



Measuring the cycle and structural shocks

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IFAC Path for the Public Finances conference, 2018



National Institute of Economic and Social Research

Outline

- **Motivation for cyclical measurement**
- Approaches to measuring the cycle and their shortcomings
- The impact of structural shocks
 - The productivity puzzle
 - Brexit
- Alternatives to cyclical adjustment
- Summary



Cyclical adjustment helpful for:

- Understanding sources of growth
 - Attribute growth to **sustainable growth in potential output** and **temporary cyclical variation** (output gap)
- Short-term demand management
 - Eg counter-cyclical fiscal policy
- Assessing sustainability of fiscal position
 - Public finances flattered when economy cyclically strong, hence attention often focused on **cyclically adjusted deficit**

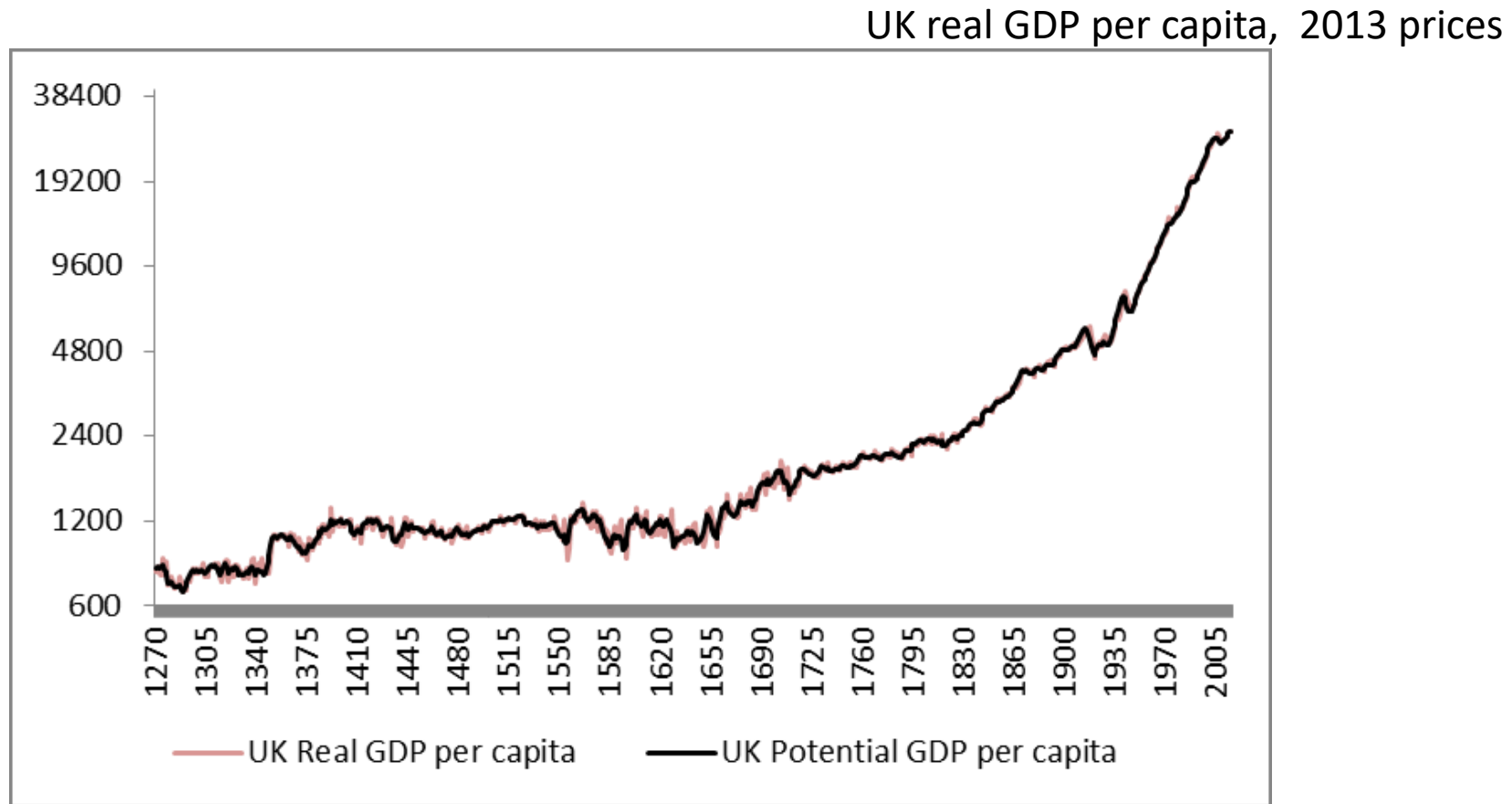


Definitions:

- **Potential output** is the level of output that an economy can sustainably produce using its full capacity, but without causing inflation to rise.
 - The **output gap** measures the gap between actual GDP and potential, expressed as a % of potential output.
 - Difficulty is that **potential output is unobserved**, and so must be **estimated**.
 - Also, may exclude sectors where output is not closely linked to inputs (eg North Sea oil in UK, large exporting enterprises in Ireland).
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Potential output growth is not constant over time

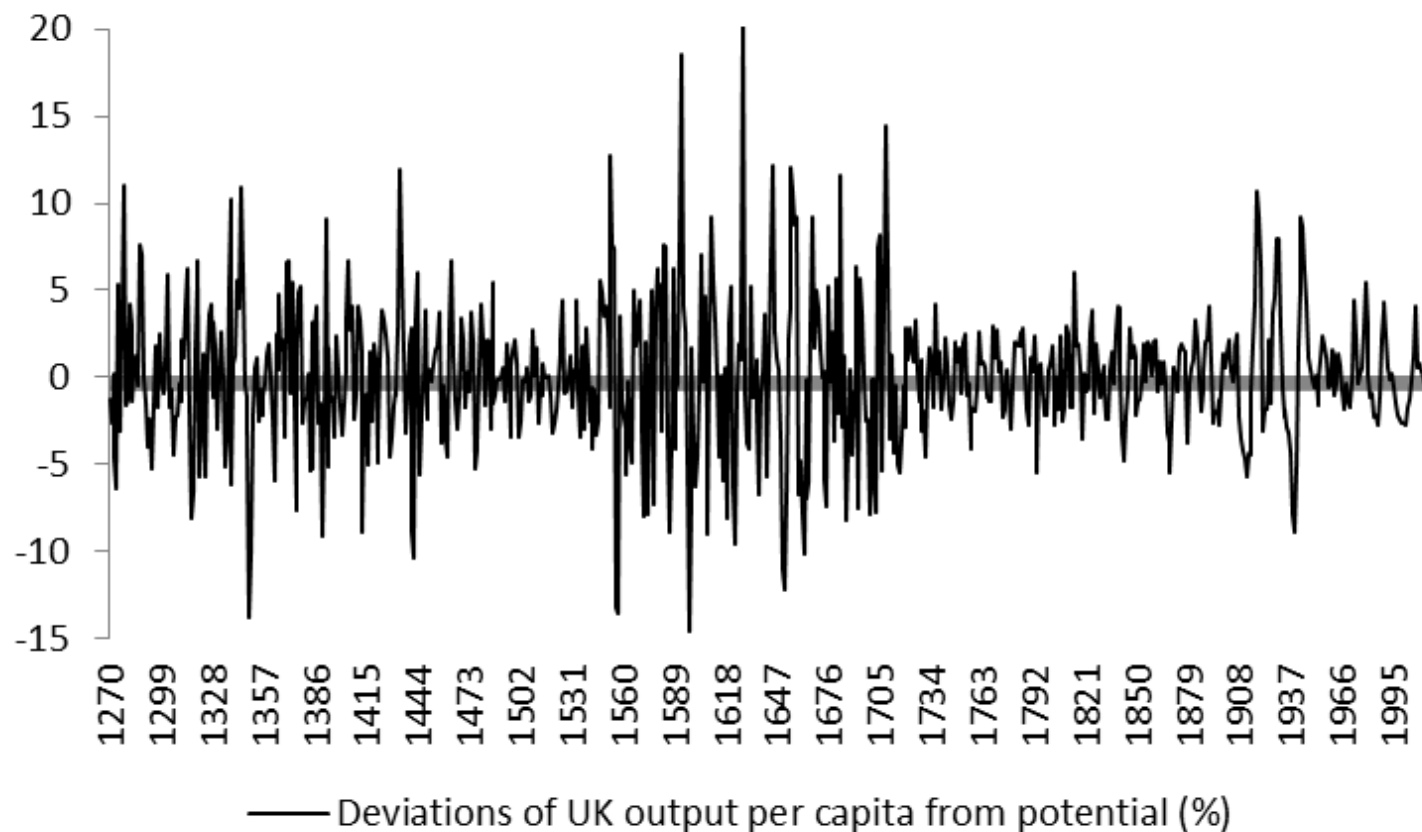


Source: Bank of England, A millenium of macroeconomic data for the UK



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Fluctuations not always 'cyclical'

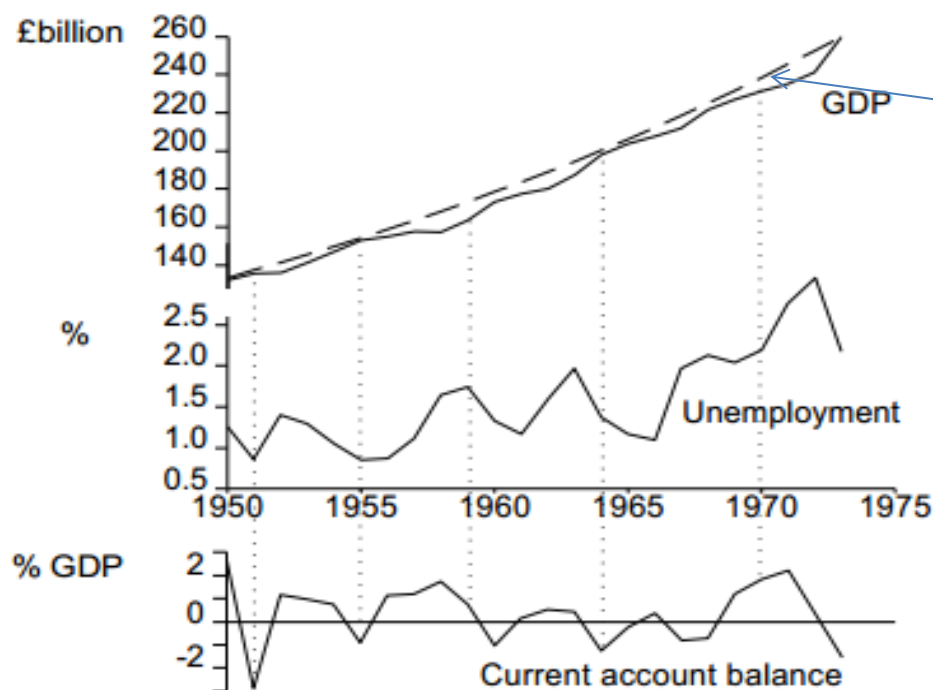


Source: Bank of England, A millenium of macroeconomic data for the UK



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Example: UK stop-go cycle 1950-73



Potential output here estimated by joining peaks in actual output

Figure 1.10 The business cycle, 1950-73

Source: Economic Trends.



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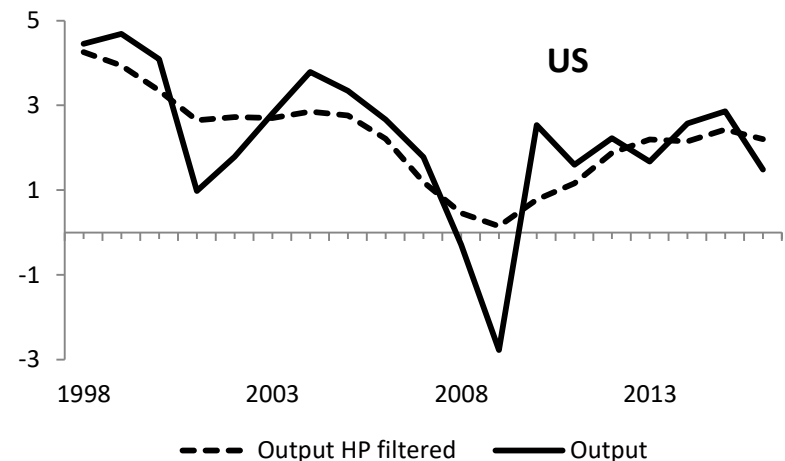
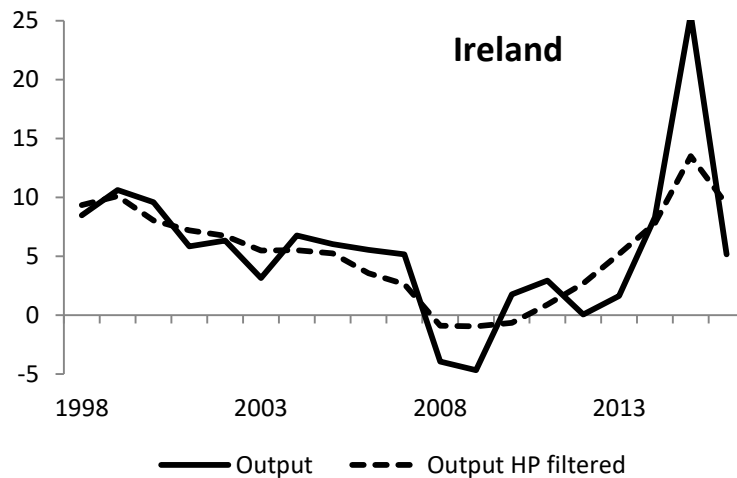
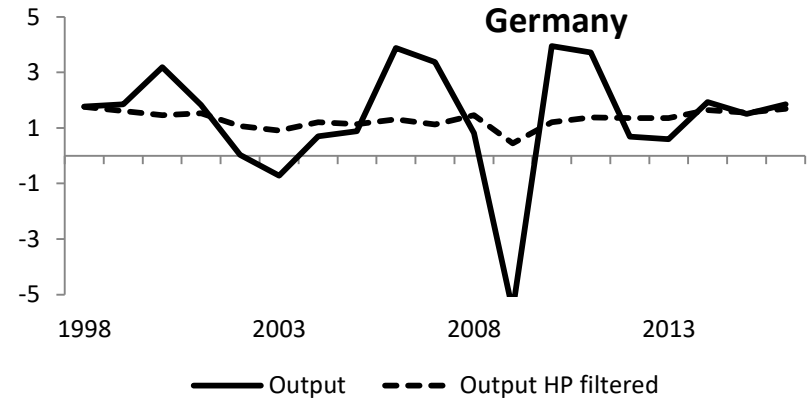
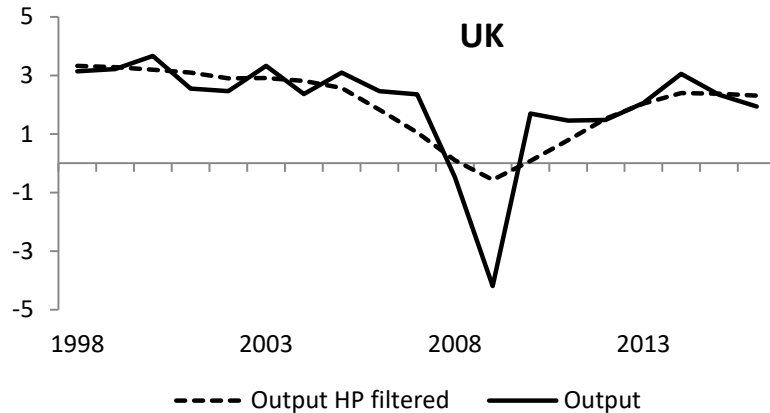


Approaches to measurement (see Casey, 2018):

- **Univariate** filters can be mechanically applied to output data to estimate trend, but:
 - have severe end-point problems
 - Misleading across structural breaks
 - ‘Worse than useless’ (Christiano and FitzGerald, 2003)
- **Multivariate** filters augment output data with other cyclical data. Blagrove *et al* (2015) derive estimates of the output gap using Phillips curve and Okun’s law. But they note these are:
 - ‘least bad’ among a host of mediocre choices—there is no panacea to the problem of estimating potential output



Example of simple univariate filter approach

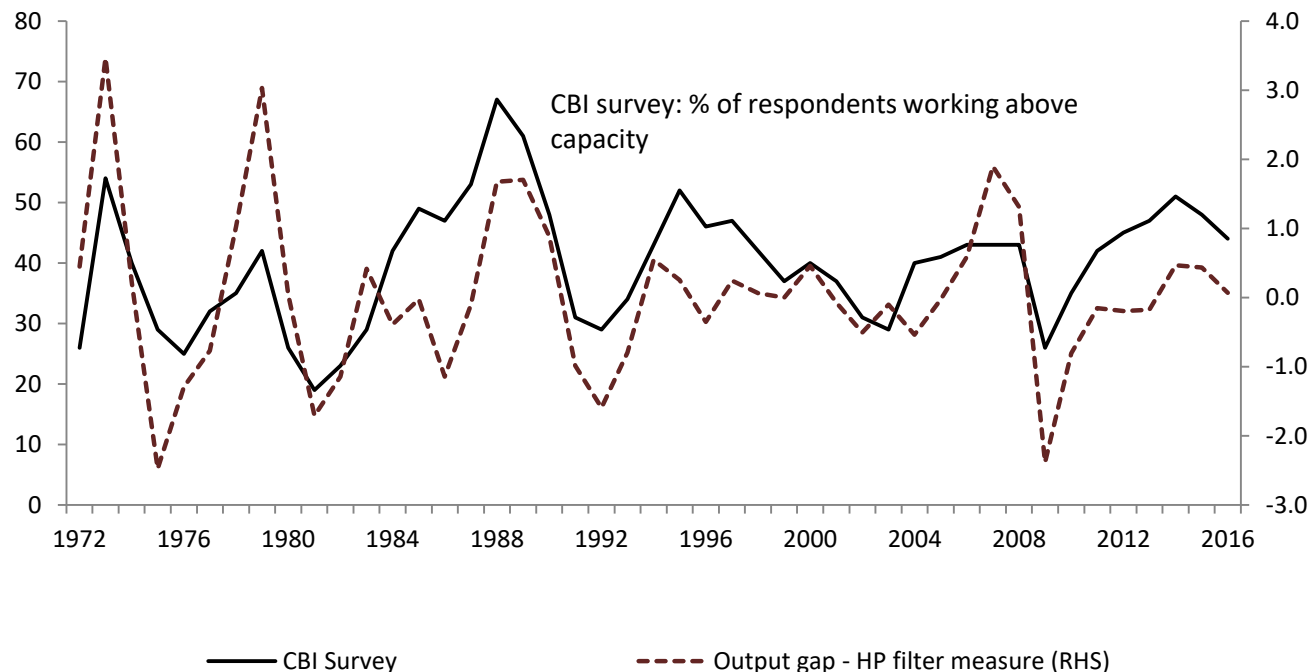


Approaches to measurement:

- **Cyclical indicators** attempt to measure state of the **cycle** directly from business surveys, recruitment difficulties etc, but:
 - Tend to focus on sectors where measurement is easy
 - Not obvious how to weight different indicators to produce overall estimate



Example of cyclical indicator approach



Approaches to measurement:

- **Production functions and structural modelling** attempt to measure potential output from available resources. Example:

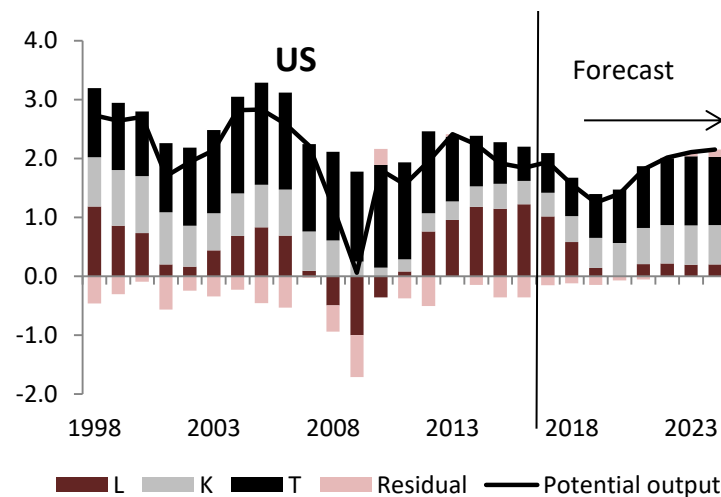
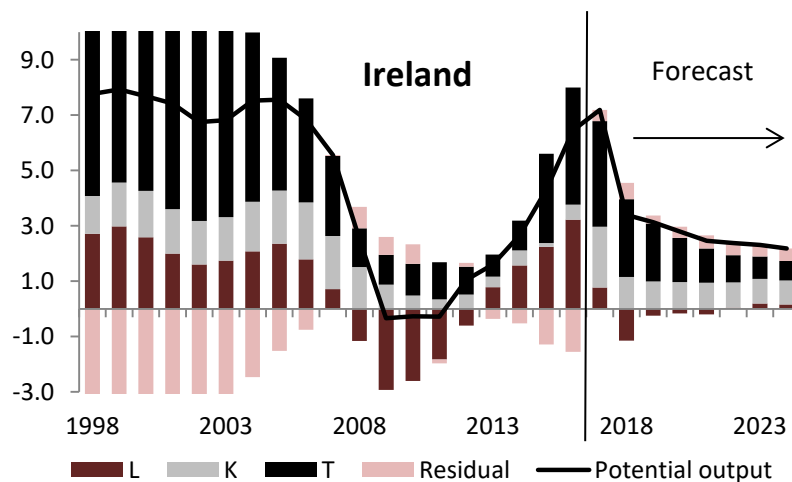
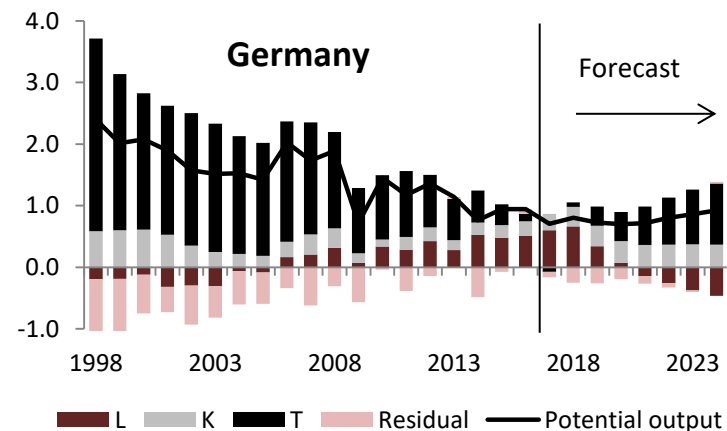
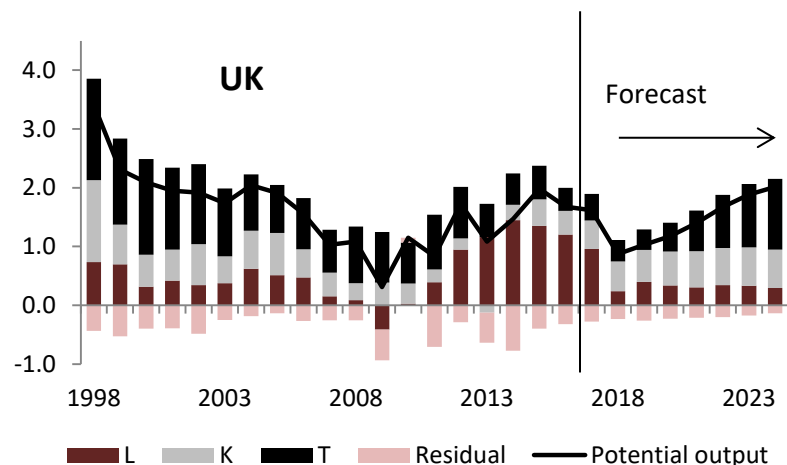
$$Q = \gamma \left[s(K)^{-\rho} + (1-s)(Le^{\lambda t})^{-\rho} \right]^{-1/\rho} M^{1-\alpha}$$

where K is the net capital stock, L is trend employment, M is material inputs, λ is labour augmenting technical progress.

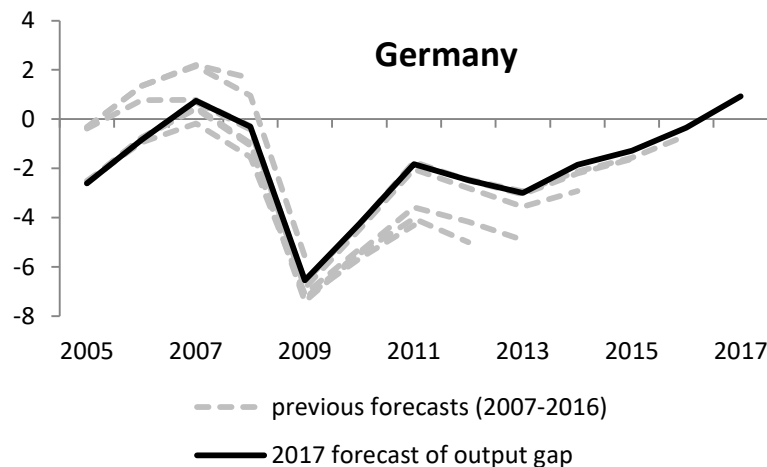
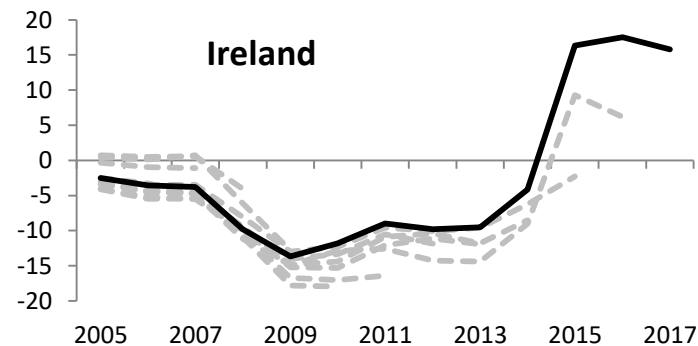
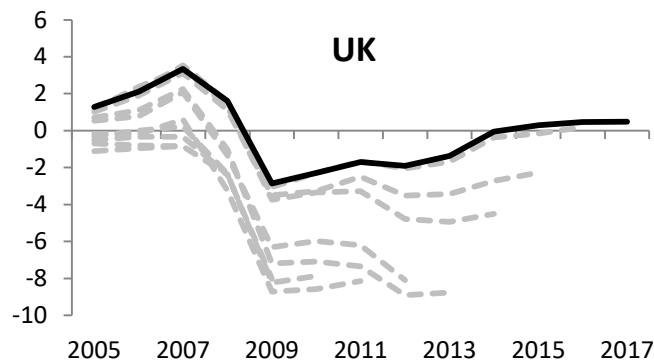
- **Advantages** of this approach:
 - Provides a narrative for potential output movements
 - Identifies policies to increase potential output



Contributions to potential output (NiGEM)



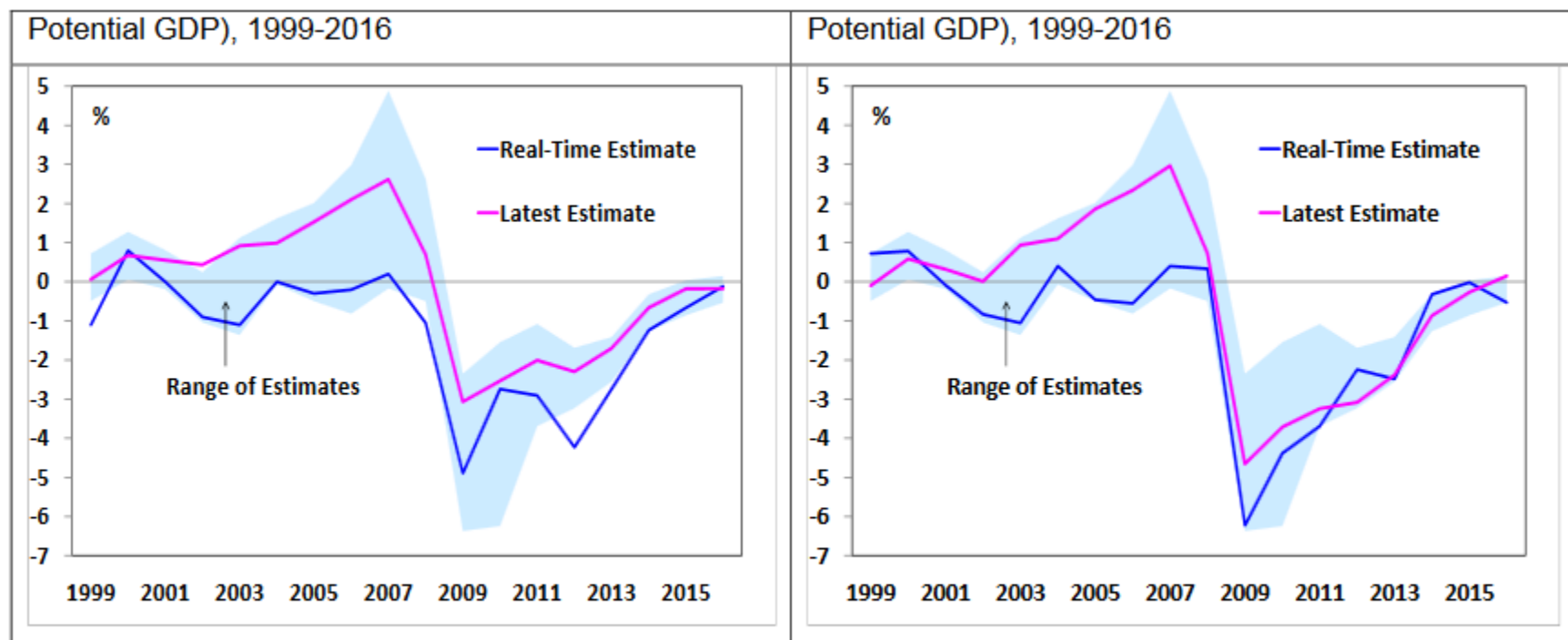
Revisions to potential output (NiGEM)



Revisions to UK output gap

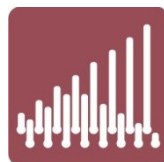
Figure 8. IMF Estimates of UK Output Gap (as Pct

Figure 9. OECD Estimates of UK Output Gap (as Pct



Note: For both charts, the real-time estimate is that published at the end of each calendar year for the same year. The range of estimates show figures for the output gap in each year published after that year. Sources: IMF, OECD and BoE

Source: Speech by Michael Saunders, Monetary Policy Committee



Revisions from other sources (OECD)

	2007 Output gap			2009 Output gap		
	Initial estimate	Most recent estimate	Revision	Initial estimate	Most recent estimate	Revision
United States	0.4	2.6	2.2	-5.1	-4.6	0.6
Japan	0.5	2.5	2.0	-5.5	-5.1	0.4
Germany	0.5	2.3	1.8	-5.2	-5.2	0.1
France	0.3	2.3	2.0	-4.5	-2.8	1.7
United Kingdom	0.2	3.4	3.1	-6.4	-3.7	2.6
Italy	-1.2	3.0	4.2	-5.5	-4.0	1.5
Canada	0.2	1.2	1.1	-5.5	-4.0	1.5
Average			2.3			1.2

Note: The "initial estimate" for 2007 (2009) is taken from the May 2008 (2010) *OECD Economic Outlook* when output data for 2007 (2009) would first have been available. The most recent estimate is taken from the November 2015 *OECD Economic Outlook*.

Source: May 2008 and November 2015 OECD Economic Outlooks



Summary on approaches to measurement :

- **All** methods of cyclical adjustment have shortcomings as require assessment of unobservable state. Work best when main source of volatility is shocks to demand.
- **Structural** methods preferred as they provide a narrative, but vulnerable to shocks with structural consequences

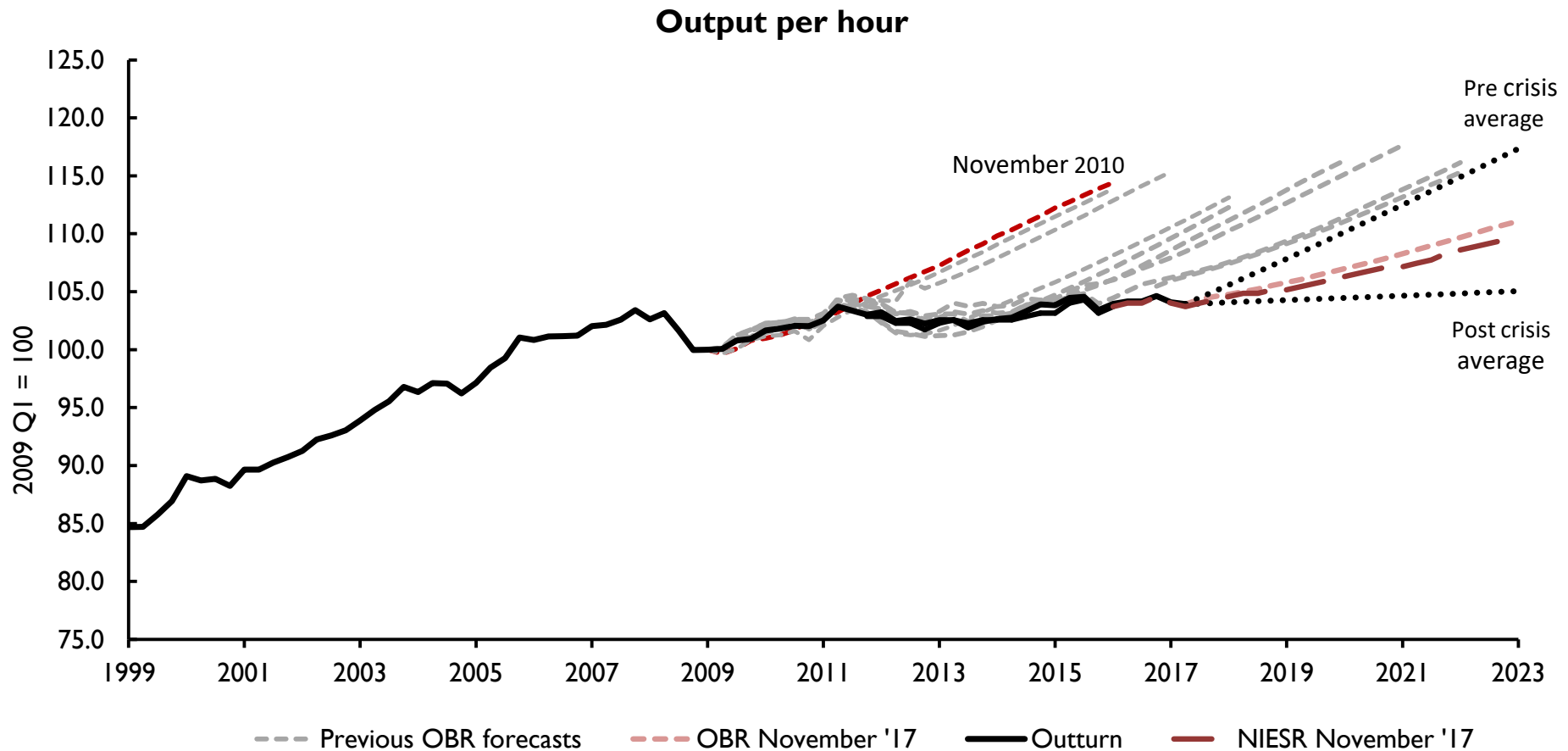


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UK productivity has been persistently below expectations

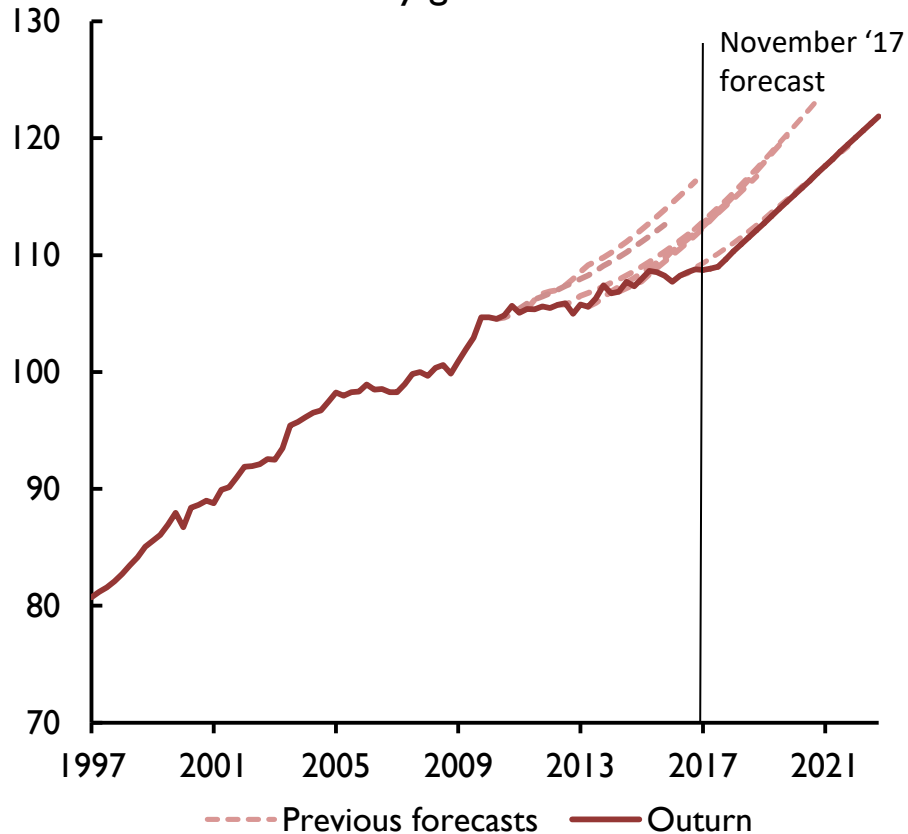


Source: OBR, NiGEM Database

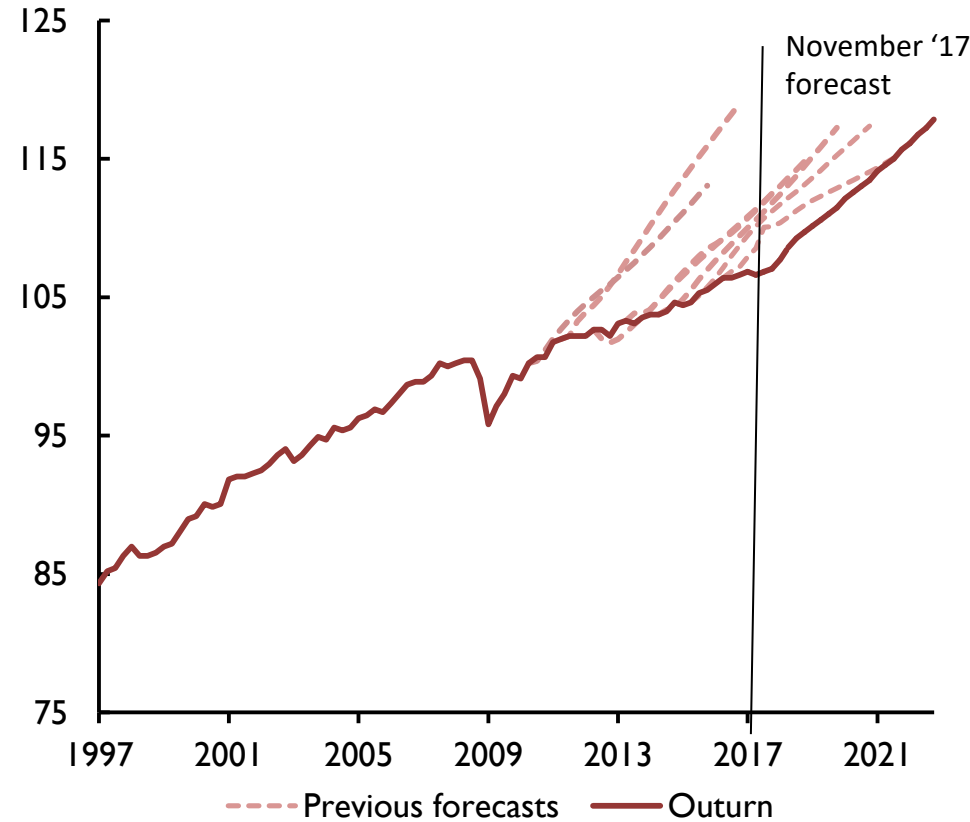


Productivity disappointment common across countries

Productivity growth in the US



Productivity growth in Germany



Note: 2007 Q4 = 100

Source: NiGEM Database and NIESR forecast



Possible causes of disappointing productivity

- Effect of tight credit conditions
 - Response to effective labour supply increase (China)
 - End of invention (Gordon)
 - Mis-Measurement
 - Response to persistent weak aggregate demand
 - Unemployment, weak wages, substitution of labour for capital, rates at ZLB
-



Is productivity slowdown due to banking sector impairment?

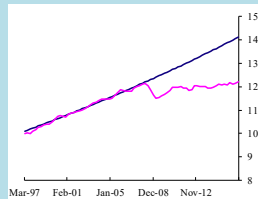
Consensus that banking sector was impaired and this impacted non-financial companies, but:

- Productivity weakness has outlasted Global Financial Crisis
 - Productivity weakness widespread across nearly all industries and not just bank-dependent ones
 - Bank forbearance not correlated with unexplained productivity weakness
 - Firm-level evidence points to importance of ‘within-firm’ effects and only modest contribution from reduced reallocation
 - Little evidence now of zombification: firms operating at full capacity and very high levels of employment
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Productivity below pre-crisis trend nearly everywhere

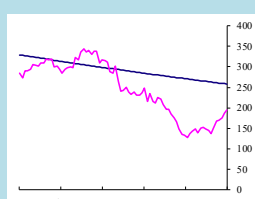
Whole economy



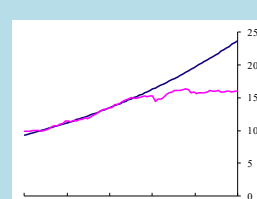
AGRICULTURE, FORESTRY AND FISHING



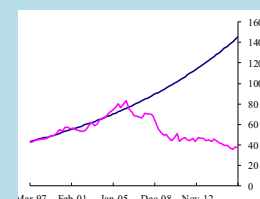
MINING AND QUARRYING



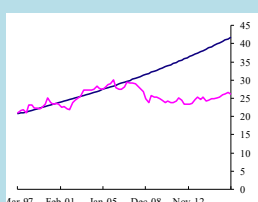
MANUFACTURING



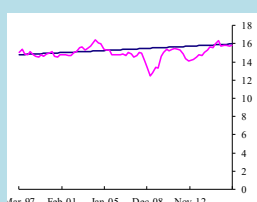
ELECTRICITY, GAS, STEAM AND AIR CONDITIONING SUPPLY



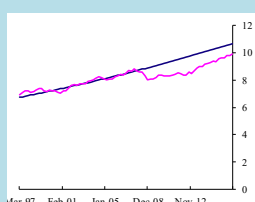
WATER SUPPLY; SEWERAGE, WASTE MANAGEMENT AND REMEDIATION



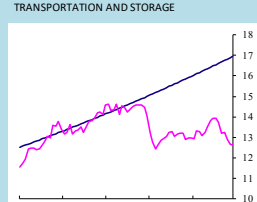
CONSTRUCTION



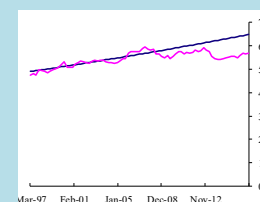
WHOLESALE AND RETAIL TRADE; REPAIR OF MOTOR VEHICLES AND MOTORCYCLES



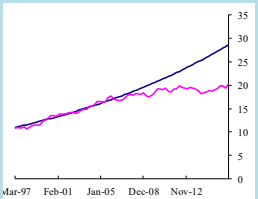
TRANSPORTATION AND STORAGE



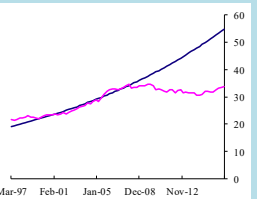
ACCOMMODATION AND FOOD SERVICE ACTIVITIES



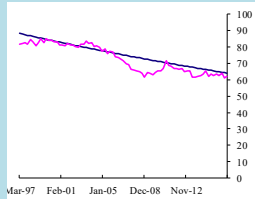
INFORMATION AND COMMUNICATION



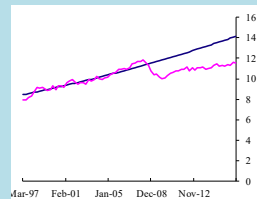
FINANCIAL AND INSURANCE ACTIVITIES



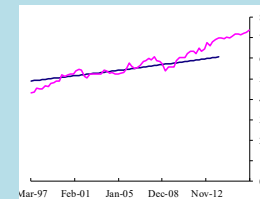
REAL ESTATE ACTIVITIES



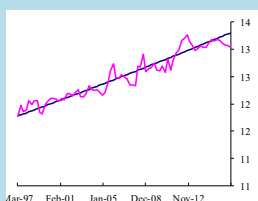
PROFESSIONAL, SCIENTIFIC AND TECHNICAL ACTIVITIES



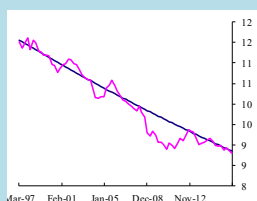
ADMINISTRATIVE AND SUPPORT SERVICE ACTIVITIES



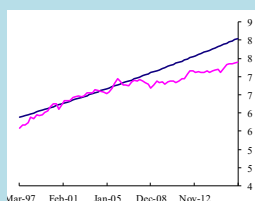
PUBLIC ADMINISTRATION AND DEFENCE; COMPULSORY SOCIAL EDUCATION



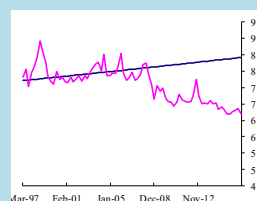
Other service activities



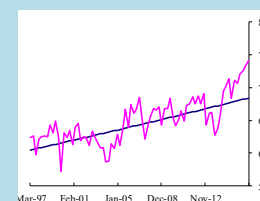
HUMAN HEALTH AND SOCIAL WORK ACTIVITIES



ARTS, ENTERTAINMENT AND RECREATION

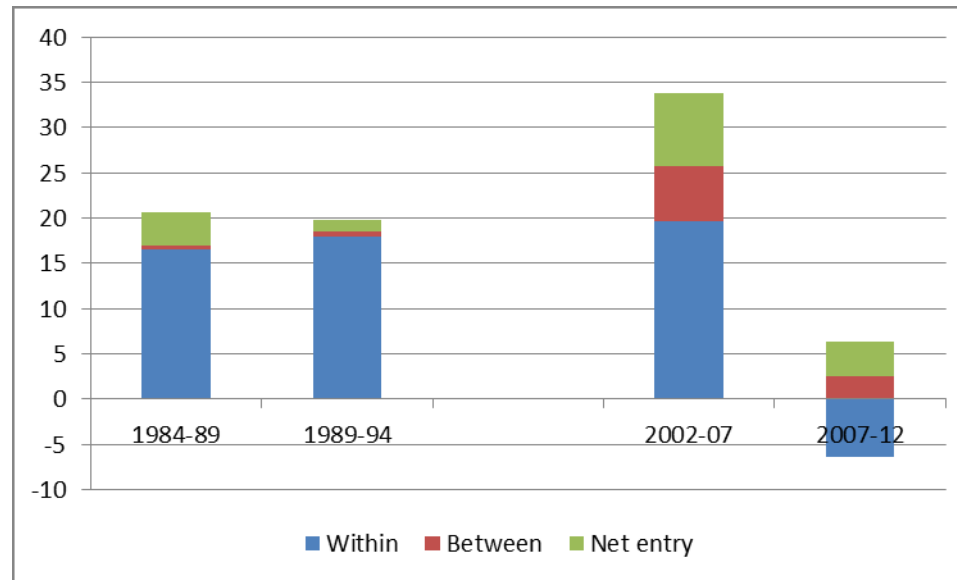


Other service activities



Comparison with early 1990s recession suggests different source of shock

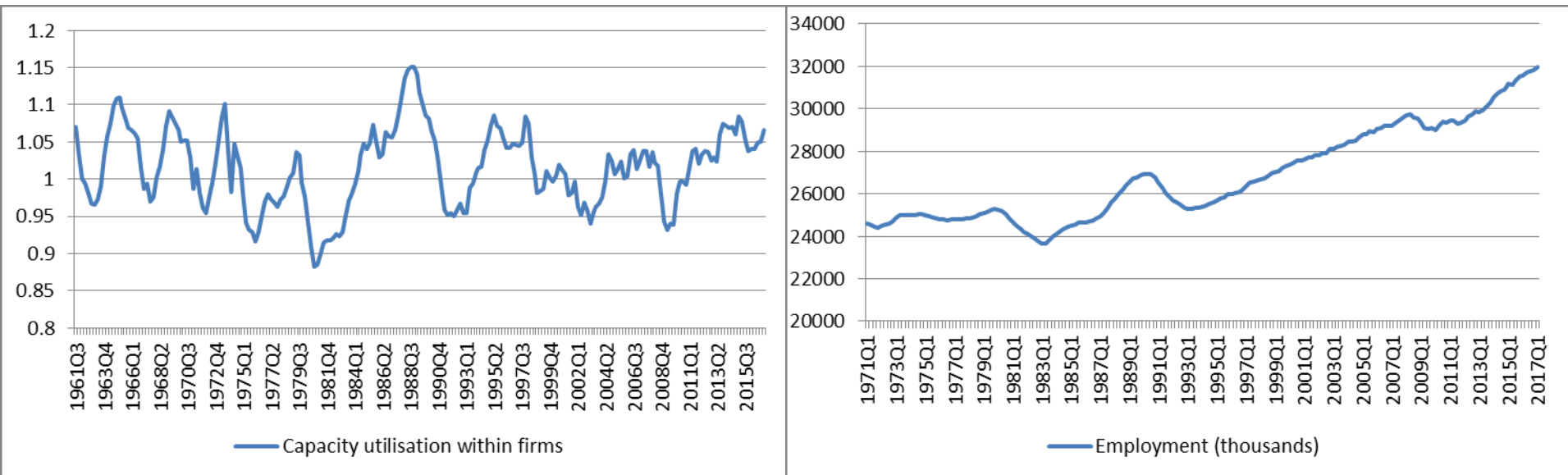
Manufacturing recessions compared: decomposition of 5-year changes in labour productivity (%)



Source: Riley et al, UK productivity puzzle, Bank of England SWP No. 531 (June 2015)



Little evidence now of zombification or spare capacity



Capacity utilisation within firms and employment are at historically high levels

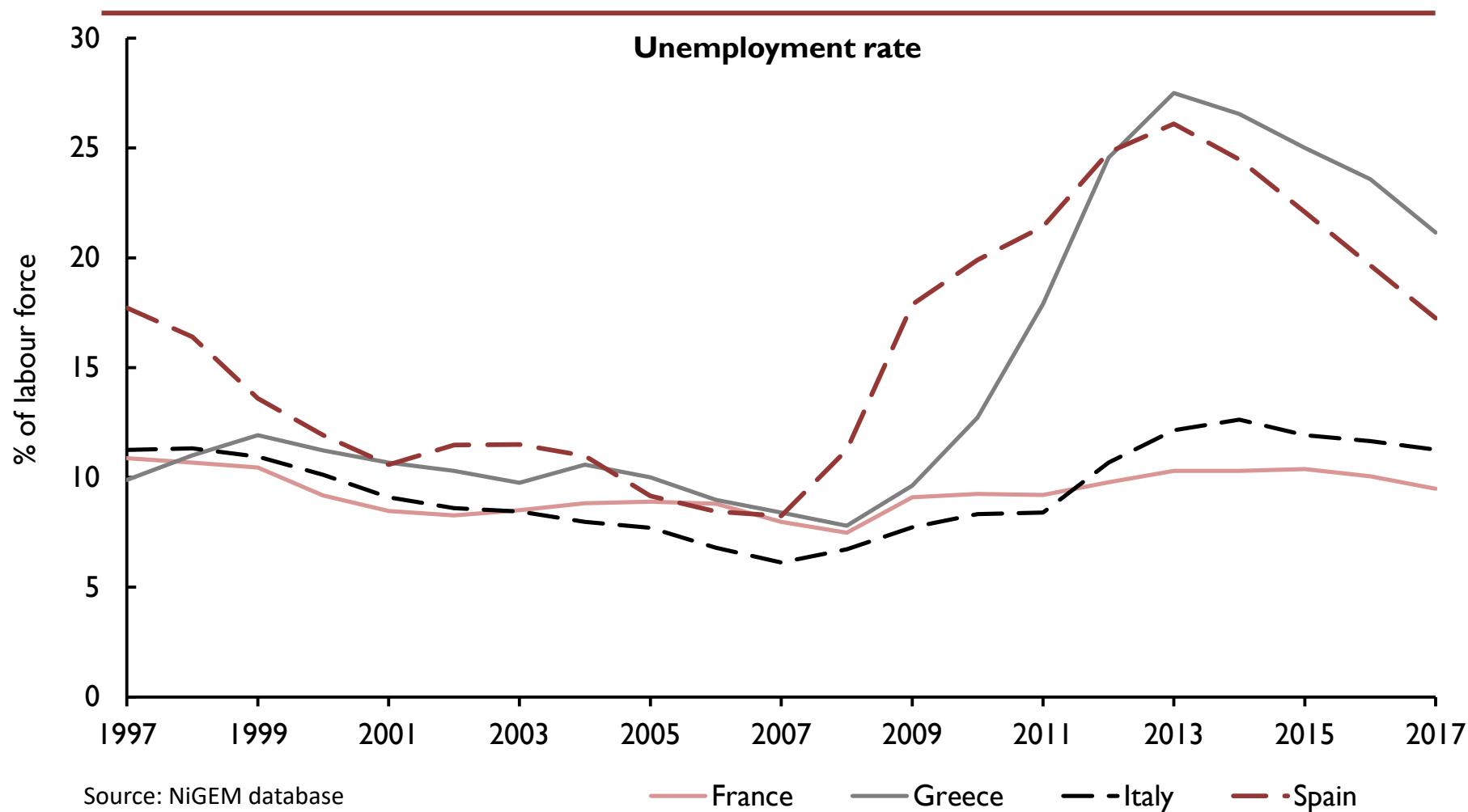


Alternative explanation

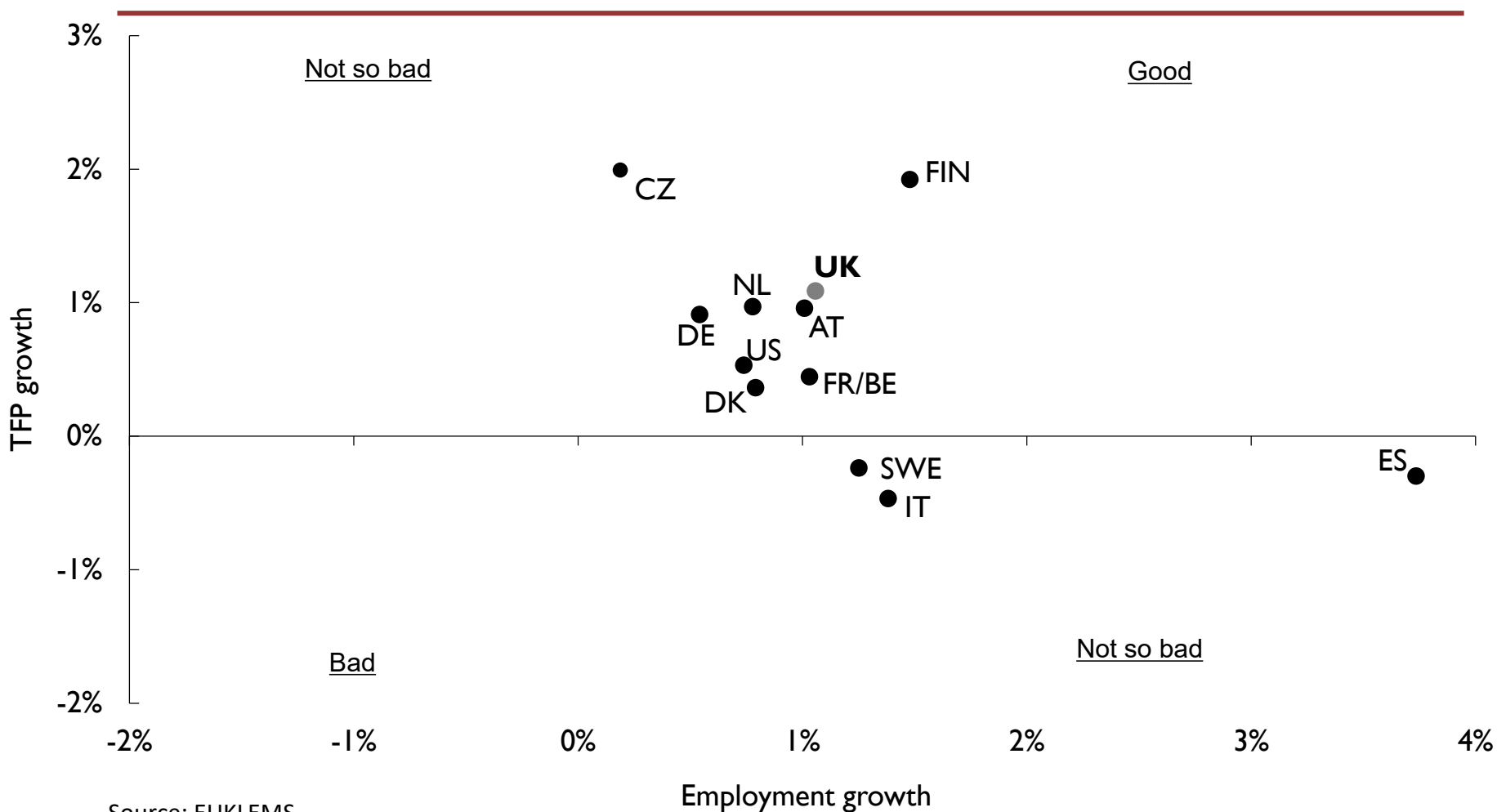
- Persistent weakness of demand relative to supply triggered by financial crisis
- Initially countered by expansionary monetary and fiscal policies
- But fiscal austerity policies introduced in a number of countries before economies had recovered and while interest rates at ZLB
- Unemployment in excess of natural rate put downward pressure on wages and encouraged businesses to substitute labour for capital and engage in fewer productivity enhancing activities
- Adjustment and impact on potential output likely to be different in different countries.



Unemployment in selected countries



TFP and employment growth



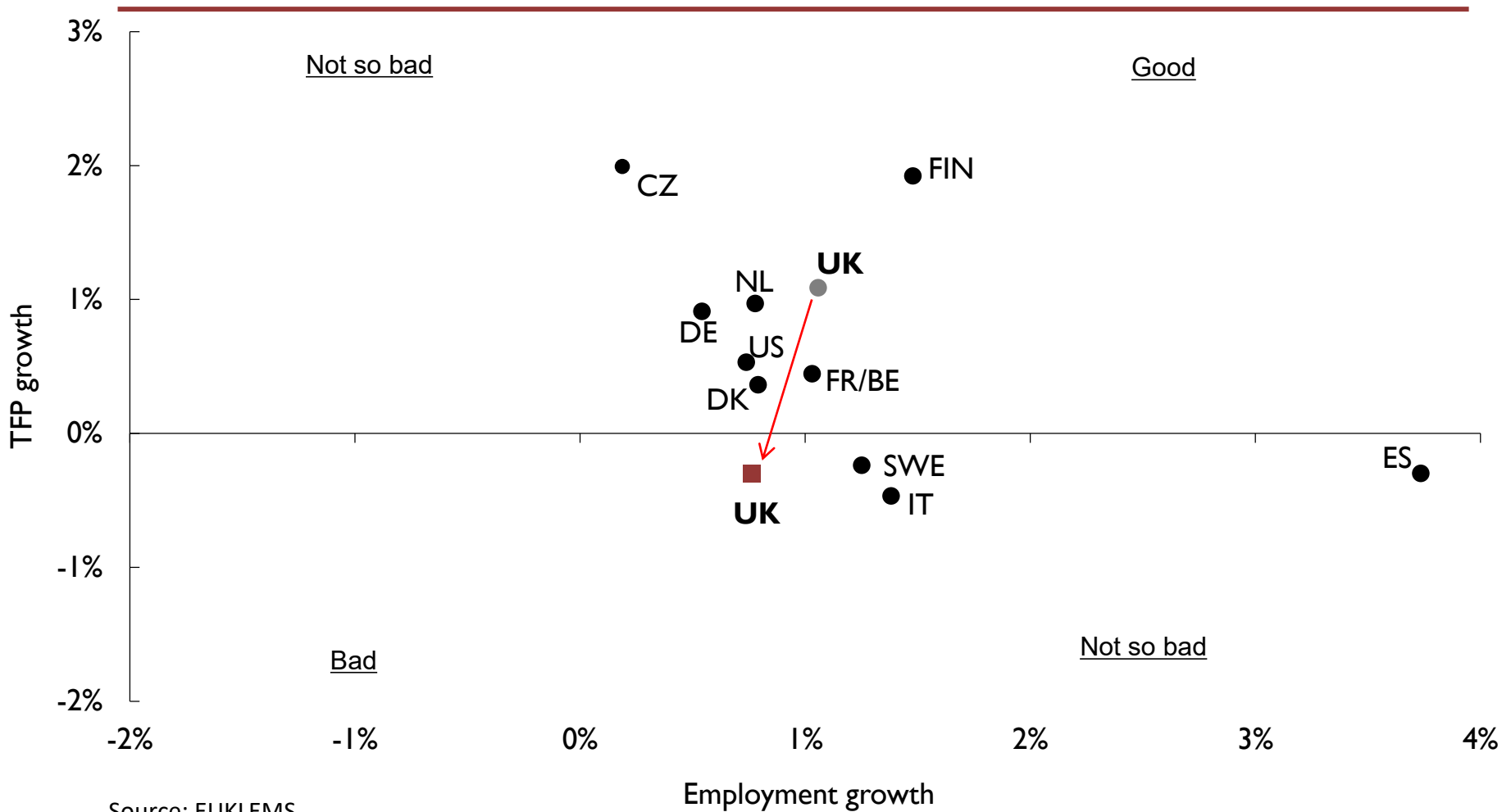
Source: EUKLEMS



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● 1999-2007
■ 2008-2015

TFP and employment growth



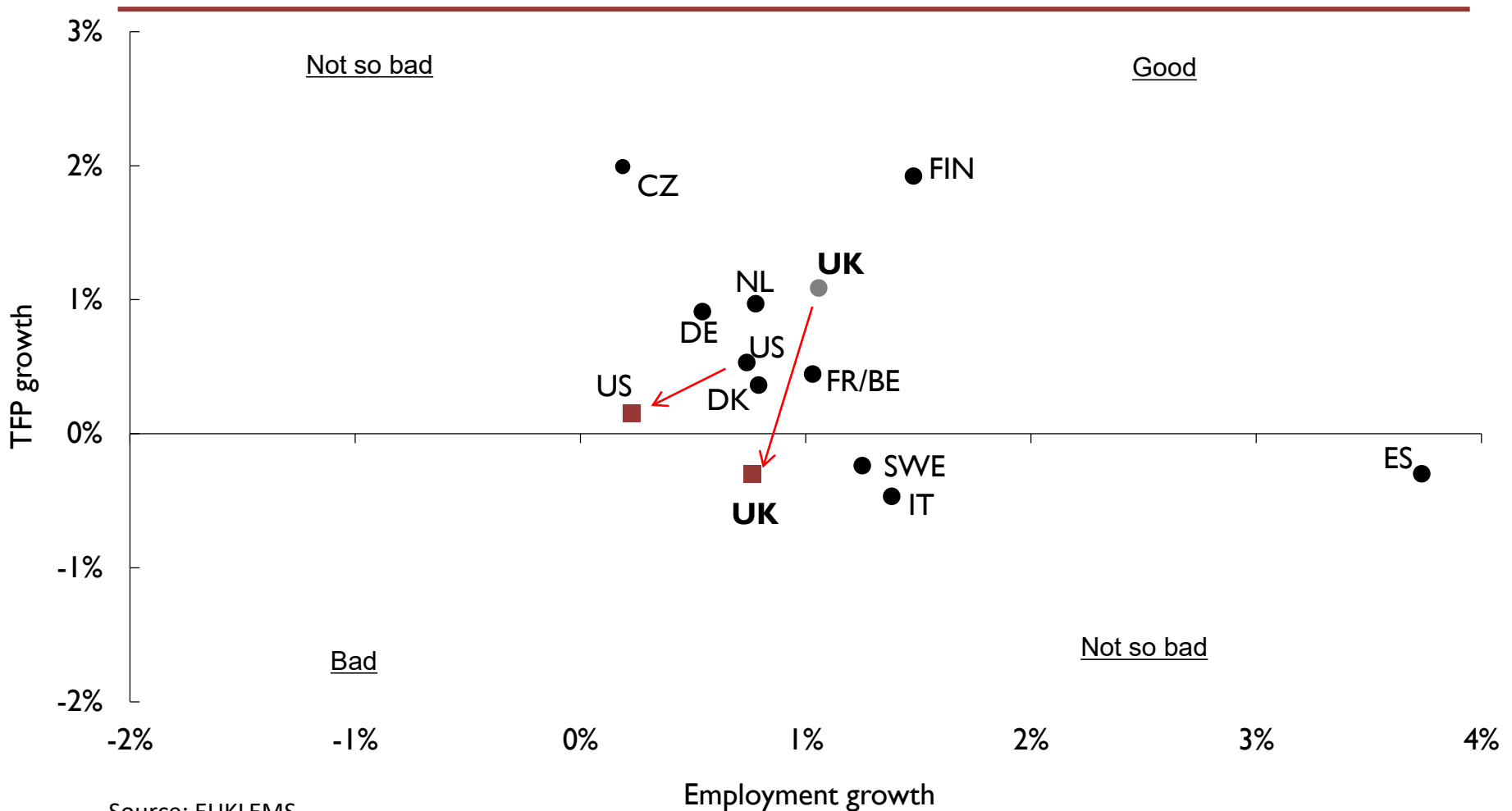
Source: EUKLEMS



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TFP and employment growth



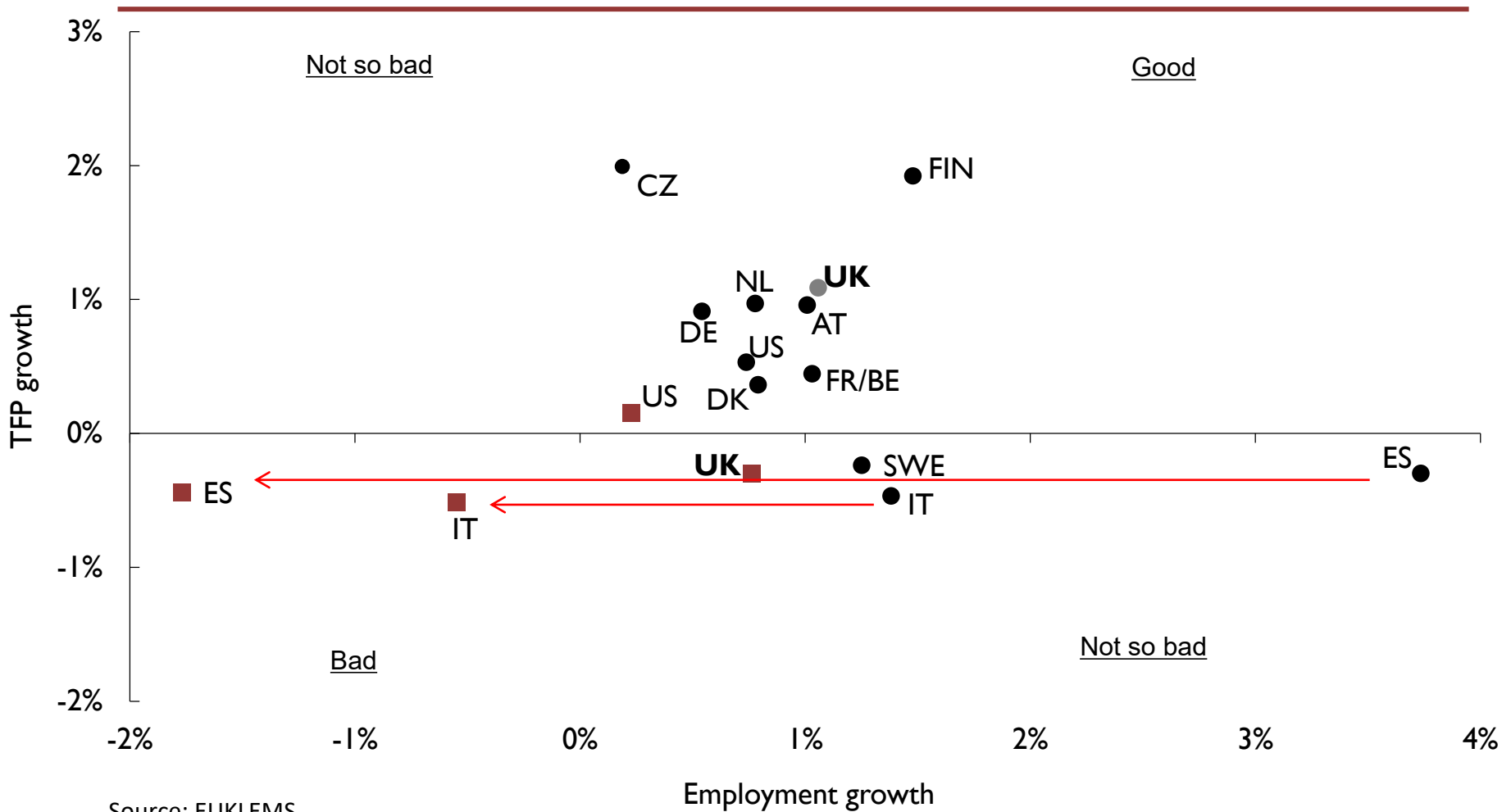
Source: EUKLEMS



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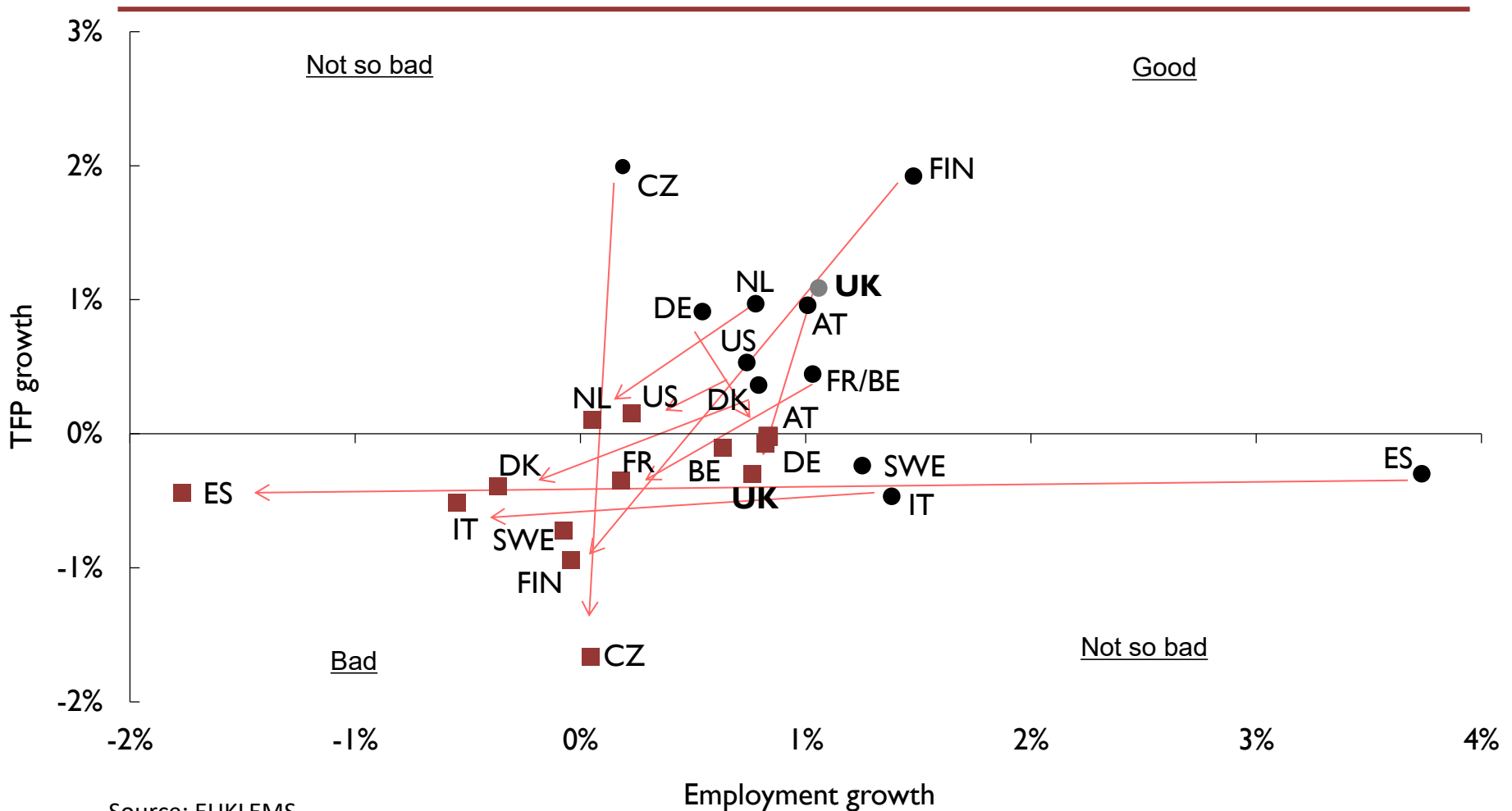
TFP and employment growth



Source: EUKLEMS



TFP and employment growth



Hysteresis



Implications of different explanations of productivity puzzle

- If puzzle due to fall in sustainable TFP growth (Gordon), then fiscal policy rightly tightened at early stage of recovery.
- But if puzzle due to **hysteric** effect of weak demand, then fiscal austerity likely to have contributed to weak growth of potential
- **Clearly important for new research to distinguish between these hypotheses**



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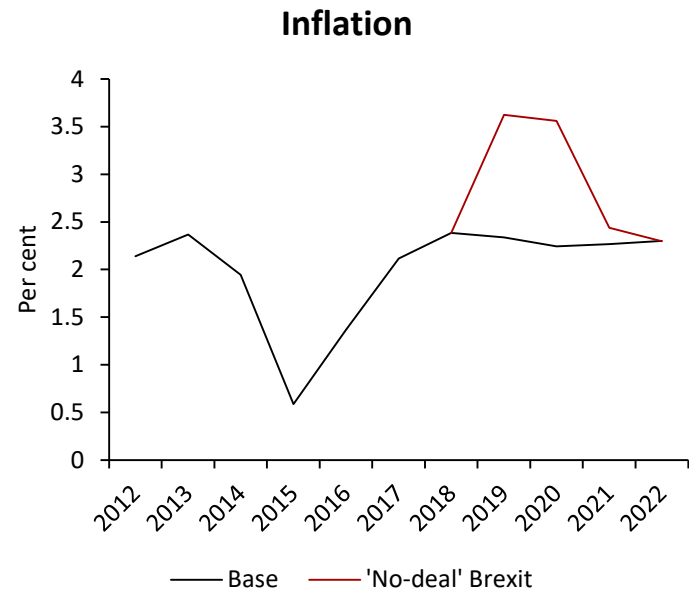
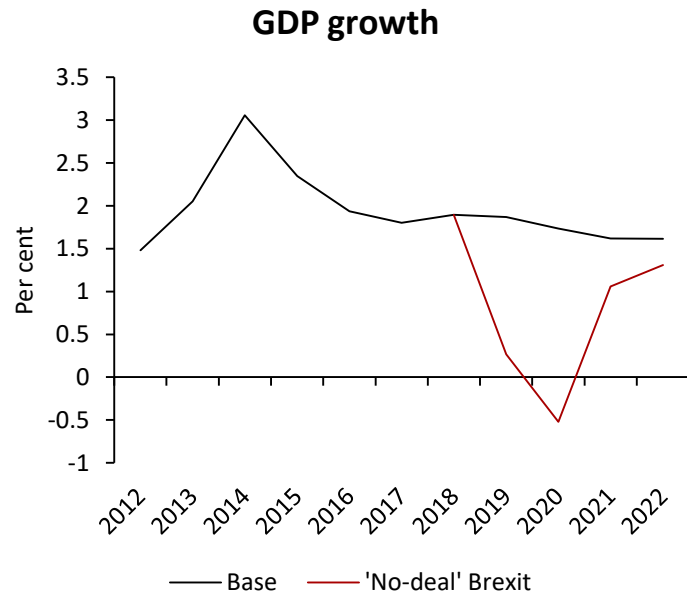
Transmission channels of Brexit

Channel	Rationale
1 Reduction in trade	<ul style="list-style-type: none">• Tariff and non-tariff barriers reduce trade volume between UK and EU
2 Foreign Direct Investment	<ul style="list-style-type: none">• Free movement of capital makes it easier to invest• The reduction in trade makes the UK a less attractive FDI destination
3 EU budget contributions	<ul style="list-style-type: none">• Depending on the continued participation in EU programmes budgetary contributions will reduce and can be recycled into domestic spending
4 Migration	<ul style="list-style-type: none">• Barriers to movement of labour from the EU may be put in place• The UK may become a less attractive destination for workers from the rest of the world
5 Productivity	<ul style="list-style-type: none">• Immediate: rebalancing of the economy to less productive industries as trade impeded• Long-run: less competition due to reduced trade, lack of FDI and skilled migration reduce productivity while lack of unskilled migration may encourage innovation
6 Uncertainty	<ul style="list-style-type: none">• Not considered in the long run

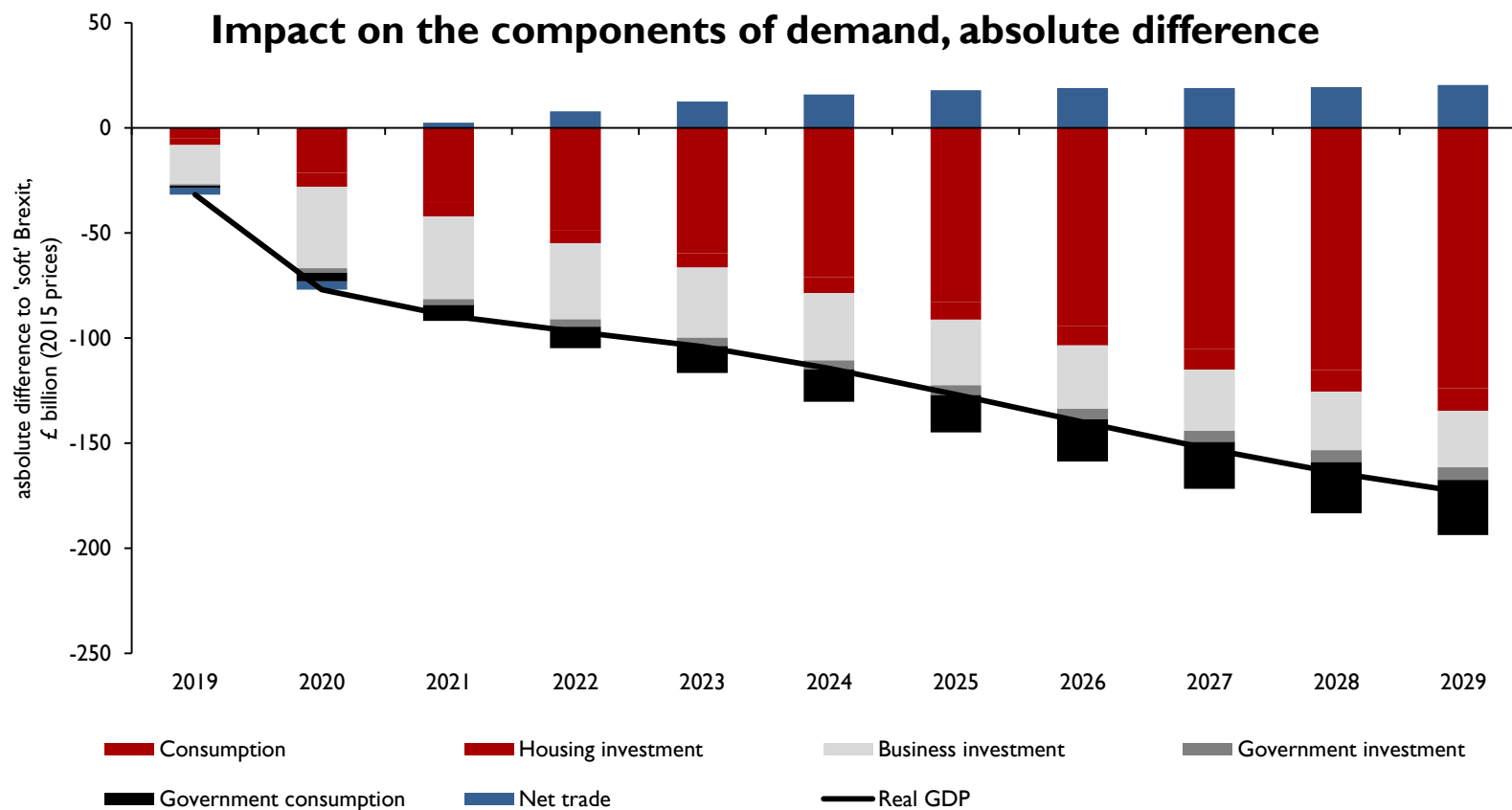


Short-term impact

- If negotiations were to fail and the UK would revert to trade under WTO rules in 2019, a mild recession would set in and inflation rise.

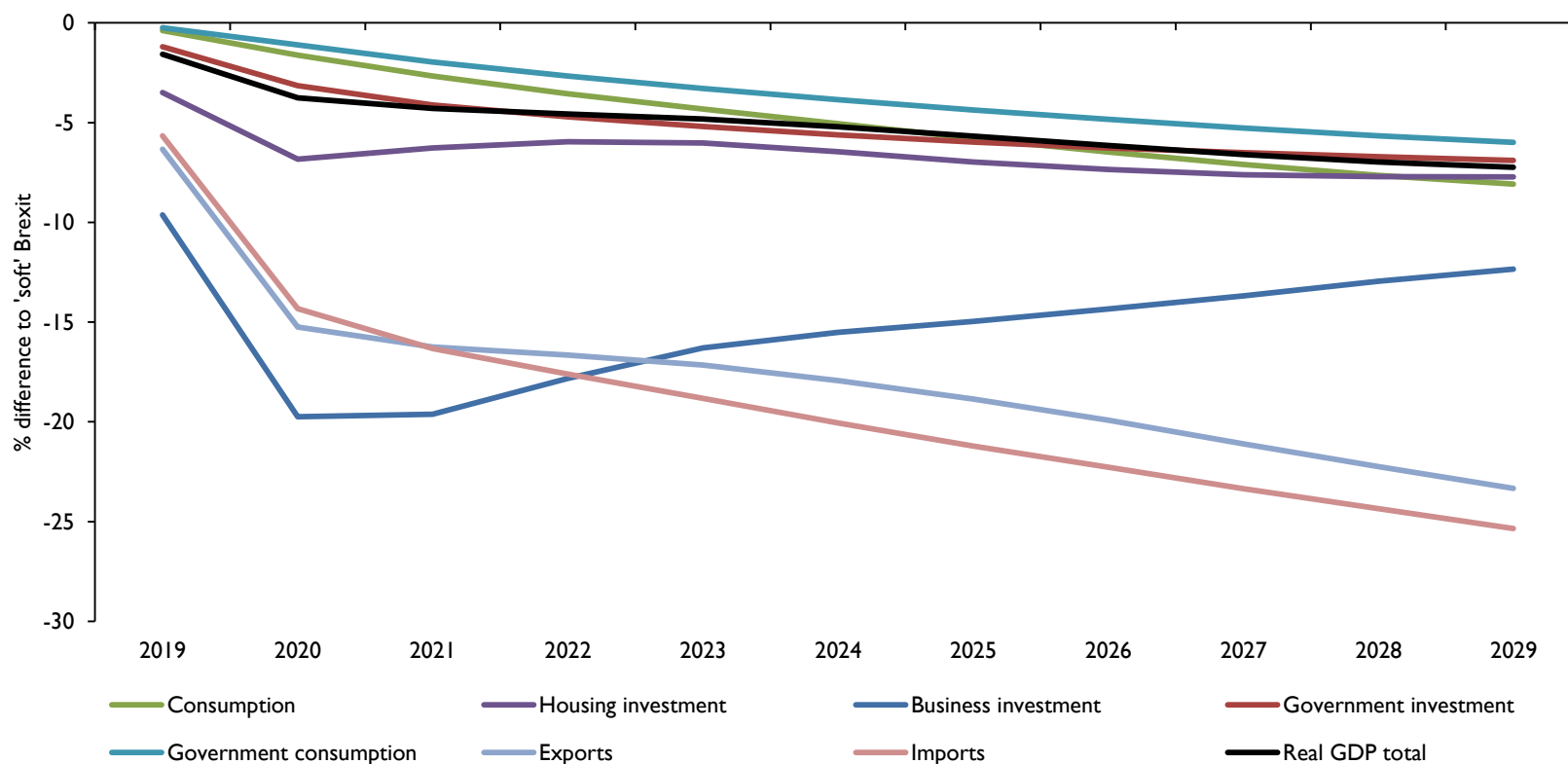


Long-term impact



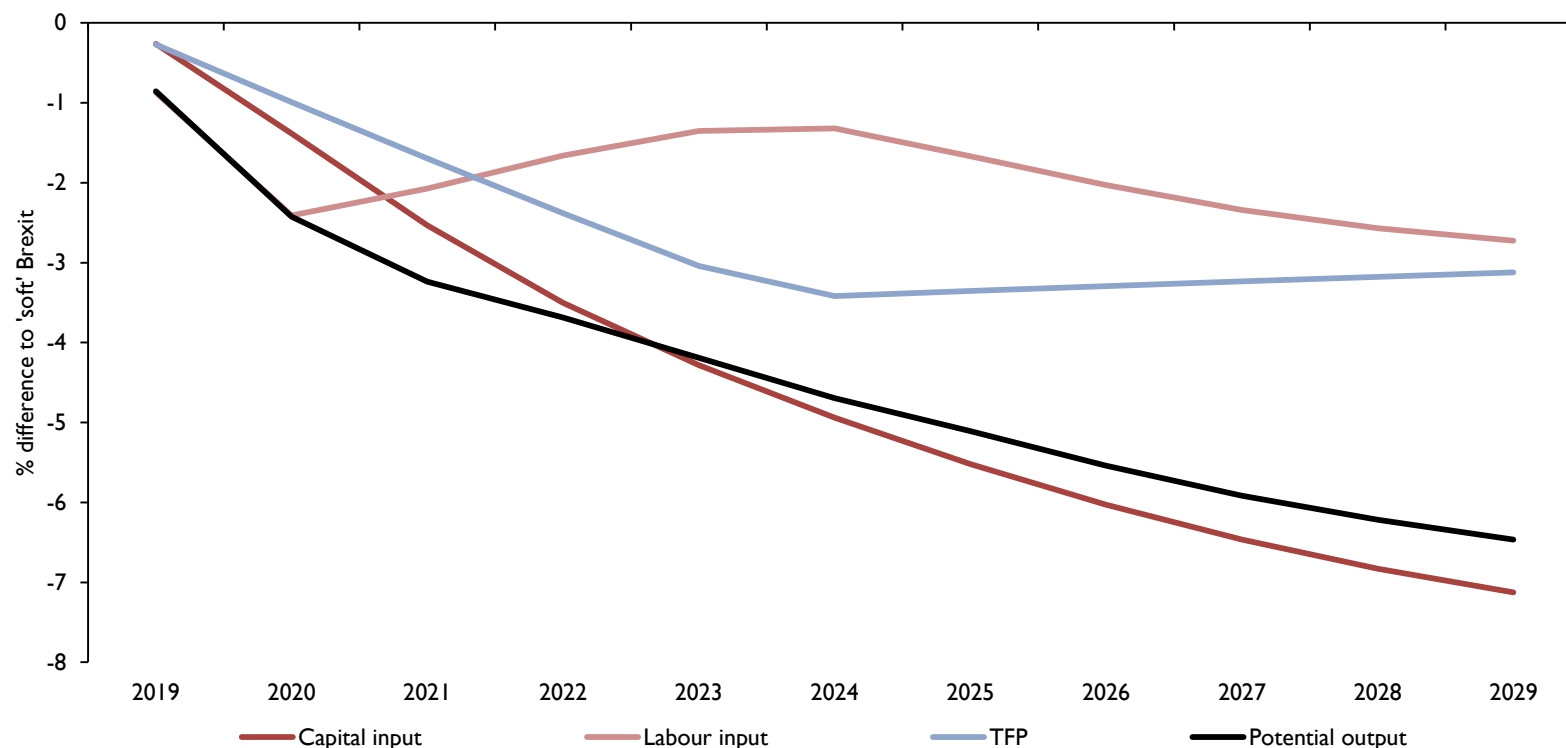
Long-term impact

Impact on components of demand, % difference



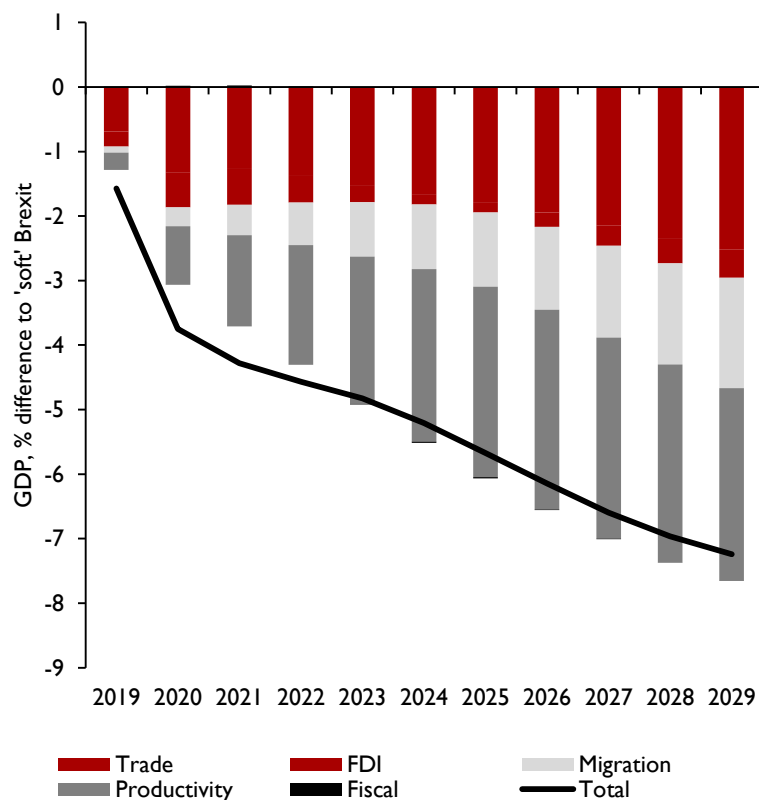
Long-term impact

Impact on components of supply, % difference

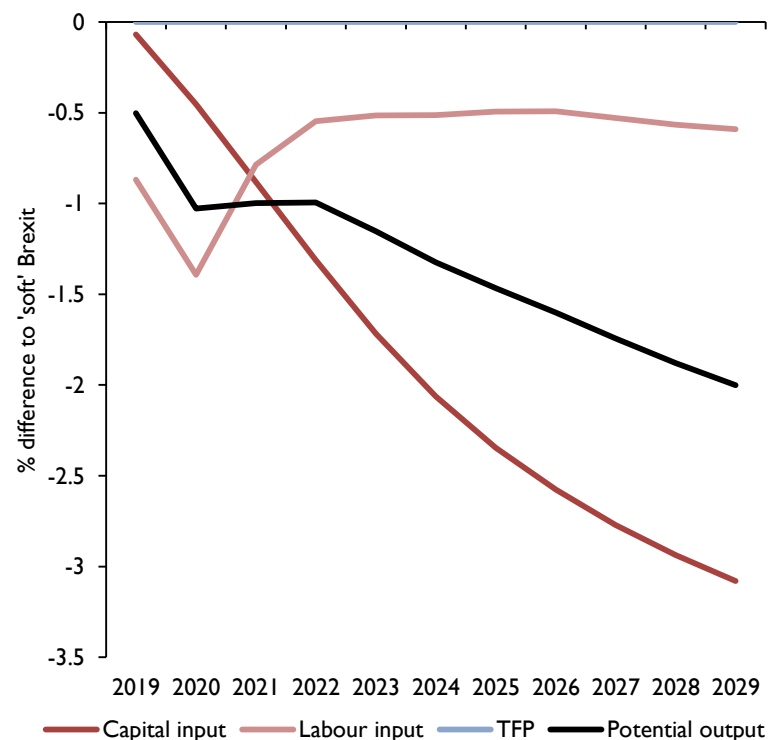


Long-term impact

Impact on real GDP by source

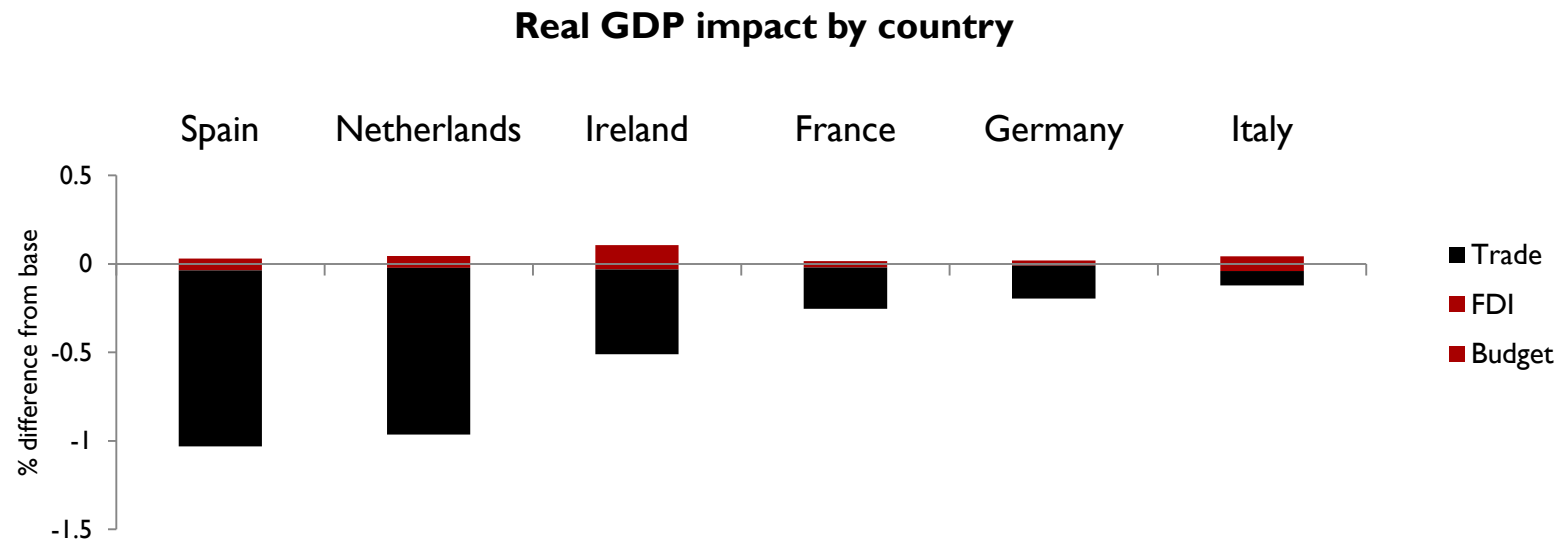


Impact of trade shock on components of supply



Impact on other countries

- To simulate effects on euro area countries, we adopt mirroring trade share, FDI and fiscal shocks.
- The impact varies according to trade links and openness.



Implications of Brexit for measurement of cycle

- Shows the benefits of structural approach over statistical approaches to analysing impact of structural shocks
- But effects shown are very uncertain



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Alternatives to cyclical adjustment

- The unreliability of estimating potential output and output gap considerably complicates fiscal policy process.
- Due to the nature of structural shocks, it is unlikely that this can be easily remedied.
- Need to face up to uncertainty and develop **policy framework** that is **robust** to uncertainty about cycle.
- What should such a framework consist of?
- For **monetary policy**, subject to similar pressures, central bank has operational independence, clear forward-looking targets, transparency and accountability. Possible for fiscal policy?



Robust policy framework?

NIESR Press Release: Tuesday 19th July 2005: 1200 hours

HM Treasury has today released a working paper on the measurement of the economic cycle. This shows that the current economic cycle began in 1997 rather than 1999 as HM Treasury has previously thought.

NIESR work has shown that **standard methods of measuring the output gap tend to be subject to revision** and it is therefore not surprising that HM Treasury should change its view. Previous comment by NIESR has drawn attention to the likelihood of this happening with **harmful consequences for the credibility** of the Government's fiscal rules.

The fiscal position, measured over the cycle as the Treasury now define it is more favourable than was the case using their previous estimates because the surpluses in 1997-1999 now count towards the position in the current cycle. NIESR's view is that events between 1997 and 1999 do not have much practical bearing on the current soundness of fiscal policy. We consider that the "Golden Rule" of maintaining the current budget in balance or surplus should be **replaced by an independent expert assessment of whether the current budget is expected to be in balance or surplus in the medium term.**



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Independent expert assessment

- In UK, **OBR** is responsible for economic and fiscal forecasting, evaluating performance against targets, sustainability and balance sheet analysis, evaluation of fiscal risks, scrutiny of costings.
- In Ireland, **IFAC**'s purpose is to provide an independent assessment of official budgetary forecasts and proposed fiscal policy objective.
- But, independent assessment not a panacea if fiscal rules are not well designed.



Issues with independent forecasts

Thursday, 9 April 2015

Cyclically adjusted deficits and instability

Jean Pisani-Ferry, currently advising the French government and former director of Bruegel (the Brussels-based economic think tank) has [written](#) a heartfelt plea for more stability in the Commission's estimates of potential output. The reason is straightforward. The Eurozone's fiscal rules require meeting targets for cyclically adjusted deficits within the next year or two. **Every time estimates of potential output change, the target for the actual deficit also changes, and policy often has to respond immediately to meet the new targets.**

Simon Wren-Lewis *Mainly Macro blog*



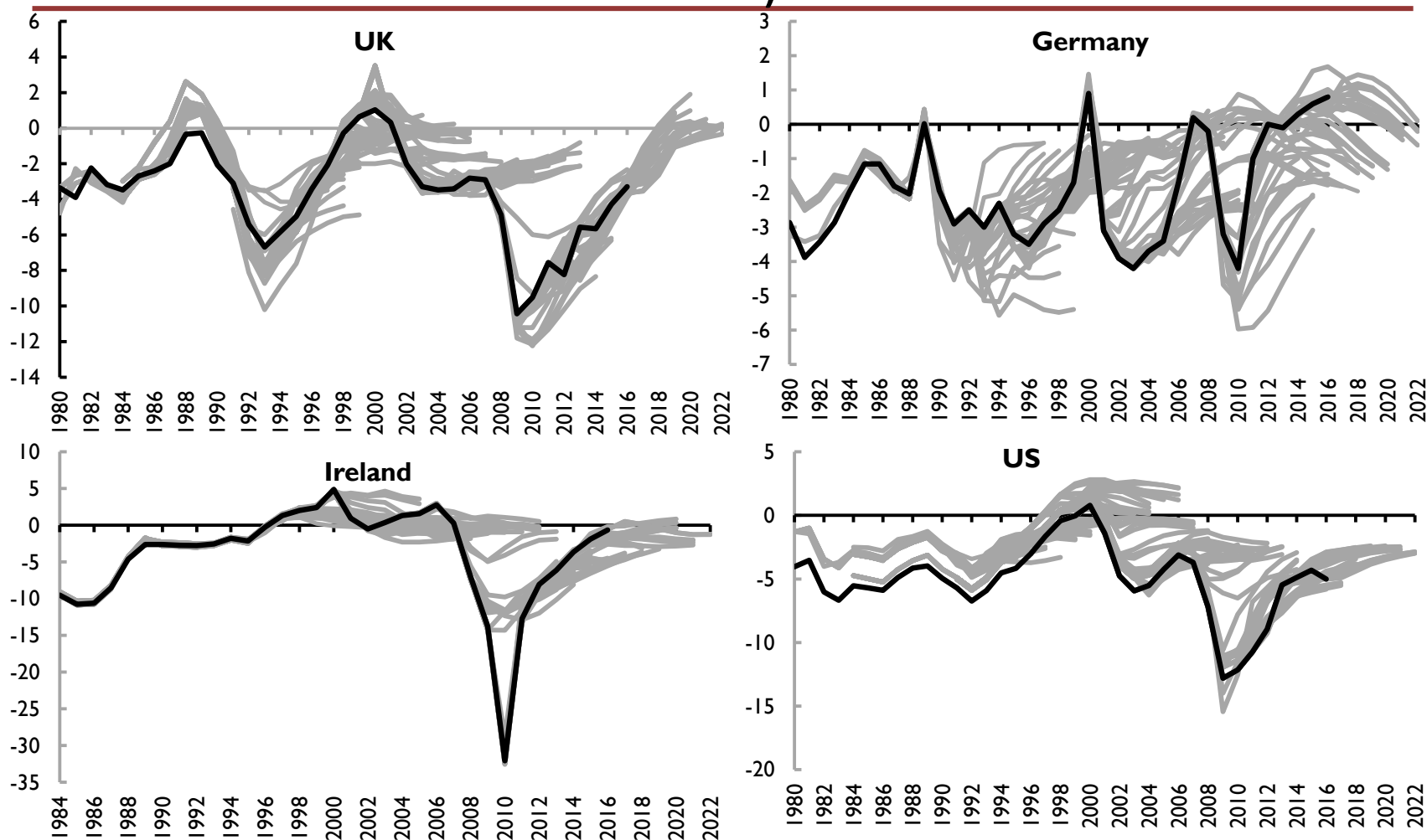
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Portes and Wren-Lewis argue

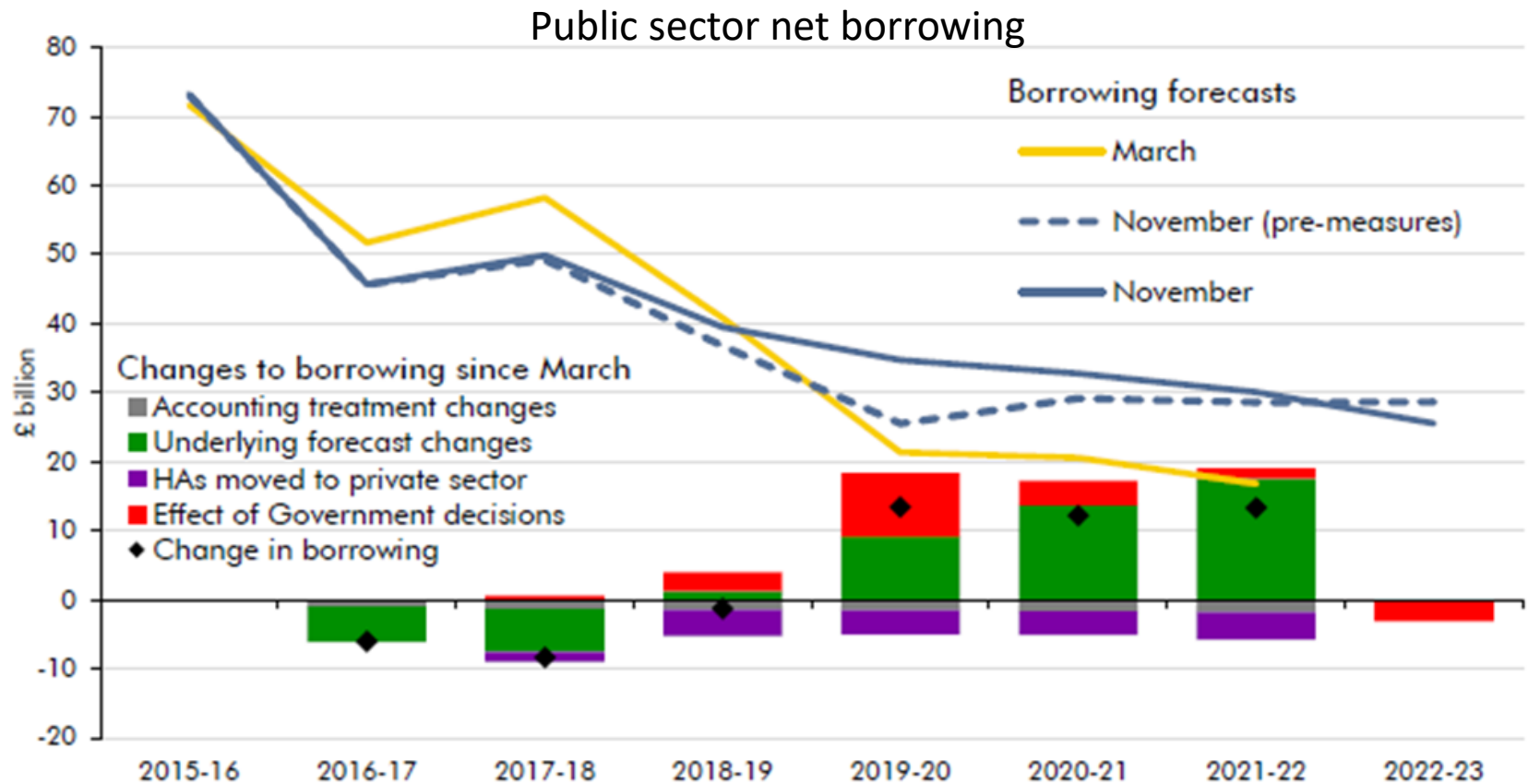
- Deficits should be allowed to absorb shocks rather than spending or taxes
- Should target cyclically-**un**adjusted deficits five-years ahead, held to account by independent and robust fiscal council
- ‘The key point is that targets for the deficit just one or two years ahead are foolish things to have, and cyclically correcting the target only makes them slightly less foolish.’
- But not clear that five-year ahead point forecasts are a guide better as borrowing forecasts are often revised substantially.



Historic forecasts of Government Budget Balance (% GDP)



Forecast changes more significant than policy decisions in determining whether fiscal rules met



Source: ONS, OBR



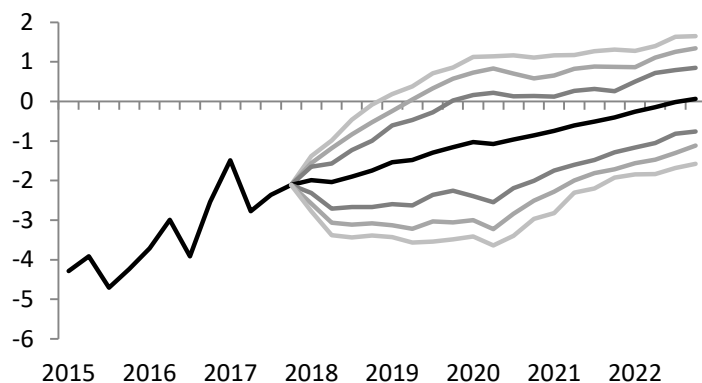
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More robust approach

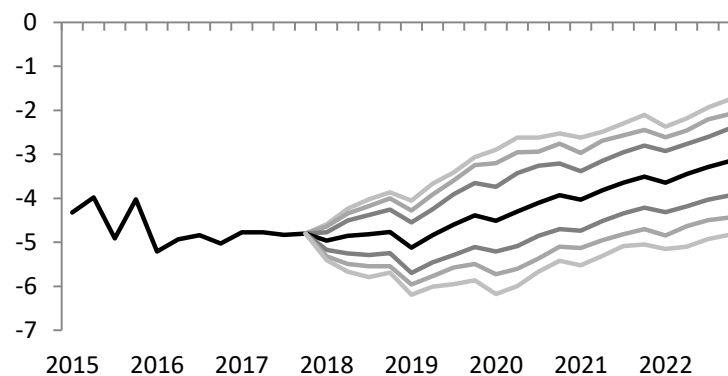
- Obsession with cyclically-adjusted budget deficits and point forecasts has led to spending and taxes being influenced by minor technical adjustments
- Robust approach would take unreliability of cyclical adjustment or forecasts into account
- Would prefer targets focused on risks around balance sheet or other suitable target, and adjust policy according to changes in risks as validated by independent fiscal authority
- For example, keep probability that deficit is greater than 3% at agreed horizon to be less than 20%.



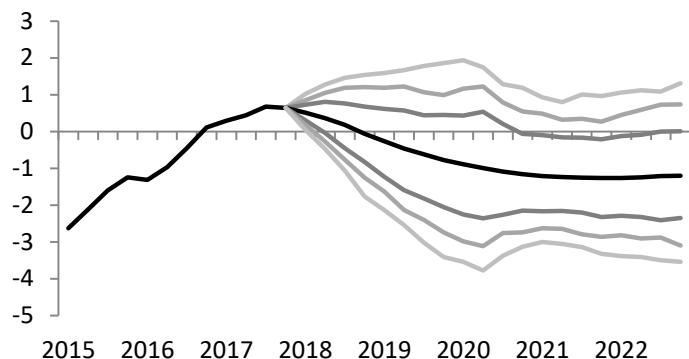
Risks around fiscal forecasts



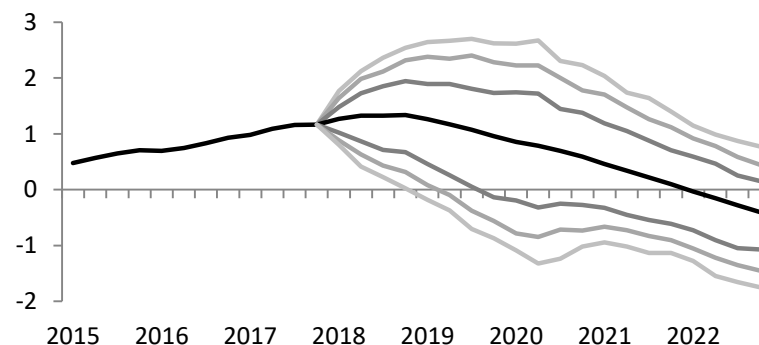
— UK Government Budget Balance - Base



— US Government Budget Balance - Base



— Ireland Government Budget Balance - Base



— Germany Government Budget Balance - Base



Conclusion

- Cyclical adjustment is important but unreliable in face of structural shocks
- Need to design fiscal policy framework that is robust to uncertainty and avoid important fiscal decisions being driven by minor forecasting changes
- Suggestion is to focus on risks around medium-term fiscal forecast, supported by independent watchdog. This will ensure policy can be kept on sustainable path, while avoiding excess sensitivity to forecasts.

