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England and Wales for 1817

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ABSTRACT. *This paper presents new estimates of the adult male occupational structure of England and Wales in 1817, over twenty years before the availability of the first reliable returns based upon the census of 1841. The system of baptismal registration introduced by parliament for the Church of England in 1813 required the occupation of the father to be recorded. By collecting these data from every parish register in England and Wales from this year until 1820, it is possible to generate estimates of male occupational structure. Comparison of these estimates with other sources suggests that they are very reliable. Through the use of (1) a population weighting system using the returns from early nineteenth century censuses; (2) the PST system of occupational coding; and (3) a method for attributing the considerable numbers of men described as ‘labourer’ between the different sectors of employment, the total number of men engaged in each sector of the economy in 1817 can then be estimated.*

In 1812, parliament passed an act reforming the way in which the registers of baptisms and burials maintained by the Church of England were kept.¹ More than 11,000 churches and chapelries, and other institutions with ties to the established church were expected to adopt the *pro forma* means of recording these events that were set out in the schedule to the act. Amongst other things, it required that those who were maintaining the parish register were to record the occupation of the father at the baptism of his child. However, since illegitimate children did not legally have fathers, no father and hence no occupation would have been required in these cases (about five percent of all the births in this period). So, in theory at least, from 1 January 1813 the occupation of the father was registered for every legitimate child that was baptised according to the rites of the Anglican church in both England and Wales.

This source has the obvious potential to be used to estimate the occupational structure of the male workforce of England and Wales at the start of the nineteenth century.² The earliest reliable source for such estimates for England and Wales are the censuses based upon household enumeration that became the established norm from 1841 onwards. The earlier censuses were little more than headcounts of the population for each of the administrative units of the old poor law.³ While they do provide some insight into occupational structure, the detail is crude, being based upon counts of the numbers of families engaged in agriculture, trade, and other similarly broad-brush categories. The 1831 Census provides a more detailed analysis of employment in agriculture, but the other categories provided are crude. Even the

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¹ The Parochial Registers Act of 1812 (52 Geo. III c. 146). While this act is often referred to as Rose’s Act, the Rose in question – George Rose – was responsible for several pieces of legislation that have become known as Rose’s Act. Recent research has also shown that Charles Abbot was also a key instigator of this piece of legislation. See Thompson, ‘Census-taking, political economy and state formation’, chapter 2.

² It should be pointed out that these sources provide virtually no insight into the structure of the female workforce at this time. On occasion, the mothers of illegitimate children were accorded an occupation in the relevant field of the baptism register. However, this was not done systematically, and is of course prone to all manner of biases due to the constrained range for ages at maternity for the mothers of illegitimate children, as well as the general suspicion that illegitimacy was concentrated among the lower orders of society.

³ An Act for taking an Account of the Population of Great Britain, and of the Increase or Diminution thereof. [1801] 41 Geo. III c. 15; An Act for taking an Account of the Population of Great Britain, and of the Increase or Diminution thereof. [22 March 1811] 51 Geo. III c.6; An Act for taking an Account of the Population of Great Britain, and of the Increase or Diminution thereof. [24 July 1820] 1 Geo. IV. c.94; An Act for taking an Account of the Population of Great Britain, and of the Increase or Diminution thereof. [23 June 1830], 11 Geo. IV. c.30.

first occupationally reliable censuses have peculiar problems in terms of how occupations were classified, and how those who were not economically active through retirement, unemployment, or otherwise were treated.⁴

This paper sets out to describe the process whereby this rich seam of information on male occupations was exploited and transformed into a ‘census’ of adult male occupations for the 8-year period between 1813 and 1820 (for convenience referred to as relating to 1817 which is more or less the mid-point of the period). Section one describes the process of data collection whereby the occupational titles recorded for fathers at baptism were abstracted for as many of the extant Anglican baptism registers of England and Wales as possible. Section two explores whether parish registers are indeed an accurate source for estimating occupational structure during the early nineteenth century through comparison with other listings that provide direct evidence on the numbers of men employed in each sector of the economy for a series of communities. Section three explains a weighting procedure using early census data to produce direct estimates of the numbers of men aged over twenty for the whole of England and Wales and thereby to construct a census of male adult occupations, while section four describes the process for allocating labourers to the various sectors of economic activity. Finally, this paper concludes with a breakdown of involvement in all the different sectors of economic activity at the level of primary, secondary, and tertiary sectors for both England and Wales in 1817, as well as a more detailed breakdown of the occupational structure.

This product of this series of operations is described as a ‘census’ of male occupations. The quotation marks have been used because there are two ways in which this exercise is not akin to a true census. Baptism registers are not an absolute headcount of individuals. The individuals who are being enumerated here were the fathers whose occupations are recorded by the parish register at the baptism of their children. Some individuals may be counted several times over a period of time, while others will simply not be included at all if they were unmarried, or if the marriage was infertile. While the presence of an occupation does imply that the occupation was present in that year, the absence of an occupation does not necessarily imply that it was absent. This problem is less pressing at higher levels of aggregation; for instance, one would expect that the proportion of fathers described as publicans at the level of a county would give a reliable indication of the share of the total adult male workforce engaged in that occupation. On the other hand, it does not necessarily follow that a parish did not have a publican within its population if the parish register failed to record the baptism of the son or daughter of a publican over an eight year period.

The second caveat follows on from the first, in that the key assumption that underlies the use of occupations recorded in baptism registers in this way is that the *ratio* between the different occupations gives an indication of their relative size. For instance, if a parish were to record 75 baptisms where the father was described as a weaver and 25 where the father was noted as a farmer, it is assumed that there were three weavers for every farmer within that parish. Even if the overall quality of parochial registration was perfect, the use of these registers in this way is contingent upon assuming an absence of significant differences between the fertility and age specificity of each occupation. If the wives of labourers had higher levels of marital fertility, or married earlier, than the wives of farmers, the ratio of labourers to farmers would be exaggerated. Similarly, if the individuals who became farmers did so at a later age than labourers, the same distortion would occur.⁵ It should be noted at

⁴ Wrigley, ‘The occupational structure of England in the mid-nineteenth century’, pp. 129-203.

⁵ Analysis of the occupational data presented in five year age intervals in the published tabulations of the 1851 census report indicates that for males the share of labour between the primary, secondary and tertiary sectors varies very little between

this stage that there is no convincing evidence for significant and systematic variations in fertility between social groups within communities for the early nineteenth century. There were very few differences in the overall levels of marital fertility between the parishes that have been subject to family reconstitution; indeed, the degree of homogeneity is quite striking.⁶ Given that there were quite marked differences in the occupational structures between different parts of the country, the available evidence suggests that any differences in fertility between occupational groups were generally muted.

I

The collection of data from over 11,000 baptism registers for England and Wales was a logistically demanding process, involving 19 research assistants and associates making visits to 83 record offices, archives and libraries over a five-year period.⁷ We have used the term ‘abstraction’ both to describe the process of abstracting the data from a given register for a particular run of years and to refer to the unit of data produced. The first stage in the process was to identify the number and location of all the registers that required abstraction. For this purpose, a registration codebook of all the Anglican registration units in England and Wales was compiled. While this is more fully described elsewhere,⁸ it is worth noting that this resource was designed primarily to list all the parish registers that were being kept by 1820. The use of the term ‘registration unit’ is intended to avoid the potential for confusion that parish and chapelry might bring. In reality not all Anglican registers were kept by parishes. Some parishes, especially in the north of England, contained one or more chapelries which kept their own registers. Hence ‘parish registers’ were kept by three types of units: parishes, chapelries and sub-parish units other than chapelries. The term ‘registration unit’ covers all three types of unit. The codebook lists the record office where the original register was kept, enabling researchers in the field to identify all the registers that would require abstraction at a particular location.

those aged 10 and over, 20 and over, 25 and over and 30 and over. In other words male occupational structure is not sensitive to the age at which the labour force comes into observation.

⁶ Wrigley, *et. al.*, *English population history*, pp. 354-511, esp. pp. 501-511.

⁷ Wrigley and Shaw-Taylor devised the rules that governed the abstraction process. Kitson was responsible for the design of the data abstraction process, as well as the maintenance of the resources that were created and the day-to-day management of the individuals engaged in data entry.

⁸ See Kitson, ‘The codebook of Anglican registration units’.

Figure 1: An example of a post-1812 baptism register

[Page 999]

BAPTISMS solemnized in the Parish of <i>Killington</i>						
in the County of <i>York</i> in the Year 18 <i>24</i>						
When Baptized.	Child's Christian Name.	Parents Name.		Abode.	Quality, Trade, or Profession.	By whom the Ceremony was performed.
		Christian.	Surname.			
18 <i>20</i> <i>June</i> <i>10.</i> No.	<i>Mary</i>	<i>Samuel</i> <i>and</i> <i>Mary</i>	<i>Yorkton</i>	<i>Killington, West York</i>		<i>Edw. Day</i>
<i>June</i> <i>16.</i> No.	<i>Agnes</i>	<i>William</i> <i>and</i> <i>Mary</i>	<i>Colby</i>	<i>Killington School</i>	<i>Master</i>	<i>Edw. Day</i>
<i>June</i> <i>20.</i> No.	<i>William</i>	<i>Leonard</i> <i>and</i> <i>Mary</i>	<i>Waller</i>	<i>Killington</i>	<i>Labourer</i>	<i>Edw. Day</i>
<i>August</i> <i>6.</i> No.	<i>Thomas</i>	<i>William</i> <i>and</i> <i>Catherine</i>	<i>Boston</i>	<i>Killington</i>	<i>Labourer</i>	<i>Edw. Day</i>
<i>August</i> <i>21.</i> No.	<i>Richard</i>	<i>Thomas</i> <i>and</i> <i>Mary</i>	<i>Sawmills</i>	<i>Killington</i>	<i>Labourer</i>	<i>Edw. Day</i>
<i>August</i> <i>23.</i> No.	<i>Thomas</i>	<i>Thomas</i> <i>and</i> <i>Ann</i>	<i>Yorkton</i>	<i>Killington</i>	<i>Labourer</i>	<i>Edw. Day</i>
<i>August</i> <i>28.</i> No.	<i>Ann</i>	<i>Mary</i> <i>and</i> <i>George</i>	<i>Brundel</i>	<i>Killington</i>	<i>Field</i>	<i>Edw. Day</i>
<i>September</i> <i>3.</i> No.	<i>Mary</i>	<i>Mary</i> <i>and</i> <i>Swedell</i>	<i>Swedell</i>	<i>Killington</i>	<i>Labourer</i>	<i>Edw. Day</i>

Notes: This is a page from the parish register of Killington in the West Riding of Yorkshire, and shows the general format for post-1812 baptism registers utilised by the Church of England.

Each baptism register was abstracted for a period of eight years, from 1813 to 1820. The logic for this was that this corresponds to the maximum interval between successive baptisms that one could expect in a fertility regime without parity-specific controls upon fertility. Thus an eight year period is sufficient to pick up virtually all men in fertile marriages. Figure 1 above gives an example of a single page from a post-1812 baptism register, and it can be seen that the structure of these documents lends itself to the rapid input of data.⁹ Early nineteenth century handwriting rarely poses a palaeographic challenge, and the tabular and regular nature of recording ensured that the collection of the occupational information was fairly rapid.

⁹ Typically research assistants were able to collect around 1,000 occupational descriptors per hour.

Figure 2: The abstraction form for 'rose' abstractions

A	B	C	D	E	F	G
1 Registration Unit Name	Llanfair Clydogau	Text parish name, using the standard name recorded by the Welsh Registration Unit Codebook.				
2 Registration Unit ID	CDG/033	To be supplied by the Welsh Registration Unit Codebook.				
3 Period of Occupational Recording	rose	Value either to be '1' (for a first PoR in the c18th), '2' (for a second PoR if any in the c18th), and 'rose' for an 1813-20 Rose Act register abs				
4 start date	03 Jan 1813	Date of first event in register, in 'dd Mmm yyyy' format. Use a '*' as a suffix for Rose Act abstractions which do not have an event recorded i				
5 end date	22 Sep 1822	Date of last event in register, in 'dd Mmm yyyy' format.				
6 years excluded		If a year has been not abstracted since it clearly falls below the 95% threshold, then note it here in the form 'yyyy'. For each additional year				
7 sampling ratio	1	Only to be specified for 1813-20 Registers. If every second page sampled enter 2. If every third page enter 3 etc.				
8 archive	National Library of Wales	Archive identifier.				
9 reference		Archive source reference.				
10 source description	MF BT	Source description.				
11 date entered	01 Aug 2007	Date when abstraction performed, in 'dd Mmm yyyy' format.				
12 researcher	Matthew Westlake	Initials of the researcher performing the abstraction.				
13 time taken	8	Time taken to abstract data, in minutes.				
14 notes		Notes regarding the register, to be only entered into this cell				
Click to Check File Format						
18	Year Occupation	Notes				
19	aailegitimate	illegitimate				
20	aaother parish - no occupation	other parish - no occupation				
21	aano occupation specified	no occupation specified				
22	aabaptism without named parents	baptism without named parents				
23	aaunreadable	unreadable				
24	1813 miner					
25	1813 farmer					
26	1813 miner					
27	1813 shoemaker					
28	1813 farmer					
29	1813 labourer					
30	1813 labourer					
31	1813 tailor					
32	1813 shepherd					
33	labourer					

Notes: This is a screenshot of the electronic abstraction form – a modified Microsoft Excel spreadsheet – for the parish of Llanfair Clydogau (Cardiganshire).

The data were collected by a group of research associates and assistants over a five-year period between 2002 and 2007,¹⁰ and entered directly into a specially formatted Microsoft Excel spreadsheet; Figure 2 provides an illustration of this abstraction form. These abstractions were then converted automatically using a computer script into a useable database.¹¹ To speed up data entry, some baptism registers were sampled, rather than abstracted in their entirety. Several large urban or industrialising registration units in Lancashire, Yorkshire, Tyneside, the West Midlands, Middlesex and Surrey contained comfortably more than 1,000 baptisms between 1813 and 1820; the register of the parish church of Manchester contained more than 23,000 baptisms during this period. Sampling rather than complete extraction took place where the numbers of baptisms recorded during these eight years exceeded 2,000 events. Where there was any doubt as to the identity of an occupation, researchers were instructed to record it exactly as it appeared in the original. Otherwise researchers were encouraged to modernise spellings, since this both sped up data input and reduced the amount of labour required for coding subsequently. A strict quality threshold on the recording of occupations in the registers was imposed. Any run of data where occupations were recorded in less than 95 per cent of the baptisms was excluded. To calculate whether or not the quality threshold had been reached it was necessary to distinguish those entries without an occupation due to clerical negligence from those where no occupation could reasonably be expected, primarily where the child was illegitimate. This required the flagging of entries where no occupation was recorded. In figure 2, there are five

¹⁰ A list of research assistants and associates follows, together with the total number of parishes abstracted by each individual. Joseph Barker (756 abstractions); Richard Churchley (693); Alec Corio (131); Oliver Dunn (312); Selah Hennessy (357); Mandy Jones (105); Peter Kitson (556); Viktoria Masten (34); Niraj Modha (52); Lauren Monaghan-Pisano (639); Eli Schacher (34); Silvia Sovic (26); Geoffrey Stanning (554); Timothy Swain (1,944); Rebecca Tyler (37); Lucy Ward (342); Matthew Ward (1,215); Alison Warren (1,033); and Matthew Westlake (2,544). We thank them all.

¹¹ This was done using a computer script that consisted of a series of macros written using the Visual Basic for Applications programming language.

entries prefixed by ‘aa’. These acted as flags, signalling to the computer script that these particular events did not record occupational information so that the quality of occupational recording for the abstraction could be assessed. The first of these five special codes is ‘aaillegitimate’. This code was entered where there was a good reason to believe that the infant was illegitimate. Sometimes, such information was not recorded, and the general injunction in these cases was to assume illegitimacy if no father were named, even if the mother was described as a widow. The second code is ‘aanother parish - no occupation’. It was not uncommon for families to baptise their children in churches other than their established parish church, and in such cases the parish clerk did not always attribute an occupation to the father in question. In such cases, this particular code was entered into the abstraction file. The third code is ‘aano occupation specified’. This code was used where no occupation had been specified for the individual in question, or where a title had been given to the father that did not imply any economic activity, such as ‘junior’, ‘younger’, ‘senior’ or ‘elder’. The fourth type of flagged entry is ‘aabaptism without named parents’. Since the issue of the revised *Book of Common Prayer* in 1662, the baptism of adults as well as infants could also be recorded within Anglican parish registers, and in the former case it was common for the names of the parents to be omitted. The greatest incidence of these cases was probably in the late seventeenth and early eighteenth centuries, but they are relatively common at all times. Finally, the fifth such entry was ‘aunreadable’. This code was used if the recorded occupation was indecipherable.

Table 1: Frequencies with which baptism codes were utilized for the parish register occupational abstractions of England and Wales between 1813 and 1820

Baptism code	England		Wales		England and Wales	
	<i>N</i>	<i>per cent</i>	<i>N</i>	<i>%</i>	<i>N</i>	<i>%</i>
(1) baptism without named parents	668	0.03	31	0.02	699	0.03
(2) illegitimate	120,636	4.79	6,075	4.52	126,711	4.78
(3) other parish - no occupation	876	0.03	99	0.07	975	0.04
(4) unreadable	2,595	0.10	78	0.06	2,673	0.10
(5) no occupation specified	7,116	0.28	284	0.21	7,400	0.28
Total	131,892	5.24	6,567	4.88	138,459	5.22
<i>All baptisms</i>	<i>2,517,109</i>	<i>100</i>	<i>134,495</i>	<i>100</i>	<i>2,651,604</i>	<i>100</i>

Source: 1813-20 Parish Register abstractions database.

Table 1 reports the frequencies of these five classes of events for England and Wales. The overwhelming majority of these types of events were the baptisms of illegitimate children, though there were also a substantial number of cases where no occupation was specified, or where the record was illegible. It is also worth noting that a very important by-product of the parish register database is the opportunity to calculate illegitimacy ratios for every registration unit in England and Wales between 1813 and 1820. As can be seen from the fifth row ‘no occupation specified’, across England and Wales as a whole, only 0.28 percent of baptisms did not attract an occupation without, so to speak, good reason. The flagged events were used to calculate a ‘percentage completeness score’ for each abstraction, to ensure that the recording of occupations was sufficiently complete for it to be reliable. The score was calculated as the percentage of all baptisms that provided this information after

discounting cases (lines (1) to (4)) where the entry took a form that precluded its use as a source of occupational information.¹²

If the abstraction as a whole generated a value for the percentage completeness score that was less than 95, the computer script would then search for a combination of years that would yield a value in excess of 95. Where it was obvious that the eight years between 1813 and 1820 would not yield an abstraction that would satisfy this criterion, the abstraction was continued for some years after 1820. In such cases if the abstraction included less than 200 events, the script searched for the combination of eight calendar years that would satisfy the completeness test. If the abstraction was greater than 200 events, the script searched for the greatest number of calendar years that would satisfy the test within the period abstracted (normally 1813-20). In both cases, any gap between the years that were converted from the raw abstraction into the compiled form had to be no more than five years, and the overall interval between the first and last extracted years had to be no more than 16 years. In practice however, very few years were excluded, and the overwhelming majority of abstractions covered the period between 1813 and 1820.¹³

In total, 10,376 baptism registers maintained by a variety of institutions observing the rites of the Church of England were abstracted for England, and 988 were abstracted for Wales.¹⁴ A small number of registers had to be omitted for a variety of reasons, ranging from the destruction of the register combined with the failure of the bishops' transcripts to survive, to deficient occupational recording, to an inability to track down the location of the surviving registers. In the end, some 25 registers could not be abstracted for England;¹⁵ the equivalent figure for Wales was three.¹⁶ The areas omitted contained a mere 0.14 percent of the English population and 0.15 per cent of the Welsh population. It should also be noted that some of these registers *probably* did not record legitimate baptisms, such as the Foundling Hospital in London; or were preoccupied with burial registration due to the demographics of the institution, as Morden College in Kent or the Middlesex Hospital.

Nationally, there was one instance where a large parish exhibited severely deficient registration of male occupations between 1813 and 1820. The parish of St Marylebone (Middlesex) had seriously defective occupational recording during the years between 1813 and 1820. Most of the entries simply described the father of the child at baptism as an 'artisan', 'mechanic', or as a 'tradesman', terms which are simply too vague to be allocated to anything other than the most general economic sectors. This potentially posed a serious problem, as this parish contained a considerable proportion of the entire population of

¹² This score was calculated as follows. If t is the total number of events, n is the number of events where no occupation was specified, b is the number of baptisms without named parents, i is the number of illegitimate baptisms, o is the number of baptisms of children from other parishes where no occupation is recorded for the father, and u is the number of unreadable events, the percentage completeness score C is returned by the following equation:

$$C = 100 \times \left[1 - \left(\frac{n}{t - (b + i + o + u)} \right) \right]$$

¹³ Of the 11,364 abstractions, 10,781 (or 94.9 per cent) covered the years between 1813 and 1820.

¹⁴ Following the usual convention, Monmouthshire is here treated as part of Wales.

¹⁵ These parishes were: Little Kimble (Buckinghamshire); Tyringham (Buckinghamshire); Scilly Isles (Cornwall); Ashbury (Devon); Colchester St Botolph (Essex); Hatfield Broad Oak (Essex); Hurstbourne Tarrant (Hampshire); Vernhams Dean (Hampshire); Morden College (Kent); Ragdale (Leicestershire); Grasby (Lincolnshire); The London Foundling Hospital (Middlesex); The Chapel Royal, Tower of London (Middlesex); Middlesex Hospital (Middlesex); The Precinct of the Savoy (Middlesex); Canons Ashby (Northamptonshire); Furtho (Northamptonshire); Kirkhaugh (Northumberland); Crewkerne (Somerset); Lufton (Somerset); Willisham (Suffolk); Hurstpierpoint (Sussex); Kingswood (Wiltshire); Whitsbury (Wiltshire).

¹⁶ Namely Llanerchymedd (Anglesea), Llanddeusant (Carmarthenshire), and Uzmaston (Pembrokeshire).

Middlesex during the early nineteenth century.¹⁷ Fortunately, by the late 1820s, occupational recording had become sufficiently descriptive to permit abstraction. However, by this time, the parish had acquired four new churches to cover this area, namely All Souls Langham Place (1825), Christchurch Cosway Place (1825), St Mary Bryanstone Square (1825) and Holy Trinity Albany Street (1828). All five registers were abstracted for the years 1828 through to 1835, and these data were then used to estimate the occupational structure of St Marylebone in 1817. While this is imperfect in some ways – the abstractions record clear references to early members of the Metropolitan Police for instance, a body not created until 1828 – it is clearly preferable to simply omitting this important location due to imperfect data. In addition, for a variety of reasons, some 35 English registers and seven Welsh registers were abstracted for years exclusively in the 1820s and 1830s.¹⁸ In the end, a total of 2,213,734 baptisms were abstracted into the final database. Once corrected for abstractions of unequal length and for the sampling procedures for larger parishes described above,¹⁹ this gives a figure of 2,651,604 ‘effective’ baptisms. This is remarkably close to the total of 2,648,246 baptisms for these years returned by the parish register abstract included within the 1831 census report. The latter is a mere 3,348 events fewer than the total effective baptisms in the parish register database,²⁰ a percentage difference of only 0.13 per cent.

In all, some 14,570 different occupational titles were abstracted. The single most common occupation recorded was that of ‘labourer’ accounting for 28.1 per cent of all entries. There is of course a long ‘tail’ of titles with 7,701 that only appear once, and 2,058 that only appear twice. Many of these titles were formulations that possessed a huge capacity for variation due to the type of detail that they recorded. The most common examples were military titles that recorded both the rank and the unit of the individual, such as ‘lieutenant 25th dragoons’. A similar cause of variation was individuals who were recorded as possessing multiple occupations, such as ‘labourer and weaver.’²¹ However, there were also a few occasions where variation was exacerbated by the idiosyncrasies of the compiler of the parish register.²² Of course, these various titles need to be coded to a standardised system if they were to be useable, and this was done to the PST scheme developed by Wrigley.²³ Ros

¹⁷ The population of the parish of St Marylebone was 75,624 in 1811, or 7.9% of Middlesex’s population of 953,276 at this time. This rose to 96,040 or 8.4% of the total population of 1,144,531 that was enumerated for Middlesex in 1821. The omission of this location would have been similar to excluding between three and four towns of a comparable size to Preston in Lancashire, whose population stood at 19,258 in 1811 and 27,300 in 1821.

¹⁸ The English registers were: Dunton (Buckinghamshire); West Wycombe (Buckinghamshire); Evershot (Dorset); Hamworthy (Dorset); Nazeing (Dorset); Winchester Cathedral (Hampshire); Brockhampton (Herefordshire); Burghill (Herefordshire); St Lawrence in Thanet (Kent); Blackburn St Paul (Lancashire); Bury St John (Lancashire); Chorlton on Medlock All Saints (Lancashire); Claughton (Lancashire); Ellel (Lancashire); Garstang St Thomas (Lancashire); Walmsley (Lancashire); Walney (Lancashire); Freeby (Leicestershire); Kirkby Green (Lincolnshire); Lincoln St Michael on the Mount (Lincolnshire); North Witham (Lincolnshire); Scot Willoughby (Lincolnshire); Greenford (Middlesex); Adstone (Northamptonshire); Brington (Northamptonshire); Dallington (Northamptonshire); Fawsley (Northamptonshire); Wheatfield (Oxfordshire); Misterton (Somerset); North Newton (Somerset); Dunwich All Saints (Suffolk); Stanton St John the Baptist (Suffolk); Lambeth Lying-in Hospital (Surrey); Broad Chalke (Wiltshire); and Cundall (Yorkshire North Riding). The Welsh registers were: Dyffryn Honddu (Brecknock); Capel Cynon (Cardiganshire); Broughton (Flintshire); Aberdare (Glamorganshire); Llanwonno (Glamorganshire); Llanbadock (Monmouthshire); and St Harmon (Radnorshire).

¹⁹ See pp. 4-5 above.

²⁰ See *1831 Census: Enumeration abstract*, vol. I, p. xxx.

²¹ Just under 10,000 out of 2.2 million events (i.e. less than 0.5 per cent) referred explicitly to individuals with more than one occupation recorded. For present purposes only the first cited occupation was coded to PST.

²² The most striking example of this is apparent in the baptism register of the parish of Middleton, near Kings Lynn in Norfolk. From 1818 through to 1820, a series of rather flippant occupational titles are recorded in the parish register, namely ‘cabbage gelder’, ‘chopper of chips’, ‘farmer and fortune hunter’, ‘crust burner’, ‘master of the rolls and burn crust’ (both the latter two titles clearly refer to bakers), ‘nobleman and good workman’, ‘turn coat and knight of the needle’ (a tailor), ‘turnip topper’, and the splendid ‘publican and beggar maker’. The exceptionality of this case should reassure as regards the overall reliability of the occupational titles, as this is the only instance where the parochial minister or clerk was clearly attempting to enliven the drudgery of record keeping.

²³ See Wrigley, ‘The PST system’.

Davies and Wrigley, acting in consort, performed the actual coding of all the occupational descriptors to the PST system.

II

If the occupational data taken from parish registers are to be trusted as a reliable source for the estimation of occupational structure, it is essential to compare them with other evidence from the documentary record. While there is no national census of male occupations available before the 1841 census, there are many documents, compiled for a variety of purposes that list the occupations of adult males before the advent of the census enumerators' books. Where such sources exist sufficiently close in time to the years between 1813 and 1820, the parish register data can be compared with these sources. Tables 4 and 5 below report the results of two such exercises. The *posse comitatus* listing for Buckinghamshire that was compiled during 1798 is an individual-level listing that records the occupations for that county of all men aged between 15 and 59, and was created as a consequence of the 1798 Defence Act.²⁴ In addition, a muster roll survives for the wapentake of Staincliffe and Ewcross in the West Riding of Yorkshire. This, again, is a listing of the names and occupations of men aged between 17 and 55 for a significant swathe of northern England, created in response to another piece of legislation concerned with the defence of the realm.²⁵ As both of these sources are close in time to the 1813-20 parish register abstractions, it is unlikely that their occupational structures would have changed so rapidly as to render direct comparison problematic.

Table 4: Comparing the estimates of occupational structure for Buckinghamshire generated from the Posse comitatus of 1798 and the 1813-20 parish register abstractions

Sector	1798 Posse Comitatus		1813-20 Parish register abstractions	
	N	%	N	%
Primary	2,599	11.4	2,983	10.0
Secondary	5,151	22.5	6,769	22.8
Tertiary				
Dealers	188	0.8	267	0.9
<i>Sellers</i>	373	1.6	488	1.6
<i>Services and professions</i>	1,145	5.0	1,716	5.8
<i>Transport and communications</i>	218	1.0	369	1.2
Total Tertiary	1,924	8.4	2,840	9.5
Labourers	9,287	40.6	16,809	56.5
Servants	3,930	17.2	340	1.1
TOTAL	22,891	100	29,741	100

Source: 1813-20 Parish Register abstractions database; 1798 Buckinghamshire *posse comitatus*.

Table 4 compares the data for Buckinghamshire for 1798 and 1813-20. Both datasets have been coded using the PST system of occupational classification, with two exceptions. Since a large number of the men in the *posse comitatus* were described as 'servant' or 'labourer', there is some difficulty in being able to attribute them directly to a particular sector of economic activity.²⁶ A similar problem exists with the large number of fathers of children who were described as 'labourers' in baptism registers. The ages of men covered by

²⁴ The act in question was 38 Geo. III c. 27.

²⁵ The particular piece of legislation was the Defence Act of July 1803 (43 Geo. III c. 96). The listing for Staincliffe and Ewcross has been published as *The Craven muster roll of 1803*.

²⁶ Ros Davies undertook the coding of all the occupational titles from the five sources discussed in this section, namely: the Buckinghamshire *posse comitatus* of 1798; the Staincliffe and Ewcross muster roll of 1803; the 1813-20 and 1829-36 parish register abstractions; and the printed tables of male occupations drawn from the 1841 census.

the baptism registers and the *posse comitatus* are also sufficiently distinct to ensure that large numbers of males under the age of 20 would have been enumerated in the latter but not in the former. This population would include large numbers of unmarried servants who would simply not appear within the pages of parish registers, save as the very small number of instances where it was recorded that they had fathered an illegitimate child.

Notwithstanding this important structural difference between the two different sources, the degree to which they agree is remarkable. The similarity in size of the primary, secondary, and the constituent elements of the tertiary sector is very good indeed. Additionally, even though there is significant disagreement between the sizes of the servant and labourer sectors between the two sources, when combined, they comprise almost exactly the same share of the overall male workforce. While around forty per cent of men in 1798 are described as labourers and seventeen per cent described as servants in the *posse comitatus*, fifty seven per cent of men are described as labourers and a mere one per cent are described as servants in the parish registers. In a rural county like Buckinghamshire the vast majority of male labourers and male servants would have worked in agriculture. The discrepancy between the two agricultural components appears merely to reflect the fact that agricultural servants were more important in the younger age groups well covered by the *posse comitatus* than in the older age groups covered by the parish registers.

On the whole, then, this comparison is very encouraging. However, there are two areas where the estimates provide cause for concern. The borough of Chesham has a marked discrepancy between the estimates from the parish registers and from the *posse comitatus* listing. The former source returns estimates of an occupational structure that is more agricultural than is suggested by the latter.²⁷ Further investigation showed that the crude baptism rate for Chesham between 1813 and 1820 was around 10.9 baptisms per thousand, significantly lower than the usual value of around 30 per thousand that is generally found in Buckinghamshire at this time. This town was an important centre of non-conformity, with several congregations of old dissenters present within the town.²⁸ Here, outright rejection of baptism registration within the Anglican church by a large share of the population means that the parish registers are not an ideal guide to the occupational structure of this town, and in some degree must also affect the estimation of the occupational structure for the entire county. However, it is worth emphasising that this is the only parish in Buckinghamshire where baptism registration was seriously defective.

One other small cause for concern relates to the numbers of servants that parish registers identify at the local level. For instance, there are significant differences between the estimates of the size of the servant workforce for the town of Eton that cannot be explained simply by assuming that all servants will become labourers. Between 1813 and 1820, the parish registers imply that 8.4 per cent of the workforce were engaged as servants, while the figure from the *posse comitatus* is 16.9 per cent; it is unlikely that the majority of these individuals were servants in husbandry since it is probable that they were employed at Eton school.²⁹ No other settlement in the county suffered from a similar problem.

The evidence from Buckinghamshire strongly suggests that estimates based upon parish registers are sound, with two possible caveats. Firstly, vagaries in registration quality make it essential to include a weighting system that ensures that each community contributes to the overall estimate of occupational structure in proportion to its size, even if the baptism

²⁷ The parish register gives the following occupational breakdown: 19% primary, 27% secondary, 13% tertiary, 42% labourers and 0% servants. In contrast, the *posse comitatus* gives the following breakdown: 10% primary, 39% secondary, 8% tertiary, 31% labourers and 11% servants.

²⁸ 'Parishes: Chesham', in Page (ed.), *A history of the County of Buckingham*, pp. 203-218.

²⁹ This community was dominated by Eton College, and there were very close links between the college and the church. The college was the custodian of the parish register, while the chapel acted as the parish church for the town, and the provost of Eton College was the *de facto* rector of the parish of Eton.

register for that community does not provide a completely reliable guide to its occupational structure. The second point is that while parish registers and the *posse comitatus* gave a very good agreement between the combined totals of labourers and servants, it is doubtful whether this holds true at the local level in places where there were significant numbers of servants not engaged in agricultural activities.

The evidence for the wapentake of Staincliffe and Ewcross supports these broad findings.³⁰ The 1803 militia list for this part of the West Riding of Yorkshire covered a great deal of the area of Craven, but also covered parts of Lonsdale. A couple of townships in the list had to be eliminated as they formed part of parishes that extended over the border into neighbouring wapentakes in the West Riding, or into Lancashire, ensuring that it was not possible to make an exact like-for-like comparison. Additionally, another four parishes had to be excluded, as the quality of registration in the militia list did not meet the five per cent rule.³¹ Twenty-two parishes remained to enable a direct comparison between parish registers and the militia listing, and the results are presented in table 5.³²

Table 5: Comparing the estimates of occupational structure for Staincliffe and Ewcross wapentake in the West Riding of Yorkshire generated from the muster roll of 1803 and the 1813-20 parish register abstractions

Sector	1803 Militia List		1813-20 Parish register abstractions	
	<i>N</i>	%	<i>N</i>	%
Primary				
Agriculture	1,543	23.0	2,513	25.5
<i>Mining and quarrying</i>	194	2.9	319	3.2
<i>Other Primary</i>	3	0.0	6	0.1
Total Primary	1,740	26.0	2,838	28.8
Secondary	3,358	50.1	5,362	54.5
Tertiary				
<i>Dealers</i>	36	0.5	69	0.7
<i>Sellers</i>	78	1.2	119	1.2
<i>Services and professions</i>	209	3.1	357	3.6
<i>Transport and communications</i>	42	0.6	69	0.7
Total Tertiary	365	5.4	614	6.2
Labourers	770	11.5	945	9.6
Servants	471	7.0	85	0.9
TOTAL	6,704	100	9,844	100

Source: 1813-20 Parish Register abstractions database; 1803 Staincliffe and Ewcross muster roll.

Again, the overall fit between the totals from the militia list and the parish registers is encouraging. While there are some discrepancies, most of this is a consequence of the problems associated with labourers and servants. If these are excluded from the calculation of percentages, the correspondence between the two sources is excellent.³³ In addition, the correlation in the proportions of the workforce that were described in either source as labourers is also very good. It is possible that the labourer/servant discrepancy was due to a tendency for agricultural servants in Yorkshire, as they grew older, to move into the secondary or tertiary sectors or even acquire a farm, rather than to become agricultural

³⁰ See also The Mid-Wharfedale Local History Research Group, 'The Craven muster roll and parish registers', pp. 61-63. This also suggests a very strong degree of agreement between parish register-based estimates and the muster roll.

³¹ These were the parishes of Clapham, Kirkby Malhamdale, Sedburgh, and Skipton.

³² These parishes were: Addingham; Arncliffe; Barnoldswick; Bentham; Bolton near Bolland; Bracewell; Broughton in Craven; Burnsall; Carleton; Gargrave; Giggleswick; Gisburn; Horton in Ribblesdale; Kettlewell; Keighley; Kildwick; Linton; Long Preston; Marton in Craven; Slaidburn; Thornton in Craven; and Thornton in Lonsdale.

³³ If the figures from table 5 are recalculated excluding labourers and servants, the militia list returns an occupational breakdown of 31.9% of men in the primary sector, 61.5% in the secondary sector, and 6.7% in the tertiary sector. The equivalent figures for the 1813-20 parish register estimates are: 32.2% primary, 60.8% secondary, and 7.0% tertiary.

labourers as was probably the case in southern English counties such as Buckinghamshire. In any case, the problem highlighted here with respect to the small number of servants in baptism registers suggests exploring the possibility of devising a method for estimating the proportion of the local workforce aged 20 and over in domestic service independently of the parish registers.

It is also possible to make direct comparisons between data drawn from the 1841 census and abstractions drawn from parish registers before the introduction of civil registration in 1837.³⁴ Firstly, the occupations of fathers at the baptism of their children as recorded within parish registers were abstracted for a sample of communities from across England and Wales for the years 1829 through to 1836.³⁵ Secondly, data on male occupations for individuals aged 20 and over were collected from census enumerators' books for the rural communities in the 1829-36 baptism register sample. Thirdly, occupational data for males 20 and over were collected from the printed return for the 1841 census for the urban centres in the 1829-36 baptism register sample. This allows us to compare the occupational structures derived from the baptism registers 1829-36 with those taken from the census in 1841 for a sample of rural and urban communities.

³⁴ We have avoided making use of parish registers following the introduction of civil registration in 1837 because it is possible that this produced all kinds of unknown social biases in the parish registers.

³⁵ This was a non-random sample which was chosen so as to include a range of urban and rural parishes in both the industrial north-west and in south-east England.

Table 6: Comparing the estimates of occupational structure for 27 rural communities from the 1841 printed census and 1829-36 parish register abstractions

Sector		1813-20 Parish register abstractions		1831 Census enumeration abstract		1829-36 Parish register abstractions		1841 Census enumerators books	
		N	%	N	%	N	%	N	%
		Primary	<i>Agriculture</i>	1,569	28.5	1,334	22.9	1,149	19.6
	<i>Mining and quarrying</i>	26	0.5	–	–	11	0.2	32	0.6
	<i>Other Primary</i>	59	1.1	–	–	69	1.2	56	1.0
	Total Primary	1,654	30.1	–	–	1,229	20.9	1,125	20.7
Secondary		1,129	20.5	–	–	1,224	20.9	1,059	19.5
Tertiary	<i>Dealers</i>	20	0.4	–	–	21	0.4	41	0.8
	<i>Sellers</i>	44	0.8	–	–	59	1.0	85	1.6
	<i>Services and Professions</i>	197	3.6	–	–	216	3.7	231	4.3
	<i>Transport and Communications</i>	65	1.2	–	–	162	2.8	91	1.7
	Total Tertiary	326	5.9	–	–	457	7.8	448	8.3
Labourers		2,344	42.6	2,868	49.2	2,924	49.8	2,353	43.4
Servants	<i>servants in husbandry</i>	11	0.2	–	–	0	0.0	438	8.1
	<i>domestic servants</i>	35	0.6	66	1.1	34	0.6		
	Total servants	46	0.8	66	1.1	34	0.6	438	8.1
Total		5,499	100	5,834	100	5,868	100	5,423	100

Source: 1829-36 Parish Register abstractions database; 1841 sample of census enumerators' books.

Table 6 reports the results of this exercise for the rural parishes. Data from 27 communities in England and Wales are included, the majority of which were drawn from Lancashire and the West Riding of Yorkshire.³⁶ The table also compares the returns from the 1841 census and the 1829-36 parish register abstractions with the relevant returns from the 1831 census and the 1813-20 parish register abstractions for the same locations. Once again, the overall degree of fit between the sizes of the primary, secondary, and tertiary sectors is very good.³⁷ However, in the 1841 CEBs it is not possible to distinguish directly between domestic servants and servants in husbandry hence these are shown as a combined category.³⁸ It is clear from the comparison with 1831 that the great bulk of the 8.1 per cent of men enumerated as servants in 1841 must have been servants in husbandry. As in Buckinghamshire, the combined totals of labourers and servants agree quite well between the two sources. On the whole the general fit between the two sources is encouraging. The general growth of the tertiary sector between 1813-20, 1829-36, and 1841 is also notable.

³⁶ The rural parishes included in this sample are: Wing (Buckinghamshire); Carlton cum Willingham (Cambridgeshire); Llangynfelin (Cardiganshire); Sennen (Cornwall); Castle Heddingham (Essex); Colmer (Hampshire); Staplehurst (Kent); Altcar, Halsall, Heysham, Maghull, Marton, Melling cum Cunsough, Poulton le Fylde, Rufford, and Tunstall (all in Lancashire); Wymeswold (Leicestershire); Coleby (Lincolnshire); Penallt (Monmouthshire); Badsey (Worcestershire); and Arncliffe, Brayton, Church Fenton, Drax, Goldsborough, Halton Gil, and Ryther (all in the West Riding of Yorkshire).

³⁷ A large number of individuals appear within the 1841 census enumerator's books with the occupational title 'independent'. This title is open to multiple interpretations, and has been excluded from the analyses presented in tables 6 and 7.

³⁸ In subsequent censuses the distinction was made clear in the CEBs. In 1841 inferences could be made based on the occupation of the household head but we have not attempted to do so here.

Table 7: Comparing the estimates of occupational structure for 8 urban communities from the 1841 census report and 1829-36 parish register abstractions

Sector		1813-20 Parish register abstractions		1831 Census enumeration abstract		1829-36 Parish register abstractions		1841 Census printed returns	
		N	%	N	%	N	%	N	%
Primary	<i>Agriculture</i>	628	2.9	301	1.0	908	2.9	757	2.1
	<i>Mining and quarrying</i>	904	4.1	–	–	843	2.7	480	1.3
	<i>Other Primary</i>	29	0.1	–	–	20	0.1	40	0.1
	Total Primary	1,561	7.1	–	–	1,771	5.7	1,277	3.5
Secondary		13,241	60.3	–	–	19,087	61.6	22,504	61.0
Tertiary	<i>Dealers</i>	407	1.9	–	–	576	1.9	1,049	2.8
	<i>Sellers</i>	610	2.8	–	–	1,162	3.7	1,838	5.0
	<i>Services and Professions</i>	2,088	9.5	–	–	2,809	9.1	3,515	9.5
	<i>Transport and Communications</i>	1,075	4.9	–	–	1,451	4.7	1,144	3.1
	Total Tertiary	4,180	19.0	–	–	5,998	19.3	7,546	20.5
Labourers		2,612	11.9	4,576	15.2	3,606	11.6	4,594	12.5
Servants	<i>servants in husbandry</i>	2	0.0	–	–	5	0.0	963	2.6
	<i>domestic servants</i>	357	1.6	523	1.7	541	1.7	963	2.6
	Total servants	359	1.6	523	1.7	546	1.8	963	2.6
Total		21,953	100	30,074	100	31,008	100	36,884	100

Source: 1813-20 Parish Register abstractions database; 1841 Census Report of England, Wales, and Scotland town occupations.

The results for the comparisons for the group of eight urban communities are presented above as table 7.³⁹ In a similar vein to the results for table 6, the general degree of agreement between the parish register abstractions and the printed census returns for the primary, secondary, and tertiary sectors is very good. The tertiary sector is again somewhat smaller in the returns from the parish register abstractions in comparison with the data from the census, though the sum of the labourer and servant fractions of the occupational structure is very good. In both tables 6 and 7, the biggest single difference between the census and the parish registers lies with the treatment of servants and labourers. The misallocation of servants in husbandry to the tertiary sector in the published 1841 census has been noted by Wrigley in earlier work comparing the 1841 and 1851 censuses.⁴⁰ However, when summed, the total number of labourers and servants listed in the 1841 census approximates very closely to the proportional shares derived from the parish register abstractions. The estimates of occupational structure presented by both parish registers and census material suggest that more unites them than divides them.

All this serves as a reminder that there are very few ‘perfect’ sources for the study of male occupational structure; all have inherent biases. Militia records possess age-truncation biases through excluding men over the age of 45, 50, or 60 (depending on the class of list), while including men at a stage of the life-cycle where they were engaged in occupations associated with being unmarried, such as service. The rules governing the collection of occupational information for the manuscript census returns from 1841 onwards may well have introduced problems in how to interpret particular occupational titles. No one source can be regarded as being authoritative; however, in spite of the problems that one might suspect from the use of parish registers, the estimates of occupational structure that can be derived from them appear to be sound and reliable.

³⁹ The following eight towns and boroughs constitute the urban group: Cambridge (Cambridgeshire); Hertford (Hertfordshire); Huntingdon (Huntingdonshire); Preston and Wigan (both in Lancashire); Northampton (Northamptonshire); and Doncaster and Huddersfield (Yorkshire West Riding).

⁴⁰ For example, the 1841 Census seems to have over-enumerated the number of domestic servants by including servants in husbandry within this group. See Wrigley, ‘The occupational structure of England in the mid-nineteenth century’, pp. 155-7.

III

The evidence presented by the previous section indicated that the proportions of occupational titles for fathers at the baptism of their children provide a reliable guide to their relative contribution to the overall occupational structure, provided that some precautions are taken. Accordingly, this section will describe how the raw data from the abstracted baptisms were converted into an estimated ‘census’ of male occupations for 1817. There are seven stages to this process, which for the sake of convenience are listed below.

1. The removal of baptisms that do not relate to male occupations
2. The calculation of an appropriate population weight for each 1817 registration unit
3. The independent estimation of the number of servants in each 1817 registration unit
4. The attribution of registration units to 1851 registration districts
5. The estimation of economically inactive men in 1817
6. The distribution of remaining men to each occupational title in 1817
7. The distribution of non-specific labourers to the primary, secondary and tertiary sectors of economic activity.

Stages 1 through to 6 will be discussed in this section. The considerations that govern the reallocation of labourers are discussed in the next section.

The first and most obvious correction relates to the baptisms that do not refer to legitimate marital fertility, or are problematic in some other way, such as where no occupation is specified or where the record refers to the baptism of an adult. This is also the simplest correction to make, as all these records were given their own particular data entry codes and are thus readily identifiable. Since the basic principle is that the *ratios* of different occupations to each other give an indication of occupational structure, the most straightforward solution is simply to remove these records from further consideration.⁴¹

The next assumption that requires consideration relates to the quality of registration within each locality. The potential risk of under-registration caused by clerical negligence, religious non-conformity, or simply the breakdown of the parochial system of registration in rapidly growing parts of the country could cause biased estimates of occupational structure as different communities are aggregated together. For instance, consider the example of two parishes possessing similar sizes and demographic parameters, one of which is engaged primarily in weaving, while the other is largely agricultural. If, due to poor registration, the weaving parish only recorded half as many events in the parish register as the agricultural community, the result would be to over-state the importance of the latter at the expense of the former.

Tables 8 and 9 detail the estimated crude baptism rates using the total number of baptisms before the removal of the specially coded baptisms, as well as the sizes of the county populations in the 1811 and 1821 census for England and Wales.⁴² An ‘average’ population for the years between 1813 and 1820 was computed by finding the annual growth rate between these two years, generating a series of population totals for the years 1813 to 1820 inclusive, and then calculating the arithmetic mean of these values. The results show that there is a reasonable degree of similarity between the English counties, although there is a considerable range, with Lincolnshire registering the highest crude baptism rate at 34.4 per

⁴¹ This was implemented by simply re-specifying the adjusted number of baptisms on all these classes of events to zero within the parish register database.

⁴² The total number of baptisms here refers to the number once those registers which were sampled had been re-weighted.

1,000, while the lowest is Northumberland with a rate of 25.5 per 1,000. Of course the crude baptism rate makes no allowance for the age structure of the population, any differences in nuptiality, fertility both outside and inside marriage, or sex ratios. It also differs from a crude *birth* rate because it does not take into any account the differences in under-registration caused by lengthening delays between birth and baptism and different degrees of adherence to the Church of England. Even so, the implication here is that Lincolnshire would be over-represented within the parish register database, and Northumberland would be under-represented if we used the data raw without any population re-weighting.

Table 8: Comparing the estimated population with the number of abstracted baptisms for each English county between 1813 and 1820

County	Total baptisms abstracted	Total adjusted baptisms	Population 1811	Population 1821	Estimated average population 1813-20	Crude baptism rate (per '000)
Bedfordshire	18,978	18,978	70,213	83,716	77,408	30.6
Berkshire	30,955	30,955	118,277	131,977	125,666	30.8
Buckinghamshire	30,431	30,431	117,650	134,068	126,471	30.1
Cambridgeshire	30,011	30,011	101,109	121,909	112,169	33.4
Cheshire	52,285	60,233	227,031	270,098	249,988	30.1
Cornwall	60,932	63,567	216,667	257,447	238,410	33.3
Cumberland	36,183	36,183	133,744	156,124	145,715	31.0
Derbyshire	45,728	45,728	185,487	213,333	200,422	28.5
Devonshire	90,919	104,067	383,308	439,040	413,222	31.5
Dorsetshire	32,689	32,689	124,693	144,499	135,301	30.2
Durham	35,988	46,546	177,625	207,673	193,693	30.0
Essex	63,674	64,633	252,473	289,424	272,304	29.7
Gloucestershire	65,910	73,823	285,514	335,843	312,398	29.5
Hampshire	59,386	71,158	245,080	283,298	265,560	33.5
Herefordshire	22,322	22,322	94,073	103,243	99,033	28.2
Hertfordshire	29,203	29,203	111,654	129,714	121,323	30.1
Huntingdonshire	10,999	10,999	42,208	48,771	45,725	30.1
Kent	89,373	108,612	373,095	426,016	401,517	33.8
Lancashire	122,367	219,331	828,309	1,052,859	946,555	29.0
Leicestershire	36,029	37,894	150,419	174,571	163,352	29.0
Lincolnshire	72,175	72,175	237,891	283,058	261,967	34.4
Middlesex	95,522	233,029	953,276	1,114,531	1,039,507	28.0
Norfolk	79,954	85,220	291,999	344,368	319,959	33.3
Northamptonshire	34,685	34,685	141,353	162,483	152,687	28.4
Northumberland	37,968	38,030	172,161	198,965	186,525	25.5
Nottinghamshire	38,764	40,839	162,900	186,873	175,764	29.0
Oxfordshire	32,828	32,828	119,191	136,971	128,729	31.9
Rutland	4,138	4,138	16,380	18,487	17,514	29.5
Shropshire	47,315	47,315	194,298	206,153	200,750	29.5
Somerset	75,631	75,631	303,180	355,314	331,047	28.6
Staffordshire	74,870	86,990	295,153	345,895	322,276	33.7
Suffolk	61,859	61,859	234,211	270,542	253,682	30.5
Surrey	50,891	82,705	323,851	398,658	363,478	28.4
Sussex	52,906	55,920	190,083	233,019	212,845	32.8
Warwickshire	42,977	61,598	228,735	274,392	253,036	30.4
Westmorland	11,067	12,254	45,922	51,359	48,853	31.4
Wiltshire	48,216	48,216	193,828	222,157	209,032	28.8
Worcestershire	42,882	44,439	160,546	184,424	173,356	32.0
Yorkshire City and Ainsty of York	6,616	6,616	27,304	30,451	29,001	28.5
Yorkshire East Riding	32,698	36,894	134,437	154,010	144,943	31.8
Yorkshire North Riding	41,093	42,488	169,391	187,452	179,146	29.6
Yorkshire West Riding	129,822	175,878	655,042	801,274	732,594	30.0
TOTAL	2,079,239	2,517,109	9,489,761	11,164,459	10,382,919	30.3

Source: 1813-20 Parish Register abstractions database. Wrigley, *The early English censuses*, p.46.

Table 9: Comparing the estimated population with the number of abstracted baptisms for each Welsh county between 1813 and 1820

County	Total baptisms abstracted	Total adjusted baptisms	Population 1811	Population 1821	Estimated average population 1813-20	Crude baptism rate (per '000)
Anglesey	7,857	7,857	37,045	45,063	41,302	23.8
Brecknock	6,407	6,407	37,735	43,603	40,880	19.6
Cardiganshire	10,346	10,346	50,260	57,784	54,296	23.8
Carmarthenshire	12,100	12,100	77,217	90,239	84,181	18.0
Carnarvonshire	9,927	9,927	49,336	57,958	53,943	23.0
Denbighshire	15,485	15,485	64,240	76,511	70,780	27.3
Flintshire	12,262	12,262	46,518	53,784	50,411	30.4
Glamorgan	15,845	15,845	85,067	101,737	93,944	21.1
Merionethshire	5,386	5,386	30,924	34,382	32,790	20.5
Monmouthshire	10,369	10,369	62,127	71,833	67,328	19.3
Montgomeryshire	11,471	11,471	51,931	59,899	56,202	25.5
Pembrokeshire	12,162	12,162	60,615	74,009	67,721	22.4
Radnorshire	4,878	4,878	20,900	22,459	21,747	28.0
TOTAL	134,495	134,495	673,915	789,261	735,524	22.9

Source: 1813-20 Parish Register abstractions database.

A more serious difference exists between the English counties as a group and their Welsh counterparts. Table 9 shows that the crude baptism rate for Wales is 22.9 per 1,000, a significantly lower rate than for England as a whole (30.3). It is worth pointing out that two Welsh counties have crude rates that are in line with many English counties. Flintshire has a rate of 30.4, while Radnorshire records a respectable 28.0. However, the only other county that exceeds the rate for Northumberland, the English county with the lowest rate, is Denbighshire, while Montgomeryshire manages a tie. All the other Welsh counties exhibit implausibly low rates, especially within the counties of South Wales, namely Carmarthenshire, Glamorgan, Brecknock, and Monmouthshire. This region covered the rapidly industrialising coal mining and metal working communities that are associated with the industrial revolution in Wales, and so the implication must be that these would be under-represented in an uncorrected parish register database.⁴³ The rates for the more agrarian counties of West and North Wales are generally not quite as depressed as one might expect given the role these counties played in the Welsh evangelical revival of the late eighteenth and nineteenth centuries. Nonetheless, the rates are very much on the low side in comparison with what one would expect in a rural English county at this time.

It seems clear that to rely on unadjusted totals of baptisms could result in a significant source of error when attempting to estimate the overall occupational structure of England and Wales. What is clearly required is a means of *weighting* the individual contributions of each parish to ensure that problems induced by differences in registration patterns do not cause biased estimates. This can be done using data from the census returns published decennially from 1801. These give population totals for each of the 16,000 or so parishes or townships in England and Wales. However, the early census was primarily organised around the units of civil government that administered the poor law, rather than the ecclesiastical jurisdictions of chapelry, parish, archdeaconry and diocese. This means that there was often a less than straightforward 'fit' between the Anglican registration unit and the units for which population data existed.

⁴³ The 1831 census shows that for every male in Wales there were 16.2 in England. The equivalent figure for men over 20 was 16.4 to 1. However, the ratio between baptisms registered in England and those registered in Wales was 18.7 to 1.

The key to addressing these issues was a process we have termed ‘spatial matching.’ The overall aim of spatial matching was to determine which units in different sources referred to the same tract of land, so that the sources could be compared at the lowest possible level of geographical aggregation. In most cases this was achieved by matching each set of units from different sources and/or from different dates to an enriched version of the boundary data generated by Roger Kain and Richard Oliver, and not by direct matches between each source.⁴⁴ Kain and Oliver’s boundary data has the advantage of using base units below the level of individual parishes, often identifying very small plots of land. Starting from such a fine-grained composite base rather than any particular set of parish boundaries allows considerable flexibility in land aggregation or disaggregation.

The parish register codebook units were matched to every polygon representing a distinct land area identified in the enriched Kain and Oliver GIS. This was done by reference to the names and other attribute data attached to both the codebook units and to the GIS polygons. In many cases there was no exact equivalence between one codebook unit and one GIS polygon, but rather multiple codebook units that each formed part of several GIS polygons, and/or *vice versa*. The end result was a two column matrix of GIS polygon identifiers and codebook unit identifiers. Each row in the matrix represented a match. Determining which matches should be made was often a complex task. Part of the matching was automated by Newton, but all of it was checked manually, often in conjunction with a detailed examination of the history of boundary changes where necessary to resolve complex cases. Difficulties arose largely as a consequence of the lack of congruence between the systems of civil and ecclesiastical jurisdictions. The prodigious increase in the numbers of chapelries in northern England and uncertainties over the precise areas of their jurisdiction also complicated matters. Several sources were invaluable in assisting this sometimes tortuous process.⁴⁵

As well as the parish register codebook units, it was also necessary to obtain parish population estimates from the 1831 Census.⁴⁶ This again involved using the enriched Kain and Oliver GIS as an intermediary, but the matches from 1831 Census units to the enriched Kain and Oliver GIS were made in a slightly different and more indirect way than those from codebook units. As a precursor to the exercise, Wrigley had apportioned to each 1831 Census unit the 1851 Census Enumerators’ Number(s), or CEN, to which it belonged. As 1851 CENs are also present as attributes of the GIS polygons in the enriched Kain and Oliver GIS, it was possible to use them to recalculate data from 1831 Census units into clusters of GIS polygons, and thus to compare the same tracts of land expressed as (groups of) 1831 Census units with those expressed as (groups of) codebook registration units. The construction of these mappable units entailed an extra stage of aggregation than if matches from 1831 to GIS polygon had been direct, since the same 1851 CEN is in some cases shared by more than one

⁴⁴ The enriched Kain and Oliver boundary data derived from 173 digital maps produced by Kain and Oliver: Kain and Oliver, *The historic parishes of England and Wales*. The maps were subsequently converted into a single GIS by Burton *et al.*, *GIS of the ancient parishes of England and Wales*. Max Satchell in co-operation with Wrigley, then considerably enriched this resource through a process of editing, checking and addition of more information from the nineteenth century census as part of the two ESRC projects referred to earlier. The work was further aided by an Emeritus Fellowship from the Leverhulme Trust, two British Academy Small Research Grants (SG 40833, SG 42909) awarded to Wrigley, with further funding under the BA Academy’s Research Project scheme awarded to Leigh Shaw-Taylor. The Landmark Group and Edina also made the exercise possible by supplying nineteenth century Ordnance Survey mapping. Further details of this work can be found in Satchell and Wrigley, ‘Areal data’ in Wrigley, *The early English censuses*, pp. 122-54.

⁴⁵ The following sources proved invaluable in performing this record linkage operation: Humphrey-Smith, *The Phillimore atlas and index of parish registers*; Various, *National index of parish registers*, multiple volumes; Youngs, *Guide to the local administrative units of England*, vols. I and II. In addition, the various census enumeration abstracts from the early nineteenth century through to 1851 were very useful.

⁴⁶ These data were drawn from the electronic version of the data presented in Wrigley, *The early English censuses*.

GIS polygon, and some 1831 Census units also share several 1851 CENs. However, a by-product of the exercise was that the GIS polygons were now sufficiently aggregated to enable comparison with other nineteenth Century censuses whose units had been apportioned to 1851 CENs by Wrigley, when constructing a series of continuous population estimates.

Once the set of spatial units used in each source has been matched to the set of polygons representing tracts of land in the enriched Kain and Oliver GIS, those polygons can be grouped into the smallest possible overarching units that the degree of correspondence between the sources will allow. These overarching units can be termed mappable units, since they allow data to be mapped into the same sets of land boundaries. Mappable units were obtained by calculating the transitive closure of the matches between GIS polygons and other units, so that any polygons or units are clustered into the same mappable unit group if and only if they are related, however indirect the relationship may be.⁴⁷ Newton performed this exercise. It is important to understand that the position and area of mappable units as displayed on a map will vary depending on the sources being compared, and that they do not reflect any single land boundary system, or boundary positions at a given point in time. Rather, they depend upon the minimal aggregation of polygons that is necessary to arrive at plots of land that exist as discrete entities in all sources being used. Generally, the greater the difference between the land boundaries in those sources, or the greater the number of sources used, the more aggregation is likely, and the larger mappable units are likely to be.

Once the spatial matching was complete, the size of the populations that were recorded in any of the early nineteenth century censuses could be computed, for mappable unit spatial clusters across the whole of England and Wales.

⁴⁷ Transitive closure is a concept widely used in graph theory; for a formal definition and how to compute it, see for instance: Cormen et al, *Introduction to algorithms*, pp.695-6.

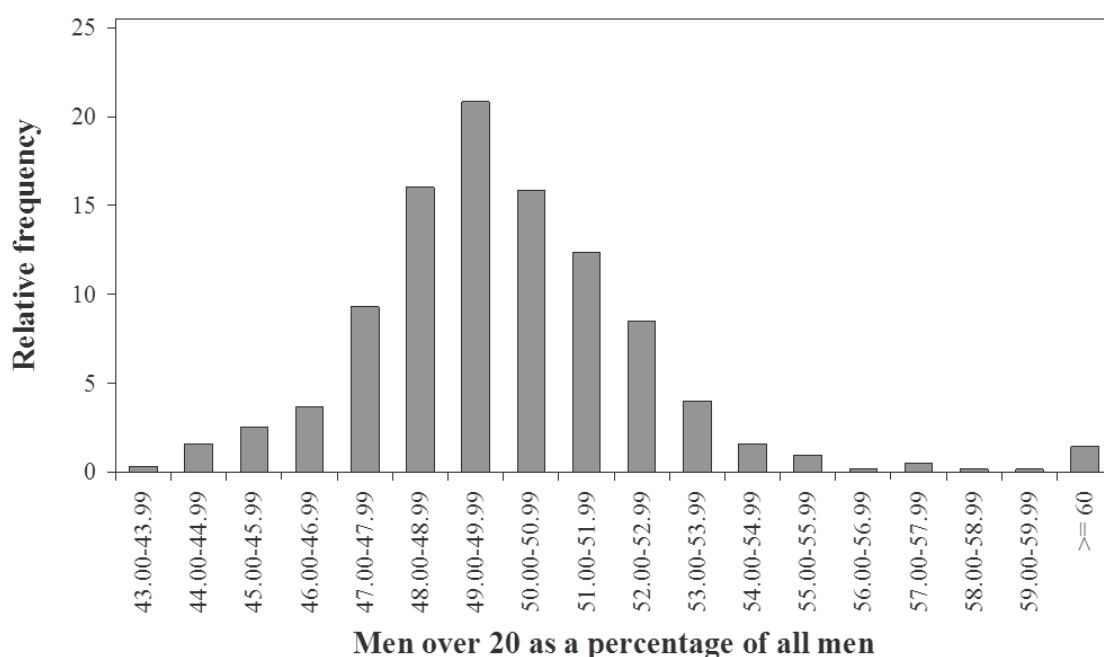
Figure 3: The distribution of sex ratios for the population 20 and over for the 624 registration districts in England and Wales as enumerated by the 1851 Census



Source: 1851 Census

It might be thought that the most obvious value for weighting each registration unit is the size of the population in that unit. However, it must be remembered that it is the occupational structure of the adult male population that is being estimated, rather than the occupational structure of the population as a whole. If simple population totals were used, parts of the country with heavily feminised sex ratios – most notably in London, but also Bath – would make overstated contributions to the overall estimates of the occupational structure. Figure 3 illustrates the degree of variation in the sex ratios of the population aged 20 and over for each of the 624 registration districts of England and Wales as recorded by the 1851 Census. While the majority of registration districts occupy the centre ground with ratios between 90 and 105 adult men per 100 women, some parts of the country have quite extreme patterns. At one extreme, the registration districts of Bath (Somerset), Hampstead, and Kensington (both in London) had adult sex ratios of 61.4, 62.7, and 63.5 respectively. At the other end of the spectrum, Haltwhistle (Northumberland), Merthyr Tydfil (South Wales), Orsett (Essex), and Sheppey (Kent) enumerated adult sex ratios of 125.7, 127.9, 130.0, and 132.1 respectively. The danger of using raw population totals as a weight in these instances is obvious. Fortunately, the early censuses provide a breakdown of the male and female elements of the local population.

Figure 4: The distribution of the proportions of the male population aged 20 and over for the 1831 Census using the 624 registration districts used by the 1851 Census of England and Wales



Source: 1831 Census database.

The other factor that might have a particular bearing upon the accuracy of the weighting placed upon each unit is the age structure of the male population. The later nineteenth century censuses tend to record the occupational breakdowns for those 20 and over and those below twenty years of age, and it would not be surprising to suppose that the proportions of the male population in each category varies considerably. The earliest census to provide information on the number of men above and below the age of 20 is the 1831 census, and figure 4 above depicts the distribution of the proportions of men twenty and over in each of the registration districts used by the 1851 Census. This again shows that while there is a strong grouping of observations with around half of all enumerated males recorded with an age over 20, there are some quite noticeable outliers. At one extreme, the registration district of Falmouth (Cornwall) had only 43.3 per cent of its male population aged over 20, followed closely by Blackburn in Lancashire and Alston (Cumberland) which both recorded 44.0 per cent of the male populations as being above this threshold. At the other end of the spectrum, the metropolitan registration districts of St Martin in the Fields, St George Hanover Square, and St James Westminster yield figures of 65.4 per cent, 65.6 per cent and 67.0 per cent respectively. Indeed, a significant number of registration districts in the greater London area have proportionately more men aged over 20 than is found in the rest of the country.

Again it is clearly desirable to use an estimate of the total number of adult males in each registration unit as the weight to convert the data abstracted from parish registers into national estimates of occupational structure. Unfortunately, the nearest point in time to the years between 1813 and 1820 that provides sufficiently geographically detailed age data to permit this is the 1831 Census. Fortunately, the 1831 census is sufficiently close in time to the years 1813-20 that it should identify any substantial variations in age structure that might have existed at that time. Moreover, it also records the number of adult males 20 and over in each parish, township, or place in 1831. The number of men aged 20 and over was the category used most consistently for reporting the total number of adult males in each

occupational category in the published censuses from 1851-1871. Hence estimating the numbers of men twenty and over here has the helpful consequence that the estimates that are produced are *directly comparable* to the enumerated figures from mid-nineteenth century censuses.

The generation of these estimates of men twenty and over in each registration unit is very straightforward. The first step requires an estimate of a mean male population between 1813 and 1820. The use of the population figures from the 1811 and the 1821 censuses provides the basis for this. If one assumes a constant annual growth rate, then it is possible to estimate the size of the male population for each of the years from 1813 through to 1820; dividing the sum of each of these estimates by eight yields an estimated mean of the male population of the parish during these years. The final step is to estimate the proportion of the population 20 and over. Here, it is possible to use the 1831 census, which enumerates both the total numbers of men, and the number of men aged 20 and over. Multiplying the population estimate by the decimal fraction of these values will then generate a final overall estimate for each unit.⁴⁸

Arithmetically, this procedure may be represented in the following way. The first step is to calculate the annualised growth rate, r , using the numbers of males enumerated in both the 1811 and 1821 census (M_{1811} and M_{1821}). This is described by equation (1).

$$r = \sqrt[10]{\frac{M_{1821}}{M_{1811}}} \quad (1)$$

The second step is then to calculate the mean of the annualised estimates of male population between 1813 and 1820, M_{1817} , which is given by equation (2).

$$M_{1817} = \frac{1}{8} \times \sum_{y=1}^8 M_{1811} r^{y+1} \quad (2)$$

Finally, using the male population size, M_{1831} , and the number of men aged over twenty, A_{1817} , from the 1831 census, the adult male population 20 and over, A_{1817} , can be estimated for 1817.

$$A_{1817} = M_{1817} \times \frac{A_{1831}}{M_{1831}} \quad (3)$$

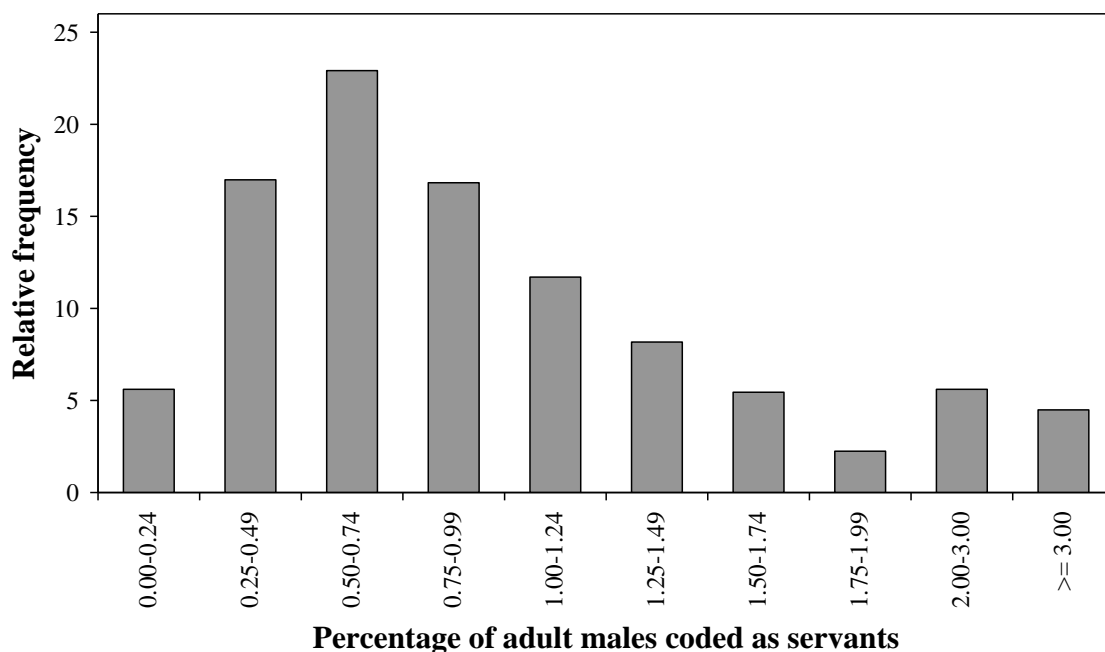
Thus an estimated size for the male population over twenty may be calculated for each of the Anglican registration units of England and Wales through the use of the number of men recorded in 1811, 1821, combined with an estimation of the proportion of men aged 20 and over based on data from the 1831 census.

The next step in the process of converting the parish register database into a census of male occupations involves dealing with those parts of the workforce that are inadequately covered by parochial registration. The first, and most obvious, relates to the issue of servants. Employment in service was a form of employment that was strongly related to the life cycle. It was associated with young unmarried men and women who had left home. It was largely specific to a particular age range, namely the ages of 15 to 30. While the children of men described as servants do appear in parish registers, they do not do so with the regularity that

⁴⁸ In the future, it may also prove possible to add constraints that ensure that the overall size of the male population over 20 is constrained to some additional piece of information such as other census returns, or the results of Generalised Inverse Projection.

one would expect given the numbers that are recorded in the nineteenth century censuses. While the comparison of census and parish register material presented in tables 6 and 7 supported the idea that the latter did give a reasonable indication of the relative numbers of men aged 20 or above employed as domestic servants, it would be hasty to conclude that this relationship would hold throughout England and Wales. The proportion of the male population 20 and over that was enumerated in the mid nineteenth century censuses as a servant varied between the different parts of the country. In the 1851 census, one extreme lay with the registration districts of Longtown in Cumberland and Rotherhithe in London. Both these had workforces where less than 0.1 per cent of the adult male population were employed as servants. At the other extreme, several metropolitan registration districts had more than five per cent of adult male workforce described as servants. For instance, Kensington had 5.8%, Marylebone had 7.5 per cent, St James Westminster had 7.6 per cent, and St George Hanover Square had 17.8 per cent. Breaking the general ascendancy of the metropolitan districts, the registration districts of Bath, Cheltenham, Oxford, and Cambridge all had sizeable proportions of their adult male populations described as servants; all these were based around towns that possessed exceptionally large service sectors. Figure 5 shows the distribution of the 1851 registration districts by the proportion of the workforce described as domestic servants. The distribution has a long tail, even though most registration districts had less than one per cent of the adult male population in domestic service.

Figure 5: The distribution of the proportions of the male population aged over 20 enumerated as domestic servants in the 1851 Census for the 624 registration districts of England and Wales



Source: 1851 Census.

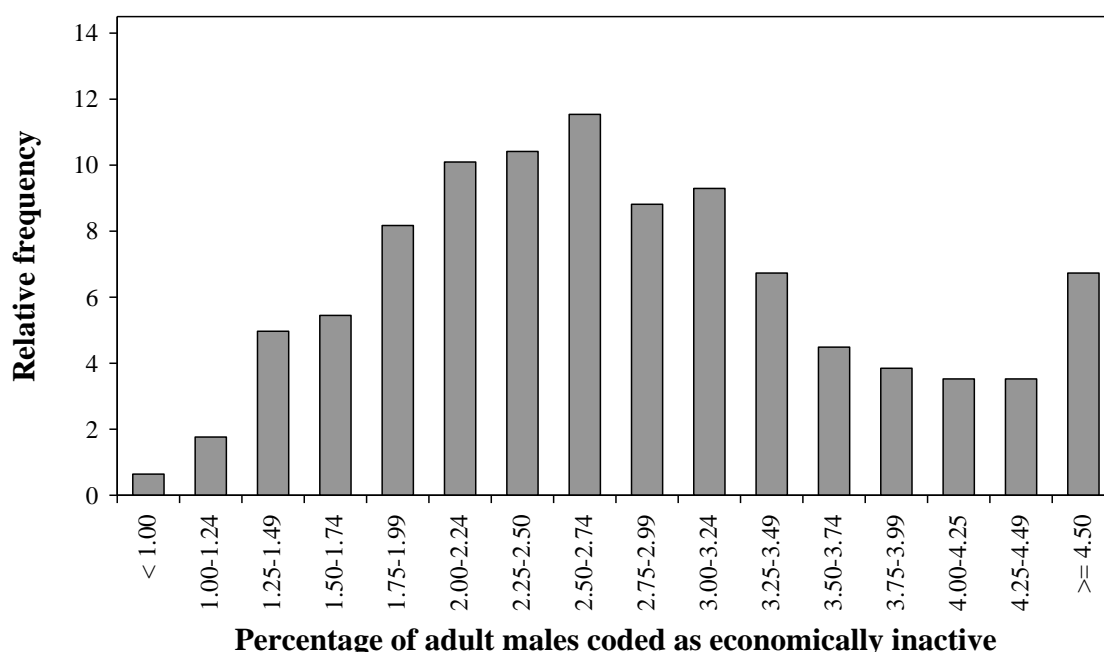
As the parish register abstractions may not be able to capture the large proportion of the workforce listed as domestic servants in these locations, a simple solution to this issue is to use the proportions of men aged 20 and over who were described as domestic servants in the 1831 Census to estimate the number of servants in each registration unit in 1817. The relevant question from the instructions sent to those overseeing the administration of the census was phrased as follows:

13th. How many Household Servants, including all Female Servants, and such Male Servants (of whatever Age) as are taxed or taxable as such; also Waiters and Attendants at Inns; distinguishing the Males upwards of Twenty Years of Age from the Males under Twenty Years of Age?⁴⁹

While this source includes some individuals who might not be described as servants in later censuses, it does provide information within twenty years of the parish register abstractions, and it also provides data on the prevalence of servants at the lowest level of spatial aggregation. Accordingly, the ratio of domestic servants aged over 20 to all men over that age in 1831 was used to calculate the numbers of domestic servants for each registration unit in 1817. At the same time, all the baptismal records where the father was described as a servant were excluded from the parish register database.⁵⁰

The other key issue that needs to be overcome before estimates of the number of men in each sector can be estimated is the numbers of individuals who were classified as economically inactive in the later nineteenth century censuses. This varied considerably, and was obviously closely related to the specifications issued to local census enumerators. Nonetheless, this group, or at least the titles that might be treated as economically inactive in the printed tables of occupations for the later censuses, rarely occur in the pages of Anglican baptism registers. For instance, a mere 2,308 baptisms – just 0.09 per cent of the total – are coded as ‘Without occupation or unstated’ in the PST classification scheme once the illegitimate and similar baptisms have been excluded.

Figure 6: The distribution of proportions of the male population aged over 20 coded as economically inactive for the 624 registration districts in England and Wales as enumerated by the 1851 Census



Source: 1851 Census.

⁴⁹ 1831 Census: Enumeration Abstract, vol. I, p. vi.

⁵⁰ The overall impact of this correction was to almost double the proportionate share of the domestic service sector. In the uncorrected parish register abstractions, 1.18% of all baptisms with occupation titles for the father were allocated to domestic service; this rose to 2.19% in the final estimates presented in table 15 below.

The 1851 Census overstated the numbers of individuals who were economically active, with a general emphasis upon ensuring that as many people as possible were given an occupation. Individuals were encouraged to state their current occupation or their previous one if they were not currently employed.⁵¹ Even then, the registration district with the lowest proportion of the men 20 and over regarded as being inactive was Winslow in Buckinghamshire, with a value of 0.4 per cent. This is over four times higher than the overall level implied by the returns from parish registers. Winslow apart, only the registration districts of Alston (Cumberland), Pateley Bridge (Yorkshire West Riding), and Chester-le-Street (County Durham) have less than one per cent of adult men recorded as being economically inactive according to the PST occupational classification scheme. At the other extreme, the registration districts of Oxford (Oxfordshire), Greenwich (London), East Stonehouse (Devonshire), and Cambridge (Cambridgeshire) produce rates of 12.0 per cent, 13.3 per cent, 13.8 per cent, and 15.9 per cent respectively. Figure 6 details the activity rates for all the registration districts in 1851, and while the modal group is the one that encompasses the range between 2.50 per cent and 2.74 per cent, it is obvious that there is a long ‘tail’ to the right of the distribution.

Although the 1851 Census tends to over-state occupational totals, it provides a sufficient degree of geographical detail to establish the genuine differences in activity rates that existed between different parts of the country. This source then provides the possibility to add in an allowance for the extent of economic inactivity to the parish register estimates for 1817, using similar assumptions to those used by the 1851 Census. To enable this to be done, however, it was necessary to allocate all the Anglican registration units to the registration districts that were created by the General Register Office when carrying out the 1851 census. This allowed both the total adult male population and the total of domestic servants in 1817 to be calculated for each registration district.

Fortunately, much of the database engineering needed to be able to perform this split was already available thanks to the process of spatial matching, making it possible to affiliate registration units to the appropriate registration district. However, there were around 600 cases where ecclesiastical parishes and chapelries crossed the boundaries of registration districts, and here a method for ‘splitting’ the data for these registration units was required. For instance, the parish of Shenley in Buckinghamshire was enumerated in the census as two separate but related townships, namely Shenley Church End and Shenley Brook End. These units were accounted separately for the purposes of the old poor law, and while the former lay in the hundred of Newport and the registration district of Newport Pagnell, the latter was situated in the hundred of Cottesloe and was placed in Winslow registration district. However, these two townships were included within one parish register. This was by no means the only source of this problem; ancient parishes that had been ecclesiastically united with a neighbouring parish during the early modern period and had ceased to maintain separate registers were often in a different registration district to their ‘twin’ parish, and were enumerated separately by the census.⁵² Therefore, a means for splitting data between registration districts is required, since there is a danger that they might be excluded or double counted.

While sharing these between registration districts on the basis of the proportion of the area of the unit that was located in each district is possible, population provides a much more appropriate basis for doing this. We opted to divide the contributions of split parishes to different registration districts on the basis of the fractional shares of the male population in

⁵¹ Wrigley, ‘The occupational structure of England in the mid-nineteenth century’, pp. 147-8.

⁵² For instance, the parish of Washingley (Huntingdonshire) was combined with the parish of Lutton (Northamptonshire) in 1512, before the introduction of parochial registration. However, in 1851, the former parish was affiliated to the Peterborough registration district, while the latter was in the registration district of Oundle.

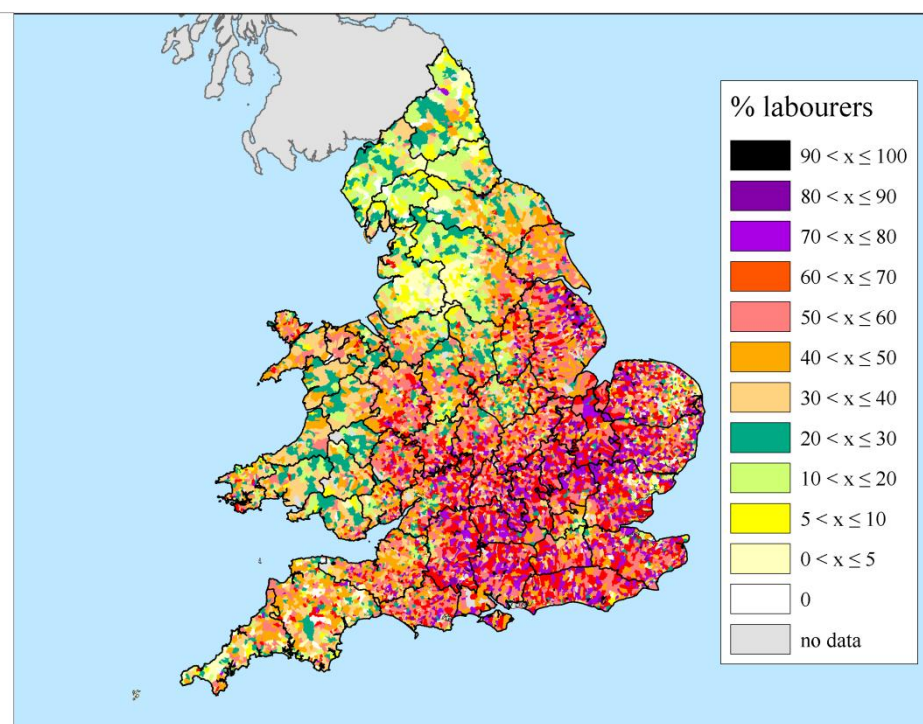
1811 and 1821. For example, if a parish enumerated 60 men in one registration district and 40 in another in 1811, and the equivalent figures for the 1821 Census were 80 and 50, the mean male populations between the two censuses were taken to be 70 and 45, with a total population of 115. All data for this parish were then split between these two registration districts using their fractional share of the total parochial population, namely 0.6087 for the more populous part of the parish in the first registration district, and 0.3913 for the less populous part in the second registration district.

The penultimate stage of the process was to estimate the total number of inactive men in 1817 for each registration district using the equivalent figures for 1851 as a guide. Inactive men were attributed to each district on the basis of the proportions of the male population that were listed as such in 1851. For instance, if three per cent were inactive in 1851, three per cent of the males over 20 in 1817 were also coded as being inactive. By this stage, each registration district had a total male population, an estimated number of male servants, and an estimated number of inactive men. The final stage was simply to attribute the remaining men in each registration district to each of the occupational titles on the basis of the proportional share of each occupational title from the parish register databases. For example, imagine a registration district with 1,000 males aged over 20 present in 1817. If 20 male servants and 30 economically inactive men were added on the basis of the 1831 and 1851 Censuses, 950 men would require the attribution of an occupational title. If the parish registers indicated that one fifth of all the men were farmers, and four fifths were labourers, the final estimated occupational structure would be that 190 farmers and 760 labourers were present in that registration district in 1817.

IV

One final set of adjustments to the data is necessary before estimates of the overall occupational structure can be generated. This relates to the large numbers of men enumerated simply as labourers. The proportion of occupied fathers in 1813-20 who were described as such can be seen in figure 7. Across England and Wales as a whole, 29.5 per cent of legitimate baptisms where a father's occupation was recorded described the father simply as a labourer. However, this proportion varied very substantially between different parts of the country. Whilst the majority of these labourers were, no doubt, agricultural labourers, many of them would have been employed in other branches of the economy. Accordingly, it is necessary to allocate these unspecific 'labourers' to particular sectors of the economy. No method for so doing can be perfect but there are sufficient empirical clues available to suggest plausible methods for doing so which should only be subject to a modest degree of error.

Figure 7: The proportion of adult males employed as labourers in 1817 in each parish register of England and Wales



Source: 1813-20 Parish Register abstractions database. This map was drawn by Max Satchell.

The datasets deriving from the published census reports of 1841 onwards also, of course, contain substantial numbers of labourers. With the census data however, the problem of sectoral allocation is substantially reduced because agricultural labourers were distinguished from non-agricultural labourers (who formed between 5 and 7 per cent of the adult male labour force). Whilst the scale of the problem is reduced in the census data sets it is still necessary to devise a method for allocating the enumerated non-agricultural labourers to particular sectors of the economy in the census data sets.

In an earlier comparison of the occupational structure of England in 1841 and 1851 Wrigley allocated all non-agricultural labourers as being in the secondary sector.⁵³ He was, of course, aware that this was a simplification.⁵⁴ In 1851 the Registrar-General believed that the category of ‘labourers’ ‘undoubtedly include[s] many agricultural labourers, many road labourers, many bricklayers labourers, many dock labourers; and also many who are ready to work in any of the ordinary mechanical employments.’⁵⁵ However, while the Registrar-General was no doubt correct about these other groups there are compelling reasons to think that it is unlikely that many agricultural labourers were included.⁵⁶ Whilst it is clear that there were many labourers employed in the transport sector it seems unlikely that many would have been employed in other parts of the tertiary sector. Table 10 shows the sectoral enumeration of labourers in the published 1851 census. As can be seen, this provides no direct clues as to how the majority of non-agricultural labourers should be allocated between the non-agricultural sectors.

⁵³ Wrigley, ‘The occupational structure of England in the mid-nineteenth century’, p. 199, ‘secondary general’ refers to those described simply as ‘labourers’.

⁵⁴ See the discussion of labourers in the tertiary sector in *ibid.*, p.171.

⁵⁵ Cited in *ibid.*, p.151.

⁵⁶ *Ibid.*, p. 151 and following.

Table 10: Male labourers aged over 20 by sector in the 1851 Census of England and Wales

PST Sector	PST Code	Occupation	Number of men aged over 20
1	1, 1, 1,30	agricultural labourer (outdoor)	724,839
2	2,81, 0,30	road labourer	7,365
6	6, 4, 0,30	coal heaver, labourer	10,628
6	6, 5, 0,30	railway labourer	26,662
90	90, 0, 0,30	labourer (branch undefined)	274,078

Source: 1851 Census.

We are now in a position to improve on Wrigley's 2004 methodology. The sectoral allocation of labourers is the subject of a forthcoming paper by Osamu Saito and Shaw-Taylor which documents a methodology both for allocating non-agricultural labourers between the secondary and tertiary sectors in the census datasets for 1851 to 1911 and for the larger problem of allocating labourers between agriculture and the rest in pre-census datasets including the 1817 dataset. Here we follow the allocation methodology developed in that paper. Only a brief summary can be provided here.

Saito and Shaw-Taylor take advantage of the fact that in 1911, unlike 1851, the published census return provides a great deal of data about the allocation of the majority of non-agricultural labourers to specific sub-sectors. This allows the authors to develop a regression model using county level data in 1911 for predicting the numbers of labourers employed in quarrying, the secondary sector and in the tertiary sector on the basis of the numbers enumerated in certain sectors in which labourers were clearly employed in significant numbers such as quarry, building and dockyards. The model is then used as the basis for allocating non-agricultural labourers between quarrying, the secondary sector and the tertiary sector between 1851 and 1911. For 1817 it is assumed that labourers formed the same share of the workforce in each of the non-agricultural sectors in which they were employed as was the case in 1851. This makes it possible to estimate the numbers of labourers employed in quarrying and in the secondary and tertiary sectors in 1817. Table 11 reports where the labourers have been re-allocated in 1817, and the only non-agricultural sector that significantly benefits from this procedure is the 'general' group within the secondary sector.

Table 11: The re-allocation of non-sectorally specific male labourers aged 20 and above to the primary, secondary and tertiary sectors of the workforce in 1817

Sector and group of economic activity	Estimates total of men aged 20 and above in 1817	
	N	%
Total men to be re-allocated	810,367	100.0
Primary: Agriculture	661,127	81.6
Primary: Mining and quarrying	1,219	0.2
Secondary: General	107,186	13.2
Tertiary: Transport and communications	40,835	5.0

Source: 1817 Estimated census of adult male occupations for England and Wales in 1851 registration districts database.

It may be helpful to explain why we did not use either of two other data sources which might at first sight appear to provide a better basis for the sectoral allocation of labourers in 1817. There are two considerable bodies of relevant data closer in time to the 1817 dataset than the censuses of 1851-1911. Firstly, the published 1831 census report enumerates the numbers of male agricultural labourers aged 20 and over and the numbers of male non-agricultural labourers aged 20 and over as well as the total numbers of males aged

twenty and over at the level of the individual parish.⁵⁷ Secondly, the numbers of agricultural and non-agricultural labourers are enumerated for the ancient counties in the 1841 census report.

At first sight the 1831 census would seem to be the obvious choice. Firstly, it is only 14 years after the mid-point of the 1813-20 data as opposed to 24 years for the 1841 census and 34 years for the 1851 census. This was presumably the reason why the 1831 census was used by Crafts to reallocate labourers in the Lindert and Williamson's reworking of social tables between 1688 and 1803.⁵⁸ Secondly, the possibility of making the adjustments at the lowest level of territorial aggregation should, in principle, give the most accurate results. However, the 1831 census is not as straightforward in this respect as might at first appear. Whilst the relevant column in the enumeration is headed 'Labourers employed in Labour not Agricultural' the reality was more complex. In England and Wales the raw data for 1831 census was collected on the ground by the overseers of the poor. The overseers were issued with several pages of instructions that listed 16 different questions. The eleventh question was:

'How many Males upwards of Twenty years old are Miners, Fishermen, Boatmen, Excavators of Canals, Roadmakers, Toll Collectors or Labourers employed by persons of the three preceding classes ... or otherwise employed in any Kind of bodily labour, excepting in *Agriculture*? Labourers in *Agriculture* having already been entered in the proper Place.'⁵⁹

In other words a man who in the parish registers or the census enumerators' books, or indeed in almost any other source of occupational data, would have been described as a miner, a collier, a quarryman, a boatman or a fisherman, should in 1831 have been enumerated as a 'labourer.' It follows that the reported figures must overstate the importance of non-agricultural labourers in the workforce; but to what extent? The 1851 census reported that 6.1 per cent of all occupied males aged 20 and over were enumerated as non-agricultural labourers. Since 4.5 per cent of males 20 and over were enumerated as miners, 0.7 per cent as boatmen and 0.3 per cent as fishermen it is likely that if the 1831 procedure had been used in 1851 then non-agricultural labourers would have been reported as at least twelve per cent of adult male labour force, rather than just 6.1 per cent. It appears that if the raw figures presented in 1831 are used as the basis for splitting labourers between agriculture and the rest it could result in an underestimate of the size of the agricultural workforce and over-estimate of the non-agricultural workforce. The 1831 census reports 36 per cent of all labourers in England as non-agricultural. The corresponding figure for England in the 1851 census, when agricultural labourers were a substantially smaller proportion of the workforce, is 26 per cent. Crafts' use of these figures from the 1831 census to split labourers between agriculture and other sectors in Lindert and Williamson's data may have resulted in an over-allocation of labourers away from agriculture. The 1831 census is therefore too problematic to form the basis for allocating labourers between agriculture and the rest of the economy in the 1813-20 dataset.⁶⁰

A second possibility, alluded to above, would have been to use the data from the 1841 census on agricultural and non-agricultural labourers. However, it is almost certain that in

⁵⁷ This is a simplification and the units reported in the 1831 enumeration abstract were described as parishes, townships or places.

⁵⁸ Crafts, *British economic growth*.

⁵⁹ *1831 Census: Enumeration Abstract*, vol. I, p. vi. A further question was asked 'and what Proportion of those entered in answer to Question 11th are employed in any Quarry, Mines, Coal Pits, Fishery, or Public Work now in progress?' *Ibid.*, p.vii, question 14. Unfortunately the answers to this question were not enumerated in the published report, but it could prove possible to extract this information from the small number of 1831 enumerators' returns that survive.

⁶⁰ It might be possible to use the data from 1831 by (1) working at the quasi-parish level rather than the registration district (2) trying to establish whether other occupational groups were systematically included as supernumerary labourers in 1831. However, it still seems unlikely that this would produce satisfactory results.

1841, but not in subsequent censuses, many agricultural labourers were in fact mis-enumerated as non-agricultural labourers.⁶¹ The 1841 census cannot therefore provide a reliable basis for the sectoral allocation of labourers either. A further benefit of basing the sectoral allocation of labourers on data deriving from 1851 is that the data are available for registration districts and registration counties rather than the ancient counties which were used in 1841. This makes the resultant c.1817 data much easier to compare with the censuses of 1851 and later at a variety of spatial levels.

The end result of the various adjustments to the baptism data was a set of tables that returned an estimate of the size of the male population aged over 20 for each 1851 registration district, the number of servants in each registration district, and the adjusted number of legitimate baptisms for each occupational title that took place within that registration district between 1813 and 1820. During this process, however, one of the 624 registration districts had to be discarded from further analysis. The unit in question was the Scilly Isles; the 1812 act does not seem to have been enforced for this particular part of the country, as the *pro forma* style of baptismal record keeping was not introduced. Indeed, it was not until 1821 that a population enumeration was returned for these islands in the census.

The process therefore not only produces an estimate of the occupational structure for England and Wales in 1817, but also for each of the 623 1851 registration districts for which a calculation is possible. It is also straightforward to provide estimates of the occupational structures for the 45 registration counties and the 11 census divisions of England and Wales. Moreover, it is possible to compare these units with later nineteenth century censuses, provided that they can be re-organised to tessellate with the units used for enumeration purposes in 1851. It should be noted that this method of converting parish register abstractions into an estimate of occupational structure is determined by the need to use the economic inactivity rates that are, at present, only available at the level of the registration district in 1851. In the long run, it may be possible to use other sources to establish the degree of economic inactivity at a lower level of spatial discrimination to generate estimates of occupational structure for smaller units, even though the registration district is a sufficiently small unit to allow for a great deal of finely-tuned geographical analysis.

V

Once all the various corrections and modifications have been performed upon the parish register database, it is comparatively straightforward to generate a series of estimates for the occupational structure of England and Wales in 1817. Table 12 provides estimates of the total numbers of men aged 20 or above for both England and Wales. What is immediately apparent is the large number of individuals who are enumerated in the category of ‘Sectorally unspecific occupations’. Nearly three out of every ten men fall into this category, which reflects the difficulties caused by the lack of specificity caused by the use of the word ‘labourer’ to describe an individual’s occupation.

⁶¹ See Wrigley, ‘The occupational structure of England in the mid-nineteenth century’, p. 151.

Table 12: Estimated numbers and proportions of men aged over 20 by sector of economic activity in England and Wales in 1817

Sector	England		Wales		England and Wales	
	<i>N</i>	%	<i>N</i>	%	<i>N</i>	%
PRIMARY	371,004	14.0	54,643	28.7	425,647	15.0
SECONDARY	972,633	36.8	47,398	24.9	1,020,031	36.0
<i>Dealers</i>	29,338	1.1	775	0.4	30,113	1.1
<i>Sellers</i>	60,260	2.3	2,150	1.1	62,410	2.2
TERTIARY <i>Services and professions</i>	258,952	9.8	13,388	7.0	272,340	9.6
<i>Transport and Communications</i>	121,557	4.6	7,674	4.0	129,231	4.6
TOTAL TERTIARY	470,108	17.8	23,987	12.6	494,094	17.4
Sectorally unspecific occupations	751,194	28.4	60,395	31.7	811,590	28.6
Without occupation or unstated	78,482	3.0	4,281	2.2	82,764	2.9
TOTAL	2,643,422	100	190,704	100	2,834,126	100

Source: 1817 Estimated census of adult male occupations for England and Wales in 1851 registration districts database.

Table 13, on the other hand, reports the results of applying the corrections described above. Those men who were described as ‘labourers’ have mainly been allocated to the primary sector, though large numbers have also been transferred to the secondary and tertiary sectors. Those who were economically inactive have been removed from consideration, and the primary and tertiary sectors have also been decomposed into their constituent elements. One important point is immediately apparent. A greater number of adult men in England were employed in the secondary sector than in the primary sector by 1817. Only just over one third of men were employed in farming by this point, and even in Wales, which had a more significant agricultural sector at this time, less than half of all men were employed in farming. Over one million men were employed in the secondary sector, while the tertiary sector numbered around 500,000 men, or 19 per cent of the total workforce. Some 10 per cent of that group were engaged in the services or professions, while nearly six per cent were employed in the transport and communications sector. It would, of course, be foolish to take the reported numbers to be precise and exact. Although reporting the totals without rounding suggests a spurious accuracy, these estimates provide the most detailed and comprehensive survey of the male labour force of England and Wales available before 1841.

Table 13: Estimates of numbers and proportions of men aged 20 and over by sector of economic activity in England and Wales in 1817 with the application of corrections for sectorally unspecific occupations

Sector	England		Wales		England and Wales		
	N	%	N	%	N	%	
Primary	Agriculture	898,674	35.1	90,551	48.6	989,225	36.0
	Mining and quarrying	71,100	2.8	13,358	7.2	84,458	3.1
	Other Primary	13,512	0.5	826	0.4	14,338	0.5
	Total Primary	983,286	38.4	104,735	56.2	1,088,021	39.6
Secondary	1,073,409	41.9	53,559	28.7	1,126,968	41.0	
Tertiary	Dealers	29,438	1.1	777	0.4	30,216	1.1
	Sellers	58,646	2.3	2,148	1.2	60,793	2.2
	Services and professions	258,893	10.1	13,387	7.2	272,281	9.9
	Transport and communications	158,877	6.2	11,759	6.3	170,635	6.2
	Total Tertiary	505,854	19.7	28,071	15.1	533,925	19.4
TOTAL	2,562,549	100	186,365	100	2,748,914	100	

Source: 1817 Estimated census of adult male occupations for England and Wales in 1851 registration districts database.

This is not the place to situate these new estimates within the broader context of the economic development of nineteenth century England at any length.⁶² However, a brief comparison with the estimates made by Crafts for 1802-3 and the Deane and Cole for 1801 shows that the new estimates suggest a major revision of current perceptions of the timing and scale of occupational change during the early nineteenth century.⁶³ Crafts estimated that 41.7 per cent of the labour force was engaged in the primary sector, with 24.7 per cent in the secondary and 33.6 per cent in the tertiary sectors. It must be remembered that Crafts' data pertain to Great Britain as a whole, and not just to England and Wales. They also include females and count mining within the secondary sector rather than the primary sector. Notwithstanding these differences, the new estimates provided by table 14 suggest that the secondary sector was considerably larger by the second decade of the nineteenth century than hitherto thought, which in turn suggests a reconsideration of sectoral productivity change during the classical period of the industrial revolution.

It is also useful to compare Deane and Cole's estimates for the distribution of the British labour force in 1801 with the estimates for 1817.⁶⁴ They estimated that 35.9 per cent of the total was engaged in agriculture, forestry, and fishing, while 29.7 per cent was employed in manufacturing, mining, and industry. Trade and transport, domestic and personal services, and the public plus professional and 'other' sectors were allocated 11.2 per cent, 11.5 per cent and 11.8 per cent respectively. Again, the new estimates suggest that the secondary sector was considerably larger than Deane and Cole believed, and that the tertiary sector was also smaller. It does need to be borne in mind, however, that Deane and Cole's estimates again include both female and male contributions to the labour market, and that the largest single occupational group in the 1841 census was female domestic servants, comprising well over 900,000 individuals. Interestingly, however, the estimates for the non-mining primary sector are broadly in line with the new estimates for 1817, at around 35 per cent of the workforce.

⁶² For a more detailed discussions see Shaw-Taylor, *et al.*, 'The occupational structure of England c.1710-c.1871'; Shaw-Taylor, *et al.*, 'The occupational structure of England and Wales c.1817-1881'; and Shaw-Taylor, 'The occupational structure of England and Wales c.1750 to 1911'.

⁶³ Crafts, *British economic growth: Deane and Cole, British economic growth*.

⁶⁴ Deane and Cole, *British economic growth*, p. 142.

Table 14: Estimates of the numbers of men aged 20 and over employed in the English agricultural sector, 1811-1851

Year	Males aged 20 and over employed in agriculture	Percentage of males employed in agriculture of all males aged 20-64	Percentage of males employed in agriculture of all males aged 20-69
1811	910,000	39.3	37.8
1817	898,674	36.5	35.2
1821	955,000	36.6	35.2
1831	981,000	32.4	31.2
1841	996,000	27.3	26.4
1851	1,010,000	24.6	23.8

Notes: Figures for 1811, 1821, 1831, 1841, and 1851 taken from Wrigley, 'Men on the land and men in the countryside', table 11.12, p.332. Figures for 1817 taken from the 1817 Estimated census of adult male occupations for England and Wales in 1851 registration districts database. The size of the male population aged between 20 and 64, and between 20 and 69, were calculated using the same assumptions as used by Wrigley in the calculation of the original table, with the average of the values for 1811 and 1821 used as the denominator.

It is also possible to compare the size of the agricultural sector in England with the estimates generated by Wrigley for the early nineteenth century, using the earliest returns from the decennial census.⁶⁵ The key data are presented above in table 14, and the estimates for 1817 are also included for comparative purposes. This exercise suggests that the parish register database returns a lower estimate of the number of men occupied in agriculture, with a difference of between 50,000 to 75,000 men or between two and three per cent of the adult male population. However, given the different assumptions that underpin the calculation of these two estimates, the degree with which they agree is notable. The source of this difference is almost certainly due to the method for re-allocating those described as non-sectorally specific 'labourers' to the primary, secondary and tertiary sectors.

The accuracy of the estimated occupational structure of England and Wales in 1817 should not be exaggerated. The estimates are reliant upon several assumptions that were made during their production. However, they are based upon a formidable volume of empirical evidence, and it is very difficult to imagine that a different set of assumptions will produce anything other than a secondary sector that is much larger than older estimates. For instance, the communities that one would expect to exhibit the greatest degree of under-registration in baptism registers would be the ones – such as Manchester, Leeds, and the London suburbs – with the greatest degree of population growth and the largest numbers of individuals engaged in the secondary sector. With *at least* forty per cent of the adult male workforce employed in the secondary sector in 1817, the implication is that the proportionate growth of the secondary sector in the first half of the nineteenth century was much slower than hitherto thought, and that a much greater proportion of that growth took place at some stage before the nineteenth century.

Table 15 – the table that follows at the end of this paper – provides a detailed overview of the male labour force aged twenty and over in 1817. Table 15 reports estimates of the numbers employed at the second digit (or 'group') level of the PST occupational classification scheme using the correction method for labourers devised by Saito and Shaw-Taylor. One should not take the numerical precision in the table at face value, especially where the totals are small – for instance, stating that exactly three men only were employed in the gas equipment group within the secondary sector in 1817. Other issues with the classification scheme are also apparent: there are only 2 sellers of footwear and 4 dealers in footwear, but 101,771 men employed as shoemakers, boot makers, cordwainers, and so on. Many shoemakers were also trading on their own account; if we were to assume that they were engaged in tertiary activity for a quarter of their time, they would contribute an additional one per cent to the size of the tertiary sector. Similar points could be made for the

⁶⁵ Wrigley, 'Men on the land and men in the countryside'.

food and drink groups within the secondary sector, serving as a reminder of the assumptions that need to be made in producing such estimates and sectoral breakdowns. Nonetheless, the essential point remains: the secondary sector in 1817 was considerably larger than hitherto believed, and that the key elements by size within this sector were building and construction (10.5 per cent), textiles (7.7 per cent of the total), and iron and steel manufacture (3.0 per cent).

This paper has given an overview of the entire process of producing estimates of the occupational structure of England and Wales in 1817; from the abstraction of the data from the original source material, to the processing of the abstractions to the generation of a usable resource, and then finally to the generation of a 'census' of male occupations. It relies upon one of the largest data collection exercises in British historiography, as well as one of the largest data collection enterprises conducted by the British state during the early nineteenth century. Notwithstanding these formidable empirical foundations, this exercise also relies upon a series of assumptions, which are open to question and invite further testing. Some assumptions and methods which could be improved, such as the generation of parochial estimates for the numbers of servants and those who were not economically active, as well as the redistribution of non-sectorally specific 'labourers' into the primary, secondary and tertiary sectors. However, different modelling exercises are unlikely to produce fundamentally different results. The occupational structure of the adult male workforce of England and Wales in 1817 was in all probability substantially different from that suggested in earlier writing, with around two-fifths employed in the secondary sector. While agriculture was still the largest single employer, it employed fewer people than the whole of the secondary sector combined. It is most unlikely that this picture will be changed through the use of different assumptions, and the next questions to answer relate to how this new evidence changes our understanding of the industrial revolution. What impact do these figures have upon estimates of productivity growth during the late eighteenth and early nineteenth centuries? And during which period did the secondary sector experience the greatest growth in its share of the male workforce? As is often the case, the answering of one question merely leads to the posing of new ones.

Table 15: An estimate of the number of men aged 20 and over in England and Wales employed in each occupational group within the PST occupational classification scheme in 1817

PST Sector		PST code	PST Group	Estimated number of men aged 20 and over	
				N	%
PRIMARY		1, 1	Agriculture	989,225	36.0
		1, 2	Estate work	4,096	0.1
		1, 3	Forestry	1,481	0.1
		1, 4	Fishing	8,680	0.3
		1,10	Other products of land and water	81	0.0
		1,20	Mining and quarrying	84,458	3.1
			TOTAL PRIMARY	1,088,021	39.6
SECONDARY		2, 0	Unspecified	107,186	3.8
		2, 1	Food industries	78,290	2.8
		2, 2	Drink industries	10,112	0.4
		2, 3	Tobacco industries	80	0.0
		2,10	Clothing	92,406	3.4
		2,15	Footwear	101,771	3.7
		2,20	Textiles	212,039	7.7
		2,25	Wood industries	55,507	2.0
		2,30	Industries using leather, bone etc.	23,002	0.8
		2,31	Industries producing products from fibres	6,266	0.2
		2,35	Furnishing	999	0.0
		2,40	Paper industries	6,286	0.2
		2,41	Printing	11,676	0.4
		2,45	Earthenware, pottery manufacture	8,068	0.3
		2,46	Glass industries	3,363	0.1
		2,50	Precious metals and jewelry	4,924	0.2
		2,52	Instrument making	9,526	0.3
		2,55	Chemical, soap, adhesives, manufacture	1,541	0.1
		2,58	Fuel industries	209	0.0
		2,61	Iron and steel manufacture and products	81,361	3.0
		2,62	Non-ferrous metal manufacture and products	17,857	0.6
		2,63	Metal working	173	0.0
		2,65	Machines and tools, making and operation	30,505	1.1
		2,67	Gas equipment	3	0.0
		2,70	Road transport vehicles	21,676	0.8
		2,71	Boat and ship building	18,867	0.7
		2,75	Brick and tile manufacture	5,195	0.2
		2,76	Stone and mineral processing industries	2,541	0.1
		2,80	Building and construction	201,650	7.1
		2,81	Public Works	1,844	0.1
		2,85	Minor manufactures and trades	5,945	0.2
			TOTAL SECONDARY	1,126,968	41.0
	TERTIARY	Dealers	3, 0	Unspecified	11,624
3, 1			Dealers in food	3,019	0.1
3, 2			Dealers in drink	3,647	0.1
3, 3			Dealers in tobacco	3	0.0

	3, 4	Dealers in live animals	1,804	0.1
	3,10	Dealers in clothing and clothing accessories	88	0.0
	3,15	Dealers in footwear	22	0.0
	3,20	Dealers in textiles and products	6,131	0.2
	3,25	Dealers in wood and wood products	1,127	0.0
	3,30	Dealers in leather, hair and related animal products	246	0.0
	3,31	Dealers in fibrous vegetable products	162	0.0
	3,35	Dealers in furnishings	50	0.0
	3,40	Dealers in paper and paper products	63	0.0
	3,41	Dealers in printed products	4	0.0
	3,45	Dealers in earthenware, pottery	407	0.0
	3,46	Dealers in glass and glass products	129	0.0
	3,50	Dealers in precious metals and jewelry	13	0.0
	3,52	Dealers in instruments	4	0.0
	3,55	Dealers in chemicals and chemical products	313	0.0
	3,58	Fuel dealers	902	0.0
	3,61	Dealers in iron and steel, and iron and steel products	213	0.0
	3,62	Dealers in non-ferrous minerals and metal products	46	0.0
	3,63	Dealers in metal	1	0.0
	3,65	Dealers in machines, tools	11	0.0
	3,70	Dealers in road transport vehicles	7	0.0
	3,71	Dealers in waterborne vessels	3	0.0
	3,75	Dealers in bricks, tiles	5	0.0
	3,76	Dealers in stone and stone products	137	0.0
	3,85	Dealers in minor products	31	0.0
	3,95	Dealers in raw materials and waste products	3	0.0
	<i>Total Dealers</i>		<i>30,216</i>	<i>1.1</i>
Sellers	4, 0	Unspecified	12,477	0.5
	4, 1	Sellers of food	20,260	0.7
	4, 2	Sellers of drink	84	0.0
	4, 3	Sellers of tobacco	1,436	0.1
	4,10	Sellers of clothing and clothing accessories	907	0.0
	4,15	Sellers of footwear	2	0.0
	4,20	Sellers of textiles and products	3,654	0.1
	4,25	Sellers of wood products	35	0.0
	4,30	Sellers of leather, hair, bone products	270	0.0
	4,31	Sellers of fibrous vegetable products	29	0.0
	4,35	Sellers of furnishings	1	0.0
	4,40	Sellers of paper products	2,236	0.1
	4,41	Sellers of printed products	1,862	0.1
	4,45	Sellers of earthenware and pottery	657	0.0
	4,46	Sellers of glass and glass products	45	0.0
	4,50	Sellers of precious metal products and jewelry	3,015	0.1
	4,52	Sellers of instruments	4	0.0
	4,55	Sellers of chemical products	5,425	0.2
	4,58	Sellers of fuel	2,007	0.1
	4,61	Sellers in iron and steel, and iron and steel products	2,267	0.1
	4,62	Sellers of non-ferrous metal products	1	0.0
	4,85	Sellers of minor products	123	0.0
	4,90	Small traders	3,998	0.1
	4,95	Sellers of raw materials and waste products	1	0.0

		<i>Total Sellers</i>		60,793	2.2
Services and Professions	5, 1	Food, drink and accommodation services		43,935	1.6
	5,10	Storage		4,544	0.2
	5,15	Entertainment		2,365	0.1
	5,16	Media		128	0.0
	5,20	Miscellaneous service industries		8,736	0.3
	5,25	Domestic service		60,104	2.2
	5,30	Financial services and professions		10,883	0.4
	5,31	Commercial and administrative services		17,610	0.6
	5,35	Professions		36,284	1.3
	5,36	Professional support		4,237	0.2
	5,41	Local government service		2,127	0.1
	5,42	National government service		10,464	0.4
	5,50	Armed forces		34,007	1.2
	5,60	Owners, possessors of capital		702	0.0
	5,65	Distinguished, titled, gentleman		36,156	1.3
		<i>Total Services and Professions</i>		272,281	9.9
Transport and Communications	6, 0	Unspecified		8,984	0.3
	6, 1	Road transport (animal power)		38,862	1.4
	6, 3	Inland navigation		23,057	0.8
	6, 4	Sea transport		57,260	2.1
	6, 5	Rail transport		11	0.0
	6,50	Communications		1,627	0.1
			<i>Total Transport and Communications</i>		129,801
Unspecified	7, 0	Tertiary labourers		40,835	1.5
TOTAL TERTIARY				533,925	19.4
TOTAL				2,748,914	100

Source: 1817 Estimated census of adult male occupations for England and Wales in 1851 registration districts database.

Bibliography

Secondary literature

- Burton, N. *et al.*, *GIS of the ancient parishes of England and Wales, 1500-1850*, (Colchester: UK Data Archive, 2004: SN 4828).
- Cormen, T.H., Leiserson, C.E., Rivest, R.L., and Stein, C., *Introduction to Algorithms*, (Cambridge, MA, 3rd ed., 2009)
- Crafts, N.F.R., *British economic growth during the Industrial Revolution* (Oxford, 1985).
- Deane, P. and Cole, W.A., *British economic growth, 1688-1959* (Cambridge, 1962).
- Humphrey-Smith, C.R., *The Phillimore atlas and index of parish registers*, 2nd edn. (Chichester, 2000).
- Kain, R.J.P. and Oliver, R.R., *The historic parishes of England and Wales: an electronic map of boundaries before 1850 with a gazetteer and metadata* (Colchester, UK Data Archive, 2001: SN 4348).
- Kitson, P.M., 'The codebook of Anglican registration units', <http://www.geog.cam.ac.uk/research/projects/occupations/britain19c/anglicanregistration.html>
- Page, W. (ed.), *A history of the County of Buckingham: vol. 3* (London, 1925).
- Satchell, A.E.M., and Wrigley, E.A., 'Areal data', in Wrigley, E.A., *The early English censuses* (2011), pp. 122-54.
- Shaw-Taylor, L., Wrigley, E.A., Kitson, P.M., Davies, R.S., Newton, G. and Satchell, M., 'The occupational structure of England c.1710-c.1871'. Unpublished preliminary paper available on the project website as paper 22 at <http://www.geog.cam.ac.uk/research/projects/occupations/abstracts/>
- Shaw-Taylor, L., Wrigley, E.A., Kitson, P.M., Davies, R.S., Newton, G. and Satchell, M., 'The occupational structure of England and Wales c.1817-1881'. Unpublished preliminary paper available on the project website as paper 23 at <http://www.geog.cam.ac.uk/research/projects/occupations/abstracts/>
- Shaw-Taylor, L., 'The occupational structure of England and Wales c.1750 to 1911'. Unpublished preliminary paper available online as paper 19 at <http://www.geog.cam.ac.uk/research/projects/occupations/abstracts/>
- The Craven muster roll of 1803: North Yorkshire County Record Office Publications*, **9** (Northallerton, 1976).
- The Mid-Wharfedale Local History Research Group, 'A comparison between the Craven muster roll and parish registers', *Local Population Studies*, **40** (1988), pp. 61-63.
- Thompson, S.J., 'Census-taking, political economy and state formation in Britain, c.1790-1840', Univ. of Cambridge Ph.D. thesis (2010).
- Various, *National index of parish registers*, multiple vols. (London, 1968-)
- Wrigley, E.A., 'Men on the land and men in the countryside: employment in agriculture in early nineteenth-century England', in L. Bonfield, R. M. Smith, and K. Wrightson (eds.), *The world we have gained: histories of population and social structure* (Oxford, 1986), pp. 295-336.

Wrigley, E.A., 'The occupational structure of England in the mid-nineteenth century', in E.A. Wrigley, *Poverty, progress, and population* (Cambridge, 2004), pp. 129-203.

Wrigley, E.A., 'The PST system of classifying occupations'

Wrigley, E.A., *The early English censuses*, British Academy Records of Social and Economic History (OUP, 2011).

Wrigley, E.A., Schofield, R.S., Oeppen, J.E., and Davies, R.S., *English population history from family reconstitution 1580-1837* (Cambridge, 1997)

Youngs, F.A., *Guide to the local administrative units of England*, vol I: *Southern England* (Royal Historical Society Guides and Handbooks), **10** (London, 1979).

Youngs, F.A., *Guide to the local administrative units of England*, vol. II: *Northern England* (Royal Historical Society Guides and Handbooks), **17** (London, 1991)

Primary sources

1831 Census: Enumeration abstract, vol. I, PP 1833, XXXVI

1851 Census, Population Tables II, vol. I & 2, Occupations of the people, divisions 1-X, PP, 1852-53, LXXXVIII, part I