BANK OF ENGLAND

Granular data and advanced analytics

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Financial Information Forum of Latin American and Caribbean Central Banks

5 May 2016

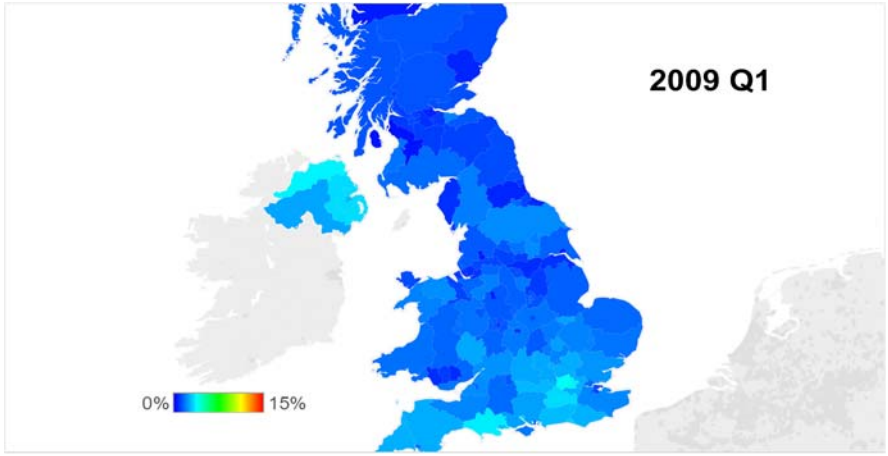
Why are we interested in Big Data?

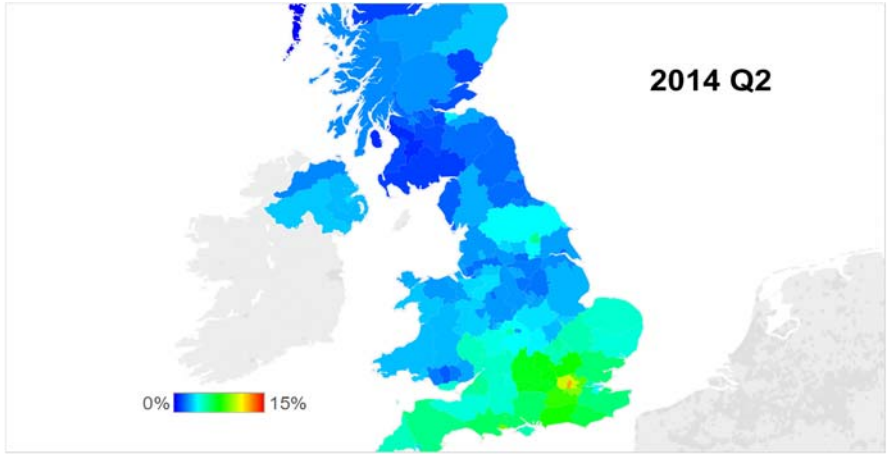
- What do we mean by the term
  - Very loose meaning, covering data, techniques and attitude
  - Granular data crucial
- Why are we interested?
  - Change of responsibilities
    - The arrival of the PRA
  - Change of opportunity
    - More data, increased computing power, technical advances
  - Change of circumstances
    - Lessons from the financial crisis
  - Change of philosophy
    - Inductive vs deductive reasoning

What are we interested in?

- Gaining a richer understanding of the phenomenon of interest
  - Can help disentangle cause and effect…
  - …and identify the underlying issue that needs to be addressed
- Getting a speedier reading of developments in the economy and financial system
  - 'Nowcasting' and 'nearcasting'
  - This might be particularly important when the system is undergoing rapid changes
- Quantifying previously purely qualitative data
  - Eg text

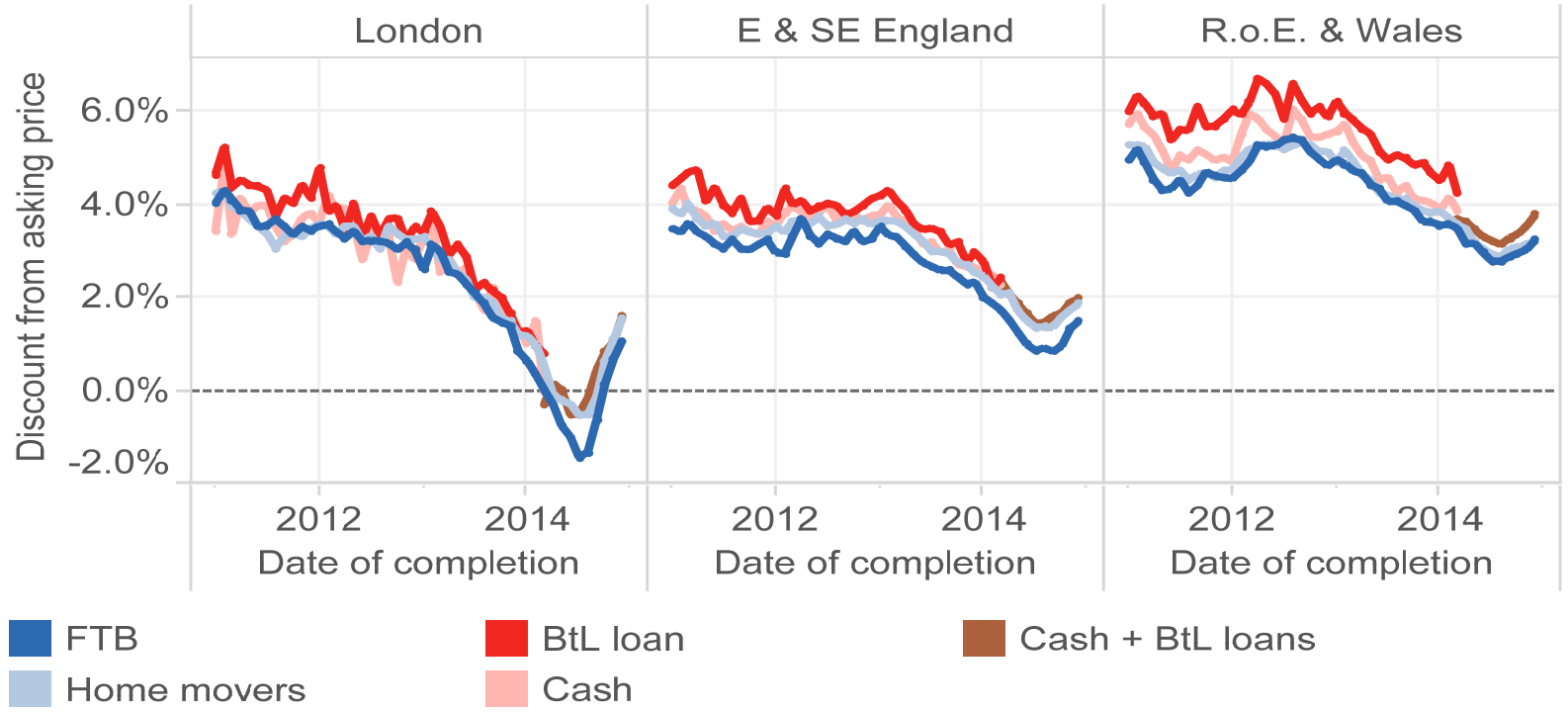
Loan-to-income multiple ≥ 4.5



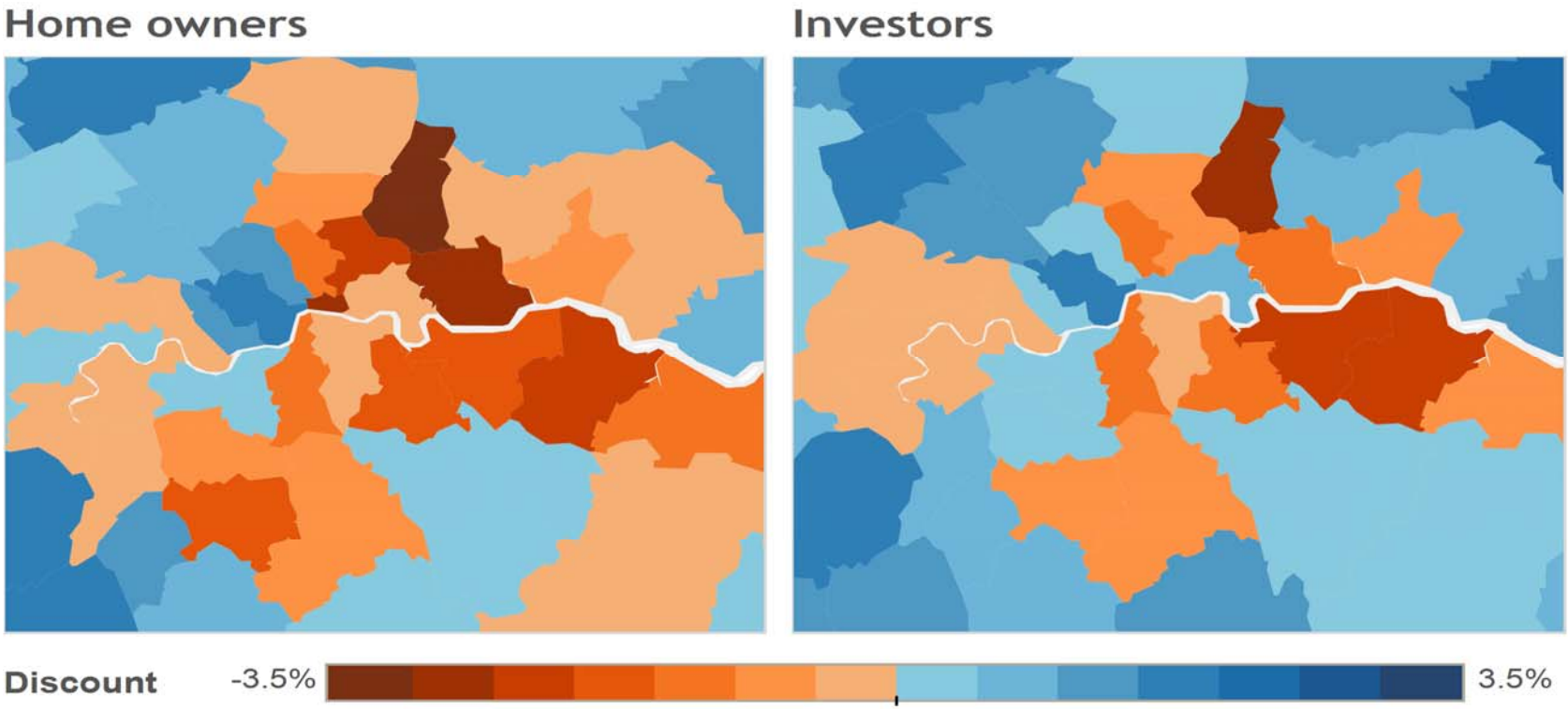


Source: Data are based on the Bank of England's internal Product Sales Database collected by the FCA.

Discount from last asking price by buyer type



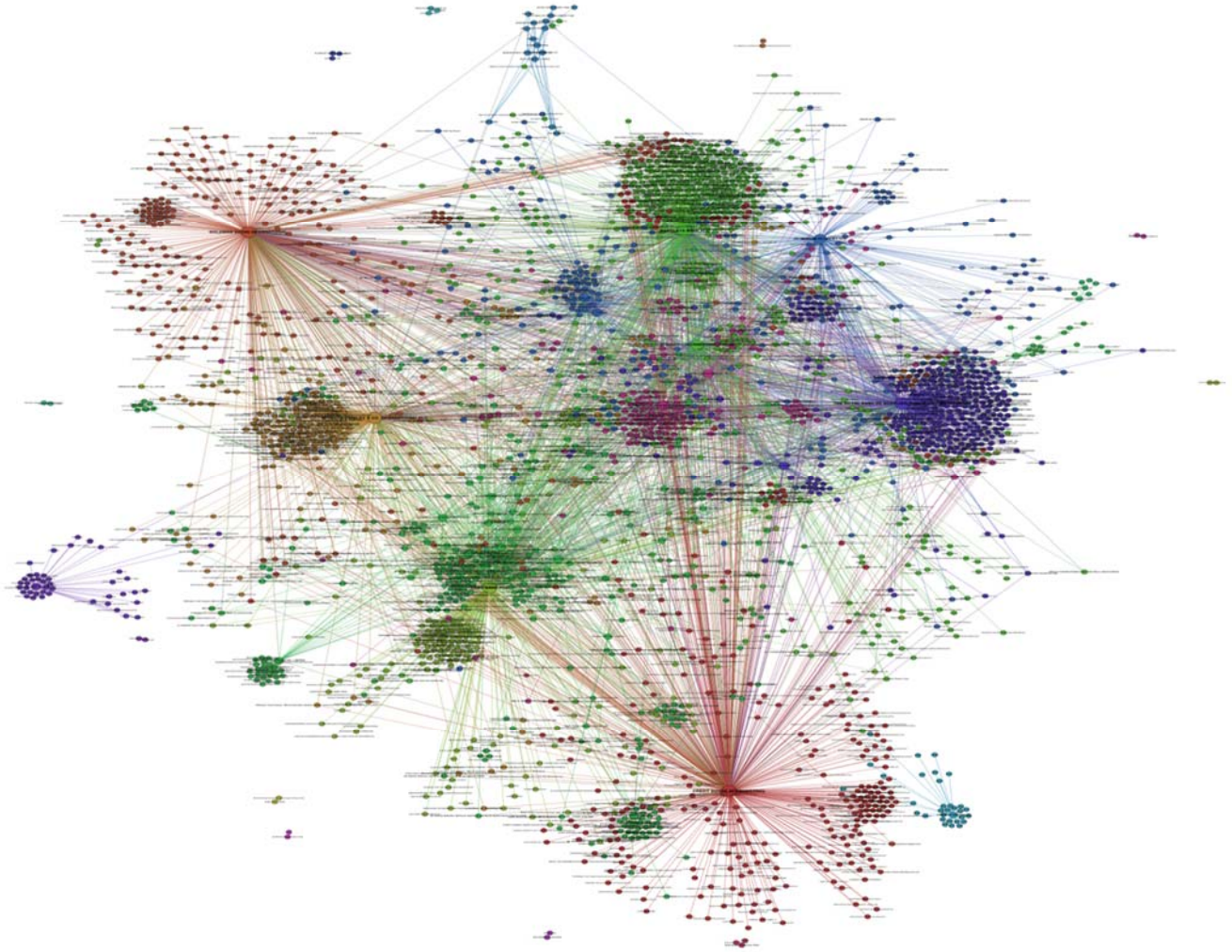
Sources: WhenFresh (Zoopla listings), Land Registry Price Paid, Land Registry Cash/Mortgage data, FCA Product Sales Data on mortgages, ONS Postcode Directory.



Sources: WhenFresh (Zoopla listings), Land Registry Price Paid, Land Registry Cash/Mortgage data, FCA Product Sales Data on mortgages, ONS Postcode Directory.

EMIR Data

Positions in outstanding CHF-denominated FX derivatives positions on 15/1/15



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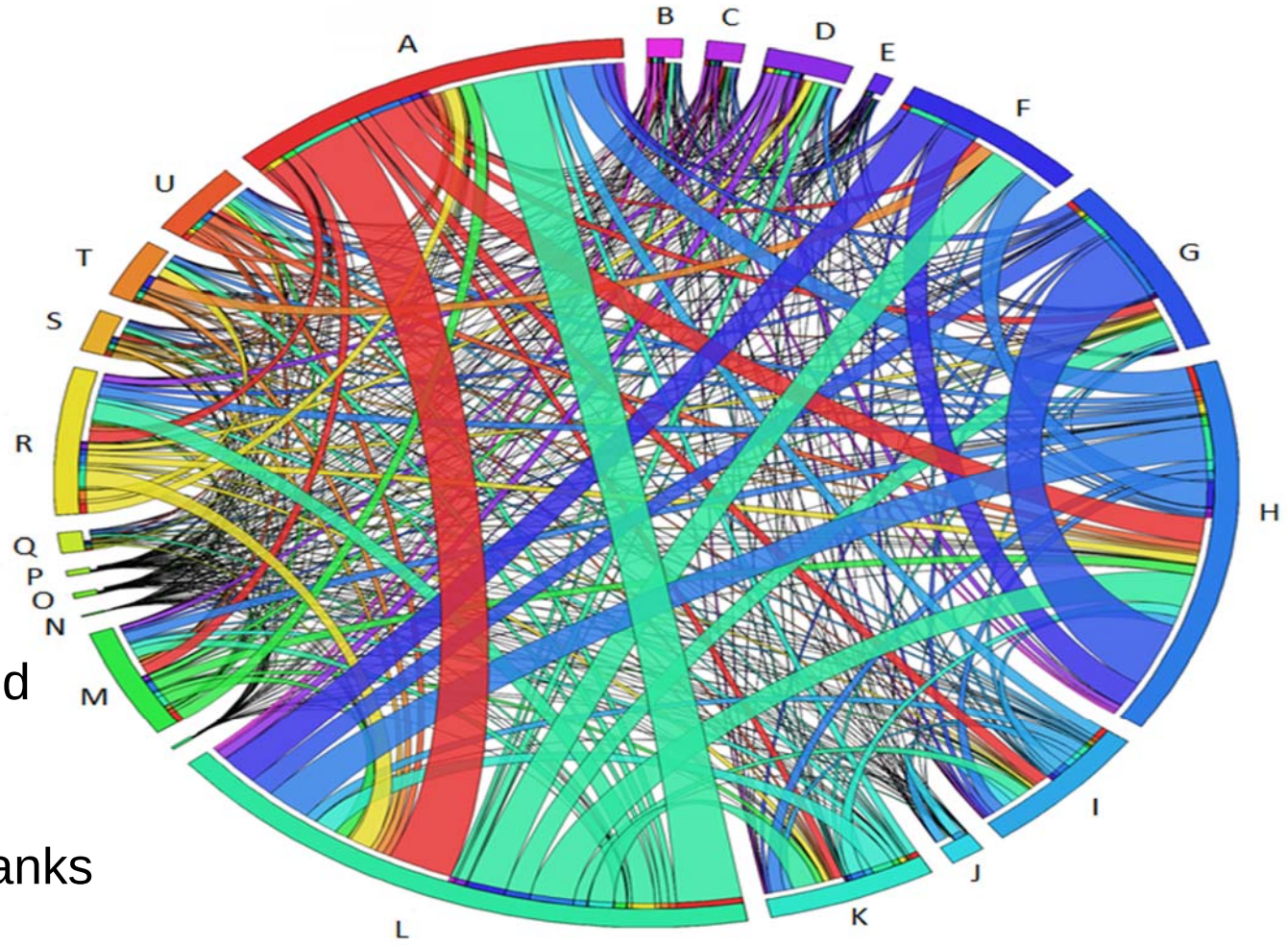
Issues encountered

- Identifying the purpose of the trade (hedging vs speculation)
- Cross-border issues
- Identifying counterparties (only ~ 50% had a LEI)
- Consolidation of institutions
- Direction of trades
- Identifying the initiator of the trade
- Separating swaps from other forms of derivative

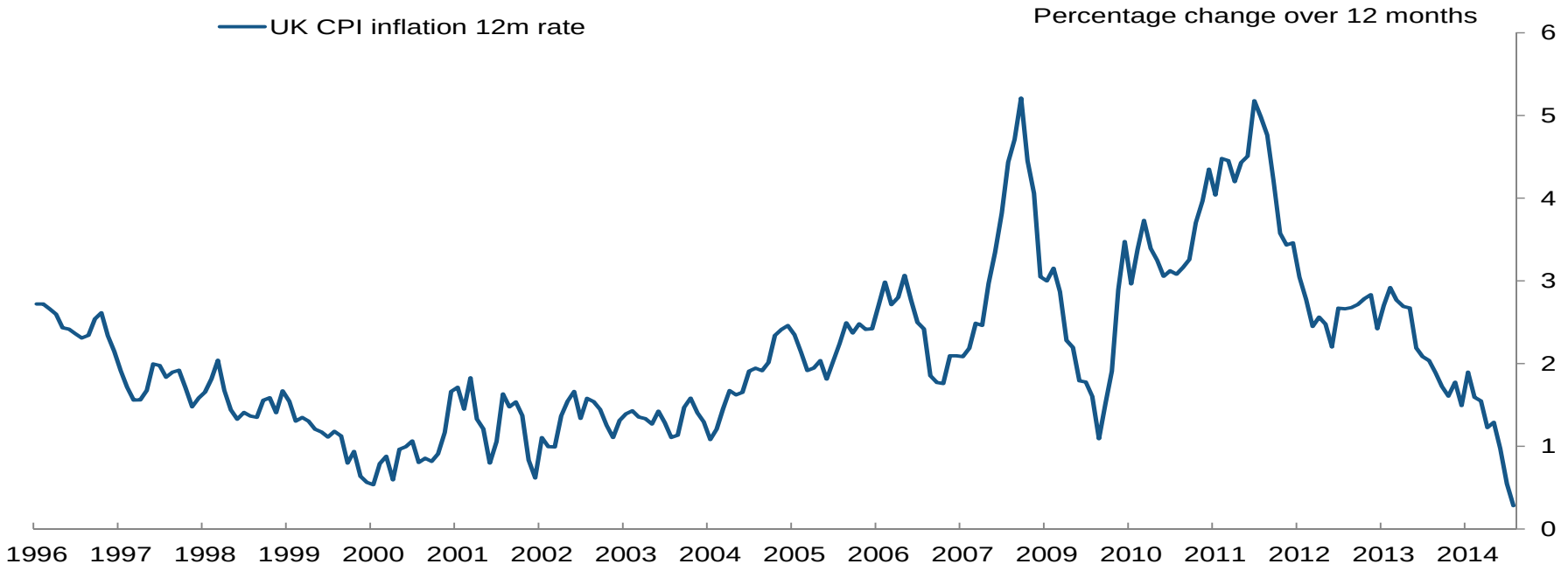
Anonymised CHAPS payments between banks



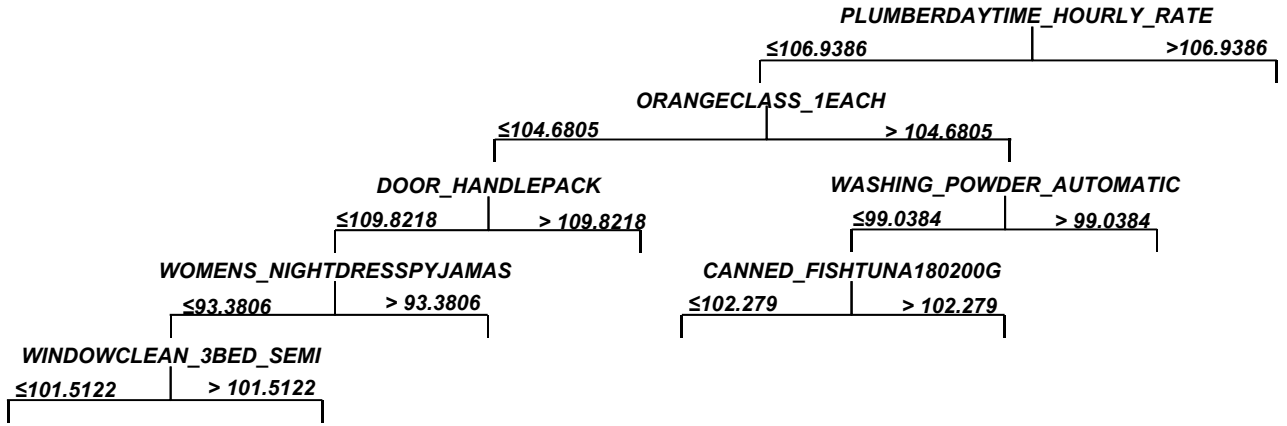
Issues with analysing ‘Big Data’

- Example: CPI micro-data
- The ONS has produced a data set comprising:
  - 215 months (Feb 1996-Dec 2013)
  - ~110,000 prices collected per month (not the same number each month)
  - 1,113 items (not the same items each year)
  - 71 COICOP classes
  - various other meta-data (eg type of shop, region etc)
  - in total: 24,442,988 records with 25 fields
  - 611,074,700 pieces of data

Issue 1: the stability of annual inflation



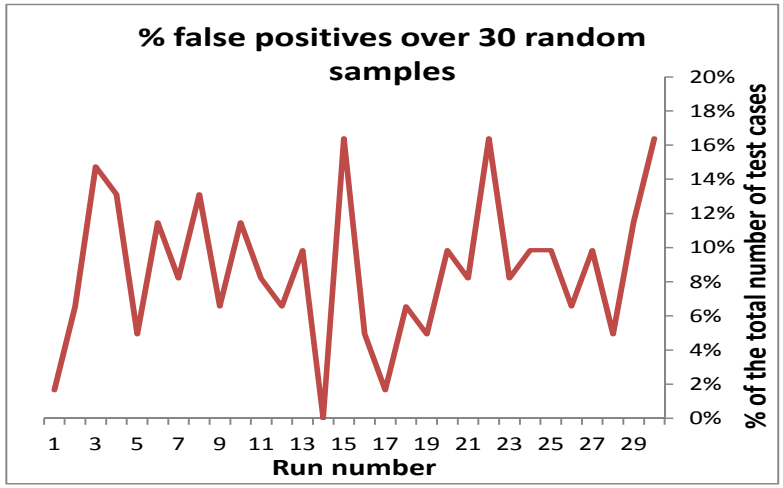
Issue 2: explaining non-linear functions

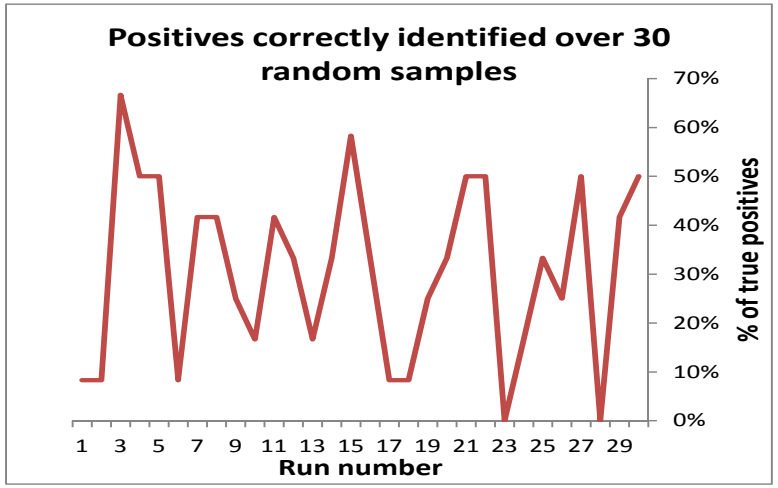


- Try explaining the intuition behind this relationship to busy policy makers…

Issue 3: Stability

- An issue that is closely linked to over-fitting is the stability of the models
- This is a particularly important issues when there is no strong *a priori* reason to think that the world works in this way
- (Though *a priori* thinking can also be misleading at times)





Issue 5: Confidentiality / ‘Big Brother’ state

- This was not relevant to the CPI work
- In general, the more detailed and granular the data set is, the more likely it is to contain confidential information
- We must ensure that:
  - we only use data for appropriate reasons
  - the minimum number of people are able to see any confidential data given the needs of the situation
  - data are stored securely and professionally