The composition of fiscal adjustments:new evidence

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- There is evidence that expenditure based fiscal adjustments (i.e. deficit reduction policies achieved by means of spending cuts) are less costly in terms of short run output losses than tax based adjustments.
- No evidence provided so far on which type of spending cuts or which tax increases have been more or less effective at reducing deficits at lower output costs.
- We want to investigate this critical policy implication regarding the composition of fiscal adjustments by providing a new disaggregated data set of narrative identified fiscal consolidations and by constructing a model to measure the macroeconomic impact of fiscal consolidation **plans**

Main findings

- adjustment plans based on increasing taxation are more recessionary than those based on cutting expenditure,
- increasing direct taxation has the most contractionary effect while cutting Government Consumption and Investment has the least expansionary effect, in some cases non-keynesian effects are observed for this component of expenditure,
- cutting Transfer has an effect close to that of increasing indirect taxation.

Methodology

- Shocks in empirical macro models (often VARs) are used in the literature to establish empirical facts to be matched with theoretical models
  - shocks are the "correct" experiment because their effect can be measured without changing any parameter in the simulation
- Fiscal foresight prevents the application of standard identification techniques, therefore narrative identification is the only alternative
- It has been observed (Jordà and Taylor, 2013) that shifts in fiscal variables identified through the narrative method are predictable
- We take this evidence as a clear indication that the correct implementation of narrative identification is through plans rather than shocks

Fiscal Policy occurs through plans not shocks

- Narrative identification can be naturally used to study the response of output (and other variables) to **multi-year fiscal consolidation plans** which is different from simulating the impact of **individual shifts** in tax revenue or spending
- When fiscal policy is conducted through multi-year plans, fiscal adjustments in each year — say year t — consist of three components:
  - unexpected shifts in fiscal variables (announced upon implementation at time t)
  - shifts implemented at time t but announced in previous years
  - future announced corrections (announced at time t for implementation in future years).
- Unanticipated and anticipated shifts and corrections in T and G are correlated

Pooling

- Fiscal plans are rare: a possible solution is pooling episodes from different countries
  - pooling is dangerous in the presence of heterogeneity (Favero, Giavazzi, Perego, 2012)
- In this paper we pool the data from different countries by allowing for **two sources of heterogeneity:**
  - **within country** heterogeneity with respect to the type of fiscal adjustments: *TB(further disaggregated in DB and IB)* or *EB(further disaggregated in CB and TRB)*
  - **between country** heterogeneity in the way fiscal policy is conducted, *e.g.* persistence

Step 1: Reconstructing plans

- Considering, for the sake of illustration, a forward horizon of 1 year, a narrative adjustments e_t can be described as follows:

$$\begin{aligned} e_t &= e_t^u + e_{t,0}^a + e_{t,1}^a \\ e_{t,1}^a &= \varphi_1 \, e_t^u + v_{t,1} \\ e_{t,0}^a &= e_{t-1,1}^a \end{aligned}$$

Step 2: The traditional approach

- In the traditional approach a truncated MA representation is adopted :

$$\Delta z_{i,t} = \alpha + B(L) f_{i,t} + \lambda_i + \chi_t + u_{i,t}$$

Two possible representation

- a truncated infinite MA from a VAR
- a specification to estimate an Average Treatment Effect

Step 3: A model to estimate and simulate plans without heterogeneity

Direct estimation of the MA representation:

$$\begin{aligned}
\Delta z_{i,t} &= \alpha + B_1(L)e^u_{i,t} + B_2(L)e^a_{i,t,0} + \\
&\quad + \gamma_1 e^a_{i,t,1} + \lambda_i + \chi_t + u_{i,t} \\
e^a_{i,t,1} &= \varphi_{i,1} e^u_{i,t} + v_{1,i,t} \\
e^a_{t,0} &= e^a_{t-1,1}
\end{aligned}$$

to be estimated on a panel of countries i for the variable of interest $\Delta z_{i,t}$.

- The standard MA representation is modified to allow flexibility in the effect of plans upon announcement and implementation.
- No distributed lag for the effect of future announced plans is introduced because the effect in time of announced adjustment is followed through the plan.

Step 4: A model to estimate and simulate plans with heterogeneity

But countries are different and plans are different so we propose:

$$
\begin{aligned}
\Delta z_{i,t} &= \alpha + B_1(L)e^u_{i,t} * TB_{i,t} + B_2(L)e^a_{i,t,0} * TB_{i,t} + \\
&\quad C_1(L)e^u_{i,t} * EB_{i,t} + C_2(L)e^a_{i,t,0} * EB_{i,t} + \\
&\quad + \gamma_1 e^a_{i,t,1} * EB_{i,t} + \delta_1 e^a_{i,t,1} * TB_{i,t} + \lambda_i + \chi_t + u_{i,t} \\
e^a_{i,t,1} &= \varphi_{i,1}\ e^u_{i,t} + v_{i,t,1} \\
e^a_{i,t,0} &= e^a_{i,t-1,1}
\end{aligned}
$$

$$
\begin{aligned}
e^u_{i,t} &= \tau^u_{i,t} + g^u_{i,t} \\
e^a_{i,t,0} &= \tau^a_{i,t,0} + g^a_{i,t,0} \\
\textit{if}\ \ \left(\tau^u_t + \tau^a_{t,0} + \tau^a_{t,1}\right) &> \left(g^u_t + g^a_{t,0} + g^a_{t,1}\right) \Longrightarrow TB_t = 1,\ EB_t = 1 - TB_t
\end{aligned}
$$

Step 5: A model to estimate and simulate plans with heterogeneity and disaggregation

$$
\begin{aligned}
\Delta z_{i,t} &= \alpha + \sum_{j=1}^{2} B_{1,j}(L) e^{u}_{i,t} * TB_{i,t} * D^{TB}_{i,j,t} + \sum_{j=1}^{2} B_{2,j}(L) e^{a}_{i,t,0} * TB_{i,t} * D^{TB}_{i,j,t} + \\
&\sum_{j} C_{1,j}(L) e^{u}_{i,t} * EB_{i,t} * D^{EB}_{i,j,t} + \sum_{j} C_{2,j}(L) e^{a}_{i,t,0} * EB_{i,t} * D^{EB}_{i,j,t} + \\
&+ \sum_{j=1}^{2} \gamma_j e^{a}_{i,t,1} * EB_{i,t} * D^{EB}_{i,j,t} + \sum_{j=1}^{2} \delta_j e^{a}_{i,t,1} * TB_{i,t} * D^{TB}_{i,j,t} \\
&+ \lambda_i + \chi_t + u_{i,t} \\
e^{a}_{i,t,1} &= \varphi_{i,1}\ e^{u}_{i,t} + v_{i,t,1}, \\
e^{a}_{i,t,0} &= e^{a}_{i,t-1,1}, e^{a}_{i,t,j} = e^{a}_{i,t-1,j+1} + \left(e^{a}_{i,t,j} - e^{a}_{i,t-1,j+1} \right)\ j \geqslant 1 \\
e^{u}_{i,t} &= \tau d^{u}_{i,t} + \tau i^{u}_{i,t} + gci^{u}_{i,t} + tr^{u}_{i,t},\ e^{a}_{i,t,0} = \tau d^{a}_{i,t,0} + \tau i^{a}_{i,t,0} + gci^{a}_{i,t,0} + tr^{a}_{i,t}
\end{aligned}
$$

Step 6: Putting the model at work

- Simulate, within sample, the output effect of fiscal adjustment plans (*i.e.* compute impulse responses)
- Simulate, out of sample, the effect of a specific plan (not in this paper)
    - auxiliary system non-necessary but useful to check that the simulated sample is not too different from the estimation sample

What are the consequences of collapsing plans into shocks?

$$f_t^{IMF} = e_t^u + e_{t,0}^a$$

1. "Shocks" become predictable (Jordà and Taylor, 2013)

$$\begin{aligned} Cov\left(f_t^{IMF}, f_{t-1}^{IMF}\right) &= Cov\left(\left(e_t^u + e_{t,0}^a\right), \left(e_{t-1}^u + e_{t-1,0}^a\right)\right) \\ &= Cov\left(\left(e_t^u + e_{t-1,1}^a\right), \left(e_{t-1}^u + e_{t-1,0}^a\right)\right) \\ &= \varphi_1 Var\left(e_{t-1}^u\right) \end{aligned}$$

2. Corrections have an effect only on implementation and the effect of unanticipated and anticipated corrections is restricted to be the same (this is why the uncertainty surrounding our estimates is much smaller than that surrounding the IMF estimates). Simulated corrections might be very different from those observed in the sample used to estimate parameters.

Exogeneity and Predictability

- Predictability of e_t^{IMF} by their own past does not necessarily imply violation of the relevant exogeneity concepts. Consider, for the sake of illustration, this simple representation

$$\begin{aligned} \Delta y_t &= \beta_0 + \beta_1 f_t^{IMF} + u_{1t} \\ f_t^{IMF} &= \rho f_{t-1}^{IMF} + u_{2t} \\ \begin{pmatrix} u_{1t} \\ u_{2t} \end{pmatrix} &\sim N\left[\begin{pmatrix} 0 \\ 0 \end{pmatrix}, \begin{pmatrix} \sigma_{11} & \sigma_{12} \\ \sigma_{12} & \sigma_{22} \end{pmatrix} \right] \end{aligned}$$

The condition required for f_t^{IMF} to be weakly exogenous for the estimation of β_1 is $\sigma_{12} = 0$, and it is independent of ρ.

Styles of fiscal adjustments

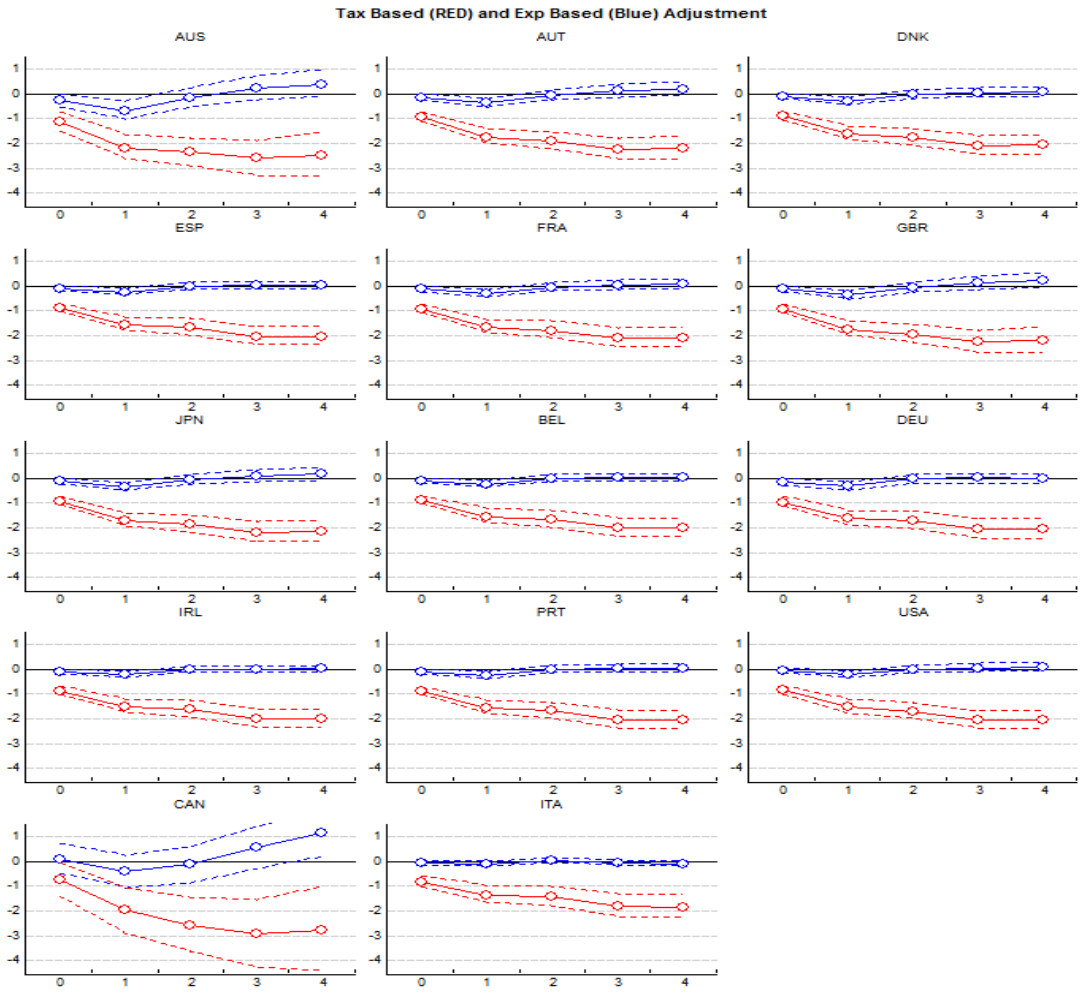
Styles of plans

	AU	OE	BG	CA	DK	DEU	FR
$\varphi_{1,i}$	0.39 (0.16)	0.36 (0.08)	0.04 (0.19)	1.3 (0.18)	0.49 (0.1)	−0.11 (0.14)	0.38 (0.12)
$\varphi_{2,i}$	−0.27 (0.14)	0	0	0.513 (0.12)	0	−0.01 (0.09)	−0.08 (0.05)
$\varphi_{3,i}$	−0.02 (0.01)	0	0	0.19 (0.09)	0	0.04 (0.03)	−0.04 (0.04)

	IR	IT	JP	PT	SP	UK	US
$\varphi_{1,i}$	0	−0.24 (0.04)	0.26 (0.03)	0.33 (0.16)	0.06 (0.06)	0.37 (0.09)	0.43 (0.36)
$\varphi_{2,i}$	0	0	−0.0005 (0.003)	0	0	0.1 (0.05)	0.32 (0.28)
$\varphi_{3,i}$	0	0	0	0	0	0	0.17 (0.24)

Table 3: the style of fiscal adjustments across different countries

Baseline results with no disaggregation



The effect of TB and EB adjustments on output growth

Disaggegation in four components:

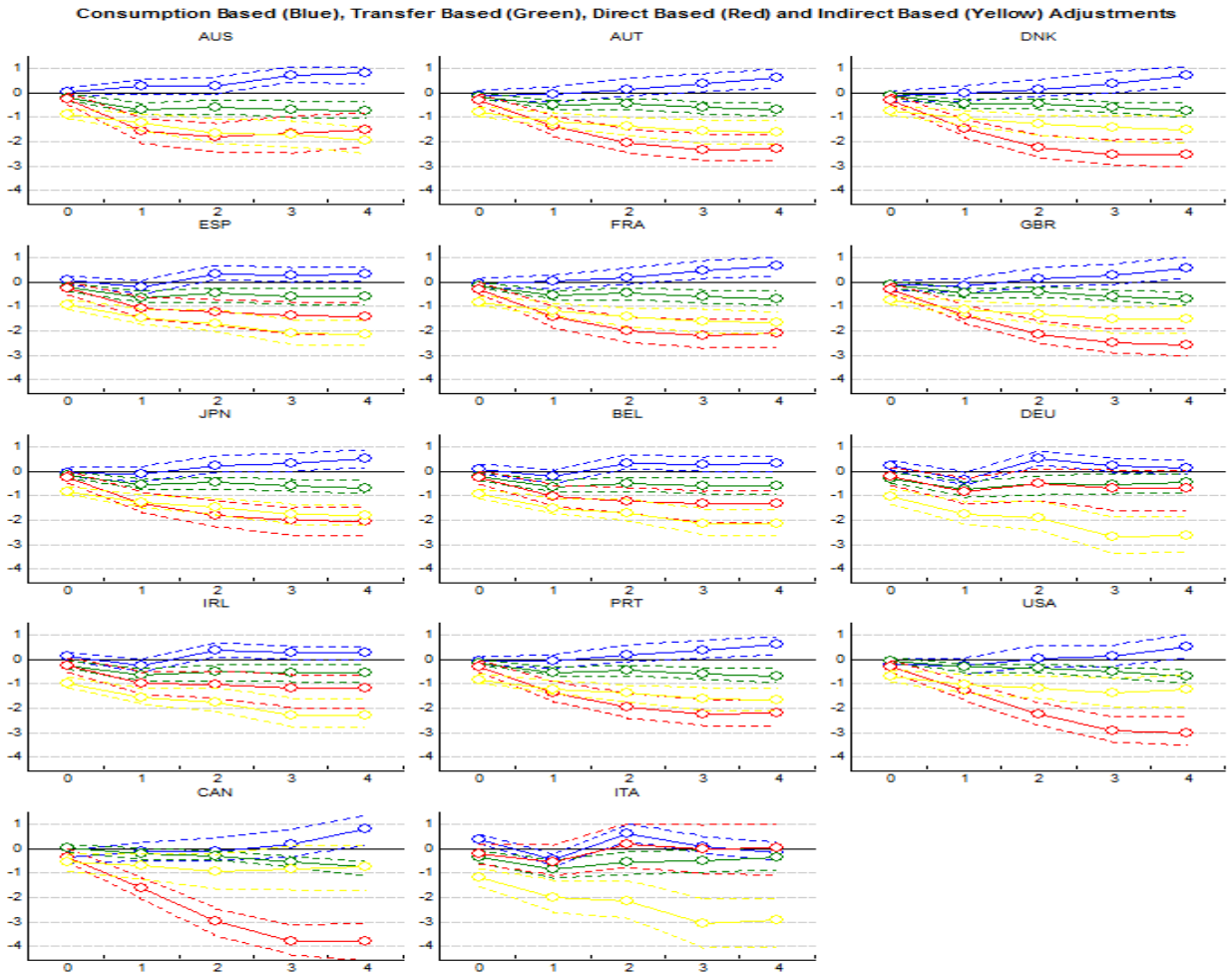


Figure: The effect of CB, TRB, DB and IB adjustmens on output growth

Disaggregation in three components

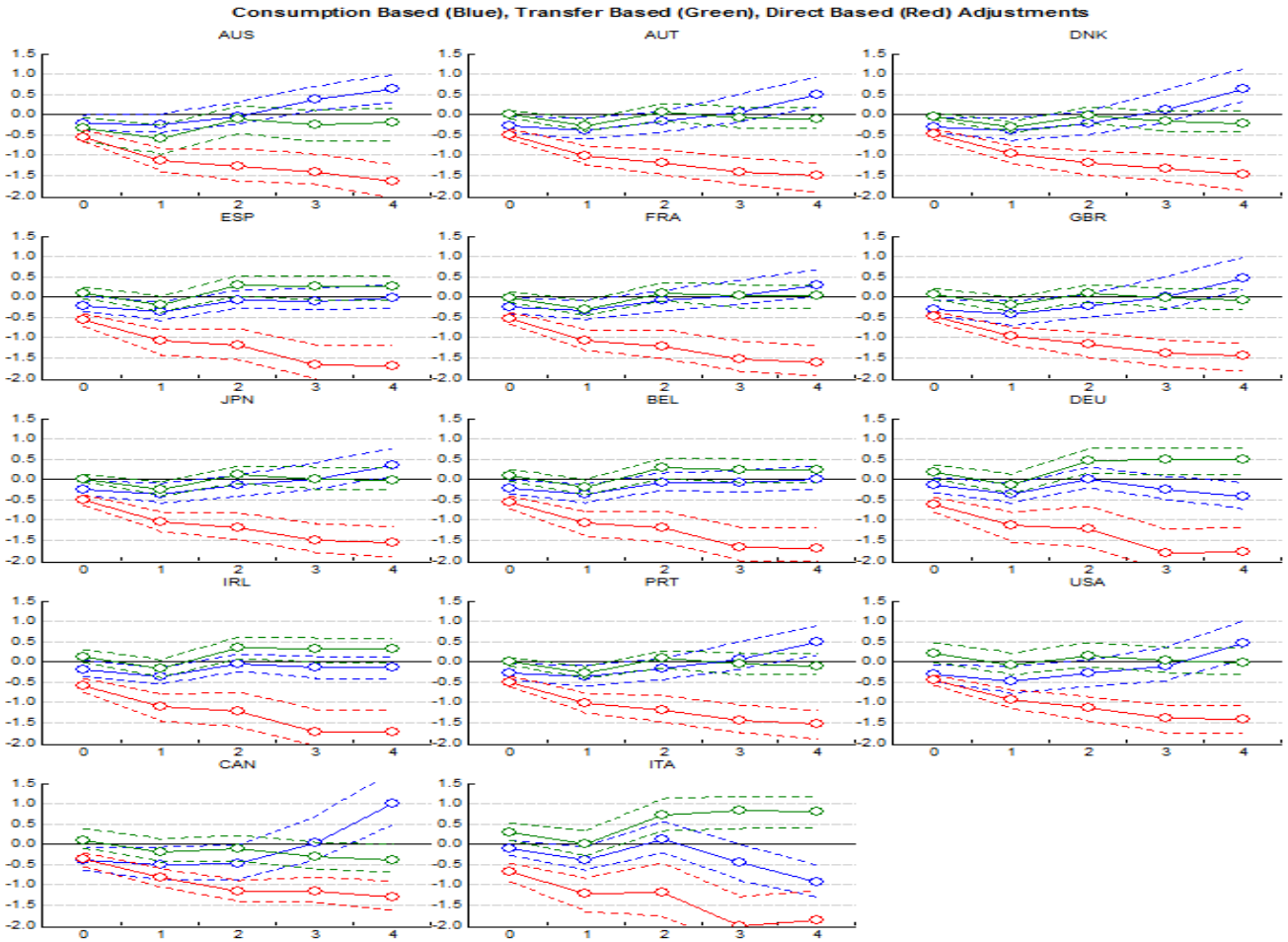


Figure: The effect of CB, TRB and TB adjustmens on output growth

Conclusions

- Reconstructing narrative fiscal plans allows to analyze the macroeconomic impact of differet styles of fiscal adjustments
- Styles can be heterogenous across countries both in their intertemporal and intratemporal dimension
- Fiscal multipliers depend on the composition of a fiscal correction: not only TB and EB based adjustments generate different multipliers but also the multipliers of the main components of Expenditure and Taxation are different.