September 2010

The ESPON 2013 Programme

DEMIFER
Demographic and migratory flows affecting European regions and cities

Applied Research Project 2013/1/3

Deliverable 12/11
Demifer Case Studies

West Yorkshire

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This report presents results of an Applied Research Project conducted within the framework of the ESPON 2013 Programme, partly financed by the European Regional Development Fund.

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1 Introduction

The DEMIFER project aims to examine the historical and future impact of demographic change upon the 27 members of the European Union (EU) plus the four additional European states that have a close relationship with the EU (EEA plus Switzerland). To achieve this aim, a comprehensive database of demographic statistics has been constructed, capturing information about trends and patterns of fertility, mortality, internal migration and international migration for each NUTS2 region in the 31 'ESPON' countries.

These data have been used to examine how the components of demographic change combine to exert different impacts upon population change, the size of the labour force and the ageing of the population in each of the NUTS2 regions. Historical analysis, coupled with multi-regional forecasting methods, has been used to assess how future developments in fertility, mortality and migration might affect population growth or decline and drive changes in the age structure in different types of regions. The impact of migration, both internal and international, has been a particular focus of the study, in order to establish its influence upon the labour force, to establish how migration between European countries and migration to Europe compensate or reinforce each other, and to consider how climate change may drive migration flows within, between and into countries and regions.

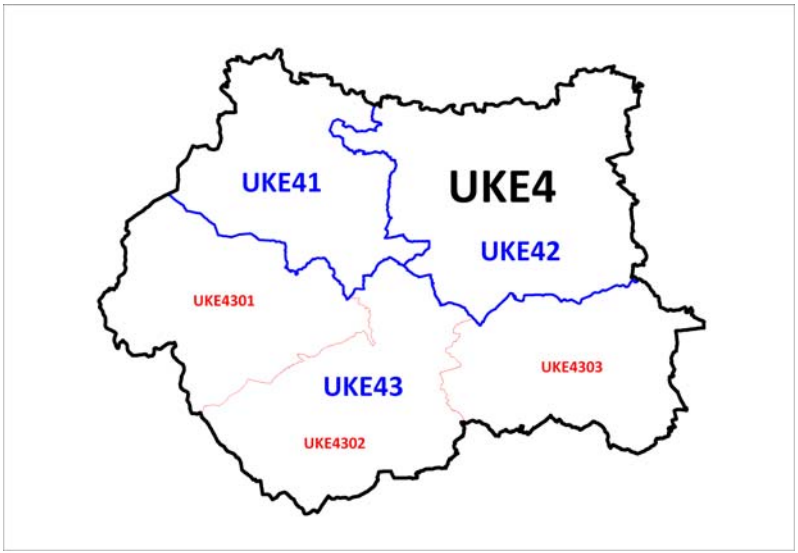
A key part of the project has been a more detailed examination of the complexity of the demographic process within a series of 'Case Studies' that draw together the various strands of analysis undertaken in the DEMIFER project; from connecting the historical analysis, developing the regional typology, building scenarios and formulating policy implication, to illustrating the results and impacts at a more disaggregate, NUTS3 regional geography. Case Study areas have been selected from DEMIFER's regional typology, with at least one region from each cluster selected. Two Case Studies have been prepared for the UK: West Yorkshire and Greater London. This paper reports on the West Yorkshire Case Study.

West Yorkshire is a NUTS2 region classified as 'Family Potentials' in the DEMIFER typology (see Appendix 1). Areas with this classification typically have a labour force population in the younger adult ages (aged 20-39) of average size, lower than average population beyond retirement (65+) and higher than average growth due to both natural increase and net migration. This study examines how well West Yorkshire fits its typology classification. Two other regions in the 'Family Potentials' cluster have also been selected for more detailed Case Studies: Alsace (FR42) and Stockholm (SE4).

Section 2 of this report provides the geographical context for the West Yorkshire study and briefly summarises the nature of the demographic data available for analysis in the UK. Section 3 reviews some of the more recent studies of demographic change in West Yorkshire, drawing in particular on the expertise in migration analysis that exists at the School of Geography at the University of Leeds. Section 4 summarises the historical picture of population change and its key components, with Section 5 taking a more detailed look at the importance of migration in this process. Section 6 examines how demographic change is likely to impact upon the profile of the population: its age structure, its labour force, its elderly sub-population and its ethnic composition. Section 7 indicates how the DEMIFER scenarios would impact upon West Yorkshire and a concluding section draws together the analysis and policy-relevant findings of the Case Study.

2 Study area definition and data availability

West Yorkshire (UKE4) is situated in the north of England and is one of four NUTS2 regions (South Yorkshire, North Yorkshire and East Yorkshire/North Lincolnshire being the others) within the UK's Government Office Region (GOR) of Yorkshire and Humber. The NUTS3 geography of West Yorkshire identifies three separate areas: the individual metropolitan district local authorities of Leeds (UKE42) and Bradford (UKE41) plus a third area (UKE43) combining the local authority districts of Calderdale (UKE4301), Kirklees (UKE4302) and Wakefield (UKE4303). The analysis in this report uses both the NUTS3 geography and the local authority geography for presentation purposes (Map 1).



Map 1 NUTS regions within West Yorkshire

West Yorkshire is a largely conurbation with a total population in 2008 of 2.2 million. Leeds is the economic hub of the GOR with a financial services industry that is second only to London in its importance to the UK economy (Unsworth and Henderson, 2004). In contrast, Bradford continues to suffer economically, has pockets of extreme deprivation and has one of the highest concentrations of ethnic minority populations in the UK, having been one of the early destinations of post-war immigration from former colonies in South East Asia.

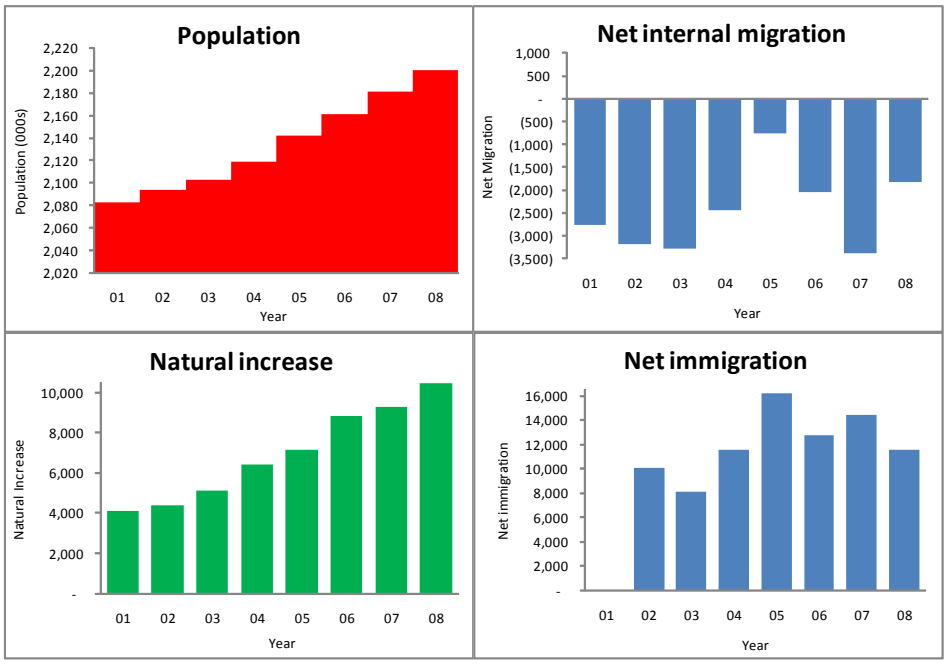
To facilitate this study, data have been collated from a variety of sources. The UK does not operate a population register and so relies on the decennial census plus a range of surveys and administrative sources to provide its key demographic statistics. Mid-Eear Estimates (MYEs) of the population are produced for each local authority area on an annual basis by the Office for National Statistics (ONS), updating the 2001 Census statistics using the most recent information on births, deaths and migration. The most accurate data are available on births and deaths, with an all-inclusive process of births and deaths registration providing very accurate and timely statistics at all geographical scales. Sources of migration data are less definitive or reliable (see Stillwell *et al*., 2010, for a recent review). Internal migration for inter-censal years is derived primarily from patient registration statistics, captured as individuals move and re-register with their local doctor (Scott and Kilbey, 1999; Chappell *et al*., 2000). These data are collected on a rolling basis and provide

disaggregation by age and local authority area; they do, however, suffer from issues of under-registration, particularly for young adult males who are least likely to register with a doctor when they move.

International migration statistics are the least robust. The UK relies upon the International Passenger Survey (IPS) as the primary source of its data on immigration and emigration, combining it with a number of other sources to produce estimates for local areas (ONS, 2008). These estimation methods have been subject to considerable scrutiny and comment (House of Commons, 2008; Rees *et al.*, 2009) at a time when net immigration has been a dominant driver of population change in the UK. Alternative estimates of immigration have been produced using a variety of administrative sources (Boden and Rees, 2009; 2010) and the ONS has recently completed a consultation process on its own methodological revisions (using administrative data) which will see local authority population estimates revised for 2001-2008. In the absence of definitive statistics on international migration, local authorities have been encouraged to use alternative sources to gather information (Audit Commission, 2007; Green *et al.*, 2008) with administrative sources such as the Department of Works and Pensions' (DWP) National Insurance Number (NINo) statistics, Workers Registration Scheme (WRS) data from the UK Borders Agency and the registration of foreign nationals with the UK health service, providing useful, if incomplete, evidence on this key element of local population change.

3 A summary of population change

Since 2001, the population of West Yorkshire is estimated to have increased by 6%, reaching 2.2 million in 2008. The components of demographic change are clearly exerting different influences on this growth but there exists particular uncertainty regarding the true impact of the international migration component (Figure 1).



Source: ONS Mid-Year Estimates

Figure 1 Components of population change, West Yorkshire, 2001-2008

Since 2001, the number of deaths recorded in West Yorkshire has remained relatively stable at 20,000-22,000 per year. In contrast, the number of births has increased year-on-year from 25,700 in 2001 to 30,600 thousand in 2008. Thus, natural increase has contributed approximately 55,600 to the total population growth in West Yorkshire over the 2001-2008 period, roughly 47% of the total change.

Net migration has therefore contributed over 50% of the estimated population growth but there is a marked contrast between the influence of internal migration versus that of international migration. Internal migration has resulted in a net loss of population from West Yorkshire in every year since 2001, ranging from 500-3,500 per year. The net impact of international migration has compensated for this loss with significant gains, reaching 12,000-16,000 in 2005.

Whilst there is considerable certainty regarding the number of births and deaths recorded in West Yorkshire since 2001 and there are reasonably good statistics on internal migration (albeit with some likely biases in the younger age-groups), there remains substantial uncertainty with regard to the robustness of the

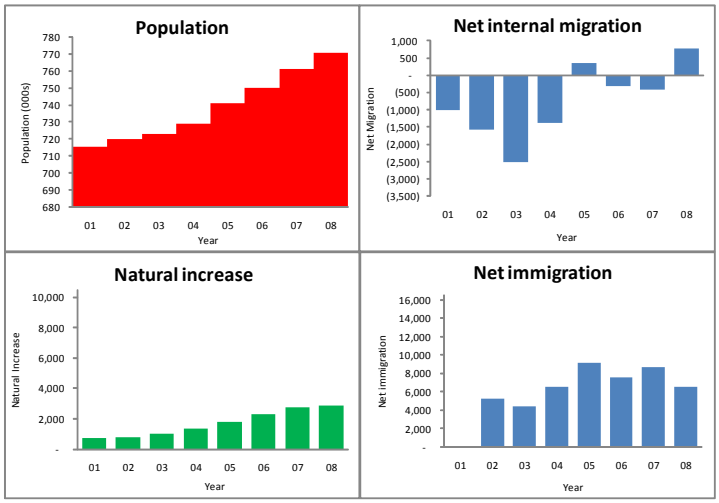
international migration estimates. Research has shown that immigration estimates for the larger Yorkshire and Humber GOR are likely to be in error (too high) which has a knock-on effect for the estimates for the component local authority areas (Boden and Rees, 2009). The scale of the over-estimation could be as high as 20-30% which, given the importance of international migration as a driver of demographic change, would have a substantial impact upon population estimates and projections; altering the age-group profile, the size of the labour force and the scale and speed of population ageing that is expected.

The uncertainty surrounding the net international migration and therefore the estimated population growth should be borne in mind when examining the components of population change for each of the NUTS3 zones within West Yorkshire (Figure 2). Since 2001, population growth has been highest in Leeds (8%) and Bradford (7%) with less significant growth in Calderdale/Kirklees/Wakefield (4%). The increasing number of births is reflected in the rising impact of natural increase in each NUTS3 region; however, there are significant differences in its importance as a driver of growth. Natural increase has accounted for 79% of population change in Bradford since 2001, and 56% in Calderdale/Kirklees/Wakefield whereas in Leeds it has only contributed 25%. With a high concentration of ethnic minority populations, Bradford does have high fertility rates (see below) but these differences in the impact of natural increase are also being driven by the relative importance of the migration components in each local population change estimate.

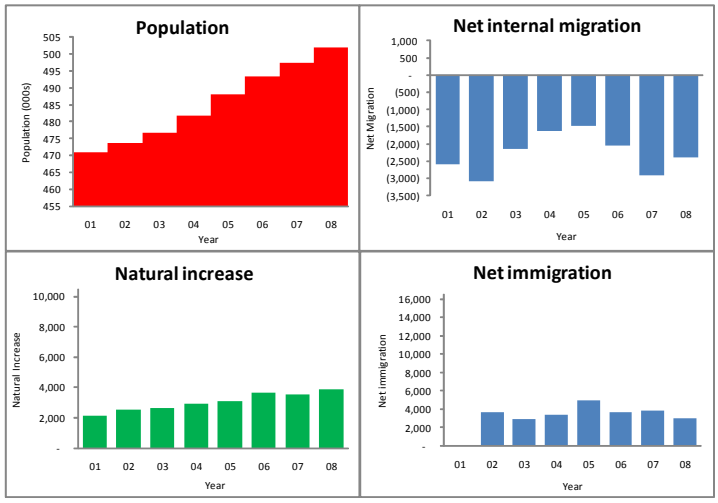
Net internal migration to Leeds has changed since 2001 from a small net loss to a small net gain. International migration in contrast has become a dominant driver of growth in the population estimates, with net immigration contributing 5,000-8,600 each year (Figure 2a). Between 2002 and 2008, net immigration is estimated to have contributed 48,000 of the overall growth of 54,600 in Leeds' population. The potential impact of uncertainty in the estimation of international migration is therefore considerable. In Bradford, a substantial net loss due to internal migration has become a consistent feature of population change. This net loss has been compensated for by annual net gains due to net immigration of 2,000-4,000 in 2002-2008. In Calderdale/Kirklees/Wakefield, a different picture is evident for migration with a net gain due to internal migration in each year

declining and becoming a net loss in 2007 and 2008. A net annual inflow of 1,000-2,000 through international migration has also contributed to population growth since 2002. The migration components are therefore primarily responsible for the different growth trajectories of each of these NUTS3 regional populations.

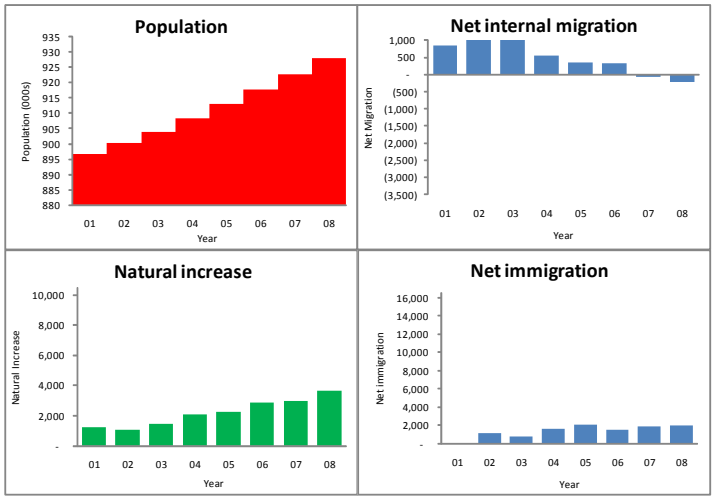
(a) Leeds



(b) Bradford



(c) Calderdale, Kirklees and Wakefield

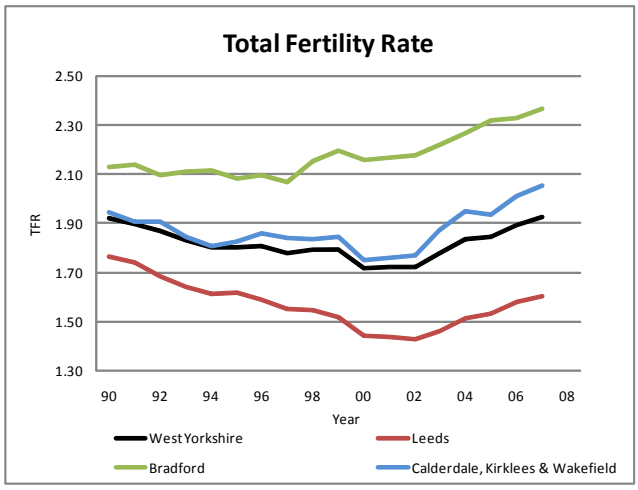


Note: Scale on population graph varies by area; other graphs have a fixed scale for all areas.
Source: ONS mid-year estimates

Figure 2 Components of population change, West Yorkshire's NUTS3 regions, 2001-2008

4 Fertility and mortality

The increasing contribution of natural increase to population growth in West Yorkshire since 2001 has been driven by a reversal in the downward trend in fertility rates that were experienced throughout the UK to the end of the last century. This turnaround has been underpinned by the trend towards late childbearing that has led to an increase in fertility for females in older age-groups and by the increasing percentage of births to mothers born outside the UK. Each of the three NUTS3 regions has experienced a rise in its total fertility rate (TFR) since 2001 but it is interesting to examine the differences that exist between the levels of the three curves (Figure 3).



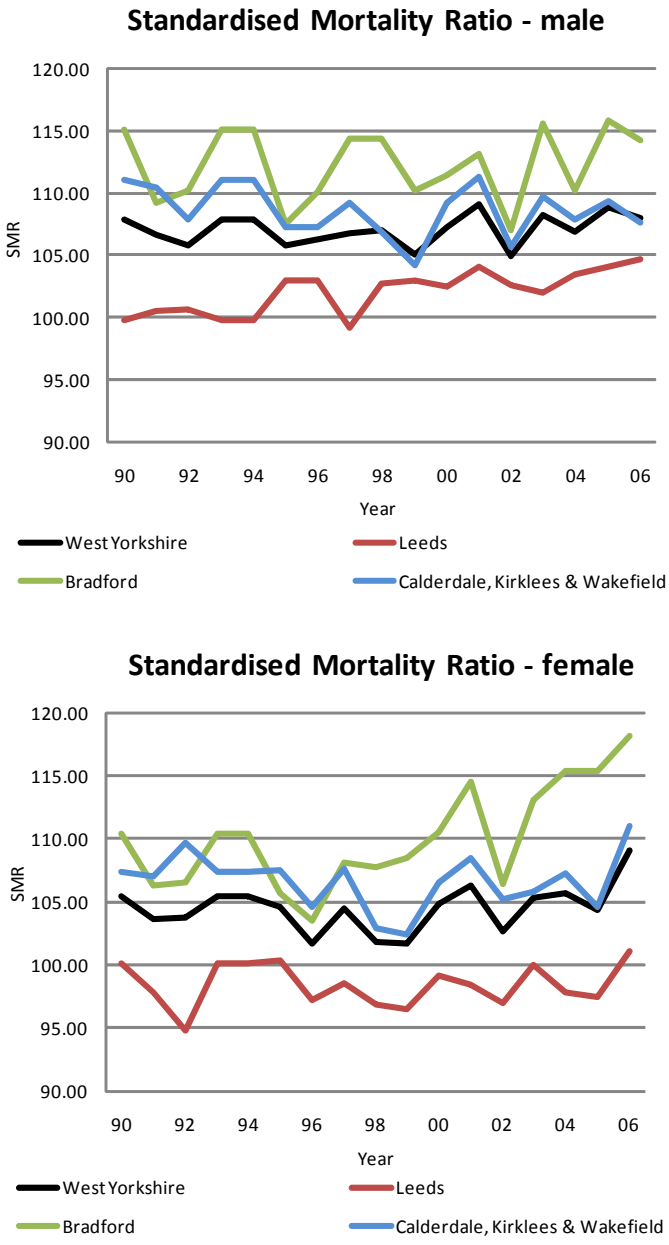
Source:

Figure 3 Total fertility rate, West Yorkshire and its NUTS3 regions, 1990-2007

With 'replacement' fertility rates now standing at slightly below 2.1, Bradford has maintained an above-replacement TFR since the 1990s, rising to almost 2.4 in 2007. With its diverse ethnic mix, the percentage of total births to mothers whose country of birth was outside the UK now exceeds 30%. In Leeds, the TFR is much lower than in Bradford, declined quite steeply throughout the 1990s and then climbed from a low-point of 1.4 in 2001 to reach 1.6 in 2007; still well below replacement. The large student population is likely to play a significant role in depressing the TFR but the uncertainty over the true population size due to the inadequacies of immigration estimation may also be playing a part, with an artificially inflated population denominator keeping the TFR at its low level.

Leeds has a TFR lower than any of the other major metropolitan areas in the UK. Births to mothers born themselves outside the UK is also an increasingly important component of the birth mix in Leeds; 13% in 2004 rising to 19% by 2008. The TFR schedule for the third NUTS3 region of Calderdale/Kirklees/Wakefield is midway between Leeds and Bradford and appears to experience the sharpest rise since 2001, approaching replacement level by 2007; with Calderdale and Kirklees above replacement by 2007 and Wakefield just below.

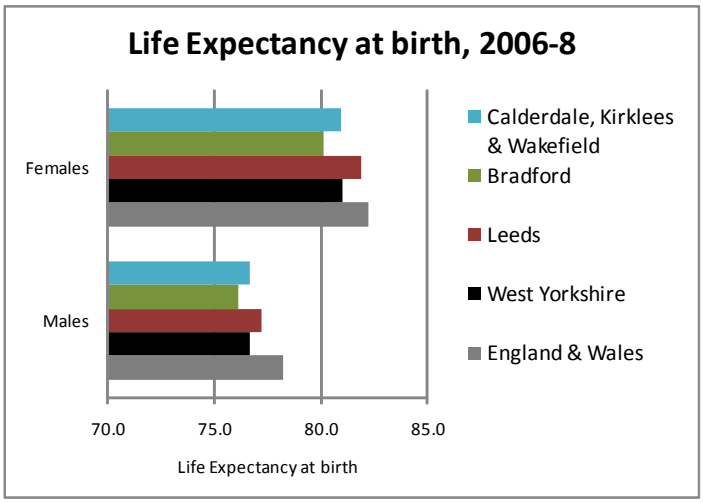
Mortality rates in West Yorkshire are 5% higher than the England and Wales average. Bradford has the highest levels over the period in West Yorkshire with its Standardised Mortality Ratio (SMR) for males 15% above than the England and Wales benchmark (100 in Figure 4) in certain years. Female standardised mortality in Bradford also fluctuates over time, with a low pint in 1996 at 4% above the national average and a high point at the end of the period when the SMR has risen to 18% of the national average. Leeds, in contrast, has an SMR for males that has remained above the England and Wales average since 1997 whilst the female SMR has tended to remain below the 100 from 1995 until 2006, The SMR for Calderdale/Kirklees/Wakefield more or less reflects the West Yorkshire average for both males and females.



Note: SMR for England & Wales = 100Source: Office for National Statistics

Figure 4 Standardised Mortality Ratios (SMR), West Yorkshire and its NUTS3 regions, 1990-2006

Statistics on life expectancy at birth reflect these SMR differences, with West Yorkshire residents expected to live one year less than the England and Wales average would suggest (Figure 5). Bradford has the lowest life expectancy for both males (76 years) and females (80 years), whereas life expentancy in Leeds is closer to the England and Wales average for females and males.



Source: Authors' calculations

Figure 5 Life expectancy at birth, 2006-08, West Yorkshire and its NUTS3 regions

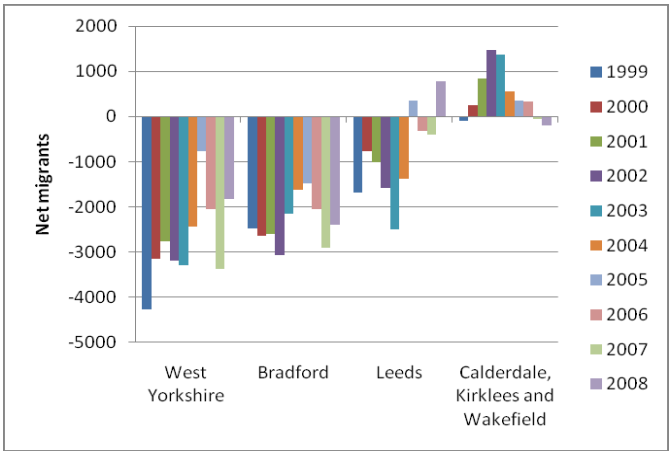
The Office for National Statistics (ONS, 2008) have released new estimates for life expectancies across the UK which indicate both a closing of the gender gap in life expectancy and also a convergence in life expectancies between the north and south of the country. These trends lead to further questions about what variations exist in life expectancy by ethnic group and how do ethnic life expectancies for men and women vary geographically. Wohland and Rees (2008) report the first ever estimates of life expectancies of ethnic groups in the districts of Yorkshire and Humber compared to England, confirming that rural areas experience higher life expectancies than urban areas across each ethnic group, but that low life expectancies are apparent for Pakistani and Bangladeshi populations. Bradford and Wakefield have the lowest life expectancies across ethnic groups in West Yorkshire for both men and women.

5 Internal migration

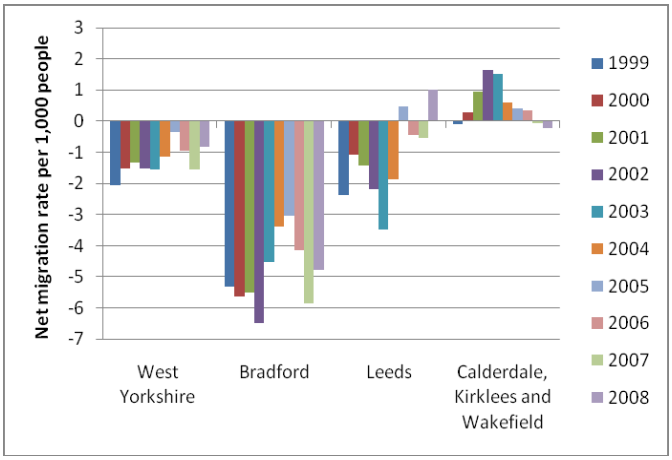
This section examines the impact of internal migration on population change in West Yorkshire in a little more detail. In the ten years prior to 2008, the NUTS2 region experienced a net loss of internal migrants in every year of the decade. The level of this loss, however, has varied quite considerably. In volume terms, the losses have been relatively low with a maximum loss of only around 4,000 migrants in 1999 and a minimum of some 800 migrants in 2005 (Figure 6a). Expressed as a rate, these losses are also relatively low with a median rate of

around 1.4 migrants per 1,000 population over the ten year period (Figure 6b). Within West Yorkshire, this pattern varies quite appreciably, with Bradford experiencing the largest net loss, both in terms of its total net balance (an average of around 2,300 migrants a year) and in terms of its rate of loss (around 5 migrants per 1,000 people on average). The net migration net losses from Leeds are lower losses that those in Bradford and appear to diminish after 2004, with positive balances recorded in 2005 and 2008. Calderdale, Kirklees and Wakefield, on the whole, experiences a positive net-migration balance across the decade, however there is a rise and fall in net gains at with small net losses of around 200 people at the start and end of the time series.

(a) Net migration balances



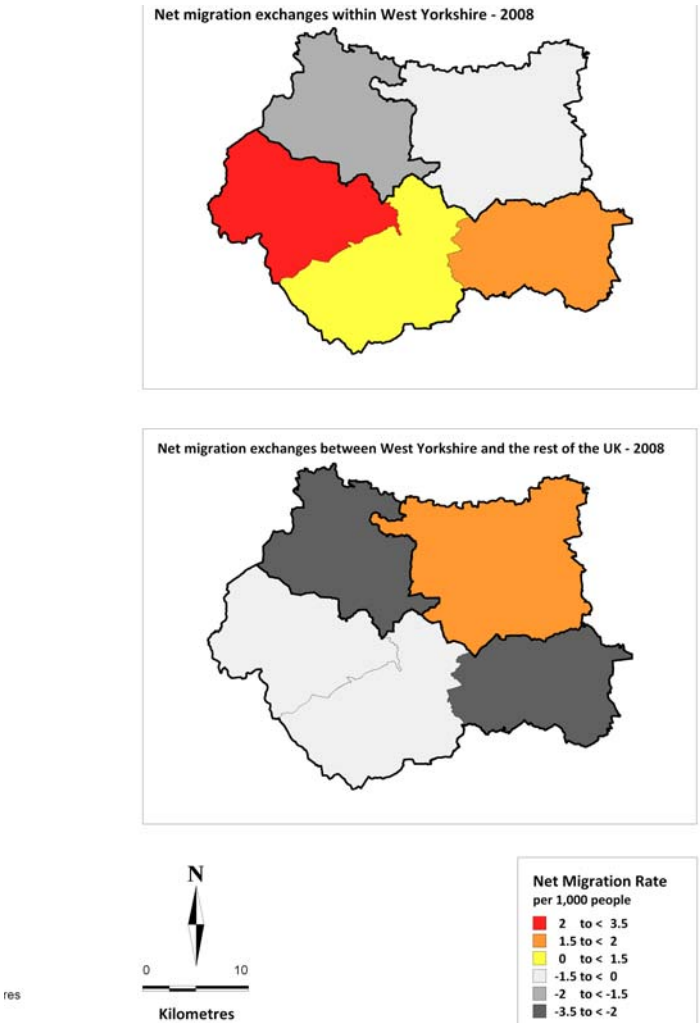
(b) Net migration rates



Source: Authors' calculations based on NHS patient registration data

Figure 6 Net migration balances and rates, West Yorkshire and its NUTS3 regions , 1999-2008

These patterns can be examined in more detail if we disaggregate the flows between those that occur *within* West Yorkshire, and those which occur between regions within West Yorkshire and elsewhere in the UK. Map 2 exemplifies this flow disaggregation for the most recent year for which there are data (2008). What can be seen clearly is that when the flows are within West Yorkshire, the largest urban areas – Leeds and Bradford – are losing migrants in net terms to the less urbanised districts in Calderdale, Kirklees and Wakefield. When the flows are between districts in West Yorkshire and the rest of the country, all districts are losing migrants to other areas in the UK except for Leeds, which becomes a net gainer of migrants.

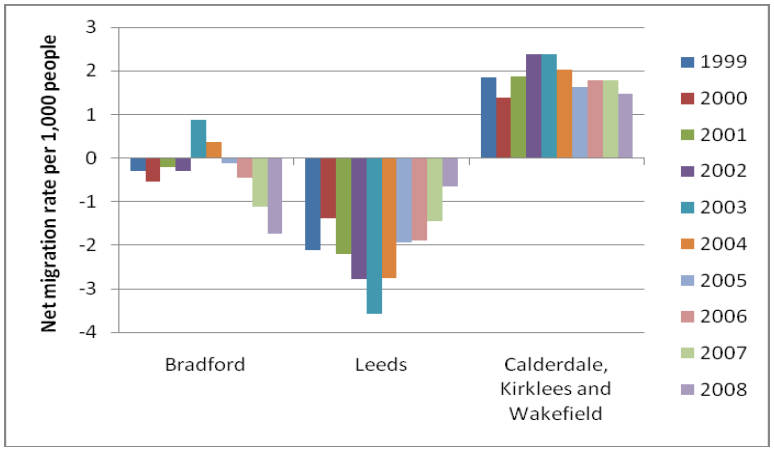


Source: Authors' calculations based on NHS patient registration data

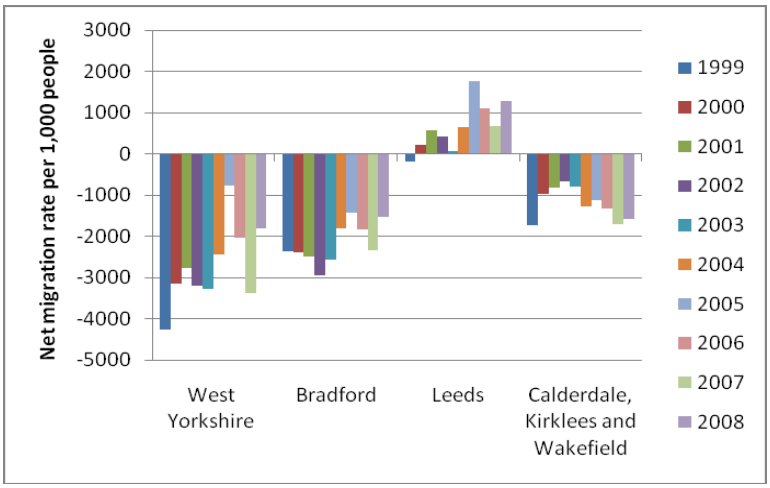
Map 2 Net migration exchanges between districts within West Yorkshire and between West Yorkshire districts and the rest of the UK, 2008

Figure 7 shows how this pattern varies over time. Calderdale, Kirklees and Wakefield maintains a relatively constant level of net in-migration from the rest of West Yorkshire and net out-migration to the rest of the UK over the decade leading up to 2008. Bradford varies somewhat more, net migration losses to other areas in West Yorkshire, except for in 2003 and 20004 when it experienced a modest net gains. Bradford is a consistent net loser of population with the rest of the country; however, the level of this net loss reduces towards 2008. Leeds is the only region within West Yorkshire that experiences a net gain of migrants from the rest of the UK. In 1999, it experienced a small net loss, but from 2000 onwards, there has been net migration gain from the rest of the UK. In contrast, with the rest of West Yorkshire it has consistently been losing population, although the rate of loss has varied, with a peak in 2004.

(a) Net migration exchanges within West Yorkshire



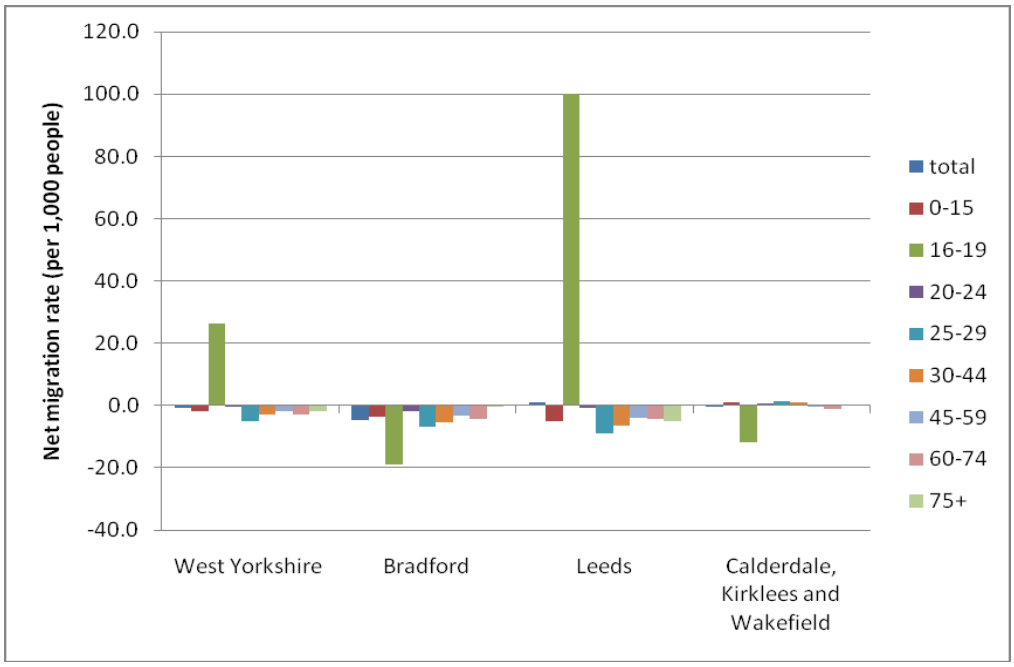
b) Net migration exchanges between West Yorkshire and the rest of the UK



Source: Authors' calculations based on NHS patient registration data

Figure 7 Net migration exchanges between districts within West Yorkshire and between West Yorkshire districts and the rest of the UK, 1999-2008

The aggregate migration flows that have been presented hitherto conceal variations in the types of flows occuring between areas. Analysis of migration patterns by age group, representing particular stages in the life course, reveals variation for the whole of the NUTS2 region of West Yorkshire, but more interstingly, also for the NUTS3 regions in 2008 (Figure 8). It is clear that West Yorkshire is only experiencing net migration gains in age group 16-19 at a rate of around 25 migrants per 1,000 population; all other age groups exhibit a net out-migration in 2008.



Source: Authors' calculations based on NHS patient registration data

Figure 8 Net migration rates by age for West Yorkshire and its NUTS3 regions, 2008.

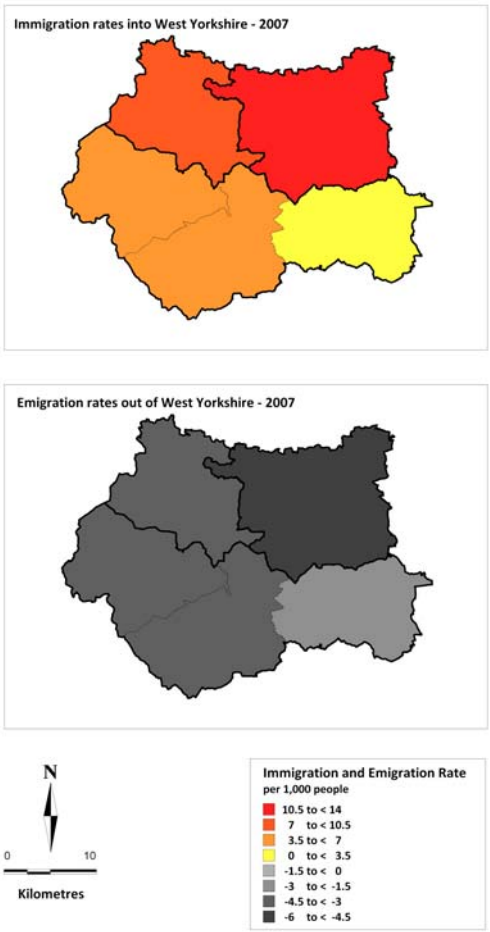
At NUTS3 level, however, more evidence is available about what is driving this spatial pattern of net-migration. Both Bradford and Calderdale, Kirklees and Wakefield actually experience net out-migration in the 16-19 age group. These losses are hugely offset by the massive net in-migration into Leeds. Leeds has a net in-migration rate of almost 100 migrants per 1,000 people which is driven by it being a very important university destination for students. Leeds has two of the largest universities (in terms of student numbers) in the UK, with other specialist music and art colleges also attracting students from far afield. All other age groups within Leeds lose migrants in net terms to other areas in the UK. Only Calderdale, Kirklees and Wakefield experiences any kind of net in-migration from any other age group, but these net-gains are extremely modest in comparison to the huge net gains Leeds experiences in the 16-19 age group.

Overall, the patterns of migration in West Yorkshire can in some ways be viewed as quite unremarkable for a region with a population of over two million people – net balances rarely exceeding a few thousand individuals. Over the decade leading up to 2008, the general pattern was of a modest net loss of migrants each year; a loss not just unique to West Yorkshire, but to the larger GOR within which it belongs (Dennett and Stillwell, 2008). Most of these losses are from

Bradford, and to a lesser extent Leeds, with only Calderdale, Kirklees and Wakefield experiencing a net gain, although this net gain is small even in comparison with the small net-losses from the more urban regions. When only the flows within the region are taken into consideration, the more urban regions of Leeds and Bradford tend to lose to the less urban districts of Calderdale, Kirklees and Wakefield although the major flows are between Leeds and Bradford with Bradford being the district of net gain, as reported in Stillwell and Dennett (2009). For flows between West Yorkshire and the rest of the country, however, Leeds is the only district of net gain in the region, driven as we have seen, by the huge inflows of young in-migrants to study at one of the large higher or further education instituitons in the city. In fact, in a region which exhibits relative low levels of internal migration, the huge net inflows of students into Leeds stand out as a defining feature.

6 International migration

Since 2001, international migration has been a dominant driver of population change yet because of the inadequacies of current data collection methods, it remains the most difficult to estimate accurately. We have noted already that the UK relies upon a combination of census and survey data to estimate immigration and emigration flows at a local level. However, in the face of much public scrutiny of its data and methods, ONS has begun to evaluate alternative approaches to the measurement and estimation of international migration, with administrative data sources now providing important information. Existing approaches to estimation have been shown to be less than robust (Boden and Rees, 2009) but these methods still underpin the population estimates produced for local authority areas in the UK. The immigration and emigration rates used in the 2007 mid-year estimates for West Yorkshire districts are illustrated in Map 3.



Source: ONS mid-year estimates

Map 3 Immigration and emigration rates, West Yorkshire districts, 2007

Over time, as in 2007, Leeds and Bradford have the highest immigration and emigration rates, with the impact upon net migration flows illustrated in Figure 3.

To examine the robustness of estimates of international migration, 'official' estimates of immigration (migrants whose duration of stay is more than 12 months) can be compared with empirical evidence from alternative administrative sources, most notably the registration of foreign nationals with a General Practitioner (GP) and the registration of foreign workers for a National Insurance Number (NINo). Both these administrative sources provide continuous data capture, albeit for a different population to that captured by the ONS estimates. GP registration is not compulsory and may not capture certain groups of migrants, young males in particular. No length of stay information is captured by the registration process and migrants are not required to de-register when

they leave the country. NINo registration captures workers only, excluding students and dependents. Again length of stay is not recorded and de-registration is not required. Despite these drawbacks, the two administrative sources do provide a large sample of statistical evidence on migrant activity at a local level that is based upon factual data and not on estimates derived from a combination of national surveys and 2001 Census information.

A comparison of ONS immigration estimates used in the population mid-year estimates for West Yorkshire (MYE Immig) with GP registrations (Flag 4) and NINo registrations from 2004 to 2008 is presented in Figure 9. The gap between the GP registrations total and the ONS estimate has been used to suggest that the latter may be too high, particularly when compared to the pattern evident in other parts of the UK (Boden and Rees, 2009).

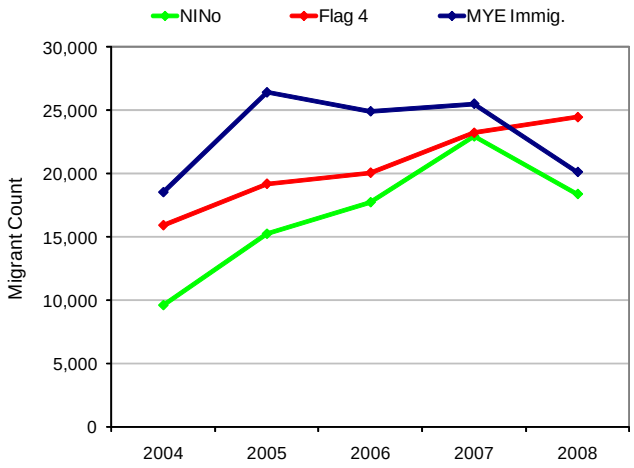


Figure 9 Immigration statistics, West Yorkshire, 2004-2008

The differences between the datasets are particularly noticeable in Leeds when compared to Bradford (Figure 10). The most recent changes to ONS immigration estimation methodologies have attempted to make direct use of both GP registrations and NINo registrations but current indications suggest that although data are being used at a local authority level, regional estimates remain unchanged. Immigration estimates for West Yorkshire remain a source of great uncertainty and given the importance of international migration as a driver of population growth in the most recent official mid-year estimates, this affects confidence in the robustness of the data.

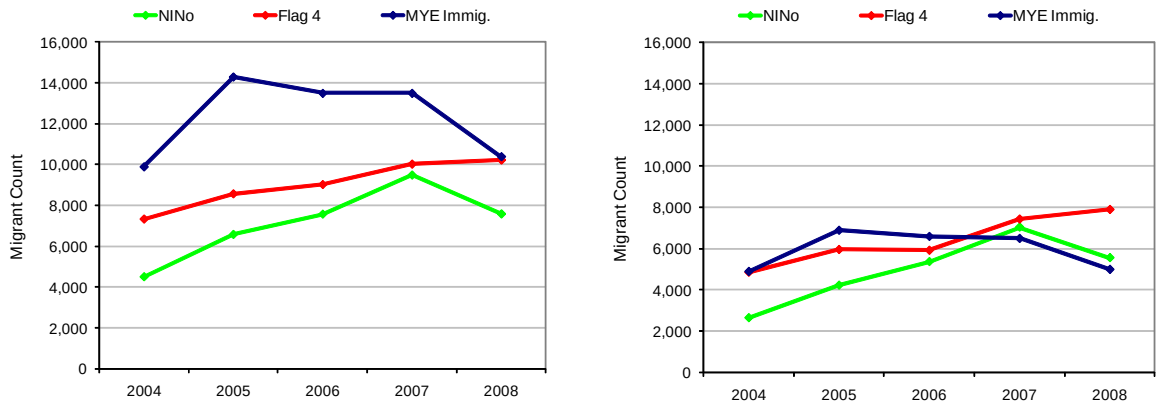


Figure 10 Immigration statistics, Leeds and Bradford, 2004-2008

NINo statistics provide an interesting, alternative picture of immigration in the UK, despite the inability to measure length of stay and the corresponding process of emigration. After EU expansion in 2004, there was a surge of in-migration from Accession states, supplementing the existing non-Accession migrant streams (Figure 11). It is interesting to see that the latter have remained relatively stable since 2004 as Accession flows have peaked and then fallen sharply in 2008. New Commonwealth flows are a particular feature of the established immigration streams into the existing communities in Bradford, Kirklees and Leeds.

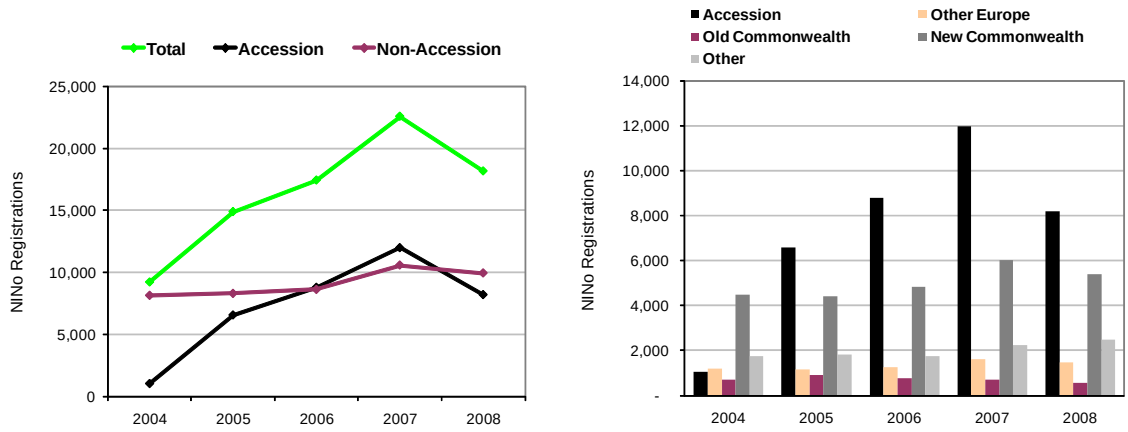


Figure 11 NINo registration profile, West Yorkshire, 2004-2008

The West Yorkshire pattern is reflected in both Leeds and Bradford, although non-Accession flows to Leeds have remained higher than Accession flows since 2004 (Figure 12). In Bradford, the level of Accession and non-Accession migrant

inflows have been similar since 2004 (Figure 13) but the latter have been dominated by New Commonwealth migrants; in contrast to Leeds which had a greater mix of migrants from elsewhere in Europe and from Old Commonwealth countries.

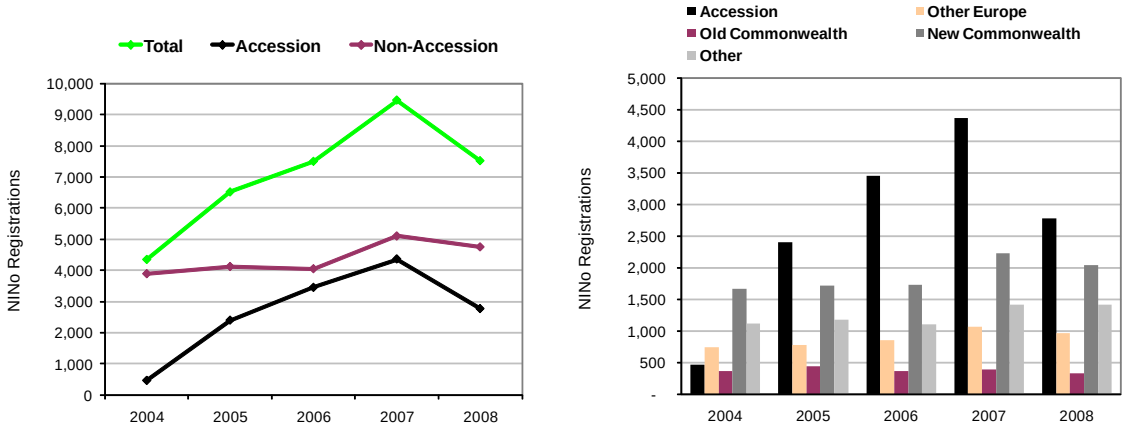


Figure 12 NINo registration profile, Leeds, 2004-2008

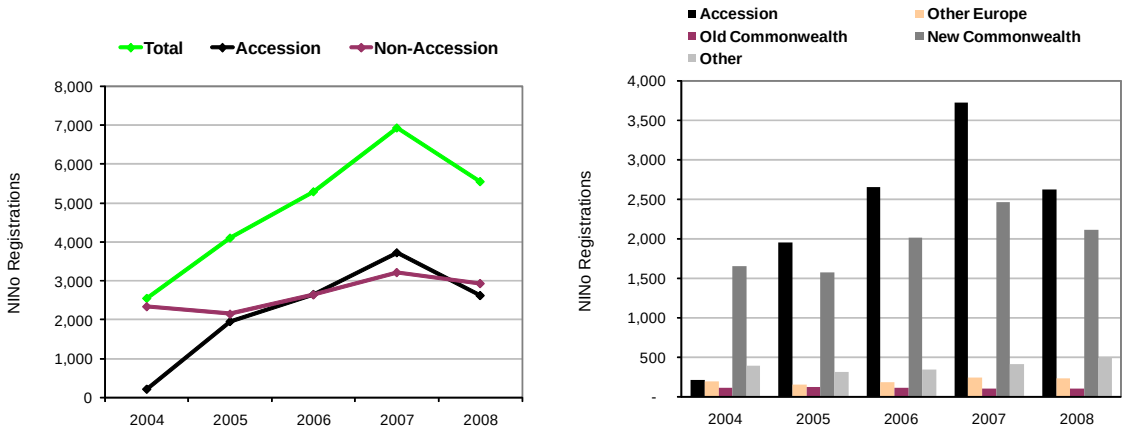
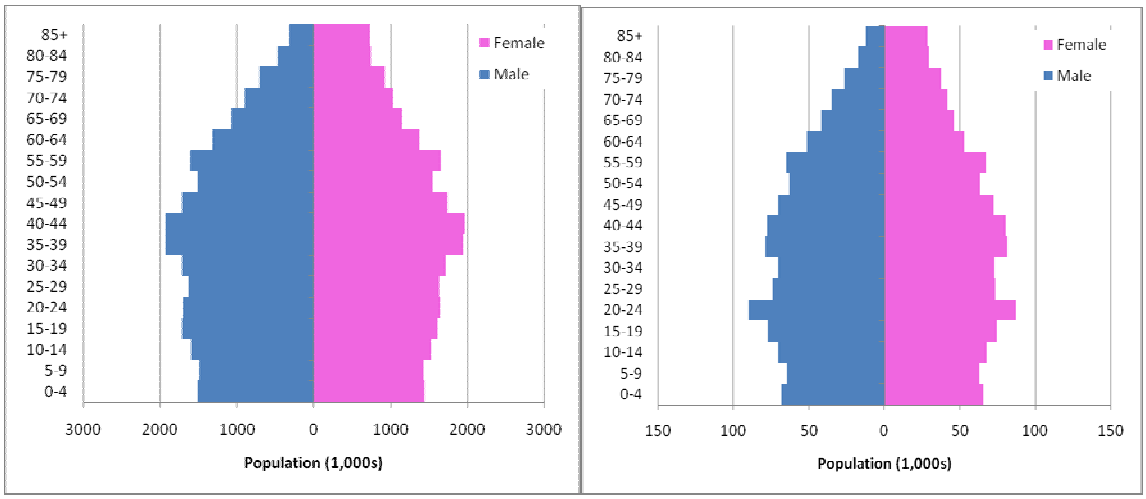


Figure 13 NINo registration profile, Bradford, 2004-2008

7 Changing profile of the West Yorkshire population

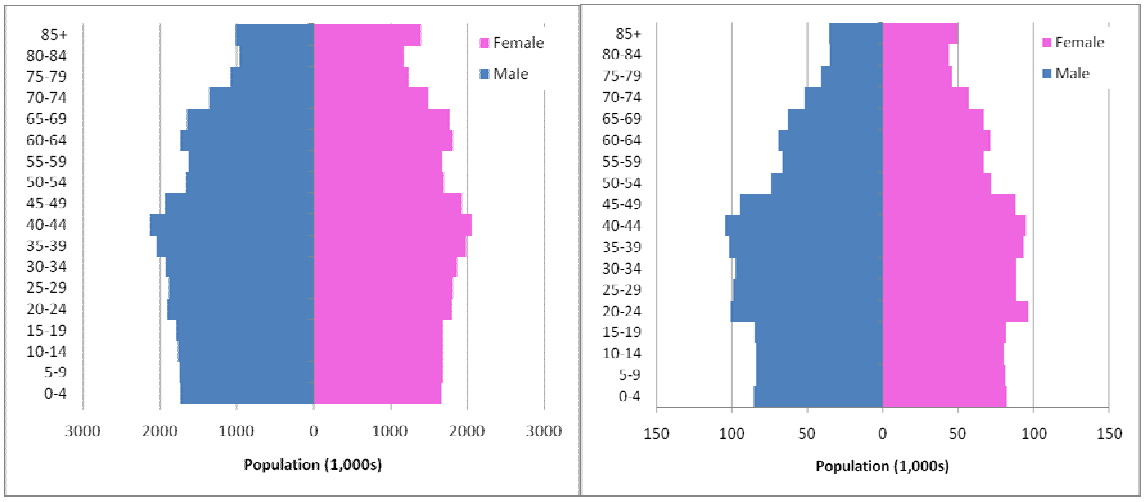
Using statistics from ONS 2006-based sub-national population projections, Figures 14 and 15 present comparable population pyramids for both England and West Yorkshire, showing some notable differences. Firstly whilst the shapes of the pyramid are broadly similar, there is a big difference at age 20-24, where in West Yorkshire, this is the age group that contains the highest proportion of the

population. The reasons for this are clear in the context of the earlier evidence on internal migration and attractiveness of the region for students studying in higher education. The much lower population in the 25-29 age group reinforces the transient nature of these students and their propensity to migrate away again from the region once they have completed their studies. Graduate retention is a key issue for Yorkshire Forward, the Regional Development Agency tasked to enhance economic growth. The rest of the population pyramid for West Yorkshire follows a similar pattern to the English one, with a slight bulge in the population between the ages of 35 and 44, and the later outlier at age 55-59 – a feature of the post-World War II baby boom.



(a) England (b) West Yorkshire

Figure 14. Population pyramids, England and West Yorkshire, 2006



(a) England (b) West Yorkshire

Figure 14 Population pyramids, England and West Yorkshire, 2031

In the 25 years between 2006 and 2031, the age structure of the population of both England and West Yorkshire is set to change. An aging population means that in 2031, in England, a much higher proportion of the population will occupy the older age groups. In West Yorksire, whilst this is true to a certain extent, the growth in the post-50 age groups is less pronounced than it is for England as a whole. Of note is that after the jump in the population at around age 20, certainly for males and to a slightly lesser extent for females, the immediate decline in the population at age 25-29 has been somewhat arrested. The other observation is that the proportion of the population under 20 is projected to increase quite noticably when compared to 2006, perhaps partly a reflection of the projected increase in the Pakistani population – an ethnic minority population characterised by high fertility rates – in the region over this period.

So with the ethnic populations of West Yorkshire potentially affecting the age profile of the region leading up to 2031, it is useful to first examine the current ethnic breakdown of the population. Figure 16 details the percentage of the total population that all non-white British groups comprise in 2006. The group which comprises by far the largest percentage of the population is the Pakistani group. Across the whole UK, the Pakistanis comprise only around 1.5% of the population. In West Yorkshire, the proportion is over four times higher at over 6% of the population. The proportion of Pakistanis is particularly high in Bradford, where almost 16% of the population are Pakistani. The only other ethnic group with proportions above the national average are the Indians, although this is only very slightly over the national average.

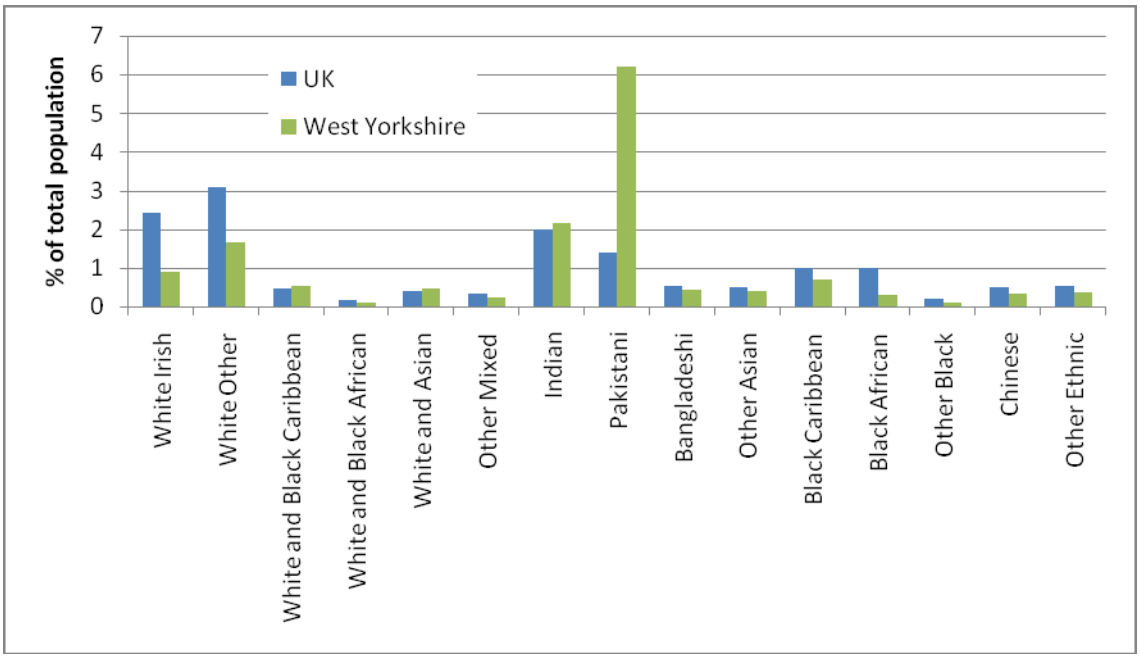


Figure 15 Non-white British ethnic groups as a percentage of total population, UK and West Yorkshire, 2006

All other non-white British ethnic groups comprise proportions of the population much lower than the UK average. Significantly lower are the White Irish and White Other groups with proportions around half that of the rest of the UK. Examining the proportion of the population in each ethnic group does not allow us to compare the relative concentrations of these ethnic groups when compared to all other areas in the UK. Location quotients allow us to do this, with a ratio of 1 representing the average concentration across all areas in the UK; a positive value indicating an over-representation, and a negative value indicating an under-representation. Figure 16 shows the location quotients for each ethnic group in West Yorkshire in 2006. Clearly the Pakistani ethnic group not only comprises a large proportion of the West Yorkshire population but, when compared with the rest of the UK, Pakistanis are far more concentrated in the region than would be expected from the national average. Whilst location quotients are high for Calderdale (3.4) Kirklees (5.0) and Leeds (1.6), they are particularly high for Bradford, which exhibits a location quotient of 11.3. Some other ethnic groups such as the White and Asian, White and Black and Indian groups have very slightly positive location quotients, but all other ethnic groups have location quotient less than 1 associated with them, indicating that the concentrations of these groups are lower than would be expected.

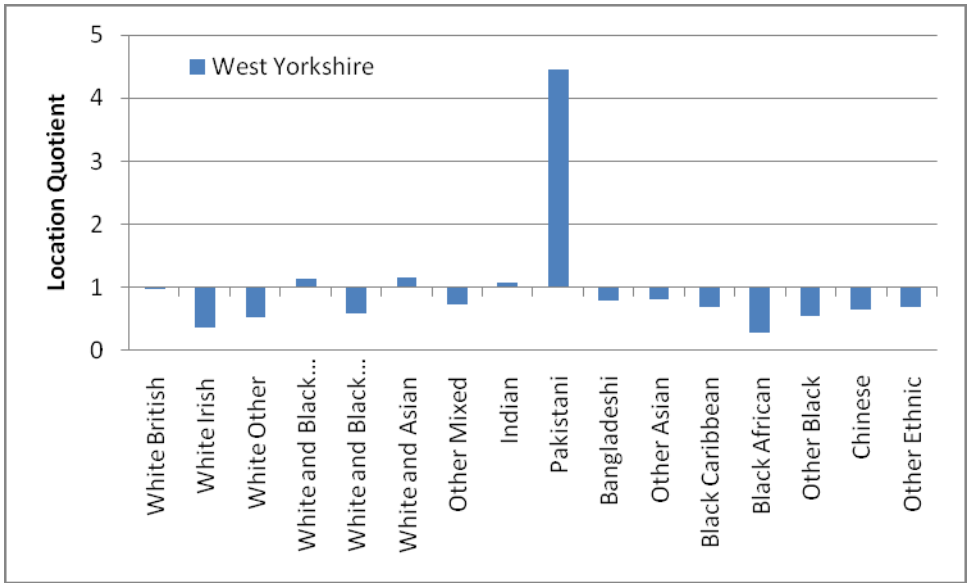
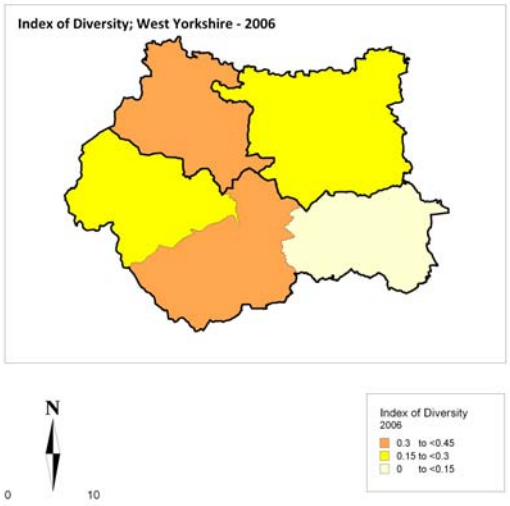


Figure 16 Location quotients for ethnic groups, West Yorkshire, 2006

Another metric which is useful in the study of ethnic group populations is the index of diversity. Rather than measuring the concentration of the ethnic group, the index of diversity measures how mixed an area is, i.e. the likelihood that two people who bumped into each other in the street in an area would differ by ethnicity. An index value of 1 would mean that it is 100% likely that they would differ; a value of 0 means that it is 100% likely they will not differ. Of course, with large areas, the indices close to 1 or 0 will not occur. In 2006, the index of diversity for the whole of the UK was 0.27 – in West Yorkshire the figure was 0.27 as well, indicating that the region lies on the national average for diversity. Of course, within the region, diversity varies quite considerably (Map 4), with Wakefield being the least diverse district with a diversity index of only 0.07 compared to Bradford which exhibits a diversity index of 0.44. Surprisingly, Leeds, despite being the largest city in the region, has a diversity index which is lower than the UK average at 0.22.



Map 4 Index of diversity, West Yorkshire districts, 2006

Examining the projected change in ethnic group location quotients and diversity by 2031, a number of points can be noted. Firstly, the average non-white British location quotient across all districts and all ethnic groups will reduce from 0.89 to 0.82, indicating that the ethnic groups within West Yorkshire will become even less concentrated in relation to the rest of the country. This is against a backdrop of the most concentrated Pakistani group increasing its location quotient from 11.27 to 11.33. In terms of diversity, the region is projected to increase its diversity from an index of 0.27 to 0.31. Whilst broadly in line with the projected national increase to 0.32, these projections do suggest that diversity will increase more slowly than the national average over this 25 year period. Projections of West Yorkshire district populations by ethnicity to 2051 have been generated as part of a research project entitled 'What happens when international migrants settle? Ethnic group population trends and projections for UK local areas'[1] and are reported in Wohland *et al.,* (2010).

[1] This research project (RES-163-25-0032), led by Philip Rees, has been funded by the Economic and Social Research Council under the 'Understanding Population Trends and Processes' initiative.

8 The impact of the DEMIFER scenarios on West Yorkshire

8.1 Scenario definition

Five scenarios have been defined as a generic framework to evaluate alternative projections of demographic change between 2005 and 2050. These scenarios are driven by alternative assumptions on fertility, mortality, internal migration, international migration within Europe and international migration to/from outside Europe. They are designed to evaluate alternative trajectories of growth that imply greater or lesser degrees of competitiveness or cohesion across the regions of Europe.

STQ	Status Quo
GSE	Growing Social Europe
LSE	Limited Social Europe
EME	Expanding Market Europe
CME	Challenged Market Europe

The Status Quo scenario retains the components of demographic change for the base period throughout the projection horizon and acts as a benchmark against which the four alternative change scenarios are compared.

8.2 Scenario summary

A summary of the key outcomes of the five alternative scenarios in West Yorkshire is presented in Figure 17 with more detail in the charts contained in Figure 18. Maintaining the Status Quo (STQ) would result in a 25% increase in population to 2050 but the relative importance of the components of change would alter considerably. A loss through natural increase would be the result of an increased number of deaths relative to births. The net losses through internal migration would be greatly accentuated, net gains from the rest of Europe would occur and net immigration from outside Europe would be the dominant driver of population growth.

	STQ		GSE		LSE		EME		CME	
Population change 2005-2050	25%		66%		35%		71%		34%	
Components of change	**2005/10**	**2045/50**	**2005/10**	**2045/50**	**2005/10**	**2045/50**	**2005/10**	**2045/50**	**2005/10**	**2045/50**
Natural Increase	35,821	-2,959	34,541	111,393	31,697	28,159	35,940	134,264	30,925	18,854
Net Internal	-10,602	-25,656	-10,877	-23,808	-10,624	-11,069	-11,025	-60,484	-10,762	-37,453
Net Europe	17,774	5,778	20,527	9,808	19,366	6,685	21,177	10,666	19,989	7,901
Net External	49,843	46,566	57,406	80,333	51,524	38,520	60,307	100,325	54,378	63,813
All components	92,836	23,729	101,597	177,726	91,963	62,295	106,399	184,771	94,530	53,115

Figure 17 Scenario summary, West Yorkshire, 2005-2050

The 'Social Europe' scenarios imply greater cohesiveness across the European regions with more convergence on fertility and mortality inequalities and a more balanced attractiveness of individual regions as migrant destinations. The Growing Social Europe (GSE) scenario achieves 66% population growth in 2005-2050. High fertility results in an increasing number of births and a significant contribution to growth through natural increase. Net internal migration losses occur despite greater convergence being achieved between the relative attractiveness of UK destinations. Migration to and from Europe continues to increase throughout the projection period but the net impact is gradually reduced. Net immigration from outside Europe remains a dominant driver of growth throughout.

With a smaller increase in fertility, the Limited Social Europe (LSE) scenario results in less significant growth to 2050 (35%) compared to GSE, and a reduced influence of natural increase as a component of this growth. Net out-migration to other regions of the UK remains stable throughout the projection period. Net immigration both from within Europe and from outside Europe remain as key drivers of growth although the volume is reduced from the base period due to lower inflows.

The 'Market Europe' scenarios imply greater competitiveness between European regions. The Expanding Market Europe (EME) scenario achieves the most substantial population growth (71%) over the projection period but results in a substantial and increasing net loss through internal migration as West Yorkshire loses out to more attractive regional destinations. Population growth is driven by very high net immigration from within and outside Europe, which in turn fuels a large increase in the number of births to the more youthful migrant population.

The EME scenario presents a diluted version of the Status Quo scenario with an increasingly diverse population resulting from the high net migration from abroad and continued net loss through internal migration.

The Challenged Market Europe (CME) scenario achieves less significant growth to 2050 (34%) than the EME scenario. The retention of mortality and fertility inequalities significantly reduces the impact of natural change. Net losses through internal migration are significant as the competitive nature of regions draws migrants away from West Yorkshire. Net immigration is the dominant driver of growth, primarily from outside Europe.

***Scenario profile*:** **West Yorkshire**

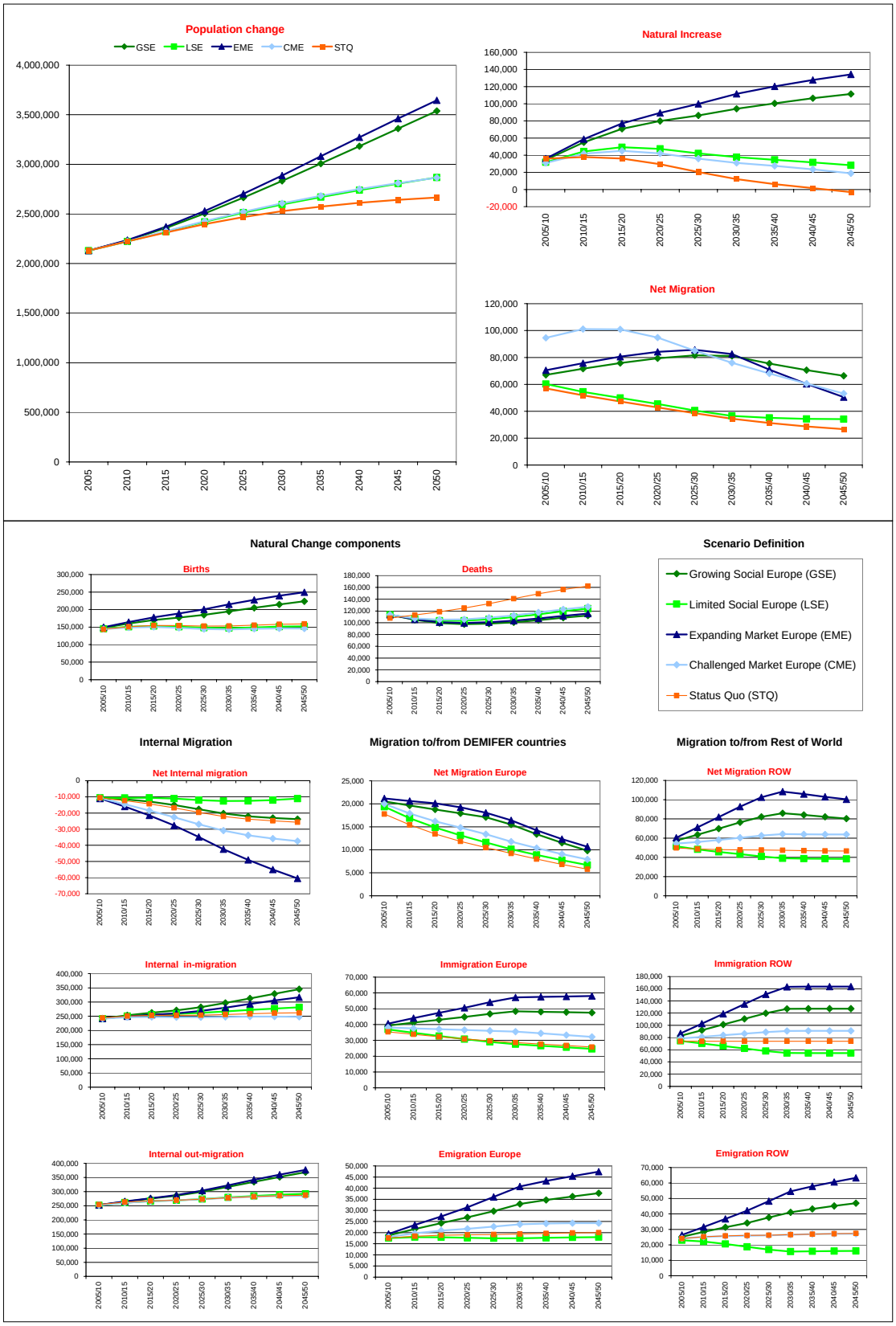


Figure 18 Components of change under alternative scenarios, West Yorkshire, 2005-2050

The effect of the various scenarios upon the age profile of West Yorkshire's population are illustrated in Figure 19 with a complementary illustration of these temporal shifts provided by the change over time in the key dependency ratios (Figure 20). The old-age dependency ratio (ODR) is defined as the ratio of population aged 65+ to population aged 15-64 years. This is a demographic indicator of ageing which provides the number of individuals above retirement age relative to the number of people in the economically active age-groups. An increase in the ODR suggests that more elderly people will need to be supported by the same number of people in the labour age. The very-old-age dependency ratio (VODR) provides an additional measure of how the increase of the most elderly will impact upon the population. It is the ratio between those aged 75+ and those aged 15-64 years, so, with the same denominator but a smaller numerator, will always be lower than the ODR.

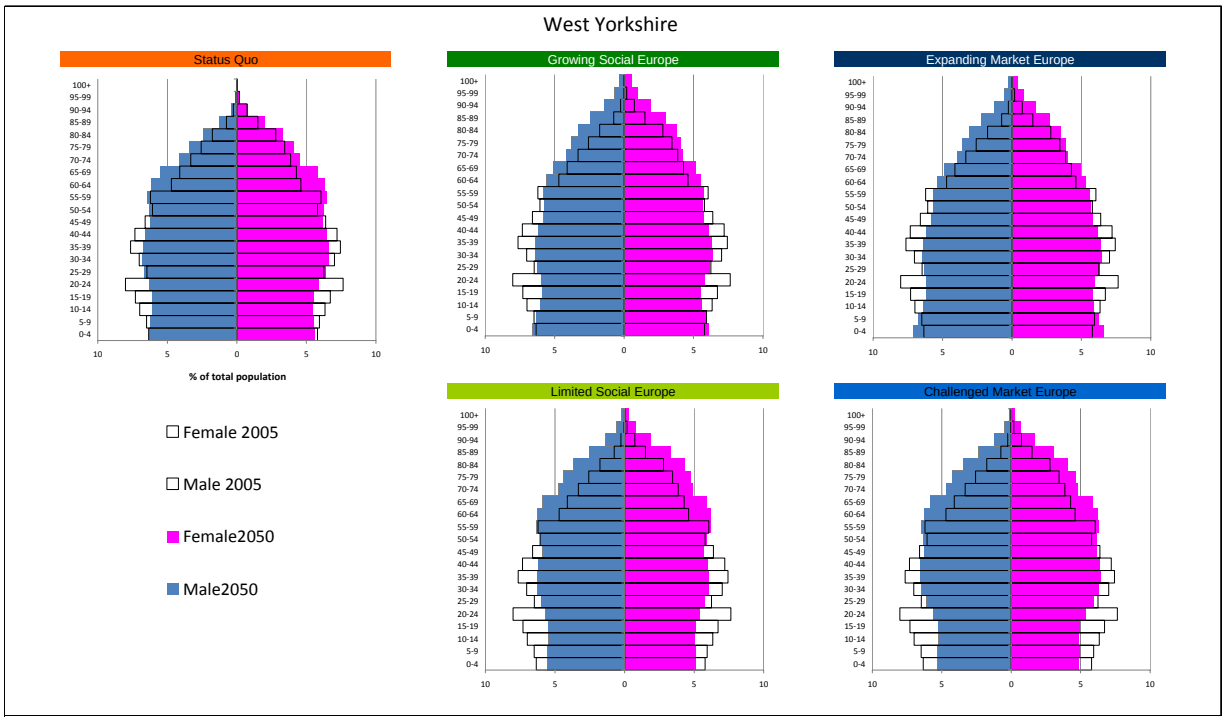


Figure 19 Age-profiles under alternative scenarios, West Yorkshire, 2005-2050

Demographic change is the key driver of the dynamics of labour markets; however, it does not take into account variations in labour force participation. The economic old-age dependency ratio (EODR) is the ratio of the economically inactive population above retirement age (65+) to the active population aged 15 +or more. The EODR measures the burden of the inactive population of

pensionable age on the working population and is an indicator that could be used to assess the sustainability of state pension systems.

Finally, the labour market dependency ratio (LMDR) is defined as the ratio of the total economically inactive population to the total active population. This indicator measures the overall economic burden of the inactive population on the labour market. The LMDR value depends not only on the size of the retired population, but also on the labour market participation of young people who may be in higher education rather than actively employed in the labour force.

Each of the four growth scenarios results in significant ageing of the West Yorkshire population as large, baby-boomer cohorts shift through the population during the projection period (Figure 20). The ODR increases from 22% in 2005 to reach 34-40% by 2050 (Figure 21). The LSE and CME scenarios present the most extreme impacts of demographic ageing, with ODRs of 42% and 39% respectively by 2050, a virtual doubling of the dependency. The effect of increased longevity is emphasised by the VODR statistics which increase from 14% to 33% in the case of the LSE scenario, with a less extreme increase to 25% in the EME, owing to the higher levels of net immigration that result from this scenario throughout the projection period, maintaining a more youthful age profile.

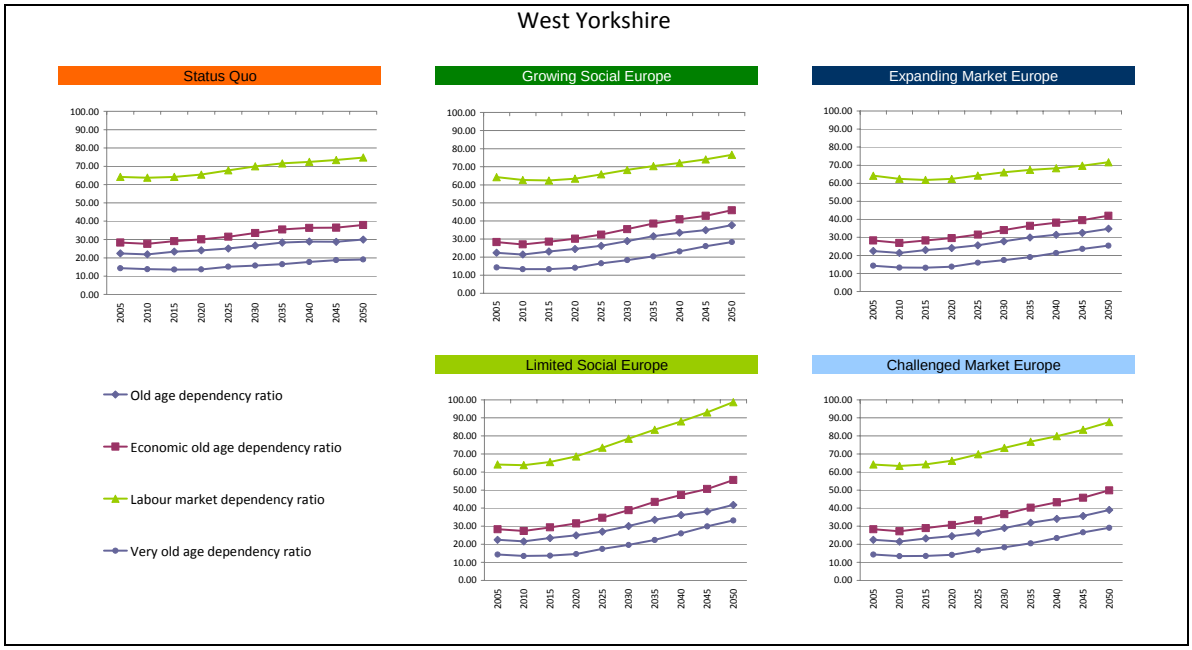


Figure 20 Dependency ratios under alternative scenarios, West Yorkshire, 2005-2050

The LMDR provides a more effective illustration of the effect of demographic ageing through the application of participation rates that might result from alternative scenarios of competitiveness or cohesion. In a Limited Social Europe (LSE) and a Challenged Market Europe (CME) with lower rates of labour force participation, the level of dependency rises most sharply, approaching 100% in the case of LSE, from a base of 64% in 2005. This means that the size of the active labour force would be equal in size to the dependent population, taking into account inactivity in the labour force ages, including students, in addition to the inactivity of the elderly. With higher levels of particpation in the GSE and EME scenarios, LMDR are maintained below 80%, lowest for the more competitive Expanding Market Europe scenario. All of these labour force patterns displayed in West Yorkshire, are broadly in line with the patterns shown in the rest of the UK.

9 Summary comments

Located in the north of England, 200 miles north of London, West Yorkshire appears as a 'peripheral' region on the European map but it remains an important commercial hub with Leeds as a key node in the UK's economy. However, with the largest financial services industry outside London, Leeds will continue to feel the impact of the economic recession well into 2011 and Yorkshire's latest jobless statistics suggest that the region as a whole, along with the West Midlands, is suffering the highest rates of unemployment in the UK. Most areas of the region, including West Yorkshire, are more dependent on publicly funded employment than the national average; consequently, the public expenditure cuts announced in the 2008 and 2009 budgets, together with more recent announcements by the new Coalition Government, will have huge labour market implications and represent one of the key future challenges (Homer *et al*., 2010).

Leeds and Bradford provide two very contrasting sub-areas within West Yorkshire. Leeds has a very large student population and in the last twenty years has attracted significant investment to develop its retail centre, expand residential accommodation in and around its central business district and to

generally benefit from sustained economic growth prior to the credit crunch (Unsworth and Stillwell, 2004). The diversity of its service economy and a relatively small percentage of workers within the public sector compared to other regions will assist its economic recovery.

Bradford, in contrast, has suffered through lack of investment. Its city centre re-development plans have been put on ice leaving a large un-developed hole in the heart of the city that is symptomatic of its current economic position. It remains in the shadow of Leeds and continues to experience significant net out-migration through internal migration, particularly to adjacent areas in Leeds, Calderdale, Kirklees and Wakefield. This net outflow is balanced by a large net inflow due to international migration that continues to enhance one of the largest concentrations of Asians s in the country.

In a more competitive market economy West Yorkshire as a region is likely to experience mixed benefits, with the local dominance of Leeds being the magnet for investment and growth. But Leeds, like most other UK cities is fast reaching its capacity in terms of the road traffic that it can accommodate and it is faced with challenging new targets for new housing developments that are designed to meet a growing population. Given the proposed abolition of regional spatial strategies by the Coalition Government, a strategy that positions Leeds within a wider 'City Region' is emerging that will enable a more spatially integrated approach to economic development, address the much needed enhancements to public transport infrastructure and the need to provide adequate market and affordable housing to a growing population. A more cohesive market economy, which seeks to reduce economic and demographic inequalities between regions, is a challenging scenario, particularly in a region like West Yorkshire with such diversity within its borders. The Northern Way initiative, has brought the three regions of the north of England (North East, North West and Yorkshire and Humber) together to facilitate a more 'cohesive' approach to economic development (Gonzalez, 2006) but it again is faced with a network of cities which see themselves very much in competition with each other and sub-regions which demonstrate huge spatial inequalities and significant demographic diversity.

9.1 Abbreviations

ASFR	Age Specific Fertility Rate
CLG	Communities and Local Government
DEMIFER	Demographic and Migratory Flows affecting European Regions and Cities
DWP	Department for Works and Pensions
EU	European Union
GAD	Government Actuary Department
GOR	Government Office Regions
LLTI	Limiting Long-Term Illness
LSOA	Lower Super Output Area
NPP	National Population Projections
NUTS2	Nomenclature of Territorial Units for Statistics, level 2
OAD	Old Age Dependency (ratio)
ONS	Office for National Statistics
PBS	Points Based System
SMR	Standardised Mortality Ratios
SNPP	Sub-national Population Projections
SPA	State Pension Age
TFR	Total Fertility Rate

9.2 References

Audit Commission (2007) Crossing borders. Responding to the local challenges of migrant workers. http://www.audit-commission.gov.uk/nationalstudies/localgov/crossingborders/Pages/Default.aspx

Boden, P. and Rees, P. (2009) Using administrative data to improve the estimation of immigration to local areas in England. *Journal of the Royal Statistical Society, Series A (Statistics in Society).* Submitted. *http://arxiv.org/ftp/arxiv/papers/0903/0903.0507.pdf*

Boden, P. and Rees, P. (2010) A New Migrant Databank: Concept and development, in Stillwell, J., Duke-Williams, O. and Dennett, A. (eds.) *Technologies for Migration and Commuting Analysis Spatial Interaction Data Applications*, IGI Global, Hershey, pp.111-132.

Chappell, R., Vickers, L. and Evans, H. (2000) The use of patient registers to estimate migration, *Population Trends*, 101: 19-24.

Dennett, A. and Stillwell, J. (2008) Yorkshire and Humber's internal migration exchanges. *Yorkshire and Humber Regional Review*, 18(3): 17-19.

Gonzalez, S. (2006) City regions, regional governance and the Northern Way, *The Yorkshire and Humber Regional Review*, 16(3): 5-7.

Green, A. E., Owen, D. and Adam, D. (2008) A resource guide on local migration statistics. Report prepared for the Local Government Association. http://www.lga.gov.uk/lga/publications/publication-display.do?id=1308025

Homer, J., Matthews, S., Jones, A. and Morris, K. (2010) The challenges ahead: responding to reduced public expenditure in Yorkshire and Humber, *The Yorkshire and Humber Regional Review,* 20(1): 14-17

House of Commons Treasury Committee (2008) "Counting the Population" The Stationery Office, London. http://www.publications.parliament.uk/pa/cm200708/cmselect/cmtreasy/183/183.pdf

ONS (2008a). *2006-based Subnational Population Projections for England - Methodology Guide*. Office for National Statistics. http://www.statistics.gov.uk/downloads/theme_population/SNPP-2006/2006_Methodology_Guide.pdf

ONS (2008b) *Life Expectancy at Birth in the UK 2005-07*, News Release 30/10/08, Available at http://www.statistics.gov.uk/pdfdir/leb1008.pdf.

Rees, P., Stillwell, J. and Boden, P. (2009) Migration Statistics. The Way Ahead? Report produced for the UK Statistics Authority. http://www.statisticsauthority.gov.uk/reports---correspondence/reports/index.html

Scott, A. and Kilbey, T. (1999) Can patient registers give an improved measure of internal migration in England and Wales?, *Population Trends*, 96: 44-55.

Stillwell, J. and Dennett, A. (2009) Inter-district migration flows within Yorkshire and Humber, *Yorkshire and Humber Regional Review,* 19(3): 19-20.

Stillwell, J., Duke-Williams, O. and Dennett, A (2010) Interaction data: definitions, concepts and sources, in Stillwell, J., Duke-Williams, O. and Dennett, A. (eds.) *Technologies for Migration and Commuting Analysis Spatial Interaction Data Applications*, IGI Global, Hershey, pp. 1-30

9.3 Unsworth, R. and Henderson, R. (2004) Accommodating financial and business services, in Unsworth, R. and Stillwell, J. (eds.) *Twenty-first Century Leeds Geographies of a Regional City*, University of Leeds Press, Leeds, pp. 191-214.

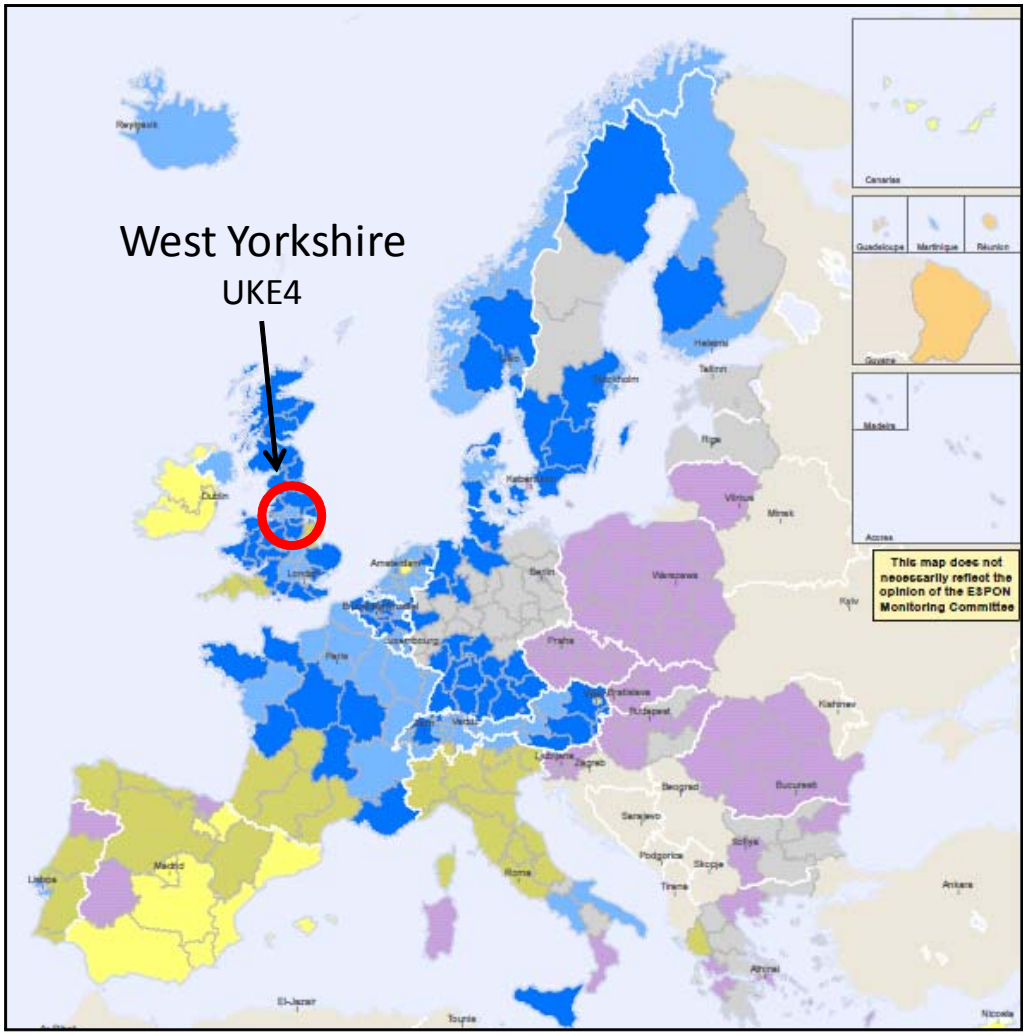
9.4 Unsworth, R. and Stillwell, J. (eds.) *Twenty-first Century Leeds Geographies of a Regional City*, University of Leeds Press, Leeds.

9.5 Wohland, P. and Rees, P. (2008) Is it who wer are or where we live? Life expectancy in Yorkshire and the Humber by ethnicity, *The Yorkshire and Humber Regional Review,* 18(3): 20-22.

Wohland, P., Rees P., Norman, P., Boden, P. and Jasinska, M. (2010) Ethnic population projections for the UK and local areas, 2001-2051, *Working Paper 10/02*, School of Geography, University of Leeds, Leeds. Online at: http://www.geog.leeds.ac.uk/research/wpapers.

9.6 Appendix

A1. West Yorkshire – location and typology



Type	Classification	Cases
1	Euro Standard	79
2	Challenge of Transition	61
3	Family Potentials	55
4	Challenge of Ageing	33
5	Challenge of Decline	38
6	Young Potentials	15
7	Overseas	5
EU 27+4	ESPON Space	286