New Measures of Deprivation in the Republic of Ireland

An Inter-temporal and Spatial Analysis of Data from the Census of Population, 1991, 1996, 2002 and 2006

Trutz Haase & Jonathan Pratschke

Presentation to Partnerships, 17th & 18th June 2008

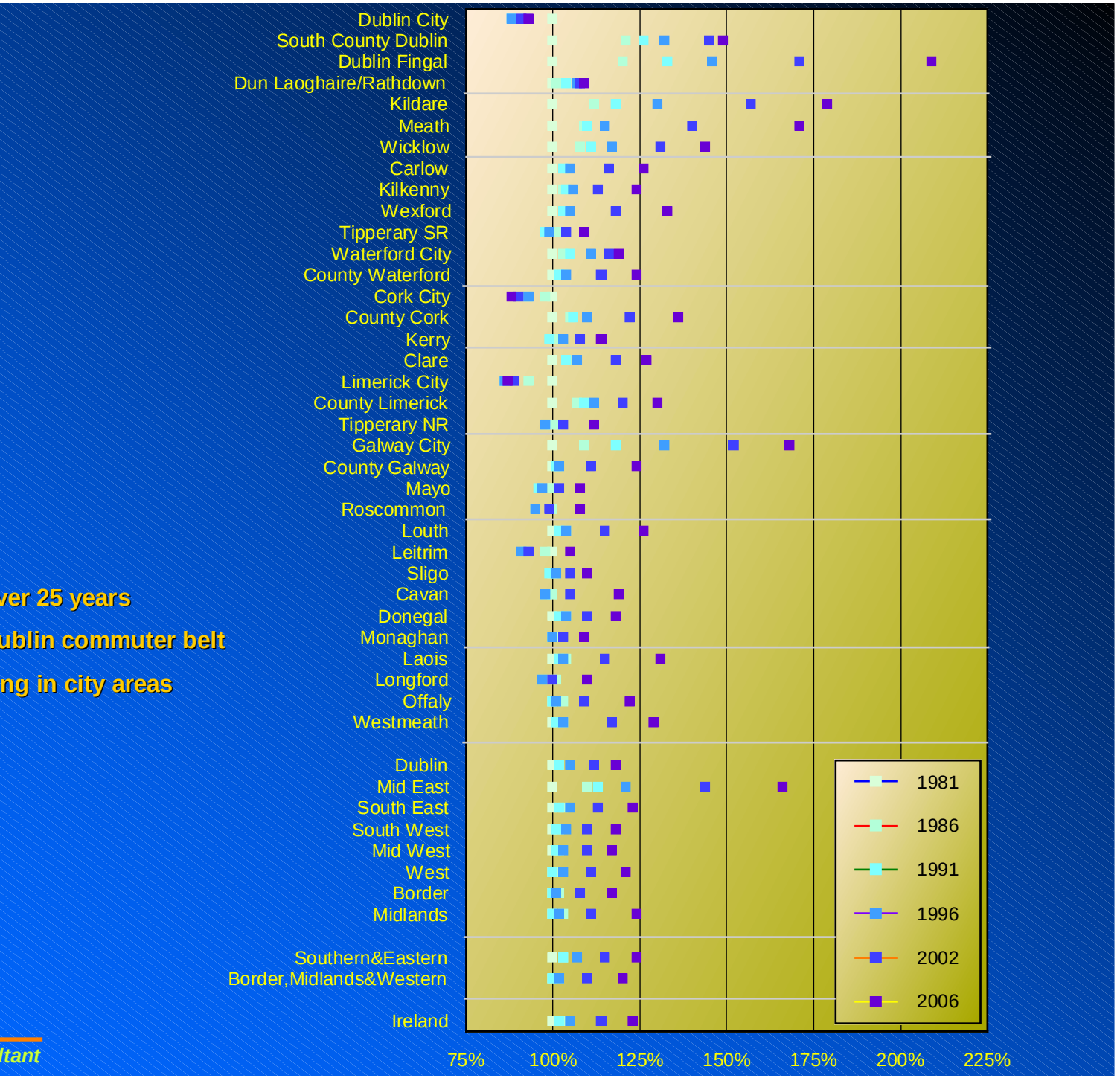
History of Irish Deprivation Measures

Local Development Programme & Pobal		Development of Deprivation Index
1991	Designation of 12 Pilot Areas to combat long-term unemployment under the PESP	
1992	ADM is given responsibility for the management of area-based integrated social and economic development programmes	First Analysis of 1986 Census data (ESRI & CPA, 1993)
1992-1995	Programme goes 'national' under the Global Grant, extending the designation to 38 Partnerships and 33 Community Groups	First Index of Relative Affluence and Deprivation, based on 1991 Census data (Haase 1993, 1996)
1994-1999	Local Development Programme becomes separate Programme under the NDP (OPLURD)	Second Index of Relative Affluence and Deprivation, based on 1996 Census data (Haase 1999)
2000-2006	Local Development Social Inclusion Programme (LDSIP)	First Index of Relative Affluence and Deprivation, using new methodological approach, based on 1991, 1996 and 2002 Census data (Haase & Pratschke 2005)
2006-2013	Continuation of LDSIP after 'Cohesion'	New Measures of Deprivation, based on 1991, 1996, 2002 and 2006 Census data (Haase & Pratschke 2008)

Comparing Social Indicators from the 1991, 1996, 2002 and 2006 Censuses

Population Change 1981 - 2006

1981 = 100



Main Observations

- significant increase over 25 years
- largest increases in Dublin commuter belt
- but population declining in city areas

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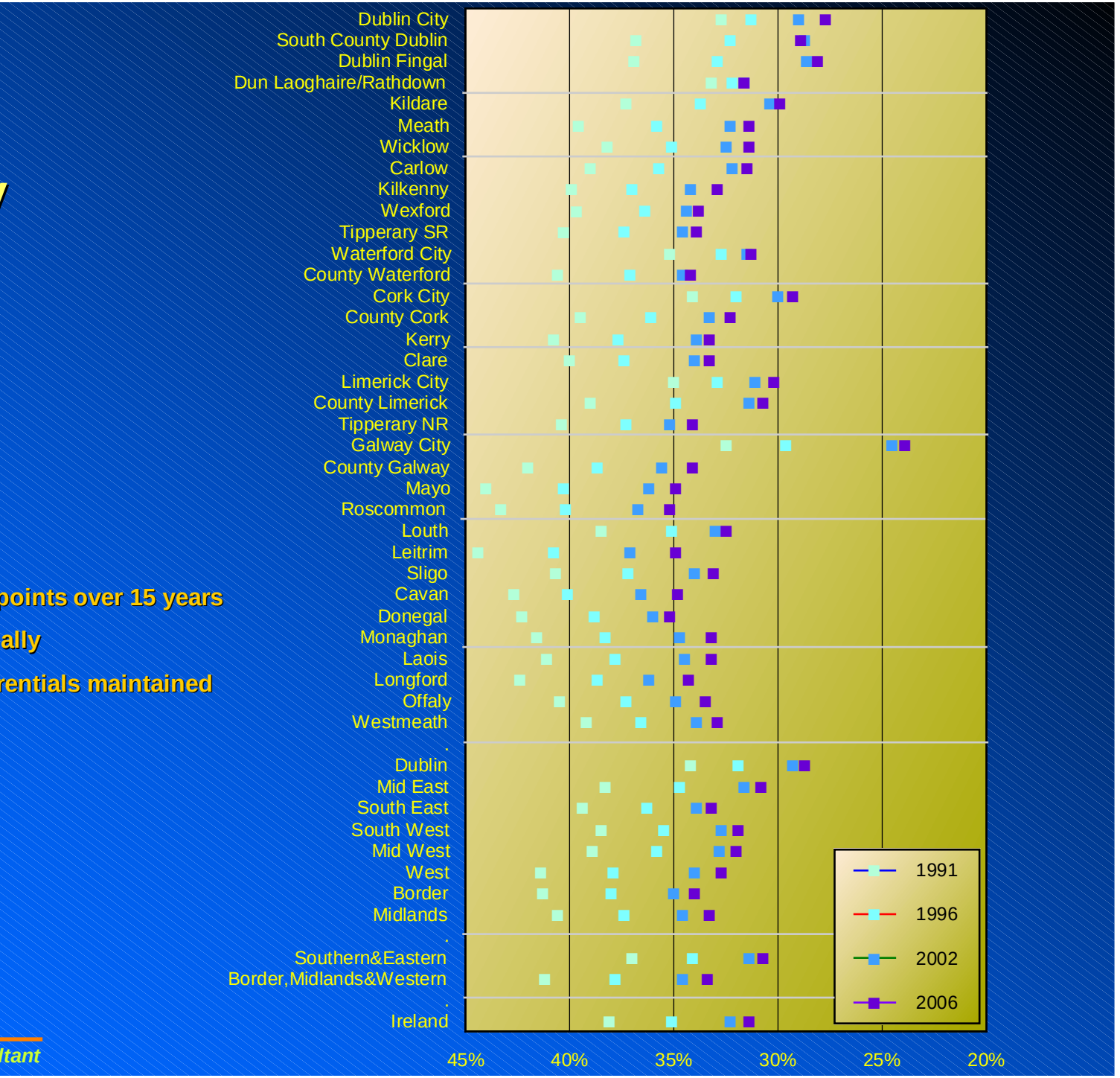
Age Dependency Rate 1991 - 2006



Main Observations

- drop of 7 percentage-points over 15 years
- affecting all areas equally
- but (urban-rural) differentials maintained

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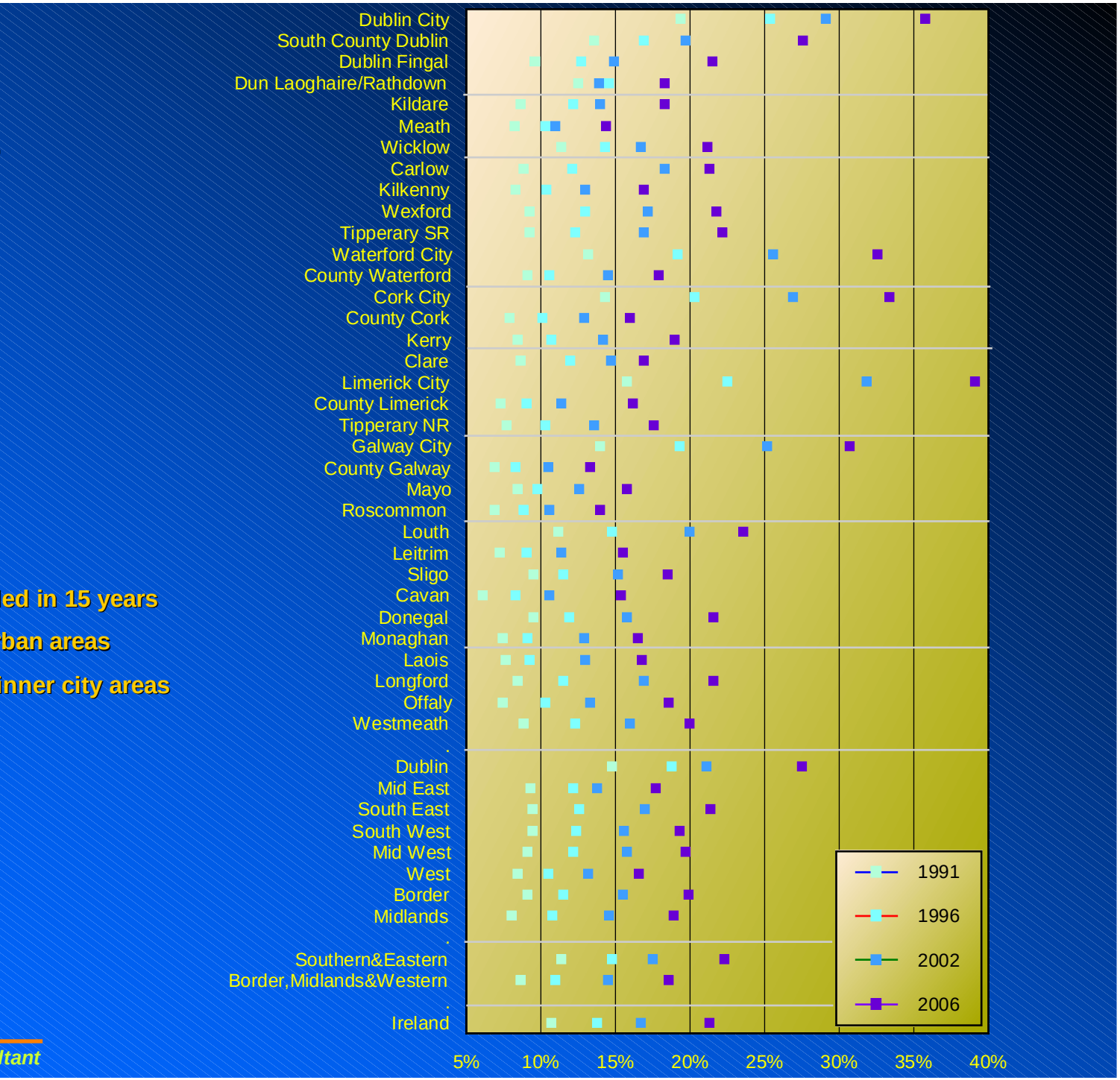
Lone Parent Rate 1991 - 2006



Main Observations

- rate has exactly doubled in 15 years
- rates are highest in urban areas
- reaching over 50% in inner city areas

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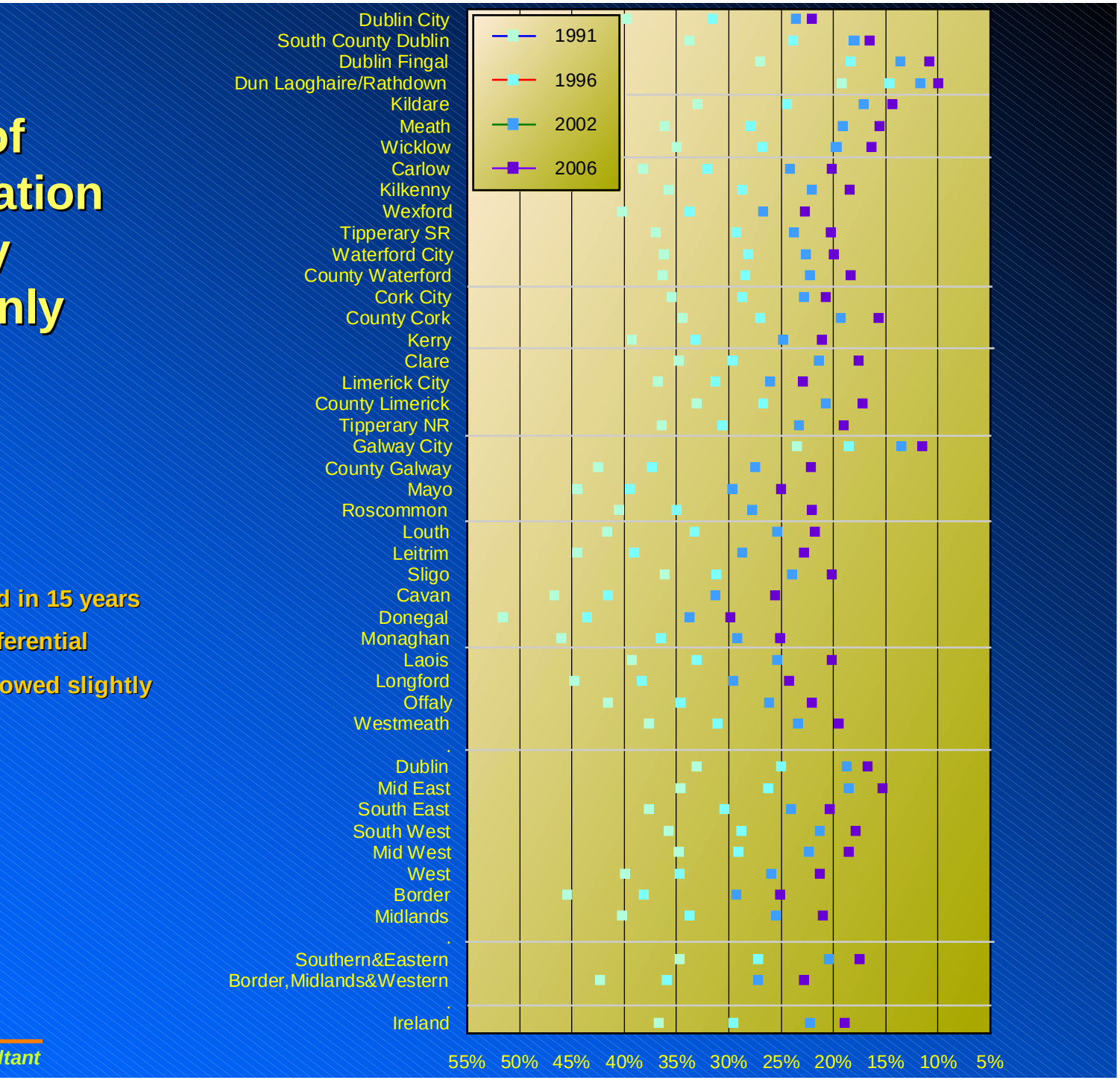
Proportion of Adult Population with Primary Education only 1991 - 2006



Main Observations

- rate has exactly halved in 15 years
- strong urban-rural differential
- differentials have narrowed slightly

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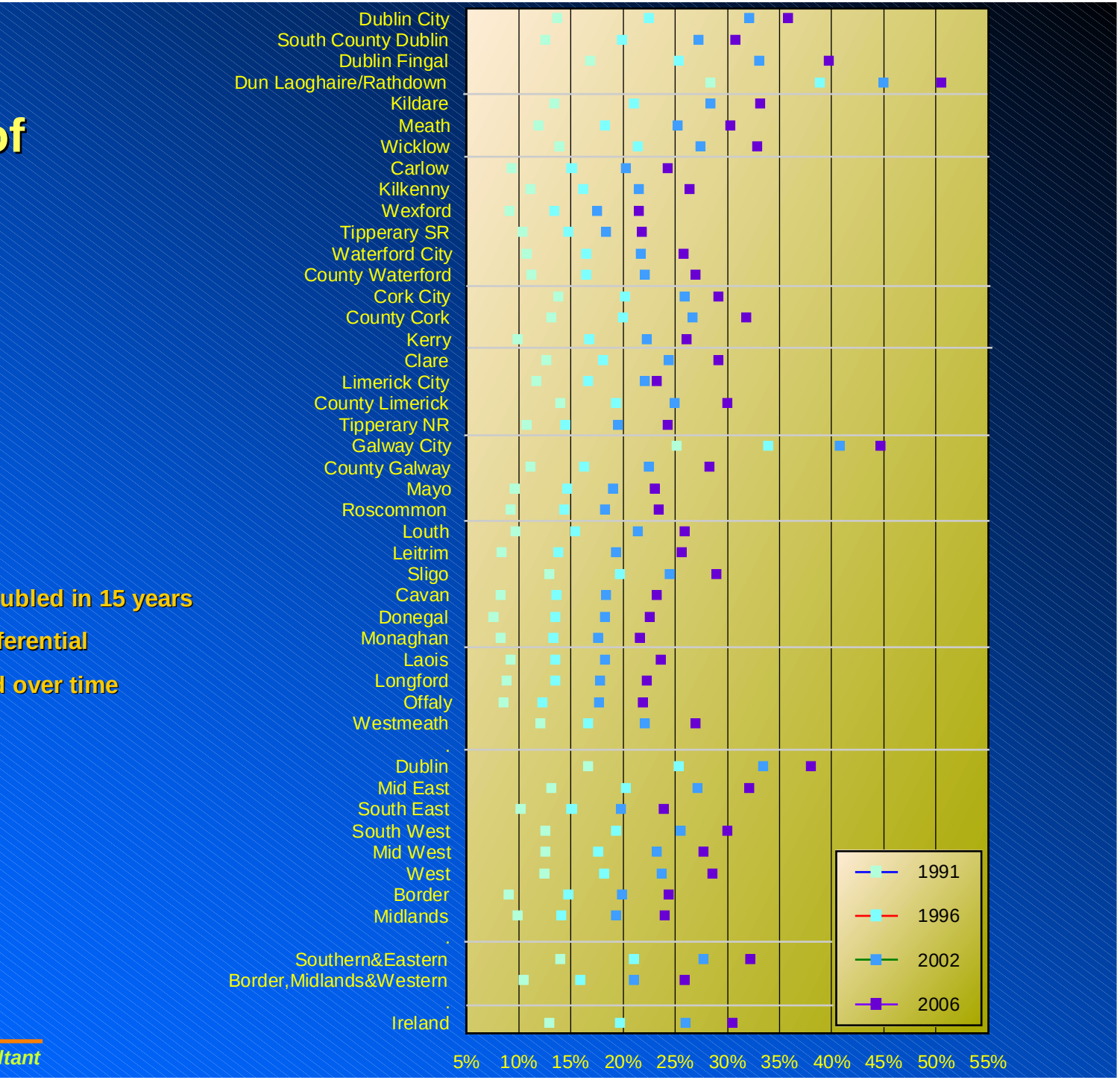
Proportion of Population with Third Level Education 1991 - 2006



Main Observations

- rate has more than doubled in 15 years
- strong urban-rural differential
- differential maintained over time

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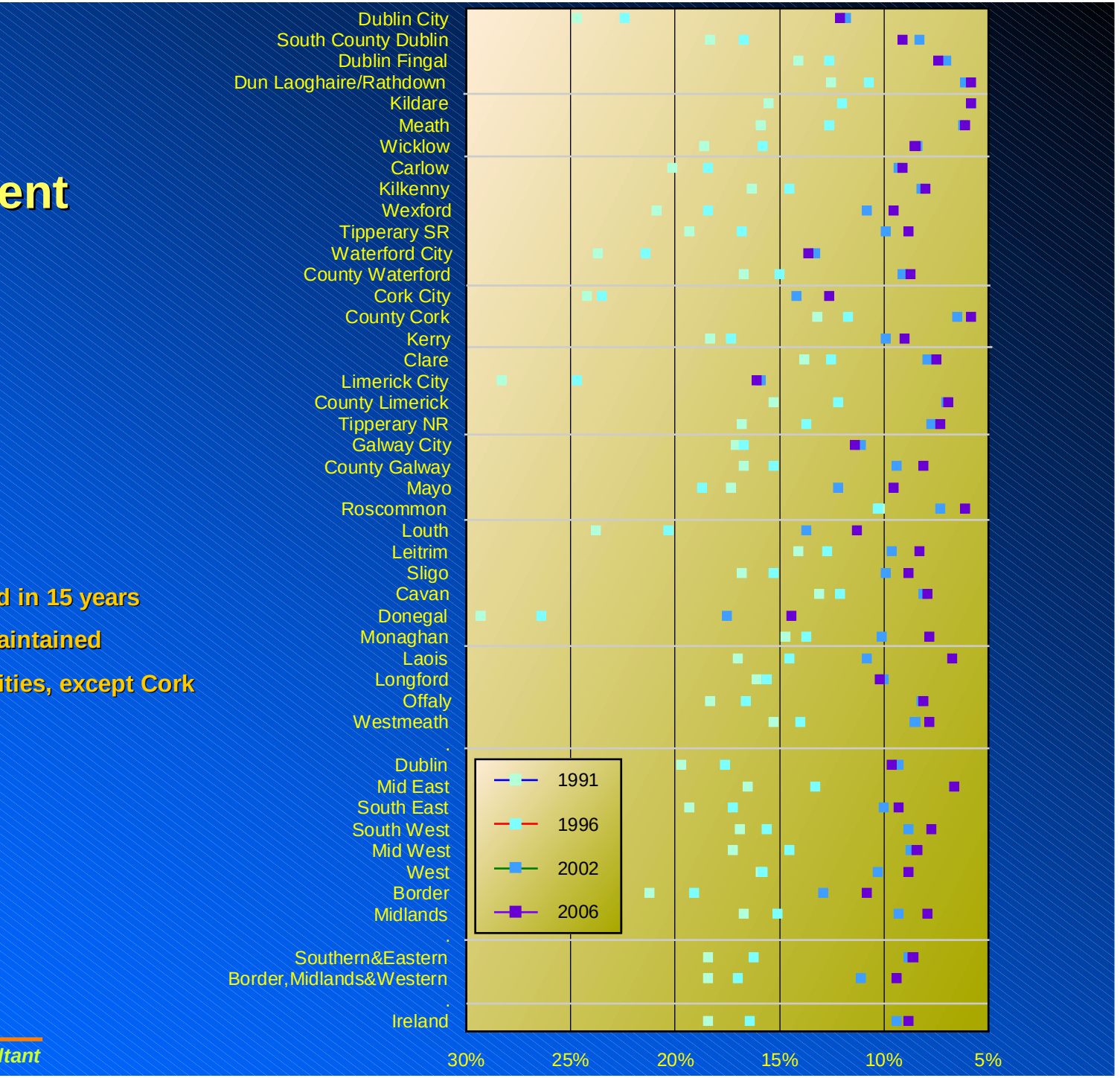
Male Unemployment Rate 1991 - 2006



Main Observations

- rate has exactly halved in 15 years
- differentials largely maintained
- reversal (2006) in all cities, except Cork

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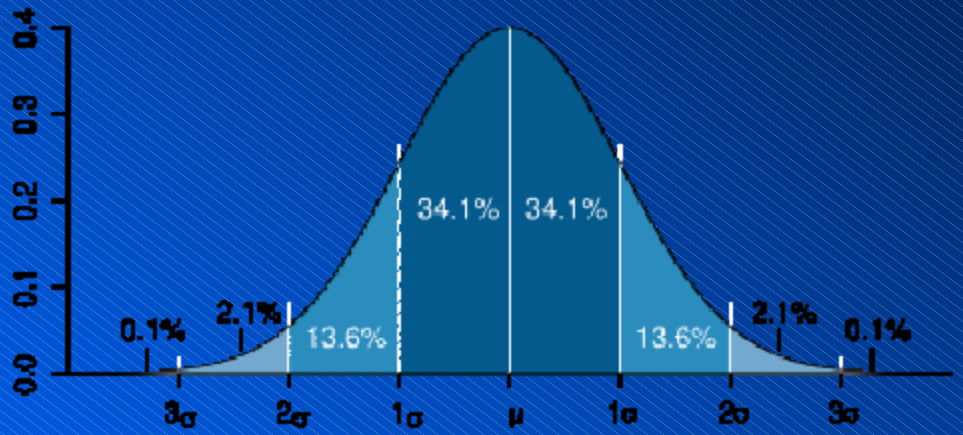
Main Observations

- Ireland has experienced an exceptional and sustained economic boom over the past 15 years.
- All social indicators exhibit significant improvements and these affect all areas.
- It is thus important to interpret changes at local level in the context of the general trends.

Mapping Social Indicators

Grading Outcomes for Mapping

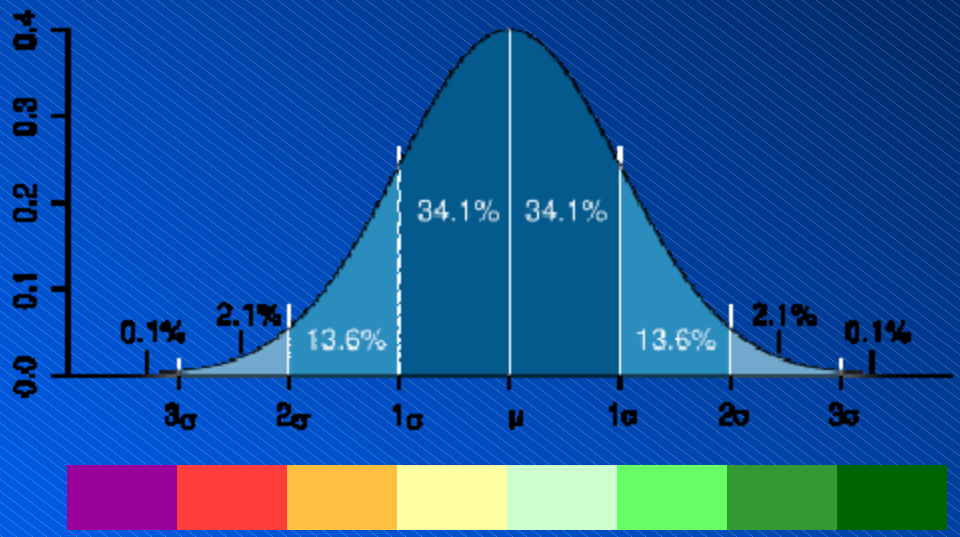


Many social phenomena – including all of the indicators used in the construction of the Irish Measures of Deprivation – follow what is known as the normal distribution, a bell-shaped curve.

This allows an easy way to express how different a particular observation is from all other observations, by using units of standard deviation.

One standard deviation from the mean accounts for about 68% (dark blue), two standard deviations from the mean (medium and dark blue) account for about 95% and three standard deviations (light, medium, and dark blue) account for about 99.7%.

Assigning Colour Codes



marginally below the average

low

very low

extremely low

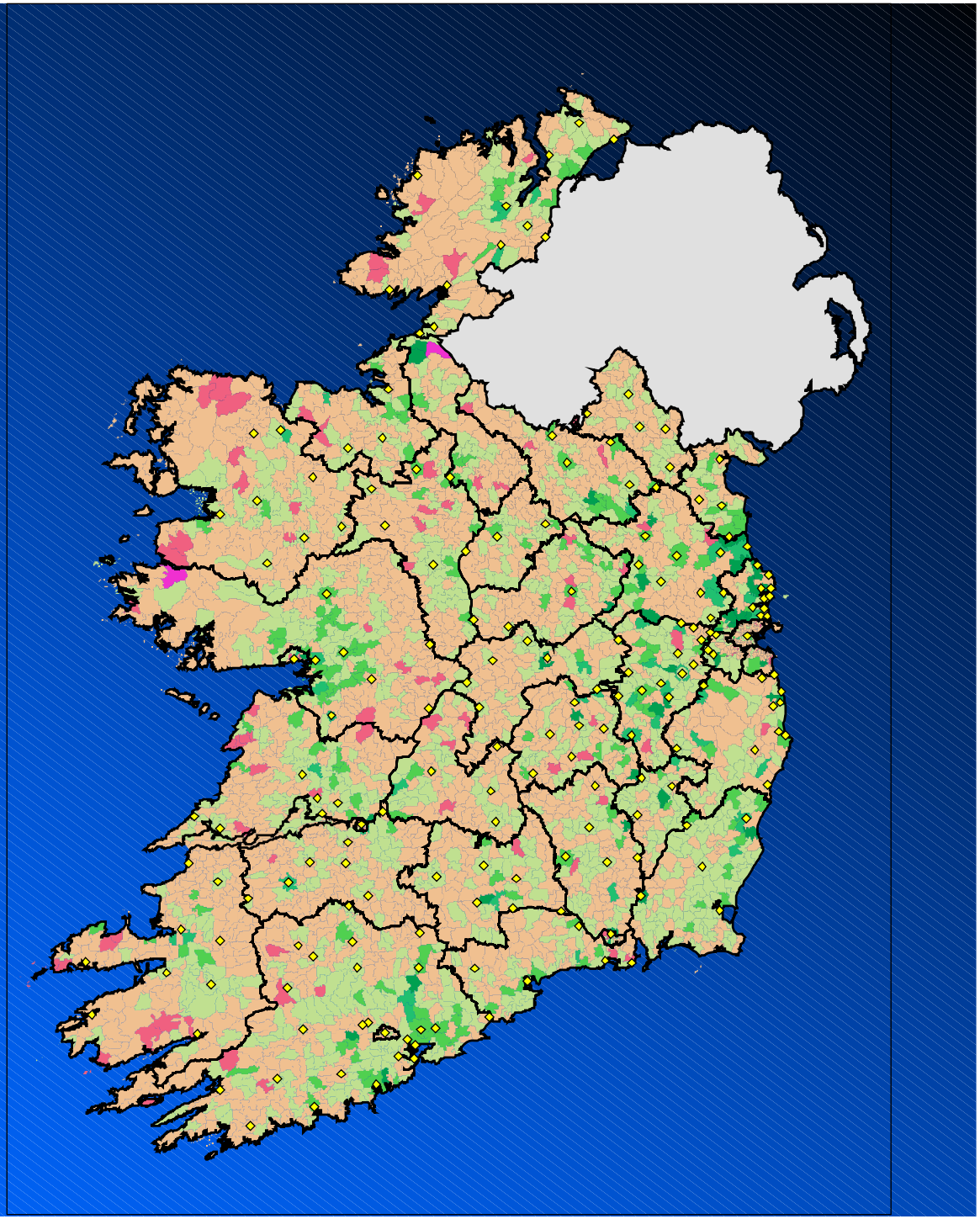
marginally above the average

high

very high

extremely high

Population Change 2002 - 2006



Main Observations

- strongest growth in urban peripheries
- but population declining in most city areas

Population Change
2002 - 2006

59 to	348
42 to	59
25 to	42
8 to	25
-9 to	8
-26 to	-9
-37 to	-26

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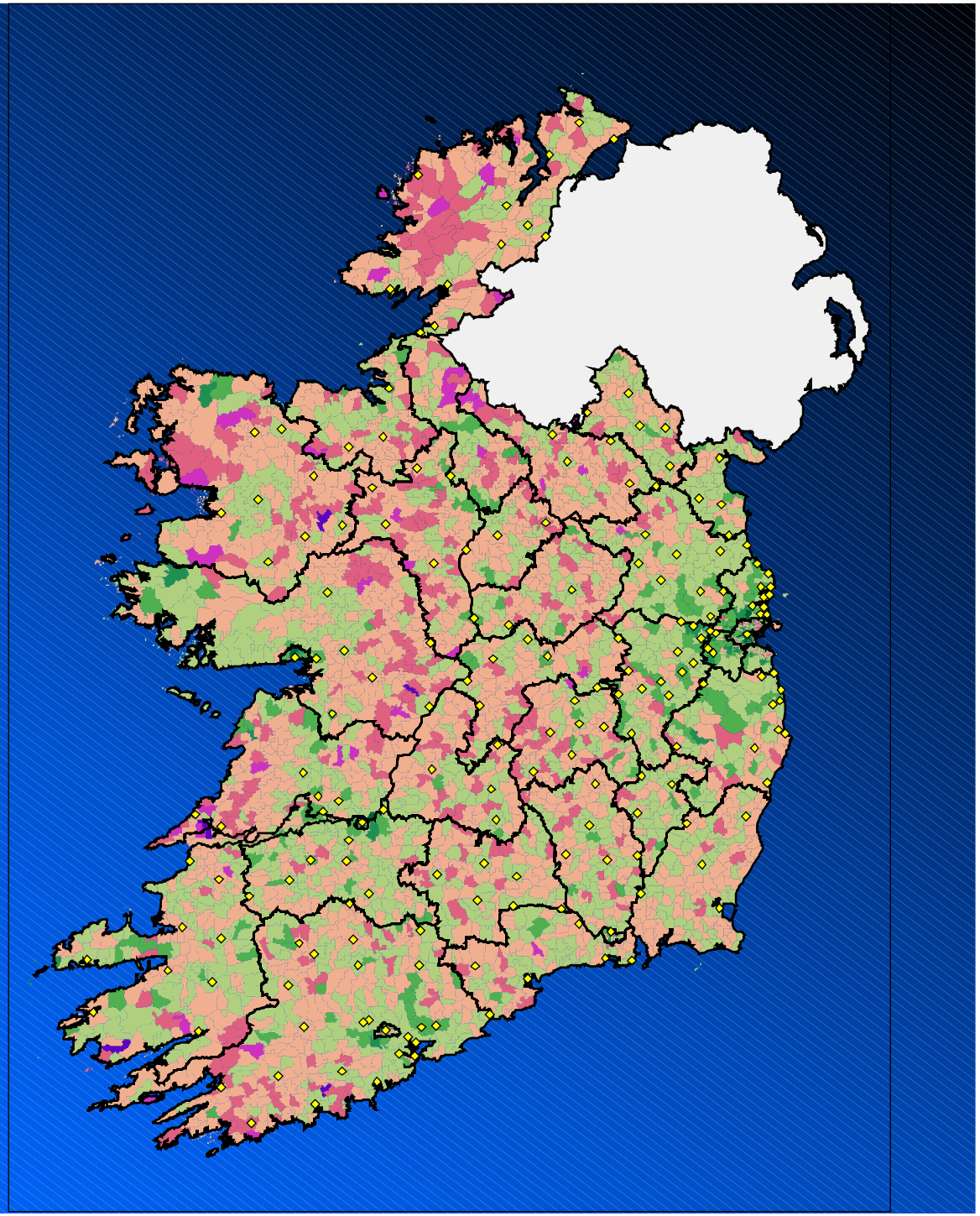
Age Dependency Rate 2006

Main Observations

- lowest rates in urban peripheries
- highest rates in (remote) rural areas



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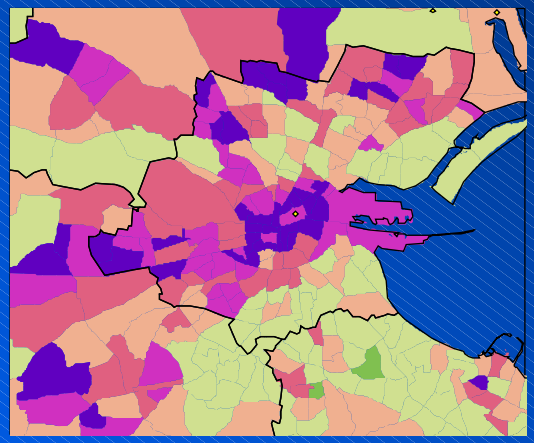
Lone Parent Rate 2006



Main Observations

- high rates found only in urban areas
- reaching over 50% in disadvantaged inner city areas

Lone Parent Rate 2006

- 49 to 75
- 37.9 to 49
- 26.8 to 37.9
- 15.6 to 26.8
- 4.5 to 15.6
- 0 to 4.5

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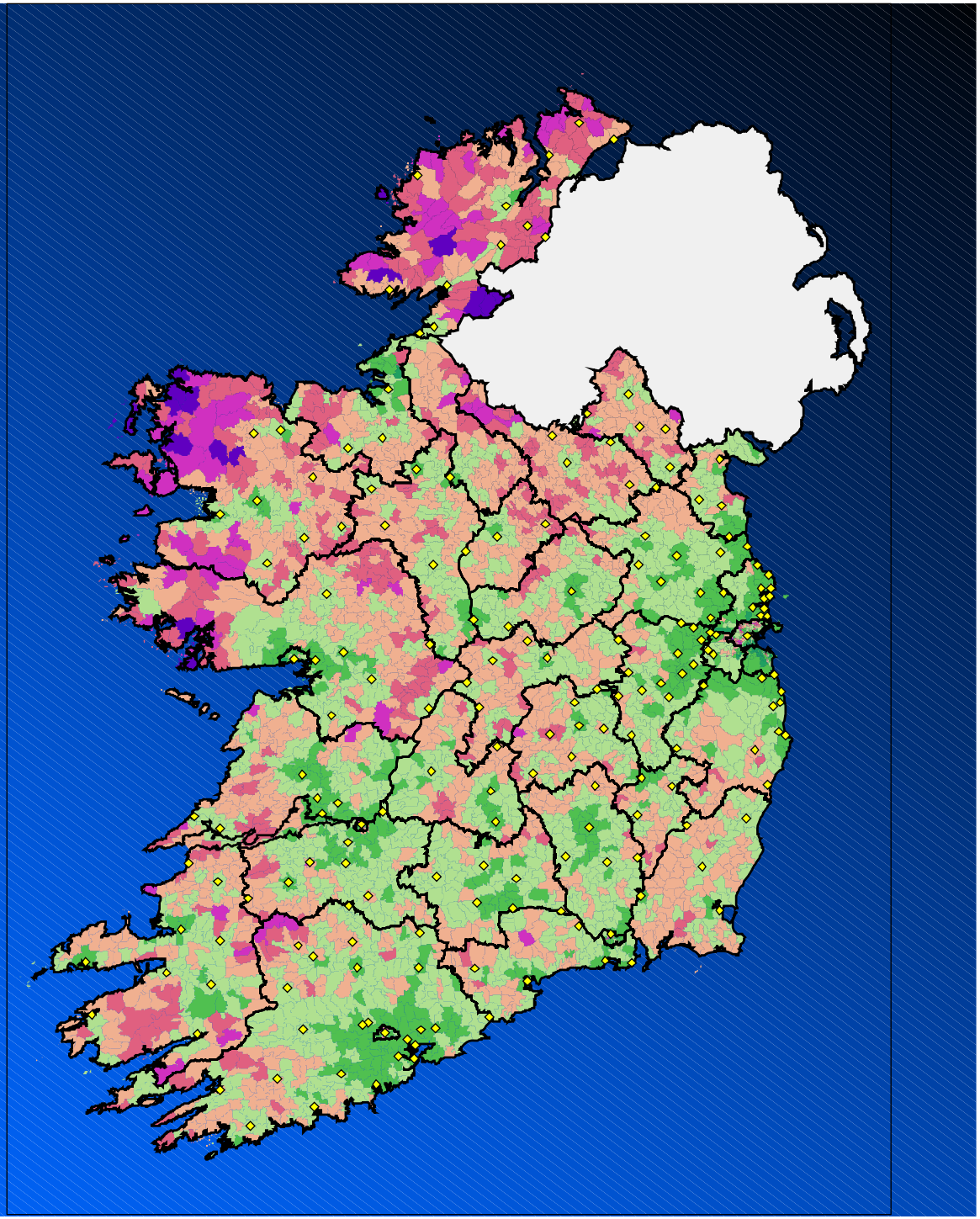
Proportion of Adult Population with Primary Education only 2006



Main Observations

- lowest in urban periphery
- highest in (remote) rural areas
- cities containing both

Primary Education Only
2006

- 47.8 to 58.9
- 39.4 to 47.8
- 31 to 39.4
- 22.6 to 31
- 14.2 to 22.6
- 5.8 to 14.2
- 1.8 to 5.8
- 1.8 to 1.8

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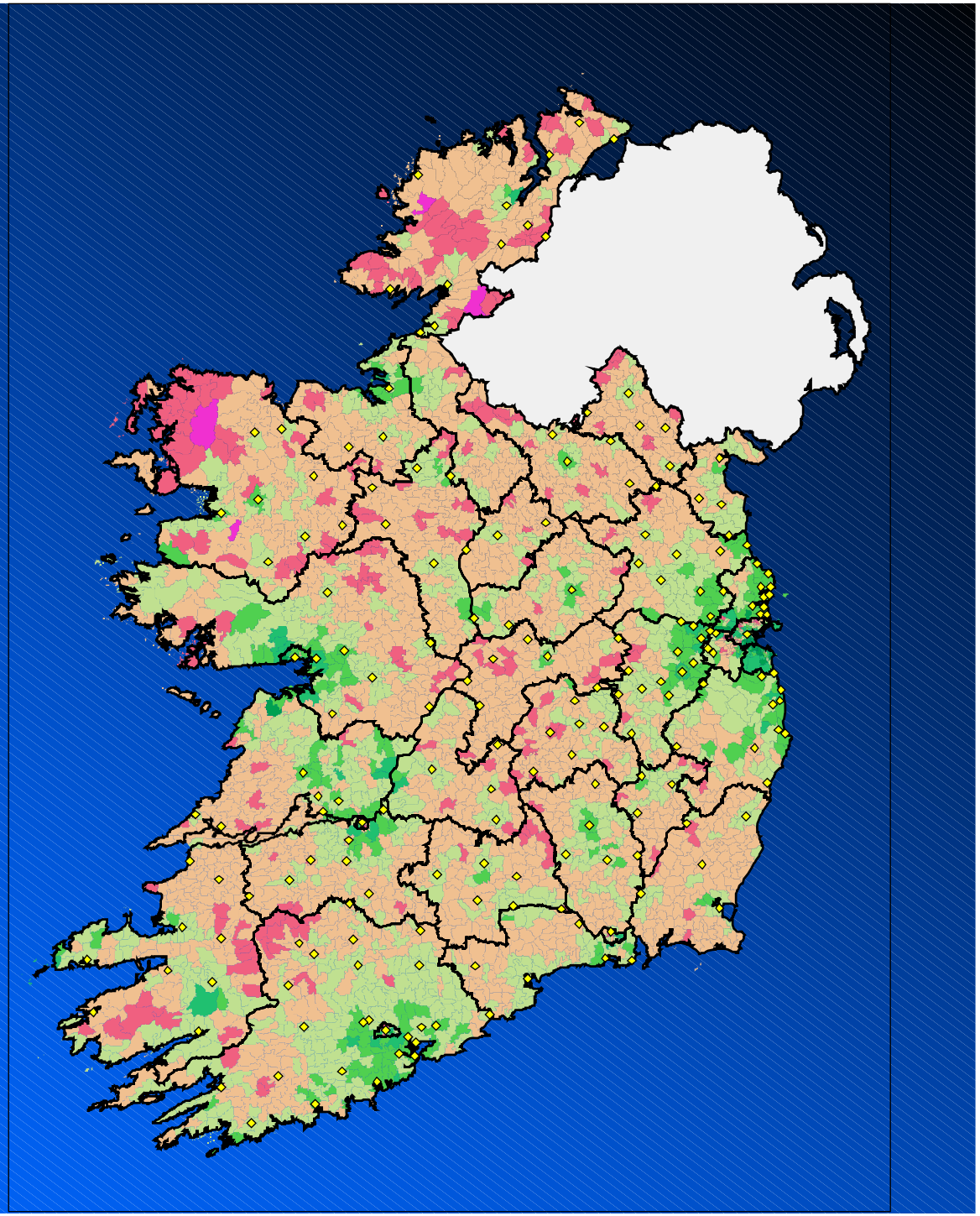
Proportion of Adult Population with Third Level Education 2006



Main Observations

- mirror image of low education
- not as pronounced in rural areas

Third Level Education
2006

- 55.7 to 76.6
- 45.6 to 55.7
- 35.5 to 45.6
- 25.4 to 35.5
- 15.3 to 25.4
- 5.2 to 15.3
- 2 to 5.2

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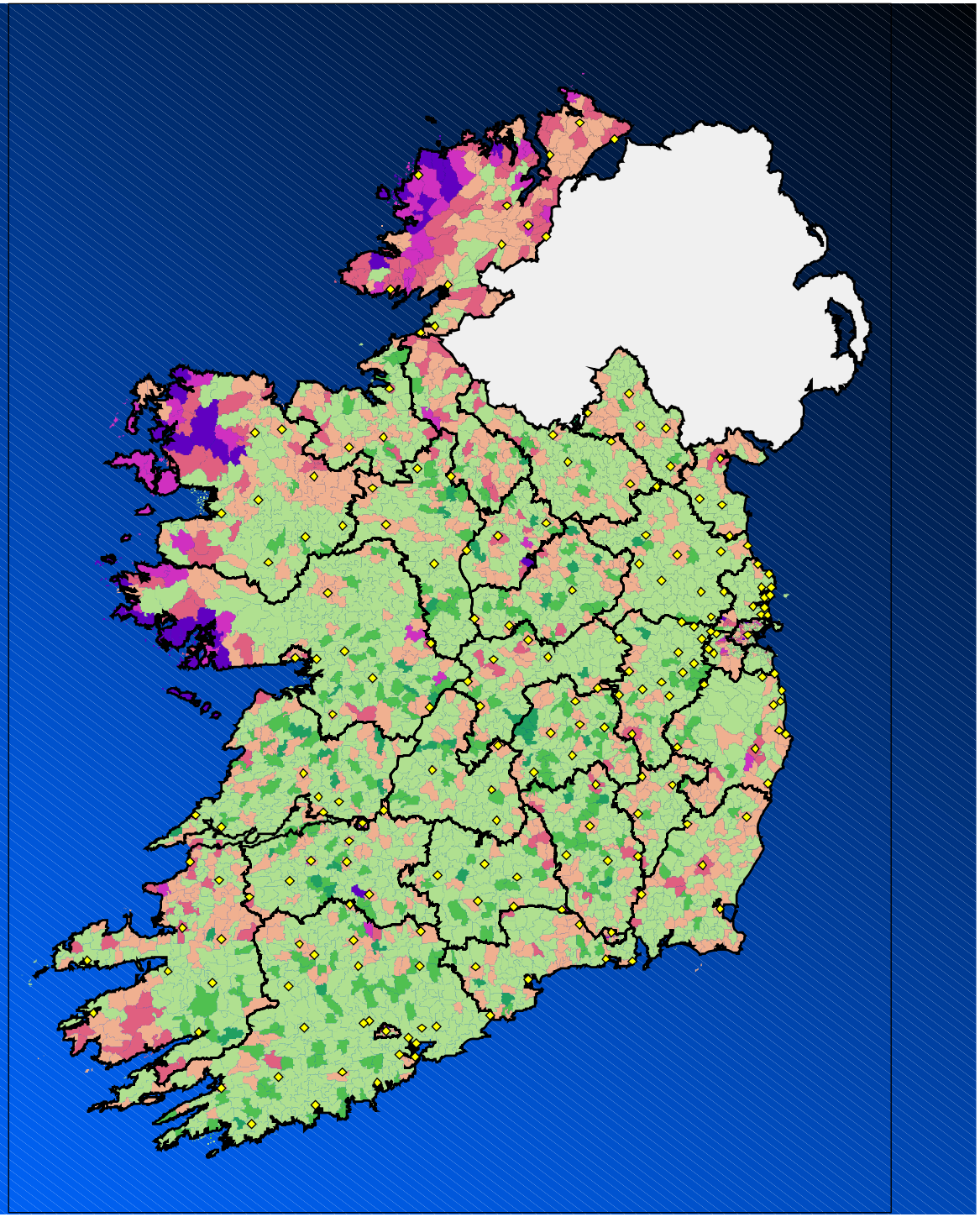
Male Unemployment Rate 2006



Main Observations

- highest in remote rural and disadvantaged urban areas

Male Unemployment Rate 2006

- 23.7 to 56.5
- 18.3 to 23.7
- 13 to 18.3
- 7.7 to 13
- 2.4 to 7.7
- 0 to 2.4

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Main Observations

- Many social indicators have similar geographical distributions.
- A picture emerges whereby the urban peripheries appear to be the most affluent parts of the country and disadvantage is concentrated either in central urban areas or remote rural areas.

The Need for a Composite Index

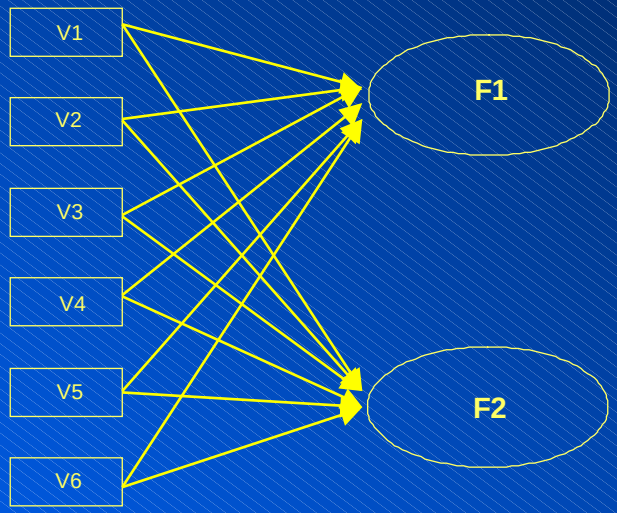
The Purpose of Composite Indices

1. It is difficult to simultaneously comprehend the multiplicity of observations across multiple indicators at different points in time.
2. For practical purposes, there is a need for a single indicator which draws all of these observations together.
3. Such an index can provide the basis for the effective targeting of the most disadvantaged areas.
4. This can provide a means by which to assess changes over time, and facilitate monitoring and evaluation.
5. However, it is important that such an index enjoys broad support amongst all key stakeholders, including Government Departments, state agencies and community representatives.

The New Measures of Deprivation for the Republic of Ireland

Traditional Approach: Exploratory Factor Analysis (EFA)

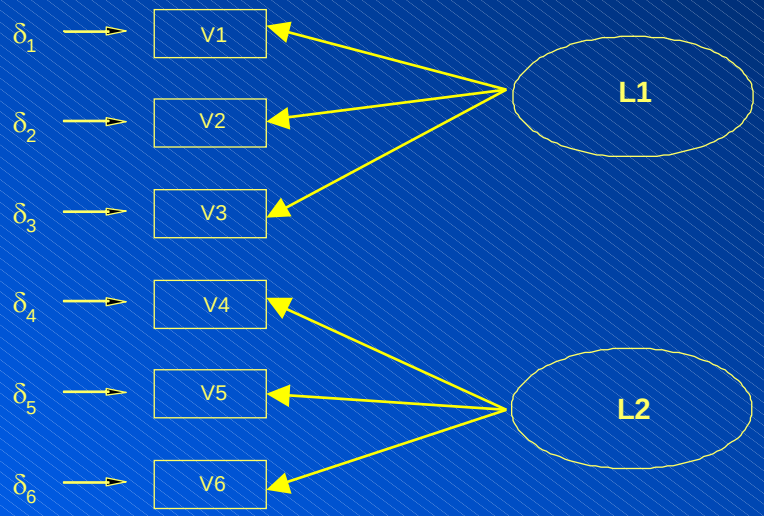
- Ordinary Factor Analysis reduces variables to a smaller number of underlying Dimensions or Factors



- EFA is essentially an exploratory technique; .i.e. data-driven
- all Variables load on all factors
- the Structure Matrix is the (accidental) outcome of the variables available
- does not allow for measurement error (v1-v6 are assumed to be perfect indicators)
- can not be used to compare outcomes over time

New Approach: Confirmatory Factor Analysis (CFA)

- Confirmatory Factor Analysis also reduces observations to the underlying Factors, however
- variables are conceptualised as the (imperfect) manifestations of underlying or latent concepts

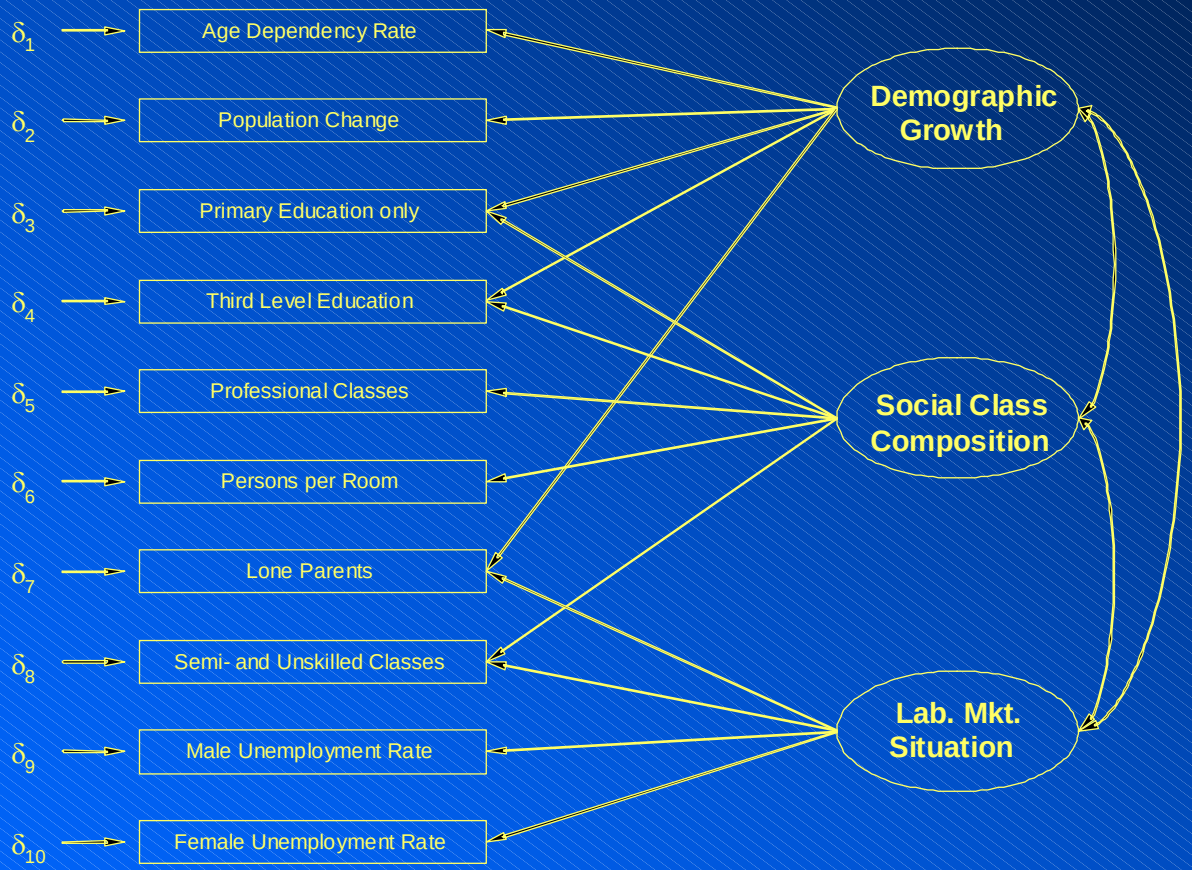


- CFA requires a strong theoretical justification before the model is specified
- the researcher decides which of the observed variables are to be associated with which of the latent constructs
- variables are assumed to be imperfect manifestations (i.e. allowing for measurement error)
- model allows the comparison of outcomes over time
- facilitates the objective evaluation of the quality of the model through fit statistics

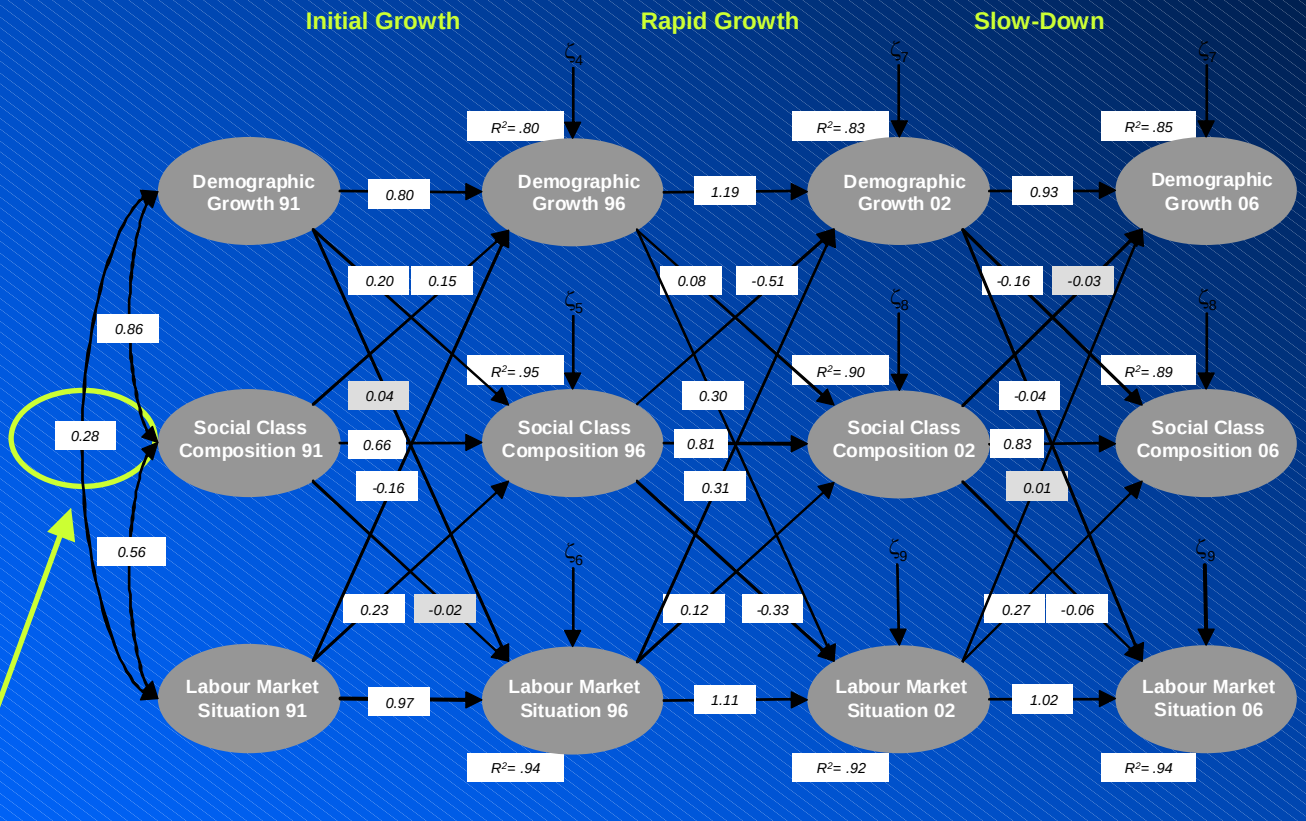
The Underlying Dimensions of Social Disadvantage

- **Demographic Decline (predominantly rural)**
  - population loss and the social and demographic effects of emigration (age dependency, low education of adult population)
- **Social Class Deprivation (applying in rural and urban areas)**
  - social class composition, education, housing quality
- **Labour Market Deprivation (predominantly urban)**
  - unemployment, lone parents, low skills base

The Basic Model of Affluence and Deprivation

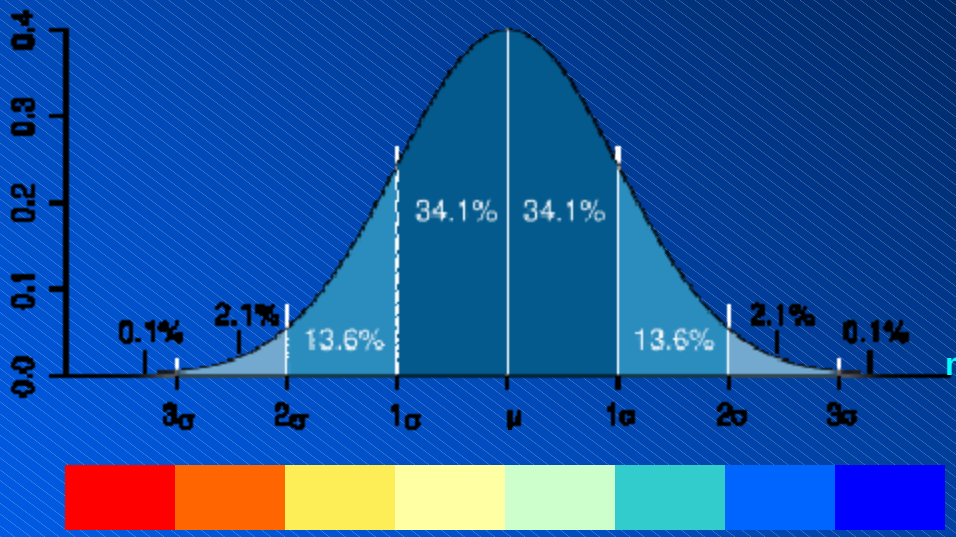


Dynamic Path Diagram for 1991, 1996, 2002 and 2006



There is a relatively small correlation between the urban and rural components of the index. This confirms the theoretical underpinning of the model which stipulates that urban and rural disadvantage are conceptually different and that the unemployment rate, for example, is not a useful indicator of rural deprivation.

Assigning Colour Codes



most disadvantaged

most affluent

marginally below the average

disadvantaged

very disadvantaged

extremely disadvantaged

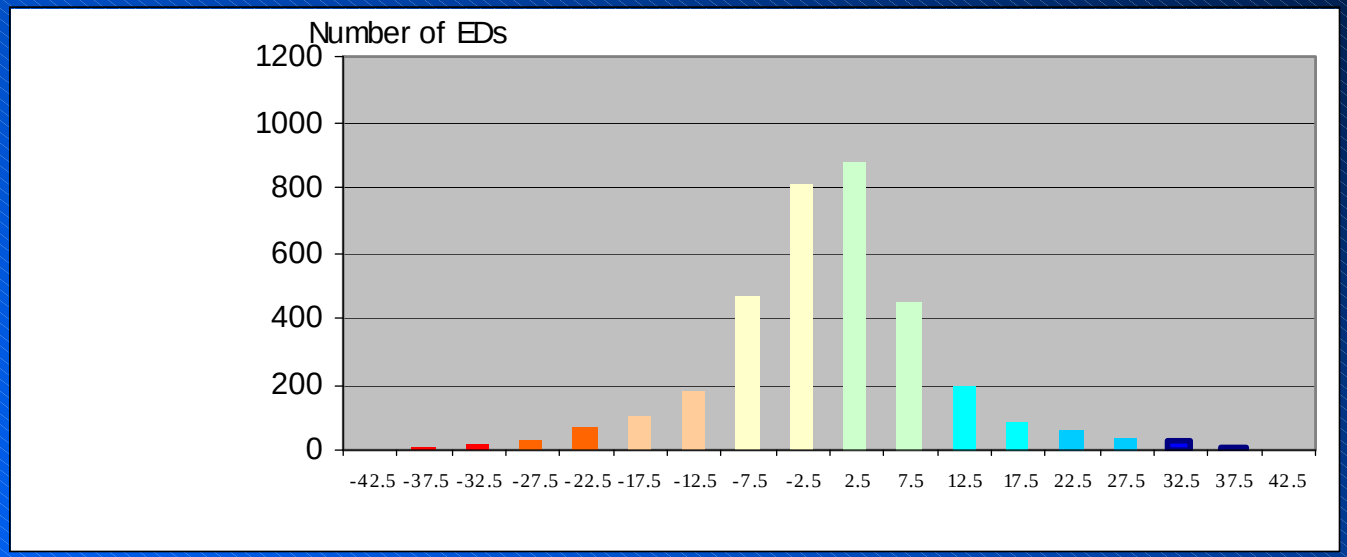
marginally above the average

affluent

very affluent

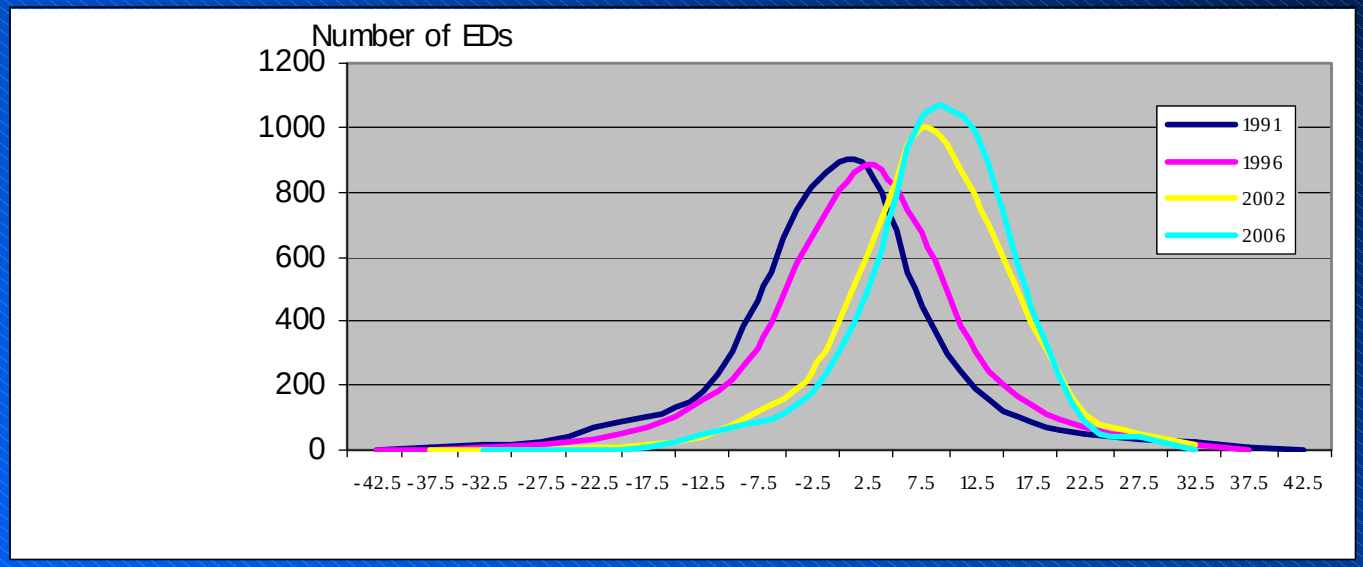
extremely affluent

Deprivation Scores in 1991



The figure shows the number of EDs in each ½ STD interval

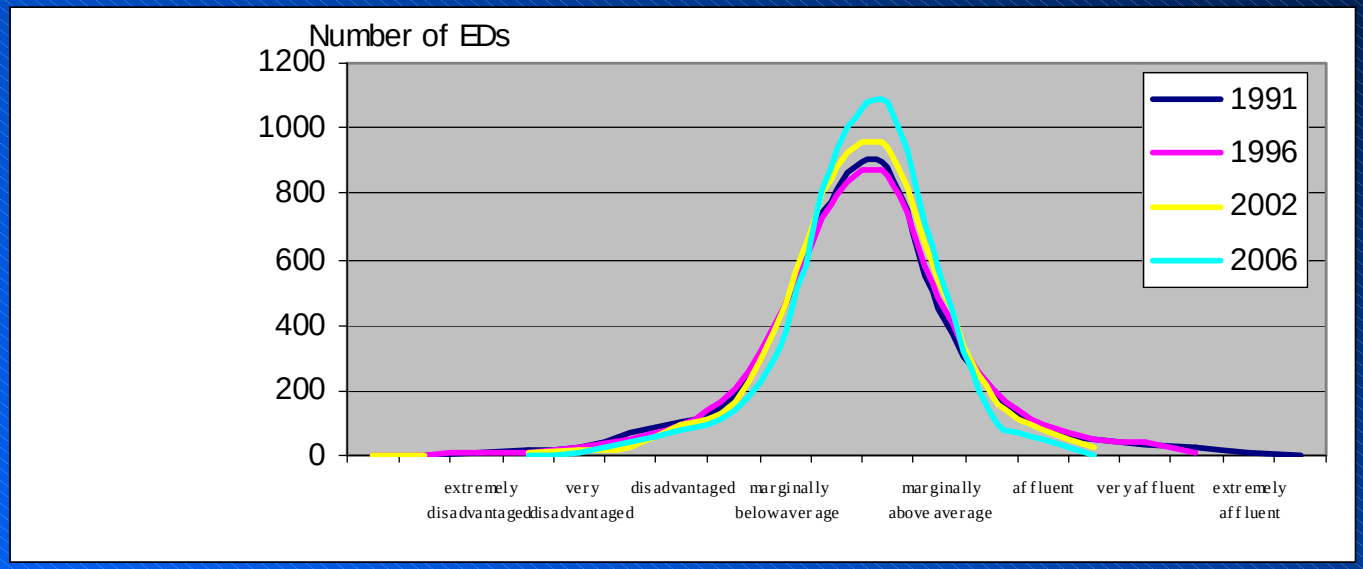
Change in Absolute Deprivation Scores, 1991-2006



The figure shows the unprecedented growth in Ireland over the past 15 years, with greatest changes occurring in the 1996 to 2002 period.

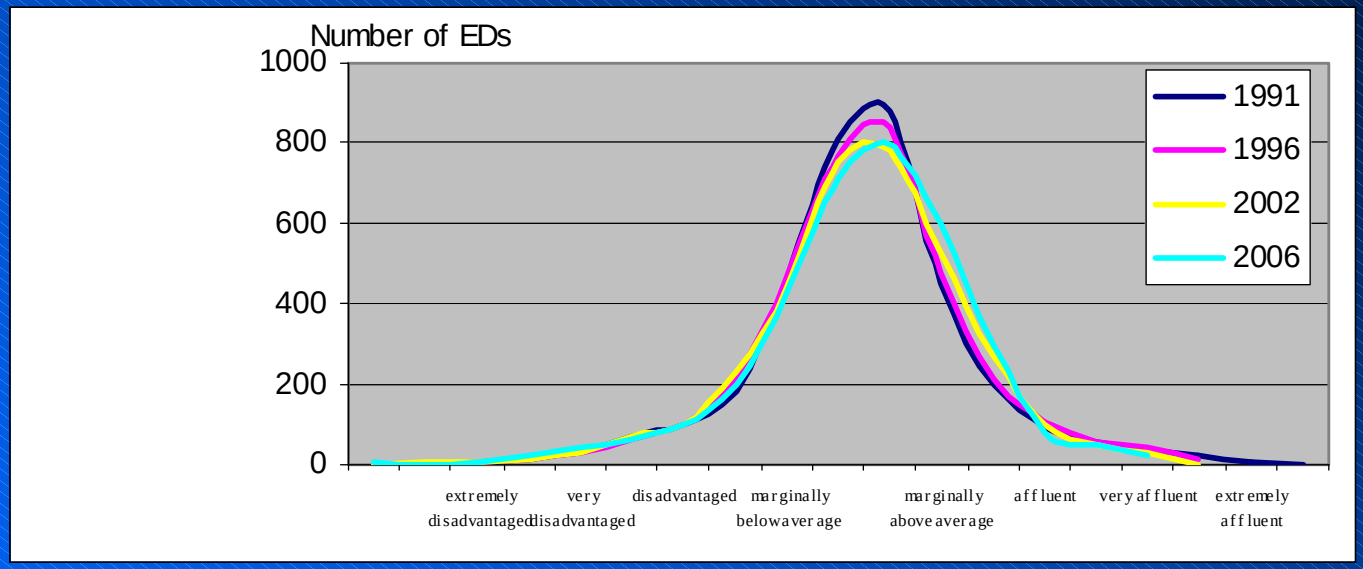
- **1991 – 1996: increase in mean scores of 2.4**
- **1996 – 2002: increase in mean scores of 5.8 (8.2 cumulatively)**
- **2002 – 2006: increase in mean scores of 0.7 (8.9 cumulatively)**

Change in Centred Deprivation Scores, 1991-2006



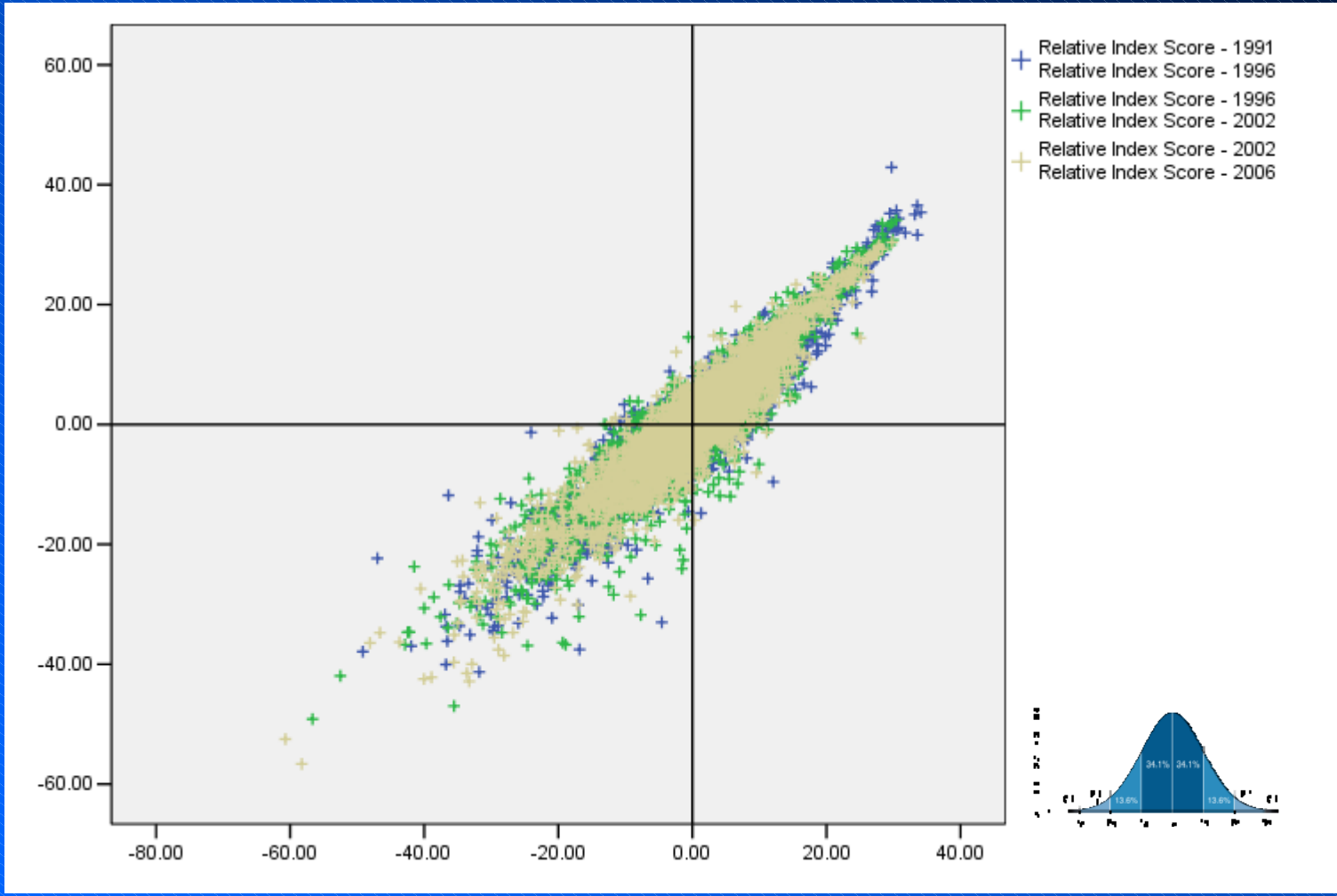
The figure shows the distribution of deprivation scores after 'detrending' the data; i.e. subtracting the average national growth in affluence. The main observation is the gradual narrowing of the distribution over time. This, however, has to be interpreted in the context of a substantial decline in deprivation. As the measurements for each indicator slide down the scale, during this period of rapid growth, the observations tend to cluster more narrowly around the mean.

Change in Relative Deprivation Scores, 1991-2006



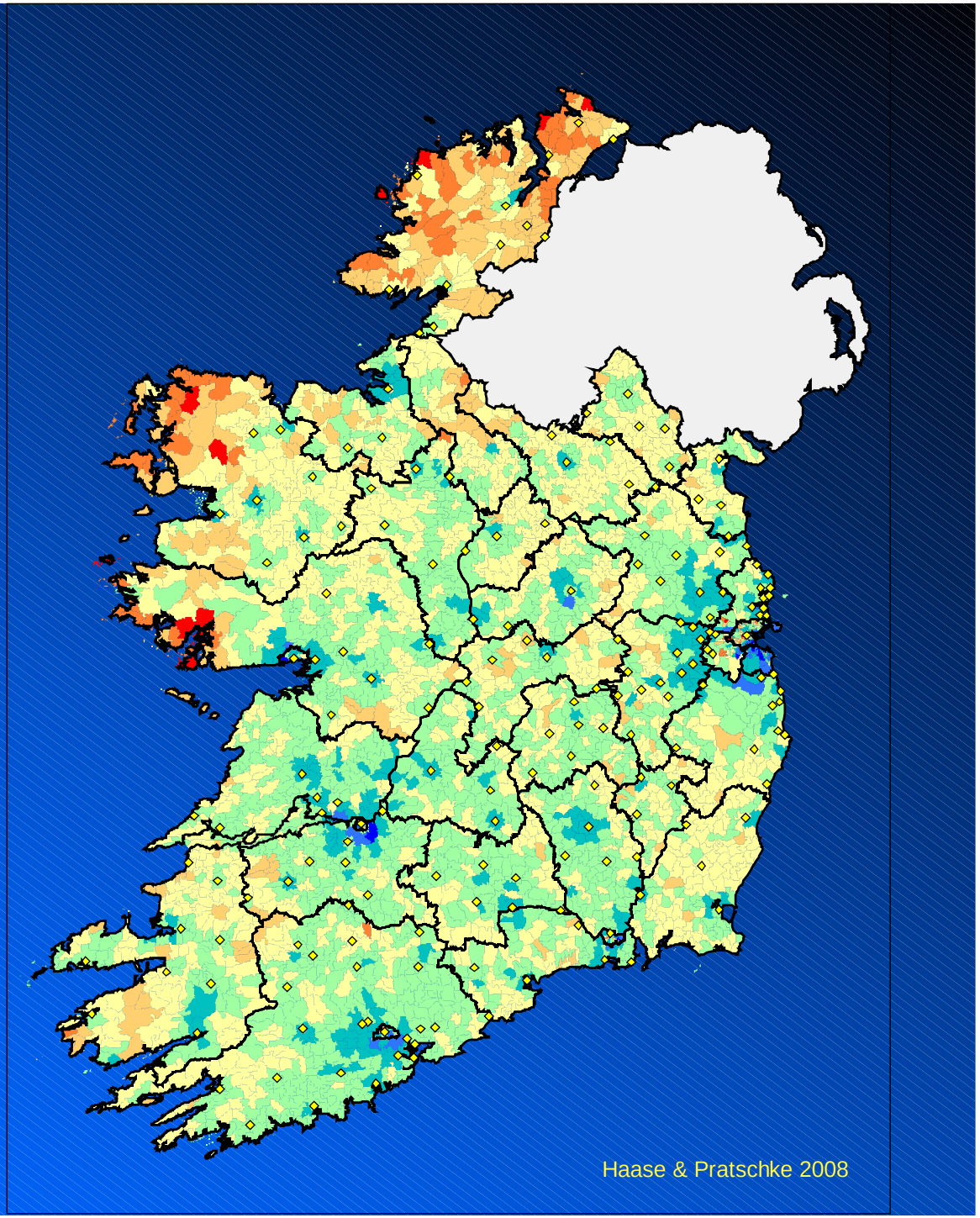
The figure shows the final distribution of Relative Deprivation Scores, after controlling for the underlying trend and standardising its spread. The scores thus look at deprivation at each point in time; i.e. as it might be perceived in relative terms.

Overlay of Paired Relative Index Scores, 1991-2006



The Spatial Distribution of Affluence and Deprivation

Absolute Affluence and Deprivation 1991



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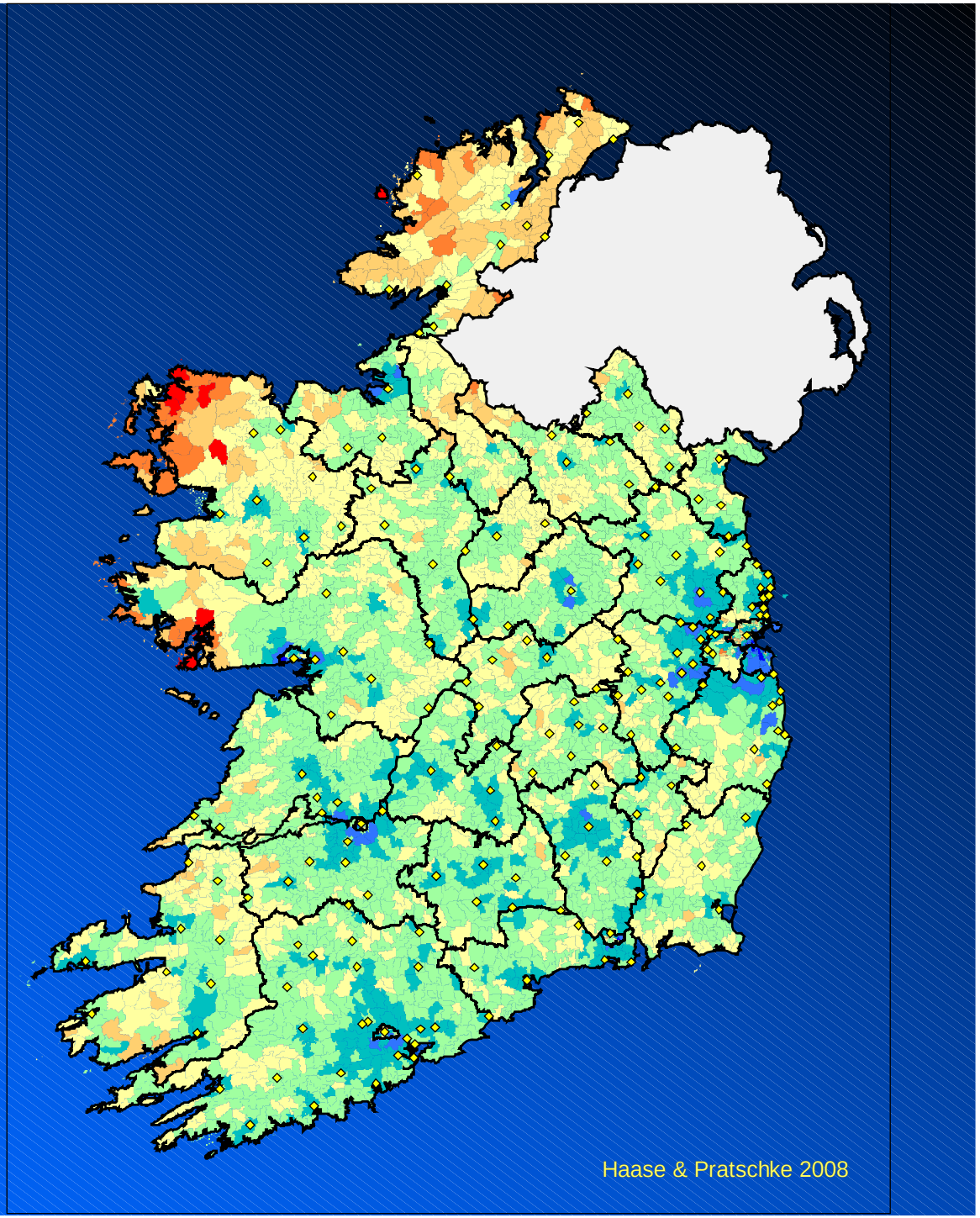
Absolute Affluence and Deprivation 1996



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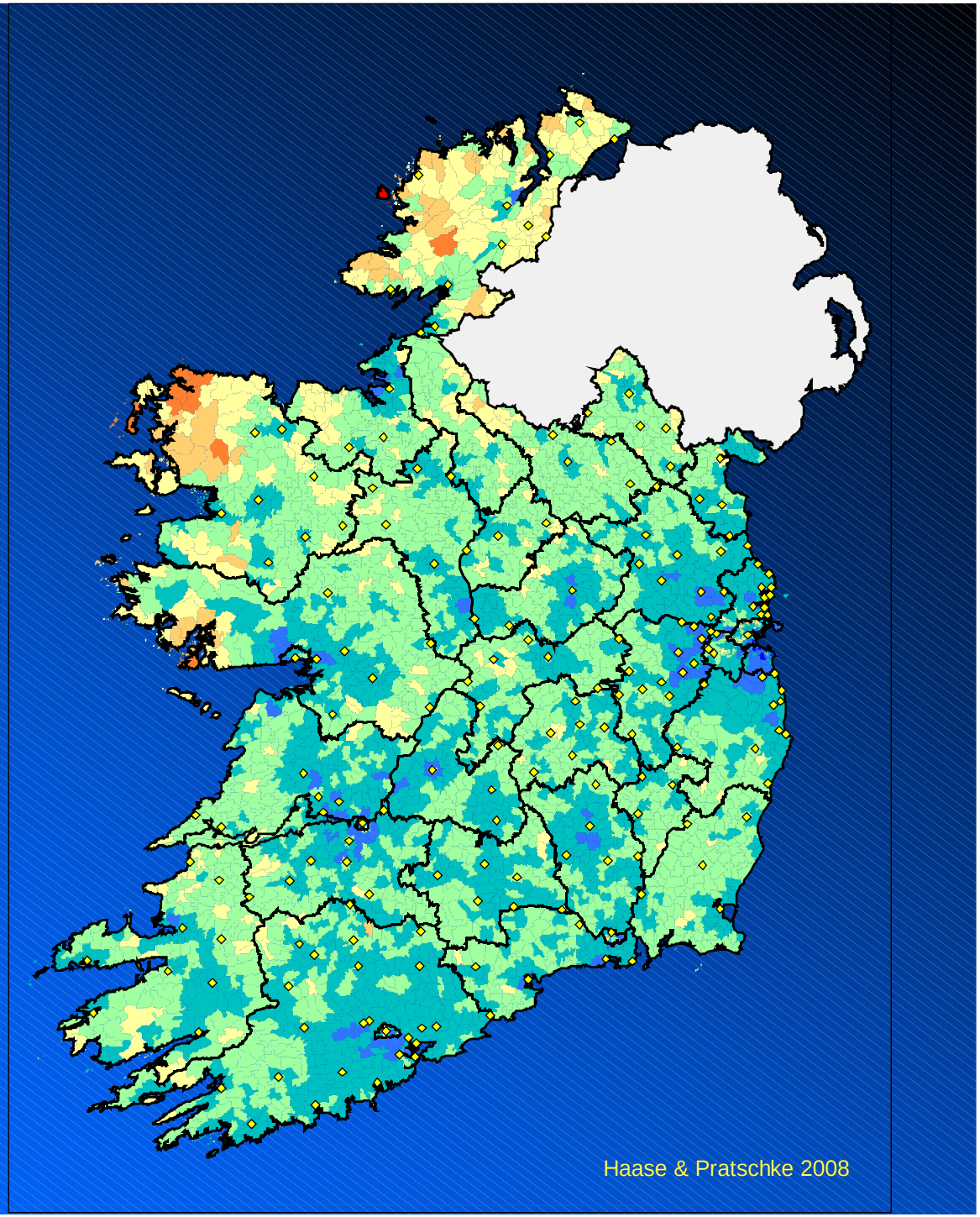
Absolute Affluence and Deprivation 2002



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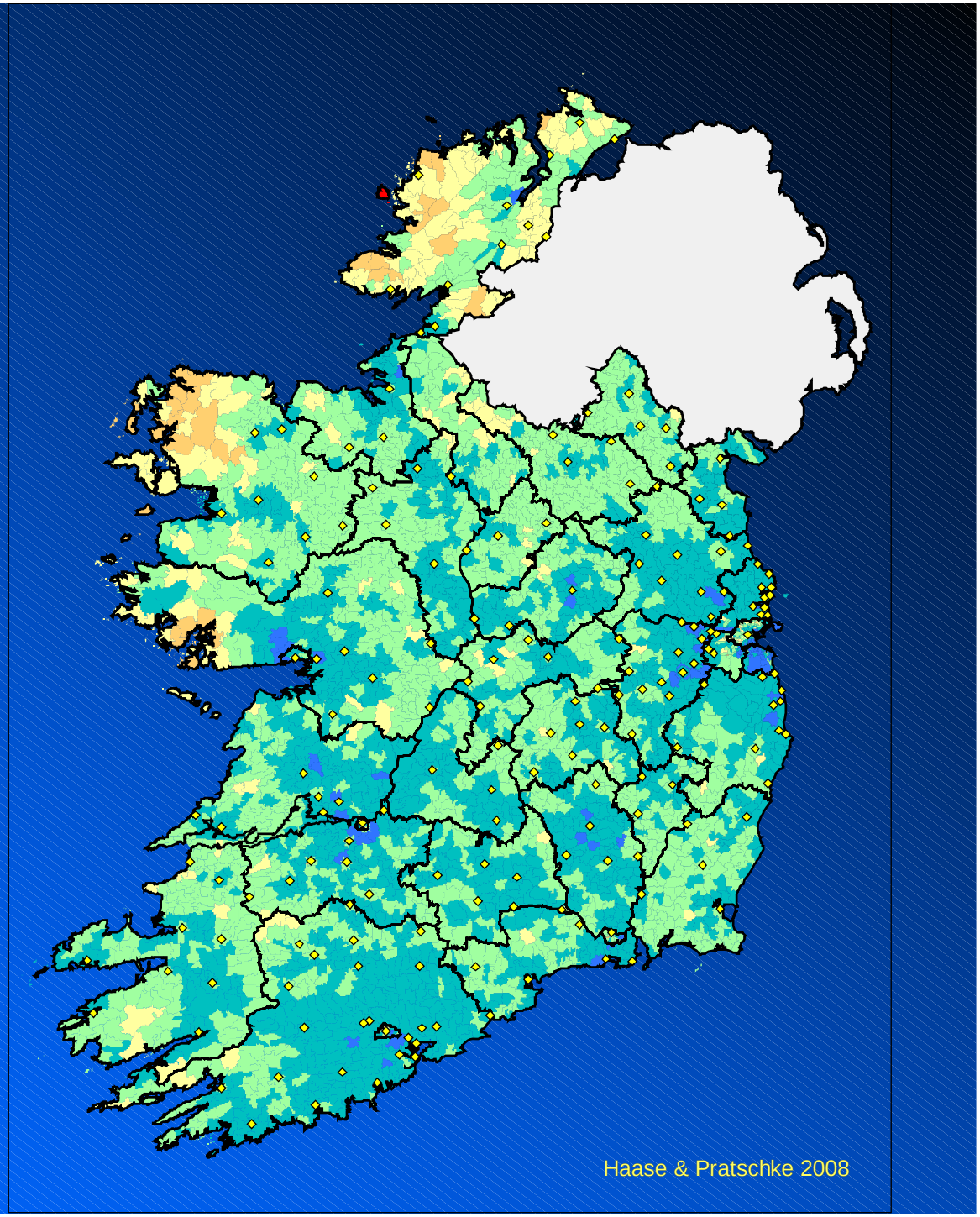
Absolute Affluence and Deprivation 2006



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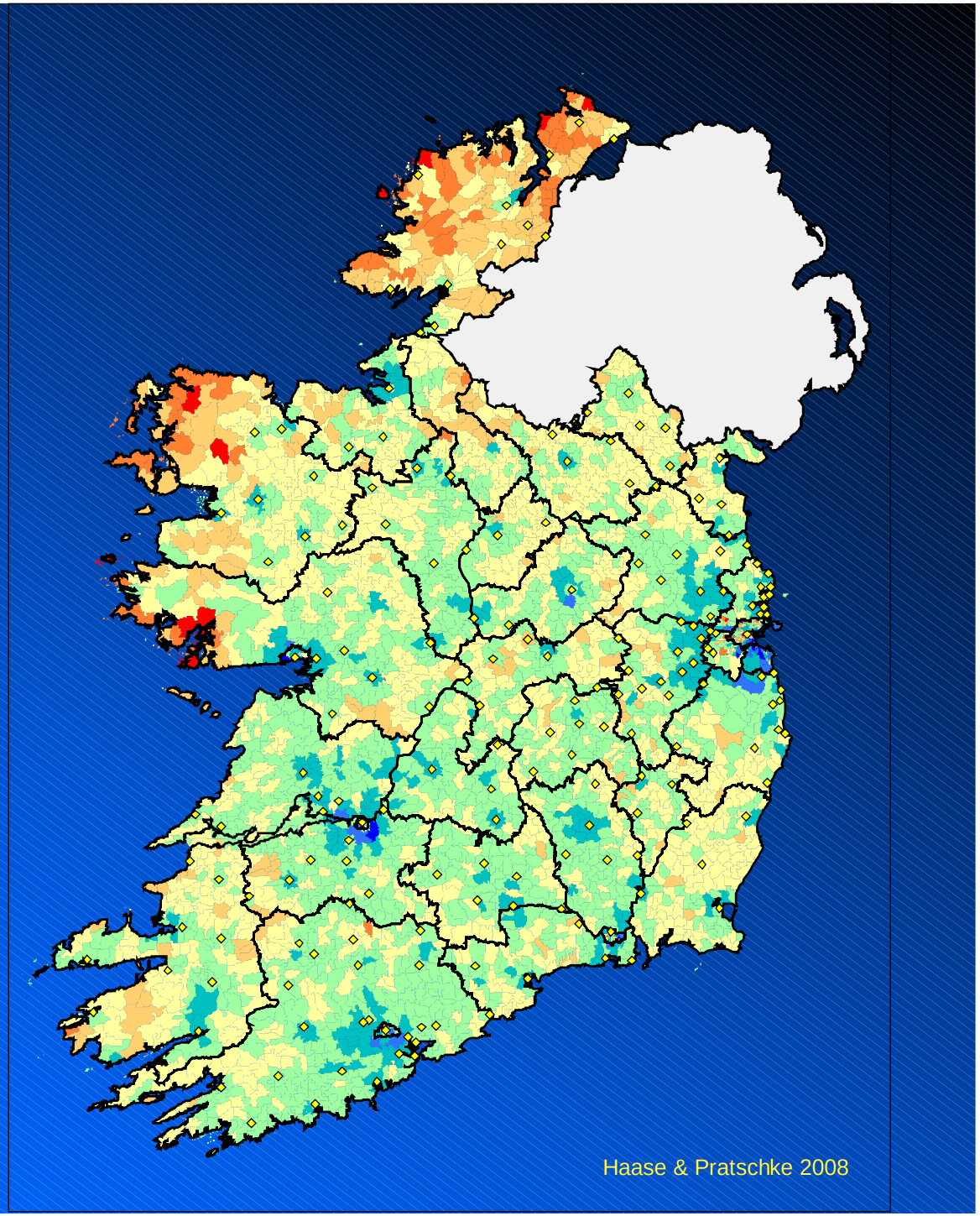
Comparison of Absolute Deprivation Scores, 1991-2006

- Shows how affluence has grown throughout the whole country.
- Greatest change occurred between 1996 and 2002.
- Shows how affluence has grown in concentric rings around the main urban centres, effectively demarcating the urban commuter belts.
- Shows that, with the exception of Dublin Inner City, cities in general have not improved in their affluence as much as the rest of the country.

Relative Affluence and Deprivation 1991



Relative Index Scores, 1991
Haase & Pratschke 2008

extremely affluent	(28)
very affluent	(89)
affluent	(285)
marginally above average	(1328)
marginally below average	(1276)
disadvantaged	(283)
very disadvantaged	(98)
extremely disadvanaged	(22)

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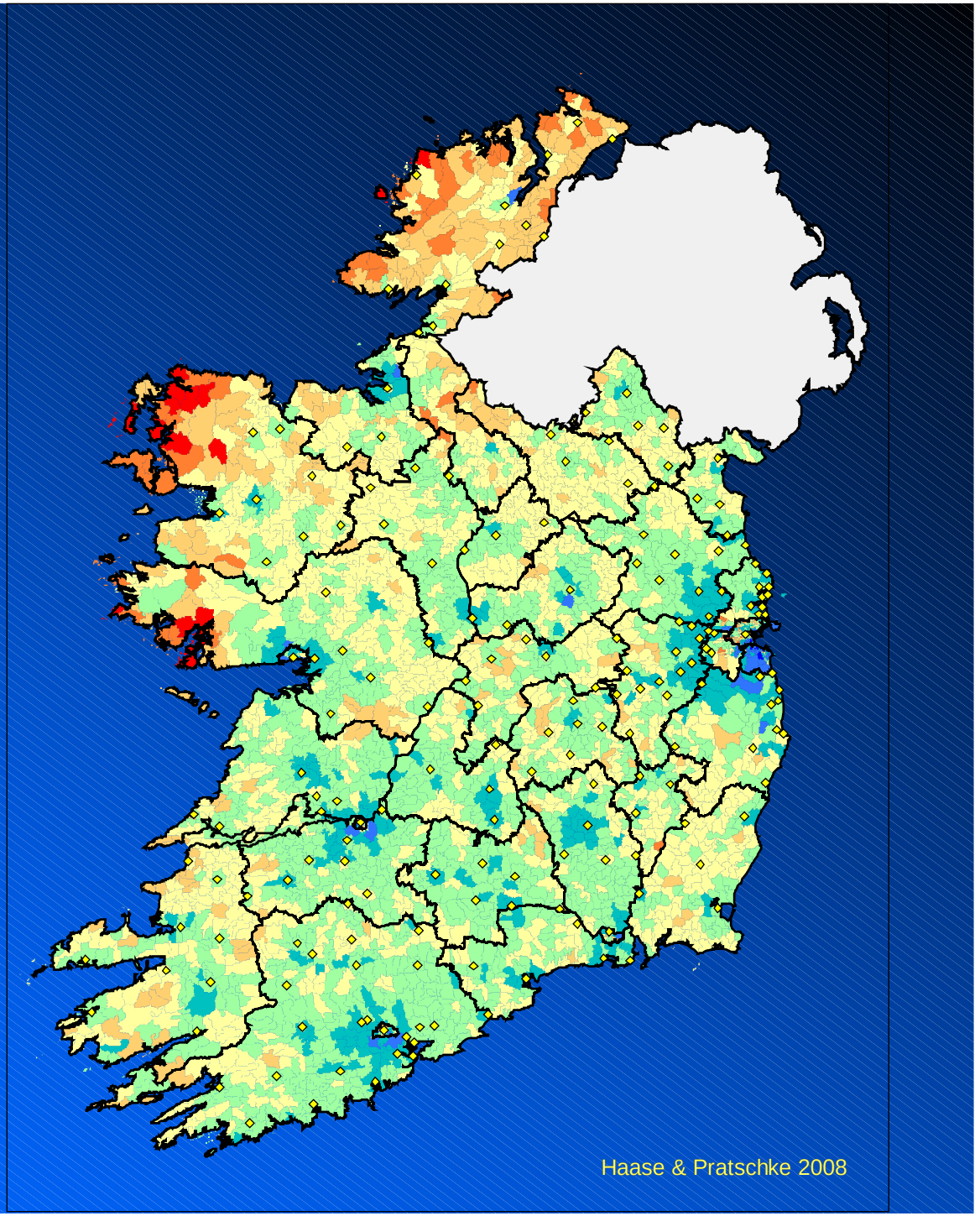
Relative Affluence and Deprivation 1996



Relative Index Scores, 1996
Haase & Pratschke 2008

extremely affluent	(11)
very affluent	(97)
affluent	(313)
marginally above average	(1317)
marginally below average	(1237)
disadvantaged	(319)
very disadvantaged	(93)
extremely disadvantaged	(22)

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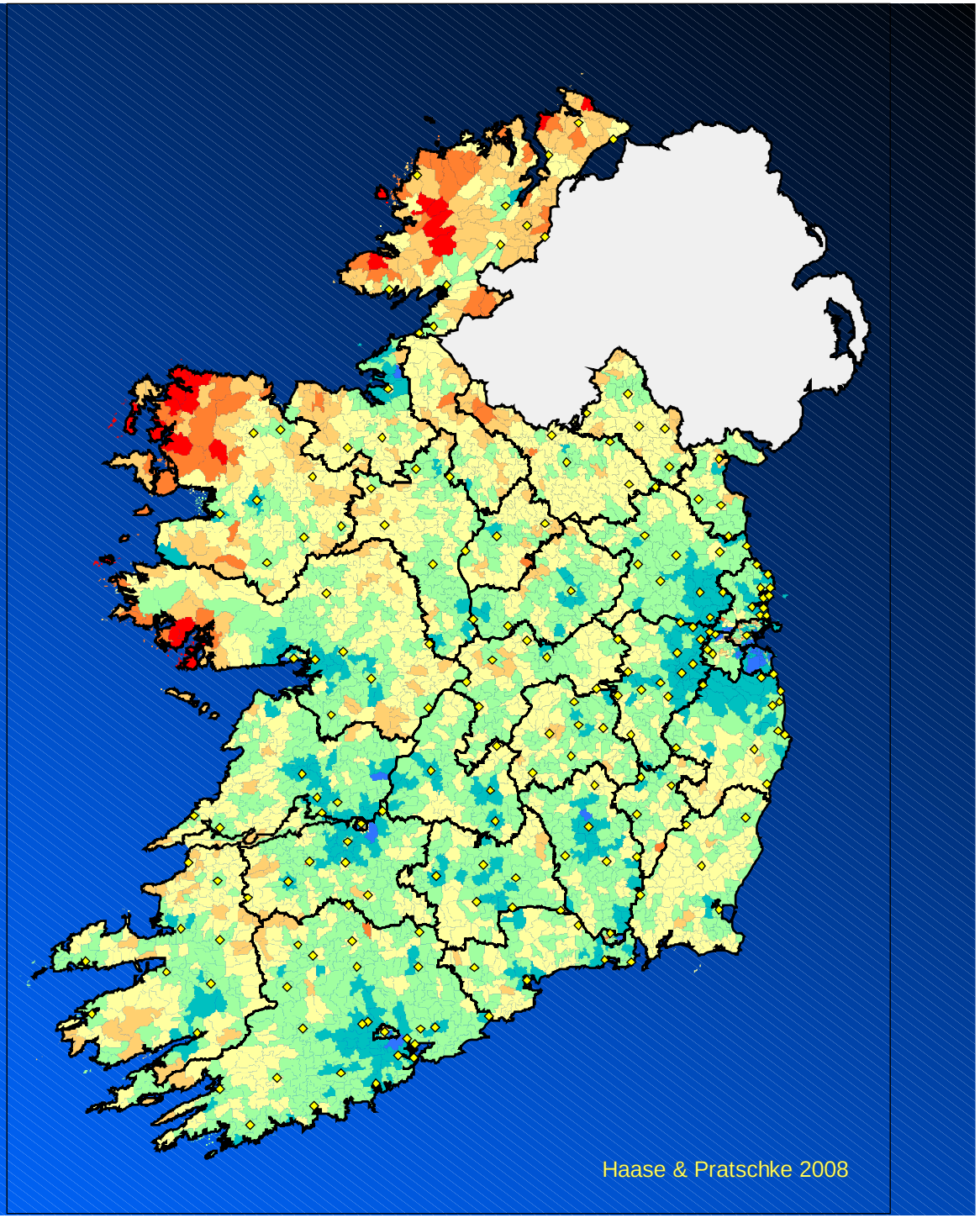
Relative Affluence and Deprivation 2002



Relative Index Scores, 2002
Haase & Pratschke 2008

extremely affluent	(1)
very affluent	(80)
affluent	(371)
marginally above average	(1306)
marginally below average	(1202)
disadvantaged	(327)
very disadvantaged	(96)
extremely disadvantaged	(26)

Haase & Pratschke 2008

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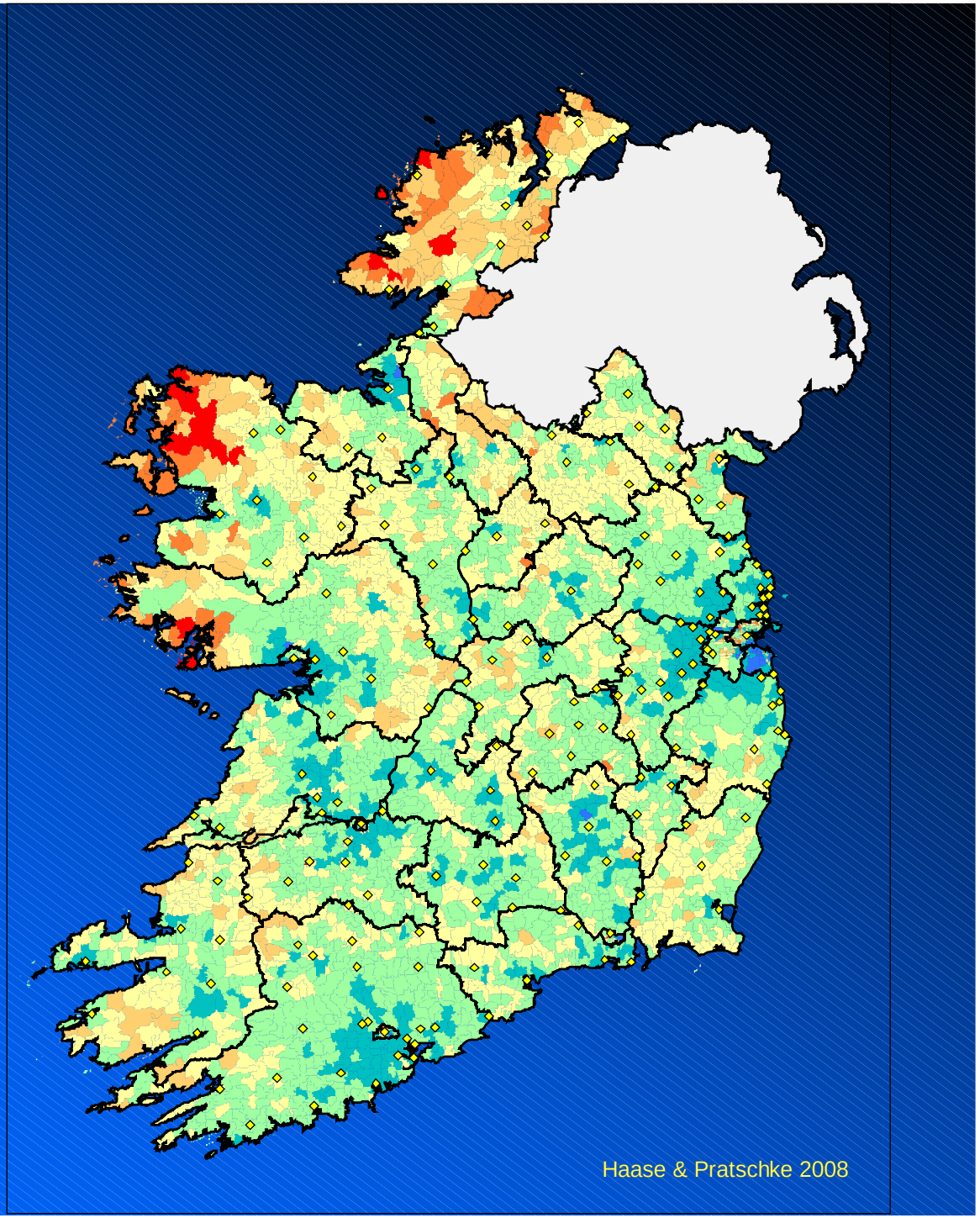
Relative Affluence and Deprivation 2006



Relative Index Scores, 2006
Haase & Pratschke 2008

extremely affluent	(0)
very affluent	(68)
affluent	(372)
marginally above average	(1393)
marginally below average	(1141)
disadvantaged	(296)
very disadvantaged	(106)
extremely disadvantaged	(33)

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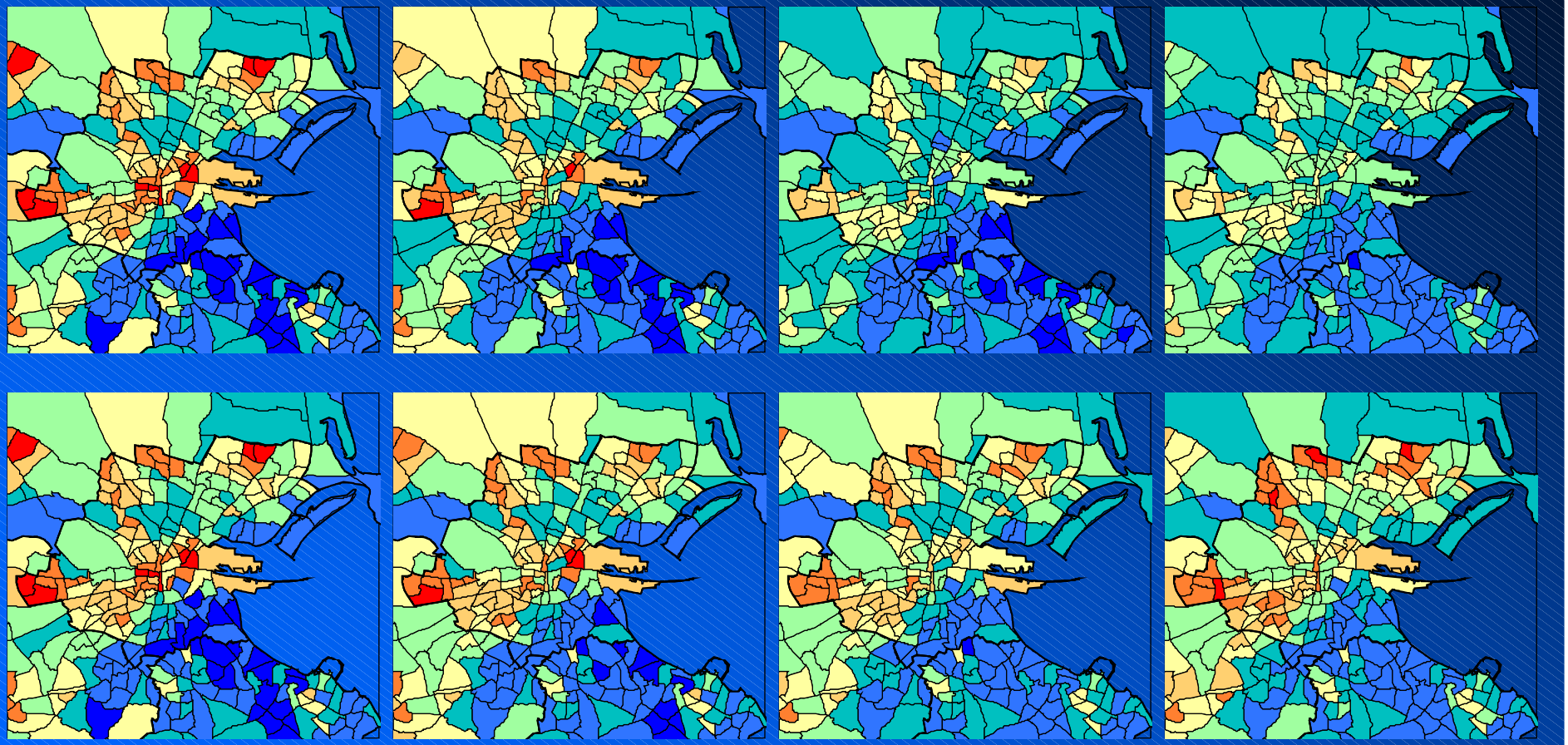
Comparison of Relative Deprivation Scores, 1991-2006

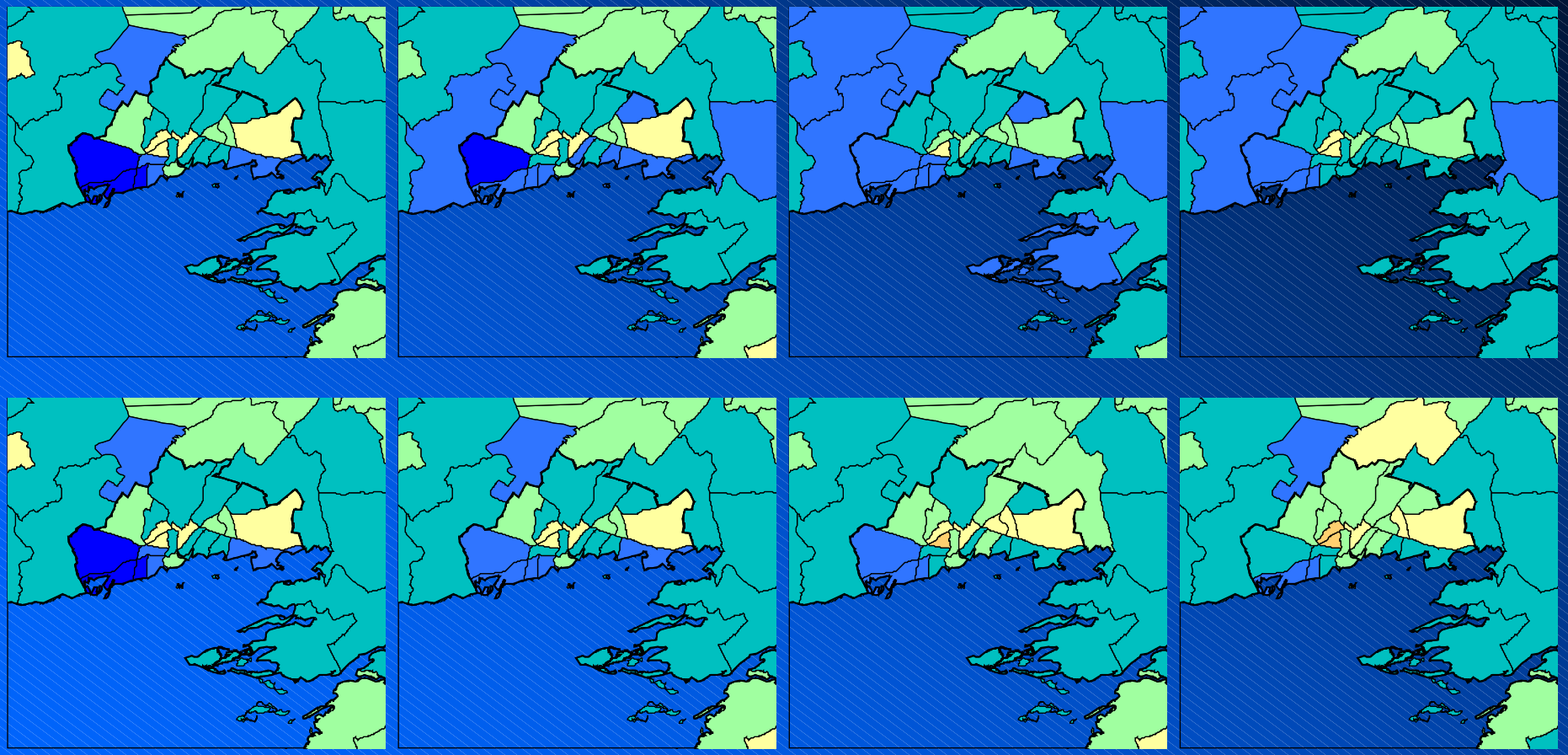
- Excluding consideration of the Five Cities, there are little differences in Relative Deprivation Scores between 1991 and 2006, effectively representing temporary and localised fluctuations only.

Absolute and Relative Deprivation in Dublin, 1991 - 2006



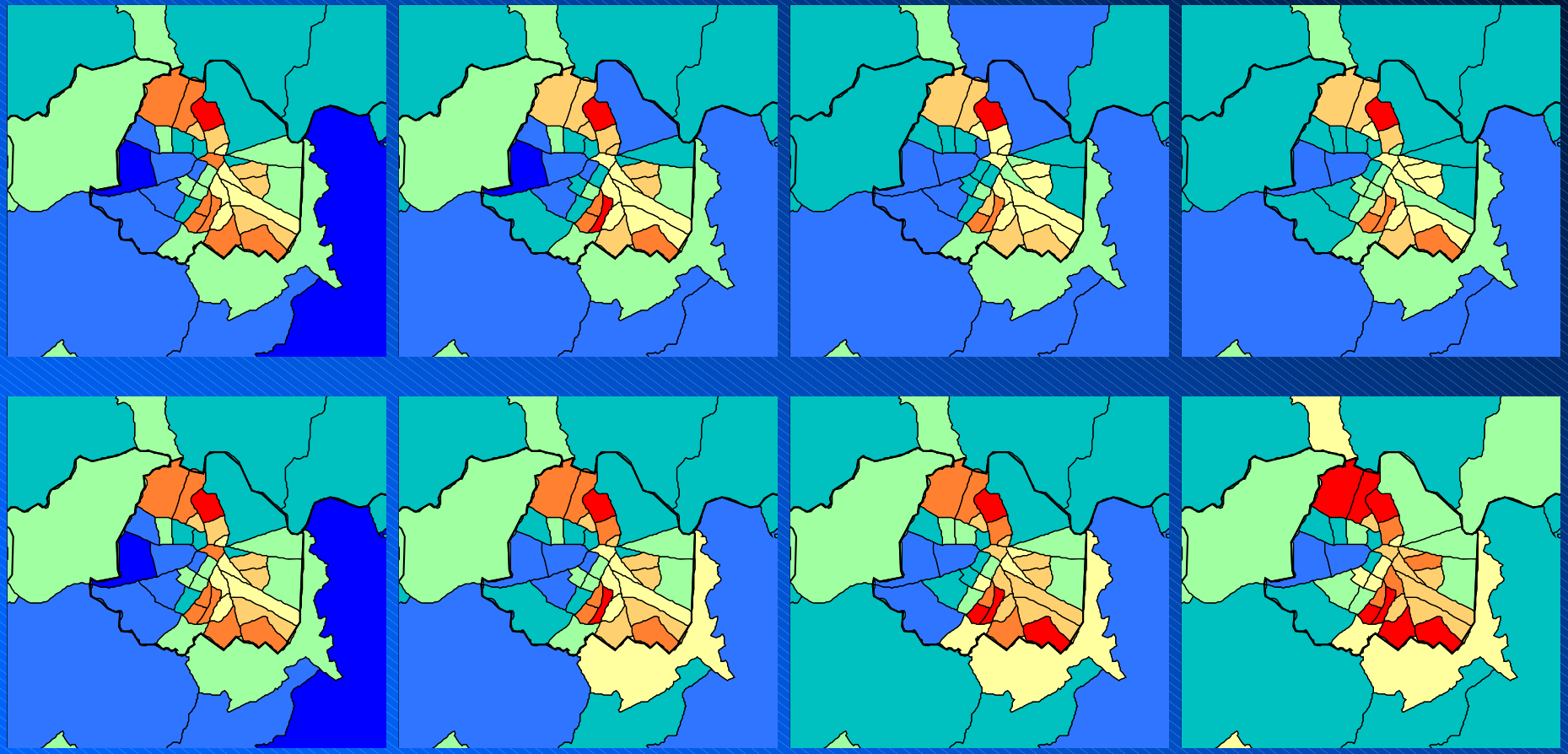
1991 1996 2002 2006

Absolute and Relative Deprivation in Galway, 1991 - 2006



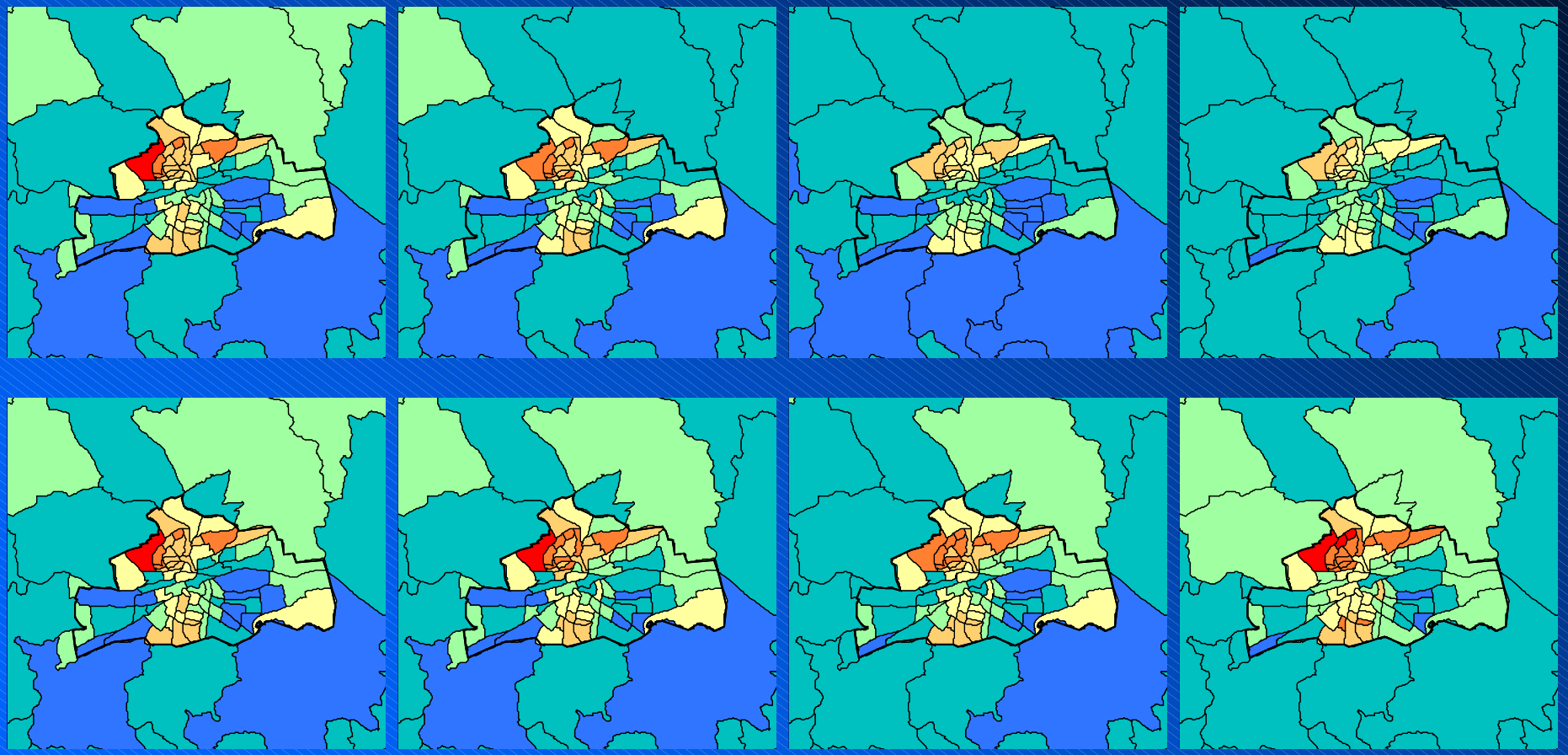
1991 1996 2002 2006

Absolute and Relative Deprivation in Limerick, 1991 - 2006



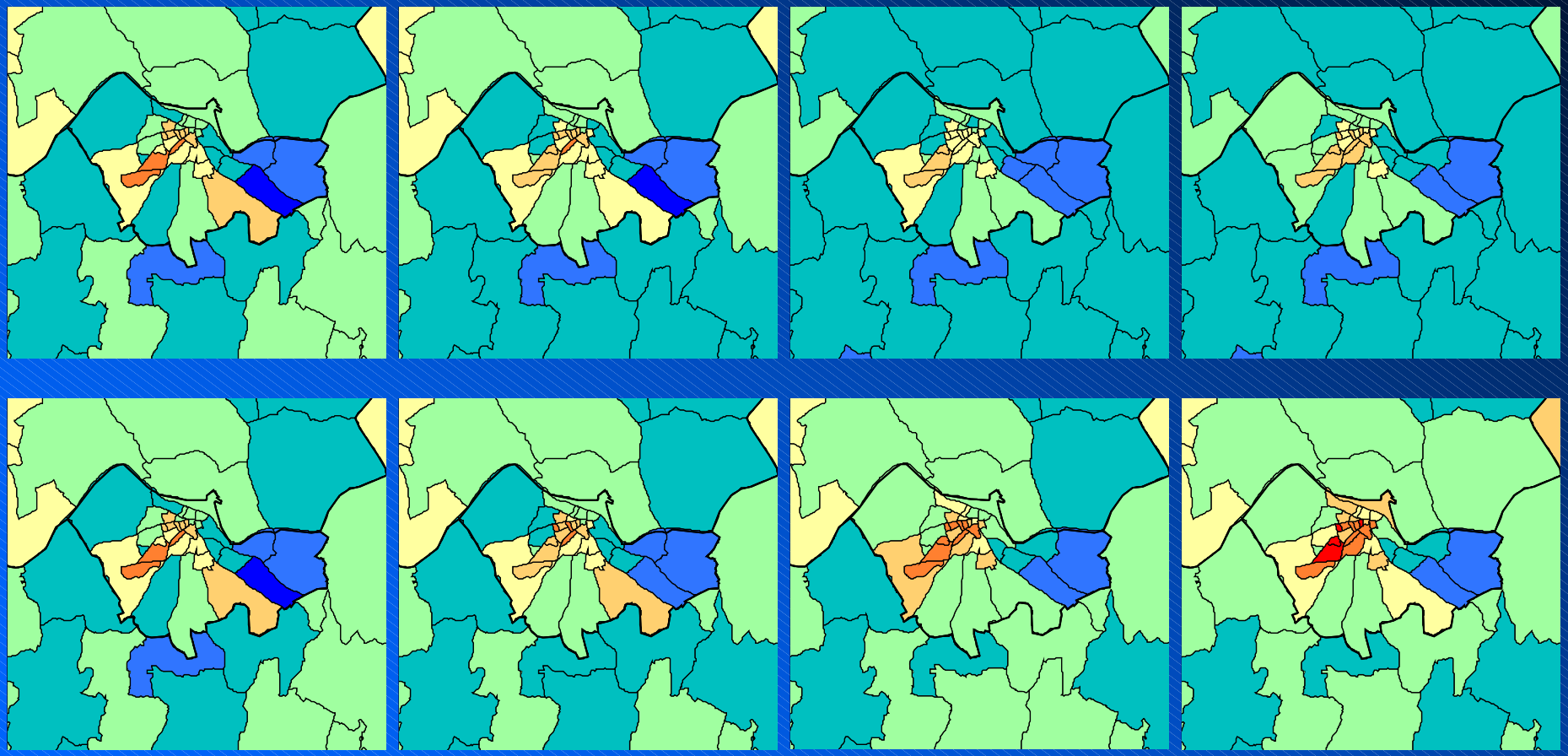
1991 1996 2002 2006

Absolute and Relative Deprivation in Cork, 1991 - 2006



1991 1996 2002 2006

Absolute and Relative Deprivation in Waterford, 1991 - 2006



1991 1996 2002 2006

Comparison of Relative Deprivation Scores, 1991-2006

- Whilst Dublin's Inner City has undergone substantial gentrification over the 1991 to 2006 period, there is clear evidence of an increase in relative deprivation in the most disadvantaged urban areas particularly of Limerick, Cork and Waterford.