ECONOMIC STATISTICS CENTRE OF EXCELLENCE

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ESCoE Research Seminar

Managing Fiscal Uncertainty: a Contribution

Presented by Jagjit S. Chadha (NIESR)

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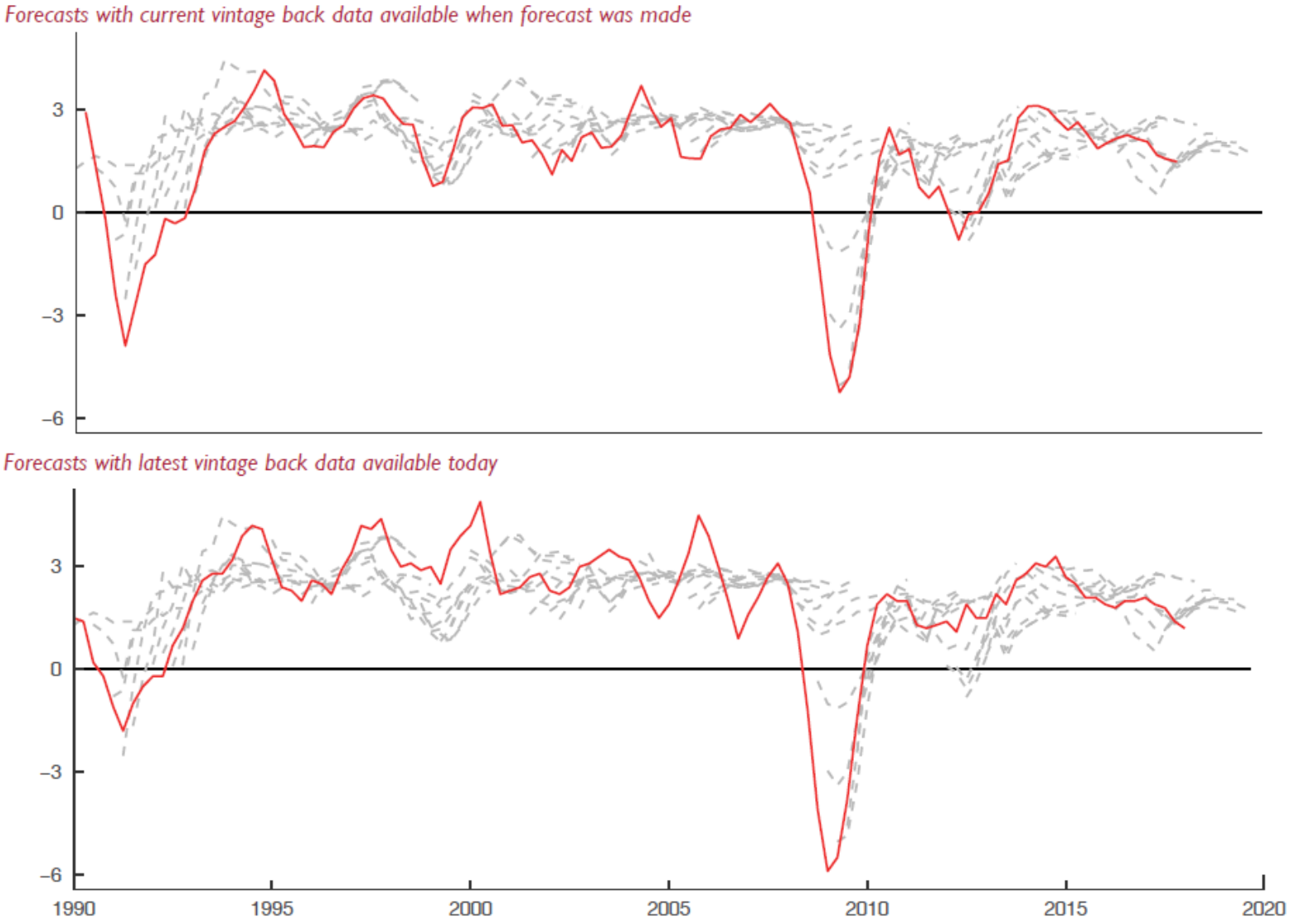
Drummond Gate
27th November 2018

National Institute of Economic and Social Research

Main Findings

- Outline “gradualist” motives for revising fiscal expenditure plans and reasons for rules;
- Using the NiGEM historical database we find expectations about the state of the economy this year and next are subject to significant revisions (data and news-related);
- There are significant year-to-year revisions in government spending plans (DEL vs AME) at short- and long-run horizons;
- The most significant factor in explaining these revisions is the change in the view on the state of the economy;
- We also start to construct measures of “warranted” expenditure that help us understand priorities better.

GDP growth forecasts and different vintages of back data



Sources: NIESR forecast database, ONS.
Note: Dashed lines show three-year ahead central forecasts starting from the date the forecast was made. The solid line is the latest data.

Barrell, Blake and Young, 2018

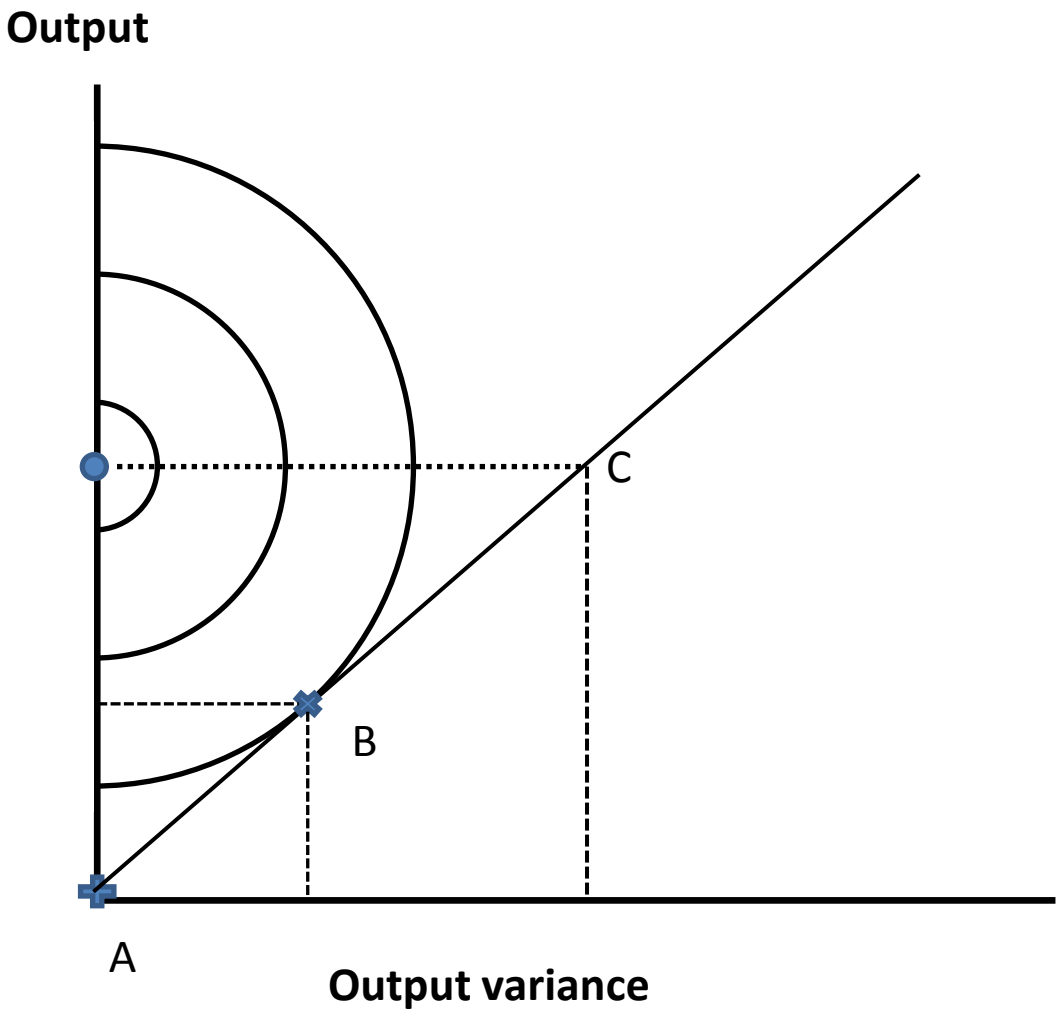
Closing Output Gaps with Fiscal Policy

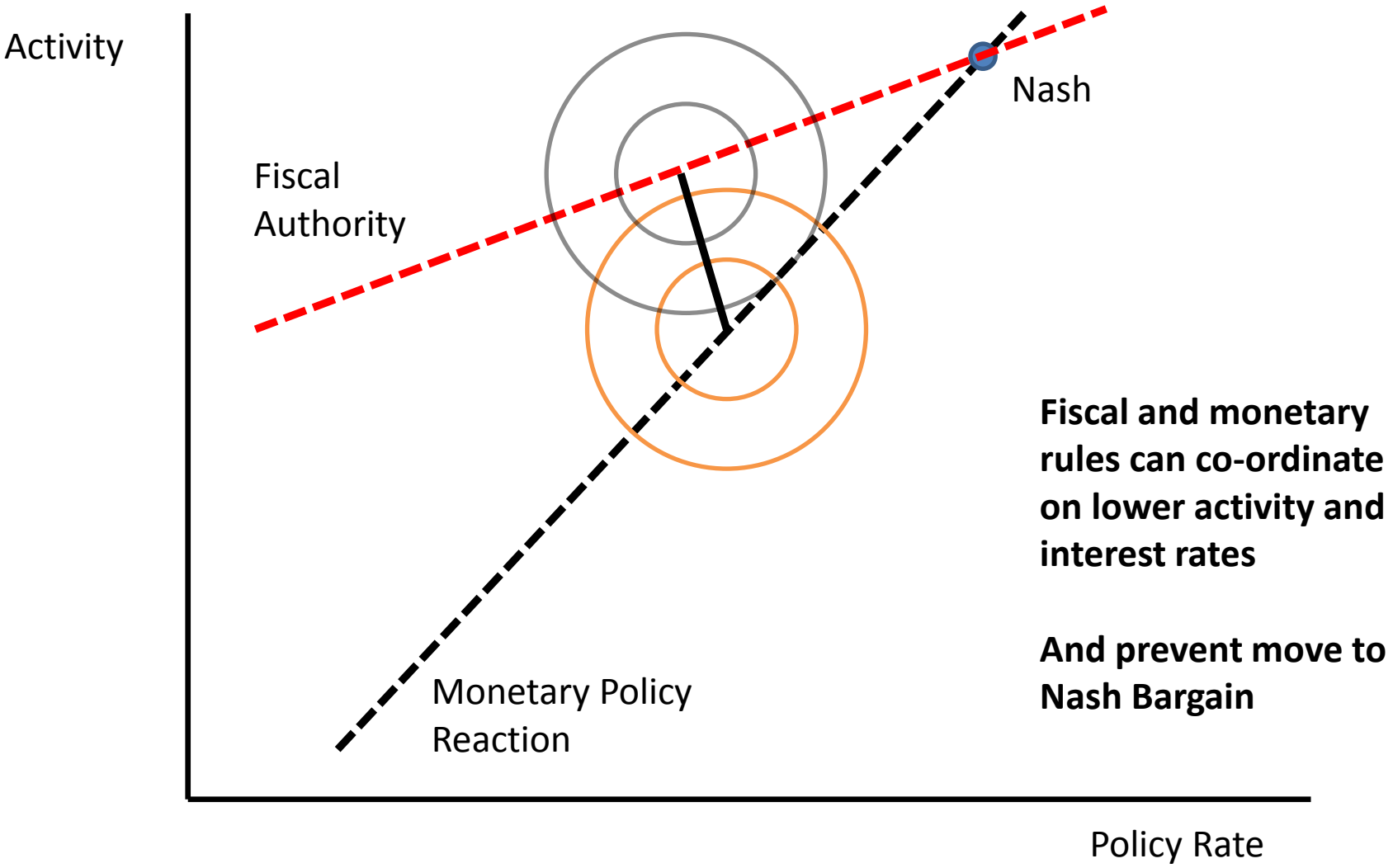
Starting from a recession at A

If further fiscal expenditure adds to uncertainty

Then the best we do is B rather than C or A

We do less to limit the variance of outcomes





Contracting with Rules vs Nash

Monetary and Fiscal Games

- Output is determined by monetary and fiscal policy plus random demand shocks
- Monetary policy (MP) pursues an inflation target through a Phillips curve mechanism s.t. supply shocks
- Loss function for MP in terms of output and inflation
- Optimal interest rate rule in terms of government expenditure and shocks
- Re-write output in terms of government expenditure and shocks
- Solve for variance of output and solve for FOC for government

Monetary and Fiscal Games

$$Y_t = Y^* + \alpha g_t - \gamma(i_t - \pi^* - \bar{r}) + \epsilon_{t,1}$$

Demand

$$\pi_t = \pi^* + \beta(Y_t - Y^*) + \epsilon_{t,2}$$

Supply

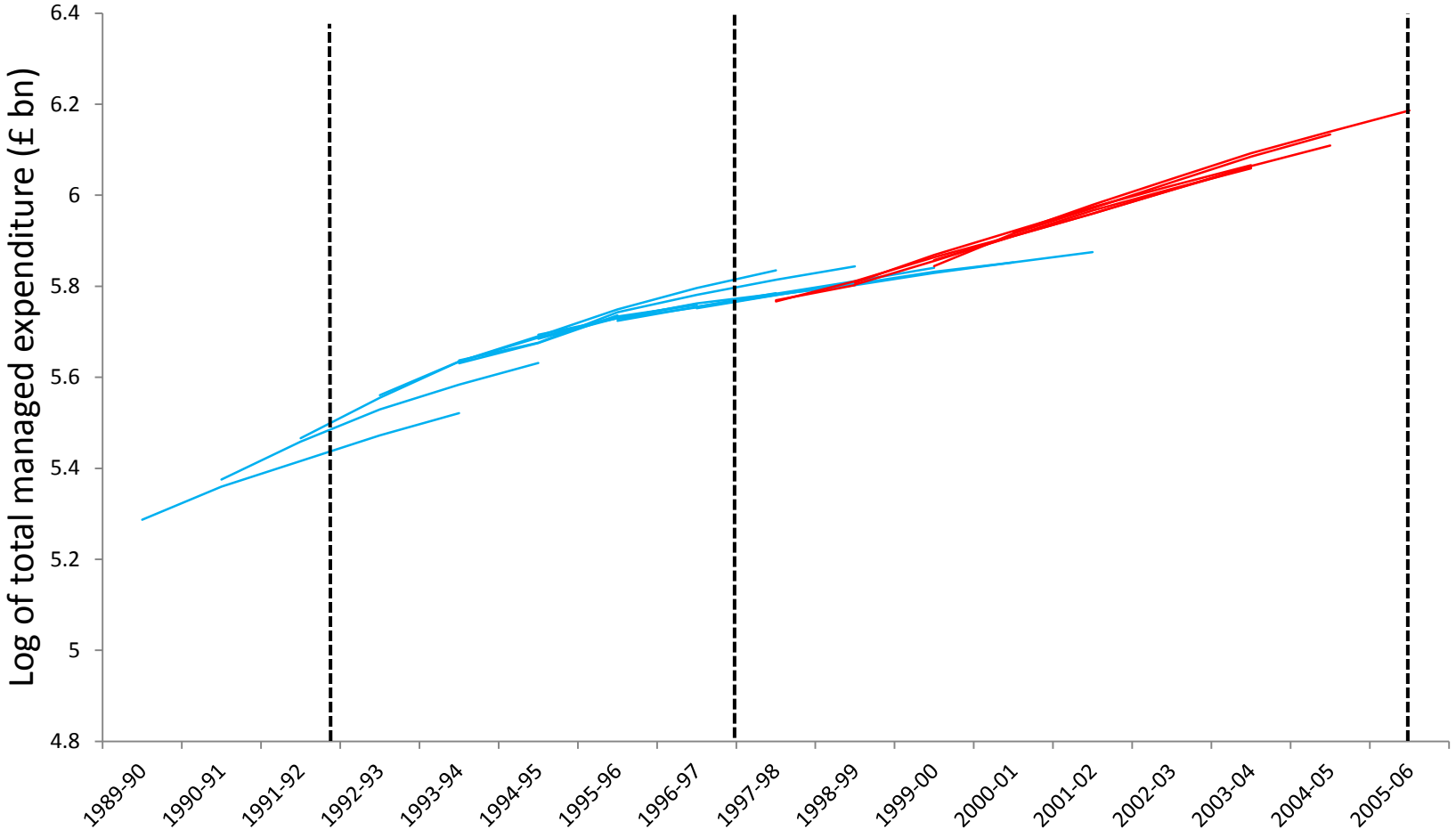
$$E(Y_t - Y^*)^2 = \sigma^2_{\phi_1} g^2 + \sigma^2_{\phi_2}\epsilon_1^2 - \sigma^2_{\phi_3}\epsilon_2^2 + 2g_t\epsilon_1\sigma_{\phi_1\phi_2} - 2g\epsilon_2\sigma_{\phi_1\phi_3} + (\bar{\phi_1}g - Y^*)^2$$

Output Variance

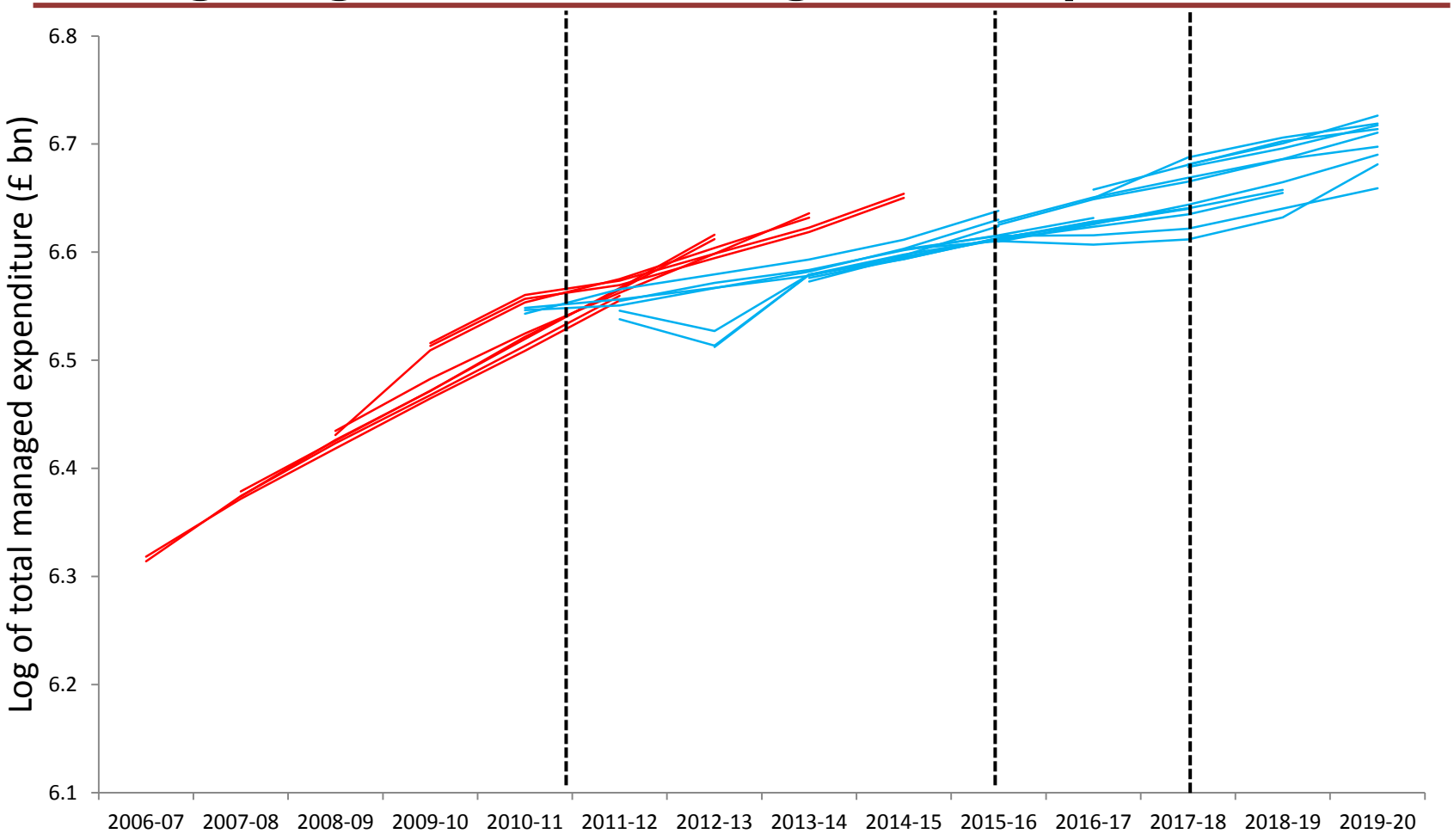
$$g = \frac{Y^* - \frac{1}{\phi_1}(\epsilon_1\sigma_{\phi_1\phi_2} - \epsilon_2\sigma_{\phi_1\phi_3})}{\frac{\sigma^2_{\phi_1}}{\phi_1} + \phi_1}$$

Fiscal Response

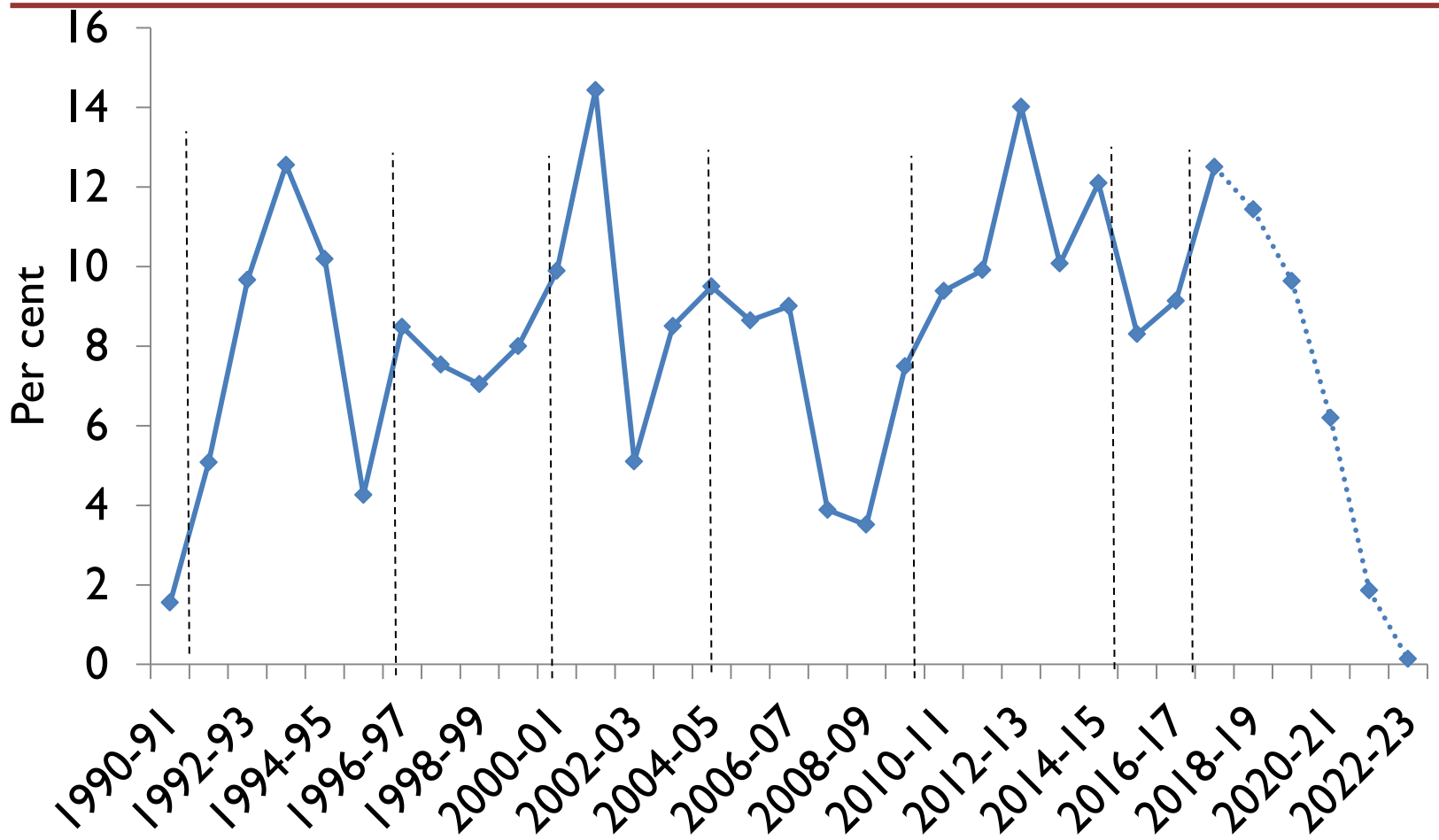
Change of government, change of fiscal plans



Change of government, change of fiscal plans

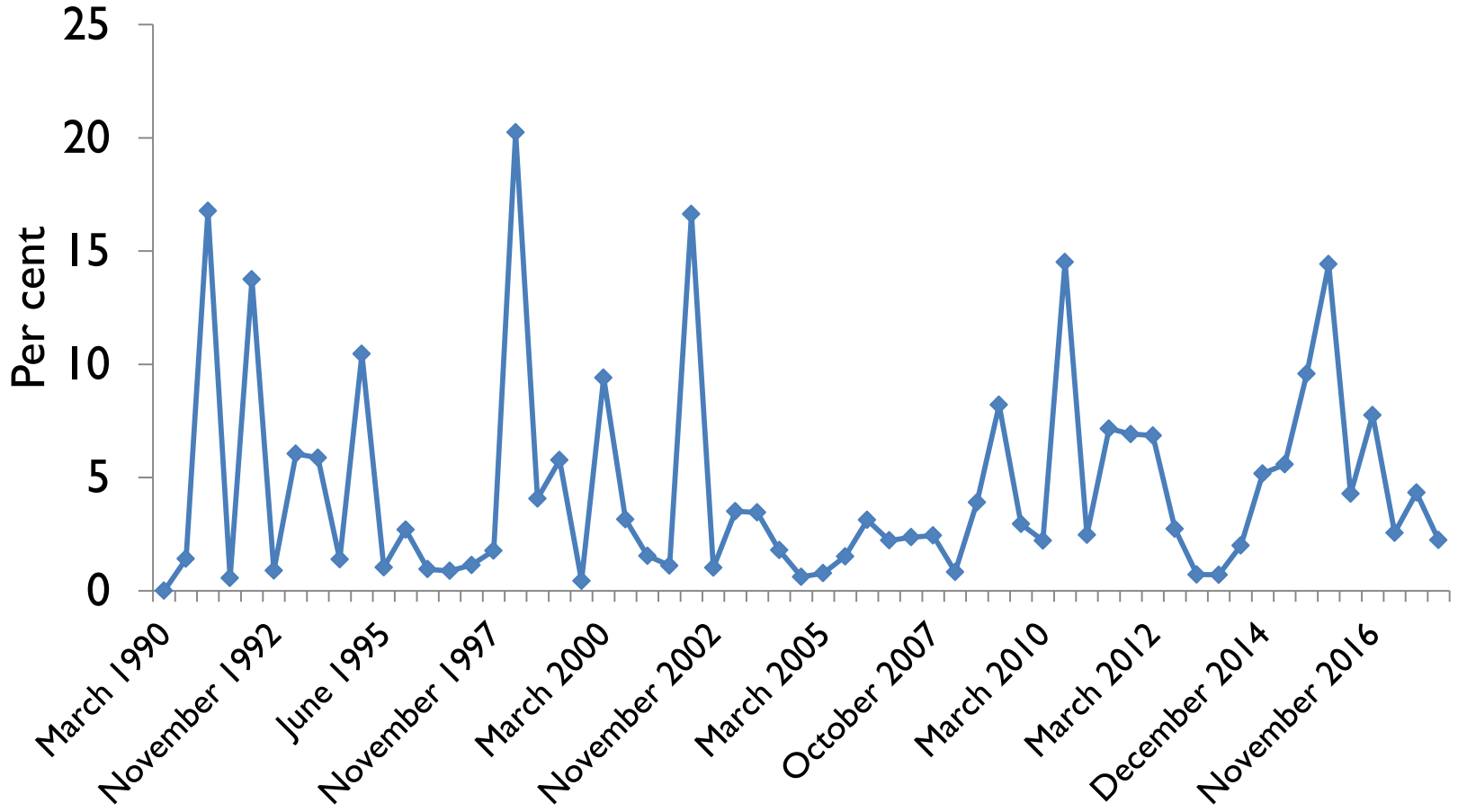


Total Proportional Revisions for a given Financial Year



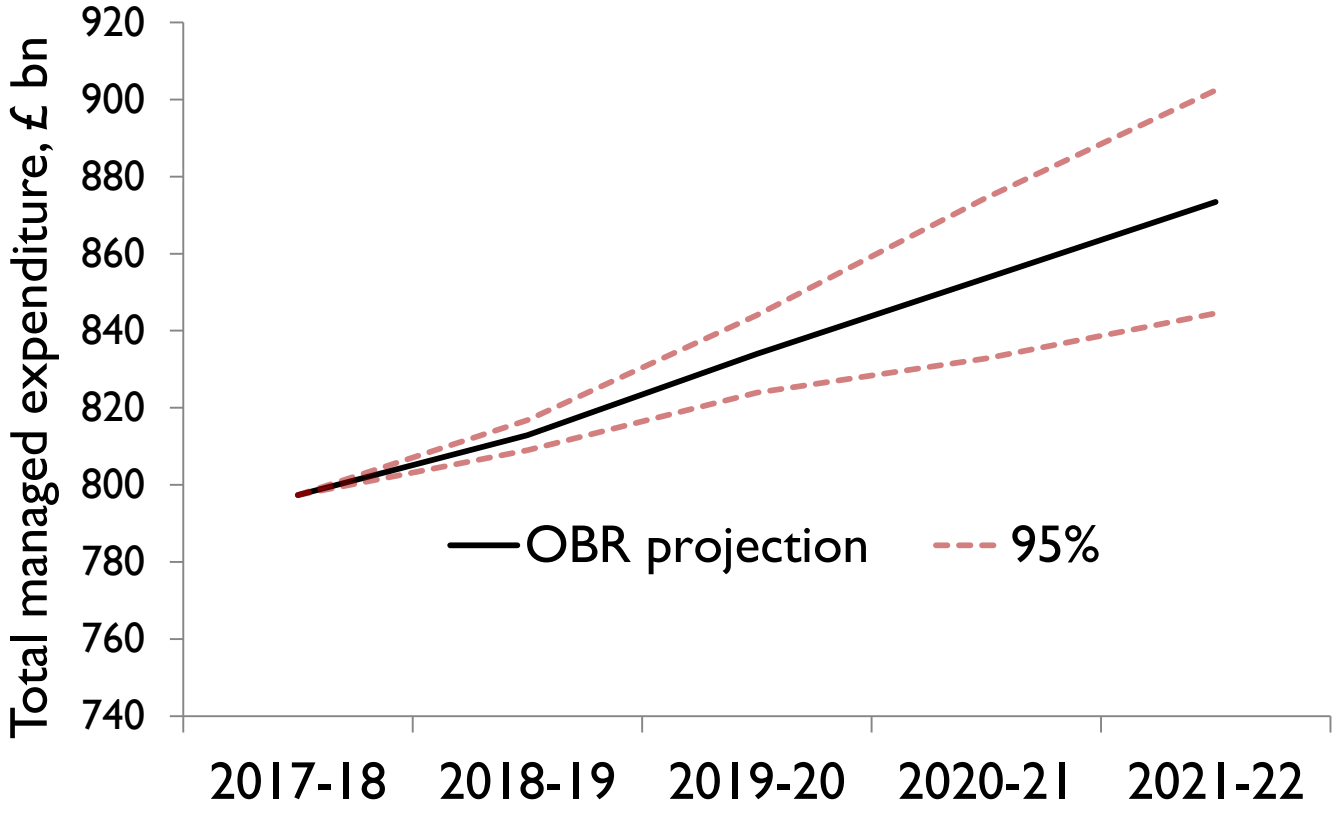
Notes: Total Proportional revisions is defined as the absolute value of all revisions for a Fiscal year, with each revision measured in proportional terms relative to the most recent plan

Total Proportional Revisions at a given Fiscal Event



Notes: We define a Fiscal Event as a Budget statement or Pre Budget report given by the Chancellor of the Exchequer to the House of Commons
Total Revisions are defined as the absolute sum of revisions announced at the fiscal event, each revision measured in proportional terms relative to the most recent event

TME Expenditure Risk based on Historical Variance



Basic Estimation System

$$\frac{TME_t^h - TME_t^{h-1}}{TME_t^{h-1}} = \alpha + \beta\left(g_t^h - g_t^{h-1}\right) + \gamma C^h + \varepsilon_t^h$$

- TME_t^h: is total managed expenditure plan for fiscal year t announced by HMT at fiscal event $h \leq t$
- g_t^h: is the NiGEM forecast of UK real GDP growth in fiscal year t published right before fiscal event h
- C^h: are control variables available in real time that may affect changes to spending plans, e.g. claimant count, Bank Rate, political party in power, election year dummy
- Use revisions to US GDP growth and changes in Fed Funds rate (over h and $h-1$) to instrument for $\left(g_t^h - g_t^{h-1}\right)$

Baseline results

Table 1. Full specification

	1 OLS t=h	2 IV t=h	3 IV t=h	4 OLS t=h+1 yr	5 IV t=h+1 yr	6 IV t=h+1 yr	7 OLS t=h+2 yrs	8 IV t=h+2 yrs	9 IV t=h+2 yrs
GDP growth	−0.084	−0.850**	−0.803***	−0.278	−1.308*	−1.836*	0.787	−2.355	−2.921
	(0.34)	(0.40)	(0.27)	(0.32)	(0.75)	(0.94)	(0.96)	(3.04)	(1.93)
Claimant count			−0.197*			−0.240			−0.382**
			(0.10)			(0.16)			(0.17)
Bank Rate			0.218**			0.354**			0.541***
			(0.09)			(0.15)			(0.12)
Election			−0.031			−0.075			0.257
			(0.29)			(0.52)			(0.59)
Conservative			0.827*			1.132			1.142**
			(0.47)			(0.75)			(0.53)
Constant	0.208	0.027	−0.399	0.462**	0.372*	−0.510	0.692**	0.481	−0.502
	(0.13)	(0.13)	(0.31)	(0.20)	(0.19)	(0.74)	(0.28)	(0.33)	(0.61)
Observations	58	58	58	54	54	54	49	49	49

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

- Some state contingent responses to events by fiscal expenditure paths

Coalition?

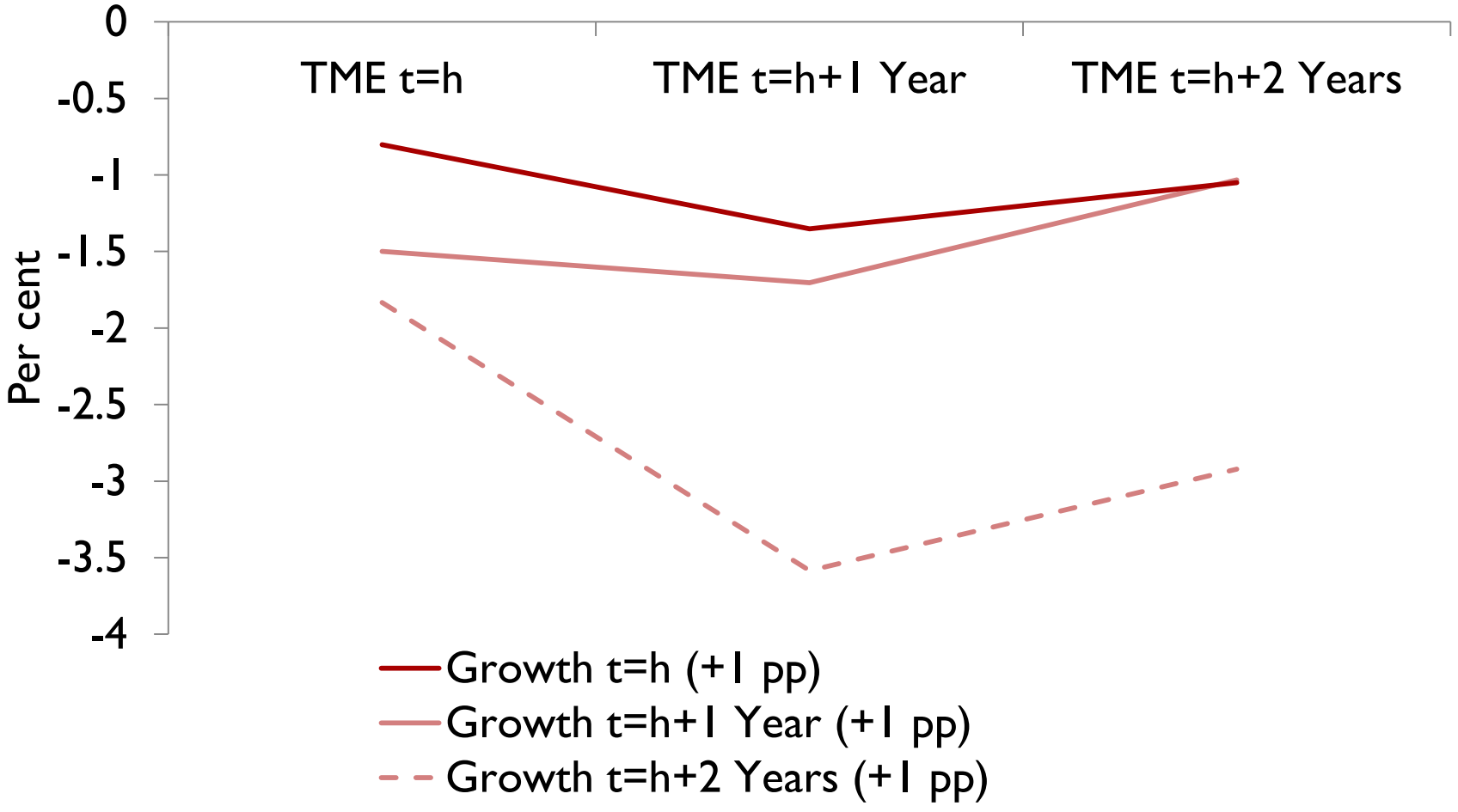
Table 2. Reduced sample

	1 IV t=h full sample	2 IV t=h pre-2010	3 IV t=h+1 year full sample	4 IV t=h+1 year pre-2010	5 IV t=h+2 years full sample	6 IV t=h+2 years pre-2010
GDP growth	−0.803*** (0.27)	−0.882*** (0.25)	−1.704* (0.96)	−2.177** (0.93)	−2.921 (1.93)	−3.227* (1.85)
Controls	Y	Y	Y	Y	Y	Y
Observations	58	40	54	36	49	31

Standard errors in parentheses
*p<0.05, **p<0.01, ***p<0.001

- Some evidence of more activist policy pre-Coalition

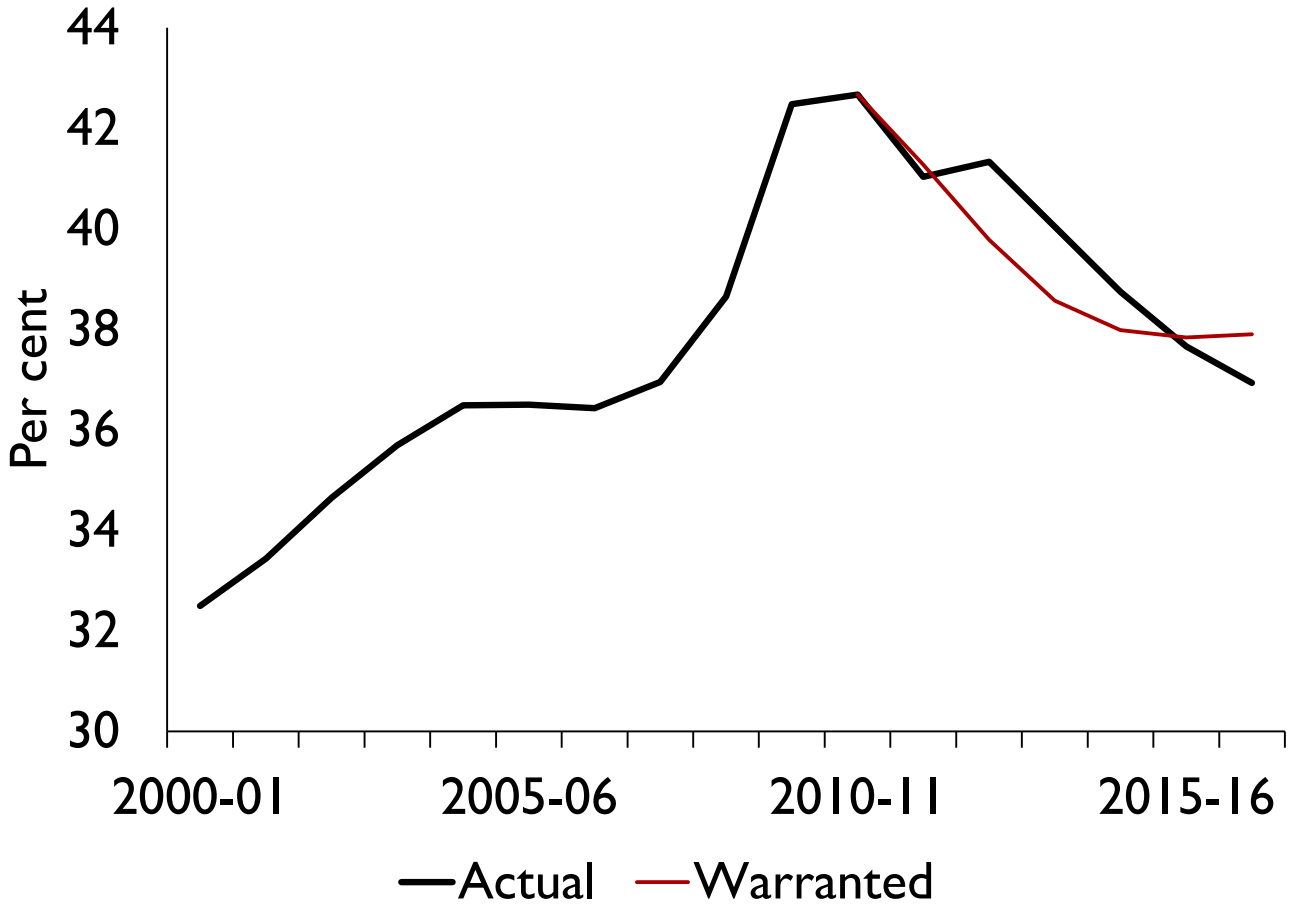
Positive revisions to growth expectations lower expenditure paths



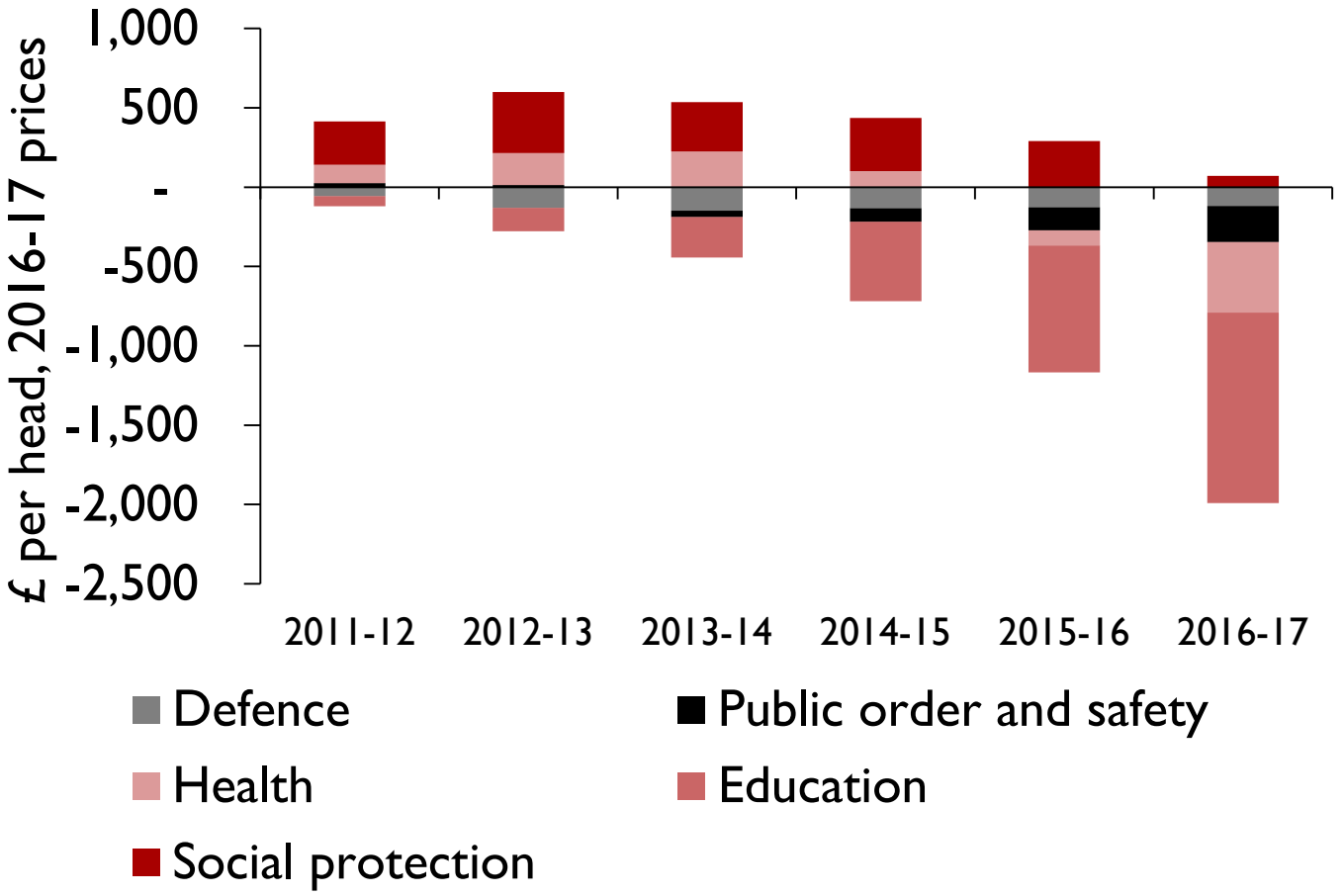
Modelling warranted expenditure

- Assume that spending as a share of GDP has evolved over time in accordance with preferences
- Fiscal Spending is required to meet a number of demands:
  - Existing spending commitments (dynamic effects)
  - Demographic Trends
  - Business cycle stabilisation
  - Fiscal sustainability
- Construct a path for warranted spending by fitting values from regression of TME/GDP on lagged TME/GDP, proportion of population who are over 85, the economic growth rate, and the debt GDP ratio, to represent preferred level of public spending chosen by UK over post-war period.
- Similar to estimating a Taylor rule for monetary policy and does not imply the estimated spending path is in any sense optimal (Pain, Weale and Young 1997)

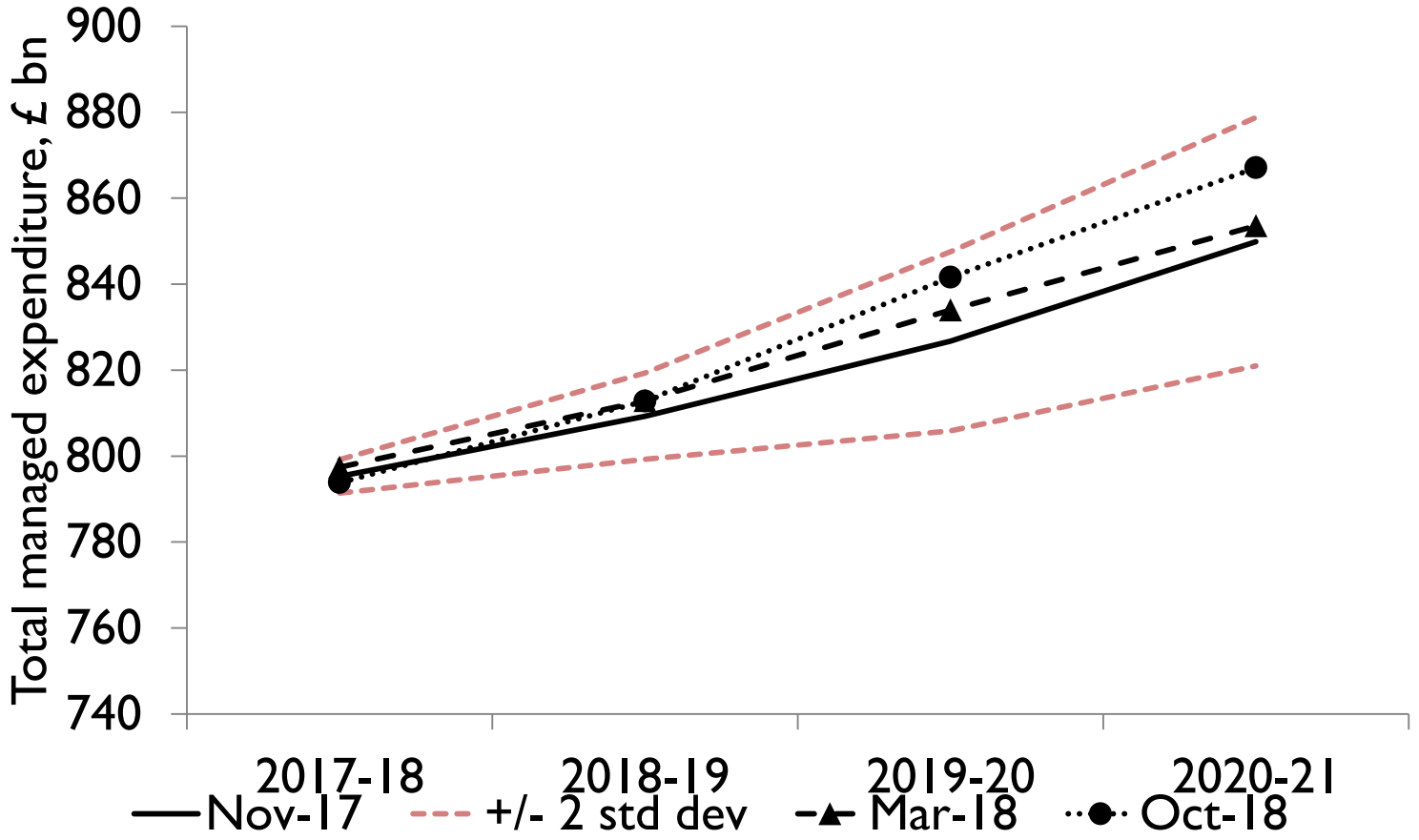
NIESR Estimates of “warranted” TME % GDP



Difference between actual and warranted spending, selected functions

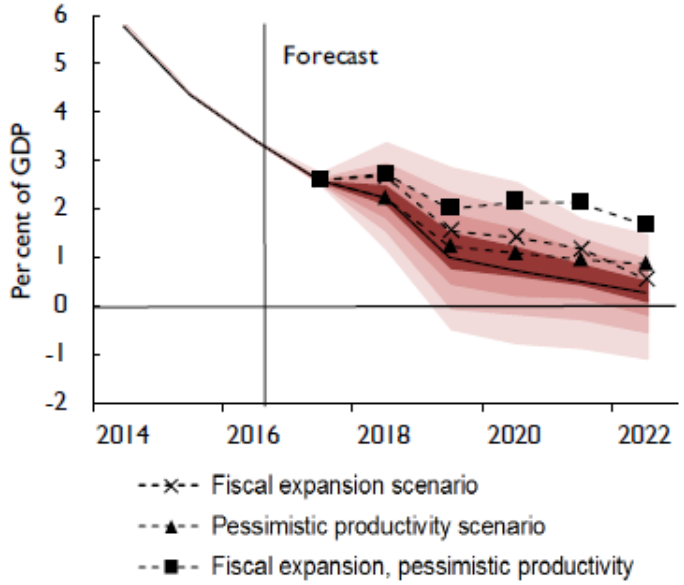


Risk around Expenditure Paths – Historic



Risk around Expenditure Paths – Simulated Errors

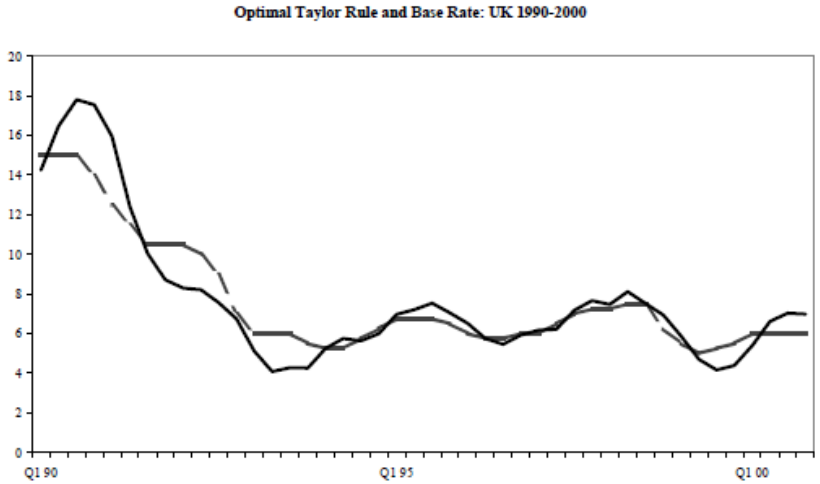
Figure 3. Probability distribution of public sector net borrowing

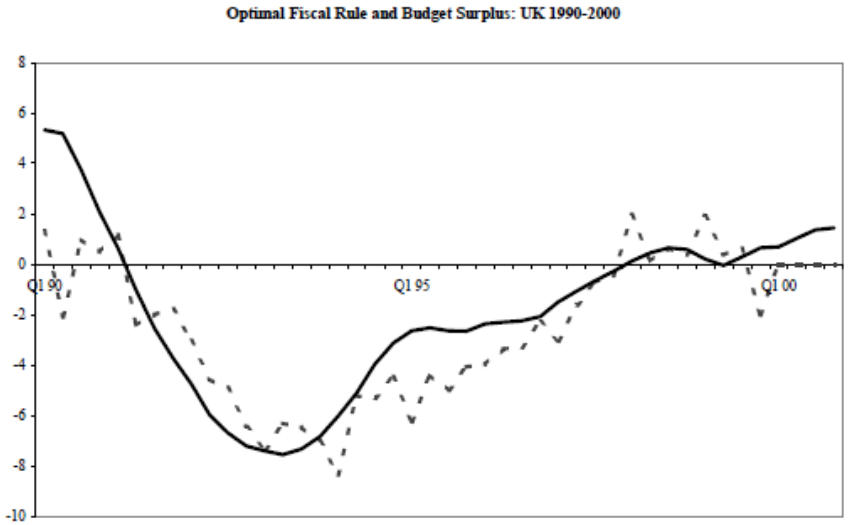


Source: NiGEM database, NiGEM forecast and NiGEM.
Note: The central forecast is based on taxation and spending plans from the 2017 Spring Budget. Each bound represents a cumulative decile of the probability distribution around the November 2017 forecast. The fiscal expansion scenario assumes a positive shock to government spending, welfare transfers and government investment of around £10 billion in 2018–19 and increases thereafter.

- Given a scenario
- Feed errors back through model many times
- To get 80% density forecast

Optimality Assessments of Fiscal Policy





- How near are we to getting to assessing fiscal policy in socially optimal terms?

Next Steps

- Relate expenditure responses to growth “shocks” and split by government consumption and investment
- Gauge responses in terms of standard estimates from macro models – were the fiscal authorities “doing enough” or “too much”? The idea continues the thought of warranted or conditioned.
- To what extent are planned expenditures already incorporating forecast risks or is policy more reactive?
- If the latter, is that a natural response to (i) parameter and forecast uncertainty and (ii) a way of forcing efficiency gains on government departments
- A fiscal database of AME and DEL expenditures would be helpful as would series of real-time data in the distant past

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