

Uncertainty in Measuring the Underlying Budgetary Position and Fiscal Stance

Richard Morris* (European Central Bank**)

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**Co-authored with Matthias Mohr.*

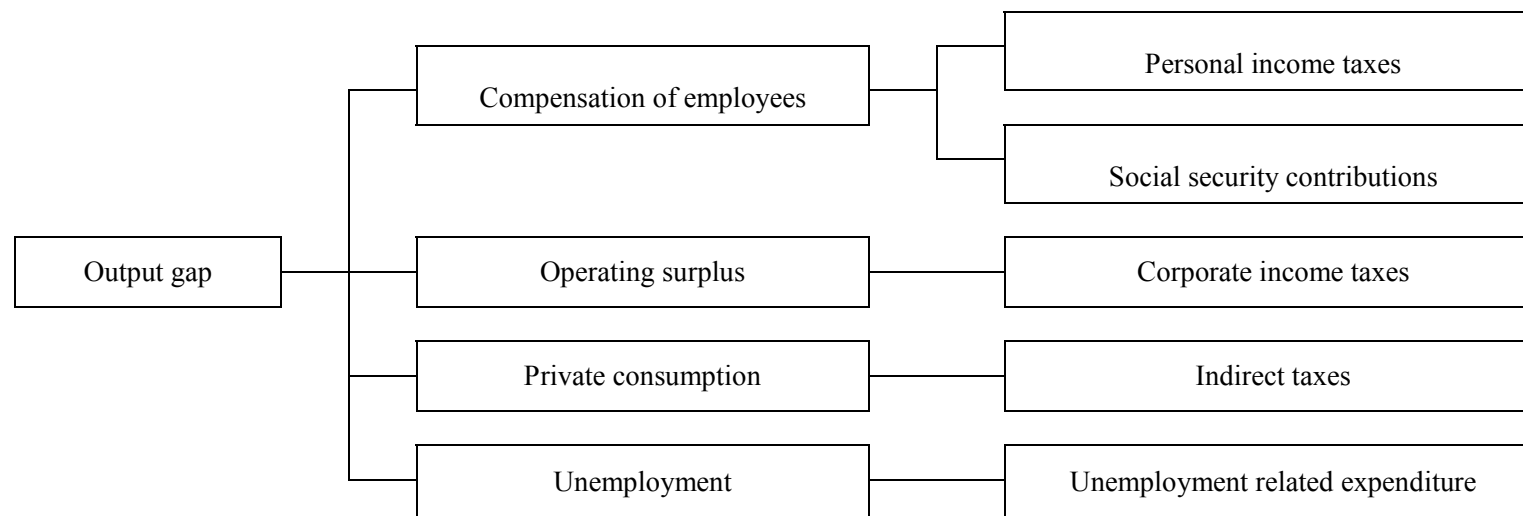
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Introduction (1)

- To assess the underlying budgetary position and fiscal stance, need to distinguish between cyclical / transitory and more permanent influences on the budget balance.
- To this end, cyclically adjusted budget balance (CAB) estimates are an important part of fiscal policy makers' tool-kit:
 - CAB (net temp measures) \approx underlying budgetary position
 - Change in (primary) CAB (net temp measures) \approx fiscal stance
- (More) prominent role in (revised) SGP.
- But significant measurement uncertainty and sometimes misleading signals (1999-2000, 2005-2007?).
- → Raise awareness & quantify / assess measurement problems.

Introduction (2)

- Focus mainly on “official” OECD/EC methodology.
- In a nutshell: $B^{CA} = B - e_{b,y}(Y_R - Y_R^P)$



- “Main” sources of uncertainty relate to:
 - (i) measurement of the output gap (OG);
 - (ii) development of revenue & expenditure bases in relation to output (composition effects);
 - (iii) behaviour of revenues in relation to their bases.

Data revisions and measurement of the output gap (1)

- OGs are not well measured in real time and give particularly misleading signals at cyclical “peaks” and “troughs” (e.g. 2000).
- Correlation between errors (i.e. differences between real time and ex post OG estimates) and cyclical conditions (ex post OG estimate).

Chart 1: The euro area cyclically adjusted balance in the year 2000 in different estimation vintages

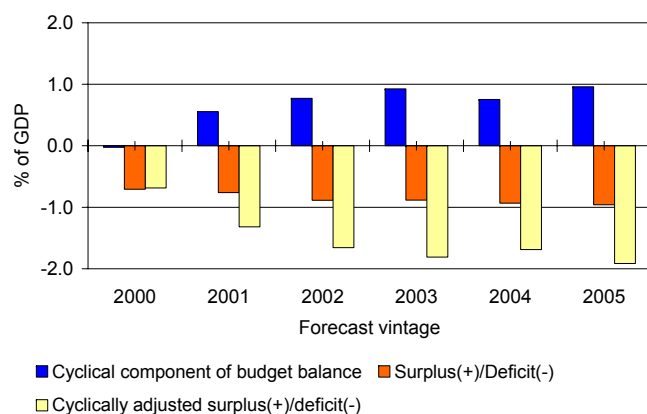
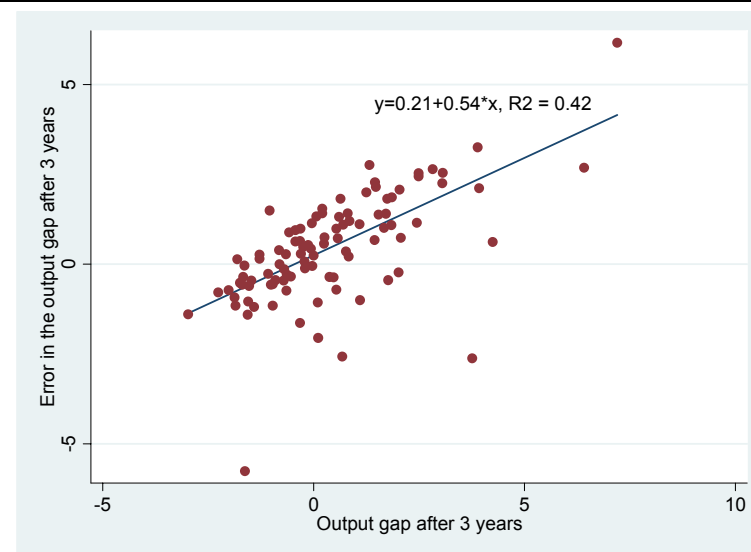


Chart 2: Errors in real time estimates of the output gap in the period 1996-2003 (in % of GDP)



Source: European Commission AMECO database and own computations. The figures exclude negative capital expenditure from the sale of UMTS licences.

Source: European Commission AMECO database and own computations.

1. Data revisions and measurement of the output gap (2)

- Systematic bias in real time estimation of the CAB.
- Regression for 12 euro area countries over 1996-2003 period: positive output gap of 1% of GDP (measured ex post) associated with CAB overestimation of 0.34% of GDP.

Table 1: Panel regression of errors in cyclically adjusted budget balance ratios on output gaps and errors in budget balances

Dep. variable	Error in CAB level			
	Indep. variables	Error in budget balance	Output gap	Constant
Coefficient		0.854	-0.337	-0.065
Std. Err.		0.054	0.028	0.046
T		15.930	-12.200	-1.410
P> t		0.000	0.000	0.162
R ²	overall: 0.771 (within: 0.858, between: 0.595)			
F Test	$F(2,81) = 244.13, Prob > F = 0.000$			
Hausman test	$Chi^2 : 9.53, Prob > Chi^2 : 0.0085$			
Number of observations	95			
Number of euro area countries	12			
Years	1996-2003			

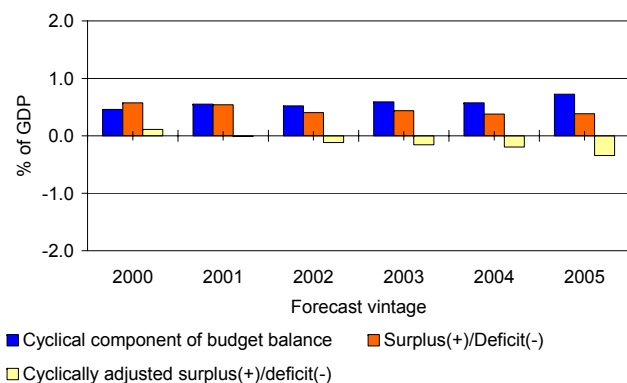
All variables are in % of GDP and are defined as year t values obtained in year t+3. Errors are computed by subtracting year t values obtained in year t. Parameter estimates significant at the 5% level are set in bold face.

Data source: European Commission AMECO database.

1. Data revisions and measurement of the output gap (3)

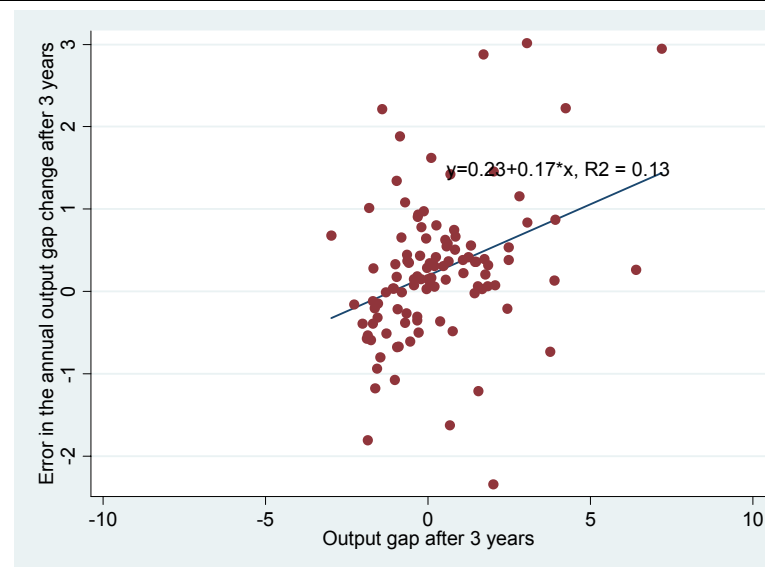
- Ex post revisions of OG “changes” are smaller and exhibit less cyclical bias than ex post revisions of OG “levels”.
- But may still be sufficient to give misleading signals regarding the fiscal stance and consolidation efforts (if interpreted too narrowly).

Chart 3: Change in the euro area cyclically adjusted balance in the year 2000 in different estimation vintages.



Source: European Commission AMECO database and own calculations. The figures exclude negative capital expenditure from the sale of UMTS licences.

Chart 4: Errors in real time estimates of the annual change in the output gap in the period 1996-2003 (in % of GDP)



Source: European Commission autumn AMECO databases and own calculations

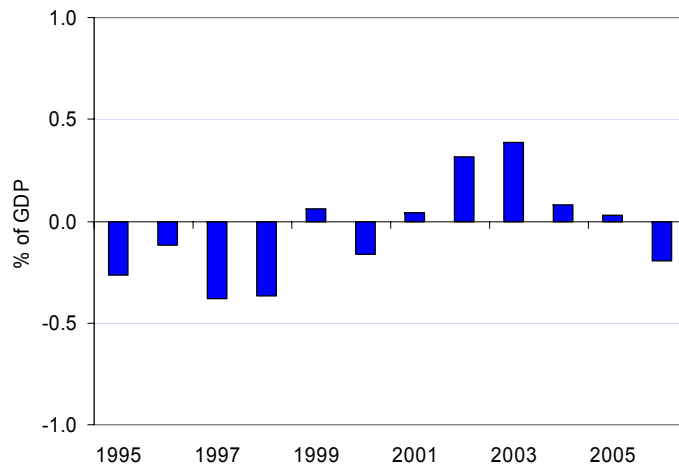
2. Composition effects (1)

- Budget balance affected by output components (e.g. wages, profits, consumption) rather than overall output.
- Output (growth) can be “tax rich” (e.g. driven by wage and/or consumption growth) or “tax poor” (e.g. export driven).
- ESCB CAB methodology seeks to account for such composition effects:
 - “disaggregated approach” based on detrending of individual revenue and expenditure bases rather than overall output.
 - composition effect = cyclical component (disaggregated approach) – cyclical component (aggregated approach).
- Calculate composition effects for 12 euro area countries (1995-2006) applying standard OECD tax bases and elasticities (simplified / standardised application of ESCB approach).

2. Composition effects (2)

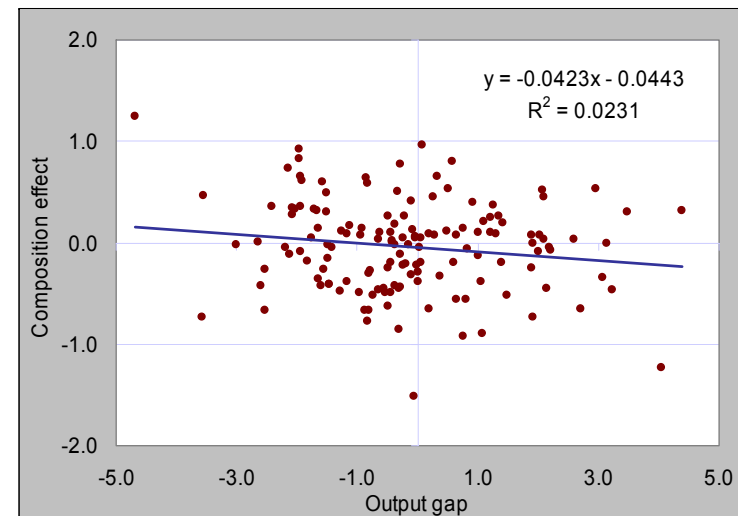
- In terms of levels, composition effects for the euro area are generally small (no more than 0.3-0.4% of GDP).
- But can be higher for individual countries (on average 0.3% of GDP in absolute terms and often more than 0.5% of GDP).
- No correlation with aggregate output gap.

Chart 5: Estimated effect of the composition of output on the euro area budget balance (1995-2006)



Sources: European Commission AMECO database and ESCB for underlying data. Own calculations.

Chart 6: Composition effects and the output gap in euro area countries 1995-2006 (% of GDP)

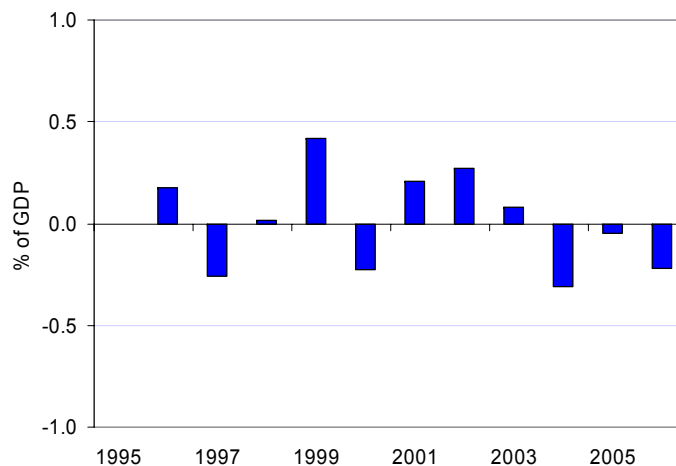


Sources: European Commission AMECO database and ESCB for underlying data. Own calculations.

2. Composition effects (3)

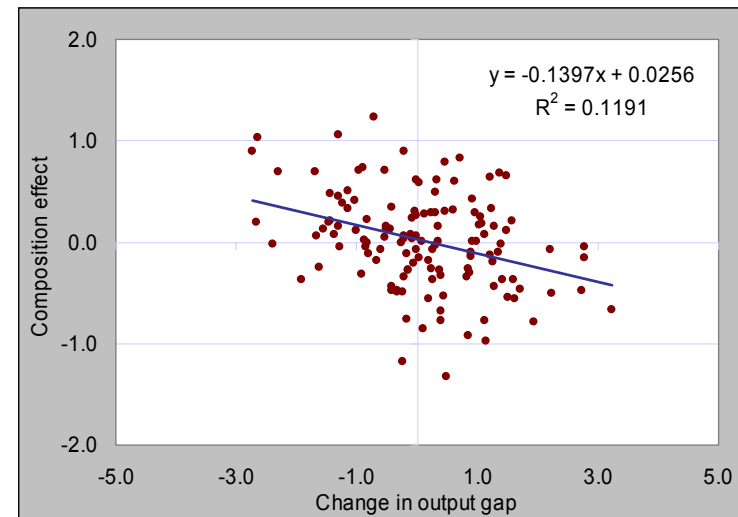
- Usually measure composition effects in terms of annual changes (i.e. measuring impact of composition of growth).
- Order of magnitude is similar (max 0.3-0.4% of GDP for euro area as a whole, on average 0.3-0.4% of GDP for individual countries).
- Enough to affect assessment of the fiscal stance and consolidation efforts.

Chart 7: Effect of change in the composition of output on the euro area budget balance



Sources: European Commission AMECO database and ESCB for underlying data. Own calculations.

Chart 8: Change in composition effect and output gap in euro area countries 1996-2006 (% of GDP)



Sources: European Commission AMECO database and ESCB for underlying data. Own calculations.

3. The behaviour of tax revenues (1)

- Developments in tax revenues rarely fully accounted for by tax bases and elasticities underlying cyclical adjustment.

Corporate income taxes:

- operating surplus \neq company profits
- leads & lags in tax collection (losses not taxed negatively but carried forward)

Household income taxes:

- some proportion related to non-wage income (e.g. profits, capital gains)
- changes in income distribution

Indirect taxes:

- some indirect taxes not related to consumption (e.g. stamp duties)
- affected by composition of consumption (goods taxed at different rates)
- Compute difference between actual tax revenues and level predicted by standard (e.g. OECD) tax bases and elasticities.

3. The behaviour of tax revenues (2)

- For the euro area, revenue “windfalls” / “shortfalls” in recent years have been large and exhibit a cyclical pattern.
- But developments in individual countries have been more heterogeneous (e.g. with no obvious correlation between windfalls / shortfalls and changes in the output gap).

Chart 11: Revenue windfalls / shortfalls in the euro area (% of GDP)

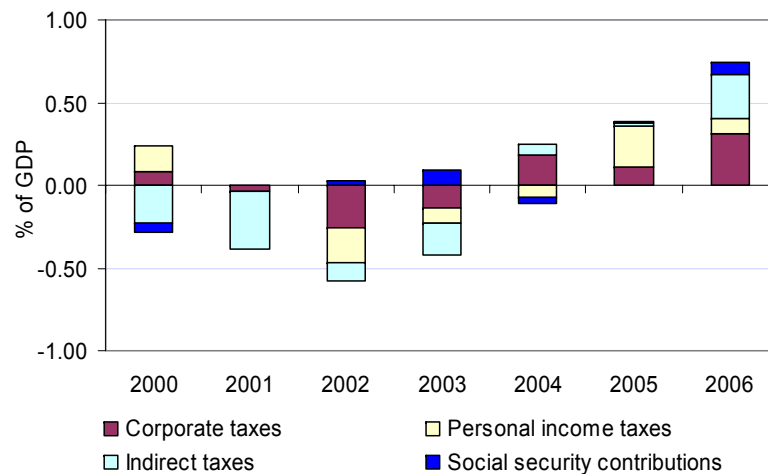
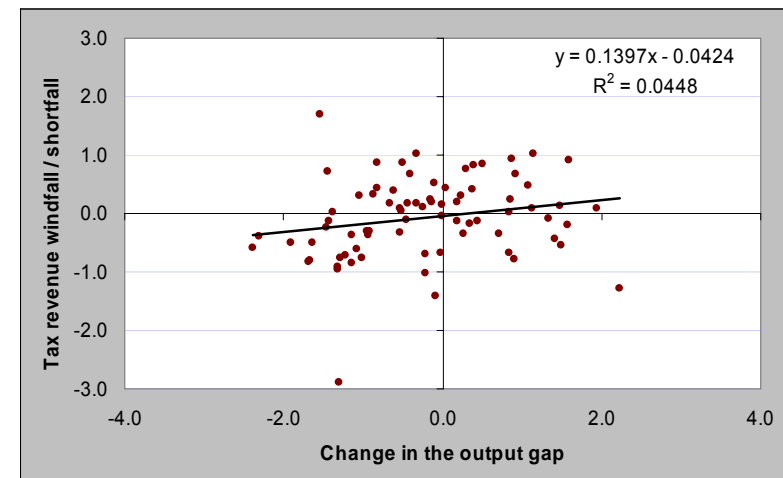


Chart 12: Tax revenue windfalls / shortfalls and changes in the output gap (% of GDP)



Sources: European Commission AMECO database and ESCB for underlying data. Own calculations.

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3. The behaviour of tax revenues (3)

- Origins of windfalls / shortfalls often clear from detailed country analysis – but availability and timeliness of relevant data heterogeneous across countries.
- Panel regression of windfalls on several “indicators”: generally little or no “cross-country” explanatory power (except for stock prices).

Table 6: Panel regression of tax revenue windfalls / shortfalls in euro area countries

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Change in output gap	0.161 (2.08)*						-0.02 (-0.26)
Change in output gap (-1)		0.009 (0.12)					
Change in stock price index			0.008 (2.36)**				0.006 (1.97)*
Change in stock price index (-1)				0.011 (4.86)***			0.010 (4.61)***
Change in current account balance					-0.041 (-0.78)		
Change in residential property prices						0.016 (0.64)	
R ²	0.15	0.09	0.16	0.33	0.09	0.08	0.37

Number of observations: 77. Number of euro area countries: 11. Years 2000-2006

Values in brackets are *t*-statistics. *, **, *** significant at the 10%, 5% and 1% levels respectively. Parameter estimates significant at the 5% level are set in bold face.

Data sample: Euro area counties except Cyprus, Luxembourg, Malta, and Slovenia.

Conclusions

- While a useful tool, CAB estimates should be interpreted with caution as measurement uncertainty is large.
- CABs are liable to overestimate the strength of the underlying budgetary position and the improvement in the fiscal stance when:
 - The OG (as measured ex post) is reaching its peak
 - The composition of output (growth) is “tax rich”
 - Revenues are boosted by factors not accounted for in the stylised tax bases and elasticities employed for cyclical adjustment.
- Fiscal policy should take these factors into account and be prudent: doing more in “good times” to provide additional room for manoeuvre in “bad times”.

APPENDIX

Table 2: Panel regression of errors in changes in cyclically adjusted balances on the output gap and errors in budget balance changes

Dep. variable	Error in change in CAB		
	Error in budget balance change	Output gap	Constant
Indep. variables			
Coefficient	0.972	-0.043	-0.103
Std. Err.	0.061	0.026	0.046
T	16.040	-1.670	-2.250
P> t	0.000	0.100	0.027
R ²	overall: 0.766 (within: 0.768, between: 0.890)		
F Test	$F(2,81) = 131.65$, Prob > F = 0.000		
Hausman test	$Chi^2 : 5.44$, Prob > $Chi^2 : 0.066$		
Number of observations	95		
Number of euro area countries	12		
Years	1996-2003		

All variables are in % of GDP and are defined as year t values obtained in year t+3. Errors are computed by subtracting year t values obtained in year t. Parameter estimates significant at the 5% level are set in bold face.

Data source: European Commission autumn AMECO databases.

Table 3: Errors in measurement of the fiscal stance as loosening/ tightening due to ex post revisions of the output gap

	Change in the cyclically adjusted balance (fiscal stance)	Measured in year t+3		Total
		Neutral or tightening	Loosening	
Measured in year t	Neutral or tightening	47	19	66
	Loosening	7	23	30
	Total	54	42	96

The sample consists of annual changes in the cyclically adjusted balance for the period 1996-2003 in 12 euro area countries (excluding Cyprus, Malta and Slovenia).

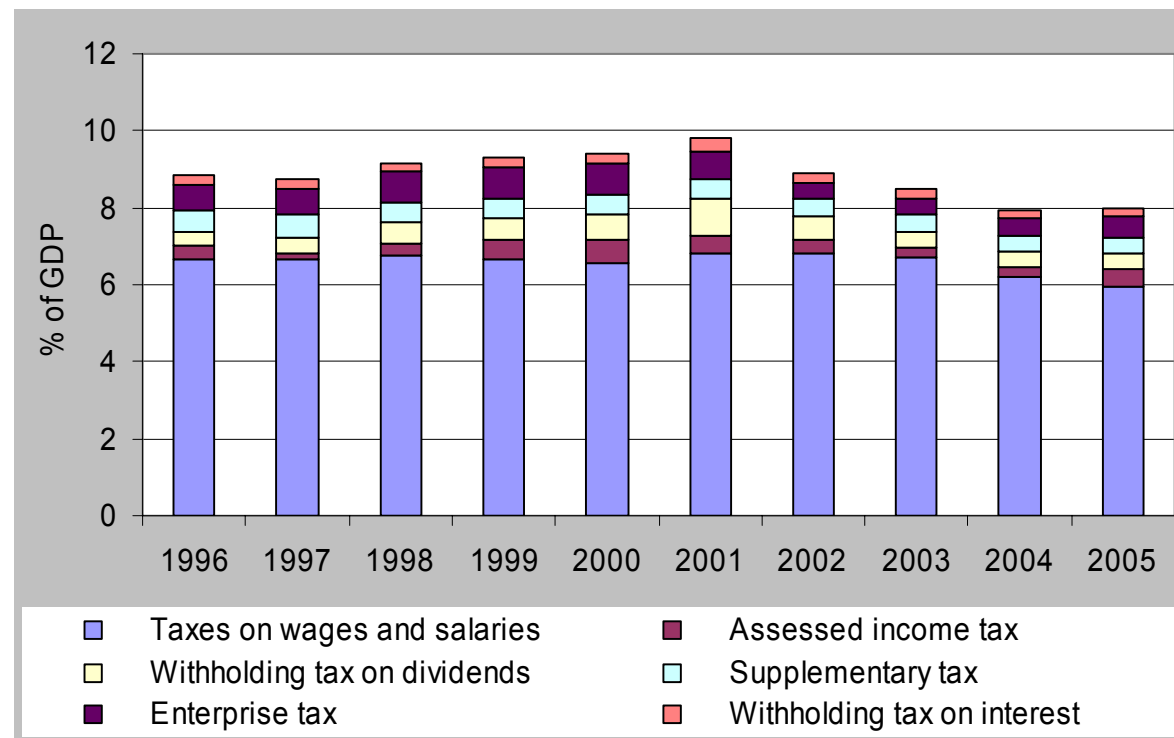
Source: European Commission autumn AMECO databases and own computations

Table 4: Uncertainty in the assessment of the fiscal stance due to composition effects

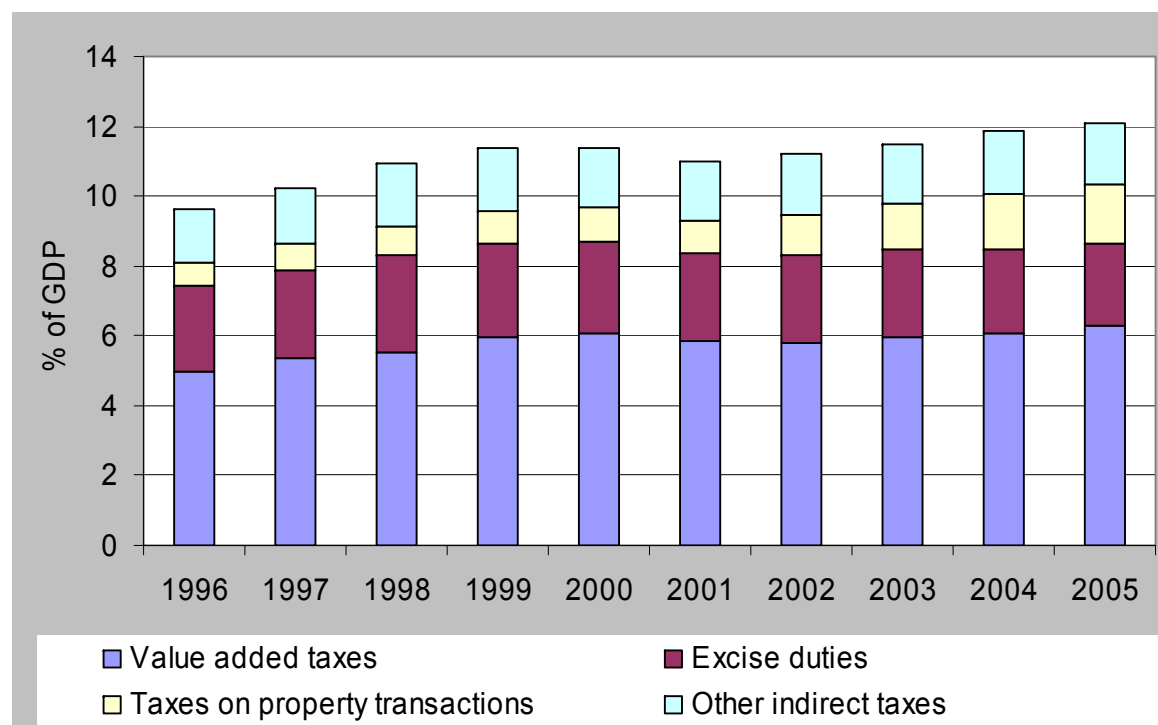
	Fiscal stance	Measured by disaggregated approach		Total
		Tightening	Loosening	
Measured by aggregated approach	Tightening	70	9	79
	Loosening	10	43	53
	Total	80	52	132

The sample consists of annual changes in the cyclically adjusted balance for the period 1996-2003 in 12 euro area countries (excluding Cyprus, Malta and Slovenia).

Sources: European Commission AMECO database and ESCB for underlying data. Own calculations.

Chart 9: Structure of personal income taxes in Germany

Source: OECD Revenue statistics and own calculations

Chart 10: Structure of indirect taxes in Spain

Source: OECD Revenue statistics and own calculations

Table 5: Uncertainty in the assessment of the fiscal stance due to revenue windfalls / shortfalls

	Fiscal stance	Change in cyclically adjusted balance (-/+ revenue windfall / shortfall)		Total
		Tightening	Loosening	
Change in cyclically adjusted balance	Tightening	37	9	46
	Loosening	12	26	38
Total		49	35	84

The sample consists of annual changes in the cyclically adjusted balance for the period 1996-2003 in 12 euro area countries (excluding Cyprus, Malta and Slovenia).

Sources: European Commission AMECO database and ESCB for underlying data. Own calculations.

APPENDIX

Table 7: Panel regression of revenue windfalls / shortfalls in euro area countries: personal income taxes

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Change in output gap	-0.008 (0.21)						
Change in output gap (-1)		0.074 (2.13)**					0.068 (2.06)**
Change in stock price index			0.001 (0.54)				
Change in stock price index (-1)				0.003 (2.76)**			0.003 (2.34)**
Change in current account balance					-0.061 (-1.97)*		-0.050 (-1.72)*
Change in residential property prices						-0.004 (-0.30)	
R ²	0.13	0.19	0.14	0.22	0.18	0.10	0.30
Number of observations: 77. Number of euro area countries: 11. Years 2000-2006.							

Values in brackets are *t*-statistics. *, **, *** significant at the 10%, 5% and 1% levels respectively. Parameter estimates significant at the 5% level are set in bold face.

Data sample: Euro area countries except Cyprus, Luxembourg, Malta, and Slovenia.

APPENDIX

Table 8: Panel regression of revenue windfalls / shortfalls in euro area countries: corporate income taxes

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Change in output gap	0.123 (2.66)**						0.032 (0.64)
Change in output gap (-1)		0.025 (0.54)					
Change in stock price index			0.003 (1.45)				
Change in stock price index (-1)				0.006 (4.58)***			0.006 (3.58)***
Change in current account balance					-0.004 (-0.10)		
Change in residential property prices						0.005 (0.34)	
R ²	0.15	0.06	0.08	0.28	0.04	0.08	0.29
Number of observations: 77. Number of euro area countries: 11. Years 2000-2006.							

*Values in brackets are t-statistics. *, **, *** significant at the 10%, 5% and 1% levels respectively. Parameter estimates significant at the 5% level are set in bold face.*

Data sample: Euro area counties except Cyprus, Luxembourg, Malta, and Slovenia.

APPENDIX

Table 9: Panel regression of revenue windfalls / shortfalls in euro area countries: indirect taxes

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Change in output gap	0.030 (0.80)						
Change in output gap (-1)		-0.091 (-2.66)**					-0.070 (-1.96)*
Change in stock price index			0.004 (2.55)**				0.003 (1.81)*
Change in stock price index (-1)				0.001 (1.07)			
Change in current account balance					0.032 (1.24)		
Change in residential property prices						0.016 (1.24)	
R ²	0.14	0.22	0.21	0.15	0.12	0.17	0.25
Number of observations: 77. Number of euro area countries: 11. Years 2000-2006.							

*Values in brackets are t-statistics. *, **, *** significant at the 10%, 5% and 1% levels respectively. Parameter estimates significant at the 5% level are set in bold face.*

Data sample: Euro area countries except Cyprus, Luxembourg, Malta, and Slovenia.