How to make the most of economics in credit risk management

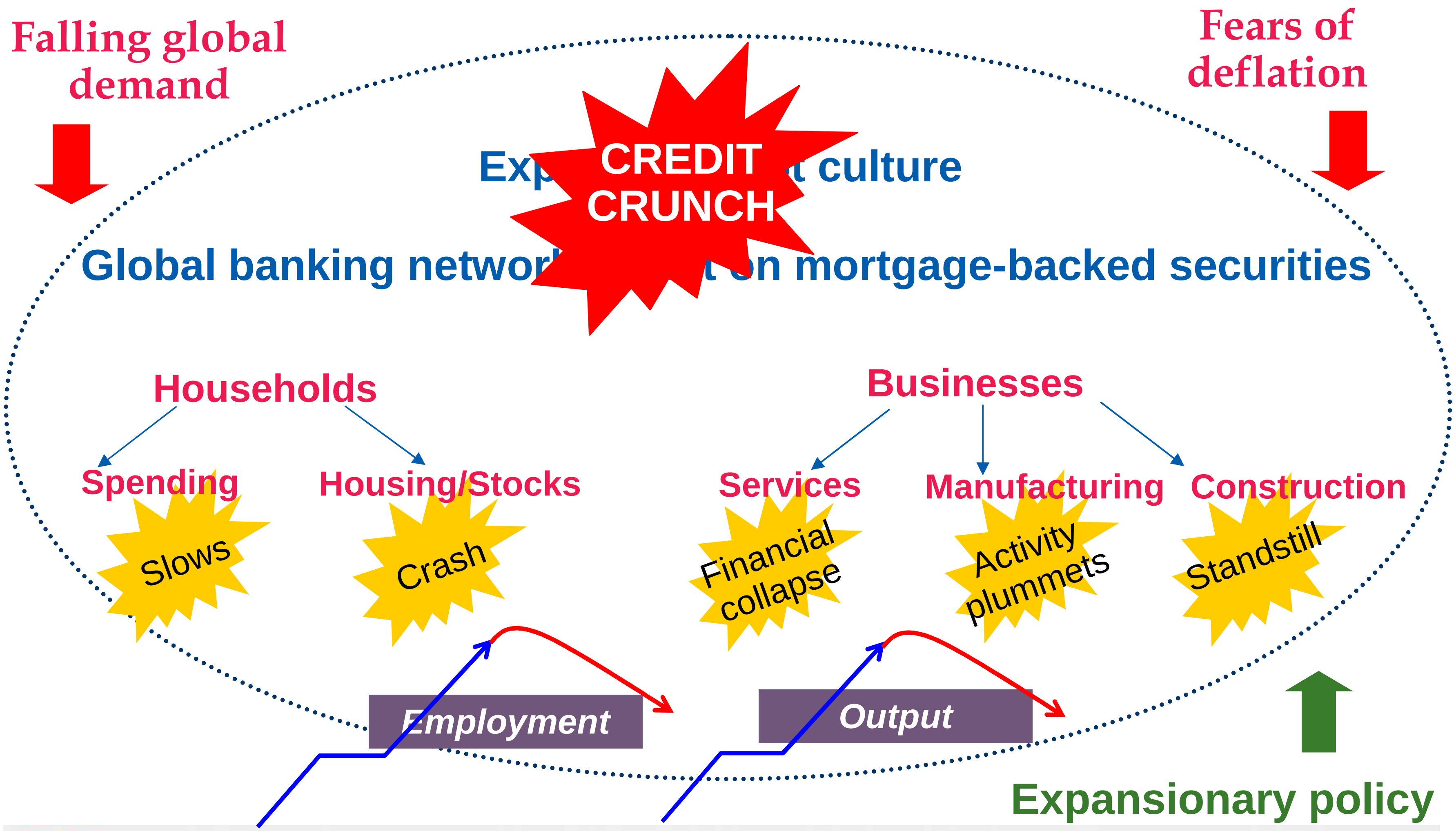
Dr William Thomson

Credit Scoring and Credit Control XI Conference

Introduction

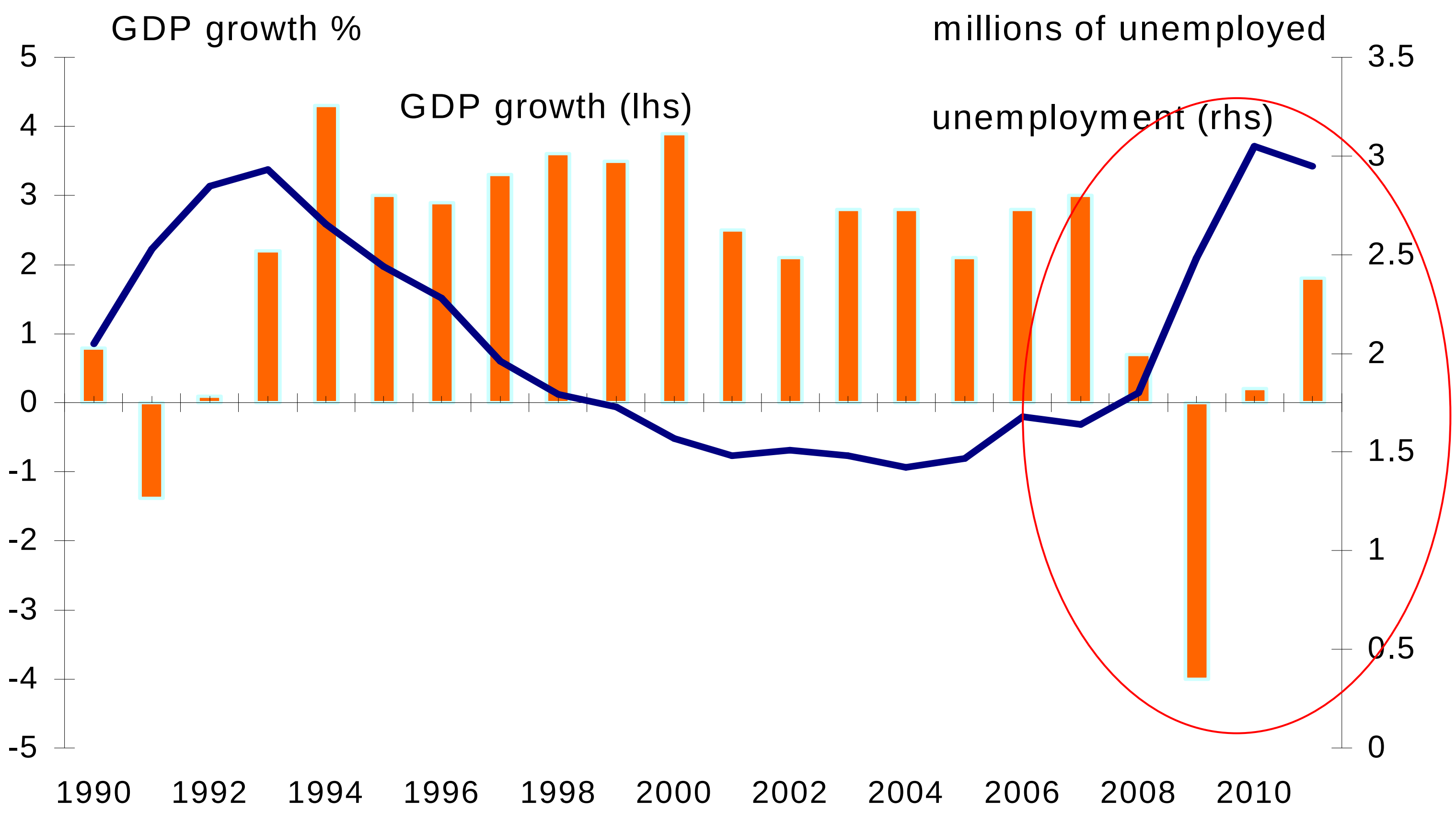
- Iconic?
- Idiosyncratic versus Systematic…..
- Definitions and characteristics of the economic data being used
    - Is it what we think it says on the label?
- Stress tests and scenarios
    - All economic cycles are different
- This is all very nice but we need to think about implementation…

Setting the context – what went wrong?



The hunt for green shoots of recovery has begun

(UK) Unemployment will rise further…



How are scorecards holding up?

- **Observation 1:**
  - Scorecards continue to work
    - Rank ordering of bad rate deciles continues to hold.
- **Observation 2:**
  - Bad rates are rising over time across all deciles.
    - Higher risk deciles see the largest increases
- **Observation 3:**
  - Bad rates vary considerably by socio-demographic segment and geography

Experian™

It's easy isn't it!

Standard Score:

$$\Pr(Outcome_i = Bad) = f(\mathbf{X}_i)$$

With macroeconomics added:

$$\Pr(Outcome_i = Bad)_t = f(\mathbf{X}_i, (L)\mathbf{Y}_t, \mathbf{X}_i \times (L)\mathbf{Y}_t)$$

Where **X** = 'idiosyncratic' risk factors

Y = macroeconomic variables

(*L*) = lag structure

But wait…….

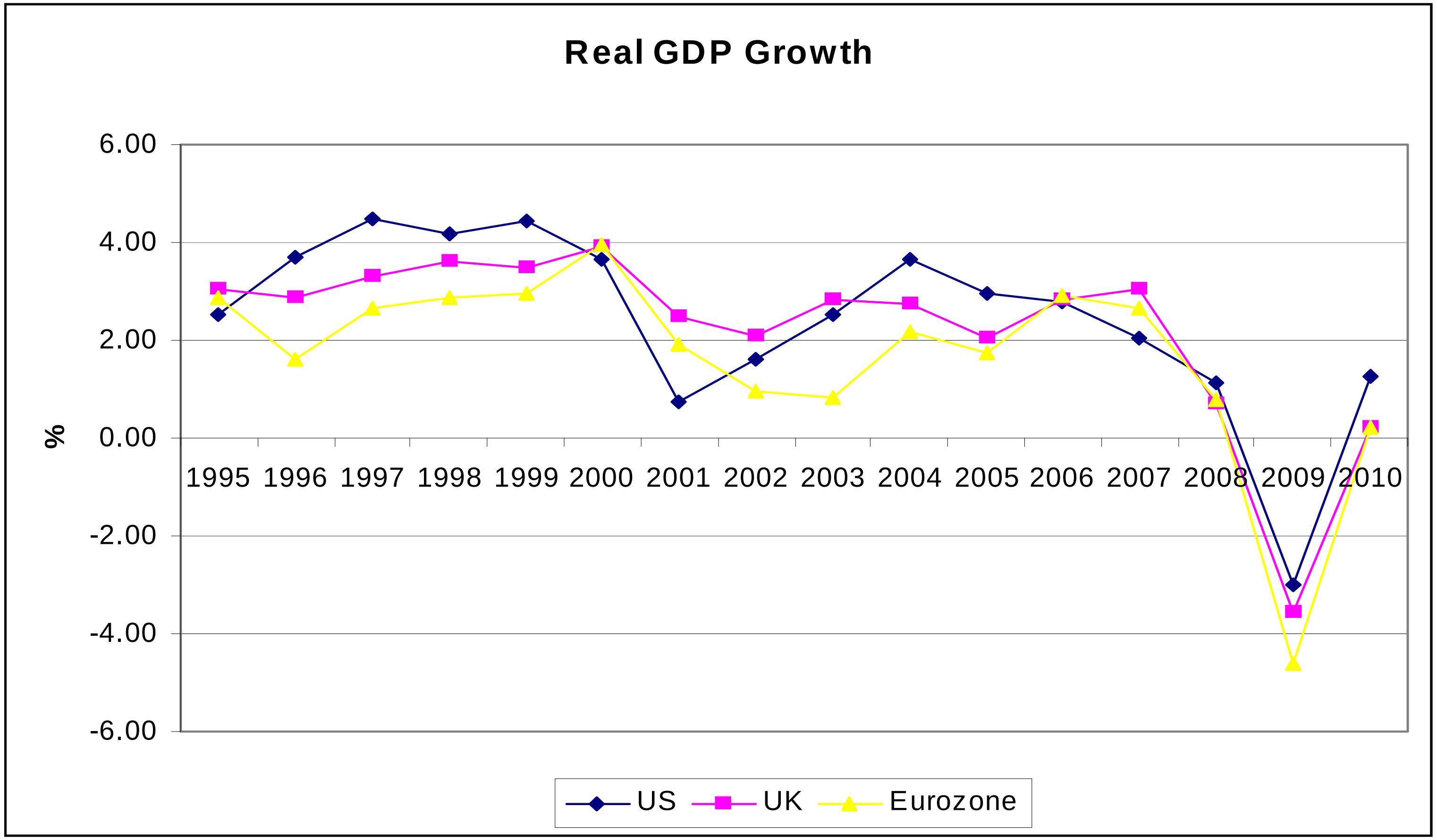
- Very little guidance on what the key components of (Y) should be, or on functional forms or lag structures etc

- Limited time-series of portfolio indicators usually limits the inclusion of economic variables due to degrees of freedom.

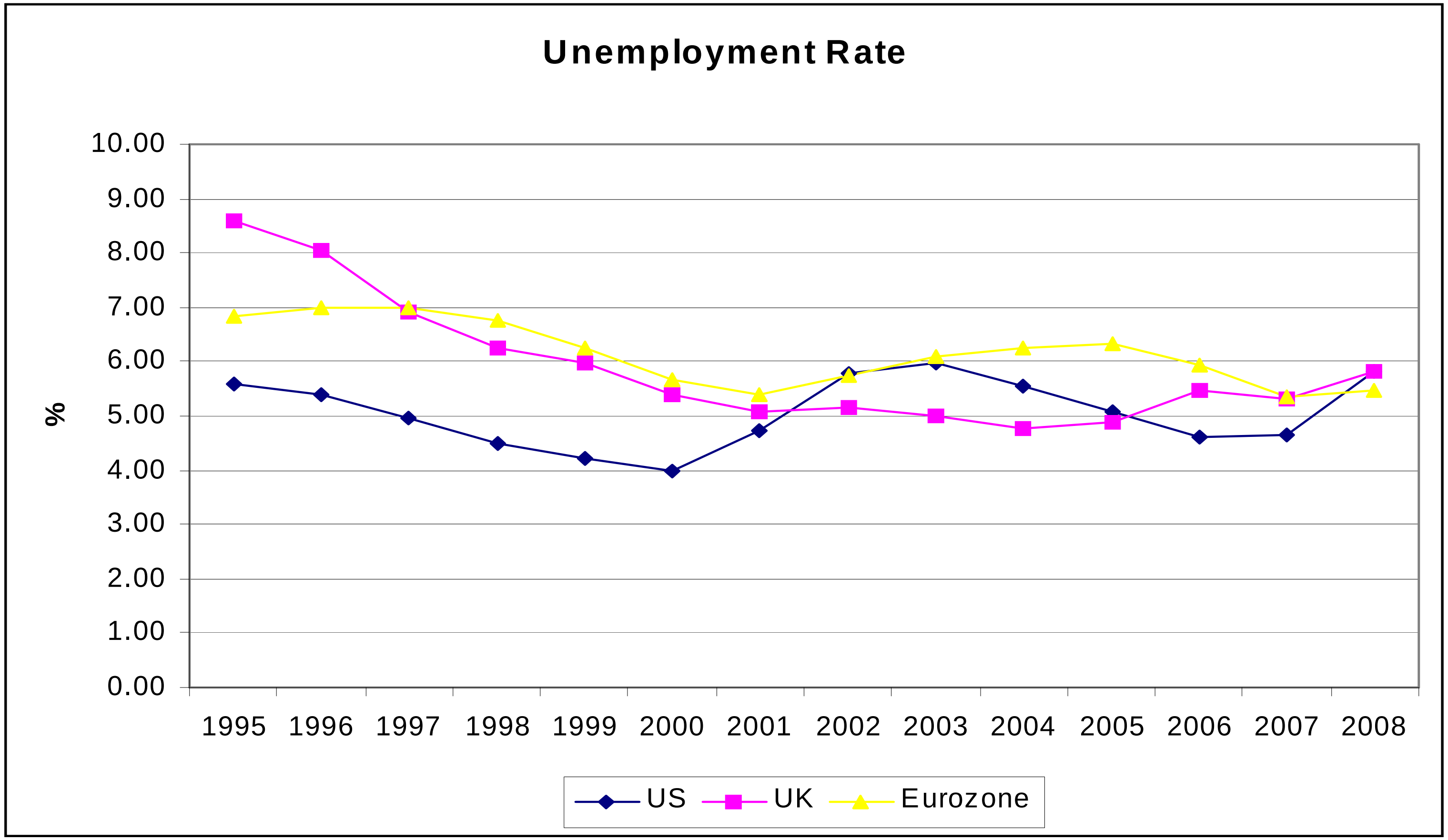
- The macroeconomic picture has shown little “volatility” over the past 10 years or so

- What do the macroeconomic data actually mean?
    - Assumes that all borrowers face the same economic conditions described by macroeconomic variables

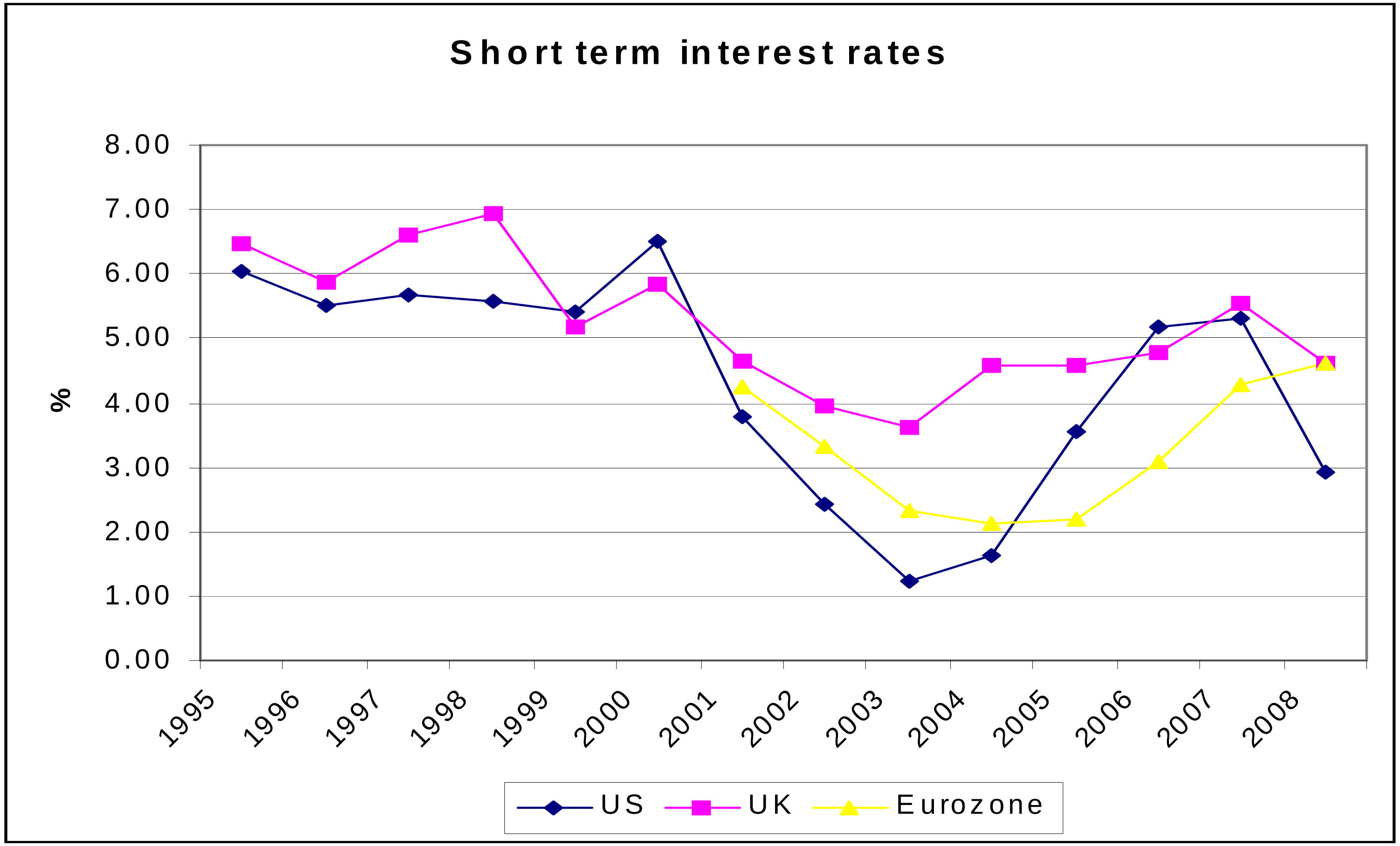
Relatively benign economic picture… until now



Stable or falling unemployment rates



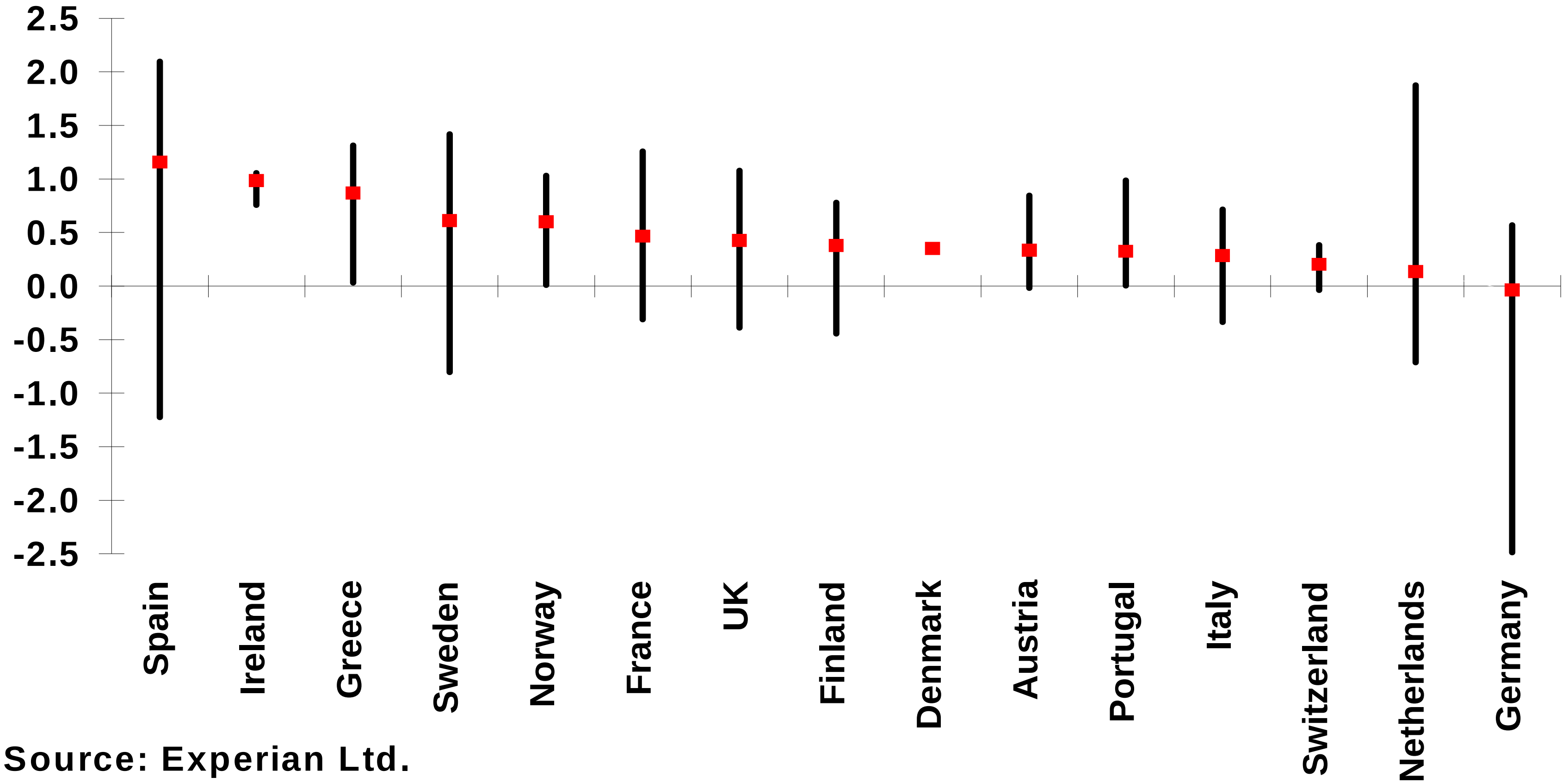
More interest rate volatility



- Why should interest rates be important?

Macroeconomic conditions do not reflect local economies

% annual average change in FTE employment 2006-16: regional highs and lows



Source: Experian Ltd.

What are these macroeconomic variables?

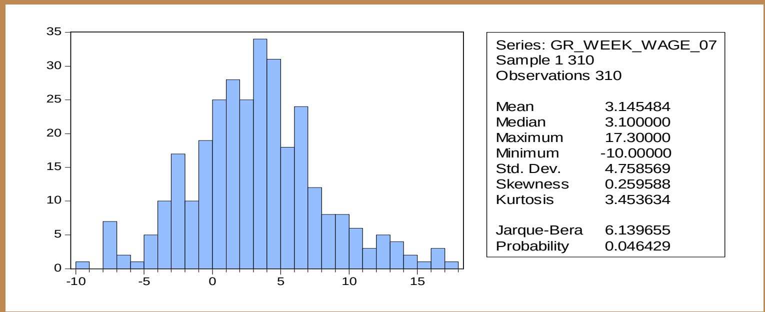
- Example: real disposable incomes
  - Inflation component – different groups face different inflation rates
  - Income components – different groups receive their incomes from different sources, and grow at different rates
  - Disposable element – different groups face different tax brackets

- What about all the rest?
  - Savings rate, wealth and asset values, GDP, unemployment rate, consumer spending…………

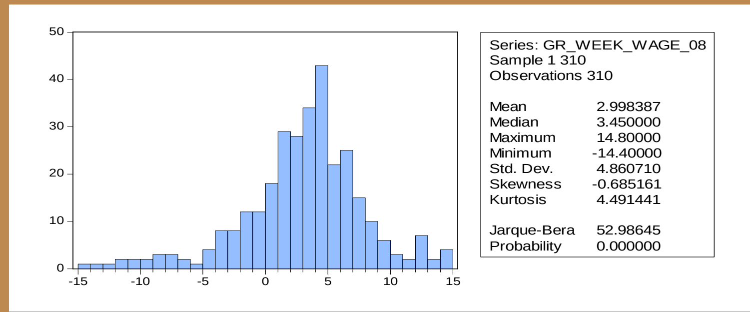
Wide variation within the disaggregated data

Annual Growth of UK average weekly wage by narrow occupations

2006-7



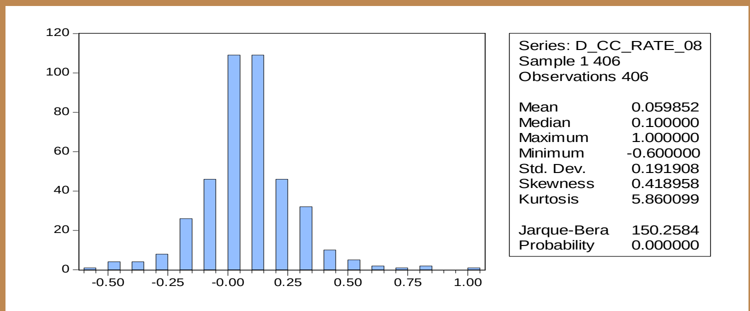
2007-8



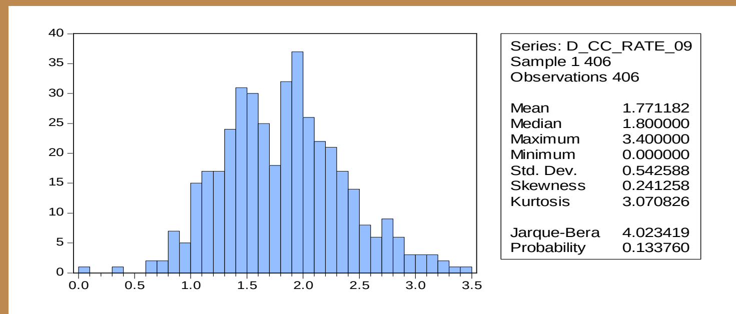
Source: ONS ASHE

Increase in local area claimant unemployment rate (ppc)

2007-8



2008-9

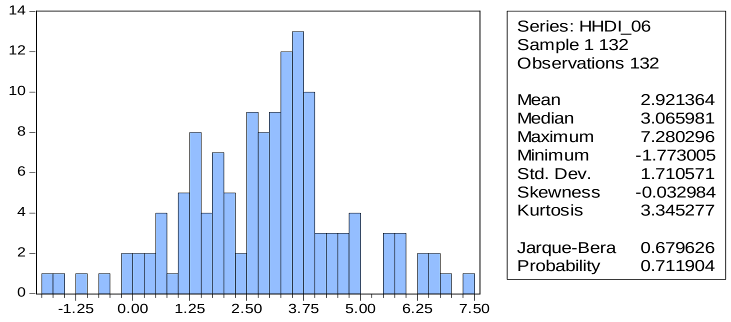


Source: ONS Claimant Count

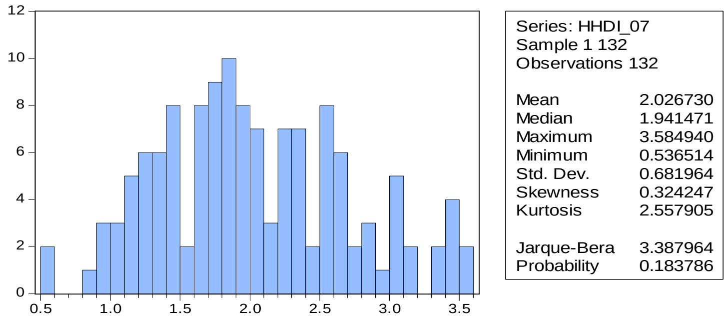
And here too…….

Growth of Household Disposable Income per head in UK Local Areas

2005-6



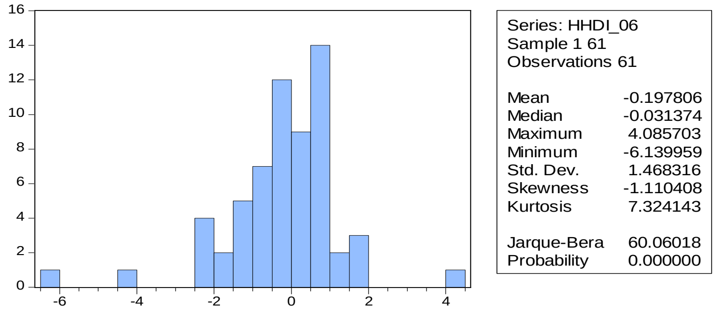
2006-7



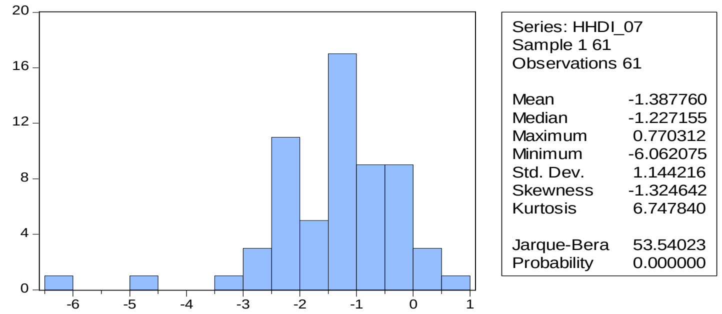
Source: ONS Regional Accounts

Growth of real Average Household Disposable by Household Type

2005-6



2006-7

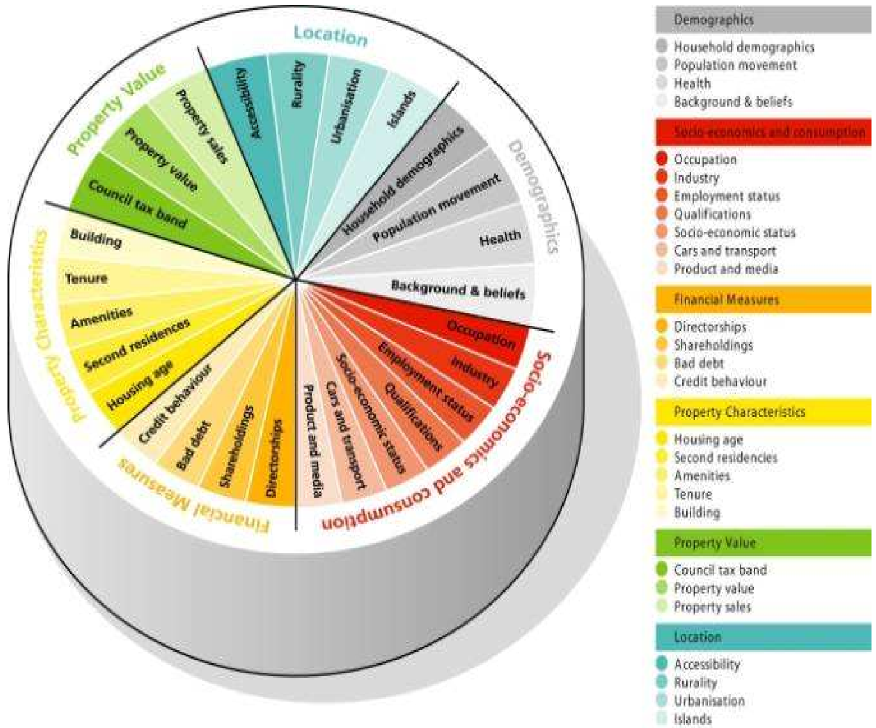


Source: Experian

How do we get closer to the household / account level?

Experian’s household segmentation system

- The UK version classifies the population into 61 types at both **postcode and household level** by:
  - socio-demographics, financial measures, lifestyles, culture and behaviour.



- 400+ variables have been used to build Mosaic UK selected on the basis of their volume, quality, consistency and sustainability.

- Used by marketing departments widely in customer acquisition.
  - Consistency across the business

Meet Nick & Claire – *Happy Families*

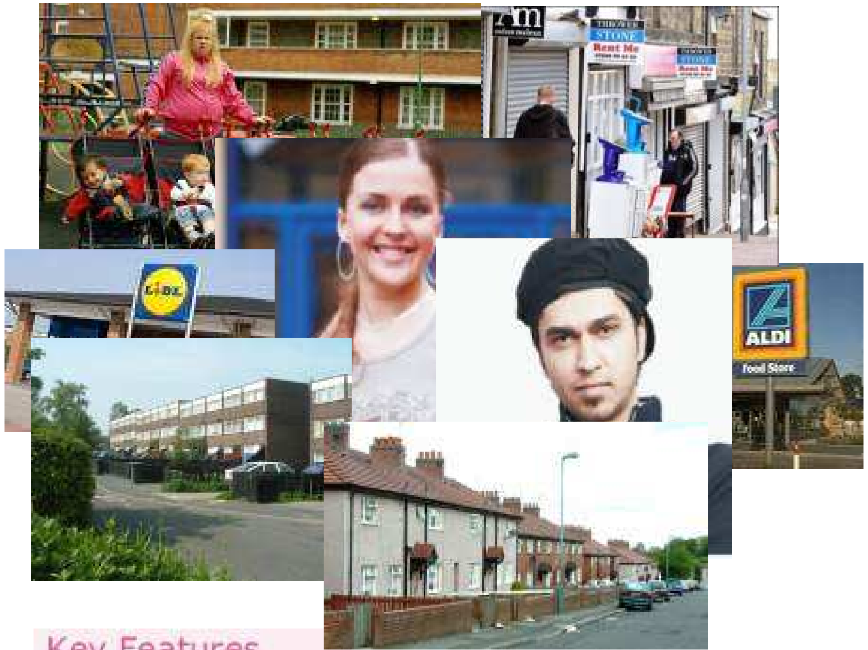
Key Features

- Young couples
- Good education
- Corporate careers
- Low unemployment
- Good prospects
- Modern homes
- Internet
- Cable and Sky TV
- Kitting out homes

Families with focus on career and home, mostly younger age groups now raising children.

- Perhaps living somewhere like Milton Keynes
- Experienced loss of job security in middle & upper management.
- Extremely reliant on wages & salaries for income - especially susceptible to redundancy.
- With large amounts of debt (especially mortgages) are increasingly stretched, finding only limited relief from lower interest rates
- Falling housing values put some who originally took out 90%+ mortgages in negative equity. Preventing them from getting better mortgage rates
- High credit card spend – increase in interest rates here
- Lack of credit for bigger purchases – new car is on hold!
- Cutting back on holidays aboard

Meet Damien & Donna – *Municipal Dependency*



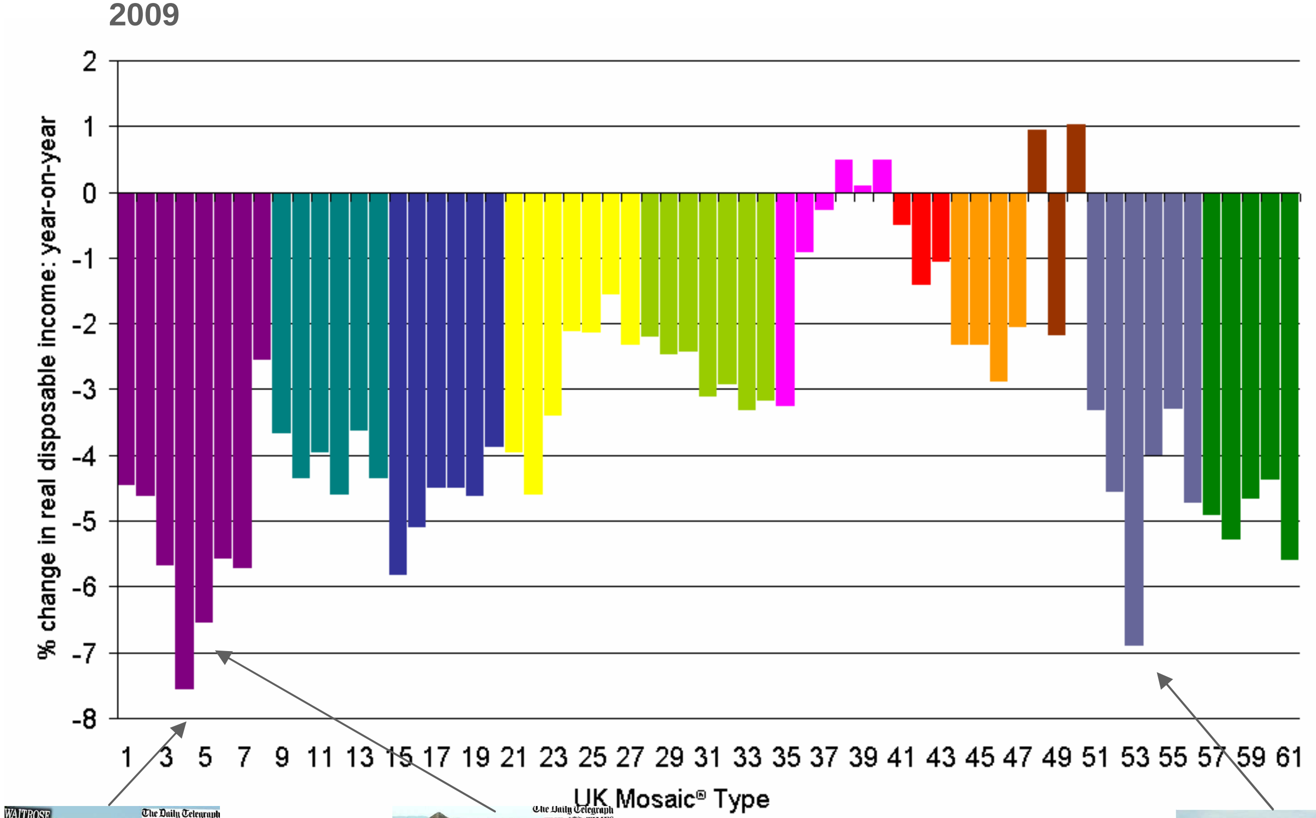
Key Features

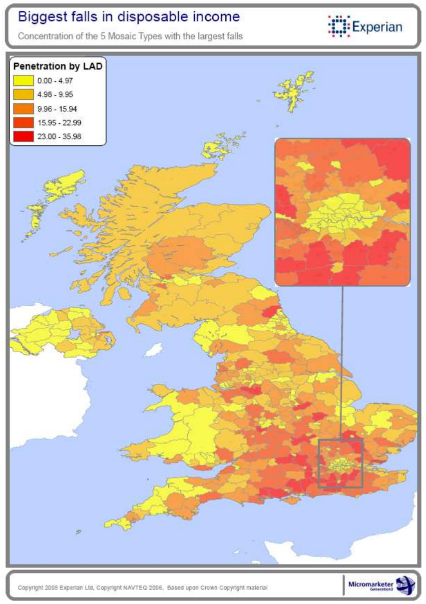
- Families
- Many young children
- Low incomes
- State benefits
- High deprivation
- Council housing
- Public transport
- Heavy watchers of TV
- Use cash

Younger families, often single parents, on lower incomes who often live in large council estates where little owner-occupation. People struggling to achieve rewards & mostly reliant on council for accommodation & benefits.

- Might live somewhere like Felling
- Always had to be cost-conscious, careful to make ends meet. So, attitude is "*what's new*"!
- LA renting - house price decline not affected net wealth
- Already high unemployment. Jobs amongst poorer paid sectors.
- Benefit from deceleration in inflation.
- Take home substantial share of income as benefits – to some extent "*secure*"
- Not well informed about economic situation
- Likely to have changed behaviour already as expect to be worse off in 6 months' time – already cutting back on any discretionary spend they do have
- Even harder to get credit, so cutting down on big tickets status symbols.

Impact on disposable incomes varies enormously





04: Golden Empty Nesters

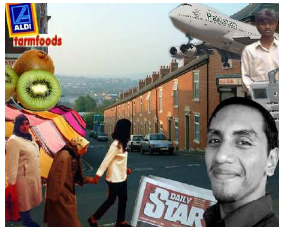
05: Provincial Privilege

53: High Spending Elders

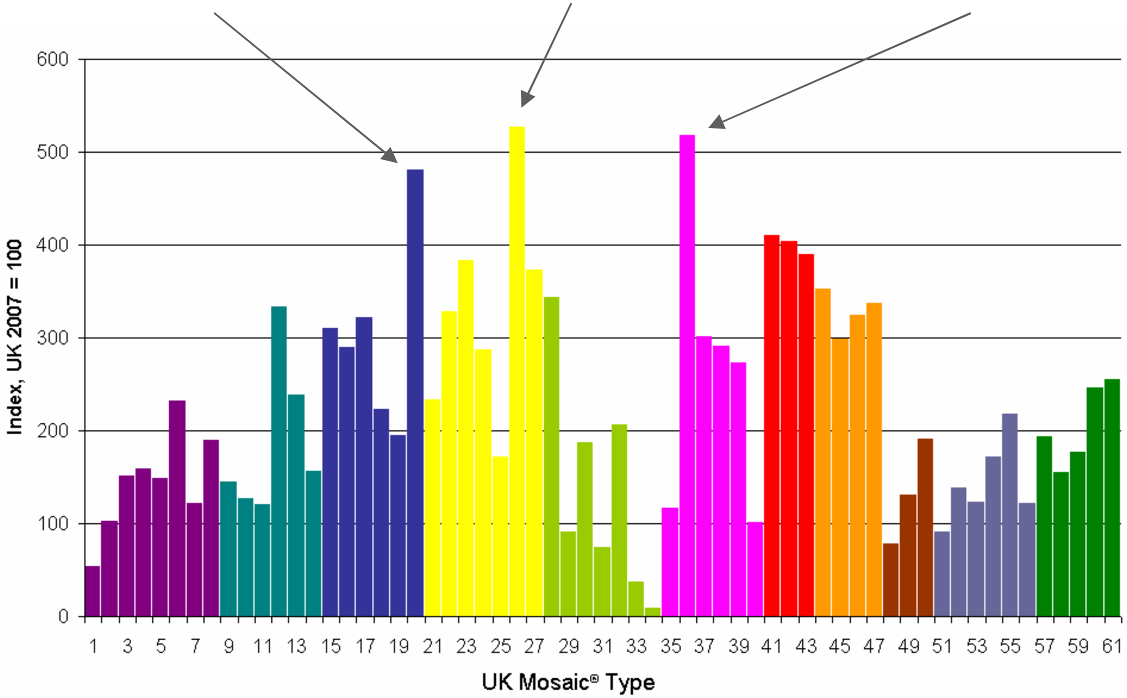
Unemployment risk significantly higher for some types

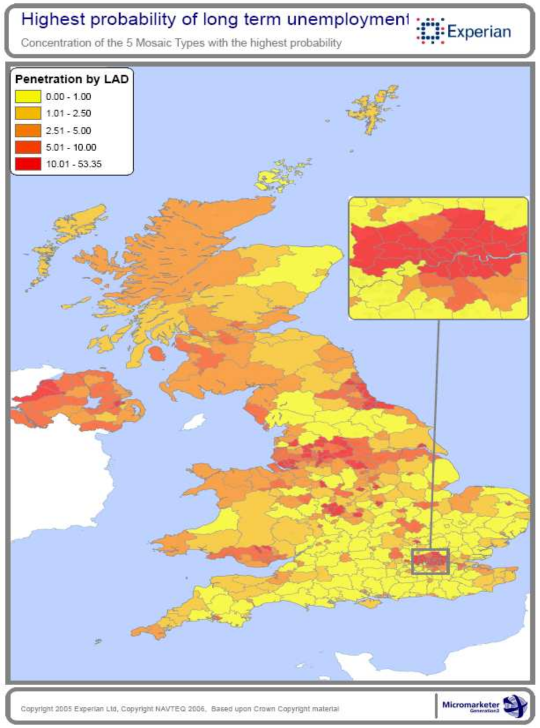
20: Small Enterprise

26: Low Paid Manufacturing



36: High-Density Urban





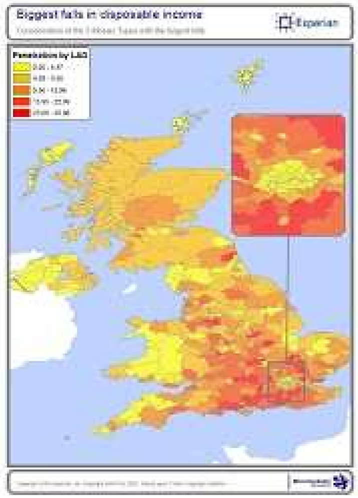
Getting economics into the mix:

Credit Data & Systems

Economics

Customers

Locations



Experian™

Methodology

- Sample size: 80,000+ random accounts from the UK bureau per quarter (weighted to represent the bureau population)
- Definition: 12 month default on new accounts
- Estimation period: 2005q4 – 2008q2
- Standard binary choice models
- Maximising the variation of economic observations across the accounts removes the degrees of freedom problem.

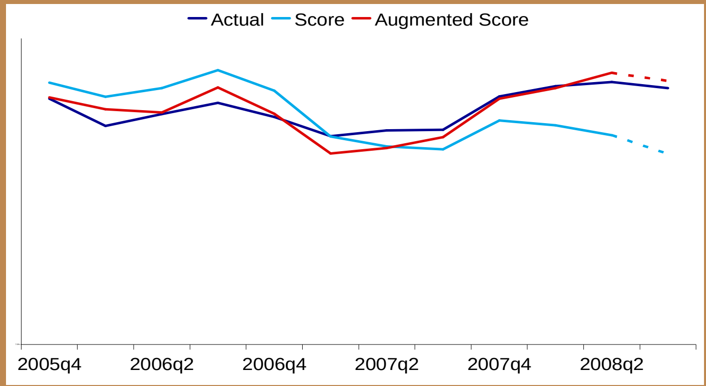
Some results – key disaggregated economic drivers

Statistically Significant Disaggregated Economic Variables

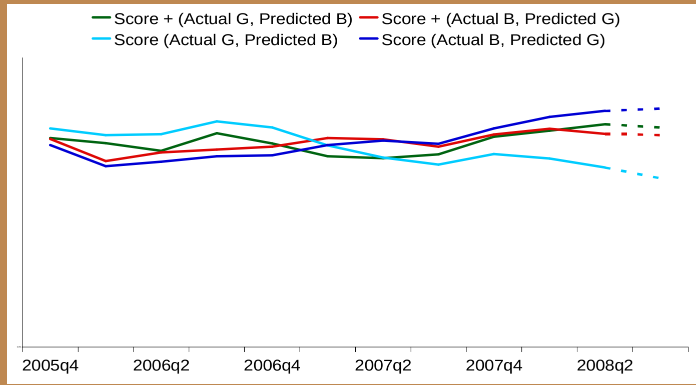
Variable	*Disaggregation*
Household real disposable income	Household Segment (Mosaic)
Growth of real Household disposable income	Household Segment (Mosaic)
Unemployment Risk	Household Segment (Mosaic)
Change in Unemployment Risk	Household Segment (Mosaic)
Claimant Unemployment Rate	Local Areas (LADs)
Change in Claimant Unemployment Rate	Local Areas (LADs)
Various of above interacted with Credit Score	

Does adding disaggregated economic data work?

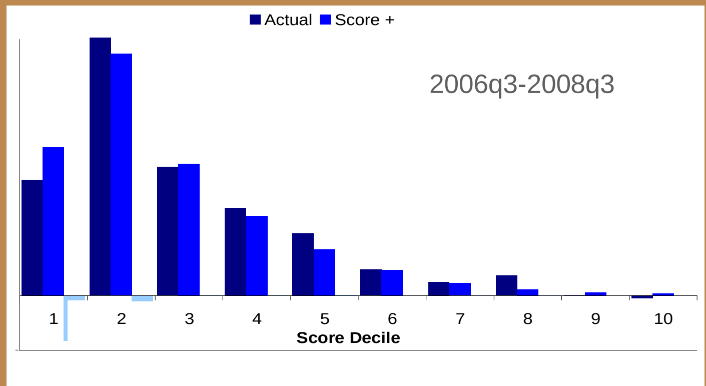
Actual & Predicted 6 month bad rate



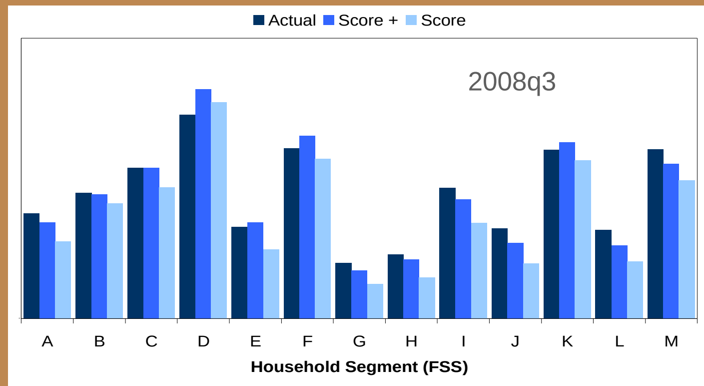
Classification Errors



Actual & predicted increase in P.D. by Score Decile



Actual & Predicted 6 month bad rates by Household type



Mosaic: Forecasts & Scenarios

Scenario Assumptions → UK Macroeconomic / Regional Models

↓

Household type Macro Drivers

↓

Household type Economics Models

↓

Household type Economics Scenario Results

Possible Scenarios:

- Economic Policy
- Global Conditions
- Import Prices
- Housing Market
- Business Investment
- Employment
- etc.

Effects on:

- Household Income
- Assets & Debts
- Unemployment
- Disposable Income
- Cost of living

Applications of this approach

- An augmented bureau score
  - Capturing base case or “stressed” economic scenarios
  - Adjusting thresholds
- Use in new business – customer acquisition?
- LGD calculations
- Portfolio stress testing
- Collections and recoveries