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Bath and North East Somerset Council

Employment Growth - Historic and Projections

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Introduction

This report presents the outcomes of work on the level of employment growth between 2011 and 2016 and establishes projected employment changes between 2016 and 2036 for Bath and North East Somerset (B&NES). The work was commissioned in May 2017 jointly by the Economic Development and Planning Policy teams at Bath and North East Somerset Council to provide the evidence base to support the development of the Council's Local Plan 2016-2036, upcoming update to the Council's Economic Strategy Review 2014-2030, and the West of England Combined Authority Joint Spatial Plan.

The Local Plan is now underway, which, based on the Council's Core Strategy and Place Making Plan, has an employment growth target of 10,150 jobs over the 18 year period 2011-2029, corresponding to maintaining a 12% share of regional growth for B&NES¹. The Council's Economic Strategy Review 2014-2030 contains ambitious targets for growth including achieving net jobs growth of 11,500 jobs across the B&NES area by 2030².

Based on forecasts by Oxford Economics, an extra 14,300 (medium-high growth) to 17,040 (high growth) jobs are planned for B&NES for 2010-2036.

This report identifies levels of employment in B&NES across the full range of economic sectors, both public and private. The current 2011-2016 total and sector estimates for employment are based on a series of data which are listed below. The projections are created using a series of corresponding dataset projections up until 2036 under different possible scenarios, triangulating among a number of data sources and approaches to test whether previous Plans and forecasts are still likely to hold true and to allow B&NES to participate with confidence in the Joint Spatial Plan discussions. Ultimately, the study aims to provide updated historic alongside projected future employment levels with the aim of creating more accurate figures.

It must be noted that whilst the employment projections will feed into the West of England Combined Authority Joint Spatial Plan, this report is concerned solely with employment projections for the B&NES local authority. It considers detailed annual projections between 2016 and 2036 derived from external sources and provides an assessment of these.

¹ <http://www.bathnes.gov.uk/services/planning-and-building-control/planning-policy/placemaking-plan>

² Bath & North East Somerset Council "Economic Strategy Review 2014-2030"

Economic Datasets

The following economic datasets have been used as part of this study:

Inter-departmental Business Register (IDBR)³ - The IDBR is a comprehensive list of UK businesses used by the Government for statistical purposes covering 2.6 million businesses in all sectors across the UK. The main sources of input are the Value Added Tax (VAT) system and Pay As You Earn (PAYE) system from HMRC. IDBR also includes additional input from Companies House, Dun and Bradstreet, and business surveys. Since the data contained in the IDBR is officially sensitive, this study is based on an anonymized version which has no impact for the purposes of this study.

In 2015 the ONS extended the coverage of businesses to include the ones that are solely PAYE to its IDBR dataset. These are non-VAT registered businesses are businesses that have a turnover of less than £82,000 p.a. and generally small businesses with few employees which should not significantly affect the employment numbers. The addition of this data brought the IDBR in line with the Business demography and the BIS Business Population Estimates (see below), which both include these businesses.

BIS Business Population Estimates (BPE)⁴ – As IDBR only contains employment of VAT and PAYE registered businesses, we have also referred to the BEIS BPE for the South West region to estimate the expected proportion of unregistered businesses in current and future figures. BIS BPE is a survey-based estimate populated through a sample of businesses. We have used this dataset as an additional source to enhance the figures of IDBR.

Business Register and Employment Survey (BRES)⁵ - BRES is the official source of employee and employment estimates by detailed geography and industry. The employment data in BRES is the number of employees added to the number of working owners, e.g. sole proprietors and partners. However, BRES does not cover the very small businesses that are neither registered VAT nor PAYE, which makes up a small part of the economy. Additionally, BRES is a survey-based estimate populated through a sample of the population. Whilst we have made reference within the study to BRES, we have used this dataset as a comparable source only

Annual Population Survey (APS)⁶ - APS is a survey-based estimate populated by means of a sample of the resident population. It covers employment and unemployment, as well as housing, ethnicity, religion, health, and education. Its employment statistics are residence-based, i.e. based on residents of B&NES

³ IDBR <https://www.ons.gov.uk/aboutus/whatwedo/paidservices/interdepartmentalbusinessregisteridbr>

⁴ BIS BPE

https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/559221/bpe_2016_methodology_note.pdf

⁵ BRES

<https://www.ons.gov.uk/employmentandlabourmarket/peopleinwork/employmentandemployeetypes/bulletins/businessregisterandemploymentsurveybresprovisionalresults/2014revisedand2015provisional>

⁶ APS labour market statistics <http://www.ons.gov.uk/ons/guide-method/method-quality/specific/labour-market/labour-market-statistics/index.html>

for the purposes of this study, which might not necessarily relate to people who also work in B&NES. It also includes residents on government supported training and/or employment programmes and those doing unpaid family work. Whilst we have made reference within the study to APS, we have used this dataset as a comparable source only.

Following a review of the above, IDBR was chosen as the best dataset for the purposes of this study as it is a comprehensive data source containing all the registered businesses (VAT and PAYE) operating in the region. It is a more accurate source to assess people who are actually employed within B&NES.

Part 1: Total employment growth 2011-2016

The table below shows the employment growth between 2011 and 2016 in B&NES established through the datasets used as part of this study.

Table 1 - Employment Growth 2011-2016 by different dataset

Year	IDBR (Registered)	IDBR (Corrected)	APS	BRES
2011	79,719	90,412	80,600	N/A
2012	79,147	89,946	86,400	85,000
2013	79,563	90,599	86,400	82,700
2014	81,861	93,305	88,100	85,200
2015	81,430	92,829	93,400	84,400
2016	82,057	93,624	93,600	N/A
Overall change	2,338	3,212	13,000	- 600 <i>(2012-2015 only)</i>

The IDBR (Registered) is the official figure from ONS which is based on the real employment in B&NES for registered businesses only. The IDBR (Registered) measure used for the above is based on the 'employment' variable within IDBR. Employment includes both full-time and part-time employees as employees, owners, and partners. Therefore, the data counts jobs as opposed to full time equivalent as some jobs can be part-time and a person can be employed in more than one job. For the purposes of the study, we have interchangeably used the terms employees and jobs.

The IDBR (Corrected) represents our estimate on the real employment in B&NES based on the IDBR data and enhanced with an estimate of the employment of unregistered businesses through the manipulation of the BIS BPE and BRES data which is not included in the IDBR (Registered) dataset; it has been calculated by using the difference between BRES (which includes data of registered businesses only) and BIS BPE (which includes data for registered and unregistered businesses).

We have chosen to use the national-level Business Population Estimates to provide a correction multiplier, rather than using regional or sector-level multipliers, as these more local multipliers are very volatile and are not plausible in the light of B&NES actual local economy.

In simple terms:

$$\text{IDBR (Corrected)} = \text{IDBR Registered} + ((\text{BIS BPE} - \text{BRES}) * \text{National Multiplier})$$

Appendix 3 has full details on how this is calculated.

The following can be noted from the table above:

- The IDBR (Registered) data shows an increase of 2,338 jobs (c. 2.9%) and the IDBR (Corrected) data shows an increase of 3,212 (c. 3.6%) between 2011 and 2016.
- APS shows a much stronger upwards trend than any of the other data sources, showing an increase of 13,000 jobs (c. 16.1%) between 2011 and 2016.
- The BRES figures are higher than IDBR Registered, although a downward trend is noted for the years available. However, BRES is lower than the IDBR Corrected data which is likely due to BRES not accounting for unregistered businesses, as well as being a survey-sample based dataset.

Based on the above, the best dataset for the purposes of this study is the use of IDBR (Corrected) as it includes the data for registered and unregistered businesses. While these businesses have negligible spatial impact, they have a material impact on the overall employment counts.

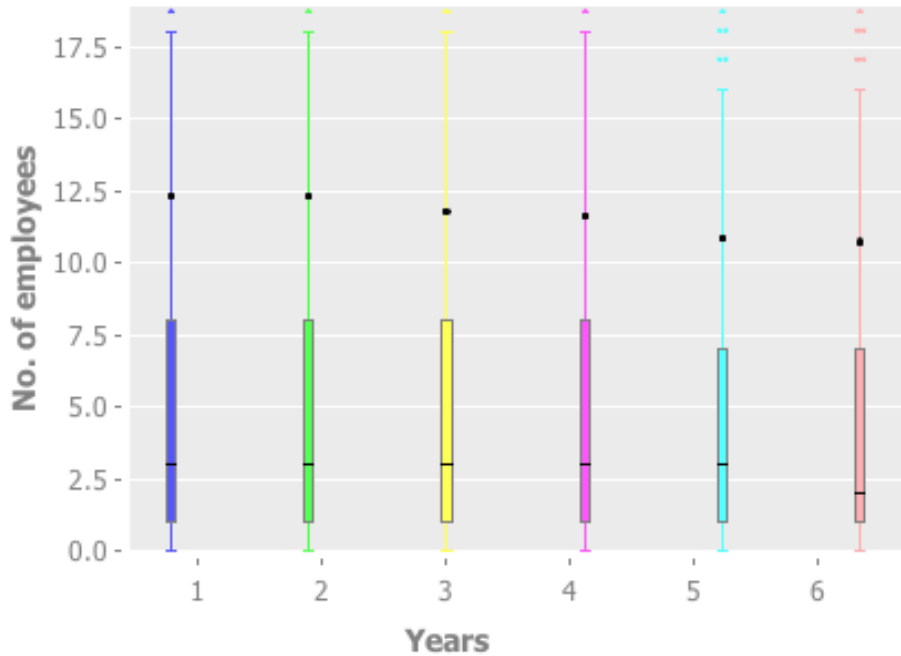
Employment Distribution

B&NES had three very large companies in 2011, i.e. companies that employ more than 2,000 jobs. This decreased to two very large companies in 2013 following the Ministry of Defence exiting its Foxhill site in Bath. However, the number of very small businesses, i.e. companies that employ less than 20 jobs, has steadily increased thereby mitigating the previous decrease of Ministry of Defence jobs.

As is the norm, jobs are not evenly distributed between organisations in B&NES. The range of the number of jobs an organisation employs has shrunk between 2011 and 2016.

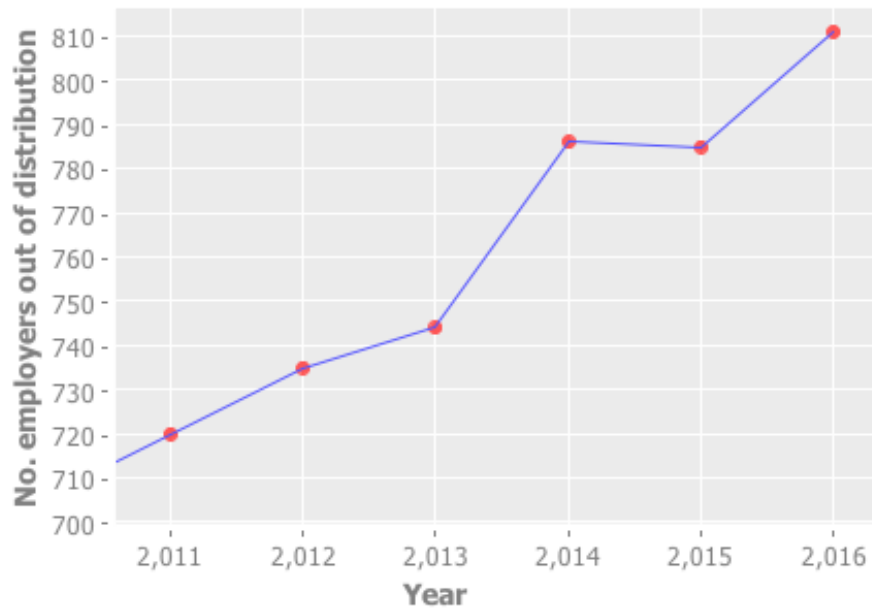
The following figure shows the distribution of jobs for all organisations between 2011 and 2016. The range of jobs typically sits between 0 and c. 17.5 employees per organisation, although there are many outliers to this which might skew the data. The black dot represents the mean number of jobs per organisation. We would expect this to sit within the interquartile range, i.e. the box, as this is where the majority of the organisations sit. However, across all years, in B&NES the mean has been skewed by the small number of organisations that employ high numbers of jobs, i.e. the three very large companies as mentioned above. An outlier here is represented as anything higher than 18, but can be as high as around 5,000.

Figure 1 - Average number of jobs for all organisations in B&NES



The number of medium sized organisations, i.e. organisations employing between 100 and 1,000 jobs, steadily increased with time (see chart below). The proportion of large organisations marginally shrank with time, but this has been easily absorbed by the overall increase in number of jobs available.

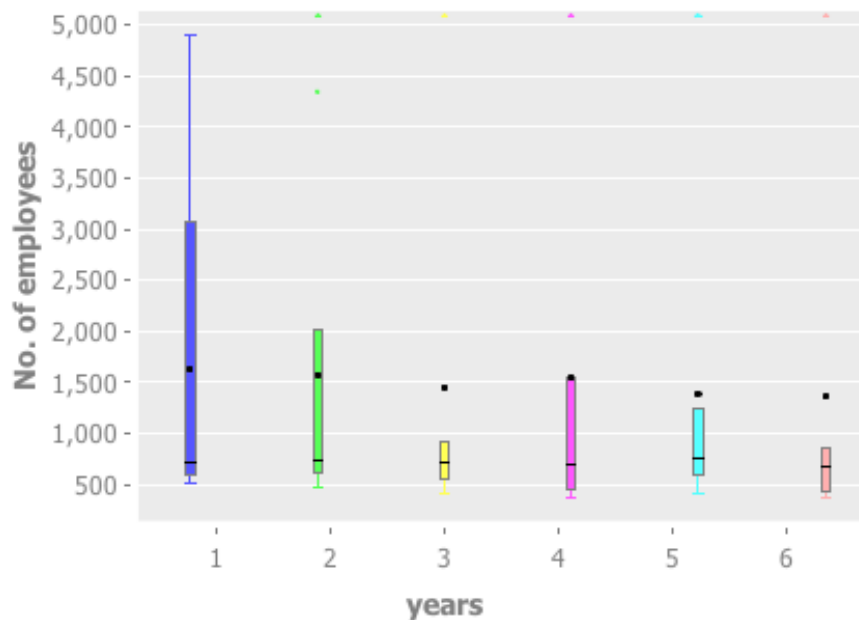
Figure 2 - Change in number of jobs within medium-sized organisations in B&NES



The total number of jobs employed by the top 10 largest employers has changed over the period 2011-2016. In many locations, as is the case in B&NES, there are normally two or three outliers at the very high end, e.g. those organisations employing more than 2000 people. The decrease over time could be as a result of:

- the very large organisations leaving B&NES, e.g. Ministry of Defence, which would make smaller organisations form part of the top 10 list, or
- there has been a workforce reduction in the medium, large, and very large organisations.

Figure 3 – Number of jobs in Top 10 Largest Employers in B&NES



Despite this large reduction in very large organisations, there is still an overall increase in the number of jobs within B&NES.

Employment by UK SIC 2007

The table below was calculated using the IDBR Registered data, and ordered by decreasing growth percentage for the period 2011-2016 in B&NES. The sectors are categorised by the UK Standard Industrial Categorisation (SIC) 2007⁷.

⁷ UK SIC 2007

<https://www.ons.gov.uk/methodology/classificationsandstandards/ukstandardindustrialclassificationofeconomicactivities/uksic2007>

Table 2 - Employment Changes in B&NES by UK SIC 2007, IDBR dataset

UK SIC 2007	2011	2016	Employment Changes	Employment Changes (%)	Employment Changes p.a.
Administrative and support service activities	4,286	6,689	2,403	56	481
Arts, entertainment and recreation	1,574	2,035	461	29	92
Mining and quarrying	31	40	9	29	2
Water supply; sewerage, waste management and remediation activities	1,105	1,379	274	24	55
Accommodation and food service activities	6,088	7,460	1,372	22	274
Human health and social work activities	12,210	14,537	2,327	19	465
Agriculture, forestry and fishing	267	306	39	15	8
Professional, scientific and technical activities	6,563	7,317	754	11	151
Other services activities	1,642	1,746	104	6	21
Wholesale and retail trade; repair of motor vehicles and motorcycles	11,674	12,221	547	5	109
Construction	2,976	3,136	160	5	32
Real estate activities	1,256	1,281	25	2	5
Transportation and storage	1,567	1,531	-36	-2	-7
Information and communication	3,304	3,140	-164	-5	-33
Electricity, gas, steam and air conditioning supply	90	83	-7	-8	-1
Education	12,538	11,326	-1,212	-10	-242

UK SIC 2007	2011	2016	Employment Changes	Employment Changes (%)	Employment Changes p.a.
Financial and insurance activities	2,558	2,200	-358	-14	-72
Manufacturing	4,440	3,641	-799	-18	-160
Public administration and defence; compulsory social security	5,550	1,989	-3,561	-64	-712
All Sectors Total	79,719	82,057	2,338	2.9%	472

A previous study by Smart Growth Analytics⁸ saw the largest increases in the Banking, Finance, and Insurance sector (4,400 jobs); Public admin, Education, and Health sector (3,400 jobs); Other Services sector (3,400 jobs); and Administration and Support Services sector (2,403 jobs). The study did not use the UK SIC 2007 sectors and therefore we are unable to make direct comparisons between the data above and the Smart Growth Analytics study. At a high level, however, even accounting for a different sub-division of the sectors above, there seems to be a strong discrepancy between the employment figures; this could be due to Smart Growth Analytics using the Annual Population Survey as their dataset

Top 5 Best Performing UK SIC 2007 in B&NES

1. Administrative and Support Service Activities

The Administrative and Support Service Activities sector includes a variety of activities that support general business operations, including:

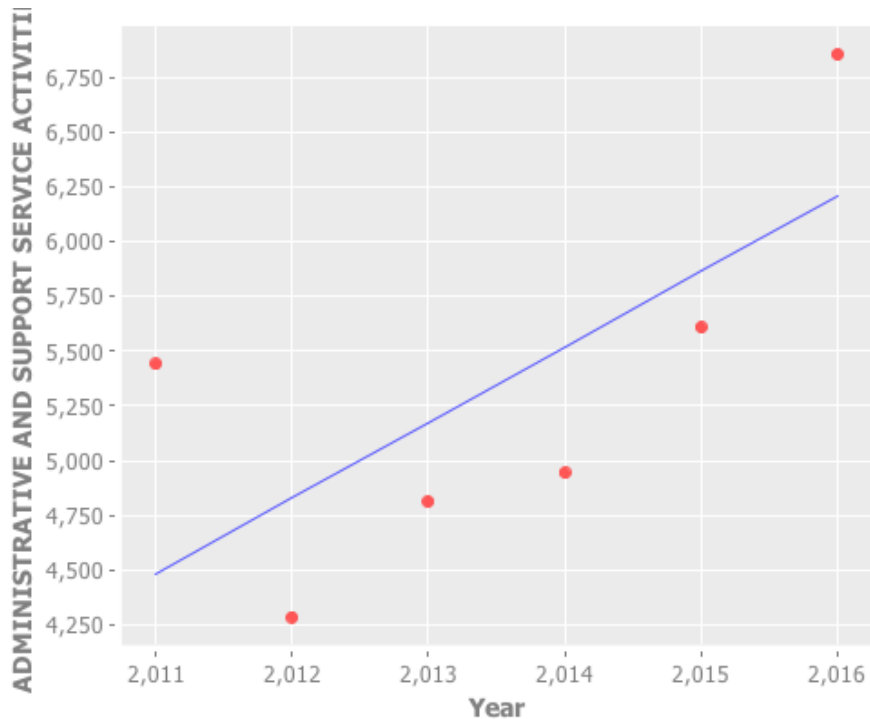
- Rental and leasing activities,
- Employment activities,
- Travel agency, tour operator, and other reservation service and related activities,
- Security and investigation activities,
- Services to buildings and landscape activities, and
- Office administrative, office support, and other business support activities.

UK SIC 2007	2011	2016	Employment Changes	Employment Changes (%)	Employment Changes p.a.
Administrative and support service activities	4,286	6,689	2,403	56	481

⁸ Smart Growth Analytics “Actual Jobs Growth in B&NES 2011 to 2016”, August 2016

The sector has seen the largest increase of employment growth between 2011 and 2016 of c. 2,400 jobs, which equates to c. 56% since 2011. This is also the largest increase of employment growth by number of jobs by UK SIC 2007 in B&NES for this period.

Figure 4 - Simple Linear Regression of Administrative and Support Service Activities



2. Arts, Entertainment, and Recreation

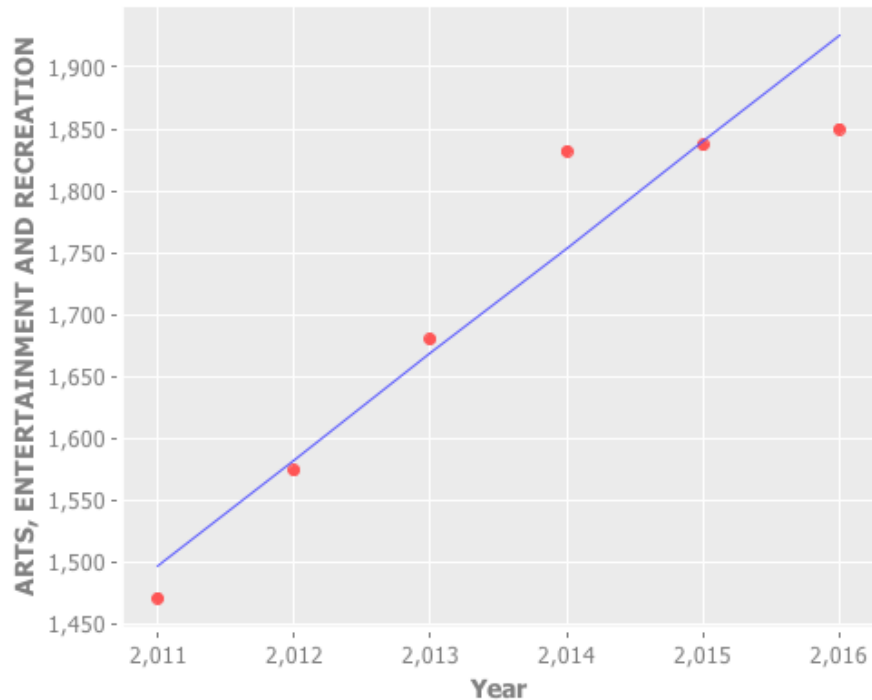
The Arts, Entertainment, and Recreation sector includes a wide range of activities catering for various cultural, entertainment and recreational interests of the general public, including:

- Creative, arts, and entertainment activities,
- Libraries, archives, museums, and other cultural activities,
- Gambling and betting activities, and
- Sports activities and amusement and recreation activities

UK SIC 2007	2011	2016	Employment Changes	Employment Changes (%)	Employment Changes p.a.
Arts, entertainment and recreation	1,574	2,035	461	29	92

This sector has seen an overall 29% employment increase between 2011 and 2016, equating to 461 jobs.

Figure 5 - Simple Linear Regression of Arts, Entertainment, and Recreation



3. Mining and Quarrying

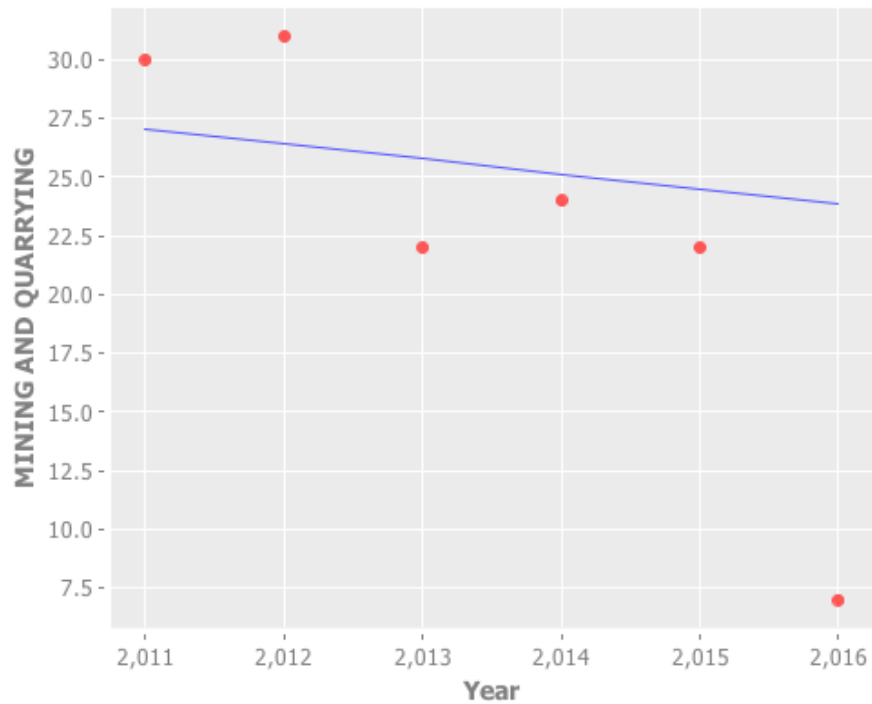
The Mining and Quarrying sector includes the extraction of minerals occurring naturally as solids (coal and ores), liquids (petroleum), or gases (natural gas) but excludes the processing of the extracted materials (as this falls under Manufacturing), the use of the extracted materials without further process for construction purposes (this would sit under Construction), bottling of natural spring and mineral waters, and treatment of certain earths, rocks and minerals not carried out in conjunction with mining and quarrying:

- Mining of coal and lignite,
- Extraction of crude petroleum and natural gas,
- Mining of metal ores,
- Other mining and quarrying (e.g. dredging of alluvial deposits, rock crushing, and use of salt marshes), and
- Mining support service activities

UK SIC 2007	2011	2016	Employment Changes	Employment Changes (%)	Employment Changes p.a.
Mining and quarrying	31	40	9	29	2

This sector has also seen an overall increase of c. 29% in jobs between 2011 and 2016, although this only equates to 9 jobs between 2011 and 2016 as it has a smaller employment base.

Figure 6 - Simple Linear Regression of Mining and Quarrying



4. Water supply; Sewerage, Waste Management, and Remediation Activities

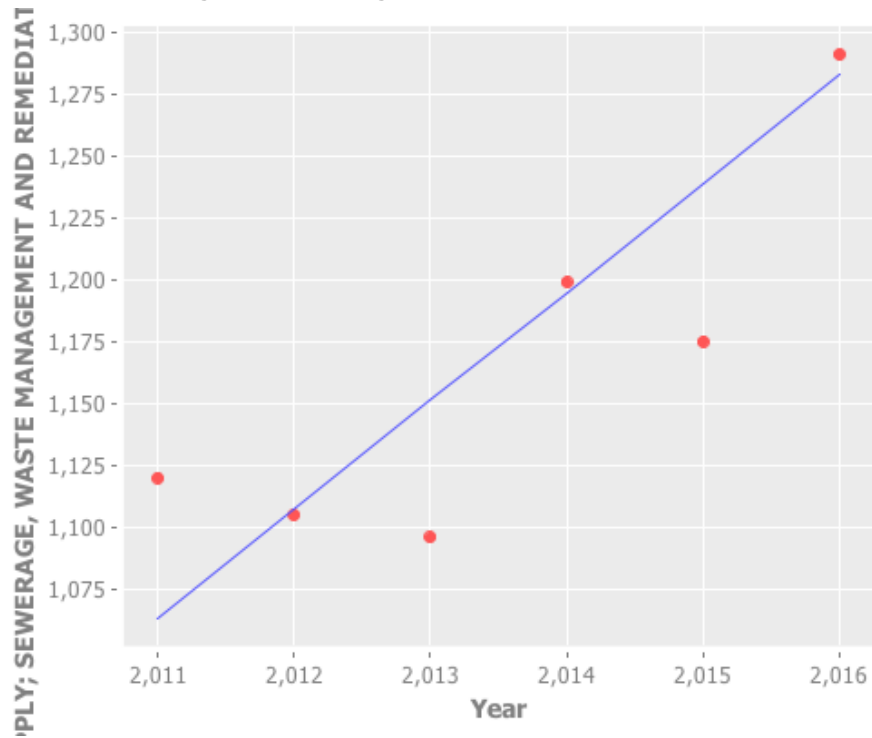
The Water Supply; Sewerage, Waste Management, and Remediation Activities sector includes activities related to the management of various forms of waste as well as contaminated sites:

- Water collection, treatment, and supply,
- Sewerage,
- Waste collection, treatment and disposal activities; materials recovery, and
- Remediation activities and other waste management services

Sector	2011	2016	Employment Changes	Employment Changes (%)	Employment Changes p.a.
Water supply; sewerage, waste management and remediation activities	1,105	1,379	274	24	55

This sector has seen an increase of 274 jobs between 2011 and 2016, equating to c. 24%.

Figure 7 - Simple Linear Regression of Water Supply; sewerage, waste management, and remediation activities



5. Accommodation and Food Service Activities

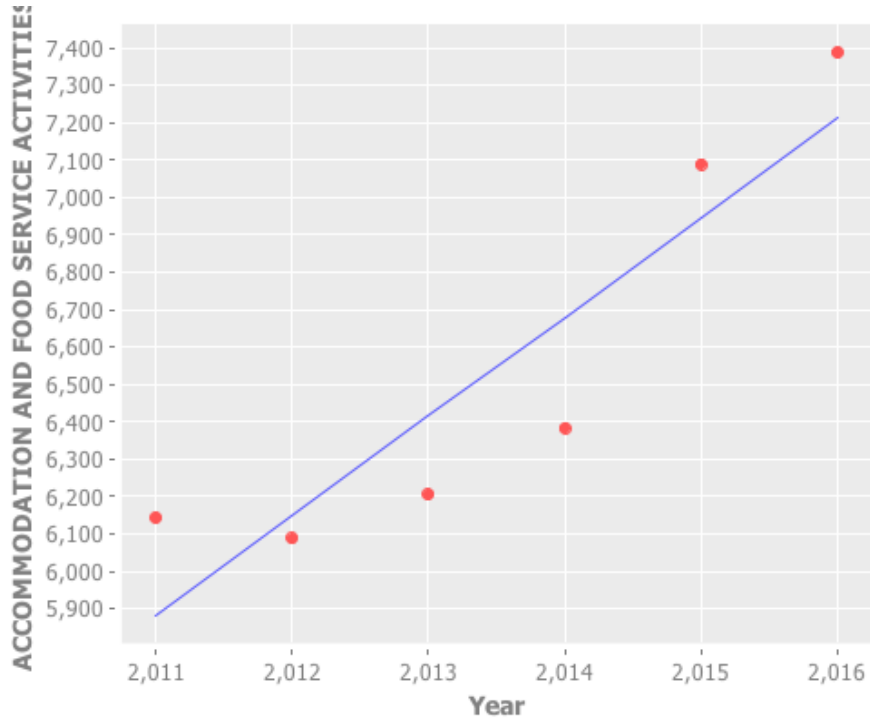
The Accommodation and Food Service Activities sector includes the provision of short-stay accommodation and the provision of food and beverage for immediate consumption:

- Accommodation, i.e. hotels and similar accommodation; holiday and short-stay accommodation; holiday centres and villages; youth hostels; camping grounds, recreational vehicle parks, and trailer parks; other accommodation, e.g. student residences etc., and
- Food and beverage service activities

Sector	2011	2016	Employment Changes	Employment Changes (%)	Employment Changes p.a.
Accommodation and food service activities	6,088	7,460	1,372	22	274

This sector saw an increase of 1,372 jobs (c. 22%) between 2011 and 2016 which is the third largest increase by number of jobs in a sector in B&NES for this period.

Figure 8 - Simple Linear Regression of Accommodation and Food Service Activities



It must be noted that whilst the following UK SIC 2007 are not part of the top 5 best performing in terms of percentage employment growth in B&NES for the period 2011-2016, the overall growth in each sector by number of jobs surpasses the Mining and Quarrying SIC and the Water Supply; Sewerage, Waste Management, and Remediation Activities SIC:

- Human Health and Social Work Activities SIC had an overall growth of 2,327 jobs or 19% between 2011 and 2016 making it the second best increase in employment by number of jobs
- Professional, Scientific, and Technical Activities SIC had an overall growth of 754 jobs or 11% between 2011 and 2016 making it the fourth best increase in employment by number of jobs.

Bottom 5 Worst Performing UK SIC 2007 in B&NES

1. Public Administration and Defence; Compulsory Social Security

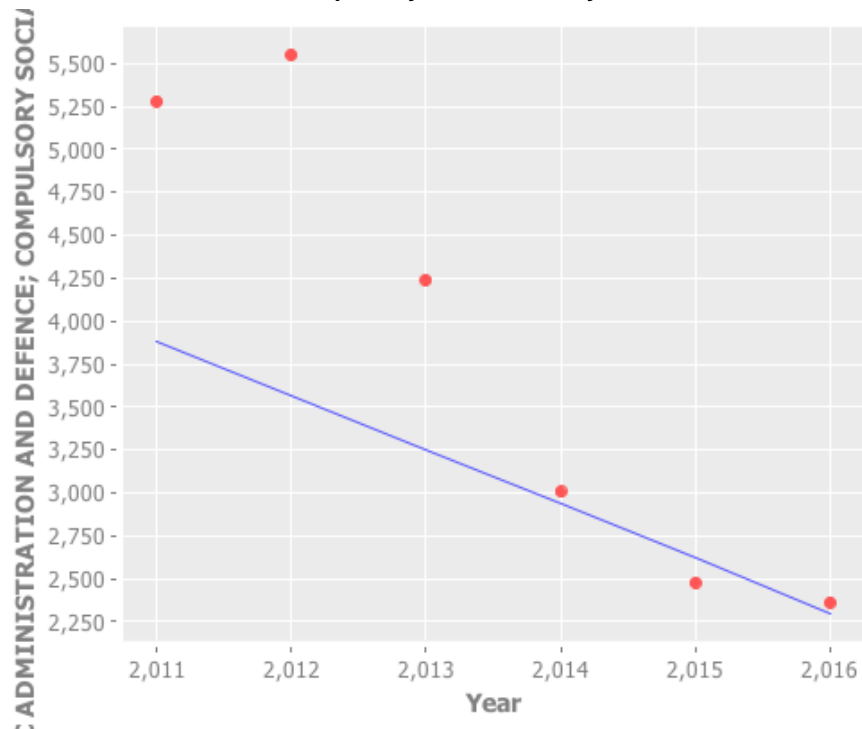
The Public Administration and Defence; Compulsory Social Security sector includes activities of a governmental nature, normally carried out by the public administration and includes:

- Administration of the State and the economic and social policy of the community,
- Provision of services to the community as a whole,
- Compulsory social security activities

UK SIC 2007	2011	2016	Employment Changes	Employment Changes (%)	Employment Changes p.a.
Public administration and defence; compulsory social security	5,550	1,989	-3,561	-64	-712

This sector has seen the biggest loss in jobs between 2011 and 2016 with 3,561 jobs losses (c. 64%). We believe that the decrease in number of jobs for this period is a result of the closure of the Ministry of Defence’s site at Foxhill in 2013 as mentioned earlier.

Figure 9 - Simple Linear Regression of Public Administration and Defence; Compulsory Social Security



2. Manufacturing

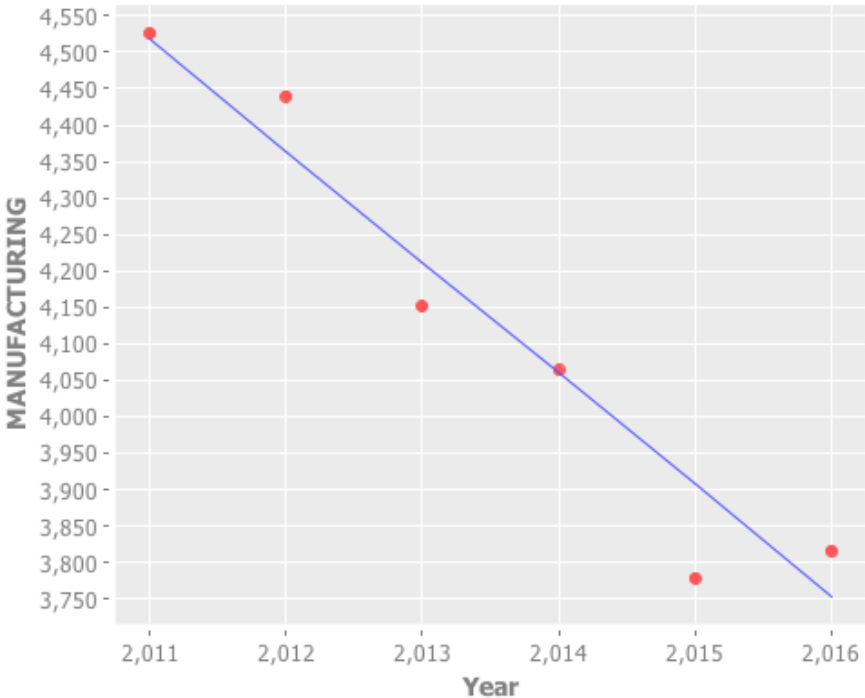
The Manufacturing sector includes the physical or chemical transformation of materials, substances, or components into new products. The materials, substances, or components transformed are raw materials that are products of agriculture, forestry, fishing, mining or quarrying as well as products of other manufacturing activities. Substantial alteration, renovation, or reconstruction of goods is generally considered to be manufacturing.

UK SIC 2007	2011	2016	Employment Changes	Employment Changes (%)	Employment Changes p.a.
Manufacturing	4,440	3,641	-799	-18	-160

This sector has the second largest decrease in its employment by percentage change in B&NES with a decrease 18% between 2011 and 2016, or 799 jobs. Whilst this is the second worst performing percentage change, it is actually the third worst performance by number of jobs after the Public Administration and Defence; Compulsory Social Security sector and the Education sector.

We believe that half of the job losses have resulted following the closure of the Cadbury factory in 2011 which accounted for around 400 jobs.

Figure 10 - Simple Linear Regression of Manufacturing



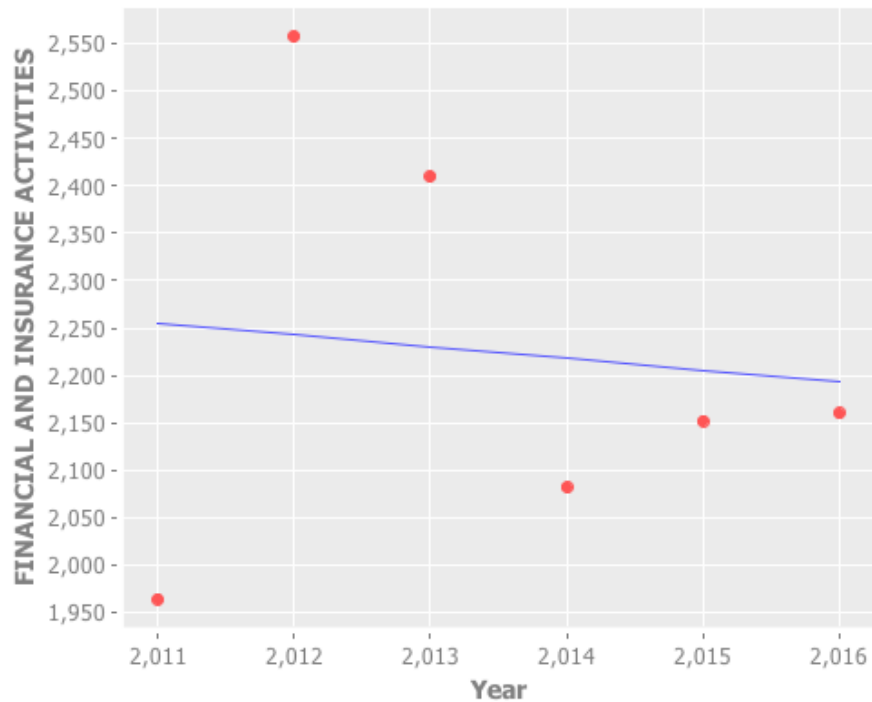
3. Financial and Insurance Activities

The Financial and Insurance Activities sector includes financial service activities, including insurance, reinsurance, and pension funding activities, and activities to support financial services. This sector also includes the activities of holding assets, such as activities of holding companies and the activities of trusts, funds, and similar financial entities.

UK SIC 2007	2011	2016	Employment Changes	Employment Changes (%)	Employment Changes p.a.
Financial and insurance activities	2,558	2,200	-358	-14	-72

This sector has seen a decrease of around 14% in jobs between 2011 and 2016, equivalent to 358 jobs. Whilst this is the third worst performing percentage change, it is actually the fourth worst performance by number of jobs after the Public Administration and Defence; Compulsory Social Security sector, the Education sector, and the Manufacturing sector.

Figure 11 - Simple Linear Regression of Financial and Insurance Activities



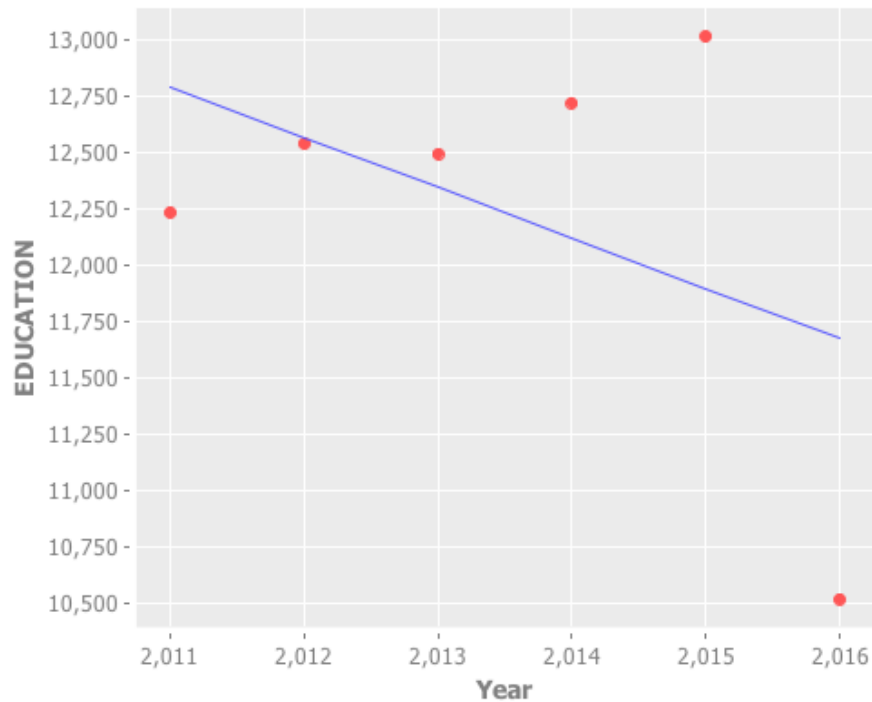
4. Education

The Education sector includes education at any level or any profession, which may be oral or written, and which may be provided by radio, television, internet, or via correspondence. It includes education by the various institutions in the regular school system at its different levels as well as adult education, literacy programmes etc. Also included are military schools and academies, prison schools etc. at their respective levels. The sector includes public as well as private education.

UK SIC 2007	2011	2016	Employment Changes	Employment Changes (%)	Employment Changes p.a.
Education	12,538	11,326	-1,212	-10	-242

This sector has seen a decrease of 1,212 jobs between 2011 and 2016, equivalent to c. 10% of jobs. This is the second biggest drop in the number of jobs for the period in B&NES.

Figure 12 - Simple Linear Regression of Education



Of particular note is a dip of around 2,500 jobs in 2015 which more than mitigates the steady growth the sector was experiencing up until 2014. The decrease in the number of jobs appears to be due to the sharp decrease in the employment figures (2,317 jobs) at the University of Bath.

There is no evidence to suggest that the University has indeed reduced its workforce, or whether the University has either re-classified these jobs making them sit under a different SIC code, TUPE'd to a contractor which might classify its employment under a different SIC code, or indeed any other cause that might lead to the sharp decrease in these numbers.

5. Electricity, Gas, Steam, and Air Conditioning Supply

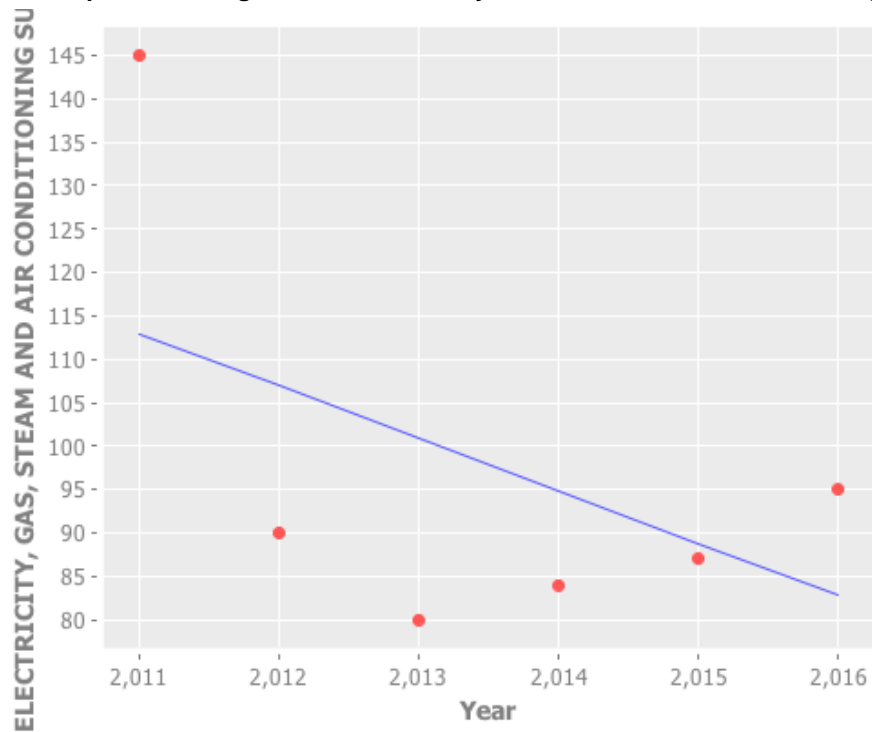
The Electricity, Gas, Steam, and Air Conditioning Supply sector includes the activity of providing electric power, natural gas, steam, hot water, and the like through a permanent infrastructure (network) of lines,

mains, and pipes. This sector therefore includes the operation of electric and gas utilities, which generate, control, and distribute electric power or gas and the provision of steam and air-conditioning supply.

UK SIC 2007	2011	2016	Employment Changes	Employment Changes (%)	Employment Changes p.a.
Electricity, gas, steam and air conditioning supply	90	83	-7	-8	-1

This sector has seen a decrease of around 8% in its employment figures between 2011 and 2016. Whilst this sector has the fifth largest decrease in employment by percentage change, it must be noted that the Transportation and Storage sector and the Information and Communication sector have had a bigger number of job losses (36 and 164, respectively) although the percentage for the period in question is smaller (2% and 5%, respectively).

Figure 13 - Simple Linear Regression of Electricity, Gas, Steam, and Air Conditioning Supply



Changes in the sectors of work place employment per area between 2011-2016

The table below was calculated using the IDBR Registered data for the areas of Bath City, Somer Valley, Keynsham, and Rural areas.

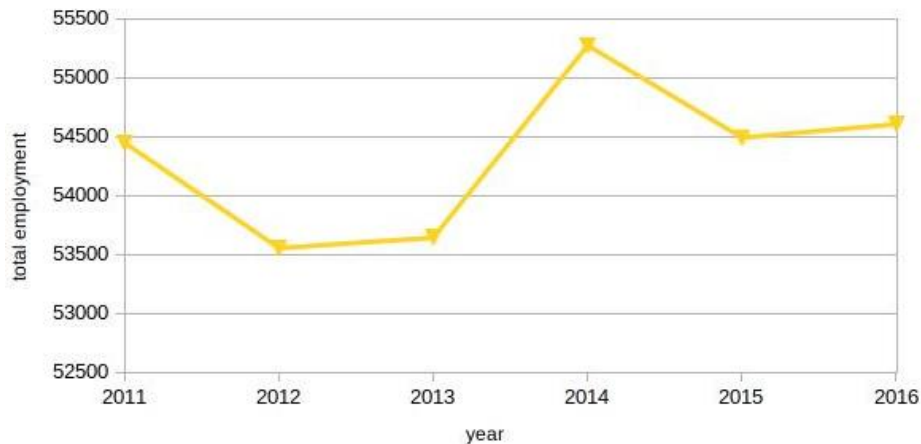
Table 3 - Overall Employment Changes in Bath City, Somer Valley, Keynsham, and Rural Areas, IDBR dataset

Year	Bath City	Somer Valley	Keynsham	Rural Areas
2011	54,446	11,389	5,590	8,294
2012	53,553	11,429	5,451	8,714
2013	53,642	11,848	5,491	8,582
2014	55,272	11,609	5,885	9,095
2015	54,490	11,695	5,970	9,275
2016	54,605	11,754	5,924	9,795
Growth	159	365	334	1,501

As expected, Bath City has the highest number of employment, yet interestingly, the biggest increase is seen in the rural areas. It is noted that employment in Bath City decreased by c. 782 in 2015; it is thought that this is due to the closure of the Ministry of Defence site. Overall, however, all areas have seen an upward trend between 2011 and 2016.

Bath City

Figure 14 –Bath City Employment between 2011 and 2016

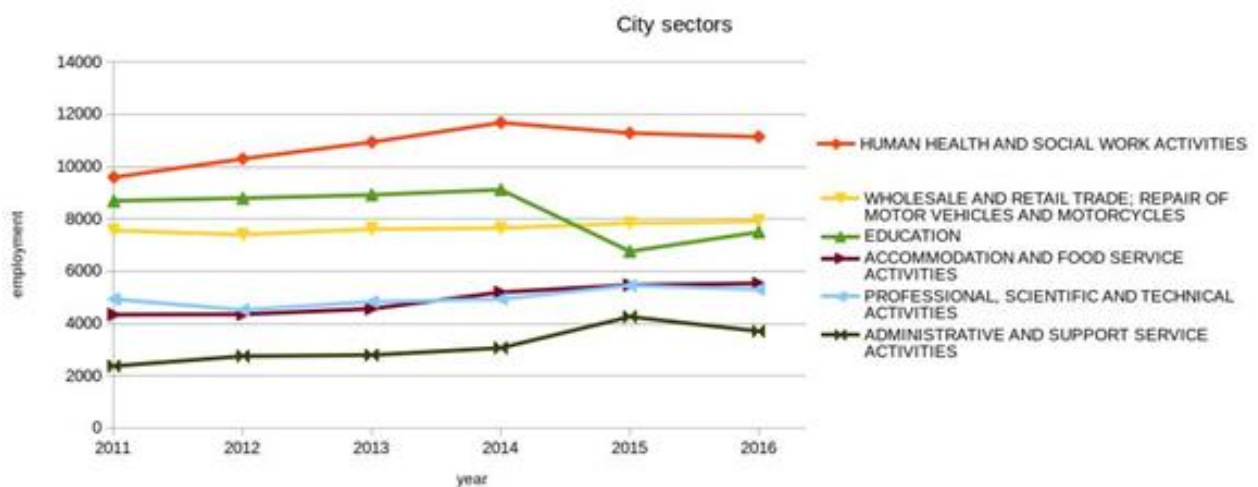


The top 5 biggest employment by UK SIC 2007 in Bath City are shown below. Other than Education, the biggest sectors by number of jobs have seen an increase with Human Health and Social Work Activities seeing the biggest increase by 1,545 jobs between 2011 and 2016, c. 16% change. The sector had a stable growth between 2007 and 2010, growing very strongly between 2010 and 2015, and then stabilising.

Education decreased by c. 1,194 jobs, or c. 14% decrease overall.

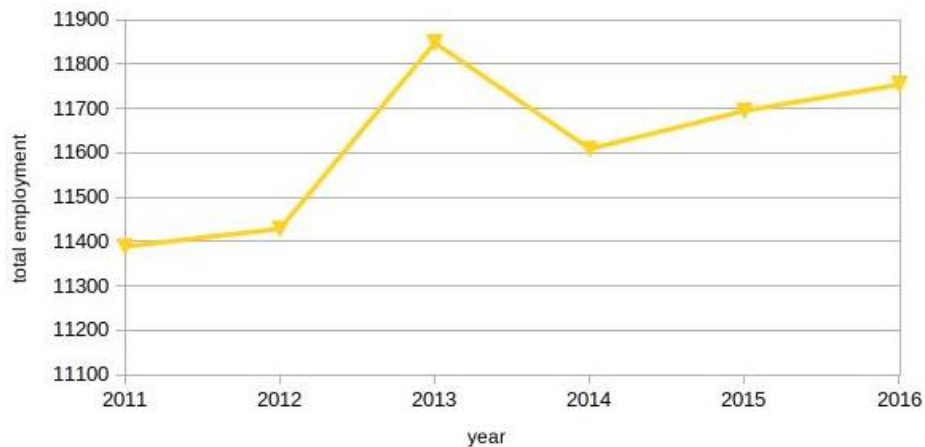
Table 4 - Biggest Employment Sectors in Bath City by UK SIC 2007

UK SIC 2007	2011	2016	Employment Changes	Employment Changes (%)	Employment Changes p.a.
Human Health and Social Work Activities	9,594	11,139	1,545	16	309
Wholesale and Retail Trade; Repair of Motor Vehicles and Motorcycles	7,559	7,912	353	5	71
Education	8,694	7,499	-1,194	-14	-239
Accommodation And Food Service Activities	4,341	5,534	1,193	27	239
Professional, Scientific And Technical Activities	4,931	5,306	375	8	75



Somer Valley

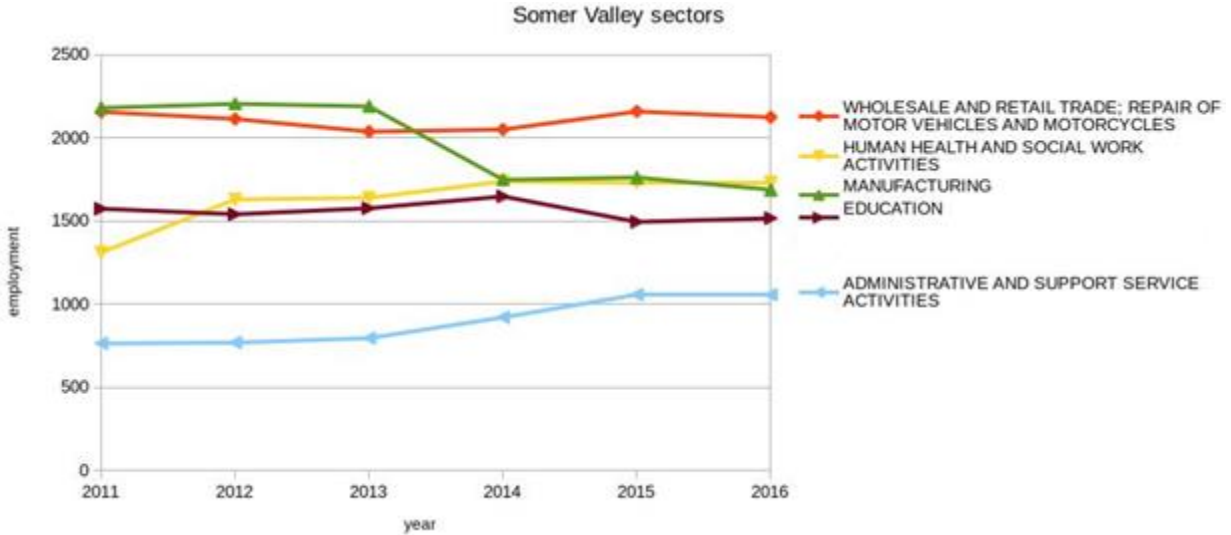
Figure 15 - Somer Valley Employment between 2011 and 2016



The biggest employment sectors by UK SIC 2007 in Somer Valley are shown below. Wholesale and Retail Trade; Repair of Motor Vehicles and Motorcycles, Manufacturing, and Education experienced a decrease in the overall number of jobs between 2011 and 2016. Manufacturing shifted down from second place to third place as a result of this, and Construction (previously in fifth place) was overtaken by Administrative and Support Service Activities.

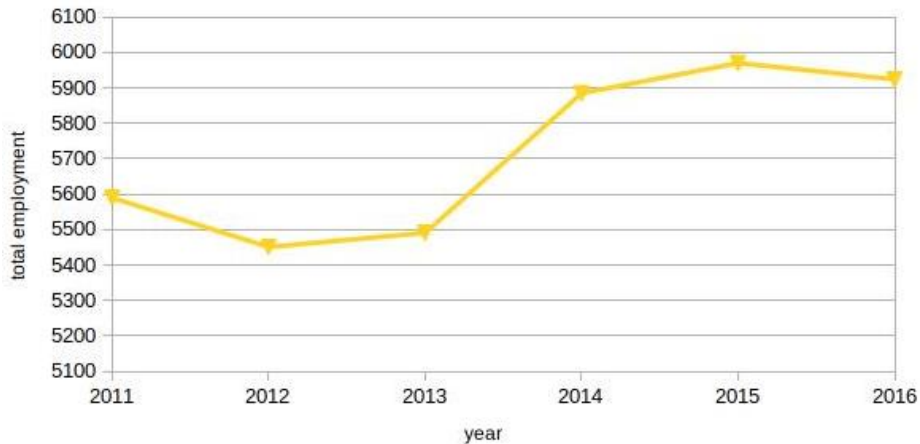
Table 5 - Biggest Employment Sectors in Somer Valley by UK SIC 2007

UK SIC 2007	2011	2016	Employment Changes	Employment Changes (%)	Employment Changes p.a.
Wholesale and Retail Trade; Repair of Motor Vehicles and Motorcycles	2,155	2,122	-33	-2	-7
Human Health and Social Work Activities	1,311	1,728	417	32	83
Manufacturing	2,179	1,687	-492	-23	-98
Education	1,573	1,516	-57	-4	-11
Administrative and Support Service Activities	764	1,056	292	38	158
Construction	928	955	27	3	5



Keynsham

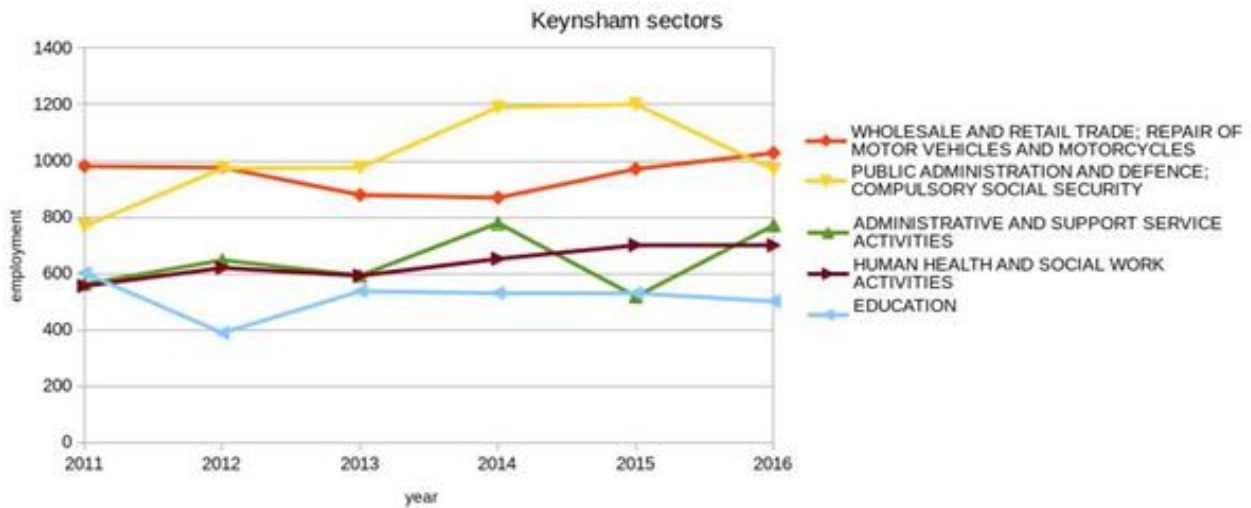
Figure 16 - Keynsham Employment between 2011 and 2016



The largest sectors in Keynsham are significantly larger than the other sectors, i.e. the fifth largest employment sector in Keynsham is larger than the sixth by a factor of two. All the largest sectors maintained their ranking throughout the period, and all grew except for Education which decreased by about a hundred jobs.

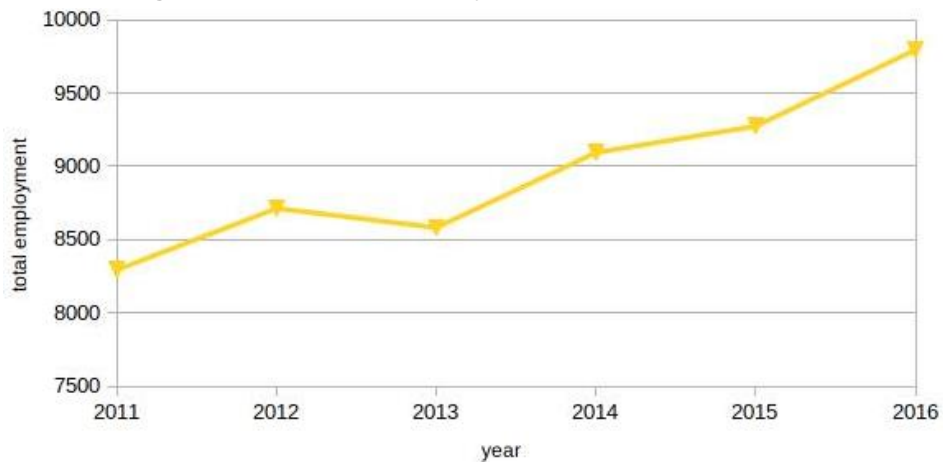
Table 6 - Biggest Employment Sectors in Keynsham by UK SIC 2007

UK SIC 2007	2011	2016	Employment Changes	Employment Changes (%)	Employment Changes p.a.
Wholesale and Retail Trade; Repair of Motor Vehicles and Motorcycles	981	1,028	47	5	9
Public administration and defence; compulsory social security	768	969	201	26	40
Administrative and Support Service Activities	563	771	208	37	42
Human Health and Social Work Activities	556	700	144	26	29
Education	602	501	-101	-17	-20



Rural Areas

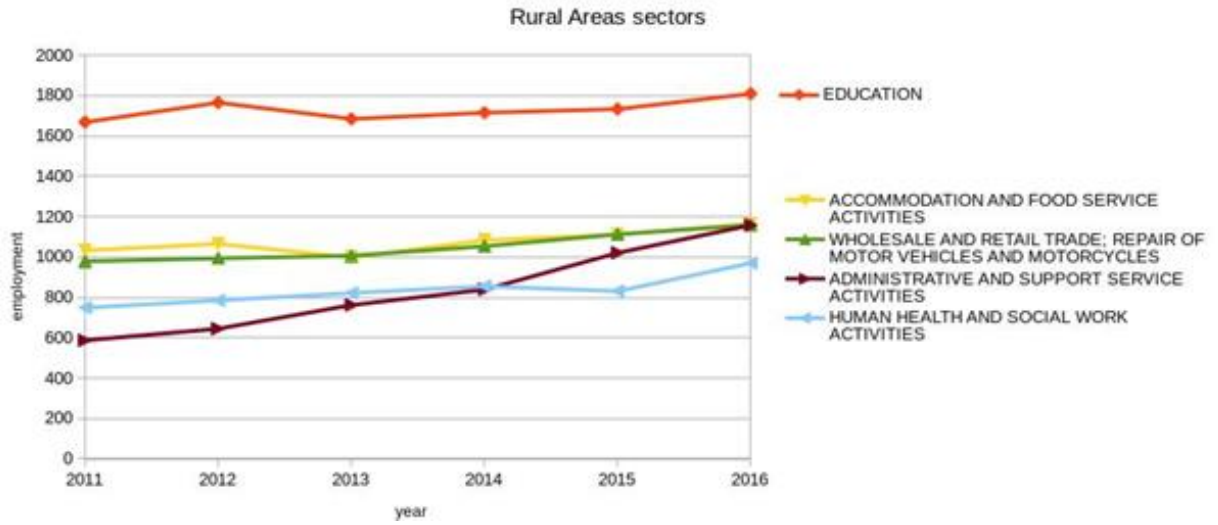
Figure 17 - Rural Areas Employment between 2011 and 2016



All of the biggest five sectors in the Rural Areas experienced an increase in the number of jobs between 2011 and 2016 with Administrative and Support Service Activities seeing a 97% increase in the number of jobs within its sector, or c. 114 jobs increase per annum.

Table 7 - Biggest Employment Sectors in Rural Areas by UK SIC 2007

UK SIC 2007	2011	2016	Employment Changes	Employment Changes (%)	Employment Changes p.a.
Administrative and Support Service Activities	587	1,158	571	97	114
Human Health and Social Work Activities	749	970	221	29	44
Wholesale and Retail Trade; Repair of Motor Vehicles and Motorcycles	979	1,159	180	18	36
Accommodation and Food Service Activities	1,033	1,165	132	13	26
Education	1,669	1,810	141	8	28



Part 2: Projected increases in employment per sector 2016-2036

The projections for all future employments mentioned below are based on the historical trends available with an 80% confidence interval of the projection and input from the Council to account for 'policy on' expectations. There has been no input from the local GVA or demography since there does not seem to be a clear correlation between those factors and the employment numbers.

For the purposes of the analysis below, we have used IDBR as is, i.e. (uncorrected for unregistered businesses, for spatial planning; as a rule of thumb, unregistered businesses generally do not occupy premises.

In terms of historical trends, we have used an Auto-Regressive Integrated Moving Average (ARIMA⁹) using the adjusted IDBR data for the period 2010-2016. Doing sector-based regressions, to follow the localised sector trends that have appeared in the last few years, will yield an overall result.

Using a sector-based approach also enables us to include different growth for different sectors based on possible future structural changes, such as automation of certain tasks.

ARIMA is shock (or outlier-) resistant, so shocks such as the Ministry of Defence job losses are not going to excessively affect the overall outcome. "Public administration and defence; compulsory social security" has a slight negative trend, but plateaus after a while.

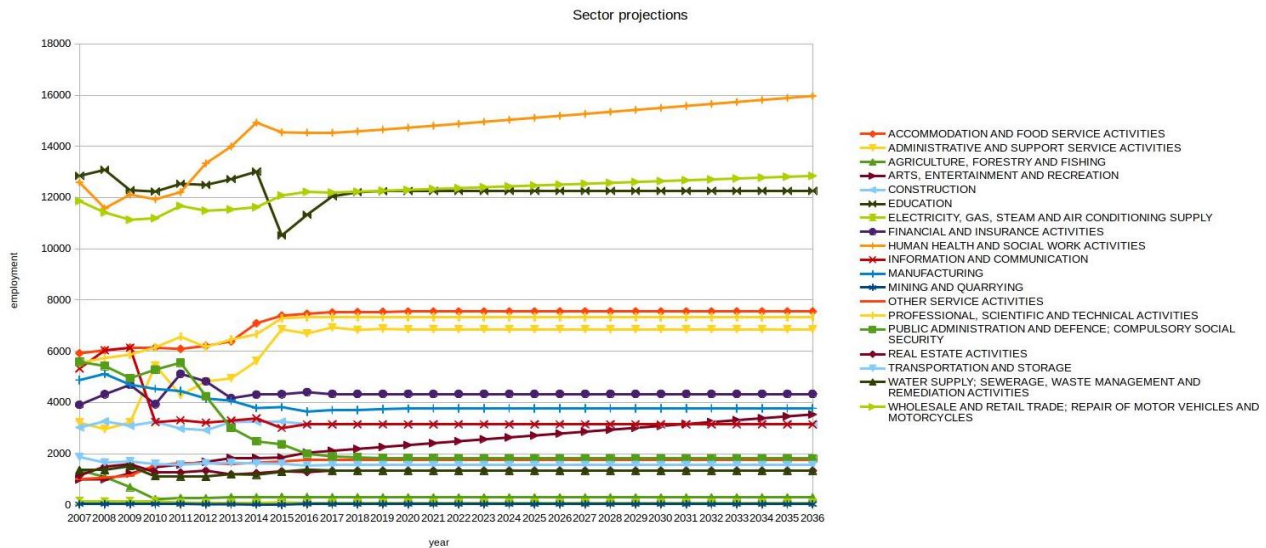
Overall, an increase of 15% across all sectors is predicted for the period 2016-2036.

Table 8 - Employment Projections 2016-2036 in B&NES by UK SIC 2007

Sector	2016	2036	Employment Changes	Employment Changes (%)	Employment Changes p.a.
Administrative and support service activities	6,689	9,281	2,592	39%	130
Professional, scientific and technical activities	7,317	9,595	2,278	31%	114
Information and communication	3,140	5,049	1,909	61%	96
Financial and insurance activities	2,200	3,996	1,796	82%	90
Manufacturing	3,641	4,850	1,209	33%	61

⁹ https://en.wikipedia.org/wiki/Autoregressive_integrated_moving_average

Sector	2016	2036	Employment Changes	Employment Changes (%)	Employment Changes p.a.
Wholesale and retail trade; repair of motor vehicles and motorcycles	12,221	13,275	1,104	9%	55
Transportation and storage	1,531	2,148	617	40%	31
Human health and social work activities	14,537	15,118	581	4%	29
Education	11,326	11,681	355	3%	18
Arts, entertainment and recreation	2,035	2,150	115	6%	6
Accommodation and food service activities	7,460	7,551	111	1%	6
Real estate activities	1,281	1,334	53	4%	3
Construction	3,136	3,152	16	1%	<1
Electricity, gas, steam and air conditioning supply	83	84	1	1%	<1
Other services activities	1,746	1,746	-	-	-
Agriculture, forestry and fishing	306	287	-19	-6%	-1
Mining and quarrying	40	16	-24	-60%	-1
Water supply, sewerage, waste management and remediation activities	1,379	1,333	-46	-3%	-2
Public administration and defence; compulsory social security	1,989	1,810	-179	-9	-9
Totals	82,057	94,526	12,469	15%	623.5



The total obtained through this method slightly exceeds an expectation based on a simple linear regression on the total employment time series, which comes to about 93,700. Sector-specific adjustments might be necessary, such as use of expectations.

A next approach will entail using scenarios, based on expectations on how well sectors will do in the next few years, mid-term and long-term. We could base ourselves on regional expectations for given sectors¹⁰.

An extension of this could be to moderate the forecast in some sectors by using the Household projections 2014-2039¹¹.

Regional share of work place jobs

As described above, we see a total job growth over 2010-2016 of:

- IDBR (registered): 2,338
- IDBR (corrected): 3,212

According to figures we've received about LEP job targets (Employment Growth Forecast Note for HoP), the OE (2013 forecasts) medium high growth scenario forecasts 95,000 jobs will be created in the West of England between 2010- 2030.

Assuming that the regional share concerns itself with the total employment figure, the corrected IDBR figures (including unregistered businesses) should be used.

¹⁰ Projections for the UK labour market for the period 2012 to 2022 from the UK Commission for Employment and Skills: <https://www.gov.uk/government/publications/working-futures-2012-to-2022>

¹¹ UK Government live tables on household projections: <https://www.gov.uk/government/statistical-data-sets/live-tables-on-household-projections#based-live-tables>

The current planned target in the Core Strategy is 12%, which puts the growth 2010-2030 at 11,400, which would mean that 35% of the target growth would already be achieved in 30% of the time (since the calculated corrected growth is $93,642 - 90,412 = 3,212$). This either means the growth projection for the region was on the pessimistic side, or the share for B&NES is larger than predicted.

Our estimation of the regional share so far, based on our corrected IDBR figures and the OE 2013 medium high growth scenario figures for the West of England:

Year	OE West of England	IDBR (corrected)	Ratio (%)
2016	638,412	94,526	14.8%

Caveat: we have no insight in the Oxford Economics West of England employment projections (these models tend to be black boxes), so we are unsure whether they are comparable quantities. Particularly, the definition of ‘jobs’ should be checked to be the same.

Another medium-high growth scenario by Oxford Economics predicts 84,444 jobs will be created in the West of England between 2016 and 2036 (same source).

Projected increases in work place per sector 2016-2036 per subarea

The main areas of interest are Bath City as it has the highest number of work place jobs, Somer Valley, Keynsham, and the Rural Areas where there has been the strongest growth between 2011 and 2016.

Bath City

The Professional, Scientific, and Technical Activities sector is expected to have the highest growth in terms of number of jobs in Bath City with c. 1,880 jobs between 2016 and 2036, or c. 35% increase (94 jobs per annum). The Administrative and Support Service Activities sector is expected to have the second highest growth in terms of number of jobs (1,800) for the same period at 49% increase overall or 90 jobs per annum.

The Financial and Insurance Activities sector is expected to have the highest growth in terms of percentage increase for the same period in Bath City at 80%, translating to 1,527 jobs overall or 76 jobs per annum.

The Agriculture, Forestry, and Fishing; Electricity, Gas, Steam, and Air Conditioning Supply; Other Service Activities; and Water Supply, Sewerage, Waste Management and Remediation Activities sectors are thought to remain static until 2036 with no increase or decrease projected for these sectors in Bath City.

The Mining and Quarrying sector is thought to be completely disappeared from the Bath City market by 2036, with a loss of 4 jobs.

Public Administration and Defence, Compulsory Social Security sector is the only other sector that is thought to suffer a loss of jobs between 2016 and 2036, estimated to be 153 jobs overall, or c. 18% loss or -8 jobs per annum.

Table 9 – Employment Projections 2016-2036 in Bath City by UK SIC 2007

Sector	2016	2036	Employment Changes	Employment Changes (%)	Employment Changes p.a.
Professional, scientific and technical activities	5,306	7,186	1,880	35%	94
Administrative and support service activities	3,704	5,504	1,800	49%	90
Financial and insurance activities	1,904	3,431	1,527	80%	76
Information and communication	2,711	4,161	1,450	53%	72.5
Human health and social work activities	11,139	11,389	250	2%	12.5
Education	7,499	7,747	248	3%	12
Wholesale and retail trade; repair of motor vehicles and motorcycles	7912	8,160	248	3%	12
Manufacturing	1,393	1,543	150	11%	7.5
Transportation and storage	874	974	100	11%	7
Accommodation and food service activities	5,534	5,607	73	1%	4
Arts, entertainment and recreation	1,306	1,356	50	4%	2.5
Real estate activities	1,011	1,058	47	4.6%	2
Construction	1,037	1,053	16	1.5%	<1
Agriculture, forestry and fishing	36	36	-	-	-
Electricity, gas, steam and air	7	7	-	-	-

Sector	2016	2036	Employment Changes	Employment Changes (%)	Employment Changes p.a.
conditioning supply					
Other services activities	1,309	1,309	-	-	-
Water supply, sewerage, waste management and remediation activities	1,052	1,052	-	-	-
Mining and Quarrying	4	-	-4	-100%	<1
Public administration and defence; compulsory social security	846	693	-153	-18%	-8
Totals	54,584	62,266	7,682	14%	384

Somer Valley

The Manufacturing sector is predicted to have the greatest overall increase in number of jobs between 2016 and 2036 with 762 jobs (45% or 38 jobs per annum), followed by Wholesale and Retail Trade; Repair of Motor Vehicles and Motorcycles with an increase of 392 jobs (18% or 20 jobs per annum), and Administrative and Support Service Activities with an increase of 218 jobs (21% or 11 jobs per annum).

The Accommodation and Food Service Activities; Arts, Entertainment and Recreation; Construction; Mining and Quarrying; Other Services Activities; Public Administration and Defence, Compulsory Social Security; Water Supply, Sewerage, Waste Management, and Remediation Activities are thought to remain static until 2036 with no increase or decrease projected for these sectors in Bath City.

The Agriculture, Forestry, and Fishing sector is thought to be completely disappeared from Somer Valley by 2036, with a loss of 9 jobs.

Table 10 - Employment Projections 2016-2036 in Somer Valley by UK SIC 2007

Sector	2016	2036	Employment Changes	Employment Changes (%)	Employment Changes p.a.
Manufacturing	1,687	2,449	762	45%	38
Wholesale and retail trade; repair of motor vehicles and motorcycles	2,122	2,514	392	18%	20

Sector	2016	2036	Employment Changes	Employment Changes (%)	Employment Changes p.a.
Administrative and support service activities	1,056	1,274	218	21%	11
Transportation and storage	291	491	200	69%	10
Human health and social work activities	1,728	1,855	127	7%	6
Information and communication	113	220	107	95%	5
Education	1,516	1,586	70	5%	3.5
Professional, scientific and technical activities	907	957	50	6%	2.5
Financial and insurance activities	85	129	44	52%	2
Real estate activities	43	49	6	14%	<1
Electricity, gas, steam and air conditioning supply	67	68	1	1%	<1
Accommodation and food service activities	478	478	-	-	-
Arts, entertainment and recreation	341	341	-	-	-
Construction	955	955	-	-	-
Mining and Quarrying	-	-	-	-	-
Other services activities	160	160	-	-	-
Public administration and defence; compulsory social security	148	148	-	-	-
Water supply, sewerage, waste management and remediation activities	48	48	-	-	-
Agriculture, forestry and fishing	9	0	-9	-100%	< -1
Totals	11,754	13,722	1,968	17%	98

Keynsham

The Administrative and Support Service Activities sector is expected to have the highest overall increase in number of jobs by 412 between 2016 and 2036; an increase of c. 53% or 21 jobs per annum, followed by Information and Communication with an increase of 322 jobs, representing the highest percentage increase in the area at 398%.

Mining and Quarrying; Public Administration and Defence, Compulsory Social Security; and Water supply, sewerage, waste management and remediation activities are anticipating a decrease in jobs in, and the Agriculture, Forestry, and Fishing sector is expected to completely disappear by 2036 in Keynsham.

Table 11 - Employment Projections 2016-2036 in Keynsham by UK SIC 2007

Sector	2016	2036	Employment Changes	Employment Changes (%)	Employment Changes p.a.
Administrative and support service activities	771	1,183	412	53%	21
Information and communication	81	403	322	398%	16
Professional, scientific and technical activities	253	561	308	122%	15
Transportation and storage	205	505	300	146%	15
Financial and insurance activities	105	305	200	190%	10
Human health and social work activities	700	872	172	25%	9
Manufacturing	136	300	164	121%	8
Arts, entertainment and recreation	205	260	55	27%	3
Wholesale and retail trade; repair of motor vehicles and motorcycles	1,028	1,110	82	8%	4
Accommodation and food service activities	283	301	38	13%	2
Education	501	526	25	5%	1
Construction	276	276	-	-	-

Sector	2016	2036	Employment Changes	Employment Changes (%)	Employment Changes p.a.
Electricity, gas, steam and air conditioning supply	-	-	-	-	-
Other services activities	88	88	-	-	-
Real estate activities	150	150	-	-	-
Mining and Quarrying	16	10	-6	-38%	< -1
Agriculture, forestry and fishing	10	0	-10	-100%	< -1
Public administration and defence; compulsory social security	969	946	-23	-2%	-1
Water supply, sewerage, waste management and remediation activities	147	104	-43	-29%	-2
Totals	5,924	7,920	1,996	34%	100

Rural Areas

Wholesale and Retail Trade; Repair of Motor Vehicles and Motorcycles is expected to have the highest increase with 382 jobs, or c. 33% between 2016 and 2036 (19 jobs per annum).

A number of sectors are expected to remain static between 2016 and 2036 as shown in the table below.

Public Administration and Defence, Compulsory Social Security; Water Supply, Sewerage, Waste Management, and Remediation Activities; and Mining and Quarrying will experience a decrease in number of jobs between 2016 and 2036 in the Rural Areas.

Table 12 - Employment Projections, Biggest Employment Sectors, 2016-2036 in Rural Areas by UK SIC 2007

Sector	2016	2036	Employment Changes	Employment Changes (%)	Employment Changes p.a.
Wholesale and retail trade; repair of motor vehicles and motorcycles	1,159	1,541	382	33%	19
Administrative and support service activities	1,158	1,320	162	14%	8

Sector	2016	2036	Employment Changes	Employment Changes (%)	Employment Changes p.a.
Manufacturing	425	558	133	31%	7
Professional, scientific and technical activities	851	891	40	5%	2
Human health and social work activities	970	1,002	32	3%	2
Information and communication	235	265	30	13%	1.5
Financial and insurance activities	106	131	25	24%	-
Transportation and storage	161	178	17	11%	<1
Education	1,810	1,822	12	1%	<1
Arts, entertainment and recreation	183	193	10	5%	<1
Accommodation and food service activities	1,165	1,165	-	-	-
Agriculture, forestry and fishing	251	251	-	-	-
Construction	868	868	-	-	-
Electricity, gas, steam and air conditioning supply	9	9	-	-	-
Other services activities	189	189	-	-	-
Real estate activities	77	77	-	-	-
Public administration and defence; compulsory social security	26	23	-3	-12%	<-1
Water supply, sewerage, waste management and remediation activities	132	129	-3	-2%	<-1
Mining and Quarrying	20	6	-14	-70%	<-1
Totals	9,795	10,618	823	8%	41

Appendices

Appendix 1 - Correction on IDBR numbers for unregistered businesses

The Department for Business, Energy, and Industrial Strategy publishes Business Population Estimates (BPE)¹² are provided on a yearly basis. The BPE only estimates unregistered businesses run by self-employed people, either alone (sole proprietorships) or with others (partnerships), and does not account for inactive businesses.

A first approach was to use the South West unregistered employment to total employment ratio. This was discarded as the region is quite diverse and different local authorities have different economies which skew the numbers and a B&NES specific breakdown is not available. Therefore we have used the national average rate.

If we assume that the ratio of unregistered employment/total employment is the same at the national level as in B&NES, we can extrapolate the total employment (including unregistered businesses) using the national ratio.

We have assumed that unregistered businesses will not enter into the calculation for workplace jobs, i.e. jobs on business premises, since unregistered businesses have no PAYE, i.e. no employees and typically have annual revenue of lower than £82,000, and are therefore not registered with HMRC. This makes it unlikely that they will occupy employment premises.

The BIS BPE unregistered employment numbers only apply to private businesses. The spreadsheets mentioning unregistered businesses have the description “*Number of businesses in the private sector and their associated employment and turnover, by number of employees, UK*” and sector-level data in those worksheets does not include the public administration and defence sector.

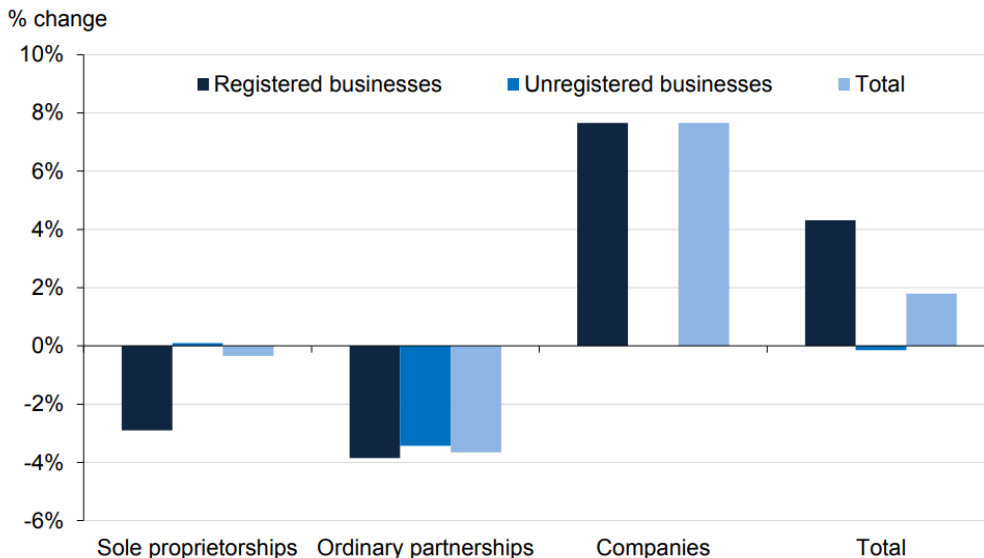
This means the multiplication is only carried out on all private sectors, but not to the public sector (“public administration and defence; compulsory social security”) which is subtracted before multiplication and then re-added after as is.

Looking at the proportion of unregistered employment as a proportion of total, over all available years, (2013 - 2016) gives a fairly stable proportion of about 12.6% of unregistered employment.

¹² <https://www.gov.uk/government/statistics/business-population-estimates-2016>

Year	National unregistered employment ratio
2013	0.1225
2014	0.1290
2015	0.1278
2016	0.1261

It is worth noting that according to this source, the majority of business population growth in the UK in general has been due to non-employing businesses (like unregistered businesses).



Other options for correction would include correcting based on sector level, and on single year unregistered ratios from the BPE; however, testing this approach shows that this makes the figures extremely unstable and completely out of step with alternative sources (APS and BRES), which suggests that the smoother national approach is more reasonable. In particular, the education sector in general has a high rate of unregistered employment; however, it would not be a sensible assumption to conclude that B&NES' education sector would follow that trend, since B&NES education employment is largely from the University of Bath, while we might assume that unregistered education is more likely to be involved with early years through to secondary tutoring rather than attached to a university.