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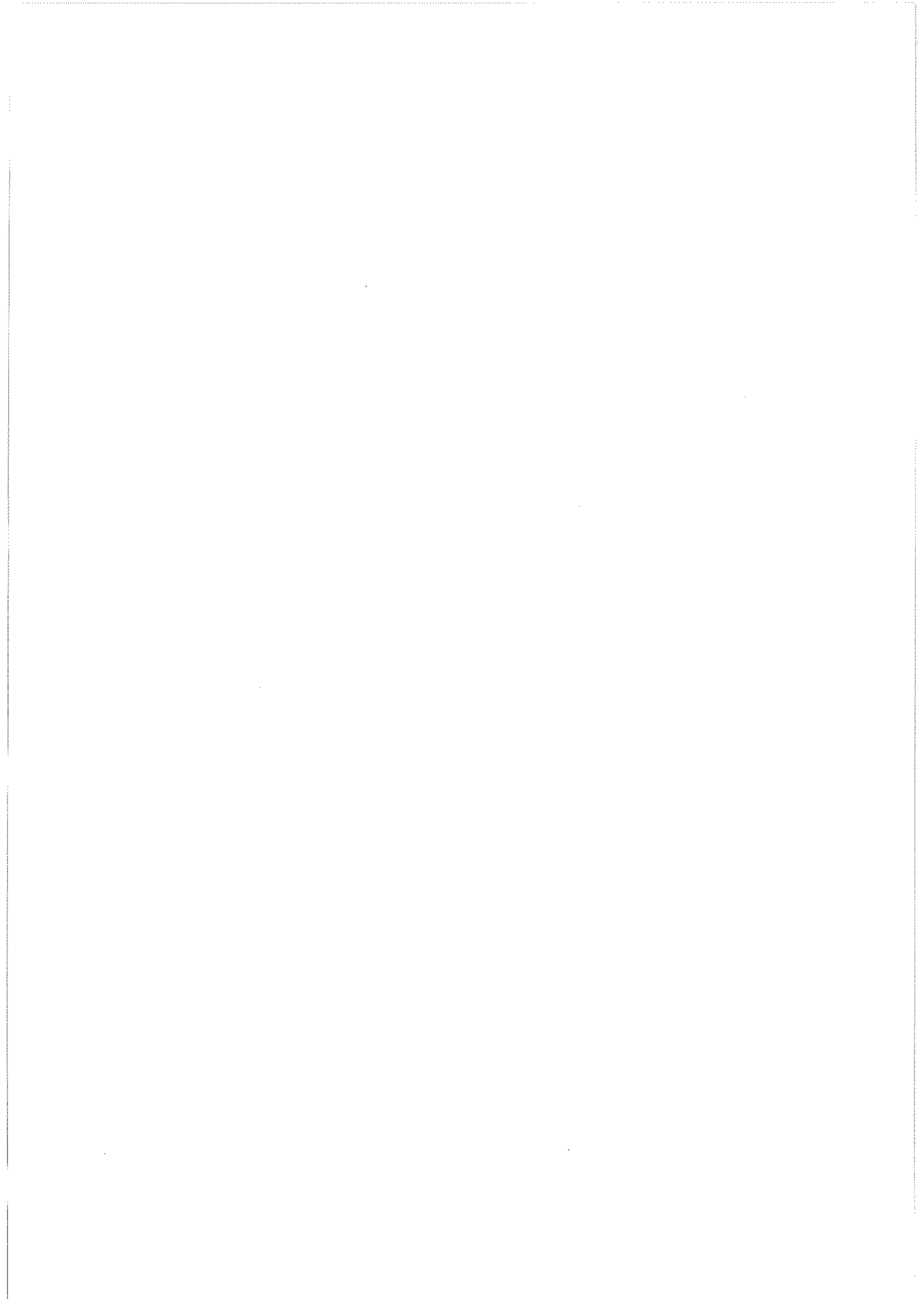
DEINDUSTRIALIZATION IN
IRELAND TO 1851:
SOME EVIDENCE FROM THE
CENSUS

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DEINDUSTRIALIZATION IN IRELAND TO 1851: SOME EVIDENCE FROM THE CENSUS

There is a certain consensus that Ireland experienced a process of deindustrialization during the first half of the nineteenth century.¹ The extent of this deindustrialization is less clear. Cullen argues that industrial decline was limited to textiles and in the main was a rural phenomenon.² Mokyr explicitly rejects this proposition arguing that the evidence, 'seems to support the view that, with few exceptions deindustrialization was widespread and not confined to textiles'.³ MacDonagh claims that by the 1830s deindustrialization extended to textiles, 'leather goods, glass, furniture, and other products of the kind'.⁴ O'Grada is more circumspect, suggesting that there was a decline in nonagricultural employment that was dominated by textiles but suggesting also that, 'some industries which declined later in the century still had much life left in them in 1845'.⁵

The causes of deindustrialization are also a matter for debate. Two broad explanations may be identified. The first associates deindustrialization with trade. One variant of this view, in direct line of descent from the work of George O'Brien,⁶ argues that Irish manufacturing industry declined as the result of the establishment of an economic union between Ireland and Britain after 1800. In particular free trade is blamed for the demise of Irish manufacturing industry, 'it was the rapidly increasing use of steam in British manufacture in the second and third decades of the century that, combined with the removal of the last of the protective duties by 1825, gave the British products their overwhelming price advantage'.⁷ Another version of what we might call the 'trade caused deindustrialization' argument is that while free trade may have exacerbated the process, it was perhaps inevitable given the proximity of the country to Britain.⁸ The second explanation discounts the impact of British

competition and attributes decline in the numbers in manufacturing industry to the impact of technical change within Ireland. Cullen and Johnson and Kennedy suggest that the apparent deindustrialization was a problem of technical progress displacing labour in textile production as factory spinning spread in Ulster.⁹

There is, then, some divergence over both the extent and the cause of Ireland's deindustrialization. This is a debate that, is bedeviled by a lack of hard evidence. In the discussion of deindustrialization, a relatively unexploited source of evidence on industrial activity is the data on occupations returned in the Irish censuses of 1831, 1841 and 1851. This paper presents two reasonably reliable series, constructed from this data, on occupations in Ireland classified by industry for the years 1841 and 1851 and on male occupations in the years 1831 and 1841. It has two objectives: first, to quantify and account for the decline in manufacturing jobs during the famine decade; second, to make a contribution to the debate on structural change in the prefamine period.

I

The 1831 census provides a return of occupations for 'males upwards of twenty years of age returned as employed in retail trade or handicraft'.¹⁰ The 1841 census was the first to rely on returns made by householders themselves rather than, as in 1821 and 1831, relying on returns made by the enumerators. The commissioners left the families to describe their occupations for themselves; 'when preparing instructions for filling the personal returns of each Family, we did not prepare any list to which the nomenclature of Occupations should

be confined. We considered it better to leave the head of the family to describe the Occupation of its several members according to his own understanding or terms.¹¹ These personal returns were then classified as belonging to one of nine classes based on serving the needs of others, i.e. ministering to food; clothing; lodging, furniture, machinery etc; health; charity; justice; education; religion; unclassified. This system of classification was used again in 1851.

The British Census has been used by Clive Lee to derive an employment series for the nineteenth century based on the twenty-seven industrial orders of the standard industrial classification as revised in 1968.¹² In order to facilitate comparison with Great Britain, and to better examine the change over time in manufacturing employment in Ireland, the occupational statistics provided in the Irish Census have been reclassified to conform with Lee's British series.¹³

Since the employment series used here are constructed from the census returns, they are subject to the limitations of the census returns as a source of information on employment. These limitations have been thoroughly aired elsewhere: by the census commissioners in the introductions to the volumes containing the general reports in which the statistics on occupations are returned, more recently by Armstrong and by Clive Lee;¹⁴ the accuracy of the pre-Famine Irish censuses has been examined by Joe Lee.¹⁵

There are two points to emphasize about the classification adopted here. First it is an industrial rather than an occupational classification; occupations are classified by industrial sector such as textiles or food and drink rather than by activity such as clerical or

managerial. Second, although the industrial classification of the labour force gives us a measure of the allocation of labour resources, of the relative position of industries and, over time, a measure of structural change in the economy, since differences in output per head are ignored, the employment figures presented here must be interpreted with due caution. In particular, for purposes of comparison across the Irish sea, account must be taken of the different level of economic development and the productivity regime within which the labour allocation occurs. Within Ireland levels of productivity differed across industries and within industries over time; this applies especially to textiles and in particular to the changes in textile employment between 1841 and 1851. Bearing in mind these qualifications, Tables 1 and 2 compare the numbers employed in agriculture, manufacturing, construction and services in Ireland and Great Britain in 1841 and 1851; they provide a broad indication of industrial structure in 1841 and 1851.

Table 1. Occupations in Ireland and Britain in 1841, (000s)

	Ireland					Great Britain					
	females	% of emp. pop.	males	% of emp. pop.	total	females	% of emp. pop.	males	% of emp. pop.	total	% of emp. pop.
Agriculture	144.8	12.7	1,707.3	73.2	1,852.1	80.8	4.5	1,445.6	28.5	1,526.5	22.2
Mining	0.0	0.0	8.2	0.4	8.3	8.3	0.5	226.7	4.5	235.1	3.4
Manufacture	693.3	60.7	327.9	14.1	1,021.2	608.0	33.7	1,712.6	33.8	2,320.5	33.8
textiles	550.5	48.2	125.3	5.4	675.7	343.6	19.1	520.3	10.3	863.9	12.6
other	142.8	12.5	202.6	8.7	345.4	264.4	14.7	1,192.3	23.5	1,456.6	21.2
Construction, gas & water	0.0	0.0	68.4	2.9	68.4	1.5	0.1	371.9	7.3	373.4	5.4
Transport & communication	0.2	0.0	20.5	0.9	20.7	2.9	0.2	169.5	3.3	172.4	2.5
Distribution	19.4	1.7	22.4	1.0	41.8	16.3	0.9	34.4	0.7	50.6	0.7
Financial & prof. servs.	9.5	0.8	29.2	1.3	38.6	47.7	2.6	117.1	2.3	164.8	2.4
Miscellaneous services	272.8	23.9	83.3	3.6	356.1	996.0	55.2	336.2	6.6	1,332.2	19.4
Public admin. & defence	0.2	0.0	16.8	0.7	17.0	1.1	0.1	86.7	1.7	87.7	1.3
Not classified	2.5	0.2	48.6	2.1	51.0	40.7	2.3	567.7	11.2	608.4	8.9
Employed population	1,142.8	100.0	2,332.5	100.0	3,475.3	1,803.2	100.0	5,068.4	100.0	6,871.6	100.0
Population	4,155.5	0.28 ¹	4,019.6	0.58 ¹	8,175.1	9,514.0	0.19 ¹	9,013.0	0.56 ¹	18,526.9	0.37 ¹

Sources: Reports from Commissioners (P.P. 1843, XXIV) and see text; Lee, *British Employment Statistics*, pp.

Notes: 1. Participation rate

Table 2. Occupations in Ireland and Britain in 1851, (000s)

	Ireland						Great Britain					
	females	% of emp. pop.	males	% of emp. pop.	total	% of emp. pop.	females	% of emp. pop.	males	% of emp. pop.	total	% of emp. pop.
Agriculture	167.7	18.5	1,291.7	68.3	1,459.4	52.1	229.9	8.2	1,835.3	28.0	2,065.2	22.1
Mining	0.3	0.0	11.8	0.6	12.1	0.4	9.2	0.3	372.8	5.7	382.0	4.1
Manufacture	447.7	49.4	285.7	15.1	733.4	26.2	1,281.3	45.5	2,358.9	36.0	3,640.2	38.9
Textiles	287.0	31.6	105.5	5.6	392.5	14.0	634.7	22.5	660.8	10.1	1,295.5	13.8
Other	160.7	17.7	180.2	9.5	340.9	12.2	646.6	22.9	1,698.1	25.9	2,344.7	25.0
Const., gas & water	0.0	0.0	51.3	2.7	51.3	1.8	0.8	0.0	509.9	7.8	510.7	5.5
Transport & comm.	0.4	0.0	50.5	2.7	51.0	1.8	12.9	0.5	411.6	6.3	424.5	4.5
Distribution	21.4	2.4	23.4	1.2	44.8	1.6	31.3	1.1	52.9	0.8	84.2	0.9
Financial & prof. servs.	12.6	1.4	30.7	1.6	43.2	1.5	98.8	3.5	171.4	2.6	270.2	2.9
Miscellaneous services	254.4	28.1	48.4	2.6	302.8	10.8	1,139.5	40.4	242.5	3.7	1,381.9	14.8
Public admin. & defence	0.4	0.0	23.3	1.2	23.6	0.8	2.6	0.1	135.6	2.1	138.2	1.5
Not classified	2.2	0.2	75.8	4.0	78.0	2.8	12.1	0.4	458.0	7.0	470.1	5.0
Employed population	907.1	100.0	1,892.5	100.0	2,799.6	100.0	2,818.4	100.0	6,548.7	100.0	9,367.1	100.0
Population	3,361.8	0.27 ¹	3,190.6	0.59 ¹	6,552.4	0.43 ¹	10,659.6	0.26 ¹	10,156.7	0.64 ¹	20,816.4	0.45 ¹

Sources: Reports from Commissioners (P.P. 1856, XXIV) and see text; Lee, British Employment Statistics, pp.

Notes: 1. Participation rate

In 1841 the Irish economy supported proportionally more than twice as many workers in agriculture as the British. The proportion of the labour force in the manufacturing sector in Ireland was close to the British figure. The aggregate figure for manufacturing is, though, deceptive. The manufacture of textiles generated around two-thirds of the manufacturing occupations in Ireland, compared to around 36 per cent of manufacturing occupations in Britain. In the construction, transport and service sectors, the Irish performance in job-creation fell considerably short of the British. Proportionally these sectors employed about half as much of the active population as they did in Britain. This is important because many of the jobs were in the non-traded goods sector and thus were not subject to competition from imports from Britain or elsewhere. The implication is that their relatively poor employment performance in 1841 can not be explained as the result of competition from more efficient British producers. On the eve of the famine then, the structure of the Irish economy diverged from that of its dynamic partner in the proportions of its labour force in agriculture and services rather than in the size of its manufacturing sector, though the manufacturing sector in Ireland relied heavily on textiles as a source of employment.

Tables 1 and 2 also indicate differences in the structure of male and female employment and differences in participation rates. Almost three-quarters of male employment in Ireland was in agriculture with another 17 per cent in manufacturing and construction; in Britain employment in agriculture generated around 29 per cent and manufacturing and construction about 41 per cent of jobs for males.

The manufacturing sector was the main source of female employment in Ireland. It generated 61 per cent of jobs for females, with around 80 per cent of these in textiles.

Miscellaneous services accounts for 24 per cent of female jobs and agriculture a further 13 per cent. These three sectors also provided the bulk of female employment in Britain; miscellaneous services was the major employment sector and textiles did not dominate female employment as it did in Ireland.

The participation rate differed across the two economies. In Ireland a greater proportion of the population was economically active. This was due to the much higher participation rate of females in the labour force in Ireland. In turn this was due to the large number of females engaged in the production of textiles. With a British participation rate and Irish employment structure the Irish would have had around 350 thousand fewer females returning occupations. Of these additional jobs around 170 thousand were in textile production, around 85 thousand in miscellaneous services, and about 45 thousand in agriculture. With a British employment structure female employment in textiles would have fallen by around 400 thousand jobs.

The large number of female textile workers returned in Ireland raises two related questions. The first concerns the numbers declaring themselves to be spinners; the numbers returned in the census do not sit well with assertions about the effects of the innovation of the wet-flax process on the employment of hand spinners in the 1830s; Mokyr, for example asserts that, 'by the late 1830s hand-spinning was completely ruined'.¹⁶ The second question concerns the issue of part-time work; in particular the amount of time females working at home devoted to spinning and how this may have altered over time.

To address the first question first: employment capacity in flax mills more than doubled between 1839 and 1850 while output probably didn't increase by much (see below) so the

process of replacement of hand-spun by mill-spun yarn to 1850 was at most less than half complete by 1839 and this ignores productivity gain in the modern sector over the following decade. This said it is clear from the reports of the Assistant Commissioners on Hand-Loom Weavers that the flax mills erected between 1826 and the late 1830s had an adverse effect on employment and earnings of hand spinners.¹⁷ To resolve the issue, then, of the accuracy of the census return of hand spinners it seems appropriate to attempt an estimate of the likely employment of hand spinners in 1841.

Average exports of linen cloth from Ireland in the triennium 1840-42 are estimated at 56.9 million yards and in 1850-52 at 64.6 million yards.¹⁸ It is probably fair to assume that there was not much growth in output for the domestic market between 1841 and 1851; Solar suggests that 'there was only modest growth in output and exports' in this decade.¹⁹ If we assume that the export ratio was about 60 per cent of output in 1841²⁰ and that the only increase in output over the following ten years was in exports then output in 1841 was about 90 per cent of its 1851 total. We will assume, then, that flax inputs in 1841 were about 90 per cent of their 1851 total. The amount of flax used in Ireland in the triennium 1850-52 averaged 34 thousand tons.²¹ This gives a figure for flax inputs in 1841 of about 31 thousand tons. Around 40 per cent of the weight of flax inputs is lost in mechanical spinning, though wastage may be less in hand spinning.²² Applying the wastage rate for mill spinning to this total gives an output of yarn of about 41.7 million lbs.

Can we allocate this yarn output between the modern and the traditional sectors? Rimmer, states that output per head of mill-spun yarn at Marshall's of Leeds was four bundles of yarn per week in 1840 and that the average count of yarn spun between 1831 and 1840 was 27

to 40 leas per pound.²³ Yarn of 25 leas per lb. weighs 8lb per bundle, 40 lea yarn weighs 5 lb per bundle and 100 lea yarn weighs 2 lbs. per bundle.²⁴ In 1837 the Railway Commissioners stated that the largest Belfast mill, that of S. K. Mulholland, Hind and Co., employed 800 workers and consumed 720 tons of flax to produce 3 million hanks of yarn;²⁵ at $16\frac{2}{3}$ hanks to a bundle this gives an annual output of 181,000 bundles²⁶ or about 4.5 bundles per hand per week. Allowing 40 per cent wastage on the flax consumed gives a total weight for the yarn produced of 960 thousand lbs or just over 5 lbs per bundle, suggesting that the average count spun was about 40 lea yarn. McCall suggests that Mulholland's mill in Belfast in 1846 employed nearly 1,000 hands and 17,000 spindles and used 800 tons of raw flax in a year.²⁷ This amounts to about 21 lbs. or just over four bundles of 40 lea yarn per hand per week.

If we apply these productivity figures for the mechanised sector to the 9,017 hands returned as employed in flax mills in Ireland by the factory inspectors in 1839²⁸ and assume that mill-spun yarn averaged 40 leas, the output of mill-spun yarn is $9,017 \times 4.5 \text{ bundles} \times 5 \text{ lbs per bundle} \times 52 \text{ weeks per year} = 10.5 \text{ million lbs of 40 lea yarn produced in the mechanised sector in 1839}$. This leaves around 31 million lbs to be produced by hand spinners.

Alternatively, consider annual output per spindle: at Marhall's in 1841 this was 10.5 bundles, or 52.5 lbs of 40 lea yarn; at Mulhollands in 1846 this was 63.2 lbs of yarn or 12.6 bundles of 40 lea yarn. McCall says there were 245 thousand spindles in Ireland in 1840²⁹ which may well be an overestimate since it implies about 27 spindles per employee in 1840 compared to around 17 in Mulholland's mill in 1846 (see above) and around 19 in 1850

according to the factory inspectors.³⁰ If we accept McCall's figure for spindles in 1841 and assume they were producing 40 lea yarn and that output per spindle in 1841 matched Marshall's, yarn output in the modern sector of was about 12.9 million lbs., leaving 29 million lbs to be produced in the traditional sector.

Horner quotes weekly output for a female spinner in County Antrim in 1808 of 5 hanks per week;³¹ in 1840 one David Longmore, a deputy seal-master in County Londonderry reported to Richard Muggeridge, 'a hank is always considered a fair days spinning; there are four hanks to the spangle and 12 cuts to each hank; a full woman (adult) would do but the hank in the day; that would give her 2d; girls of 12 years of age and upwards would do from six cuts to eight or ten cuts per day, according to their age; a hank is always regarded a fair days work';³² at $16\frac{2}{3}$ hanks to a bundle an annual output of around 16 bundles seems reasonable. Rimmer suggests that a hand spinner in the Leeds area in the early 1840s produced one bundle every four weeks or about 13 bundles in a year.³³ It is not clear what count of yarn is involved in these productivity figures; it would probably be reasonable to assume a higher count of yarn spun in the traditional sector (see fn. 31) but we will assume 40s and take the higher, Irish, figure for a spinner's annual output; annual output of a hand spinner was thus about 80 lbs. Divide this into the estimates of the quantity of flax spun in the traditional sector and we get an employment figure of between 390 thousand and 360 thousand hand spinners. It seems reasonable to suggest that the lower figure is a conservative estimate since it is based on McCall's estimate of spindles in 1841. The higher figure may well also be a conservative estimate; if females in the traditional sector were spinning a higher count of yarn, this would give a lower annual weight of yarn spun per spinner and

require more spinners. The 1841 census returned about 516,000 hand spinners in Ireland including around 73,000 wool spinners.

The second question concerns the issue of part-time work and what constitutes 'a fair days spinning'. This is really part of a larger question relating to multiple occupations in pre-industrial societies. How are the occupations returned in the census to be interpreted? The 1841 commissioners were aware of this problem and observed that, 'the occupation which was sought was that which the individual himself considered to be the chief business of his life'.³⁴ Nevertheless, hand spinning along with hand weaving was home work and unregulated work of this kind means that we cannot know what allocation of a female's labour time the amount of yarn spun per year represents nor how this changed over time. However, the census commissioners' judgement, was that occupations returned were, 'of that name or within that class, which yields to the individual the greatest profit, and in which he is most useful to the community'³⁵ which seems a reasonable working hypothesis. Since we use a productivity figure for 1805, we may surmise that the 400 odd thousand females returned as flax spinners in 1841 made an allocation of time to spinning similar to, or the same as, that of their mothers and grandmothers almost 40 years before.

On the basis of such estimates of raw material input and labour output among hand spinners and factory workers as are available, it seems that the large number of female hand spinners returned in 1841 is consistent with the fact that the Irish were producing a large quantity of linen textiles using traditional methods of production. This was not modern sector employment, it was low productivity and low wage employment in the traditional sector but it was production of manufactured goods.

Between 1841 and 1851 the Irish economy experienced a decline in employment in agriculture, manufacturing, construction and miscellaneous services. Some 751 thousand jobs disappeared: almost 393 thousand jobs were lost in agriculture, 288 thousand in manufacturing, 17 thousand in construction and 53 thousand in miscellaneous services. Total employment fell by nearly 676 thousand; around 75 thousand jobs were created in the other service sectors, transport and mining and also among those not classified. The size and the allocation of the labour force altered; it fell by around 19 per cent; agriculture still occupied more than half of this reduced labour force though its share of employment fell slightly (one percentage point); the proportion of the labour force in the manufacturing sector declined by three percentage points; the share of employment generated by the construction, transport and service sectors increased by four percentage points.

Examining the distribution of employment loss between the sexes it is clear that male employment loss was dominated by the disappearance of jobs in agriculture. Of the gross total of employment decline, 55 per cent was in agriculture, 38 per cent in manufacturing and the remainder in construction and miscellaneous services. All of the agricultural loss represented male employment; more than 80 per cent of the gross total of male employment lost was in the agricultural sector. Almost all of the manufacturing jobs lost, about 85 per cent, represented female employment and manufacturing accounts for around 94 per cent of the gross total of female jobs lost.

This presents a clear contrast with the experience of the British economy. In employment terms the manufacturing sector in Ireland was in decline relative to the manufacturing sector

in Britain. Ireland's share of UK manufacturing employment fell from 31 per cent in 1841 to around 17 per cent in 1851.

II

Given the size of the contraction in manufacturing employment (around 38 per cent of the gross loss or 42 per cent of the net loss of jobs) it is important to establish whether decline occurred as a result of the collapse of employment in one major manufacturing industry or was a more widespread phenomenon striking a range of industries. Table 3 outlines the level of employment in industries within the manufacturing sector in 1841 and 1851.

Table 3. Employment in manufacturing in Ireland in 1841 and 1851

	1841			1851			Change		
	Males	Females	Total	Males	Females	Total	Males	Females	Total
Food, drink & tobacco	30385	10133	40,718	38455	17270	55,725	7,870	7,137	15,007
Chemicals & allied industries	1742	73	1,815	1946	101	2,047	204	28	232
Metal manufacture	30017	127	30,144	25368	58	25,426	-4,649	-69	-4,718
Mechanical & instrument engineering	4206	31	4,237	4817	69	4,886	611	38	649
Shipbuilding	1768	1	1,769	2126	13	2,139	358	12	370
Vehicles	4143	14	4,157	2556	33	2,589	-1,587	19	-1,568
Metal goods not elsewhere specified	8120	439	8,559	7032	667	7,699	-1,088	228	-860
Textiles	125276	550460	675,736	105497	287007	392,504	-19,779	-263,453	-283,232
Leather, leather goods & fur	6820	630	7,450	6715	1359	8,074	-105	729	624
Clothing & footwear	92195	130211	222,406	69528	138599	208,127	-22,667	8,388	-14,279
Bricks, pottery, glass & cement	1048	140	1,188	1425	302	1,727	377	162	539
Timber, furniture etc.	17700	419	18,119	15202	808	16,010	-2,498	389	-2,109
Paper, printing & publishing	3551	473	4,024	4411	1179	5,590	860	706	1,566
Other manufacturing	693	153	846	645	213	858	-48	60	12
Totals	327864	693304	1,021,168	28 5723	447678	733,401	-42,141	-245,626	-287,767

Source: As for tables 1 and 2.

Employment in manufacturing industry in Ireland in 1841 was dominated by the textile sector; it accounted for 66 per cent of manufacturing employment, clothing and footwear accounted for a further 22 per cent, the remaining twelve manufacturing industries accounted for 12 per cent. Between 1841 and 1851 the numbers engaged in manufacturing fell by around 28 per cent. This contraction did not fall uniformly across the manufacturing sector; of the fourteen industries identified, eight increased and six experienced reductions in their employment totals.

The reduction in manufacturing employment was dominated by the loss of jobs in textiles; of the gross total of manufacturing jobs which disappeared 92 per cent were in this sector. The remainder (around 24 thousand jobs) disappeared in metals, vehicles, clothing and footwear, and timber and furniture; sixty per cent of these jobs were in clothing and a further 25 per cent in metal manufacture. Around 19 thousand jobs were created in food, drink and tobacco, chemicals, engineering, shipbuilding, leather, in bricks, pottery, glass and cement, and in paper, printing and publishing; more than 75 per cent of these jobs were in the food, drink and tobacco industry. Excluding textiles the net loss of employment in manufacturing amounted to around 4,500 jobs.

We have already established that decline in manufacturing employment overwhelmingly affected females; however, outside textiles, manufacturing employment loss was almost entirely confined to males. Female employment increased by around 17 thousand in the other manufacturing industries; almost all of these jobs were gained in clothing and footwear and in food, drink and tobacco.

Male employment increased in food, drink and tobacco, in chemicals, in engineering, in shipbuilding, in bricks, pottery etc., and in paper and publishing; the gain was around 10 thousand jobs. About 52 thousand male jobs were lost in the other manufacturing sectors; 20 thousand of these were in textiles, around 23 thousand in the clothing industry and about 6 thousand in metals.

Compared to the loss of textile jobs the changes in employment in the other manufacturing industries were relatively unimportant in the account of Ireland's 'deindustrialization' during the famine decade. Given the overwhelming importance of textiles in the contraction of manufacturing employment it is important to establish the dimensions of the contraction of employment within the textile manufacturing sector.

Textiles as an industry is defined by its product. Within textiles its sectors are divided by product (cotton, linen, wool) and by production process (preparation, spinning, weaving, finishing). Table 4 examines the distribution of employment within textiles as a group by production process. Employment is divided into spinning, weaving, factory workers, and others. This last category includes both preparation and finishing trades. Factory workers are not defined in the census by process: power weaving of flax yarn was a later development so this category represents for the most part mechanised flax spinning with some cotton and woollen mill workers; the category 'spinning' by implication refers to domestic spinning.

Table 4. Employment in textiles 1841-1851

	1841				1851				Change
	Males	Females	Total	%	Males	Females	Total	%	
Spinning	634	515,790	516,424	76.4	630	111,645	112,275	28.6	-404,149
Weaving	109,390	20,805	130,195	19.3	84,930	50,166	135,096	30.2	+ 4,901
Factory workers	2,371	5,822	8,193	1.2	5,105	13,575	18,680	9.0	+ 10,487
Others	12,881	8,043	20,924	3.1	14,833	111,621	126,453	32.2	+105,529
Total	125,276	550,460	675,736		105,497	287,007	392,504		-283,232

Source: As for tables 1 and 2.

In 1841 the majority of textile jobs, around three-quarters, were in spinning and these jobs were almost exclusively the preserve of females. A further 20 per cent of textile employment was in weaving and around 84 per cent of these operatives were males. Employment contraction between 1841 and 1851 was concentrated on spinning. A gross total of 404 thousand jobs disappeared, all of them in spinning and all of them among females. Against this must be set an increase in factory workers of around 10 thousand and an increase in the residual category covering preparation and finishing of about 105 thousand workers. This last was made up almost entirely of females engaged in two occupations, embroiderers and sewed muslin workers. The number of weaving process workers increased by almost five thousand. This increase may be more apparent than real; the number of weavers returned in the census declined by about four thousand while the number of winders and warpers increased by around nine thousand. The number of males engaged in weaving fell by about 25 thousand; the number of female weavers increased by around 30 thousand (including winders and warpers). By 1851 the structure of employment in Ireland's textile industry had altered considerably: the number of weavers almost matched the number of spinners, if factory and non-factory hands are taken together; spinning probably employed around one third of the textile labour force, while weaving probably employed slightly more; and there

was a substantial increase in finishing process work for female embroiderers and sewed muslin workers.

The extent of the decline in manufacturing employment is now clear. An examination of the aggregate figures establishes that the manufacturing sector accounts for over 40 per cent of the net total of jobs which disappeared during the famine decade; that the contraction which occurred in manufacturing employment was overwhelmingly dominated by textiles; that within textiles the entire contraction is accounted for by the disappearance of employment opportunities in the spinning sector.

In the last two sections we have used the occupational statistics of the Irish census to trace the changes in the industrial structure of the Irish economy during the famine decade. What seems clear is that decline in manufacturing employment in Ireland between 1841 and 1851 was essentially confined to textiles.

III

What of the prefamine period? Does the structure of employment indicated by the 1841 census shed any light on what went before? In subscribing to the view that the manufacturing sector in Ireland shrunk in the prefamine period, we must accept that the level and structure of employment encountered in 1841 is the outcome of this deindustrialization process. And yet the employment structure of 1841, when compared with Britain indicates an economy with a manufacturing sector, in relative terms, almost as large as the British, albeit one dominated by traditional sector production and employment.

Typically, it is the development of the British economy against which the development of the pre-famine Irish economy is measured. However comparison with Britain is not necessarily the appropriate one; there were a number of possible paths to higher per capita income in nineteenth century Europe. The patterns and diversity of the nineteenth century European experience of economic development have been explored by Crafts; the development transition is analyzed in terms of the average structure of the European economies at various per capita income levels measured in \$US1970.³⁶ He concludes that far from serving as a model for the other developing countries of the nineteenth century, 'Britain appears to be a very untypical nineteenth-century developer';³⁷ and the distinctive characteristic of British development lay in the unusually large shifts of employment from agriculture into industry at a relatively low level of per capita income. Mokyr estimates that Ireland's per capita income in 1841 was around forty per cent of the British.³⁸ There are, then, at least two reasons to be wary of making a simple comparison between Ireland's employment structure in 1841 and that of Britain in 1841: first because of the untypical nature of structural change in Britain as the level of per capita income increased; second because Ireland was so much further behind Britain in terms of per capita income level achieved.

It seems appropriate to compare Ireland's industrial structure in 1841 not with the Britain of 1841 but with Britain at a lower level of income. Table 5 seeks to place Ireland's position in 1841 on the path of development transition in both a British and European perspective. The comparison, though is with Britain and with an expected Europe at 60 per cent of British income per capita in 1841.

Table 5. Indicators of economic structure Ireland, Britain and Europe

<u>Income level in 1970 US dollars</u>	<u>Britain 1700 (US\$333)</u>	<u>Ireland 1841</u>	<u>European norm at US\$333</u>
Urbanization ¹	na	14.0	13.0
Percentage of labour force in primary sector	50-55 ²	53.5	72.9
Percentage of male labour force in agriculture	61.2	73.2	72.0
Percentage of male labour force in industry ³	18.25	17.4	12.6

Notes: 1. Towns with population of 2000 or more. 2. excludes mining. 3. includes mining.

Sources: Ireland, Table 1 and Vaughan and Fitzpatrick, eds., Irish Historical Statistics, p. 27; Britain and Europe, Crafts, British economic growth during the industrial revolution, Tab. 3.3, p. 55 and Tab. 3.6, p. 62; idem, 'British Industrialization', p. 416.

In terms of the level of urbanization and the proportion of the male labour force in agriculture the Irish economy was at a point on the development transition path consistent with the predicted European average. However in terms of two other indicators, the proportions of the male labour force in industry and the proportion of the labour force in the primary sector, the Irish performance seems almost nearer to the British than to the European model. The Irish economy displayed an employment structure either consistent with its level of per capita income or with a relatively low proportion of its total labour force in the primary sector and a relatively high proportion of its male labour force in industry. This is hardly evidence of the outcome of a process of deindustrialization.

What then of the evidence for pre-1841 deindustrialization? Mokyr relies on a comparison of the occupation returns of the 1821 census with those of the 1841 census. He concludes: 'whether they confirm the hypothesis of actual deindustrialization or not depends entirely on how much credence we can attach to the 1821 data. Clearly, the 1821 Census has to be enormously off the mark if the conclusion of a decline in industrial-commercial activity is

to be reversed'.³⁹ There are three reasons to suggest that they do not confirm the deindustrialization hypothesis.

The first questions the credibility of the 1821 data: the proportion of the labour force returned in agriculture is 40 per cent; this is a remarkably early release of labour from agriculture given Ireland's low level of agricultural productivity and per capita income.⁴⁰

The second relates to the comparability of the 1821 and 1841 returns: the 1841 figure for agriculture includes a number of occupations which are not included in the 1821 figure. For the most part the numbers are not large enough to make a substantial difference. There may, though, be a major problem with the 1821 order 'labourers': the class agriculture in 1821 was made up of two orders - farmers and labourers; the order labourers was made up of two occupations - ploughmen and herds.⁴¹ The 1841 census, however, returned three or four occupations which appear to correspond with these two - 'ploughmen', 'herds' and 'servants and labourers'; male servants and labourers in the class 'ministering to food' total 1.2 million and females 0.12 million in 1841;⁴² without knowing how this combined occupation was returned in 1821, Mokyr's comparison between 1821 and 1841 is unreliable. The omission in 1821 of a large number of those returned as 'servants and labourers' in the 1841 total for agriculture would go a long way to explain the relatively low proportion of the active population engaged in agriculture in that year.

The third relates to causation: the global sectors compared - industry and commerce - cannot be used to test the 'deindustrialization through trade' hypothesis. Many of the occupational orders in these sectors were producing goods or services which were not traded between

Britain and Ireland and thus were not subject to threat from British exports; even if a decline were identified in the numbers occupied in these sectors, it does not follow that it was caused by an influx of cheap British goods.

Consider now the 1831 census. Mokyr compares the occupational data from the three censuses of 1821, 1831 and 1841 and obtains a 'percentage occupied in population' of 24 per cent for 1831 compared to 41.7 percent for 1821 and 43 per cent for 1841; he concludes that, 'for most practical purposes the 1831 census is useless'⁴³. However he has misread the census; the aggregate return of occupations for individuals in the 1831 census refers not to the whole population but to males 'upwards of twenty years of age'. The figure of 1,867,598 persons which Mokyr gives as the 'total occupied' refers to 'males twenty years of age' and in addition appears to be the total of males upwards of 20 years of age in the population.⁴⁴ Expressing this figure as proportion of the population does not give, as he states, the 'percentage occupied in the population' but the percentage of males aged 20 and over in the population which explains why he gets a participation rate of 24 per cent in 1831 compared to 41.7 percent in 1821 and 43 per cent in 1841.

Traditionally the 1831 Census is regarded as suffering from overenumeration compared to the 1821 and 1841 returns;⁴⁵ if this is so it should be all the harder to encounter signs of an increase in the numbers occupied in manufacturing. The 1831 census returned a summary table of the numbers of males of 20 years and upwards engaged in each occupation for the class 'retail trade and handicraft'. We can use these occupational returns to compare the number of males aged twenty and over in manufacturing, construction, transport and trade

occupations in 1831, with the number of males aged 15 and over returned in the same occupations in 1841.

A total of 298,838 males were returned in 1831 as employed in some 214 occupations in these classifications. In order to facilitate comparison with 1841, some occupations had to be combined, so the comparison is based on 197 occupations. Of these it was possible to match 167, employing 293,304 or 98 per cent of those occupied. Of these, 120 occupations employing 244,332 or 82 per cent of those occupied, registered increases in the numbers employed between the two years. If we include in the 1831 total, some 4,934 jobs which could not be matched and exclude from the 1841 total all of the unclassified occupations of 1841, the net increase was 126,878 or 42 per cent.

It has to be said that the comparison is between males aged 20 and over in 1831 and males aged 15 and over in 1841, so the 1841 figure is inflated by the active males aged 15 to 20 in these occupations in 1841. For purposes of comparison either the 1831 figure should be inflated by the proportion of males aged 15 to 20 out of the total of males aged 15 and over active in these occupations or the 1841 figure needs to be reduced by this proportion. The approach of the 1841 Commissioners to this problem when they sought to compare the numbers of labourers and servants in 1831 and 1841 was to inflate the 1831 figure by one eighth to allow for persons aged between 15 and 20.⁴⁶ Following this procedure gives a net increase in manufacturing, construction, transport and trade occupations between 1831 and 1841 of 89,523 jobs or an increase of about 27 per cent.

We can either accept this adjustment or seek to generate our own. In the absence of data on the number of active males aged 15 to 20, let alone those engaged in manufacturing, construction etc., we must resort to the share of males aged 15 to 20 in the male population age 15 and over in 1841 as a proxy for the desired proportion outlined above. The figure is 17.7 per cent; in adopting it we assume that the activity rate was the same in both age groups and that the proportion of 'trade and handicraft' employment was the same in the two age groups. It is a considerably more severe adjustment than that used by the 1841 Commissioners; given that the age group between 15 and 20 included students and apprentices and a disproportionate number of messengers and labourers its use biases the outcome against encountering an increase in 'handicraft and trade' occupations; nevertheless the increase is 51,528 or 17 per cent. Even on these unfavourable assumptions the share of males over 20 engaged in 'handicraft and trade' occupations in the total male population aged 20 and over increased from 15.2 per cent in 1831 to 17.5 per cent in 1841.

However in terms of the debate on deindustrialization it is the change in manufacturing employment in which we are most interested. Besides detailing the numbers engaged in the 214 occupations classified as trade and handicraft, the 1831 census gave an aggregate return of those engaged in 'manufacture or in making manufacturing machinery'. There were 25,746 returned in this class. The commissioners indicated, in a footnote, the industrial sectors in which they were engaged which allows them to be classified with the manufacturing occupations of the trade and handicraft class, to give a picture of employment in manufacturing industries in 1831, for males over 20. Table 8 compares manufacturing employment among males in 1831 and 1841.

Table 8. Males aged 20 and over in 1831 and males aged 15 and over in 1841 in manufacturing

Industry	Males aged 20±	Males aged 15±	Estimate of males 20+ in 1841	Estimated change	Estimated growth
Food, drink & tobacco	23,997	30,067	24,745	748	3.1
Chemicals & allied industries	1,513	1,734	1,427	-86	-5.7
Metal manufacture	22,900	29,546	24,316	1,416	6.2
Mech. & instrument engineering	1,842	4,127	3,397	1,555	84.4
Shipbuilding & marine engineering	970	1,754	1,444	474	48.9
Vehicles	3,648	4,104	3,378	-270	-7.4
Metal goods not elsewhere specified	5,946	7,777	6,400	454	7.7
Textiles	81,633	118,181	97,263	15,630	19.2
Leather, leather goods & fur	5,822	6,700	5,514	-308	-5.3
Clothing & footwear	59,835	89,575	73,720	13,885	23.2
Bricks, pottery glass & cement	1,329	1,006	828	-501	-37.7
Timber, furniture etc.	14,064	17,504	14,406	342	2.4
Paper, printing & publishing	2,540	3,411	2,807	267	10.5
Other manufacturing	498	672	553	55	11.0
Manufacturing unclassified	4,191	2,621	2,157	-2,034	-48.5
Total manufacturing	230,728	318,779	262,355	31,627	13.7
Population	1,867,765	2,432,119	2,000,082	133,869	7.2

Notes: 1. Col. 3 reduces col. 1 by 0.177, the share of males aged 15 to 20 in the male population aged 15 and over in 1841 (see text).

Source: *Accounts and Papers* (P.P. 1833, XXXIX), pp. 343 and 345-351 and as for Table 1.

Of the total of 324,484 males aged 20 and over returned in the two classifications in 1831, some 232,523 can be classified as engaged in the manufacturing industries (allocating those returned as 'defective specification' in 'trade and handicraft' to manufacturing unclassified). Comparing their aggregate number with the total aged 15 and over in 1841 there is an increase of 88 thousand in manufacturing employment. Allowing for the different age groups, the increase is 59 thousand if the procedure of the 1841 commissioners of increasing the 1831 figure by an eighth is followed, or it is 32 thousand if the 1841 total is reduced by the share of 15 to 20 year olds in the male population. Either way the increase in the number of males in manufacturing is greater than the increase in population.

Now consider employment in those manufacturing industries which on the basis of British exports to Ireland in the mid-1820s were likely to come under most pressure in the subsequent decade. Even on the least favourable estimate of the change in employment, textiles (54% of British exports) experienced the largest increase in male employment of about 19 per cent, iron and other metalware (17% of exports) increased employment by 6 per cent, and clothing (12% of exports) increased employment by 23 per cent. The residual group shows a net increase of around 6 per cent, though there are falls registered for chemicals, vehicles, leather, bricks etc. and those unclassified. The evidence of the 1831 census is unequivocal; for males over 20, the group which was most affected by loss of non-textile manufacturing jobs in the 1840s, the 1830s saw an increase in employment in the manufacturing sector and in the construction, transport and trade sectors. We should be clear though that female employment in hand spinning was already being effected by the spread of wet spinning in the 1830s; however the employment effects of wet spinning were not the

results of trade but of technical change - a process which was to proceed apace in the following ten years.

We have no direct evidence on employment change in the pre-1831 period. However as regards the likely effect of trade with Britain on employment we have the evidence of the exchange of manufactures between Ireland and Britain. The record of this exchange in 1804-6 and 1824-6 is set out in table 10.

Table 9. British trade in manufactures with Ireland in 1804-6 and 1824-6 (000, current values)

	<u>1804-6</u>	<u>1824-6</u>	<u>Change</u>
Exports	2551	3145	+594
of which:			
Textiles	1157	1685	+528
Other ¹	1394	1460	+ 66
Imports	2067	2997	+930
of which:			
Textiles	2034	2547	+513
Other ¹	33	450	+417
Balance	+484	+148	-336
of which:			
Textiles	-877	-862	- 15
Other ¹	+1361	+1010	-351

Note: 1. Excludes processed foodstuffs.

Source: Davis, British Overseas Trade, Appendix, Tab. 43, p. 96; Tab. 45, p. 98; Tab. 59, p. 114; Tab. 61, p. 118.

Britain was in deficit in its trade in textiles with Ireland at the beginning of the century and that deficit remained about constant over the next twenty years. While there was a surplus on trade in non-textile manufactures, this surplus fell between 1804-6 and 1824-6; the value of Ireland's exports of non-textile manufactures increased by around six times the value of Britain's non-textile manufactures to Ireland. We should note also that this table probably underestimates Ireland's manufacturing trade balance with Britain since processed foodstuffs

are excluded. There is simply no evidence in the record of manufactured trade between the two countries of the import penetration which might be expected to accompany a process of deindustrialization through trade with Britain in this period.

This section has considered the evidence for deindustrialization in the pre-famine period. It makes four points. First that the structure of employment encountered in 1841, rather than indicating the end result of a period of deindustrialization, is consistent with Ireland's position on the path of development transition as exhibited either by an average for continental Europe or by Britain at a similar level of income. Second that comparison between the 1821 and 1841 census returns is an unreliable indicator of the course and cause of structural change. Third that comparison of the 1831 and 1841 Census returns on male occupations indicates that the level and the share of employment of males in manufacturing increased. Finally that the trade returns for the period before the mid-1820s do not reveal the import penetration which should be associated with a decline in manufacturing employment.

IV

We began with the debate on the degree, the spread and the origin of deindustrialization in the prefamine economy. This debate boils down to one about the influence of trade and technology on structural change. It is dominated by two competing explanations for Ireland's perceived deindustrialization in the first half of the nineteenth century. The first and oldest is predicated upon a weak trading performance from Ireland's manufacturing sector leading

to import penetration by British manufactured products with consequent loss of manufacturing employment. The second attributes it to technical progress in the manufacturing sector's major source of employment - textiles.

The evidence which we have presented here suggests that among males decline in manufacturing employment in the first half of the century was confined to the decade 1841 to 1851. Among females employment loss was confined to textiles, in particular to hand spinning; employment loss among female hand-spinners had its greatest impact in the 1840s but it was in train from the 1830s. In seeking an explanation for the fall in the number of manufacturing jobs in Ireland in this period, it is clear that we must differentiate between the experience of the textile industry and that of the other manufacturing industries.

The textile sector accounts for almost 92 per cent of the gross total of manufacturing jobs which disappeared during the famine decade and job loss was confined to one process - spinning. Of the gross total of 400 thousand spinning jobs which disappeared, 230 thousand were lost in Ulster, 90 thousand in Connaught, 50 thousand in Munster and 30 thousand in Leinster.⁴⁷ Most of these jobs were in flax spinning; it is impossible to be precise because of the large numbers of unspecified spinners returned, however of the 320 thousand females returned as 'spinners (unspecified)' in 1841, 65 per cent were in Ulster and 18 per cent in Connaught, the centres of flax spinning.

A poor trading performance simply will not do to explain the loss of employment in the flax spinning sector. We have suggested that flax inputs increased by about 10 per cent between 1841 and 1851. With the labour force declining and output increasing, clearly labour

productivity was growing, implying that the loss of jobs was due to labour saving technical progress. Since jobs disappeared in only one process, spinning, it seems reasonable to attribute the decrease in employment in this sector to the displacement of labour by capital.

The 1851 census returned about 70 thousand flax spinners (including unspecified spinners). The factory inspectors returned 20,438 workers and 396.3 thousand spindles in Irish flax mills in 1850. The estimate of flax consumed in the triennium 1850-52 is 34 thousand tons. Allowing 40 per cent for waste gives 45.7 million lbs. of yarn. There is a figure for annual output per flax spindle in Belfast in 1853 of 18 bundles.⁴⁸ Rimmer, following Porter, suggests that the average count of yarn spun after 1841 fell; between the early 1840s and the late 1850s he cites an average between 28 and 36 leas.⁴⁹ On the other hand Warden, writing in the 1860s states, 'the yarn spun in Ireland consists of both flax and tow qualities, partly dry spun and partly wet spun, and the bulk of it is of the higher or lighter numbers, of fine quality, and suitable for the description of linens manufactured there'.⁵⁰ It would help to have a count; in the absence of one we shall assume 40s which is probably low and thus overestimates the weight of yarn spun. On this basis total output of the 396.3 thousand Irish flax spindles was about 35.7 million lbs. of yarn. This leaves 10 million lbs to be produced by hand spinners. With the productivity level of 1841 and assuming 40s yarn was spun, this gives 125 thousand hand spinners. This is 50 thousand more than the census returns. Now it might be that they devoted more hours to spinning which would increase output per spinner and tend to reduce their numbers; on the other hand, if they were turning to higher counts of yarn this would decrease their output measured by weight (though not by value) and tend to increase their numbers. Kane writing in the mid 1840s suggests that

females spinning 360 lea yarn (which weighed under 1 lb per bundle) produced two hanks in a six day week.⁵¹

These calculations suggest that output per mill worker in the early 1850s was about 1950lbs of yarn compared to the estimate of 1042lbs in 1841. This an impressive annual average growth rate of labour productivity of 6.5 per cent per annum in Irish flax mills. It might seem high, but it appears to be matched by growth in the productivity of spindles. Rimmer argues that Leeds fell behind Belfast in productivity after the mid 1840s. 'Each Irish spindle in 1853 averaged eighteen bundles of yarn a year; since 1846 Marshalls had not managed much over twelve.'⁵² Assuming that Belfast and Leeds were on a par in 1841 (and the figure quoted above for Mulholland's mill suggests that they were in the mid-40s) gives productivity growth per spindle of 5.9 per cent per annum over the decade.

As regards the woollen industry, much is made of imports of English woollens and yet imports of woollen manufactures amounted to about half a yard per caput in 1825 and to one yard per caput in 1835 (if the trade returns for the latter year provided by the Railway Commissioners are to be relied on).⁵³ This perhaps explains why Otway, commenting on the domestic wool clip in 1840 was able to observe, '...the wool is at present only suited for coarser cloths and friezes for domestic manufacture among the peasantry, and hence that branch of the woollen trade has received considerable extension'.⁵⁴ Deane and Cole suggest that the Irish domestic wool clip increased by almost 10 per cent between 1828 and 1841.⁵⁵

The 1841 census returned some 73,000 females engaged in wool spinning; this total fell by around 33 thousand (about 8 per cent of the decline in the numbers of domestic spinners)

between 1841 and 1851. The numbers of wooldressers, weavers of wool and woollen manufacturers all increased.⁵⁶ Almost all of the decline in the number of wool spinners occurred in Munster and Connaught while flax spinning employment disappeared for the most part in Ulster and Connaught. We can be less secure about ascribing decline in the numbers of wool spinners to technical change but equally the increase in the numbers of wooldressers, weavers and manufacturers casts doubt on the proposition that it was due to an influx of imports from Britain.⁵⁷ Perhaps a more likely explanation is to be found in the effect of the potato blight; decline in the number of wool spinners shows a significant positive correlation with the decline in adult male employment in agriculture for Ireland as whole and for the counties in Munster and Connaught but none for Leinster and Ulster.⁵⁸ The suggestion is that it was the destruction of the family economy by the potato blight which accounts for the disappearance of these jobs: (this is not true of the decline in female flax spinning; the innovation of the wet-flax process appears to be an event independent of the effects of the blight⁵⁹).

In attributing declining employment in textiles to events within Ireland we are explaining over 90 per cent of the gross total of manufacturing jobs lost and we are explaining all of manufacturing employment loss among females. Male employment in non-textile manufacturing contracted in metal and metal goods, vehicles, clothing and footwear, and timber and furniture which between them shed a total of 32 thousand jobs. Allowing for employment growth among females (mainly in clothing) the net loss in these industries was about 23.6 thousand jobs this is about 7 per cent of the 1841 total of non-textile manufacturing jobs; even if all of these jobs could be accounted for in terms of the effects of imports it would not amount to 'widespread deindustrialization'.

However in concentrating on competition from Britain to explain these job losses another shock to the economy is ignored. The potato famine was more than a supply shock, the fall in population which accompanied it amounted to a demand shock. Ireland's manufactured exports in the years up to 1825 were dominated by textiles and food and drink. There is no reason to believe this position altered subsequently. Thus, it seems reasonable to suggest that population decline was translated directly into a decline in the size of the domestic market for manufactures, with, linen and food and drink excepted, no offset from exports.

The impact of this negative demand shock on the remainder of Ireland's manufacturing industries is difficult to evaluate. As a rough approximation we may suggest that the growth of demand for labour depends on the rate of growth of demand for output less the rate of growth of labour productivity. The growth of demand for any sector's output will be made up the growth of population plus the growth of income per capita times the income elasticity of demand for that sector's output.⁶⁰ Population fell by 19.8 per cent, the aggregate labour force by 19.4 per cent, and non-textile manufacturing employment by 7 per cent, ranging between 15 per cent in metals to about 7 per cent in clothing. Differing sectoral income elasticities and differing sectoral rates of productivity growth will ensure dispersion of sectoral employment change round the economy average for any given population change.

The importance of population change becomes all the more important if these industries are regarded as serving local markets. While Mokyr has argued that, 'domestic industries were an important part of the Irish rural economy; their rapid decay after 1825, though it did not originate from anything that happened in Ireland, severely affected it',⁶¹ he has also characterised rural industry as serving local markets: 'in the city of Dublin manufacturing

fell on very hard times after 1815....Other towns - Belfast excepted -followed Dublin's sad example....Artisans and craftsmen in the Irish countryside were probably somewhat better protected against this decline, insulated as they were by transportation costs and the personal nature of local trade networks.'⁶² In 1831 about 79 per cent of the total of non-textile 'retail, trade and handicraft' occupations among males of 20 years and upwards was located outside the 16 towns returned in the census.⁶³ In 1841 about 14 per cent of Ireland's population lived in towns of 2,000 and over. The nine towns returned in the 1841 census account for about half of this total and they account for about 20 per cent of non-textile manufacturing employment.⁶⁴ Since this sample contains all of the large towns it is unlikely that the rest could account for a similar share of manufacturing employment; we may surmise, then, that well over sixty per cent of non-textile manufacturing employment was located in rural areas in 1841. When the potato blight so dramatically reduced rural population (the population living in towns of 2,000 fell by about 20 thousand between 1841 and 1851) this is likely to have had a negative impact on local markets and 'local trade networks'.

If this was the case we might expect to observe a positive correlation across counties between relative population decline and relative employment decline in metals, engineering, vehicles, clothing and timber and furniture - the non-textile manufacturing industries which experienced decline in employment. This proposition is examined in Table 11.

Table 11. Correlation of relative change in non-textile manufacturing and relative change in population across counties.

<u>1841-1851</u>				
	<u>Food</u>	<u>Chemicals</u>	<u>Metals</u>	<u>Engineering</u>
<u>Population</u>	0.114 (n=32)	-0.014 (n=32)	0.823 ¹ (n=32)	-0.090 (n=32)
	<u>Shipbuilding</u>	<u>Vehicles</u>	<u>Leather</u>	<u>Clothing</u>
<u>Population</u>	0.0536 (n=32)	0.507 ² (n=32)	-0.116 (n=32)	0.280 (n=32)
	<u>Bricks etc.</u>	<u>Timber etc.</u>	<u>Paper etc.</u>	<u>Other manf.</u>
<u>Population</u>	0.237 (n=32)	0.830 ¹ (n=32)	0.079 (n=32)	0.238 (n=32)

Notes: 1. Significant at the 0.001 level. 2. significant at the 0.01 level.

In the case of metals, vehicles, and timber and furniture the correlation coefficients are consistent with the hypothesis that employment decline was related to population decline.

Clothing and footwear is an exception with no relationship between change in population and change in employment. There may be a difficulty here, though, related to changes in occupations within counties. In the aggregate, there was an increase in female textile workers of 62.3 thousand sewed muslin workers and 41.7 embroiderers (almost all in Ulster); the number of sempstresses and dressmakers in clothing fell by three thousand. The average fall in clothing employment in those counties which experienced falls was just under one thousand persons or 16 per cent; in county Down employment fell by 17.8 thousand or 67 per cent; some 16.6 thousand of this total is accounted for by a decline in the number of sempstresses. At the same time Down experienced the largest increase in sewed muslin workers at 31.3 thousand. This was about 3.5 times the next largest increase (which occurred in Fermanagh); it would seem reasonable to suggest that much of the fall in clothing employment in Down was in fact a movement by females from the occupation 'sempstress'

in clothing to the occupation 'sewed muslin worker' in textiles. If Down is excluded as an outlier then the correlation between relative decline in clothing and relative decline in population is 0.390 which is significant at the 5 per cent level. Tyrone and Londonderry made untypically large gains in clothing workers (in excess of 80 per cent) in both cases based on gains among sempstresses; Cavan, Armagh and Donegal made gains of 30 per cent and more. If all of the Ulster counties are excluded, the correlation coefficient is 0.527 which is significant at the 2 per cent level.

We can approach the issue from a slightly different angle. Of the gross total of 23.5 thousand non-textile manufacturing jobs which were lost between 1841 and 1851 more than 90 per cent were lost in rural areas. Belfast and Dublin each returned increases in the numbers occupied in non-textile manufacturing. At the same time, Belfast and Dublin are the two cities which might have been thought most susceptible to British imports. The rate of British manufacturing sector productivity growth was increasing at its fastest of the half-century after 1800 in the years after 1831; despite this, Belfast and Dublin not only maintained, but increased the size of their manufacturing base. As Mokyr has pointed out, the manufacturing sectors in the cities were probably less well protected by transportation costs than those in the countryside and smaller towns. The implication is that Ireland's small manufacturing sector was healthier, or as yet better protected by transportation costs, than the import-penetration hypothesis allows for.

VI

We have suggested that technical change, together with the effects of population decline rather than trade must serve to explain Ireland's 'deindustrialization' between 1841 and 1851 and that on the basis of the employment structure of 1841 and a comparison of the 1831 and 1841 census returns, a preceding period of deindustrialization is unlikely. Can we offer an explanation then for the structure of employment in Ireland in the prefamine period?

In certain respects what we are seeking to explain is an employment structure not dissimilar to that displayed by Britain: in the proportion of males in agriculture Ireland conforms to the European pattern but in the proportion of males in industry and the proportion of the labour force in the primary sector Ireland conforms more to the British pattern. There is a story which appears to fit these facts which is offered here as hopefully an encouragement to a more sophisticated treatment of the hypotheses underlying it and to a more systematic examination of the facts.

The British story about employment structure relies on comparative advantage. It is argued that despite superior levels of productivity in agriculture rapid productivity growth in traded manufactured goods, most obviously textiles, gave Britain a comparative advantage in, and a resource allocation which favoured, these activities.⁶⁵ The Irish story about prefamine employment structure proposed here is about unused labour resources and low levels of productivity; it is a tale of 'vent-for-surplus'.

Irish levels of output per worker in agriculture were at the lower end of European rather than at British levels.⁶⁶ In the case of Ireland low levels of productivity in agriculture, lay behind a low wage economy particularly for unskilled workers.⁶⁷ In addition there appears to have been considerable unused labour resources.⁶⁸ This meant that labour which was turned to handicraft production for the market was cheap; for example, Thomas Crossthwaite, a Dublin dry-spinner (mill owner), in his evidence to the Linen Trade Commission of 1825 suggested that the women of Ireland placed no value on their labour for spinning.⁶⁹ This cheap labour was a cost advantage to the Irish in the production of textiles which even British productivity gains could not offset. Where the new technology of textile production had as yet not made sufficient contribution to lowering unit costs, the Irish could produce more cheaply, goods which the British could produce in a more technically efficient way. This was recognized by English and Scots cotton manufacturers who sent yarn to Ireland to be woven.⁷⁰ The result was that in 1825 the Irish exported 55 million yards of linen and about 10.5 million yards of cotton piece goods while they received around 5 million yards of cotton goods and 3.4 million yards of woollens in return.

Cotton production in Ireland, though, was never more than a sideshow; linen was the main textile product. Technical change came relatively late to linen production. Although British firms were spinning the lower counts of yarn using machinery from the end of the eighteenth century and the Irish from the early nineteenth, machine spinning could not compete with Irish hand spinning either in terms of price or of fineness of spun yarn.⁷¹ The Irish sent about 52.6 million yards of linen to Britain in 1825 and received no linen manufactures in return.⁷² While the small cotton spinning sector located largely in Belfast was mechanized and while there were a very few cotton power-loom weaving establishments again located

largely in the northeast, the spinning and weaving of textiles was carried out using traditional handicraft methods.

The production of these textiles for the British market afforded a source of employment for otherwise surplus female labour; of the 675 thousand textile workers returned in 1841, 550 thousand were female and 125 thousand male. This accounts for the relatively low proportion of the total labour force in the primary sector given Ireland's level of per capita income and the relatively high proportion of manufacturing sector workers in textiles - females were engaged in spinning flax by hand. This was low wage, low income employment which combined with the low income in agriculture limited spending on other manufactured goods. In turn, this placed a constraint on the size of the manufacturing sector producing for the domestic market. The result was, in employment terms a relatively large manufacturing sector whose employment structure was dominated by textile workers. Trade with Britain, far from destroying Ireland's manufacturing base raised the opportunity cost of leisure for the seasonally unemployed and otherwise surplus labour by creating the possibility of exchanging Irish textiles for British goods, and created the possibility of employment in textiles for Ireland's considerable unused labour resources.

The development and innovation of the wet-flax spinning process in the mid-1820s changed all this; it enabled progressively higher counts of yarn to be spun on machinery though even by 1840 the modern sector was responsible for only around one-third of yarn output. Power-weaving was a later development, not establishing itself until after the mid-century. The timing of technical change thus limits the possibilities for the destruction of jobs by machinery in the years before 1841; and anyway, whatever the timing, it was flax mills in

Ulster and especially Belfast, rather than west Yorkshire and Leeds, which eliminated hand spinning.

This paper has examined structural change in the famine years through changes in the size and allocation of the labour force. It argues that the decline in manufacturing employment in these years may be largely accounted for by productivity gain in textiles. The evidence of the 1831 census return suggests an increase in manufacturing employment among males in the 1830s. The trade returns do not provide evidence of import penetration in the preceding decades. The main conclusion is straightforward and substantially agrees with Cullen's view: such deindustrialization as occurred before the mid-century was, in the main, limited to textiles and can be attributed to technical change. As regards Ireland's prefamine employment structure, it seems unlikely that competition from Britain destroyed manufacturing jobs but trade with Britain may well have generated them; to this we might add that preoccupation with the mills and workshops of Lancashire, Yorkshire and the English midlands ignores the constraint imposed on structural change in Ireland by the low level of per capita income and the level of effective demand in the domestic market.

Notes

1. Cullen, Economic History of Ireland; Johnson and Kennedy, 'Nationalist Historiography'; MacDonagh, 'Economy and Society'; Mokyr, Why Ireland Starved; O'Grada, 'Industry and Communication'; O'Malley, 'Decline of Irish Industry'.
2. Cullen, Economic History of Ireland, pp. 124 and 144.
3. Mokyr, Why Ireland Starved, pp. 13.
4. MacDonagh, 'Economy and Society', p.228.
5. O'Grada, 'Industry and Communication', p.138.
6. O'Brien, Economic History of Ireland.
7. Macdonagh, 'Economy and Society', pp. 228-9.
8. O'Grada, 'Industry and communication', pp. 144-145; Mokyr, Why Ireland starved, pp. 288-289.
9. ibid. p.124.
10. Accounts and Papers (P.P. 1833, XXXIX), pp. 346-350.
11. Reports from Commissioners (P.P. 1843, XXIV), p. xvii.
12. Lee, C.H., British Regional Employment Statistics 1841-1971, (Cambridge,1979).
13. This is a fairly straightforward if laborious process. Lee, British Employment Statistics, has provided a list of the component occupations which make up the main orders of his series. There is also an appendix to volume ten of the 1911 Census of England and Wales which provides a classified list of occupations giving the order, sub-order and heading in which each occupation should be located.
14. Armstrong, 'The use of information'; Lee, British employment statistics, ch. 1.
15. Lee, 'On the accuracy of the pre-Famine Irish censuses'.
16. Mokyr, Why Ireland Starved, p. 282.
17. Reports from Commissioners (P.P. 1840, XXII)
18. Solar, P., 'The Irish Linen Trade', p. 69, Tab. 4. Three year average 1840-42 and 1850-52.

19. ibid, p. 73.
20. The majority of the estimates of pre-famine output point towards this ratio of exports to output. Solar, 'The Irish Linen Trade', fn. 35, p. 84.
21. Boyle, Economic development of the Irish linen industry, p. 259.
22. Ibid., pp. 260-1.
23. Rimmer, Marshall's of Leeds, p. 247 and p. 315.
24. Horner, Linen Trade of Europe, pp. 182-3. A 'lea' is a length of flax yarn of 300 yards. The terms 25 lea, 40 lea and 100 lea refer to the count of the yarn. The count is a measure of its diameter or fineness indicated by the number of leas in 1 lb weight of yarn. The lower the number of leas the thicker the yarn.
25. Reports from Commissioners (P. P. 1837, XXXV), p. 771
26. Horner, Linen trade of Europe, p. 182.
27. McCall, Ireland and her staple manufactures, p.395.
28. Accounts and Papers (P.P. 1839, XLII), p. 335.
29. McCall, Ireland and her staple manufactures, p. 397.
30. Accounts and Papers (P.P. 1850, XLII), p.465
31. Horner, Linen Trade of Europe, p. 49. Horner also quotes a figure for county Monaghan of 'five dozen per week of yarn from a pound of flax'; there were 12 leas to the hank so if 'dozen' here refers to 12 leas, then we also have a figure of five hanks per week in Monaghan. If we allow 25 per cent wastage, then a bundle weighs about 2.5lb and the yarn being spun is around 75 to 80 leas per lb (with no wastage the count is 55 to 60 leas per lb (Horner, p. 182).
32. Reports from Commissioners (P.P. 1840, XXII), p. 569. This is Scotch reel; a cut was the same measure of length on the Scotch reel as a lea on the Irish. There were $4\frac{1}{6}$ spangles to one bundle Irish (Horner p. 182). We should note that 'fair' here probably means 'good' or 'ample' in local parlance.
33. Rimmer, Marshall's of Leeds, p. 247.
34. Reports from Commissioners (P.P. 1843, XXIV), p. xxi.
35. ibid, p. xxi.
36. Crafts, N., British Economic Growth during the Industrial Revolution, ch. 3.

37. *ibid.*, p.60.
38. Mokyr, Why Ireland, p. 11.
39. ibid, p. 13.
40. Crafts, British economic Growth, tab. 3.3, p.55.
41. Accounts and Papers Relating to Ireland (P.P. 1824, XXII), p. 392. Though in a brief extract from the enumerator's return for the parish of Inchicronane there are males entered as 'labourer'.
42. Reports from Commissioners (P.P. 1843, XXIV), p. 552.
43. Mokyr, Why Ireland starved, p. 13.
44. The ratio of persons aged twenty and over in 1821 was 0.468. In 1841 the ratio of males aged twenty and over to the male population was 0.497. If the figure of 1,867,765 males aged twenty years of age returned in 1831 refers to those occupied it must be inflated by those not occupied to obtain the full complement of males over twenty in the population. The activity rate for those aged 15 and over in 1841 was 0.908. If we apply this activity rate to the figure of 1,867,765 then the male population aged twenty and up was 2,039,599 and its share in the male population was 0.537. On the other hand if the figure of 1,867,765 refers to the male population the ratio of males over 20 to total males was 0.492 which seems more consistent with the other two censuses. Accounts and Papers Relating to Ireland (P.P. 1824, XXII), pp. 378-9; Accounts and Papers (P.P. 1833, XXXIX), pp. 342-3; Reports from Commissioners (P.P. 1843, XXIV), pp. 488-9 and 440.
45. Lee, 'On the Accuracy of the Pre-Famine Census Returns', pp. 37-8
46. Reports from Commissioners (P.P. 1843, XXIV), pp. xxiii.
47. Geary, 'Regional aspects of employment decline', tab. 4, p. 12.
48. Rimmer, Marshall's of Leeds, p. 250; see also Warden, Linen Trade p. 406.
49. Rimmer, Marshall's of Leeds, p.315
50. Warden, Linen Trade, p. 408.
51. Kane, Industrial resources of Ireland, p. 334.
52. Rimmer, Marshall's of Leeds, p.250.

53. Tables of the Revenue, Population and Commerce of the United Kingdom and its Dependencies. Part I From 1820 to 1831, Both Inclusive (P.P. 1833, XLI), pp.171-3; Reports from Commissioners (P.P. 1837-8 XXXV) p. 836.
54. Reports from Commissioners (P.P. 1840 XXIII), p. 687.
55. Deane and Cole, British Economic Growth, p.195.
56. As in the case of flax, it should be said that the numbers returned as 'spinners (unspecified)' and weavers (unspecified)' make accuracy about the change in the number of woollen spinners and weavers impossible. These numbers which exclude unspecified spinners are probably an underestimate but not by much.
57. There is another way to approach this. Between 1840 and 1850, the value of final output of the UK woollen industry increased by £3.7m. Of this increase, £2.9m went to exports leaving an increase in domestic consumption of £0.8m (Deane and Cole, British Economic Growth, Tab. 47, p. 196). Consumption of woollen products by value in 1841 in the UK was about £1 per capita. We may assume that British consumption per capita was greater than this and Irish consumption, less. Let us say the Irish consumed about half as much by value as the British - British consumption of £1.16 per capita against Irish consumption of £0.58 per capita. The population of Britain increased by 2.3 million between 1841 and 1851 while the population of Ireland decreased by 1.7 million. This increase in the population of Britain is more than enough to account for the increase in the domestic consumption in the UK even allowing for the decline in the population of Ireland (and ignoring change in per capita income). It seems unlikely that Ireland was flooded with woollen imports in these years.
58. Geary, 'Regional aspects of employment decline', Tab. 7, p. 20.
59. *ibid.* Tab.6, pp. 18-19.
60. $\Delta L_{mi}/L_{mi} = [\Delta P/P + e_{mi} \times \Delta(O/P)/(O/P)] - \Delta(O_{mi}/L_{mi})/(O_{mi}/L_{mi})$
 where L_{mi} is employment in manufacturing sector i , P is population, e_{mi} is income elasticity of demand for manufacturing sector i 's output, O is output, O/P is income per capita and O_{mi}/L_{mi} is productivity of labour in manufacturing sector i .
61. Mokyr, Why Ireland Starved, p. 281.
62. Mokyr, Why Ireland Starved, p. 14.
63. Accounts and Papers (P.P. 1833, XXXIX), pp. 346-350.
64. Reports from Commissioners (P.P. 1843, XXIV)

65. Crafts, 'British Industrialization'.
66. O'Grada estimates a ratio of Britain's advantage over Ireland in excess of two to one compared to an advantage over France at around 1.8 to one. O'Grada, Agriculture before and after, p. 62; see also Crafts, 'British industrialization', p. 418.
67. Bowley, Wages in the United Kingdom, ch. 6; Mokyr, Why Ireland starved, pp.223-8.
68. Bowley, Wages in the United Kingdom, p. 46; Mokyr, Why Ireland starved, pp. 217 concludes that 'seasonal unemployment was a serious problem, and probably worse than in most other European countries'; O'Grada, Ireland before and after, p. 17.
69. Reports from Commissioners (P.P. 1825, V), p. 733.
70. Green, Lagan Valley, p. 105.
71. In 1825 John Marshall of Leeds appearing before the select committee on the linen trade of Ireland said that the yarn he spun was about ten to fifteen per cent more expensive than Irish hand-spun. The select committee itself concluded that, 'establishing mill-machinery for spinning Linen Yarn..will not in the opinion of this Committee, interfere with the interests of the spinner of hand-spun Yarn, as both mill and hand-spun Yarn are required, and in great demand, for different parts of the manufacture of linen'. Reports from Commissioners (P.P. 1825, V), pp. 674, 708-9 and 712.
72. Tables of the Revenue, Population and Commerce of the United Kingdom and its Dependencies. Part I From 1820 to 1831, Both Inclusive (P.P. 1833, XLI), p. 171.

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