Using Geo-Demographic Data in Fraud Prevention

Credit Scoring and Credit Control XIII

Chris Tyers

August 2013

Fraud Trends

- In 2012, fraud rose by 5% compared with the previous year. [CIFAS]
- The overall rate of fraud at the point of application across the UK's financial services sector continues to inch higher. This is in part due to a rise in mortgage fraud, as well as an overall jump in credit card and savings fraud. [Experian]
- Insurance fraud jumped by seven percent last year and is now estimated to be a £1 billion-a-year industry. [Experian]
- Credit card fraud rose by a quarter last year. [Experian]

Geo-Demographics in Fraud Prevention

- Typically, application fraud models utilise indicators to predict fraud

- Indicators of fraud can include:
  - Previous fraud records
  - Inconsistencies with credit bureau data
  - Undisclosed adverse credit bureau data

- However, when none of these indicators are available, for instance where there is a thin credit bureau file, geo-demographics become more useful

Agenda

- Fraud Data
- Fraud Penetration Indicators
- Geo-Detect Index
  - Methodology
  - Scorecard Segmentation
  - Performance
- Mapping
  - Fraud Hotspots
  - Geo-Detect Index
- Applications
  - Application Fraud Scoring
  - Open Account Fraud
- Conclusions

Fraud Data
CIFAS

- CIFAS – The UK's Fraud Prevention Service
- Non-profit making establishment with 280 members

- CIFAS Aims:
  - Protect its members from the actions of criminals by pooling information on fraud and attempted fraud
  - Ensure that innocent members of the public who are victims of fraud are not prejudiced by the misuse of their identities and documentation
  - Build on crime prevention data sharing to encompass both the private and public sectors in the public interest

Fraud Penetration Indicators
Cases

- Postcode level indicator to describe the prevalence of fraud relative to the size of the postcode / postal area
- Also calculated for wider postal district / sector levels
- Calculated as the number of cases of fraud reported to CIFAS per residential address in the designated area
- Used to highlight areas with a high volume of fraud

$$Penetration_{Cases} = 100\left(\frac{Fraud\ Cases}{Residential\ Addresses}\right)$$

Fraud Penetration Indicators
Individuals

- Volume of reported fraud is not the only measure of fraud penetration

- Indicators can also be developed to describe the number of individuals who have committed fraud in the designated area

- Used to identify an area where many fraudsters are operating which is considered higher risk than one individual perpetrating large volumes of fraud

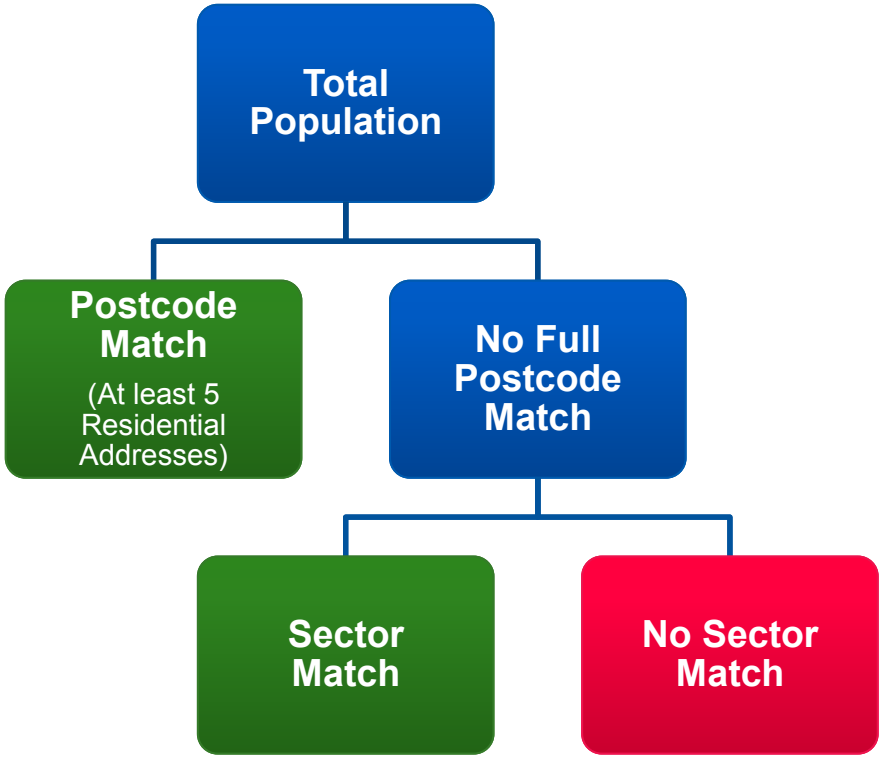
$$Penetration_{Individuals} = 100\left(\frac{Fraudulent\ Individuals}{Residential\ Addresses}\right)$$

Geo-Detect Index
Methodology

- The Geo-Detect Index provides a geo-demographic assessment of the fraud risk associated with a postcode
- The index was developed on a sample of applications which had a known fraud outcome
- Fraud penetration indicators were attached to all applications using the postcode
- Predictive model built using multi-stage stepwise linear regression
  - Stage 1 – Postcode level fraud indicators
  - Stage 2 – Sector level fraud indicators

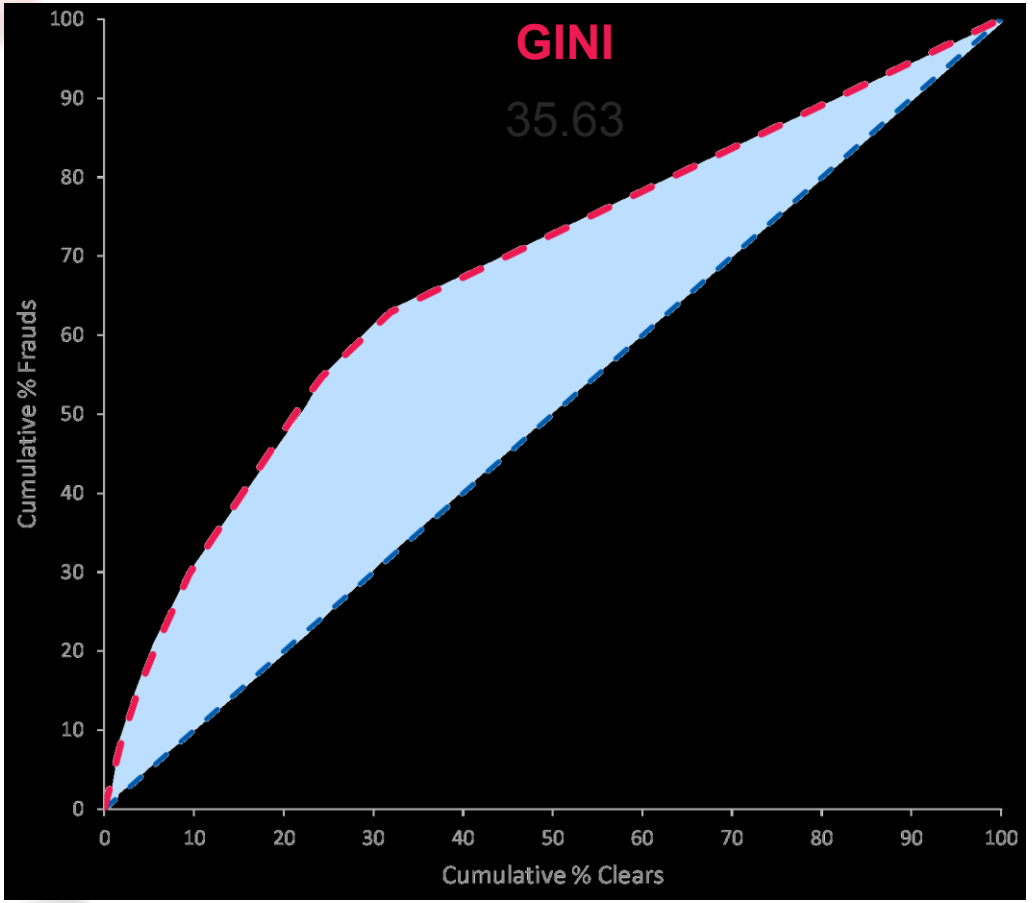
Geo-Detect Index
Scorecard Segmentation

- Separate scorecards developed for postcode and sector matches
- Postcodes require at least 5 residential addresses to be considered for the postcode scorecard to reduce the volatility of the penetration indices
- Postcodes with < 5 residential addresses are instead considered for the sector match process



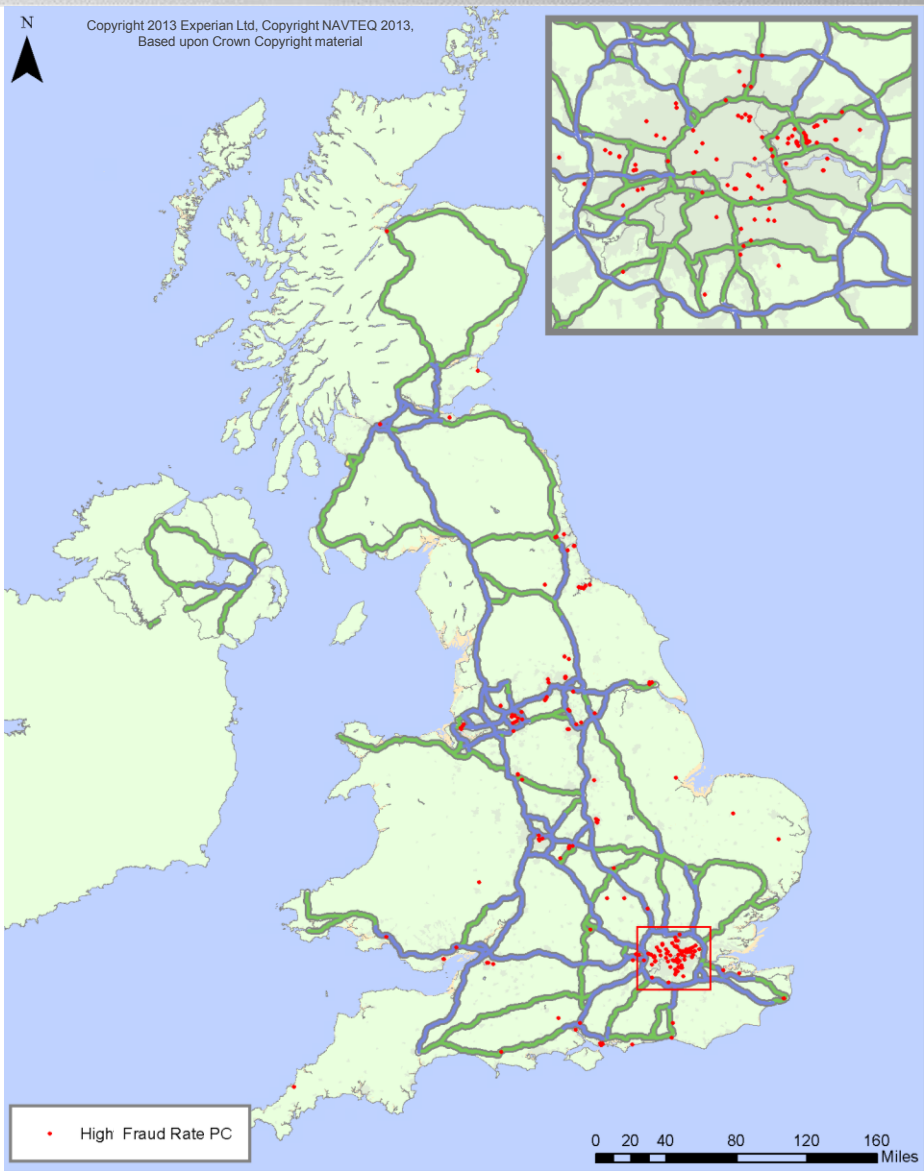
Geo-Detect Index
Performance

Index	%	Fraud Rate
1	67.99	0.12%
2	7.64	0.24%
3	2.25	0.33%
4	12.60	0.38%
5	3.72	0.55%
6	2.03	0.62%
7	1.90	0.78%
8	0.23	0.89%
9	1.64	1.01%



Mapping
Fraud Hotspots

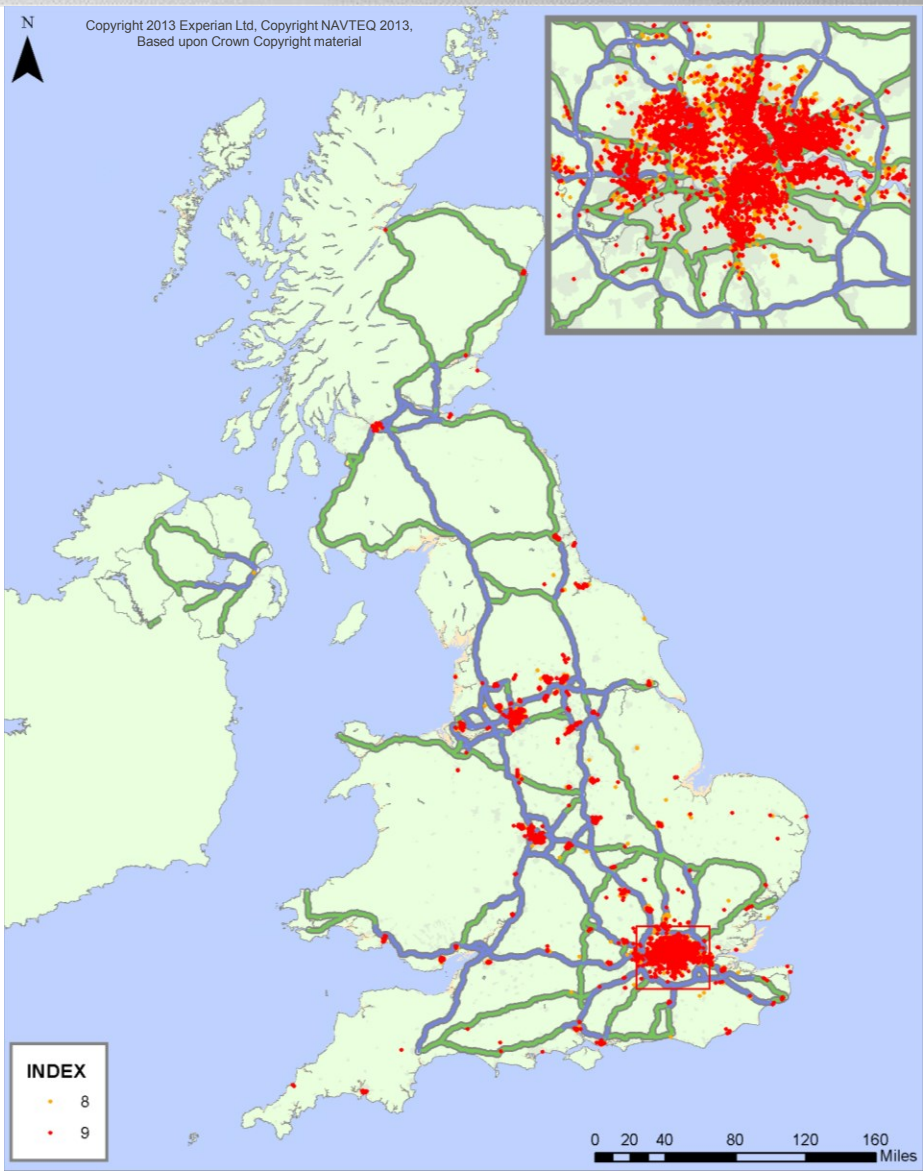
- The 200 postcodes with the highest fraud penetration shown on the map
- Highest concentration of high risk postcodes is in London
- Other urban centres also contain high risk postcodes



Mapping
Geo-Detect - 8s and 9s

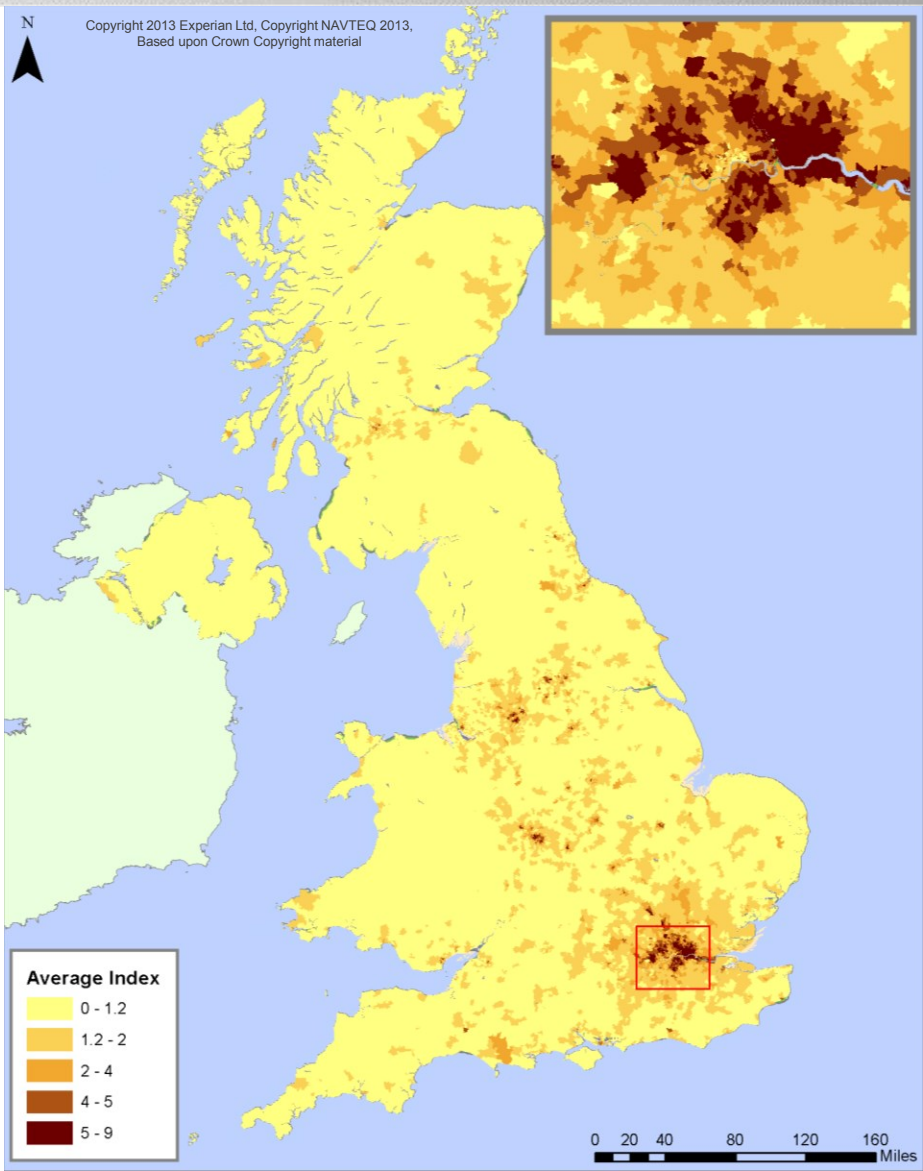
- Postcodes classified as high risk by Geo-Detect

- Well aligned with fraud hotspots



Mapping
Average Geo-Detect Index

- Average Geo-Detect Index across postal sectors
- Areas with the highest concentration of high risk postcodes highlighted
- Focus on urban areas



Applications
Application fraud scoring

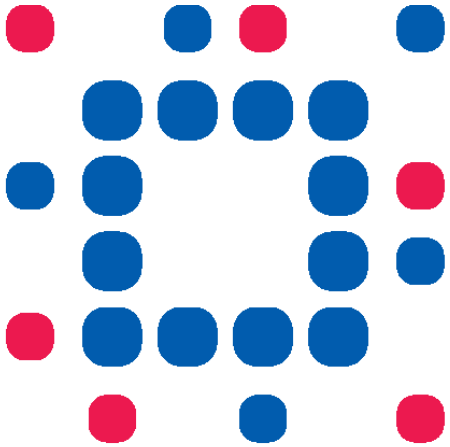
- Performance of the Geo-Detect Index was assessed on a recent application fraud score

- Geo-Detect was modelled in an additional modelling stage to assess the uplift provided by the geo-demographic data over application and credit bureau characteristics

Application Fraud Score	+ Geo-Demographics	Uplift
67.43	71.72	**+ 6.36%**

Conclusions

- Fraud rates are continuing to rise
- Traditional fraud detection methods are effective
- Geo-Demographics can be used to identify postcodes with higher than average fraud rates
- Geo-Demographics can also be used to supplement existing fraud indicators in decisions



Experian™

A world of insight