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MEASURES OF DEPRIVATION: NOBLE V ROBSON

This paper provides a brief outline of the Robson and Noble measures of deprivation and highlights the main differences between them.

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SUMMARY OF KEY POINTS

The Targeting Social Need (TSN) initiative was first introduced to Northern Ireland in 1991 with the aim of improving the social and economic conditions of the most disadvantaged. The implementation of this policy requires the identification of areas where the highest levels of disadvantage and deprivation exist.

A research team was commissioned under Brian Robson of Manchester University to construct a deprivation index for the 26 District Councils, 566 wards and 3,729 enumeration districts in Northern Ireland. Robson's team produced deprivation scores and rankings for each of these areas and their report was published in September 1994. An updated version of this work was produced in July 2001 by a new team under Michael Noble of the University of Oxford.

The Robson deprivation index employed a total of 18 indicators derived from 1991 Census data covering the areas of health, shelter, physical environment, education, family, income and jobs. Noble used a total of 45 indicators from administrative sources.

In addition to differences in the number and type of indicators and the data sources, Noble employed a different statistical methodology and introduced new measures of child poverty and economic deprivation along with seven individual domain measures covering income, employment, health & disability, education & training, geographical access, social environment and housing.

Overall, Noble would appear to offer a methodological improvement over Robson, but some of the new measures, such as *Local Concentration*, are conceptually and methodologically difficult to grasp. It is therefore difficult to see how policy makers and funding bodies can readily apply the Noble index without recourse to technical guidance from experts. In providing such guidance the experts will need to have a clear understanding of the policy and funding objectives and will have to be wary of the seemingly higher risk of urban prejudice in applying funding allocation formulae based on Noble.

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MEASURES OF DEPRIVATION: NOBLE V ROBSON

INTRODUCTION

The Targeting Social Need (TSN) initiative was first introduced to Northern Ireland in 1991 with the aim of improving the social and economic conditions of the most disadvantaged. This policy involves: a) identifying where the highest levels of disadvantage and deprivation exist; and b) targeting programmes and resources more sharply on those suffering the highest levels of social and economic disadvantage.

In order to satisfy a), a research team was commissioned under Brian Robson of Manchester University to utilise 1991 Census data in the construction of a deprivation index for the 26 District Councils, 566 wards and 3,729 enumeration districts in Northern Ireland. Robson's team produced deprivation scores and rankings for each of these areas and their report was published in September 1994. An updated version of this work was produced in July 2001 by a new team under Michael Noble of the University of Oxford.

THE ROBSON INDEX

The Robson deprivation index employed a total of 18 indicators derived from 1991 Census data (covering the areas of health, shelter, physical environment, education, family, income and jobs). The data related to enumeration district (ED) level, ward level and District Council (DC) level.

At ED level, a combination of the following 9 indicators was used:

- Pensioners lacking central heating
- Residents lacking bath, shower or WC
- Households lacking a link to public sewers
- Households living at 1.0+ persons per room
- Households with no car
- Children in households with no economically-active adult or with a single adult in part-time employment
- Children in flats or non-permanent accommodation
- Persons aged 18-24 with no qualifications
- Unemployed economically active persons

At ward level, 5 further indicators were added and combined with the 9 above (giving a total of 14 indicators used at this level):

- 17 year-olds not in full-time education
- Part-time male employees
- Ratio of long-term to total unemployed males

- Standardised long-term limiting illness ratios for persons aged 20-60
- Domestic properties with rateable value of less than £40

At DC level, a further 4 indicators were added and combined with the 14 above (giving a total of 18 indicators at this level):

- Income support claimants
- Standardised mortality ratio
- Primary pupils entitled to free school meals
- Births to parents not jointly registered

Deprivation scores were calculated based on the difference between local area rates and the overall Northern Ireland rate for each of the indicators. All 18 indicators were given equal weighting and the scores were combined by simply adding them together (taking account of the plus or minus signs).

The combined scores were used to produce three different measures in order to reflect the complexity of spatial patterns of deprivation:

- 1) **Degree** - The sum of the deprivation scores for each area (i.e. the sum of 9 indicators at ED level, 14 at ward level and all 18 at DC level).
- 2) **Intensity** - The average score of the worst sub-areas (i.e. the worst three EDs at ward level and the worst three wards at DC level).
- 3) **Extent** - Proportion of the population living in 'deprived' sub-areas (i.e. the population in the worst 10% of EDs at ward level and the worst 15% of wards at DC level).

In general, urban areas emerge as more deprived on the *intensity* measure than on the *degree* measure because of the more concentrated nature of deprivation in urban areas. Conversely, rural areas emerge as more deprived on the *degree* measure than on the *intensity* measure because of the more widespread nature of deprivation in rural areas.

The Noble Index

As the Robson index was based on 1991 Census data it was effectively out of date even at the time of its introduction in 1994. By 2000, when the Noble team at Oxford University was contracted to produce a new index of deprivation for Northern Ireland, the Robson index was very much out of date. For this reason, Noble and his colleagues focussed on the use of data from administrative sources that could be updated regularly.

A total of 45 indicators were used (mostly 1999 data), covering the seven domains of income, employment, health & disability, education & training, geographical access, social environment and housing (see Annex A for a list of these indicators).

The indicators in each domain were combined to create ward level Domain Deprivation Measures. These seven measures were further combined to

produce an overall Multiple Deprivation Measure using the following weights (derived from a process of consultation):

Income	25%
Employment	25%
Health & Disability	15%
Education, Skills & Training	15%
Geographical Access	10%
Social Environment	5%
Housing	5%

A supplementary Child Poverty Measure was created from a subset of the Income Domain Deprivation Measure, to give a total of nine deprivation measures (the seven domain measures, the overall measure and the child poverty measure) for each of the 566 wards in Northern Ireland.

ED level Domain Deprivation Measures were constructed for the Income and Employment Domains only (as data was not available at this level for the other Domains). An Economic Deprivation Measure was created by combining the Income and Employment Domain Measures at ED level. The Economic Deprivation Measure is summarised at ward level.

At DC level, the overall Multiple Deprivation Measure for wards was used to generate six different DC deprivation measures:

Local Concentration - The population weighted average of the ranks of the DC's most deprived wards that contain exactly 10% of the total DC population.

Extent - Proportion of the DC population living in wards which rank within the most deprived 10% of wards in Northern Ireland.

Scale (Income) - Number of people who are income deprived.

Scale (Employment) - Number of people who are employment deprived.

Average of Ward Ranks - Population weighted average of the combined Multiple Deprivation Measure ranks for all wards in the DC.

Average of Ward Scores - Population weighted average of the combined Multiple Deprivation Measure scores for all wards in the DC.

Major Differences between Noble and Robson

Both Robson and Noble are designed to measure multiple deprivation at ED, ward and DC levels. They both employ the concept of domains of deprivation and a matrix of measures to allow comparisons between areas to be made in different ways.

The **matrix of measures** at DC level employed by Noble are *Local Concentration, Extent, Scale* (Income and Employment), and *averages of ward ranks or scores*. The measures used by Robson were *Degree, Intensity* and *Extent*.

Conceptually, the Noble *Local Concentration* and the Robson *Intensity* measures are similar (they both provide measures of the worst deprivation in an area) although they are calculated in different ways. The Noble *Extent* measure only differs insofar as it is based on the worst 10% of wards instead of the worst 15% applied by Robson. In both cases, it gives an indication of the proportion of the DC population living in highly deprived wards. The Robson *Degree* measure (the sum of the deprivation scores for each area) has been abandoned in favour of the Noble *Scale* measure (the numbers of income and employment deprived in the area) and the use of *average ranks or scores* (derived from the multiple deprivation measure at ward level). The abandonment of the *Degree* measure is necessitated by the change in the **statistical methodology** employed by Noble. Methodologically, the average of the ward scores is probably the nearest comparable Noble measure to the Robson *Degree* measure.

The table at Annex B offers a rough comparison of the Robson and Noble DC measures based on rankings. It is clear from this comparison that **rural areas are generally emerging as less deprived on the Noble index** than they were on the Robson index, while urban areas are emerging as more deprived on Noble than on Robson. The question must be asked - is this due to methodological differences or is there a genuine shift in deprivation from rural to urban areas? The dramatic improvement in areas such as Fermanagh, Dungannon and Cookstown may have more to do with statistics than reality. Noble's exclusion of some of the indicators used by Robson, such as *lack of public sewerage*, may partly account for this shift.

There are many other methodological differences between the Noble and Robson measures of deprivation. The **number and type of indicators** used and the **source of data** are among the most obvious differences. The Noble team have drawn from a much wider range of information, which unlike the Census data used by Robson can be kept reasonably up to date. As well as introducing many new indicators, particularly in relation to *geographical access* and *social environment*, Noble discarded some of the old Robson indicators, such as *car ownership* and *lack of public sewerage*.

The **use of weightings** to produce the overall multiple deprivation measure is another departure from Robson. It could be argued that this is both a strength and a weakness in Noble. The weakness is highlighted by the following quote from Robson (p.5):

" Any form of weighting is bound to incorporate a degree of arbitrariness in the absence of an external referent. There is therefore no way in which one can measure how close any combination approaches to the measurement of 'true' deprivation. Different ways of combining the indicators would produce different results."

This may give rise to a problem when using any of the weighted DC level measures. Some DC areas, for example, may have greater needs than others in relation to housing or social environment so the lower weight given to these particular domains of deprivation could result in funding allocations that do not adequately address the problems in the area.

Noble, however, provides a greater choice of measures than Robson and the weighting problem can be overcome by employing any of the **seven individual domain measures** at ward level in accord with the purpose for which the index is being used.

The supplementary **Child Poverty Measure** and the **Economic Deprivation Measure** are also useful additions introduced by Noble.

Overall, Noble would appear to offer a methodological improvement over Robson, but some of the new measures, such as *Local Concentration*, are **conceptually and methodologically difficult** to grasp. It is therefore difficult to see how policy makers and funding bodies can readily apply the Noble index without recourse to technical guidance from experts. In providing such guidance the experts will need to have a clear understanding of the policy and funding objectives and will have to be wary of the seemingly higher risk of **urban prejudice** in applying funding allocation formulae based on Noble.

REFERENCES

Robson, B., Bradford, M. & Deas, I. *Relative Deprivation in Northern Ireland*. Centre for Urban Policy Studies, Manchester University. September 1994 (Policy Planning and Research Unit Occasional Paper No.28).

Measures of Deprivation in Northern Ireland. Social Disadvantage Research Centre, University of Oxford. July 2001 (NISRA Occasional Paper No. 18).

ANNEX A

The Noble Indicators

Income Deprivation

- Adults in Income Support households
- Children in Income Support households
- Adults in Income Based Job Seekers Allowance households
- Children in Income Based Job Seekers Allowance households
- Adults in Family Credit households
- Children in Family Credit households
- Adults in Disability Working Allowance households
- Children in Disability Working Allowance households

Employment Deprivation

- Unemployment claimants under 60
- Incapacity Benefit recipients under 60
- Severe Disablement Allowance recipients under 60
- New Deal participants not included in the unemployment claimant count

Health Deprivation & Disability

- Standardised Mortality Ratios for men and women under 75
- People receiving Attendance Allowance or Disability Living Allowance or Incapacity Benefit or Severe Disablement Allowance
- People registered as having cancer (excluding non-melanoma skin cancers)
- Proportion of 12 to 17 year olds with extractions and registered with a GDS dentist, and those not registered with a GDS dentist
- Drugs prescribed for depression or anxiety

Education, Skills & Training Deprivation

- Working age adults with no qualifications
- Proportions of those leaving school aged 16 and not entering Further Education
- Proportions of 17-20 year olds who have not successfully applied for Higher Education
- GCSE/GNVQ performance data points score and no qualifications
- Absenteeism at secondary level (all absences)
- Proportions of Years 11 and 12 pupils not in a grammar school

Geographical Access to Services

- Access to a post office
- Access to a GP surgery
- Access to an Accident and Emergency hospital
- Access to a dentist
- Access to an optician
- Access to a pharmacist
- Access to a library
- Access to a museum
- Access to a Social Security Office or a Training and Employment Agency

*Social Environment**

- Recorded offences relating to burglary in a dwelling
- Recorded offences relating to violence against the person (excluding assaults)
- Recorded common assaults
- Recorded serious assaults
- Recorded offences relating to theft of a vehicle
- Recorded offences relating to theft from a vehicle
- Recorded offences relating to criminal damage
- Recorded offences relating to burglary in a building other than a dwelling
- Recorded drug offences
- Local Area Problem Score (generated from data on graffiti, scruffy buildings or gardens, litter and vandalism in the area)

Housing Stress

- Housing in disrepair
- Houses without central heating
- Houses lacking insulation

* The *Social Environment* domain is exclusive to Northern Ireland (the other six domains were used in the construction of deprivation measures for England and Wales).

ANNEX B

DC Deprivation Rankings: Noble v Robson

DC Area	Noble			Robson			
	Local Concentration	Extent	Average of Ward Scores	Intensity	Extent	Degree	
Antrim	24	16	22	22	19	17	
Ards+	23	16	24	25	19	22	
Armagh	14	11	14	16	14	13	
Ballymena	12	12	20	21	16	19	Sig. increase
Ballymoney*	20	16	12	19	13	12	
Banbridge	26	16	21	23	19	18	
Belfast+	1	1	2	1	2	2	
Carrickfergus+	19	16	19	20	19	21	
Castlereagh+	18	13	25	24	19	25	Sig. increase
Coleraine	10	9	17	18	17	20	Sig. increase
Cookstown*	11	16	6	8	5	8	Sig. decrease
Craigavon+	7	6	10	14	15	15	Sig. increase
Derry+	2	2	3	2	7	3	
Down	17	14	15	12	11	16	
Dungannon*	15	16	9	9	8	5	Sig. decrease
Fermanagh*	21	16	11	5	3	6	Sig. decrease
Larne	16	16	16	17	19	14	
Limavady*	8	10	8	7	9	11	
Lisburn+	5	4	18	13	18	23	Sig. increase
Magherafelt*	22	16	13	15	19	10	
Moyle*	4	5	5	11	10	7	Sig. increase
Newry & Mourne	6	7	4	4	6	4	
Newtownabbey+	13	15	23	10	12	24	
North Down+	25	16	26	26	19	26	
Omagh*	9	8	7	6	4	9	
Strabane*	3	3	1	3	1	1	

Areas showing significant increase in deprivation in red

Areas showing significant decrease in deprivation in green

* Rural areas (population density less than 70 persons per sq. km.)

+ Urban areas (population density greater than 180 persons per sq. km.)