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**The Science of Finance**

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# Using PMI surveys to monitor economic trends

September 2015



**Markit PMI surveys**

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# Background

*“We are always, as it were, looking up a train in last year’s Bradshaw”*

Harold Macmillan

### Official data weaknesses:

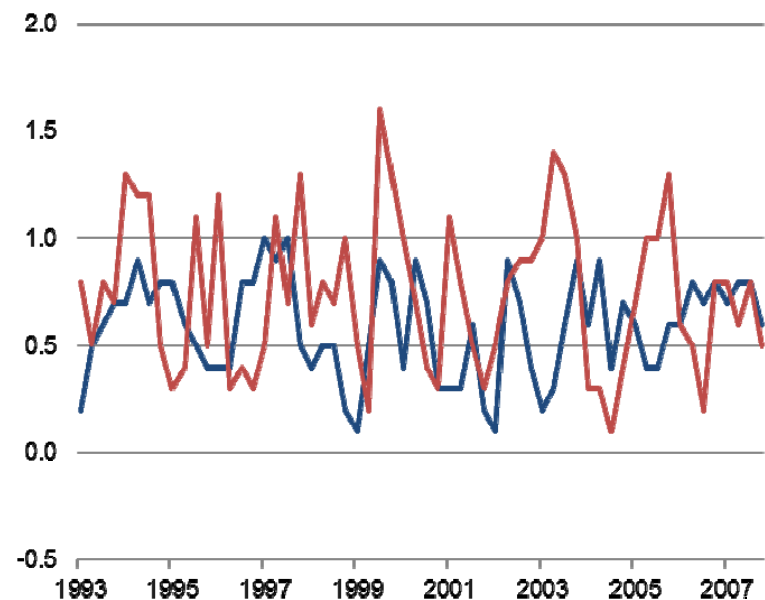
- Poor coverage of the whole economy
- Often infrequent with delay in publication
- Revision prone

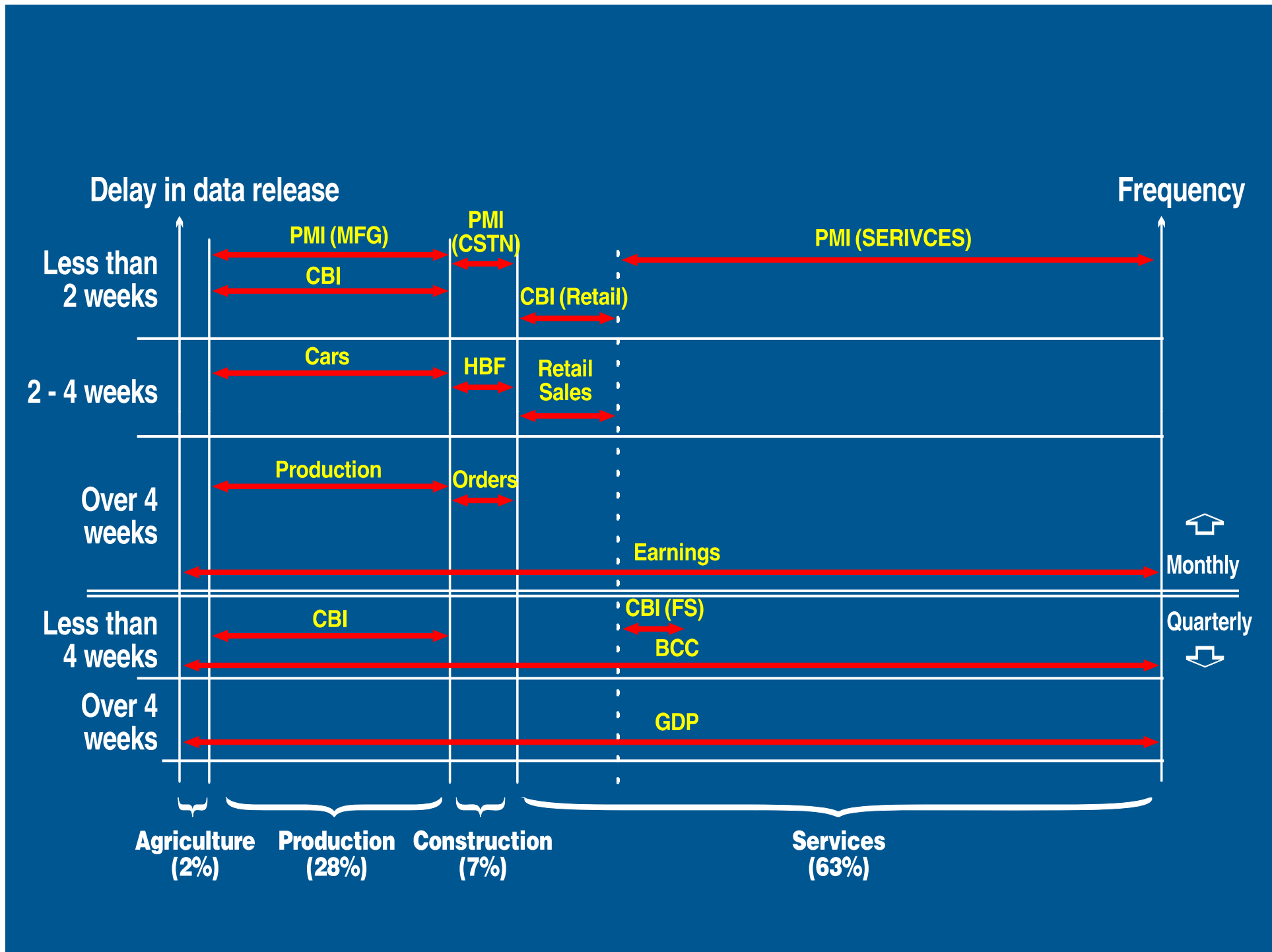
### Lead to:

- Policy errors
- Investment allocation errors
- Business decision errors

### Objectives:

To provide the **earliest**, most **accurate** and most **comprehensive** suite of economic indicators





*“Three cheers for NTC Research [now Markit Economics] which yesterday published **the first ever survey on activity in the service industries**...and can therefore be fairly described as world leaders in the field.*

*“It should be noted that virtually no other country provides much in the way of statistics on service industries and even the NAPM [now ISM] in America has not yet got around to issuing its own report on services.”*

The [London] Times, April 4 1997

## Eurozone PMI



Sources: Markit, Eurostat via Ecwin.

## PMI expansion since 2010

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**30+**

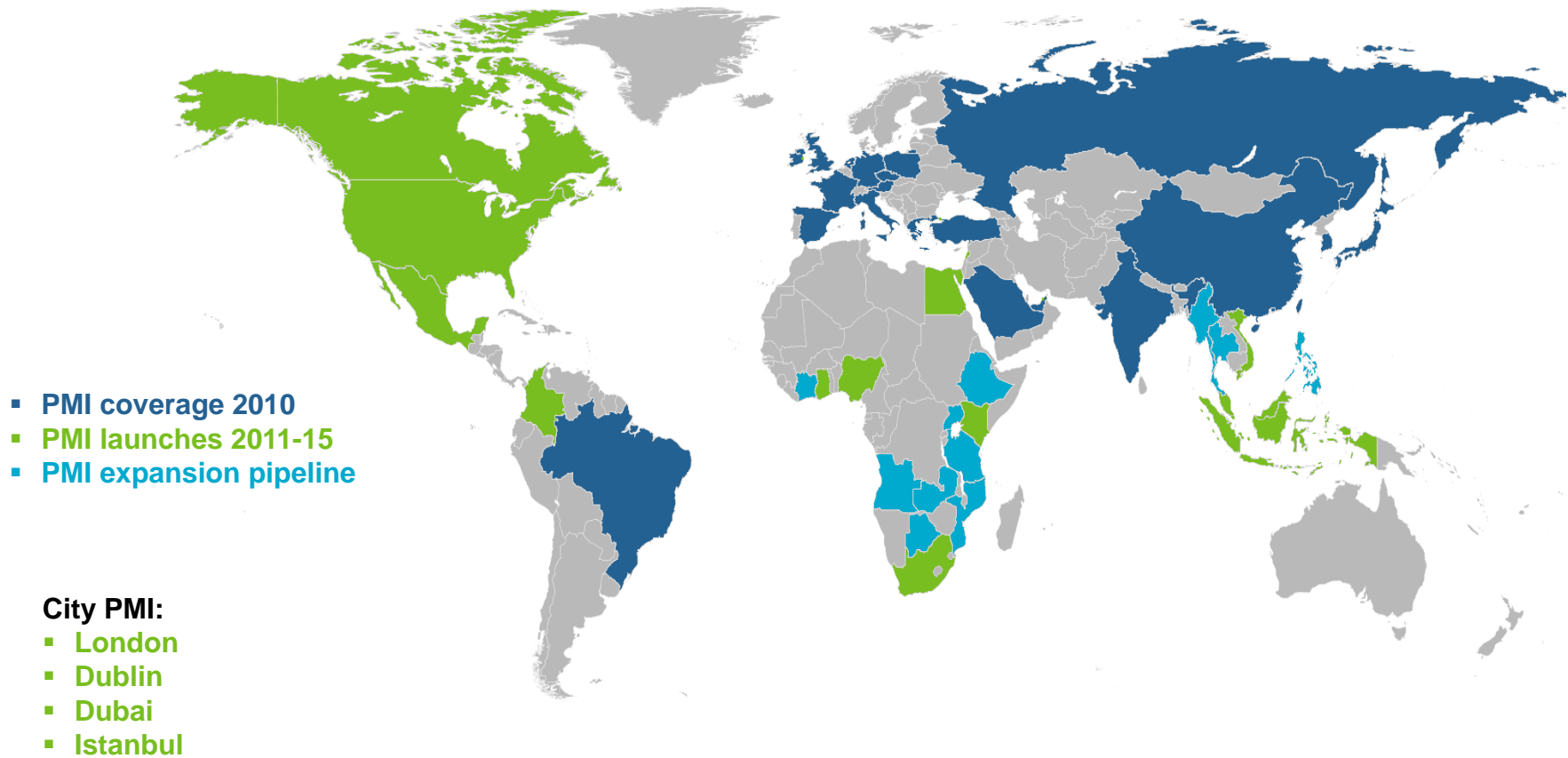
Countries covered

**22,000+**

Companies surveyed every month

**83%**

Global GDP





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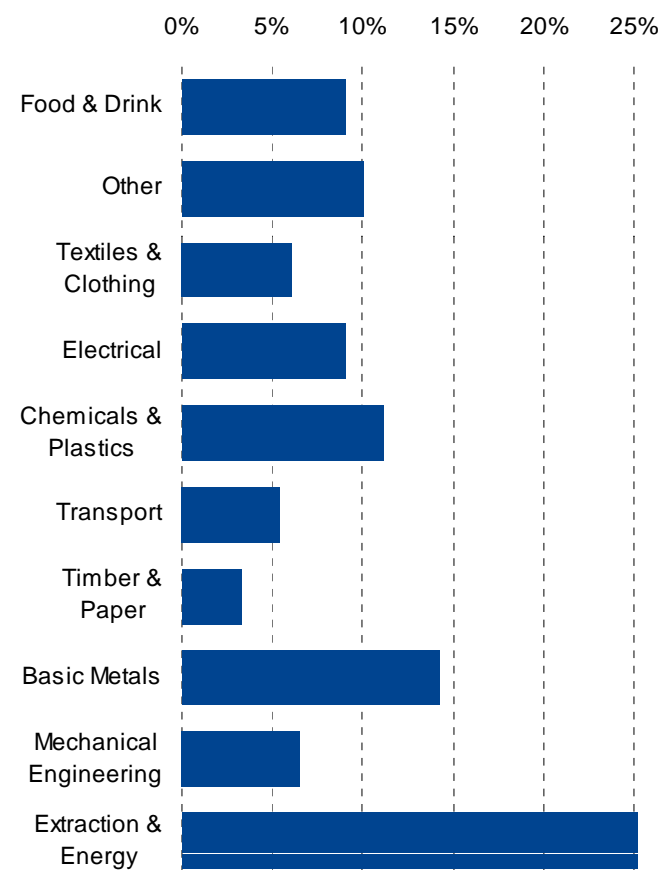
# Methodology



## China manufacturing PMI panel composition\*

	Company size			All
	Small	Medium	Large	
Food & Drink	3.7%	3.0%	2.3%	<b>9.1%</b>
Other	4.9%	3.0%	2.1%	<b>10.0%</b>
Textiles & Clothing	3.0%	1.9%	1.2%	<b>6.1%</b>
Electrical	2.6%	2.8%	3.7%	<b>9.1%</b>
Chemicals & Plastics	5.8%	3.3%	2.1%	<b>11.2%</b>
Transport	1.4%	1.6%	2.3%	<b>5.4%</b>
Timber & Paper	1.9%	0.7%	0.7%	<b>3.3%</b>
Basic Metals	4.9%	2.6%	6.8%	<b>14.2%</b>
Mechanical Engineering	3.5%	1.9%	1.2%	<b>6.5%</b>
Extraction & Energy	5.8%	6.1%	13.3%	<b>25.2%</b>
<b>All</b>	<b>37.5%</b>	<b>26.8%</b>	<b>35.7%</b>	<b>100.0%</b>

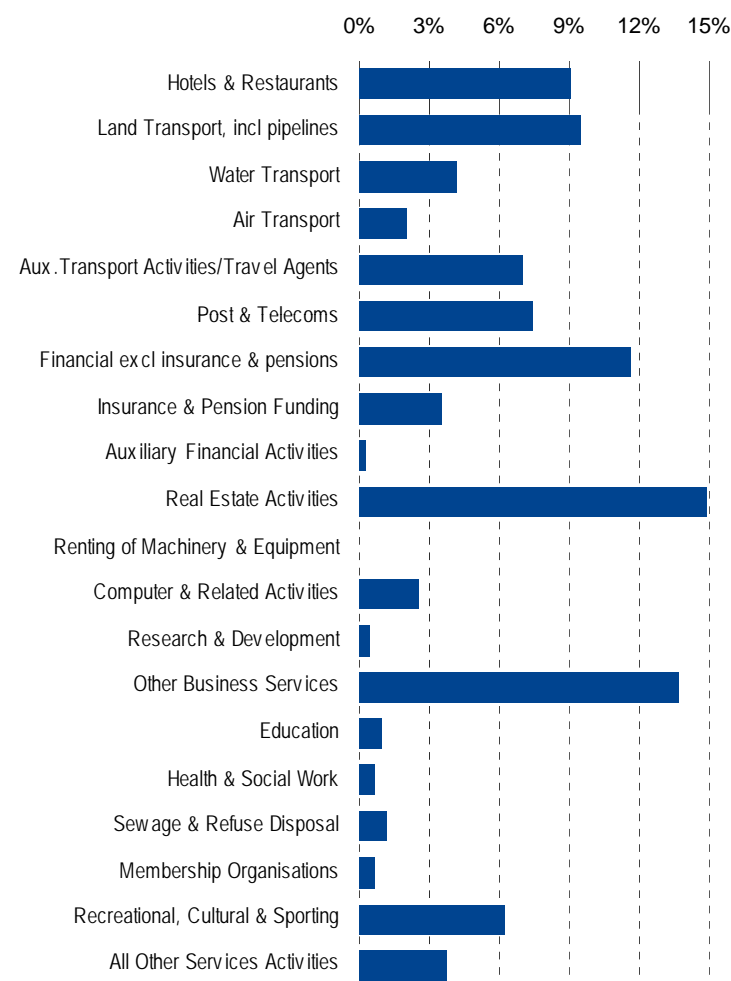
\* Data show % of all industry accounted for by sector/company size. Data based on weights derived from official (NBS) production statistics.



## China services PMI panel composition\*

	Company size			All
	Small	Medium	Large	
Hotels & Restaurants	1.6%	4.2%	3.3%	<b>9.1%</b>
Land Transport, incl pipelines	1.4%	3.7%	4.4%	<b>9.6%</b>
Water Transport	0.2%	0.9%	3.0%	<b>4.2%</b>
Air Transport	0.0%	0.0%	2.1%	<b>2.1%</b>
Aux.Transport Activities & Travel Agents	1.6%	3.7%	1.6%	<b>7.0%</b>
Post & Telecoms	0.2%	0.9%	6.3%	<b>7.5%</b>
Financial excl insurance & pensions	0.2%	1.9%	9.6%	<b>11.7%</b>
Insurance & Pension Funding	0.0%	1.2%	2.3%	<b>3.5%</b>
Auxiliary Financial Activities	0.0%	0.2%	0.0%	<b>0.2%</b>
Real Estate Activities	4.9%	8.6%	1.4%	<b>14.9%</b>
Renting of Machinery & Equipment	0.0%	0.0%	0.0%	<b>0.0%</b>
Computer & Related Activities	0.7%	0.9%	0.9%	<b>2.6%</b>
Research & Development	0.0%	0.2%	0.2%	<b>0.5%</b>
Other Business Services	3.5%	4.9%	5.4%	<b>13.8%</b>
Education	0.2%	0.5%	0.2%	<b>0.9%</b>
Health & Social Work	0.0%	0.2%	0.5%	<b>0.7%</b>
Sewage & Refuse Disposal	0.2%	0.7%	0.2%	<b>1.2%</b>
Other Activities of Member Organisations	0.5%	0.2%	0.0%	<b>0.7%</b>
Recreational, Cultural & Sporting	1.2%	2.8%	2.3%	<b>6.3%</b>
All Other Services Activities	1.9%	1.4%	0.5%	<b>3.7%</b>
<b>All</b>	<b>18.4%</b>	<b>37.3%</b>	<b>44.3%</b>	<b>100.0%</b>

\* Data show % of all industry accounted for by sector/company size. Data based on weights derived from official (NBS) national accounts statistics.





## PMI questions asked

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Survey questions ask respondents to compare the situation in the current month with that of the previous month

For example: Is the level of output at your company higher, the same or lower than one month ago?

### Manufacturing

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Output  
New orders  
Backlogs of work  
Employment  
Input prices  
Output prices  
Quantity of purchases  
Suppliers' delivery times  
Stocks of purchases  
Stocks of finished goods  
New export orders

### Services

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Business activity  
New business  
Outstanding business  
Employment  
Input costs  
Prices charged  
Future expectations

### Composite

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Output/business activity  
New business  
Outstanding business  
Employment  
Input costs  
Output prices

## PMI calculation

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## Index calculation

### Weights used for index:

% responding higher = 1.0

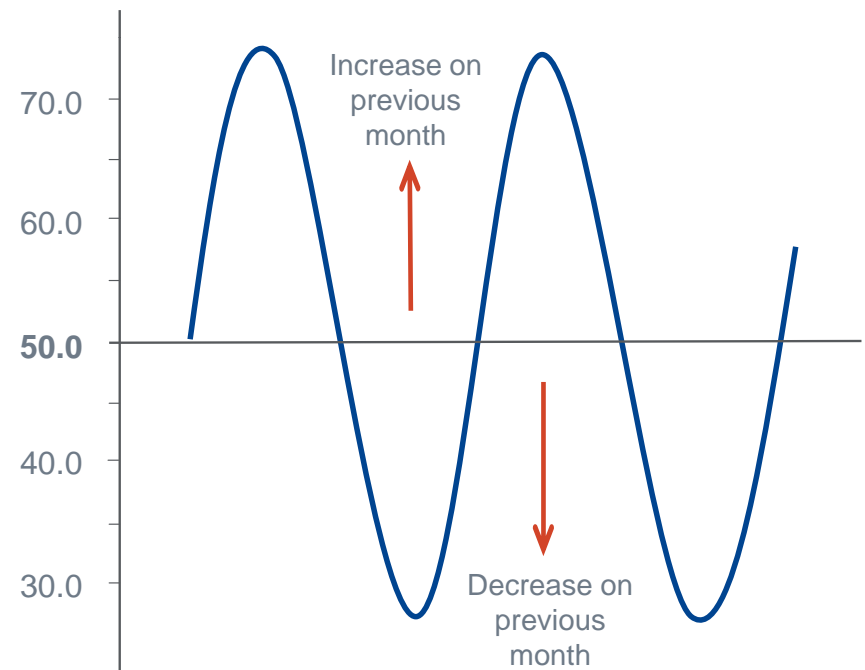
% responding no change = 0.5

% responding lower = 0.0

### Key points:

- index measures month-on-month changes
- index reading of **50.0 = no change** from previous month
- any index reading **above 50.0** indicates growth
- any index reading **below 50.0** indicates contraction

50.0 = no change from previous month:



## Monthly schedule

- Questionnaires answered in the second half of the month
- Typically a response rate of 75%
- PMI data released at the beginning of the following month
  
- Flash PMI [Eurozone, US, Japan and China] data are an early release of the final data, published usually one week in advance
- Flash PMI data typically based on 80% of total questionnaire responses



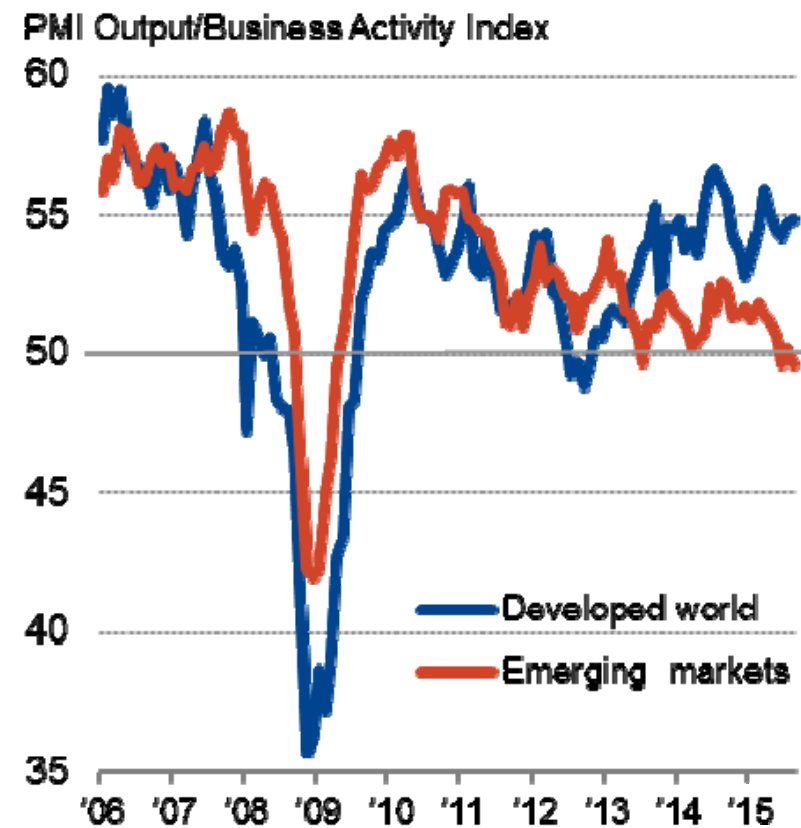
Markit PMI surveys

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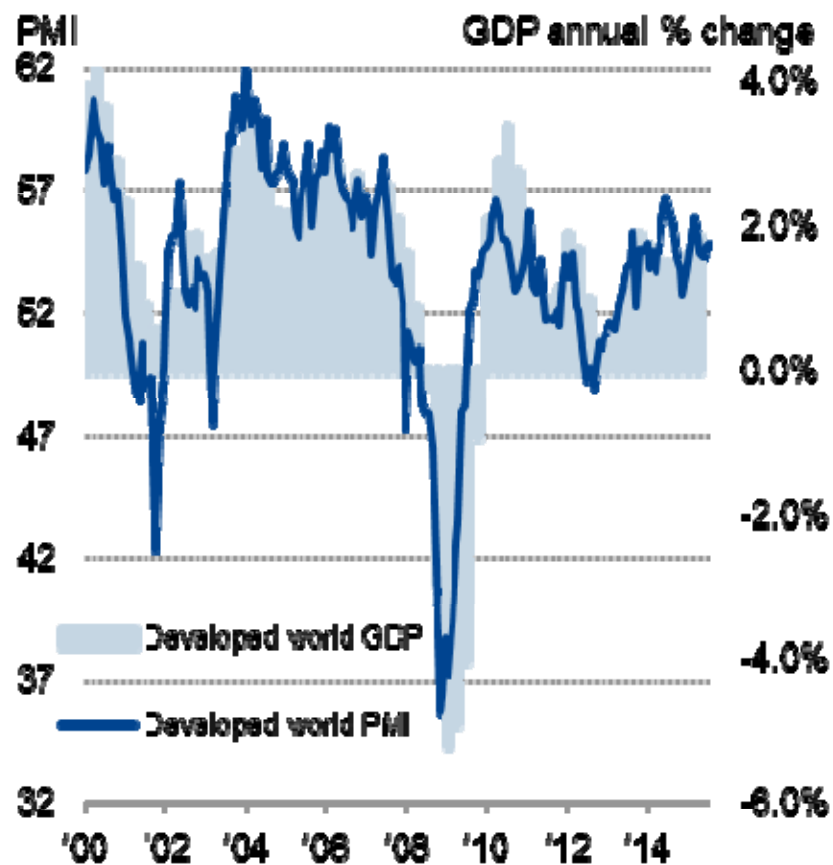
# Interpreting the data

## GDP

## Global economic growth



## Developed world



## Emerging Markets





## GDP nowcasting using the PMI – eurozone

85% correlation with GDP, using quarterly ave of PMI

GDP quarterly % change = (PMI x 0.1183) - 5.93



40	=	-1.2
41	=	-1.1
42	=	-1.0
43	=	-0.8
44	=	-0.7
45	=	-0.6
46	=	-0.5
47	=	-0.4
48	=	-0.3
49	=	-0.1
50	=	0.0
51	=	0.1
52	=	0.2
53	=	0.3
54	=	0.5
55	=	0.6
56	=	0.7
57	=	0.8
58	=	0.9
59	=	1.0
60	=	1.2

## Even earlier GDP nowcasts – eurozone

Growth rate indicated by the PM for 1<sup>st</sup> two months of quarter has never diverged from signal from full quarter PMI average by more than +/-0.1%.

PMI-implied GDP quarterly % change



See also ECB paper “Nowcasting: Trust the Purchasing Managers’ Index or wait for the flash GDP estimate?” by Gabe Jacob available here:

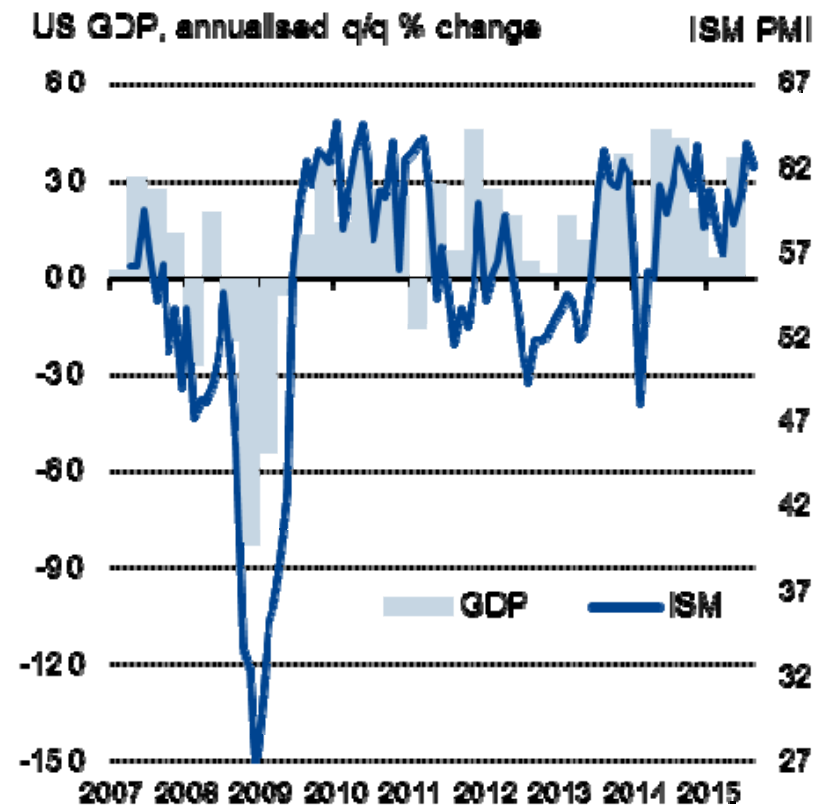
<http://econpapers.repec.org/paper/ekd002672/3896.htm>

## US GDP nowcasting

### Markit (80%)



### ISM (78%)

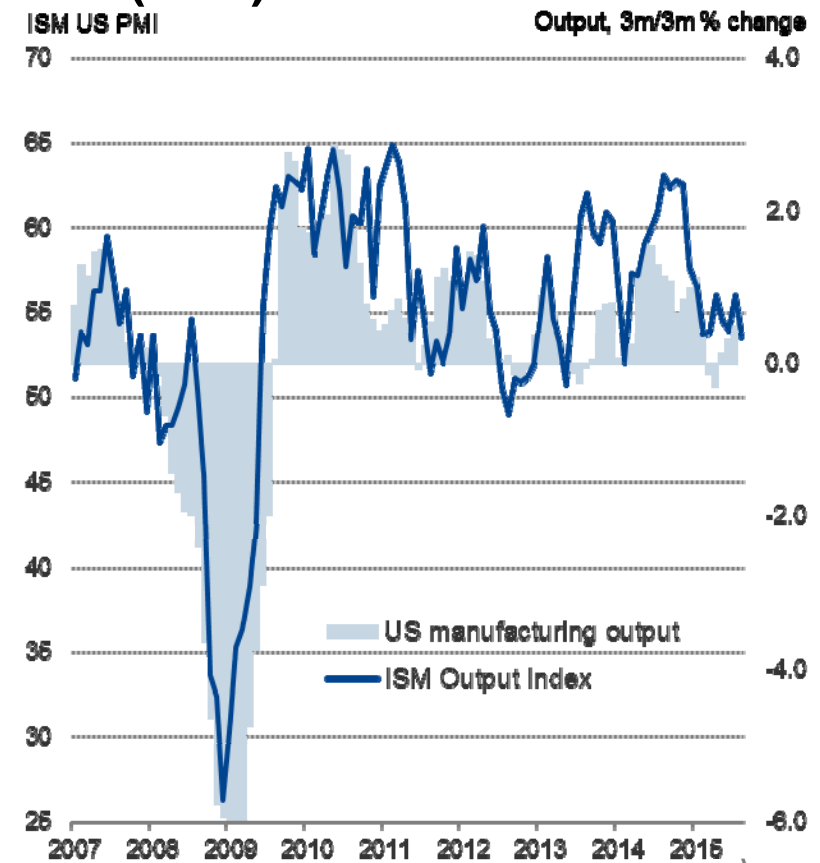


## US manufacturing

### Markit (92%)

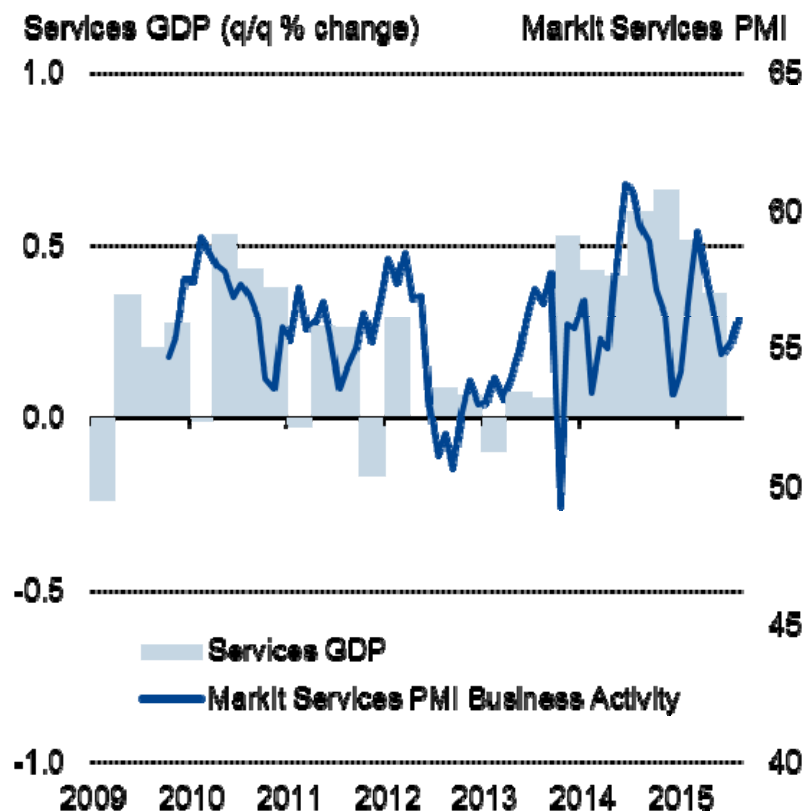


### ISM (86%)

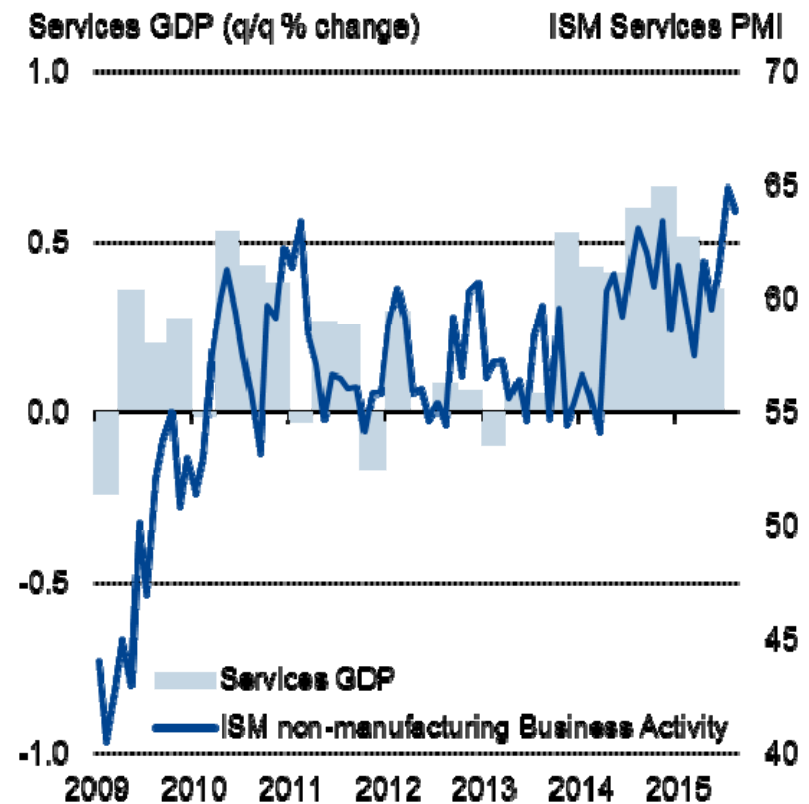


## US services

### Markit



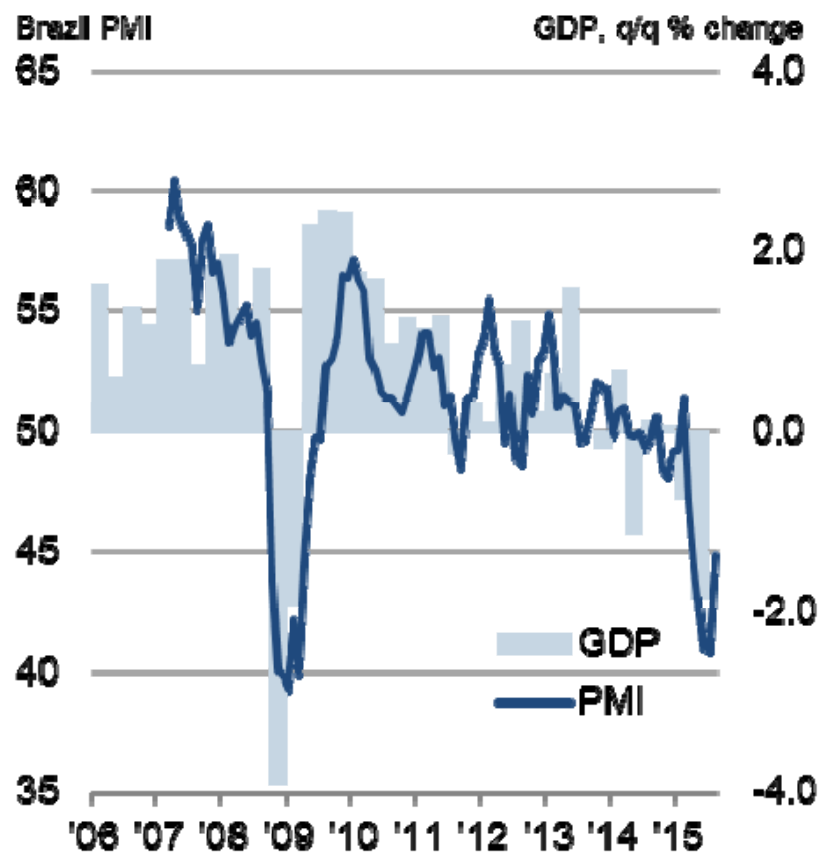
### ISM



## Markit PMI surveys: Global Overview

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### Brazil GDP



### Russia GDP



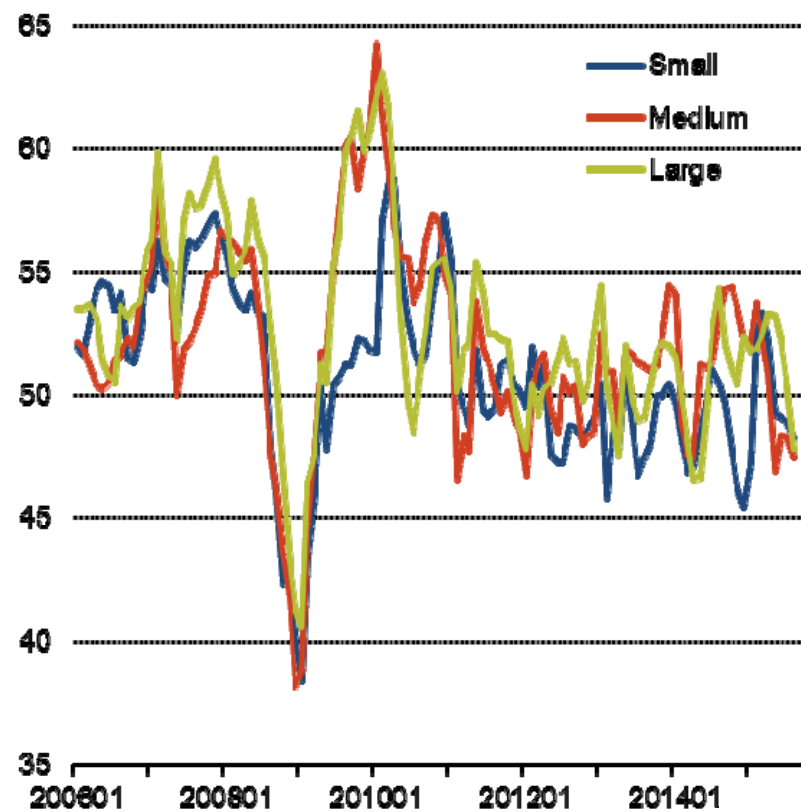
Sources: Markit, Ecwin.

## China

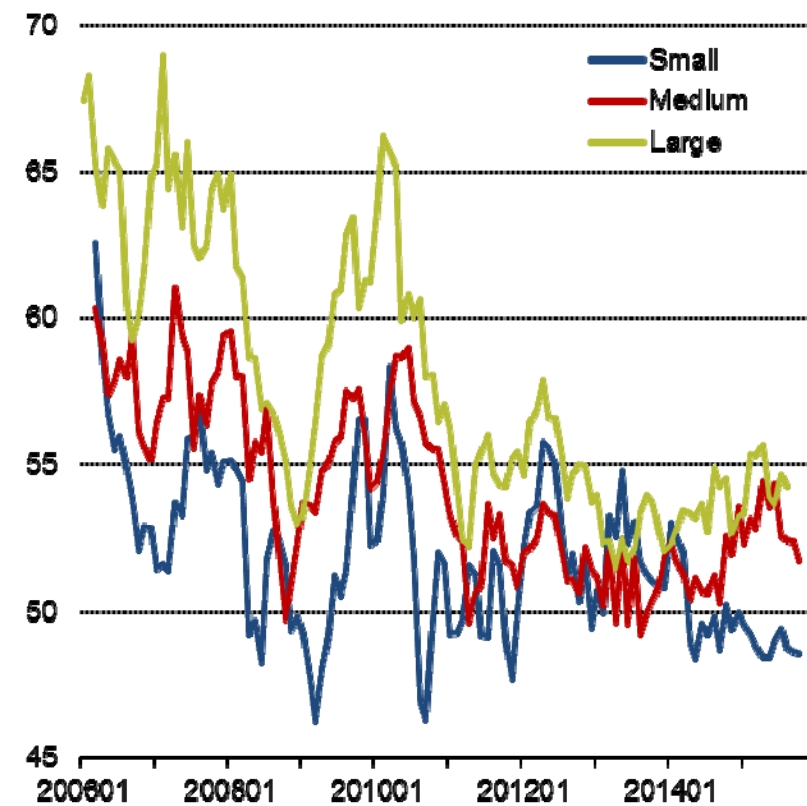


## China

### Manufacturing output

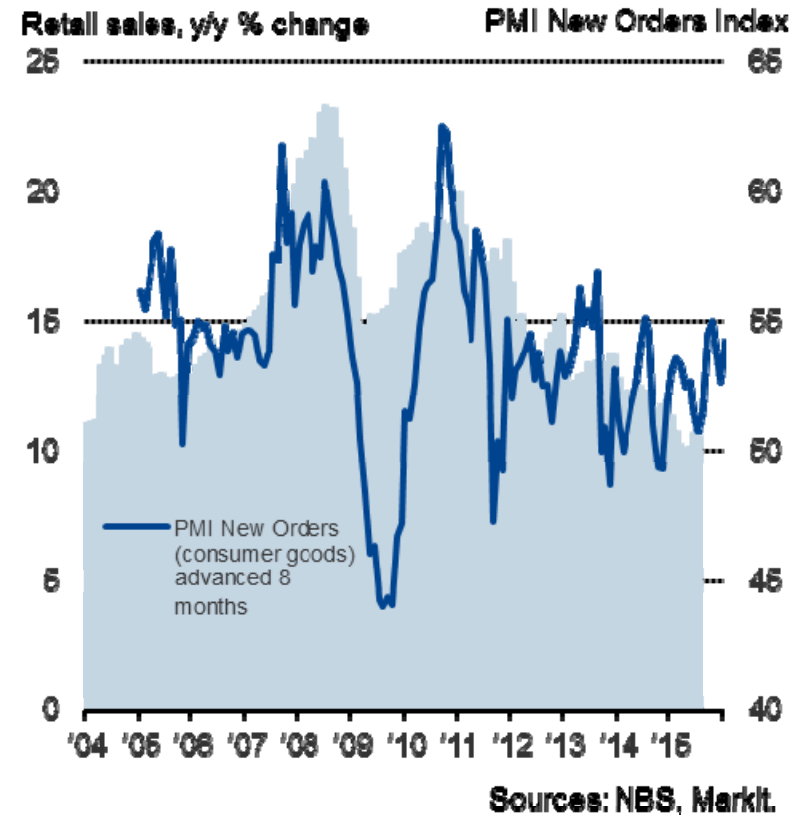
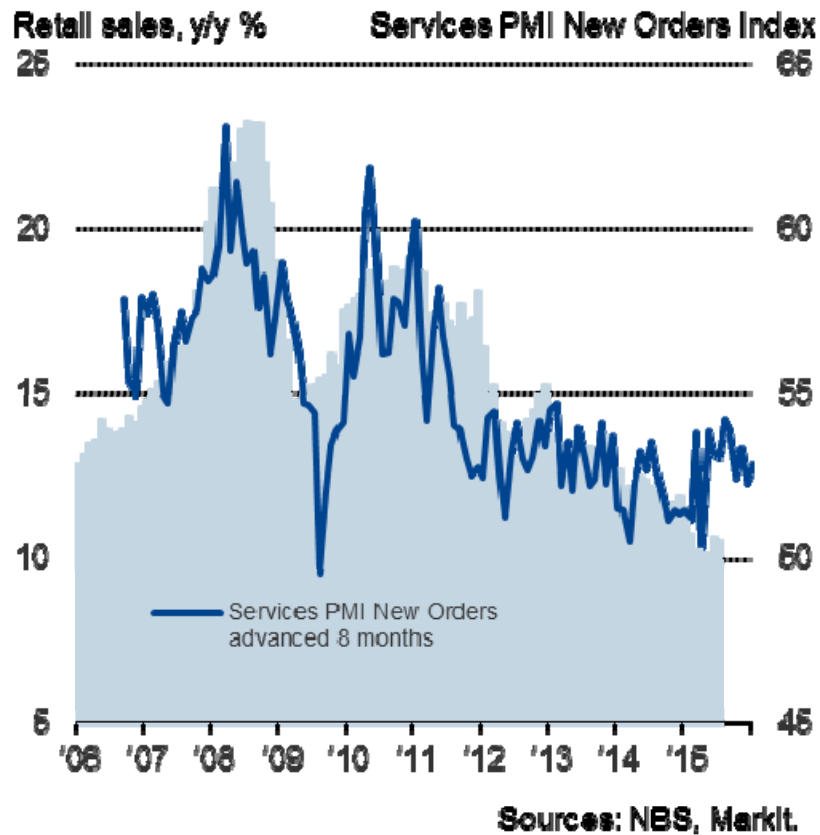


### Services output





## China retail sales



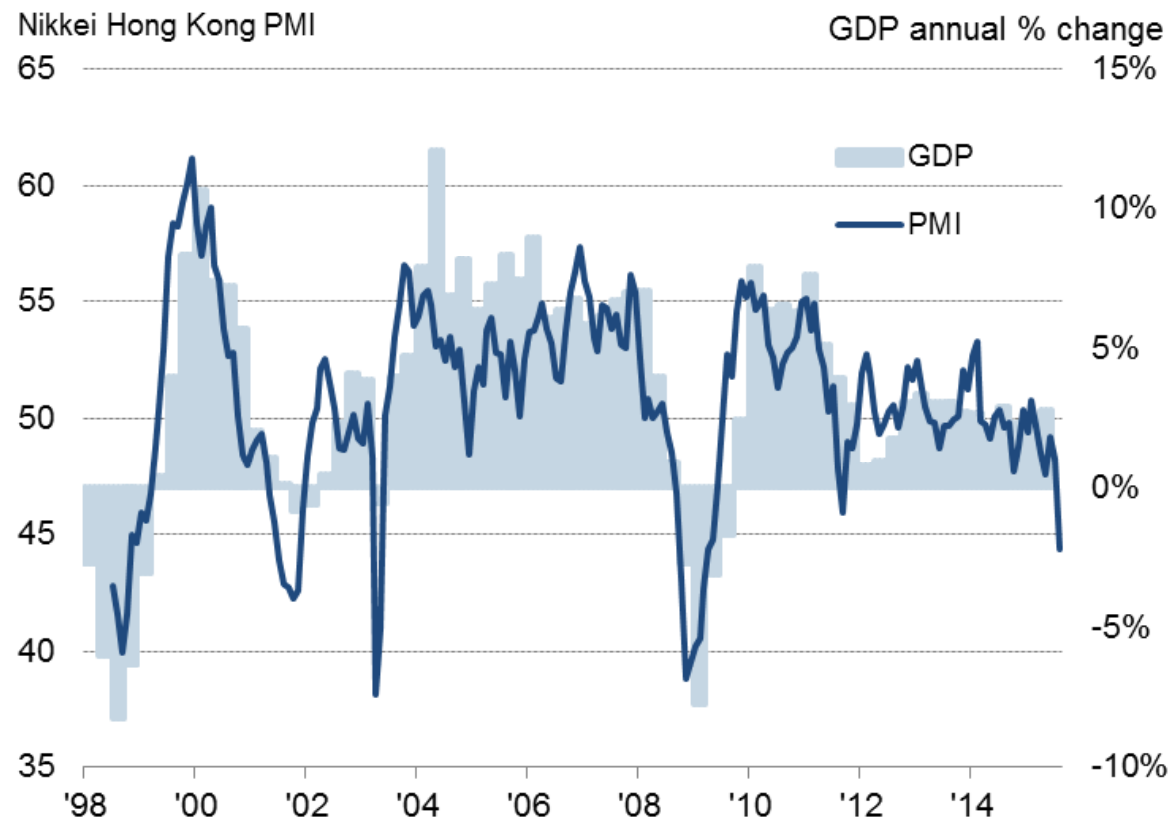
## GDP nowcasting

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## Hong Kong

88% correlation with GDP, PMI acting with a lead of two months

GDP annual % change = (PMI x 0.0088) - 0.41



40	=	-5.9%
41	=	-5.0%
42	=	-4.2%
43	=	-3.3%
44	=	-2.4%
45	=	-1.5%
46	=	-0.7%
46.8	=	0.0%
47	=	0.2%
48	=	1.1%
49	=	2.0%
50	=	2.8%
51	=	3.7%
52	=	4.6%
53	=	5.5%
54	=	6.3%
55	=	7.2%
56	=	8.1%
57	=	9.0%
58	=	9.8%
59	=	10.7%
60	=	11.6%

## Taiwan GDP



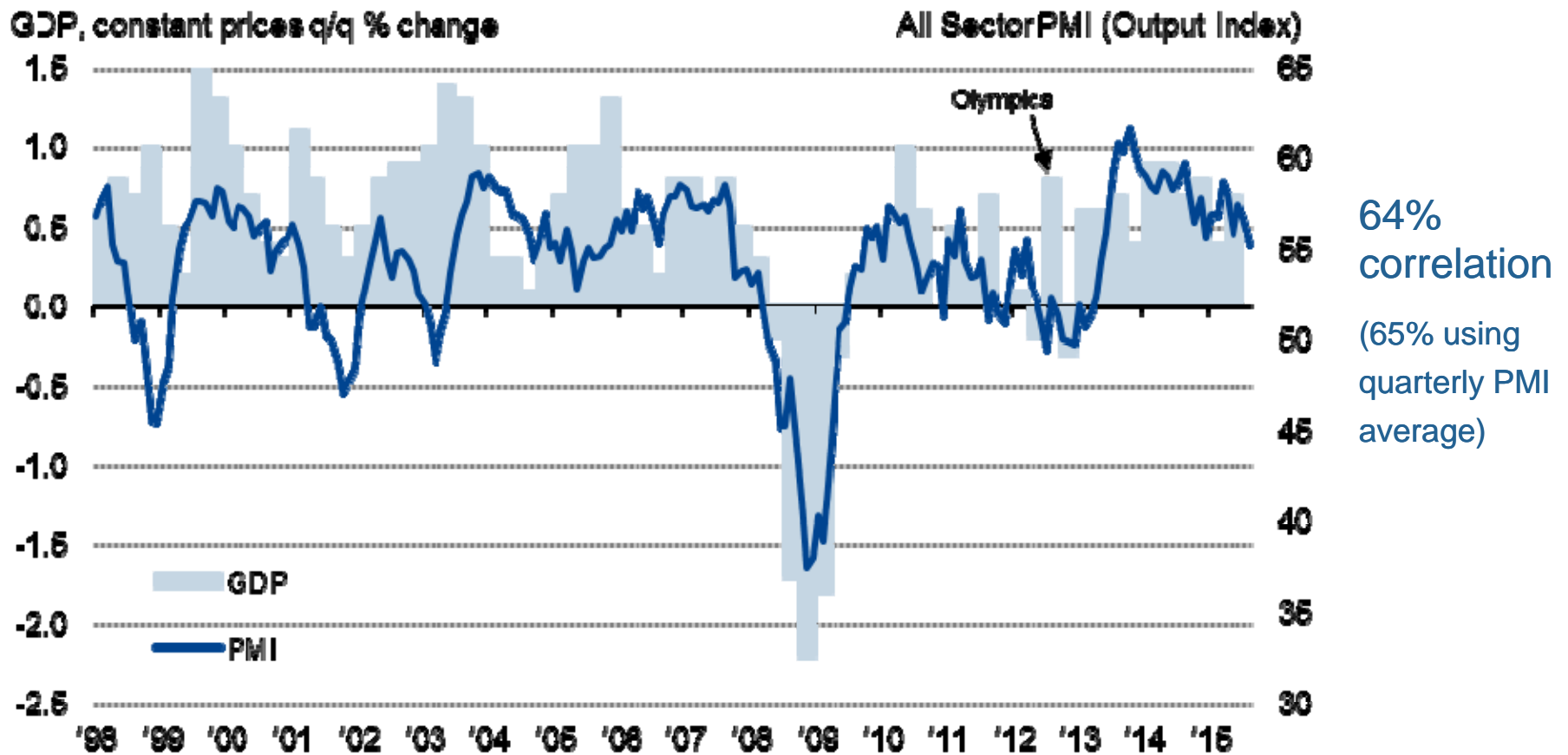
## S Korea GDP



# Interpreting the data

## GDP – focus on the UK

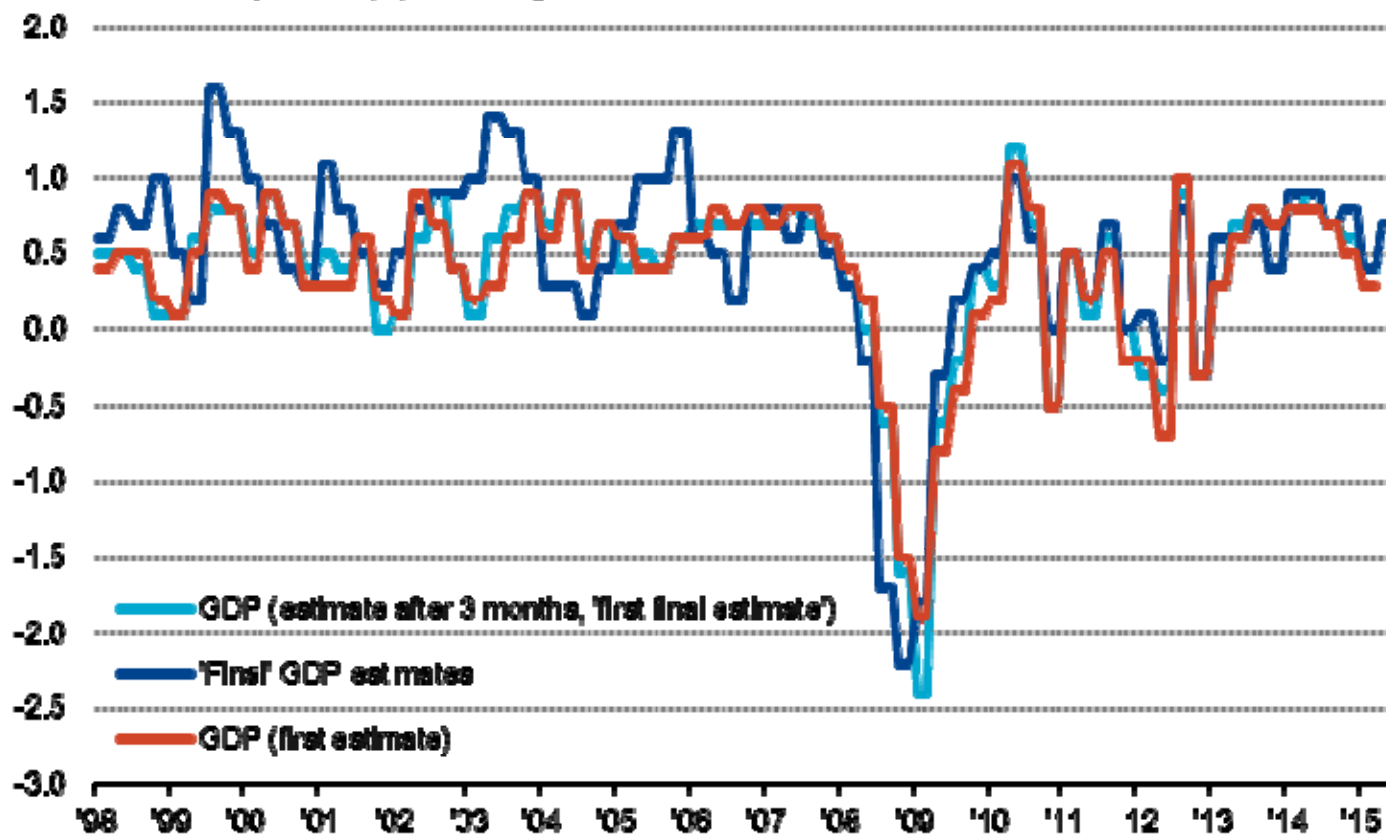
## GDP nowcasting – UK PMI v 'latest final' estimates



Sources: Markit, ONS.

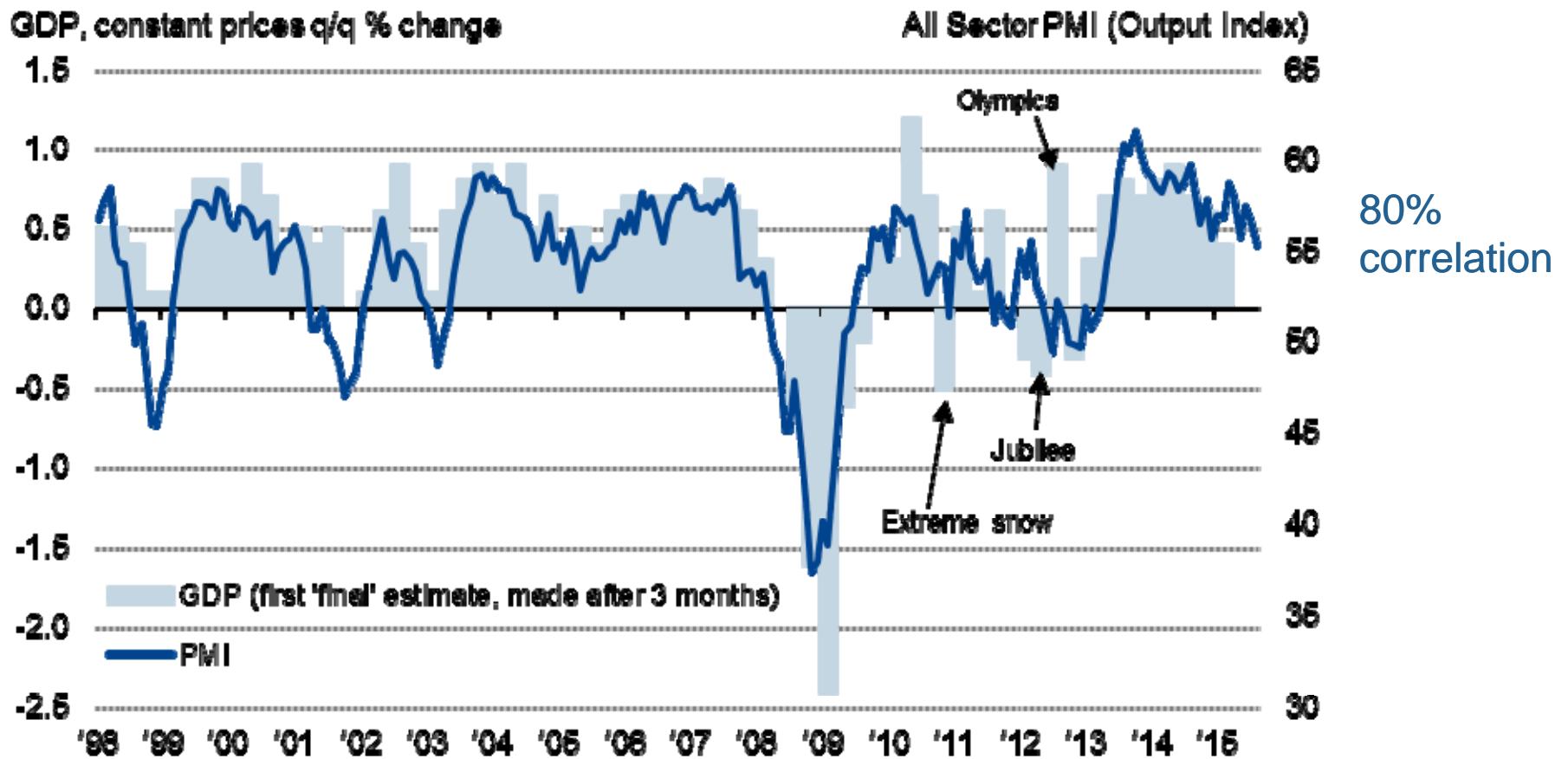
## GDP nowcasting – what are we targeting?

GDP, constant prices q/q % change



Source: ONS

## GDP nowcasting – UK PMI v month three estimates



Sources: Markit, ONS.

## GDP nowcasting – UK PMI

**Table 1: Correlations between PMI and GDP (1998-2015)**

GDP 'vintage'	Quarterly average of PMI	Average of PMI for 1 <sup>st</sup> two months of quarter
Latest GDP estimates	0.650	0.635
GDP first estimates	0.752	0.761
GDP first 'final' estimates	0.797	0.801
GDP first 'final' estimates outlier adjusted	0.831	0.841

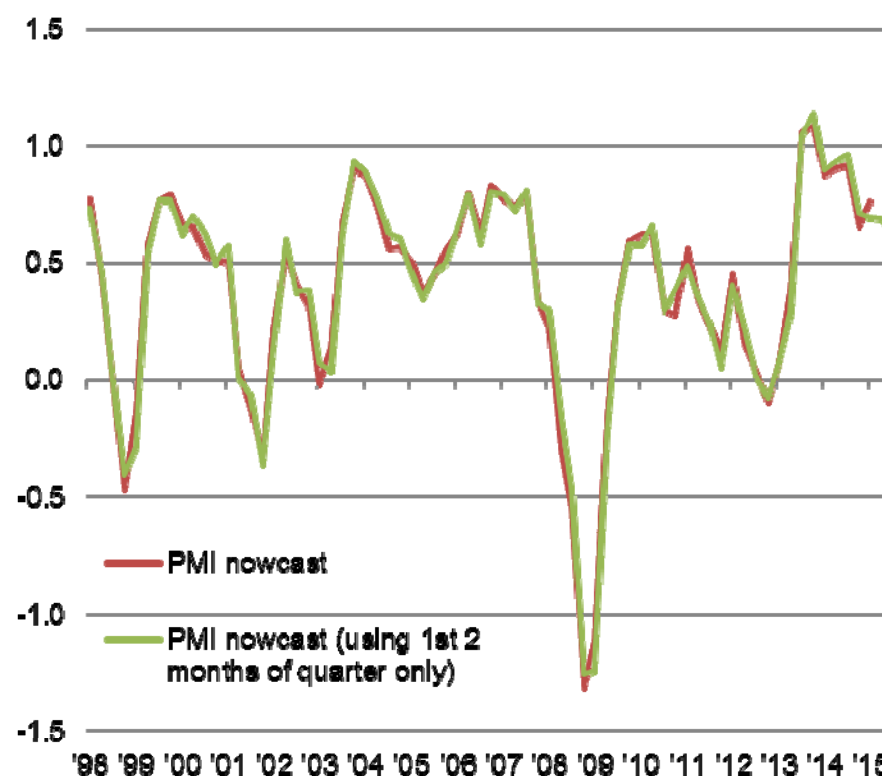
**Table 2: PMI v GDP ready reckoner**

All-sector PMI*	Implied quarterly GDP growth rate (%)**
40	-1.2
45	-0.6
50	-0.1
51	0.0
55	0.5
60	1.0
65	1.6

\* Weighted average of the three output/business activity indices

\*\*  $Q/Q\% \text{ change in GDP} = -5.652 + (PMI \times 0.111)$

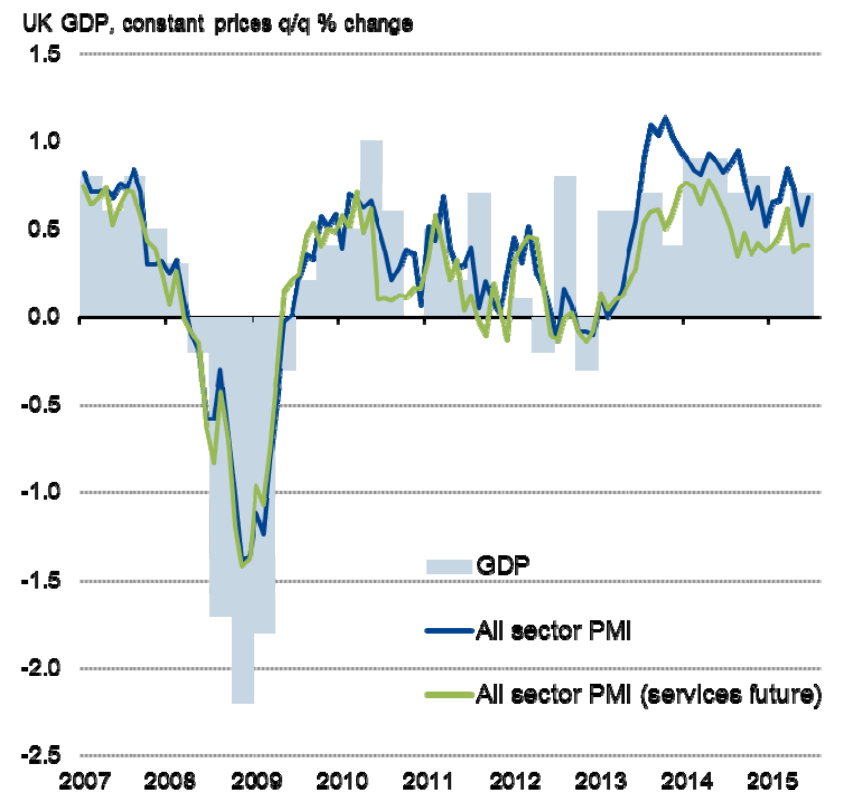
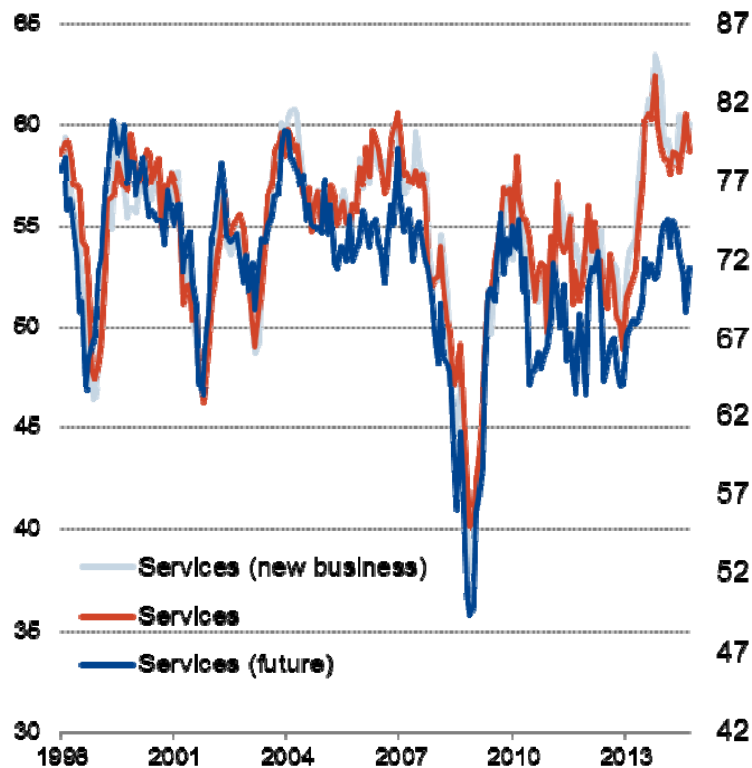
**UK GDP, constant prices q/q % change**



Source: Markit.



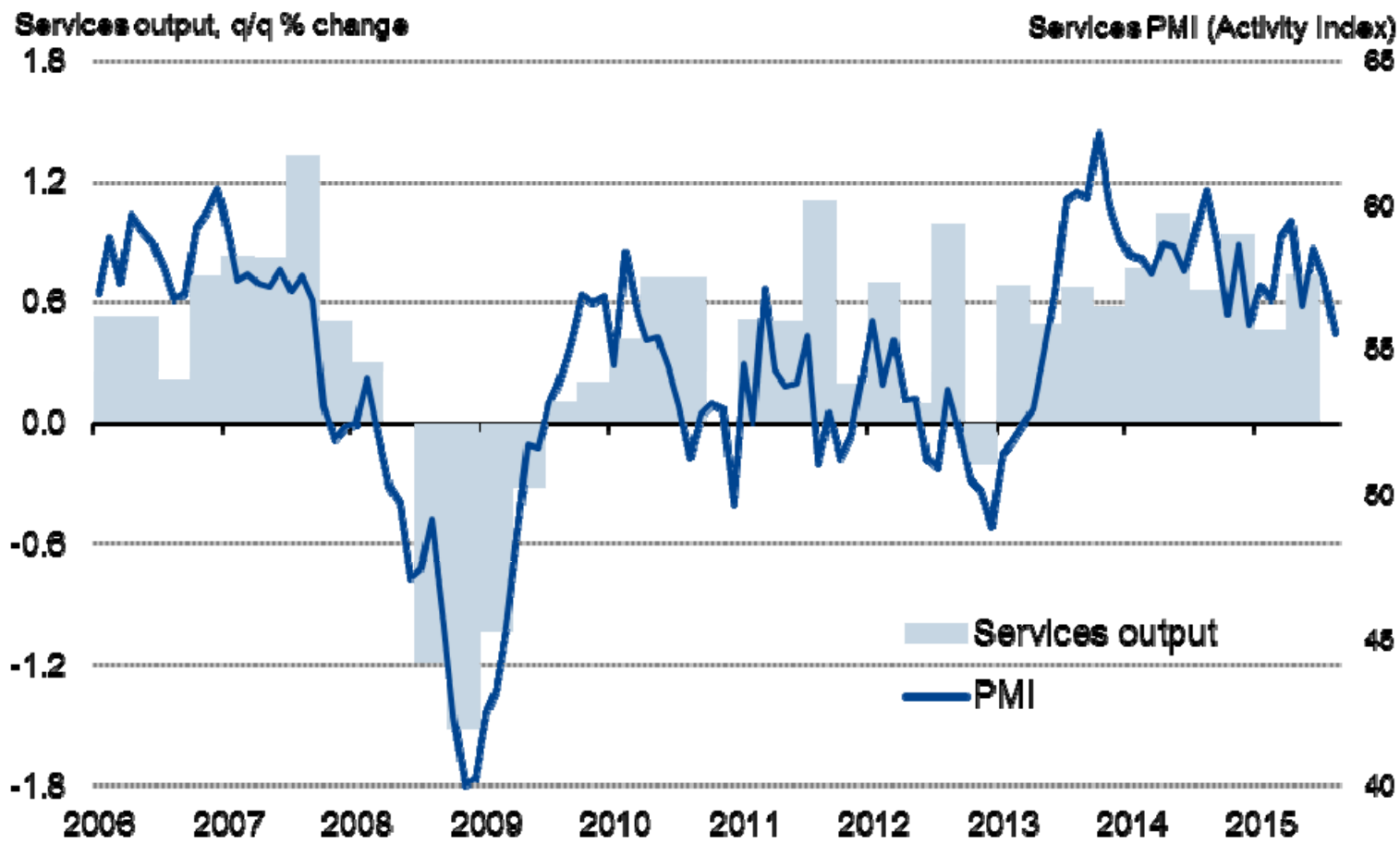
## GDP nowcasting – using services expectations



Sources: ONS, Markit

	GDP	GVA excl oil & gas	GDP (month 3 estimate)
All sector PMI	0.647	0.641	0.786
All sector PMI (services future)	0.710	0.694	0.748

## UK services: official and survey data compared

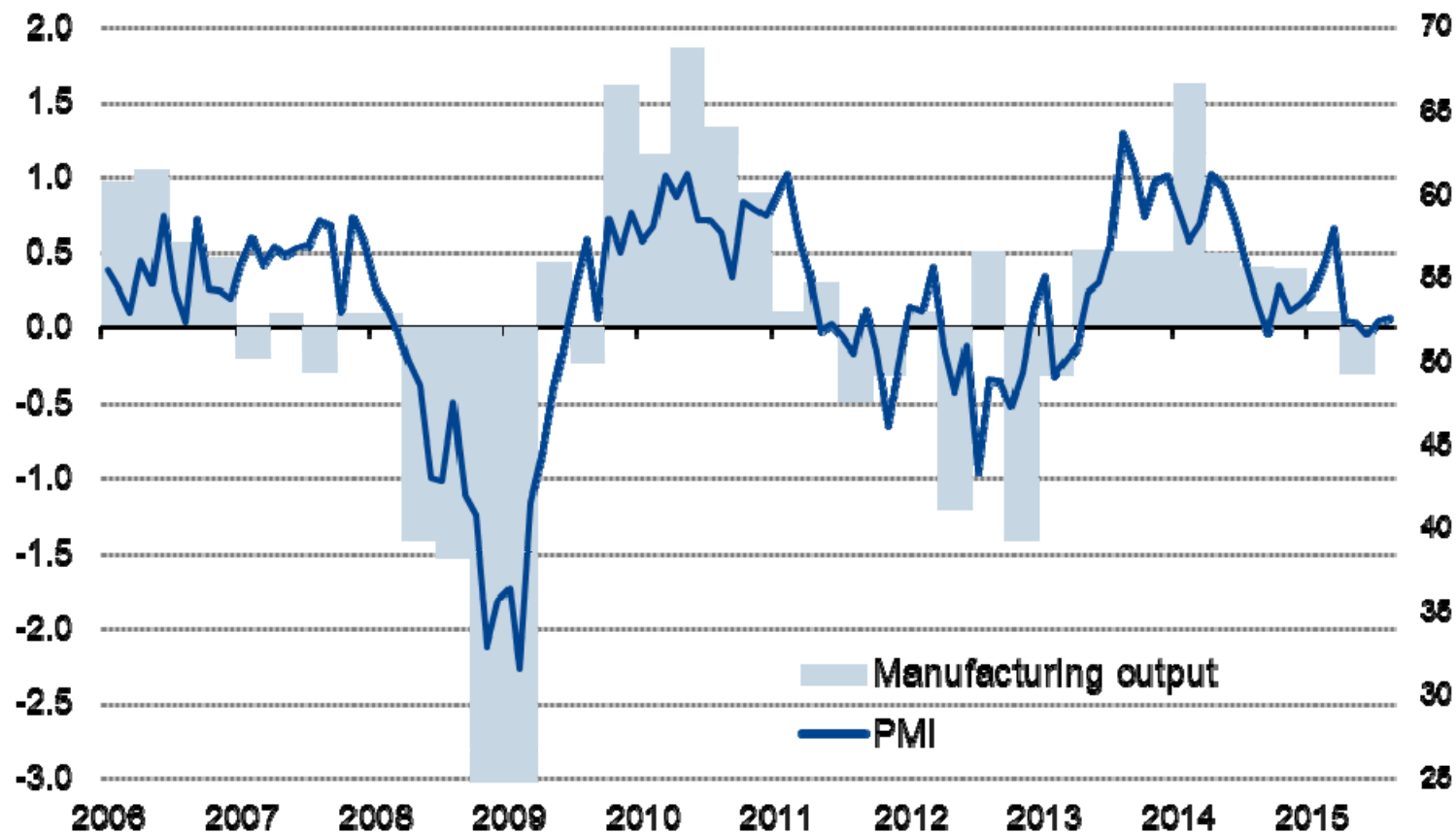


Sources: Markit, ONS.

## UK manufacturing: official and survey data compared

Manufacturing output, q/q % change

Manufacturing PMI (Output Index)

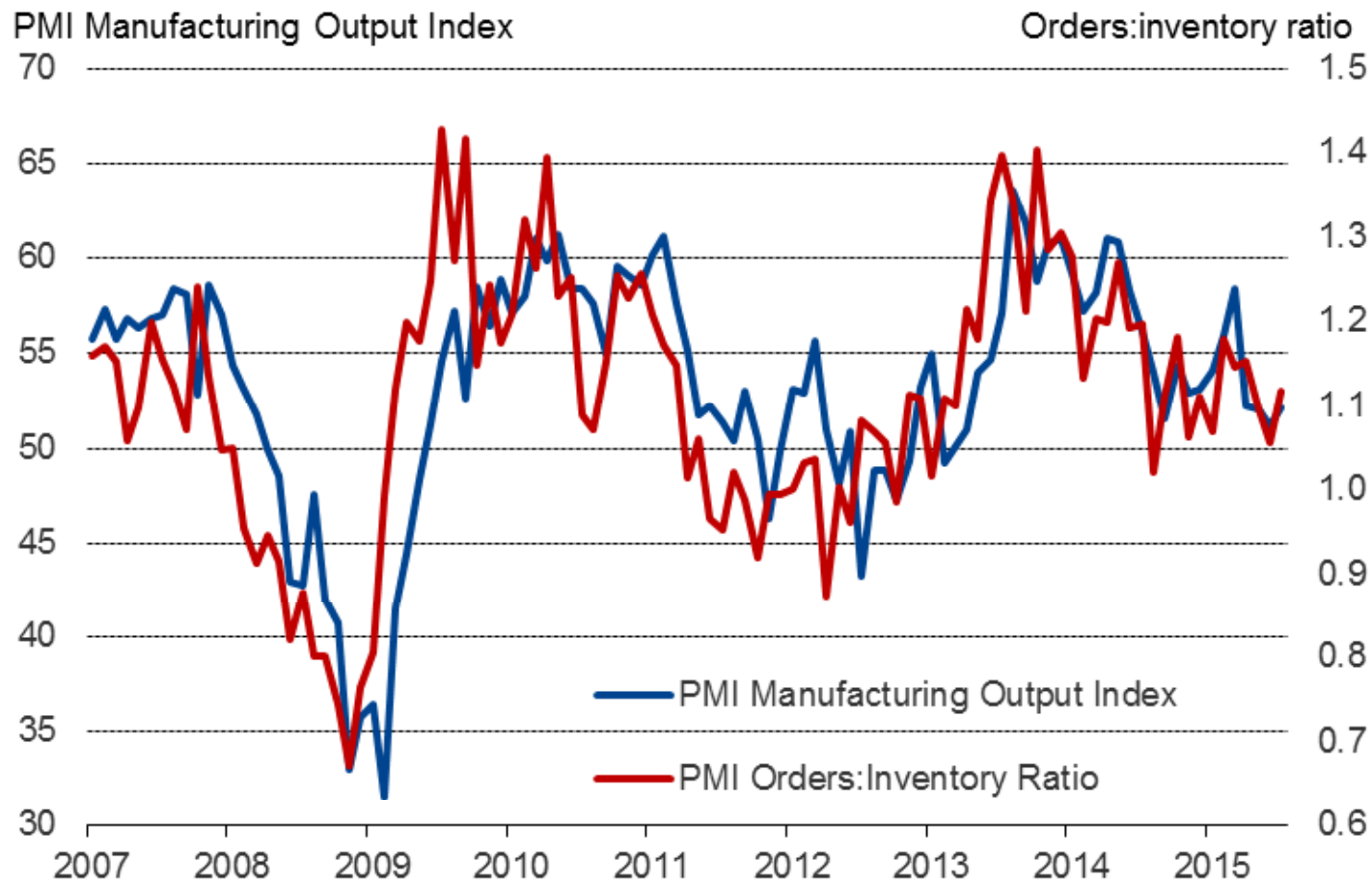


Sources: Markit, ONS.

## Markit PMI surveys

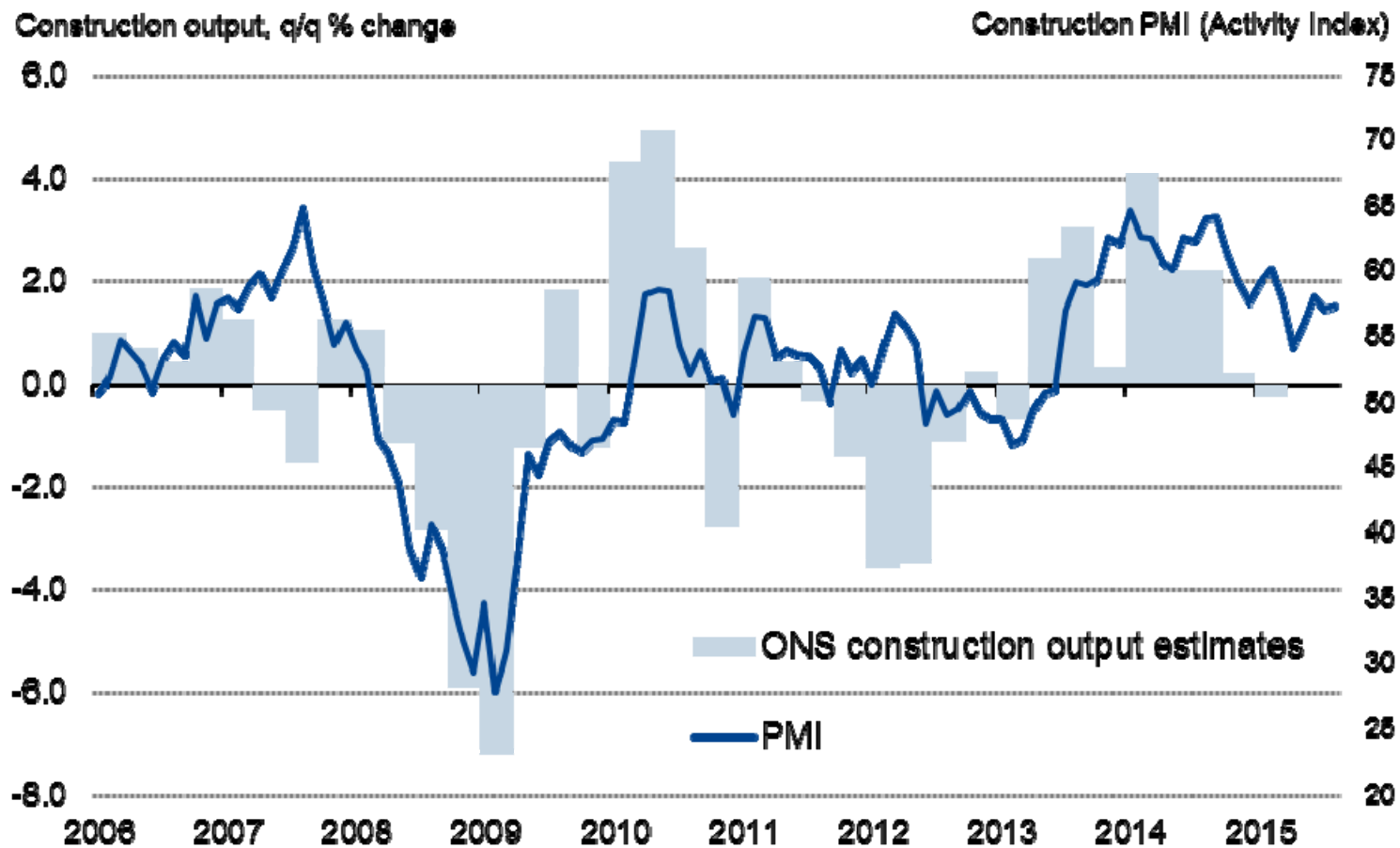
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### New orders to inventory ratio



Source: Markit.

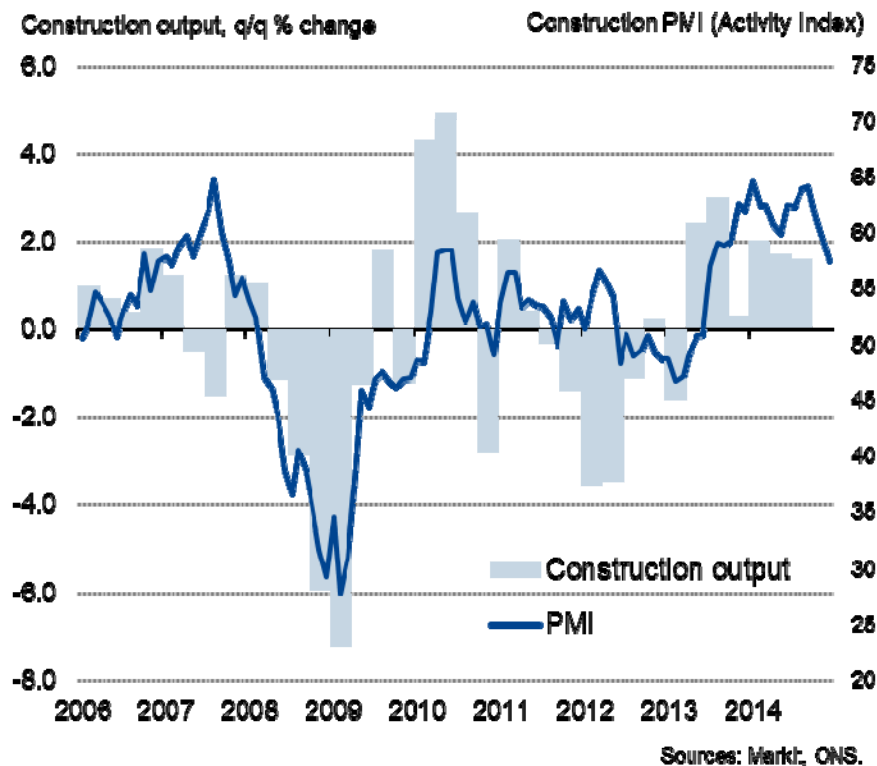
## UK construction: official and survey data compared



Sources: Markit, ONS.

## UK construction revisions

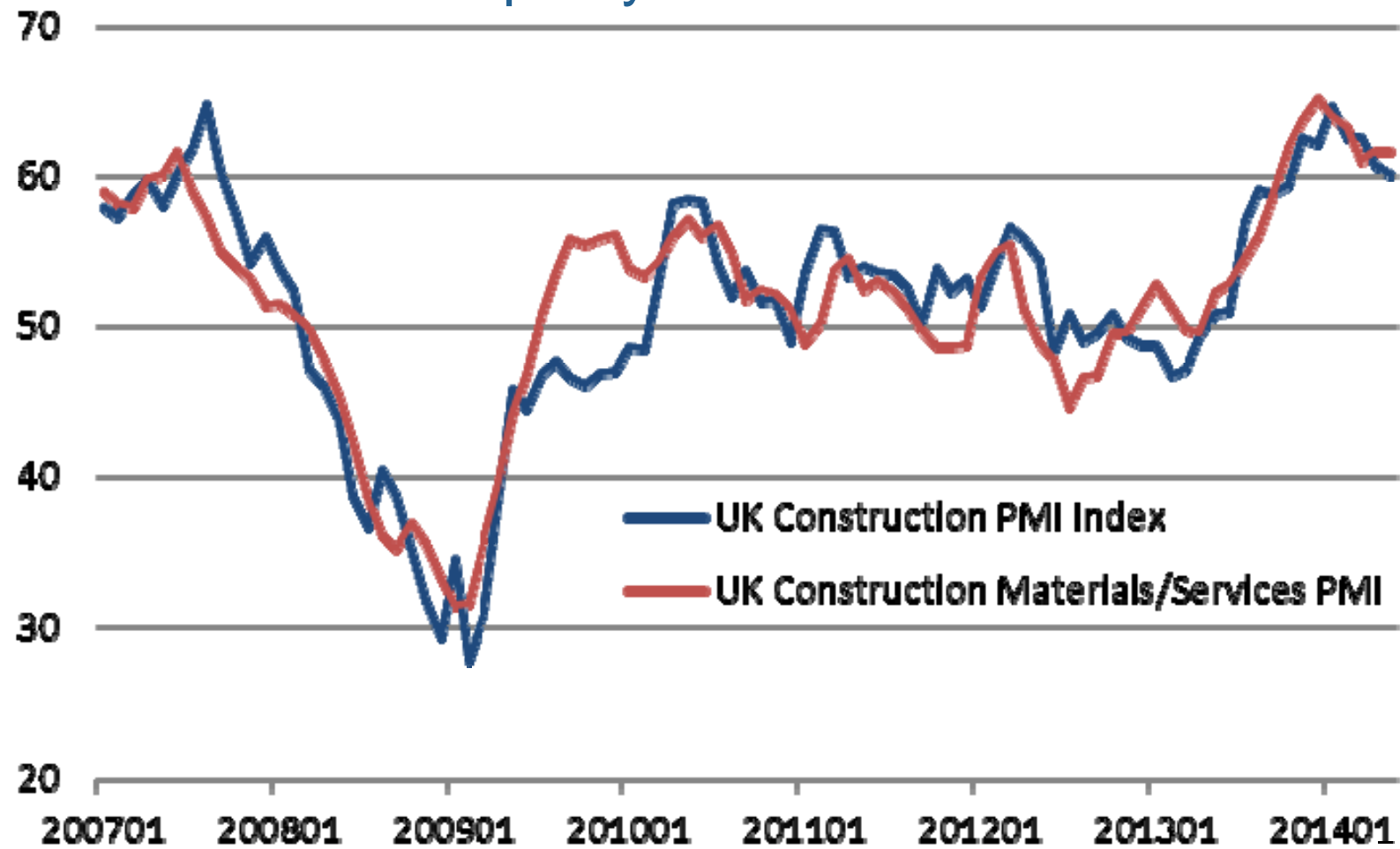
Start of 2015



End of 2014



## UK construction – proxy indicator



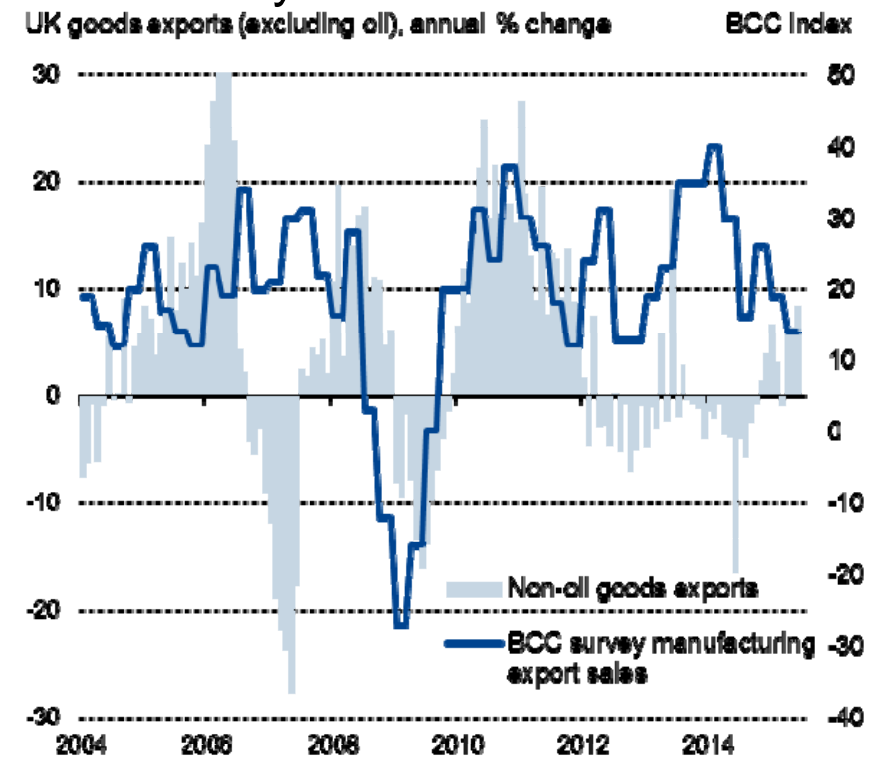
## UK exports

### PMI survey



Sources: Markit, Office for National Statistics (via Ecwin).

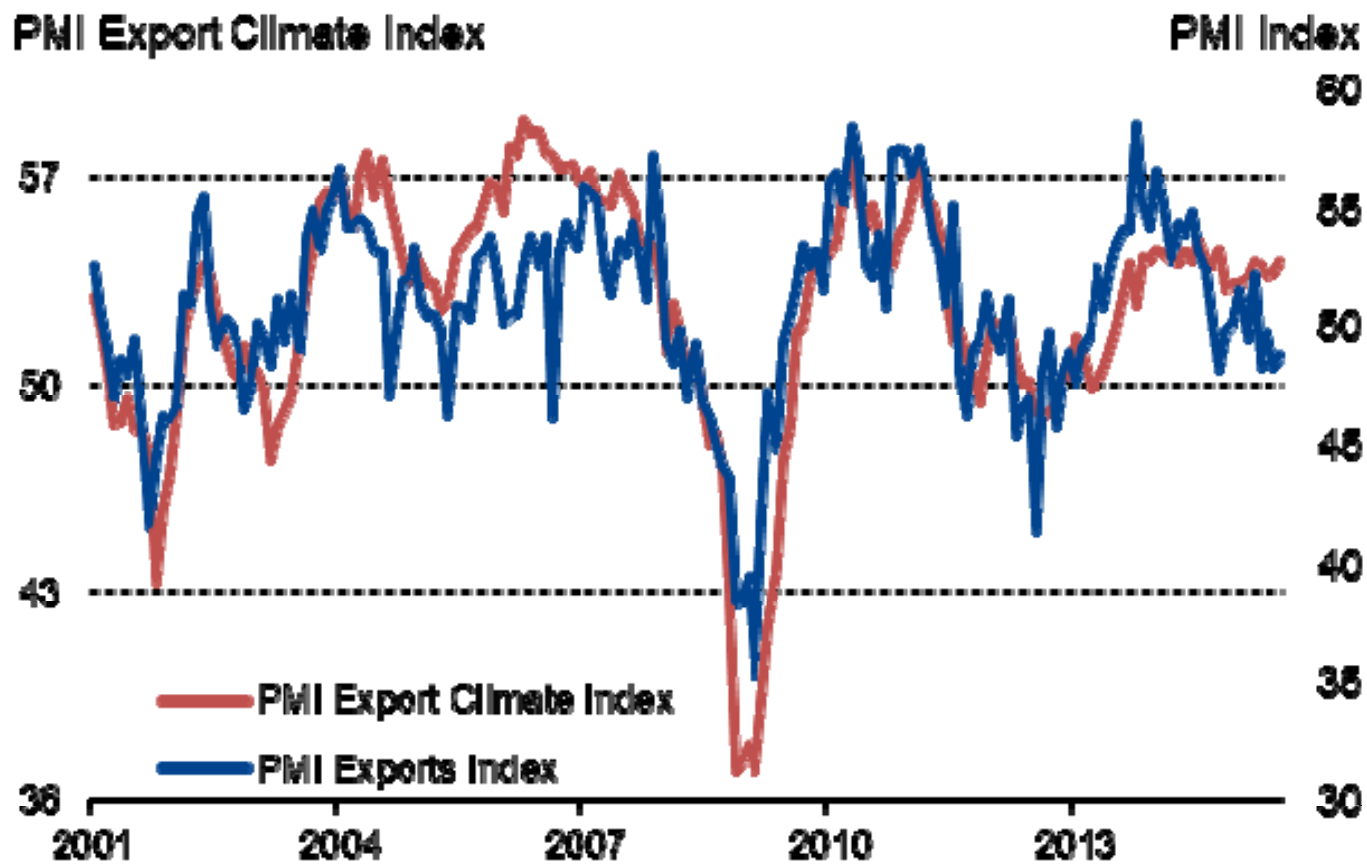
### BCC survey



Sources: BCC, Office for National Statistics (via Ecwin).

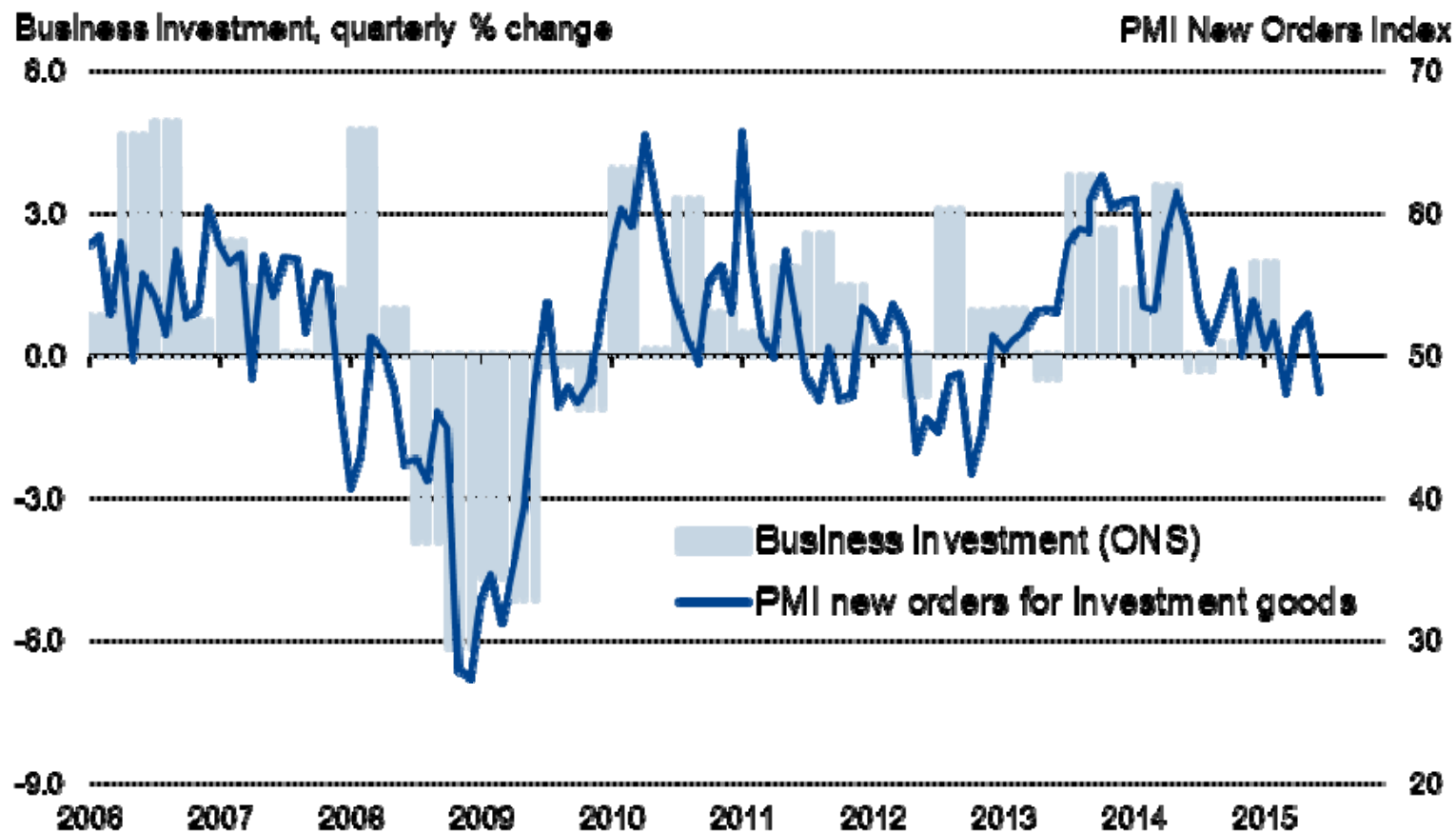


## UK exports



Sources: Markit.

## UK business investment



Sources: Markit, ONS.



Markit PMI surveys

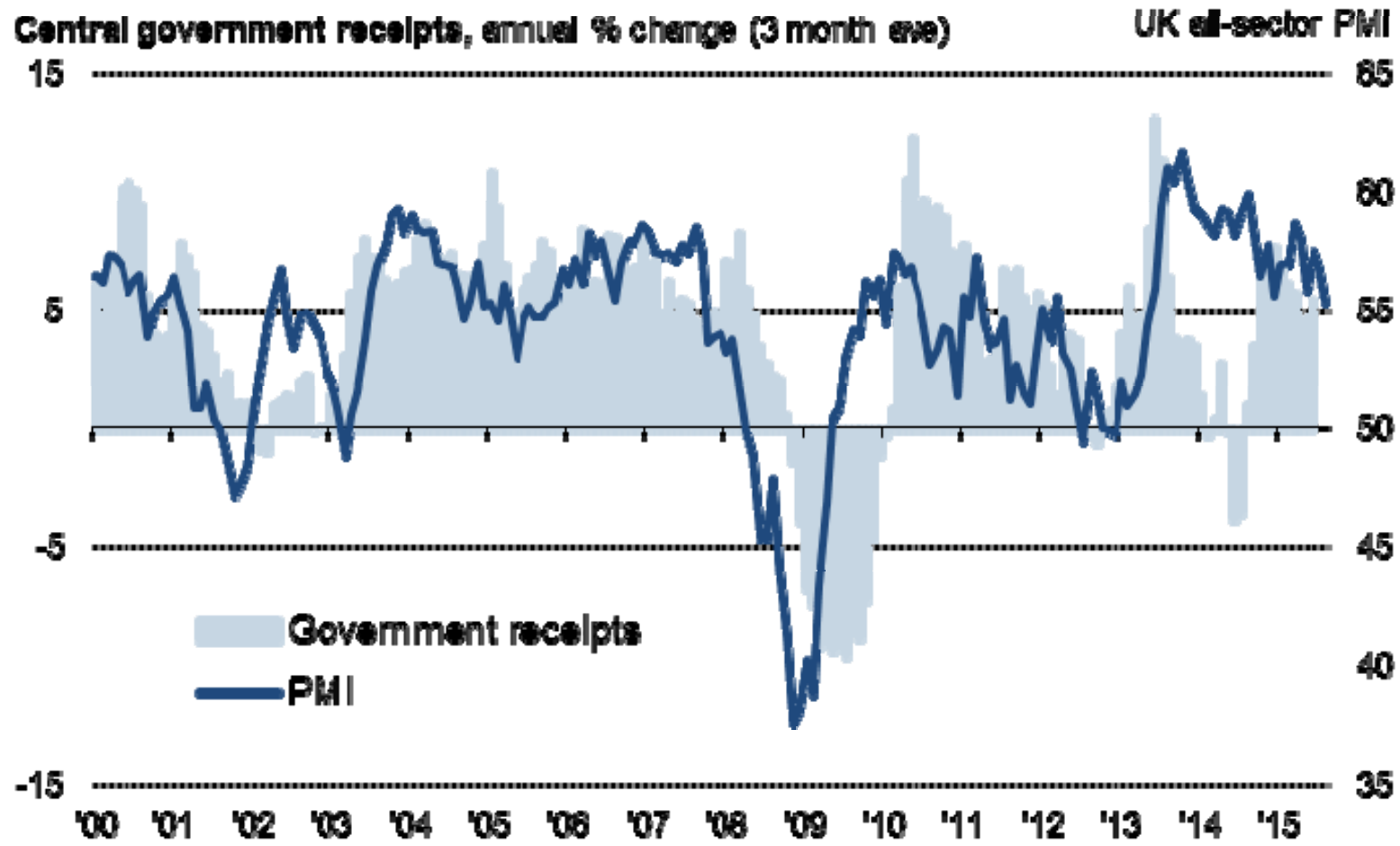
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# Interpreting the data

## Policy

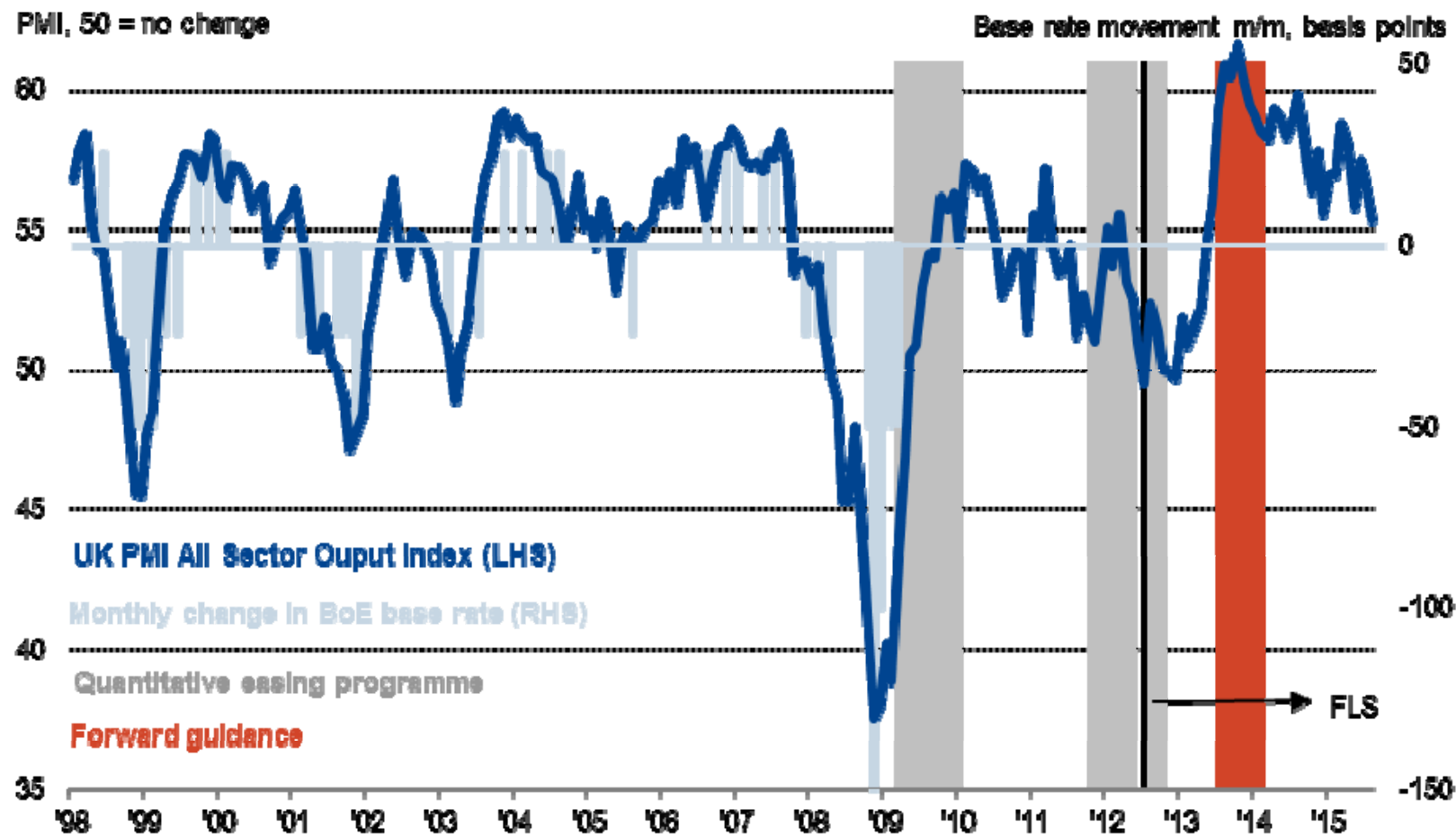
## Markit PMI surveys

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Source: Markit, ONS via Ecwin.

## Bank of England policy decisions and the PMI

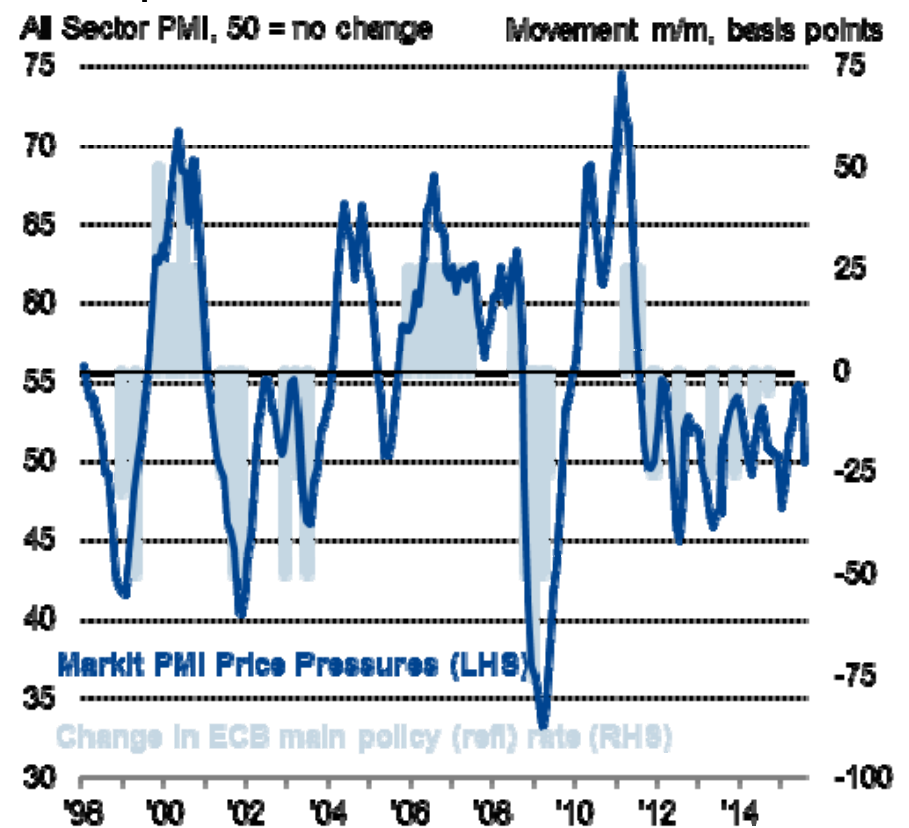


## ECB policy and the PMI

### Business activity

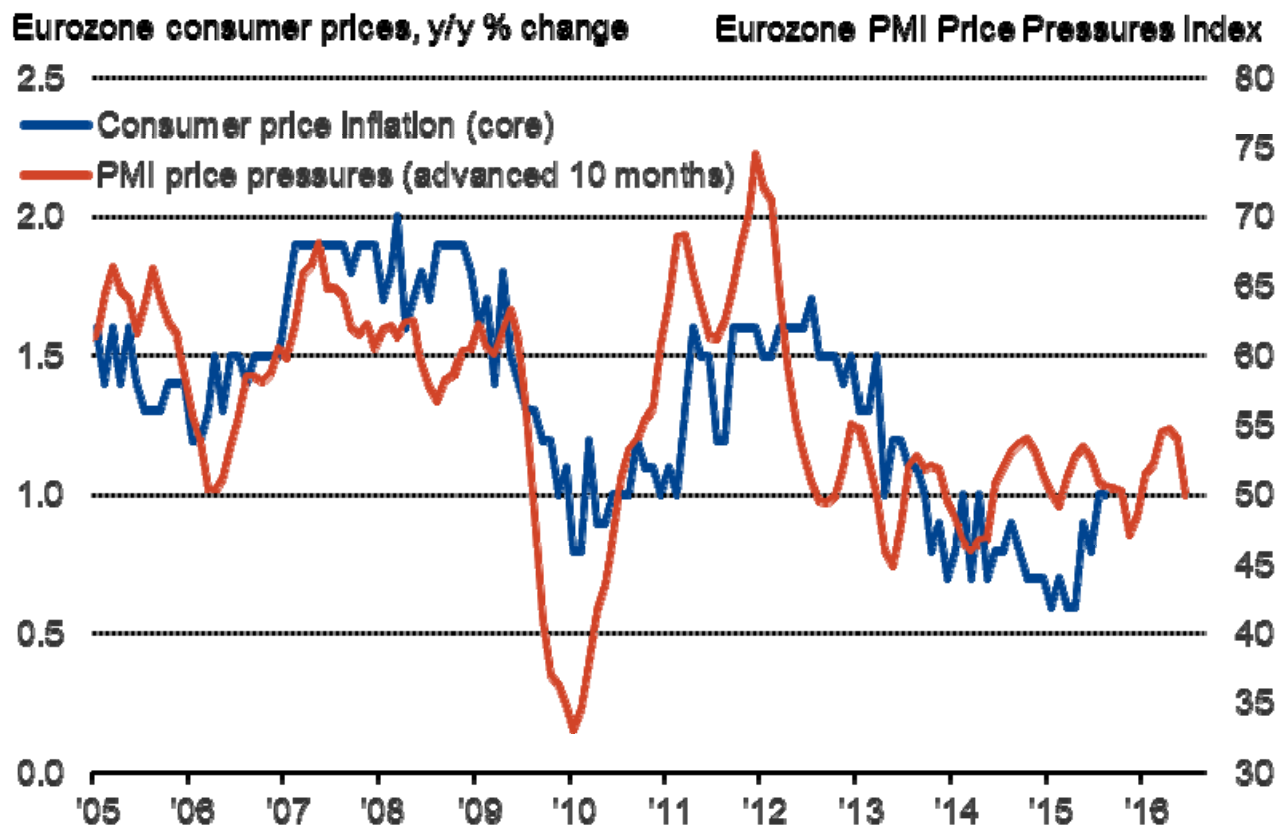


### Price pressures



## ECB policy and the PMI

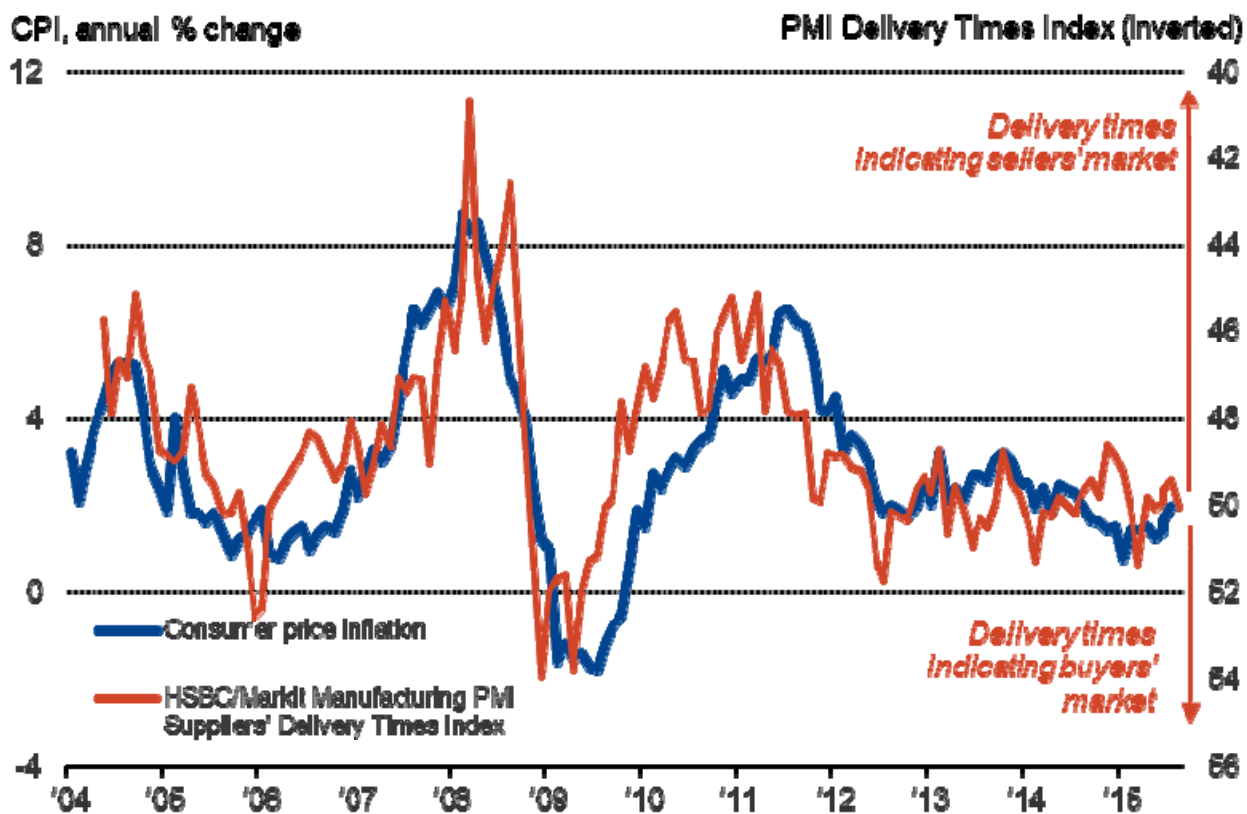
### PMI price pressures and inflation



Sources: Markit, Eurostat via Ecwin.

## Suppliers' delivery times

### China PMI price pressures and inflation



Sources: Markit, HSBC, NBS (via Ecwin).





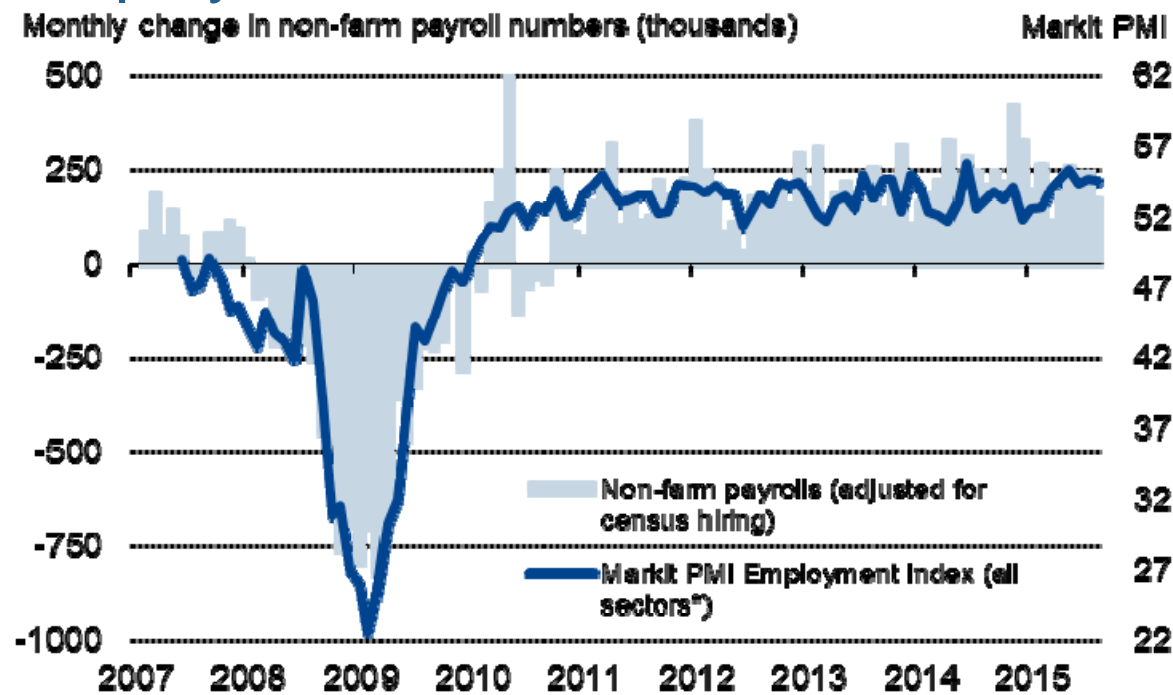
Markit PMI surveys

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# Interpreting the data

## Employment

## Employment – US

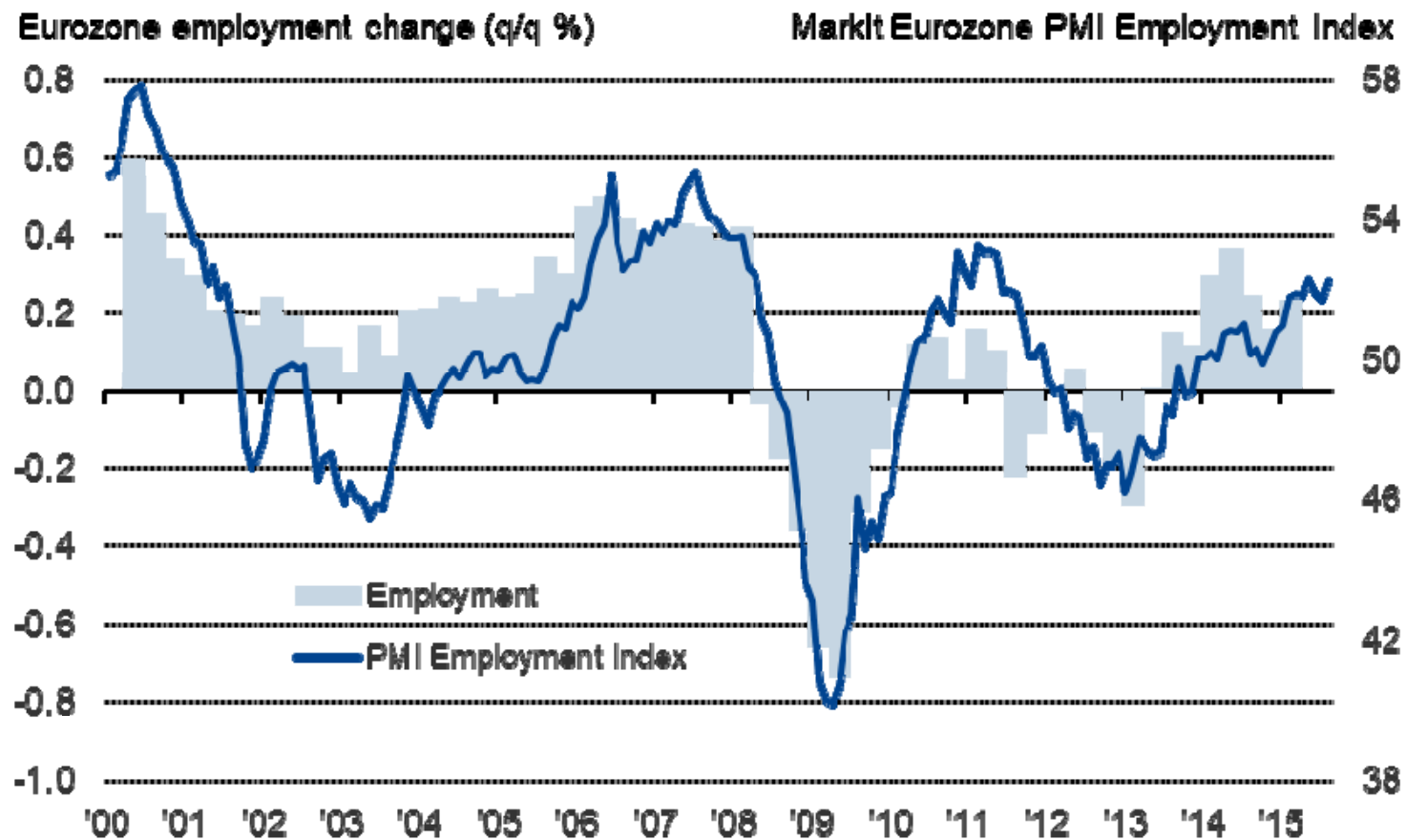


Sources: Markit, Bureau of Labor Statistics. \*Manufacturing only pre-October 2009

PMI	NFP
40	-277
42	-208
44	-139
46	-70
48	-1
50	68
52	137
54	206
56	275
58	344
60	413
62	482
64	551
66	619

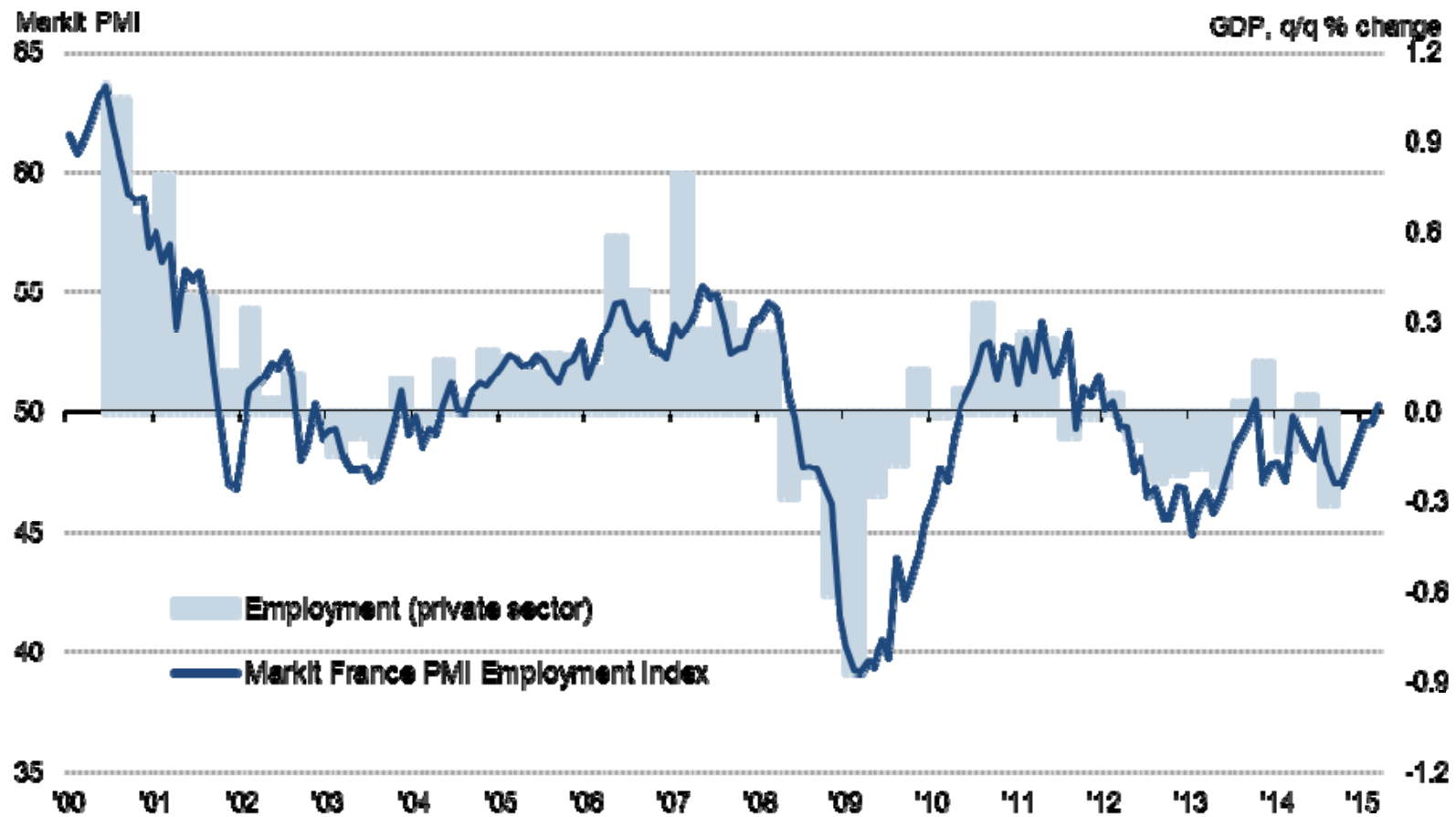
Sector coverage	PMI index used	Correlation	Adj. R2	SE
Whole economy	Weighted composite PMI Employment Index	0.68	0.70	57
Private sector	Weighted composite PMI Employment Index	0.86	0.73	50
Services	Services PMI Employment Index	0.72	0.65	39
Manufacturing*	Manufacturing PMI Employment Index	0.96	0.92	17

## Employment – Eurozone



Sources: Markit, Eurostat via Ecwin.

## Employment – France



## Employment – UK





**Markit PMI surveys**

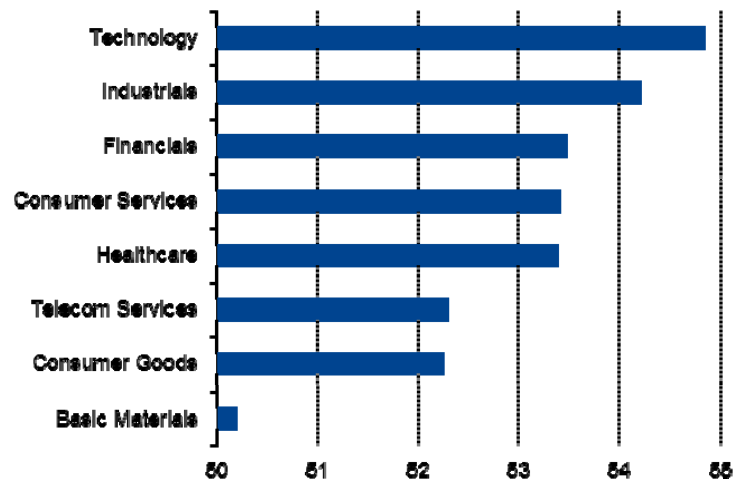
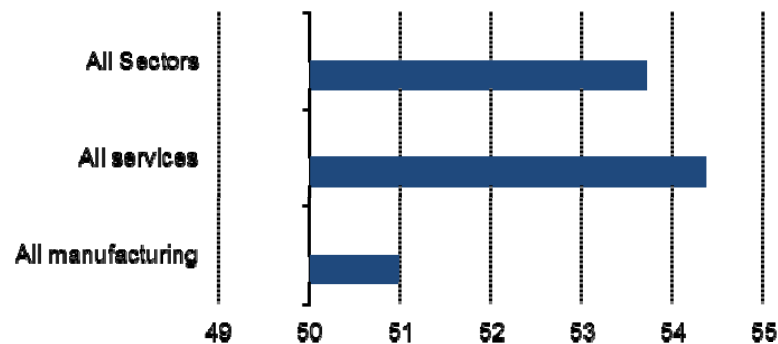
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# Detailed sector data

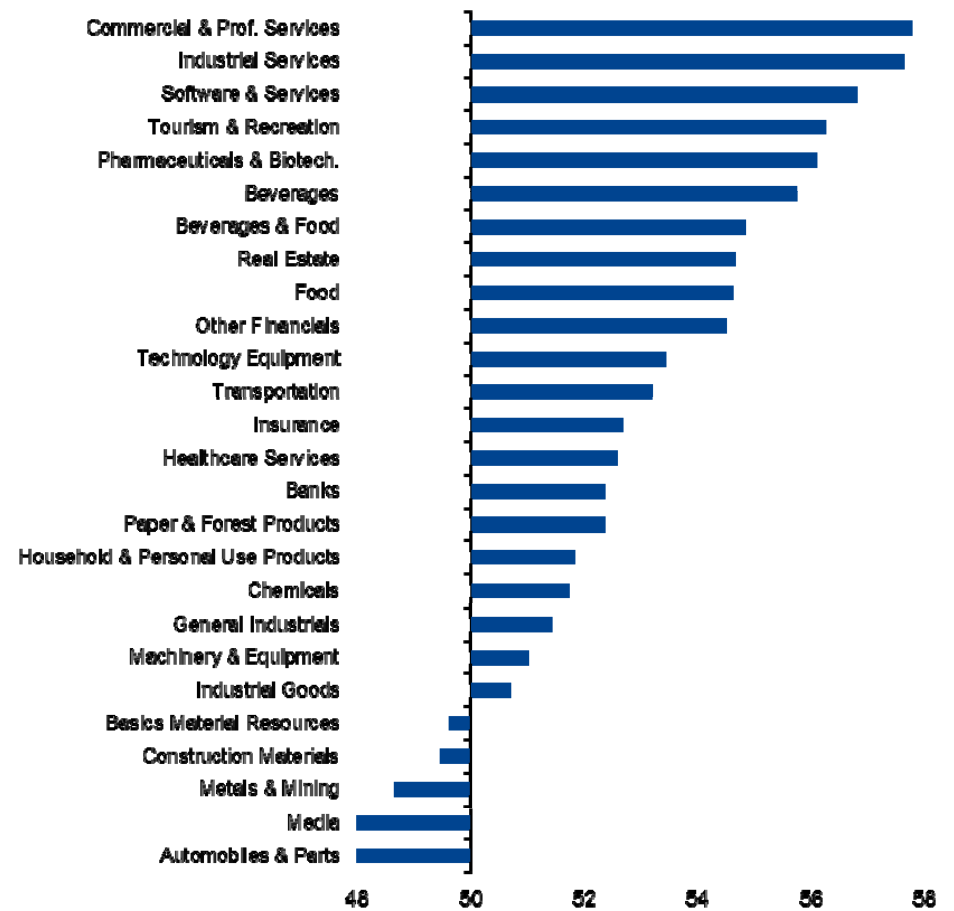
## Markit PMI surveys

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## Global PMI Sector rankings



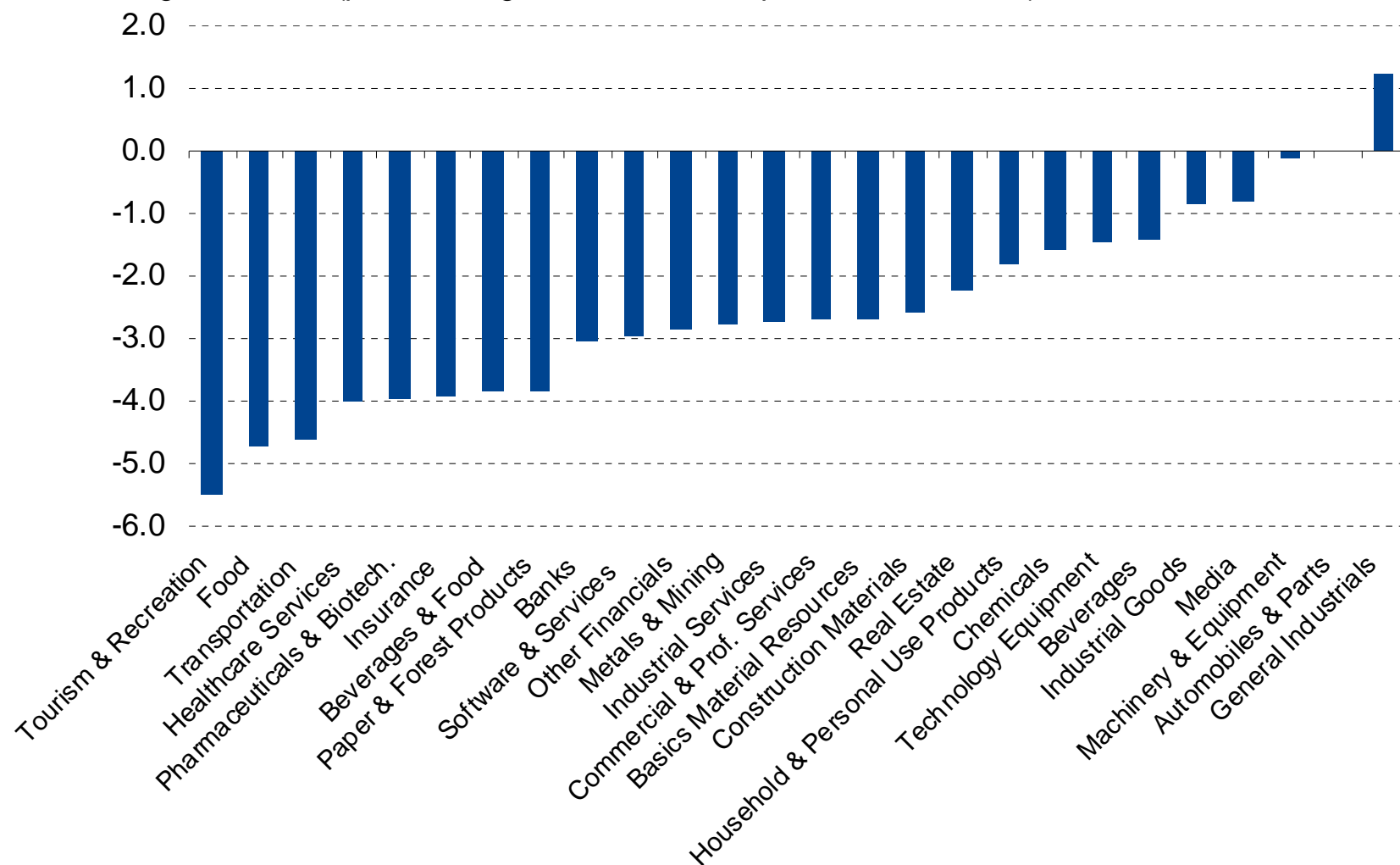
## Markit Global PMI (business activity indices, August 2015)



## Profitability indicators

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Margin indicator (prices charged index minus input cost index YTD)





## Asset allocation models

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Composite index:

- Prices charged (one month change)
- New orders (three month change)
- New orders (latest relative to historical average)
- Backlogs of work (latest relative to past 12 months)

Specific sector  
change (e.g. autos)

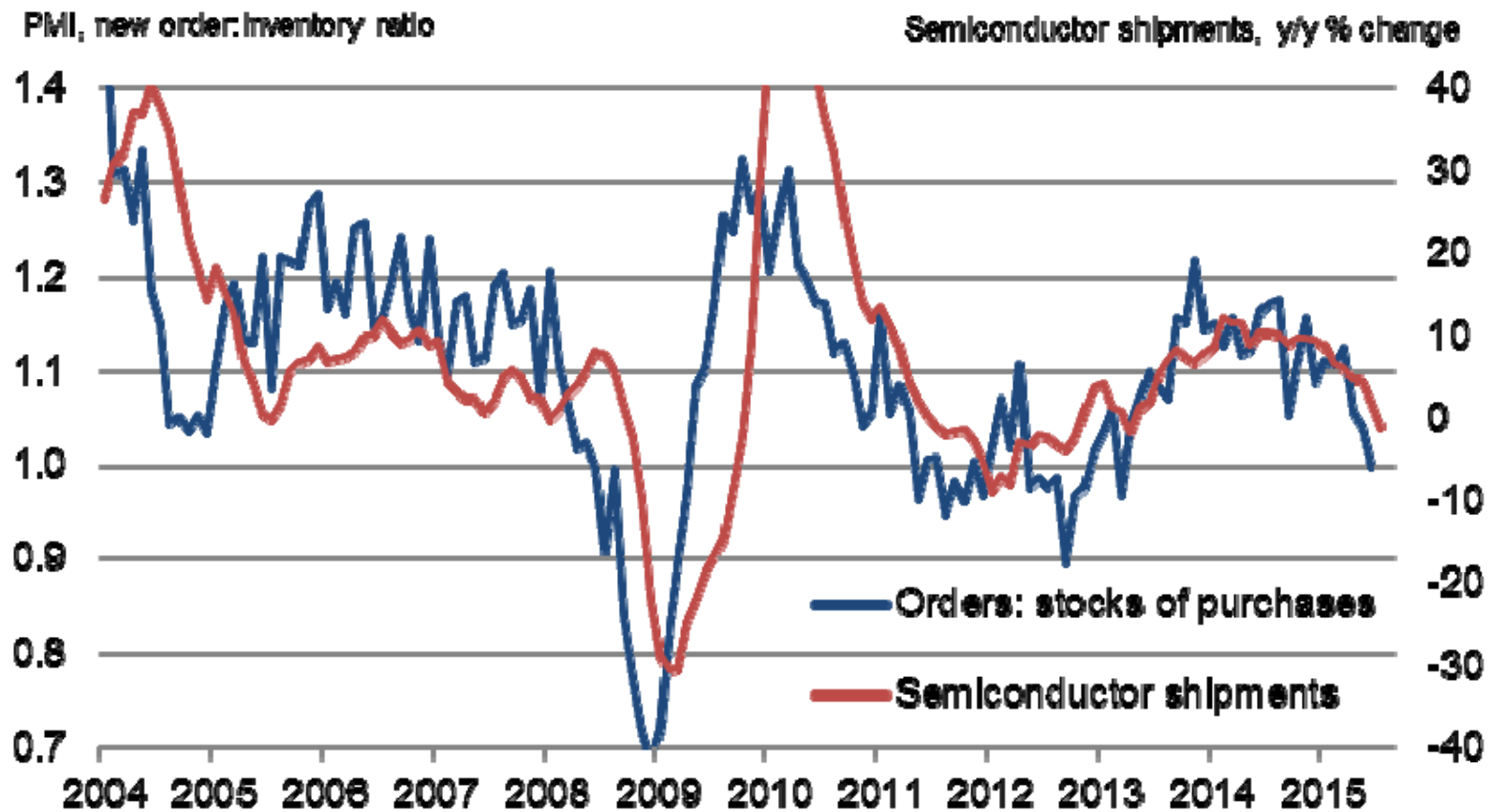
Mean change  
for all sectors

$$\text{Score}_t = \frac{\text{Change}_t - \text{AverageChange}_t}{\text{Standard Deviation}_t}$$

SD for all index values that month

High score = outperformance in terms of growth momentum  
Low score = underperformance in terms of growth momentum

## Global Electronics PMI



Source: Markit.



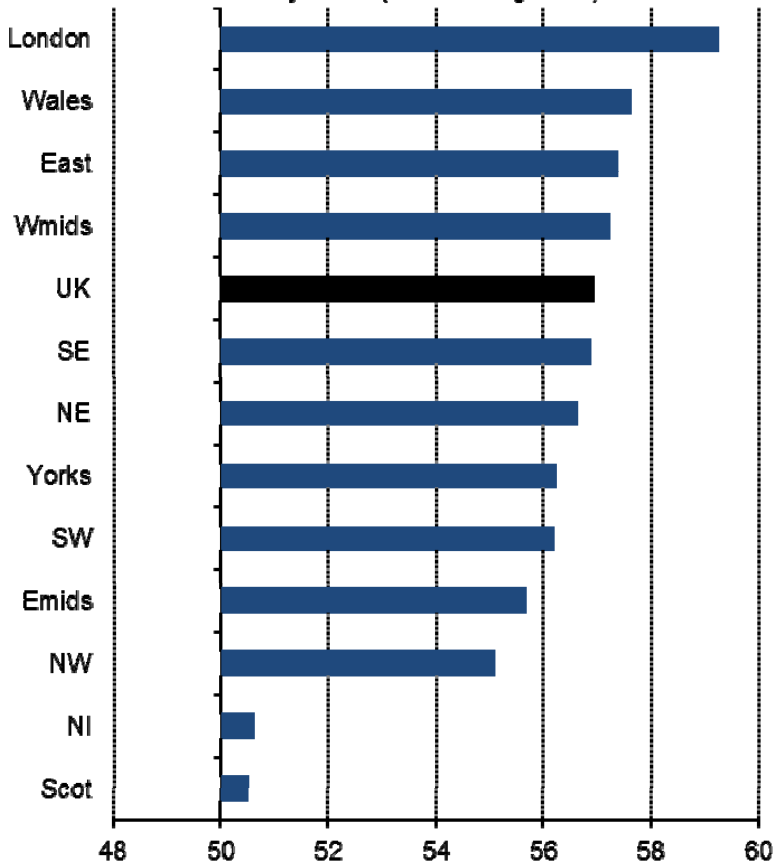
**Markit PMI surveys**

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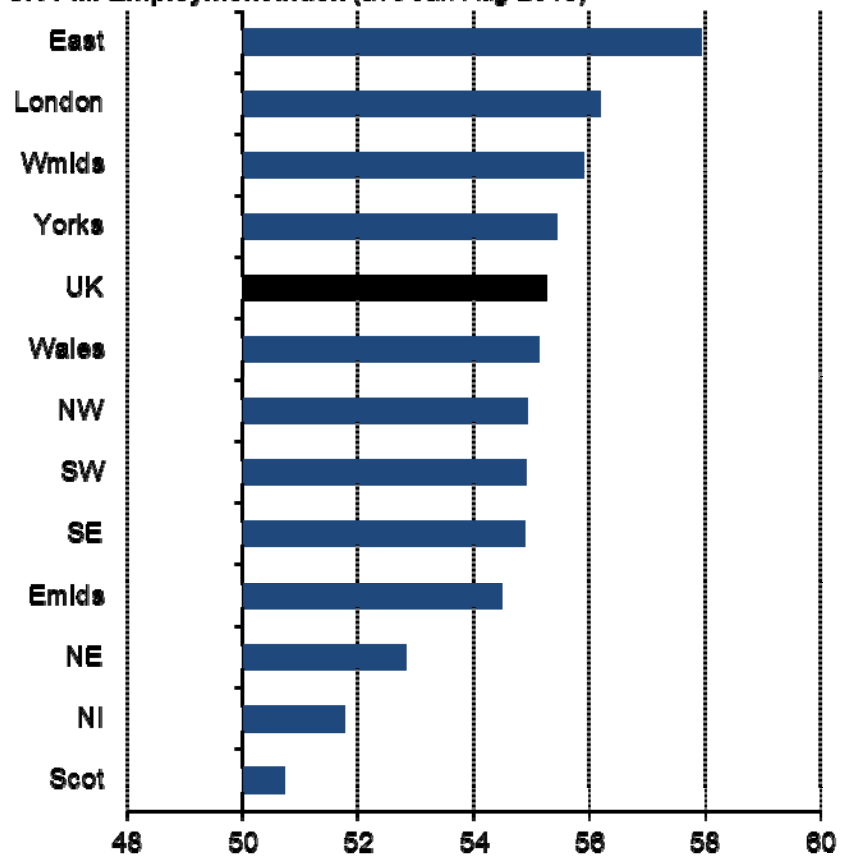
# Detailed regional data

## UK regional PMIs

UK PMI Business Activity Index (ave Jan-Aug 2015)



UK PMI Employment Index (ave Jan-Aug 2015)

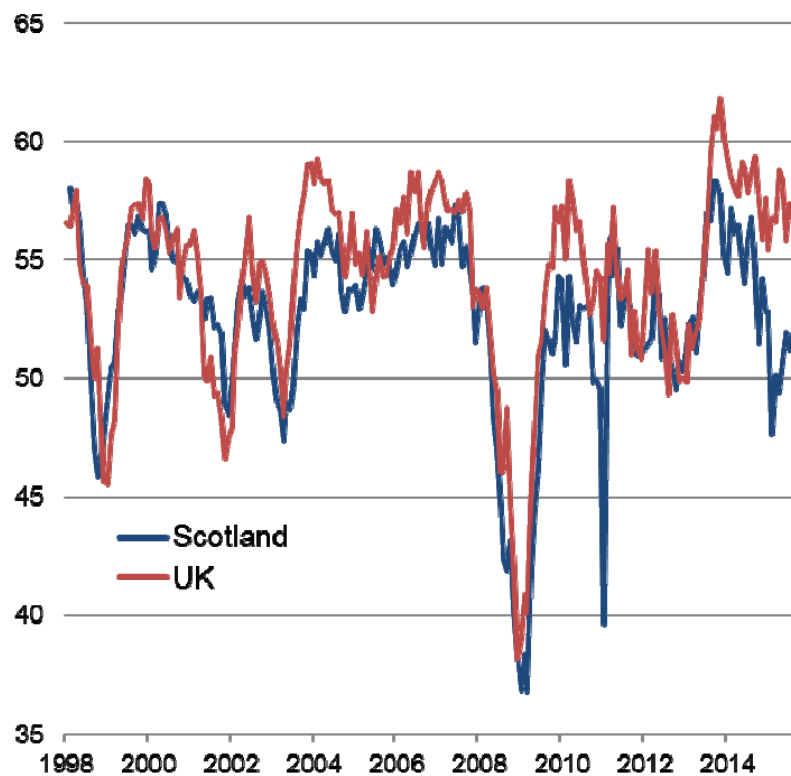


## Markit PMI surveys

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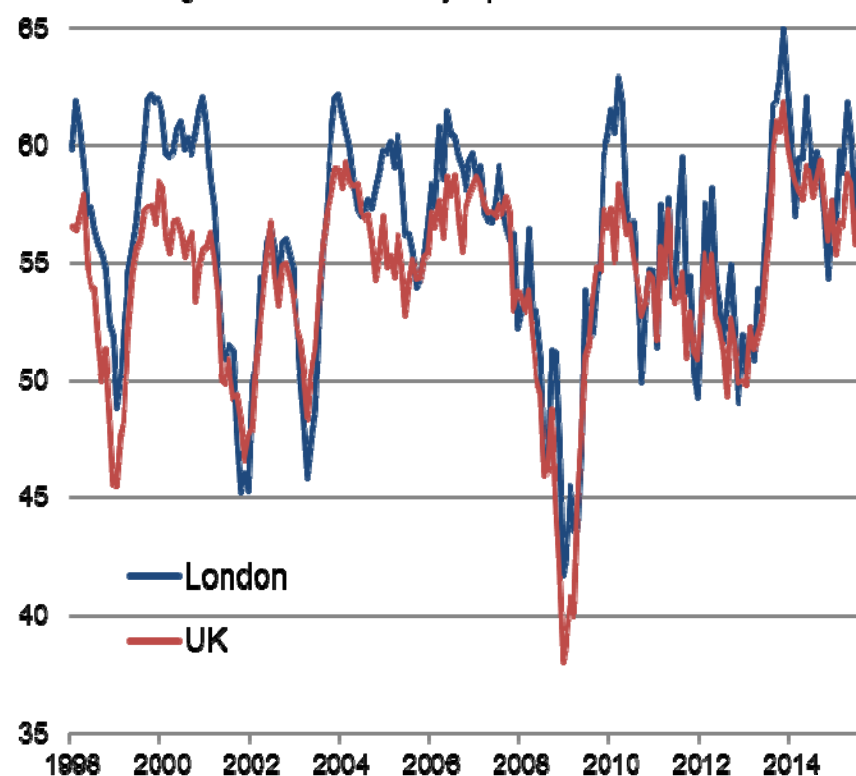
### UK regional PMIs

50 = no change in business activity v prior month



Sources: Markit, CIPS, Bank of Scotland

50 = no change in business activity v prior month



Sources: Markit, CIPS, Lloyds.

## What's new and what's next?

### New PMI surveys:

- Just launched: Asian sectors, Kenya, Malaysia, Singapore
- Coming: Nigeria, Ghana, Thailand, Philippines, Myanmar  
US regions and N American sectors

### Using PMI data in new ways:

- Global growth asset allocation models
- Sector rotation models
- GDP factors and nowcasting
- Derived proxy indices (e.g. construction)
- Profit(ability) factors

## Product development: other surveys

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## Other Markit surveys

### Recruitment industry



KPMG

Recruitment consultants

History to 1998

UK only

### Bellwether / marketing



IPA

Marketing professionals

History to 2002

UK only

### Commercial property



Savills

Developers + contractors

History to 2005

UK only

### Household finances



No sponsor

Households

History to 2009

UK only

### House price sentiment



Knight Frank

Households

History to 2010

UK only

## Latest trends

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Using PMI data

PMI data are available on an annual subscription basis from Markit by contacting [enquiries@markit.com](mailto:enquiries@markit.com). Packages are available depending on the number of users and number of surveys required. Data can be provided directly via Markit Distribution Platform or via third party distributors such as Bloomberg, Factset, Haver, IHS, Macrobond, and Thomson Reuters.

The Week Ahead

A summary of all forthcoming economic data releases

Monthly/Quarterly Review

Markit economic overview

The following is an extract from Markit's monthly economic overview. For the full report please click the link at the bottom of the article.

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ECONOMICS | May 9th, 2015



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### Global investment flows

Investor appetite for US, UK and Japan wanes in favour of eurozone

- ETF data show strong inflows into eurozone
- Japanese ETFs show signs of lower investor interest
- Uncertainty over US and UK outlooks leads to equity ETF outflows

Data for the first four months of 2015 (up to 27 April) show inflows into exchange-traded funds are so far running some 80% higher than a year ago, with total assets under management rising some €113bn in the year to date, according to data from Markit.

However, a deeper dive into the data shows major shifts in investor sentiment between main economies. Most notably, April continuation of a trend of improving exposure to the eurozone, and its particular, with sentiment shifting away from UK equities. The data also indicate a rise in exposure to Japan and renewed economic trouble.

#### Investors ignore Greek worries

After a record first quarter, eurozone-wide have seen further net inflows of \$4bn taking the net total for the year-to-date inflows indicate that investors are economic growth picking up further in this year, with ECB stimulus widely expected to build on a nascent upturn especially in the 'periphery'.

It's notable that the rate of inflows slows this appears to reflect a wariness of growth in the core euro countries rather than about 'Greece' or a Greek default, instead focusing on recent economic signals a welcome upturn in the periphery.

Flash eurozone PMI data for April second-strongest expansion for nine months with growth outside of the core countries Germany reaching the highest since 2007.

These eurozone inflows are consequent on the fact that the eurozone is the most attractive region for investors, with the eurozone's PMI data showing a clear recovery trend.



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### Japan

Manufacturing PMI raises prospect of renewed economic downturn

- Flash PMI at 12-month low in April, signals renewed downturn
- Order books fall for second month as domestic demand weakens and export growth tapers
- Prospect of renewed downturn raises questions over effectiveness of policy

Japan's manufacturing economy contracted for the first time in almost a year, according to PMI data from Markit. Together with signs of price pressures easing in the survey, the downturn means the goods-producing sector joins the service sector in a new downturn, highlighting a need for further policy stimulus.

Investors have ploughed into Japanese funds, largely on the basis that the economy will revive on the back of aggressive stimulus initiatives from the government and Bank of Japan. But inflows slowed in April, according to exchange-traded fund data, and investor appetite for exposure to Japanese equities in particular could weaken further on the basis of a darkening economic outlook.

#### Renewed downturn

The headline Markit Manufacturing PMI fell from 50.3 in March to 49.7 in April, according to the preliminary 'flash' PMI. Any reading below 50.0 signifies a deterioration of business conditions compared to the prior month.

The latest index was the lowest seen since April of last year and represents a disappointing start to the second quarter. After GDP rose 0.4% in the final quarter of last year, PMI data so far this year have signalled a weakening in the pace of expansion in the first quarter, and now raise the possibility of the economy sliding back into contraction in the second quarter. In addition to the renewed contraction of manufacturing signalled in April, March PMI data shows the service sector to have already been in a state of accelerating decline.

As such, the PMI survey calls into question the Bank of Japan's latest assessment of the economy enjoying a 'moderate recovery trend'.



Continued...





Thank you.

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