Predictive Power of External Data in Pricing: Credit and Beyond

2004 CAS Seminar on Ratemaking

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WWW.WATSONWYATT.COM/INSURANCE

Watson Wyatt
Worldwide

External data

- Geodemographic data

- Geophysical data

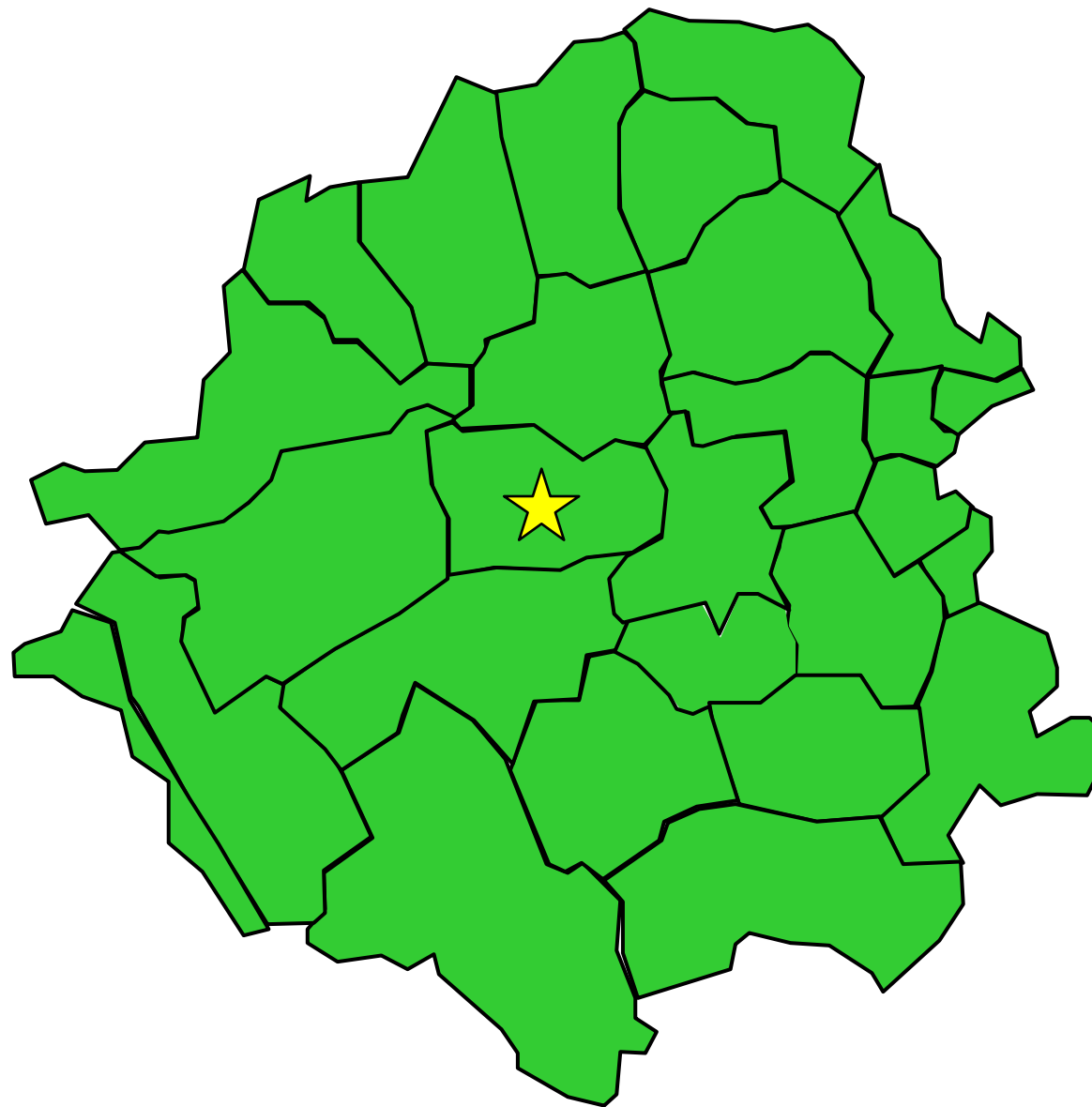- Vehicle data

- Banking data

Geodemographic data

- Often designed for selling detergent

- Attaches to post code / zip code therefore easy to use at point of sale

  – can be hidden in a territory definition

- Marketing segment types often not predictive

- Underlying data often more interesting
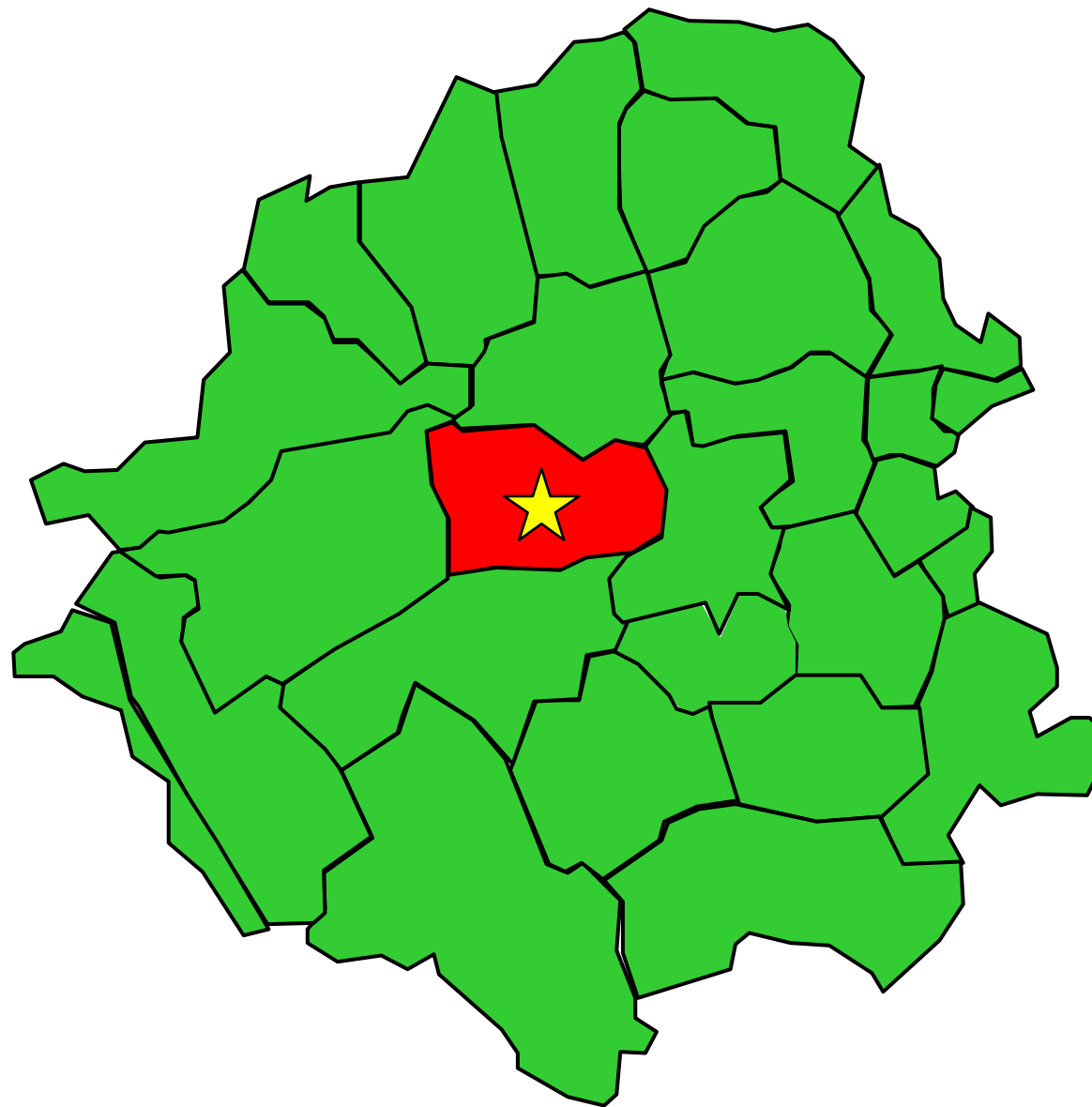
- Simple measure of urban density often predictive
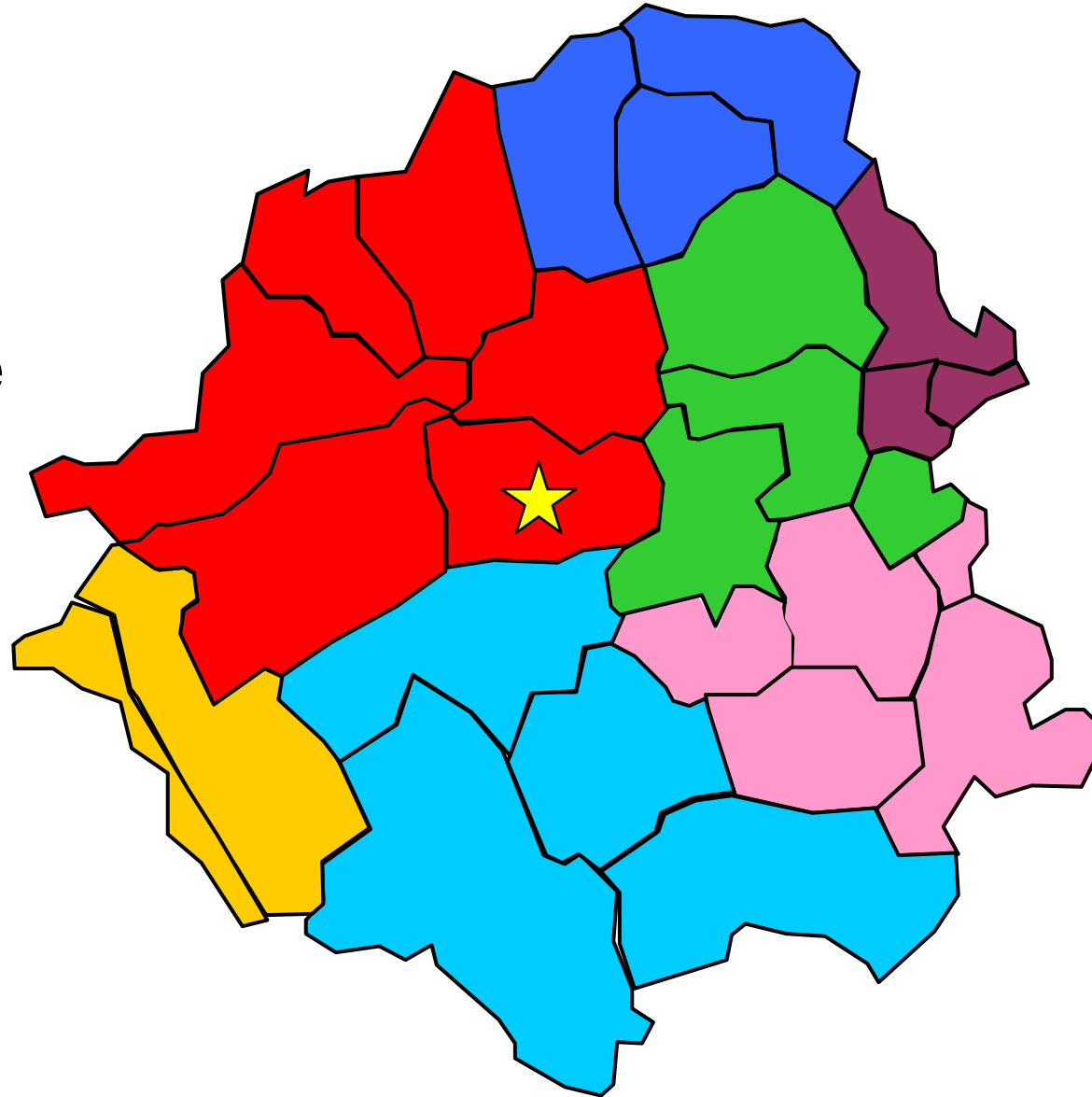
Measures of urban density

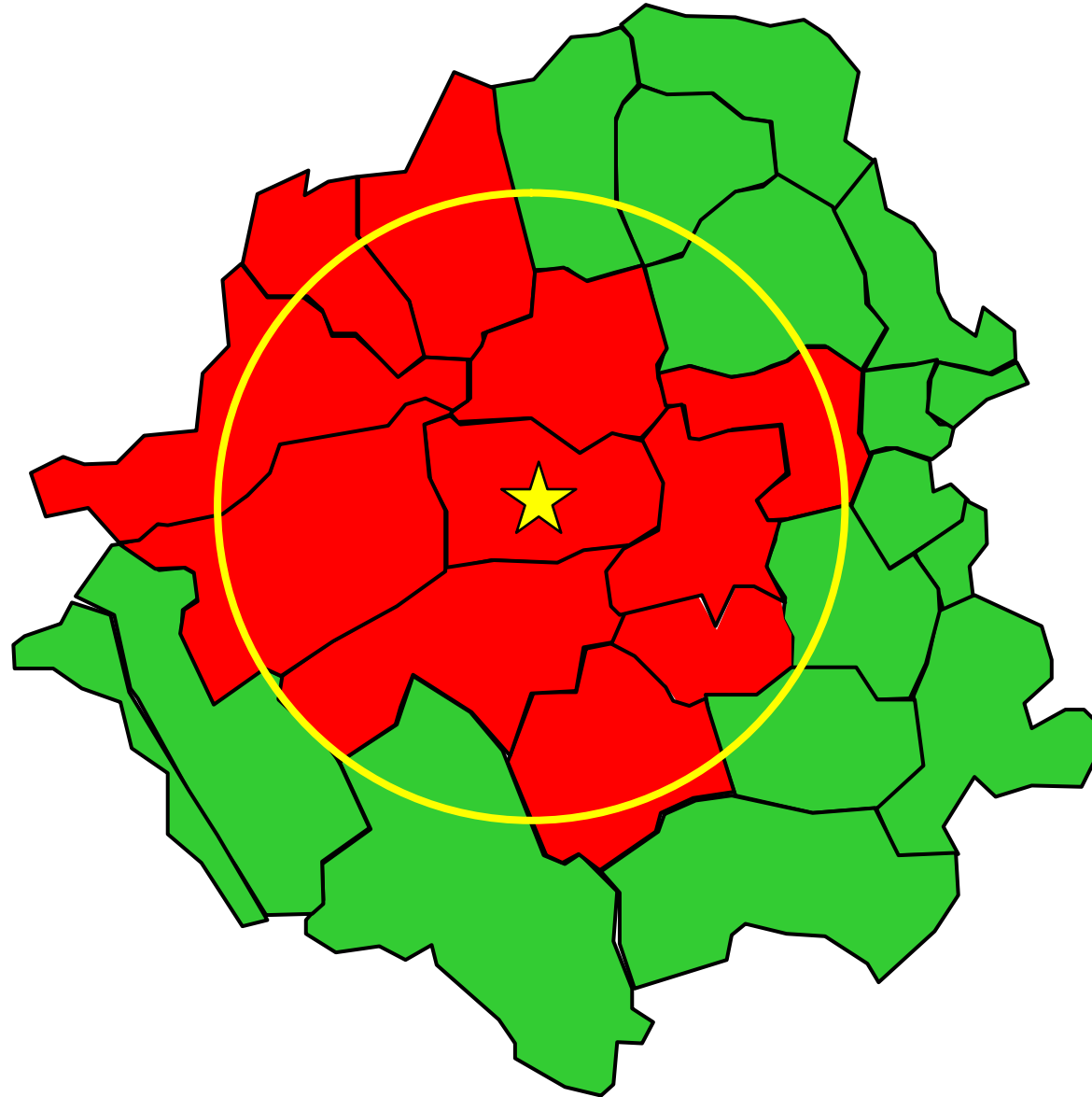# Measures of urban density

- Consider density of region

Measures of urban density

- Consider density of a wider post code region
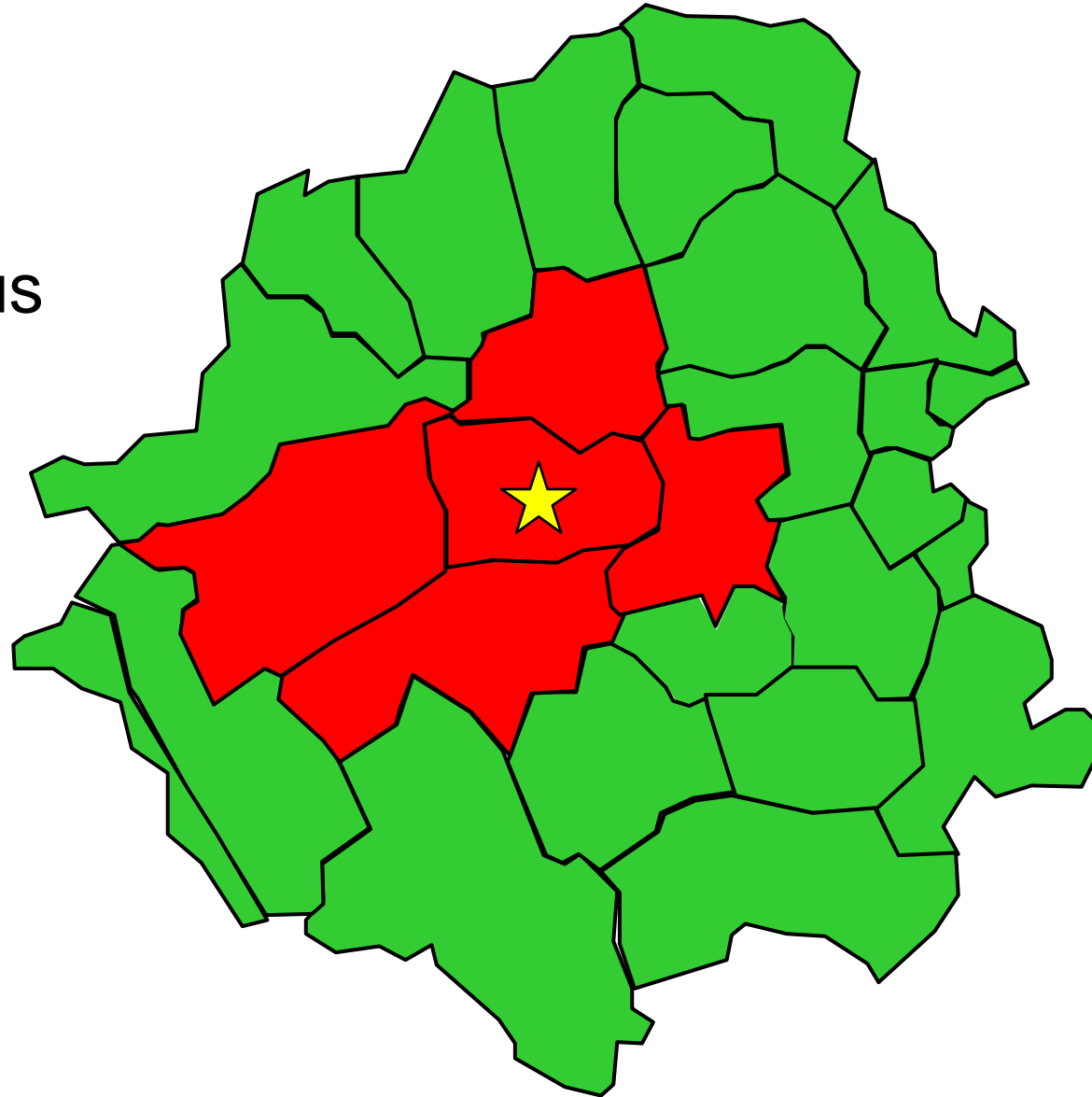
Measures of urban density

- Consider density of regions within a radius

- Useful when boundary data not available

Measures of urban density

- Consider density of region plus adjoining regions

Example of effect of urban density on EU country #1 homeowners theft frequency

Real GLM output cannot be disclosed in handouts

Graph shown in presentation showed strong
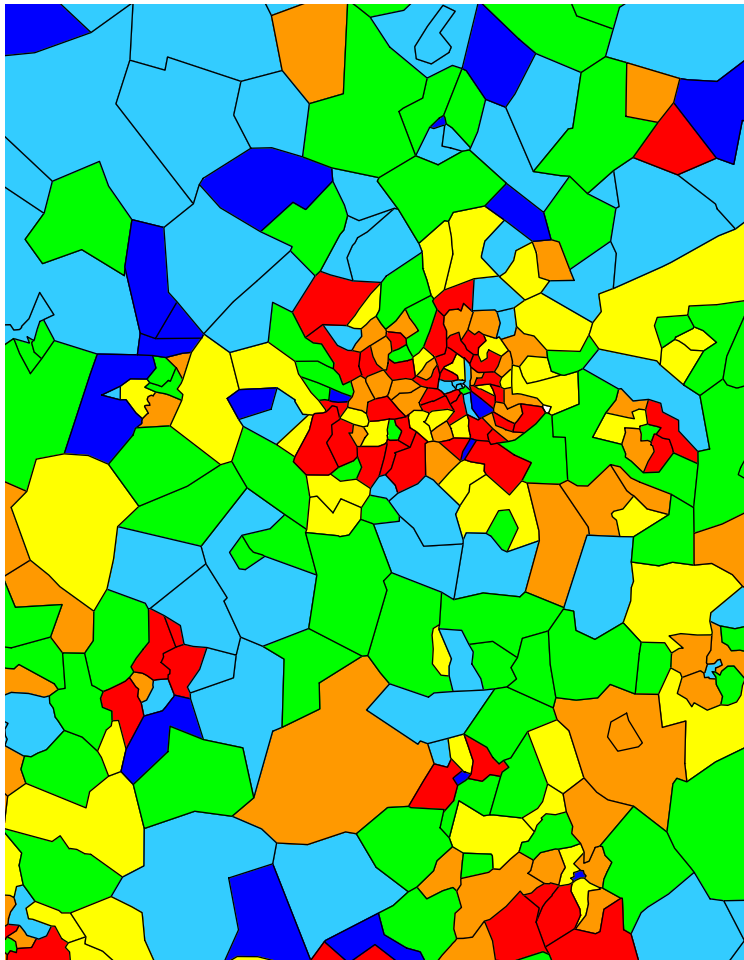multivariate effect of urban density

Comparison of alternative measure of urban density

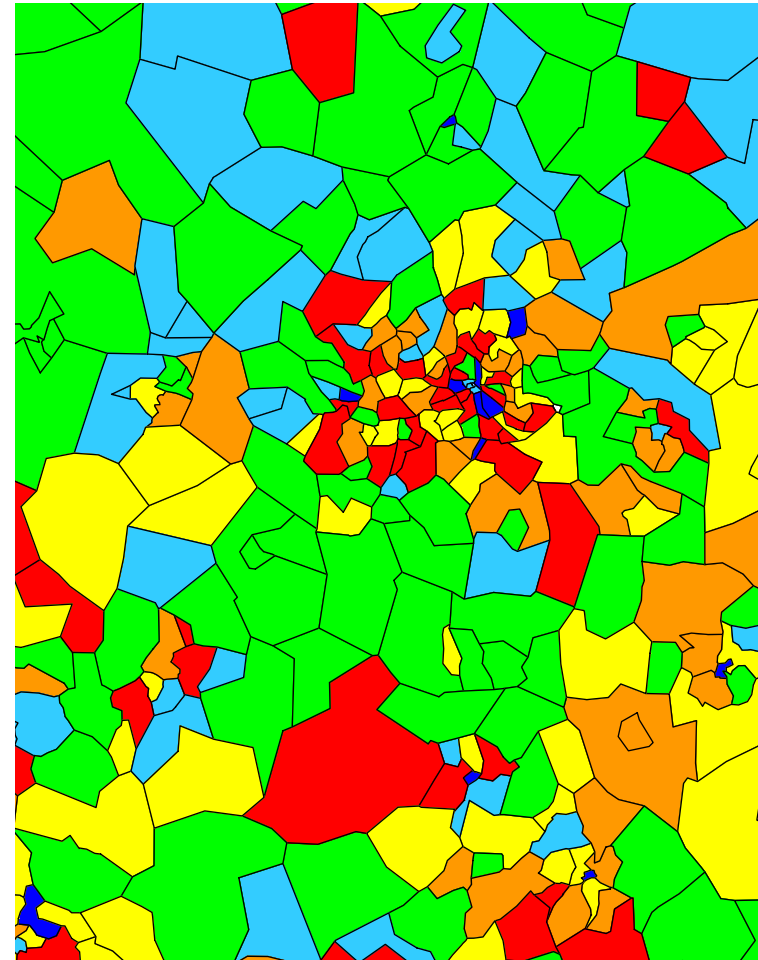Real GLM output cannot be disclosed in handouts

Graphs shown in presentation showed that differing measures of urban density had similar effects

Use alongside spatial smoothing (see also PL-9)

Density not in
standardizing GLM

Density in
standardizing GLM

Use alongside spatial smoothing (see also PL-9)

Density not in standardizing GLM
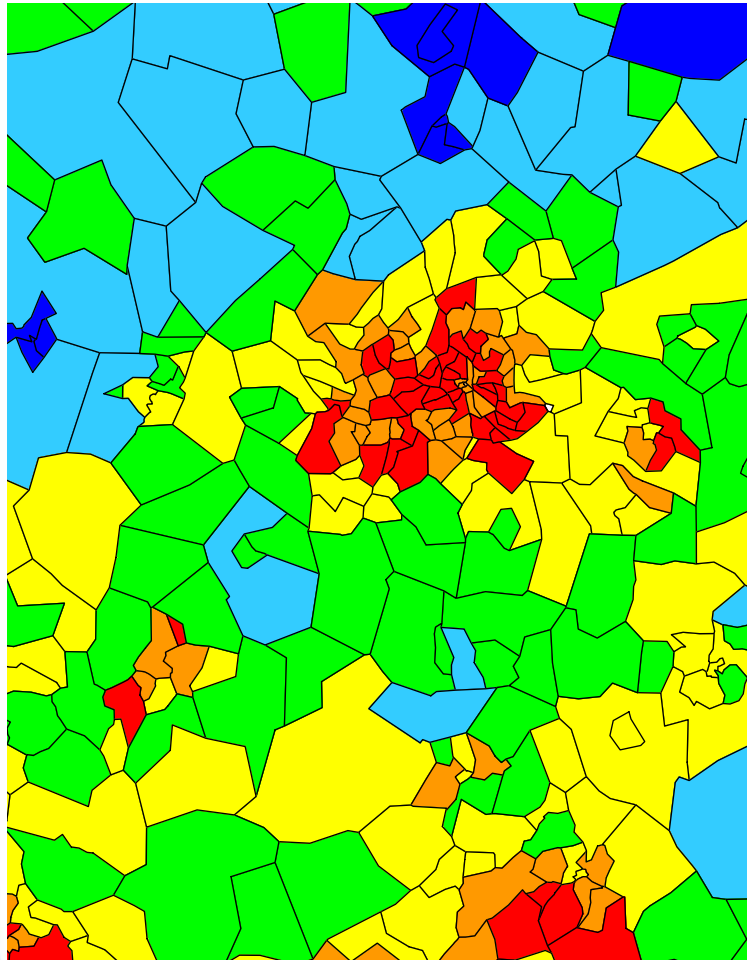
Density in standardizing GLM
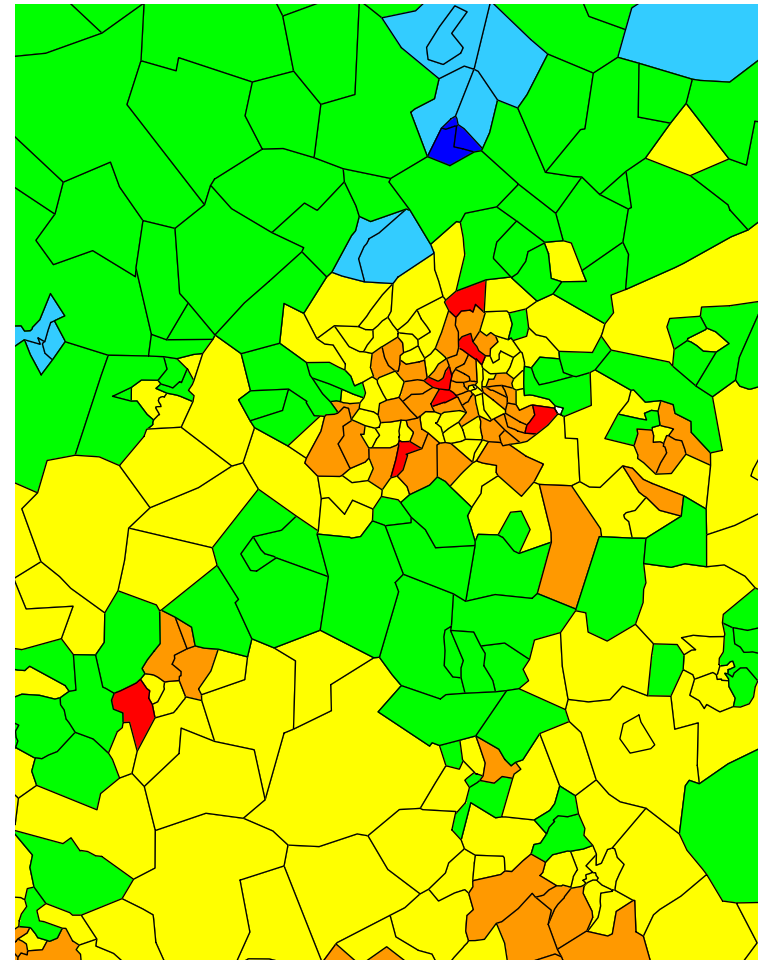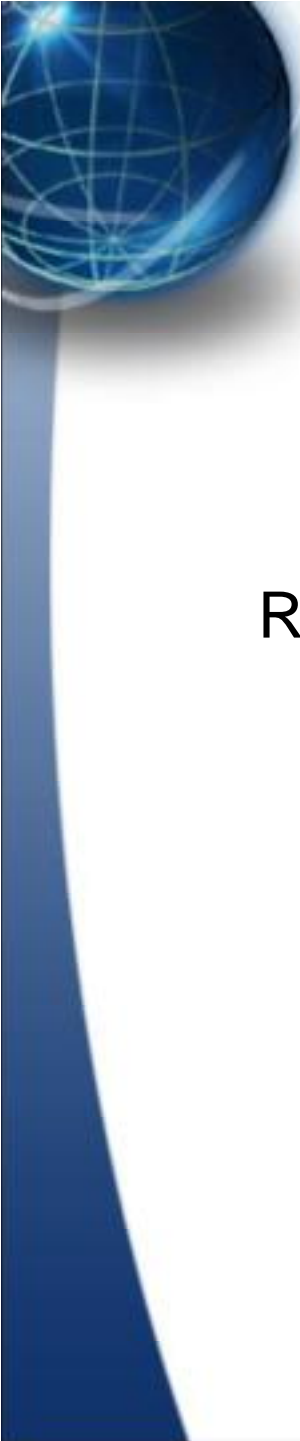
Effect of density varies - homeowners example from EU country #1

- Effect of increasing density on risk:

	Frequency	Severity
Theft	↑	↑
Fire	↓	↑
Acc. Dam.	↓	↑
"Weather"	↓	↑ & ↓
"Other"	↑	↑

Excludes some covers such as subsidence and flood

Example of urban density
Auto, EU country #2 - Theft frequency

Real GLM output cannot be disclosed in handouts

Graph shown in presentation showed strong
multivariate effect of urban density

Example of urban density
Auto, EU country #2 - Property Damage frequency

Real GLM output cannot be disclosed in handouts

Graph shown in presentation showed multivariate
effect of urban density which is significant but weaker
than the effect for auto theft claims

Geodemographics can be rather related!

	R1	R2	R3	R4	G1	G2	G3	G4	G5	G6
R1										
R2	11%									
R3	32%	3%								
R4	17%	7%	58%							
G1	8%	2%	57%	16%						
G2	8%	2%	53%	15%	49%					
G3	7%	3%	44%	14%	33%	33%				
G4	5%	4%	21%	8%	30%	30%	30%			
G5	3%	2%	31%	6%	36%	35%	34%	31%		
G6	8%	2%	65%	16%	37%	35%	31%	29%	34%	
G7	8%	2%	65%	16%	36%	34%	30%	30%	34%	71%

Cramer's V for a selection of standard rating factors (R1, .., R4) and geodemographic factors (G1, …, G4)

Example of geodemographic factors
Homeowners, EU country #3

Real GLM output cannot be disclosed in handouts

Graph shown in presentation showed strong
multivariate effect of a geodemographic factor related
to average life-stage of an area

Example of geodemographic factors
Homeowners, EU country #3

Real GLM output cannot be disclosed in handouts

Graph shown in presentation showed strong
multivariate effect of another geodemographic factor

Example of geodemographic factors
Homeowners, EU country #3

Real GLM output cannot be disclosed in handouts

Graph shown in presentation showed strong
multivariate effect of factor related to average type of
building in the area

External data

- Geodemographic data

- **Geophysical data**

- Vehicle data

- Banking data

Geophysical data

- Available in many countries

- Particularly helpful for elements of claim for which own claims experience is not credible / predictive, including
  - flood
  - subsidence
  - storm
  - etc

Geophysical data

Examples of data available in UK:

- Flood risk

- Soil type / subsidence risk

- Windstorm risk

- Frost risk

- Theft risk (police data / geodemographic data)

- Earthquake risk

- Average building type (susceptibility to winds etc)

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Insurer 'maps' UK in flood fight

One of the UK's largest insurers has unveiled technology that will enable it to pinpoint whether individual homes are at risk from flood.

At present insurers assess risk through checking if the postcode of the property is in a flood plain.

The digital map can show how often a flood is likely to occur

Nearly five million people live in a flood plain, which makes it hard for them to get cover.

Norwich Union has digitally mapped the UK and can now calculate the risk of flood to within a few metres.

Property risk

The insurer will be able to set premiums for home contents insurance based on a particular address, rather than just a postcode band, for both residential and commercial properties.

As well as showing whether an individual property is at risk, the map shows how often a flood is likely to occur and to what depth.

The multi-million pound project is launching for new customers in parts of Shropshire and Norfolk on Wednesday.

> 66 Because of the level of detail provided by the map, people who previously thought their property was uninsurable could now obtain cover 99
>
> Laurence Loughnane, Norwich Union

Examples of geophysical data EU country #3 - homeowners

Real GLM output cannot be disclosed in handouts

Graph shown in presentation showed strong multivariate effect of a weather related geophysical data item

Examples of geophysical data
EU country #3 - homeowners

Real GLM output cannot be disclosed in handouts

Graph shown in presentation showed multivariate effect of another weather related geophysical data item

Examples of geophysical data
EU country #3 - homeowners

Real GLM output cannot be disclosed in handouts

Graph shown in presentation showed another strong
multivariate effect of a weather related geophysical
data item

External data

- Geodemographic data

- Geophysical data

- Vehicle data

- Banking data

Vehicle data

- Links to license/registration plate

- Available in some EU countries, particularly common in UK

- Benefits include
  - faster quotation process
  - accurate factors
  - more factors

- In UK, DVLA also holds personal data which is not disclosed

Vehicle data

- Example data includes
  - exact make, model, type
  - engine size
  - power
  - max speed / acceleration
  - weight
  - number of doors
  - color

External data

- Geodemographic data

- Geophysical data

- Vehicle data

- Banking data

Banking data

- Highly predictive of insurance claims experience

- Generally not used at point of sale in EU

- Many EU banks distribute insurance or own insurance companies

- If data collected with the correct box ticked, can be used for selective marketing

Example of predictive power of credit score (one-way of loss ratio)

Real GLM output cannot be disclosed in handouts

Graph shown in presentation showed strong effect of credit score on insurance claims experience

Banking data

- Credit score predictive, but so are lower level elements such as

  – average balance

  – whether or not in debt

- In one example over 12 banking factors were predictive in a GLM, some with effects of 1.5x or more

- Eg: strong increase in claims when policyholder in arrears on mortgage payments

 – suggests fraud element to the effect?

Case study: EU bank

- Distributed insurance products underwritten by a partner insurance company

- Bank could not easily change rates but shared in insurance profit

- Insurance penetration of banking customer base relatively small

- Bank derived profitability score based on banking factors which were not available at point of sale

- Score then used to market insurance selectively to banking customers

Profitability scoring

Distribution of score
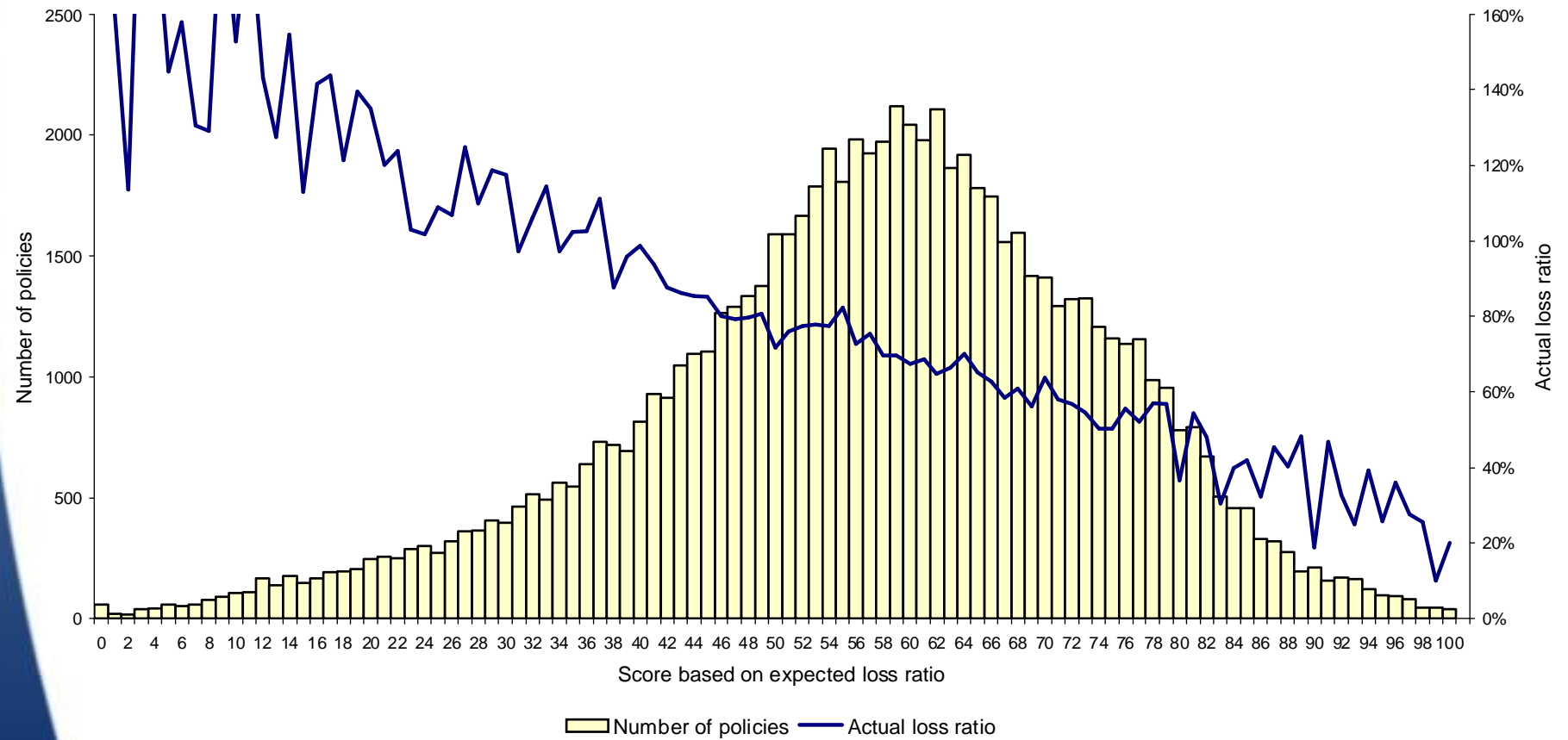
External data

- Can add predictive power and thus give competitive pricing edge

- Can improve speed and accuracy of quotation process

- Can help assess risk when own data insufficient

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