

## Small Area Population Estimates for Northern Ireland (2008)

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## Executive Summary

### Background and introduction

- 1 Northern Ireland Statistics and Research Agency initiated the Small Area Population Estimates (SAPE) project primarily to meet the requirements for the NI Measures of Multiple Deprivation 2010 (NIMDM).
- 2 A small area is a geographical unit below the level of Local Government District (LGD). NISRA produces mid-year estimates for LGDs on an annual basis.
- 3 Small area population estimates have been produced for the years 2001 to 2008 inclusive, for the following geographical areas:
  - Super Output Areas (SOA).
  - Census Output Areas (COA).
  - Electoral Wards.
  - Neighbourhood Renewal Areas.
  - Settlements.
- 4 The estimates have been prepared to be consistent with the pre-existing mid-year estimates for LGDs.
- 5 It is recognised that interest in and use of the small area population estimates will extend beyond their use in the construction of the NIMDM 2010. This paper has been prepared within that context, with the following objectives:
  - Set out the methodology used to produce the small area population estimates.
  - Describe the quality assurance process.
  - Summarise the key geographical patterns in the small area population estimates.
- 6 The results for Northern Ireland's 890 Super Output Areas were published on 31 March 2010. These small area population estimates are the focus of this paper. Additional tables for the remaining geographical areas were published on 26 May 2010.

### Methodology

- 7 Small area population estimates are challenging to produce. The smaller the geographical level, the greater will be the volume of population turnover, as people move into and out of small areas for a variety of reasons. For some age and sex groups, such as young males, such movements can be difficult to track from administrative sources.
- 8 The most commonly used methods for producing small area population estimates are as follows:
  - The Cohort Component method.
  - The Ratio Change method.
- 9 The central feature of the Cohort Component method is that it seeks to estimate population change by taking account of the components of change from one time period to another i.e. births, deaths and migration.
- 10 In the Ratio Change method, selected indicators of population change are used to update the population from some earlier or base period. The method assumes an unchanged relationship over time between the chosen indicator and the true population.
- 11 Both methods are used in other parts of the UK. In England and Wales, the Ratio Change method is employed for small area population estimates. In Scotland, the Cohort Component method is the preferred approach. There is therefore no single agreed approach. Nor is there conclusive evidence to suggest that one method should be preferred over the other. They both have their strengths and weaknesses.
- 12 For the Northern Ireland small area population estimates, it was decided to employ a mixed approach i.e. to separately estimate the change in population from 2001 to 2008 using both the Cohort Component and Ratio Change methods and then take an average of the two estimates for each SOA. Estimates were prepared for eight age-sex groups.

- 13 The two methods are complementary, as they each approach small area population estimation in a different fashion and using different datasets. This provides a strong rationale for a combined approach that draws on the strengths of both methods. Furthermore, the complementarities between the two methods mean that the mixed approach makes maximum use of the available information. Both methods are grounded in the 2001 Census of Population.
- 14 The Cohort Component and Ratio Change methods produced very similar small area population estimates for the 890 SOAs. From a quality assurance perspective, the similarity of the results from the two methods is very reassuring.

### Quality assurance

- 15 The main elements in the approach to quality assuring the estimates were as follows:
  - Multiple indicators for assessing the change in key population ratios e.g. the ratio of children to the working age population (the child dependency ratio).
  - Comparing the population estimates with secondary data sources, such as the change in occupied dwellings by SOA.
  - Use of local knowledge, both in-house and external.

## Small Area Population Estimates for Northern Ireland (2008)

### Key findings

- 16 From 2001 to 2008, the population of Northern Ireland increased by 5.1 per cent. The growth was unevenly distributed by region and by Local Government District (LGD). Belfast experienced a population loss of -3 per cent compared with a 10 per cent expansion in the West & South region.
- 17 The small area population estimates have been prepared to be consistent with the mid-year estimates for the larger geographies within which they are located. Hence, the divergent regional and LGD-level trends are fully reflected in the population estimates for Northern Ireland's 890 SOAs.
- 18 The fastest growing areas tended to be located in suburban areas within commuting distance of major urban centres. Dispersal from Greater Belfast followed a distinct pattern, with the direction of growth following the M1 and A1 corridors, mainly to LGDs located in the East of NI, such as Banbridge and Craigavon, extending down to Newry & Mourne in the West & South region.
- 19 West of the Bann, the fastest-growing areas were mainly located on the outskirts of the major urban centres. This 'overspill' effect was most pronounced in Derry Urban Area, with a cluster of areas on the eastern fringe of the City registering growth rates in excess of 20 per cent.
- 22 On average, the population in rural areas grew by 11 per cent, compared to two per cent in urban areas, a gap of nine percentage points.
- 23 From 2001-2008, the net change in Northern Ireland's population was 86,000. Of that total, 61,000 (71 per cent) occurred in rural areas with urban areas increasing by just 25,000.

### Deprivation (2005)

- 24 The information used to compile the NIMDM 2005 relates to the year 2003. The 2005 NIMDM therefore provides another useful point of reference to describe differences between small areas in rates of population change from 2001 to 2008.
- 25 The most deprived and also the least deprived areas in Northern Ireland are also the most urbanised. Reflecting the urban-rural population shift, the 10 per cent most deprived areas lost population between 2001 and 2008. Similarly, the least deprived 10 per cent of areas also lagged behind the Northern Ireland average in population growth. The fastest growing areas were in the middle of the ranking of SOAs on the deprivation scale. These were also the least urbanised in 2001.

### Migration

- 26 From 2001 to 2008, population movements within Northern Ireland (internal migration) were predominantly from urban areas to rural areas. Within the urban hierarchy, only small towns gained from internal migration, although by a small margin. The main direction of internal movements was to intermediate settlements, villages and small villages, hamlets and open countryside. The overall pattern by settlement type did not vary greatly by region.
- 27 External migration flows – population movements into and out of Northern Ireland – followed a different pattern. The largest net inflows were recorded by medium and large towns, followed by small towns. The external migration flows also had a distinct regional character, with the largest net gains experienced by large and medium towns in the West & South of NI and the East of NI.

### Settlement Type

- 20 The shift from the most densely-populated urban areas of Belfast and Derry is clearly evident from the disparities in growth rates by settlement type. With average growth rates in the range 6-8 per cent, large, medium and small towns grew slightly faster than the NI average (+5 per cent). The fastest rates of growth were seen in villages (+13 per cent) and intermediate settlements (+11 per cent). Small villages, hamlets and open countryside areas registered growth of 9 per cent on average.

### Urban-Rural Contrasts

- 21 In 2001, 66 per cent of Northern Ireland's population lived in areas classified as urban with the remaining one-third living in rural areas. Over the period 2001-2008, the vast majority of rural SOAs (90 per cent) registered some increase in population. Over half (51 per cent) grew by 10 per cent or more. By contrast, the majority of urban areas (54 per cent) experienced a loss of population.

## Regional Patterns

- 28 Belfast. Of the City's 150 SOAs, almost three in four (114) registered a fall in population between 2001 and 2008. A further 30 SOAs grew at a modest pace, between 0-10 per cent. Growth in excess of 10 per cent was recorded in a dozen SOAs, including some City centre areas and others on the periphery of Belfast. The main driver of growth in the City centre areas was the young working age population.
- 29 Outer Belfast. Half the SOAs in Outer Belfast gained in population while the remaining half have seen some degree of decline. The population trends in some parts of the sub-region have been positively affected by decentralisation from Belfast. Other more densely urbanised parts of the sub-region, such as Castlereagh, have been more affected by the shift to less densely populated suburban and rural areas that characterised the 2000s.
- 30 East of NI. With a large rural hinterland, well-served by the motorway network and intersected on its southern flank by the A1, the region contains many of the features that were associated with faster rates of population growth in the 2000s. Growth was the norm across most of the East of NI. Almost 70 per cent of the SOAs in the East of NI recorded an increase in population between 2001 and 2008, compared with 60 per cent for Northern Ireland as a whole. Fifteen of the 30 fastest-growing SOAs were located in the region.
- 31 North of NI. In the period from 2001 to 2008, the pattern of growth within the region was characterised primarily by dispersal from Derry Urban Area and the medium and large towns to less densely settled surrounding SOAs. A number of SOAs on the outskirts of Derry Urban Area featured among the fastest-growing in Northern Ireland, with rates of population growth in excess of 30 per cent. A similar pattern could be seen in Coleraine and Strabane.
- 32 West & South of NI. The most rural of Northern Ireland's five regions; in 2001, almost two in three people in the South and West lived in rural settlements. Between 2001 and 2008, the main feature of population change in the region was the widely dispersed growth. Almost half of SOAs (47 per cent) grew by 10 per cent or more, compared to a NI-wide average of 29 per cent of SOAs.

## Concluding remarks

- 33 While the small area estimates have been prepared to update the 2001 Census of Population, they should not be accorded the same status as a Census. First, the Census remains the most effective approach to the production of small area population statistics.
- 34 Second, the Census of Population provides the benchmark against which the accuracy of small area statistics can be appraised. In the absence of a Census, it is not strictly possible to measure the accuracy of the small area estimates.
- 35 This inherent uncertainty in the estimation process has been managed by
- Adopting the mixed approach to the production of the statistics, ensuring that all the available information is brought to bear in producing the estimates.
  - Through a rigorous process of quality assurance, based on the analysis of multiple indicators and comparison with secondary datasets.
- 36 The next Census of Population is scheduled to be held in March 2011. When the results of that Census are known, the methodology used for the 2008 small area statistics will be subject to further evaluation, to identify where improvements and refinements can be made.

## Background and Introduction

- 37 This paper reports on the small area population estimates produced for the preparation of the Northern Ireland Multiple Deprivation Measure (NIMDM) 2010.
- 38 NISRA produces mid-year population estimates, on an annual basis, for each of Northern Ireland's 26 Local Government Districts (LGDs). A small area population estimate is an estimate of the population for a geographical area below the LGD level.
- 39 The NIMDM provides a measure of the spatial distribution of deprivation in Northern Ireland. It is used by Government and others to target resources on the most deprived areas in Northern Ireland and to monitor the spatial impact of policy interventions. The NIMDM 2010 results were released by NISRA on 31 March 2010<sup>1</sup>.
- 40 The NIMDM 2010 has been designed to update and replace the NIMDM 2005. Similar to its predecessor, the NIMDM 2010 provides information on seven types or 'domains' of deprivation (income; employment; health deprivation and disability; education, skills and training; proximity to services; crime and disorder; and living environment) and an overall measure of multiple deprivation derived from a weighted combination of the seven constituent domains.
- 41 As with the 2005 version, the indicators for each of the seven domains in the NIMDM 2010 were constructed from a series of surveys and administrative datasets<sup>2</sup>. The datasets used for the NIMDM 2010 mainly relate to 2007 to 2009.
- 42 In order to draw meaningful comparisons across the small areas for which the NIMDM has been prepared, many of the deprivation indicators are expressed as rates i.e. they measure the incidence of some measure of deprivation amongst the relevant population at risk of experiencing the specific type of deprivation.
- 43 For example, the Employment Deprivation domain indicators are based on counts of the number of people receiving various work-related benefits, such as Jobseeker's Allowance, Employment and Support Allowance, Carer's Allowance, etc. In order to make comparisons between one area and another regarding the extent of employment deprivation, it is necessary to express the counts of people in receipt of the various benefits as a percentage of the relevant population i.e. men aged 18-64 and women aged 18-59.
- 44 Similarly, the Income Deprivation domain is based on receipt of means-tested benefits, such as Income Support, Pension Credit, and so on. For that domain, it is necessary to have estimates for total population and also for children and older people, as separate Income Deprivation estimates are produced for those age groups.
- 45 In other domains, some of the component indicators are specifically expressed as proportions of some relevant population. For example, in the Education, Skills and Training Deprivation domain, the proportions of 18-21 year olds who have not enrolled in Higher Education Courses at Higher Education or Further Education establishments.
- 46 The preparation of the NIMDM therefore requires a range of population estimates to serve as denominators for the various deprivation indicators, including both total population estimates and specific age and sex breakdowns. The Small Area Population Estimates (SAPE) project was initiated to meet those requirements. The primary purpose of the SAPE project was to produce population estimates for the core NIMDM small area geographies, broken down by relevant age and sex groupings.
- 47 While the main purpose of the SAPE project was to provide the requisite population inputs to the NIMDM update, it is recognised that population estimates for small areas in Northern Ireland will attract a wider interest. This paper has been prepared within that context.
- 48 The next section outlines the SAPE requirements with reference to the geography of small areas in Northern Ireland. The paper then provides a description of the methodology and data sources. This is followed by a summary of the quality assurance process. Prior to the concluding remarks, the paper presents a discussion of the main patterns of change from 2001 to 2008.

<sup>1</sup> The results and reports of the 2010 NIMDM can be found at: [http://www.nisra.gov.uk/deprivation/nimdm\\_2010.htm](http://www.nisra.gov.uk/deprivation/nimdm_2010.htm).

<sup>2</sup> See the *Northern Ireland Multiple Deprivation Measure 2010*, issued in May 2010, for a more detailed description of the indicators within each of the seven domains: [http://www.nisra.gov.uk/deprivation/archive/Updateof2005Measures/NIMDM\\_2010\\_Report.pdf](http://www.nisra.gov.uk/deprivation/archive/Updateof2005Measures/NIMDM_2010_Report.pdf).



# 1 Requirements

- 49 The core geographical unit for the NIMDM 2010 is the Super Output Area (SOA). There are 890 SOAs in Northern Ireland. SOAs were developed by NISRA to improve the reporting of small area statistics<sup>3</sup>. The first use of SOAs was in the preparation of the NIMDM 2005.
- 50 Previously, the Electoral Ward had been the standard unit for presenting local area statistics. However, Wards vary considerably in size. At the time of the 2001 Census of Population, the smallest Ward (Bushmills in Moyle) contained fewer than 800 persons while close to 10,000 persons resided in the largest Ward (Botanic in Belfast). SOAs were designed to create a set of small areas that were more similar to each other in terms of population size. On average, SOAs contain slightly less than 1,900 people, ranging in size from 1,300 to 3,000<sup>4</sup>. Half of the 890 SOAs were in the population range 1,600 to 2,100 at the time of the 2001 Census of Population.
- 51 The Census Output Area (COA) is the basic building block for SOAs. COAs were designed for the 2001 Census of Population specifically for statistical purposes to serve both for reporting Census outputs and as a flexible geography to facilitate Neighbourhood Statistics.
- 52 There are 5,022 COAs. They were configured to each contain about 125 households, with an average population size of fewer than 340. So far as possible, COAs are also designed to contain households of a similar type and tenure. Typically, SOAs are comprised of 4-6 neighbouring COAs.
- 53 In the NIMDM 2010, each of the seven domains is measured at SOA level, along with the overall or multiple deprivation measure. In addition, income deprivation measures are separately produced for children and older people. The NIMDM also produces a more restricted set of measures at COA level i.e. an overall deprivation measure comprised of four domains (income, employment, proximity to services and crime and disorder).
- 54 The NIMDM requirement is therefore for a set of population estimates, broken down by relevant age and sex groupings, for both the SOA and COA geographies.
- 55 The 'gold standard' approach to the production of small area population estimates is to conduct a Census of the population. This is because a Census aims to enumerate the population by seeking information directly from all households and residential institutions within Northern Ireland. Some estimation is required, depending on the level of non-response. But alternative approaches to estimating the population must rely on the use of administrative datasets, such as patient registers, which are designed for purposes other than the enumeration of the population. Such datasets are therefore secondary to a Census in seeking to estimate population levels.
- 56 In Northern Ireland, a Census is taken every 10 years. The last Census of Population was held in April 2001. Much has changed since then. The last decade has witnessed an unprecedented inflow of immigrants from outside Northern Ireland, particularly following the accession of eight Eastern European countries in 2004. From 2004 to 2007, Northern Ireland also experienced a housing market boom, with elevated levels of housing transactions (over 50,000 in 2006) and construction activity.

**Table 1 Small areas in Northern Ireland**

	Census Output Areas	Super Output Areas	Electoral Wards
Number	5,022	890	582
Median number COAs	1	5	8
Population size (2001):			
Mean	336	1,894	2,896
Median	333	1,823	2,600

Source: NISRA, *Census of Population 2001*.

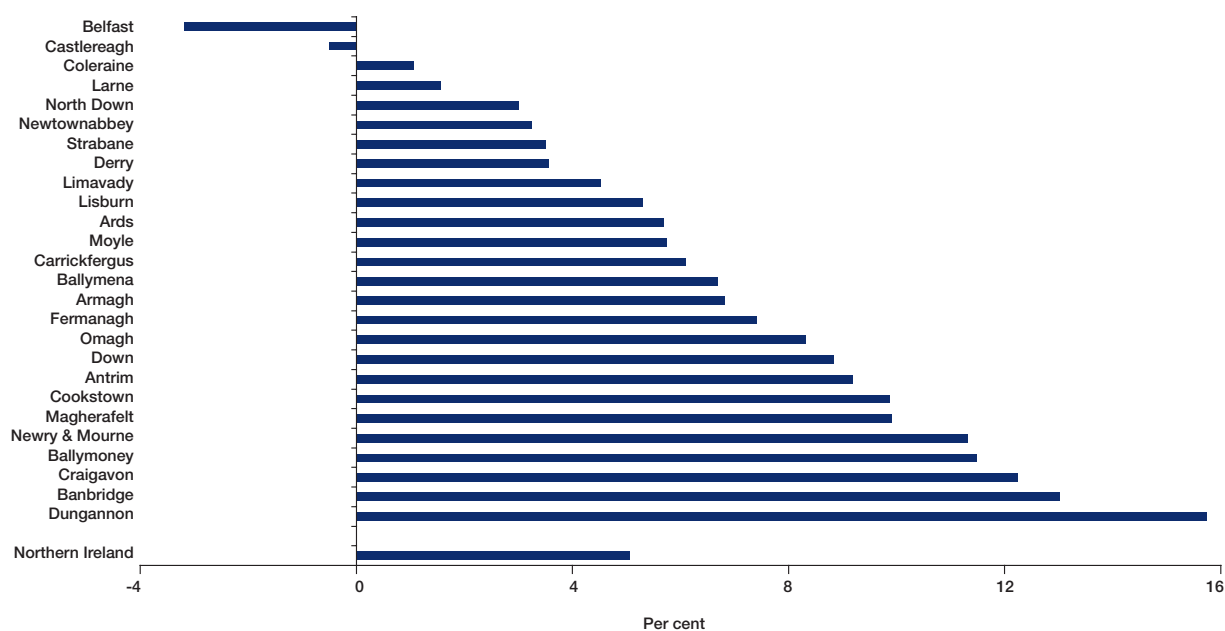
<sup>3</sup> See [http://www.nisra.gov.uk/deprivation/super\\_output\\_areas.htm](http://www.nisra.gov.uk/deprivation/super_output_areas.htm).

<sup>4</sup> In order to maintain consistency with the population size requirements, some of the smaller Wards in Moyle were combined to form SOAs within that LGD. In all other LGDs, SOAs are 'nested' within their respective Wards.

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- 57 Reflecting those various influences, the geographical pattern of population change has been highly uneven. This is evident from the mid-year population estimates produced for Northern Ireland's 26 Local Government Districts (LGDs). From 2001 to 2008, population change ranged from a 3.2 per cent fall in Belfast to an estimated 15.8 per cent increase in Dungannon (Figure 1).
- 58 Clear patterns of population dispersal are also evident from the LGD mid-year estimates. The fastest rates of population growth, in excess of 10 per cent, were experienced mainly in areas in the East of NI, within commuting distance of Belfast, and in the West & South of the province, where international in-migration was a key factor. To illustrate the latter influence, by 2007 immigrants from the A8 Accession countries were estimated to comprise almost seven per cent of the population of Dungannon, compared to a NI average of 1.7 per cent (NISRA, 2008).
- 59 Given the length of time elapsed since the 2001 Census, and the population dynamics evident from the LGD mid-year estimates, there was a clear need to provide updated population estimates for the purposes of the NIMDM 2010.
- 60 The remainder of this paper sets out how those estimates were prepared and presents the broad findings. At this juncture, it is useful to briefly list the main outputs from the SAPE project, as follows:
- The results for Super Output Areas (SOAs), the core NIMDM geography, were published by NISRA on 31 March 2010<sup>5</sup>.
  - The SOA outputs contain estimates for total population and the following age groups, by sex: children aged under 16, young working age adults aged 16-39, older working age adults aged 40-59F/64M, and pension age persons (women aged 60+ and men aged 65+).
  - Additional tables were published on 26 May 2010, including Ward-level population estimates and COA results (total population only).
  - For all of the above, population estimates have been prepared for each year from 2001 to 2008.

**Figure 1 Population change by LGD, 2001-2008, all ages**



<sup>5</sup> <http://www.nisra.gov.uk/demography/default.asp125.htm>.

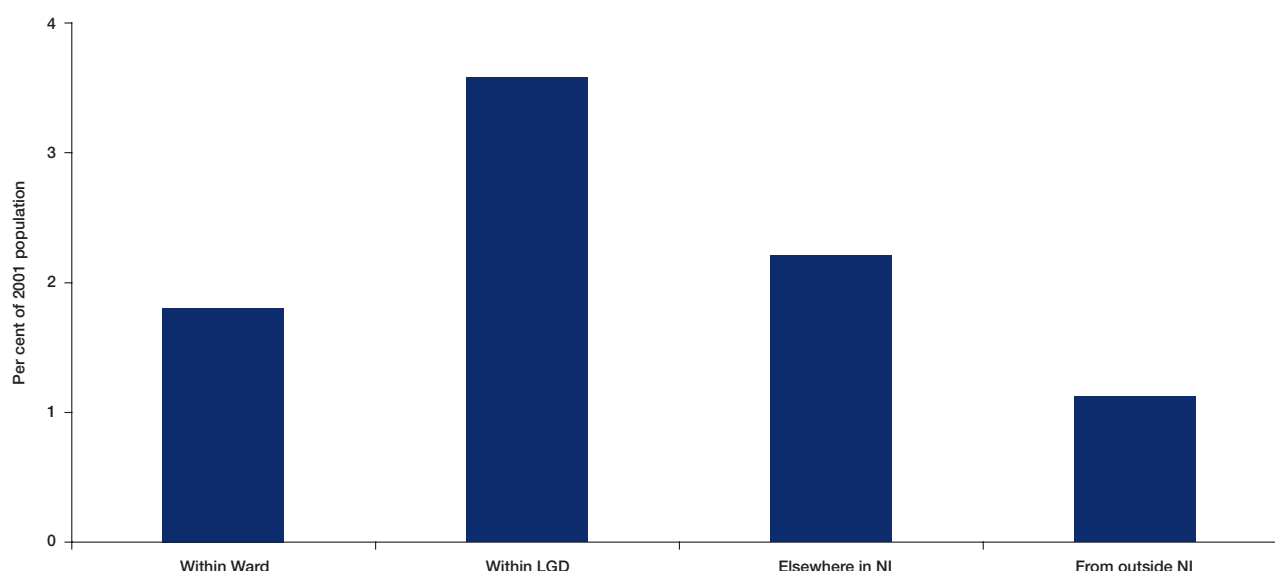
## 2 Methodology and Data Sources

### 2.1 Challenges

61 For the purposes of the NIMDM, estimates are required for mid-2008 i.e. seven years distant from the 2001 Census of Population. The greater the elapsed time since the 2001 benchmark, the greater the difficulties in accurately measuring population change, for the following reasons:

- **Population turnover** In any given time period, some households will move to a different address. Individuals will relocate for reasons such as to start a new job or commence a course of study or to form a new household e.g. with a partner. At the time of the last Census, in April 2001, over 150,000 people lived at a different address compared to the same period in the previous year. Clearly, in the seven-year period from 2001 to 2008, the number of moves will have been substantially greater than that.
- **Geographic scale** The smaller the geographical unit of analysis, the greater the number of movements that need to be accounted for and hence the more difficult it becomes to measure population turnover. From the 2001 Census, a majority of moves are within the same small area or from one part of an LGD to another (Figure 2). Such moves do not need to be considered in compiling LGD estimates but will clearly affect small area population levels.
- **The distribution of the stock of dwellings** From 2001 to 2009, over 90,000 dwellings were added to the stock of dwellings in Northern Ireland, representing an increase of 14 per cent (NIHE, 2010). An increase of that magnitude will clearly affect the geographical distribution of the dwelling stock and hence the residential location choices of households moving from one area to another.

Figure 2 Population movements. Northern Ireland, 2001 Census (different address 1 year previously)



## 2.2 A Mixed Approach

- 62 The range of options available for producing small area population estimates in the UK context has been examined by the Office for National Statistics (ONS). In 2000, ONS initiated the SAPE project to examine the feasibility of producing small area estimates for England and Wales. From that work, two main options can be identified, as follows<sup>6</sup>:
- The Cohort Component method.
  - The Ratio Change method.
- 63 The central feature of the Cohort Component method is that it seeks to estimate population change by taking account of the components of change from one time period to another i.e. births, deaths and migration. The starting point is the ageing on of the population age structure from an earlier period to the period for which estimates are required. Births occurring between the two periods are added to the population. Deaths are subtracted, by age group from the initial population age structure. The method also takes account of population gains due to in-migration and losses due to out-migration, again by age group.
- 64 In the Ratio Change method, selected indicators of population change are used to update the population from some earlier or base period. The method assumes an unchanged relationship over time between the chosen indicator and the true population<sup>7</sup>. For example, if the chosen indicator increases by five per cent over the period for which estimates are required, the base population is also increased by five per cent.
- 65 The main distinction between the two methods is that the Cohort Component method seeks to measure population change by means of an accounting identity which will hold true so long as the components are accurately measured. By contrast, the Ratio Change method depends on proxy indicators for the change in population levels between two time periods. Alternatively, in the Cohort Component method, population change is measured by estimating **flows** into (births, in-migration) and out (deaths, out-migration) of the population whereas the Ratio Change method focuses on changes in population levels or **stocks**.

<sup>6</sup> See Bates, 2006; ONS, 2005, 2008, 2009.

<sup>7</sup> That is, the ratio of the true population to the indicator remains constant between the base period and the later period for which estimates are required, hence the name Ratio Change method.

- 66 The Cohort Component method is used by NISRA in preparing the mid-year estimates for Northern Ireland and the 26 LGDs (NISRA, 2006). It is also the standard method used across the rest of the UK for that same purpose and is widely used internationally for country-level population estimates and projections. To that extent, the Cohort Component method would generally be preferred over the Ratio Change method, especially as the latter relies on proxy indicators of population change. However, the Cohort Component method is very data-intensive and the difficulties outlined above are especially acute at small area level. The estimation of net migration flows is particularly challenging at small area level.
- 67 Both methods are used in other parts of the UK<sup>8</sup>. In England and Wales, the Ratio Change method is employed for small area population estimates (ONS, 2009)<sup>9</sup>. In Scotland, the Cohort Component method is the preferred approach (GROS, 2005)<sup>10</sup>. There is therefore no single agreed approach. Based on the experience in England and Wales, the Ratio Change method would appear to be preferable for time periods that are within three years or so of the Census of Population. Beyond that timeframe, there is no overwhelming evidence to favour one method over the other (ONS, 2009).
- 68 For the Northern Ireland small area population estimates, it was decided to employ a mixed approach, with the following main steps:
- Separately estimate the population in the period 2001 to 2008 using both the Cohort Component and Ratio Change methods.
  - Constrain both sets of SOA-level estimates to their respective LGD population levels.
  - Take an average of the two estimates for each SOA, for each of 18 5-year age groups, both male and female.
- 69 The rationale for the mixed approach is as follows.
- 70 Primarily, the two methods approach the measurement of population change from two separate but **complementary** perspectives (stocks versus flows). This provides a strong rationale for a combined approach that draws on the strengths of both methods. Furthermore, the complementarities between the two methods mean that the mixed approach makes maximum use of the available information.

<sup>8</sup> For a brief overview on the approaches taken across the UK, and web links to further information, see [http://www.statistics.gov.uk/about/methodology\\_by\\_theme/sape/default.asp](http://www.statistics.gov.uk/about/methodology_by_theme/sape/default.asp).

<sup>9</sup> The 2008 estimates can be found at <http://www.statistics.gov.uk/StatBase/Product.asp?vlnk=14357>.

<sup>10</sup> The 2008 Small Area Population Estimates for Scotland can be found at <http://www.statistics.gov.uk/StatBase/Product.asp?vlnk=14357>.

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- 71 As noted earlier, the geography of the population in Northern Ireland has changed in the period 2001 to 2008. Hence, the basic Ratio Change assumption of a constant relationship between proxy indicators and the population is more uncertain given the length of time that has elapsed since the 2001 Census. A key strength of the Cohort Component method is that it explicitly seeks to account for the components of change.
- 72 Conversely, the Cohort Component method is very data intensive. While births and deaths are well measured at small area level, migration flows are more difficult to estimate and the risk of measurement error increases at small area level.
- 73 The Ratio Change method helps to offset that risk as it relies on multiple secondary datasets applied to different age groups of the population, including patient registers and receipt of benefits such as the retirement pension. Indeed, the secondary datasets used in the Ratio Change method are also used for quality assurance purposes in preparing the mid-year population estimates, both for Northern Ireland as a whole and the sub-national estimates prepared for each of the 26 LGDs.
- 74 Regardless of the method chosen, the small area population estimates must be consistent with their respective LGD population estimates. For example, the estimated number of children across all SOAs contained within the Antrim LGD as at mid-2008 should add up to the 2008 mid-year population estimate for children in Antrim.
- 75 This basic adding-up requirement means that the small area population estimates are produced within a consistent 'top-down' framework. Thus, the estimated rates of population change at small area level will, when aggregated to LGD level, be consistent with the geographical pattern illustrated in Figure 2 (see paragraph 61).
- 76 The next part of this Section describes the data sources used for the two methods of producing small area population estimates.

## 2.3 The Cohort Component Method

- 77 In the Cohort Component method, the difference between births and deaths is referred to as the *natural increase* in the population. *Net migration* is the difference between population gains due to in-migration from other areas compared with losses due to out-migration to other areas.
- 78 The *net change* in the population from one period of time to another is determined by adding together natural increase and net migration. The net change can be positive or negative, depending on the balance between those components that result in additions to the base population (births and in-migration) and the components that bring reductions in the base population (deaths and out-migration).
- 79 The main data sources for measuring the components of change are listed in Box A. In general, the information on births and deaths is of high quality.

### Box A Components of Change: Main data sources

#### Component Births

Source General Register Office (GRO)

Comment Individual records, geocoded and allocated to COAs based on usual address of mother (or, if not available, place of birth).

#### Component Deaths

Source General Register Office (GRO)

Comment Individual records, geocoded and allocated to COAs based on usual residence of deceased (or, if not available, place of death).

#### Component Migration

Source Central Health Index (CHI)

Comment Database of all persons registered with a GP. Maintained by the Health & Social Care Business Services Organisation (formerly Central Services Agency). Internal flows measured by changes of address when people change their GP registration from one location in NI to another. External flows measured by new registrations of people moving from outside NI and de-registrations by people moving away from NI.

- 80 Unlike births and deaths, there is no complete system for registering migration. Also, at sub-national level, whether for LGDs or small areas, there are two sources of migration flows:
- External migration i.e. flows into and out of the area from locations *outside* Northern Ireland; for example, the recent migration of persons from the EU accession countries.
  - Internal migration i.e. flows into and out of the area from locations *inside* Northern Ireland. Small area internal migration flows comprise moves to and from other small areas within the same LGD as well as to other locations in Northern Ireland (see Figure 2 above).
- 81 At the Northern Ireland level, only external migration needs to be taken into account. By definition, internal migration flows from one location to another balance each other out across Northern Ireland. This is not the case for small areas.
- 82 In preparing the LGD mid-year estimates, internal migration flows from one year to the next are estimated from changes in the list of patients registered with a family doctor (the Central Health Index). The data are available by age, sex and location.
- 83 The Central Health Index is also used to estimate external migration<sup>11</sup>. Outflows are estimated from the list of patients registered with a family doctor by counting the number of people de-registering or registering in Great Britain over the course of a one-year period. Inflows are measured by counting new registrations.
- 84 The patient register data suffers some limitations. In particular, re-registration patterns vary by age and sex. For example, in student areas where students may not immediately re-register on finishing their course of study. For that reason, students are treated as a special population in the Cohort Component method (see paragraph 93). Despite the limitations, there is no other available source that has as good coverage and quality as the NHS administrative data<sup>12</sup>.

<sup>11</sup> At Northern Ireland level, flows to the Republic of Ireland are measured using the Irish Quarterly National Household Survey (QNHS). As a sample survey, the QNHS is not suitable for estimating out-migration at small area level.

<sup>12</sup> See ONS, 2008.

## Small Area Population Estimates for Northern Ireland (2008)

- 85 Nonetheless, the use of the Central Health Index for estimating small area migration flows posed its own challenges. In particular, at small area level, greater demands are placed on the quality of the geographic information for GP card holders.
- 86 Within the time frame for the Northern Ireland SAPE project, it was necessary to rely on the data files used for the LGD mid-year estimates. From 2004 onwards, the migration data files included full postcodes of the health card holder and also their GP. For health card holders, postcodes were matched to COAs using the Central Postcode Directory<sup>13</sup>. Where health cards could not be matched to a COA in that fashion<sup>14</sup>, due to the absence of a valid postcode, they were allocated in proportion to the spread of health cards within the same GP practice.
- 87 Prior to 2004, migration data were available at varying geographic scales. Hence, it was necessary to estimate COA-level migration flows, which were then scaled to their respective LGD and Parliamentary Constituency constraints. For example, in 2003, only SOA-level data were available on migration flows. These data were allocated to their constituent COAs using the total migration flows from 2004-05.
- 88 Clearly, the greater the reliance on estimation procedures, the greater the risk of measurement error in the migration estimates. This serves to further validate the choice of a mixed approach to the small area population estimates.
- 89 Furthermore, at small area level, the Cohort Component method is very data-intensive. In order to ensure maximum flexibility in meeting the NIMDM 2010 requirements, it was decided to generate estimates for each of the components of change at COA level. As the Cohort Component method is based on successively ageing on the population for each year since the 2001 Census, the same information was required for each of seven consecutive time periods. In such a complex system, measurement errors in one time period tend to cumulate i.e. errors do not tend to cancel out in later periods. Again, the mixed approach helps to manage that degree of complexity.
- 90 It was also necessary to take account of two special populations i.e. the Armed Forces and student areas.
- 91 The Armed Forces are treated as a special population because they are not included in the GP registration system. Individual members of the Forces move relatively frequently into and out of the coverage of population estimates. Also, over the period from 2001 to 2008, there were a number of closures of army barracks in Northern Ireland, including Ebrington Barracks in Derry LGD, Lisanelly and St Lucia in Omagh LGD and Drumadd in Armagh LGD, among others.
- 92 Based on information supplied by the Defence Analytical Services Agency (DASA), the number of Forces personnel stationed in Northern Ireland fell from 9,400 in 2001 to a little over 4,000 in 2008. However, information on the age and sex composition of the Forces was only available from DASA down to LGD level. It was therefore necessary to generate estimates of the number of Forces by single year of age and sex at COA level by combining the available DASA information with the available small area information on the disposition of the Forces resident in Northern Ireland at the time of the 2001 Census of Population.
- 93 In the mid-year estimates for LGDs, special adjustments are made to account for under-recording of migration into student areas (especially those aged 18-19) and lags in the de-registration of those moving out of student areas (especially those aged 20-29). For the small area estimates, COAs with high concentrations of students were identified from the 2001 Census of Population. In those areas, the age structure of the population in the student age groups was held constant from one year to the next rather than being successively aged on, as in other COAs. The basic assumption is that, in such areas, there is a relatively constant turnover of the student population so that the age structure remains stable from one year to the next.

<sup>13</sup> The Central Postcode Directory (CPD) is a set of lookup tables providing a direct look-up between a postcode and geographies such as COAs. See <http://www.nisra.gov.uk/geography/postcode.htm>.

<sup>14</sup> For example, townland names rather than postcodes are often used in Fermanagh.



## 2.4 Ratio Change Method

- 94 The implementation of the Ratio Change method depends on the availability of administrative datasets containing counts of individuals at each of the relevant time periods for which estimates are required. The datasets serve as a basis for calculating rates of change that can be used as proxy indicators for the change in relevant population sub-groups.
- 95 Such datasets must satisfy a number of criteria, including (see Bates, 2004):
- Northern Ireland-wide coverage.
  - Sufficient geographic detail to enable counts to be prepared down to SOA and/or COA level.
  - Consistent criteria for inclusion of members of the population.
  - Acceptable quality.
  - Lack of prohibitive cost or constraint.
  - Sufficiently large counts to derive reliable rates of change.
- 96 The main datasets meeting those criteria in Northern Ireland are summarised in Box B.

### Box B Ratio change method: Main data sources

Source Central Health Index

Coverage All ages

Comment All persons currently registered with a GP in Northern Ireland.

Source Child Benefit

Coverage Information on all children for whom the benefit is claimed.

Comment Near universal coverage of under-16s. Partial coverage only of 16-18 year-olds. Data maintained by HMRC. Not available for 2008. Individual records for 2007 aged one year to provide 2008 estimates.

Source Schools Census

Coverage School-age children

Comment Annual exercise conducted by Department for Education. All attending a primary or secondary school in Northern Ireland.

Source Older Person's Database

Coverage Persons aged 65 and over

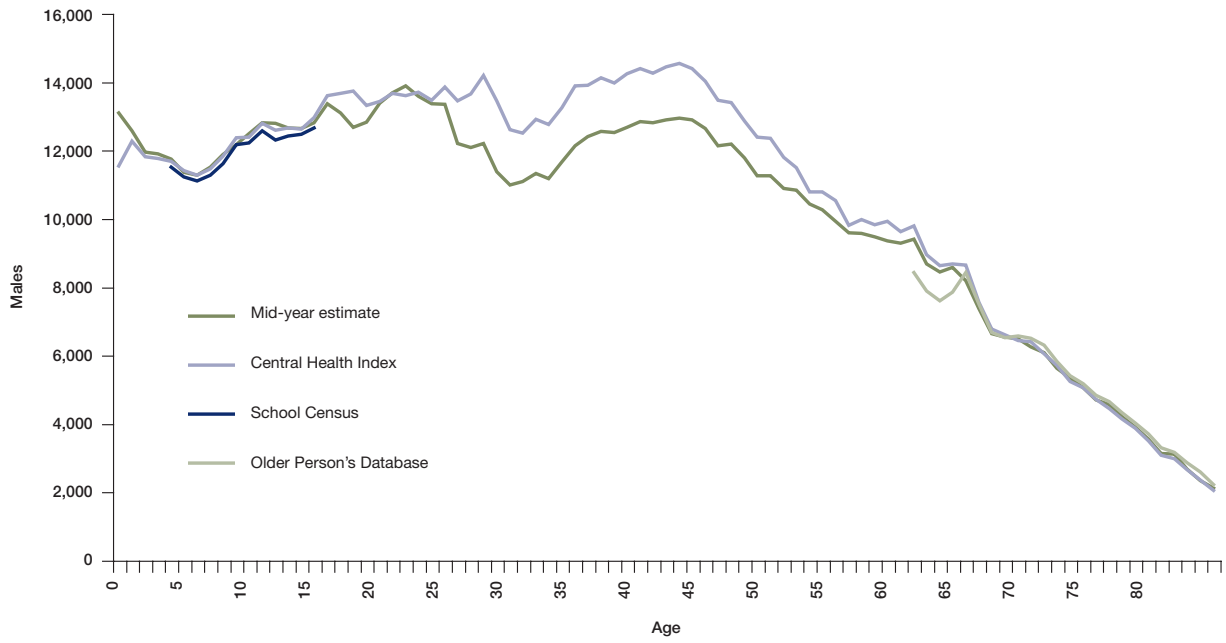
Comment All claimants of State Retirement Pension, disability benefits, Pension Credit. Sourced from the Department for Social Development (DSD).

- 97 In principle, the Central Health Index should provide near-universal coverage of all persons ordinarily resident in Northern Ireland. In practice, due to factors such as lags between population changes e.g. moves from one area to another and notification of such changes to the Health and Social Care Business Services Organisation (BSO)<sup>15</sup>, the CHI suffers from the problem of list inflation, which varies from one area to another and across age groups. As can be seen from Figures 3 and 4, the total number of persons on GP Lists in the age range 25 to 40 tends to be in excess of the relevant Northern Ireland mid-year population estimates. List inflation can also be localised, for example, along the border with the Republic of Ireland.

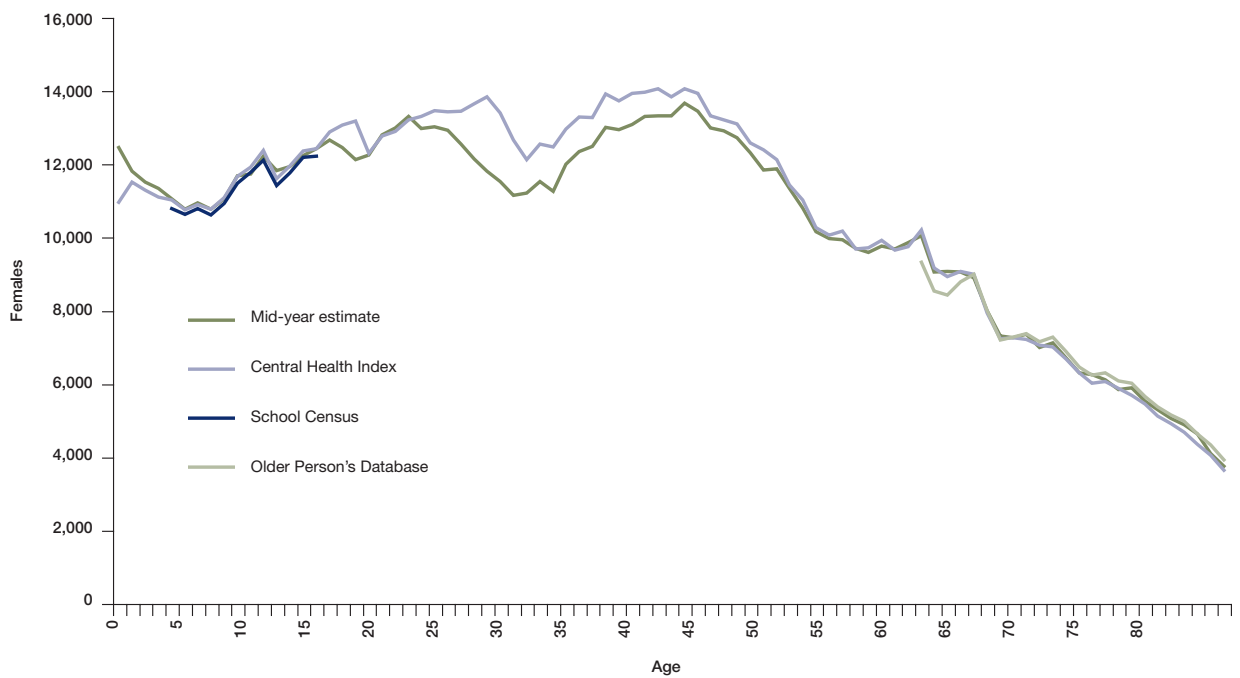
<sup>15</sup> Formerly the Central Services Agency.

## Small Area Population Estimates for Northern Ireland (2008)

**Figure 3 Mid-year population estimates and key datasets, 2008, males by age, Northern Ireland**



**Figure 4 Mid-year population estimates and key datasets, 2008, females by age, Northern Ireland**



- 98 List inflation means that the Central Health Index database cannot be used for the purpose of enumerating the resident population at a given point in time. However, in the application of the Ratio Change method, insofar as the incidence of list inflation remains **constant over time** from one area to another, changes in the number of persons registered with a GP can serve as a valid indicator of population change. That assumption will not hold across all areas and age groups, as it is known that certain age/sex groups and areas are targeted for list cleansing at different points in time. Hence the use of additional datasets to supplement the CHI.
- 99 As shown in Box C, a number of datasets are available to measure the change over time in the child population, including the Child Benefit and School Census databases. Both of these child datasets provide close to complete coverage of the age groups shown in Box C, as can be seen from Figures 3 and 4.
- 100 Similarly, the Older Person's Database provides almost complete coverage of those aged 65 and over, primarily because of the very high take-up of the State Retirement Pension.

Age group	CHI	Births	Child Benefit	School Census Database	Older Person's
Children 0-1	✓	✓	-	-	-
Children 2-4	✓	-	✓	-	-
Children 5-15	✓	-	✓	✓	-
Adults 16-64	✓	-	-	-	-
Adults 65+	✓	-	-	-	✓

- 101 From Figures 3 and 4 above it can be seen that the Ratio Change datasets provide excellent coverage of their respective age and sex populations. In addition, the geographical distribution of the various datasets is well linked to the spatial distribution of the population. As evidenced by the correlations reported in Table 2, this is particularly true for children and people aged 50 and over, albeit somewhat less for those aged 16-49.

**Table 2 Correlations between 2001 Ratio Change datasets and 2001 Census population, SOA level**

Age group	CHI	Child Benefit	School Census	Older Person's Database
Children 0-1	0.9251	-	-	-
Children 2-4	0.9333	0.9255	-	-
Children 5-15	0.9576	0.9258	0.9243	-
Adults 16-49	0.8580	-	-	-
Adults 50-64	0.9600	-	-	-
Adults 65+	0.9818	-	-	0.9844

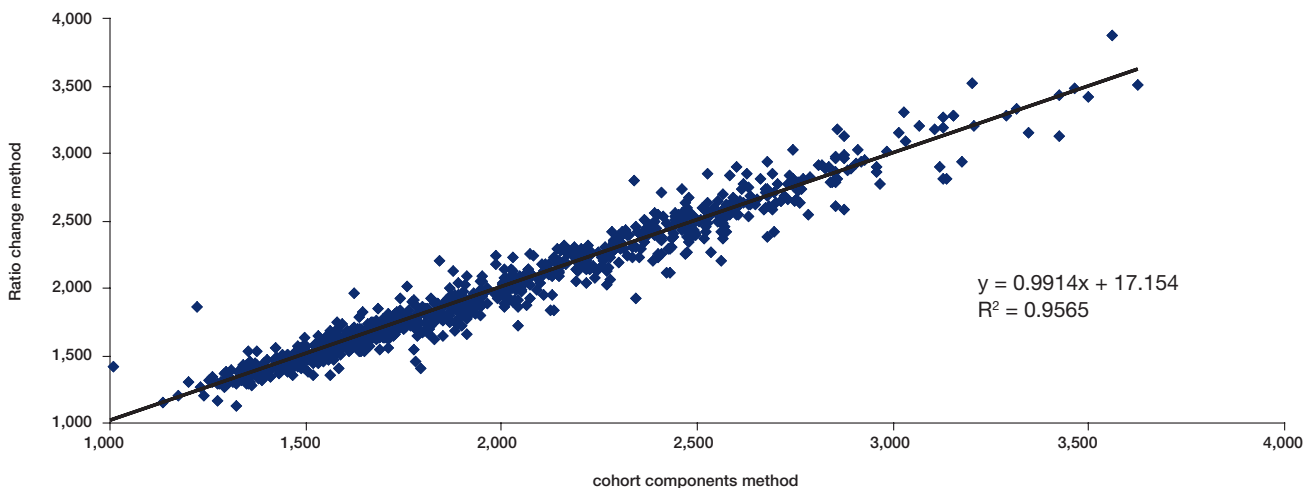
- 102 Unfortunately, for adults aged 16-64, the CHI is the only dataset meeting the requirements of the Ratio Change method. In the preparation of the NIMDM 2005, only the Ratio Change method was used to produce population estimates by SOA for the year 2003 (NISRA, 2005). In that earlier exercise, the risk of sole reliance on the CHI dataset was managed by giving weight also to the Child Benefit dataset in preparing estimates for adults aged 16-49 and the Older Person's Database for adults aged 50-64. In updating to 2008, that risk is better managed through the medium of the mixed approach<sup>16</sup>.
- 103 A particular advantage of the Ratio Change method is that it is straightforward to implement from the available datasets. For adults aged 16-64, the Ratio Change estimate was produced by applying, for each SOA, the percentage increase from 2001 to 2008 in the number of persons listed as registered on the CHI to the 2001 mid-year estimate for that SOA. This was done for each of 10 age groups within that age range, separately for men and women.
- 104 For the remaining age groups, the datasets shown in Box B above were combined to produce weighted average estimates of the change in the relevant population within each SOA. The weightings used were based on the same procedure adopted for the preparation of the 2003 small area estimates used in the NIMDM 2005.

<sup>16</sup> It can also be noted that a number of different weighting schemes were tested for the population aged 16-64. Relying solely on the CHI, rather than some combination of the CHI and the child or older person datasets, yielded the minimum mean absolute error when comparing unconstrained SOA level estimates grossed up to LGD level, with the actual LGD mid-year estimates for 2008.

## 2.5 Coherence

105 The Cohort Component and Ratio Change methods yield very similar small area population estimates for mid-2008 (Figure 5). From a quality assurance perspective, the similarity of the results from the two methods is very reassuring. This is because, in principle, the two methods could be expected to yield the **same** answer under certain conditions i.e. if the components of change were measured with complete accuracy **and** the assumed relationship between the 'true' population and its Ratio Change proxy remained unchanged over the relevant time period. In practice, these conditions will not hold across all areas or age groups. In that circumstance, a mixed approach based on taking a simple average of the two methods provides the opportunity to exploit the complementarities between the two methods, so that the strengths of one method act to offset any weaknesses that may exist in the other method.

Figure 5 Ratio change and Cohort Component estimates – total population 2008 (non-zero axes)



### 3 Quality Assurance

- 106 It is not possible to quantify the accuracy of the small area population estimates prepared for the period 2001 to 2008 i.e. the closeness between the estimates and the true (but unknown) population levels within each SOA. This would require a benchmark such as the Census of Population, but the next Census is not scheduled to take place until 2011.
- 107 Nor is it possible to quantify the uncertainty associated with the estimates. As outlined above, the estimates have been produced using various administrative datasets. They are not based on sample surveys for which confidence intervals could be constructed as a measure of uncertainty.
- 108 Reflecting their reliance on administrative datasets, the population estimates will inevitably be subject to a degree of measurement error. Some groups within the population are more difficult to estimate, such as migrants and students. Administrative practices may not always accord with the assumptions and requirements of the methods for estimating small area populations. For example, localised list cleansing of patient registers may serve to undermine the Ratio Change assumption of a constant relationship between the population and the CHI in affected SOAs. In the Cohort Component method, inaccuracies in the estimation of migration flows may arise where valid postcodes are missing from the CHI database.
- 109 From a methodological perspective, these and other limitations in the administrative databases have been managed through the use of the mixed approach to producing population estimates. Assessing the similarity between the two estimates, as shown above, helps meet the ONS coherence criterion for quality assurance i.e. the extent to which data that are derived from different sources or methods but which refer to the same phenomenon, are similar.
- 110 It should, however, be clearly understood from the user perspective that the mixed approach cannot be expected to eliminate uncertainty and measurement error. For that reason, the population estimates were subjected to a range of quality assurance checks. The main elements in the approach to quality assuring the estimates were as follows:
- Multiple indicators for assessing the change in key population ratios e.g. the ratio of children to the working age population (the child dependency ratio).
  - Comparing the population estimates with additional secondary data sources, such as the change in occupied dwellings by SOA.
  - Use of local knowledge, both in-house and external.

### 3.1 Multiple Indicators

111 The approach to quality assurance was implemented by constructing a database designed to enable a wide range of indicators to be examined for each of the 890 SOAs, both graphically and in tabular form. The demographic indicators examined included:

- Child and pension age dependents per 100 working age adults.
- Sex ratios.
- Crude birth and death rates.
- Marriage rate.
- Average household size.

112 Ratios such as those listed above provide a useful means of checking the consistency between the population estimates for different age groups. A particular focus was on the occurrence of outliers, that is, SOAs where the change in the ratio was outside the range of values that would be expected from trends across Northern Ireland.

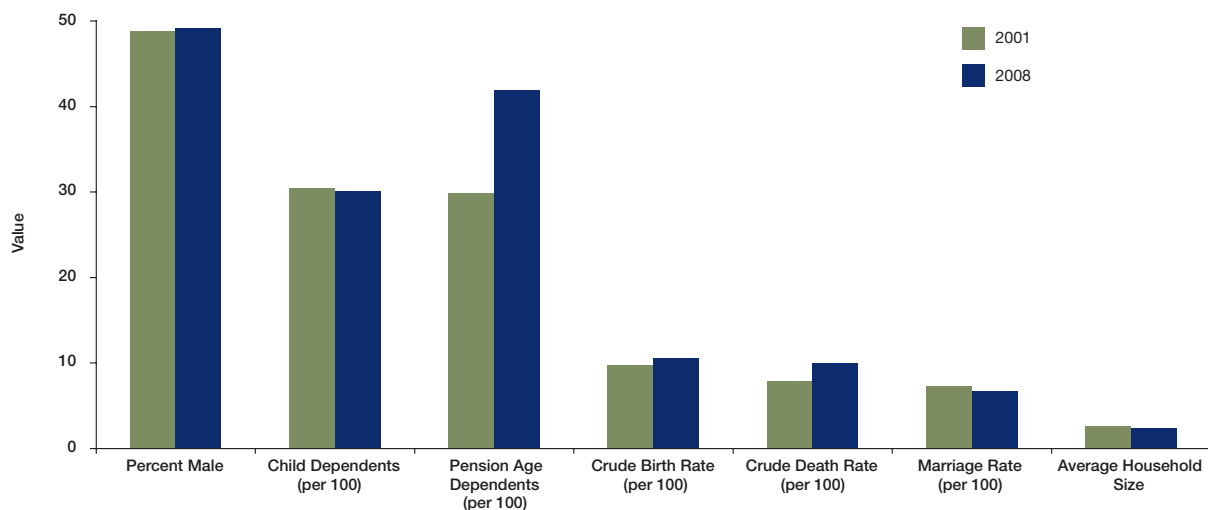
113 An example of such an outlier is illustrated for the Templepatrick SOA in Figure 6 i.e. the sharp upward shift in the ratio of pension age dependents to the working age population. As can be seen, the ratio grew from 30 per 100 to 42 per 100. By comparison, for Northern Ireland as a whole, the pension age dependency ratio rose by just 1.5 percentage points. Such an outlier flags the need to consider whether the pension age population estimates for that SOA may have been overstated or, alternatively, whether the working age estimates might have been understated.

### 3.2 Secondary Data Sources

114 An important focus of the quality assurance process was to compare the estimated population changes with a range of secondary datasets. In the first instance, the estimates were compared with the various administrative datasets that were combined for the Ratio Change method, for two reasons:

- To identify SOAs where the individual secondary datasets may have been inconsistent between one another and/or the population estimates. Such inconsistencies signal a degree of uncertainty regarding the population estimates.
- As a means of further examining areas where the demographic ratios had signalled one or more outliers.

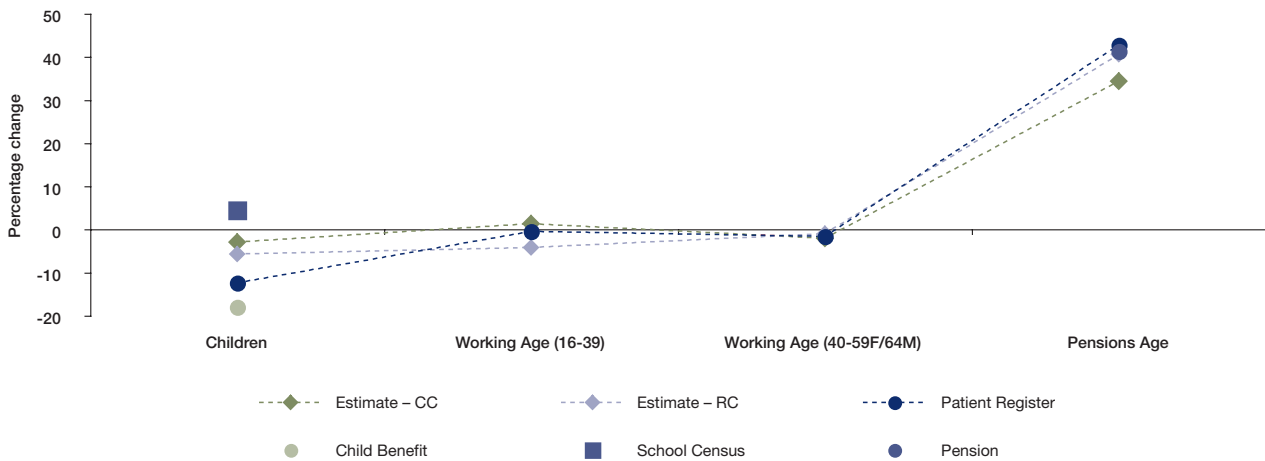
Figure 6 Demographic indicators, Templepatrick SOA, 2001 and 2008



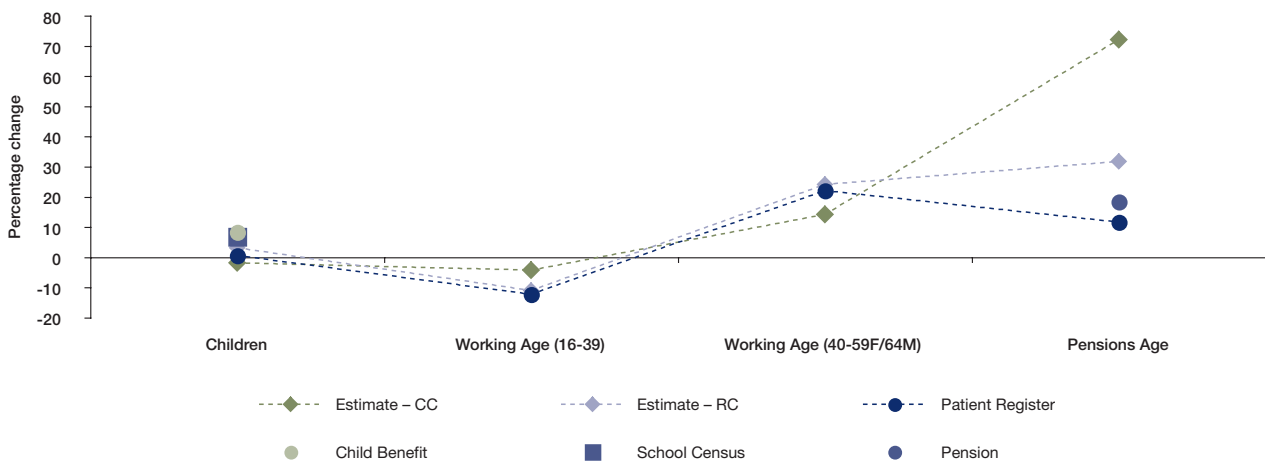
115 In practice, outliers identified from shifts in demographic ratios were generally found to be explicable in terms of the changes in secondary datasets. For example, the sharp increase in the older person dependency ratio for the Templepatrick SOA (see Figure 6 above) was found to be entirely consistent with a rapidly growing older population which was evident across all of the available datasets (Figure 7).

116 However, in some SOAs, the population estimates and secondary datasets were not all mutually consistent. For example, in Kilmore\_1 (Down LGD), there was a large difference in the estimated pension age population between the ratio change method and the cohort component method (Figure 8). The estimates from the ratio change method were in line with the 2001-08 relative change and the actual 2008 CHI and pension benefits. It was therefore decided to use the ratio change results in Kilmore\_1 for the pension age population only.

**Figure 7 Secondary datasets and population estimates, Templepatrick SOA, percentage changes, 2001-2008**



**Figure 8 Secondary datasets and population estimates, Kilmore\_1 SOA, percentage changes, 2001-2008**



## Small Area Population Estimates for Northern Ireland (2008)

- 117 The secondary datasets examined for the quality assurance exercise were not confined to those used also as inputs to the population estimates. For each of the broad age groups – children, working age adults and older persons – the population estimates were also compared with counts for persons living in households in receipt of means-tested benefits such as Income Support, Income-based Jobseeker's Allowance and Pension Credit. These comparisons served to ensure that the population estimates did not exceed the counts of people in receipt of those benefits.
- 118 The assessment also considered the change in the number of occupied dwellings within each SOA. Given the housing market trends noted earlier, this was considered an important source of data to check the consistency between the population estimates and the geography of the dwelling stock. The current data source for counts of occupied dwellings is the Land and Property Services Agency (LPSA) list of domestic addresses. However, the database is not available on a consistent basis at SOA level back to 2001. Notwithstanding the limitations, the occupied dwellings dataset was a useful secondary source.
- 119 Finally, the quality assurance exercise considered population trend lines for each SOA. The trend lines were included as a useful check on whether the pattern of change over time within each SOA was marked by any pronounced 'kinks' or changes of direction that would signal a cause for concern.
- 120 Overall, a considerable range of data sources and methods were deployed for the quality assurance exercise. In general, the use of a mixed approach based on averaging the Cohort Component and Ratio Change methods tended to address uncertainties associated with one or other of the two methods. There were 27 SOAs where manual adjustments were required, to address inconsistencies across datasets or indicators such as the demographic ratios. For the most part, however, these adjustments were required to manage the small area estimation problems that typically accompany special populations, such as students and the Forces.



## 4 Patterns of Change 2001 to 2008

- 121 This Section describes the main patterns of small area population change from 2001 to 2008<sup>17</sup>. The Section commences with an overview on the geographical variations in rates of population change across Northern Ireland. It then examines the experience of different types of areas in the period from 2001 to 2008 under the following headings: settlement type; urban-rural contrasts; and, deprivation, as measured for 2003 by the NIMDM 2005.
- 122 The Section concludes by presenting the main features of small area population growth at sub-regional level. The sub-regional classification used in this paper is the LGD groupings for the European Union's NUTS 3 level classification of spatial units<sup>18</sup>.

### 4.1 Overview

- 123 From 2001 to 2008, the population of Northern Ireland increased by 5.1 per cent. The growth was unevenly distributed by region (Table 3) and by LGD (Table 4). Belfast experienced a population loss of 3.2 per cent compared with a 9.9 per cent expansion in the West & South region

**Table 3 Population change by region and broad age group, 2001-2008**

	Belfast %	Outer Belfast %	East of NI %	North of NI %	West & Northern South of NI %	Ireland %
All ages	-3.2	3.4	8.6	4.1	9.9	5.1
Children	-12.5	-4.0	0.2	-6.6	-0.9	-4.0
16-39	-1.8	-3.7	3.7	-2.3	10.2	1.6
40-59F/64M	3.3	11.9	15.6	15.8	17.2	13.2
60F/65M+	-3.5	13.5	19.2	18.3	15.8	12.8

Source: NISRA, Mid-year Population Estimates.

- 124 The small area population estimates have been prepared to be consistent with the mid-year estimates for the larger geographies within which they are located. Hence, the divergent regional and LGD-level trends are fully reflected in the population estimates for Northern Ireland's 890 SOAs.

**Table 4 Population change 2001-2008, by LGD**

Area	Overall population change (%)	Per cent of SOAs with population:		
		Falling	Growing 0%-10%	Growing 10%+
<b>Belfast</b>	<b>-3.2</b>	<b>72</b>	<b>20</b>	<b>8</b>
Belfast East *	-0.9	65	26	10
Belfast North *	-2.9	70	25	5
Belfast South *	-4.5	81	12	7
Belfast West *	-3.9	70	19	11
<b>Outer Belfast</b>	<b>3.4</b>	<b>48</b>	<b>31</b>	<b>21</b>
Carrickfergus	6.1	25	50	25
Castlereagh	-0.5	61	36	3
Lisburn	5.3	45	24	31
Newtownabbey	3.2	60	17	23
North Down	3.0	43	43	15
<b>East of NI</b>	<b>8.6</b>	<b>31</b>	<b>28</b>	<b>40</b>
Antrim	9.2	32	16	52
Ards	5.7	39	35	26
Ballymena	6.7	24	45	31
Banbridge	13.0	16	26	58
Craigavon	12.3	27	25	48
Down	8.8	19	28	53
Larne	1.6	75	13	13
<b>North of NI</b>	<b>4.1</b>	<b>41</b>	<b>33</b>	<b>25</b>
Ballymoney	11.5	0	50	50
Coleraine	1.1	48	38	14
Derry	3.6	56	19	25
Limavady	4.5	39	28	33
Moyle	5.7	33	44	22
Strabane	3.5	28	56	17
<b>West &amp; South of NI</b>	<b>9.9</b>	<b>13</b>	<b>41</b>	<b>47</b>
Armagh	6.8	24	32	44
Cookstown	9.9	6	50	44
Dungannon	15.7	0	32	68
Fermanagh	7.4	16	56	28
Magherafelt	9.9	5	52	43
Newry & Mourne	11.3	17	32	51
Omagh	8.3	13	42	46
<b>N. Ireland</b>	<b>5.1</b>	<b>40</b>	<b>31</b>	<b>29</b>

\* Parliamentary Constituency areas within Belfast LGD.

Source: NISRA, Mid-year Population Estimates (overall rates of change) and Small Area Population Estimates (SOA population change)

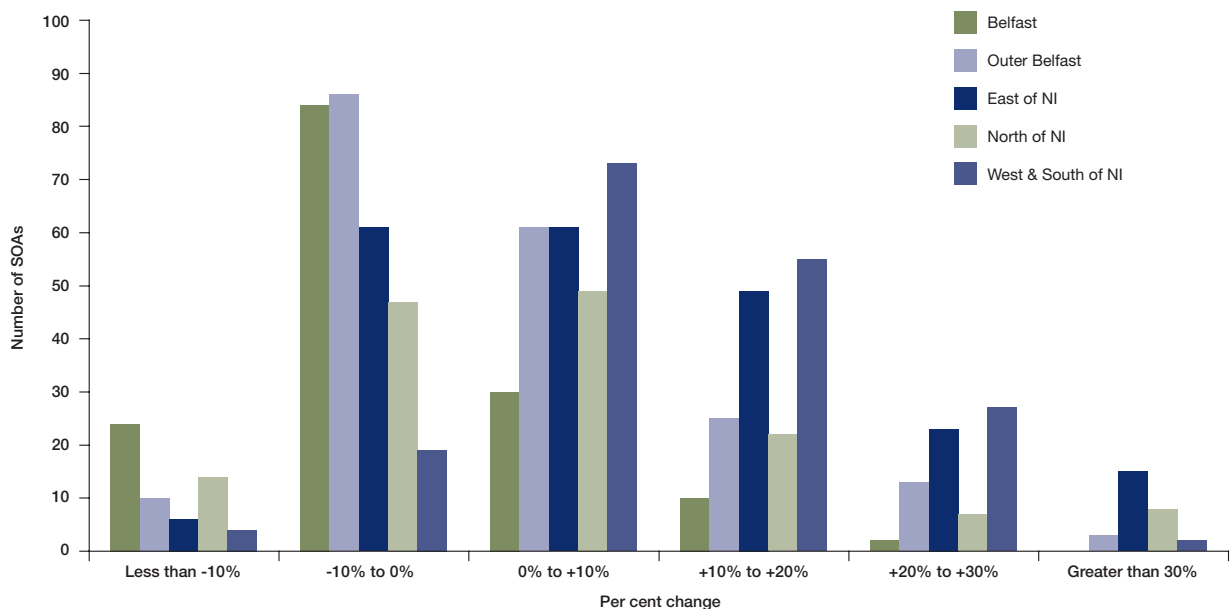
<sup>17</sup> The small area population estimates for SOAs can be found at <http://www.nisra.gov.uk/demography/default.asp125.htm>. The site also includes an interactive mapping feature.

<sup>18</sup> See <http://www.statistics.gov.uk/geography/nuts.asp> for an explanation of the NUTS (Nomenclature of Units for Territorial Statistics) classifications.

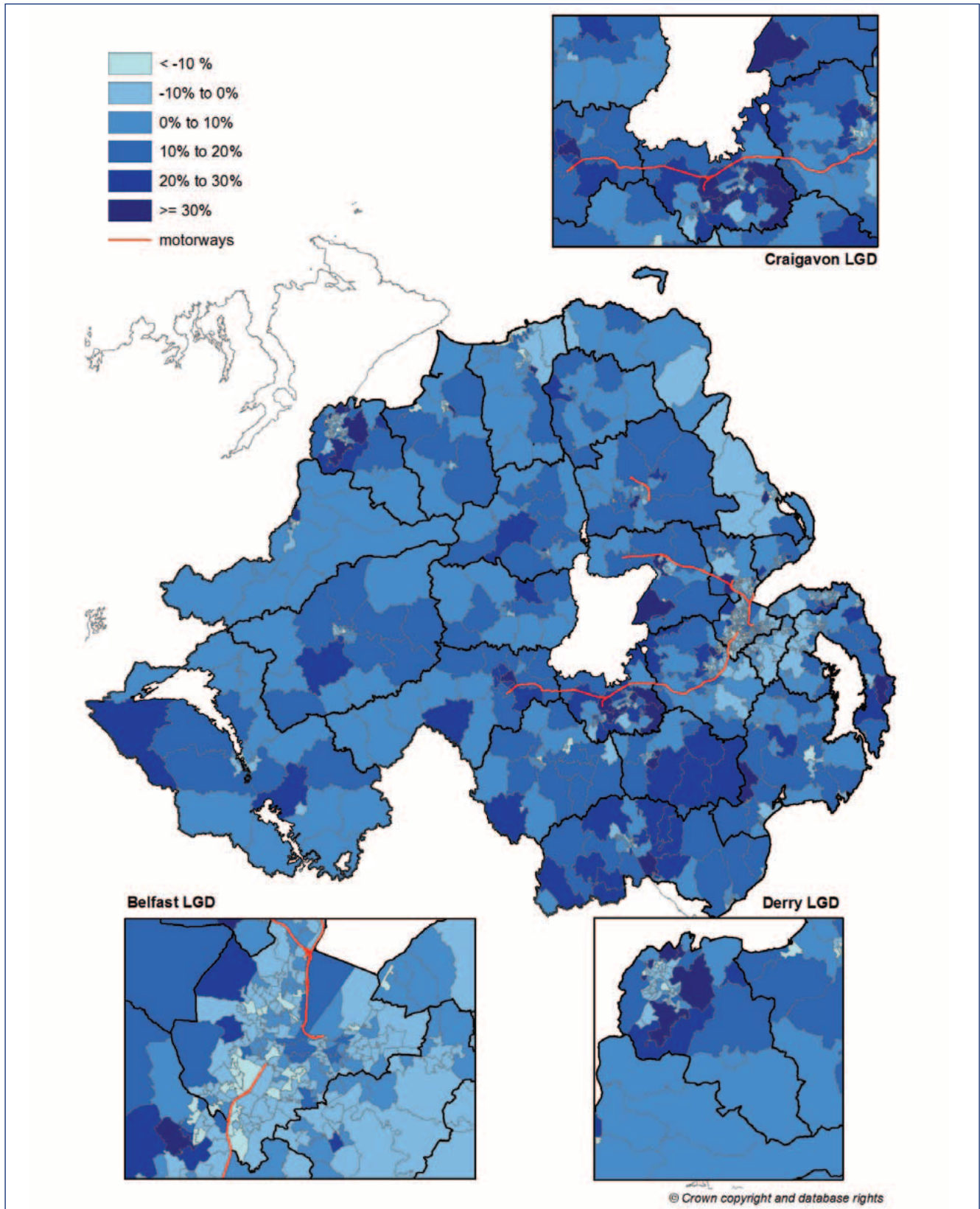
## Small Area Population Estimates for Northern Ireland (2008)

- 125 As can be seen from Map 1, there was a pronounced clustering within Belfast of SOAs losing population. Population decline was not, however, confined to the Belfast area. All regions exhibited a mix of growth and decline between 2001 and 2008 (Figure 9. See also Table B.1 in Appendix B).
- 126 The fastest growing areas tended to be located in suburban areas within commuting distance of major urban centres. Dispersal from Greater Belfast followed a distinct pattern, with the direction of growth following the M1 and A1 corridors, mainly to LGDs located in the East of NI, such as Banbridge and Craigavon. Indeed, the growth of small areas along the A1 extended down to Newry & Mourne, perhaps reflecting proximity to the Irish Border and commuting to Dublin and other urban centres in the east region of the Republic of Ireland during the 'Celtic Tiger' boom years of the 2000s. Newry also gained in population from the inflow of international immigrants to Northern Ireland from 2004 onwards.
- 127 West of the Bann, the fastest-growing areas were mainly located on the outskirts of the major urban centres. This 'overspill' effect was most pronounced in Derry LGD, with a cluster of areas on the eastern fringe of the City registering growth rates in excess of 20 per cent.

**Figure 9 Population change, 2001-2008, all ages, by region**



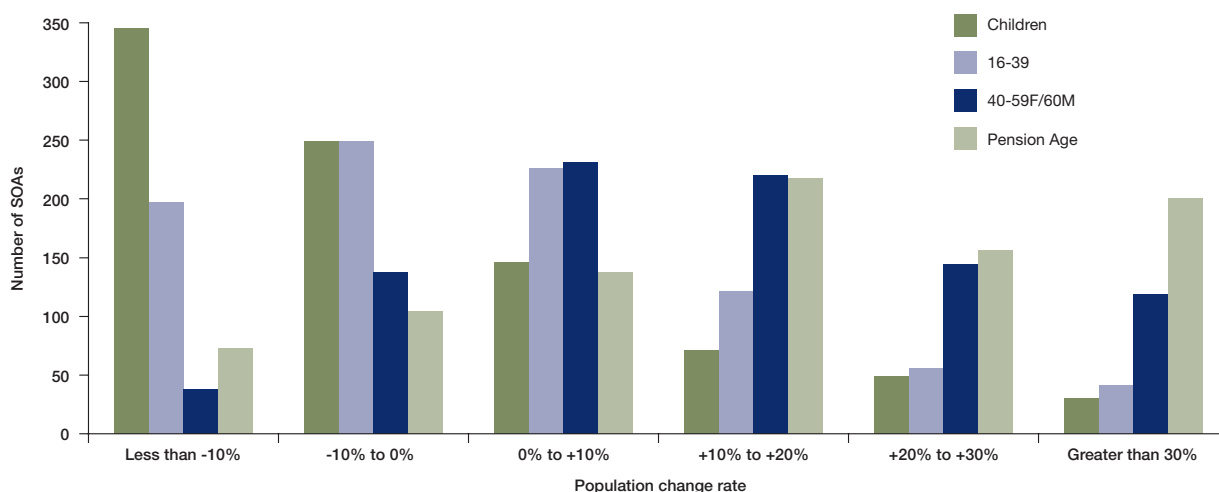
Map 1 Population change, 2001-2008, all ages



## Small Area Population Estimates for Northern Ireland (2008)

- 128 The effect of proximity to the major urban centres is most obvious from the locations of the 28 SOAs that registered population growth in excess of 30 per cent from 2001-2008 (Table B.2). The two fastest growing areas are both located in the Outer Belfast area i.e. Derryaghly\_1 (+97 per cent), in the Lisburn LGD, followed by Mallusk\_2 in Newtownabbey (+88 per cent). Still within Outer Belfast, Conlig\_2 in North Down (64 per cent) ranked fourth among the 890 SOAs in population growth. SOAs in the East of NI accounted for 15 of the 28 areas with growth in excess of 30 per cent. Kilwaughter\_1 in the Larne LGD again illustrates the overspill effect. The M1 effect was most pronounced in Craigavon, with six SOAs growing at 30 per cent or more. In the North of NI, overspill from Derry Urban Area was prominent, with six SOAs recording 30+ per cent growth (Enagh\_2, Culmore\_5, Culmore\_4, Crevagh\_3, Shantallow West\_4 and Holly Mount\_2).
- 129 The period 2001-2008 also witnessed marked differences in rates of population change by age group, which also exhibited pronounced geographical patterns (see Table B.3 for the LGD pattern).
- 130 Across Northern Ireland as a whole, the number of children aged 0-15 fell by four per cent (see Table 3). Reflecting that overall trend, two in three SOAs – 594 out of a total of 890 – experienced a decline in their child population (see Map A.2 in Appendix A). Of those, 345 recorded a decline of 10 per cent or more (Figure 10. See also Table B.1). At a regional level, 85 per cent of SOAs in Belfast experienced a decline in the child population, compared to 56 per cent in the West & South.
- 131 Between 2001 and 2008, Northern Ireland experienced modest growth (+1.6 per cent) in the young working age population (16-39 years). For this age group, half of the 890 SOAs saw a decline in their young working age population with a similar proportion recording an increase. The geographical pattern of change broadly mirrored the all ages picture discussed above (see Map A.3). Population decline in this age group was, however, more widely dispersed, notably in the North of NI, along the coast, as well as much of the Outer Belfast region, where 70 per cent of SOAs lost population in this age group, the highest proportion among the five regional groups.

**Figure 10 Distribution of population change rates, SOAs, 2001-2008, broad age bands**



132 Across Northern Ireland, the population in the older working age group (40-59F/64M) rose by 13 per cent, ranging from three per cent in Belfast to 17 per cent in the West & South (Table 3). At LGD level, the fastest rate of growth was in Banbridge (+24 per cent). For this age group, the majority of SOAs in Northern Ireland (80 per cent) saw an increase in population (Figure 8). Over half of all SOAs (54 per cent) grew by 10 per cent or more. The fastest-growing SOAs were in the M1 and A1 corridors and also on the outskirts of Derry Urban Area (Map A.4). Loss of the older working age population was mainly concentrated in Belfast, where one in three SOAs lost population, and also Outer Belfast, where there was a decline in 26 per cent of SOAs.

133 The population of pension age (60F/65M+) also grew by 13 per cent across Northern Ireland from 2001 to 2008 (Table 3). Similar to the older working age group, population growth was the norm for those of pension age, with 80 per cent of SOAs registering some increase and 65 per cent growing by 10 per cent or more. Relative to other age groups, the fastest rates of growth (30 per cent and over) were more dispersed across suburban and rural areas of the province (see Map A.5).

134 Nonetheless, the pension age population declined in one in five SOAs (177). Mainly, this occurred in Belfast, where 63 per cent of SOAs saw a decline in the older population from 2001 to 2008. Of the 177 SOAs where the pension age population declined, over half (54 per cent) are located in Belfast. Outer Belfast accounted for 22 per cent of the SOAs where the pension age population fell.

## 4.2 Settlement Type

135 NISRA has developed a statistical classification and delineation of settlements in Northern Ireland, based on the Settlement Development Limits (SDLs) defined by the Planning Service (NISRA, 2005). The classification categorises urban areas by population size (Bands A-E in Box D) and also identifies rural areas (Bands F-G). The settlement type classification therefore provides a useful framework for summarising the geographical patterns in the rates of population change shown in Map 1.

### Box D Settlement types in Northern Ireland

Band	Name	Settlement population type and size (2001 Census)
A	Belfast Metropolitan Urban Area (BMUA)	Urban – circa 580,000
B	Derry Urban Area (DUA)	Urban – circa 90,000
C	Large town	Urban – 18,000 to 75,000 <sup>†</sup>
D	Medium town	Urban – 10,000 to under 18,000 <sup>†</sup>
E	Small town	Urban – 4,500 to under 10,000 <sup>†</sup>
F	Intermediate settlement	Rural – 2,250 to under 4,500 <sup>†</sup>
G	Village	Rural – 1,000 to under 2,250 <sup>†</sup>
H	Small village, hamlet and open countryside	Rural – Less than 1,000 <sup>†</sup>

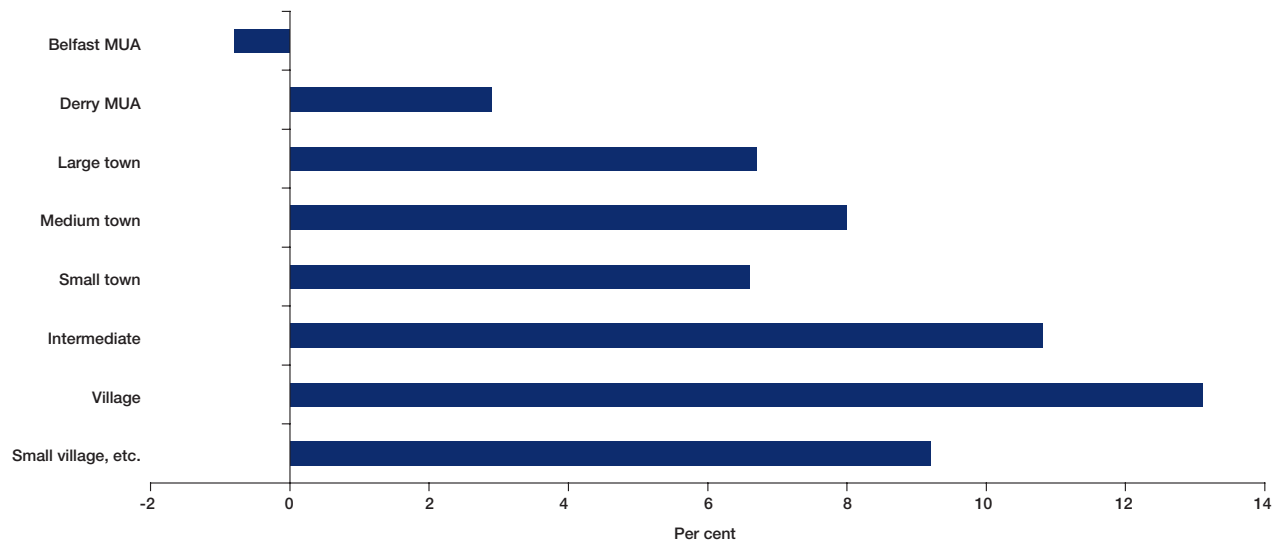
<sup>†</sup> Outside BMUA and DUA

Source: NISRA, 2005.

136 The shift from the most densely-populated urban areas of Belfast and Derry is clearly evident from the disparities in growth rates by settlement type (Figure 11). With average growth rates in the range 6-8 per cent, large, medium and small towns grew slightly faster than the NI average (+5 per cent). The fastest rates of growth were seen in villages (+13 per cent) and intermediate settlements (+11 per cent). Small villages, hamlets and open countryside areas registered growth of nine per cent on average.

## Small Area Population Estimates for Northern Ireland (2008)

**Figure 11 Population change by settlement type, 2001-2008**



137 The overall picture of slower growth in towns as compared with intermediate settlements and villages was replicated across the regions (Table 5).

138 With average population growth rates in double digits, it is clearly possible that some intermediate settlements and villages may require re-classification at some future stage. Given the uncertainties involved in small area population estimation, this is a task that will require information from a Census of Population.

**Table 5 Population change by region and settlement type, 2001-2008, all ages**

	Belfast %	Outer Belfast %	East of NI %	North of NI %	West & Northern South of NI %	Northern Ireland %
All	-3.2	3.4	8.6	4.1	9.9	5.1
Belfast MUA	-3.2	1.4	-	-	-	-0.8
Derry Urban Area	-	-	-	2.9	-	2.9
Large town	-	-	7.0	1.5	8.1	6.7
Medium town	-	-	6.3	4.2	10.7	8.0
Small town	-	10.8	5.3	5.5	8.0	6.6
Intermediate settlement	-	9.7	14.6	12.0	4.9	10.8
Village	-	23.3	13.5	5.6	15.7	13.1
Small village, etc.	-	12.3	9.5	4.4	10.3	9.2

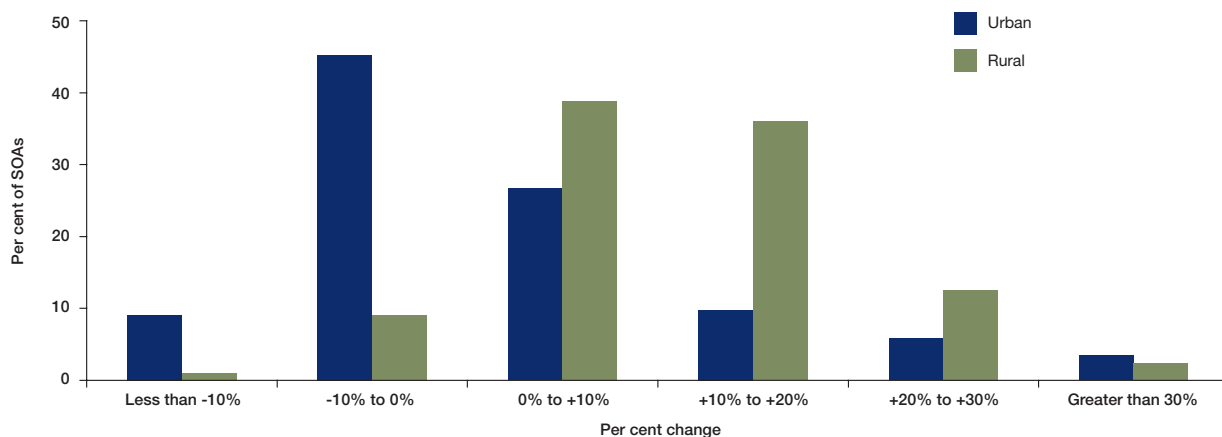
Source: NISRA, *Small Area Population Estimates*.

### 4.3 Urban-Rural Contrasts

- 139 Based on the settlement type classification outlined above, each of Northern Ireland's 890 SOAs has been categorised as urban or rural. As the urban-rural classification is based on the 2001 Census of Population results, it provides a useful summary description of small areas as at the start period for the small area population estimates. At that time, 66 per cent of Northern Ireland's population lived in areas classified as urban with the remaining one-third living in rural areas.
- 140 Over the period 2001-2008, the vast majority of rural SOAs (90 per cent) registered some increase in population (Figure 12). Over half (51 per cent) grew by 10 per cent or more. A substantial proportion (15 per cent) saw their population climb by over 20 per cent. By contrast, the majority of urban areas (54 per cent) experienced a loss of population.

- 141 On average, the population in rural areas grew by 11 per cent, compared to two per cent in urban areas, a gap of nine percentage points. A similar disparity in population growth rates was evident across all age groups (Figure 13).
- 142 The urban-rural disparity in population growth rates was also evident in each of the four regions outside Belfast<sup>19</sup> (Figure 14). Population growth was strongest in the two most rural regions. In 2001, 63 per cent of the population in the West & South of NI lived in rural areas, followed by the East of NI with 43 per cent (Table B.8). In both these areas, rural population growth out-paced urban areas, but the latter grew at a rate slightly faster than the overall NI average of 5 per cent.

Figure 12 Population change by urban-rural, 2001-2008, all ages



<sup>19</sup> All of the SOAs in Belfast are classified as urban.

Figure 13 Population change, 2001-2008, urban-rural by age group

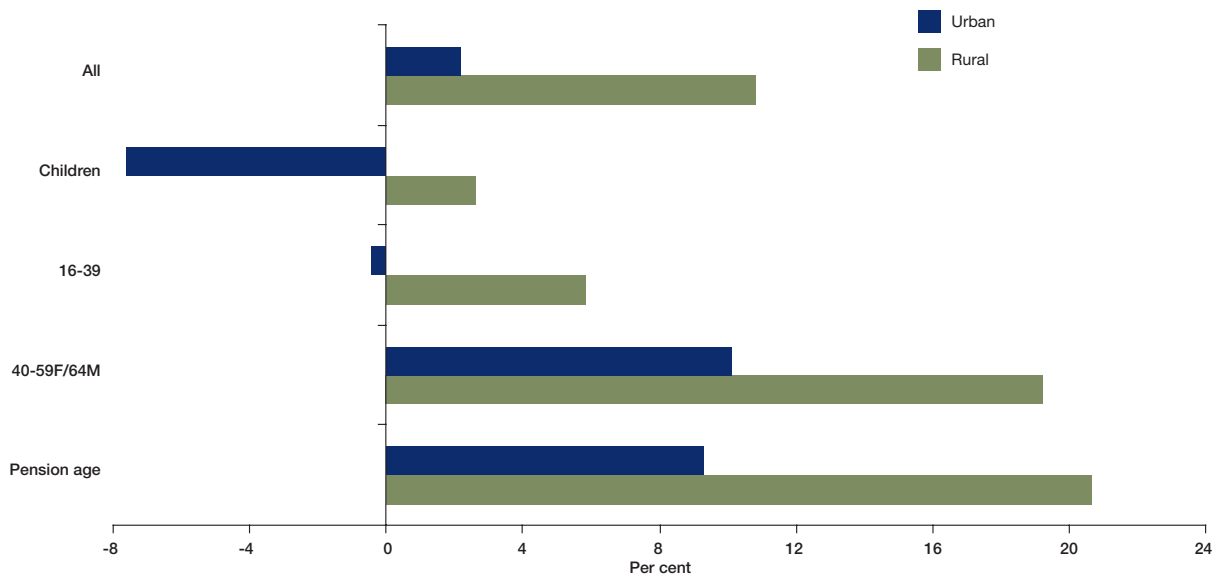
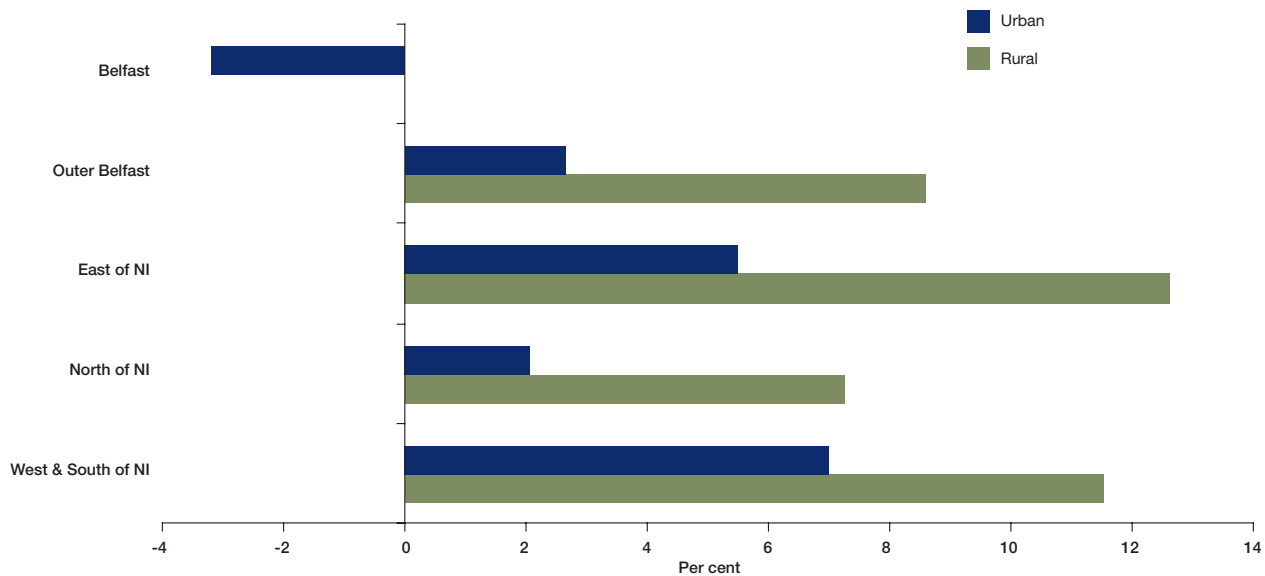


Figure 14 Population change, urban-rural by region, 2001-2008



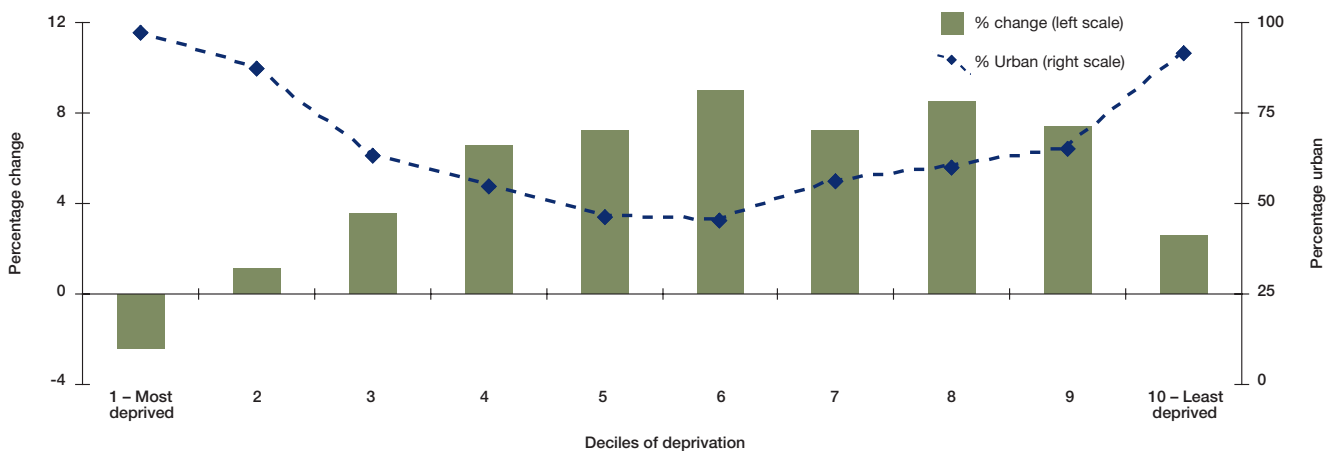


- 143 In the more heavily urbanised Outer Belfast, only 13 per cent of the population lived in rural areas in 2001. There, urban growth was below the overall NI average of 5.1 per cent while rural growth was in excess of the NI average. In the North of NI, the rural share was 37 per cent in 2001. There, the urban population, which includes the Derry Urban Area, grew by just two per cent, well behind the rural growth of seven per cent.
- 144 Considered in tandem with the decline in Belfast's population, the foregoing urban-rural contrasts in population growth would seem to indicate a preference for less densely populated locations that many households were able to satisfy during the 2000s. From 2001-2008, the net change in Northern Ireland's population was 86,000. Of that total, 61,000 (71 per cent) occurred in rural areas with urban areas increasing by just 25,000.

#### 4.4 Deprivation (2005)

- 145 The information used to compile the NIMDM 2005 relates mostly to the year 2003. The 2005 version of the NIMDM therefore provides another useful point of reference to describe differences between small areas in rates of population change from 2001 to 2008. It should be emphasised that the NIMDM 2005 is used in this paper solely to assist in describing the geographical pattern of population change. It does not, and should not be construed as, representing any form of evaluation or assessment of the impacts of policies that have used the NIMDM 2005 for spatial targeting purposes<sup>20</sup>.
- 146 On average, the 10 per cent most deprived areas lost population between 2001 and 2008, according to the small area estimates (Figure 15). However, the relationship between deprivation and population change was not straightforward. As can be seen from Figure 15, the least deprived 10 per cent of areas also lagged behind the Northern Ireland average in population growth. Partly, this would seem to reflect an urban-rural contrast.
- 147 The most deprived and also the least deprived areas in Northern Ireland are also the most urbanised (Figure 15). Indeed, the fastest growing areas were in the middle of the ranking of SOAs on the deprivation scale<sup>21</sup>. These were also the least urbanised in 2001.

**Figure 15 Population change 2001-2008 and percentage rural by deciles of deprivation**



<sup>20</sup> Identifying policy impacts would require the construction of a counterfactual, which is not an objective of the small area population estimates.

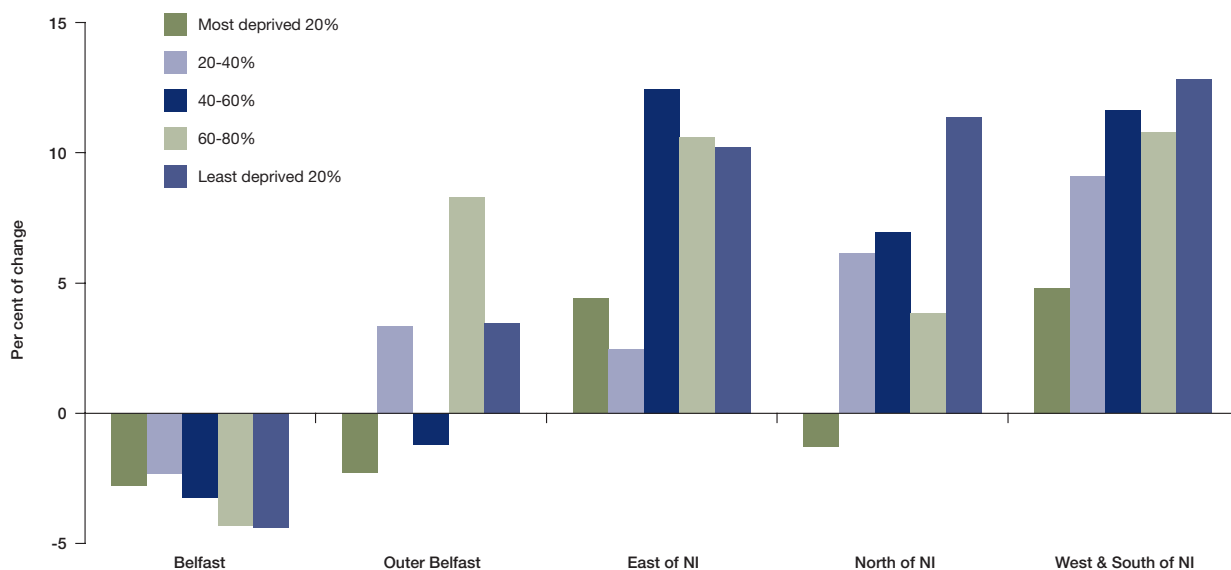
<sup>21</sup> For the purpose of Figure 15, the 890 SOAs were first ranked from most deprived to least deprived on the NIMDM 2005 deprivation scores. They were then sorted into 10 equal-sized groups, with the 89 most deprived areas in the first decile, the next 89 most deprived in the second decile, and so on. The fifth and sixth deciles are therefore in the middle of the ranking of SOAs by deprivation.

148 A second important feature of the most deprived areas is the extent to which they are concentrated in Belfast and Derry LGDs. Of the 10 per cent most deprived SOAs on the NIMDM 2005, 57 per cent were located in Belfast (Table B.8), which suffered a loss of population from 2001 to 2008. In that context, when comparing population change between the most and least deprived SOAs, it is noteworthy that for those in Belfast, most deprived SOAs have lost population at a slower rate than the least deprived SOAs (Figure 16)<sup>22</sup>. This may perhaps reflect the more general trend towards suburbanisation of the population as reflected in the contrasts highlighted above by settlement type (Figure 11) and urban-rural (Figures 12-14). On the other hand, outside Belfast, the most deprived areas tended to lose population at a faster pace than other areas, notably in the West & South.

#### 4.5 Migration

149 As described in Section 2 above, the methodology for producing the small area population estimates employed a mixed approach, combining the Cohort Component and Ratio Change methods. Consequently, it is not strictly possible to divide the change from 2001 to 2008 into the components of change i.e. natural increase and net migration. However, as births and deaths are very well measured, it is possible to derive approximate estimates for the migration component. The migration patterns are especially useful to examine because, the smaller the area, the more important is migration as a component of change. By the same token, the smaller the area, the more uncertain will be the migration estimates. That caveat should be borne in mind in the following discussion.

Figure 16 Population change by region and quintiles of deprivation, 2001-2008, all ages



<sup>22</sup> For Figure 16, the 890 SOAs have been ranked on the NIMDM 2005 and sorted into five equal-sized groups, with the most deprived 20 per cent in the first group, and so on.

150 At the small area level, there are two streams of migration flows to consider, as follows:

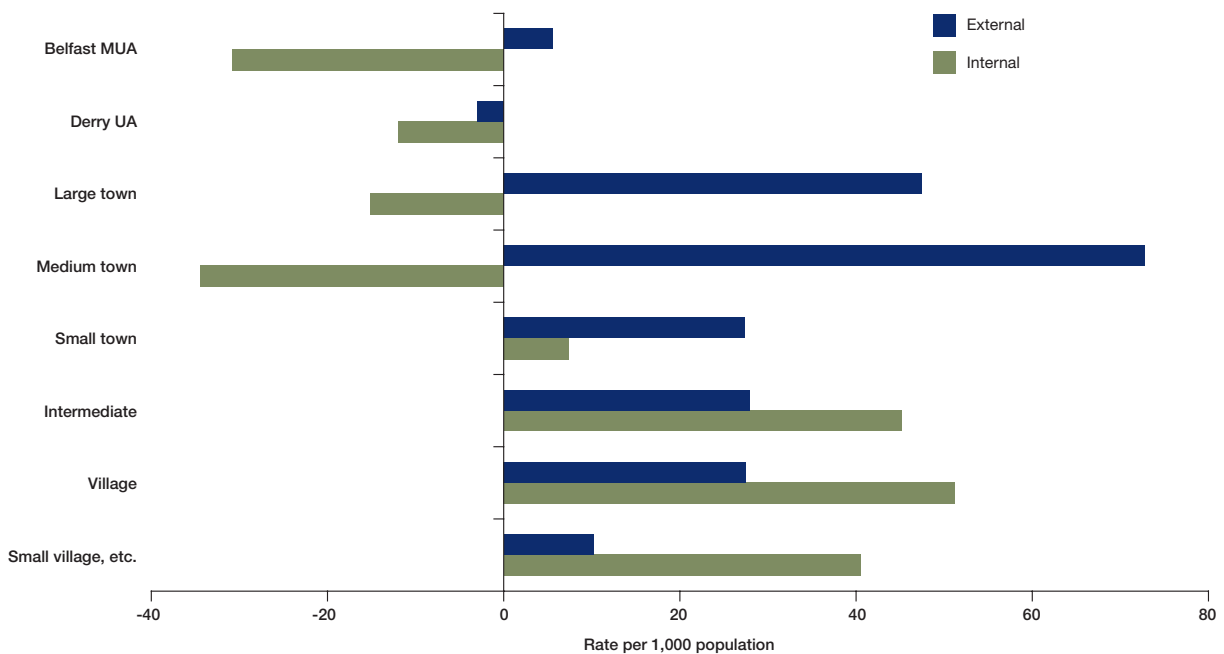
- Internal migration i.e. moves made from one location in Northern Ireland to another.
- External migration i.e. moves into Northern Ireland by those living elsewhere and moves from a location in Northern Ireland to some other country or region of the UK.

151 The estimated net migration rates for the two categories of movements by settlement type are shown in Figure 17. A negative rate signifies that more people left the area than came in, while a positive rate indicates a gain in population from migration.

152 As can be seen, net flows within Northern Ireland (internal migration) are predominantly from urban areas to rural areas. Within the urban hierarchy, only small towns gained from internal migration, although by a small margin. The main direction of internal movements was to intermediate settlements, villages and small villages, hamlets and open countryside. The overall pattern by settlement type did not vary greatly by region (see Table B.6).

153 External migration flows followed a different pattern. Rural areas gained from external migration, but the largest net inflows were recorded by medium and large towns, followed by small towns. Furthermore, in marked contrast to the internal migration pattern, Belfast is estimated to have gained slightly more from external migration than it lost. Unlike the internal migration pattern, the external migration flows had a distinct regional character.

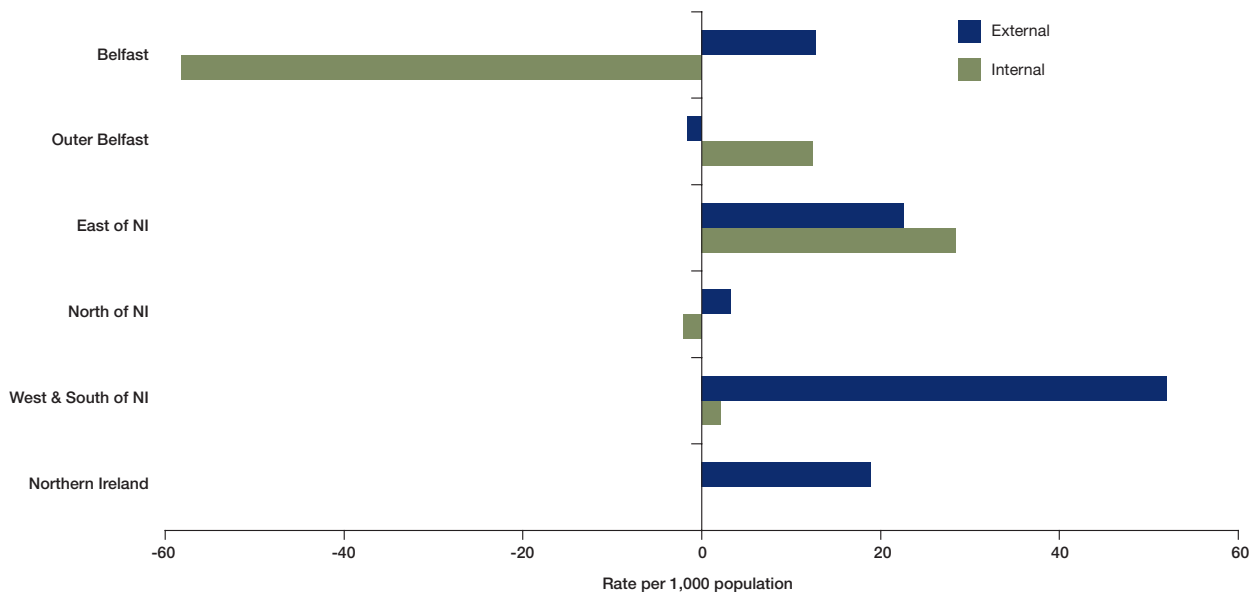
**Figure 17 Internal and external migration by settlement type, net flows, 2001-2008, rate per 1,000 of 2001 population**



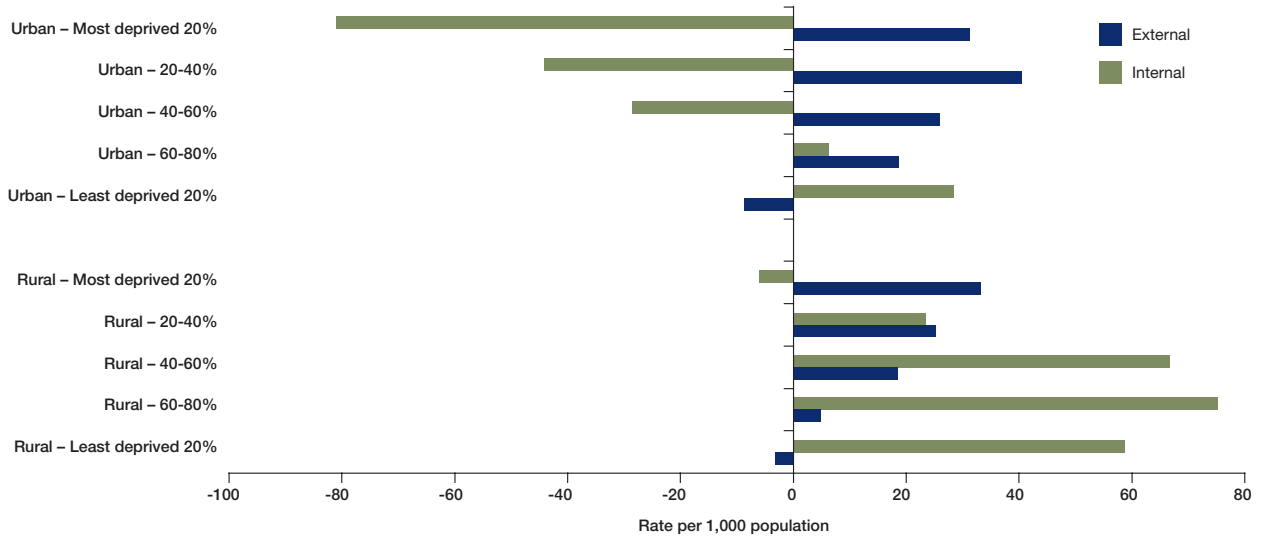
## Small Area Population Estimates for Northern Ireland (2008)

- 154 In the West & South of NI, all of the gain from migration was derived from flows into the region from outside Northern Ireland (Figure 18). The region's large and medium towns are estimated to have gained more from external migration than the villages and more rural areas (see Table B.6).
- 155 The East of NI gained both from external and internal migration. Similar to the West & South, the external inflow rates were higher for the towns than the rural areas.
- 156 Migration patterns also varied by level of deprivation. Within urban areas, the most deprived areas tended to lose population due to internal migration with the least deprived areas gaining from internal flows, on average (Figure 19). By contrast, external migration rates were positive in all but the least deprived areas.
- 157 In the rural areas, internal migration rates also varied by level of deprivation, being lowest in the most deprived areas. In contrast to urban areas, internal migration rates in the most deprived areas were only slightly negative. In those same areas, net inflows due to external migration were higher than in the least deprived rural areas, though the latter gained substantially from internal migration inflows.

**Figure 18 Internal and external migration by region, net flows, 2001-2008, rate per 1,000 of 2001 population**



**Figure 19 Migration by rural-urban and deprivation, net flows, 2001-2008, rate per 1,000 of 2001 population**



#### 4.6 Belfast

- 158 In 2001, Belfast accounted for 16 per cent of the total population living in Northern Ireland (Table B.8). One in four of Northern Ireland's urban population lived in the City. Belfast also contained 57 per cent of the population living in Northern Ireland's most deprived areas. The City was therefore especially exposed to the trends outlined above that are associated with declining population.
- 159 The foregoing trends are reflected in the small area estimates for Belfast (Map 2). Of the City's 150 SOAs, over two in three (108) registered a fall in population between 2001 and 2008 (Figure 20). A further thirty SOAs grew at a modest pace, between 0-10 per cent.
- 160 Growth in excess of 10 per cent was recorded in a dozen SOAs. These included the wedge of growth emanating from the City centre and comprised of Falls\_3, Shaftesbury and Duncairn\_1 as well as The Mount and Island\_2 in East Belfast. The main driver of growth in those areas was the young working age population. Other growing areas were located mainly on the periphery of the City, including Legoniel, Highfield and Glencolin in the North and West, and Rosetta in South.
- 161 The child population fell in over 85 per cent of SOAs. This was well in excess of the proportion of SOAs showing a fall in the young working age (62 per cent) or the older working age (34 per cent) populations. Consequently, the number of children per 100 persons of working age (the child dependency ratio) in Belfast dropped from 36 to 31 per cent. The largest declines, are estimated to have occurred mainly in parts of Belfast West.
- 162 The pension age population declined in 95 of Belfast's SOAs (63 per cent). In contrast to other parts of Northern Ireland, the pension age population fell at a slightly faster pace than the working-age population. Hence, the number of pension age persons per 100 working age adults fell slightly, from 29 in 2001 to 28 in 2008.

Map 2 Belfast – Population change, 2001-2008, all ages

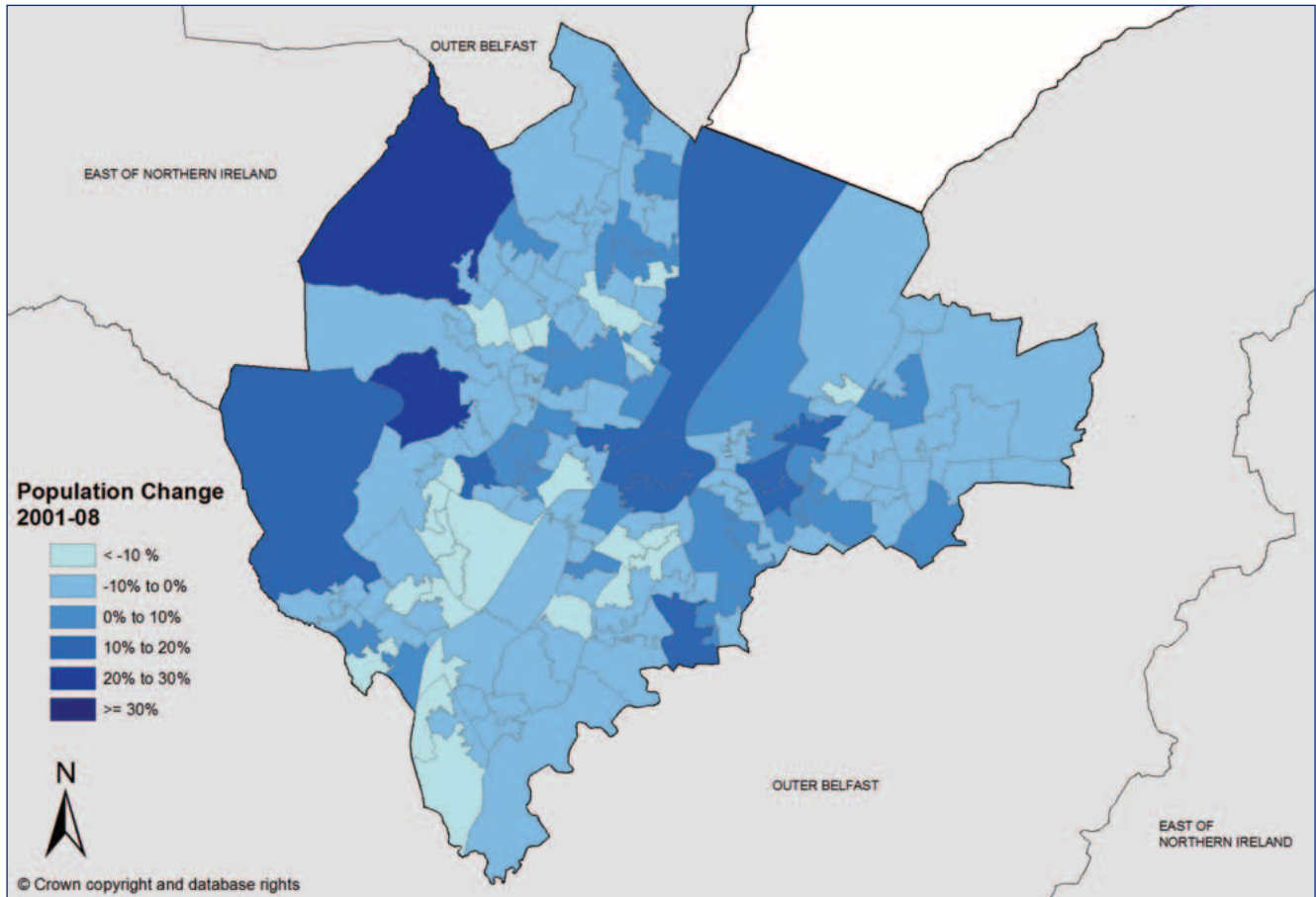
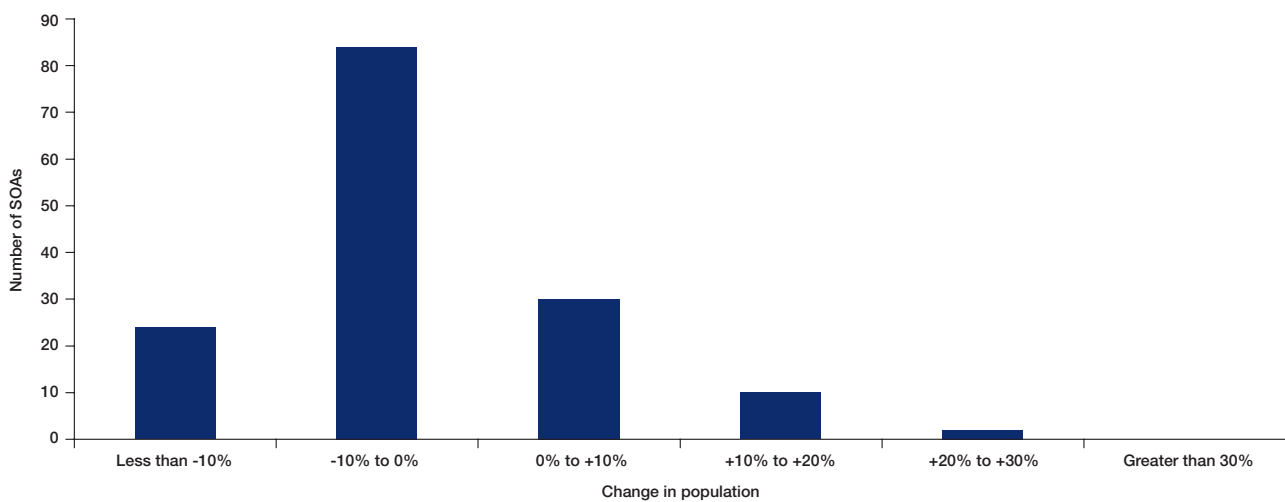


Figure 20 Belfast – Population change, 2001-2008, all ages



## 4.7 Outer Belfast

- 163 Outer Belfast is comprised of the five LGDs that encircle Belfast LGD. Each of the LGDs, which include the City of Lisburn, has its own distinct urban core. It is, therefore, a heavily urbanised sub-region, with 87 per cent of 198 SOAs classified as urban. In 2001, the sub-region contained 29 per cent of Northern Ireland's urban population. The sub-region differs sharply from Belfast in its relative deprivation profile; in 2001, almost one in two people lived in the 20 per cent least deprived SOAs in Northern Ireland as measured by the NIMDM 2005.
- 164 The population trends in some parts of the sub-region have been positively affected by decentralisation from Belfast. The northern and western parts of Lisburn LGD have seen substantial growth, notably in areas such as Ballinderry\_2 and Glenavy (Map 3). Closer to Belfast, parts of Derryaghy have witnessed very rapid growth. In other parts of the sub-region, growth has occurred in locations such as Mallusk in Newtownabbey, as well as Eden, on the fringe of Carrickfergus.
- 165 The opposite pattern has been seen in Castlereagh. More tightly linked to Belfast East, the population trends in Castlereagh would appear to have been more affected by the shift to less densely populated suburban and rural areas that characterised the 2000s. Only Knockbracken\_1 registered growth in excess of 10 per cent. The remainder of the LGD either lost population or grew at less than 10 per cent. Similarly, in North Down LGD, in the areas closest to Belfast City, population growth has been subdued. Locations further away from the City have grown, such as Conlig.
- 166 Overall, half the SOAs in the sub-region have gained in population while the remaining 50 per cent have seen some degree of decline (Figure 21).
- 167 As in other regions, the child population has fallen in most SOAs within the sub-region (71 per cent). Compared to the picture for Northern Ireland as a whole, there has also been a higher incidence of SOAs in the sub-region losing population in the younger working age bracket (70 per cent compared to an NI average of 50 per cent). However, as in the rest of Northern Ireland, the older working age and pension age groups have grown in the majority of SOAs (respectively, 74 and 80 per cent of SOAs).
- 168 Across the sub-region, there has therefore been a decrease in the number of children and an increase in the number of pension age persons per 100 population of working age. The sharpest decreases in the number of children per working age adult have been in the three Colin Glen SOAs, adjacent to Belfast LGD. The number of pension age people per 100 working age population rose by 23 percentage points in Carnmoney\_2 in Newtownabbey.



Map 3 Outer Belfast – Population change, 2001-2008, all ages

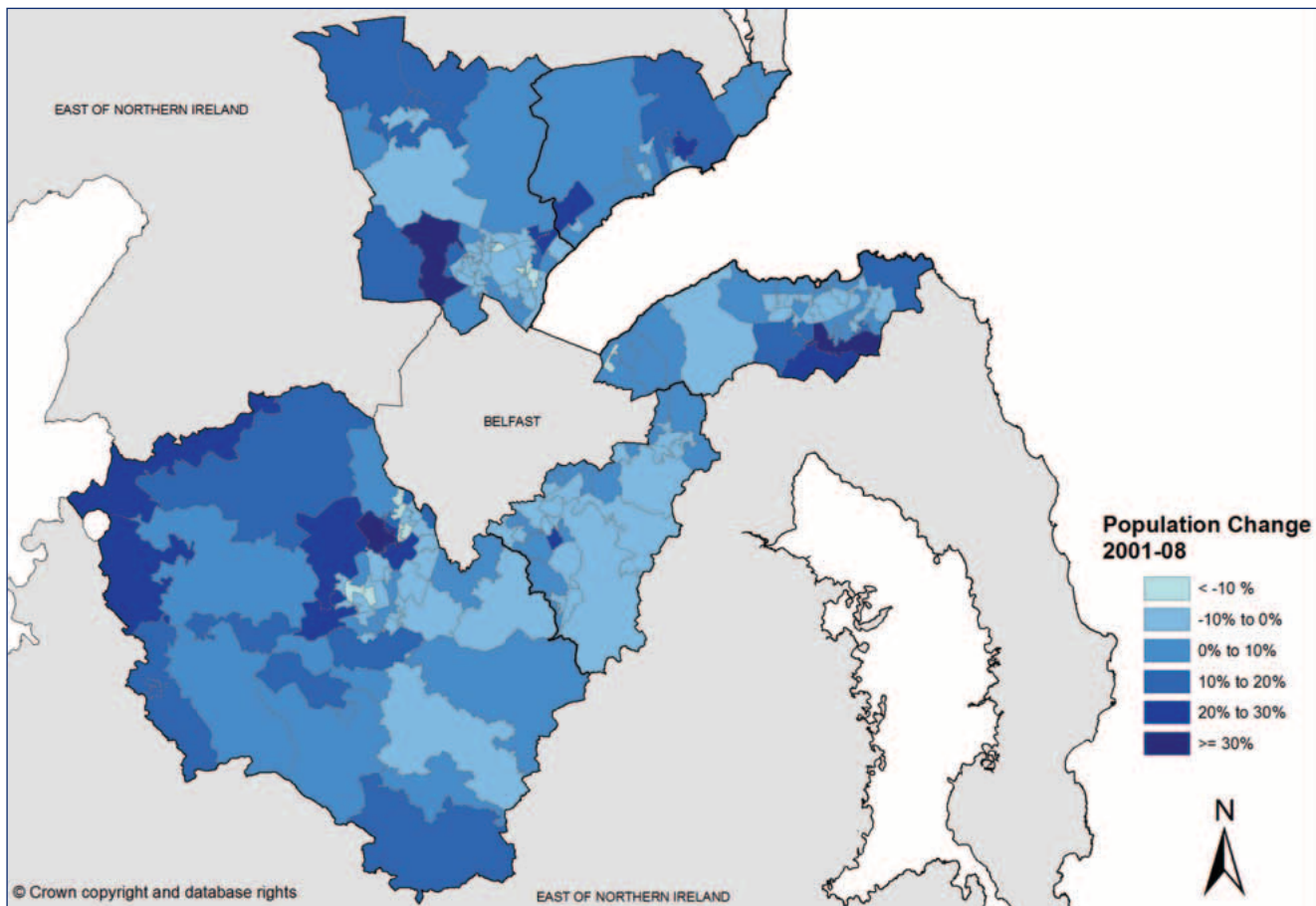
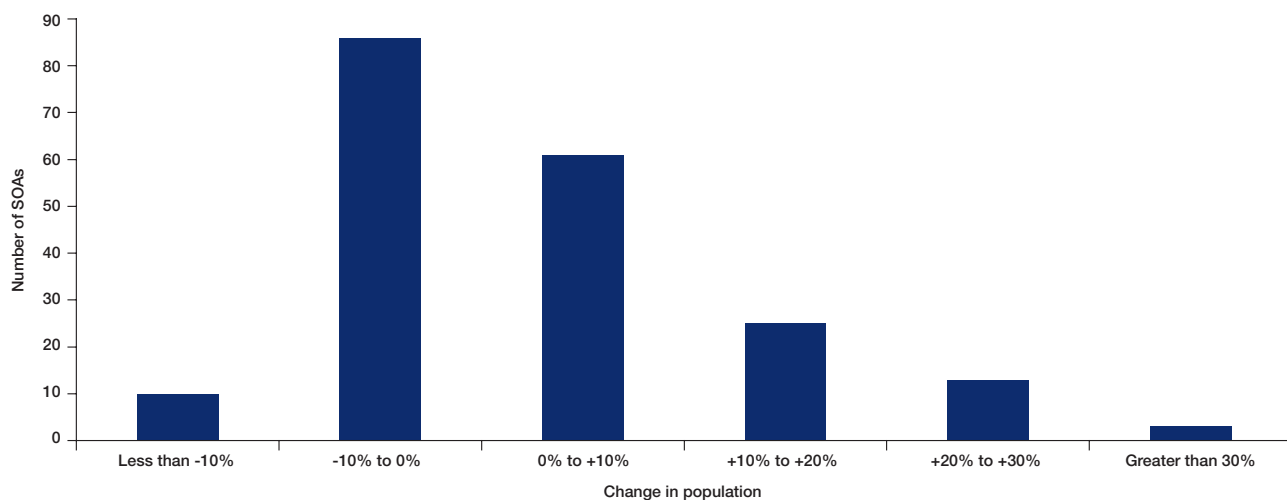


Figure 21 Outer Belfast – Population change, 2001-2008, all ages



## 4.8 East of NI

- 169 Home to about one in four of the population of Northern Ireland, the East of NI forms a crescent shape encircling the Greater Belfast MUA. It ranges from Larne on the east coast, north of Belfast, through Ballymena and Antrim, Craigavon to the east, Banbridge and Down in the south and around to the Ards peninsula on the coast to the southeast of Belfast.
- 170 The East of NI is a diverse region, encompassing large towns such as Craigavon, Antrim, Ballymena and Newtownards, medium towns such as Banbridge and Downpatrick, and small towns such as Ballyclare, Randalstown and Newcastle.
- 171 With a large rural hinterland, well-served by the motorway network and intersected on its southern flank by the A1, the region therefore contains many of the features that were associated with the faster rates of growth in the 2000s. This was in fact the case. Growth was the norm across most of the East of NI (Map 4). Almost 70 per cent of the SOAs in the East of NI recorded an increase in population between 2001 and 2008, compared with 60 per cent for Northern Ireland as a whole (Figure 22). Fifteen of the 30 fastest-growing SOAs were located in the region.
- 172 The faster rates of growth have been centred on the M1 corridor, in Craigavon, and the A1 corridor, in Banbridge. Craigavon has also benefited from a substantial inflow of immigrants following the A8 Accession in 2004. Other pockets of growth have occurred on the outskirts of larger towns, such as Massereene (Antrim) and Ardeevin (Ballymena). The rural dimension is evident in the growth recorded by intermediate settlements such as Castlewellan (Down) and villages such as Portavogie in Ards.
- 173 The growth has not, however, been evenly distributed. While the population of Larne LGD grew by two per cent from 2001-2008, the median population change was -3.4 per cent i.e. population growth in half the SOAs with Larne was below the median. The fastest rate of growth in the region was Kilwaughter\_1 (+72 per cent), on the outskirts of Larne. But the Kilwaughter\_1 growth rate perhaps serves mainly to illustrate one of the main trends in the 2000s i.e. the overspill of population from urban centres. Similarly, in the Ards LGD, the SOAs in the more built-up areas around Newtownards are estimated to have declined between 2001 and 2008, perhaps as population dispersed towards the Ards peninsula or more rural areas in Down. The precise nature of such movements will not, however, be revealed until the results of the 2011 Census of Population are known.

Map 4 East of NI – Population change, 2001-2008, all ages

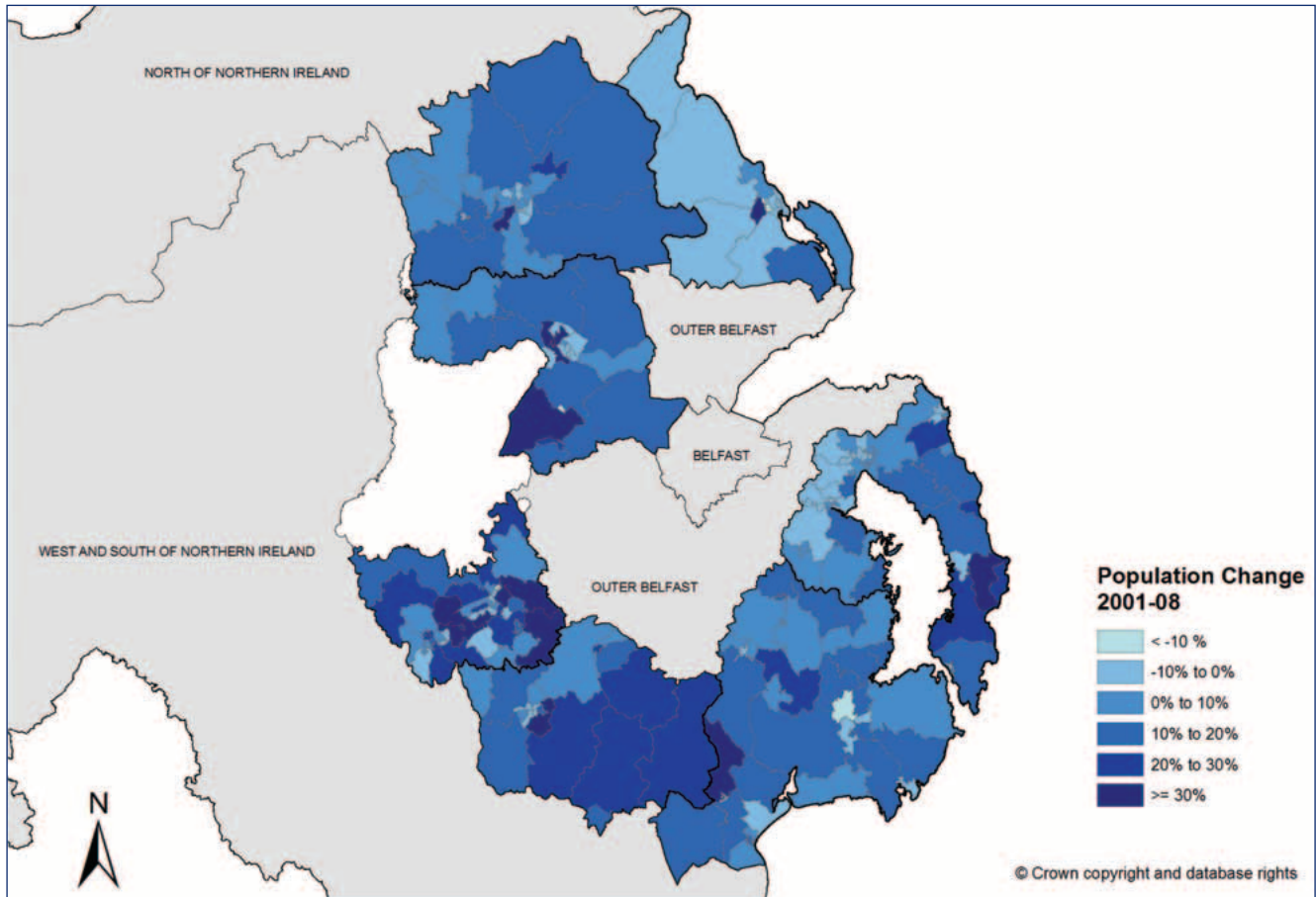
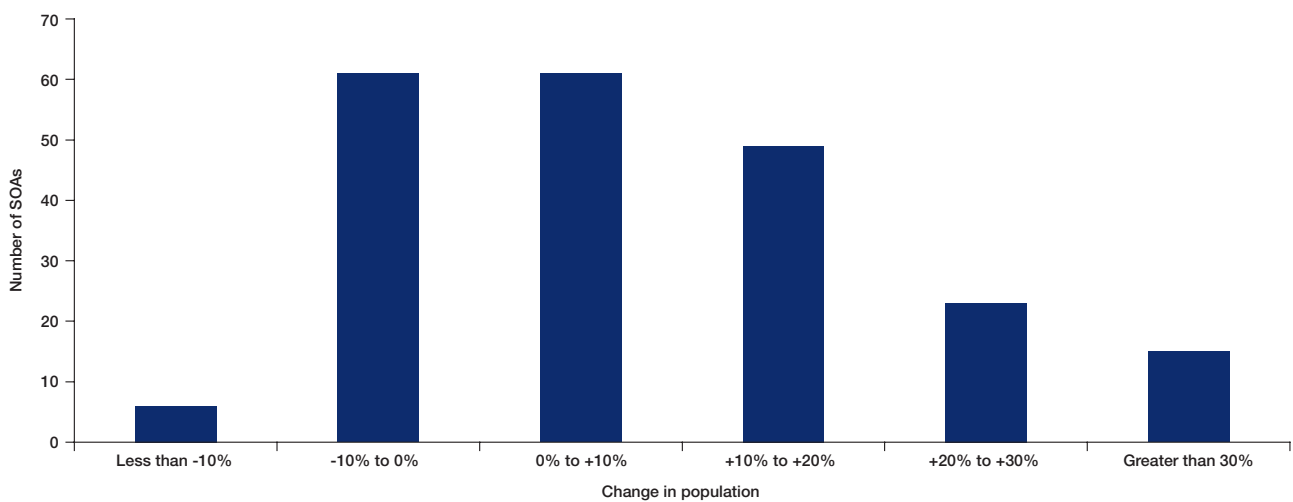


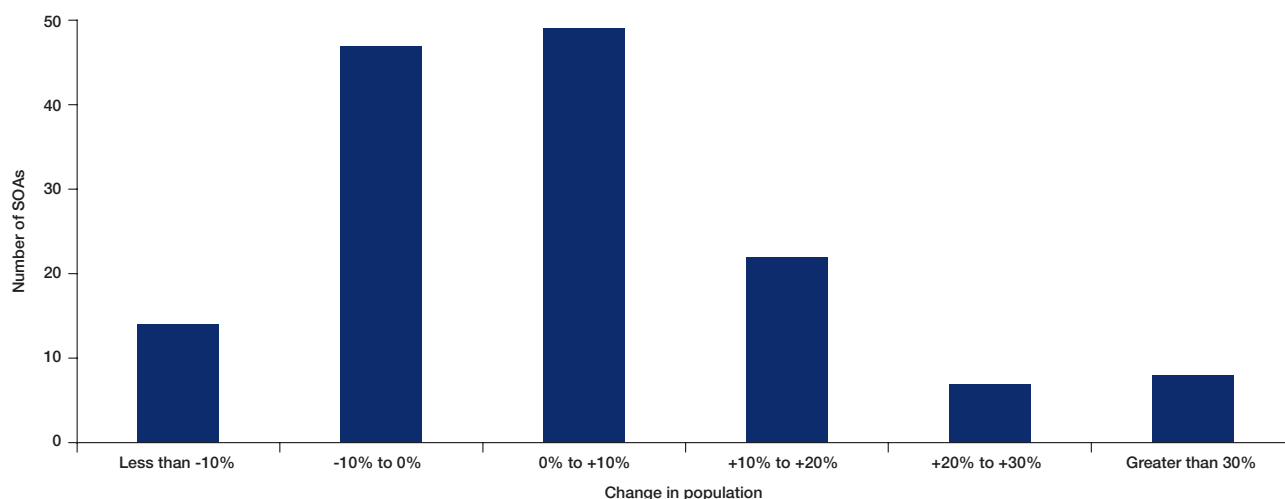
Figure 22 East of NI – Population change, 2001-2008, all ages



#### 4.9 North of NI

- 174 The North of NI stretches from Moyle on the east coast, along the Causeway coastline, through Derry LGD and down to Strabane on the Border with the Republic of Ireland. The largest urban area in the region is Derry Urban Area, contained within the Derry LGD. In 2008, 38 per cent of the regional population of 287,000 lived in the Derry LGD, the same share as in 2001.
- 175 Outside of Derry LGD, the region comprises a mix of large, medium and small towns alongside a substantial rural population. In 2001, almost two in five (37 per cent) of the region's population lived in SOAs classified as rural. There is one large town (Coleraine), two medium towns (Strabane and Limavady) and a number of small towns, such as Ballycastle (Moyle), Portrush (Coleraine) and Ballymoney. The region is therefore quite varied with a dispersed population. In that regard, it can be noted that there are three separate travel-to work areas<sup>23</sup> in the North region: Derry (along with Limavady); Coleraine (taking in Moyle and Ballymoney) and Strabane.
- 176 In the period from 2001 to 2008, the pattern of growth within the region was characterised primarily by dispersal from the Derry Urban Area and the medium and large towns to less densely settled surrounding SOAs (Map 5. See also Figure 23).
- 177 As discussed earlier, a number of SOAs on the outskirts of the Derry Urban Area featured among the fastest-growing in Northern Ireland, with rates of population growth in excess of 30 per cent. A similar pattern could be seen in Coleraine, with rapid population growth in areas such as Knocklynn\_1 (+34 per cent), Hopefield\_2 (+25 per cent) and Dundooan\_2 (+19 per cent). In Strabane, West\_1 and North both saw their population increase by +25 per cent.
- 178 Overall, in the North of NI, the dynamics of population change were largely internal to the region. As shown in Figure 18 above, for the region as a whole, net external migration was close to zero. So too was net internal migration (Figure 24). Within the region, Derry Urban Area and the large and medium towns lost population due to internal migration. The counterpart of the net loss by urban areas was the positive rates of net internal migration seen in the small towns and rural settlements.

Figure 23 North of NI – Population change, 2001-2008, all ages



<sup>23</sup> A travel-to-work area is an area within which the majority of the population both lives and works i.e. most commuting by residents is within the travel-to-work area boundary.

Map 5 North of NI – Population change, 2001-2008, all ages

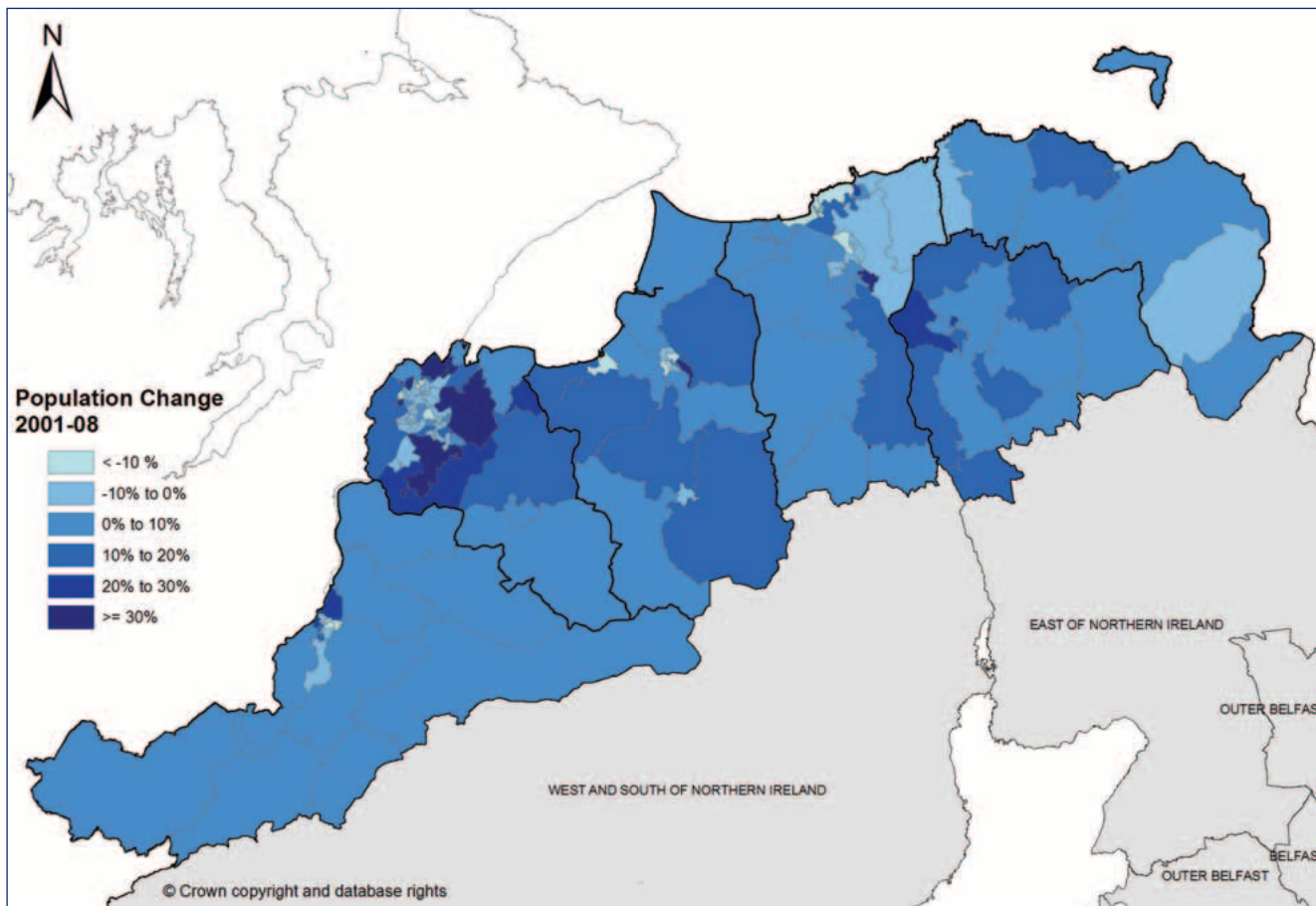
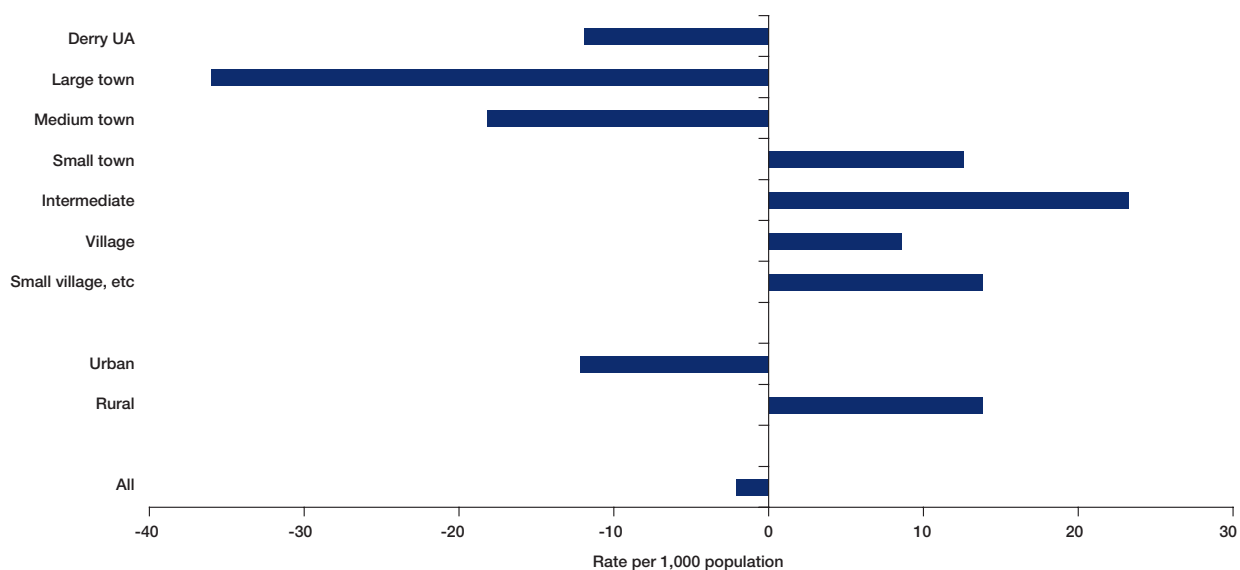


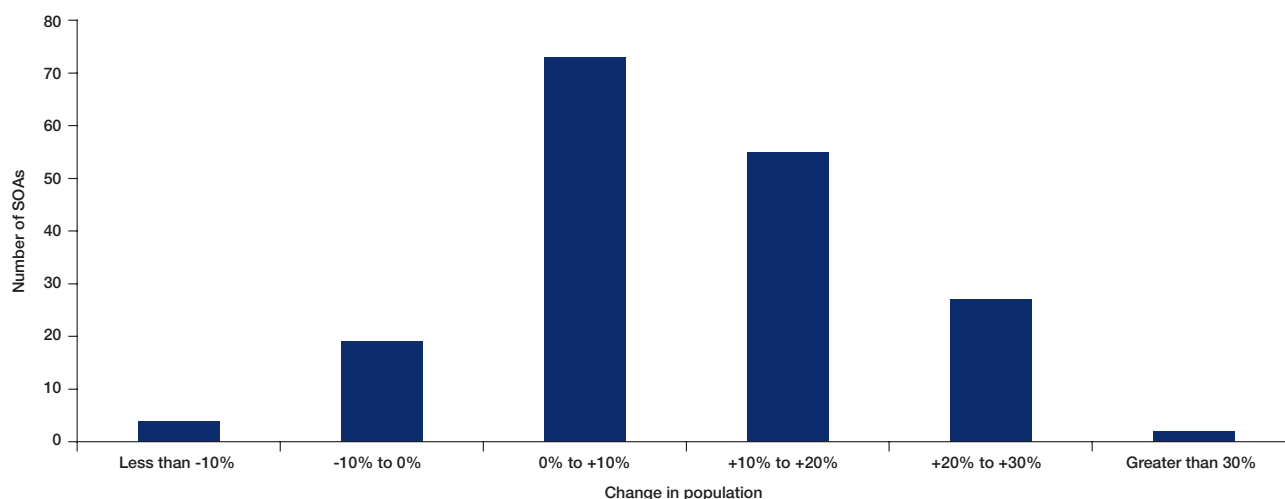
Figure 24 North of NI – Net internal migration by settlement type and urban-rural, 2001-2008



#### 4.10 West & South of NI

- 179 The West & South region is comprised of seven LGDs, including Cookstown and Magherafelt in mid-Ulster, Omagh in the west of the province, and Fermanagh, Dungannon, Armagh and Newry & Mourne in the south.
- 180 It is the most rural of Northern Ireland's five NUTS 3 regions. In 2001, almost two in three people in the West & South lived in rural settlements. The vast majority of those (about 85 per cent) lived in small villages, hamlets and in the open countryside.
- 181 The region contains two large towns – Newry and Omagh – and four medium-sized towns (Dungannon, Armagh, Cookstown and Enniskillen) which are spread across the region. The small towns include Coalisland and Magherafelt. Examples of intermediate settlements include Tandragee and Keady in Armagh and Maghera in Magherafelt.
- 182 Between 2001 and 2008, the main feature of population change in the region was the widely dispersed growth (Map 6). Almost half of SOAs (47 per cent) grew by 10 per cent or more, compared to a NI-wide average of 29 per cent of SOAs (Figure 25).
- 183 Only 23 SOAs (13 per cent) registered a fall in population, compared to 40 per cent across Northern Ireland as a whole. Three of the four SOAs where population declined by more than 10 per cent were affected by army base closures (Rich Hill\_1 and the Mall in Armagh and Lisanelly\_1 in the Omagh LGD).
- 184 The main factor driving the widespread experience of growth was in-migration from outside Northern Ireland. For the region as a whole, net internal migration was close to zero (Figure 26). Within that context, the familiar pattern of an urban-rural shift in net internal migration was evident over the period from 2001 to 2008. The external migration pattern was much different. The region as a whole gained from a net inflow from outside Northern Ireland, mainly from 2004 onwards following the A8 accession (see Fegan and Marshall, 2008).
- 185 Across the size spectrum, urban areas posted strong gains from net in-migration. These inflows were more than sufficient to offset the outflows from urban to rural areas. But rural settlements also gained from external inflows, helping to explain why the pattern of growth in the region was so widely dispersed.

**Figure 25 West & South of NI – Population change, 2001-2008, all ages**



Map 6 West & South of NI – Population change, 2001-2008, all ages

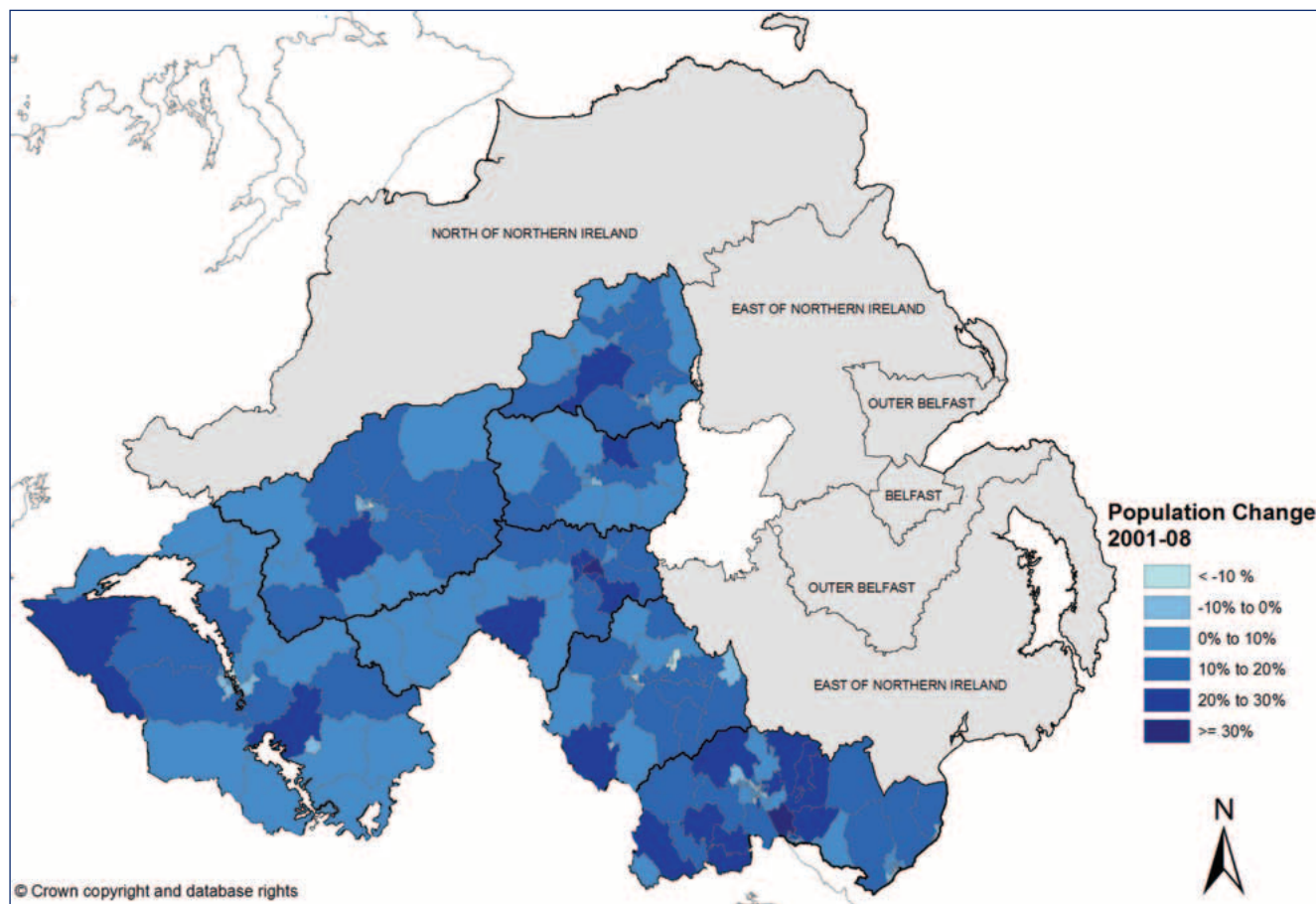
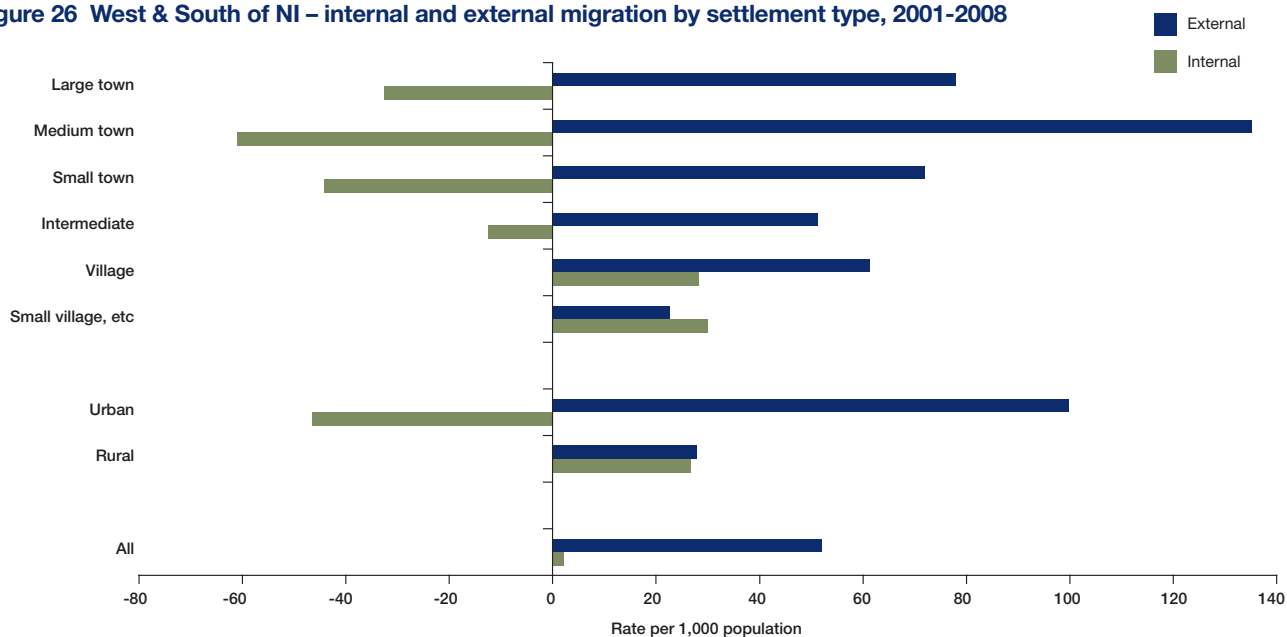


Figure 26 West & South of NI – internal and external migration by settlement type, 2001-2008



## 5 Concluding Remarks

- 186 The primary objective of the small area population estimates prepared for the period 2001 to 2008 was to meet the requirements for an update of small area population levels by age and sex to assist with the preparation of the 2010 NI Measures of Multiple Deprivation (NIMDM). The results by SOA were published on 31 March 2010.
- 187 It is recognised that interest in and use of the small area estimates will extend beyond their use in the construction of the NIMDM 2010. For that reason, this paper has set out the methodology used to make the small area estimates as well as outlining the quality assurance process and summarising some key geographical patterns. Nonetheless, in the use and interpretation of the small area statistics, it is important to bear in mind the following points.
- 188 Small area population estimates are challenging to produce. The smaller the geographical level, the greater will be the volume of population turnover, as people move into and out of small areas for a variety of reasons. For some age and sex groups, such as young males, such movements can be difficult to track from administrative sources.
- 189 While the small area estimates have been prepared to update the 2001 Census of Population, they should not be accorded the same status as a Census. Firstly, the Census remains the most effective approach to the production of small area statistics.
- 190 Secondly, the Census of Population provides the benchmark against which the accuracy of small area statistics can be appraised. In the absence of a Census, it is not strictly possible to measure the accuracy of the small area estimates.
- 191 This inherent uncertainty in the estimation process has been managed in two main ways:
- By adopting a mixed approach to the production of the statistics i.e. combining the Cohort Component and Ratio Change methods. This ensures that all the available information is brought to bear in producing the estimates.
  - Through a rigorous process of quality assurance, based on the analysis of multiple indicators and comparison with secondary datasets.
- 192 The next Census of Population is scheduled to be held in March 2011. When the results of that Census are known, the methodology used for the 2008 small area statistics will be subject to further evaluation, to identify where improvements and refinements can be made.



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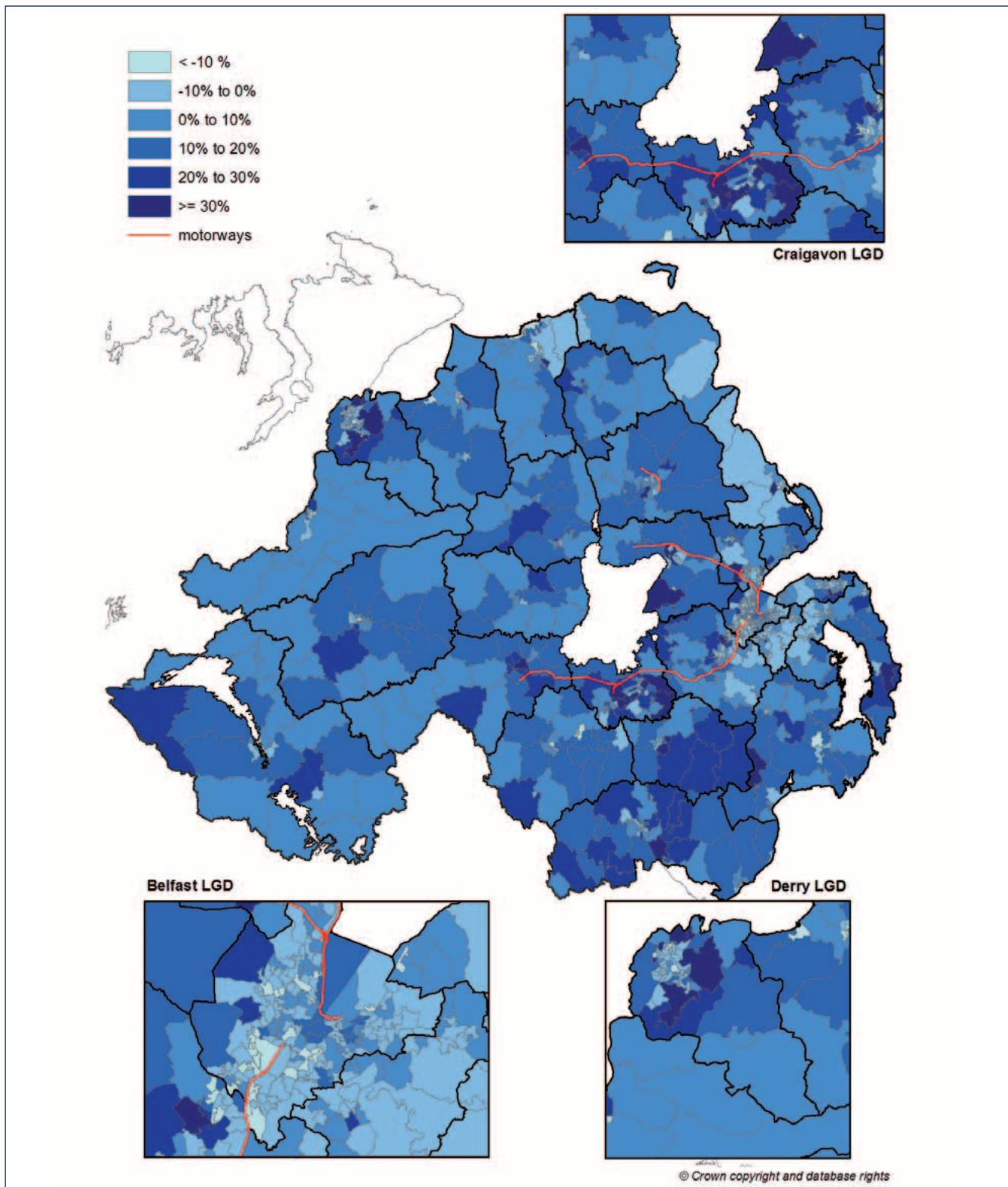
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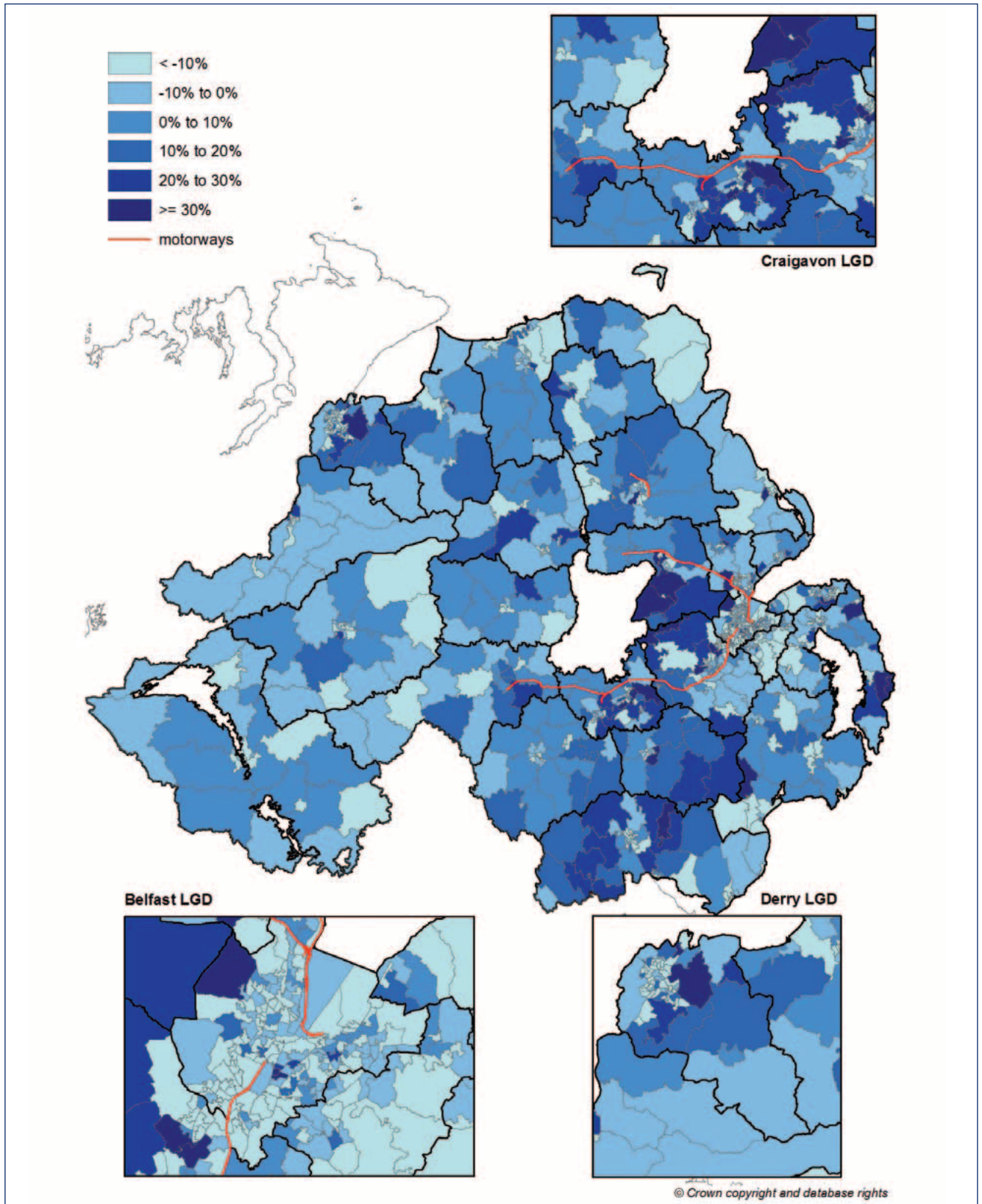
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## Appendix A Maps

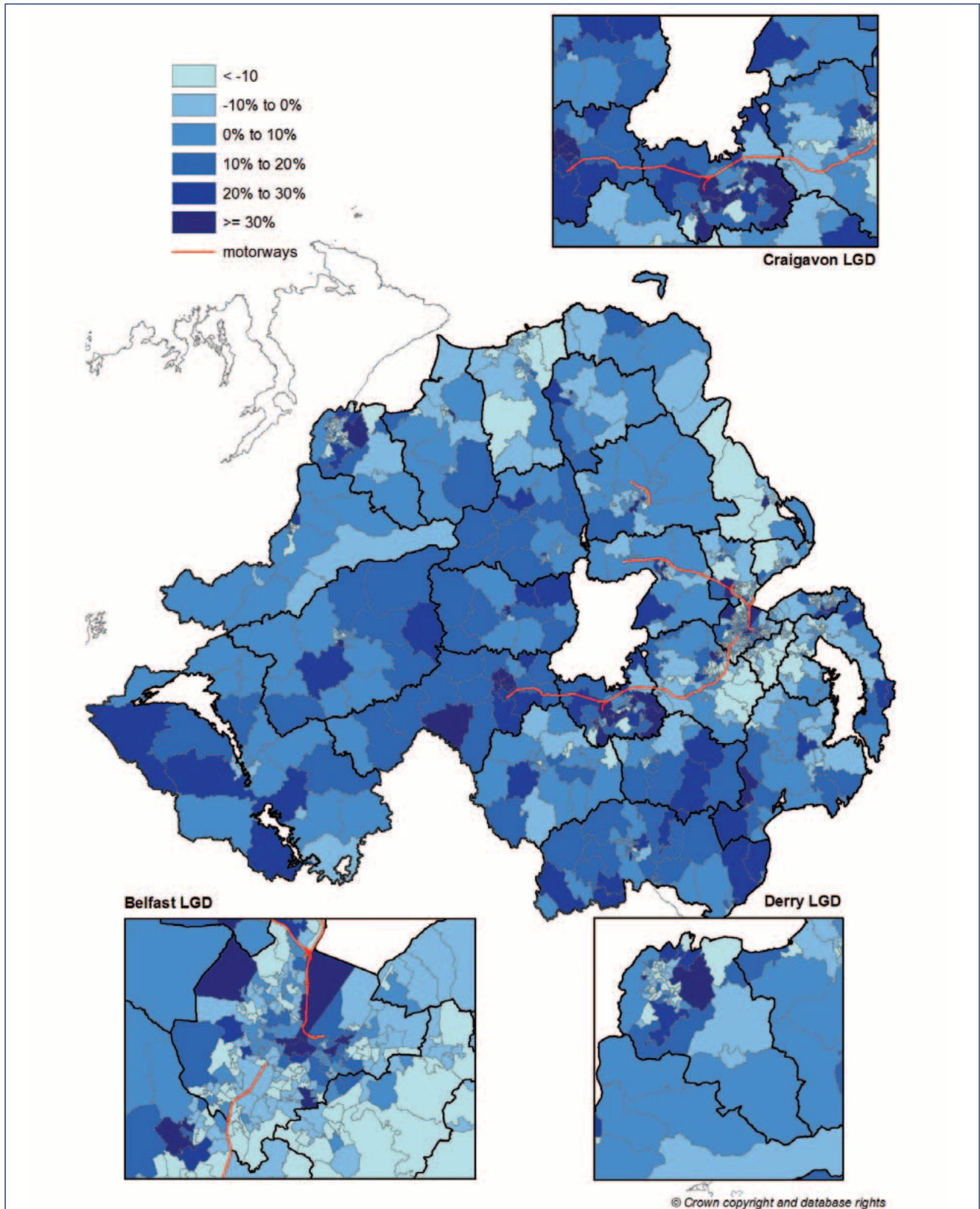
Map A.1 Population change, 2001-2008



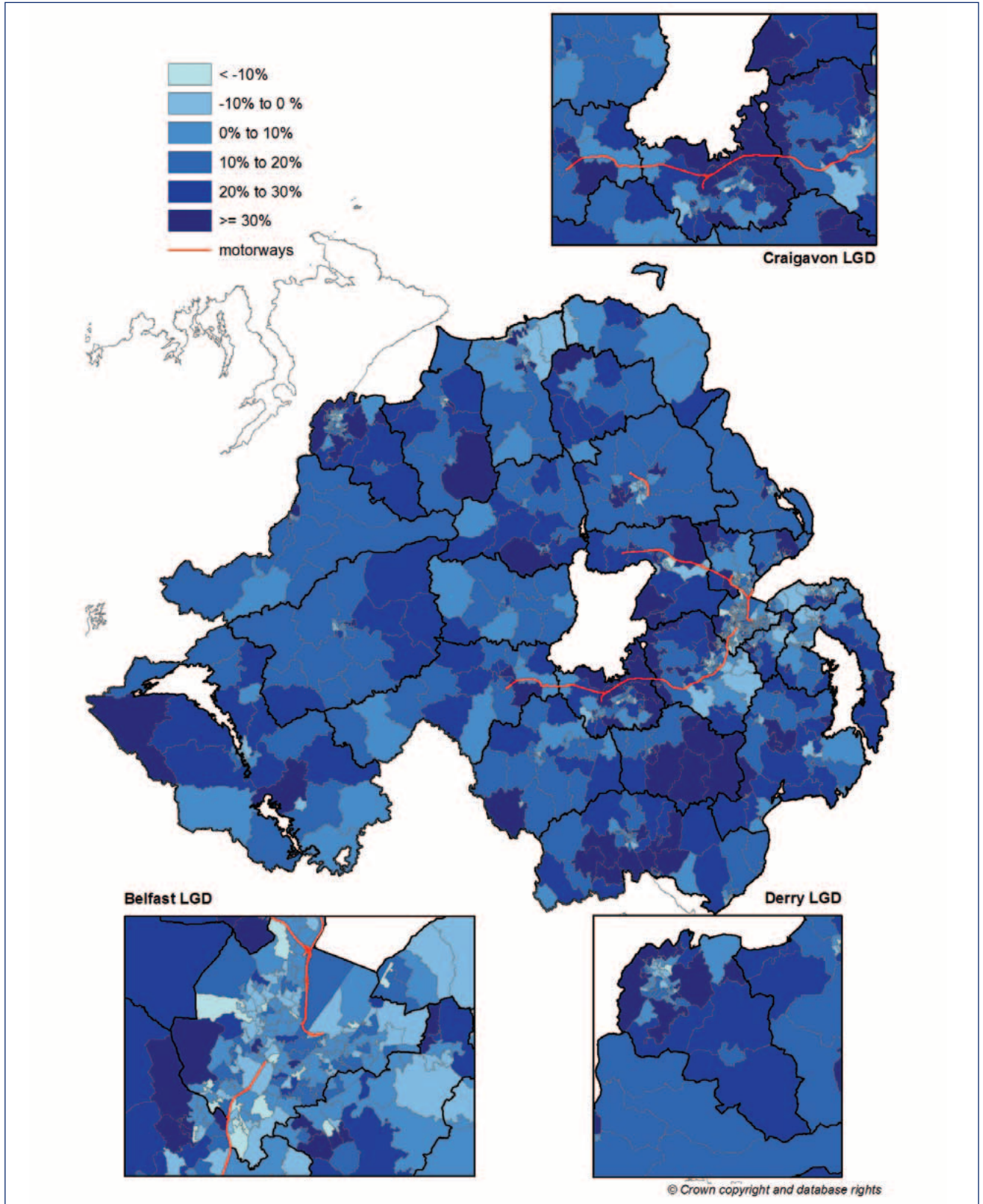
Map A.2 Population change, 2001-2008, children



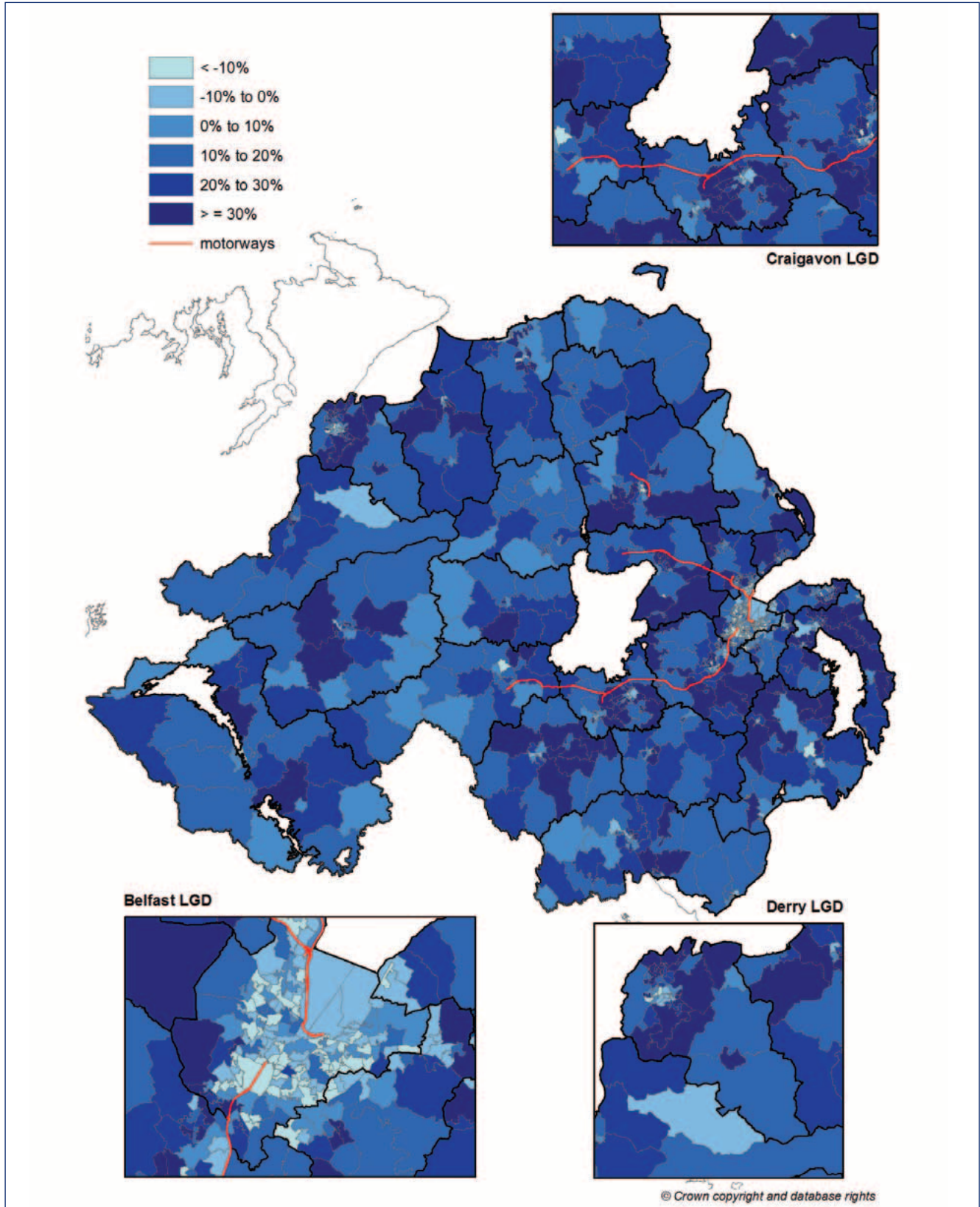
Map A.3 Population change, 2001-2008, aged 16-39



Map A.4 Population change, 2001-2008, aged 40-59F/64M



Map A.5 Population change, 2001-2008, pensions age (aged 60F/65M+)



## Appendix B Accompanying Tables

**Table B.1 Population change 2001-2008, by region and broad age group – Per cent of Super Output Areas**

Age group	Population change (%)	Belfast	Outer Belfast	East of NI	North of NI	West & South of NI	Northern Ireland
	<b>Base N of SOAs</b>	<b>150</b>	<b>198</b>	<b>215</b>	<b>147</b>	<b>180</b>	<b>890</b>
<b>All ages</b>	Less than -10%	16.0	5.1	2.8	9.5	2.2	6.5
	-10% to 0%	56.0	43.4	28.4	32.0	10.6	33.4
	0% to +10%	20.0	30.8	28.4	33.3	40.6	30.8
	+10% to +20%	6.7	12.6	22.8	15.0	30.6	18.1
	+20% to +30%	1.3	6.6	10.7	4.8	15.0	8.1
	+30% and above	0.0	1.5	7.0	5.4	1.1	3.1
<b>Children</b>	Less than -10%	58.0	40.4	30.7	42.9	27.2	38.8
	-10% to 0%	27.3	30.8	26.5	26.5	28.3	28.0
	0% to +10%	8.0	14.1	18.1	13.6	26.1	16.4
	+10% to +20%	2.7	6.6	9.8	9.5	10.6	8.0
	+20% to +30%	2.0	4.5	7.4	5.4	7.2	5.5
	+30% and above	2.0	3.5	7.4	2.0	0.6	3.4
<b>16-39</b>	Less than -10%	28.0	33.8	18.6	28.6	3.3	22.1
	-10% to 0%	34.0	36.4	27.0	32.0	11.7	28.0
	0% to +10%	20.7	18.7	27.9	21.8	36.7	25.4
	+10% to +20%	10.7	6.6	11.6	9.5	29.4	13.6
	+20% to +30%	2.0	2.5	7.4	5.4	13.3	6.3
	+30% and above	4.7	2.0	7.4	2.7	5.6	4.6
<b>40-59F/60M</b>	Less than -10%	8.7	8.1	2.8	2.0	0.0	4.3
	-10% to 0%	25.3	18.2	16.7	12.9	5.0	15.5
	0% to +10%	40.7	27.3	20.0	25.9	19.4	26.0
	+10% to +20%	19.3	18.7	21.4	26.5	38.3	24.7
	+20% to +30%	4.0	12.6	20.0	16.3	25.6	16.2
	+30% and above	2.0	15.2	19.1	16.3	11.7	13.4
<b>Pension age</b>	Less than -10%	32.7	6.6	2.3	2.7	1.1	8.2
	-10% to 0%	30.7	13.1	7.0	6.1	4.4	11.7
	0% to +10%	18.0	12.6	15.8	12.9	18.3	15.5
	+10% to +20%	10.0	24.7	22.3	26.5	37.2	24.5
	+20% to +30%	4.7	15.2	19.1	23.1	24.4	17.5
	+30% and above	4.0	27.8	33.5	28.6	14.4	22.6

Source: NISRA, Small Area Population Estimates



**Table B.2 The fastest growing SOAs, 30% or more, 2001-2008**

Region	District	Urban	MDM05 decile	SOA	Change (%)
Outer Belfast	Lisburn	Yes	4	Derryaghy_1	97
Outer Belfast	Newtownabbey	Yes	9	Mallusk_2	88
East of NI	Larne	Yes	9	Kilwaughter_1	72
Outer Belfast	North Down	Yes	8	Conlig_2	64
North of NI	Derry	No	6	Enagh_2_Derry	63
North of NI	Limavady	Yes	8	Aghanloo_1	52
East of NI	Craigavon	Yes	6	Kernan_2	47
East of NI	Antrim	Yes	8	Massereene_1	47
East of NI	Craigavon	Yes	2	Drumgask_1	44
North of NI	Derry	Yes	9	Culmore_5	43
East of NI	Ards	No	6	Portavogie_2	41
North of NI	Derry	Yes	5	Culmore_4	40
East of NI	Antrim	Yes	5	Springfarm_1	40
East of NI	Antrim	No	6	Aldergrove_2	39
East of NI	Down	No	6	Castlewellan_2	39
North of NI	Derry	Yes	2	Crevagh_3	38
North of NI	Derry	Yes	6	Shantallow West_4	37
East of NI	Antrim	Yes	9	Massereene_2	36
West & South of NI	Dungannon	Yes	7	Killymeal	36
East of NI	Craigavon	No	8	Donaghcloney_2	36
East of NI	Craigavon	No	9	Magheralin_2	35
North of NI	Derry	Yes	5	Holly Mount_2	35
North of NI	Coleraine	Yes	9	Knocklynn_1	34
East of NI	Ballymena	Yes	10	Ardeevin	34
East of NI	Banbridge	Yes	10	Ballydown_2	33
East of NI	Craigavon	Yes	7	Kernan_1	32
West & South of NI	Newry & Mourne	No	8	Burren and Kilbroney_2	31
East of NI	Craigavon	Yes	4	Parklake	31

Source: NISRA, Small Area Population Estimates

Small Area Population Estimates for Northern Ireland (2008)

**Table B.3 Population change 2001-2008, by age group, Local Government Districts and NUTS 3 regions**

	All ages %	Children %	16-39 %	40-59F/64M %	60F/65M+ %
<b>Belfast</b>	<b>-3.2</b>	<b>-12.5</b>	<b>-1.8</b>	<b>3.3</b>	<b>-3.5</b>
Belfast East	-0.9	-8.7	1.7	5.1	-5.1
Belfast North	-2.9	-11.3	-0.1	1.6	-3.1
Belfast South	-4.5	-11.7	-4.8	2.5	-6.1
Belfast West	-3.9	-16.5	-2.0	4.2	0.8
<b>Outer Belfast</b>	<b>3.4</b>	<b>-4.0</b>	<b>-3.7</b>	<b>11.9</b>	<b>13.5</b>
Carrickfergus	6.1	-3.4	-3.3	17.9	19.7
Castlereagh	-0.5	-10.0	-8.9	12.8	5.4
Lisburn	5.3	-1.7	-1.5	14.0	17.7
Newtownabbey	3.2	-3.0	-3.1	10.6	12.4
North Down	3.0	-3.8	-3.3	6.9	14.7
<b>East of NI</b>	<b>8.6</b>	<b>0.2</b>	<b>3.7</b>	<b>15.6</b>	<b>19.2</b>
Antrim	9.2	6.5	0.2	16.7	24.9
Ards	5.7	-1.8	-2.9	11.9	21.0
Ballymena	6.7	0.2	2.0	10.3	18.3
Banbridge	13.0	6.1	6.6	24.4	19.1
Craigavon	12.3	1.0	13.5	18.0	17.8
Down	8.8	-3.1	5.7	18.1	19.4
Larne	1.6	-9.4	-6.1	11.5	12.8
<b>North of NI</b>	<b>4.1</b>	<b>-6.6</b>	<b>-2.3</b>	<b>15.8</b>	<b>18.3</b>
Ballymoney	11.5	3.4	7.2	20.0	18.7
Coleraine	1.1	-7.3	-9.1	10.9	16.5
Derry	3.6	-8.6	-1.7	17.9	18.2
Limavady	4.5	-5.2	-3.8	18.2	23.6
Moyle	5.7	-7.7	2.4	13.1	18.4
Strabane	3.5	-7.5	-1.4	14.2	17.3
<b>West &amp; South of NI</b>	<b>9.9</b>	<b>-0.9</b>	<b>10.2</b>	<b>17.2</b>	<b>15.8</b>
Armagh	6.8	0.1	0.9	14.0	19.5
Cookstown	9.9	-3.5	13.8	13.4	18.5
Dungannon	15.7	2.4	23.5	19.2	14.8
Fermanagh	7.4	-4.6	6.4	14.9	14.8
Magherafelt	9.9	-1.2	10.2	19.3	13.5
Newry & Mourne	11.3	1.3	11.8	19.4	14.7
Omagh	8.3	-3.7	6.7	18.7	15.8
<b>Northern Ireland</b>	<b>5.1</b>	<b>-4.0</b>	<b>1.6</b>	<b>13.2</b>	<b>12.8</b>

Source: NISRA, Mid-year Population Estimates.

**Table B.4 Population change 2001-2008, Local Government Districts and regions – Number of Super Output Areas**

	Change %	Median %	Less than 0% No.	0-10% No.	10-20% No.	20% and above No.	SOAs No.
<b>Belfast</b>	<b>-3.2</b>	<b>-4.7</b>	<b>108</b>	<b>30</b>	<b>10</b>	<b>2</b>	<b>150</b>
Belfast East	-0.9	-2.2	20	8	3	0	31
Belfast North	-2.9	-4.0	28	10	1	1	40
Belfast South	-4.5	-5.2	34	5	3	0	42
Belfast West	-3.9	-7.2	26	7	3	1	37
<b>Outer Belfast</b>	<b>3.4</b>	<b>0.2</b>	<b>96</b>	<b>61</b>	<b>25</b>	<b>16</b>	<b>198</b>
Carrickfergus	6.1	3.7	5	10	3	2	20
Castlereagh	-0.5	-1.1	20	12	0	1	33
Lisburn	5.3	0.5	26	14	10	8	58
Newtownabbey	3.2	-2.4	28	8	8	3	47
North Down	3.0	1.1	17	17	4	2	40
<b>East of NI</b>	<b>8.6</b>	<b>7.2</b>	<b>67</b>	<b>61</b>	<b>49</b>	<b>38</b>	<b>215</b>
Antrim	9.2	10.3	8	4	7	6	25
Ards	5.7	1.9	18	16	7	5	46
Ballymena	6.7	6.6	7	13	7	2	29
Banbridge	13.0	16.2	3	5	5	6	19
Craigavon	12.3	8.8	12	11	5	16	44
Down	8.8	10.1	7	10	17	2	36
Larne	1.6	-2.9	12	2	1	1	16
<b>North of NI</b>	<b>4.1</b>	<b>2.3</b>	<b>61</b>	<b>49</b>	<b>22</b>	<b>15</b>	<b>147</b>
Ballymoney	11.5	10.0	0	8	6	2	16
Coleraine	1.1	0.4	14	11	2	2	29
Derry	3.6	-2.3	32	11	6	8	57
Limavady	4.5	3.7	7	5	5	1	18
Moyle	5.7	5.9	3	4	2	0	9
Strabane	3.5	3.1	5	10	1	2	18
<b>West &amp; South of NI</b>	<b>9.9</b>	<b>9.7</b>	<b>23</b>	<b>73</b>	<b>55</b>	<b>29</b>	<b>180</b>
Armagh	6.8	7.9	6	8	10	1	25
Cookstown	9.9	9.0	1	8	6	1	16
Dungannon	15.7	14.5	0	7	8	7	22
Fermanagh	7.4	8.2	4	14	5	2	25
Magherafelt	9.9	9.4	1	11	7	2	21
Newry & Mourne	11.3	10.7	8	15	10	14	47
Omagh	8.3	8.4	3	10	9	2	24
<b>Northern Ireland</b>	<b>5.1</b>	<b>3.3</b>	<b>355</b>	<b>274</b>	<b>161</b>	<b>100</b>	<b>890</b>

Source: NISRA, Small Area Population Estimates.

Small Area Population Estimates for Northern Ireland (2008)

**Table B.5 Population change, 2001-2008, per cent, by region, urban-rural and deciles of deprivation**

		Belfast %	Outer Belfast %	East of NI %	North of NI %	West & South of NI %	Northern Ireland %
<b>All SOAs</b>	<b>All SOAs</b>	<b>-3.2</b>	<b>3.4</b>	<b>8.6</b>	<b>4.1</b>	<b>9.9</b>	<b>5.1</b>
<b>Urban/rural</b>	Rural	-	8.6	12.6	7.2	11.5	10.8
	Urban	-3.2	2.7	5.5	2.0	7.0	2.2
<b>Deciles of Deprivation 2005</b>	Most deprived 10% of SOAs	-1.6	-2.9	1.6	-5.3	0.0	-2.4
	2nd decile	-5.4	-2.1	5.5	3.4	5.6	1.1
	3rd decile	0.2	-0.9	-1.2	7.5	6.7	3.6
	4th decile	-6.0	7.0	5.4	4.7	11.7	6.5
	5th decile	-2.7	1.5	7.6	6.0	11.3	7.3
	6th decile	-3.9	-3.3	15.5	8.0	12.0	9.0
	7th decile	-3.2	6.7	6.4	4.7	12.2	7.3
	8th decile	-4.7	9.8	15.0	2.5	8.7	8.5
	9th decile	-4.7	5.1	10.8	18.5	8.0	7.4
	Least deprived 10% of SOAs	-4.3	2.2	9.0	-0.6	23.9	2.6

Source: NISRA, Small Area Population Estimates.

**Table B.6 Migration, 2001-2008, per 1,000 of population in 2001, by region, settlement type and urban-rural**

		Belfast %	Outer Belfast %	East of NI %	North of NI %	West & Northern South of NI %	Ireland %
<b>Internal</b>							
Settlement type	Band A: Belfast Metropolitan Urban Area (BMUA)	-57.8	-6.1	-	-	-	-30.8
	Band B: Derry Urban Area (DUA)	-	-	-	-11.9	-	-11.9
	Band C: Large town	-	-	-6.2	-36.0	-32.7	-15.1
	Band D: Medium town	-	-	2.0	-18.2	-61.1	-34.4
	Band E: Small town	-	78.0	23.2	12.6	-44.2	7.4
	Band F: Intermediate settlement	-	68.6	79.9	23.3	-12.6	45.2
	Band G: Village	-	158.7	71.0	8.6	28.4	51.2
	Band H: Small village, hamlet and open countryside	-	99.1	56.9	13.8	30.0	40.5
Urban / rural	Urban	-57.8	-3.8	-0.2	-12.2	-46.6	-22.8
	Rural	-	99.8	62.4	13.8	26.8	42.2
All SOAs	All	-58.2	12.4	28.4	-2.1	2.1	0.0
<b>External</b>							
Settlement type	Band A: Belfast Metropolitan Urban Area (BMUA)	12.7	-1.1	-	-	-	5.5
	Band B: Derry Urban Area (DUA)	-	-	-	-3.0	-	-3.0
	Band C: Large town	-	-	43.7	11.0	78.0	47.5
	Band D: Medium town	-	-	16.0	6.9	135.2	72.8
	Band E: Small town	-	-1.1	17.7	7.6	72.0	27.4
	Band F: Intermediate settlement	-	20.6	11.9	40.3	51.3	27.9
	Band G: Village	-	-1.5	22.5	6.0	61.4	27.5
	Band H: Small village, hamlet and open countryside	-	-10.6	2.8	0.4	22.7	10.2
Urban / rural	Urban	12.7	-1.1	35.9	2.3	99.8	21.6
	Rural	-	-3.8	6.9	4.7	27.9	14.1
All SOAs	All	12.8	-1.6	22.6	3.2	52.0	18.9

Source: NISRA, Small Area Population Estimates.

**Table B.7 Population change 2001-2008 by deciles of MDM 2005, age group and urban-rural**

Deciles of MDM05	Children %	16-39 %	40-59F/64M %	Pension age %	All %	Urban %	Rural %
Most deprived 10% of SOAs	-14.8	1.4	4.6	-0.2	-2.4	-2.7	4.9
2nd decile	-9.1	2.9	6.0	5.8	1.1	0.3	6.8
3rd decile	-6.3	3.4	11.6	6.0	3.6	2.0	6.3
4th decile	-2.1	4.9	13.5	11.4	6.5	3.3	10.5
5th decile	-1.2	4.4	15.2	13.3	7.3	2.1	11.7
6th decile	2.5	4.6	16.6	16.3	9.0	2.1	14.7
7th decile	-1.1	1.1	18.6	14.6	7.3	5.0	10.1
8th decile	0.8	1.7	16.9	19.6	8.5	4.3	14.7
9th decile	-0.9	-2.7	18.9	22.2	7.4	7.7	6.8
Least deprived 10% of SOAs	-6.1	-7.0	9.3	20.1	2.6	1.9	10.1
All	-4.0	1.6	13.2	12.8	5.1	2.2	10.8

Source: NISRA, Small Area Population Estimates.

Small Area Population Estimates for Northern Ireland (2008)

**Table B.8 The regions in 2001: Main features**

	Belfast	Outer Belfast	East of NI	North of NI	West & South of NI	All
<b>(a) Per cent of region</b>						
<b>All</b>	<b>100</b>	<b>100</b>	<b>100</b>	<b>100</b>	<b>100</b>	<b>100</b>
<b>Urban-Rural</b>						
Urban	100	87	57	63	37	68
Rural	0	13	43	37	63	32
<b>NIMDM 2005</b>						
Most deprived 10% of SOAs	34	3	3	16	2	10
2nd decile	15	7	7	14	10	10
3rd decile	7	5	10	14	16	10
4th decile	5	7	11	13	14	10
5th decile	8	4	7	12	20	10
6th decile	7	5	12	10	16	10
7th decile	3	9	14	9	13	10
8th decile	9	11	14	6	8	10
9th decile	5	21	14	5	1	10
Least deprived 10% of SOAs	8	28	7	3	1	10
<b>(b) Per cent of Northern Ireland</b>						
<b>All</b>	<b>17</b>	<b>22</b>	<b>24</b>	<b>17</b>	<b>20</b>	<b>100</b>
<b>Urban-Rural</b>						
Urban	25	28	20	15	11	100
Rural	0	9	32	19	40	100
<b>NIMDM 2005</b>						
Most deprived 10% of SOAs	57	7	7	26	3	100
2nd decile	26	16	16	22	20	100
3rd decile	11	11	24	22	31	100
4th decile	8	15	27	21	29	100
5th decile	13	9	18	19	40	100
6th decile	11	11	29	17	31	100
7th decile	4	20	35	15	26	100
8th decile	16	24	34	10	17	100
9th decile	8	47	35	8	2	100
Least deprived 10% of SOAs	13	63	18	4	1	100

Source: NISRA, Small Area Population Estimates.

## The Northern Ireland Statistics and Research Agency

The Northern Ireland Statistics and Research Agency (NISRA) was established as an Executive Agency within the Northern Ireland Department of Finance and Personnel on 1 April 1996. NISRA is the principal source of official information of socio-economic conditions in Northern Ireland. The Agency provides statistics and social research services, undertakes the Northern Ireland census of population and administers the civil registration of births, deaths, marriages and adoptions.

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- Administer the marriage laws and to provide a system for the civil registration of births, marriages, adoptions and deaths in Northern Ireland.

NISRA can be found on the internet at [www.nisra.gov.uk](http://www.nisra.gov.uk)

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