Fiscal Procyclicality and Over-optimism in Official Forecasts

Jeffrey Frankel
Harpel Professor, Harvard University

MAS Term Professor,
National University of Singapore, May 22, 2017
Main papers on which the presentation is based

1) Which countries succeed in running counter-cyclical fiscal policy?

2) A possible source of the problem: Are official forecasts biased?

3) Is the bias in government forecasts better or worse for countries subject to fiscal rules such as the Stability & Growth Pact?

4) Possible solutions: Can private-sector forecasts do better?
Procyclicality

- Fiscal policy has historically tended to be pro-cyclical in a majority of countries, especially developing countries, thereby worsening ups & downs in the economic cycle.

- Correlation of income & spending mostly positive:

- Tax policy tends to be procyclical as well:
Correlations between Gov't Spending & GDP 1960-1999

G always used to be pro-cyclical for most developing countries.

Adapted from Kaminsky, Reinhart & Vegh (2004)
An important development -- some developing countries were able to break the historic pattern after 2000:

- taking advantage of the boom of 2002-2008
  - to run budget surpluses & build reserves,
- thereby earning the ability to expand fiscally in the 2008-09 crisis.

 Chile, Botswana, Malaysia, Indonesia, Korea, China...

How were they able to achieve counter-cyclicality?
Correlations between Government spending & GDP

2000-2009

In the decade 2000-2009, about 1/3 developing countries switched to countercyclical fiscal policy: Negative correlation of G & GDP.

DEVELOPING:
43% (or 32 out of 75) countercyclical. The figure was 17% (or 13 out of 75) in 1960-1999.

INDUSTRIAL:
86% (or 18 out of 21) countercyclical. The figure was 80% (or 16 out of 20) in 1960-1999.
Update of Correlation (G, GDP): 2010-14
Back-sliding among some countries.

DEVELOPING: 37% (or 29 out of 76) pursue counter-cyclical fiscal policy.
INDUSTRIAL: 63% (or 12 out of 19) pursue counter-cyclical fiscal policy.
Who achieves countercyclical fiscal policy?

Countries with “good institutions”

“On Graduation from Fiscal Procyclicality,”
Frankel, Végh & Vuletin; *J.Dev.Economics*, 2013.

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Figure 5, Country correlations between the cyclical components of the real government expenditure and real GDP (1960-2009) vs. average institutional quality (1984-2008)

- Corr(G, GDP) = 0.81 - 1.02 av.IQ
- (0.09)*** (0.15)***
- $R^2 = 0.32$

Notes: The cyclical components have been estimated using the Hodrick- Prescott Filter. A positive (negative) correlation indicates procyclical (countercyclical) fiscal policy. Real government expenditure is defined as neutral government expenditure and net lending deflated by the GDP deflator. Country correlations between the cyclical components of the real government expenditure and real GDP (i.e., Corr(G, GDP)) are calculated for the period 1960-2009. Institutional quality is a normalized index that ranges between 0 (lowest institutional quality) and 1 (highest institutional quality). The index is calculated as the average of four components: investment profile, corruption, law and order, bureaucracy quality. Country average institutional quality (i.e., av. IQ) is calculated for each country for the period 1984-2008. See Appendix 2 for correlation values and average institutional quality for each country.

The quality of institutions varies, not just across countries, but also across time.

Frankel, Végh & Vuletin, 2013.
The countries that graduated to countercyclical fiscal policy after 2000, statistically, are those where institutional quality improved.

How can countries avoid pro-cyclical fiscal policy?

- What are “good institutions,” exactly?

- Rules?
  - Budget deficit ceilings (SGP) or debt brakes?
    - Have been tried by many countries:
      - 97 IMF members, by 2013.
      - Usually fail.
  - Rules for cyclically adjusted budgets?
    - Countries can more likely stick with them. But...

- Rules don’t address a major problem:
  - Over-optimism in official forecasts
    - of GDP growth rates, tax receipts & budgets.
Countries with Balanced Budget Rules frequently violate them.

Compliance with Fiscal Rules, 1985–2012 (Percent compliance)

- **BBR**: Balanced Budget Rules
- **DR**: Debt Rules
- **ER**: Expenditure Rules

Compliance < 50%
To expect countries to comply with the rules during recessions is particularly unrealistic (and not even necessarily desirable).

Bad times: years when output gap < 0

International Monetary Fund, 2014
Over-optimism in official forecasts

- Statistically significant findings among 33 countries

- Official forecasts on average are overly optimistic, for:
  - (1) budgets &
  - (2) GDP.

- The bias toward optimism is:
  - (3) stronger the longer the forecast horizon;
  - (4) greater in booms.
Implication of forecast bias for actual budgets

- Can lead to pro-cyclical fiscal policy:
  - If the boom is forecast to last indefinitely, there is no apparent need to retrench.

- BD rules don’t help.
  - The SGP *worsens* forecast bias for euro countries.
    - Frankel & Schreger (2013)
US official projections were over-optimistic on average.

Forecasts of budget balance, one-three years ahead

United States

Budget balance as % of GDP

Year

1980 1990 2000 2010

-10 -5 0 5

One year ahead
Two years ahead
Three years ahead
Actual

F & Schreger, 2013
Greek official forecasts were \emph{always} over-optimistic.

Data from Greece’s Stability and Convergence Programs.
German forecasts were also usually too optimistic.
Table 2: Frankel (2011)
Budget balance forecast error as % of GDP, full dataset

<table>
<thead>
<tr>
<th>Variables</th>
<th>1 year ahead</th>
<th>2 years ahead</th>
<th>3 years ahead</th>
</tr>
</thead>
<tbody>
<tr>
<td>GDP gap</td>
<td>0.093***</td>
<td>0.258***</td>
<td>0.289***</td>
</tr>
<tr>
<td></td>
<td>(0.019)</td>
<td>(0.040)</td>
<td>(0.063)</td>
</tr>
<tr>
<td>Constant</td>
<td>0.201</td>
<td>0.649***</td>
<td>1.364***</td>
</tr>
<tr>
<td></td>
<td>(0.197)</td>
<td>(0.231)</td>
<td>(0.348)</td>
</tr>
<tr>
<td>Observations</td>
<td>398</td>
<td>300</td>
<td>179</td>
</tr>
<tr>
<td>$R^2$</td>
<td>0.033</td>
<td>0.113</td>
<td>0.092</td>
</tr>
<tr>
<td>RMSE</td>
<td>2.25</td>
<td>2.73</td>
<td>3.10</td>
</tr>
</tbody>
</table>

*** p<0.01, ** p<0.05, * p<0.1.
(Robust standard errors in parentheses, clustered by country.)
Note: GDP gap is lagged so that it lines up with the year in which the forecast was made, not the year being forecast.
Econometric findings regarding bias among EU countries in particular.

- Euro countries, subject to the SGP,
  - show even more optimism bias than others
    - in growth forecasts, significant at 1 and 2-year horizons
  - particularly when GDP is currently high.
- Forecasts of budget balance among euro countries also show extra bias when GDP is currently high.
### GDP growth rate forecast error, full dataset. Frankel (2011), Table 5 (c)

<table>
<thead>
<tr>
<th></th>
<th>1 year ahead</th>
<th>2 years ahead</th>
<th>3 years ahead</th>
<th>1 year ahead</th>
<th>2 years ahead</th>
<th>3 years ahead</th>
</tr>
</thead>
<tbody>
<tr>
<td>SGP dummy</td>
<td>0.379*</td>
<td>0.780**</td>
<td>−0.555</td>
<td>0.192</td>
<td>0.221</td>
<td>−1.067*</td>
</tr>
<tr>
<td></td>
<td>(0.199)</td>
<td>(0.352)</td>
<td>(0.529)</td>
<td>(0.215)</td>
<td>(0.410)</td>
<td>(0.549)</td>
</tr>
<tr>
<td>SGP*GDPgap</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>0.148**</td>
<td>0.516***</td>
<td>0.522***</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>(0.068)</td>
<td>(0.141)</td>
<td>(0.161)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Constant</td>
<td>0.239</td>
<td>0.914***</td>
<td>2.436***</td>
<td>0.252</td>
<td>0.887***</td>
<td>2.444***</td>
</tr>
<tr>
<td></td>
<td>(0.168)</td>
<td>(0.318)</td>
<td>(0.643)</td>
<td>(0.168)</td>
<td>(0.330)</td>
<td>(0.642)</td>
</tr>
<tr>
<td>Observations</td>
<td>369</td>
<td>282</td>
<td>175</td>
<td>368</td>
<td>282</td>
<td>175</td>
</tr>
<tr>
<td>Countries</td>
<td>33</td>
<td>31</td>
<td>28</td>
<td>33</td>
<td>31</td>
<td>28</td>
</tr>
<tr>
<td>R²</td>
<td>0.006</td>
<td>0.006</td>
<td>0.007</td>
<td>0.011</td>
<td>0.042</td>
<td>0.040</td>
</tr>
<tr>
<td>RMSE</td>
<td>2.40</td>
<td>3.44</td>
<td>3.81</td>
<td>2.38</td>
<td>3.36</td>
<td>3.73</td>
</tr>
</tbody>
</table>

***p<0.01, **p<0.05, *p<0.1. (Robust standard errors in parentheses.) Random effects.

SGP ≡ dummy for countries subject to the SGP.

GDP gap ≡ GDP as deviation from trend.

All variables are lagged so that they line up with the year in which the forecast was made.
## Budget balance forecast error, full dataset. Frankel (2011), Table 3(c).

<table>
<thead>
<tr>
<th>Variables</th>
<th>1 year ahead</th>
<th>2 years ahead</th>
<th>3 years ahead</th>
<th>1 year ahead</th>
<th>2 years ahead</th>
<th>3 years ahead</th>
</tr>
</thead>
<tbody>
<tr>
<td>SGP dummy</td>
<td>0.368</td>
<td>0.922***</td>
<td>0.625</td>
<td>0.182</td>
<td>0.331</td>
<td>0.066</td>
</tr>
<tr>
<td></td>
<td>(0.342)</td>
<td>(0.329)</td>
<td>(0.415)</td>
<td>(0.335)</td>
<td>(0.355)</td>
<td>(0.449)</td>
</tr>
<tr>
<td>SGP * GDPgap</td>
<td></td>
<td></td>
<td></td>
<td>0.161**</td>
<td>0.509***</td>
<td>0.544***</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>(0.065)</td>
<td>(0.147)</td>
<td>(0.148)</td>
</tr>
<tr>
<td>Constant</td>
<td>0.245</td>
<td>0.530**</td>
<td>1.235***</td>
<td>0.219</td>
<td>0.501*</td>
<td>1.240***</td>
</tr>
<tr>
<td></td>
<td>(0.198)</td>
<td>(0.268)</td>
<td>(0.408)</td>
<td>(0.193)</td>
<td>(0.268)</td>
<td>(0.404)</td>
</tr>
<tr>
<td>Observations</td>
<td>399</td>
<td>300</td>
<td>179</td>
<td>398</td>
<td>300</td>
<td>179</td>
</tr>
<tr>
<td>Countries</td>
<td>33</td>
<td>31</td>
<td>29</td>
<td>33</td>
<td>31</td>
<td>29</td>
</tr>
</tbody>
</table>

R²  0.018  0.023  0.008  0.029  0.080  0.076  
RMSE 2.113 2.701 3.130 2.122 2.614 3.011

***p<0.01, **p<0.05, *p<0.1. (Robust standard errors in parentheses.) Random effects.

SGP ≡ dummy for countries subject to the SGP.
GDP gap ≡ GDP as deviation from trend.
All variables are lagged so that they line up with the year in which the forecast was made.
What institutions might help address the problem of bias in fiscal forecasts?

- The evidence from the euro-zone and other countries suggests that fiscal rules are not the solution to the problem.

- Two papers offer suggestions of possible answers:
  - The use of private sector forecasts.
  - The case of Chile’s fiscal institutions.
New research brings in private sector forecasts, from *Consensus Economics*

Frankel & Schreger (2016)

The extension of the analysis helps answer two important questions.

i. When the time sample is short, results based on ex post realizations can be too sensitive to particular historical outcomes: Might earlier findings of over-optimism be explained by one historical event, the severe 2008-09 crisis that everyone underestimated?

Private forecasts offer an alternative standard by which to judge performance of official forecasts, less sensitive to historically volatile ex post outcomes.

ii. If the reform proposal is that budget-makers should use independent projections such as those by private forecasters, it may be instructive to test whether private forecasters suffer from optimism bias as badly as government forecasters.
Italy is typical: Private forecasts more realistic than official forecasts

Fig. 2: Budget Balance Forecasts

Fig. 3: Real GDP Growth Forecasts

Notes: Forecast year is year being forecast. Frankel & Schreger (June 2013)
We have three main new results, for a sample of 26 countries (sample period up to 2013.)

1. Official forecasters are more over-optimistic than private forecasters on average, at the 1- & 2-year horizon for budget balances and at the 1- & 2-year horizon for real GDP forecasts.

2. While euro area governments were very reluctant to forecast violations of the 3% deficit/GDP cap in the SGP; private sector forecasters were not.

3. The difference between official forecast & private forecast is positively correlated with the difference between official forecast and ex post realization.

• These results suggest that incorporating private sector forecasts into the budget process could help countries stick to fiscal rules, by identifying over-optimism ex ante rather than just ex post.
In the euro countries, which are subject to SGP rules, the optimism bias took the form of never forecasting next year’s budget deficit > 3% of GDP.

Private-sector forecasts surveyed by Consensus Forecasts are free to forecast budget deficits > 3% of GDP.
Frankel & Schreger (2016) Table III

Summary Statistics for Budget Balance Forecasts (% of GDP)

Two-year ahead forecasts (95 observations, 10 countries)

<table>
<thead>
<tr>
<th></th>
<th>Mean</th>
<th>Standard Error</th>
</tr>
</thead>
<tbody>
<tr>
<td>Official Minus Consensus</td>
<td>0.478***</td>
<td>(0.086)</td>
</tr>
<tr>
<td>Official Forecast Error</td>
<td>1.060*</td>
<td>(0.541)</td>
</tr>
<tr>
<td>Consensus Forecast Error</td>
<td>0.582</td>
<td>(0.548)</td>
</tr>
</tbody>
</table>

Driscoll-Kraay Standard Errors with 2 year lag. Only includes countries with at least 6 years of data.

- The official budget forecasts are over-optimistic on average.
- The private forecasts from Consensus Economics are significantly less over-optimistic than the official forecasts.
### Summary Statistics for GDP Growth Forecasts

**Two-year ahead forecasts** (278 observations, 23 countries)

<table>
<thead>
<tr>
<th></th>
<th>Mean</th>
<th>Standard Error</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Official Minus Consensus</strong></td>
<td>0.135**</td>
<td>(0.048)</td>
</tr>
<tr>
<td><strong>Official Forecast Error</strong></td>
<td>1.244</td>
<td>(0.738)</td>
</tr>
<tr>
<td><strong>Consensus Forecast Error</strong></td>
<td>1.110</td>
<td>(0.736)</td>
</tr>
</tbody>
</table>

Driscoll-Kraay Standard Errors with 2 year lag. Only includes countries with at least 6 years of data.

- As with the forecasts of budget balance, the private forecasts of GDP growth are significantly less over-optimistic than the official forecasts.
The official-private forecast difference is correlated with the official prediction error.

Frankel & Schreger (2016), Figure 4

GDP Growth Forecasts, 2-Year Ahead

Mean Official Overoptimism

Official - Private Disagreement
## Official GDP Growth Forecast Errors and Government-Private Disagreement

excluding 2008-09, to make sure the great recession isn’t driving the results

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Official-Consensus</strong></td>
<td>0.856***</td>
<td>0.845***</td>
<td>0.471**</td>
<td>0.284*</td>
</tr>
<tr>
<td></td>
<td>(0.161)</td>
<td>(0.181)</td>
<td>(0.203)</td>
<td>(0.135)</td>
</tr>
<tr>
<td><strong>Constant</strong></td>
<td>-4.669***</td>
<td>-1.855**</td>
<td>1.595***</td>
<td>1.141</td>
</tr>
<tr>
<td></td>
<td>(0.124)</td>
<td>(0.764)</td>
<td>(0.020)</td>
<td>(0.702)</td>
</tr>
<tr>
<td><strong>Observations</strong></td>
<td>272</td>
<td>272</td>
<td>232</td>
<td>232</td>
</tr>
<tr>
<td><strong>R-squared</strong></td>
<td>0.416</td>
<td>0.594</td>
<td>0.424</td>
<td>0.593</td>
</tr>
<tr>
<td><strong>Countries</strong></td>
<td>26</td>
<td>26</td>
<td>23</td>
<td>23</td>
</tr>
<tr>
<td><strong>Year FE</strong></td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td><strong>Country FE</strong></td>
<td>No</td>
<td>Yes</td>
<td>No</td>
<td>Yes</td>
</tr>
</tbody>
</table>

The official-private difference in ex ante forecasts is significantly correlated with the ex post official prediction error.

Frankel & Schreger (2016), Table VII
When official forecasts of budget balance are more optimistic than private forecasts, they are too optimistic.
When official forecasts of GDP are more optimistic than private forecasts, they are too optimistic.
Conclusions regarding private forecasts

Incorporating private sector forecasts into the budget process could help countries stick to fiscal rules:

1. Official forecasters are more over-optimistic than private forecasters judged by outcomes for budget balances & real GDP.

2. While euro area governments were very reluctant to forecast violations of the 3% deficit/GDP cap in the SGP during the period 1999-2009, private sector forecasters were not.

3. The difference between official forecast & private forecast is positively correlated with the difference between official forecast and ex post realization, i.e., the prediction error.
A possible solution: The case of Chile’s institutions

1st rule – Governments must set a budget target,

2nd rule – The target is structural: Deficits allowed only to the extent that
- (1) output falls short of trend, in a recession,
- (2) or the price of copper is below its trend.

3rd rule – The trends are projected by 2 panels of independent experts, outside the political process.
- Result: Chile avoided the pattern of 32 other governments, where forecasts in booms were biased toward optimism.
Chilean fiscal institutions

- In 2000 Chile instituted its structural budget rule.
- The institution was formalized in law in 2006.
- The structural budget surplus must be...
  - 0 as of 2008 (was 1%, then ½ %, before; negative after),
  - where structural is defined by output & copper price equal to their long-run trend values.
- I.e., in a boom the government can only spend increased revenues that are deemed permanent; any temporary copper bonanzas must be saved.
Chile’s fiscal position strengthened immediately:
- Public saving rose from 2.5 % of GDP in 2000 to 7.9 % in 2005
- allowing national saving to rise from 21 % to 24 %.

Government debt fell sharply as a share of GDP and the sovereign spread gradually declined.

By 2006, Chile achieved a sovereign debt rating of A,
- several notches ahead of Latin American peers.

By 2007 it had become a net creditor.

By 2010, Chile’s sovereign rating had climbed to A+,
- ahead of some advanced countries. Now AA-.

=> It was able to respond to the 2008-09 recession
- via fiscal expansion.
Chile’s official forecasts have *not* been over-optimistic.
In sum, Chile’s fiscal institutions appear to have overcome the problem of over-optimism:

- Chile is not subject to the same bias toward over-optimism in forecasts of the budget, growth, or the all-important copper price.

- The key innovation that has allowed Chile to achieve countercyclical fiscal policy:
  - not just a structural budget rule in itself,
  - but rather the regime that entrusts to two panels of independent experts estimation of the long-run trends of copper prices & GDP.
Appendices

- Appendix I: Pro-cyclical politicians in the US.
- Appendix II: Mexican case
- Appendix III: More on the European case
- Appendix IV: More on the Chilean case.
Appendix I: Pro-cyclical politicians in the US

Through 3 cycles, some pursued austerity during recessions, followed by fiscal expansion when the economy was already expanding.
Appendix II:
The private sector downgraded forecasts for Mexico in response to the 2008-09 global crisis, while government forecasters did not.
The private sector has also been less optimistic than government forecasters about Mexican budget prospects especially in the 2009 global crisis.
Appendix III: More on the Europe case

Figure 2 (F&S, 2013):
Mean Budget Forecast Errors, Europe, 1995-2011
Figure 3 (F&S, 2013):
Mean GDP Growth Forecast Errors, Europe, 1995-2011
Most European official forecasts have been over-optimistic.

Figure 1 (F&S, 2013):
Mean 1-year ahead budget forecast errors, European Countries, Full Sample Period

For 17 Europeans, the bias is even higher than others, averaging:
- 0.5% at the 1-year horizon,
- 1.3% at the 2-year horizon,
- 2.4% at the 3-year horizon
Figure 2 (F&S, 2013):
Mean 2-year ahead budget forecast errors, European Countries, Full Sample Period
More findings regarding systematic forecast errors in Europe (Frankel & Schreger, 2013a).

Besides cyclicality (output gap), another determinant of government bias: they over-forecast speed of disappearance of budget deficits.

<table>
<thead>
<tr>
<th>VARIABLES</th>
<th>$BBE_{t+1}$</th>
<th>$BBE_{t+2}$</th>
<th>$BBE_{t+3}$</th>
</tr>
</thead>
<tbody>
<tr>
<td>$Surplus_t \times BudgetBalance_t$</td>
<td>-0.080</td>
<td>-0.295**</td>
<td>-0.175</td>
</tr>
<tr>
<td></td>
<td>(0.057)</td>
<td>(0.108)</td>
<td>(0.171)</td>
</tr>
<tr>
<td>$Deficit_t \times BudgetBalance_t$</td>
<td>-0.293***</td>
<td>-0.363**</td>
<td>-0.558***</td>
</tr>
<tr>
<td></td>
<td>(0.064)</td>
<td>(0.134)</td>
<td>(0.180)</td>
</tr>
<tr>
<td>$OutputGap_t$</td>
<td>0.651***</td>
<td>1.409***</td>
<td>1.812***</td>
</tr>
<tr>
<td></td>
<td>(0.113)</td>
<td>(0.281)</td>
<td>(0.452)</td>
</tr>
<tr>
<td>Constant</td>
<td>-0.150</td>
<td>0.459</td>
<td>0.932**</td>
</tr>
<tr>
<td></td>
<td>(0.169)</td>
<td>(0.274)</td>
<td>(0.404)</td>
</tr>
</tbody>
</table>

Observations | 243 | 210 | 164 |
R-2           | 0.213 | 0.344 | 0.374 |
Countries     | 17 | 16 | 15 |
Year FE       | No | No | No |

(Robust s.e.is n parentheses, clustered at the country level.) ***, **, &* : significance at the level of 1, 5, and 10%, respectively.)
Appendix IV: More on the Chilean case

5 econometric findings regarding official forecasts in Chile.

- (1) The key macroeconomic input for budget forecasting in most countries: GDP. In Chile: the copper price.
- (2) Real copper prices revert to trend in the long run.
- (3) But this is not always readily perceived:
  - (3) 30 years of data are not enough to reject a random walk statistically; 200 years of data are needed.
  - (4) Uncertainty (option-implied volatility) is higher when copper prices are toward the top of the cycle.
- (5) Chile’s official forecasts are not overly optimistic. It has apparently avoided the problem of forecasts that unrealistically extrapolate in boom times.
In 2008, the government of Chilean President Bachelet & her Fin.Min. Velasco ranked very low in public opinion polls. By late 2009, they were the most popular in 20 years. Why?

Evolución de aprobación y desaprobación de cuatro presidentes chilenos.

In 2008, with copper prices spiking up, the government of President Bachelet had been under intense pressure to spend the revenue.

- She & Fin.Min.Velasco held to the rule, saving most of it.
- Their popularity fell sharply.

When the recession hit and the copper price came back down, the government increased spending, mitigating the downturn.

- Bachelet & Velasco’s popularity reached historic highs by the time they left office.
In August 2009, the popularity of the Finance Minister, Andres Velasco, ranked behind only President Bachelet, despite also having been low two years before.

* La evaluación positiva no es lo mismo que la adhesión política.
** Con menos de 50% de conocimiento

Application of the innovation to other countries

- Any country could adopt the Chilean mechanism.

- Suggestion: give the panels more institutional independence
  - as is familiar from central banking:
    - laws protecting them from being fired.

- Open questions:
  - How much of the structural budget calculations are to be delegated to the independent panels of experts?
    - Minimalist approach: they compute only 10-year moving averages.
  - Can one guard against subversion of the institutions (CBO)?
More complete list of relevant references by the author