

Recognising uncertainty and evaluating errors: The role of PBOs and fiscal councils

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Responsibility**

The Office for Budget Responsibility

- Created in 2010 to provide independent and authoritative analysis of the public finances
- Produces the UK's Budget and Autumn Statement forecasts of the economy and public finances
- Assesses UK Government progress against fiscal targets
- Reports on the long-term sustainability of the public finances and on fiscal risks
- Scrutinises UK Government's costing of policy measures
- Objective to make fiscal forecasts and costings unbiased and clear, but we have no role in making or commenting on Government policy

Challenges of producing forecasts and costings

The need to predict the future

**“Prediction is very difficult...
especially if it’s about the future.”**

Nils Bohr, Nobel laureate in Physics

- **But PBOs and fiscal councils have to make predictions:**
 - How much revenue will the Government raise?
 - How much will this new spending programme cost?
 - How much will this new tax policy raise?

What to do about it?

Transparency

- **Transparency is important for several reasons:**
 - Fiscal forecasting is highly disaggregated – without transparency, users of forecasts will struggle to understand them
 - Transparency builds trust – people may disagree with forecasts, but they will see that they're based on professional judgement
 - Transparency aids self-discipline – avoid the temptation to make analytically dubious but presentationally convenient judgements because no one will ever spot them
- **But must also emphasise uncertainty:**
 - Transparency about detail can imply spurious precision, so...
 - ...accompany with extensive discussion of uncertainty

What to do about it?

Evaluating forecast/costing errors

“An economist is an expert who will know tomorrow why the things he predicted yesterday didn’t happen today.”

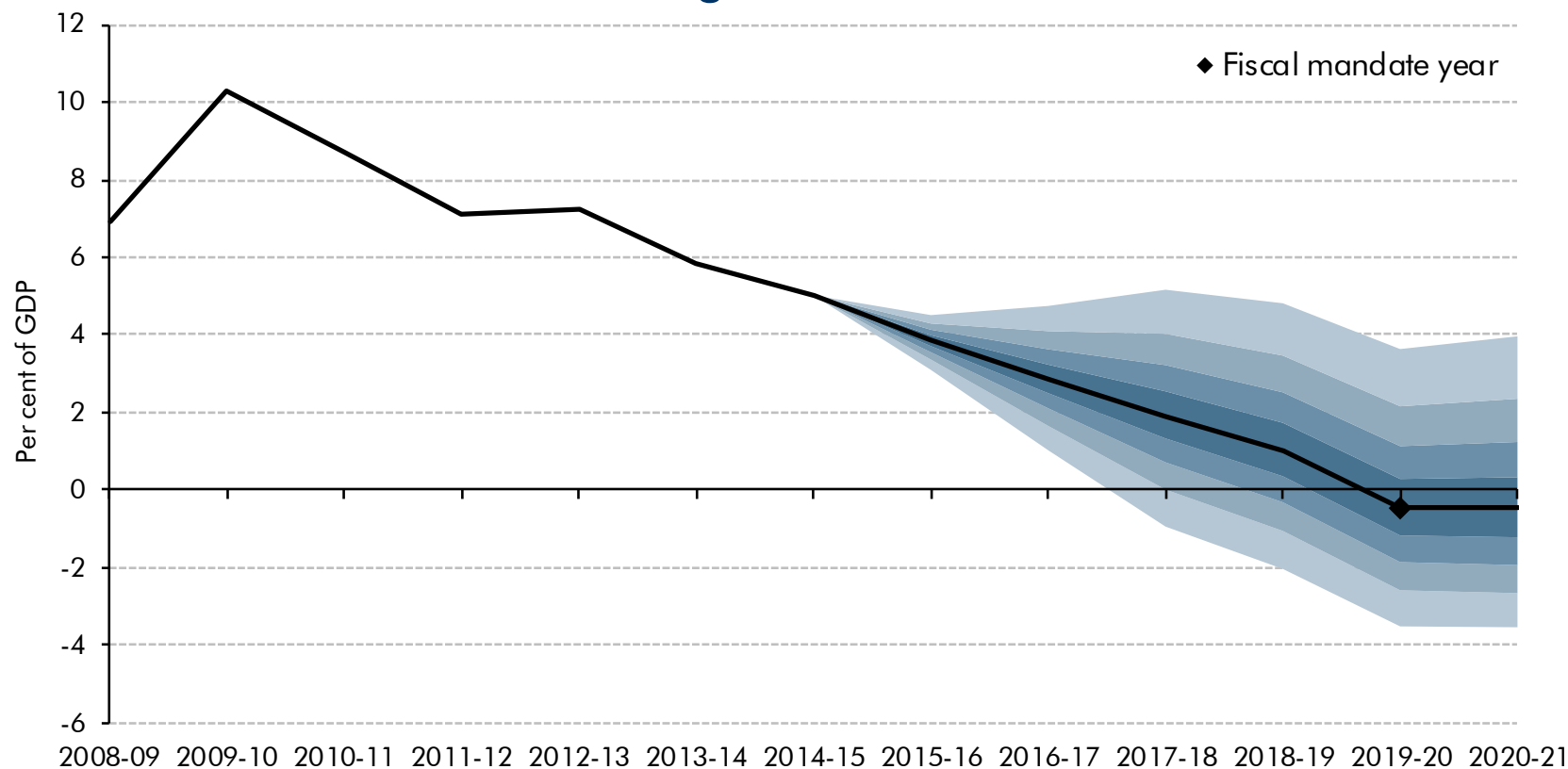
Evan Esar, US humourist

- **Identifying and explaining forecast or costing ‘errors’ helps us to:**
 - **improve understanding of how the economy and public finances behave in response to different events**
 - **refine our assumptions, judgements and techniques for the future forecasts or costings**

Forecast uncertainty

Forecast uncertainty: Historically informed fan charts

Public sector net borrowing fan chart



Source: ONS, OBR

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For methodology see: "Briefing paper No. 4: How we present uncertainty"
http://budgetresponsibility.org.uk/docs/dlm_uploads/Briefing-paper-No4-How-we-present-uncertainty.pdf

Forecast uncertainty: Sensitivity analysis & ready reckoners

Table B.1: Ready reckoners

Determinant	Direct impact on tax/spend stream of 1 per cent increase, unless otherwise stated ^{1,2}	Affected receipts or spending categories
GDP	0.5% of GDP in the first year, rising to 0.7% of GDP after two years	Public sector net borrowing
Inflation		
GDP deflator	-0.4% of GDP	Total spending
RPI (positive revenue effects)	£½ billion in first year, rising to £1 billion	Indirect taxes, business rates, student loan interest
CPI (negative revenue effects) ³	-£1¼ billion, with a one year lag	IT and NICs
RPI/CPI ⁴ (Total revenue effect)	In year: £½ billion, -£¼ billion thereafter	
CPI (positive spending effects)	£1¼ billion with a one year lag	Benefits, tax credits, public sector pensions
RPI (positive spending effects)	£3½ billion, rising to £6 billion	Debt interest
RPI/CPI ⁴ (Total spending effect)	In year: £3½ billion, rising to £7 billion	
Interest rates (1ppt)		
Gilt rates	£½ billion in first year, rising to £4 billion	Debt interest
Short rates	£4½ billion	Debt interest
Savings rates	£1¼ billion with a one year lag	Self-assessment
Interest on gov. assets	£1½ billion	Interest receipts
Nominal GDP expenditure		
Consumption	£¾ billion	VAT
Consumption SRS (1ppt) ⁵	£1½ billion	VAT
Other VAT tax bases	£0.4 billion	VAT
Business investment	-£50 million	Corporation tax
Real GDP	£100 to £200 million	Fuel duty, APD
GDP income		
Wages & salaries	£3 billion rising to £3¾ billion	PAYE income tax & NICs
Self employment income	£¼ billion, with a one year lag	Self-assessment
PNFC trading profits	£0.2 billion in first year, rising to £0.4 billion	Indust. & comm. CT
Financial profits	£50 million	Financial sector CT
Labour market		
Average earnings	£3¾ billion rising to £4½ billion	PAYE & NICs
	£¾ billion	Benefits and tax credits
Employment	£2½ billion rising to £3 billion	PAYE & NICs
Unemployment (0.1m)	£0.5 billion	Benefits
Assets		
House prices	£180 to £360 million	Capital taxes
Property transactions	£100 to £170 million	Capital taxes
Equity prices	£100 to £200 million	Capital taxes
Oil prices (£10 a barrel)	£¾ billion	Oil and gas revenues
	-£¼ billion	Fuel duty

¹These are ballpark figures that are specific to the March 2015 EFO forecast. The actual effects will differ over time, as policy and our forecast continue to evolve

²A positive figure represents an increase in the tax or spending stream.

³Assuming that average earnings growth is unchanged

⁴Impact of a 1% increase in the price level.

⁵Standard rated share; share of nominal household consumer spending subject to the standard rate of VAT.

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See: Annex B of the March 2015 Economic and fiscal outlook

http://budgetresponsibility.org.uk/docs/dlm_uploads/March2015EFO_18-03-webv1.pdf

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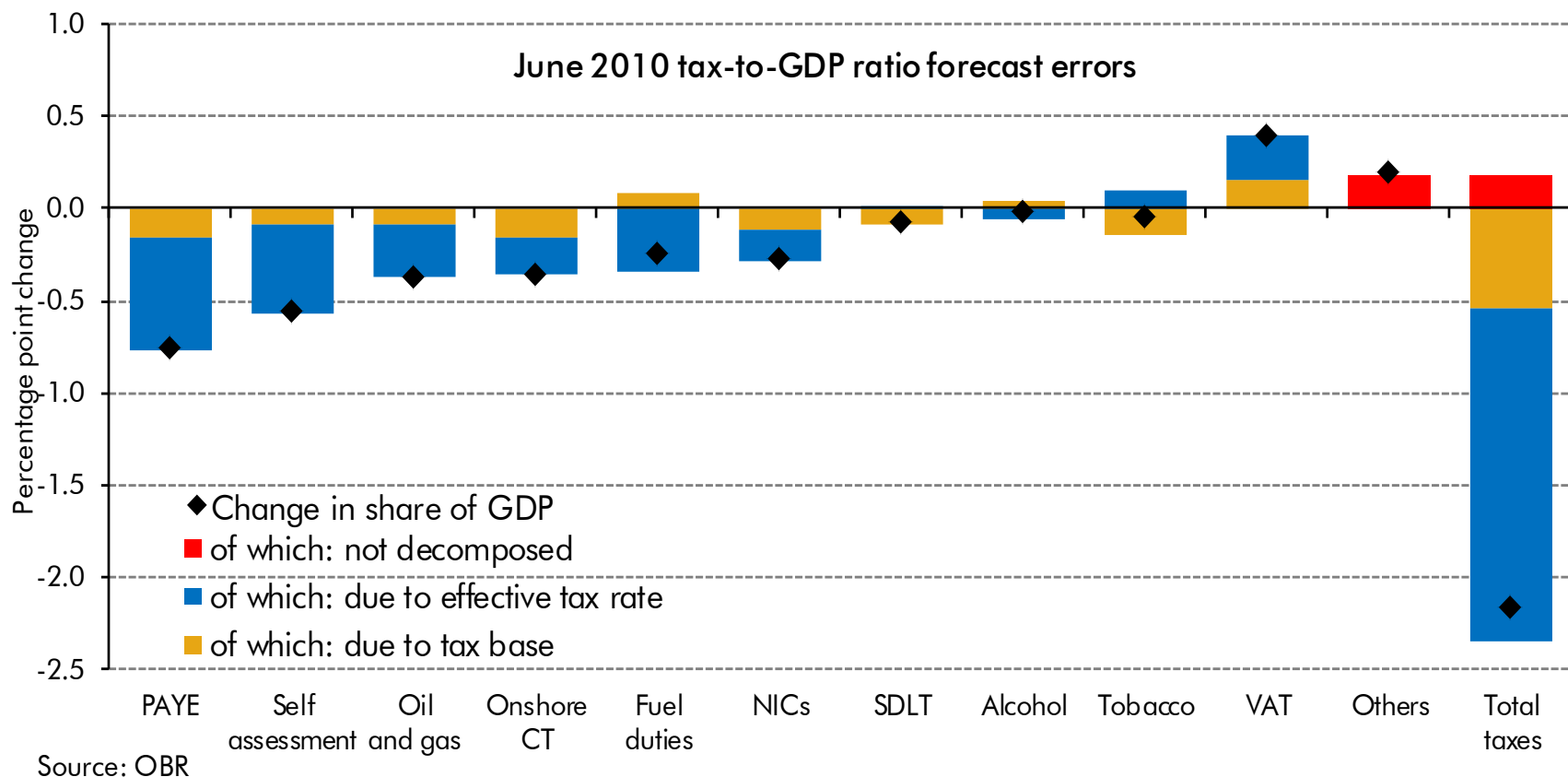
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Forecast uncertainty: Scenario analysis

Table 5.7: Key economic and fiscal aggregates under alternative scenarios

	Per cent of GDP, unless otherwise stated					
	2014-15	2015-16	2016-17	2017-18	2018-19	2019-20
Central forecast						
Economic assumptions						
GDP (percentage change)	3.0	2.2	2.2	2.4	2.3	2.3
Fiscal outcome						
Welfare cap margin (per cent)		0.8	0.0	-0.6	-0.1	
Public sector net borrowing	5.0	4.0	2.1	0.7	-0.2	-1.0
Cyclically adjusted current budget	2.7	2.2	0.5	-0.7	-1.5	-2.3
Public sector net debt	80.4	81.1	80.7	78.8	76.2	72.8
Weak productivity scenario						
Economic assumptions						
GDP (percentage change)	2.8	1.2	1.0	0.9	0.8	0.7
Fiscal outcome						
Welfare cap margin (per cent)		0.9	0.4	0.0	0.9	
Public sector net borrowing	5.1	4.6	3.2	2.5	2.2	2.0
Cyclically adjusted current budget	2.8	2.7	1.6	1.1	0.9	0.8
Public sector net debt	80.6	82.6	84.2	85.1	85.9	86.6
Strong productivity scenario						
Economic assumptions						
GDP (percentage change)	3.4	4.1	4.0	3.9	3.8	3.7
Fiscal outcome						
Welfare cap margin (per cent)		0.5	-0.6	-1.7	-1.6	
Public sector net borrowing	4.8	3.0	0.3	-1.6	-3.1	-4.4
Cyclically adjusted current budget	2.5	1.2	-1.3	-3.0	-4.4	-5.7
Public sector net debt	79.9	78.3	74.9	69.8	63.7	56.7

Forecast uncertainty: Learn from past forecast errors



Policy costings uncertainty

Policy costings uncertainty: How we scrutinise policy costings

- A policy change can potentially affect the public finances through a variety of channels, some of which are more straightforward to quantify than others:
 - the **static effect** of changing policy parameters such as tax rates or thresholds, before considering any behavioural response from firms or individuals;
 - the **immediate direct behavioural effects** of firms or individuals to the policy change;
 - **micro-level behavioural effects in closely-related areas** that are small in relation to the whole economy;
 - **macro-level behavioural effects** of policy changes that are material in relation to the whole economy
- When considering policy changes in the context of a Budget, it is also important to consider the overall net impact of the policy package as a whole.

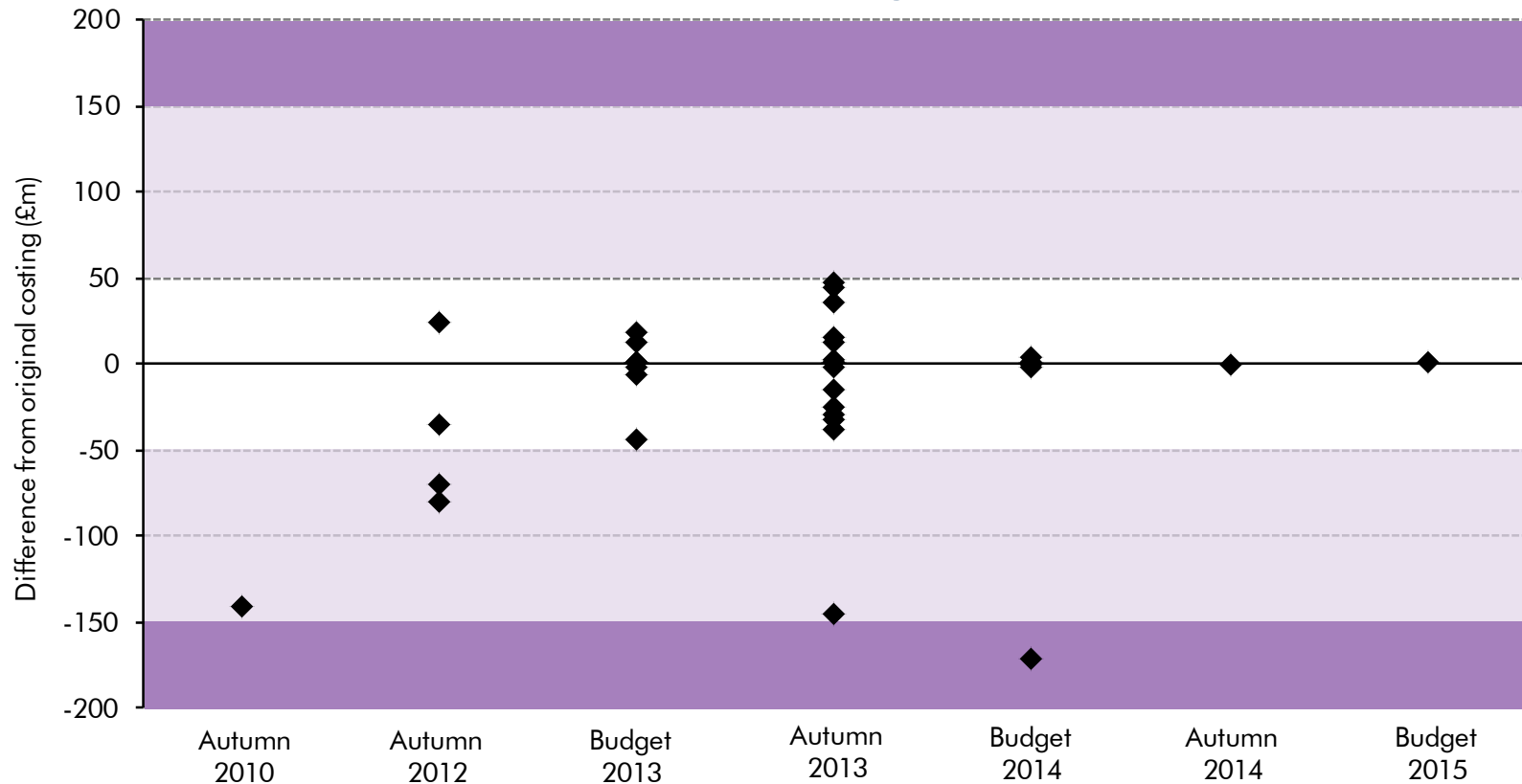
Policy costings uncertainty: Subjective uncertainty rankings

Table A.2: Example of assigning uncertainty rating criteria: 'help to save'

Rating	Modelling	Data	Behaviour
Very high	Significant modelling challenges	Very little data	No information on potential behaviour
	Multiple stages and/or high sensitivity on a range of unverifiable assumptions	Poor quality	
High	Significant modelling challenges	Little data	Behaviour is volatile or very dependent on factors outside the tax/benefit system
	Multiple stages and/or high sensitivity on a range of unverifiable assumptions	Much of it poor quality	
Medium-high	Some modelling challenges	Basic data	Significant policy for which behaviour is hard to predict
	Difficulty in generating an up-to-date baseline and sensitivity to particular underlying assumptions	May be from external sources Assumptions cannot be readily checked	
Medium	Some modelling challenges	Incomplete data	Considerable behavioural changes or dependent on factors outside the system
	Difficulty in generating an up-to-date baseline	High quality external sources Verifiable assumptions	
Medium-low	Straightforward modelling Few sensitive assumptions required	High quality data	Behaviour fairly predictable
Low	Straightforward modelling of new parameters for existing policy with few or no sensitive assumptions	High quality data	Well established, stable and predictable behaviour
Importance	Medium	Medium	High
Overall		High	

Policy costings uncertainty: Evaluation of anti-avoidance costings

Difference between initial costing and latest estimate



Source: HMRC, OBR

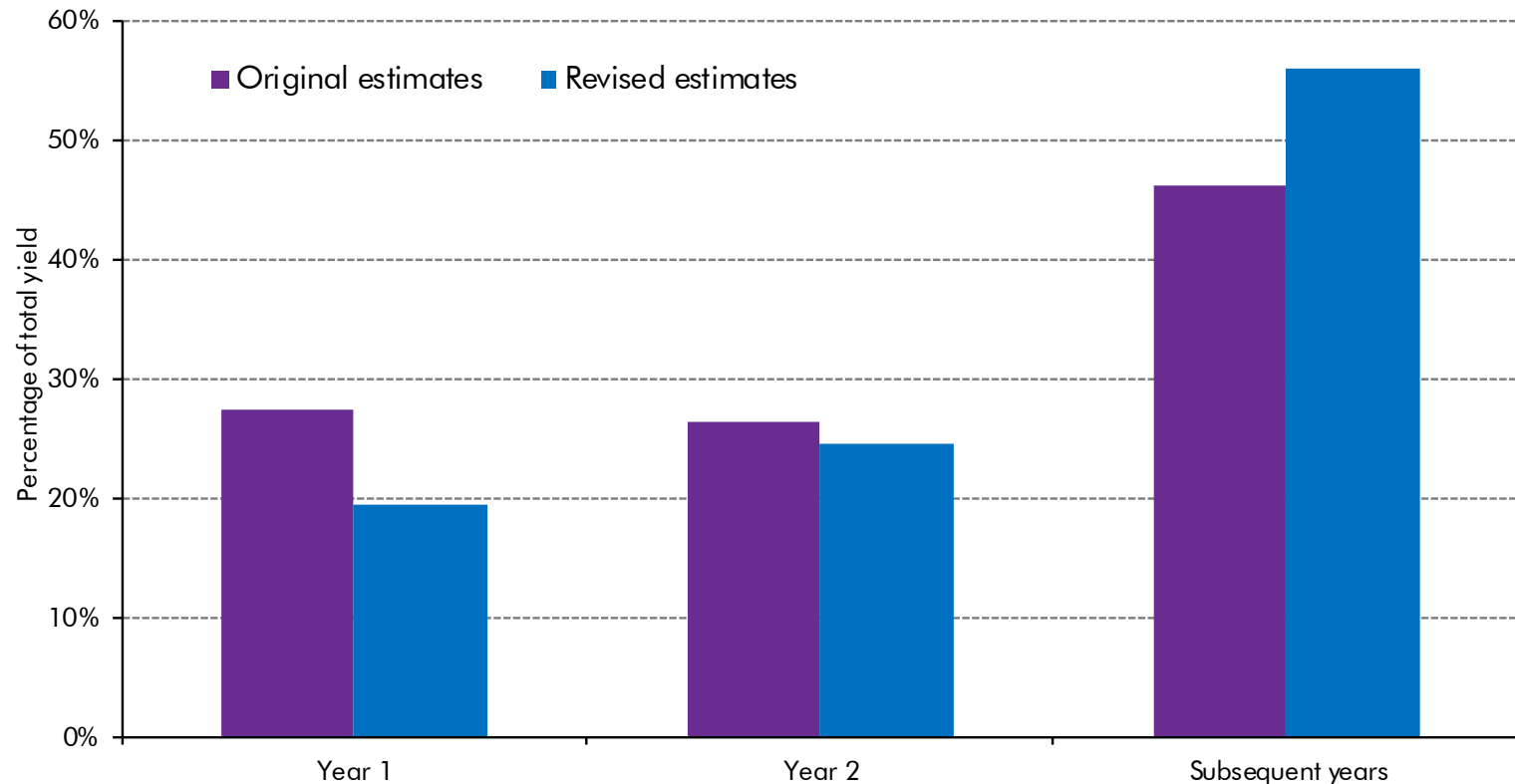
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See: Working Paper No.8: *Anti-avoidance costings: an evaluation*

http://budgetresponsibility.org.uk/docs/dlm_uploads/Working-paper-No8-Anti_avoidance.pdf

Policy costings uncertainty: Evaluation of anti-avoidance costings

Difference in timing of yield between initial costing and latest estimate



Source: HMRC, OBR

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See: Working Paper No.8: *Anti-avoidance costings: an evaluation*

http://budgetresponsibility.org.uk/docs/dlm_uploads/Working-paper-No8-Anti_avoidance.pdf

Conclusions

Conclusions:

Be transparent about uncertainties

- Recognise uncertainty when making predictions:
 - Fan charts
 - Sensitivity analysis
 - Scenarios
 - Subjective uncertainty rankings

Conclusions:

Evaluate past predictions

- Analyse sources of errors in past forecasts or policy costings
- Identify any lessons that can be applied to future forecasts or costings
- Use evaluation exercises to inform what can be said about uncertainty in the future

Conclusions:

Build on OBR experiences

- OBR website contains lots of useful material – briefing papers, databases, examples

Website: <http://budgetresponsibility.org.uk/>

- OBR staff happy to answer questions where possible

Email: obrenquiries@obr.gsi.gov.uk

Thank you