ARTICLES

Impacts of mine closure in Doncaster: an index of social stress

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Introduction

This study uses administrative data to characterise small areas within Doncaster, South Yorkshire, a location affected by mine colliery closures. The use of administrative data is motivated by questions about the future of the UK's Census. Following the 2011 Census, the 'Beyond 2011' programme was established by the Office for National Statistics (ONS) to assess the feasibility of using administrative statistics as an alternative to the census in England and Wales. Informed by Beyond 2011, the National Statistician recommended that there *will* be a 2021 Census but that the country's statistical system should be *enhanced* by greater use of administrative data.

It has been 30 years since the last large-scale miners' strike in the UK. From 1979, the Conservative government saw to the gradual closing of mines through a process of privatisation. This resulted in a large section of the population in mining regions losing their source of livelihood (Fieldhouse & Hollywood, 1999; Power, 2008). This was something of a backlash by the government which had in the previous election suffered a defeat influenced by the National Union of Mineworkers (Saville, 1985; Gouiffes, 2007). Cabinet Papers of the time reveal that the government had a secret plan to close 75 pits, run down coal production and make 65,000 men redundant (Phipps, 2014). The covert operations against the miners relate to the long-run determination by the Tory Party and Margaret Thatcher, "to avenge absolutely and unequivocally their double humiliation at the hands of the miners in the historic strikes of 1972 and 1974. The problem of how to 'deal' with the miners and their recalcitrant leadership became one of the great obsessions of Conservative political life" (Milne, 1994: p.7).

After the mines closed attempts were made to support the newly jobless miners with promises to provide redundancy payments and retraining along with regeneration measures (Saville, 1985; Waddington & Parry, 2003). Critics of the Redundant Mineworkers Payments Scheme of 1984 explain the impact that colliery closure had on those made redundant (Turner & Gregory, 1995; Wass, 1996). Jobs (re)generated were rarely accessed by those made redundant (Turnbull & Wass, 1997). This was for a number of reasons including that the age of some hindered their ability to learn a new profession. Therefore they would be placed at entry-level in a new job. Furthermore, where new jobs were created, they were often undertaken by internal migrants and immigrants (Audit Commission, 2008).

Doncaster lies at a vertex of the South Yorkshire Coalfield, the other vertices being Sheffield and Barnsley. Within the region, which has experienced a reduction in deprivation (Noble *et al.,* 2009; Norman, 2010), Doncaster has areas with economic instability and some of the poorest health. In 2001, unemployment was 4.6% points higher than the national average and there were higher proportions of retired people and more permanently sick or disabled and reporting long-term limiting illnesses (ONS, 2003).
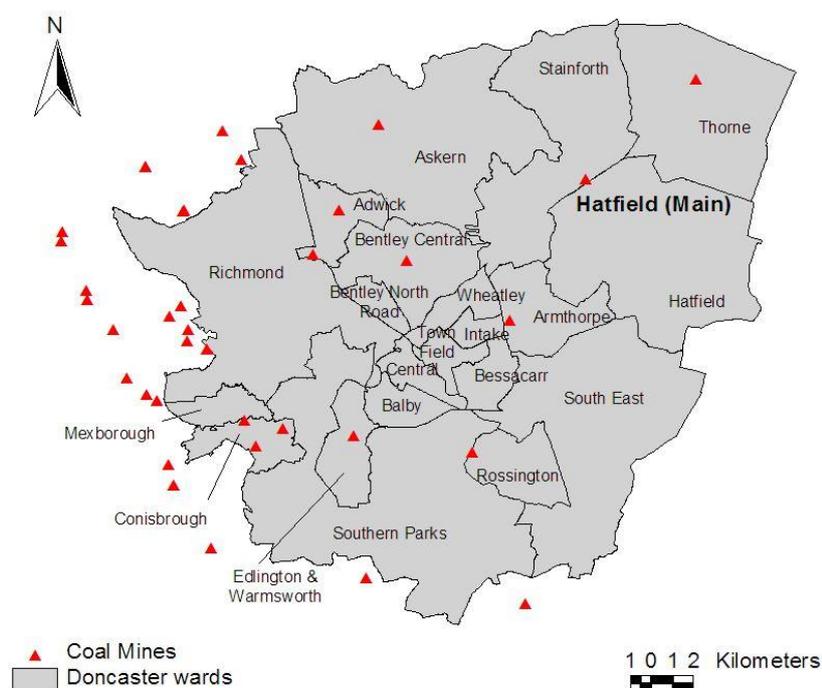
Figure 1: Coal mines in and near Doncaster

Figure 1 shows the mine locations within and near Doncaster including Hatfield Main. All of these mines have closed apart from Hatfield which

is one of only three deep mines still operating in GB. The likely closures of Kellingley (North Yorkshire) and Thoresby (Nottinghamshire) will leave employee-owned Hatfield as the country's last remaining mine.

A major use of the UK's census data has been to develop deprivation indexes by obtaining a variety of input variables, each thought to indicate a dimension of deprivation, and combining them in a relatively simple manner (e.g. Townsend et al, 1988; Carstairs, 1995). Various versions of the Index of Multiple Deprivation (IMD) were produced during the 2000s utilising administrative data (Noble et al, 2006). The IMD for 2010 in England provides an overall score of the relative level of multiple deprivation experienced in each LSOA. To achieve this, 38 indicators are grouped into seven domains reflecting a different aspect of deprivation (income, employment, health, education, crime, access to services and living environment), which are combined to produce an overall IMD score. The domain scores are combined, weighted by information resulting from the use of factor analysis (McLennan, 2011). The multivariate nature of the IMD and complexity of the method by which it is produced means that reproducing the IMD or emulating the approach with alternative data inputs is beyond most practitioners.

Much of ONS' Beyond 2011 work looked at single administrative variables and their utility to inform population counts (Tinsley, 2011). Here, instead, we seek to find whether, when combined in a Townsend / Carstairs manner, a set of administrative data variables can inform on area characteristics. An index is developed here relevant to Doncaster which combines information obtained from administrative data on: the economic situation through jobseeker's allowance claimant counts; health difficulties through incapacity and disability benefit claimants; and economic-gerontography based on the income dependency of the older population. The resulting index represents small area variations in social stress (in a similar way to Simpson's (1993) 'Areas of Stress' in Bradford) which is detailed below.

Data and Methods

2007 has been selected because this year was generally economically buoyant (Monaghen, 2014) and was before the economic crisis of 2008 so variable distributions should reflect relatively good social conditions, unaffected by unusual economic circumstances. Inputs are from administrative data sources for the 193 Lower Super Output Areas (LSOA) with locations referred to within wards in Doncaster. The indicators included represent various stresses including economic, health and income dependency of the elderly. All data were extracted

from the ONS Neighbourhood Statistics website[1] with the variables listed in Table 1 and discussed below.

Table 1: Indicators of social stress: Doncaster, 2007

Indicator	Source	Variables included	Rationale for use
Economic	Worklessness – Key Out of Work Benefits; Office for National Statistics (ONS)	Percentage of Jobseeker Allowance (JSA) Claimants Aged 18-64 (Males); 18-59 (Females)	Lack of employment opportunities (Audit Commission, 2008); Failure of regeneration initiatives (Wass, 1996)
Health	Incapacity Benefit/Severe Disablement Allowance; Department of Work and Pensions (DWP)	Percentage of claimants above the age of 25	Proximity to coalfields results in exposure to harmful gases and pollutants which have an impact on health (Coggon *et al.* 1995)
Economic-Gerontography	IMD 2007 Income Deprivation; Communities and Local Government (CLG)	Score for Deprivation Affecting Older People. a) aged 60+ claiming Income Support, Jobseeker's Allowance or Incapacity Benefit. b) aged 60+ and their partners	Forced retirement and other failures of regeneration schemes (Wass, 1996; Turnbull & Wass, 1997; Fieldhouse and Hollywood, 1999). Apprehensions by employers to take ill and unskilled labour (Turner & Gregory, 1995)

Economic: This variable represents the willingness of the population to be employed but unable to find suitable jobs. It differs from the unemployment count in the census, where people are not necessarily actively seeking work. Worklessness or jobseeking implies the gap between a desire to be employed and job availability or lack of qualifications for vacancies. In the mapped distribution (Figure 1a), most coalfield areas reveal poor economic opportunity but for LSOAs with no coalfield history (such as Hatfield, South-East and Southern Parks) this is less the case. Town Field, a central location, has the highest level of jobseeking.
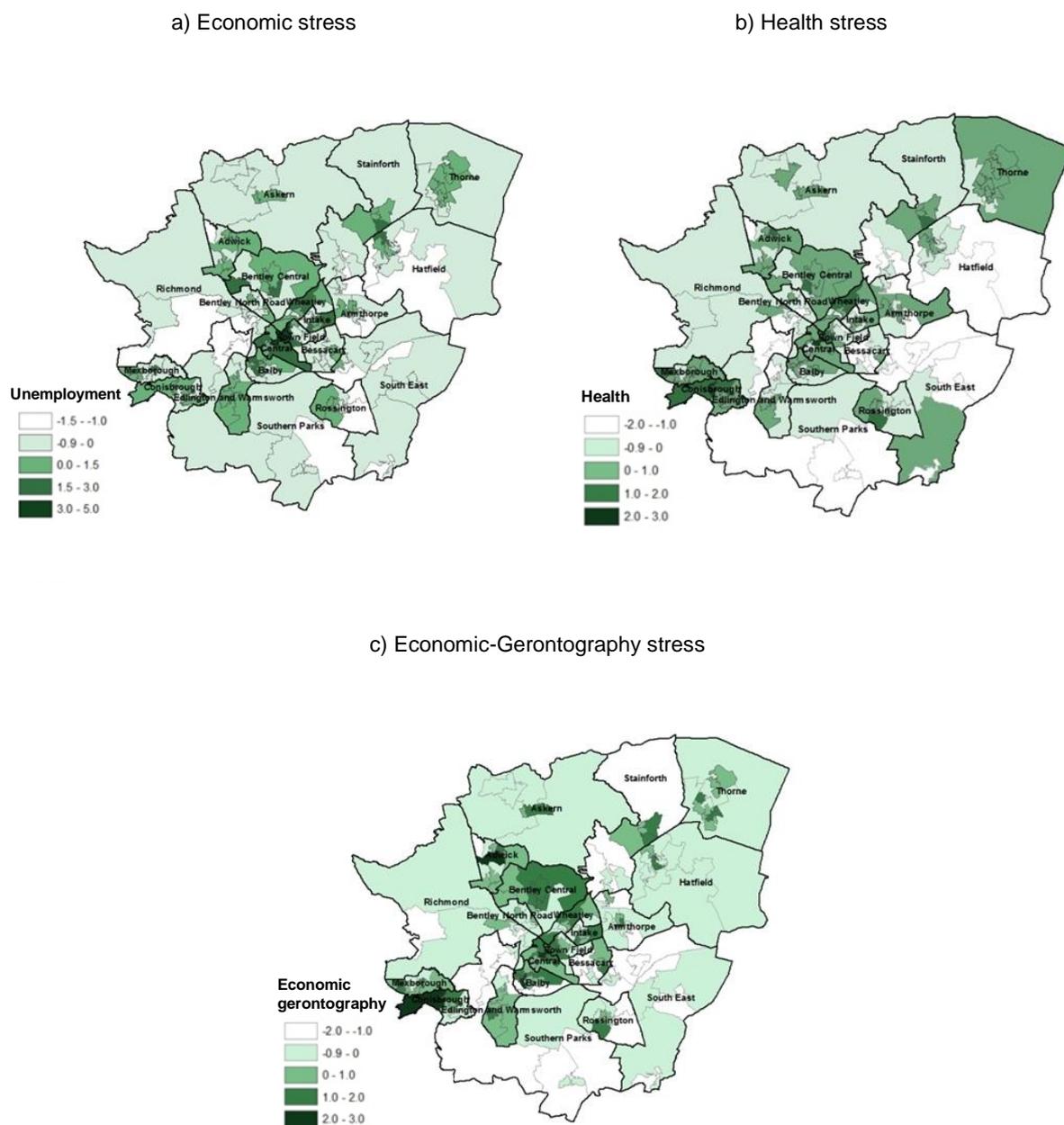
Health: The health of those in mining was poor, including long-term illnesses and disabilities sustained from mining accidents. This made it difficult for them to acquire employment elsewhere (Brown & Rees, 2006; Turner & Gregory, 1995). Accordingly, a score for health and disability was selected. All coalfield areas show poor health (Figure 1b) which implies that the effect of coalmining on the population is long-term.

Economic-Gerontography: The closure of mines placed a large number of people out of work so the Redundant Mineworkers Payment Scheme of 1984 was created. However, Wass (1996) suggested this did little to help those below 50 years of age and that the Scheme rarely paid out to those who were older as these people were encouraged to take voluntary

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[1] http://www.neighbourhood.statistics.gov.uk/

retirement. This is 'economic-gerontography' regarding potential loss in opportunities through income and health disadvantage for people of retirement age. In Figure 1c, LSOAs in Adwick and Conisbrough fall in the highest class of this measure.

Figure 1: Input variable distributions (z-scores): Doncaster, 2007

a) Economic stress   b) Health stress
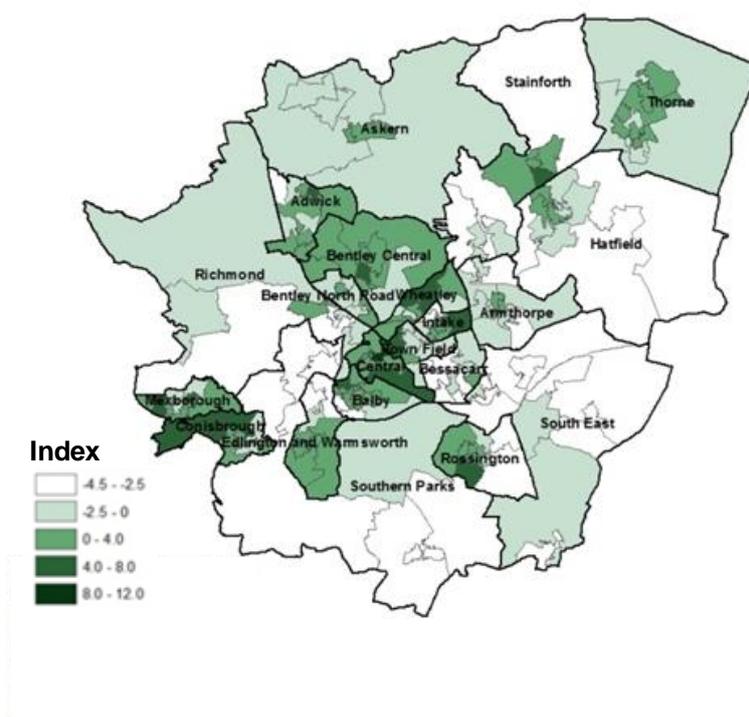

c) Economic-Gerontography stress

Similar to Townsend *et al.* (1988) and Carstairs (1995), the input variables used to develop the composite index are standardised from their original data type using z-scores. The index comprises the sum of the equal weighting of the three z-scores to highlight social stress in

Doncaster. High index values represent less good circumstances and vice versa.

A social stress index in Doncaster

Figure 2 illustrates the index value distribution for LSOAs in Doncaster. More negative scores represent less stress; more positive scores represent more stress. In the main, the most stressed areas are those in which mines were located. The highest levels of stress are in Adwick and Conisbrough; areas in which the mines were closed by the early 1990s. The wards located closest to Hatfield colliery include relatively less stressed areas which may be because this mine is still open. However, we cannot know whether the people who work in the mine live in these locations.

Figure 2: Index of social stress: Doncaster, 2007

The social stress index here has strong positive correlations with various domains of England's IMD for 2007; Income (0.94), Employment (0.95) and Health (0.92). The strongest correlation is with the overall IMD score (0.96). For completeness and because the method of calculation is similar, the social stress index for 2007 has a correlation of 0.93 with the Townsend Index for 2001 for the LSOAs in Doncaster.

In terms of addressing inequalities in relation to deprivation distributions, there may be policies which consider the physical landscape and quality of life and those which focus on more

socioeconomic aspects. For the former situation, environmental justice is closely linked with socioeconomic justice; regions with good environmental conditions also experience lower levels of deprivation (Mitchell & Norman, 2012). In terms of the physical environment, Doncaster's 'Areas of Special Landscape Value' (ASLV) fall at the lower end of the social stress index and include non-mining areas within Hatfield and Thorne wards. The ASLV areas are designated within Doncaster's Local Development Framework (Doncaster Council, 2015). Whilst the framework has passing references to brownfield sites and coalfield areas, these tend to relate to physical screening or to features of habitat, rather than planning for socioeconomic improvement of areas in need. It is possible then that environmental conservation initiatives reinforce inequalities and result in gentrification with already nice places improving (Lee, 2013).

For the more socioeconomic aspects, regeneration projects rarely address the damaging psychological impact of a failing industry (Rowlands & Huws, 1995). Enquiries into coping mechanisms show that cultural practices such as the Annual Miners' Gala in Durham have been better than government initiatives which emphasise monetary regeneration and changing land use and quality; most of which have been poorly implemented. Cultural forms of regeneration have had a considerable positive impact on the wellbeing of the population (Stephenson & Wray, 2005; Evans & Foord, 2006; Power, 2008; Morse, 2009; Lawless & Beatty, 2013).

There is then a need to consider the socioeconomic situation of populations in deprived areas (Fairburn *et al.,* 2009). Comparing Townsend deprivation over time (Norman, 2010), we find consistency of correlations for LSOAs in Doncaster for successive censuses since 1971 to be 0.87(1971-81), 0.96 (1981-91), 0.93 (1991-2001) and 0.95 (2001-11). During a period of mine closures, schemes to help ex-miners and regeneration and landscape planning, the level of socioeconomic deprivation of areas relative to other areas in Doncaster is remarkably persistent.

Using administrative data

What have we learned during our use of administrative data? Administrative datasets are typically very large, covering counts or samples of individuals and time periods not normally achievable through traditional data collection methods. For researchers there are therefore cost savings (time and money). Other advantages include: relieving the burden on survey respondents and providing data on individuals who would not normally respond. For instance, there is an

incentive (financial!) for the unemployed to get their benefit so they 'sign on', whereas they might not fill out a census questionnaire.

Administrative data are collected by government departments and other organisations for various purposes but not necessarily to count or characterise the population or for others to use in their research. If data have been collected by an organisation for their purposes then there is a lack of control by independent researchers regarding data collection and dissemination. This can affect what you subsequently do with the source in terms of data type, variable definition and the geography for which data are released. To an extent this is true of other secondary sources. There are, however, consultations on census content, data on births and deaths and official survey questions, whereas with administrative sources there is more risk of a lack of utility because making the data available to others is not the designated purpose of the original data collection. For example, if benefit eligibility criteria change (because of a policy change), rates can change from one year to the next.

Notwithstanding these issues, the ONS Neighbourhood Statistics website and equivalents in Wales, Scotland and Northern Ireland, plus NOMISWEB, are all excellent resources containing a wealth of administrative data as well as more traditional sources. The developers of these websites have saved researchers a lot of time by cleaning raw data, linking to geographies and providing metadata.

Conclusion

The National Statistician recommends that there *will* be a 2021 Census but the country's statistical system should be *enhanced* by greater use of administrative data. A common usage of census data has been to combine a set of variables each of which indicate a dimension of deprivation into a single figure index. For these schemes, there has been widespread debate on: which variables to use, whether to transform to near-normal distributions, how to standardise and whether to weight when adding variables together. Despite the debate, creating an index similar to Townsend or Carstairs (in line with what was done in this study) is within the capability of many researchers.

The Indexes of Multiple Deprivation in the UK's constituent countries are an exemplar of administrative data usage and may well have 'oiled the wheels' for making administrative data sources widely available to researchers. However, the methods used for the construction of the various IMDs are beyond all bar experts and the schemes are hard to replicate. There is also risk that the IMDs are used naively (given their lack of comparability over time and between the UK's constituent

countries). In contrast, the type of approach we adopt here is readily replicable and transparent.

Doncaster, like many coalfield areas, has seen the industry decline dramatically which has knock on effects to employment rates and health and especially to the ageing workforce. Summing three standardised variables which capture these dimensions into a single figure index has revealed small area variations in social stress. It is interesting that the result of this relatively simple approach has such a close correspondence to the IMD's sophistication.

Acknowledgments

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