

The occupational structure of England and Wales c.1817-1881

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A British Academy Research Project**

Note

This paper is preliminary and should not be cited without written permission. It derives from work funded by two ESRC project grants with additional funding from the British Academy.¹ It forms part of *The Occupational Structure of Britain c.1379-1911*, a project based at the Cambridge Group for the History of Population and Social Structure. This paper is a slightly updated and modified version of a paper presented in Nottingham to the annual conference of the Economic History Society in 2008. The data are the same as those presented in 2008. The text differs in places in the light of further work done since. During 2010 the paper will be revised for submission to a journal.

The data presented in this paper will be modified in three ways before publication. Firstly, an improved version of the 1813-20 dataset has been produced since this paper was written. Details can be found in Kitson, P., et al, 'The creation.' Secondly, an improved method of allocating labourers between the primary, secondary and tertiary sectors has been developed. This will be fully documented in Shaw-Taylor, L., et al, 'The sectoral allocation of labourers.' These improvements mean that virtually all the numbers presented in this paper will change somewhat by the time it is published. However, none of these changes are so large that they are likely to alter substantially the conclusions presented here. Thirdly, the paper currently stops in 1871, though there is some reference to 1881. For publication the treatment will be extended to 1911.

Abstract

This paper examines the male occupational structure of England and Wales between c.1817 and 1881. The creation of a new quasi-census of male occupational data for c.1817 from parish register data makes it possible, for the first time, to examine reliably the changing male occupational structure over the whole of this period and to do so both in the aggregate and at fine spatial resolution and in sectoral detail. One key result is to show that the secondary sectors' share of adult male employment grew very little over this period. The basic feature of structural change was a relative shift from agricultural to service sector employment. The secondary sector was much larger at the beginning of the nineteenth century than has been thought hitherto. One implication is that the productivity growth of the secondary sector grew much more rapidly between c.1817 and 1841 than has been suggested hitherto. One likely consequence is that new technology made a much bigger impact on the secondary sector at the aggregate level, than the national accounts literature suggests at present. Moreover, striking tertiary sector growth was a feature of all regions of England and Wales, suggesting that the Industrial Revolution affected all parts of the country and cannot be viewed merely as a regional phenomenon, as has sometimes been argued.

¹ The changing occupational structure of nineteenth century Britain (RES-000-23-1579) and Male occupational change and economic growth in England 1750-1851 (RES 000-23-0131).

Half a century ago Deane and Cole published *British economic growth 1688-1959*. This work transformed the study of the British industrial revolution. They used the then novel technique of national income accounting to marshal and integrate scattered data relating to production and trade to produce a more structured account of growth and change than had previously been achieved, a technique which made it possible to examine the implications of different assumptions about many aspects of the growth which occurred. Since then the bulk of the literature about the industrial revolution has made use of this framework for description and analysis. It has produced much that is illuminating and has identified a range of issues which need to be resolved if a more authoritative consensus is to be achieved. Over this half century, however, there has been a relatively modest flow of new empirical data relating to most aspects of the radical changes which were taking place (an important exception is the large volume of new data concerning population growth). In the absence of such data it is difficult to test the validity of the different assumptions embodied in competing models of the changes taking place.

In relation to some topics it is not possible to remedy the paucity of data, but there is one fundamental aspect of the changes which took place where there is a comparative abundance of data which has been little exploited --- change in occupational structure. Changes in the proportion of the workforce engaged in each form of economic activity will reflect change in the structure of the economy. For example, if the change in the size of the agricultural workforce on the one hand, and the change in the size of the workforce engaged in manufacture on the other, can be established with confidence, this will narrow the range of assumptions which can plausibly be entertained about rates of change in the relative importance of primary and secondary activity in the economy. Furthermore, occupational data, unlike most other economic variables, are available at all geographical levels from the individual parish to the country as whole, an immense advantage in relation to the resolution of a host of questions which have arisen about the nature and timing of the changes taking place.

It was the aim of the research project which is the subject of this paper to bring into play this major but neglected data source.

As a result of revisionist work over the last 25 years, economic growth during the British Industrial Revolution is now thought to have been slow until after 1830.² However, structural change is thought to have been rapid during the classic Industrial Revolution period, say 1750 to 1850.³ Structural change is usually taken to mean a transfer of labour and capital out of agriculture and into manufacturing (and sometimes services). A further feature of revisionist accounts of the Industrial Revolution is that the Industrial Revolution was far from complete in the mid-nineteenth century. In 1851 steam power remained of limited importance and employment in traditional industries unaffected by revolutionary technologies greatly exceeded employment in factories.⁴ A curious feature of the literature is that while the incompleteness of the Industrial Revolution in 1851 is frequently noted, no revised subsequent date or date range is suggested in the revisionist account. Moreover, surveys of the economic history of the period after mid-century have not examined

² Crafts, N.F.R., *British economic growth*; Crafts, N.F.R., and Harley, C.K. 'A restatement.'

³ Berg, M., and Hudson, H., 'Rehabilitating the Industrial Revolution'; Crafts, N.F.R., and Harley, K. 'A restatement.'

⁴ Crafts, N.F.R., *British economic growth*; Crafts, N.F.R., and Harley, K. 'A restatement'; Wrigley, E.A., *Continuity, chance and change*.

the completion of the Industrial Revolution being pre-occupied with the onset (or otherwise) of relative economic decline and other issues.⁵

Much of the uncertainty over the timing of key aspects of industrialisation stems from the paucity of occupational data before the census of 1841 which was the first to provide comprehensive data on male occupations. New work, funded by the ESRC, has enabled us to create a quasi census of male occupations for c.1817 which give us a robust and detailed picture of male occupational structure a generation before the 1841 census which is both sectorally and geographically comprehensive.⁶ This paper examines structural change in male employment from c.1817 to 1871. The choice of the terminal date of 1871 is not meant to indicate that we regard the Industrial Revolution as 'complete' by this date but reflects the latest date for which the digitised data were available when this paper was originally written in 2008.⁷ Nevertheless, by 1871, steam power was the dominant source of motive power in industry which had not been the case as late as 1851.⁸

The datasets

The creation of the quasi census of male occupations c.1817 is described in detail elsewhere.⁹ The data derive from c.11,400 Anglican baptism registers spanning the eight years from 1813 to 1820. The midpoint of the data set is c.1817. The dataset contains c.2.2 million observations. The data were collected by research assistants who collected the data from around 80 archives in England and Wales.¹⁰ All of the occupational data used for this paper were coded to the PST system devised by E.A. Wrigley which has been described elsewhere.¹¹ The primary sector encompasses: agriculture, forestry, estate work, fishing and mining and in essence relates to the production of raw materials. The secondary sector include manufacture, construction, handicraft and basically covers anyone processing raw material to make something else. The tertiary sector covers all service sector occupations and includes: transport, retail and wholesale sectors, professional and clerical employment, the hospitality trades and government employment including military employment.

To make full use of the 1813-20 dataset it was necessary to link it to a Geographical Information System (GIS) of parish boundary data created by Dr Max Satchell for the project, a process we have termed 'spatial matching'.¹² The process of spatially matching the two datasets was extremely labour intensive since the boundary GIS

⁵ See for instance: Floud, R., and Johnson, P., *Economic maturity 1860-1939*; Dauntton M., *Wealth and welfare*.

⁶ For a detailed account of how this dataset was created see: Kitson et al, 'The creation.'

⁷ When this paper is redrafted for publication the treatment will be extended to 1911. For a brief treatment of the period from c.1817 which does goes through to 1911 which was produced after this paper was given, see Shaw-Taylor, L., *The occupational structure of England and Wales c.1750 to 1911*.

⁸ Musson, A.E., 'Sources of motive power'; Allen, R.C., *The British Industrial Revolution*.

⁹ Kitson et al, 'The creation.'

¹⁰ The data collection process was designed and managed by P.M. Kitson. He also transformed the raw data into a usable dataset. For details see Kitson, P.M. et al 'The creation.' The following individuals collected the data: J. Barker, A. Corio, R. Churchley, O. Dunn, S. Hennesey, P.M. Kitson, A. Jones, V. Masten, N. Modha, L. Monaghan-Pisano, S. Sovic, G. Stanning, T. Swain, R. Tyler, A. Warren, L. Ward, M. Ward, M. Westlake.

¹¹ See, Wrigley, E.A., 'The PST system' for details. The coding work was undertaken by R.S. Davies who also contributed to the design of the system.

¹² This was built on earlier work by Roger Kain and Richard Oliver: R.J.P. Kain and R.R. Oliver, *Historic parishes of England and Wales* and by Burton et al: *GIS of the ancient parishes of England and Wales, 1500-1850*.

consisted of c.23,000 spatial entities and the occupational data were reported in 11,400 units.¹³ As a result it is now possible to map male occupational structure c.1817 at the parish level and this is illustrated in figures 1 and 2.¹⁴ All the maps in this paper were created by Max Satchell, using the various GIS datasets created for that purpose.

The paper also makes use of datasets deriving from the published census reports of 1851 to 1871 which were digitised as part of the project.¹⁵ We have also made extensive use of a database constructed from the Census Enumerators Books (CEBs) from the 1881 census. The 1881 dataset was originally digitised by the Mormon church and was subsequently enhanced, not least with an occupational coding scheme, by Kevin Schürer and Matthew Woollard at the University of Essex. It contains nominal records for 26 million individuals. It too required spatial matching and occupational coding to PST.¹⁶

Figure 3 shows parish level mapping of the share of adult male employment in the tertiary sector deriving from the 1813-20 dataset and the 1881 dataset. This provides a preview of one of the key findings of this paper. Almost every part of England and Wales experienced a sharp increase in the share of the adult male workforce employed within the tertiary sector. We will come back to this in more detail later in the paper.

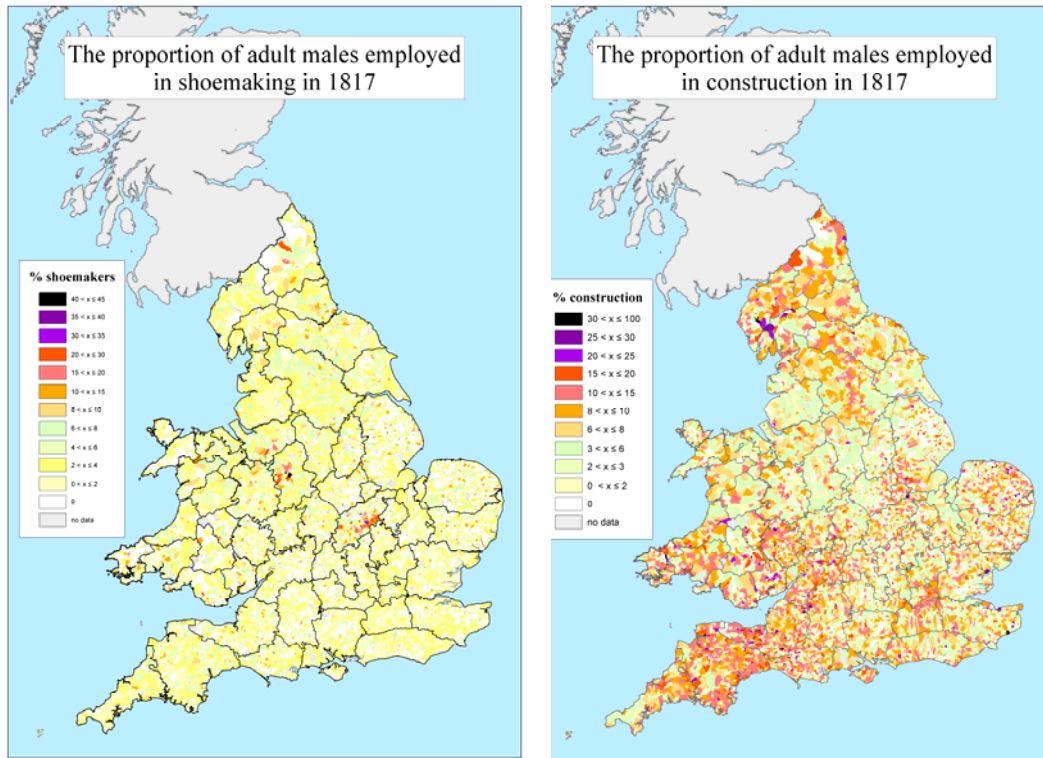
¹³ This process will be described in full elsewhere. A brief account can be found in Kitson, P., et al, 'The creation.' The process was managed by Gill Newton, Max Satchell and Peter Kitson with assistance from Stephen Thompson. Research assistance was provided by: Sean Bottomley, Zoe Crisp, Georgie Wade, Dave Walsh and Rebecca Whyte. E.A. Wrigley undertook a parallel matching process which provided a powerful check on the accuracy of the spatial matching and the underlying GIS.

¹⁴ Strictly speaking these units should not be referred to as parishes. While many of them were parishes, some of them were chapelries within parishes and others were those parts of parishes not covered by chapelries. Elsewhere we have referred to these units by the more accurate term of 'Anglican registration units'. In this paper 'parish' should be understood to refer to an Anglican registration unit – i.e. the geographical area actually covered by a single baptism register.

¹⁵ The data inputting was undertaken by Rebecca Tyler. Gill Newton transformed the raw material into a series of powerful and easy to use databases.

¹⁶ Gill Newton built our database from the Schürer and Woollard dataset. Gill Newton and Max Satchell managed the process of linking the dataset to the GIS boundary data based on a approach suggested by Peter Kitson. Research assistance was provided by Stuart Basten, Sean Bottomley, Zoe Crisp, Georgina Wade, Dave Walsh and Rebecca Whyte. Peter Kitson completed the spatial matching by linking units which the research assistants had not been able to link.. Schürer and Woollard had already coded the data to the scheme used by the registrar general in 1881. This was enhanced by Gill Newton. The data were then coded to PST by Wrigley and Davies.

**Figure 1. Mapping the 1813-20 dataset at parish level:
shoemakers and construction workers.**



**Figure 2. Mapping the 1813-20 dataset at parish level:
Framework knitters and shepherds.**

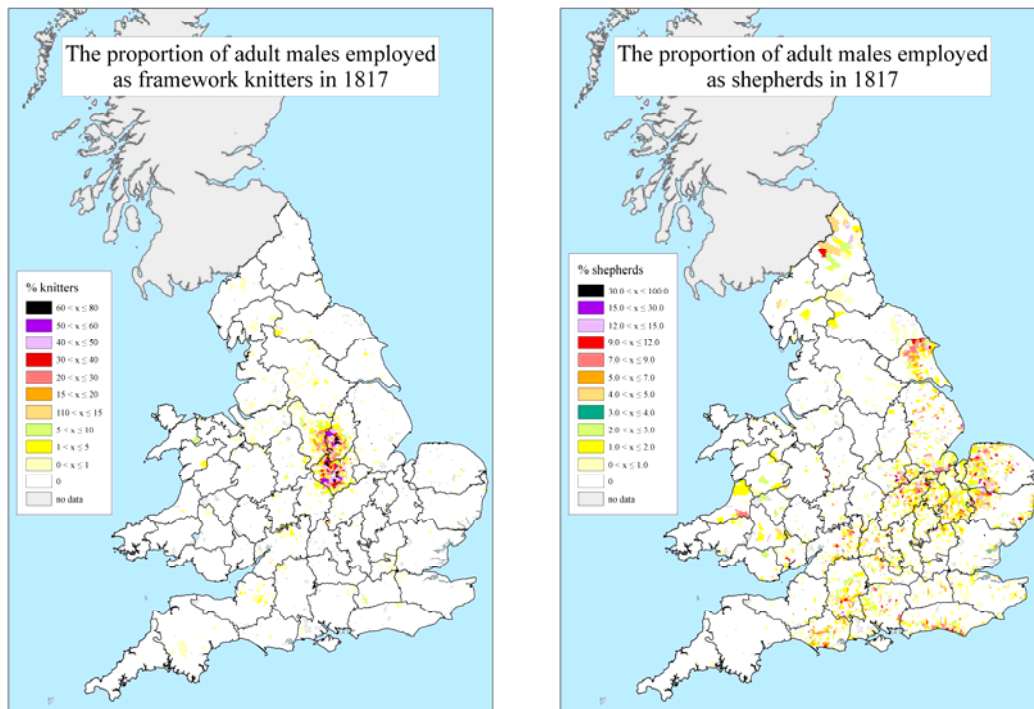


Figure 3. The proportion of adult males employed in the tertiary sector in 1817 and 1881 in each parish of England and Wales

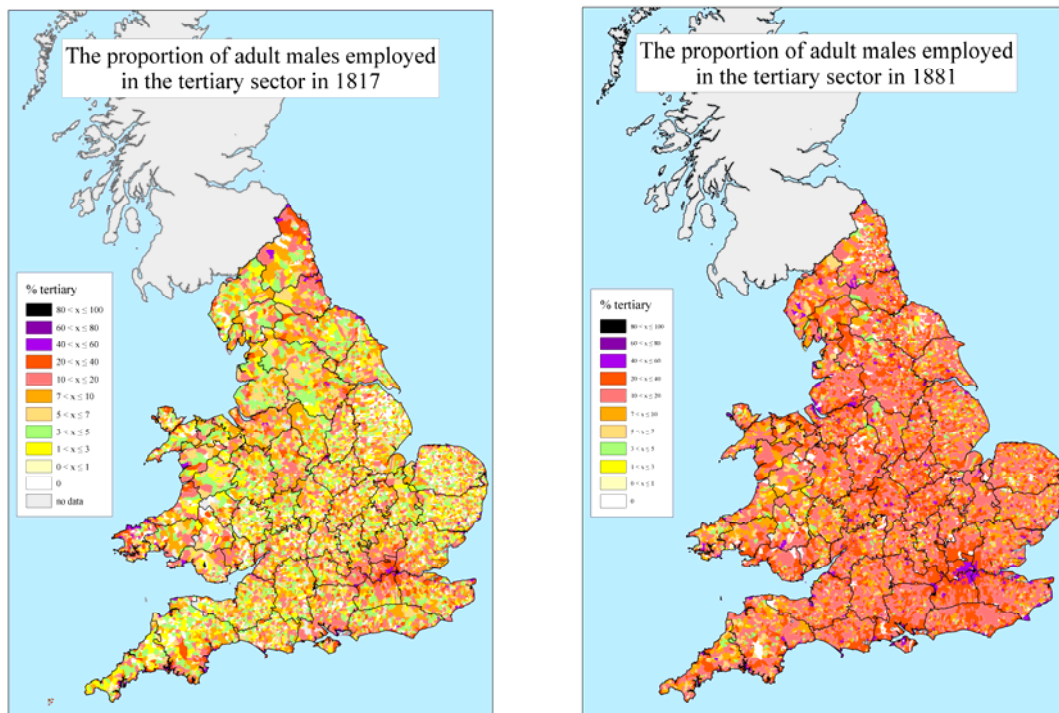


Figure 4. The proportion of adult males employed in the secondary sector in 1817 and 1881 in each parish of England and Wales

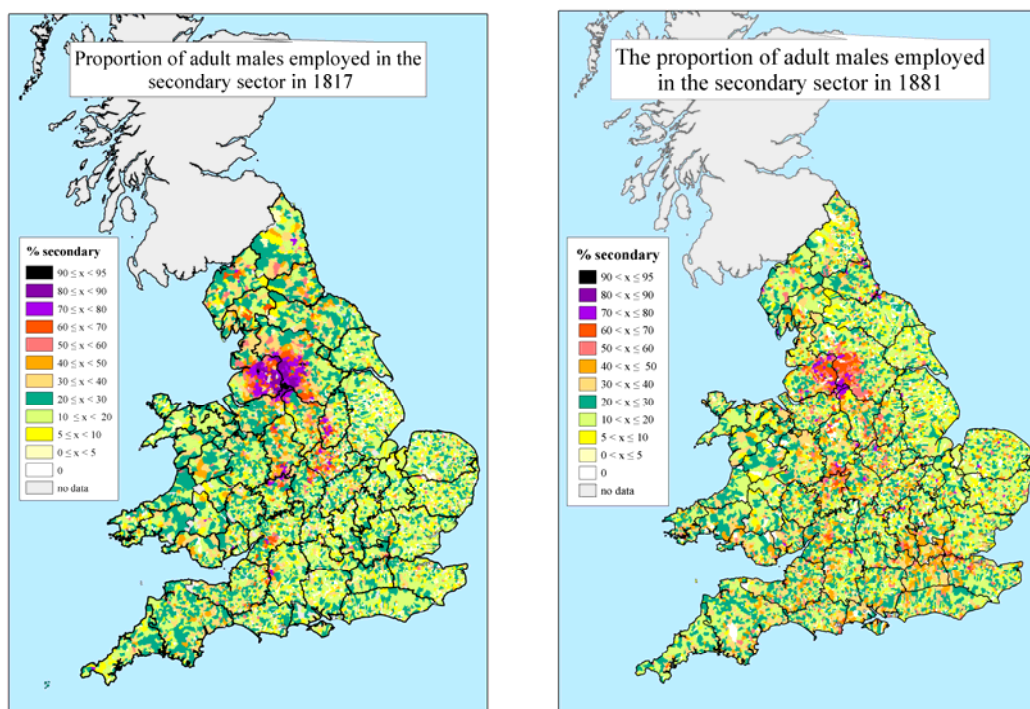
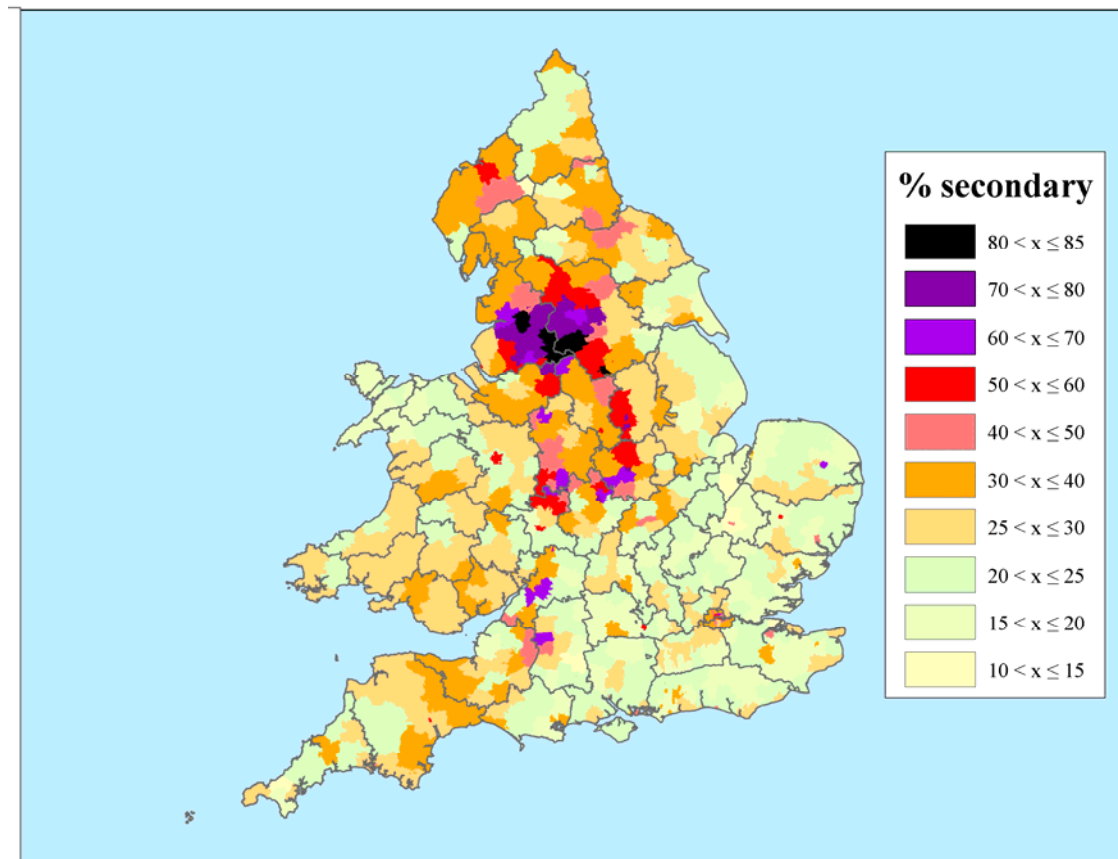


Figure 4 (above) shows parish level mapping of the share of adult male employment in the secondary sector deriving from the 1813-20 dataset and the 1881 dataset. Again this provides an initial glimpse of a key conclusion of this paper. The geography of male secondary sector employment is remarkably stable over the period 1813-20 to 1881. Again we will come back to this in more detail later in the paper.

Because these two parish level datasets have been spatially matched to our parish boundary GIS and because a number of other administrative units have been built from that same GIS it is now a relatively simple matter to aggregate the datasets to other spatial units whenever it is analytically useful to do so.¹⁷ For instance, if we wish to compare the 1813-20 dataset with the occupational data published by registration district in the 1851 and 1861 census reports, the ‘spatial architecture’ of the datasets makes this straightforward. This is illustrated by figure 5 which re-plots the data in left hand panel of figure 4 but using the registration districts that were used in the 1851 census.

Figure 5. The proportion of adult males employed in the secondary sector in 1817 in each registration districts of England and Wales

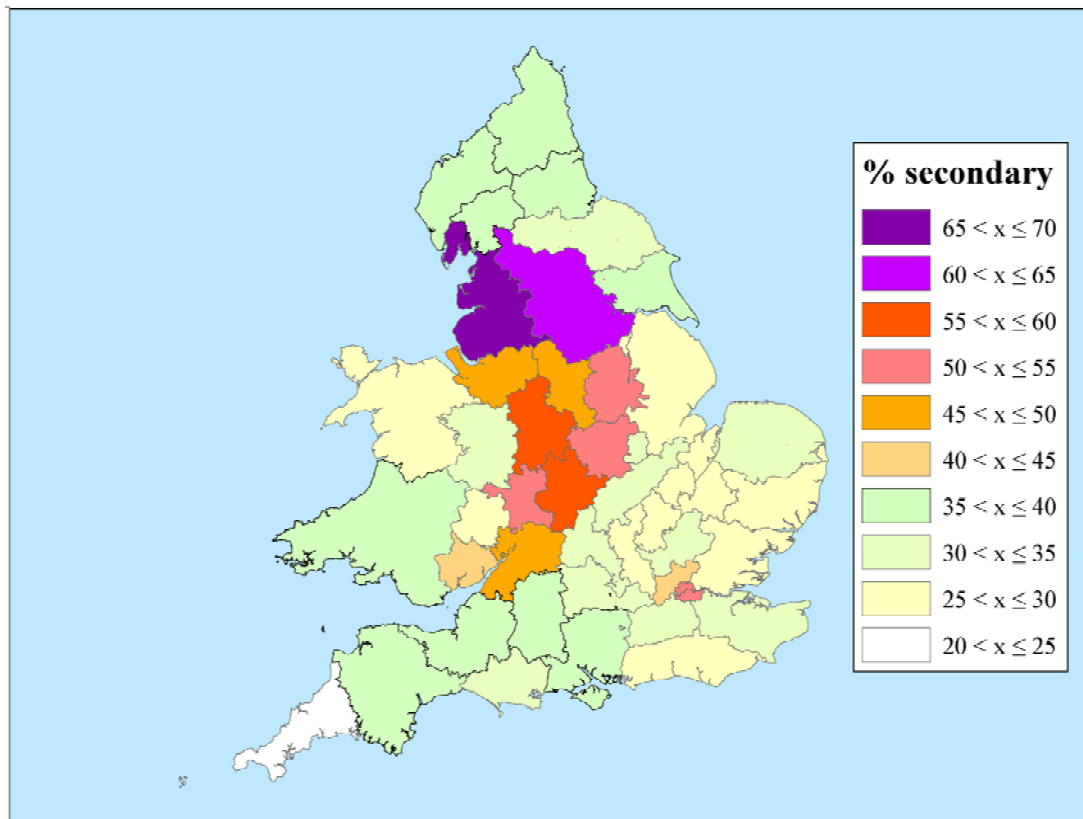


Equally the 1813-20 and 1881 datasets can easily be mapped into the registration counties used in the censuses of 1851 onwards for comparison with the data published in the census reports of 1851 to 1911. This is illustrated by figure 6 which re-plots the data in the left hand panel of figure 4 but using the registration counties that were used in the 1851 census. In the same way we can map both the 1813-20 dataset and

¹⁷ All the GIS resources were created by Max Satchell as part of the project. See: <http://www.geog.cam.ac.uk/research/projects/occupations/britain19c/boundaries.html>

the 1881 datasets into the both hundreds and the ancient counties that were the basis of census enumeration down to 1841 or into the registration sub-districts that were intermediate between the census parish and the registration district in the second half of the nineteenth century. The flexibility this provides adds greatly to the utility and analytical power of these datasets. Whilst it is now relatively easy to map the datasets by a variety of spatial units creating the spatial architecture that made this possible was a very labour intensive process and took the better part of three years.

Figure 6. The proportion of adult males employed in the secondary sector in c.1817 in each registration county of England and Wales.



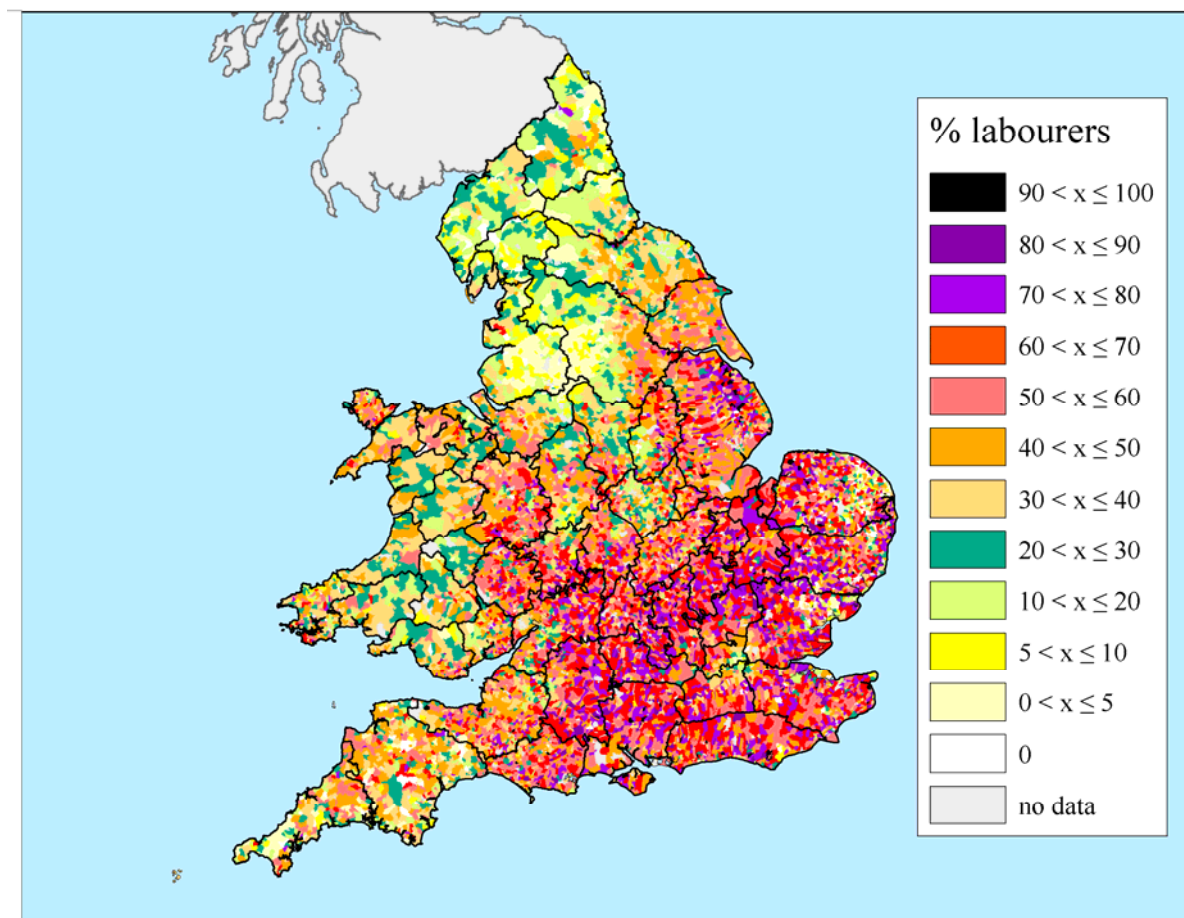
The sectoral allocation of labourers

There is a major methodological problem to be discussed before the results can be presented. How should individuals termed ‘labourers’ be allocated between the primary, secondary and tertiary sectors. Figure 7 shows the proportion of ‘labourers’ in the 1813-20 dataset at the parish level. Across England and Wales as a whole, about 30 per cent of adult males were described as labourers but it is clear from figure 7 that there was acute regional variation. If we are to derive estimate of occupational structure from the parish register data it is necessary to make assumptions, preferably evidence-based, on how to allocate labourers across the various sectors. Perfection is not possible but the reduction of likely errors to modest levels is attainable.

Whilst most of these labourers will undoubtedly have been agricultural labourers, many of them will have been unskilled workers in the secondary sector, some in the tertiary sector and perhaps others in mining. In the censuses of 1841 onwards, agricultural labourers are distinguished from non-agricultural labourers and there is

reason to think that from 1851 on this distinction was drawn fairly accurately.¹⁸ In 1851, as high a proportion as 24 percent of labourers were not agricultural. But this ranged from a low of 6 percent in Herefordshire to a high of 94 percent in the registration county of London. But the census provides no further direct evidence as to how non-agricultural labourers should be allocated. The problem is most acute in 1813-20 where we need to allocate all labourers between the primary, secondary and tertiary sectors. It is less acute from 1851 where we only need to allocate non-agriculture labourers across the remaining sectors.

Figure 7. The proportion of adult males described as ‘labourers’ in the baptism registers of England and Wales c.1817.



The approaches to the sectoral allocation of labourers considered in this paper are crude and preliminary and represent what was done in 2008 when the data were presented to *Economic History Society's* annual conference in Nottingham. Five different approaches are examined below. All five of them share three methodological assumptions each of which is unsatisfactory and will be modified before we publish this paper. Firstly, that no labourers should be allocated to mining. Secondly, that no labourers should be allocated to the tertiary sector. Thirdly, and in consequence of the first two assumptions, all non-agricultural labourers should be allocated to the secondary sector.¹⁹ We are perfectly aware that none of these

¹⁸ Wrigley, E.A., 'The occupational structure of England in the mid-nineteenth century.'

¹⁹ This is the approach followed in *ibid*.

assumptions are strictly accurate. But they do provide a basis for a preliminary examination of the data and, whilst they will affect both the absolute levels of primary, secondary and tertiary employment shares in a modest way their impact on trends over time will be very limited indeed.²⁰ Since 2008 a more sophisticated approach has been developed which allocates labourers deemed to be non-agricultural between mining, the secondary sector and transport employment in proportion to the size of those sectors before the allocation of labourers.²¹ In due course we plan to experiment with more sophisticated methods of labourer allocation using regression analysis. In consequence the numbers presented here will be modified somewhat before any revised version of this paper is submitted for publication. But it should be emphasised that these changes in the data will be modest in scale and will not substantially modify the conclusions of this paper.

For the present paper five different approaches to the sectoral allocation of labourers were considered. Their common assumptions, outlined above, means that the adjustment of the census datasets from 1851 was straightforward. All non-agricultural labourers were simply assumed to belong to the secondary sector. The distinctions between the five methods relate exclusively to the 1813-20 dataset and were as follows. In method (1) it was assumed that non-agricultural labourers formed the same share of total employment as in 1851. In method (2) it was assumed that non-agricultural labourers formed the same share of secondary sector employment as in 1851. In method (3) it was assumed that non-agricultural labourers formed the same share of all labourers as they did in 1851. In method (4) it was assumed that all labourers were agricultural in 1813-20. In method (5) it was assumed that the annual growth in non-agricultural labourers share of total employment between 1851 and 1871 was same as between 1851 and 1871. The results of each of these five approaches is shown in table 1 below in columns 1-5.

**Table 1. Six methods for the sectoral allocation of labourers in 1813-20
England and Wales**

Sector	Estimates for 1813-20 on six different assumptions						1851	1871
	1	2	3	4	5	6	Census	Census
	%	%	%	%	%		%	%
Agriculture	39.5	39.6	39.1	45.4	41.0	39.5	32.6	25.2
Secondary	43.4	43.3	43.8	37.5	41.9	41.5	45.6	46.6
Tertiary	17.1	17.1	17.1	17.1	17.1	19.0	21.9	28.2

(1) Assuming that secondary sector labourers had the same share of total employment as in 1851

(2) Assuming that 'labourers' made up the same share of the secondary sector as in 1851

(3) Assuming that secondary sector 'labourers' were the same share of all labourers as in 1851

(4) Assuming that all 'labourers' were in agriculture in 1813-20

(5) Assuming that the annual growth in the secondary sector labourer's share of

(6) Assuming that non-agricultural labourers had the same share of total employment as in 1851 but where allocated in the secondary and tertiary sectors in proportion to the relative size of those sectors before the allocation of labourers

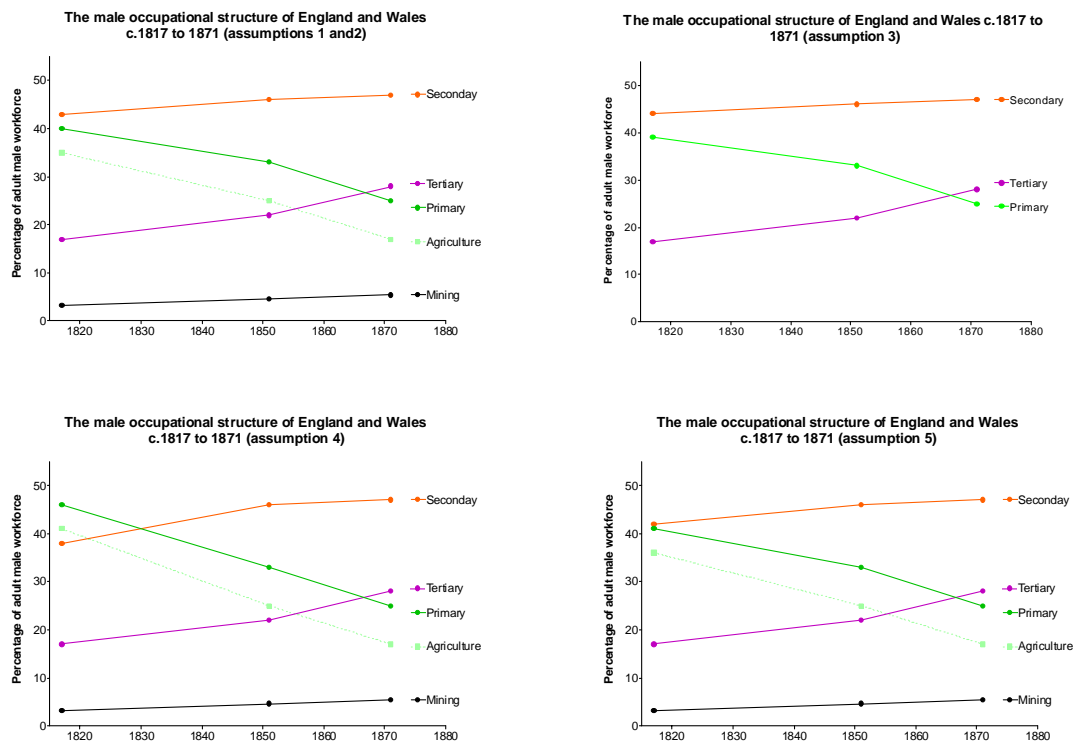
²⁰ Any increase that needs to be made to the tertiary sector in 1813-20 will for instance, be paralleled by an increase in the census datasets from 1841 onwards which is likely to be very similar in size. Hence the effect on trends over time of the choices made as to the allocation on non-agricultural labourers to specific sectors will be very limited. That said the trends in the secondary and agricultural sectors do have some sensitivity to the estimates for the share of labourers deemed to be agricultural.

²¹ Shaw-Taylor, L., and Kitson, P., 'The sectoral allocation of labourers.'

A sixth approach is shown in column 6. This is a modified version of method 1 in which those labourers deemed non-agricultural have been split between the secondary and tertiary sectors in proportion to the size of the sectors before any labourers had been allocated and is shown merely to give a sense of the modest overall impact of a probably overgenerous allocation of some non-agricultural labourers to the tertiary sector. It should be noted that in the 1851 and 1871 datasets all non-agricultural labourers have been allocated to the secondary sector. Column 6 cannot therefore be compared with the 1851 and 1871 data since these would also need adjusting before they would be comparable with the data in column 6. Figures. Were they similarly adjusted then the secondary sector shares would fall by about two percentage points and the tertiary figures would rise by the same amount.

Figure 8 below presents the results of methods 1-5 in graphical form. As can be seen there is very little difference between methods 1, 2, 3 and 5 at the level of national aggregation and methods 1 and 2 are indistinguishable. Method 4, the assumption that all labourers are agricultural does produce significantly different results. Whilst the assumption is implausible this does give an upper bound figure for the size of the primary sector in 1813-20 and a lower bound figure for the size of the secondary sector at that date. For this paper, method 2 (incorporating the assumption that all non-agricultural labourers were in the secondary sector and that the secondary sector's share of all labourers was the same in 1813-20 as in 1851) has been adopted. In future re-tabulations of the data we will use a modified combination of method 3 and 6 but all the re-allocations will be applied at the level of the registration district. We will assume that non-agricultural labourers should be

**Figure 8. Male occupational structure of England and Wales c.1817 to 1871:
Five methods for the sectoral allocation of labourers in 1813-20**



allocated to mining in the primary sector, the secondary sector and to transport in the tertiary sector in proportion to the size of those sectors before the allocation of labourers. The numbers of non-agricultural labourers will be estimated by assuming

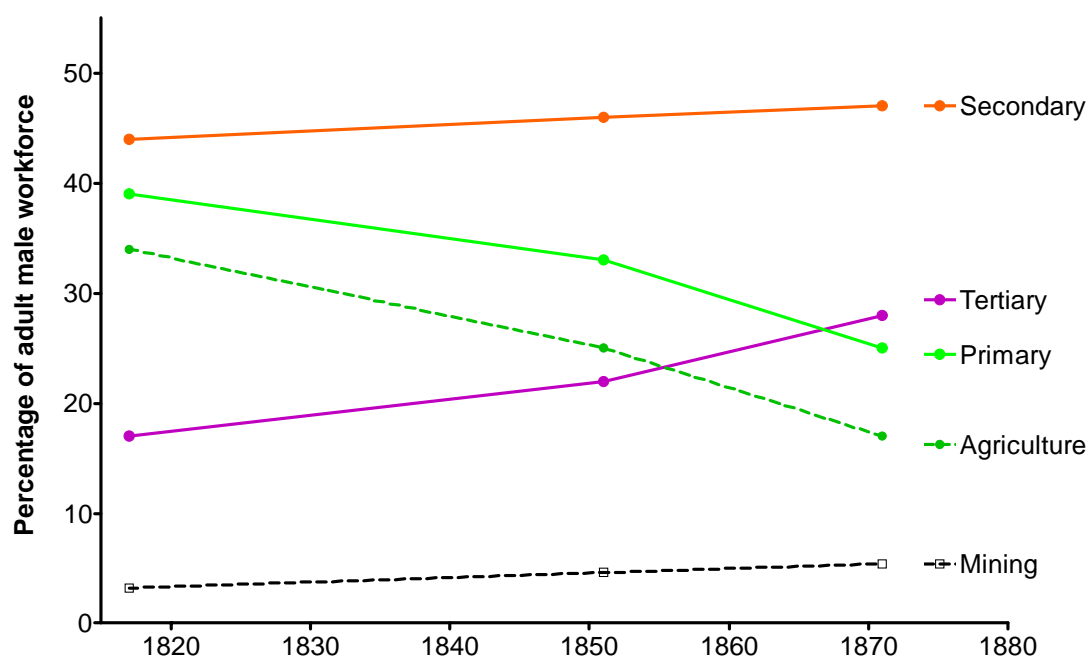
that, in each registration district labourers formed the same share of the mining, secondary and transport sectors in 1813-20 as they did in 1851.²²

The occupational structure of England and Wales c.1817 to 1871

Figure 9 below show the results for method 3 again but also shows agriculture and mining separated from the primary sector. The growth in the secondary sector's share of employment is very muted over the latter half of the period conventionally considered as the Industrial Revolution. The decline in the primary sector's share of male employment growth is fairly steep and is clearly driven overwhelmingly by the rapid decline in agriculture's share of employment but offset slightly by the growth of mining's share of employment.

The most striking feature of figure 9 is the dynamism of tertiary sector employment. The effects of refining the 1813-20 dataset are modest in this regard.²³ It is clear from this graph that, at the national level, the key structural shift in this period was not a proportional re-allocation of the labour force from the primary sector to the secondary sector but a proportional shift from the primary sector to the tertiary sector. The rapid growth of the tertiary sector across the nineteenth century stands in sharp contrast to the sector's very modest growth in the eighteenth century.²⁴ The contrasting nature of structural change in the eighteenth and nineteenth centuries opens up a series of fundamentally important questions but will not be discussed further here.²⁵

Figure 9. Male occupational structure of England and Wales c.1817 to 1871 (method 3)



²² This is the method used in Kitson et al, 'The creation.' For obvious reasons the numbers reported there for 1813-20 differ somewhat from those reported here. Those numbers will supersede the ones reported here and the 1851-1871 numbers will be recalculated using the same procedures.

²³ See, Kitson et al, 'The creation.'

²⁴ See: Shaw-Taylor et al, The occupational structure of England c.1710-c.1871

²⁵ But see *ibid*, for a preliminary discussion.

The occupational structure of English and Welsh counties I

In this section of the paper we will disaggregate the changing occupational structure to examine change at the county level in graphical form. In the following section we will examine the patterns further making use of county level maps. Figure 10 shows the male occupational structure of Nottinghamshire c.1817 to 1871. The stability of the secondary sector over the whole period is as remarkable as it is unexpected. The shift from primary to tertiary sector, so apparent at the national level is evident here too.

Figure 10. Male occupational structure of Nottinghamshire c.1817 to 1871

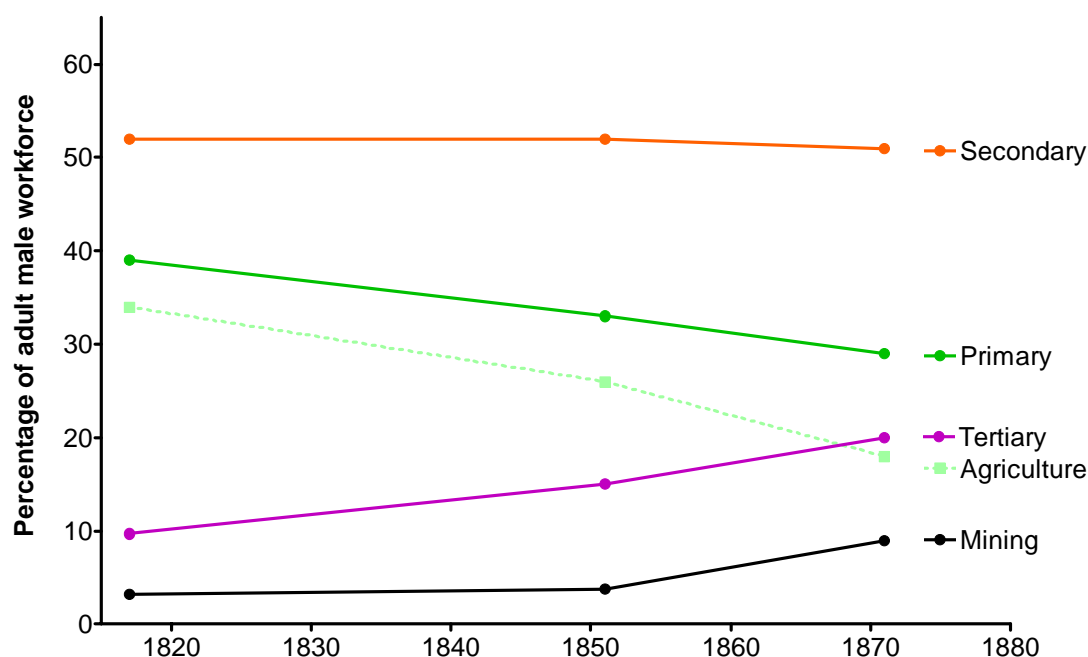


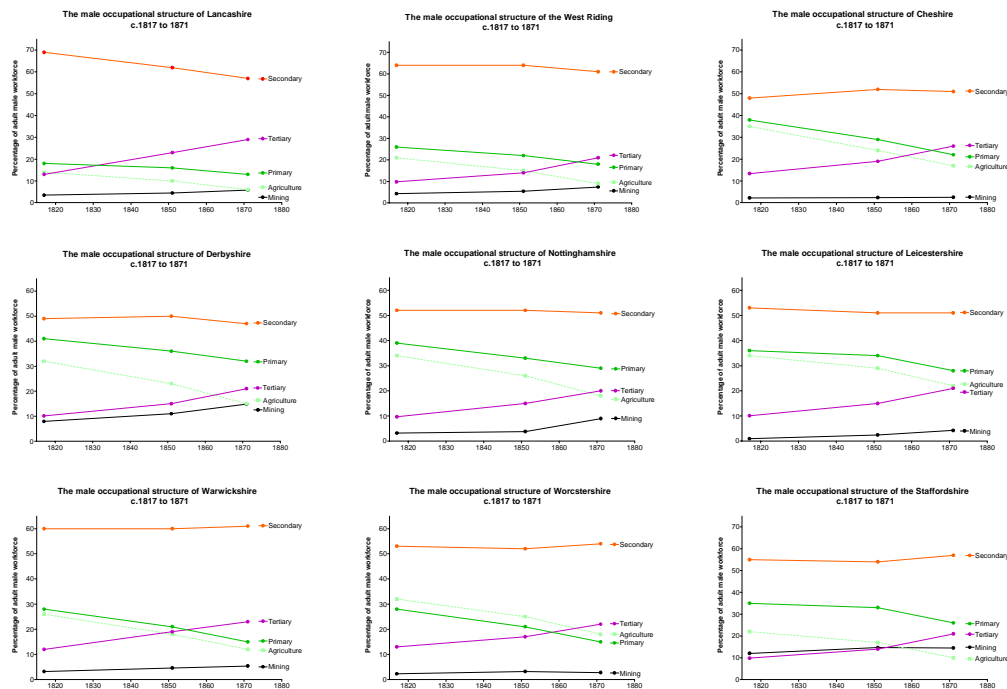
Figure 11 below shows the male occupational structures c.1817 to c.1871 for nine ‘industrial counties’, all of which had 50 per cent or more of the male workforce in the secondary sector by c.1817. In most cases the pattern is strikingly similar to that in Nottinghamshire. The only significantly different pattern is that for Lancashire (top left) where the relative importance of the secondary sector is actually in decline over the nineteenth century. None of these counties exhibit the kind of change in the occupational structure that a familiarity with the current historiography would lead one to expect – i.e. a sharp increase in the relative importance of secondary sector employment at the expense of agriculture.²⁶

Figures 12 and 13 show the male occupational structures c.1817 to c.1871 for 17 relatively ‘agricultural counties.’ Again agricultural employment was falling everywhere as a share of total employment while the tertiary sector’s employment share was rising everywhere. But many of these counties did experience a significant increase in the secondary sector’s share of total employment over the course of the

²⁶ Kuznets, S., *Modern economic growth*; Deane, P., and Cole, A.W., *British economic growth*; Lindert, P.H., and Williamson, J., ‘Revising England’s social tables’; N.F.R. Crafts, *British economic growth*; Berg, M., Hudson, P., ‘Rehabilitating the Industrial Revolution’; Crafts, N.F.R., and Harley, C.K., ‘Restating.’

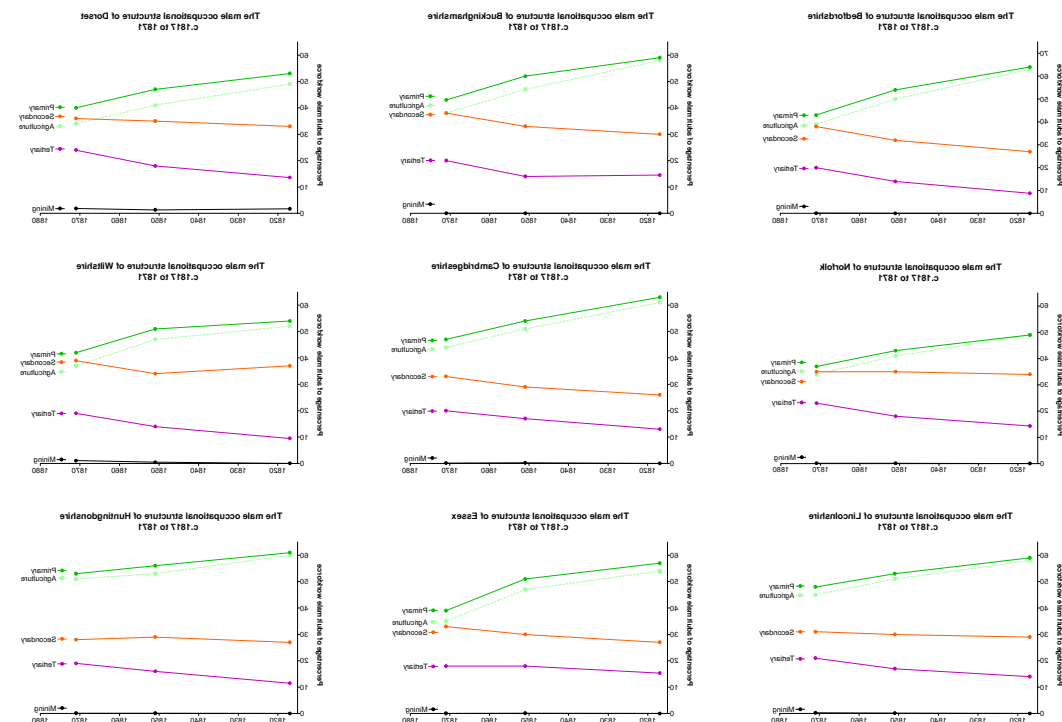
nineteenth century. Ironically, some of these counties, far from what are traditionally considered to be the heartlands of the Industrial Revolution, present a picture closer to that which the historiography of the period might have led us to expect either nationally or in the more industrial areas. The East Riding of Yorkshire or Northamptonshire are perhaps closest to this image.

Figure 11. Male occupational structure of Industrial counties c.1817 to 1871



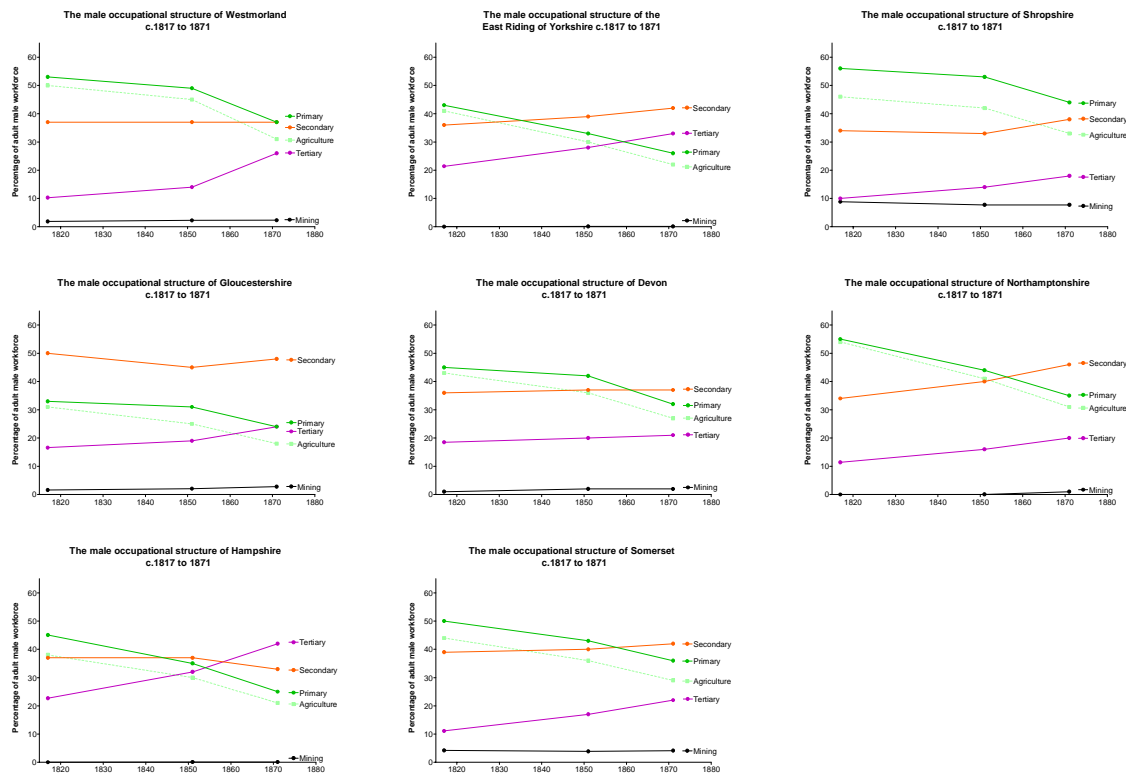
From top left to bottom right the counties shown are Lancashire, the West Riding, Cheshire, Derbyshire, Nottinghamshire, Leicestershire, Warwickshire, Worcestershire and Staffordshire.

Figure 12. Male occupational structure of agricultural counties I c.1817 to 1871



From top left to bottom right the counties shown are Bedfordshire, Buckinghamshire, Dorset, Norfolk, Cambridgeshire, Wiltshire, Lincolnshire, Essex and Huntingdonshire.

Figure 13. Male occupational structure of agricultural counties II c.1817 to 1871



From top left the counties shown are Westmorland, The East Riding of Yorkshire, Shropshire, Gloucestershire, Devon, Northamptonshire, Hampshire and Somerset.

The occupational structure of English and Welsh counties II

It is easier to take in the geography of these patterns if the data are presented in map form and it is also viable to absorb considerably more data that way. This section of the paper therefore presents a series of maps of county level occupational data for the period c.1817 to 1871.²⁷ Only brief comments will be made on each map.

Figure 14 shows the percentage of adult male employment in each registration county in c.1817, 1851 and 1871 in agriculture. Two features of the patterns are noteworthy, if unsurprising. Firstly, the decline in the importance of agriculture is universal and by 1871 Huntingdonshire and Hereford are the only registration counties with over half of all adult male employment in agriculture. Secondly, the relative regional geography is preserved over time in the sense that the pattern of high and low relative levels is broadly similar over time with the exception of South Wales

Figure 15 shows the percentage of adult male employment in each registration county in c.1817, 1851 and 1871 in mining. Whilst many areas with well established mining operations show a stability of employment patterns other areas, most notably South Wales, but also North Wales, Westmoreland and the North Riding show very dramatic growth in mining over this period. The spectacular growth of mining in South Wales accounts for the relative rapidity of the decline of agriculture's share of employment noted above. It is also apparent in the extraordinary rates of population increase on the South Wales coalfield over the nineteenth century revealed by our work on population geography.²⁸

Figure 16 shows the percentage of adult male employment in each registration county in c.1817, 1851 and 1871 in the secondary sector. The general pattern of stability in, when viewed at the county level, is remarkable, though the modest decline from very high levels in some of the industrial counties is visible. Figures 4 (above) and 17 (below) suggest that when we come to examine these trends at a higher level of spatial resolution we will find that stability at the county and regional level masks significant spatial re-arrangements within regions. The most striking exceptions to county level stability is the major increase in secondary sector employment levels in Durham²⁹ It is likely that further exploration of the data at a finer spatial resolution will show that these developments were dominated by the coal-field. There are also some noticeable increases in Northumberland, the North Riding and Northamptonshire.³⁰ The former, no doubt relates also relates to the coal field while the latter can safely be attributed to the continued expansion of the shoe making industry. The increases in relative secondary sector employment, from low levels, in predominantly agricultural counties is also notable. This is in striking contrast to the de-industrialisation that we can document for many of these counties in the eighteenth century, as a result of which agriculture had higher employment shares c.1710 than it

²⁷ As intimated previously this exercise will be extended to 1911 when the paper is revised for publication.

²⁸ See the maps at

<http://www.geog.cam.ac.uk/research/projects/occupations/britain19c/populationenglandwales/>

²⁹ In fact the registration district maps of the mining and secondary sectors included in the addendum to this paper reveal a somewhat more complex pattern. Secondary sector growth was indeed confined to very restricted areas of the two counties. It was focussed along the Tyne and on the north side of the Tees (an area which does not overlap with the coalfield).

³⁰ See Shaw-Taylor, L., and Jones, A., 'Northamptonshire.'

had in 1817 for all those 'agricultural' counties for which we have eighteenth century data.³¹

Figure 17 takes one element of the secondary sector, textile employment and shows its relative importance at parish level at the two dates for which we have data, c.1817 and 1881 at that level of spatial resolution. This serves to give an indication of how much more it will be possible to uncover by examining the data at finer levels of spatial and temporal resolution.³² Figure 17 neatly illustrates the spatial characteristics of the shift from proto-industry to factory-industry. In c.1817 the dominance of a region encompassing, south-east Lancashire, neighbouring parts of the West Riding of Yorkshire and north-east Cheshire is already striking. But at that date a much more spatially dispersed pattern of textile employment is still widespread in the north of England, Wales and parts of the south-west. The spatial dispersion of much of the textile industries in large parts of the country clearly indicates the survival of cottage industry in those areas in c.1817. By 1881, outside west Wales, very little of this spatially dispersed industry survived. Figure 2 (above) showed very clearly the location of cottage industry in framework knitting in c.1817. Thus mapping the data at this level provides very powerful evidence of the survival, or otherwise of cottage industry. The widespread existence of a cottage-textile industry (probably blanket weaving) in West Wales, as late as 1881, came as a surprise to us, which is a further indication of the benefits of this kind of simple mapping exercise.

The spatial contraction of the textile district in the north-west, evident in figure 17, is itself probably associated with the interrelated processes of urbanisation and the move from cottage industry to factories within the textile districts. These occupational data together with the new population data created by E.A. Wrigley will allow this process to be investigated much more fully than has hitherto been possible.³³

Figure 18 shows the percentage of adult male employment in each registration county in c.1817, 1851 and 1871 in the tertiary sector. It is now apparent that every single registration county in England and Wales experienced significant tertiary sector growth between 1813-20 and 1871. This suggests that structural change during the Industrial Revolution cannot be adequately conceptualised a process confined to some quasi-autarkic industrial regions which by-passed much of the country as has been suggested in some accounts.³⁴

One surprising feature of tertiary growth is the relatively even spread of the growth between the major components of the tertiary sector and this can be seen in figures 19 through 22 which maps some of larger sub-sectors. Much the largest sub-sector was transport which accounted for around 30 per cent of the tertiary sector throughout the nineteenth century. Figure 19 shows the percentage of adult male employment in each registration county in c.1817, 1851 and 1871 in the transport sector. Nationally, this grew from 5 per cent to 8.6 per cent between c.1817 and 1871. By 1911 it had

³¹ Shaw-Taylor, L., et al., 'The occupational structure of England and Wales c.1710 to c.1871'

³² For a further illustration of this point with respect to textiles, see the registration district level maps for c.1817, 1851, 1861 and 1881 in the addendum to this paper and at:
<http://www.geog.cam.ac.uk/research/projects/occupations/britain19c/occupationsenglandwales/>

³³ A comparison of the pattern of population densities in 1801 and 1891 within the textile region at <http://www.geog.cam.ac.uk/research/projects/occupations/britain19c/populationenglandwales/> is instructive on this point.

³⁴ Most notably by Jack Langton, Maxine Berg and Pat Hudson: Langton, J., 'The Industrial Revolution and the regional geography of England'; Berg, M., Hudson, P., 'Rehabilitating the Industrial Revolution'.

reached the extra-ordinary level of 12.5 per cent, making it a substantially larger employer of male labour than coal mining and four times larger than textiles. No other European country had anything like such a large share of the male workforce in transport in the nineteenth century.³⁵

Rapid growth in the relative importance of transport employment can be seen in virtually every registration county in England and Wales. Northumberland and Durham stand out as two interesting exceptions to this general pattern. In 1813-20 these two counties had the highest levels of transport employment in England and Wales presumably because so much labour was required to move coal from the pit-head to the wharves on the Tyne. It is striking that despite the spread of the railways, which might be expected to raise labour productivity in transport, and hence decrease the share of male labour in transport employment, the share of male labour in transport employment rose sharply everywhere with the striking exception of the north-eastern coalfield. Three hypotheses may be advanced here, which will, in due course, be tested using the datasets we have created. The first, the increasing spatial concentration of the population into certain areas, together with the massively increased output of coal mines and parts of the secondary sector required a great increase in the freight traffic. The second is that the increase in labour productivity in transport associated with the development of the railways was offset in the transport sector as a whole, because of the need to move the increased flows of primary and secondary goods to and from railway stations by carts and wagons and to load and unload trains, wagons and carts by hand. The third is that in the north-east, the major user of transport services was the coal industry, and here the impact of the railways on the overall productivity of the transport sector was so great that the increased coal output of the region could be moved around by a smaller share of the adult male labour force, perhaps because trains replaced carts and wagons in a more thoroughgoing manner by running all the way from the pithead to the wharves or county borders. Clearly these are issues which require much more detailed exploration. But the tools with which to do so are at hand.

Figure 20 shows adult male employment in retailing and wholesaling. Nationally the sector doubled its share of adult employment from 3 per cent to 6 per cent between 1813-20 and 1871 and went on to reach 7.6 per cent by 1911. The rapid growth of retailing and wholesaling employment is evident within every registration county in England and Wales. Taken together, transport, retailing and wholesaling employment accounted for around half of all tertiary sector employment across the whole period 1813-20 to 1871 and indeed down to 1911. Although some share of transport employment was obviously concerned with passenger traffic this means that the distribution of primary and secondary sector products accounted for approaching half of all tertiary sector employment.

Figure 21 shows adult male employment in professional and administrative employment. Nationally, this rose from 2.3 to 5 per cent between 1813-20 and 1871. But once again, it can be seen that this was a geographically ubiquitous phenomenon. It is likely that this too was very largely a consequence of the greatly increased flow of primary and secondary products around the country.

Finally figure 22 shows adult male employment in the hospitality trades, which was dominated by inn-keeping. Again there was a substantial increase in every part of the country. But the much higher levels of employment in the south-east by the end of

³⁵ Mitchell, B.R., *European Historical Statistics*.

the period are striking. No obvious explanation suggests itself. Did southerners simply drink more? Or did the south-east simply contain a higher proportion of residents with the money and time to spare for drinking? Neither seems a very plausible explanation. More detailed examination of the data, not least at a higher level of spatial resolution, may, in time, throw more light on this intriguing phenomenon.

Figure 14. Male employment in agriculture by county c.1817 to 1871

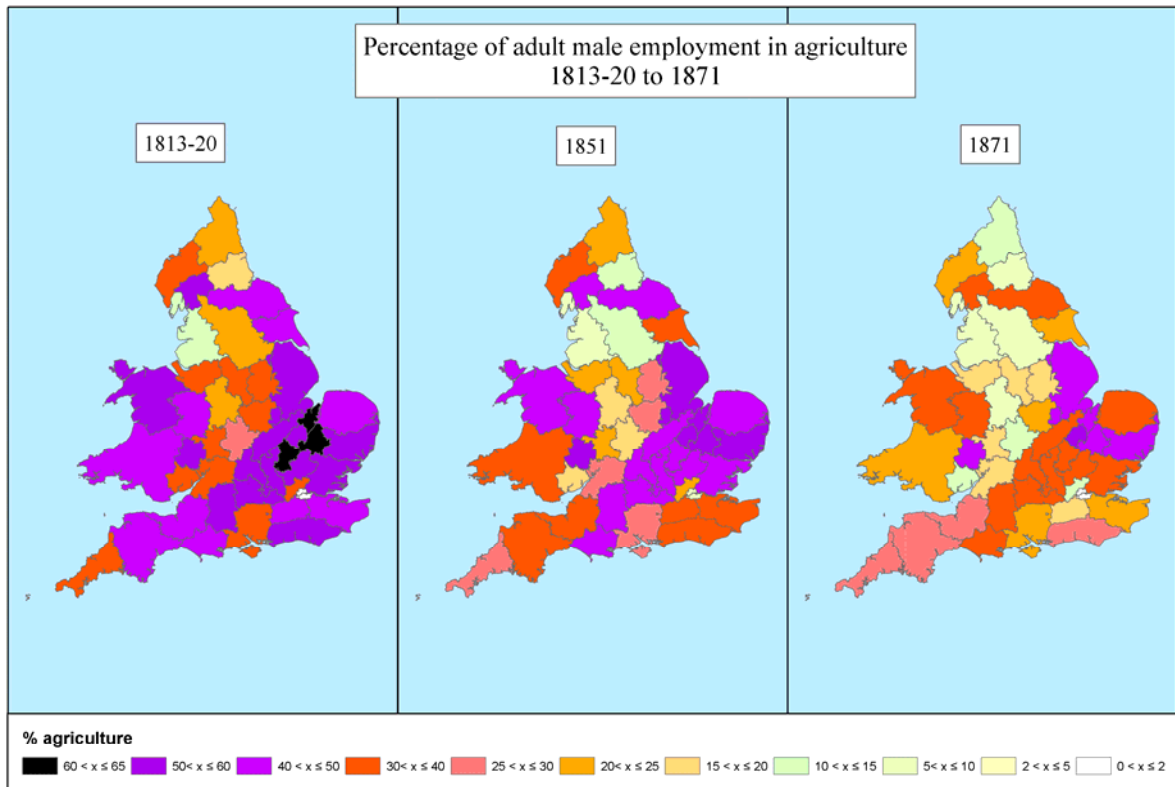


Figure 15. Male employment in mining by county c.1817 to 1871

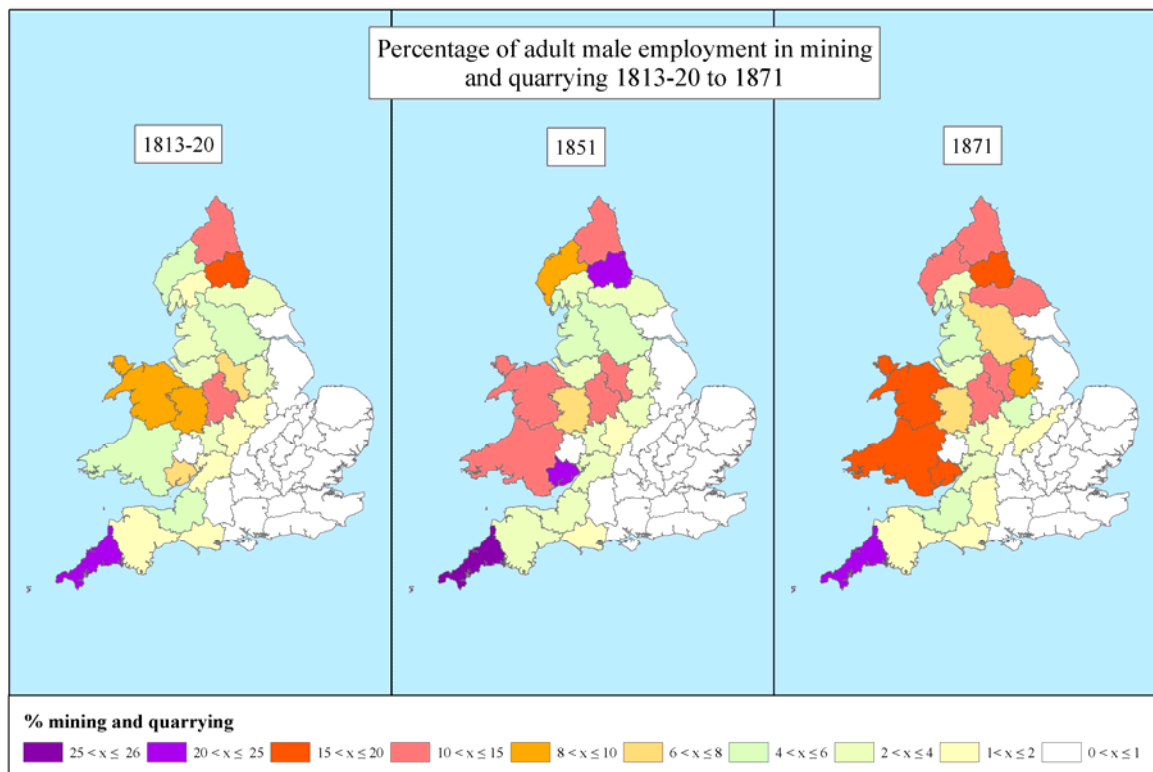


Figure 16. Male employment in the secondary sector by county c.1817 to 1871

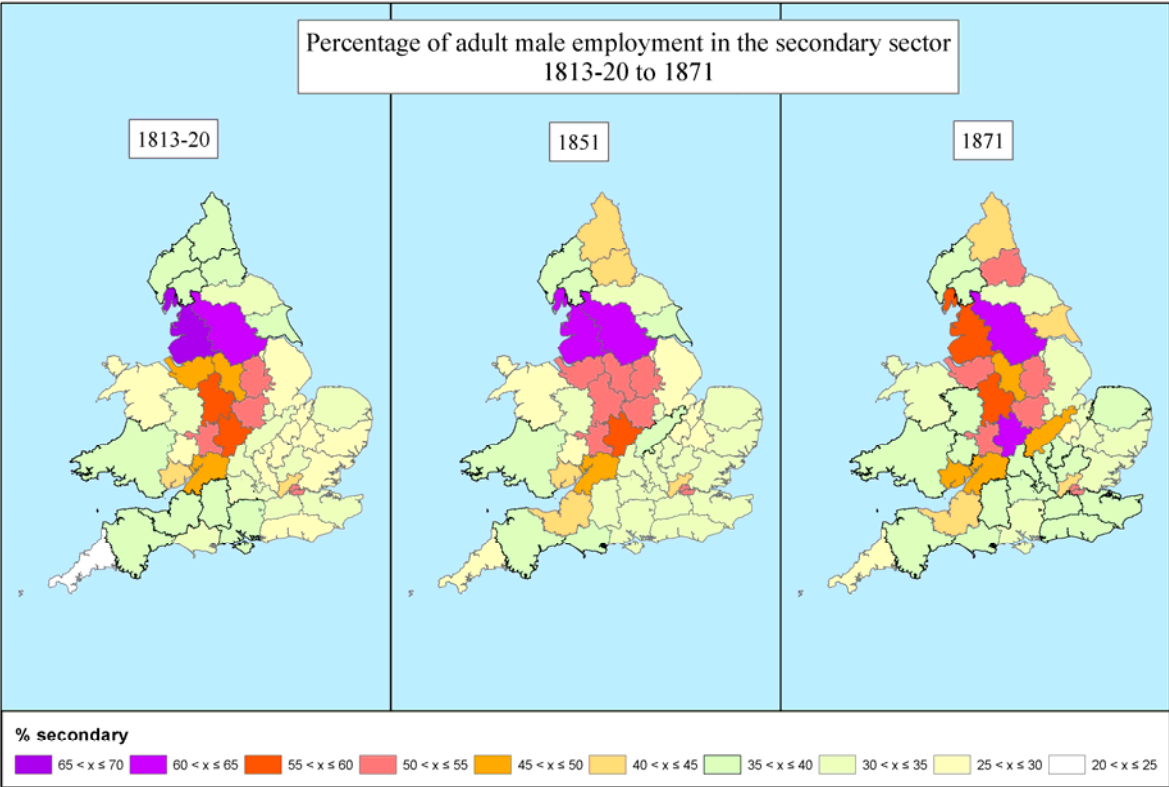


Figure 17. Male employment in the textile sector by parish c.1817 and 1881

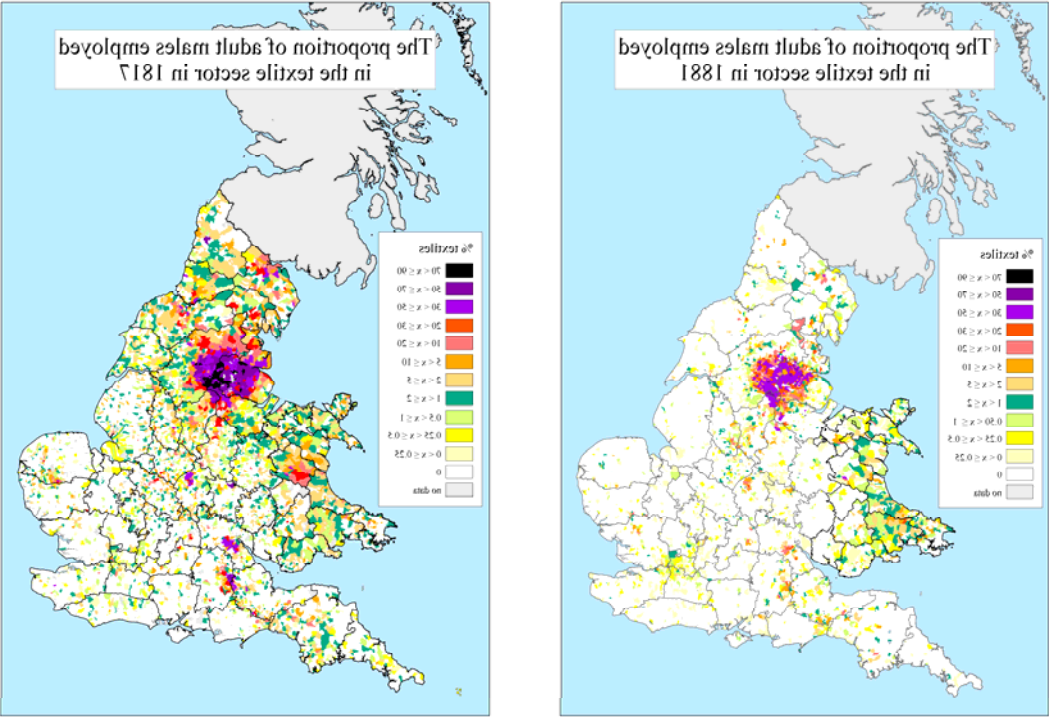


Figure 18. Male employment in the tertiary sector by county c.1817 and 1881

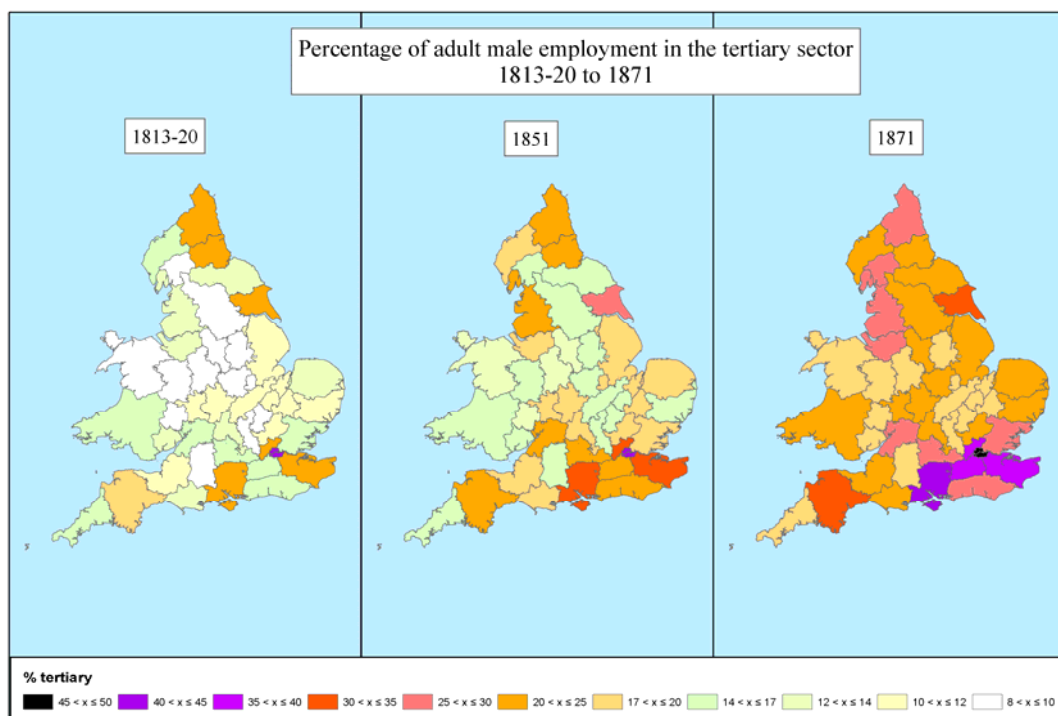


Figure 19. Male employment in the transport sector by county c.1817 and 1881

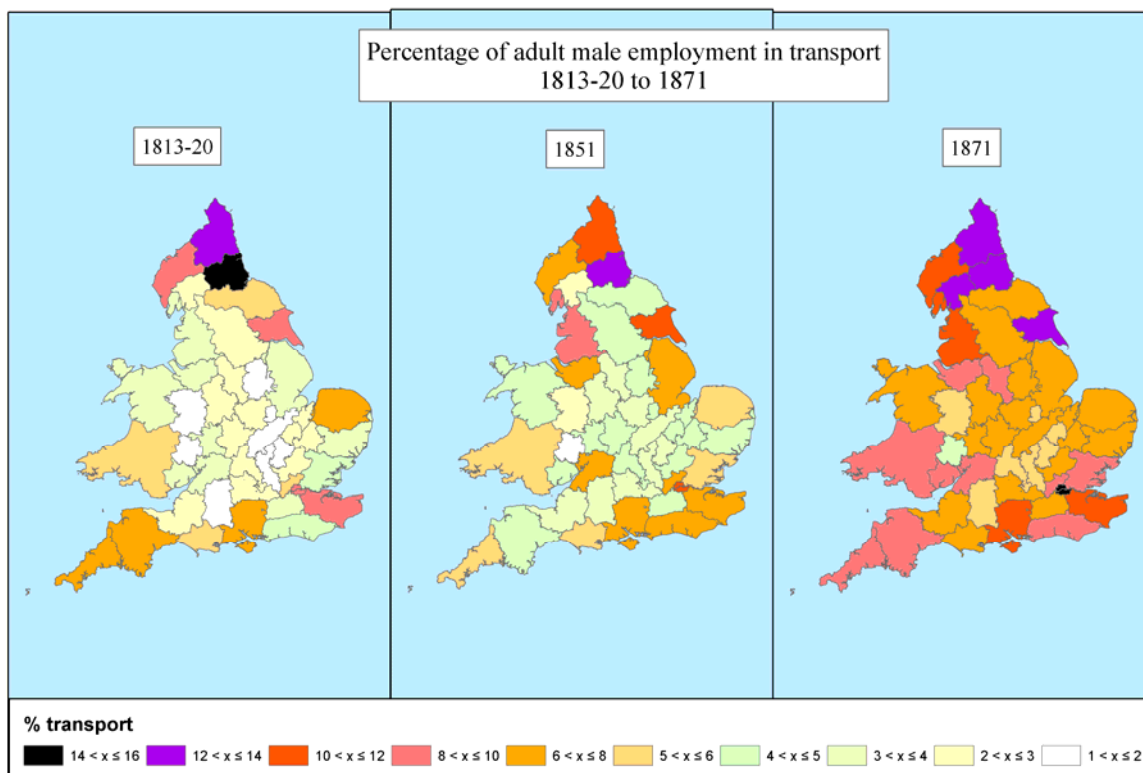


Figure 20. Male employment in the wholesale and retail sectors by county c.1817 and 1881

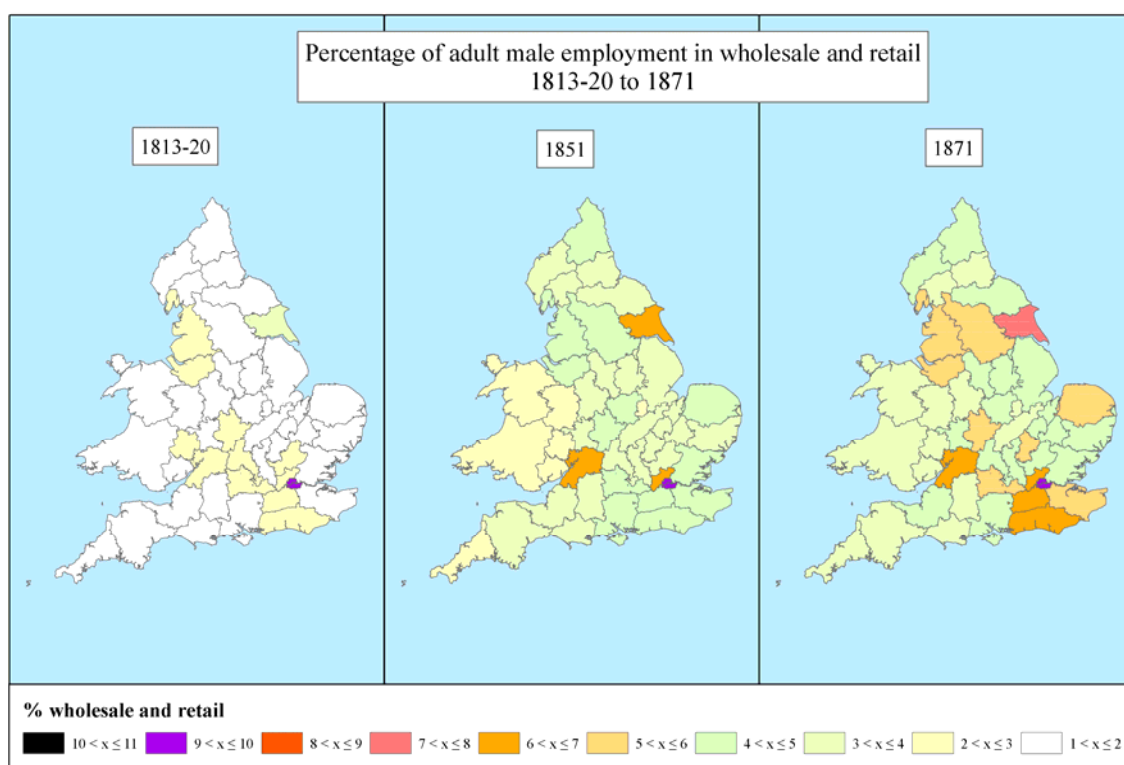
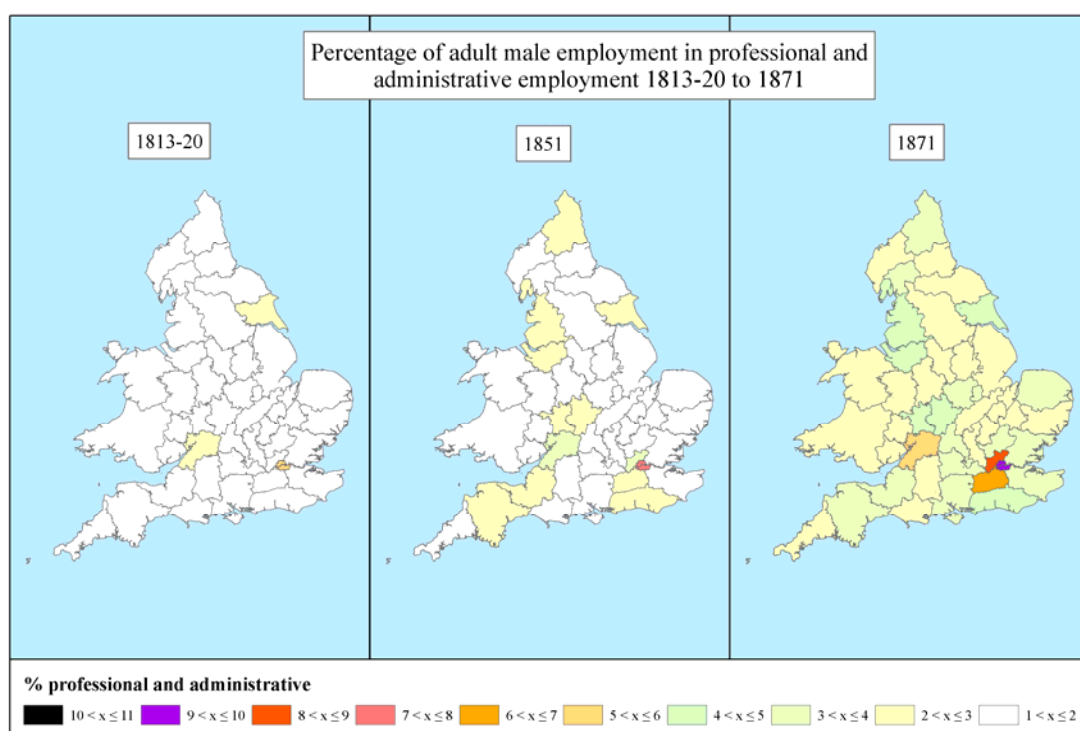
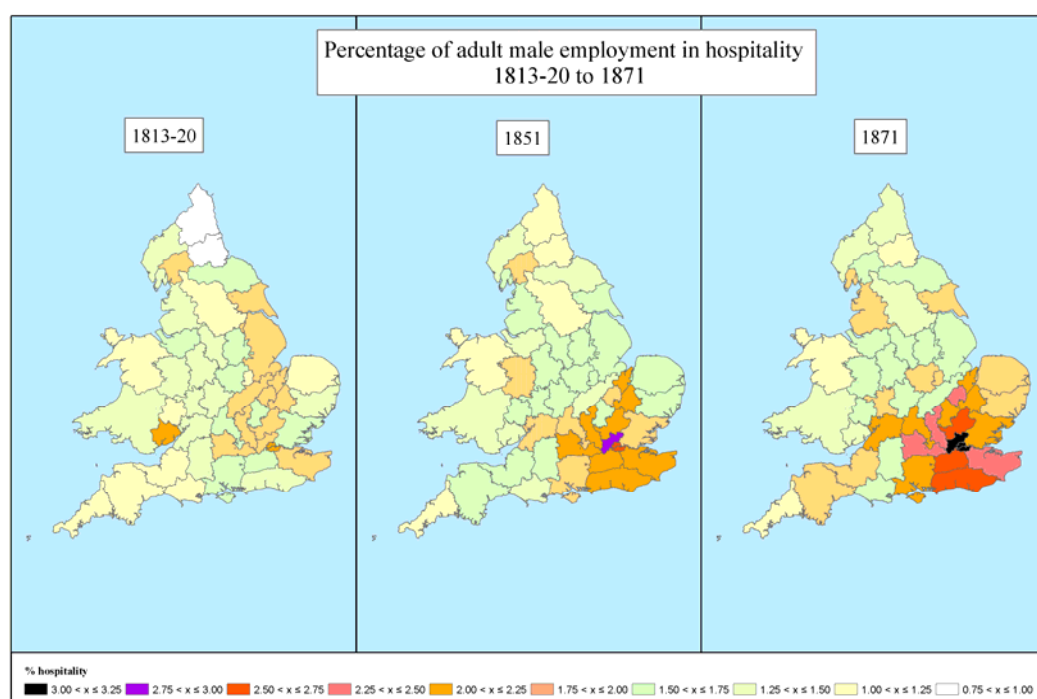


Figure 21. Male employment in professional and administrative employment by county c.1817 and 1871



**Figure 22. Male employment in the hospitality sector by county
c.1817 and 1871**



Concluding remarks

Before concluding two caveats are necessary. Firstly, as has been discussed already, all of the data presented in this paper are provisional and will be revised somewhat before publication. This relates in part to the question as to the optimal way of allocating labourers to particular sectors and in part to a reweighting of the 1813-20 dataset³⁶. More progress has been made on this issue since the data in this paper were presented in 2008. However, we have not yet had the opportunity to incorporate the revisions to the data here. For the moment, it will have to suffice to say that the revisions to that data do not appear to substantially affect the picture presented above or the conclusions discussed below.

A more intractable issue is that all the data presented in this paper relate to adult males. Good data on female employment are not currently available for any date before 1851.³⁷ With some caveats about the reliability of the recording of agricultural employment, the censuses of 1851 onwards do provide a good guide to patterns of female employment.³⁸ An analysis of male and female employment patterns 1851 to

³⁶ See Kitson, P., et al, 'The creation' for details.

³⁷ The data on female employment in 1841 do not provide a good guide to female employment though they have often been used uncritically as if they were comparable in quality with the censuses of 1851 onwards, which they are not. In 1841, but not 1851, married women living with their husbands, and unmarried women co-resident with their fathers were specifically requested not to report an occupation. This makes the data on female unemployment in 1841 fundamentally more problematic than that in the published censuses from 1851 onwards.

³⁸ See Shaw-Taylor L., 'The occupational structure of England and Wales c.1750 to 1911', for a discussion of female employment between c.1817 and 1911 in relation to male employment. See

1911, discussed elsewhere suggests that including data on female employment, once it possible to do so from 1851 does not fundamentally change the picture presented here, though it obviously enriches it considerably.³⁹ One reason for this is that in the nineteenth century female labour force participation rates were radically lower for women than men. Another is that the employment trends after 1851 in the three sectors appear broadly similar between male and female employment. Including women does reduce the growth of the tertiary sector after 1851 somewhat because women were disproportionately employed in the service sector and the growth of female employment in the tertiary sector was not as pronounced as for men.

There are strong grounds for supposing that there was a major reduction in the levels of female employment, associated with the mechanisation of spinning, before c.1817 in the secondary sector.⁴⁰ The absence of data on female employment before c.1817 therefore has the potential to distort the broad picture of trends in occupational structure significantly in a way that would not be true for the later period if we had no data for female employment from 1851 onwards, though we can make plausible guesses about the nature of the distortion in the earlier period.⁴¹ But what about the period between c.1817 and 1851?⁴² The mechanisation of spinning was largely completed by c.1817. With the exception of power-loom weaving in cotton textiles, no major sector of employment would have been heavily affected by mechanisation between those dates. It can be shown that between 1851 and 1871 the sex ratios of the major employment sectors were remarkably stable. It is therefore at least plausible that the sex ratios in the major employment sectors in 1851 were not radically dissimilar from those prevailing in c.1817. If this line of reasoning is not too far off the mark, then what holds true for the period after 1851 will hold true for the period between c.1817 and 1851. In other words, the absence of data on female employment in the period between c.1817 and 1851 is unlikely to fundamentally distort the broad picture of structural change presented here. However, these are rather speculative arguments and it is self-evident that anything that could be done to fill the evidential lacunae on female employment would be of great value.

By way of conclusion a number of key points may be emphasised. Firstly, the secondary sector was much larger, at the beginning of the nineteenth century than has been presumed hitherto. Whereas we find the secondary sector employing 43.3 per cent of the adult male workforce, Nick Crafts has used the figure of 24.7 per cent for 1802-3. Crafts' figure is based on Peter Lindert and Jeffrey Williamson's re-working of the contemporary estimates made by Patrick Colquhoun. Some of the difference between our figure and Crafts' figures might be accounted for by the fact the Crafts' figures nominally include Scotland and women, whereas our figures do not. But this is likely to be the source of only a modest share of the difference between the figures. If, like Crafts, we included mining in the secondary sector our figure would rise to 46.6 per cent. The main difference arises from the fact that Lindert and Williamson's estimates massively underestimate the size of the secondary sector at the beginning of

Shaw-Taylor, L., 'Diverse experiences' on female employment in England 1851 and assessment of the evidential problems with the census recording of female employment which suggests that the problems have been overstated – primarily by historians working on other sources (including the CEBS) who have not in fact examined the published census material in any detail.

³⁹ Shaw-Taylor, L., 'The occupational structure of England and Wales, c.1750-1911.'

⁴⁰ See Shaw-Taylor et al, 'The occupational structure of England and Wales c.1710 to c.1871' for a discussion of this issue.

⁴¹ For an elaboration on this point see *ibid.*

⁴² For a fuller version of the argument presented here see *ibid.*

the nineteenth century. One consequence of this difference is that we find only a very modest increase in the relative size of secondary sector employment in the first half of the nineteenth century (from 43.3 per cent in c.1817 to 45.6 per cent in 1851), whereas Crafts' account sees it rising from 24.7 per cent to 40.5 per cent in 1841. In consequence it must be the case that Crafts' has very substantially under-estimated the growth in the productivity of the secondary sector and over-estimated the growth in the productivity of the agricultural sector between 1802/3 and 1841. A much greater rate of productivity increase in the secondary sector suggests that technological improvements may have had a much greater impact on the secondary sector's productivity in this period than Crafts has suggested.⁴³

Secondly, the broad regional structure of industrial employment changed surprisingly little over the nineteenth century. This was also true in the second half of the eighteenth century.⁴⁴ This does not sit comfortably with those accounts that suggest that the industrial regions were created in the 1750-1850 period.⁴⁵

Thirdly, structural change in male employment c.1817-1871 was not dominated by a relative shift of labour from agriculture to the secondary sector, as has generally been assumed hitherto, but by a relative shift of labour from agriculture into the tertiary sector. This was true in virtually all regions of the country suggesting the industrial revolution was much more than a regional phenomenon. Over half of the tertiary sector and of tertiary growth was in the distributive sector and could be seen as causally downstream of the greatly increased flow of primary and secondary sector outputs in this period. It could be argued that the tertiary sector increased its employment share, in large part, because, overall, its productivity growth was substantially less than of the secondary sector. This is very similar to the argument that Tony Wrigley has made for the early modern period where the share of the secondary sector in total employment grew as high productivity agricultural shed labour (in relative terms) to a low (in relative terms) productivity secondary sector.

We are not the first to point to the importance of the tertiary sector. Max Hartwell argued that tertiary sector growth was of central importance to the Industrial Revolution.⁴⁶ But this perspective has not been generally adopted, perhaps because it lacked a strong evidential base. The tertiary sector as such has been largely overlooked in accounts of the Industrial Revolution. Whilst there has been plenty of work on transport, commerce, shop-keeping, banking and other components of the tertiary sector, the role of tertiary growth in structural change has not been appreciated or theorised. C.H. Lee has stressed the importance of the tertiary sector in the latter part of the nineteenth century. What is novel here is evidence demonstrating that the tertiary sector was the most dynamic sector in terms of employment growth right across the nineteenth century.⁴⁷

Fourthly, there is a striking contrast between structural change in male employment in the nineteenth century and in the eighteenth century.⁴⁸ In the eighteenth century structural change was dominated by a gradual shift from agriculture to the secondary

⁴³ It must be noted though that some of the productivity growth no doubt stemmed from non-technological developments associated with Smithian growth.

⁴⁴ Shaw-Taylor, L., et al. 'The occupational structure of England c.1710 to c.1871.'

⁴⁵ Langton, J., 'The Industrial Revolution and the regional geography of England'; Berg, M., and Hudson, P., 'Rehabilitating the Industrial Revolution.'

⁴⁶ Hartwell, M., 'The service revolution.'

⁴⁷ Lee, C.H., 'The service sector'

⁴⁸ Shaw-Taylor, L., et al, 'The occupational structure of England c.1710 to c.1871.'

sector while tertiary sector growth was muted. But in the nineteenth century, structural change was dominated by a steady shift from agriculture to the tertiary sector while the growth of the secondary sector was muted in comparison. This sharp shift in the nature of structural change may turn out to be very closely connected with the onset of modern economic growth in the early nineteenth century.⁴⁹ Be that as it may, closer investigation of this gear-change in the structural change at the beginning of the nineteenth century is likely to reveal much of great importance about the world's first Industrial Revolution.

⁴⁹ For further elaboration on this point see Shaw-Taylor, L., et al. 'The occupational structure of England c.1710 to c.1871.'

Addendum

Since this paper was presented to the Economic History Society in 2008 we have created the spatial data architecture which makes it possible to examine and to map the changing occupational geography of male employment at registration district level in c.1817, 1851, 1861 and 1881.¹ We intend to use these datasets to investigate the changing geography of employment in much more detail than is possible using the county level data in the foregoing paper. The maps which follow are presented, without comment on the individual maps, simply to illustrate what is now possible. The cartographic analysis will be complemented by statistical analysis. Again, by way of illustration we have included a table of Gini coefficients following the maps.² Other forms of mapping and of statistical analysis will be required.³

Whilst no detailed commentary is provided here on either the maps or the Gini coefficients, it is striking how little change there is in the concentration of most sectors between c.1817 and 1881 whether viewed by mapping or through gini-coefficients. At the outset the textile sector is very spatially concentrated (0.8 I c.1817 rising to 0.84 in 1881). This is broadly similar to the spatial concentration exhibited by mining. A few industries, most notably footwear and clothing, do show rising gini co-efficients at in the final period 1861-1881 but the rise is small. In the close of footwear, as the maps illustrate this is driven by a substantial detail in the importance of shoemakers in all parts of the country outside the main manufacturing centres (Northamptonshire, Leicester, Norwich and Staffordshire. Further investigation is needed but this change is probably attributed to adoption of sewing machines in both domestic and factory settings in this period. But it is likely that the major shift to factory production took place after 1881.⁴

In a few years time, when the Icem project funded by the ESRC and run by Kevin Schürer and Eddy Higgs at the University of Essex is complete, it would be possible, with a little further funding, to extend this exercise to 1911.⁵ This would enable us to test what is currently just a speculative hypothesis, that outside the textile sector, most of the spatial concentration of industry associated with the shift to factories during the maturation of the Industrial Revolution took place between 1881 and 1911.⁶ In the mean time it will still be possible to pursue the analysis beyond 1881 using county level data.

Much more striking changes took place in the tertiary sector as has already been discussed in the foregoing paper and is shown in more detail by the maps below. But the gini coefficients reveal that the service sector also became much more evenly distributed over the course of the nineteenth century. This might be explained by the service poor north and west converging with the service rich south-east over the course of the nineteenth

¹ The geography of female (and hence total employment) can be examined at registration district level too but only for 1851, 1861 and 1881. For an examination of the geography of female employment in 1851 see Shaw-Taylor, L., 'Diverse experiences.' We hope soon to add maps of female employment 1851-1881 to the project website. For the time being see

<http://www.geog.cam.ac.uk/research/projects/occupations/britain19c/occupationsbritain/>

² It was Peter Kitson's idea to make use of Gini coefficients and he who created the software necessary for their calculation.

³ One form of mapping which will be utilised is the creation of maps indicating levels of spatial concentration. The maps contained in this addendum show how important each sector was locally. But since population densities varied greatly this is a very unreliable guide to the importance of employment in particular localities for national employment. For examples of existing maps of spatial concentration for 1851 see: <http://www.geog.cam.ac.uk/research/projects/occupations/economic1851/>. Compare map 2.4 with map 2.5

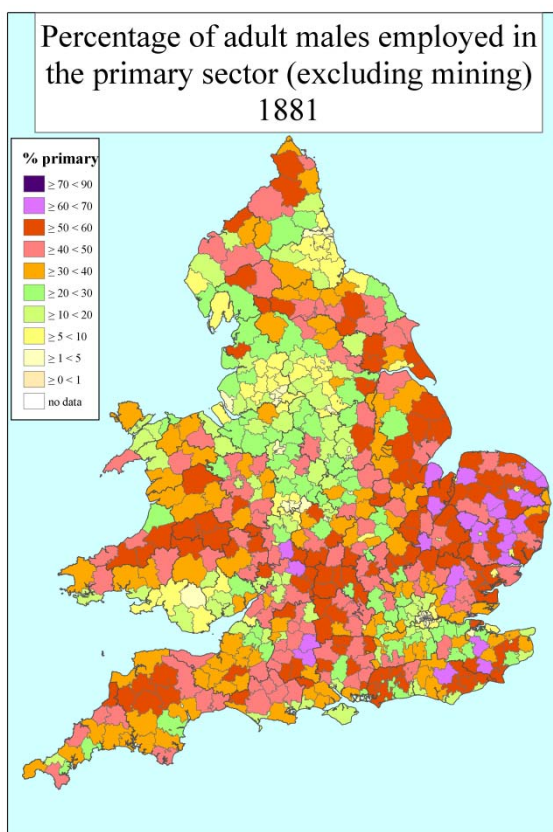
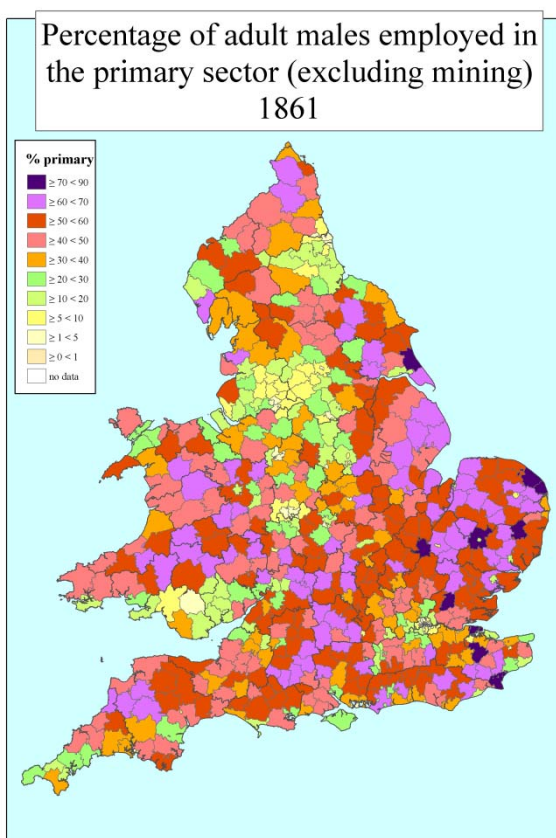
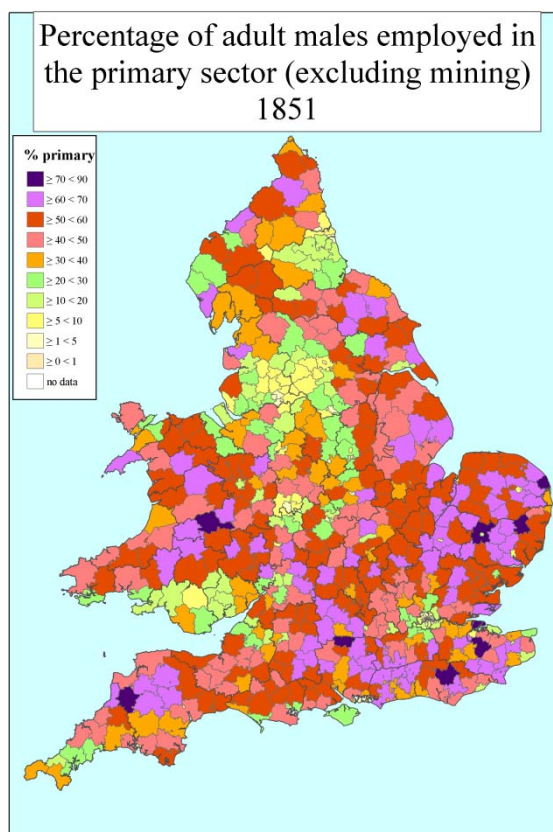
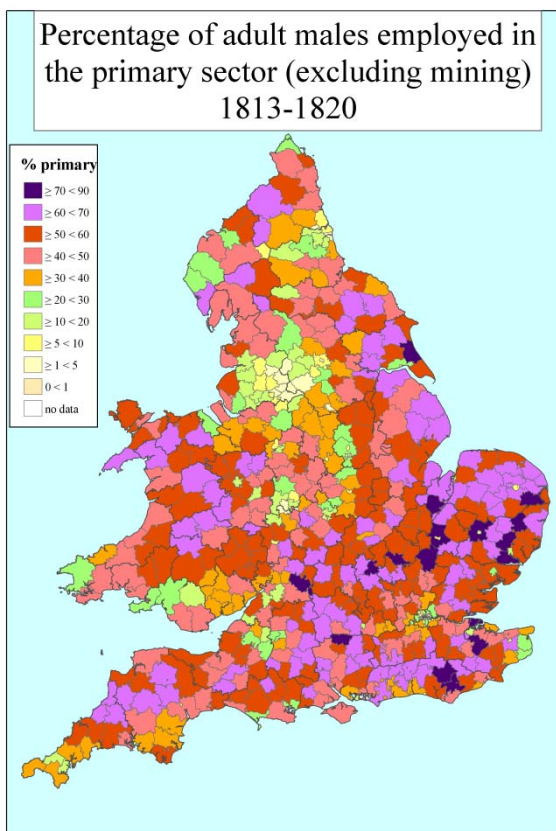
⁴ See Clapham, J.H., *Economic History of Modern Britain*.

⁵ By repeating what we have done for 1881 for other census years 1851-1911. For details of the ICEM project see: <http://www.essex.ac.uk/history/research/icem/>

⁶ Though we will be able to test this in a preliminary manner with the county level datasets we already have available.

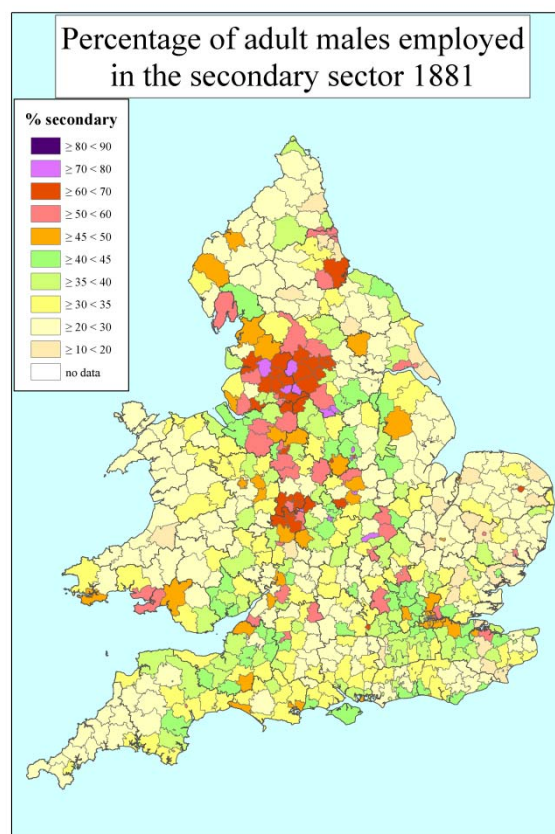
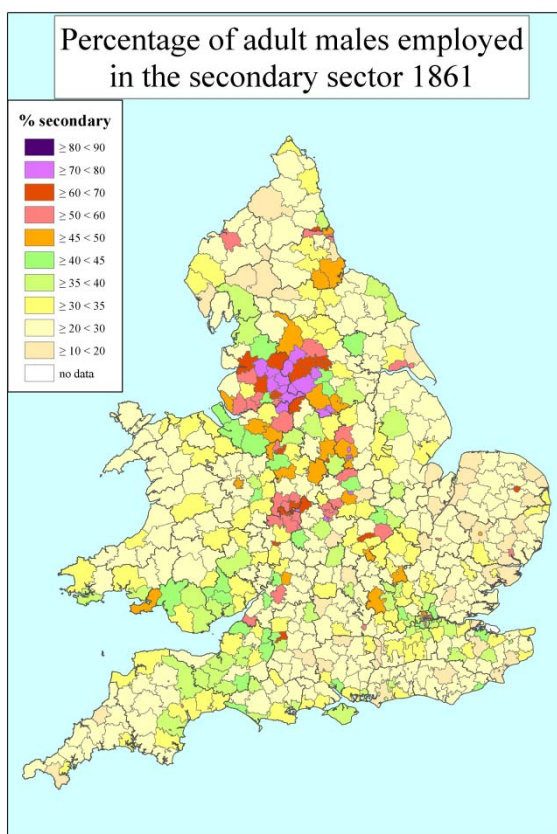
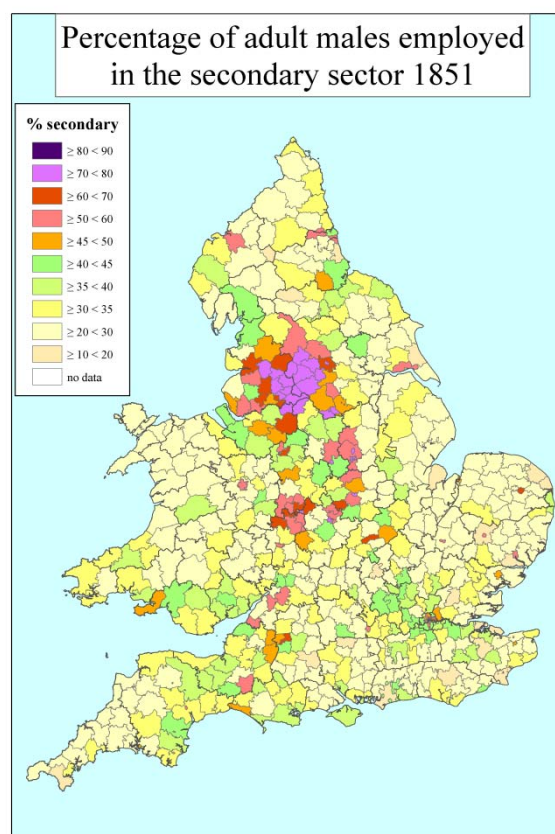
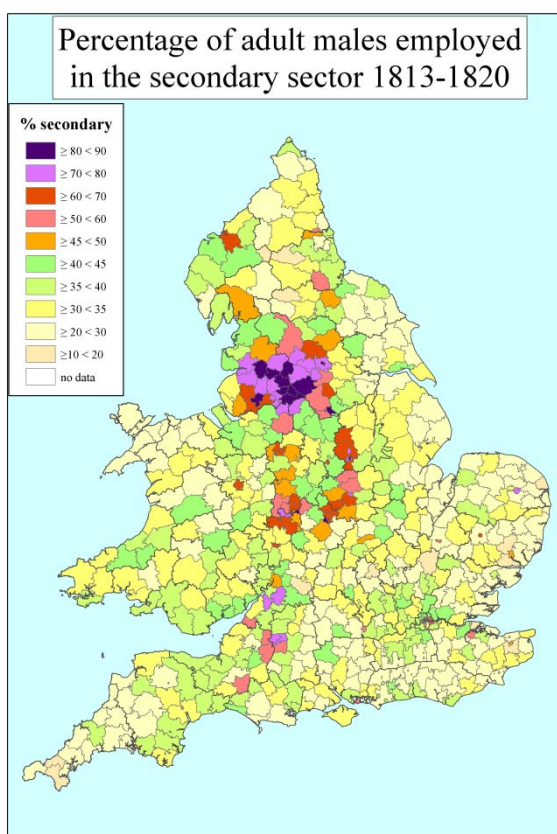
century. If so, it means that C.H. Lee's arguments about the importance of the south-east in the rise of the service sector will require some re-assessment. Clearly much more analysis of the changing spatial organisation of the nineteenth century economy is required but it is likely to be highly illuminating.

Mapping the occupational geography of England and Wales c.1817-1881
The percentage of adult males employed in the primary sector (excluding mining)



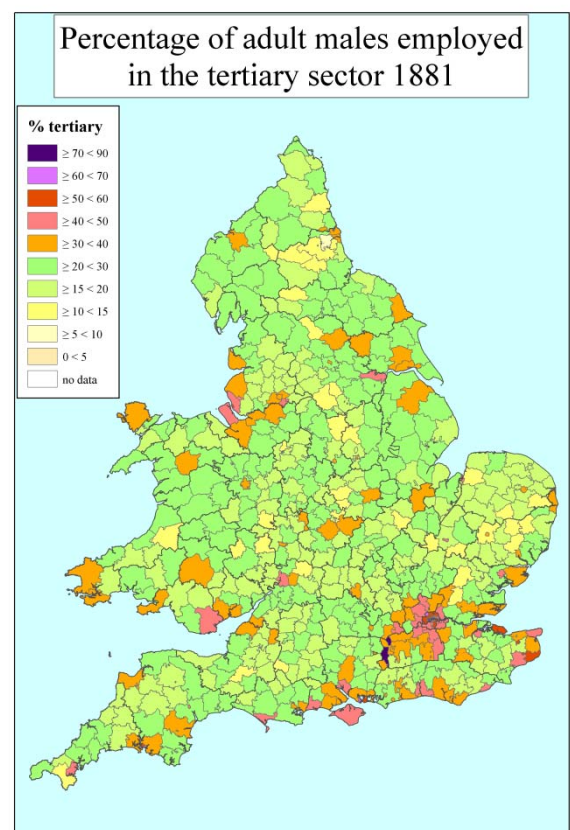
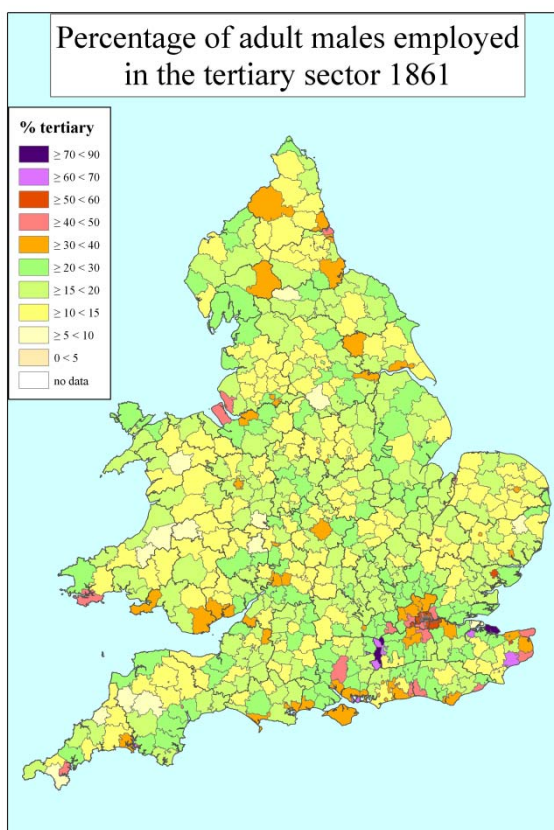
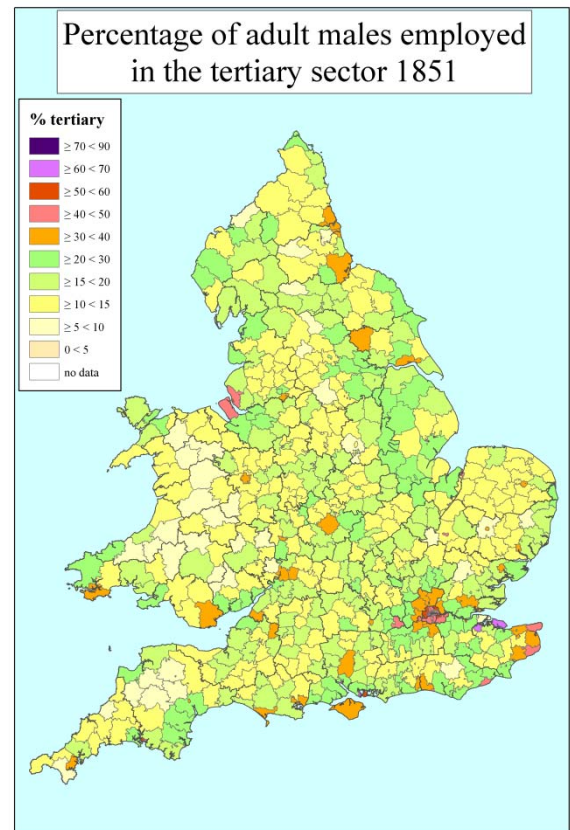
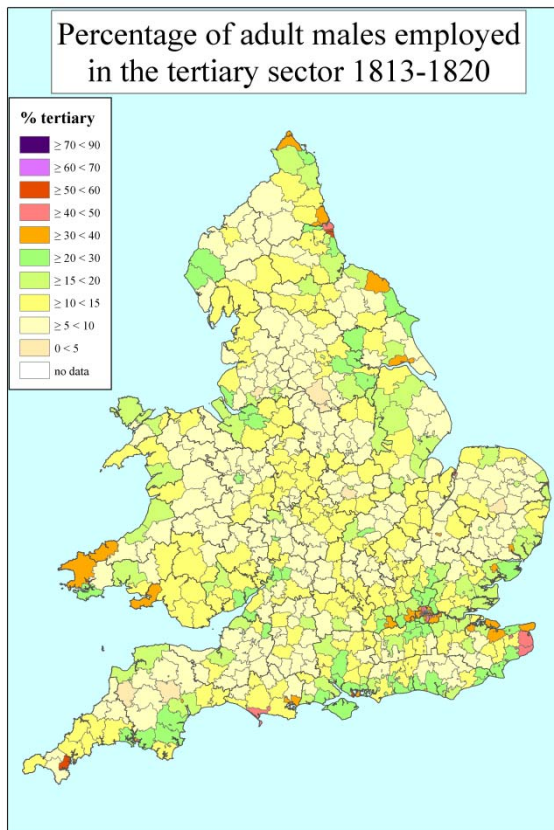
Mapping the occupational geography of England and Wales c.1817-1881

The percentage of adult males employed in the secondary sector



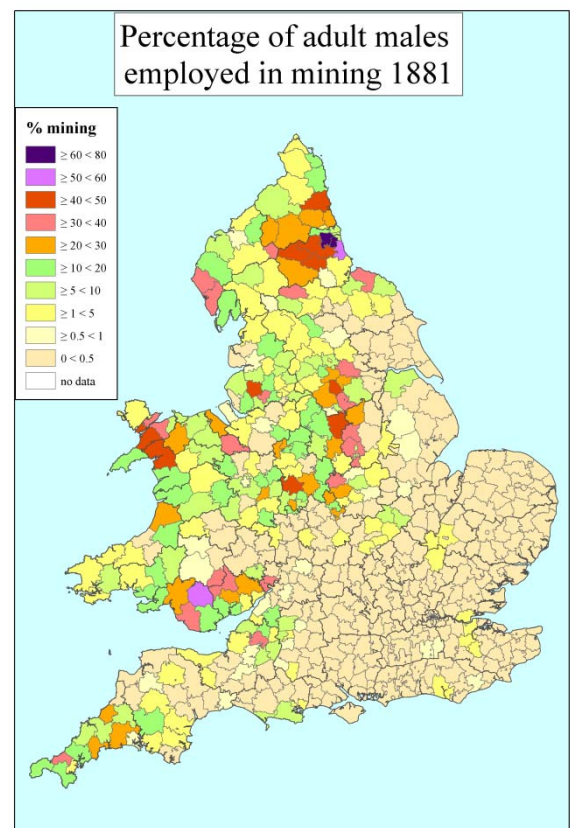
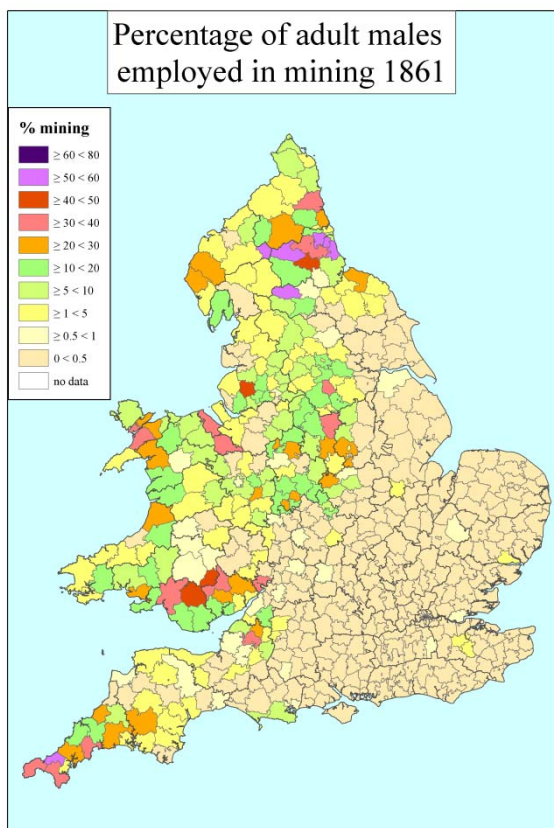
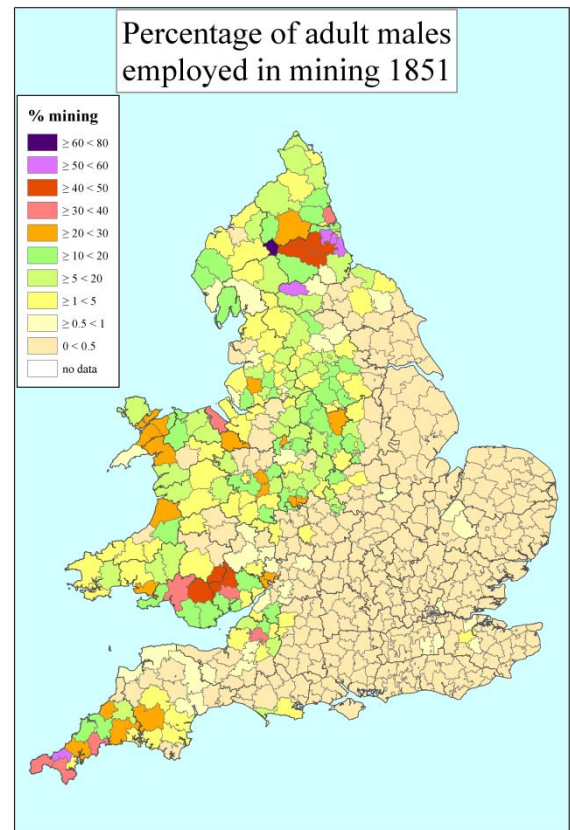
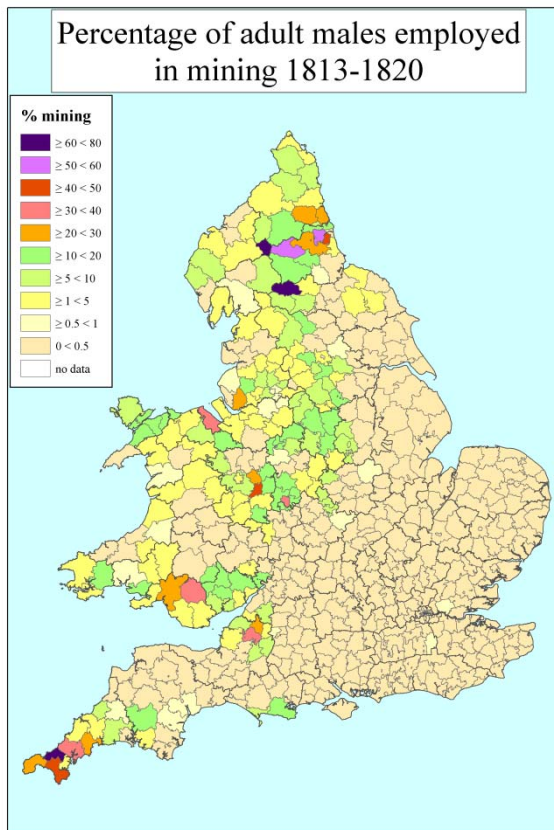
Mapping the occupational geography of England and Wales c.1817-1881

The percentage of adult males employed in the tertiary sector



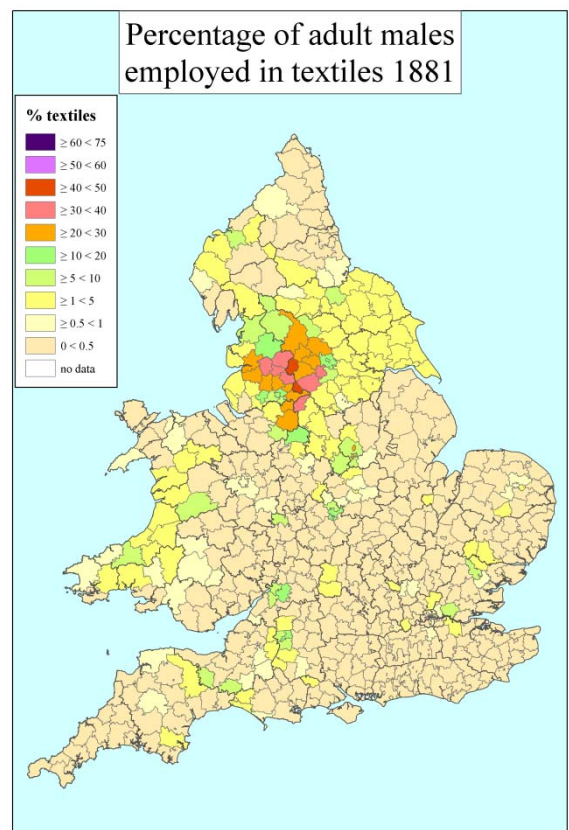
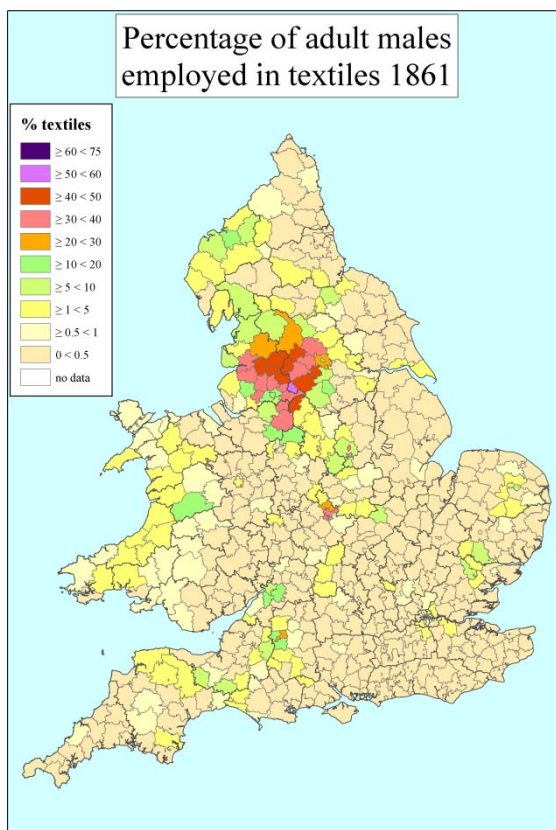
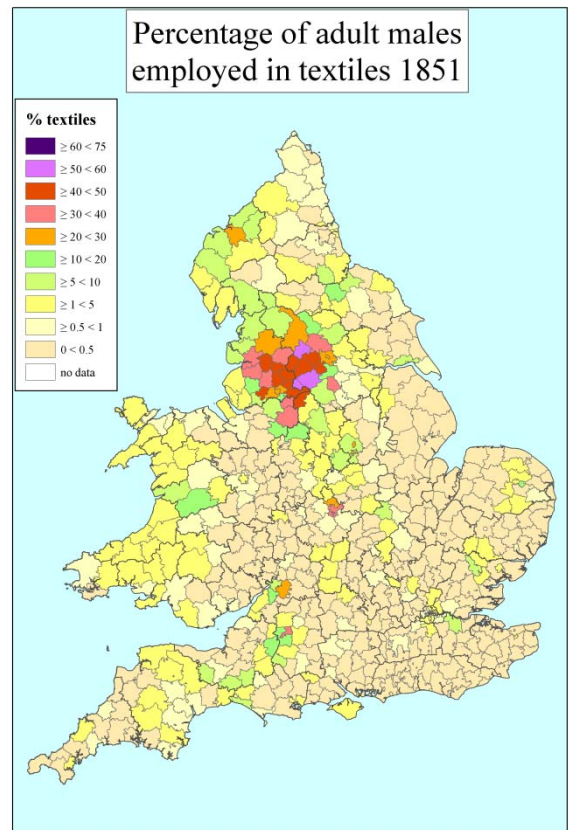
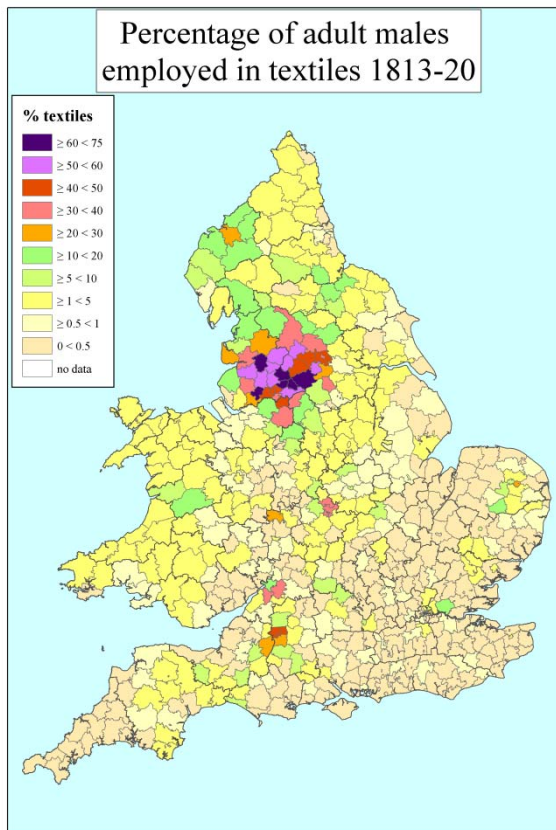
Mapping the occupational geography of England and Wales c.1817-1881

The percentage of adult males employed in the mining sector



Mapping the occupational geography of England and Wales c.1817-1881

The percentage of adult males employed in the textiles sector



Mapping the occupational geography of England and Wales c.1817-1881

The percentage of adult males employed in the footwear sector

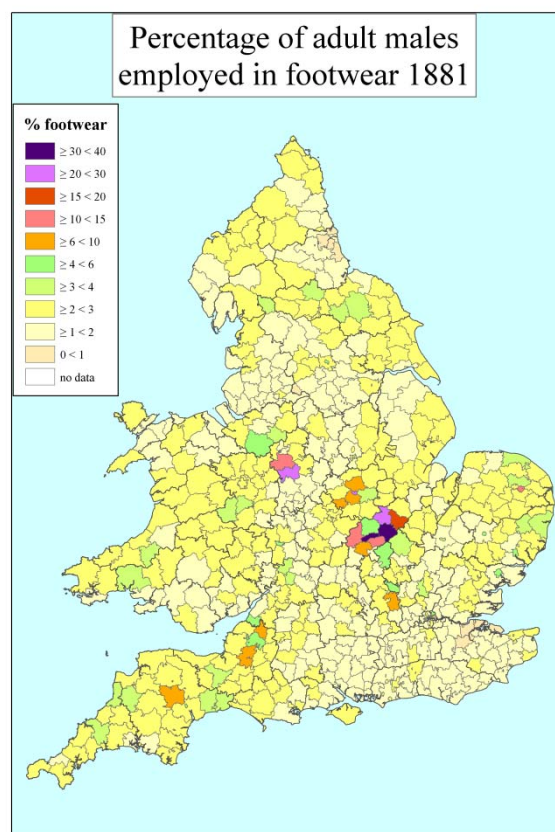
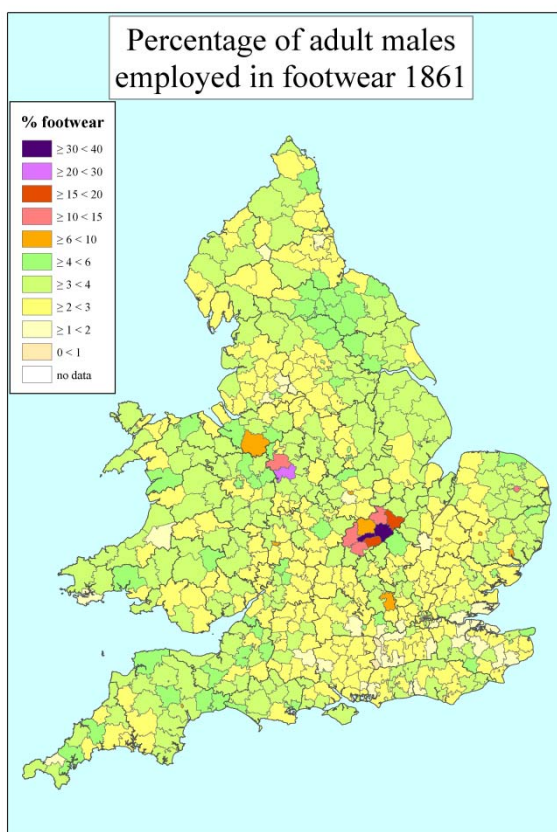
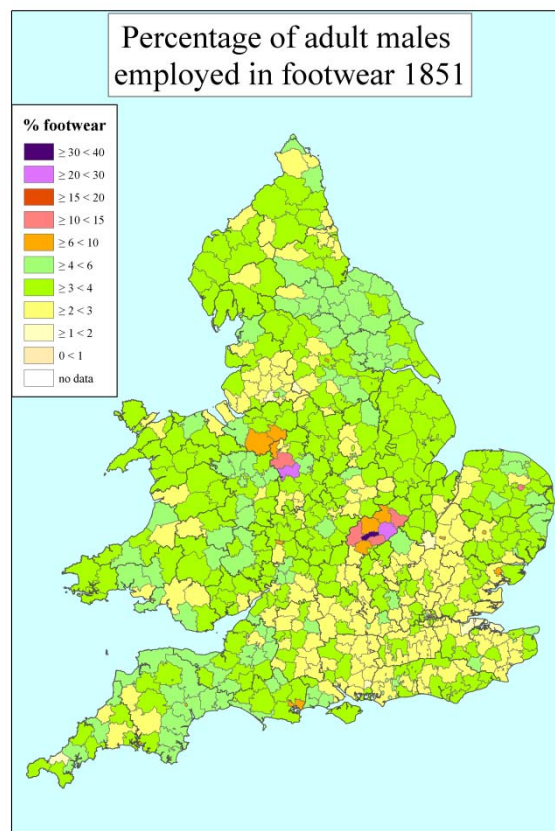
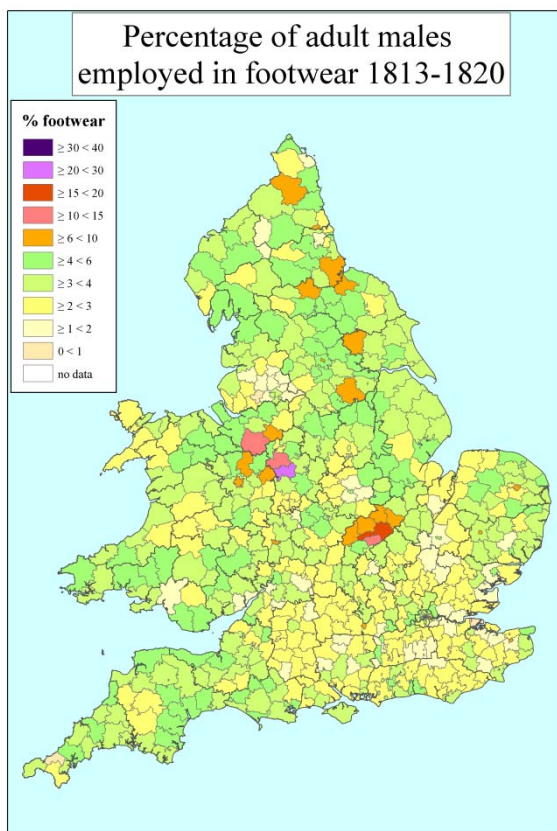


Table 1: Gini coefficients for the equality of spatial distribution of adult men at the sectoral level of the PST classification for the economy of England and Wales in 1817, 1851, 1861, and 1881

Sector	Year			
	1817	1851	1861	1881
Primary	0.24	0.25	0.25	0.28
Secondary	0.22	0.19	0.22	0.21
Tertiary Overall	0.33	0.26	0.28	0.22
Dealers	0.45	0.31	0.30	0.28
Sellers	0.39	0.27	0.24	0.20
Services and professions	0.29	0.27	0.32	0.26
Transport and communications	0.54	0.40	0.35	0.30

Figure 1: Gini coefficients for the equality of spatial distribution of adult men at the principle sectoral level of the PST classification for the economy of England and Wales in 1817, 1851, 1861, and 1881

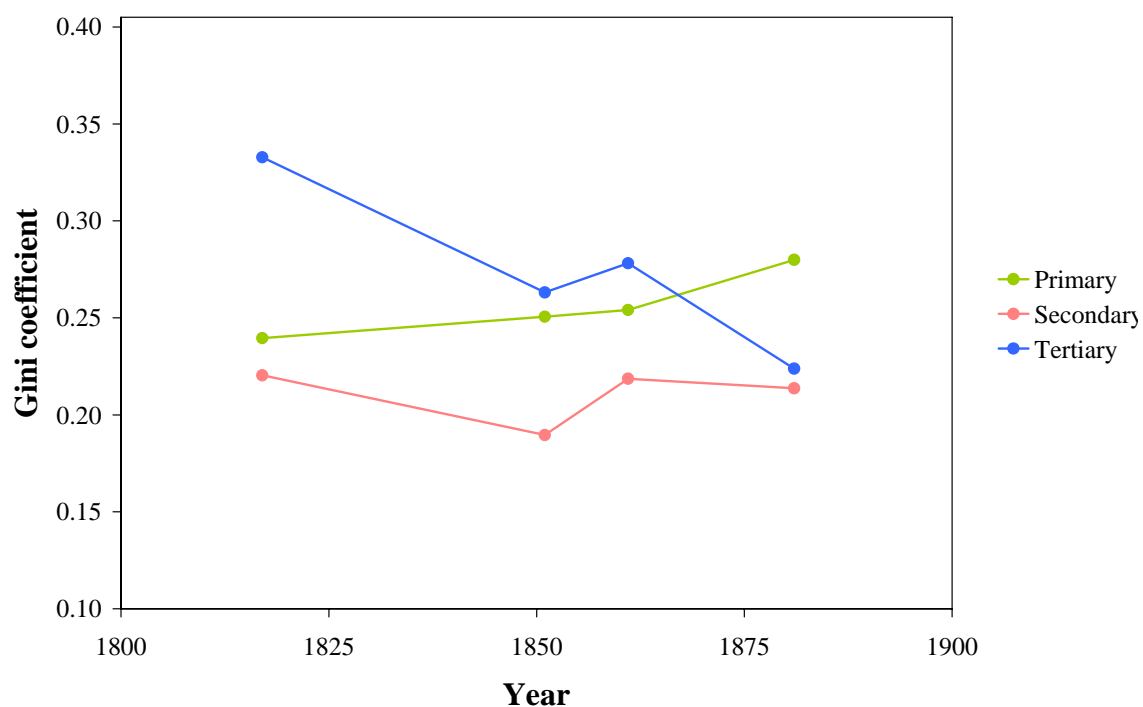


Figure 2: Gini coefficients for the equality of spatial distribution of adult men within the four divisions of the tertiary sector in the PST classification for the economy of England and Wales in 1817, 1851, 1861, and 1881

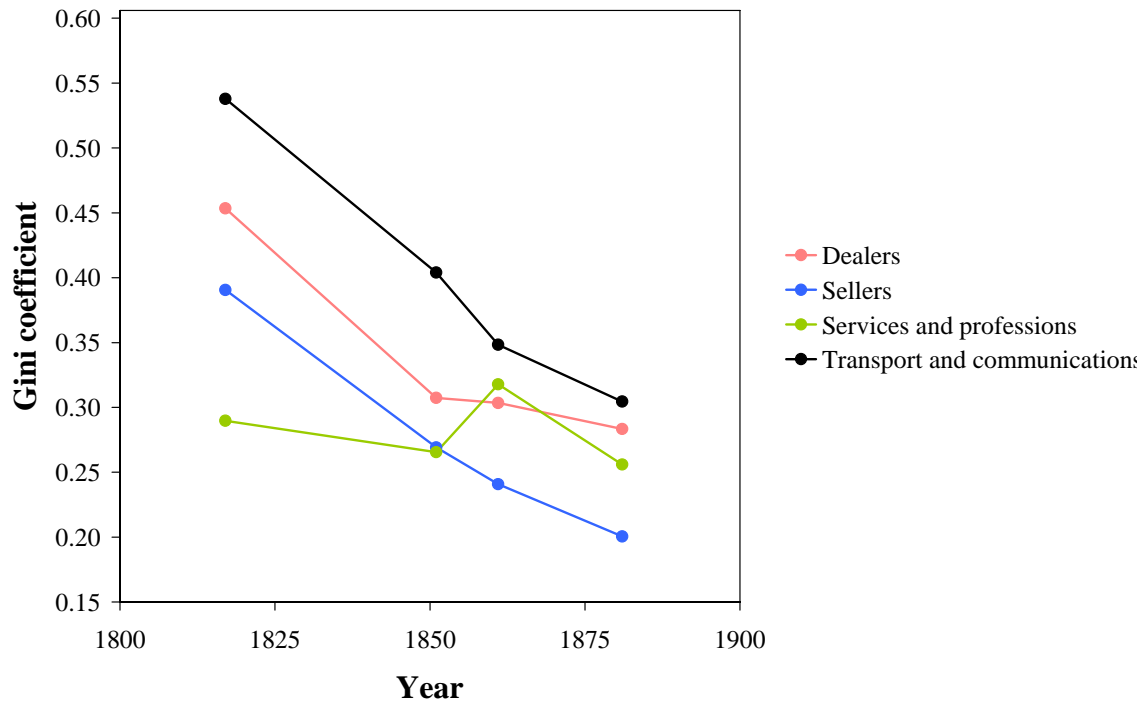


Table 2: Gini coefficients for the equality of spatial distribution of adult men at the group level of the PST classification scheme for the economy of England and Wales in 1817, 1851, 1861, and 1881

Sector	Group	Year			
		1817	1851	1861	1881
Primary	Agriculture	0.28	0.30	0.31	0.34
	Estate work	0.57	0.48	0.50	0.49
	Forestry	0.83	0.66	0.65	0.62
	Fishing	0.90	0.87	0.88	0.89
	Mining and quarrying	0.86	0.81	0.81	0.81
<i>Secondary</i>	Food industries	0.19	0.17	0.18	0.20
	Drink industries	0.43	0.35	0.40	0.43
	Clothing	0.49	0.39	0.40	0.46
	Footwear	0.22	0.18	0.22	0.29
	Textiles	0.80	0.81	0.85	0.84
	Wood industries	0.39	0.34	0.34	0.37
	Industries using leather, bone etc.	0.39	0.34	0.36	0.37
	Industries producing products from fibres	0.74	0.62	0.66	0.70
	Furnishing	0.94	0.98	0.91	0.89
	Paper industries	0.80	0.80	0.81	0.76
	Printing	0.83	0.68	0.69	0.64
	Earthenware, pottery manufacture	0.92	0.92	0.91	0.91
	Glass industries	0.95	0.94	0.94	0.93
	Precious metals and jewelry	0.93	0.85	0.84	0.80
	Instrument making	0.66	0.49	0.53	0.48
	Chemical, soap, adhesives, manufacture	0.88	0.79	0.89	0.82

	Iron and steel manufacture and products	0.30	0.36	0.39	0.41
	Non-ferrous metal manufacture and products	0.60	0.56	0.55	0.61
	Machines and tools, making and operation	0.74	0.61	0.61	0.50
	Road transport vehicles	0.39	0.31	0.30	0.30
	Boat and ship building	0.87	0.85	0.84	0.85
	Brick and tile manufacture	0.64	0.49	0.48	0.53
	Stone and mineral processing industries	0.76	0.55	0.78	0.67
	Building and construction	0.17	0.15	0.17	0.17
	Public Works	0.86	0.46	0.43	0.31
	Minor manufactures and trades	0.85	0.79	0.83	0.80
<i>Tertiary: dealers</i>	Unspecific dealers	0.68	0.57	0.49	0.68
	Dealers in food	0.73	0.51	0.45	0.41
	Dealers in drink	0.70	0.50	0.52	0.49
	Dealers in live animals	0.68	0.49	0.43	0.52
	Dealers in textiles and products	0.51	0.32	0.33	0.32
	Dealers in wood and wood products	0.81	0.53	0.49	0.46
	Dealers in earthenware, pottery	0.90	0.53	0.51	0.48
<i>Tertiary: sellers</i>	Unspecified sellers	0.40	0.42	0.38	0.34
	Sellers of food	0.50	0.27	0.22	0.19
	Sellers of paper products	0.80	0.68	0.76	0.67
	Sellers of printed products	0.82	0.59	0.58	0.61
	Sellers of chemical products	0.65	0.37	0.38	0.34
	Sellers of fuel	0.80	0.47	0.45	0.33
	Sellers of iron and steel products	0.72	0.43	0.41	0.33
	Small traders	0.55	0.37	0.38	0.62
<i>Tertiary: services and professions</i>	Food, drink and accommodation services	0.26	0.23	0.23	0.24
	Storage	0.92	0.81	0.79	0.77
	Entertainment	0.71	0.38	0.59	0.51
	Miscellaneous service industries	0.50	0.30	0.32	0.37
	Domestic service	0.38	0.39	0.43	0.42
	Financial services and professions	0.70	0.44	0.51	0.37
	Commercial and administrative services	0.41	0.54	0.58	0.50
	Professions	0.27	0.19	0.21	0.20
	Professional support	0.46	0.37	0.33	0.34
	Local government service	0.75	0.34	0.28	0.23
	National government service	0.44	0.70	0.54	0.41
	Armed forces	0.62	0.82	0.85	0.79
	Owners, possessors of capital	0.90	0.30	0.35	0.46
	Distinguished, titled, gentleman	0.47	0.40	0.38	0.85
<i>Tertiary: transport and communications</i>	Road transport (animal power)	0.40	0.28	0.28	0.33
	Inland navigation	0.77	0.70	0.69	0.70
	Sea transport	0.82	0.78	0.79	0.76
	Rail transport	—	0.58	0.49	0.37
	Communications	0.77	0.53	0.51	0.46

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