The Occupational Structure of England c.1750-1871
A Preliminary Report

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Please note that for the most part this presentation is an abbreviated version of a longer paper which can be downloaded from:

http://www.geog.cam.ac.uk/research/projects/occupations/introduction/

The numbering of the tables and figures in this paper corresponds to the numbering in the longer paper and this is why the numbering is discontinuous in this paper.

Economic historians continue to disagree about the nature and timing of the British industrial revolution. In the late nineteenth century Toynbee described the industrial revolution as a period in which the old order was suddenly broken in pieces by the mighty blows of the steam engine and the power loom.' This traditional image of the industrial revolution as a sudden and dramatic take off in economic development occurring in the late eighteenth and nineteenth centuries has been under attack by economic historians since the early years of the twentieth century.

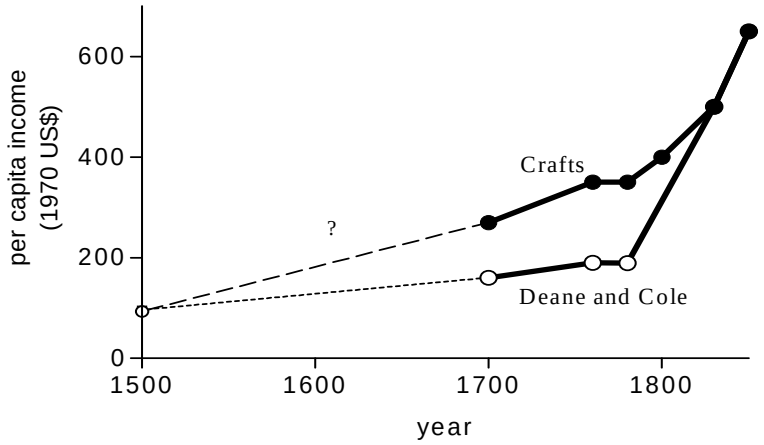
In the last three decades in particular most economic historians have come to believe that the pace of economic development in the classic industrial revolution period was slower than was once believed.

Figure one shows Deane and Cole's 1962 estimates of English per capita income together with Nick Crafts' more recent estimates. As is well known, Crafts' estimates imply slower economic growth between 1700 and 1830 than the Deane and Cole estimates. In turn this implies the economy was much more developed in 1750 than was formerly believed and that much development occurred earlier. The revisionist case, associated particularly with Nick Crafts and Tony Wrigley, is that much development preceded 1750 and that the industrial revolution was far from complete in the mid-nineteenth century.

Two key criticisms have been made of the Crafts' story. The first, advanced by some historians, is that the estimates are unreliable. The second, is that such a highly aggregated national view conceals dramatic structural change, especially at the regional level.

Together with Tony Wrigley and others I have been working on a research project aimed at putting our knowledge of the first industrial revolution on a more secure footing and deepening our understanding of what it entailed. Our aim is to create new more reliable long-run datasets that allow us to measure change at the aggregate national level but also at the regional and sectoral levels. We are doing this by reconstructing, as far as is possible, the history of England's occupational structure from end of the middle ages through to the late nineteenth century.

Figure 1 English per capita income



In this presentation I am going to present preliminary findings from the first phase of research, which for reasons of source availability, covered male but not female occupations over the period 1750-1871. I do not have time to discuss the importance of female occupations but would be happy to address this in the questions.

By the middle of the nineteenth century the occupational structure can be recovered from the published census material, much of which we have made machine-readable for the first time. For the period before 1841, for which census data are not available, it is necessary to locate suitable manuscript sources. Our principal source is Anglican baptism registers and so far we have collected occupational data from around 11,000 registers in over 50 archives.

For Lancashire we have collected occupational data from over 200,000 baptisms.[1] As you can see, from table one below, this generates an unmanageably large number of occupational descriptors. 1,636 for Lancashire alone. Nationally we have over 20,000 unique descriptors from over two million baptisms. Such data can only be used if they are coded and categorised.

Tony Wrigley has devised a coding scheme, called PST which is illustrated in table two below. At it its simplest level PST codes all the occupations into either the primary, the secondary or the tertiary sector. Essentially these refer to agriculture, manufacturing and services. At its most complex level PST contains around 900 occupational categories. Today I am only going to present occupational data at the simplest level comparing the development of the primary, secondary and tertiary sectors over the period 1750-1871.

One reason for categorising occupational data in this way is that there is a very clear relationship between the share of the workforce in the primary, secondary and tertiary sectors and levels of economic development as measured by average income levels.

[1] England was sub-divided into 41 adminstrative units called counties. Lancashire was the most important industrial county in the eighteenth and nineteenth centuries and was the centre of the cotton textile industry. The second most important industrial county was the West Ridinig of Yorkshire which, during the eighteenth century, came to dominate the wool textile industry.

Table One: Raw occupational data from Lancashire 1813-20

	Father's Occupation	*Number of Baptisms*
1	weaver	53,584
2	labourer	18,902
3	illegitimate	13,895
4	farmer	11,016
5	spinner	5,948
6	husbandman	5,525
7	collier	4,455
8	joiner	3,740
9	hatter	3,212
10	mariner	2,973
11	tailor	2,613
12	shoemaker	2,605
13	cordwainer	2,334
14	cotton spinner	2,281
15	blacksmith	2,237
	…. …. ….	….
	earthernware	
1628	manufacturer	1
1629	rag merchant	1
1630	razor grinder	1
1631	reclifier	1
1632	reeler	1
1633	regiment of foot	1
1634	reverand	1
1635	enameller	1
1636	excise-man	1
1637	quartermaster	1

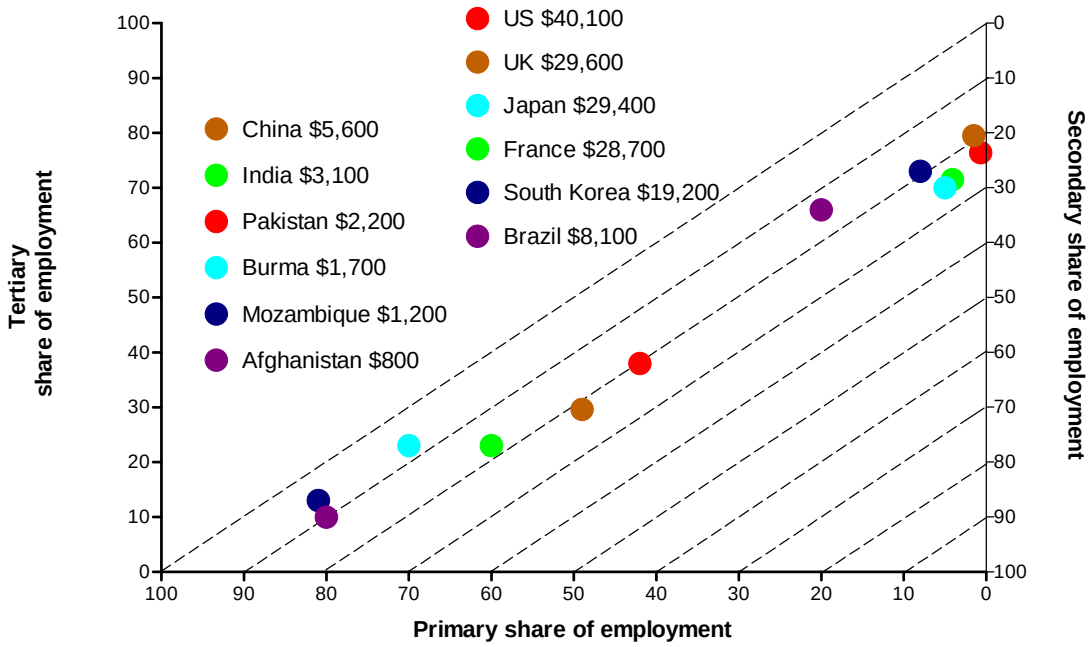
Table Two The PST System

The Primary Sector	
The products of land and water	1, 1
Mining and quarrying	1, 2
The Secondary Sector	
Food, drink, and tobacco	2, 3
Clothing and footwear	2, 4
Textiles	2, 5
Wood industries	2, 6
Furnishing	2, 8
Paper industries	2, 9
Printing and publishing	2,10
Earthenware, pottery manufacture	2,11
Glass manufacture	2,12
Building and construction	2,24
The Tertiary Sector	
Dealers in the raw products of land and water	3, 1
Sellers of food, drink, tobacco	4, 3
Transport	5, 1
Hotels, restaurants, public houses …	5, 2
Domestic service	5, 5
Financial, commercial, administrative services	5, 6
Owners, possessors of capital	5, 7
Professions	5, 8
Public, government, church service	5, 9
Titled, gentleman	5,11
Armed forces	5,10

Figure four, below, illustrates the sectoral distributions of employment for a number of modern economies.

- The vertical axis shows the percentage of the workforce in the tertiary sector.
- The horizontal axis shows the percentage of the workforce in the primary sector. However, the conventional direction of the axis has been reversed so 100 % primary is on the far left and 0 % on the far right.
- Afghanistan has 80 per cent of the workforce in the primary sector and 10 percent in the tertiary sector. It follows that 10 per cent of the workforce must be in the secondary sector. And that is true all along the dashed line which can be read off on the right-hand scale.
- The advantage of this layout is that the developmental trajectory over time is from the bottom left to top right.
- It is evident from this diagram that countries with very high levels of primary sector employment tend to be very poor whilst rich countries tend to have very high levels of tertiary employment.

Figure 4 Occupational structures and GDP per capita: Various countries $2004



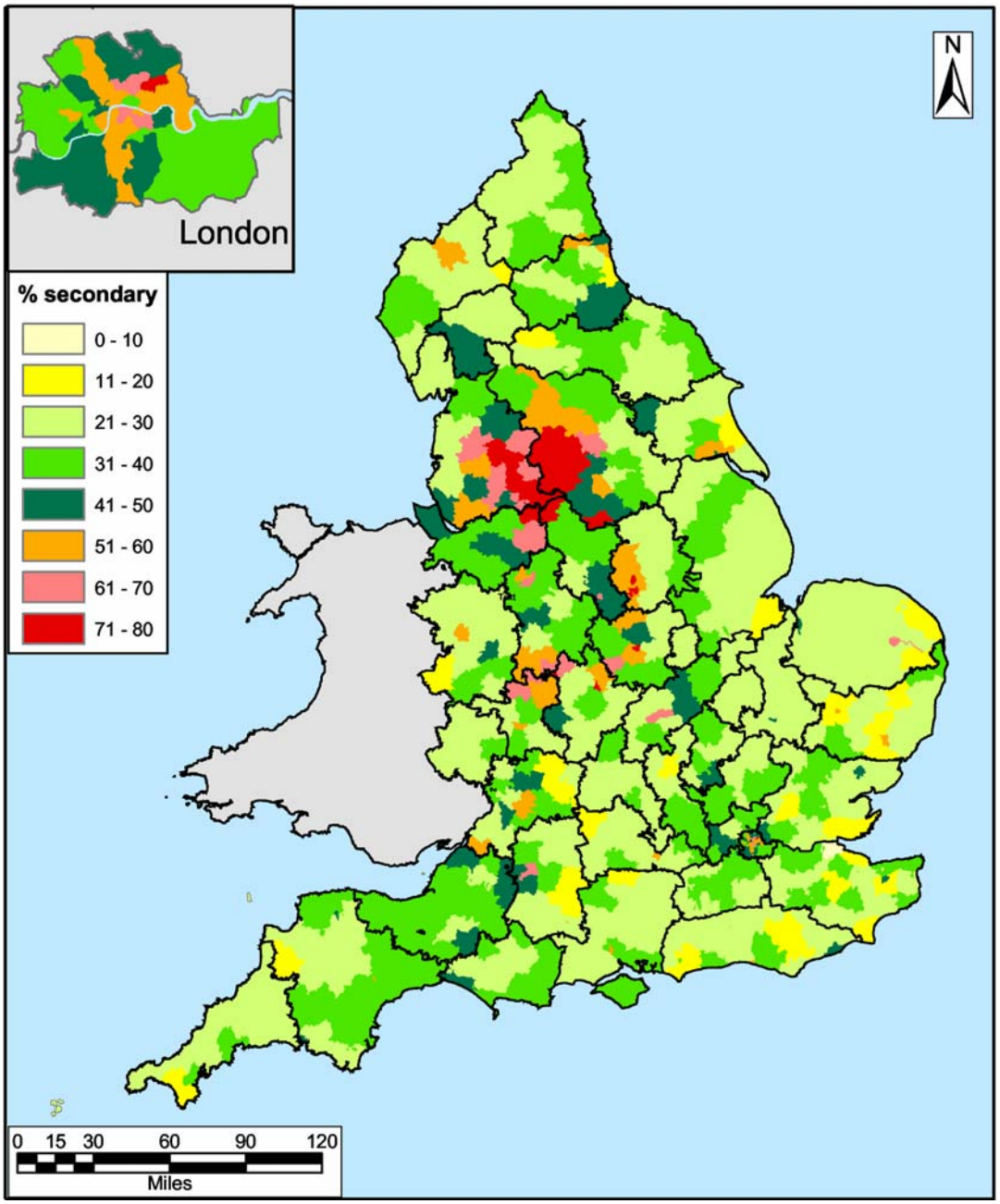
I want to begin the presentation of our findings by looking at England in 1851. Figures five, six and fifteen are maps of England in 1851 displaying data for 575 administrative units called registration districts.

Figure five (below) is a conventional cartographic representation showing the percentage of adult males in secondary sector employment in 1851. Such a representation shows clearly what was important in a particular area but it is not a reliable guide to which areas formed the most important concentrations of industry nationally because population densities varied greatly.

Figure six (below) unlike figure five is not a conventional cartographic representation and shows the degree of spatial concentration of secondary sector employment in 1851. The areas in each colour account for 10% of the country's secondary sector employment. Just six districts, shown in dark purple (St Pancras, Birmingham, Liverpool, Manchester, Huddersfield and Bradford) between them accounted for 10% of all secondary sector employment. At the other end of the scale some 226 districts, shown in yellow, only accounted for 10% of all secondary sector employment. The areas coloured orange through purple, essentially the textile districts of Lancashire, Cheshire and the West Riding, the Birmingham area and London between them accounted for half of all secondary sector employment nationally.

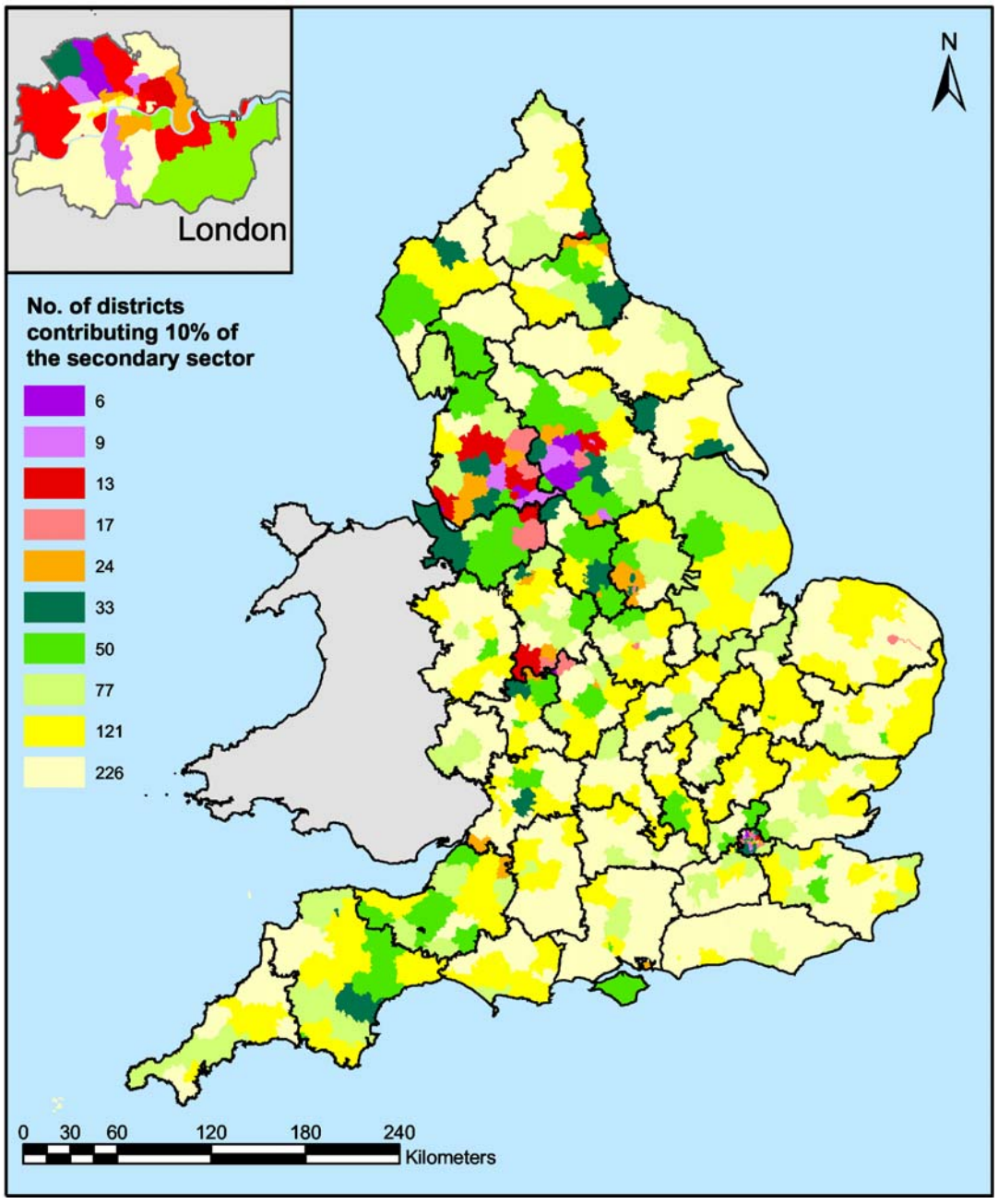
The industrial districts experienced much more rapid population growth than agricultural areas. Lancashire's population grew by 400% between 1761 and 1851 while Hertfordshire's population grew by only 50%. Figure 15 (below) shows the spatial concentration of population growth 1801 to 1851. The areas that had high levels of non-agricultural employment accounted for roughly half of all population growth 1801-1851 and the same is true for the previous fifty years. Since we know that these areas had higher than average mortality and that fertility did not vary much geographically it follows that these relative increases in population were driven by migration into these areas from other parts of the country.

Figure 5. England 1851: Percentage of adult males in secondary employment



This paper has eleven conclusions. The first is that areas with very high levels of secondary sector employment experienced much more rapid population growth than agricultural districts. And they did so because of very substantial migration into these areas from predominantly agricultural areas.

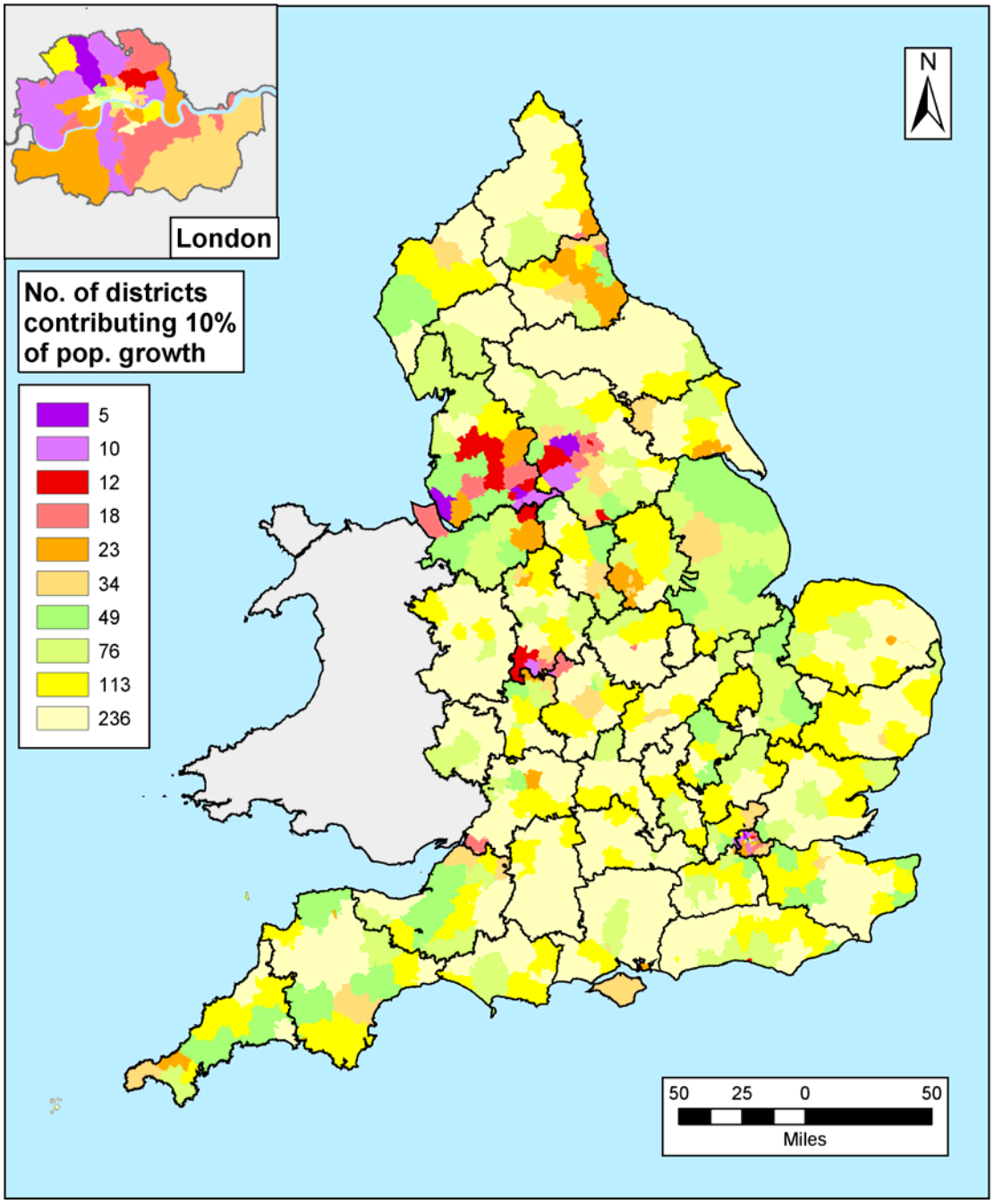
Figure 6. England 1851: Spatial concentration of adult male secondary employment



Now I want to turn to changes in occupational structures over time. Figure 12 (below) shows the changing sectoral share of employment in the primary sector for a number of counties for which we have occupational data. A preliminary national estimate is shown in blue.

- Before 1815 the experience of different parts of the country varied. In some areas, which de-industrialised, the share of the primary sector in total employment actually rose. Elsewhere it was level or fell gently. However, migration from areas with high levels of agricultural employment to areas with

Figure 15. Spatial Concentration of English population growth 1801-1851



low levels ensured that the national trend was decreasing rather more rapidly than the any unweighted county average.

- After 1815 the share of the primary sector in total employment fell rapidly in all areas. Continued internal migration again ensured that nationally the fall was steeper than the unweighted county average.

Figure 12a The decline of the primary sector

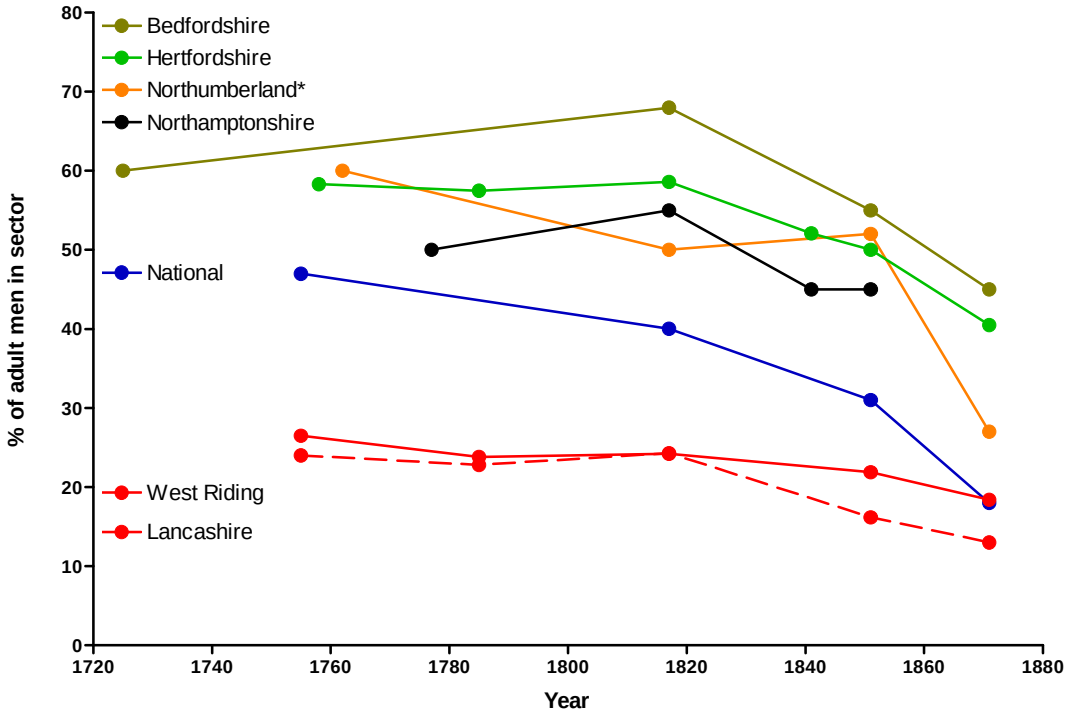


Figure 12b The decline of the primary sector

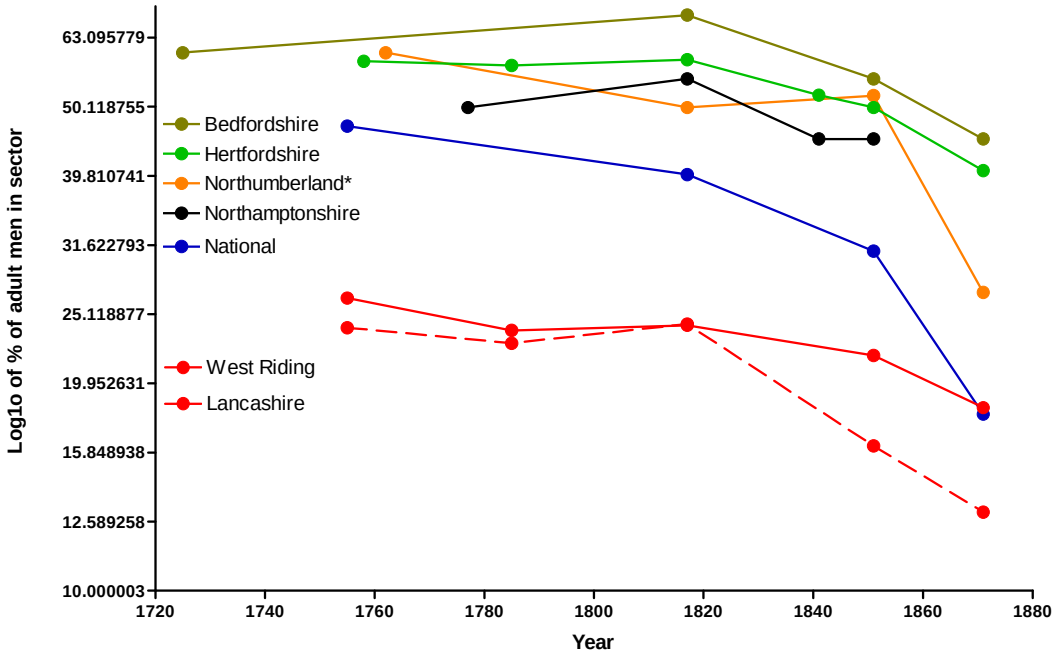


Figure 13 (below) shows the trends in the employment share of the secondary sector.

- Lancashire and the West Riding of Yorkshire are shown in red.
- Both counties had remarkably high levels of secondary sector employment in 1750 at 66%.

Figure 13a The growth of the secondary sector

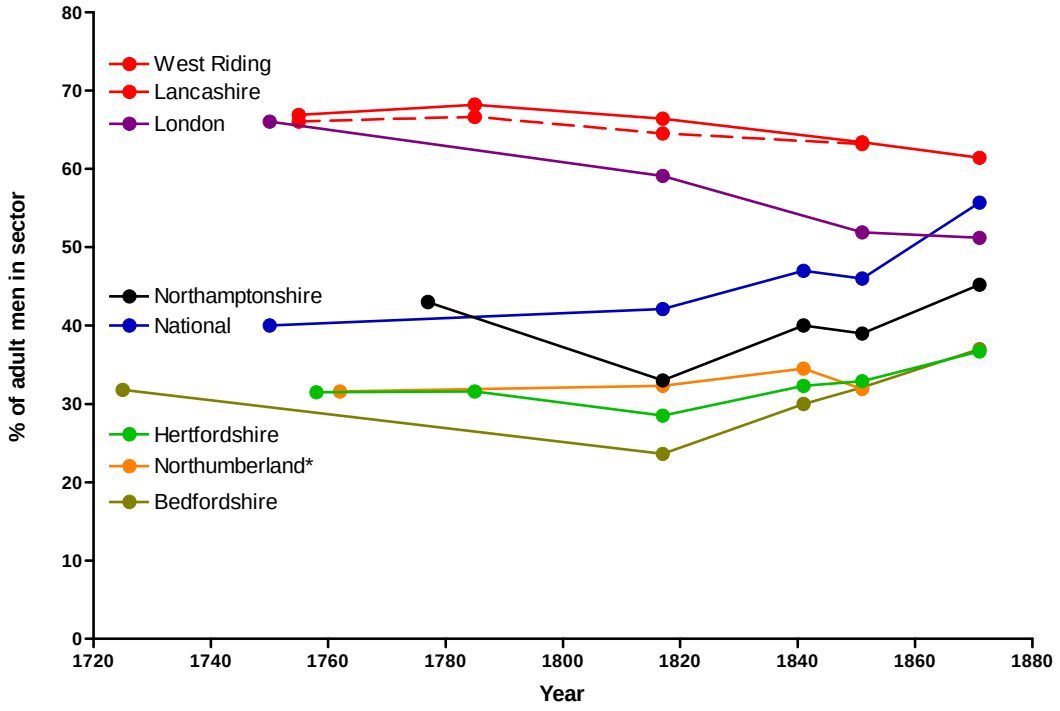
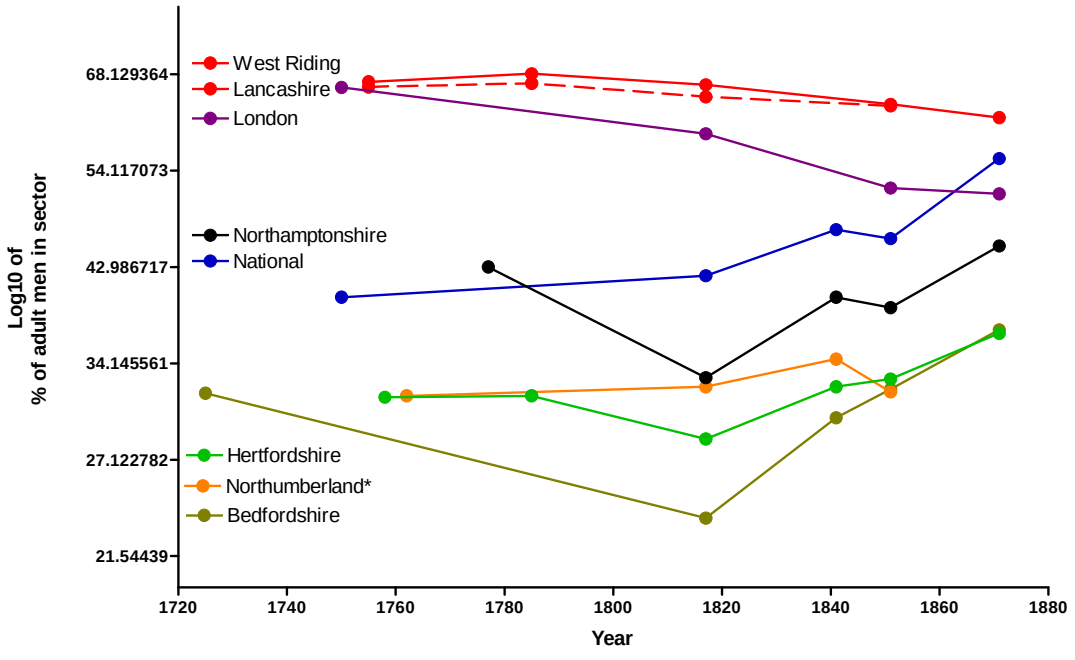


Figure 13b The growth of the secondary sector



- Astonishingly, and against all *a priori* expectations, there was no rise over time for either Lancashire or the West Riding.
- London, shown in purple, also experienced decline from a very high initial level
- A number of rural southern counties are shown. These had much lower levels of secondary sector employment and declined somewhat over time as their textile industries de-industrialised in the face of competition from the West Riding.

So, the second conclusion of the paper is that Lancashire and the West Riding had two-thirds of adult males in the secondary sector as early as 1750.

The third is that, contrary to the prevailing orthodoxy, there was no increase in the relative importance of the secondary sector in Lancashire or the West Riding or indeed anywhere else c.1750-1815.

The fourth is that, the regional economic geography of England in the nineteenth century was not, as Langton and others have argued, a product of the period 1750-1850 but of the early modern period.

After 1815 there was a remarkable step change in the nature of development in the areas outside the classic industrial districts.

My fifth conclusion is that after 1815 the kind of radical upward shift in the relative importance of the secondary sector usually assumed to have taken place in the industrial districts took place but exclusively outside the traditional heartlands of the industrial revolution.

A preliminary estimate of the national trend in secondary sector employment is shown in blue

My sixth conclusion is that by 1750, before the start of the classic industrial revolution period, England already had 40 % of its adult male workforce in the secondary sector. This means that England's occupational structure was already radically different from that prevailing else in Europe with the possible exception of the Dutch Republic.

We have already seen that areas with high secondary sector employment experienced very rapid population growth driven by in-migration from areas with low secondary employment. There was therefore a huge increase in the relative population of those regions which had high levels of secondary sector employment at the beginning of the period.

In consequence, and this is conclusion seven, there was some increase in the importance of the secondary sector at national level during the classic industrial revolution period but this was very modest indeed from 40% to 42%. This was driven not by structural change at the regional level but by differential population growth driven by migration.

However, and this is conclusion eight, after 1815 and especially after 1851 there was a very rapid increase in the relative importance of the secondary sector which reached 56% of adult male employment by 1871.

Figure 14a The growth of the tertiary sector

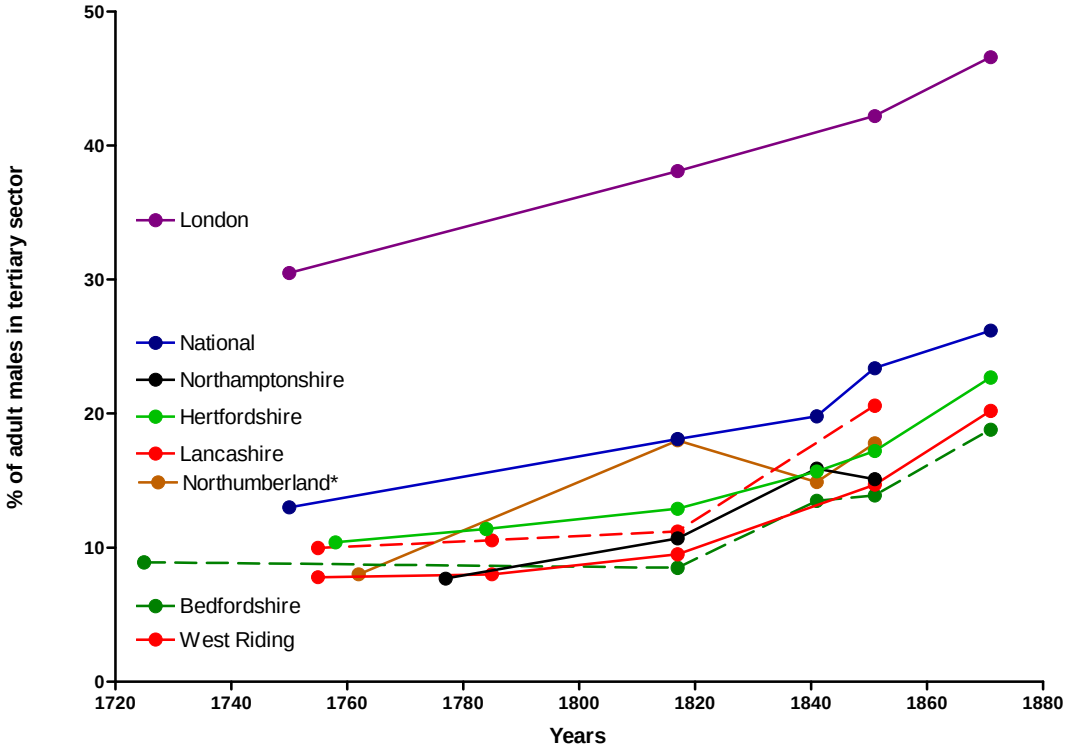
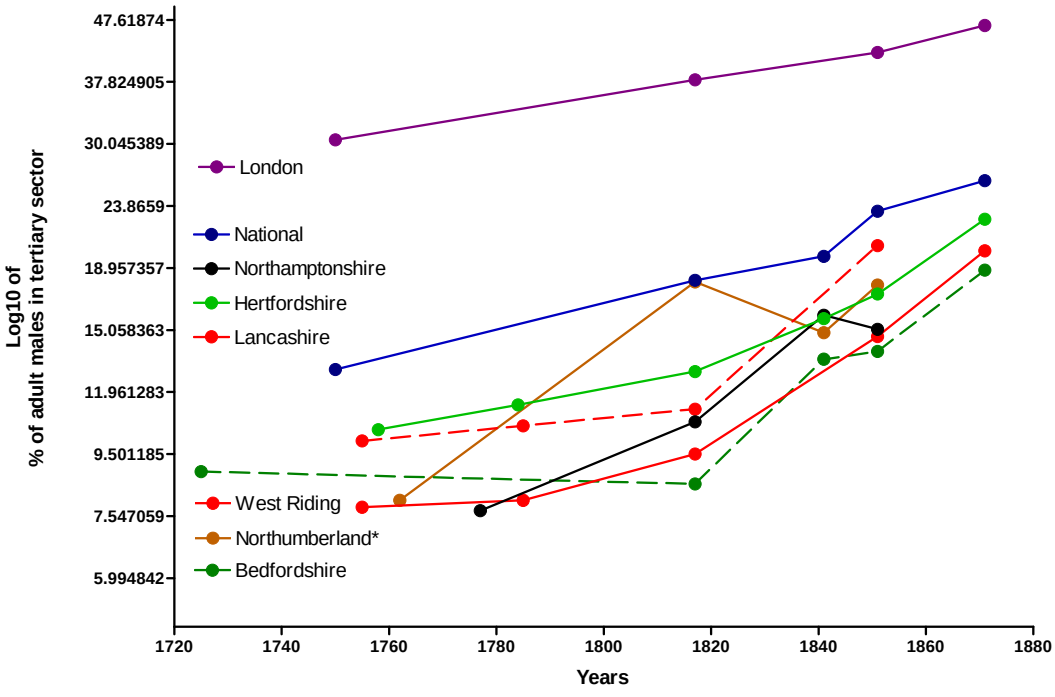


Figure 14b The growth of the tertiary sector

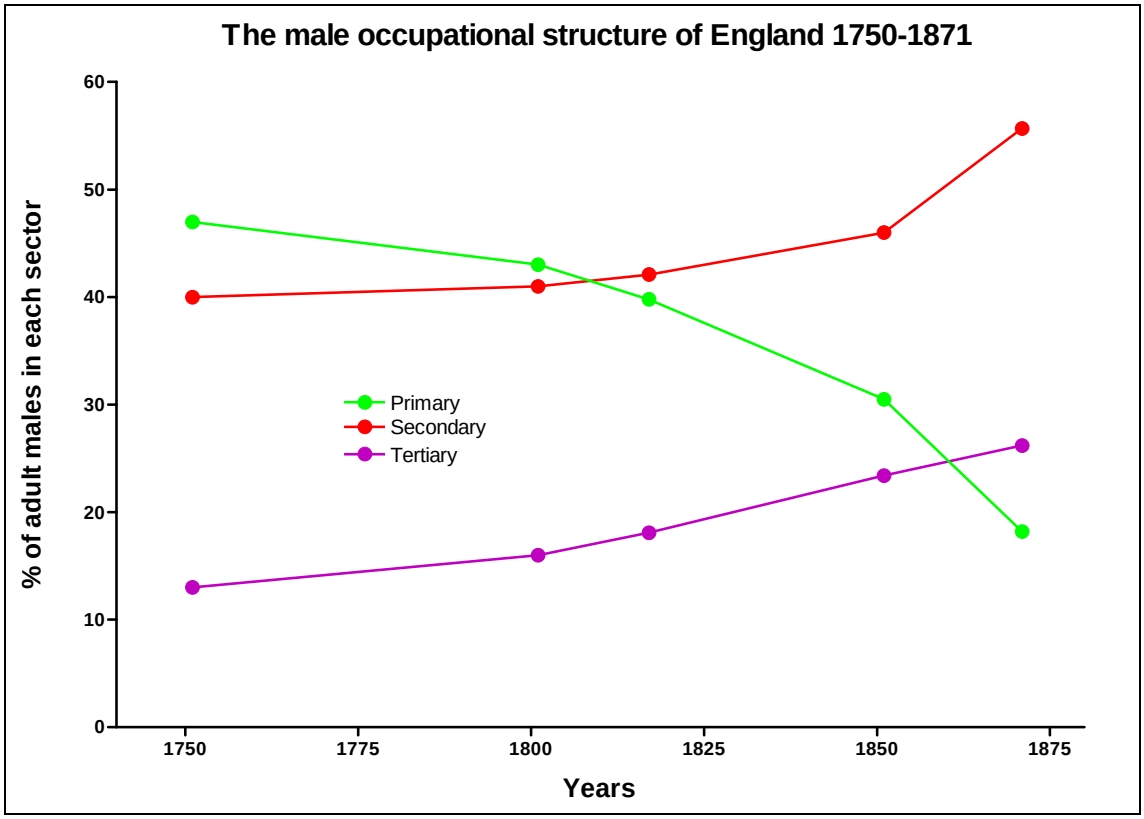


We have known for some time (in particular from the work of C.H. Lee) that the

tertiary sector was growing rapidly in the late nineteenth century especially around London. As can be seen from the figure 14, and this is my ninth conclusion, the tertiary sector grew rapidly and continuously in all regions from the late eighteenth century and was much the most dynamic element in the occupational structure.

Overview

Figure 21 (below) uses the same form of representation I used earlier for modern economies. The total sectoral change possible from the Neolithic to the indefinite future is represented by the movement from the bottom left to the top right. If you prefer there is a more conventional graphical representation following figure 21.



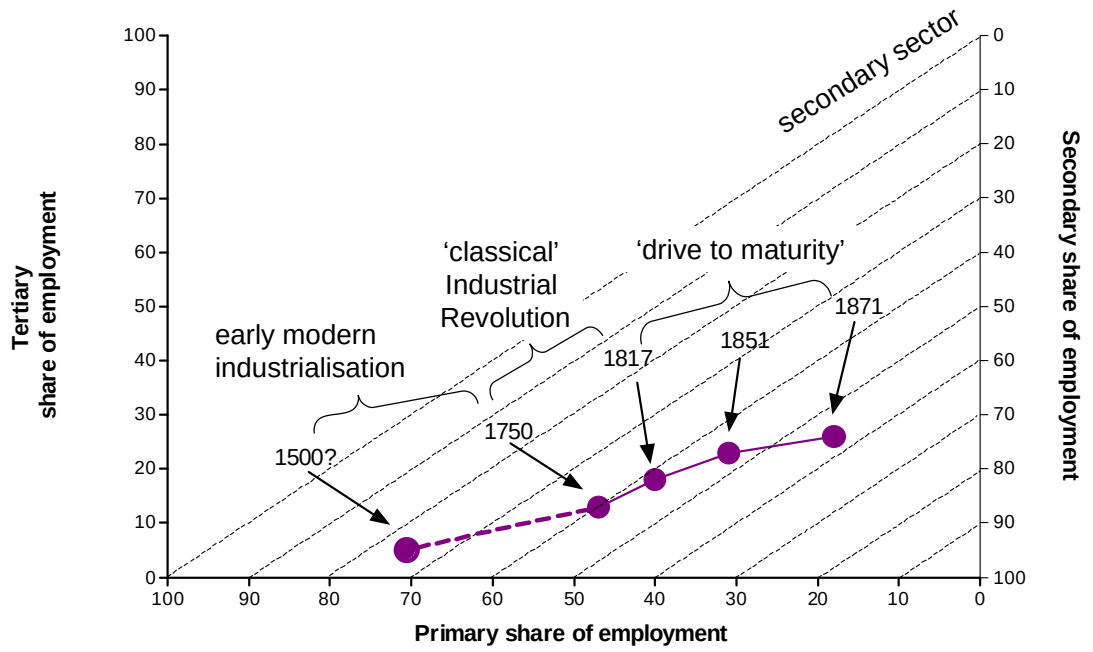
My tenth conclusion is threefold:

Firstly, change in the structure of the labour force in the period 1750 to 1815 was very modest and many areas experienced de-industrialisation,

Secondly, structural change after 1815 was much more rapid and the two decades after 1851 saw almost as much change as the previous one hundred years put together.

Thirdly, whilst we currently lack good data for the period around 1500 early modernists and medievalists would concur that around 70 per cent of the workforce was in the primary sector, so we can, tentatively put 1500 on the diagram and this is shown in figure 22 (below).

Figure 22 Male occupational structure of England 1500-1871



It is now clear that the early modern period saw a much greater increase in the size of the secondary sector than the classic industrial revolution period.

Collectively these findings are a spectacular confirmation of the revisionist case but, for the first time, put it beyond reasonable doubt.

My final conclusion is that this suggests three distinct phases of economic development

Firstly, an early modern phase in which the size of the secondary sector approximately doubled, the economic geography of the later period was laid down, Lancashire and the West Riding attained very high levels of secondary sector employment, but the technologically driven increases in labour productivity in the secondary sector were limited. The growth of the secondary sector was driven largely by labour shedding in agriculture caused by the emergence of high productivity agrarian capitalism This structural change was facilitated by the widespread adoption of coal for domestic heating and for nearly all industrial processes requiring heat.

A second phase beginning at some point before 1750 but ending around 1815 in which the relative importance of secondary sector employment was constant at the regional level, except in de-industrialising regions and which grew very modestly at the national level. But in this period there were spectacular increases in productivity in the textile districts as their production processes were revolutionised by the adoption of water and then steam-powered manufacturing. These sectors experienced massive increases in output relative to the rest of the economy. Meanwhile the productivity of the agricultural sector continued to grow and greatly increased inter-sectoral and inter-regional trade required a dramatic increase in transport, wholesaling, retailing and other service sector occupations.

Thirdly, a period beginning after 1815 in which factory technologies spread to the rest of the country. Outside London and the established industrial districts all areas experienced a sharp increase in secondary sector employment and a sharp decrease in agricultural employment. This is the period in which the railways were built and steam-powered manufacturing, which had been pioneered in the textile districts spread throughout industry. The period after 1815 saw both the most rapid changes in occupational structure and the most dramatic increases in secondary sector productivity.

I will end the paper by posing three questions for other participants:

One follows on from the preceding paragraph. How closely did industrialisation outside Britain during the nineteenth century follow patterns similar to those parts of Britain outside London and the established factory districts in the period after 1815? Was the extension of industrialisation in Britain post 1815 similar to that experienced in north-western Europe for instance?

The second is whether Lancashire and the West Riding of Yorkshire were already fundamentally different from proto-industrial regions in other parts of the world by 1750. To put the question more precisely, were there other large proto-industrial districts with two thirds of adult males in secondary sector employment and with comparable population densities and (relatively) low levels of by-employment in the middle of the eighteenth century.

Thirdly, the service sector growth, which is such a striking feature of the period after 1750 for which we now have good evidence, was overwhelmingly made up of growth in transport and distribution. Arguably it was an inevitable accompaniment of increasing regional specialisation in secondary production and an associated increase in inter-regional trade. It seems likely that the growth in the secondary sector before 1750 must also have been accompanied by a similar growth of the tertiary sector. Again it seems likely that this would be true in other advanced organic economies. What evidence do we have on this point?

More research is probably needed before such questions can be answered definitively but discussing them here might prove very instructive.