Office for Economic Policy and International Affairs
Ministry of Finance

Survey-based measure of output gap for Portugal[1]

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Overview

What is the Output Gap?

The Output Gap is an unobserved variable

$$\textbf{Output Gap} = \textbf{GDP}_{\boldsymbol{Actual}} - \textbf{GDP}_{\boldsymbol{Potencial}}$$

Output Gap > 0 Observed output is more than full-capacity output.

Output Gap < 0 Actual output is less than what an economy could produce at full capacity.

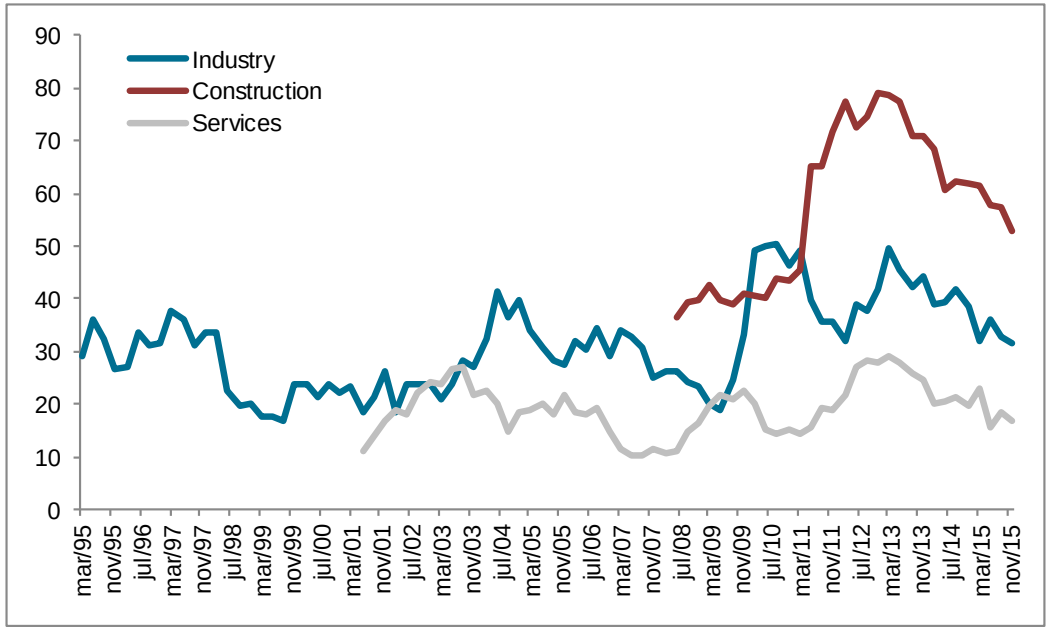
Output Gap

Alternative aproches to assess slack in the economy:

- Simple statistical filters
- Unobserved component model (Phillips Curve and Okun Law)
- Production function based methods
- **Survey based measures**

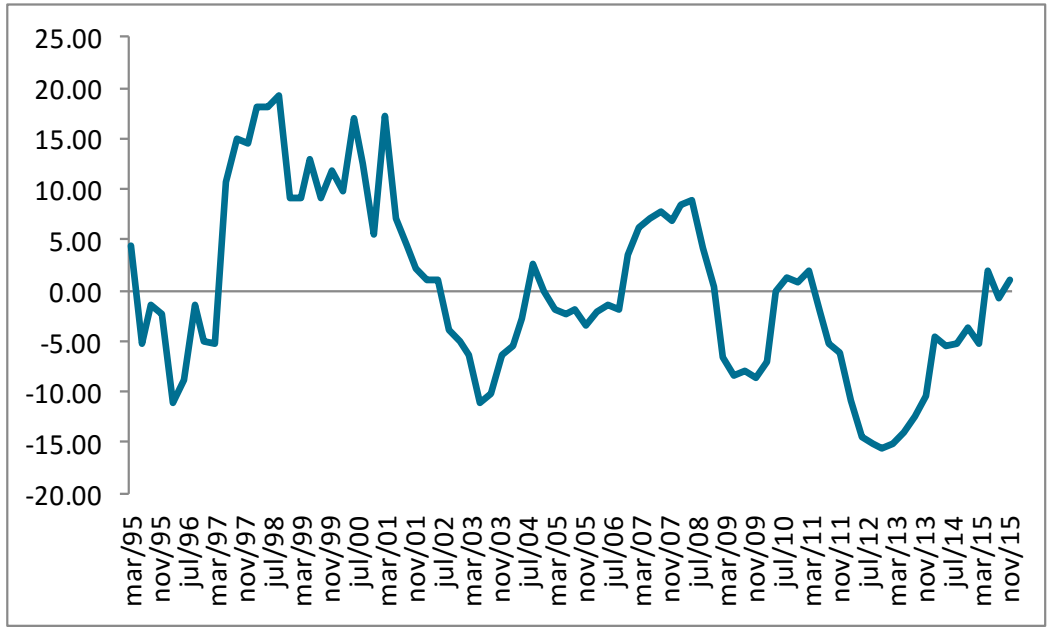
Output Gap

"Insufficient Demand Limiting Production"



Source: Author's Calculations.

"Aggregate survey Indicator "



Source: Author's Calculations.

The Survey-based measure of slack

The model to estimate slack is a fairly simple unobserved component model

Estimated with maximum likelihood

$$y_t = \bar{y}_t + \hat{y}_t \quad \textbf{(1)}$$

$$d\bar{y}_t = d\bar{y}_{t-1} + \varepsilon_t \quad \textbf{(2)}$$

$$\hat{y}_t = \beta_0 + \beta_1.break1 \times DLP_t + \beta_2.break2 \times DLP_t + \beta_3.break3 \times DLP_t + \mu_t \quad \textbf{(3)}$$

Results

$$\text{OUTPUT GAP} = \beta_0 + \beta_1.break1 \times DLP_t + \beta_2.break2 \times DLP_t + \beta_3.break3 \times DLP_t \mu_t$$

- DLP = Aggregate survey-based measure indicator
- Break1, Break2 and Break3 = Dummies variables
  - Break1= 1 between 1995Q1 and 2001Q1 (Industry)
  - Break2= 1 between 2001Q2 and 2008Q1 (Services)
  - Break3= 1 between 2008Q2 and 2015Q4 (Construction)

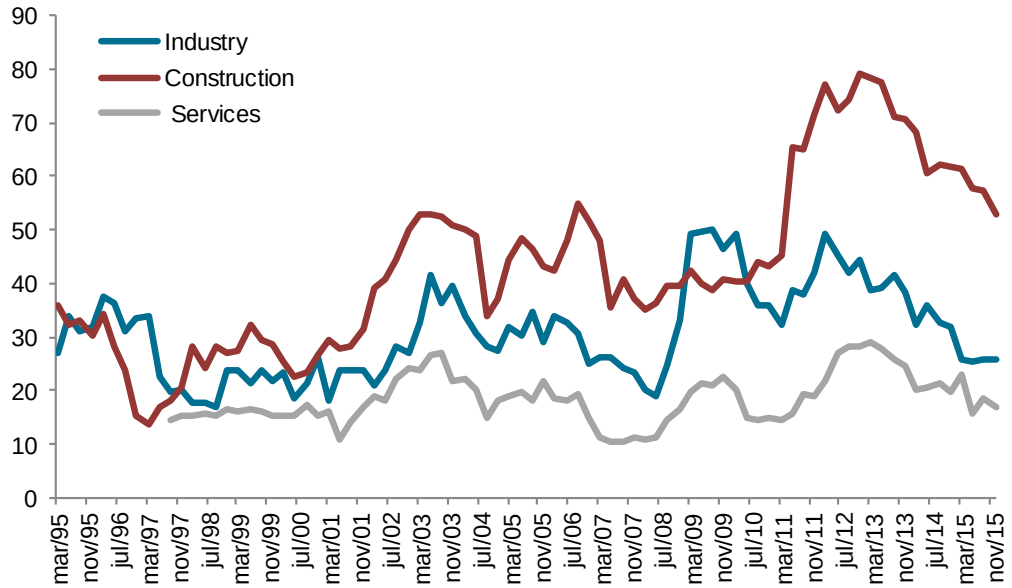
Table 1 – Estimation Results

Sample: 1995Q1 2015Q4		
	Coeficient	Prob.
β_0	4.923	0.000
β_1	29.531	0.030
β_2	92.722	0.000
β_3	100.713	0.000
Akaike info criterion		16.011
Schwarz criterion		16.127
Hannan-Quinn criter.		16.058

Source: Author's Calculations.

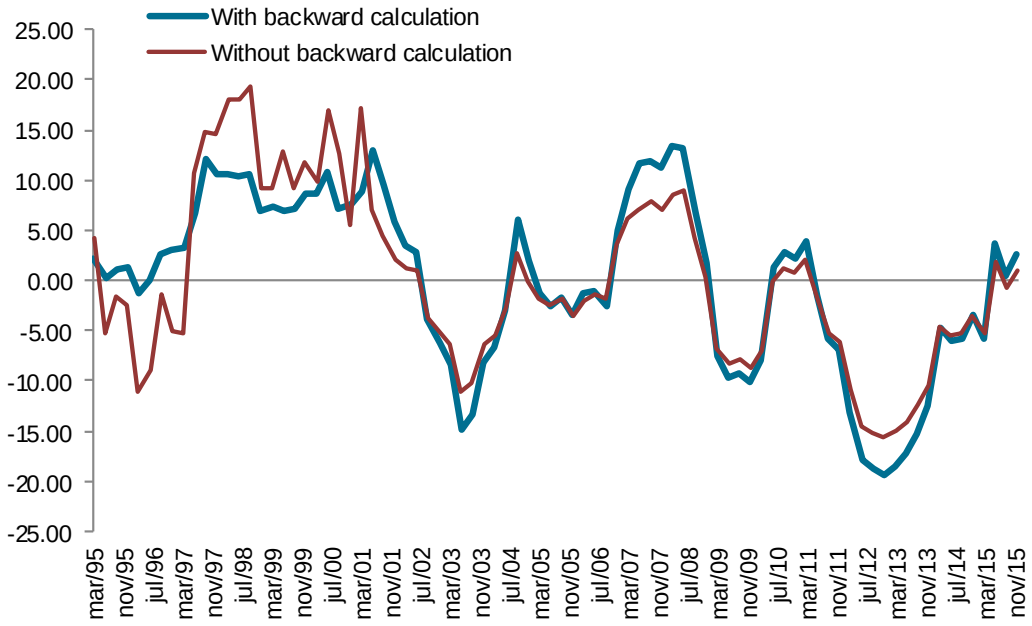
Output Gap

"Insufficient Demand Limiting Production"



Source: Author's Calculations.

"Aggregate survey Indicator "



Source: Author's Calculations.

Results

$$\text{OUTPUT GAP} = \beta_0 + \beta_1.\text{break1} \times DLP_t + \beta 2.\text{break2} \times DLP_t + \mu_t$$

- DLP = Aggregate survey-based measure indicator
- Break1 and Break2 = Dummies variables
  - Break1= 1 between 1995Q1 and 1997Q2
  - Break2= 1 between 1997Q3 and 2015Q4

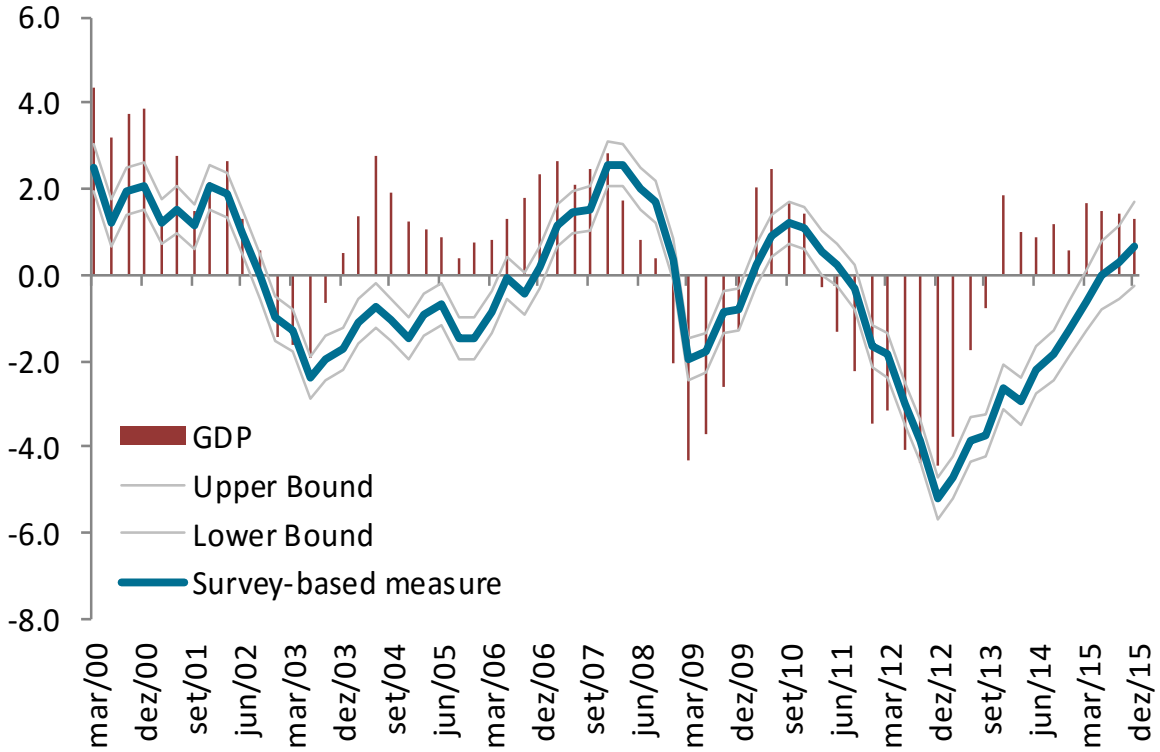
Table 2 – Estimation Results

Sample: 1995Q1 2015Q4		
	Coeficient	Prob.
β_0	4.871	0.000
β_1	19.575	0.815
β_2	75.705	0.000
Akaike info criterion		15.936
Schwarz criterion		16.022
Hannan-Quinn criter.		15.970

Source: Author's Calculations.

The slack through time…

Graph 5 – Survey-based measure of slack



Source: Author's Calculations.

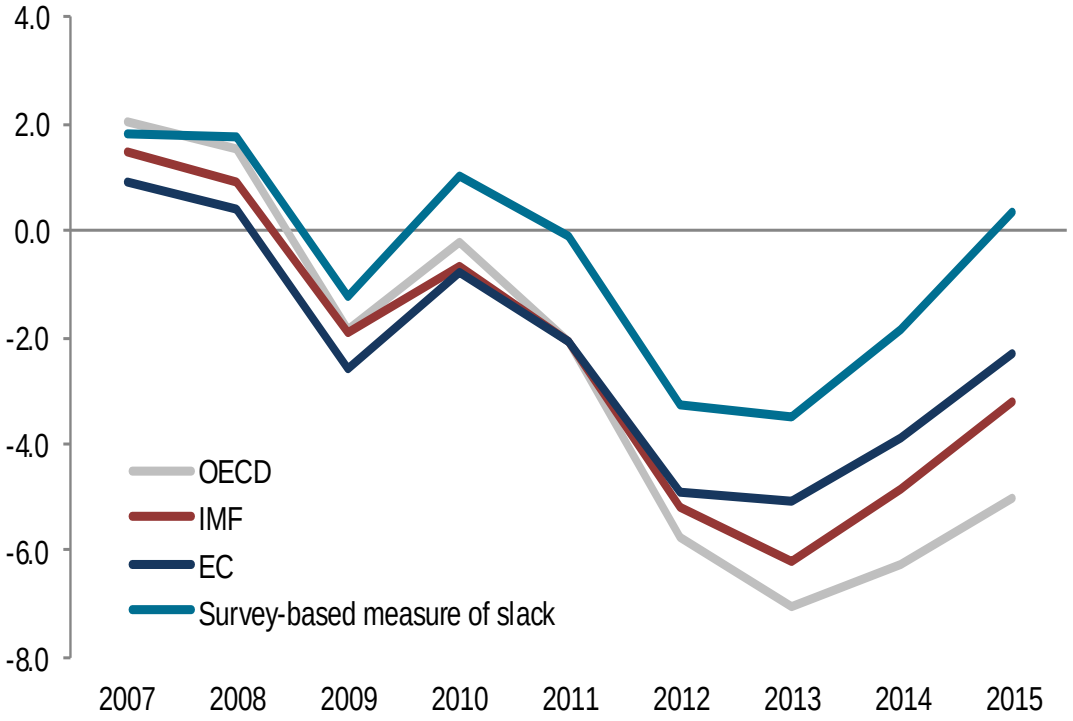
- **Minimum:** -5.22 in December 2012
  (Actual output is less than what an economy could produce at full capacity)

- **Maximum:** 2.58 in December 2007
  (Economy more significantly overheated)

These results suggest…

The survey-based measure is reliable: it is in line with estimations of the main international organisations.

Graph 6 – Estimates of output gap in 2015 (p.p)



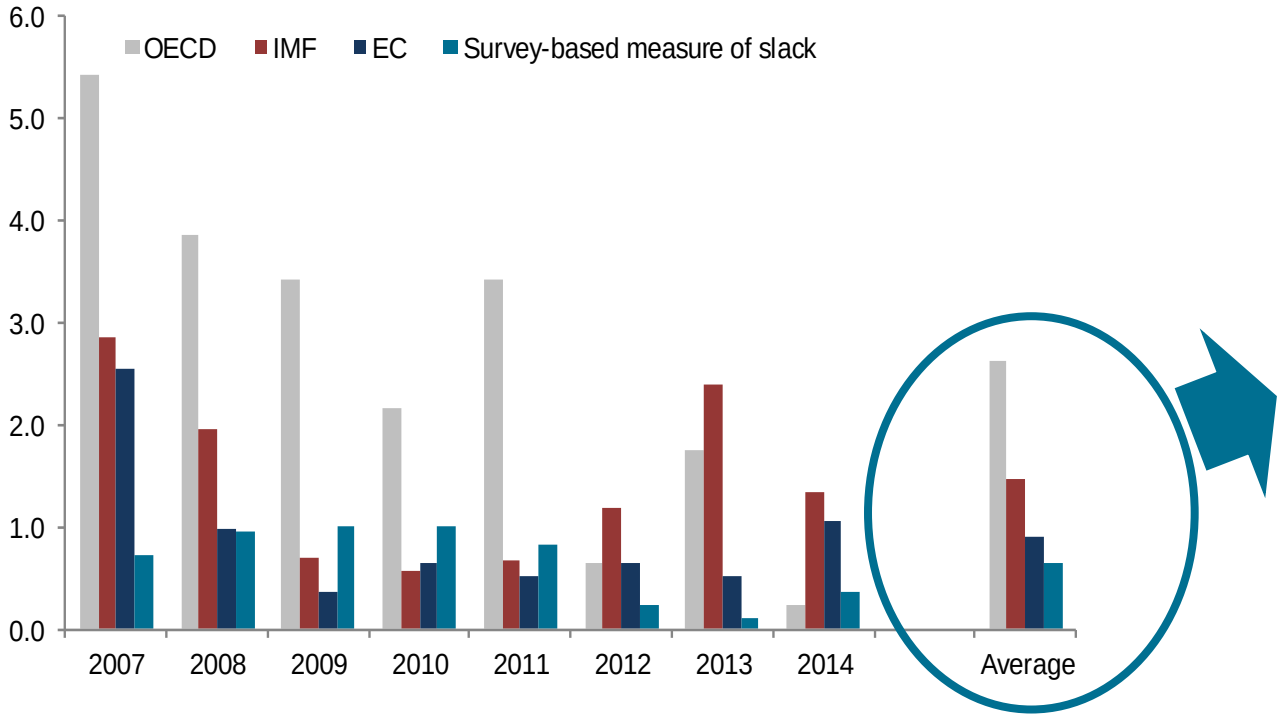
Source: European Commission, IMF, OECD, Author's Calculations.

In 2015:

- Follow more or less the same path, with some being more volatile than other.
- There are, however, differences in the magnitude of slack, in recent years.

These results suggest…

Graph 7 – Absolute Revisions to real-time estimates of slack (p.p)



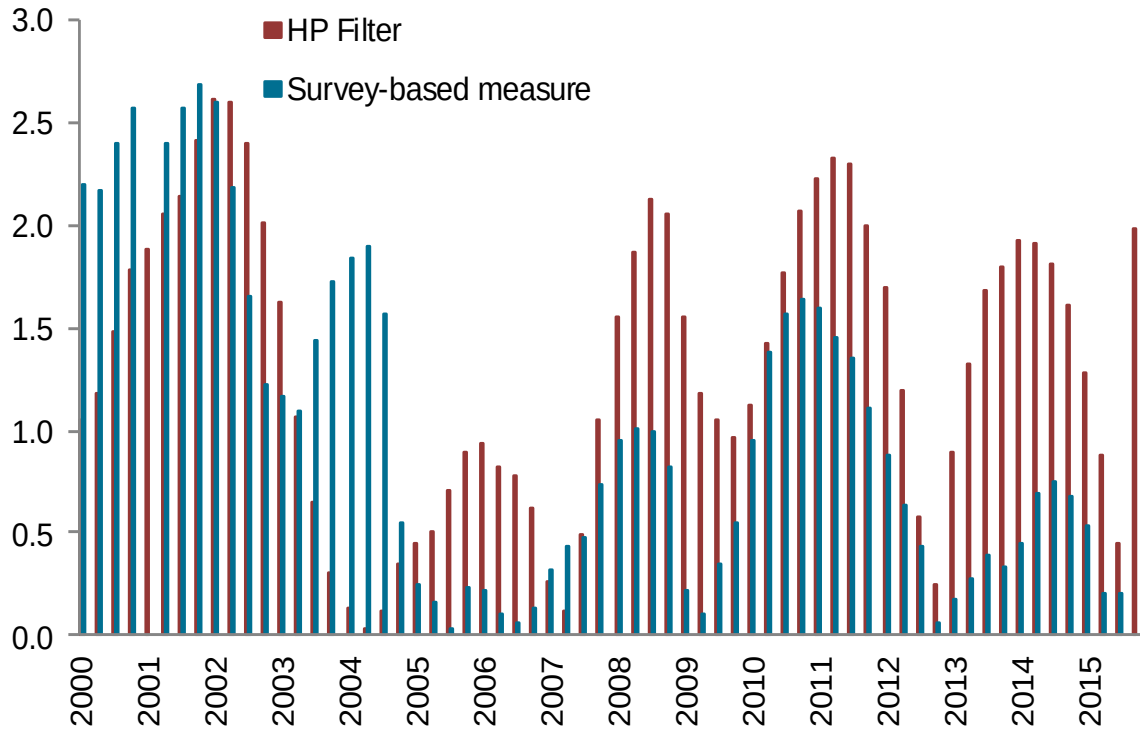
OECD = 2.6
IMF = 1.5
EC = 0.9

Survey-based measure of Slack = 0.6

Source: OECD, IMF, European Commission, Author's Calculations.

These results suggest…

Graph 8 – Absolute Revisions to real-time estimates of slack (p.p)



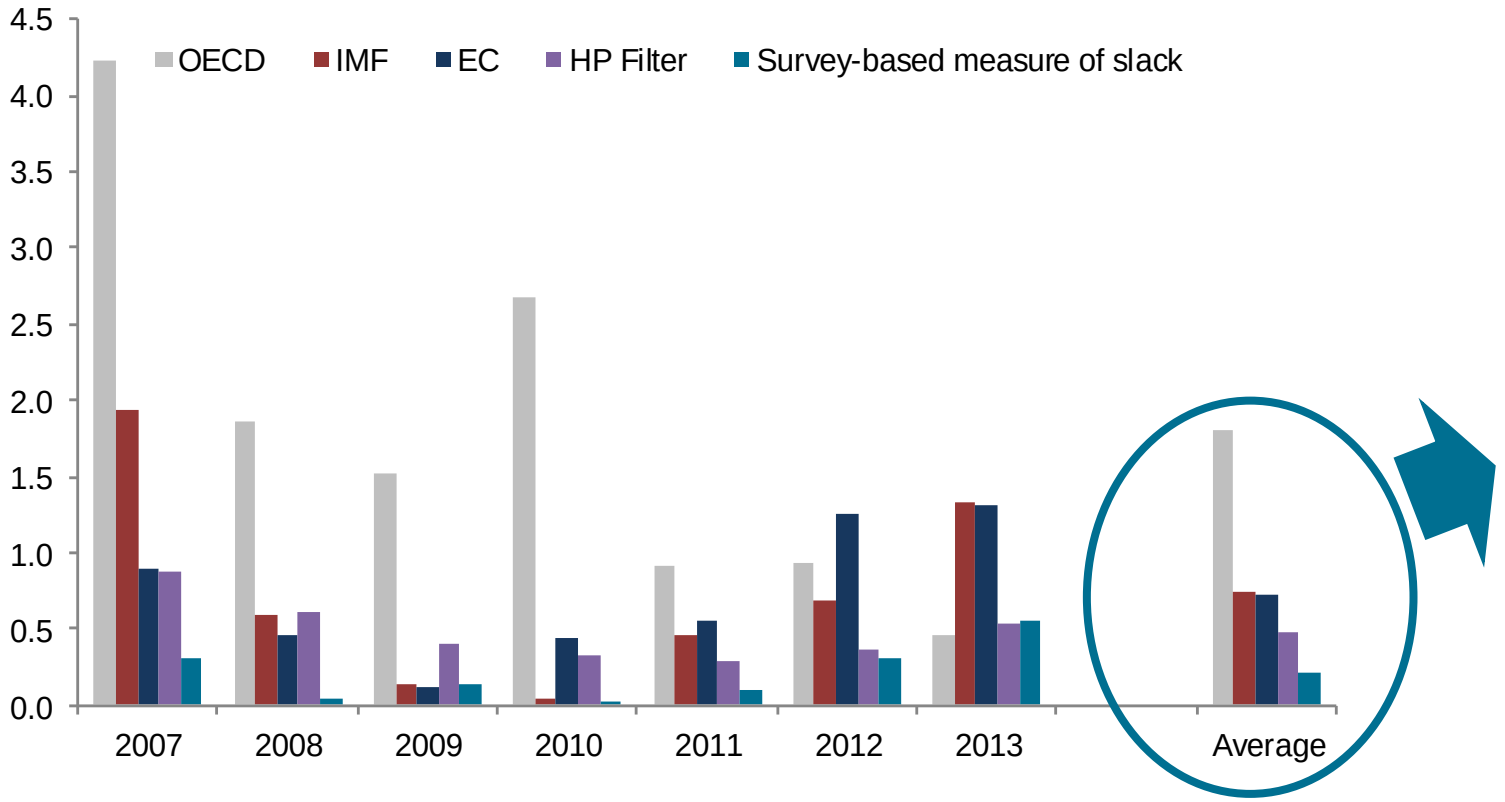
HP Filter = 1.6

Survey-based measure of Slack = 0.6

Source: Author's Calculations.

These results suggest…

Graph 9 – Absolute revisions to nearly real-time estimates of slack (p.p)

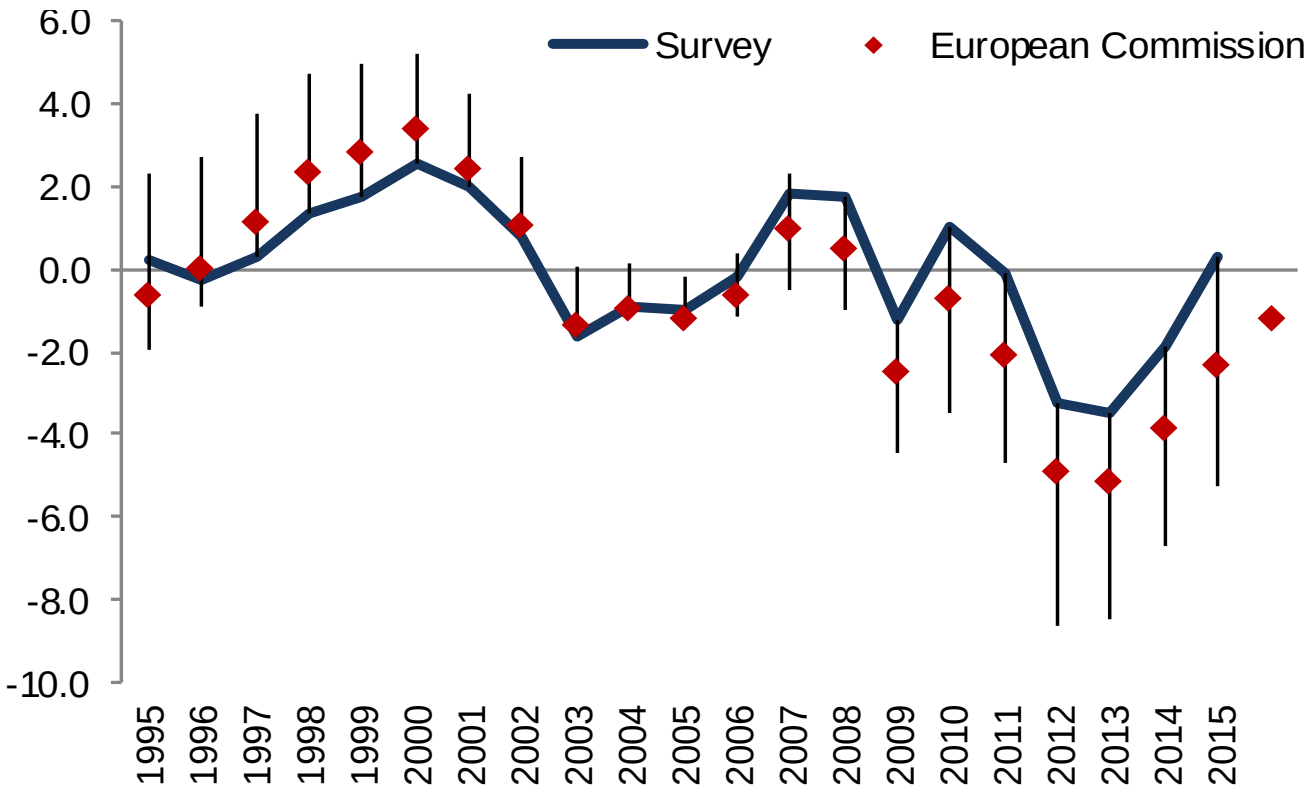


OECD = 1.8
IMF = 0.7
EC = 0.7
HP Filter = 0.5
Survey-based measure of Slack = 0.2

Source: OECD, IMF, European Commission, Author's Calculations.

These results suggest…

Graph 10 – Potential Output



Source: Author's Calculations.

Results

Table 3 – Comparison of results: Revisions to real-time estimates of Slack (p.p)

	OECD	IMF	European Commission	HP Filter	Survey-based measure
Without backward calculation	2.6	1.5	0.9	1.6	0.7
With backward calculation					0.6

Source: OECD, IMF, European Commission, Author's Calculations.

Conclusions

1 Aggregate survey indicator

- Provide a representative measure of total economic slack.

2 Estimates of output gap

- The reliability of survey-based measure of output gap is in line with estimations of the main international organisations.

3 Revisions: Survey-based estimates of slack

- Revealed robust stability properties when considering revisions in the estimations of main international institutions (OECD , IMF and European Commission);
  - In real-time and nearly real-time estimations survey-based approach had the lower revisions.

Thank you for your attention!

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