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Geographies of the impact of retirement on health in the United Kingdom

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Geographies of the impact of retirement on health in the United Kingdom

Abstract

This paper explores how the impact of retirement on self-assessed illness varies spatially across the UK. Curves of age-specific limiting long term illness rates reveal a 'retirement kink' - where the rise in illness rates with age slows or declines at retirement age indicating possible health improvement after retirement. The kink is negligible in the affluent South East and most prominent in the coalfield and former industrial districts. It is likely that the kink is attributable to hidden unemployment and health-related selective migration but additionally that in certain areas retirement is associated with improvements in self-assessed health.

K**eywords**: Retirement, self-assessed health, health inequality, population ageing

Introduction

The challenges posed by population ageing and the persistence (and expansion) of health inequalities between social groups and areas are important international issues (Pearce et al. 2007; Kunst 2005; Dorling and Thomas 2004; Shaw et al. 2002). Population ageing is a result of low fertility and increasing longevity that leads to a growing proportion of the population at the older ages. Population ageing is a concern because it is feared that rising costs associated with healthcare provision and pensions will result, creating a greater burden on the diminished working age population through increased taxation (Thane, 1989; Bos and Weizsacker 1989). The extent of the challenge associated with population ageing is debated and more positive outlooks have been proposed (Mullan 2000; Sanderson and Scherbov 2010; Herrmann 2011; Emery 2011).

In the UK, strong health inequalities exist between socio-economic groups and sub-national areas for a number of health indicators including mortality (and many specific causes of mortality), self-reported morbidity and disability, clinical measures (such as blood pressure and body mass index) and administrative measures (such as sickness absences and doctor consultations) (Marmot, Feeney et al. 1995; Graham 2000; Shaw et al. 2002; Bajekal and Prescott 2003; Bellaby 2006). Research suggests that absolute health inequalities are greatest at the older ages (Huisman et al. 2004) and the accumulation of disadvantage (or advantage) over the lifecourse provides an explanation for this (Berney, Blane et al. 2000).

The impact of retirement is a central question within research on both population ageing and health inequalities. A common policy response to the issue of population ageing in Western countries is to postpone retirement to older ages (Hamblin 2010; Pond et al. 2010). For example, in the UK, under the Pensions Act 2011, the state pension age for women will increase from 60 to 65 by 2018. From 2018 the state pension age for both men and women will increase, reaching 68 by 2046. A concern surrounding such policies is that they might have negative consequences for the extent of health inequalities between social groups and areas (Bellaby 2006; Harper et al. 2011). Harper et al. (2011) propose alternative retirement cut-offs based on lifetime earnings or time spent in the labour market that provide a means to respond to the challenge of population ageing without exacerbating health inequalities.

Proposals to increase the retirement age rest on the assumption that sufficient jobs are available or creatable for a larger working age population to fill. However, levels of economic participation have declined across most Organisation for Economic Cooperation and Development (OECD) countries over the past two decades (Delson 1996) partly as a result of a collapse in the demand for unskilled labour (Burstrom et al. 2000). A common feature of the rise in economic inactivity in OECD countries has been an increase in the proportion of the population classed as inactive due to disability and poor health (Delson 1996). Marin and Prinz (2003) compare rates of disability benefit claims in 1999 amongst those aged 16 to 64 in a number of OECD countries finding similarly high levels in the UK, Norway, The Netherlands, Denmark, Sweden and Portugal (7-9% of population aged 16 to 64) with lower levels of disability benefit claimants in France, Germany, Spain and the USA (4-5% of population aged 16 to 64).

Banks and Smith (2006) provide an excellent analysis of retirement in the UK with the following key observations. First, there are several ways in which retirement might be defined including: as a complete and permanent withdrawal from the labour market; through receipt of income from a state or private pension; or through self-definition. According to any of these definitions, the majority of people in the UK retire before the statutory retirement age. Second, retirement tends to be abrupt rather than gradual and is almost always permanent. Third, there are two distinct groups of retirees for which the observations above apply. The first group comprises well-qualified retirees who draw a private income whilst the second group are less well-qualified people who are usually supported by disability benefits, may be relatively young (in their 50s) and who may not classify themselves as being retired.

Findings on the impact of retirement on health are mixed and it is thought that the nature of analysis (cross-sectional or longitudinal), the timing and the reason for retirement, the circumstances of an individual before retirement and the health measure under investigation are responsible for the lack of consistency (Behncke 2011; Gall et al. 1997). Research on objective measures of physical health and mortality do not appear to show evidence of improvement associated with retirement (Behncke 2011; Litwin 2007; Johnston 2009). However, a number of studies demonstrate improvements in both mental health and self-assessed measures of health after retirement (Mein et al. 2003; Westerlund et al. 2009; Gall et al. 1997; Bellaby 2006; Mojon-Azzi et al. 2007). An important result for the analysis undertaken here is that that the retirement-related improvements in self-reported health are greatest for those in lower occupational grades or poor work environments (e.g. high demands and low job satisfaction) and for those who are in poor health prior to retirement (Westerlund et al. 2009). Hyde et al. (2004) investigate the impact of pre-retirement factors and retirement routes on circumstances after retirement finding that pre-retirement circumstances are more important to post-retirement health and life satisfaction than retirement route. They conclude that the main causes of health inequality in retirement are work-based rather than the nature of retirement.

In this paper we extend the existing research on the impact of retirement on health to explore spatial variations in self-assessed limiting long term illness (LLTI). We investigate the extent to which districts within the UK exhibit a 'retirement kink' whereby the increase in limiting long term illness rates with age slows (or even declines) after retirement age for some areas but not others. Using 2001 Census data, Figure 1 illustrates male LLTI rates for example districts which have this kink to different degrees. The kink coincides with the ages at which most male retirement occurs (60-64) (Banks and Smith 2006). We also observe a kink in the LLTI curve for females that occurs at a younger age (55-59) perhaps reflecting the younger statutory retirement age for women in 2001 (see figure 2). For presentational purposes we focus on the male retirement kink in this paper but note that results for women, while less strong, are very similar to those for men. Where there are differences we point them out.

<<Figure 1 about here>>

<<Figure 2 about here>>

The retirement kink may be attributable to an improvement in self-assessed health for the populations living in certain areas. However, other factors are likely to be involved. Particularly important amongst alternative hypotheses is the propensity for self-assessment of poor health at working ages to be influenced by what is termed 'hidden unemployment' (Beatty and Fothergill 1996) whereby the benefits system, a lack of appropriate jobs and poor health incentivises the unemployed who are capable of working to claim sickness rather than unemployment benefits.

In the UK in 2001, the main state benefit for those with a health problem or disability that prevented them from working was Incapacity Benefit (IB). Emerson and Leicester (2002) provide a detailed and valuable summary of the benefits available in the UK in 2001-2 on which the following is based. At that time, eligibility for Incapacity Benefit was assessed by a healthcare professional under the 'own occupation test' during the first 28 weeks which considered whether an individual was capable of returning to the job they had previously held. After 28 weeks the claimant's eligibility to Incapacity Benefit was assessed according to their capability to perform all types of work, the 'personal capability assessment'. On 9th April 2001 the rate of Incapacity benefit was £52.60 per week for adults, however, after 28 weeks this payment increased to £62.20 per week. The unemployment benefit in 2001, Jobseekers allowance, paid £53.05 per week for those aged over 25. In 2001, The Basic State pension (BSP) was paid for life from pension age (65 for men and 60 for women) with eligibility determined by accumulation of working life credits of at least 90% of working lifetime (44 year for men and 39 years for women) required. As working life credits could still be accumulated during periods of illness, disability and unemployment the receipt of the BSP was widespread. On 9th April 2001, the BSP stood at £72.50 per week.

Thus, proponents of the hidden unemployment theory argue that the benefits system as outlined above encourages the long term unemployed to define themselves as disabled. A worker living in an area with few jobs would receive a higher level of benefits, in the long term, if they claimed Incapacity Benefit rather than Job Seekers Allowance. In areas of persistently high unemployment this is likely to have encouraged the long term unemployed to view any illnesses or disabilities as limiting their ability to work. Once in retirement the receipt of the Basic State Pension removed the financial incentive to define oneself as having a limiting illness or disability.

As we are working with aggregate, cross-sectional data we need to consider the possibility that the kink may be a cohort effect in which the population aged 60-64 are particularly unhealthy compared to the age groups around them as a result of exposure to specific social or occupational conditions in the past. Similarly, the relative health of a population before and after retirement age is likely to be affected by the demographic processes of mortality and migration independently of any changes in the health of individuals themselves.

We evaluate the plausibility of a cohort effect, hidden unemployment, premature mortality and migration as possible explanations for the retirement kink in a case study district of Merthyr Tydfil; an area with a prominent retirement kink. Further details on each of these processes and the evaluation technique are given in the data and methods section.

After this introduction the paper is divided into three parts. First, the data and methods are specified. Second, the results are presented. Third, these results are discussed and conclusions are drawn.

Data and Methods

The census is a key source of data for this research providing reliable rates of limiting long term illness for all 432 districts in the UK (City of London and Isles of Scilly are not included in this analysis because of the small populations in these areas once counts are subdivided by age and sex). There is some undercount in the census which is larger in some areas of the country and for certain population groups (Cook 2004). However, these problems are minor compared to the uncertainty associated with sample data. The census of population has been carried out since 1801, during which time sporadic questions on health and disability have been asked (Charlton 2000). The main advantage of the census as a data source is its coverage of the total population (all ages, households and institutions) and the fine geographical detail at which data are available. In 2001 the census included three questions on health/disability. The self-assessed general health question allowed respondents to classify their health as good, fair or poor. The economic activity question included a category of permanently sick or disabled. Finally, the limiting long term illness question records illnesses, health problems or disabilities that limit an individual in their daily activities.

Of the three questions the census LLTI question is particularly useful because it applies to the whole age range (including the elderly) and is included in the 1991 and 2001 censuses (see box 1 for question wording). It is important to note that the replacement of the word 'handicap', used in

1991 with ‘disability’ in the 2001 Census is thought to result in a lower level of LLTI (compared with 2001) due to an unwillingness of respondents to classify themselves as being handicapped as opposed to disabled (Bajekal et al. 2003). This issue of question change is relatively unproblematic for this analysis as our use of 1991 Census data is simply to assess whether or not there is a retirement kink in 1991 rather than to compare levels of LLTI in 1991 and 2001. In both the 1991 and 2001 Censuses the LLTI question features a prompt for elderly people to include problems that are due to old age. This is a useful feature because it is known that the elderly discount some heath problems as being a result of ageing. LLTI data is released with five year age and sex detail for districts across the UK. For males the age-groups of 60-64 and 65-69 are particularly important within this analysis, as most retirement occurs prior to the statutory retirement age (65) at the ages of 60-64 and so the retirement kink observed in LLTI schedules spans these two age groups. For females the age-groups of 55-59 and 60-64 are of most interest reflecting the younger retirement age of 60 for women in 2001. We combine 2001 Census LLTI data for the private household population (Table ST016) and the institutional population (Table ST065).

A large body of work supports the validity of measures of self-assessed health (Mitchell 2005) with LLTI found to be most strongly associated with general health perceptions, more serious health conditions (Manor et al. 2001) and physical limitations rather than with psychological health (Cohen et al. 1995). There are strong relationships between LLTI and other health outcomes including all cause and cause-specific mortality (Charlton et al. 1994; Bentham et al. 1995; Idler & Benyamini 1997) as well as sickness benefits claims from different health conditions (Bambra and Norman 2006; Norman and Bambra 2007). One potential weakness of the use of LLTI across the UK is that there is some evidence for different health expectations and propensity to report ill-health across the constituent countries of the UK. The relationship between self-reported health and mortality varies; for a given life expectancy the Welsh and the Northern Irish are more likely to report a LLTI than Scots or the English (Mitchell, 2005; O’Reilly et al., 2005).

In order to investigate spatial patterns of retirement kinks a curve is fitted to the 2001 LLTI schedule of age-specific rates for males and females separately. The model curve (see equation 1) comprises two polynomials of order 3. The α parameters are the coefficients of a cubic curve that applies to the whole LLTI age pattern. The β parameters fit an additional cubic effect that applies throughout the retirement and oldest ages capturing the shape of the LLTI schedule specifically at these ages. The differing values of the β parameter estimates provides a means to classify districts according to the extent of their retirement kink.

p_{xr} = the proportion of the population who have an LLTI at age x in district r

x= quinary age group (x=2.5, 7.5, 12.5, … 77.5, 82.5, 88) (88 is the age used to represent the 85+ group)

z_x=1 if age>59 (55 for women) and 0 otherwise

$$p_{xr} = \sum_{i=0}^{3} \alpha x^{i} + \sum_{i=1}^{3} \beta z_x x^{i} + \varepsilon_x \qquad [1]$$

There is a potential issue when modelling a proportion in this way because where probabilities are close to 1 or 0 there is a danger that model estimates may fall outside the 0-1 range (Dobson 1990). However, there are several examples in the demography literature of schedules where rates are modeled directly without any transformation (Keyfitz 1982; Michaud 1996). Furthermore, the LLTI rates at retirement are not problematic in this sense as they are not particularly close to 1 or 0 and examination of model and observed rates reveal a close fit for LLTI schedules with varying extents of retirement kink (see figures 1 and 2).

There are a number of clustering methods that can be used to group data and these are divided into hierarchical methods and non-hierarchical methods (Hair, Anderson et al. 1995). K-means clustering is selected for the analysis of the retirement kink because exploratory examination of LLTI curves (see figures 1 and 2) indicates that districts can be placed into groups based on the extent of retirement kink. For males, three groups of no/minor kink, medium kink and major kink emerge. For females the kink is less prominent and two groups separating those districts with a kink and with no kink are appropriate. Cluster seeds are derived from the β estimates for the districts in figures 1 and 2 that represent characteristic patterns of illness rates throughout retirement age. For males South Bucks, Bury and Merthyr Tydfil are used. For females, South Bucks and Merthyr Tydfil are used. There are a number of advantages of this technique over hierarchical methods. The results are less susceptible to outliers, the distance measure used and the inclusion of irrelevant variables (Hair, Anderson et al. 1995). Furthermore, the clusters from the k-means procedure retain a high proportion of the variance of the input variables and produce clusters that are relatively even in terms of membership (Vickers 2006). The STATA k-means procedure is used to perform the clustering based on the Euclidean distance measure. Almost identical groupings are obtained if cluster seeds are selected randomly. A comparable grouping is also obtained from agglomerative hierarchical clustering using Ward's method.

As noted in the Introduction, the decline in LLTI rates after retirement in some areas may not be a result of improvements in health after retirement. In order to assess the validity of four alternative theories for the retirement kink, we use a number of additional data sources focusing predominantly on the case-study district of Merthyr Tydfil which displays a prominent retirement kink. These data include vital statistics on mortality, incapacity benefit claimants, census migration data and finally 1991 Census LLTI data by age and sex (Tables LBS12 and LBS13). Details of how we assess each of the alternative explanations of the retirement kink are given below:

1. Cohort effect: The kinks we observe in cross-sectional period data for 2001 may be due to cohort effects with people born at different times being exposed to different health-related risk factors which then become evident in later life. Ideally we would use longitudinal survey data to address this facet but sample sizes preclude local level analyses for confidentiality reasons (Norman and Riva 2012). Although not ideal, one way to consider the likelihood of a cohort effect above is to examine how the kinks in LLTI schedules have developed over time. We do this in two ways. First we examine the LLTI schedule for England in 1981, 1991 and 2001 using the General Household Survey (GHS), a multipurpose continuous survey collected by the Office for National Statistics containing information on a range of topics from individuals living in private households. The GHS has included the same question on LLTI since its inception. More information on the GHS and access to this data source is provided by the Economic and Social Data Service (Government). Second we compare the LLTI schedules in 1991 and 2001 in Merthyr Tydfil using data from the census. If the population aged 60-64 are particularly unhealthy we might see a spike in LLTI rates at progressively younger ages in our LLTI schedules in 1991 and 2001. Similarly, if 'hidden unemployment' (see below) is an important factor in creation of the kink, rather than a cohort effect, we would expect a smaller kink for England in the GHS data in 1981 when the levels of sickness related benefits were low compared to 1991 and 2001 (Beatty and Fothergill 2005).

2. Hidden unemployment: The retirement kink may not be an indicator of changes in health around retirement but a symptom of what is termed ‘hidden unemployment’ and its influence on health reporting. Beatty and Fothergill (2005) provide evidence to suggest that the UK benefits system has steadily diverted the long term jobless from unemployment benefits to sickness benefits particularly in the former industrial and mining areas of the UK during the 1980s and early 1990s. Additionally, Houston and Lindsay (2010) note that those with low skills and qualifications and with experience in manual occupations are at a greater disadvantage in the labour market of today compared with the industrial labour market of the past. Ill health, which is particularly prevalent in industrial and manufacturing areas, makes it more difficult to secure and hold down a job (Houston and Lindsay 2010). It is not suggested that the hidden unemployed are faking illness but, that in a situation of full employment, their illness might not prevent them working. The decline in limiting long term illness rates after retirement in former industrial and mining areas might be a result of hidden unemployment. If a worker who loses his or her job can get better benefits by claiming they are disabled there might be an incentive to report disability. After retirement, when the amount paid through the state pension exceeds that of Incapacity Benefit, this incentive is removed. Thus health status never changes and the kink in rates of LLTI at retirement is simply a function of the social benefits system and a lack of jobs.

We investigate the plausibility of this theory by creating an LLTI schedule that excludes an estimate of the population who may be hidden unemployed from the LLTI population. The extent of hidden unemployment in Merthyr Tydfil is estimated by adjusting the incapacity benefit claimant count so that the ratio of incapacity benefit claimants to the LLTI population count is equal to that observed in England and Wales. This approach has some similarities with that of Beatty and Fothergill (2005) and takes into account the higher level of illness in Merthyr Tydfil when calculating an estimate of the hidden unemployed. Table 1 compares the IB/LLTI ratios (males and females) in England and Wales and Merthyr Tydfil whilst table 2 gives the estimate of the hidden unemployed and the calculation of an adjusted LLTI rate (males and females). In these calculations of the adjusted LLTI rate we exclude the hidden unemployed from the LLTI count (numerator) but not the total population (denominator). The assumption here is that the hidden unemployed may have an illness but in a situation of full employment they would not classify themselves as having a *limiting* long term illness.

<<Tables 1 and 2 about here>>

3. Premature mortality: If an area had high levels of mortality just after retirement age this would leave a relatively healthier surviving population with lower LLTI rates at the post-retirement ages. An alternative LLTI schedule is calculated in which all who died in 2001 at the ages of 65 or older are added back into the population and assumed to have an LLTI. Comparison of this alternative LLTI schedule with the observed LLTI schedule allows assessment of whether mortality in the early years of retirement could account for the retirement kink. If the kink is evident in the alternative LLTI schedule when all those who died are included this would suggest that is not the result of premature death of the unhealthy post-retirement.

4. Migration: The proposition that health-related selective migration might affect local health rates is established within the literature (Norman et al., 2005). If an area experienced high levels of out-migration of healthy individuals in the years leading up to retirement, this could lead to a fast increase in LLTI up to retirement age with a less steep increase at the older ages. Migration at these ages is supported in the literature with evidence that the migration flow is usually towards rural areas with links to urban centres (Stockdale 2006; Marshall and Simpson 2009). Similarly, if an area received migrants of better health than the existing population at ages following retirement, then LLTI rates could be lowered as a result. Data are available from the 2001 Census on the health of migrants who moved in the year preceding census day. This information enables the hypothesis that the retirement kink is a result of a net loss of healthy individuals prior to retirement and a net gain of unhealthy people after retirement to be tested.

It should be noted that many of the assumptions made here are not likely to be valid. For example, when we look at the case study area, we might expect Merthyr Tydfil to have more serious LLTIs than England which could lead to different incapacity benefit/LLTI ratios and lower estimates of hidden unemployment. Similarly, it is unlikely that all those who died prematurely in Merthyr Tydfil had an LLTI. In general the assumptions maximise the potential for a theory to explain the retirement kink. If we find the retirement kink cannot be explained despite the assumptions made then we can be confident that other factors, and most notably changes to the health of individuals throughout retirement, are likely to be involved.

Results

Classifying districts according to their LLTI retirement kink

As illustrated in figure 1 and 2 the model schedules provide an excellent fit to the observed LLTI schedules in districts with different shapes and levels of LLTI for both males and females. The R-squared statistic is generally above 0.99 confirming that the models fit the data excellently. Wald tests on the β parameters indicate that they make a statistically significant contribution to the fit of the model across districts regardless of the level of the schedule or whether or not there is a kink in the schedule at the retirement ages.

K-means cluster analysis was used to divide the districts into three groups for males and two groups for females based on the β parameter estimates in equation 1. Figure 3 shows the distribution of the b_1, b_2 and b_3 parameters in each of the three male cluster groups (no/negligible kink, medium kink and large kink). The clusters are clearly separated according to these parameter values, particularly so for the b_1 parameter. For each parameter the districts in the medium kink cluster take values that are generally less extreme than in the other two clusters (large kink and no/negligible kink). The separation of clusters according to parameter values for females is similarly clear and, as for males, particularly so for the b_1 parameter.

<<Figure 3 about here>>

Figure 4 displays schedules for the three male clusters and two female clusters in aggregate. The retirement kink is clearly much more prominent for males than females. The spatial distribution of the retirement kink groups is displayed in map 1 (males) and map 2 (females). For males the most prominent kinks are in former industrial areas of South Wales, North East, Yorkshire and the North West. Interestingly, many of the districts in Northern Ireland and Wales also display a prominent kink. The districts in the South East around London exclusively have a small/no retirement kink. (Note - these results are independent of district age structure.) Very similar spatial patterns are observed for female LLTI retirement kinks although these are not quite as marked as for males.

<<Figure 4 about here>>

The geographical distribution of the retirement kink clusters have clear parallels with other area classification schemes. Figures 5 and 6 show LLTI schedules for males in each of the Townsend deprivation quintiles and the National Statistics 2001 Area Classification (NSAC). The largest retirement kinks (males) are in the more deprived areas according to the Townsend Index for 2001 and the Mining and Manufacturing group of the NSAC. Conversely the areas with no/negligible retirement kinks are in least deprived quintile of Townsend deprivation and the Prospering UK group (mainly in the South East) of the NSAC. Similarly, the largest retirement kinks are found in areas with the highest levels of LLTI whilst the areas with no/negligible kink are the most healthy.

<<Figure 5 and 6 about here>>

<<Maps 1 & 2 about here>>

Explaining the LLTI retirement kink

Examination of LLTI schedules for males in England in 1981, 1991 and 2001 (see figure 7) reveals that whilst the retirement kink is present in 1981 it is much less prominent than in 1991 and 2001. This fits with the theory that hidden unemployment, which developed during the 1980s and early 1990s (Beatty and Fothergill 2005), is a plausible factor behind the retirement kink observed. However, other factors such as declines in work autonomy, job satisfaction and job security and increases in working hours that occurred during the 1990s may also be involved (Green 2009).

<<Figure 7 about here>>

We now consider each potential explanation of the kink (cohort effect, hidden unemployment, premature mortality and migration) in Merthyr Tydfil. Merthyr Tydfil district has a population of around 55,000 and is located in South Wales. The district consists of the northern part of the Taff valley and the neighbouring Taff Bargoed valley and has an industrial history involving coal mining, iron making and manufacturing. Like other such areas, Merthyr Tydfil suffered large job losses as a result of the collapse of such industries throughout the 20th Century. Beatty and Fothergill (1996) report the tendency for such job losses in areas like Merthyr Tydfil in the 1980s and early 1990s to be accommodated by rises in benefit claims relating to sickness rather than unemployment. In 2001, 17% of the working age population claimed incapacity benefit rising to 50% for males aged 55-64. The district is ranked as the most deprived in Wales according to the Welsh Index of Multiple Deprivation (2011) and has high levels of deprivation and poverty along a number of domains. For example, teenage pregnancy and low birth weight babies, levels of limiting long term illness, crime and drug problems are all amongst the highest in Wales (Buck et al. 2006). According to the 2001 Census 19% of employees worked as professionals or managers compared to 24% in Wales and 28% in Great Britain. At the other end of the socioeconomic scale of occupation 26% of employees worked within elementary occupations or as process plant or machine operatives compared with 22% in Wales and 19% in Great Britain.

Figure 8 presents a case study involving Merthyr Tydfil to assess whether cohort, hidden unemployment or premature mortality might be responsible for the prominent kink within this district.

A cohort effect? It is clear that a strong male retirement kink existed in Merthyr Tydfil in 1991 as well as in 2001. This conclusion holds in other districts with retirement kinks and for females (for more details see Marshall 2009). This provides some evidence to suggest the kink is not simply a result of particularly poor health of those aged 60-64 in 2001. However, longitudinal data is required to answer this question conclusively.

Hidden unemployment? The adjusted LLTI schedule in figure 8 that excludes the hidden unemployed displays a reduced retirement kink that is moved five years later, to the 65-69 age group for males and to the 60-64 age group for females. This suggests that hidden employment has the potential to play an important role in the creation of the retirement kink observed. However, the presence of a kink at later ages in the adjusted LLTI schedule, with slower increases in LLTI rates after retirement compared to before, suggests that factors additional to hidden unemployment are also involved.

Premature mortality? An alternative male LLTI schedule, in which any deaths from age 60 onwards are added back into the population with the assumption that they suffer from an LLTI, is insufficient to account for the retirement kink. Although this alternative LLTI schedule is raised somewhat at ages older than retirement age, the retirement kink remains indicating that premature mortality is not an important factor generating the retirement kink in Merthyr Tydfil.

<<Figure 8 about here>>

Migration? The final factor we consider as an explanation for the retirement kink is migration and in particular the out-migration of healthy adults in the years leading up to retirement resulting in a steeper increase in LLTI rates for a more unhealthy population left behind. Census data indicates that in the year leading up to the 2001 Census, Merthyr Tydfil lost 157 healthy men through out-migration and gained 7 men with an LLTI through in-migration between the ages of 0 to 64 (out of a population of 23,253). For the post-retirement ages (65+) migration is negligible. The extent of out-migration of healthy people in Merthyr Tydfil between 2000 and 2001 alone is insufficient to account for the retirement kink; the observed schedule of LLTI rates is almost identical to an adjusted schedule that keeps these healthy out-migrants within the area.

Unfortunately, the census data are far from ideal through which to assess the impact of migration due to the confidentiality measures applied by ONS (Stillwell & Duke-Williams, 2007). Carrying out an analysis of the net impact of flows by healthy and unhealthy migrants for an individual local authority is virtually futile. If we return to an aggregate analysis patterns become somewhat clearer though. Figure 9 illustrates the net movement of migrants without LLTI to or from each deprivation quintile. This reveals a net loss of healthy male migrants in the more deprived quintiles 4 and 5 and a net gain of healthy male migrants in the less deprived quintiles 1, 2 and 3. The differences in the sizes of the flows by age is in large part due to the size of the age-groupings for which the census data are released. The effect of migration on the retirement kink, whilst modest in Merthyr Tydfil, cannot be discounted completely. If the net loss of healthy migrants is concentrated in the years leading up to retirement then LLTI rates will be raised above the level they would have been at had migration not occurred. These patterns are consistent with those observed over a twenty year period (for males and females) whereby health selective migration has been found to contribute to widening health inequalities over time between deprivation quintiles (Norman et al., 2005).

<<Figure 9 about here>>

Discussion and conclusions

This paper shows that in the UK there are strong spatial patterns in the extent of a retirement kink; the phenomenon of a levelling off or even decline in census rates of limiting long term illness (LLTI) for males (and females) at retirement age in some local areas but not others. An area classification based on patterns of LLTI rates at retirement age is developed; the retirement kink is negligible or absent from the affluent South East and is most prominent in coalfield districts and the former manufacturing and industrial areas of Scotland, South Wales, North East, Yorkshire and the North West. The spatial distribution of the retirement kink has similarities with levels of LLTI generally and other sociodemographic area classifications, with the strongest kink – the greatest decline in rates of ill health after retirement – in the most deprived areas. In the analysis presented we consider four theories that might explain the spatial patterns of retirement kinks finding health-related selective migration and, in particular, hidden unemployment the most plausible.

However, we add a note of caution in regard to the assumptions we make on the extent of hidden unemployment within Merthyr Tydfil (that the ratio of incapacity benefits claimants to the LLTI population should equal that in England and Wales) that may well overestimate the size of this population sub-group. It is plausible that levels of incapacity benefit claims may be closer to the size of the LLTI population in Merthyr Tydfil than in England and Wales due the higher prevalence of more serious health conditions in Merthyr compared to England and Wales. Such an effect would be entirely consistent with the mining and industrial history of Merthyr Tydfil. Additionally, it is worth noting that the extent to which hidden unemployment impacts upon health reporting and the exaggeration of ill-health has been queried in the literature. According to the theory of hidden unemployment, scarcity of appropriate job opportunities following de-industrialisation led those who may have had illnesses but who were fit enough to work to define themselves as having a limiting illness. If this theory holds, then we should expect the ill population to be healthier relative to the working population than in the past when higher levels of employment meant the hidden unemployed population was smaller. Akinwale et al. (2010) demonstrate this is not the case; the relative risks of mortality between working people and the permanently sick remains constant between 1971 and 2001.

Our focus on patterns of LLTI rates for sub-national areas means that the analysis we produce is inevitably restricted to cross-sectional rather than longitudinal data sources. One consequence of this is that we do not examine other theories that might lead to improvements in rates of LLTI after retirement in certain areas which demand a longitudinal approach. Particularly important amongst these is the impact of occupational conditions and pre-retirement characteristics on health after retirement. The spatial patterns of retirement kinks are in line with the existing research in this area. For example, Chandola et al. (2007) report retirement to be associated with less of a decline in physical health for low grade occupations compared to high grade occupations. The research of Westerlund et al. (2009) reveals the strongest retirement-related improvements for those in poor health prior to retirement and involved in the least favourable occupations (low occupational grades, high demands, low job satisfaction). Another factor that we do not explore and which might contribute to the patterns of retirement kinks observed is the role of unhealthy lifestyle choices. For example, the improvement in rates of LLTI after retirement may partly be a consequence of people giving up unhealthy activities, such as smoking, in response to the development of a limiting long term illness at the older working ages.

The processes that we suspect are causing the retirement kink and its spatial patterning are found in many industrialised countries and so we might expect retirement kinks elsewhere. For example, hidden unemployment is reported outside the UK, the Netherlands also offers financial benefits for movement from unemployment to sickness benefits (Green 2010) with the majority of Dutch employees retiring before the mandatory age of retirement (Rijs et al. 2011). Becker (2000) claims that the Dutch disability scheme actually provides a safety net for nearly half a million long term unemployed. Similar levels of disability benefit claimants are found in a number of European countries. Black et al. (2002) find receipt of disability benefits for areas within the USA to be strongly influenced by availability of jobs. Similarly, it is plausible to suggest that potentially health-damaging effects of certain occupations at the older ages hold outside the UK (Westerlund 2009; Carlsson et al. 2012). As noted in the introduction, the existence of spatial health inequalities within countries is an international issue (as are pockets of high unemployment and deprivation) and so we might expect migration and premature mortality to play a similar role in the creation of retirement kinks outside the UK.

The spatial patterns of illness rates at retirement reflect a number of public policy decisions that emerged in response to the failure to regenerate certain local labour markets following de-industrialisation. A lack of coordination around policies of support for the unemployed, those with work-limiting illness and in retirement appears to be an important factor driving the strong spatial patterns of retirement kinks observed. Literature on responses to the challenge of hidden unemployment stresses the importance of creating the type of work in areas like Merthyr Tydfil that accommodates the skills and circumstances of the resident population (Houston and Lindsay 2010; Buck et al. 2006). Crucially, policy should not victimise those who are disabled in an attempt to reduce hidden unemployment.

Whilst this paper classifies districts according to the extent of retirement kink and proposes plausible explanations, further research is required to disentangle the relative contributions of, in particular, health damaging effects of certain occupations and hidden unemployment. Such analysis has very important policy implications. For example, if those in certain occupations are less capable of working at the oldest ages without health damaging effects then it is reasonable to query the fairness of policies that increase the statutory retirement age across the whole UK population. Setting a retirement time based on wealth or years spent in the labour market, as suggested by Harper et al (2011), may provide a fairer way to determine the state retirement age whilst reacting to the challenge of population ageing.

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Census 1991

Do you have any long term illness, health problem or handicap which limits your daily activities or the work that you can do? Include problems which are due to old age. (Yes/No)

Census 2001

Do you have any long term illness, health problem or disability which limits your daily activities or the work that you can do? Include problems which are due to old age. (Yes/No)

Box 1: Census LLTI question (1991 and 2001)

Males						
Age	Merthyr Tydfil			England and Wales		
	LLTI pop	IB count	IB count/LLTI ratio	LLTI pop	IB count	IB count/LLTI ratio
15-24	292	38	0.13	185,399	15,095	0.08
25-34	539	180	0.33	295,885	55,590	0.19
35-44	803	360	0.45	442,650	104,010	0.23
45-54	1,284	788	0.61	611,172	183,570	0.30
55-59	939	663	0.71	391,117	158,430	0.41
60-64	1,098	910	0.83	466,421	220,208	0.47
Females						
Age	Merthyr Tydfil			England and Wales		
	LLTI pop	IB count	IB count/LLTI ratio	LLTI pop	IB count	IB count/LLTI ratio
15-24	235	33	0.14	158,064	12,393	0.08
25-34	529	193	0.36	266,480	49,665	0.19
35-44	921	448	0.49	413,910	91,795	0.22
45-54	1444	728	0.50	605,159	166,708	0.28
55-59	882	508	0.58	378,266	120,658	0.32

Table 1: Comparison of the ratio of Incapacity benefit (IB) claimants to the LLTI population by age for males in Merthyr Tydfil and England and Wales

Source: Authors' own calculations using data from the 2001 census and the Department for Work and Pensions (accessed via the Nomis website)

Males							
Age	IB count (Merthyr)	IB count (Merthyr) assuming England and Wales IB/LLTI ratio	Estimate of hidden unemployed (Merthyr)[1]	Observed LLTI (Merthyr)		Adjusted LLTI (Merthyr) (excluding hidden unemployed)	
				Count	Rate	Count[2]	Rate[3]
15-24	38	24	14	292	0.09	278	0.08
25-34	180	101	79	539	0.16	460	0.14
35-44	360	189	171	803	0.20	632	0.16
45-54	788	386	402	1,284	0.35	882	0.24
55-59	663	380	282	939	0.57	657	0.40
60-64	910	518	392	1,098	0.74	706	0.48
Females							
Age	IB count (Merthyr)	IB count (Merthyr) assuming England and Wales IB/LLTI ratio	Estimate of hidden unemployed (Merthyr)[1]	Observed LLTI (Merthyr)		Adjusted LLTI (Merthyr) (excluding hidden unemployed)	
				Count	Rate	Count[2]	Rate[3]
15-24	33	18	14	235	0.07	221	0.07
25-34	193	99	94	529	0.14	435	0.12
35-44	448	204	243	921	0.22	678	0.16
45-54	728	398	330	1444	0.38	1,114	0.29
55-59	508	281	226	882	0.55	656	0.41

Table 2: Calculation of an adjusted LLTI schedule for Merthyr Tydfil that excludes the hidden unemployed

Source: Authors' own calculations using data from the 2001 census and the Department for Work and Pensions (accessed via the Nomis website)

1 Estimates of hidden unemployed = column 2 (IB count) - column 3 (Adjusted IB count)

2 Estimate of adjusted LLTI count (excluding hidden unemployed) = column 5 (observed LLTI) – column 4 (Estimate of hidden unemployed)

3 Estimate of adjusted LLTI rate (excluding hidden unemployed) = column 7 (adjusted LLTI count)/total population (not in table). Note the total population includes the hidden unemployed. We make the assumption that they do not have a limiting long term illness but a long term illness.

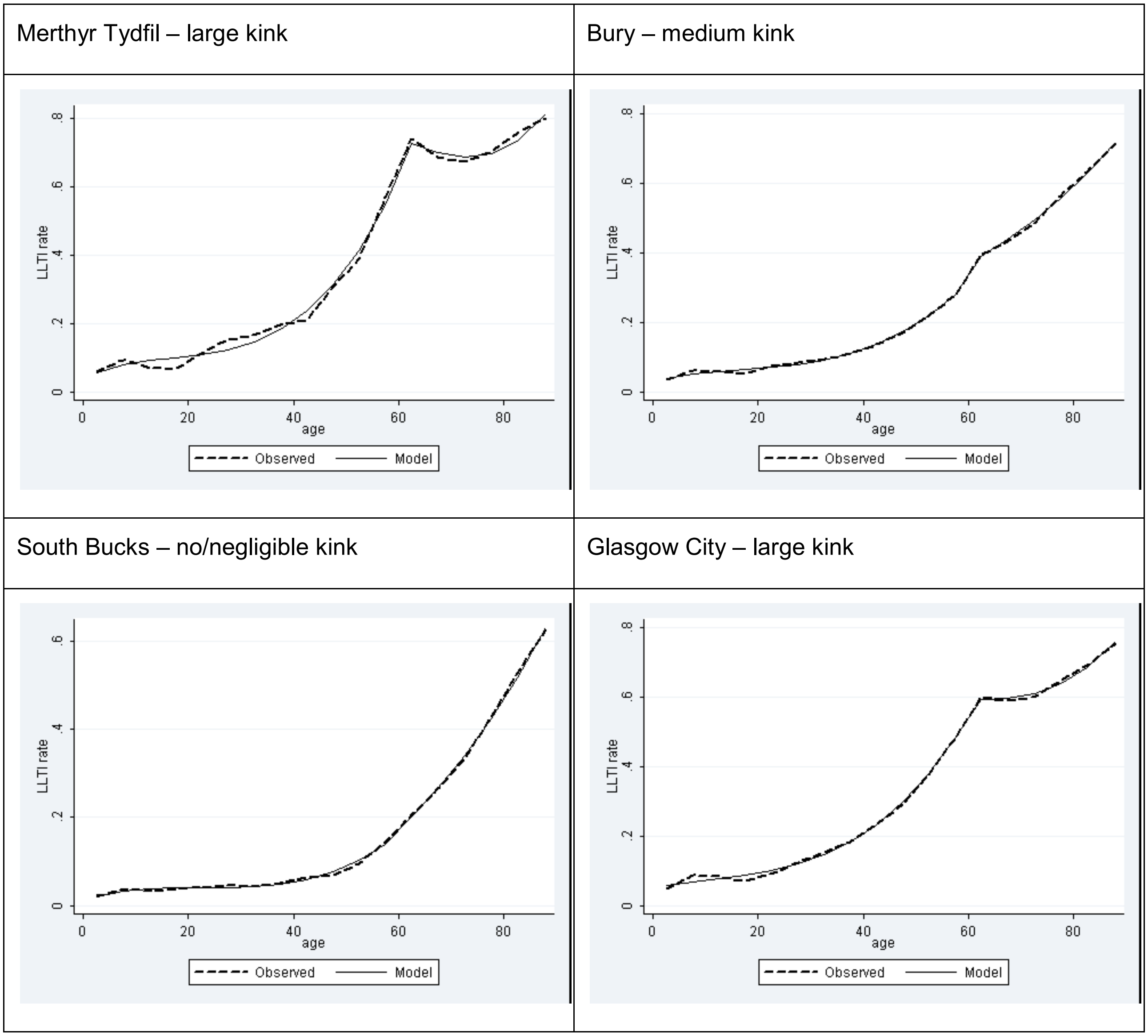


Figure 1: Observed and modelled LLTI schedules (males) in a selection of districts

Source: Authors' own calculations based on data from the 2001 census

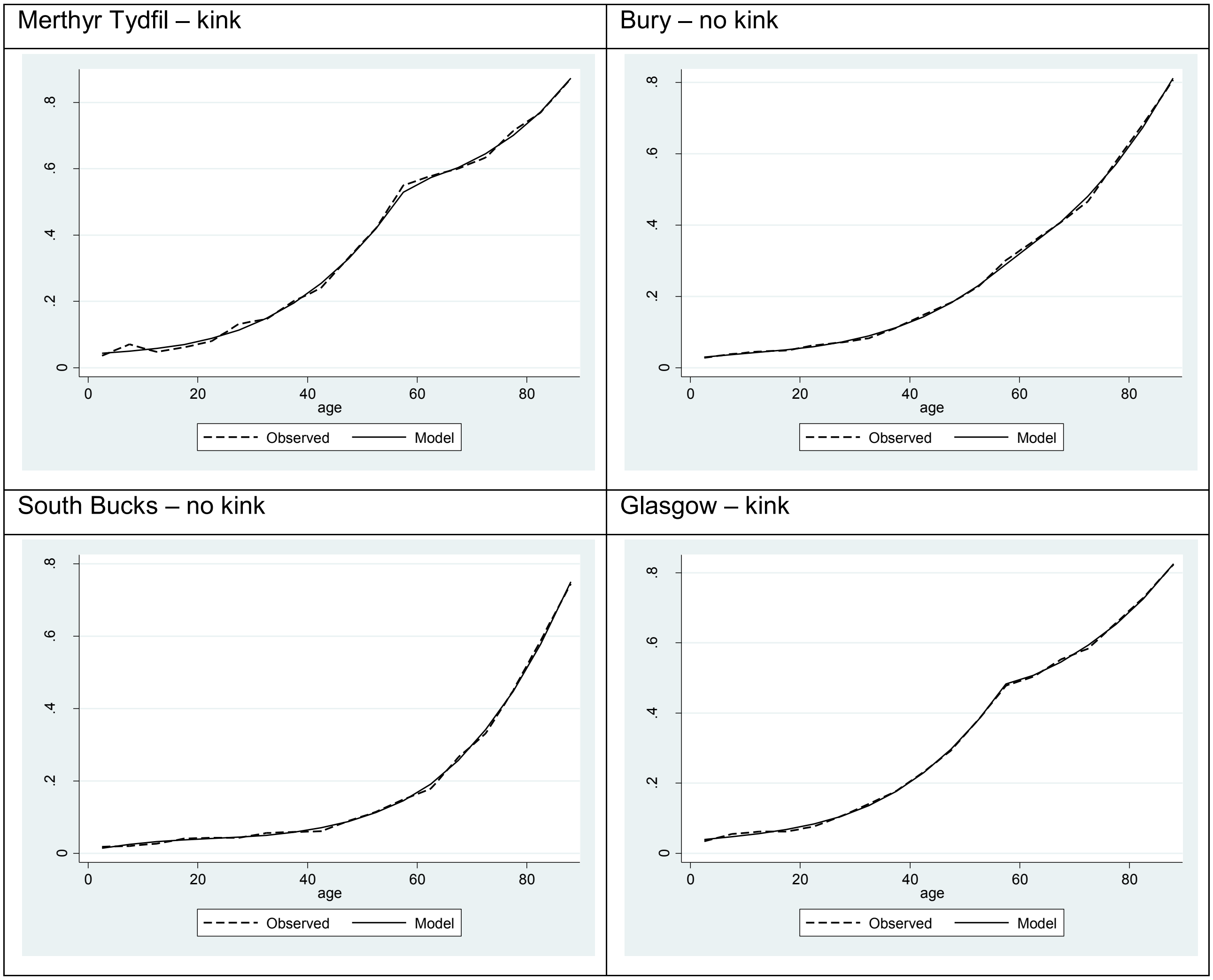
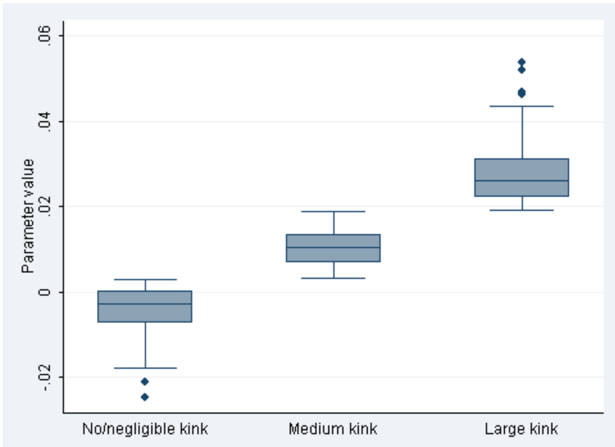


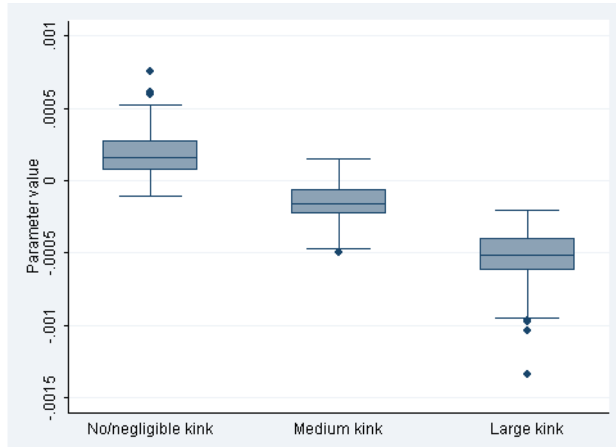
Figure 2: Observed and modelled LLTI schedules (females) in a selection of districts

Source: Authors' own calculations based on data from the 2001 census

Distribution of b_1 parameter estimates



Distribution of b_2 parameter estimates



Distribution of b_3 parameter estimates

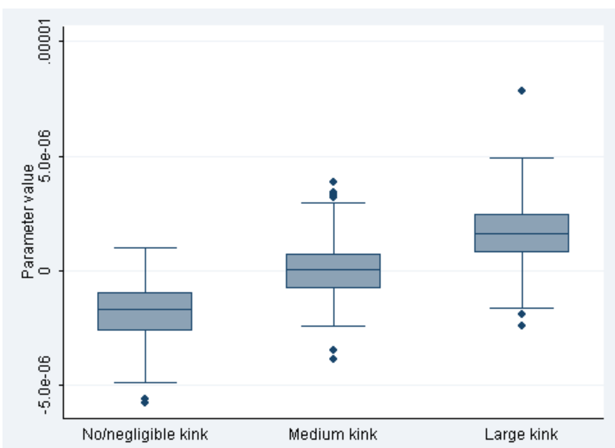
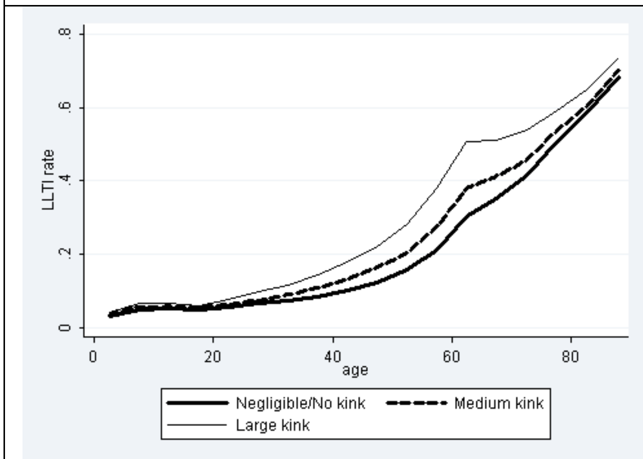


Figure 3: Boxplots showing the distribution of the b_1 , b_2 and b_3 parameter estimates within each of the three retirement kink cluster groups

Source: census 2001 and authors' own calculations

Males



Females

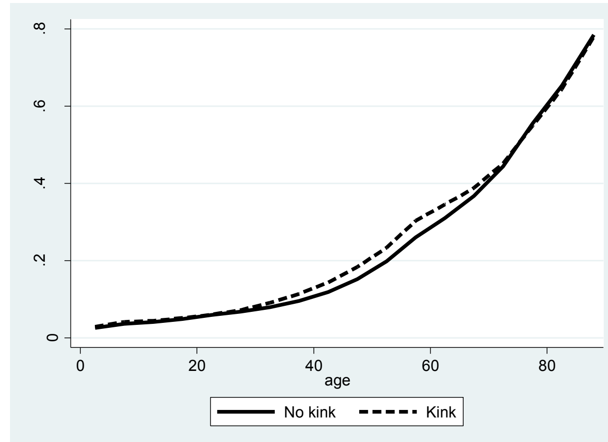


Figure 4: Aggregate LLTI schedules in each of the three retirement kink clusters

Source: census 2001 and authors' own calculations

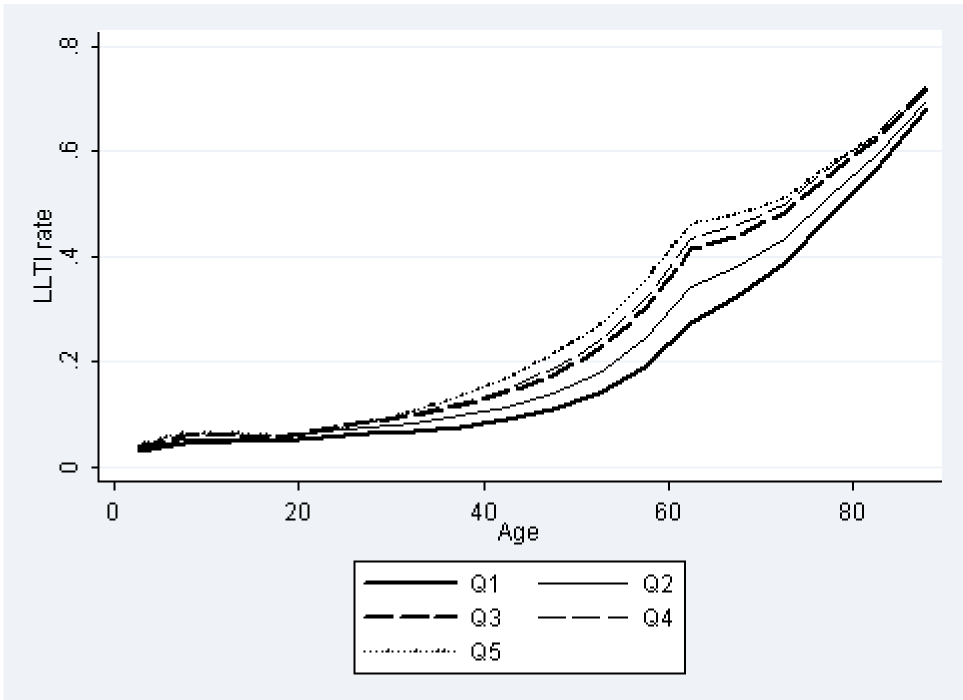


Figure 5: Aggregate LLTI schedules (males) in each of the five Townsend deprivation quintiles (Q1 least deprived)

Source: census 2001 and authors' own calculations

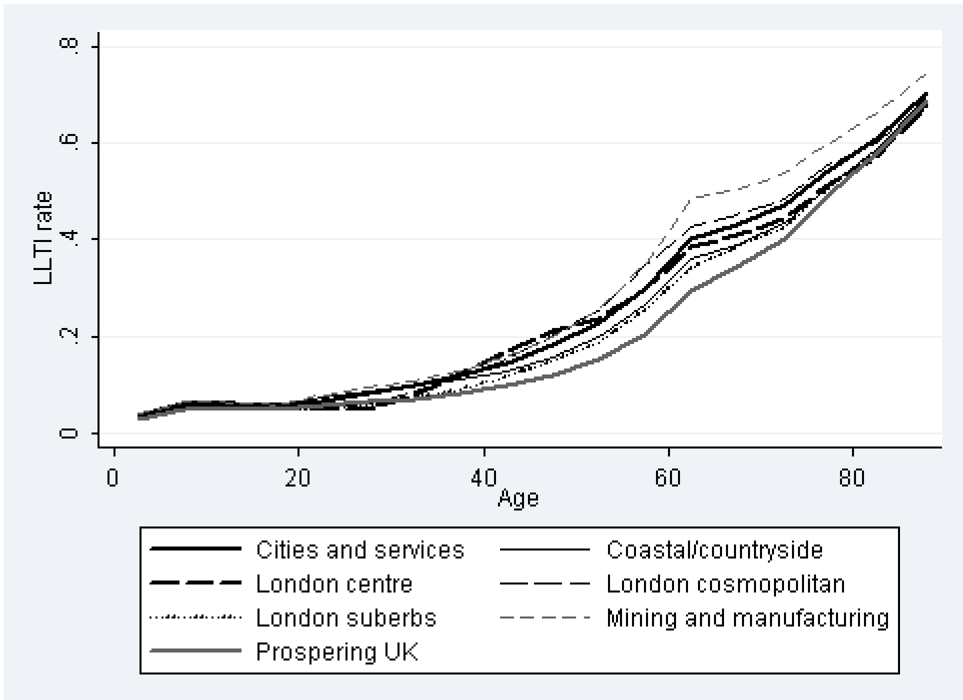


Figure 6: Aggregate LLTI schedules (males) in each of the 'supergroups' of the National Statistics 2001 Area Classification (NSAC)

Source: census 2001, National Statistics 2001 Area Classification (NSAC) and authors' own calculations

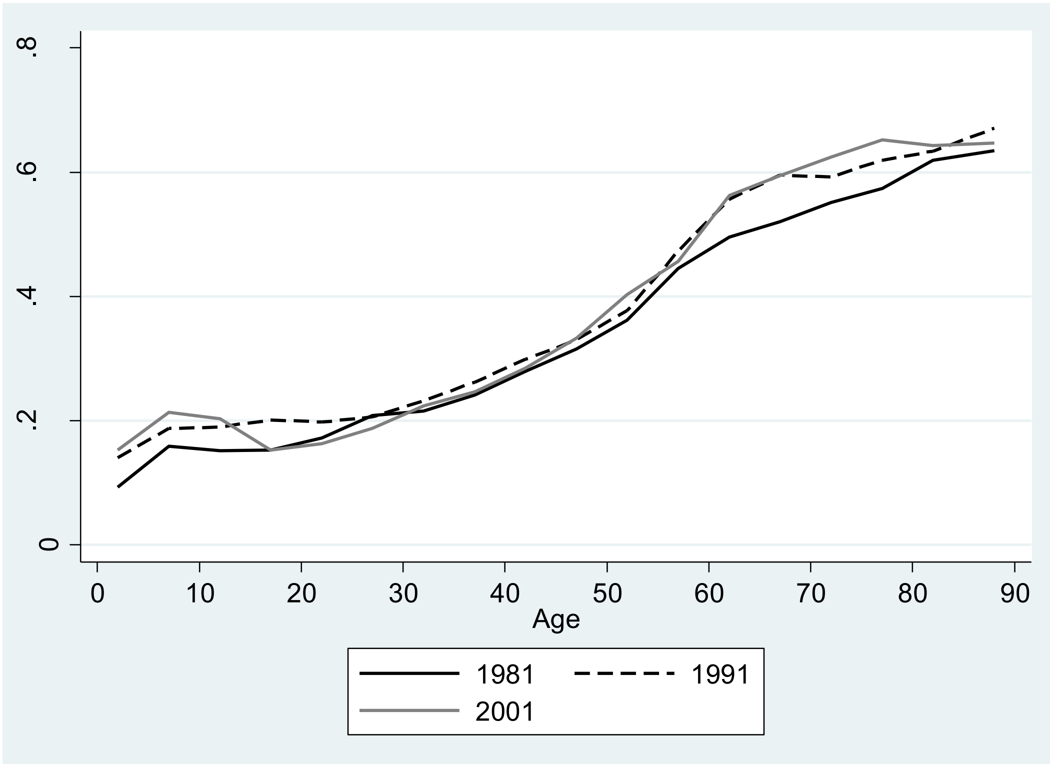
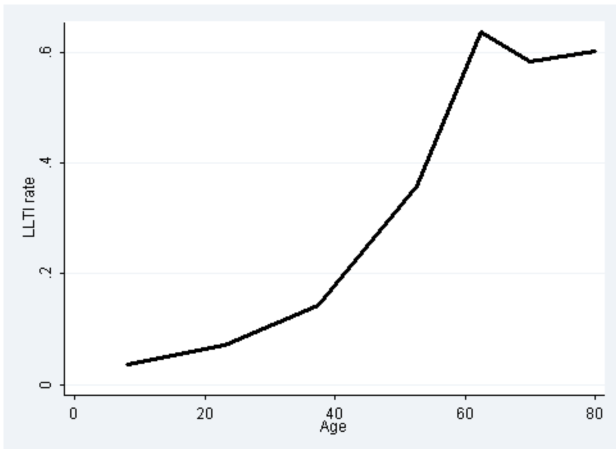


Figure 7: LLTI schedules in England (Males – private household population) 1981, 1991 and 2001

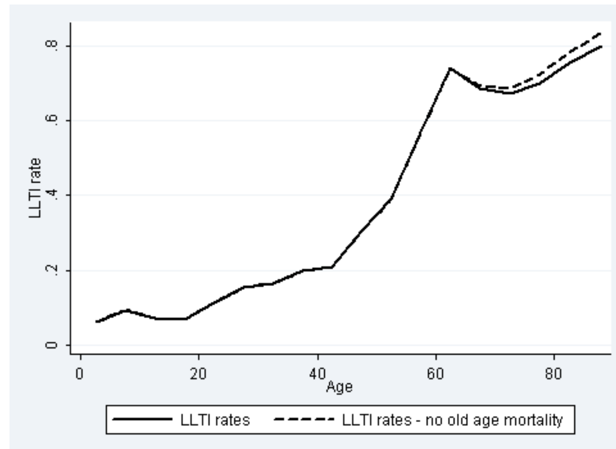
Source: Authors’ own calculations using data from the General Household Survey

1991 LLTI schedule (males) - Merthyr Tydfil (Males)



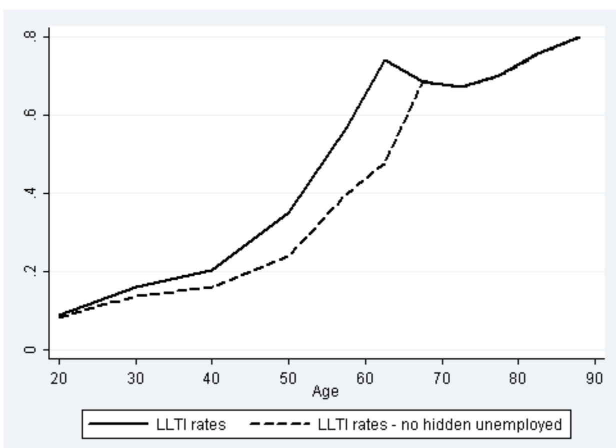
LLTI schedules (males) – Methyr Tydfil (2001)

Observed and alternative (assuming no premature mortality)



LLTI schedules (males) – Methyr Tydfil (2001)

Observed and alternative (assuming no excess hidden unemployment)



LLTI schedules (females) – Methyr Tydfil (2001)

Observed and alternative (assuming no excess hidden unemployment)

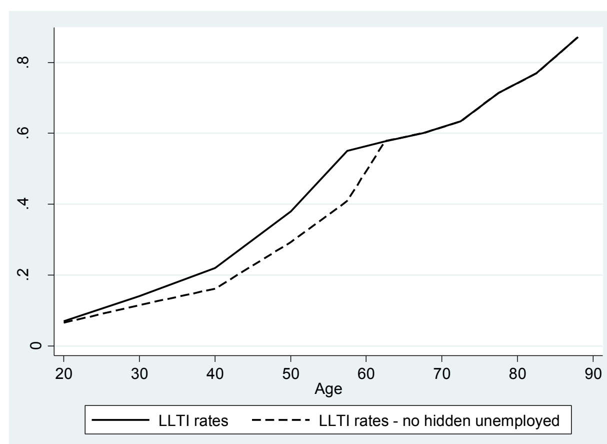


Figure 8: A selection of LLTI schedules for Merthyr Tydfil to explore the validity of various theories (cohort effect, retirement kink, premature mortality, migration) to explain the retirement kink

Source: Authors' own calculations using data from the census (2001 and 1991) and vital statistics

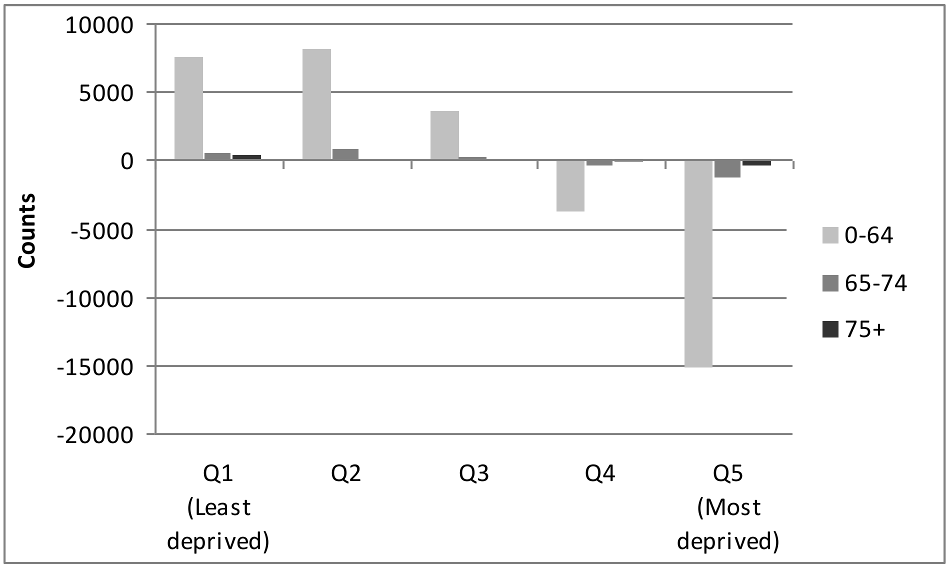
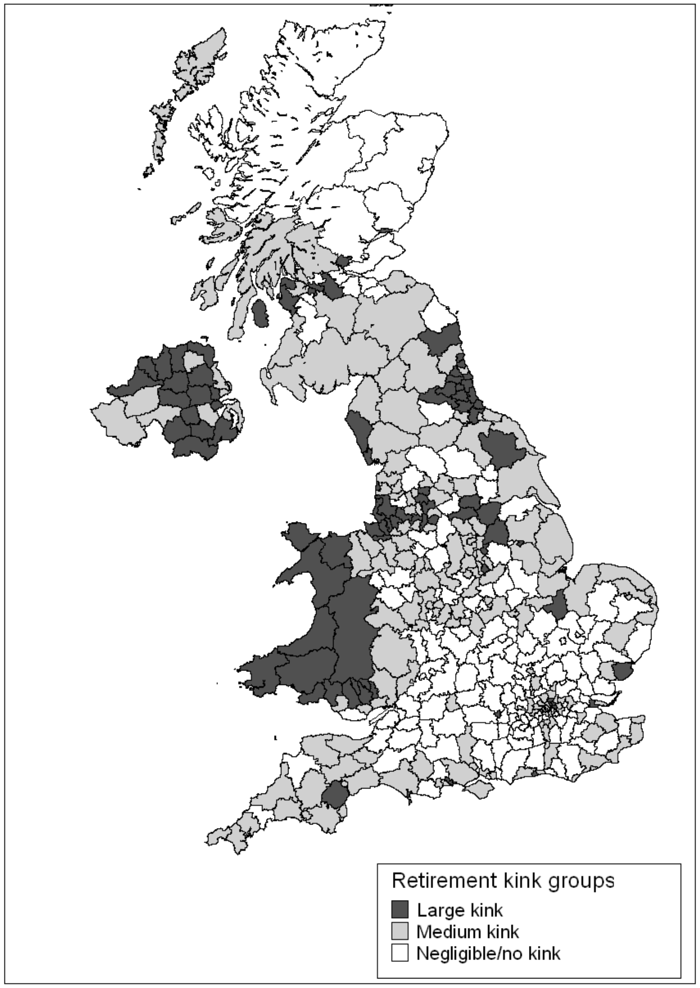


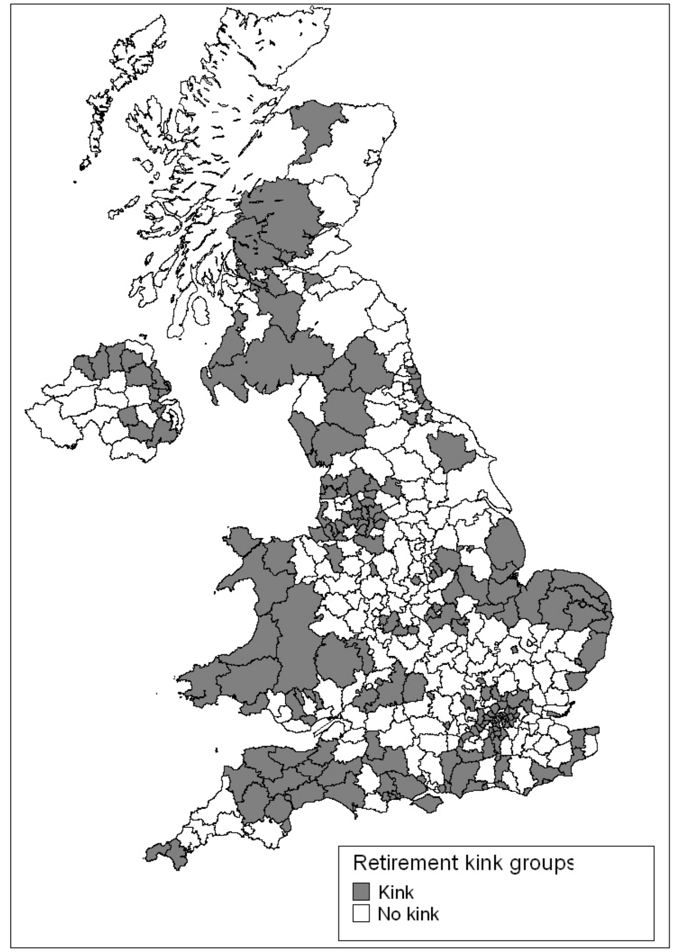
Figure 9: Net migration by age (males) in each of the five Townsend deprivation quintiles (Q1 least deprived) in the year preceding the 2001 census.

Source: Authors' own calculations using data from the census 2001



Map 1: Spatial patterns of the LLTI retirement kink (Males-2001)

Source: census 2001 and authors own calculations



Map 2: Spatial patterns of the LLTI retirement kink (Females-2001)

Source: census 2001 and authors own calculations