Cyclical budgetary policy and its effects on growth

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Does macroeconomic policy (budget deficit, interest rates, taxation,...) matter for (long-run) growth?

- Debate on ECB policy and the Stability and Growth Pact.
- Does it matter for growth that Eurozone shows less countercyclical deficit than US/UK?
- How does the degree of development, and in particular financial development, affect the efficiency of macro policy?
Hypothesis: Countercyclical fiscal and budgetary policy should be more growth enhancing when a country is less financially developed.
Previous literature

- Calderon et al. (2004): institutions (ICRG).
- Lane (2003): growth volatility, trade openness and political divisions.
We use OECD panel data.

Public deficit in the OECD gets more countercyclical over time, but less so in the EMU.

Lower financial development is associated with a less countercyclical fiscal and budgetary policy.

More countercyclical public deficit, investment and consumption increase growth; but this effect is lessened when financial development is higher.
First stage: the cyclicality of public debt and spending and its determinants.

Second stage: the effect of the cyclicality of public debt and spending on growth.
Data used

- OECD Economic Outlook.
- Ross Levine’s dataset on financial development: private credit/GDP.
- Penn World Tables.
First stage: theory

The variation of public debt (or spending) is determined by (Barro 1979 tax smoothing theory):
- the size of government and the variation in government spending
- the stock of debt at the previous period
- GDP gap (tax revenues)
Econometric specification

- Correlation won’t do (panel).
- Problem: how do we estimate a time-varying coefficient on the GDP gap?
- First method: Coefficient in the linear regression assumed to follow an AR(1) process for each country $i$ at time $t$:

$$\forall i, a_{i,t} = a_{i,t-1} + \varepsilon_t^{a_i}, \varepsilon_t^{a_i} \sim N(0, \sigma_{a_i}^2)$$

- Second method (check): OLS 10-years rolling window:

$$y_t = \sum_i a_{i,t} x_{it} + \varepsilon_t, t \in [\tau - 4, \tau + 5]$$
Procyclicality of government debt (AR(1))

Procylicality

Year

USA
EMU countries
France
United Kingdom
## Determinants of the procyclicality of fiscal and budgetary policy

The table below presents the results of regression analysis for the determinants of procyclicality. The explained variable is procyclicality as estimated by the AR(1) method. All regressions also control for EMU country status, government share of GDP, and relative GDP per capita.

<table>
<thead>
<tr>
<th></th>
<th>Public Debt</th>
<th>Public Investment</th>
<th>Public Consumption</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Year f.e.</td>
<td>Country f.e.</td>
<td>Year f.e.</td>
</tr>
<tr>
<td>Private credit/GDP</td>
<td>0.175</td>
<td>-0.638</td>
<td>0.010</td>
</tr>
<tr>
<td></td>
<td>(0.186)</td>
<td>(0.193)***</td>
<td>(0.010)</td>
</tr>
<tr>
<td>Standard error of GDP growth</td>
<td>-1.979</td>
<td>1.019</td>
<td>(0.104)***</td>
</tr>
<tr>
<td></td>
<td>(1.873)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Openness</td>
<td>0.016</td>
<td>0.028</td>
<td>0.000</td>
</tr>
<tr>
<td></td>
<td>(0.002)***</td>
<td>(0.007)***</td>
<td>(0.000)</td>
</tr>
<tr>
<td>Observations</td>
<td>486</td>
<td>486</td>
<td>453</td>
</tr>
<tr>
<td>R-squared</td>
<td>0.26</td>
<td>0.70</td>
<td>0.41</td>
</tr>
</tbody>
</table>

Robust standard errors in parentheses

* significant at 10%; ** significant at 5%; *** significant at 1%

Explained variable: procyclicality as estimated by the AR(1) method. All regressions also control for EMU country status, government share of GDP, relative GDP per capita.
Second stage: theory


Productivity $a(t)$
Firms borrow to invest in short-term investment $s(t)$ and long-term investment (R&D) $l(t)$

Production: $a(t)F(s(t))$
Liquidity shock $c(t)$ is realized.
Firms borrow to pay $c(t)$.

Productivity $a(t+1)$
Long-term investment yields $a(t+1)q(l(t))$ if liquidity shock covered

Depends on credit constraints/financial development

Government intervention increases net cash flow through lower taxes or demand stimulation
The explained variable is the growth of GDP per capita. All regressions include the following controls: relative GDP per capita, average years of schooling for the population over 25 years old, trade openness, inflation, population growth, government share of GDP (in %), investment/GDP (in%), terms of trade shock, price shock.
Table calculates the implied growth effect of the government investment becoming acyclical.
Conclusion

- Macro policy over the cycle matters for growth.
- Procyclicality of government investment, and to a lesser extent consumption, is harmful to growth of GDP per capita.
- Less financially developed countries could increase growth substantially by reducing procyclicality of government investment.
- Effect is particularly strong for EMU.
Econometric specification

\[
\frac{(b_t - b_{t-1}) - i_t}{y_t} = a_1 y_{gap,t} \left( \frac{g_t}{y_t} \right) + a_2 \{ \ln(g_t) - \ln(g_{t-1}) \} \frac{g_t}{y_t} + a_3 \frac{b_{t-1}}{y_t} + a_4 + \epsilon_t
\]

Problem: how do we estimate a time-varying coefficient on the GDP gap?
The explained variable is the growth of GDP per capita. All regressions include the following controls: relative GDP per capita, average years of schooling for the population over 25 years old, trade openness, inflation, population growth, government share of GDP (in %), investment/GDP (in%), terms of trade shock, price shock.

## GDP growth and government investment and consumption procyclicality

<table>
<thead>
<tr>
<th></th>
<th>Country f.e.</th>
<th>Year f.e.</th>
<th>Country year f.e.</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>AR(1)</td>
<td>10YRW</td>
<td>AR(1)</td>
</tr>
<tr>
<td>lag(Procyclicality of government investment)</td>
<td>-0.239 (0.069)**</td>
<td>-0.043 (0.022)**</td>
<td>-0.064 (0.034)*</td>
</tr>
<tr>
<td></td>
<td>lag(Procyclicality of government consumption)</td>
<td>-0.058 (0.032)*</td>
<td>-0.038 (0.020)*</td>
</tr>
<tr>
<td></td>
<td>lag(Private credit/GDP)</td>
<td>-0.017 (0.010)*</td>
<td>-0.022 (0.009)**</td>
</tr>
<tr>
<td></td>
<td>lag(Procyclicality of government investment*Private credit/GDP)</td>
<td>0.156 (0.043)**</td>
<td>0.029 (0.017)*</td>
</tr>
<tr>
<td>Observations</td>
<td>370</td>
<td>304</td>
<td>370</td>
</tr>
<tr>
<td>R-squared</td>
<td>0.30</td>
<td>0.26</td>
<td>0.43</td>
</tr>
</tbody>
</table>

Robust standard errors in parentheses

* significant at 10%; ** significant at 5%; *** significant at 1%