2017 DEPRIVATION MEASURES FOR NORTHERN IRELAND – RESEARCH PAPER

Northern Ireland Statistics and Research Agency
Gníomhaireacht Thuaisceart Éireann um Staitisticí agus Taighde

Deprivation and Population Decline in Northern Ireland

Introduction

Following the publication of the 2010 Northern Ireland Multiple Deprivation Measure (NIMDM 2010), a list of 36 recommendations[1] for future updates was made. One of the recommendations was:

> *"that research is undertaken into the relationship between population decline and deprivation, and consideration given to whether population decline is an indicator of deprivation."*

This recommendation originated from the finding that over the period 2001-2008, the population declined in the most deprived decile, while population increases occurred in all other deciles[2]. Given these results, it was recommended that the relationship between deprivation and population decline should be investigated further.

Population change 2001-2008

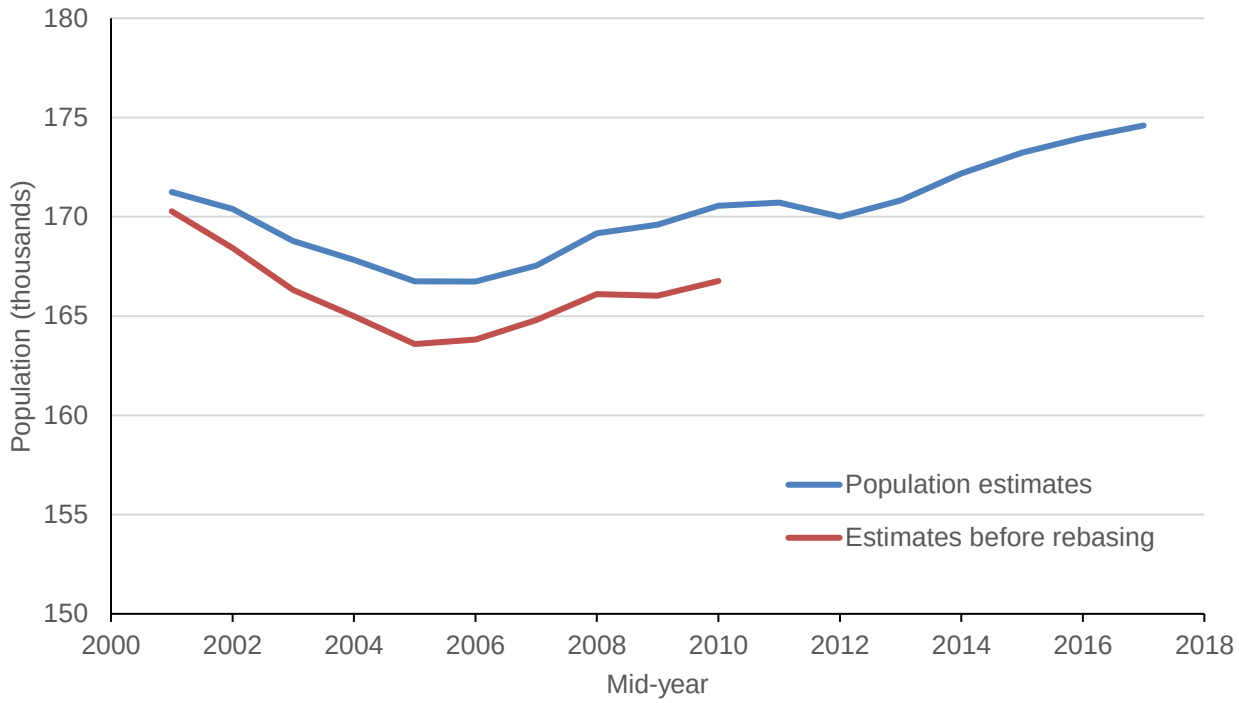
In the group of most deprived 10% of SOAs, the population declined between mid-2001 and mid-2008 while in all other deciles, the population increased. This was based on the NIMDM 2005, thus describing how the population of deprived areas had developed since being identified as deprived. According to the estimates at the time, their combined population fell by 2.4% during this period. The population estimates were the revised in light of the 2011 Census results (See Figure 1). Whilst the trend still showed a decline between mid-2001 and mid-2008, the magnitude was

[1] Northern Ireland Multiple Deprivation Measure 2010: Recommendations for Future Research into Spatial Deprivation, see https://www.nisra.gov.uk/publications/northern-ireland-multiple-deprivation-measure-2010-recommendations

[2] Small Area Population Estimates for Northern Ireland (2008), see https://www.nisra.gov.uk/sites/nisra.gov.uk/files/publications/SAPEdocFinal.pdf#page=33

roughly half at 1.2%. Furthermore, annual population estimates suggested that the population of the most deprived 10% of SOAs was at its lowest in mid-2006, and has been steadily increasing ever since, exceeding the mid-2001 population from mid-2014 onwards.

Figure 1: Population in 10% most deprived SOAs (MDM'05) - 2001-2017 (non-zero y-axis)



Further analysis revealed that the population decline between mid-2001 and mid-2008 in the 10% most deprived SOAs was driven largely by a drop in the number of children (i.e. those aged 0 to 15 years) of 16.5% compared to a 4.8% decrease for Northern Ireland as a whole. The number of births had been falling steadily from 28,000 in 1986 (i.e. aged 14/15 in mid-2001) to a historic low of 21,400 in mid-2002, before slowly recovering again thereafter. In each year from mid-2001 to mid-2007, there were fewer babies being born than children turning 16, thus more people leaving this age group than joining each year. This effect was largest in the most deprived and least deprived deciles. In addition, the most deprived decile had a disproportionately large number of children, plus a net outward migration of children, which compounded the effect of the falling birth rate.

There were 314 SOAs whose population declined between mid-2001 and mid-2008. In 56 of the 89 most deprived SOAs (63%) the population declined[3], compared to in 35% of all SOAs. Furthermore,

[3] Population decline by fewer than 20 people have been ignored for the purpose of this comparison.

population decline occurred in nearly half (49%) of all urban SOAs, compared to in only 7% of rural SOAs.

In short, the population decline observed in the 10% most deprived SOAs at the time when the recommendation was proposed, can be largely attributed to a NI-wide decline in the number of births, compounded with a net outward migration. Urban areas were most affected.

Deprivation and Population Change

From the outset, it should be recognised that deprivation and population are intertwined at multiple points within the Noble methodology. The majority of indicators are expressed as a rate of the population. For example, the employment deprivation indicator is derived from the number of working age adults who are employment deprived[4], divided by the working age population. If only employment deprived individuals leave the area, this rate will fall and thus the area will look less deprived.

A clear example of the opposite effect is Lisanelly_1 SOA near Omagh. It was the location of army barracks with 600-700 armed forces, but it closed in 2007. As a direct result, the population declined from 1,400 in mid-2001 to 400 in mid-2007[5], a level at which the population has remained till mid-2017. The loss of half its population, which were HM Forces and likely to be in good health, with qualifications and without income-related benefits, meant that this area became more deprived overnight. The full effect of this was not yet clear in the NIMDM 2010, but according to the NIMDM 2017 Lisanelly_1 was ranked 47th, alongside the neighbouring Lisanelly_2 at 46th compared to at ranks 653 and 105 in 2005.

[4] Individuals are assumed employment deprived if they are (a) in receipt of at least one employment related benefit, or (b) not in receipt of the selected benefits, nor have received income from employment. Further detail is available in https://www.nisra.gov.uk/sites/nisra.gov.uk/files/publications/NIMDM17_Description%20of%20Indicators.pdf#page=9.

[5] The population decline was larger than the number of armed forces; it is likely to include their spouses and children as well.

The selective emigration of less deprived individuals from deprived areas can accelerate an area becoming more deprived[6]. However, this view has been countered by the Joseph Roundtree Foundation[7], stating that *"in general, deprived areas […] do not become more deprived through migration flows"*.

A second consideration for population decline is whether whole households leave the area, or only one individual leaves a household. This has a particular effect on the income deprivation indicator and the overcrowding indicator in the Living Environment Domain. When a person leaves a household, it will become less crowded and possibly cease to be overcrowded. For the income indicator it depends on the income brought in by whoever left the household. If a person left who did not contribute to the household income, then the same income is shared by fewer people and thus a household and its remaining members may be no longer be income deprived.

Finally, indicators in the Health and Disability Domain can be associated with higher rates of mortality, which is a component of population change. In NIMDM 2005 and 2010 this was 'Potential Years Life Lost', whereas NIMDM 2017 used preventable deaths. However, other indicators in this domain that relate to morbidity (cancer registrations, prescription use) can also affect population decline through increased mortality. Indeed, research from the University of St Andrews[8] suggests that when controlling for deprivation, there is no significant relationship between population change and mortality in Scotland.

Population Decline in Rural Areas

The interest in population decline with regards to deprivation was reignited from the rural perspective. Haase and Pratschke (2005[9]) identified emigration in Ireland from rural areas as a result of the lack

[6] D. O'Reilly (2013). *The use of Spatial Measures for the targeting of Need*. Downloaded from https://www.executiveoffice-ni.gov.uk/sites/default/files/publications/ofmdfm_dev/the-use-of-spatial-measures-for-the-targeting-of-need.pdf#page=56

[7] See https://www.jrf.org.uk/sites/default/files/jrf/migrated/files/2004-population-census-deprivation.pdf#page=13

[8] Daniel J. Exeter, Z. Feng, R. Flowerdew, and P.J. Boyle (2005). Shrinking areas and mortality: an artefact of deprivation effects? *Journal of Epidemiology and Community Health* 2005 59: 924-926. Downloaded from http://jech.bmj.com/content/59/11/924

[9] Deprivation and its Spatial Articulation in the Republic of Ireland: http://trutzhaase.eu/wp/wp-content/uploads/R-2005-Deprivation-and-its-Spatial-Articulation.pdf

of job opportunities. They pose that this emigration is selective, removing the better educated and young working age population and leaving behind an aging, dependent population. As such, their model includes both population change and age dependency as indicators of population decline. Furthermore, the smaller population makes it harder to justify the presence of key services. Population change is one of six indicators of the dimension Demographic Profile, which was described as 'first and foremost a measure of rural affluence/deprivation' (Haase & Pratchke, 2017[10]). This goes against the criteria for the NIMDM, for example an indicator should represent all types of area.

The same methodology was used to create an All-Island Deprivation Index[11], which sparked the interest in Northern Ireland from a rural perspective. Indeed, one of the authors was invited to present their findings to the Committee for Agriculture and Rural Development of the Northern Ireland Assembly[12]. References to migration and population decline in rural areas also appeared in responses to the consultation on proposals for the NIMDM 2017[13].

Population decline was also identified in Scotland, as a factor making rural areas more fragile[14], which is not captured by the Scottish Index of Multiple Deprivation (SIMD). The Office of the Chief Statistician investigated the possibility of creating a new population domain to be included in SIMD 2009. They proposed indicators on population density, population change, and change in dependency ratios. However, as these indicators were not strongly correlated, they could not be combined to create a population domain. Whilst there were some rural areas experiencing population decline or an ageing population, this was not necessarily being experienced in all rural areas in Scotland.

---

[10] T. Haase and J. Jonathan Pratschke (2017). The 2016 Pobal HP Deprivation Index for Small Areas (SA); Introduction and Reference Tables. Downloaded from http://trutzhaase.eu/wp/wp-content/uploads/The-2016-Pobal-HP-Deprivation-Index-Introduction-07.pdf

[11] See http://trutzhaase.eu/deprivation-index/the-2011-all-island-hp-deprivation-index/

[12] See http://data.niassembly.gov.uk/HansardXml/committee-11024.pdf

[13] Response to Comments on NIMDM 2017 Consultation: https://www.nisra.gov.uk/sites/nisra.gov.uk/files/publications/Individual%20comments%20from%20deprivation%20consultation%20and%20response.pdf

[14] Socio-Economic Briefing on Rural Scotland: Identifying Fragile Rural Areas: http://www.gov.scot/Resource/Doc/320175/0102396.pdf

The narrative of population decline in rural areas does not necessarily translate into the deprivation measures. This has sometimes resulted in the call for an extra domain of population decline to be added to the current 7 deprivation domains. Experiences in Scotland suggest that this may not be feasible as indicators are required to meet criteria[15], including freedom from spatially biased characteristics, i.e. applicable to both urban and rural areas.

A final point relates to the definition of rural areas. A default urban-rural split was recommended in the latest Review of the Statistical Classification and Delineation of Settlements, where settlements with a population greater than 5,000 people were classified as urban, and the rest of the country as rural[16]. The boundaries of settlements were taken from the statutory Settlement Development Limits (SDLs), which are normally defined in a Development Plan proposals map beyond which the local planning authority proposes that a settlement should not be allowed to extend. As such, rural areas are very diverse, from remote open country side to villages within commuting distance of towns and outskirts of cities.

Population Estimates and Population Change

NISRA produces annual estimates of the resident population. Full details of the methodology are available here. At the Northern Ireland level, it uses the cohort component method, i.e. the previous year's estimates are aged on by one year, and adjustments are made for births, deaths and migration. The starting point is the latest Census of population. When new Census results become available, estimates over the period between the last two Censuses are revised.

Population estimates for areas within Northern Ireland are created using a combination of the cohort component method and the ratio change method. The latter applies the annual change in proxies of population, such as GP registration counts, to the previous year's population estimates. As such, it cannot provide a further breakdown of the population change beyond age and sex: population decline can be caused by mortality or emigration, either to elsewhere within Northern Ireland, the UK or the

[15] See https://www.nisra.gov.uk/sites/nisra.gov.uk/files/publications/NIMDM%202017_Technical%20Report.pdf

[16] NISRA (2015). Review of the Statistical Classification and Delineation of Settlements. Downloaded from https://www.nisra.gov.uk/sites/nisra.gov.uk/files/publications/review-of-the-statistical-classification-and-delineation-of-settlements-march-2015%20%281%29.pdf#page=19

rest of the world. Even when migration flows are available, the reasons for migration are not collected. Returning to the example of rural emigration, it could be the lack of job opportunities or suitable /affordable housing in the area.

Population change in small areas is *"never a straight line; it's a forest and like a forest, it's easy to get lost, to forget where you came in"* (Hattori Hanzo). Given the small size of Super Output Areas – on average 2,100 people in mid-2016 – there can be a large effect from a local change. A new housing development with 20 houses can add 100 people (5%) to the population. Similarly, the closure of a nursing home or the regeneration of a single street can affect the population by the same magnitude in the opposite direction.

Population estimates for small areas can fluctuate significantly between consecutive years. Therefore, care should be taken when interpreting these population changes. As such, it is recommended to look at changes over a 5 or 10 year period. Population estimates for Super Output Areas, from mid-2001 to mid-2017, broken down by sex and 4 broad age groups, can be found at:

https://www.nisra.gov.uk/publications/2017-mid-year-population-estimates-northern-ireland

Case Studies

There are 10 rural SOAs where the population has decreased during subsequent 5-year intervals: 2001-2006, 2006-2011 and 2011-2016. This represents less than 4% of the 267 rural SOAs in Northern Ireland. Table X shows some demographic data for 5 of these SOAs:

- Portaferry_2 (Ards and North Down);
- Rich Hill_1 (Armagh City, Banbridge & Craigavon);
- Ahoghill_1 (Mid & East Antrim);
- Moneyreagh_2 (Lisburn & Castlereagh); and
- New Buildings_1 (Derry City & Strabane).

The pattern of population change in these 5 areas are very similar, and conform to the rural narrative: a decline in the young working age population (aged 16 to 39) of around 30% leads directly to a decline in the number of children of the same magnitude, whilst the population aged 40 to 64 stays relatively stable and the population aged 65 and over grows by around 50%. Between mid-2006 and mid-2016, net out migration accounts for roughly 10% of the population.

Table X: Demographic data and Deprivation for 5 SOAs

SOA	Portaferry_2 95BB20S2	Rich Hill_1 95CC20S1	Ahoghill_1 98DD02S1	Moneyreagh_2 95II19S2	New Buildings_1 95MM21S1
Population Estimates					
Mid-2001	1,699	1,408	1,540	2,072	1,807
mid-2006	1,639	1,341	1,450	2,003	1,701
mid-2011	1,525	1,299	1,448	1,945	1,657
mid-2016	1,462	1,220	1,404	1,905	1,604
Population Change					
2001-2006	-3.5%	-4.8%	-5.8%	-3.3%	-5.9%
2006-2011	-7.0%	-3.1%	-0.1%	-2.9%	-2.6%
2011-2016	-4.1%	-6.1%	-3.0%	-2.1%	-3.2%
MDM Rank (1=most deprived, 890=least deprived)					
MDM 2005	280	742	618	757	202
MDM 2010	159	782	542	681	241
MDM 2017	219	786	598	740	278
Dependency ratio - Older people per working age population					
mid-2001	*0.188*	*0.137*	*0.188*	*0.181*	*0.131*
mid-2006	*0.206*	*0.150*	*0.220*	*0.213*	*0.143*
mid-2011	*0.263*	*0.176*	*0.263*	*0.270*	*0.188*
mid-2016	*0.344*	*0.228*	*0.336*	*0.302*	*0.237*
Dependency ratio - Children per working age population					
mid-2001	*0.369*	*0.459*	*0.354*	*0.353*	*0.424*
mid-2006	*0.334*	*0.347*	*0.322*	*0.290*	*0.373*
mid-2011	*0.303*	*0.353*	*0.284*	*0.263*	*0.355*
mid-2016	*0.324*	*0.326*	*0.287*	*0.251*	*0.364*

For the remaining 5 SOAs, whilst they meet the criteria of a decreasing population during subsequent 5-year intervals, the population changes requires a better description:

Killough_2: the closure of Ballykinler army barracks in 2014 led to a sudden drop of roughly 25% of the population.

Rosslea: population decline has been slowing down in recent years, falling by 14 people between mid-2011 and mid-2016; the mid-2017 estimate is 25 people (1.2%) higher than the low point in mid-2013.

Culmore_1: the population decline between mid-2011 and mid-2016 was only 2 people. There have been year-on-year increases between mid-2014 and mid-2017.

Eglinton_1: the population decline between mid-2011 and mid-2016 was only 3 people.

Fintona: population decline has been relatively small, with a loss of 50 people or 2.5% over the period 2001-2016; its population estimate was smallest in mid-2004.

These 5 examples show the difficulty in the identification of small areas with declining populations. Not only could there be external factors at play, but the selection of the time period could strongly affect the findings.

Summary

The recommendation to investigate the relationship between population decline and deprivation arose from the observation that only in the most deprived 10% of Super Output Areas, population declined between mid-2001 and mid-2008. However, this decline can be largely attributed to a NI wide decline in the number of births, compounded with a net outward migration. There is also a level of circularity, with deprivation affected by mortality and many indicators expressed per head of population.

Renewed interest into population decline with respect to deprivation came from a rural perspective. Whilst it has been used as an indicator in the Republic of Ireland, it does not fit within the Noble methodology. Furthermore, rural areas are very diverse, there could be external factors at play and findings depend on the selected time period of population change. Only 10 out of 267 rural SOAs have had a consistently declining population since mid-2001, and half of these had a marginal drop in population.

NISRA

August 2018