The Macroeconomic Effects of Fiscal Adjustment Plans: Disaggregating Taxes and Spending

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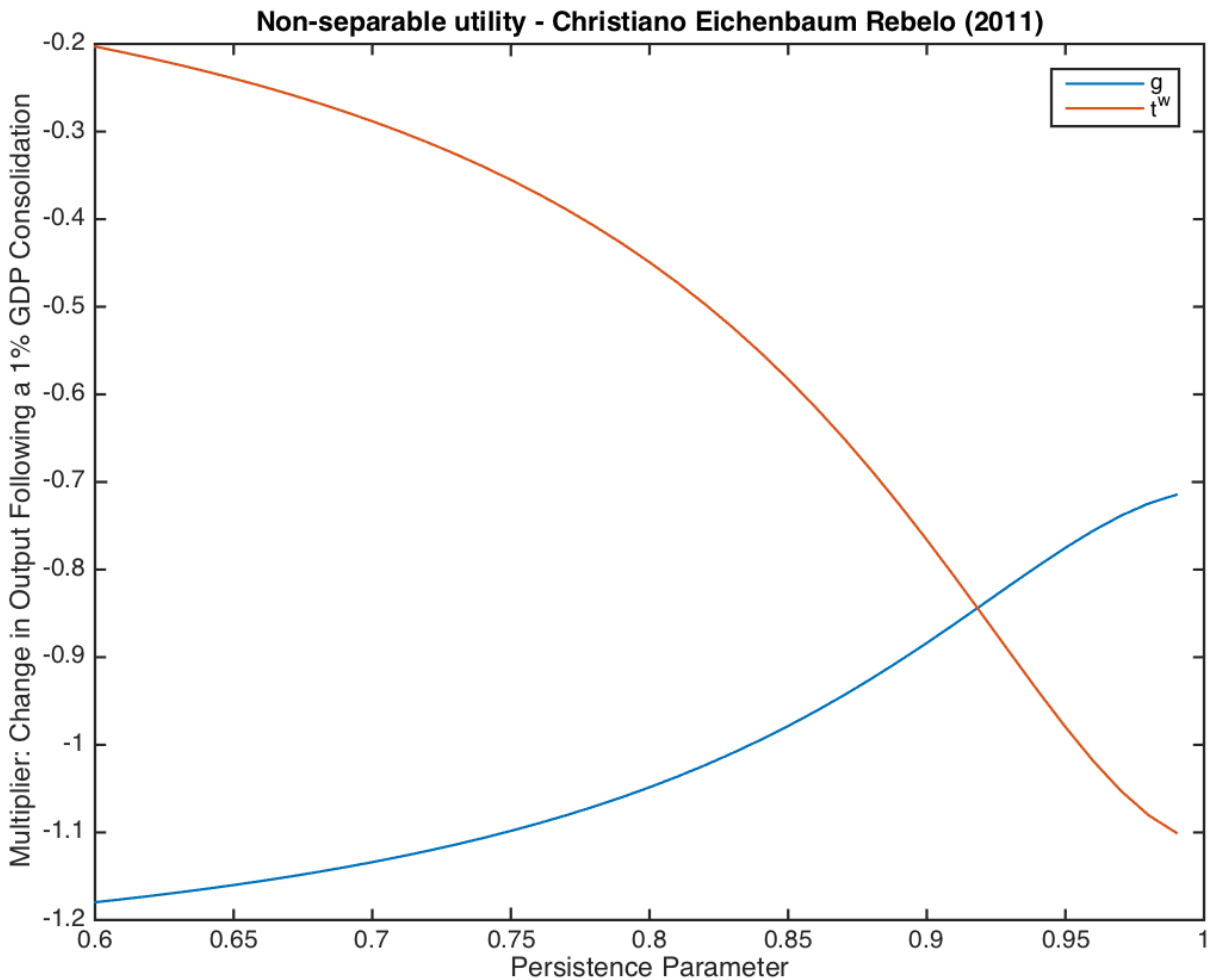
Research question

1. Does the composition of a fiscal adjustment make a difference? How much of a difference?
   - cuts in current and capital spending
   - cuts in transfers
   - hikes in direct taxes
   - hikes in indirect taxes
2. Are these differences consistent with a theoretical macro model with tax distortions?
   - results from a new-keynesian DSGE model

Fiscal multipliers and the persistence of fiscal shocks

Istantaneous output multipliers to shifts in G and τ_n in Christiano, Eichenbaum and Rebelo (2011) for varying level of shocks persistence



Empirical Results: methodology and data

- Plans, rather than isolated shifts in fiscal variables
- Country-specific styles: extent to which plans are
  - announced in advance
  - consistent over time
- Narrative identification from a *reconstruction* and an *extension* of the Devries et al (2011) IMF dataset ("exogenous" fiscal consolidations in 14 OECD countries over 40 years)

Plans vs the existing literature

$$e_t : \left\{ e^u_t,\ e^a_{t-i,t},\ e^a_{t,t+i} \right\}$$

$$e^u_t : \left\{ \tau^u_t,\ g^u_t \right\} \quad e^a_{t-i,t} : \left\{ \tau^a_{t-i,t},\ g^a_{t-i,t} \right\} \quad e^a_{t,t+i} : \left\{ \tau^a_{t,t+i},\ g^a_{t,t+i} \right\}$$

Romer and Romer (2010)

$$e^{R\&R}_t = \tau^u_t + \tau^a_{t,t+i}$$

Mertens and Ravn (2011)

$$e^{M\&R}_t = \left\{ \tau^u_t,\ \tau^a_{t,t+i} \right\}$$

Jordà and Taylor (2013)

$$e^{J\&T}_t = e^u_t + e^a_{t-i,t}$$

$\Rightarrow$ i.e. $e^{J\&T}_t$ is predictable

Pooling data from different countries allowing for two sources of heterogeneity

- **within country** heterogeneity with respect to the type of fiscal adjustments
  - plans mostly based on
    - *hikes in Direct Taxes*
    - *hikes in Indirect Taxes*
    - *cuts in Transfers*
    - *cuts in Government Spending*
- **between country** heterogeneity in the way fiscal policy is conducted over time: *persistence*

$$e^{a}_{i,t,t+j} = \varphi_{i,j}\ e^{u}_{i,t} + v_{i,t+j}$$

$\Longrightarrow$ Note that when the model contains announcements, the effect of an unanticipated shift in a fiscal variable can only be simulated using estimates of the $\varphi's$

Styles of fiscal adjustments (persistence of plans)

	AUS	AUT	BEL	CAN	DEU	DNK	ESP
φ_1	0.48	0.36	0.14	1.34	-0.10	0.48	0.27
	(0.19)	(0.08)	(0.14)	(0.17)	(0.12)	(0.13)	(0.06)
φ_2	-0.23	0	0.11	0.51	-0.03	-0.02	0.06
	(0.14)	(0.04)	(0.03)	(0.11)	(0.07)	(0.08)	(0.02)

	FRA	GBR	IRL	ITA	JPN	PRT	USA
φ_1	0.46	0.35	0.21	-0.26	0.25	0.89	0.47
	(0.09)	(0.22)	(0.04)	(0.07)	(0.03)	(0.29)	(0.35)
φ_2	0.14	0.07	0	-0.02	0	0.12	0.34
	(0.05)	(0.18)	(0.00)	(0.04)	(0.00)	(0.10)	(0.28)

Constructing plans and extending the data

- We go back to the original Devries&al sources and
  - separate out unanticipated, anticipated and implemented (but previously announced) shifts in taxes and spending
  - organize the data into plans
  - extend the data and construct plans that cover the period 2010-2014
  - disaggregate expenditure in government consumption and investments and transfers, and revenues in direct and indirect taxes
  - while doing this we double check the Devries&al identification

Disaggregation

Taxes

- **Direct Taxes**: taxes on net income of individuals, on profits of corporations and enterprises, on capital gains and taxes on individual and corporate properties
- **Indirect Taxes**: taxes on transactions, goods and services (e.g. VAT, excise duties, stamp duty, services tax)

Spending

- **Government consumption and investment**: current expenditures for consumption of goods and services, public sector salaries, costs of state provided services (e.g. public education and health) plus all government fixed capital formation expenditures
- **Transfers**: money transferred by the government to households (e.g. pensions and unemployment benefits) and corporations (without expecting an economic gain, e.g. subsidies)

Labelling of plans

We define 4 types of plans. Plans mostly based on

- **Direct Taxes**
- **Indirect Taxes**
- **Government consumption and investment**
- **Transfers**

We label plans in two steps

- we evaluate whether the plan mainly consists of spending measures (EB) or tax measures (TB)
  - if the plan is EB, we assess whether it consists mostly of consumption and investment or transfers measures
  - If TB whether direct or indirect taxes prevail

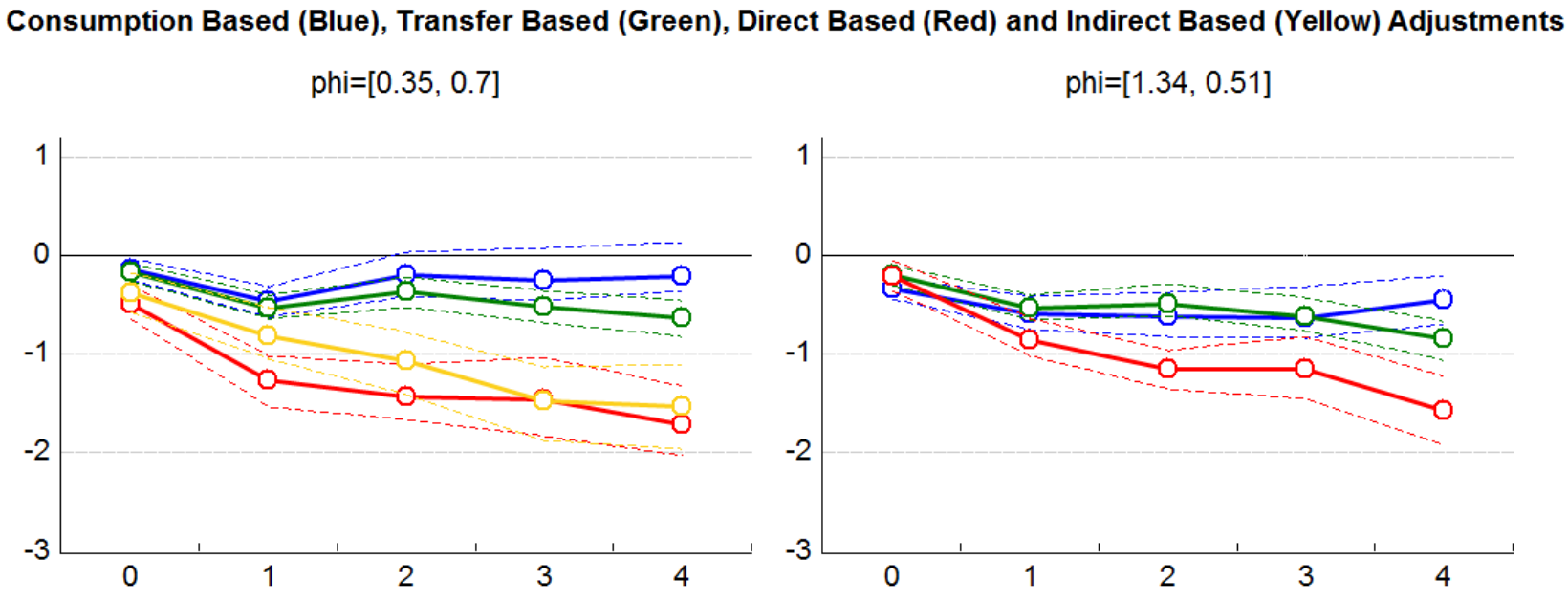
Average plans

4 components - (1981-2014)

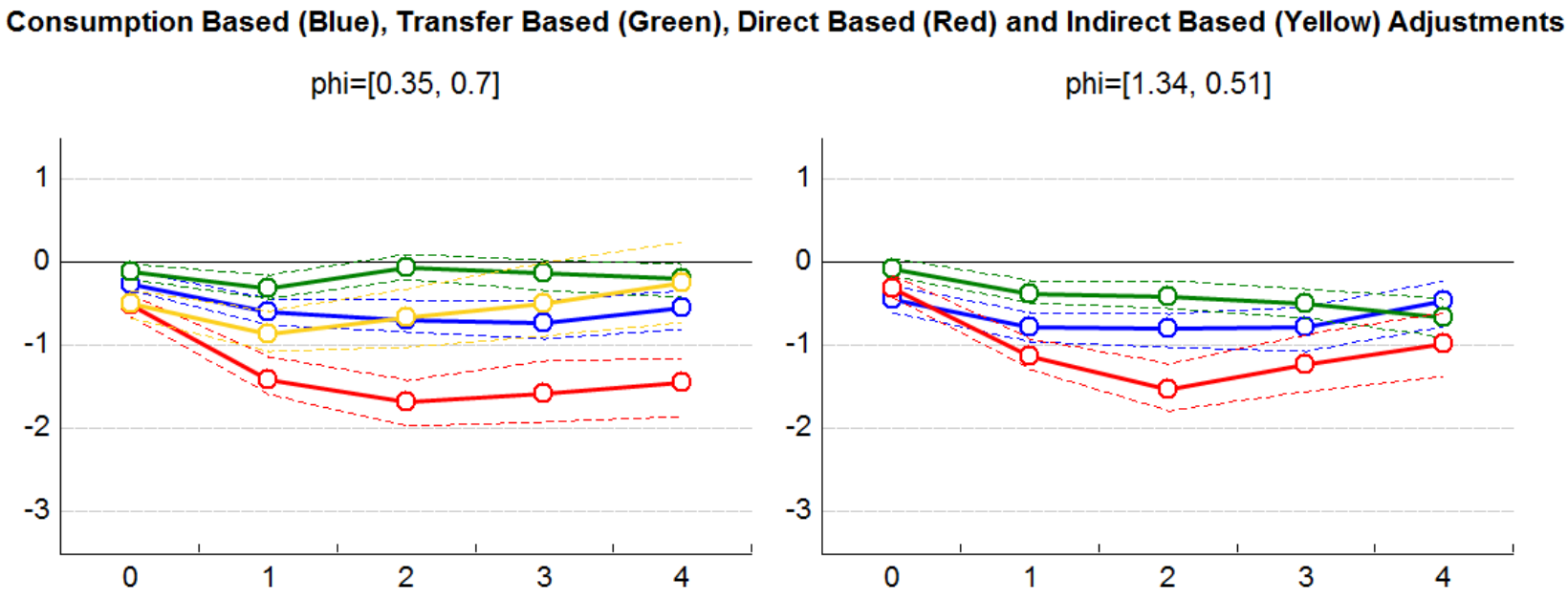
	Number of plans	Average composition (% of GDP)				
		Plan	*Direct*	*Indirect*	*Consumption*	*Transfer*
Direct Tax Based	38	1.67	**0.73**	0.22	0.31	0.18
		(0.25)	(0.06)	(0.05)	(0.08)	(0.06)
Indirect Tax Based	20	1.52	0.28	**0.82**	0.15	0.03
		(0.31)	(0.09)	(0.05)	(0.10)	(0.08)
Consumption Based	58	1.81	0.20	0.20	**0.90**	0.31
		(0.16)	(0.05)	(0.04)	(0.05)	(0.05)
Transfer Based	43	1.20	0.30	0.20	0.40	**0.81**
		(0.20)	(0.06)	(0.04)	(0.07)	(0.04)

▸ How IRFs are computed

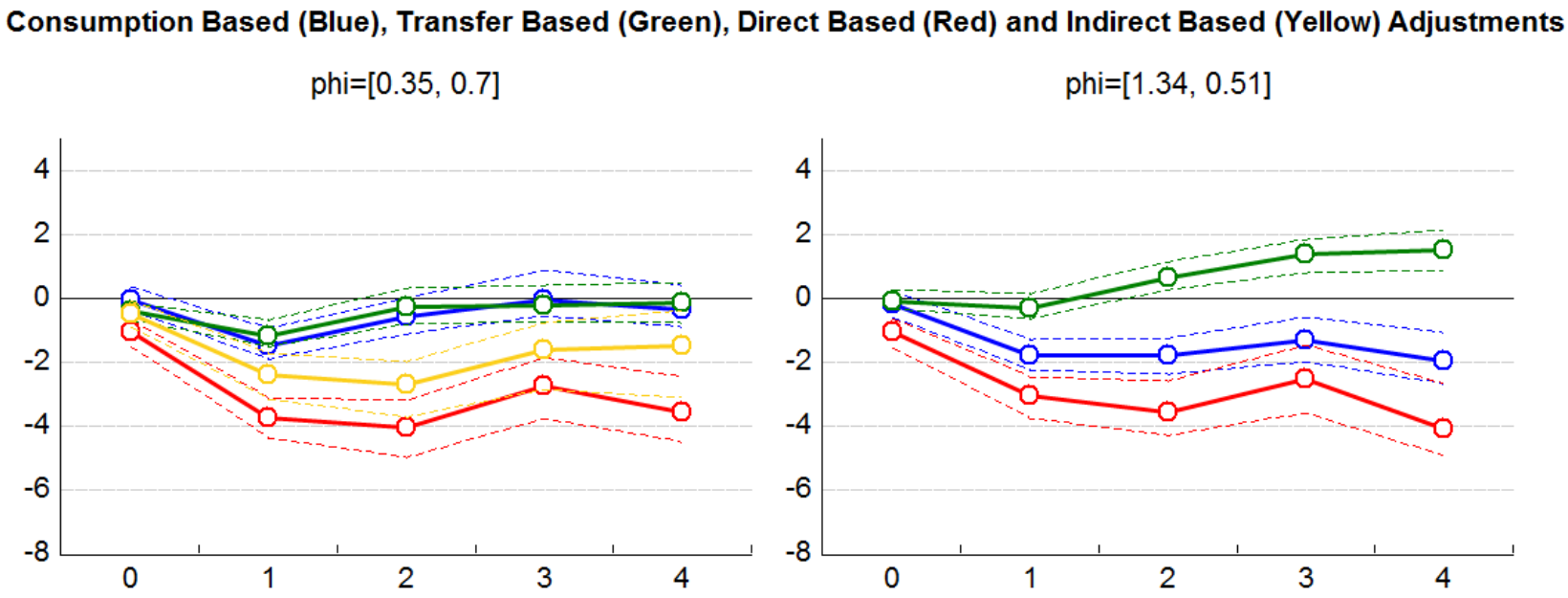
4-level disaggregation: output growth



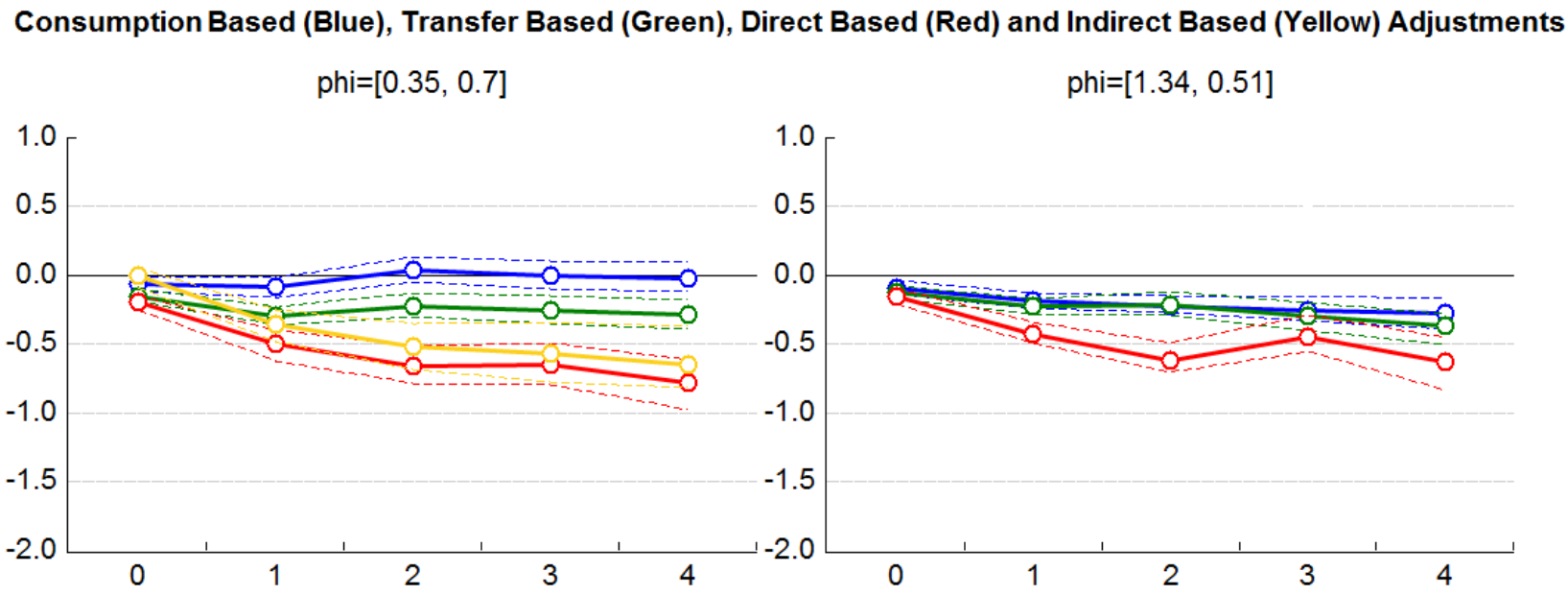
4-level disaggregation: private consumption growth



4-level disaggregation: fixed capital formation



4-level disaggregation: ESI business confidence



▸ Negative phi

Fiscal plans in a NK framework (extending Chistiano, Eichenbaum and Rebelo, 2011)

- Representative household:
  - Infinitely lived with $U_t(C_t, G_t, N_t) = \frac{(C_t + a_g G_t)^{1-\sigma}}{1-\sigma} + \frac{N^{1+\psi}}{1+\psi}$
  - Invests in two types of assets: capital K_t and risk free government bonds B_t
  - Subject to adjustment costs on investments
  - Receives lump sum transfer T_t and pays payroll tax τ_t^d and private consumption tax τ_t^c
- Production side: monopolistic competition among intermediary firms with Calvo price rigidity, flexible wages and constant returns to scale
- Government
  - 4 instruments: τ^d, τ^c, T *(lump sum transfers)*, G

$$G_t + T_t + (1 + i_t)\frac{B_t}{P_t} = \tau_t^d w_t N_t + \tau_t^c C_t + \frac{B_{t+1}}{P_t}$$

- Monetary policy:Taylor rule

Introducing plans

$$G_t = (1-\rho_G)G_{ss} + \rho_G G_{t-1} + e_t^{u,G} + \sum_{s=1}^{3} e_{t-s,t}^{a,G}$$

$$T_t = (1-\rho_T)T_{ss} + \rho_T T_{t-1} + e_t^{u,T} + \sum_{s=1}^{3} e_{t-s,t}^{a,T}$$

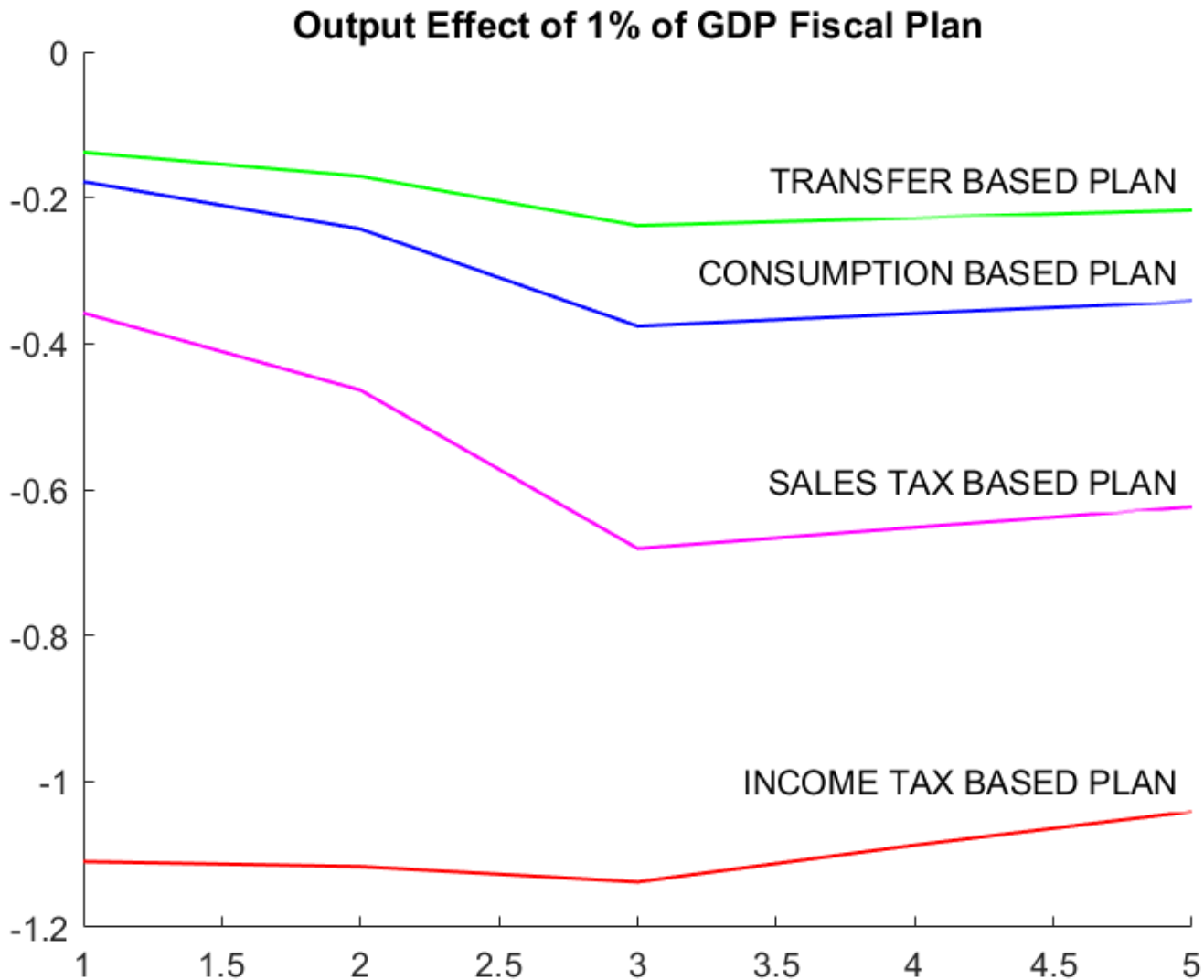
$$\tau_t^d = (1-\rho_{\tau^d})\tau_{ss}^d + \rho_{\tau^d}\tau_{t-1}^d + e_t^{u,\tau^d} + \sum_{s=1}^{3} e_{t-s,t}^{a,\tau^d}$$

$$\tau_t^c = (1-\rho_{\tau^c})\tau_{ss}^c + \rho_{\tau^c}\tau_{t-1}^c + e_t^{u,\tau^c} + \sum_{s=1}^{3} e_{t-s,t}^{a,\tau^c}$$

Note that each movement in $e_t^{u,f}$, $f \in \{G, T, \tau^d, \tau^c\}$, is accompanied by

- **announcements**: $e_{t,t+s}^{a,f} = \varphi_s e_t^{u,f}$, $s \in \{1,2,3\}$
- **contemporaneous changes in fiscal variables other than** f
  - e.g. the composition of the average *CB plan* is 50% G, 17%, T and 12% each τ_t^d and τ_t^c (see slide 11)

Calibration as in CER. Plans: phi1=0.35, phi2=0.7, phi3=0



Conclusions

- Empirical results
  - Tax-based plans (both based on Direct and Indirect Taxes) are the most recessionary
  - Plans based on cuts in Spending are the least recessionary
  - Transfers-based plans are not very different from Spending-based plans

- This heterogeneity is consistent with the predictions of a simple NK model with tax distortions and standard calibration

Computing impulse responses

- Heterogeneity in styles implies that an initial correction of 1% of GDP will generate plans of different size across countries
- We normalize plans, computing impulse responses to a *plan* of the size of 1% of GDP, while traditional impulse responses are computed with respect to a *shock* of 1% of GDP

$$e^{u}_{i,t} + e^{a}_{i,t,t+1} + e^{a}_{i,t,t+2} = 1$$

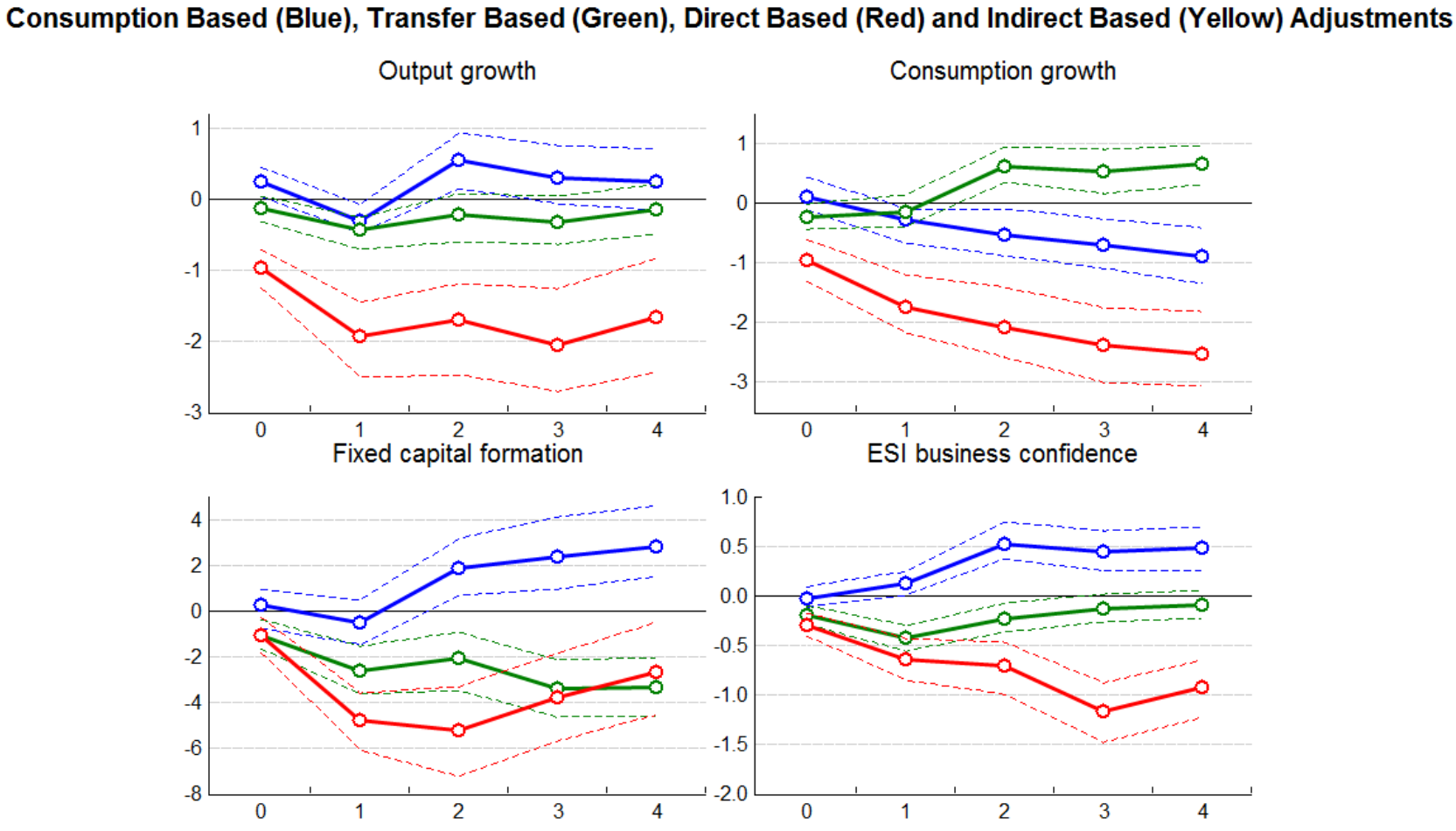
$$\hat{e^{a}_{i,t,t+j}} = \hat{\varphi}_{i,j} e^{u}_{i,t} \quad \text{for} \quad j = 1, 2$$

$$e^{u}_{i,t} = \frac{1}{1 + \hat{\varphi}_{i,1} + \hat{\varphi}_{i,2}}$$

as an example for Italy, where $\hat{\varphi}_1 = -0.24$ and $\hat{\varphi}_2 = 0$ we simulate $e^{u}_{t} = 1.32$, $e^{a}_{t,t+1} = -0.32$, $e^{a}_{t,t+2} = 0$

◂ Back

Negative phi



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