Inspecting the macroeconomic effects of fiscal policies in the EU using a new dataset of narrative measures[1]

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[1] Preliminary and incomplete slides. Please do not circulate them without authors' permission

This paper

Joint estimate of the macroeconomic effects of both government and tax changes

- Cumulative spending multipliers of about 2.
- Cumulative tax multipliers of about 1 on impact and essentially 0 for longer horizons.

The ESCB dataset

- The Eurosystem and ECB staff conduct four **projection exercises** per year to quantify the revenue and spending impact of discretionary policy measures
- The fiscal projections rely on granular and confidential ESCB **fiscal questionnaires** (FQ) filled by NCB experts.
  - Quantifies the impact of *all* fiscal measures.
  - Over the following 10 years
  - Classification of their nature (fiscal category)
  - Focus on both **restrictive and expansionary** fiscal measures (no truncation)

The ESCB dataset

- Annual dataset with average starting date in 2003
- More than **14,000 datapoints** over the last decades from 27 countries
  - Around **5,000** for the 'Big-4'countries (DE, FR, IT, ES), **9,000** for the remaining 23
  - For reference: Romer and Romer (2010) have only about **110 tax measures** for the US

The ESCB Dataset: distribution of tax measures

Tax categories	Frequency	Percent
Direct taxes by households	2314	27.97
Direct taxes by corporations	1394	16.85
Other indirect taxes	1128	13.64
Other direct taxes	783	9.47
VAT	678	8.20
Net social contributions paid by employers	497	6.01
Energy taxes	406	4.91
Net social contributions paid by employees	377	4.56
Current transfers other than interest	168	2.03
Capital taxes	122	1.47
Sales	103	1.25
Other capital revenue	90	1.09
Local business taxes	87	1.05
Other social contributions	78	0.94
Other	47	0.57
TOTAL	8272	100

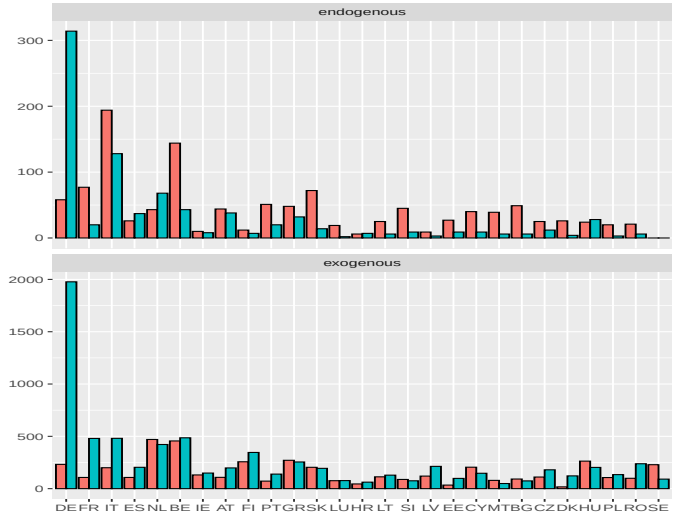
The ESCB Dataset: distribution of spending measures

Expenditure categories	Frequency	Percent
Subsidies	1010	16.61
Other social benefits other than in kind	995	16.37
Wages and salaries	690	11.35
Intermediate consumption	682	11.22
Capital transfers	593	9.75
Other current transfers	521	8.57
Government investment	478	7.86
Old age pensions	450	7.40
Social transfers in kind	320	5.26
Unemployment benefits	179	2.94
Employers' actual social contributions	65	1.07
Other net acquisitions of non-financial assets	42	0.69
Interest	13	0.21
Employers' imputed social contributions	6	0.10
TOTAL	6080	100

Identifying endogenous vs. exogenous measures

1. Identification strategy relying on the **motivation** behind each fiscal measure
   - **Big-4 countries:** Manually process official documentation that supports the motivation of each measure and then make a subjective assessment.
   - **Other 23 countries:** Use the manual work for the Big-4 to **train a Machine-Learning (ML) algorithm** that replicates this task for this set of countries
2. Pin down the **timing of approval** and implementation of measures

Identifying endogenous vs. exogenous measures



Shocks

$u_{i,t}$: surprise discretionary exogenous narrative change in total government spending between t and $t+3$ in country i (a compact measure of the entire program of discretionary spending, present and future).

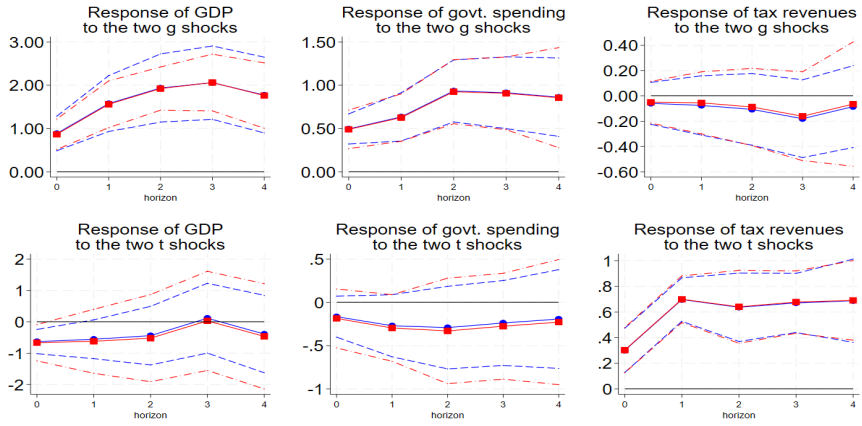
$q_{i,t}$: same for tax revenues

Empirical strategy: IRF

- Estimate a series of **local projections** as in Jordà, 2005:

$$z_{i,t+h} = \alpha^h_{zu} u_{i,t} + \alpha^h_{zq} q_{i,t} + \Theta'_h w_{i,t} + \lambda_i + \omega_{i,t+h}$$

- $z_{i,t}$: variable of interest (output y_t, gov. expenditure g_t, revenues τ_t) in country i, time t
- $w_{i,t}$: controls
- **Correlation** between $u_{i,t}$ and $q_{i,t}$. Orthogonalization
- All variables are expressed in log differences and then transformed into shares of GDP by multiplying by he country-specific average share of spending (taxes) in GDP.



Impulse responses to spending and tax shocks

Unconditional multipliers

Spending multiplier: ratio of the cumulative IRF of spending to the cumulative IRF of GDP

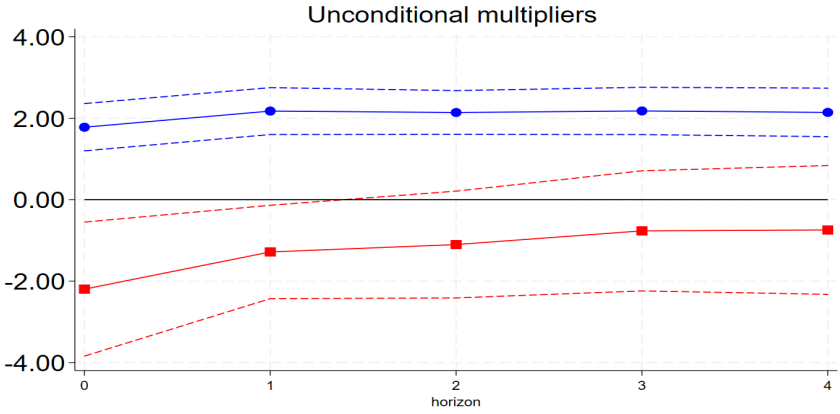
$$\widehat{m}_g^H = \sum_{h=0}^{H} \widehat{\alpha}_{yu}^h / \sum_{h=0}^{H} \widehat{\alpha}_{gu}^h$$

It does not control for the endogenous movement of taxes

Tax multiplier

$$\widehat{m}_\tau^H = \sum_{h=0}^{H} \widehat{\alpha}_{yq}^h / \sum_{h=0}^{H} \widehat{\alpha}_{\tau q}^h$$

It does not control for the endogenous movement of expenditure



Unconditional spending (blue circles) and tax multipliers (red squares)

Conditional multipliers

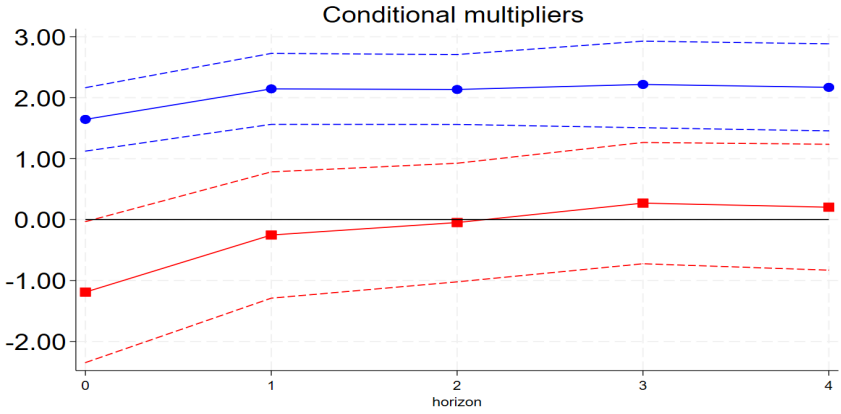
Estimate the equation:

$$\sum_{j=0}^{J} y_{t+j} = \beta_{yg,J} \sum_{j=0}^{J} g_{t+j} + \beta_{y\tau,J} \sum_{j=0}^{J} \tau_{t+j} + \Theta_h' w_{i,t} + \lambda_i + e_{t+j}$$

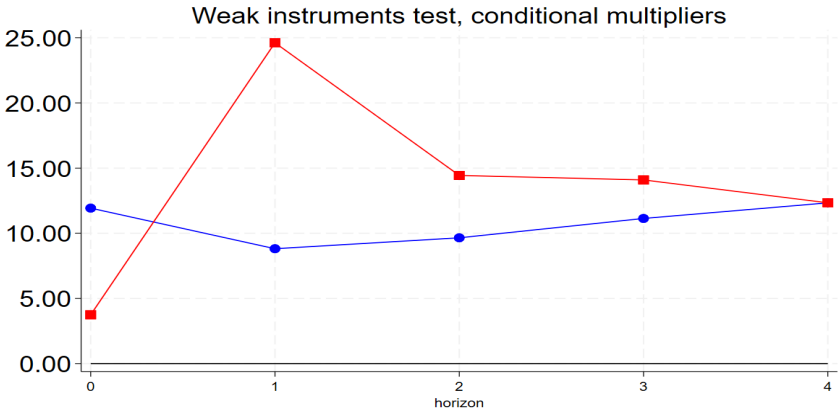
using the spending shock, $u_{i,t}$, and the tax shock, $q_{i,t}$ as instruments

$\beta_{yg,J}$ and $\beta_{y\tau,J}$ are the **conditional multipliers**.

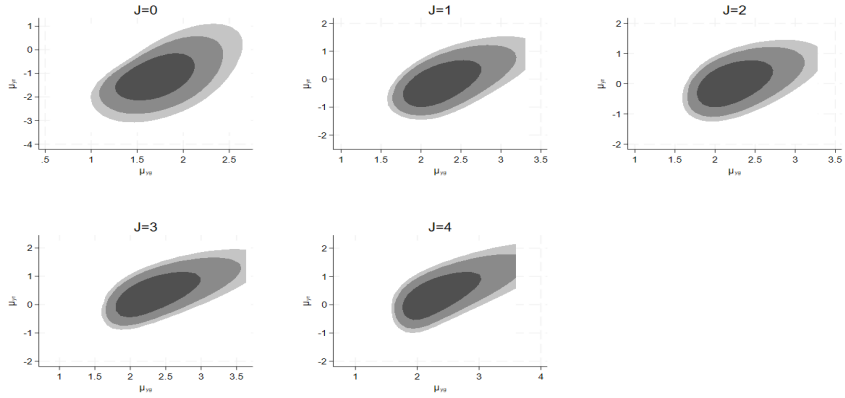
Response of output to a change in spending, **keeping taxes constant** and viceversa



Conditional spending (blue circles) and tax multipliers (red squares)



Mertens and Lewis weak instrument tests. Blue circles: cumulative spending; red squares: cumulative taxes.



Anderson-Rubin tests

News shocks

So far, narrative shock to current and future (spending) taxes constrained to have the same effect.

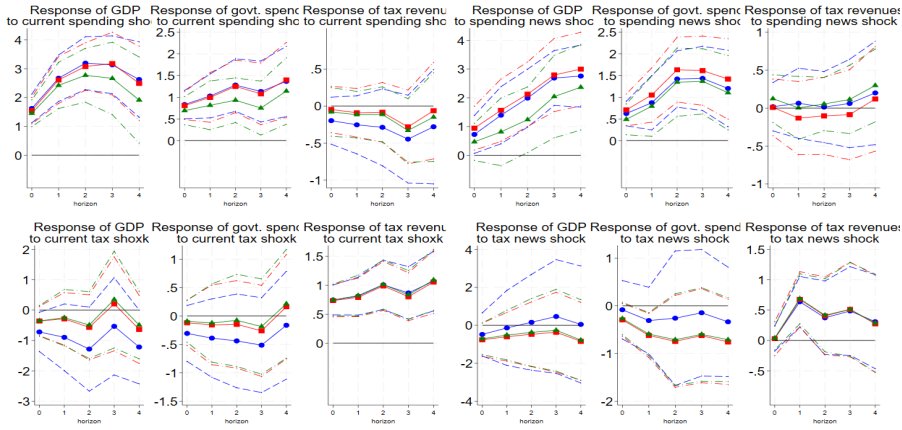
Create two tax shocks by splitting q_t into two shocks:

$$q1_t = \tau_t^0; \qquad q2_t = \sum_{h=1}^{3} \tau_t^h \tag{1}$$

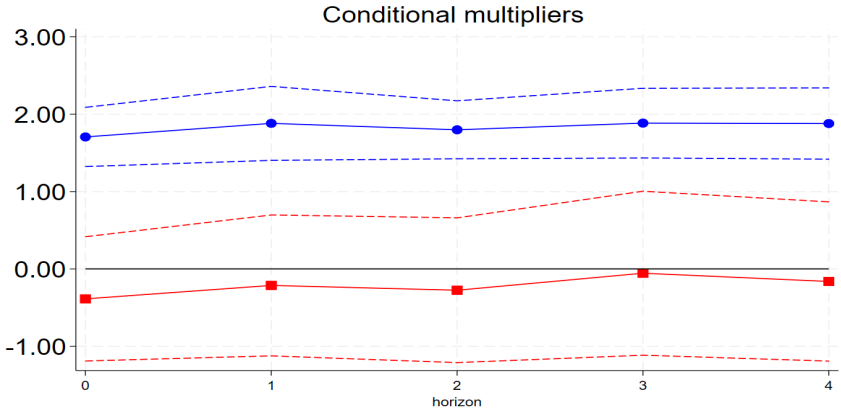
$q1_t$ "current tax shock". Shock in t for t

$q2_t$ "tax news shock". Shocks in t for $t + h$

Same for spending: $u1_t$ and $u2_t$



Responses to current shocks (columns 1 to 3) and to news shocks (columns 4 to 6).
First row: spending. Second row: taxes.



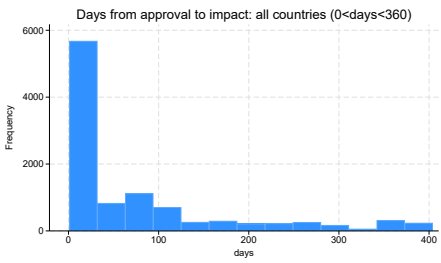
Conditional spending multiplier (blue circles) and tax multiplier (red squares); 4 instruments.

Conclusions

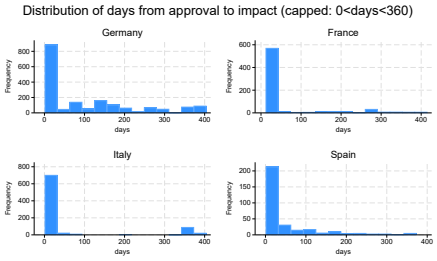
- New evidence on the **aggregate effects of fiscal policy in the EU**, based on an extended and refined version of the ESCB dataset on discretionary fiscal measures.
- Machine-learning methodology to separate exogenous vs. endogenous surprise discretionary changes
- New method to compute **conditional** cumulative multipliers, controlling for the response of the "other" fiscal tool
- Relatively **large conditional expenditure multiplier (~ 2)** while the **tax multiplier** is less precisely estimated and smaller (~ 0) in the medium run

Appendix: days to impact

All countries

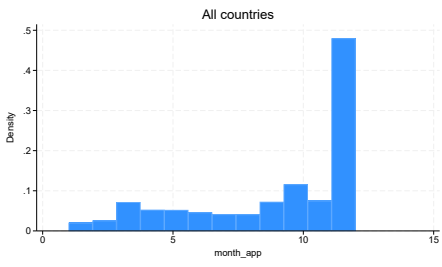


4 largest countries

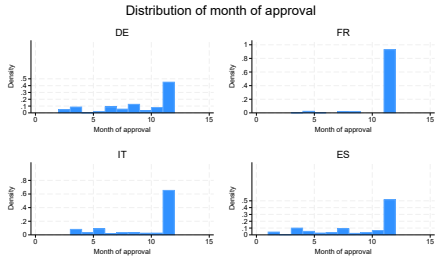


Appendix: month of approval

All countries

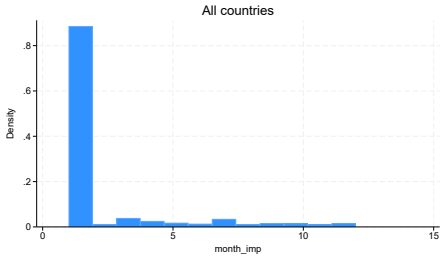


4 largest countries



Appendix: month of first impact

All countries



4 largest countries