0.127	–0.079	**0.488**	**1.740**
Italy	0.147	0.128	0.208	0.189	0.156	0.212	–0.146	–0.102	**0.829**	**1.128**
Netherlands	0.107	0.090	0.211	0.195	0.121	0.219	–0.230	–0.144	**0.891**	**1.612**
Portugal	0.092	0.076	0.156	0.157	0.116	0.241	–0.185	–0.144	**0.574**	**1.193**
Spain	0.166	0.159	0.246	0.274	0.175	0.274	–0.157	–0.109	**1.109**	**1.732**
Average	0.136	0.119	0.226	0.214	0.159	0.268	–0.167	–0.108	**0.845**	**1.464**

NiGEM again, now in figures

multiplier vs GDP
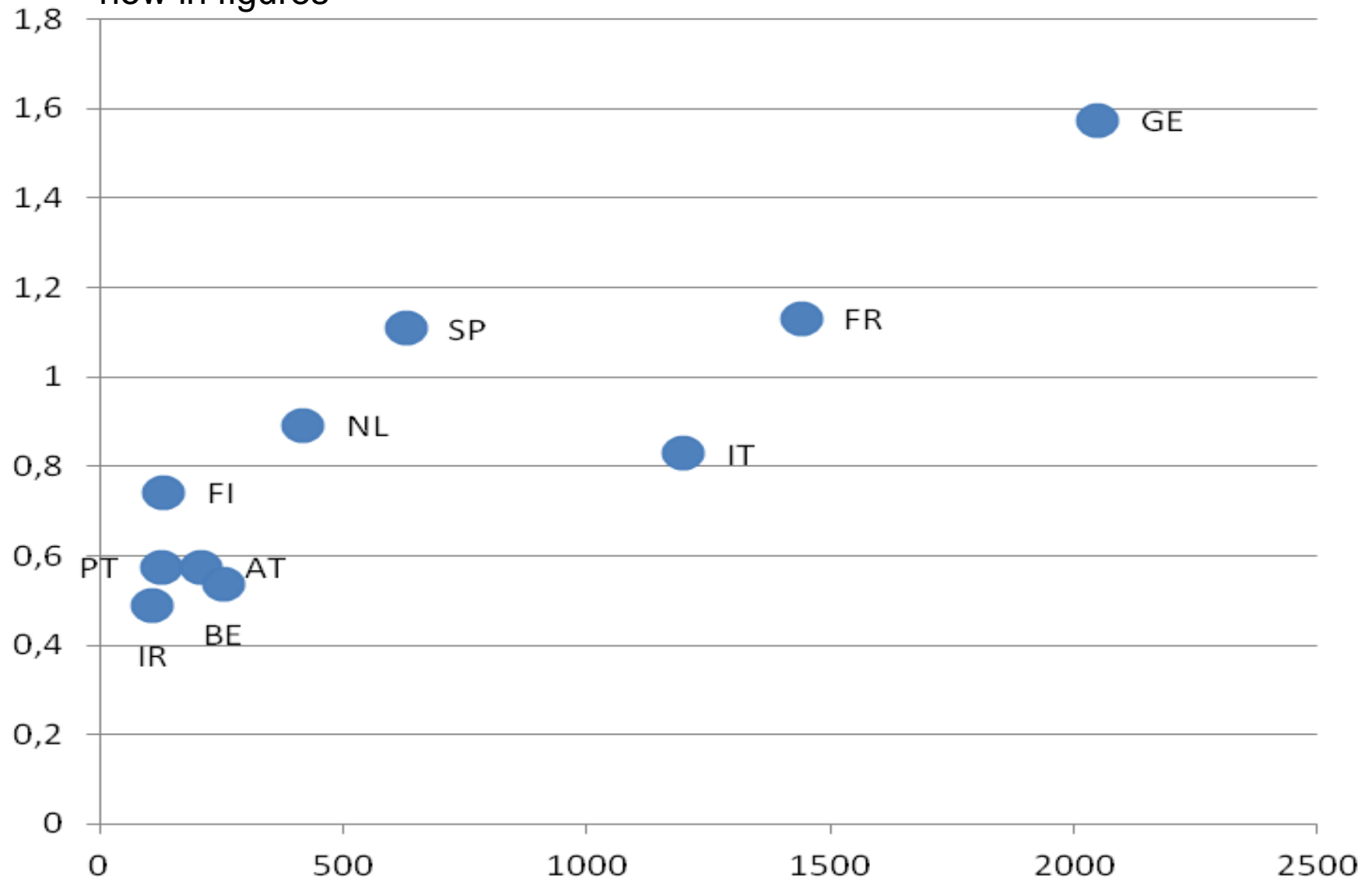
Maximum effect of a one per cent increase in public consumption on GDP with and without policy coordination
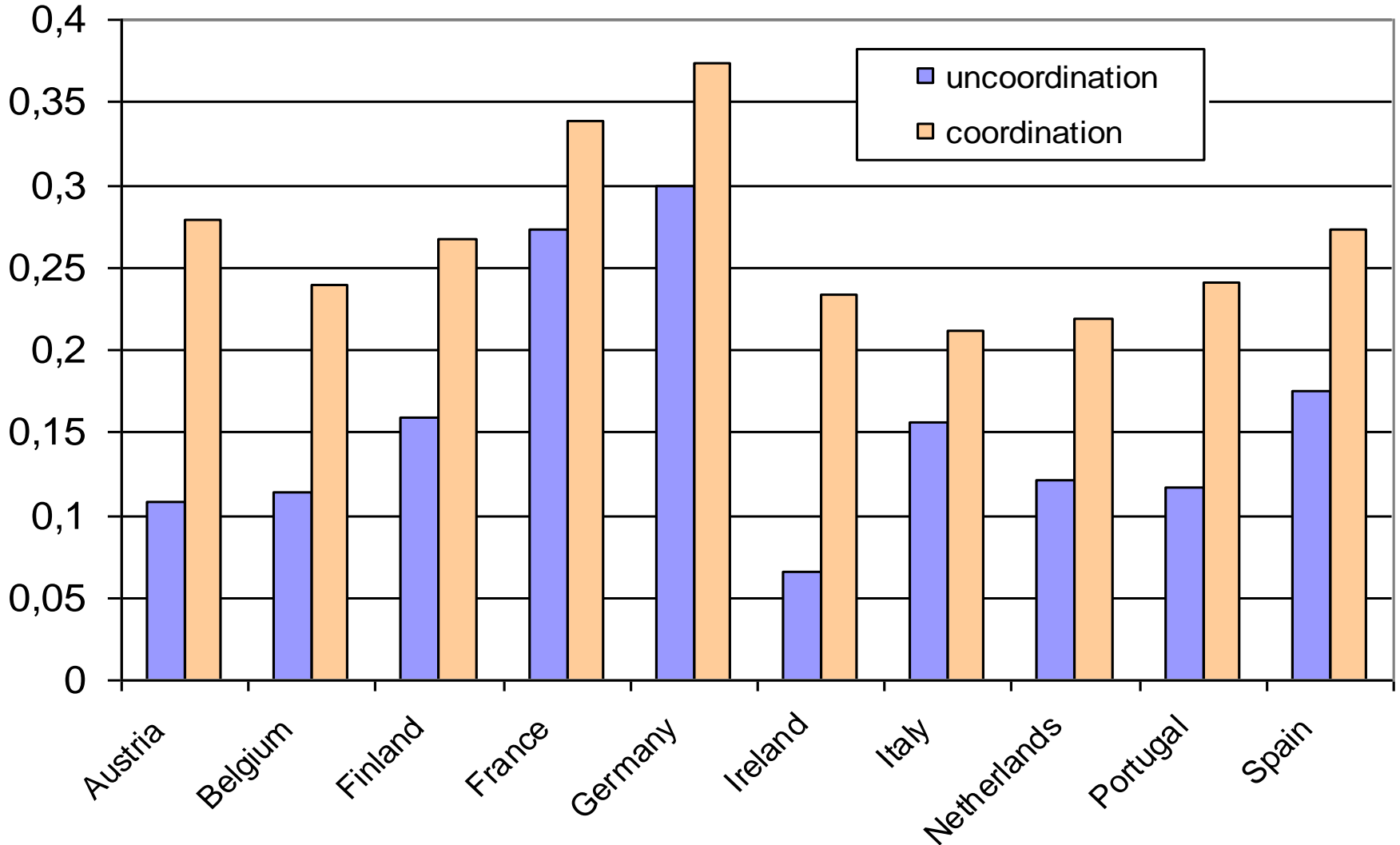
NiGEM results continued; benefit from policy coordination in small and big countries

coordination vs GDP
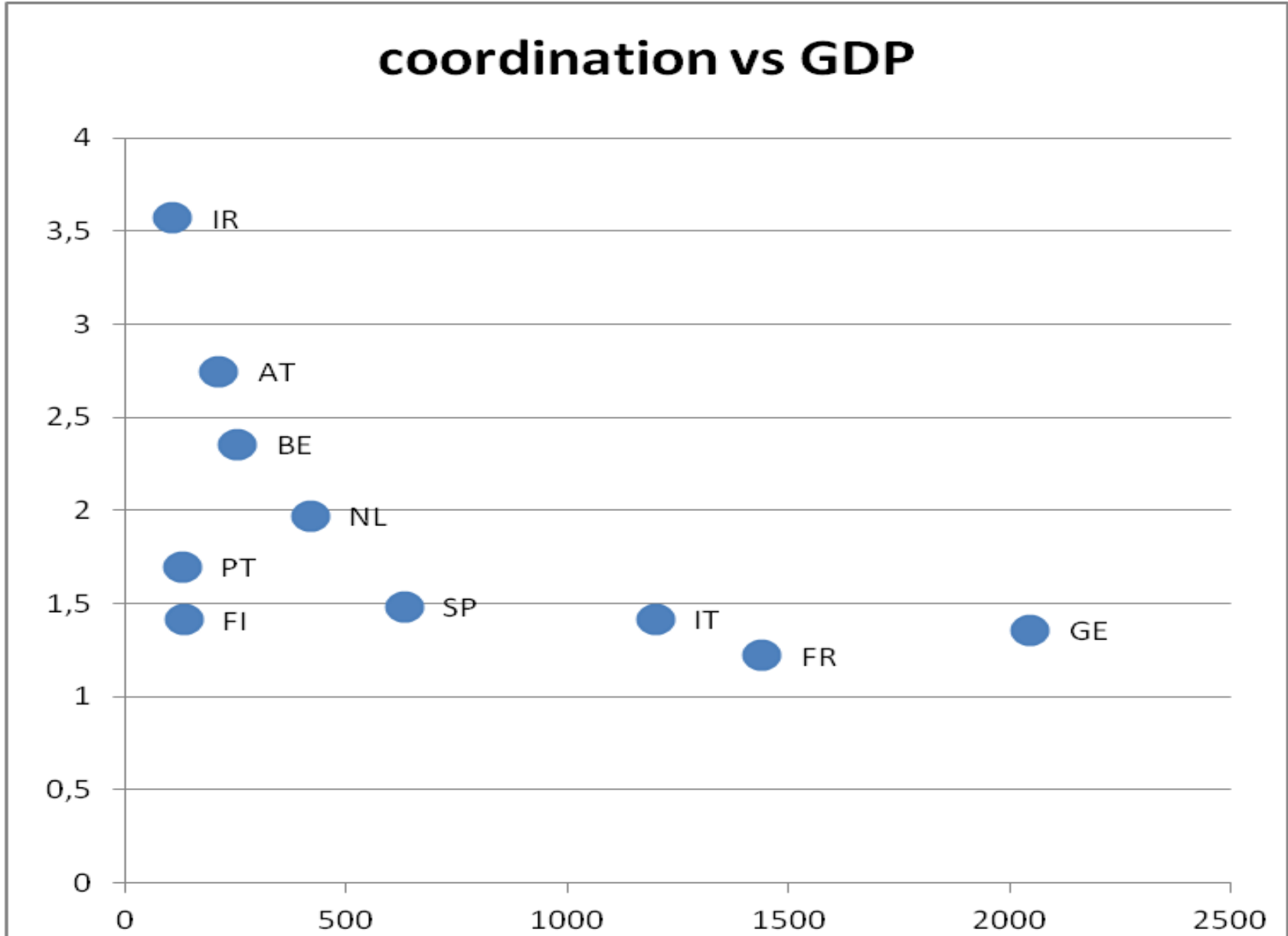
Effect of an increase in direct taxes on GDP and government surplus/GDP with and without policy coordination: NiGEM model simulations
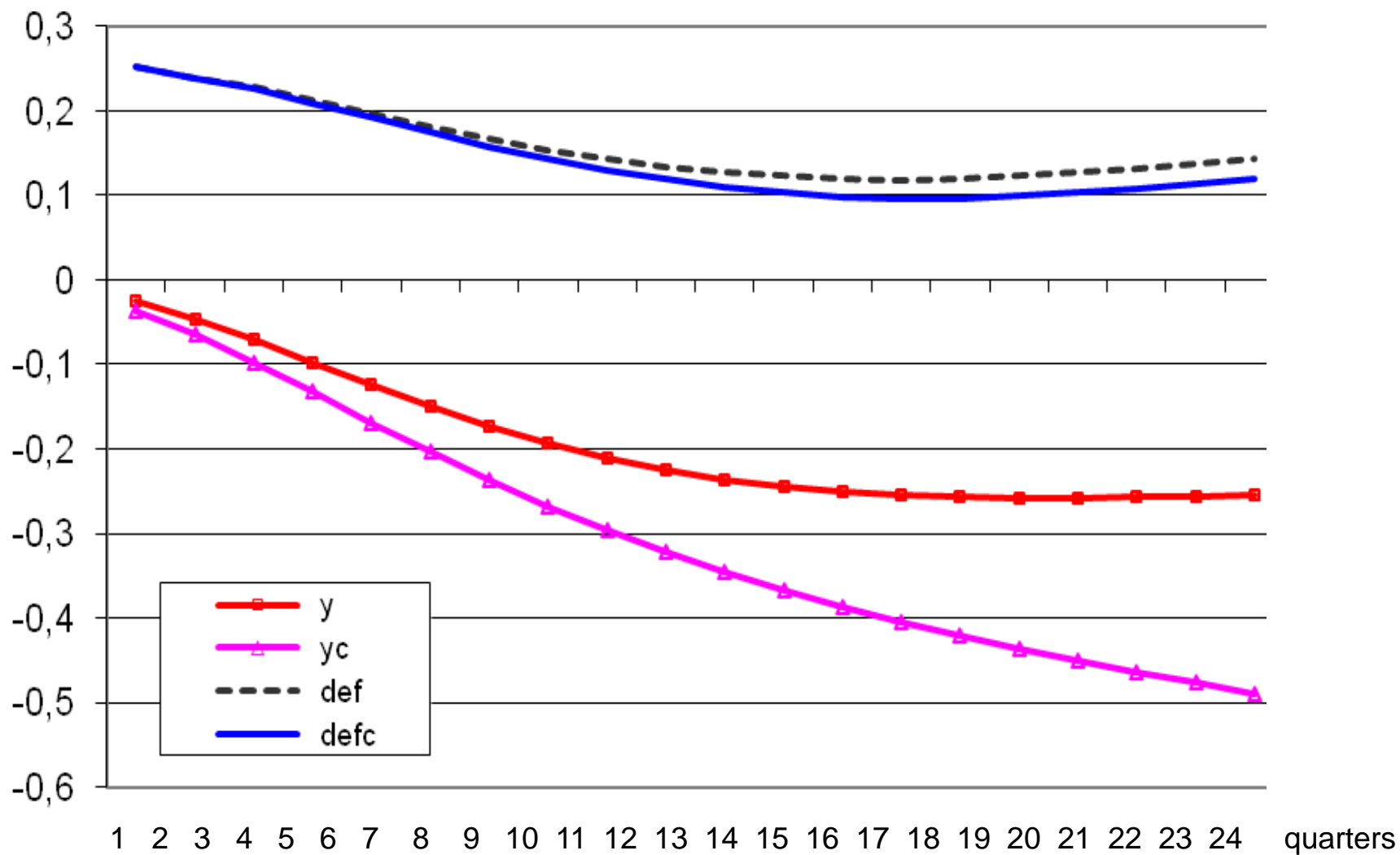
The IMF/GS model

- $\Delta y_t = a_0 + a_1 \Delta y_{t-1} + a_2 \Delta y_{t-2} + a_3 \text{Fiscal}_t + a_4 \text{Fiscal}_{t-1} + a_5 \text{Fiscal}_{t-2} + \text{fixed time and cross-section effects} + u_t$

- where y indicates log GDP, and Fiscal the fiscal consolidation indicator (measured in terms GDP, 5) constructed by IMF, all with panel data (IMF World Economic Outlook, October 2010, Ch3) .

Estimation results with cross-country data 1978-2009

|	1	2	3	4	5	6
Δy_{-1}	.509	.479	.487	.558	.498	.482
	(7.83)	(7.57)	(7.81)	(7.53)	(7.81)	(7.62)
Δy_{-2}	-.122	-.073	-.086	-.238	-.099	-.089
	(1.46)	(1.30)	(1.50)	(3.94)	(1.70)	(1.59)
Fiscal	-.337	-.632	-.298	-.557	-245	-.618
	(1.86)	(3.18)	(2.86)	(2.25)	(1.55)	(3.11)
Fiscal$_{-1}$	-.016	-.456	-.166	-.062	.082	-.419
	(0.54)	(2.00)	(1.24)	(0.24)	(0.58)	(1.87)
Fiscal$_{-2}$	.223	.130	.235			
	(2.04)	(0.69)	(2.05)			
world$_{-1}$				.378	.403	.402
				(3.51)	(1.62)	(1.62)
R^2	0.706	0.689	0.686	0.370	0.352	0.346
SEE	1.332	1.363	1.372	1.883	1.393	1.365
DW	1.95	1.96	1.95	1.76	1.93	1.58
Fiscal	spend	tax	total	tax	spend	tax
fixed ef.	ct+tt	ct+tt	ct+tt	ct	ct+tr	ct+tr

ct indicates fixed cross-section effect and tt fixed time effect, tr in turn indicates random time effect. World is the growth rates of World GDP. Numbers inside parentheses a t-ratios. The dependent variable is the growth rate of GDP.

Basic results from the IMF exercise: comparison of spending and tax-based consolidation programs
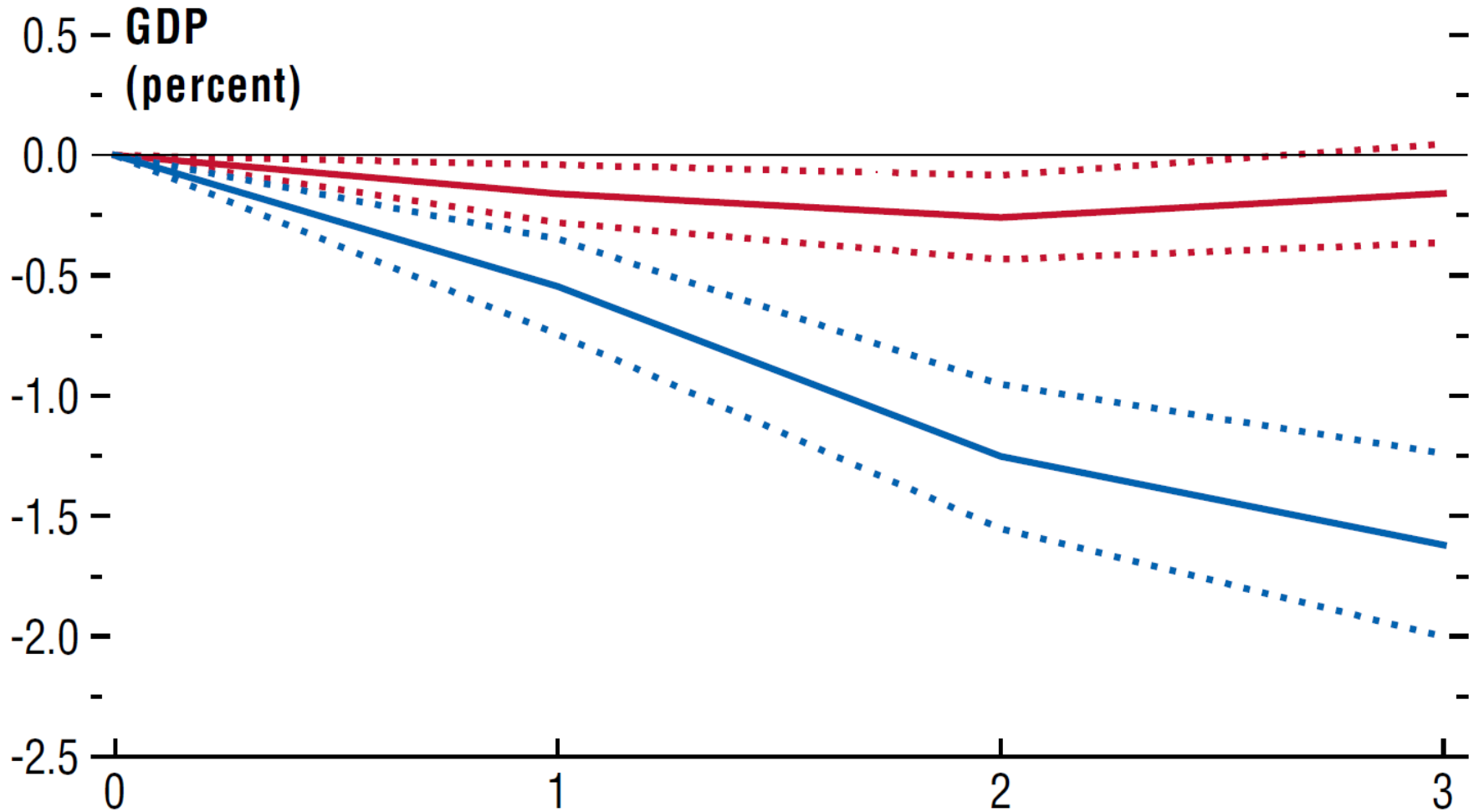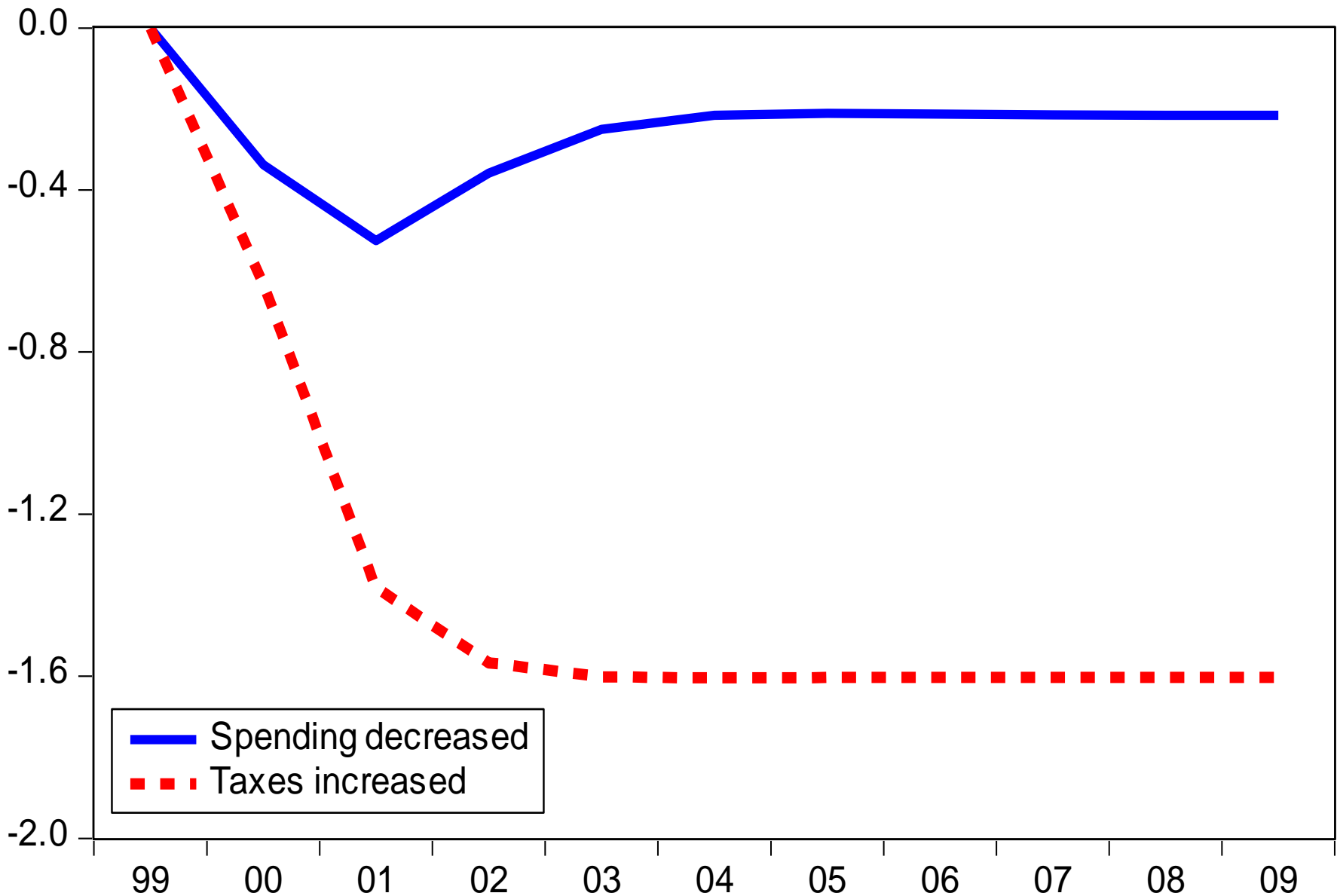
Repetito with GS research; the message is the same: taxes hurt more than spending cuts
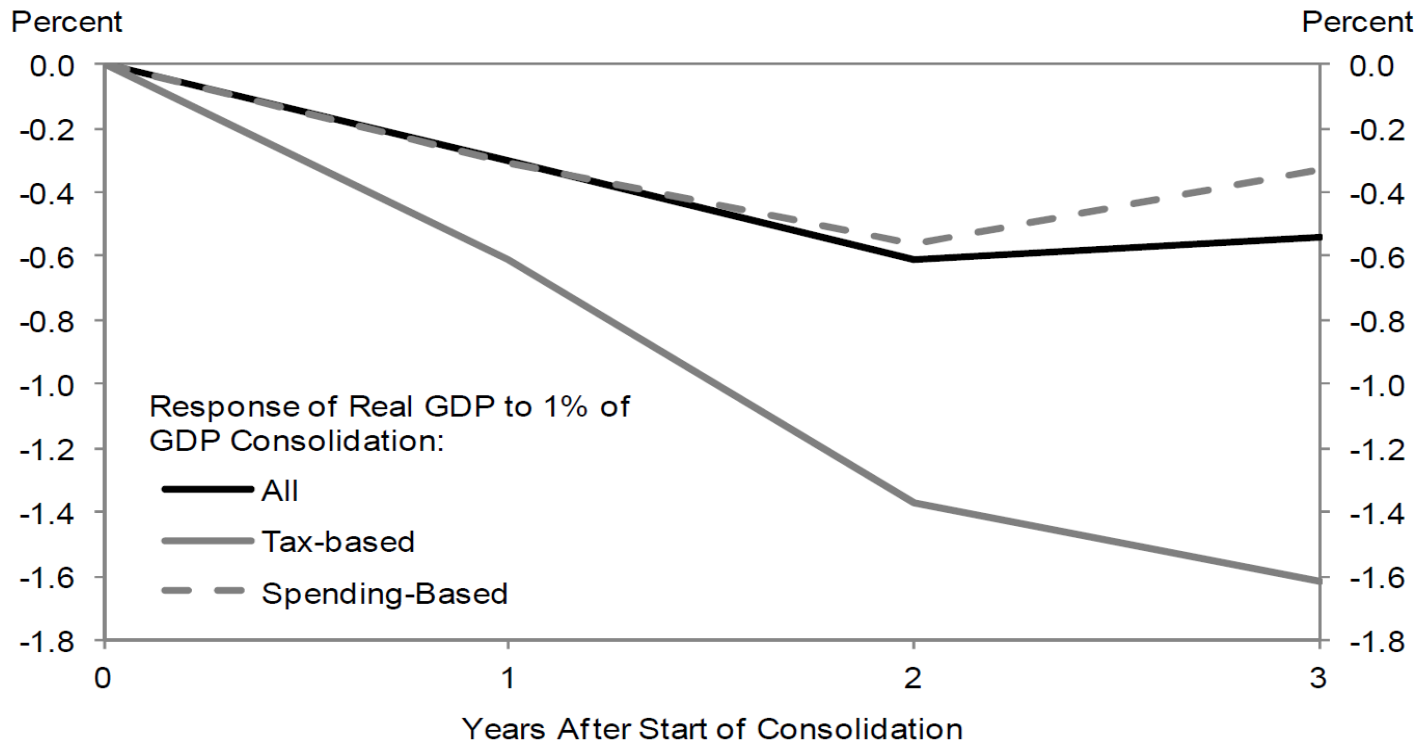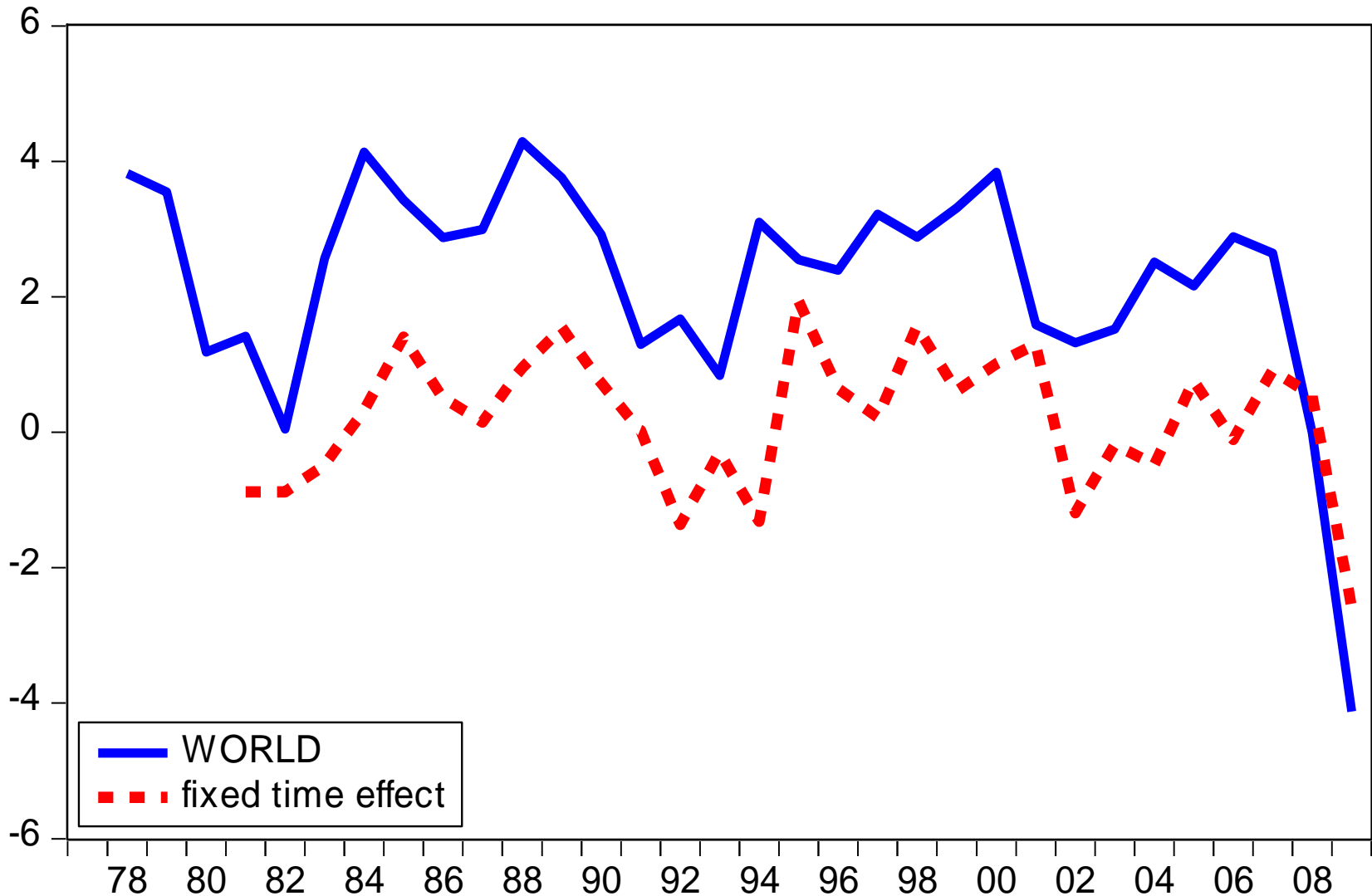

Source: GS Global ECS Research.

Taxes vs spending once more, simulation results from a fixed effects model

World GDP vs the fixed time effect
The fixed effects in the IMF model basically represent the World GDP growth

WORLD
fixed time effect

Alternative model

- $\Delta y_t = a_0 + a_1 \Delta y_{t-1} + a_2 \Delta y_{t-2} + a_3 \Delta y_{W,t-1} + a_4 \text{Fiscal}_t + a_{5F} \text{iscal}_{t-1} + \text{fixed effects} + u_t$

- $y_{W,t-1} = \sum b_i y_{it-1}$

- where b_i's are country weights, Fiscal = size of fiscal consolidation either by taxes spending cuts in terms of GDP. World GDP is now "endogenous"

Taxes vs spending; endogenous world GDP
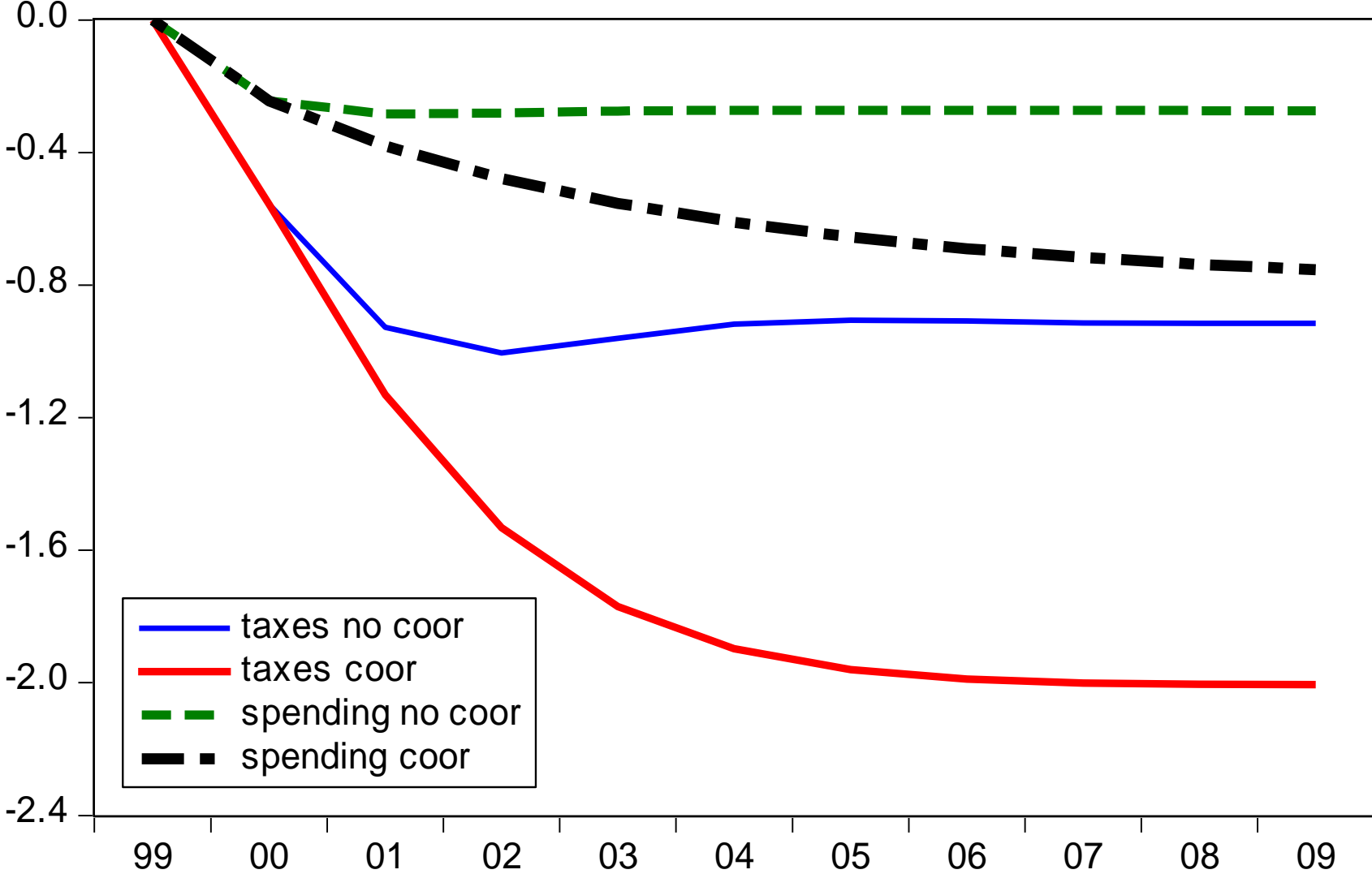
But are the multipliers invariant in terms of cyclical situation?

- Not necessarily, recall the VAR results

- Also the GDP effects of fiscal consilidations seem to be much larger in economic downturns:

- If we use very a simple threshold model with the basic IMF/GS estimating equation, the sum of fiscal variables is much higher when $\Delta y < 0$; see the results in the following Table:

Simple test of linearity with the IMF model

	7	8
Δy_{-1}	.475	.465
	(7.50)	(7.48)
Δy_{-2}	-.085	-.065
	(1.46)	(1.16)
Fiscal	-.064	-.256
	(0.52)	(1.36)
$(D|\Delta y<0)*$Fiscal	-.647	-1.428
	(1.81)	(3.04)
R^2	0.680	0.695
SEE	1.382	1.348
DW	1.95	1.97
Fiscal	spend	tax
fixed effects	ct+tt	ct+tt

Nonlinearity

- Seems to be a prevailing feature of fiscal (policy) models

- Cf. the "policy reaction functions" (next slide)

- The effects/multipliers seem to be much larger in bad times

- If that is indeed the case, consolidation becomes much more tedious when GDP is "already" decreasing

Estimation results of a simple threshold model

Sample Dep.var	g		lagged def/y	debt$_{-1}$	rr	R^2/ SEE	DW J-stat	Estimator
1971-2011 def/y	0.464 (8.22)		0.744 (7.48)	0.028 (5.10)	-0.106 (2.52)	0.789 2.03	2.00	GLS
1971-1998 def/y	0.396 (6.69)		0.797 (16.61)	0.029 (4.62)	-0.142 (3.06)	0.851 1.66	2.03	OLS
1971-2011 exp/y	-0.579 (12.06)		0.815 (13.55)	-0.017 (2.13)	0121 (3.22)	0.932 1.85	2.11	OLS
1995-2001 rev/y	-0.091 (3.02)		0.867 (38.11)	-003 (0.80)	0.050 (2.18)	0.976 1.11	1.64	OLS
	g|g<0	g|g>0						
1971-2011 def/y	0.741 (5.34)	0.327 (2.90)	0.750 (7.98)	0.025 (4.21)	-0.104 (2.52)	0.792 2.017	2.06	OLS
1971-1998 def/y	0.983 (4.76)	0.265 (3.74)	0.795 (16.94)	0.028 (4.42)	-0.141 (3.11)	0.856 1.636	2.09	OLS
1971-2011 def/y	0.776 (11.21)	0.405 (8.03)	0.536 (4.22)	0.060 (3.40)	-0.257 (2.12)	2.683	30.9	GMM

Estimates with cyclically adjusted data

Dep.var	$\Delta y / \Delta y < 0$	$\Delta y / \Delta y > 0$	lagged def/y	$debt_{-1}$	r	$R^2/$ SEE	DW Wald
defa/ŷ _{ols}	.282 (2.89)	.027 (0.60)	.826 (24.74)	.018 (4.78)	-.062 (1.79)	0.778 1.845	2.11 0.033
defa/ŷ _{gls}	.182 (1.51)	.108 (1.42)	.767 (9.05)	.026 (5.19)	-.057 (1.09)	0.782 1.780	2.02 0.654
defpa/ŷ _{ols}	.308 (2.08)	.127 (1.40)	.750 (8.24)	.027 (4.90)	.092 (1.73)	0.741 1.929	1.97 0.393

Evidence of asymmetry
Coefficients of GDP in a model for deficit/GDP ratio
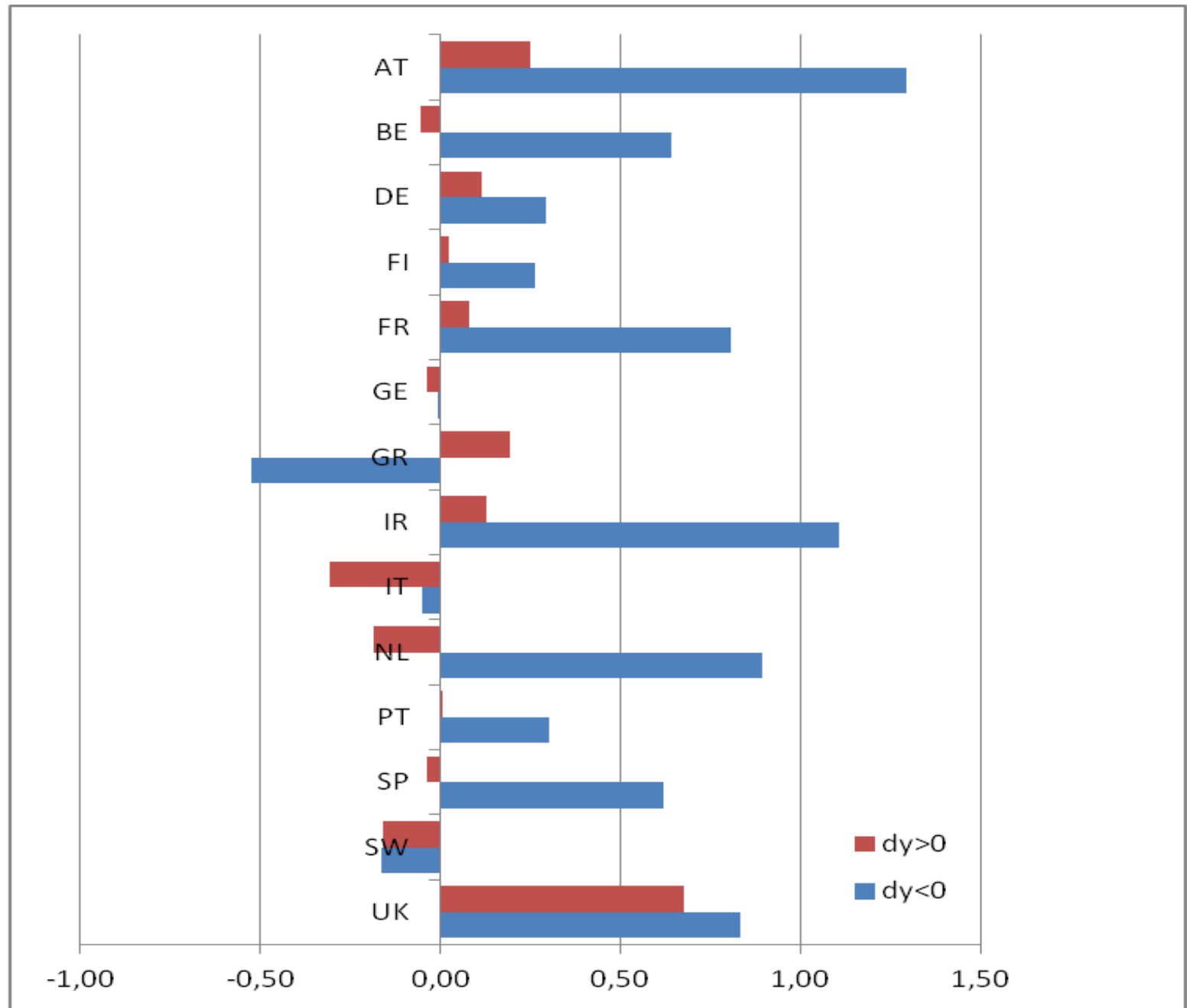
Concluding remarks

- Fiscal multipliers are in general rather small
- But they are very different for small and big countries, open and closed economies and apparently also for different cyclical situations
- (At least for the long-term) tax effects are much stronger than spending effects
- Thus, right menu and timing for fiscal consolidation is a big issue

Assessment for policy coordination

- Fiscal policy coordination would most probably increase the effectiveness of fiscal policy (even too much?)

- The multipliers are almost twice as high as in the non-coordination case

- All countries would benefit from coordination, smaller countries somewhat more.

Thank you!