Expansionary Austerity? International Evidence

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Primary Balance

From the IMF's "Computing Cyclically Adjusted Balances and Automatic Stabilizers"...

Definition of Overall Balance

$OB = PB + INT$

OB - Overall Balance

PB - Primary Balance

INT - Interest Payments

Primary Balance Decomposition

Primary Balance Decomposition

$PB = CPB + CAPB$

$\Delta PB = \Delta CPB + \Delta CAPB$

PB - Primary Balance

CPB - Cyclical Primary Balance

CAPB - Cyclically Adjusted Primary Balance

Cyclically Adjusted Primary Balance

CAPB Defined

Cyclically adjusted revenue: R^{CA}

$$R^{CA} = R \times \left(\frac{Y^p}{Y}\right)^{\varepsilon_R}$$

Cyclically adjusted expenditures: G^{CA}

$$G^{CA} = G \times \left(\frac{Y^p}{Y}\right)^{\varepsilon_G}$$

$$\begin{aligned} CAPB &= R^{CA} - G^{CA} \\ &= R \times \left(\frac{Y^p}{Y}\right)^{\varepsilon_R} - G \times \left(\frac{Y^p}{Y}\right)^{\varepsilon_G} \end{aligned}$$

R: nominal revenue
Y^p : potential output
Y: actual output
G: nominal primary expenditure
ε_R : elasticity of revenue with respect to output gap
ε_G : elasticity of expenditure with respect to output gap

CAPB Simplification

ASSUMPTION

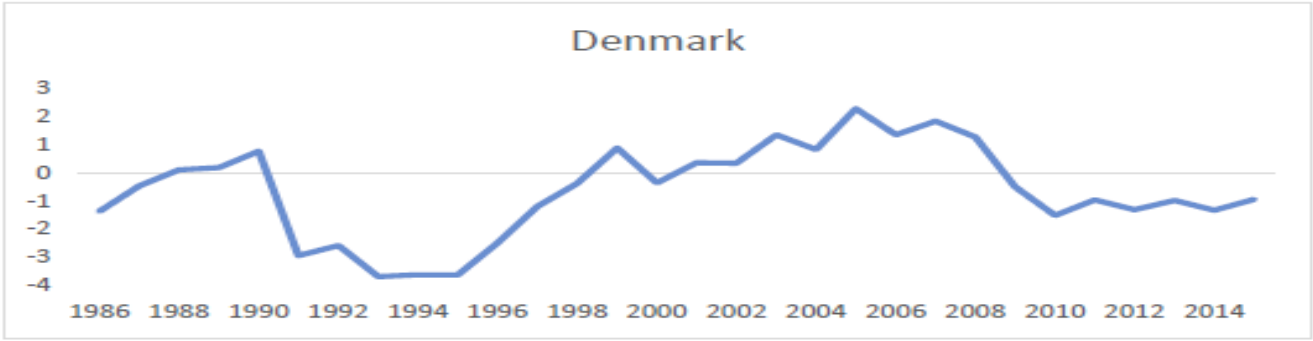
Assume $\varepsilon_R = 1$ and $\varepsilon_G = 0$

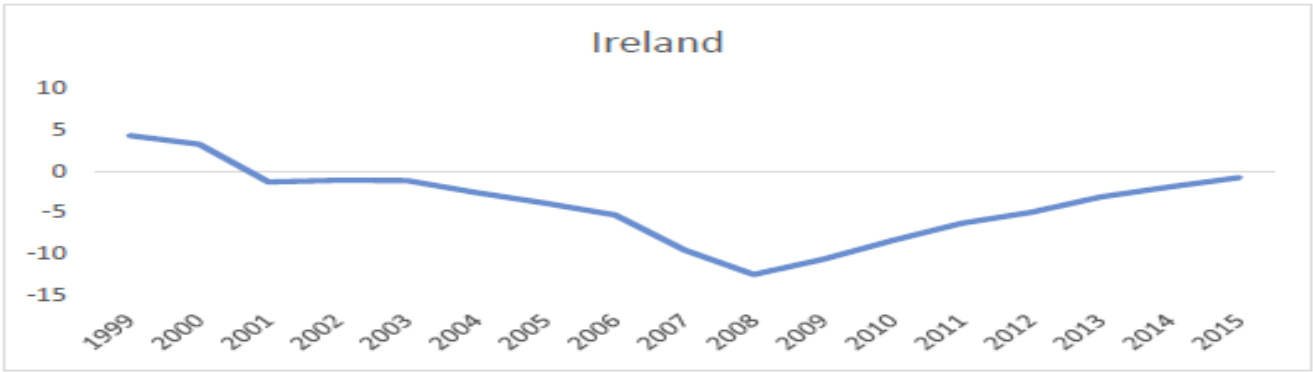
That is, revenues are perfectly correlated with the business cycle and expenditures are not correlated with the business cycle. There is some evidence that this holds empirically in Europe in regards to certain tax categories (Girouard and Andrea, 2005).

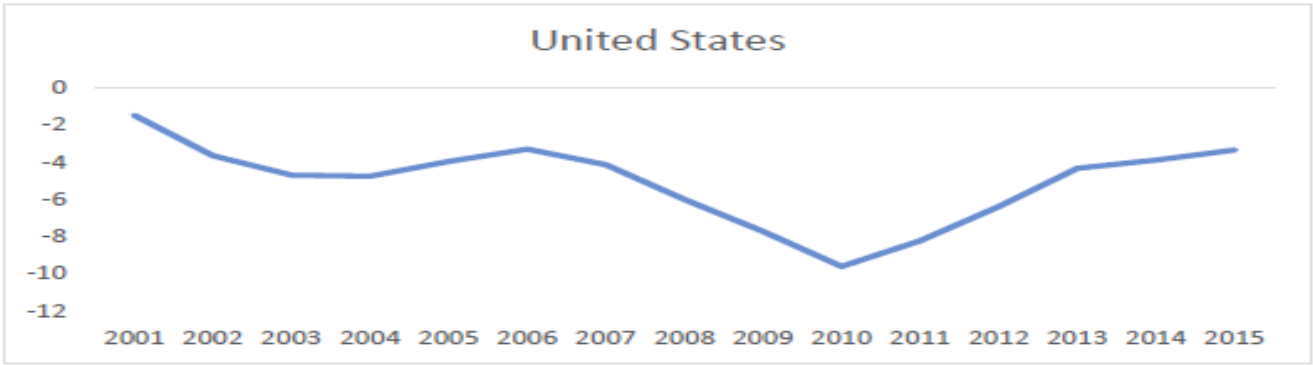
CAPB simplified

$$CAPB = R \times \left(\frac{Y^p}{Y}\right) - G$$

Some CAPB Examples







Previous Work

- Keynes (1937)
  - "The boom, not the slump, is the right time for austerity at the Treasury."
- Giavazzi and Pagano (1990)
  - Study Keynesian view vs Expectation view
  - Compare Denmark and Ireland in the 1980s.
  - Denmark cut spending and raised taxes. $\longrightarrow$ Consumption increased.
  - Ireland had one successful adjustment and one failed adjustment, possibly due to liquidity constraints.
- Blanchard (1990)
  - Showed theoretically that tax increases can lead to consumption increases in a non-Ricardian economy.
  - If a country raises taxes before a critical level of debt, consumption can be raised through improved expectations of output. Also less uncertainty can lead to lower buffer stock savings.

Previous Work - Blanchard

Assumption

Let T be the critical value of the tax rate t such that:
for $t < T, y = \underline{y}$
for $t > T, y = \underline{y} - \sigma$
where $\underline{y}$ is some level of output y and σ is the amount output falls by when taxes cross threshold T.

Blanchard's Result

$$\Delta C = (p + \theta)[-\text{change in expected present value of output}]$$
$$+ (p + \theta)[-\text{change in expected present value of taxes}]$$

C: Consumption θ: discount rate
p: probability of death or measure of how non-Ricardian the economy is.

We expect the first term to be positive and the second term to be negative. If the adjustment happens before T, this will be positive.

Previous Work

- Alesina et al (2002)
  - Showed empirically in a panel of OECD countries that there is an inverse relationship between increasing government spending or increasing taxes and profits (therefore also in investment).
- Alesina and Ardagna (2010)
  - Tested the same countries using change in CAPB and found that the composition of the fiscal adjustment (tax increases vs spending cuts) matter for growth effects. Cuts were found to be less harmful to growth.

Previous Work

- Romer and Romer (2004), Romer and Romer (2010)
  - Sought out a new method to identify exogenous changes in fiscal variables
  - Narrative records - Look at historical documents to find the reasons policy makers said for making changes. Identified policy which is not systematically correlated with output. Only looked at US tax policy changes.

Motivation

If cyclically adjusted variables are picking up effects that are not related by policy but are correlated with output or consumption growth, it could bias estimates of the effect of CAPB on output or consumption growth.

For example:
A boom in the stock market is going to raise cyclically adjusted revenues (R^{CA}), but this is also likely to raise private consumption. So in a simple regression:

$$\Delta Consumption_t = \beta \Delta CAPB_t + u_t$$

β will have an upward bias indicating expansionary effect of fiscal adjustment policy even if there was no policy change.

Motivation

GLP took the idea from Romer and Romer to use narrative records to identify policy changes.

They want to test the effect of policy changes identified by narrative shocks and compare that to the results using CAPB shocks.

The Narrative Approach

GLP examine contemporaneous policy documents to identify changes in tax policy and government spending that are exogenous to economic outlook (not forward looking). Focus on policy changes motivated by reducing the budget deficit

The documents list why the policy was enacted and what the estimated budgetary impact was. They acknowledge that there are still potential downsides to this approach.

- Ignores the role of antipatory effects.
- If a country adjusts in a countercyclical fashion, there will still likely be biased estimates but unclear in what direction.

Data

Dataset covers 17 OECD countries (Australia, Austria, Belgium, Denmark, Finland, France, Germany, Ireland, Italy, Japan, the Netherlands, Portugal, Spain, Sweden, the United Kingdom, and the United States.)

Sources: budgets, central bank reports, Convergence and Stability Programs submitted by the authorities to the European Commission, IMF Recent Economic Developments reports, IMF Staff Reports, OECD Economic Surveys, Congressional Budget Office (CBO) reports and the Economic Report of the President for the United States, the Journal Officiel de la Republique Francaise for France, and Ministry of Finance press releases and publications.

Find 173 fiscal policy adjustments

TABLE 1. Budgetary impact of narrative fiscal shocks (% of GDP).

Country	Year	Impact	Country	Year	Impact	Country	Year	Impact	Country	Year	Impact
AUS	1985	0.45	DEU	1984	0.18	FRA	2000	−0.20	NLD	1982	1.71
AUS	1986	1.02	DEU	1991	1.11	GBR	1979	0.27	NLD	1983	3.24
AUS	1987	0.90	DEU	1992	0.46	GBR	1980	0.08	NLD	1984	1.76
AUS	1988	0.10	DEU	1993	0.11	GBR	1981	1.58	NLD	1985	1.24
AUS	1994	0.25	DEU	1994	0.91	GBR	1982	0.53	NLD	1986	1.74
AUS	1995	0.50	DEU	1995	1.08	GBR	1994	0.83	NLD	1987	1.48
AUS	1996	0.62	DEU	1997	1.60	GBR	1995	0.28	NLD	1988	0.06
AUS	1997	0.70	DEU	1998	−0.10	GBR	1996	0.30	NLD	1991	0.87
AUS	1998	0.37	DEU	1999	0.30	GBR	1997	0.69	NLD	1992	0.74
AUS	1999	0.04	DEU	2000	0.70	GBR	1998	0.31	NLD	1993	0.12
AUT	1980	0.80	DEU	2003	0.74	GBR	1999	0.21	NLD	2004	1.70
AUT	1981	1.56	DEU	2004	0.40	IRL	1982	2.80	NLD	2005	0.50
AUT	1984	2.04	DEU	2006	0.50	IRL	1983	2.50	PRT	1983	2.30
AUT	1996	2.41	DEU	2007	0.90	IRL	1984	0.29	PRT	2000	0.50
AUT	1997	1.56	DNK	1983	2.77	IRL	1985	0.12	PRT	2002	1.60
AUT	2001	1.02	DNK	1984	2.38	IRL	1986	0.74	PRT	2003	−0.75
AUT	2002	0.55	DNK	1985	1.54	IRL	1987	1.65	PRT	2005	0.60
BEL	1982	1.66	DNK	1986	−0.72	IRL	1988	1.95	PRT	2006	1.65
BEL	1983	1.79	DNK	1995	0.30	IRL	2009	4.74	PRT	2007	1.40

Comparing ΔCAPB and Marrative Shocks

- Compare CAPB data from Alesina and Ardagna (2010) to constructed narrative shock data.
- Considered the cases where there was a difference greater than 3% of GDP. Found 13 such cases.
- Found that in 12 of the cases CAPB misidentified that size of the consolidation. No case where CAPB was more accurate.
- Found an additional issue with CAPB: one-off accounting operations. Example - East German housing debt transferred to general German government account.

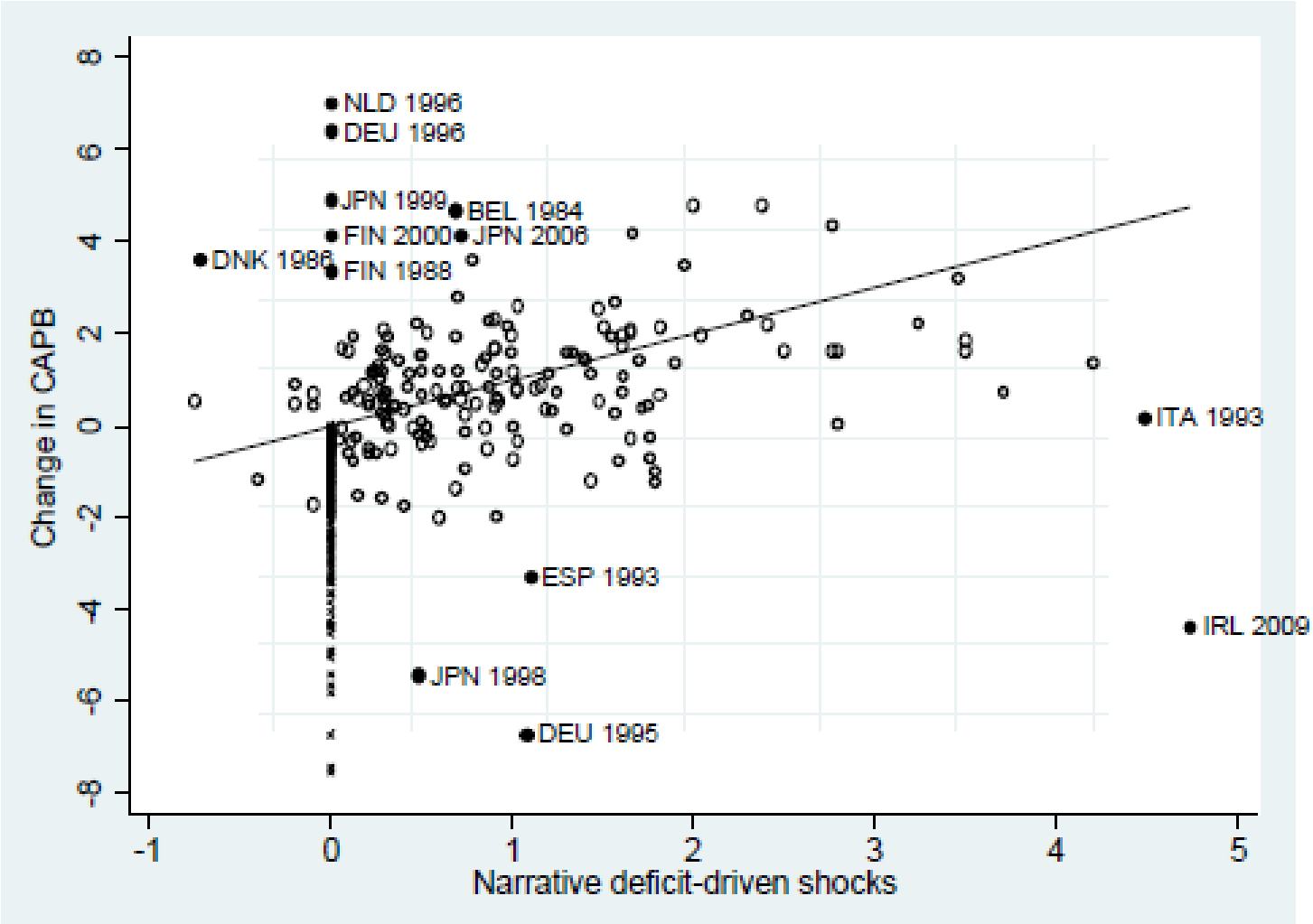


FIGURE 1. Two measures of fiscal consolidation: changes in CAPB versus narrative deficit-driven fiscal shocks (% of GDP). Labels indicate cases where either the CAPB or the narrative approach identify fiscal consolidation and the discrepancy between the two measures exceeds 3% of GDP. Crosses indicate observations for which neither the CAPB nor the narrative approach identify fiscal consolidation. Labels indicate three-letter ISO country codes. The diagonal line indicates points along which the series are equal (45° line).

Testing Narrative Shock Exogeneity

TABLE 2. Testing the orthogonality of fiscal policy changes to news regarding the state of the economy.

Equation estimated: $\Delta F_{it} = \mu_i + \lambda_t + \beta \text{News}_{it} + \varepsilon_{it}$

Measure of ΔF	β	s.e.	R-squared	*Obs*
Change in *CAPB*	0.34***	(0.08)	0.45	321
Narrative fiscal shock	−0.07	(0.07)	0.18	321

Notes: The table reports point estimates and heteroskedasticity-robust standard errors. All specifications contain full set of country and time fixed effects (not reported in the table). See the text for description of the *news* variable.
*Significant at 10%; **significant at 5%; ***significant at 1%.

- "News" is a real-time revision to IMF forecasts of real GDP for country i at time t.
- Find that narrative fiscal shocks are more exogenous to current economic developments than CAPB.
- Authors note that fiscal shocks may not be exogenous to past developments and, in fact, are likely correlated.

Estimation of Fiscal Consolidation Effect

$$\Delta log(GDP_{i,t}) = \mu_i + \lambda_t + \sum_{s=1}^{2} \gamma_s \Delta log(GDP_{i,t-s}) + \sum_{s=0}^{2} \beta_s \Delta CAPB_{i,t-s} + \nu_{i,t}$$

$$\Delta log(C_{i,t}) = \mu_i + \lambda_t + \sum_{s=1}^{2} \gamma_s \Delta C_{i,t-s} + \sum_{s=0}^{2} \beta_s \Delta CAPB_{i,t-s} + \nu_{i,t}$$

C - Consumption μ_i - country fixed effects

λ_t - time fixed effects

β_s - direct effects of fiscal consolidation

γ_s - control for AR process

$\nu_{i,t}$ - mean-zero error term

Estimation

The authors do two parallel tests

1. Estimate these two equations using the CAPB measure from Alesia and Ardagna.
2. Estimate these two equations by 2SLS using the narrative shocks as instruments for changes in CAPB.
   - First stage: $\Delta CAPB_{i,t} = \delta_1 NarrShock + u_{i,t}$

Estimation

They also test using a four variable VAR with 2 lags: narrative shocks, change in CAPB, change in log consumption, change in log GDP.

$$x_t = \Pi_1 x_{t-1} + \Pi_2 x_{t-2} + \mu_i + \lambda_t + \epsilon_{i,t}$$

x_t - vector of narrative shocks, change in CAPB, change in log consumption, change in log GDP.
μ_i - vector of country fixed effects.
λ_t - vector of time fixed effects
$\epsilon_{i,t}$ - error term.

TABLE 3. Estimation results: the effect of a 1% of GDP CAPB shock in year $t = 2$ (%).

Specification	Consumption	GDP	Consumption	GDP
Single equation	OLS		2SLS	
Benchmark	0.37***	0.29***	−1.02**	−0.82**
	(0.11)	(0.10)	(0.47)	(0.33)
Cragg-Donald Wald test *p*-value	...	...	0.00	0.00
Anderson canonical correlations *p*-value	...	...	0.00	0.00
Similar observations	−0.25	−0.21	...	...
	(0.23)	(0.28)		
Similar observations, controlling for asset prices	−0.42*	−0.30	...	...
	(0.21)	(0.25)		

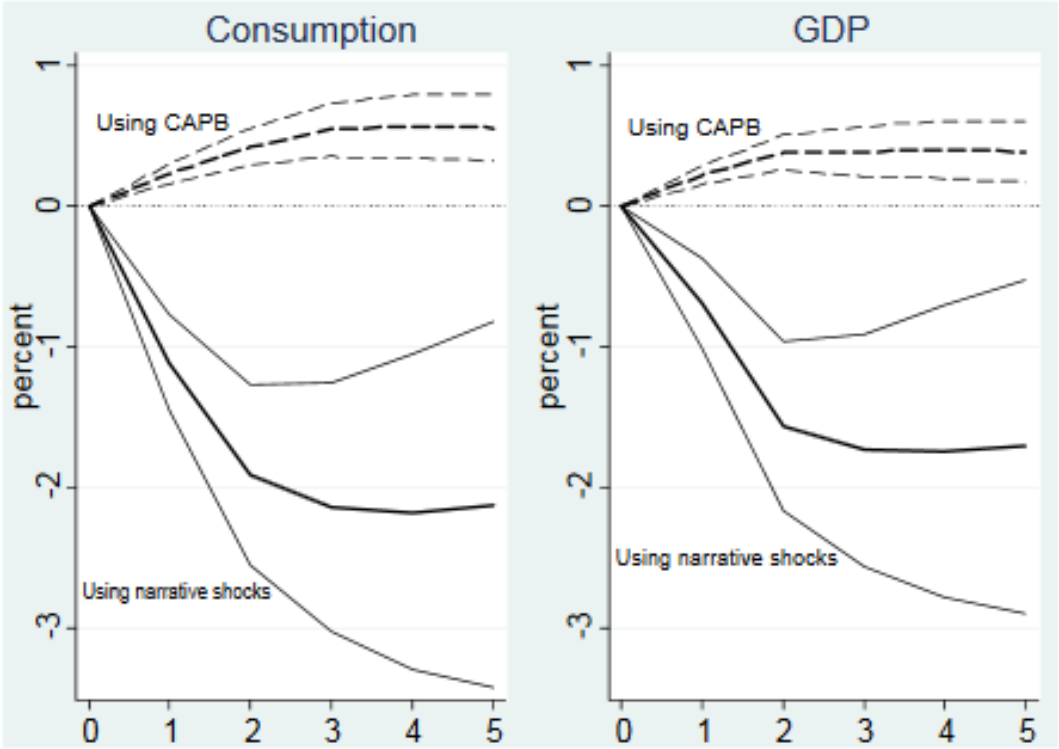
VAR	Innovation to CAPB		Innovation to Narrative Fiscal Shock	
Benchmark	0.43***	0.39***	−1.91***	−1.57***
	(0.08)	(0.08)	(0.39)	(0.37)
Additional controls:	0.59***	0.47***	−2.26***	−1.83***
Seven-variable VAR	(0.10)	(0.10)	(0.57)	(0.56)
Additional controls:	0.57***	0.49***	−1.65***	−1.24***
First principal component	(0.09)	(0.09)	(0.40)	(0.40)
Subsample:	0.40***	0.32***	−1.34***	−1.08***
Only Europe	(0.09)	(0.08)	(0.38)	(0.32)
Subsample:	0.38***	0.35***	−2.08***	−1.55***
Only euro area	(0.10)	(0.09)	(0.56)	(0.50)

Notes: The table reports point estimates and heteroskedasticity-robust standard errors in parentheses obtained via the delta method. All specifications contain full set of country and time fixed effects (not reported). In VAR specifications, CAPB shock is identified either as innovation to CAPB or to narrative fiscal shocks. In each case, the shocks are normalized so that the CAPB rises by 1% of GDP in year $t = 1$. VAR specifications with additional controls include government debt-to-GDP ratio, Institutional Investor Rating, and rise in old-age dependency ratio, either included in seven-variable VAR or summarized by first principal component.
*Significant at 10%; **significant at 5%; ***significant at 1%.

Results

- OLS estimates using CAPB changes imply expansionary austerity, as it has in previous work.
  - A rise of 1% in CAPB leads to 0.37% rise in consumption and a 0.29% rise in GDP within two years. Both effects are significant at the 1% level.
- 2SLS estimates using narrative shocks as instruments imply contractionary austerity.
  - A rise of 1% in CAPB leads to 1.06% fall in consumption and a 0.82% fall in GDP within two years. Both effects are significant at the 5% level.

VAR Results



- Fiscal consolidation measured by narrative records has contractionary effects on consumption persisting over five years.
- Narrative shocks (1% of GDP) have -1.91% and -1.57% effects on consumption and GDP, respectively, within two years.
- CAPB shocks (1% of GDP) have 0.42% and 0.38% effects on consumption and GDP, respectively, within two years.

Robustness Tests

Investigating the difference between OLS and 2SLS results.

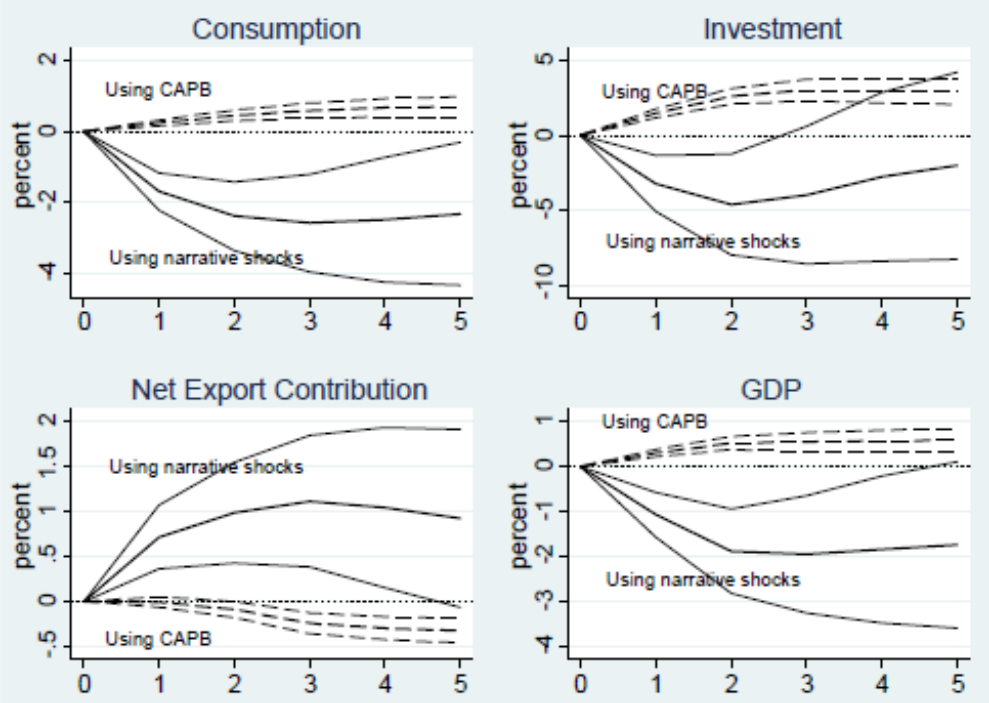
- Drop observations where first stage absolute residual is greater than median absolute residual.
  $|\hat{u}_t| > |\hat{u}_{med}|$
  - Find that estimates are no longer expansionary, but also not statistically significant. Effects on consumption and GDP are -0.25% and -0.21%, respectively.
- Continuing with the last change, add in $\Delta log(assetprices)$.
  - Δ CAPB effects are now contractionary and siginificant.
  - Authors acknowledge that the endogeneity of asset prices to CAPB confound the interpretation of the results.

Robustness Tests

Robustness of the VAR specification.

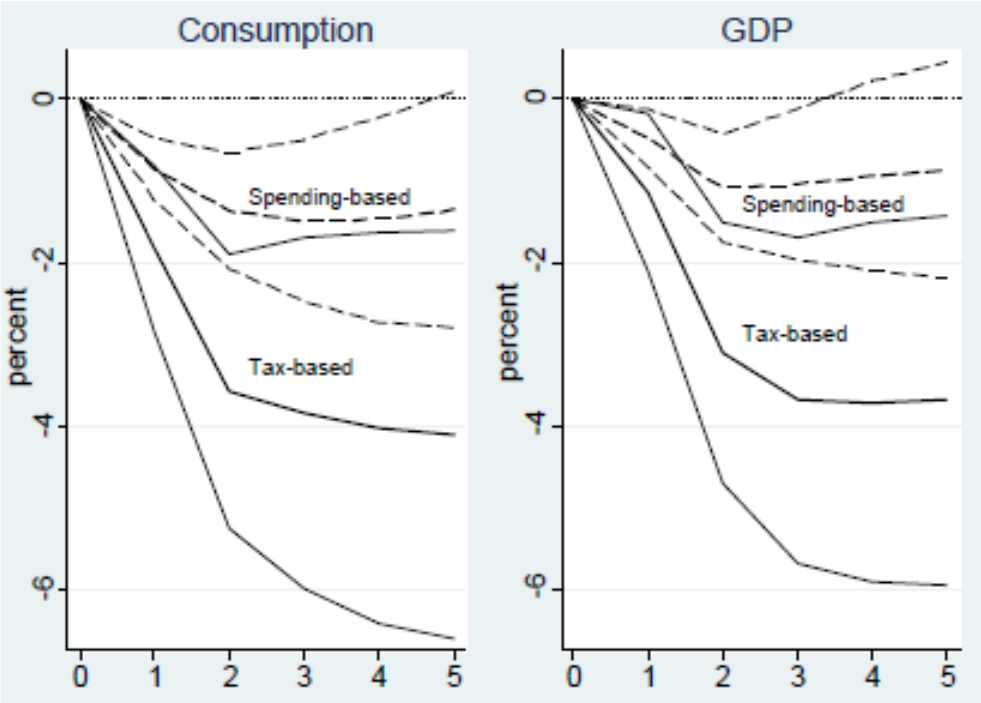
- Tested the VAR specification on just European countries in the sample and also on Euro area countries (exluding Denmark, Sweden, and the UK).
  - Found similar results to the baseline VAR.

Modifications of the VAR



- Components of GDP.
  - Test a 6 variable VAR by adding private investment and net exports variables to the baseline.
  - As before, there are opposite effects when looking at CAPB shocks or narrative shocks. This is now true for investment (-4.26% vs 2.61% of GDP in two years). Net exports rises with narrative shocks and has a small decline with CAPB shocks.

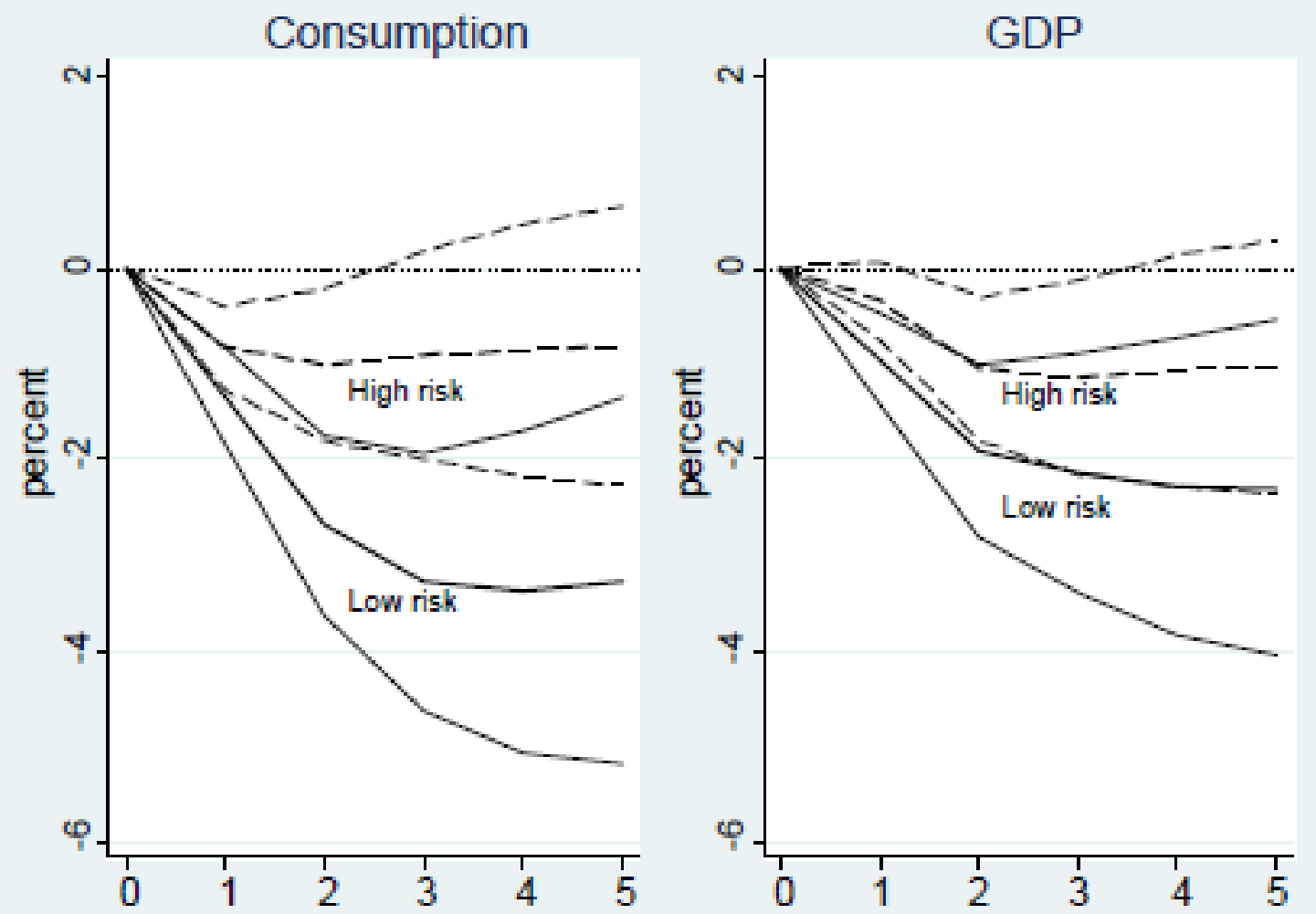
Modifications of the VAR



- Composition of fiscal adjustment.
  - Split the variables for narrative shocks into two variables - tax increase shocks or spending cut shocks.
  - Narrative shocks have an -1.36% and -1.01% of GDP effect on consumption and GDP, respectively, when they are spending cut bases. When based on tax increases, the effects are -3.60% and -3.10% of GDP on consumption and GDP, respectively.

Modifications of the VAR

- Perceived Risk of Default
  - Institutional Investor Ratings index (IIR) - private sector analysts' assesment of sovereign risk.
  - Split the narrative shock variable into two variables - shocks to the worst (high risk) IIR as defined by being in the bottom 25% of the contemporaneous IIR, and shocks to the rest - top 75% IIR rating contemporaneously.
  - For high risk economies, narrative shocks has an effect of -1.01% and -1.06% on consumption and GDP respectively.
  - For low risk economies, the effects of shocks are less contractionary.


Consumption
GDP
percent
2
0
-2
-4
-6
0
1
2
3
4
5
High risk
Low risk

My Extension

Looking at the United States at the state level...
I would like to see if fiscal policy changes made with the goal of reducing long term debt are expansionary or contractionary.