



When did Britain industrialise? The sectoral distribution of the labour force and labour productivity in Britain, 1381–1851

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ABSTRACT

Britain's labour force industrialised early. The industrial and service sectors already accounted for 40% of the labour force in 1381, and a substantial further shift of labour out of agriculture occurred between 1522 and 1700. From the early seventeenth century rising agricultural labour productivity underpinned steadily increasing employment in industry and services, so that by 1759 agriculture's share of the labour force had shrunk to 37% and industry's grown to 34%. Thereafter, industry's output acceleration during the Industrial Revolution owed more to gains in labour productivity consequent upon mechanisation than the expansion of employment.

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1. Introduction

Modern revisions to the story of Britain's industrialisation raise awkward questions about comparative advantage prior to and during the initial phase of the Industrial Revolution. Deane and Cole's (1967) once influential account of British economic development since 1688 was premised on an eighteenth-century agricultural revolution which released labour to industry at the very time that mechanisation and the division of labour were raising the productivity of labour in manufacturing. British-made goods thereby became unbeatable in world markets so that industry became the most dynamic employment sector within a fast-growing economy. Agricultural historians, however, in an important revision to this narrative, now see the agricultural revolution as having begun much sooner, in the early seventeenth century, so that agriculture's labour-force share was already much reduced before the industrial revolution got under way. The output estimates of Crafts (1985) and Crafts and Harley (1992) endorse this revision and, in turn, propose that industrial growth was slower during the eighteenth century than estimated by Deane and Cole, notwithstanding the continued transfer of labour out of agriculture and into industry. On this revised scenario eighteenth-century agriculture was more successful at shedding labour than industry was at expanding output. Hence the paradox that, at the very time that Britain was becoming the workshop rather than the granary of the world (Crafts, 1989), productivity growth in agriculture apparently exceeded that in industry.

To resolve this paradox this paper reconstructs the labour-force and output shares of the three principal sectors of agriculture, industry and services between 1381 and 1851. The labour-force estimates are reconstructed for benchmark years using the Poll

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Tax Returns of 1381, the Muster Rolls of 1522, and re-worked social tables for 1700, 1759, 1801 and 1851, paying particular attention to the differing sectoral participation rates of male and female workers. These estimates are then combined with reconstructions of sectoral output from Broadberry et al. (2011) to chart the growth of labour productivity by sector. Commencing from a firmly established late-medieval base, the critical structural shift of labour away from agriculture to industry occurred during the early modern period of vigorous proto-industrial growth. So much progress had been made by 1700 that the shift of labour from agriculture to industry during the eighteenth century was smaller than that proposed by Crafts and Harley, thereby reinstating industry as the sector with the fastest labour productivity growth during the classic Industrial Revolution period. Although there was also substantial agricultural labour productivity growth between 1700 and 1851, it was at a slower pace than in industry, thus reversing the most paradoxical finding of Crafts and Harley (1992). Yet while these findings reconcile the output estimates of Crafts and Harley with traditional views of an industrially dynamic Industrial Revolution they challenge those of Clark (2013–this issue), who argues for little or no trend growth in *per capita* incomes before 1800 and a relatively late final shift of labour out of agriculture. A critical evaluation of Clark's estimates thus comprises the final section of the paper.

2. The shift of labour out of agriculture

One way to answer the question “when did Britain industrialise?” is to reconstruct the shares of the labour force engaged in the three main sectors of agriculture, industry and services for a number of benchmark years. Relevant data are available for the territories of England between 1381 and 1700 and Great Britain between 1700 and 1851.

2.1. Labour force shares from the 1381 Poll Tax Returns

The Poll Tax Returns of 1381, made accessible recently in Fenwick (1998, 2001, 2005), provide the earliest securely documented basis for estimating the occupational structure of England. Information is available for 30,292 individuals (approximately 2% of total adults), resident in 892 villages, covering 95 hundreds in 22 counties stretching across England from Kent in the southeast to Lancashire in the northwest and Dorset in the southwest to Yorkshire in the northeast.

A particular strength of the Poll Tax returns is that information is given on female as well as male occupations, which are treated separately in Parts A and B of Table 1. The first step in derivation of the results summarised in this table involved allocating male and female workers with known occupations across agriculture, industry and services using Wrigley (2006a) Primary–Secondary–Tertiary (PST) scheme, but with mining included in the industrial sector, as in Shaw-Taylor (2009a). The 15.0% of male workers and 16.4% of female workers with the non-sector specific designation ‘labourer’ present a particular problem, common to all the pre-census benchmark data. They have been assigned to agriculture and non-agriculture in proportion to the identified workers in these sectors, but with all non-agricultural labourers allocated to industry (the results are not particularly sensitive to this procedure, since for example, if labourers were allocated in proportion to the shares of identified workers in all sectors, there would be no change to the share of agriculture but an improbable 4.4% of the labour force would be redistributed from industry to services). Finally,

Table 1
Sectoral distribution of the male and female labour forces from the 1381 Poll Tax Returns.

	Weighted number of male workers with known occupations		Allocated male labourers		Total male workers		
	No.	%	No.	%	No.	%	
<i>A. Male workers</i>							
Agriculture	14,351	67.0	2526	67.0	16,877	67.0	
Industry	2602	12.1	1244	33.0	3846	15.2	
Services	4480	20.9	0	0.0	4480	17.8	
Total	21,433	100.0	3770	100.0	25,203	100.0	
	Weighted number of female workers with known occupations		Allocated female labourers		Total female workers		Total labour force
	No.	%	No.	%	No.	%	%
<i>B. Female workers and total labour force</i>							
Agriculture	1467	34.5	288	34.5	1755	34.5	57.2
Industry	899	21.1	547	65.5	1446	28.4	19.2
Services	1888	44.4	0	0.0	1888	37.1	23.6
Total	4254	100.0	835	100.0	5089	100.0	100.0

Sources and notes: Male and female workers from Fenwick (1998, 2001, 2005). Workers with known occupations allocated to agriculture, industry and services using Wrigley (2006a) Primary–Secondary–Tertiary (PST) scheme, but with mining included in the industrial sector, as in Shaw-Taylor (2009a). Weights derived from the *Cambridge Urban History of Britain* as described in the text: urban 10%, semi-rural 10%, and rural 80%. Areas with more than 70% of occupations in agriculture are classified as rural, cities as identified in A. Dyer (2000) are classified as urban, and the rest are semi-rural. Labourers allocated between agriculture and non-agriculture in proportion to identified workers, but with all non-agricultural labourers allocated to industry. Females are assumed to account for 30% of total employment, in line with Shaw-Taylor (2009a).

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