

# Faster indicators of economic activity: new data sources to solve old problems

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The longer a decision-maker has to wait for the statistics, the less useful they are likely to be

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Independent Review of UK  
Economic Statistics, Bean,  
2016

# FASTER INDICATORS OF UK ECONOMIC ACTIVITY



Data Science  
Campus



Office for  
National Statistics



BARCLAYS

Real-time	Identify close-to-real-time data representing economic concepts
Large changes	Create early-warning indicators of large economic impacts
Insights	Provide insights into economic activity & increased granularity

# FASTER INDICATORS OF UK ECONOMIC ACTIVITY OBJECTIVES

# DATA SOURCE

Road  
traffic flow



Payments  
data

Ship  
tracking



VAT  
returns

HM Revenue  
& Customs

BARCLAYS

A large ship is being lifted by several blue and yellow cranes at a port. The ship is white and has a red section on its side. The background shows industrial buildings and a cloudy sky. The text "TRACKING SHIP MOVEMENTS" is overlaid in white, with a vertical line to the right of the word "SHIP".

# TRACKING SHIP MOVEMENTS

TCV D880 3401

1 ABC 2 DEF  
3 GHI 4 JKL 5 MNO  
6 PQRS 7 TUV 8 WXYZ  
C 9 ENTER

▲  
◀ ▶  
▼

MENU ON/OFF

- 
- This map illustrates the distribution of 1000 simulated immigrants originating from the British Isles. The map covers the British Isles, France, Belgium, the Netherlands, and parts of Germany and the North Sea. Key locations labeled include Dundee, Edinburgh, Glasgow, London, Manchester, Liverpool, Leeds, Cambridge, Oxford, Bristol, Plymouth, and various cities in Ireland (Dublin, Limerick, Cork, Galway). The map is densely populated with colored dots and arrows, representing the movement of immigrants from their points of origin to their destinations across Europe.

# SHIPS - DATA SOURCES

## UK – Maritime and Coastguard Agency

- UK waters only - 20 - 30miles
- July 2016 – Aug 2018

## Global – ORBCOMM, UN Global Platform

- live stream - 500 messages / s

## Data quality

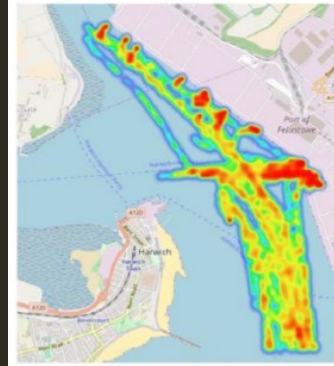
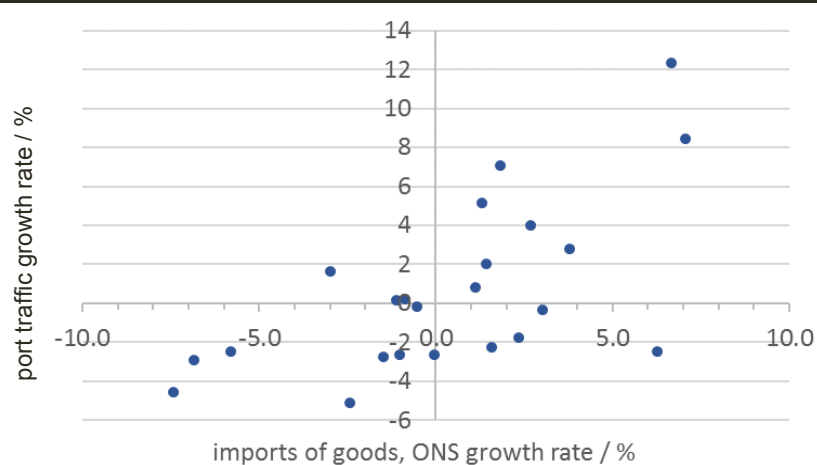
- manual entry, illegal behaviour, noisy data, etc, but
- positioning errors => small bias in aggregated results

ORBCOMM®



Maritime &  
Coastguard  
Agency

- Port traffic and time in port
- 13 UK ports
- 2 months after reference period
- Port traffic correlates better with trade than time in port



Monday 12 December 2016



Monday 19 December 2016



Sunday 25 December 2016



Sunday 1 January 2016



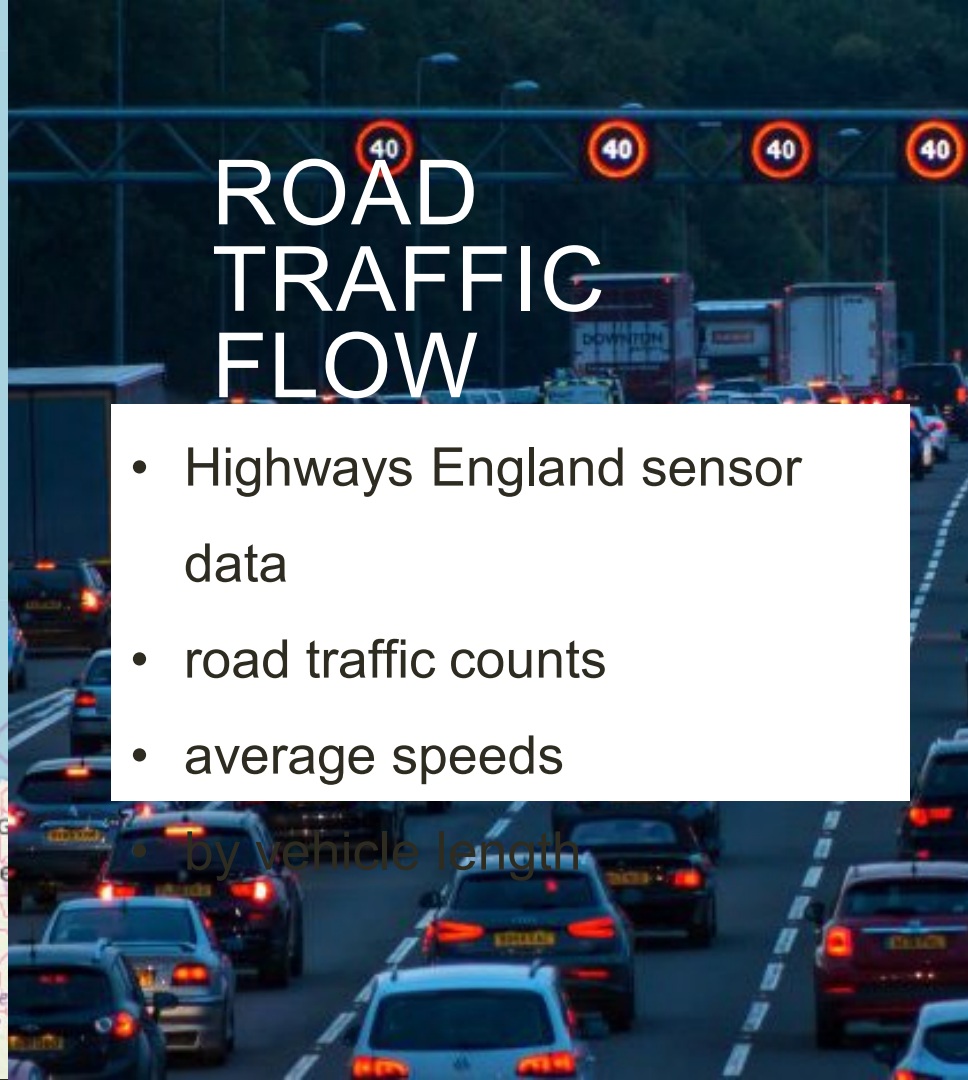


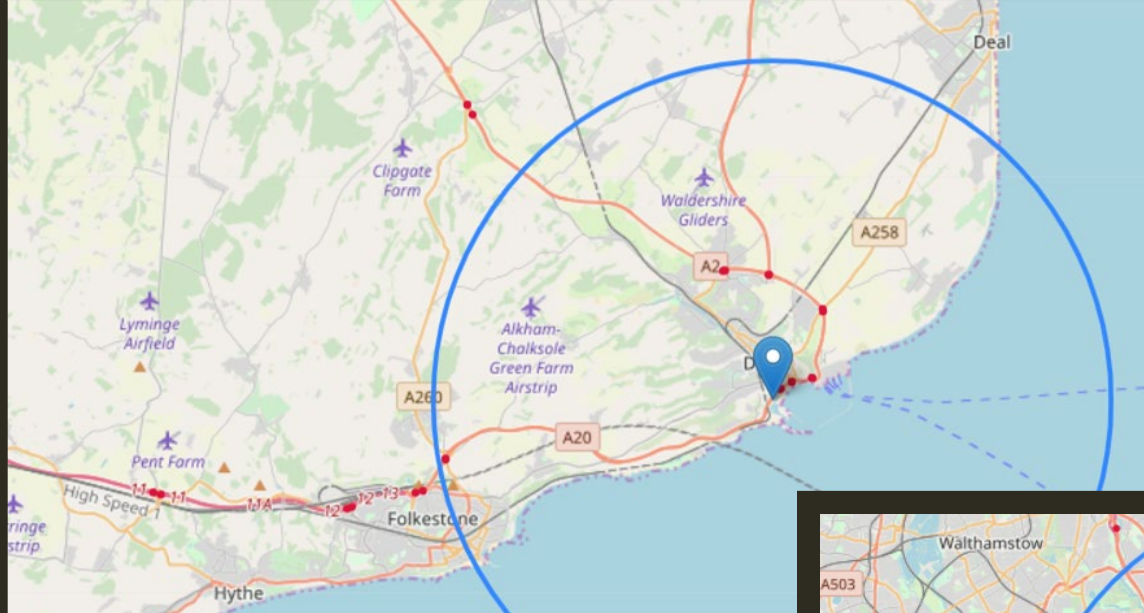
# ROAD TRAFFIC



# ROAD TRAFFIC FLOW

- Highways England sensor data
- road traffic counts
- average speeds
- by vehicle length

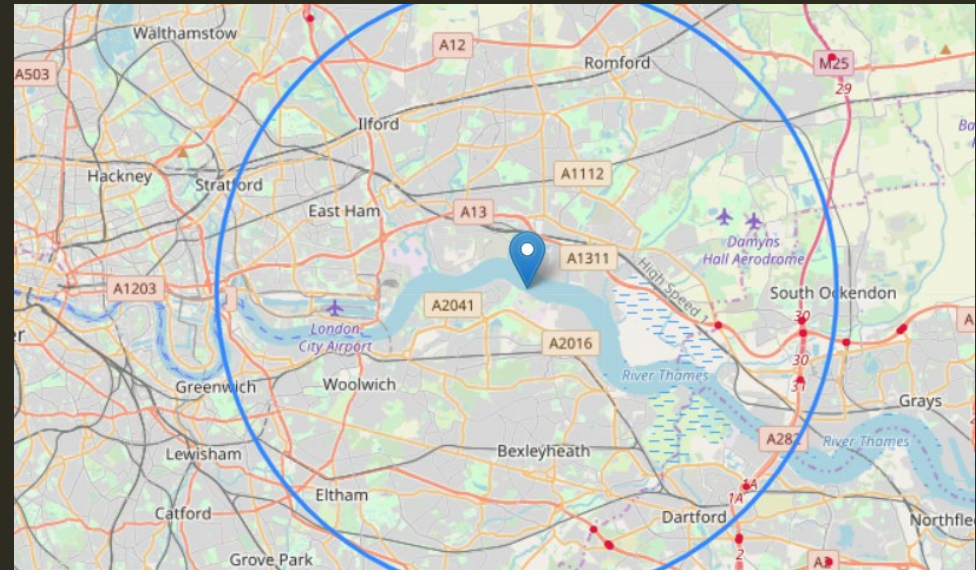


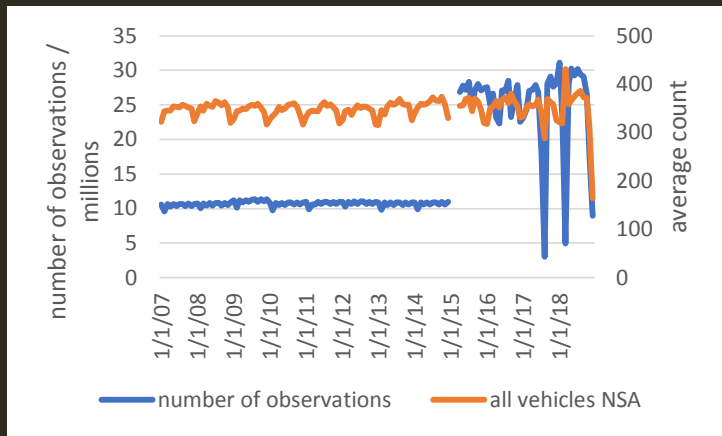


mean value per 15  
minute interval per  
sensor:

- counts
- speed

- all-England
- 10 ports – 10 km radius



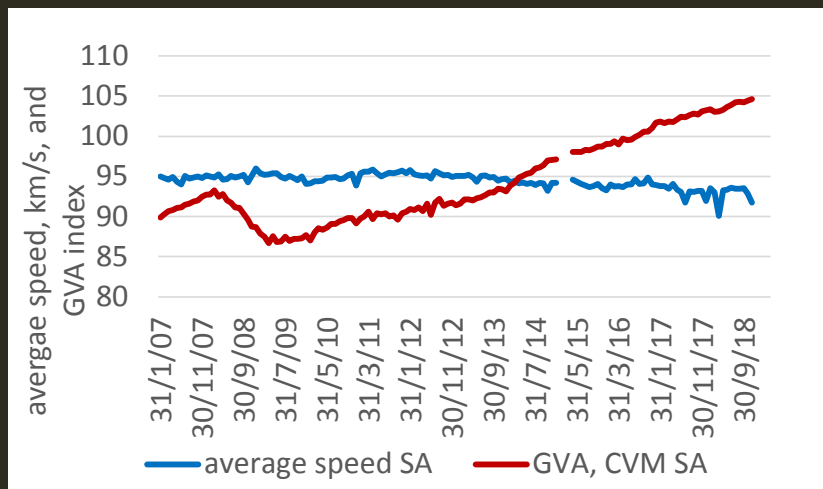
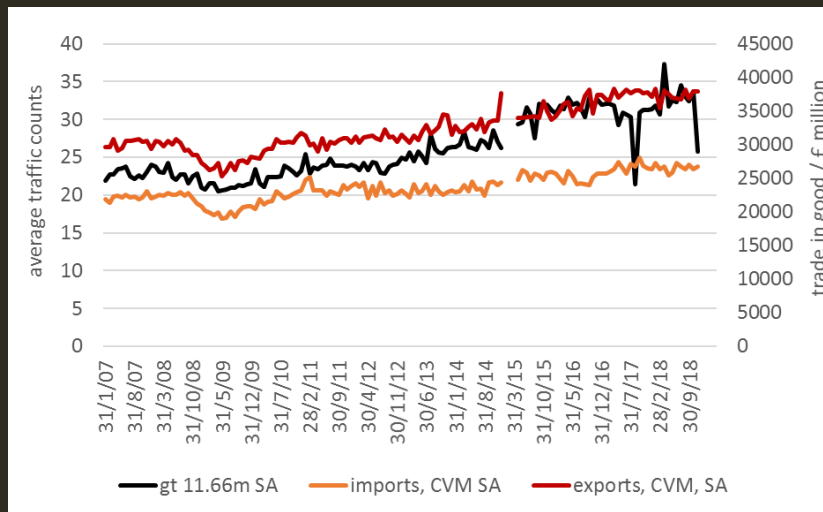


## Data quality

- change in data collection / sensors
- drop outs
- potential location bias
- what's on the lorries?

## Results

- road traffic counts reflect wider economy and road haulage for granular geographies







# VAT – A NOVEL USE OF ADMIN DATA

# VAT

- HMRC value added tax returns
- expenditure and turnover
- industry
- record type
- monthly or quarterly reporting
- month 1 ~900 reporters
- quarter ~ 330,000



## HM Revenue & Customs

VAT due in this period on <b>acquisitions</b> from other EC Member States	2		
Total VAT due (the sum of boxes 1 and 2)	3		
VAT reclaimed in this period on <b>purchases</b> and other inputs (including acquisitions from the EC)	4		
Net VAT to be paid to HMRC or reclaimed by you (Difference between boxes 3 and 4)	5		
Total value of <b>sales</b> and all other outputs excluding any VAT. Include your box 8 figure	6		00
Total value of <b>purchases</b> and all other inputs excluding any VAT. Include your box 9 figure	7		00
Total value of all <b>supplies</b> of goods and related costs, excluding any VAT, to other EC Member States	8		00

## VAT DIFFUSION INDICES

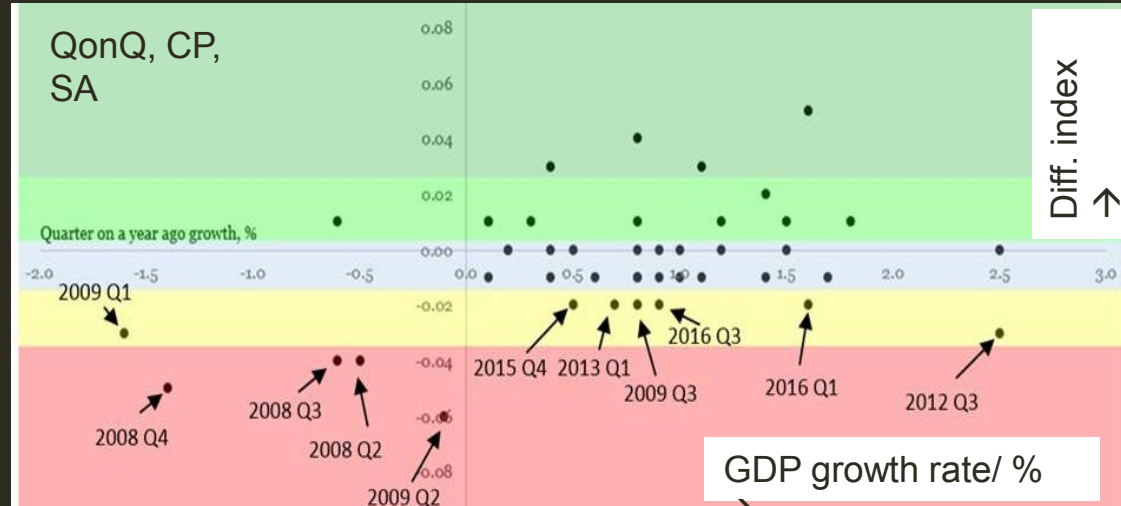
$$\frac{\text{Number growing}_t - \text{Number declining}_t}{\text{Number growing}_t + \text{Number declining}_t + \text{Number unchanged}_t}$$

Takes values between  
- 1 = all firms decreasing  
+1 = all firms increasing

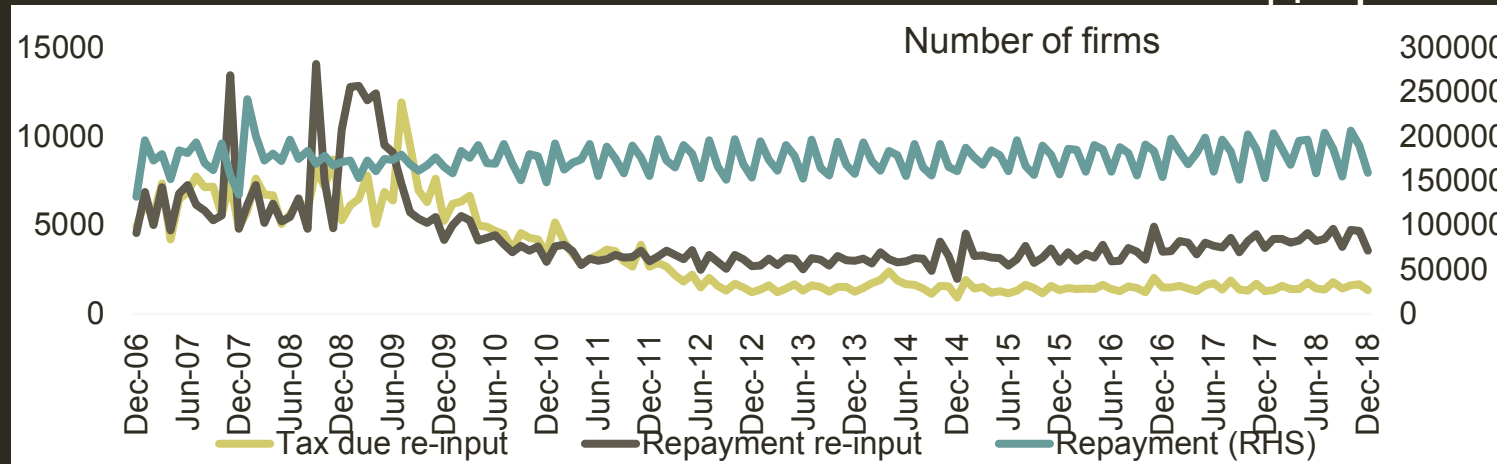
Equal weight for each reporter

## REPORTING TYPE AND NEW REPORTERS

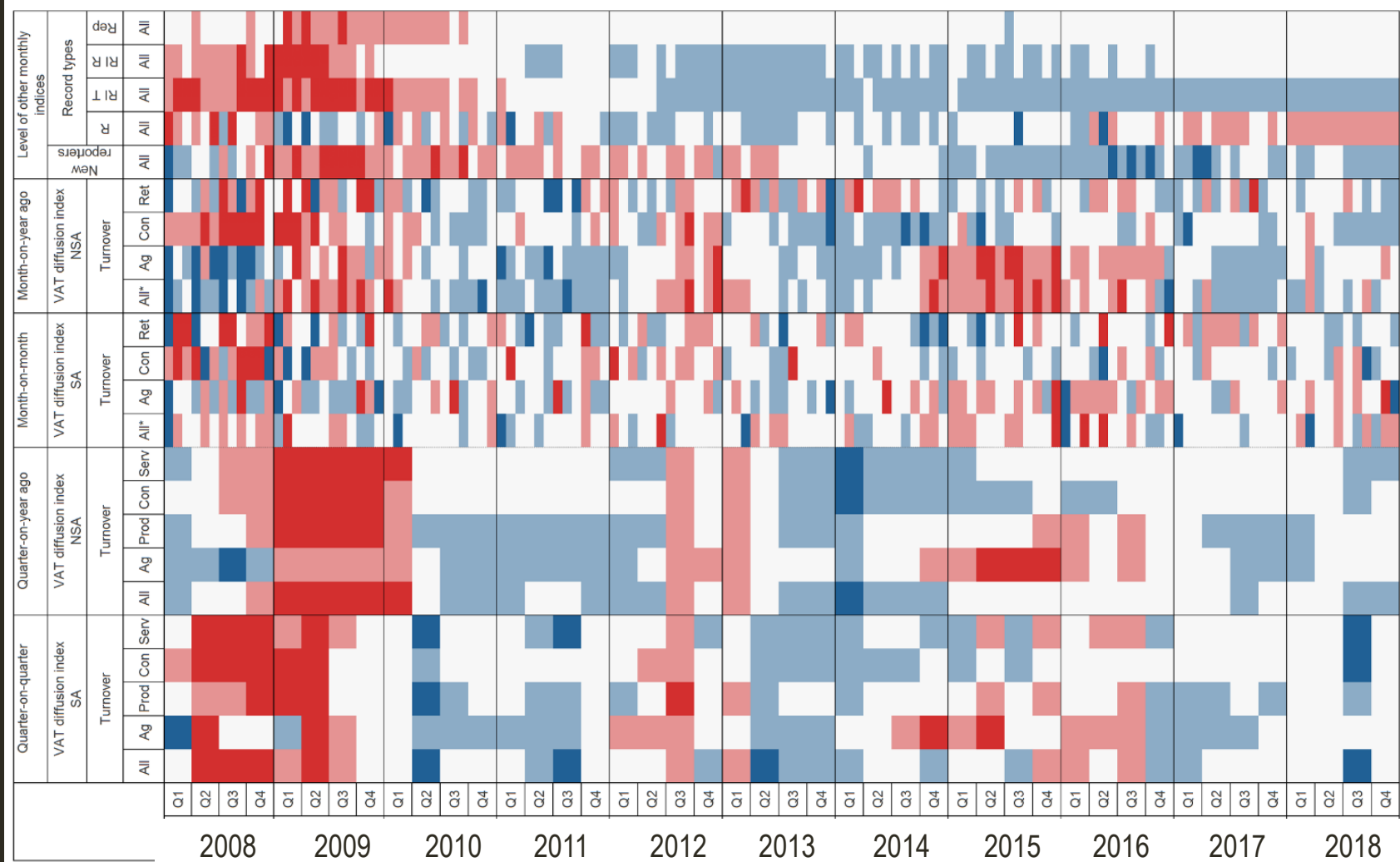
Simple counts:  
payment  
re-payment  
re-input  
re-payment re-input



- VAT is a good indicator of large change
- Last recession identified 5 months before official statistics
- Novel repayments indicators show financial stress
- Care with over-interpretation and beware







# PUBLICATION

Economic activity, faster indicators, UK, monthly

- research output
- Voluntary Adoption of the Code of Practice
- ethical review
- interpretation and commentary



## Trustworthiness

*Confidence in people and organisations that produce statistics and data*

## Quality

*Data and methods that produce assured statistics*

## Value

*Statistics that support society's needs for information*

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## 1. Disclaimer

These research outputs are part of the [faster indicators of UK economic activity](#) project and are not official statistics. The indicators are still in development and not yet fully in production. We are making these data available at an early stage to invite feedback and comment on their further development.

## Prepare

- Process map & QA plan
- Build with scale-up in mind
- Document and comment

## Handover

- Plan training, coaching and mentoring
- Report to owners' project board

## Involve

- Users
- Development team
- Production team

## Re-use

- UN AIS task force
- Share – GitHub, show and tell, user groups

WHAT  
HAVE WE  
LEARNED  
?

# WHAT'S NEXT?

## UN AIS Task Force

- involve other countries via UN Global Platform
- training delivered

## Further development

- Shipping indicators
- Payments data

Continue to gather feedback

# CONCLUSIONS

We met our objectives

- Faster indicators of UK economy to meet a clear need
- New statistical output developed in < 6 months
- Collaboration makes it work
- Progress in understanding exciting new data sources

But

- There are no silver bullets
- Publication is not the end point
- Prototypes are easy, scale-up is hard

# CONTACT US



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MARCH 20 2019, 12:01AM, THE TIMES

## Even a skip-counter like me agrees economic indicators need updating

DAVID SMITH



**T**oday I want to take you away from the Alice in Wonderland world of Brexit, populated by strange creatures often called Steve or John, and deal with something that will still be important long after the dust has settled. My interest was piqued

The Telegraph

## Instant warning of next economic slump from new ONS system

## ONS harnesses big data in effort to quickly spot economic trends

**Novel ways of monitoring the UK economy include counting the number of trucks on roads**

THE  TIMES

## Traffic data drives sneak preview of the economy

fastFT UK economic growth

[+ Add to myFT](#)

## UK loses momentum in first quarter, new government statistics show

Office for National Statistics releases debut of more 'timely' economic report