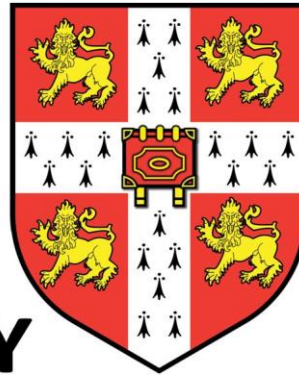


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***BY-EMPLOYMENTS IN EARLY MODERN
ENGLAND AND THEIR SIGNIFICANCE FOR
ESTIMATING HISTORICAL MALE
OCCUPATIONAL STRUCTURES***

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ABSTRACT

Based on the evidence from probate inventories, by-employments have generally been presumed ubiquitous amongst early modern Englishmen. This would appear to present a significant problem for estimates of the contemporary male occupational structure, since the sources on which these estimates are based describe men almost always by their principal employment only. This paper argues that this problem is vanishingly small, for three reasons. Firstly, the probate inventory evidence is shown to exaggerate the incidence of by-employments by a factor of two, as a consequence of its inherent wealth bias. Secondly, it is demonstrated that even after wealth-bias correction, the probate record greatly overstates by-employment incidence as most of the traces of subsidiary activities in the inventories actually point to the employments of other members of the household, not to by-employments of the inventoried male household head. Thirdly, even if one ignored this and assumed that they *did*, in fact, point to his by-employments, they are shown to have been relatively small in economic importance compared to the principal employment, and to necessitate only a very minor adjustment of the principal-employment-only male occupational structure.

INTRODUCTION

Scholarly orthodoxy has it that by-employments, that is, gainful activities in addition to a person's principal occupation, were a ubiquitous element in the socio-economic framework of early modern England and, indeed, the Western world. Joan Thirsk contended that about half the men employed in agriculture in seventeenth-century Britain were also engaged in manufacturing.¹ Fernand Braudel argued that European peasants depended on manufacturing income for sheer economic survival and that by-employments must therefore have been ubiquitous.² Lamenting the 'evil day when rural industries left the countryside and returned to the towns,' Alan Everitt used probate evidence to calculate that sixty per cent of agricultural labourers in the 1560-1640 period were by-employed in manufacturing.³

Historians have also argued for the widespread existence of by-employment 'in the opposite direction', that is, of manufacturers with significant subsidiary income from the land. Alan Armstrong contended that even town-dwelling artisans continued to fill part of the peak demand for agricultural labour in the harvest season well into the nineteenth century.⁴ Mark Overton *et al* calculated that nearly sixty per cent of early modern Kentish weavers' probate inventories showed clear signs of farming, leading them to conclude that 'by-employment was the norm'.⁵ Many others have come to similar conclusions on the basis of probate inventory evidence.⁶ As will be discussed, much of the evidence for the ubiquity of by-employments is rather weak and indirect. However, probate inventories would appear to offer a robust basis of proof. They provide occupational information in two ways: in the form of the occupational descriptor of the decedent, typically found in the inventory preamble, and in the form of tools, livestock, raw materials, produced goods, etcetera in the actual inventory. By-employment incidence can therefore be determined straightforwardly and

¹ Thirsk, 'Seventeenth-century agriculture and social change', in her Thirsk, 'The rural economy of England: collected essays', (London: Hambledon, 1984), pp. xiv, 420p (p. 211).

² Braudel, *Civilisation and capitalism, 15th-18th century. Vol. 2, The wheels of commerce* (London, 1982), p. 255.

³ Everitt, 'Farm labourers', in Finberg (ed.), *The agrarian history of England and Wales. Vol. IV, 1500-1640* (Cambridge: Cambridge University Press, 1967), pp. 428-29.

⁴ Armstrong, 'Labour I: rural population growth, systems of employment, and incomes' in Mingay (ed.), *The agrarian history of England and Wales. Vol. VI, 1750-1850* (Cambridge: Cambridge University Press, 1989), pp. 679-80.

⁵ Overton *et al*, *Production and consumption in English households, 1600-1750* (London: Routledge, 2004), pp. 76-77.

⁶ For example, Donald Woodward for building craftsmen in several counties, see: Woodward, 'Wage rates and living standards in pre-industrial England', *Past & Present*: 91 (1981), pp. 39-42; David Hey for South-Yorkshire nailers, although his calculations are based on only fourteen inventories, see: Hey, 'A dual economy in south Yorkshire', *The Agricultural History Review*, 17:2 (1969), p. 113; Pauline Frost for South Staffordshire metalsmiths, see: Frost, 'Yeomen and metalsmiths: livestock in the dual economy in south Staffordshire 1560-1720', *The Agricultural History Review*, 29:1 (1981), p. 40; Holderness for Lincolnshire artisans, see: Holderness, 'Rural tradesmen 1660-1850: a regional study in Lindsey', *Lincolnshire History and Archaeology*, 7 (1972), pp. 77-83; Mary Rowlands for West-Midland metalworkers, see: Rowlands, *Masters and men in the West Midland metalware trades before the Industrial Revolution* (Manchester: Manchester University Press, 1975), pp. 42-43; for urban artisans and others in the town of Lincoln see Johnston, *Probate inventories of Lincoln citizens 1661-1714* (Woodbridge: Lincoln Record Society: Boydell Press, 1991), p. lix; for early modern Gloucestershire see Moore, *The goods and chattels of our forefathers: Frampton Cotterell and district probate inventories, 1539-1804* (London: Phillimore, 1976), pp. 26-27. Alan Rogers, however, is an exception, concluding for the West-Midlands' framework knitting industry that 'dual occupations are rarely recorded', see Rogers, 'Rural industries and social structure: the framework knitting industry of south Nottinghamshire 1670-1840', *Textile History*, 12:1 (1981), p. 17.

quantitatively, by means of a simple count of the numbers of inventories with and without indications of additional employments – typically resulting in high incidence percentages, as shown in Table 1.

My personal interest in by-employments is the result of my involvement in the Cambridge Group's ongoing 'Occupational Structure of Britain 1379-1911' project.⁷ In this project, much progress has been made in establishing the composition of England's eighteenth- and nineteenth-century labour force, in particular of its male component; first results were recently published by Leigh Shaw-Taylor and Sir E.A. Wrigley in the newest edition of the Cambridge Economic History of Modern Britain.⁸ The eighteenth- and early-nineteenth-century components of these results are based on parish baptism registers. My PhD research has recently complemented these with occupational evidence from indexes to wills and other probate documents, thereby creating a set of occupational estimates at twenty-year time intervals, starting in 1600, at national, regional, and local levels.⁹

Table 1. Probate-inventory-based assessments of agricultural by-employment incidence¹⁰

Historian	Region	Period	Principal occupations	Sample size	Incidence
C. Ironfield	Chipping (Blackburn hundred, Lancashire)	1650-1700	Craftsmen	14	79%
D. Hey	South-Yorkshire	1694-1769	Nailers and cuttlers	43	84%
B.A. Holderness	Lindsey in Lincolnshire	1660-1799	Artisans and shopkeepers	173	84%
D. Woodward	Lincolnshire, Lancashire, Cheshire	1550-1650	Carpenters	91	88%
J. Stobart	Cheshire	1700-1760	Tailors and shoemakers	27	63%
P. Frost	South-Staffordshire	1601-1640	Craftsmen	c.50 ^a	78%
		1681-1720	Craftsmen	c.250 ^a	55%
M.B. Rowlands	West-Midlands	1660-1710	Metalworkers	434	56%
J. M. Martin	South-Warwickshire	1727-1749	Craftsmen and traders ^b	98	51%
M. Overton, J. Whittle,	Kent	1600-1740	Craftsmen	735 ^c	47-63% ^d
D. Dean, and A. Hahn	Cornwall	1600-1740	Craftsmen	632 ^c	47-66% ^d

Notes: ^a The inventory numbers have been estimated here, based on shares of probate inventories belonging to the metal trades per time period, provided on page 29 and 38 of the paper.

^b This groups includes an unstated number of labourers, but given that these very rarely left inventories, it has been assumed that this number was negligibly low.

^c The Overton et al figures are not easily comparable to the others in this table, since the classification of the occupational

⁷ See <http://www.campop.geog.cam.ac.uk/research/occupations> for a description of this project.

⁸ Shaw-Taylor and Wrigley, 'Occupational structure and population change' in Floud, Humphries, and Johnson (eds), *The Cambridge Economic History of Modern Britain. Volume 1. Industrialisation, 1700-1870* (Cambridge: Cambridge University Press, 2014), pp. 53-88.

⁹ Keibek, *The male occupational structure of England and Wales, 1600-1850* (PhD dissertation, University of Cambridge, 2017).

¹⁰ Originally published in a slightly extended form in Keibek and Shaw-Taylor, 'Early modern rural by-employments: a re-examination of the probate inventory evidence', *Agricultural History Review*, 61:2 (2013), p. 248, table 1, based on figures from Ironfield, 'The Parish of Chipping during the seventeenth century', *Transactions of the Historic Society of Lancashire and Cheshire* 127 (1978), pp. 37, 41-2; Hey, 'A dual economy in south Yorkshire', pp. 114-6, tables IV and V; Holderness, 'Rural tradesmen 1660-1850: a regional study in Lindsey', pp. 79 (table 1), 81; Woodward, 'Wage rates', pp. 39-42; Stobart, 'The economic and social worlds of rural craftsmen-retailers in eighteenth-century Cheshire', *The Agricultural History Review*, 52:2 (2004), p. 151; Frost, 'Yeomen and Metalsmiths', pp. 29, 38, 40; Rowlands, *Masters and men*, pp. 42-43; Martin, 'Village traders and the emergence of a proletariat in south Warwickshire, 1750-1851', *The Agricultural History Review*, 32:2 (1984), p.184; Overton et al, *Production and consumption*, pp. 67-8.

group to which the inventory belongs was based on the presence or absence of activities in the inventories, not on the stated occupation of the deceased. This means that occupational groups, as used in this table, inevitably overlap. For example, an inventory showing clear evidence of weaving and of commercial farming will be ranked under both occupational categories in the table above, and will be counted as by-employed in both categories.

^d The lower figure indicates commercial agriculture only, the higher indicates all agricultural activities, including (very) minor ones.

Sources: see footnote 6.

The occupational information in parish registers and probate indexes is virtually limited to men's principal occupations. For example, only 0.1 per cent of all men in the early eighteenth century parish registers were described with a dual or triple occupational denominator. Therefore, if by-employments were really as ubiquitous and important as argued by the historians above and as depicted in Table 1, an early modern occupational structure based on main employments only would not adequately represent the economic activities of contemporary men. John Swain has contended that 'the exceptionally high degree of participation in industry is largely hidden if undue reliance is placed on occupational data' in early modern Lancashire.¹¹ James Rosenheim put it even stronger, praising Swain for his exposition of 'the futility of reliance on occupational information to assess the structure of the early modern labor force'.¹² Jack Langton has even claimed that manufacturing by-employment was so widespread amongst the agricultural population that it renders the very term 'agricultural sector' essentially meaningless in its application to the early modern world.¹³ The issue of by-employments, and the problem they present for the Occupational Structure Project's results has been raised at virtually every conference and seminar in which these results have been presented.

This paper therefore examines the need for a by-employment correction of the early modern, male occupational structure. It presents a set of headline estimates of by-employment incidence, that is, frequency counts of probate inventories. The three main problems which such estimates suffer from are identified, and analysed one by one. Based on these analyses, a judgement is made about the necessity for and the size of the by-employment correction.

BY-EMPLOYMENT INCIDENCE – EVIDENCE AT FIRST SIGHT

Much of the evidence for the scholarly orthodoxy of pervasive multiple employments amongst early modern men is indirect and rather weak. One line of reasoning, followed for example by Fernand Braudel, is that by-employments *must* have been ubiquitous because they provided early modern peasants with the necessary level of protection through differentiation of income, as well as a means to utilize spare hours in the slack periods of the farming year and day.¹⁴ Such an argument sounds intuitively compelling but there is little actual evidence for its validity. For example, 'the seasonality

¹¹ Swain, *Industry before the Industrial Revolution: north-east Lancashire c.1500-1640* (Manchester: Manchester University Press for the Chetham Society, 1986), p. 207.

¹² Rosenheim, 'Review of Swain's "Industry before the Industrial Revolution"', *Albion*, 20:1 (1988), pp. 99-100. This sentiment can also be found in other studies of the pre-industrial economy, for example in Clarkson, *The pre-industrial economy in England, 1500-1750* (London: Batsford, 1971), p. 77; Pahl, *Divisions of labour* (Oxford: Blackwell, 1984), p. 47.

¹³ Langton, 'Prometheus prostrated?', in Slack and Ward (eds), *The peopling of Britain: the shaping of a human landscape* (Oxford: Oxford University Press, 2002), pp. 244-46.

¹⁴ Braudel, *Civilisation*, p. 255.

of farming often coincided with the seasonality of manufacture'.¹⁵ And it is not obvious that manufacturing incomes would have provided an effective buffer against economic distress in the agricultural sector, since economic crises, then and now, have a tendency to hit sectors simultaneously – although by-employments may have provided a degree of economic protection against specifically *local* agricultural crises.

Historians have therefore looked for more direct, hard evidence for the prevalence of by-employments and have found this in probate inventories. These documents, created as part of the probate process, list the moveable goods of a decedent, and provide a wealth of occupational data. Inventories almost always provide identifying information of the decedent. When the decedent was male, this information often includes a – usually single – occupational denominator.¹⁶ If such a denominator is missing, it can often be found in other probate documents referring to the same person. The actual list of assets provides additional information on gainful activities in the form of tools, materials, livestock and rooms that are listed and valued in them. The probate inventory of a farmer will typically list assets like livestock, agricultural tools, crops growing on the land or in storage, etcetera. If that farmer was by-employed as, for example, a weaver, the inventory will also list assets pertaining to that activity, such as one or more looms, other weaving-related tools, yarn, etcetera. Therefore, the incidence of by-employments can be calculated straightforwardly by examining a sufficiently large set of probate inventories, counting the number of inventories which indicate more than one occupation and expressing them as a fraction of the total data set. The estimates of by-employment incidence by early modern historians in Table 1 above are all based on this type of frequency count.

Probate inventories are also the data source for my own assessment of the prevalence and significance of by-employments in pre-industrial England and Wales, presented in this paper.¹⁷ The analyses in this paper are based on a set of nearly 1,900 probate inventories, most of which were collected, transcribed and interpreted specifically for this research.¹⁸ These covered six counties and wider geographic areas in early modern England in the 1700-1760 period and, for two of these areas, the 1560-1700 period as well. In addition to the need for a reasonable degree of geographic spread across England, the choice of counties was informed by the desire to include areas with arable and pastoral farming regimes, areas with well-developed manufacturing sectors as well as those which were overwhelmingly agricultural, and areas which industrialized in the eighteenth century and those which de-industrialized. Inventories were selected from lists provided by the several record offices. To

¹⁵ Hudson, 'Industrial organisation and structure', in Floud and Johnson (eds), *The Cambridge Economic History of Modern Britain Vol. 1: Industrialisation, 1700–1860* (Cambridge: Cambridge University Press, 2004), p. 30.

¹⁶ Overton et al have claimed that such information is unreliable, as the occupation stated in the inventory 'often differed from that stated by the decedent in his or her will'. See Overton *et al*, *Production and consumption*, p. 34. However, such alleged differences were only recorded in a handful of cases in the dataset used in this research, and clear evidence for the reliability of probate-derived occupational descriptors is provided in the discussion around Figure 1. Note that Craig Muldrew also found only very few such cases in his dataset. See Muldrew, *Food, energy and the creation of industriousness: work and material culture in agrarian England, 1550-1780* (Cambridge: Cambridge University Press, 2011), p. 166. See also the discussion on this issue in Shaw-Taylor, 'The nature and scale of the cottage economy' (unpublished book chapter, Cambridge, 2002), <http://www.geog.cam.ac.uk/research/projects/occupations/abstracts/paper15.pdf>, pp. 11-12.

¹⁷ And, earlier, in Keibek, *By-employment and occupational structure in early-modern England* (MPhil dissertation, University of Cambridge, 2012); Keibek, *Male occupational structure*, ch. 4.

¹⁸ I would like to thank Craig Muldrew, Ken Sneath and Leigh Shaw-Taylor for their generosity in sharing with me a substantial number of transcribed and untranscribed inventories from their own research, which were incorporated in this dataset.

ensure that principal employments could be distinguished from potential by-employments, only inventories with known, principal occupations were considered. A targeted, non-random selection of inventories was made to ensure that all (principal) occupations within the two major occupational sectors were well represented, roughly in line with their share of the male occupational structure.¹⁹ It is worth noting here that this approach differs fundamentally from the one taken by Overton et al for early modern Kent and Cornwall. They ignored the ‘stated’ occupation of the ‘male household head’ and picked inventories entirely at random from the extant probate record in their selected parishes. This implies that their dataset must have had a very considerable overrepresentation of yeomen compared to husbandmen, of tanners and brewers compared to weavers and tailors, and more generally, of farmers compared to manufacturers. This means that, for example, the production activity mixes that they derived from inventories are not representative of actual, contemporary society.²⁰ The geographic and occupational composition of the inventory set is described in Table 2.

¹⁹ Remaining small differences between the ‘weight’ of occupations in the dataset and the overall occupational structure could, in principle, have been removed by working with weighted averages, but in practice this turned out to be unnecessary.

²⁰ Overton *et al*, *Production and consumption*, pp. 37-39.

Table 2. The inventory dataset

Sector	Occupation	1700-1760						1560-1700		All
		Lancashire	Cheshire	Staffordshire	Northampton-shire	Lincolnshire & Rutland	Salisbury Diocese	Cheshire	Salisbury Diocese	
Agriculture	Yeoman	32	41	32	76	45	34	65		325
	Husbandman	48	24	28	24	31	21	54		230
	Shepherd				36					36
	All agricultural	80	65	60	136	76	55	119		591
Manufacturing	(Black)smith	15	27	14	31	14	15	18	12	146
	Baker	6		8	29	5	3	3	5	59
	Brewer/maltster	8	6			2	7	4	4	31
	Butcher	10	16	10	37	10	10	14	8	115
	Carpenter/joiner	26	38	11	41	18	12	1	13	160
	Mason	11	11	2	29	2	3	2	3	63
	Miller	5	9	5	1	1	1	12	9	43
	Shoemaker/cordwainer/glover	12	20		28	1	3	3	13	80
	Tailor	17	23		35	6		2	17	100
	Tanner/skinner	8	12	8		4	5	18	4	59
	Weaver/clothmaker	62	23	18	32	9	18	31	26	219
	Other type of artisan	8		13		3	8	4	25	61
	All manufacturers	188	185	89	263	75	85	112	139	1,136
Labourers	Labourers	5	20		84	2	1	59		171
	All	273	270	149	483	153	141	290	139	1,898

Notes: The Lancashire inventories provide good coverage of all hundreds in that county which lie south of the Ribble river, but only very patchy coverage of the two northernmost hundreds, Amounderness and Lonsdale. The reason lies in the inventory database which was used for the Lancashire inventory selection, which is based on the records of the Diocese of Chester, whose ecclesiastical court only covered Lancashire south of the Ribble. Salisbury Diocese refers to the probate jurisdiction of said diocese, which covered Wiltshire and parts of Berkshire and Dorset. About half of the ‘Salisbury Diocese’ inventories in the dataset stemmed from Wiltshire, a quarter from Dorset, fifteen per cent from Berkshire and the remainder from several other, neighbouring counties. In addition to the pre-1700 manufacturers’ inventories for Salisbury Diocese, farmers’ and labourers’ inventories were collected as well, but have not yet been transcribed and have therefore not (yet) been included in the research.

When using probate inventories for estimating by-employment incidence amongst early modern men, several issues with these documents must be taken into account – as discussed earlier in a joint paper with Leigh Shaw-Taylor.²¹ A first problem is that probate inventories are always to a degree ‘abbreviated’, that is, they do not separately list items below a certain value. This threshold value differs per inventory. Most inventories feature headings like ‘hustlements’ or ‘things seen and unseen’, covering a collection of small, low-value items. Sometimes, however, the level of abbreviation goes much further, and all items in a room or even an entire house are grouped together under general terms like ‘household goods’. In such inventories, potential indications of gainful activities like carpentry tools or cheese presses are invisible. The solution for this problem is straightforward: only use a specific inventory for the purposes for which it is suitably detailed. It may contain enough detail on livestock to be used for counting cattle, yet be too abbreviated in other goods to serve as a reliable source on non-agricultural pursuits. In practice, the problem is fairly slight for agricultural and most manufacturing activities: only two per cent of the inventories collected for this research proved too abbreviated to provide reliable occupational indications.

A second, related problem is that some occupations leave few traces in probate records. This problem can be illustrated by comparing the decedents’ occupational descriptors with indications on gainful activities provided by the goods and rooms listed in the inventory. Figure 1 shows that for occupations which produced high-value output or which required expensive capital goods, significant quantities of raw materials, or tools of non-trivial value, this comparison is very encouraging. For example, only seven per cent of all yeomen’s inventories used in this research contained no or merely very weak indications of agricultural activities. For many manufacturing occupations, for example for weavers, tanners and brewers, the figure is comparably low. This is clear evidence for the reliability of the occupational descriptor of probate documents.²² It also indicates that such occupations will likely leave clear traces in inventories for which they are ‘merely’ by-employments.

But Figure 1 also shows that some occupations did not always leave such clear traces. Forty per cent of the shoemakers’ inventories used in our research showed no sign of the stated occupation and the same was true for over eighty per cent of tailors’ inventories. The low value of the tools used in these occupations means that they often go unmentioned. Furthermore, tailors typically worked on commission, so held little or no stock, and often worked with cloth provided to them by their customers, which therefore does not show up in the inventory either. Determining by-employment in such ‘trace-poor’ occupations is problematic. If a farmer’s inventory shows no proof of by-employment, one can be relatively sure that he was not involved in weaving, as that would probably have left clear traces, but it is much less certain that he was not by-employed as a shoemaker or tailor.

²¹ Keibek and Shaw-Taylor, ‘Rural by-employments’, pp. 252-9.

²² As announced in footnote 16.

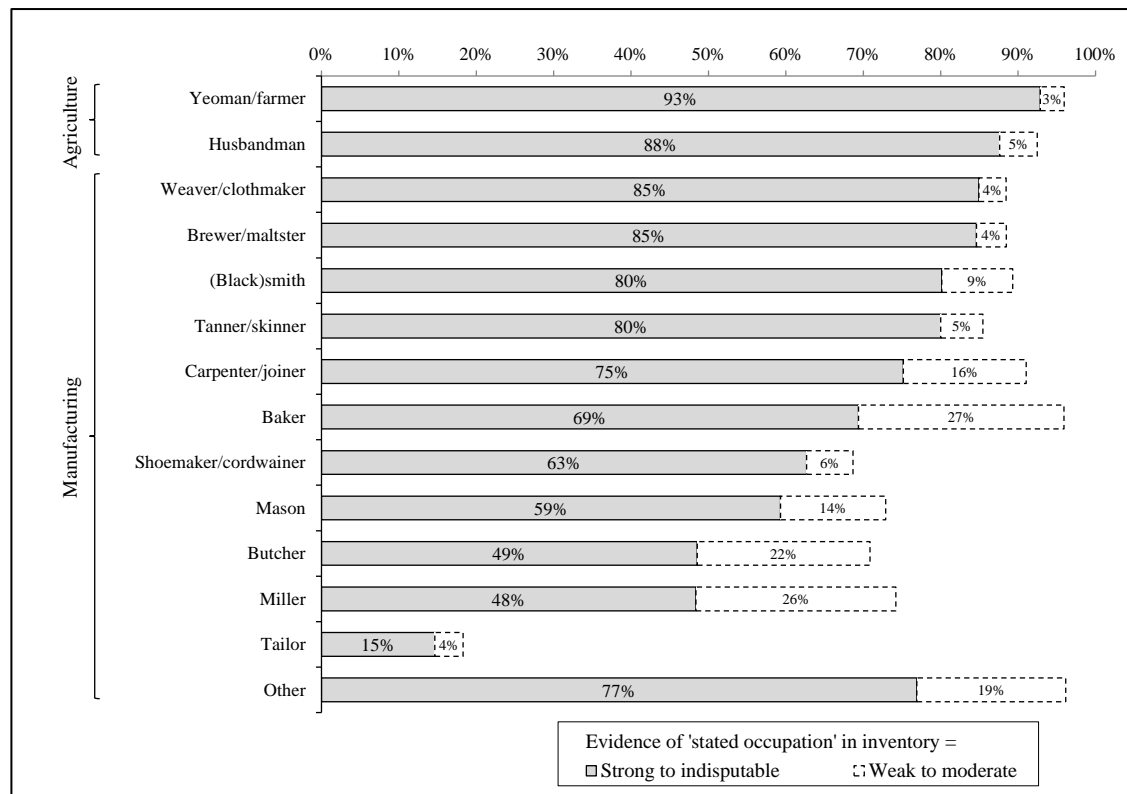


Figure 1. Strength of indication for the deceased's principal occupation provided by the goods and rooms listed in probate inventories (all eighteenth-century inventories in the dataset)

Note: principal occupation defined as the one stated in the inventory preamble and/or other probate documents referring to the same deceased.

For male trace-poor male manufacturing occupations such as tailoring, this problem can be resolved if a reliable occupational structure is available, derived from parish registers and/or social-bias corrected probate data. An approximate correction can then be applied to the by-employment calculations based on such occupations' general importance in the occupational structure. Nevertheless, Figure 1 does show that, in general, probate inventories are simply not a good source of information on by-employments that required and produced little stock and used no or merely very cheap tools. This is the case for many tertiary-sector by-employments and for wage labour. The analyses in this paper therefore generally exclude such by-employments. But this is not a fundamental problem. The tertiary sector was relatively small, and the by-employment historiography is almost exclusively concerned with primary- and secondary-sector activities. Wage labour as a subsidiary activity for farmers and manufacturers would have been limited to low-skilled work in periods of extreme labour shortage, such as helping out during the agricultural harvest. Such labour was occasional, therefore represented only a limited – although undoubtedly welcome – contribution to household income.²³

Some inventories suffer from a very specific, third problem: they fail to provide clear occupational evidence even though the deceased's (stated) occupation was not 'trace poor'. This was, for example, the case for seven per cent of yeoman farmers' inventories, as already mentioned above. One potential explanation would be that the occupational descriptor of these

²³ For a discussion on what constitutes a by-employment in the sense in which the term has been used in this research, see the discussion on the 'fifth problem', on page 11-2. See also page 4.

inventories is simply a misnomer, and they were really left by, say, weavers or carpenters. Alternatively, agricultural indications could be missing because the deceased was no longer an active farmer at the time of death due to ill health, or because cattle and equipment had already been transferred to his descendants before the inventory was taken. An analysis of the affected inventories shows that this second explanation is the more likely. None of the farmers' inventories without agricultural indications showed evidence of any other male occupation. Their households were, as Overton et al have called them, 'unproductive'.²⁴

This is both good and (somewhat) bad news for probate inventories' suitability for by-employment analyses. The good news is that the analysis reconfirms that their occupational descriptors are reliable, so indications of by-employments in the inventories really are precisely that and not the actual main employment masquerading as by-employment. The bad news is that 'unproductive' inventories represent a small but tricky problem for by-employment calculations. For occupations with relatively expensive production goods or stock, for example for tanners or farmers, unproductive inventories can be identified quite well, as the above shows. They can subsequently be excluded from the analyses. But for occupations like tailors and shoemakers, which often do not leave occupational evidence in the inventory anyway, this is impossible. Consequently, the inventory collection for these occupations will always include some individuals who were no longer gainfully employed at time of death, or whose estate had already been wrapped up before the inventory was made. If the deceased or his household had been by-employed, the evidence in the inventory will have disappeared along with the evidence for his primary employment. This results in an underestimate of by-employment. However, the effect is small, as can be demonstrated using the farmers' inventories, amongst which unproductive inventories can be identified with relative certainty. Had such inventories been left in the dataset, manufacturing by-employment amongst farmers would have been underestimated by a mere two per cent.

A potential fourth problem is caused by the fact that inventories were taken at the end of life. One might therefore logically presume that the elderly must be overrepresented in probate collections. If they had reduced their range of activities near the time of death compared to when they had been in their physical prime, this might lead to by-employment incidence being undercounted as evidence of these (former) activities may not be present in the inventory; with the period before death frequently characterised by ill health and, therefore, relative poverty, it is possible that part of the estate was liquidated to make up for lost income from work. However, systematic analysis by Mark Overton found no evidence of age bias in English inventories.²⁵ Furthermore, 'moveable estates appear to have remained substantially intact' making inventories 'a reasonable guide ... to the moveable goods of individuals across adult life', as Shaw-Taylor has argued.²⁶

A fifth problem lies in the occasional lack of clarity of inventories' by-employment indications. Evidence for manufacturing activities is sometimes multi-interpretable. For example, the inventory of Joshua Walker, a butcher from Capesthorpe in Cheshire, lists a large number of

²⁴ Overton *et al*, *Production and consumption*, p. 84.

²⁵ Overton, 'Household wealth, indebtedness, and economic growth in early modern England', paper presented at the 14th International Economic History Congress, Helsinki, 2006, <http://www.helsinki.fi/iehc2006/papers3/Overton122.pdf>, pp. 15-7. See also Overton *et al*, *Production and consumption*, pp. 27-28, 208; Shaw-Taylor, 'Cottage economy', p. 2. Note, however, that American probate studies did find evidence of age bias – see for example Main, 'The standard of living in southern New England, 1640-1773', *The William and Mary Quarterly*, 45:1 (1988), p. 125.

²⁶ Shaw-Taylor, 'Cottage economy', p. 2.

livestock of all kinds. Since he was a butcher, this does not necessarily indicate agricultural by-employment, as he may have recently bought the livestock for (final fattening in preparation for) slaughter. But, his inventory also listed a significant number of pieces of agricultural equipment such as ploughs and harrows, making his agricultural by-employment pretty indisputable. He also owned £6 in hides and skins. This might indicate by-employment as a tanner, but since the deceased was a butcher and the inventory does not contain any references to tanning equipment or bark, it is more likely that he would simply have had hides and skins resulting from killing animals for their meat, and had been about to sell them to a genuine tanner for further processing.

And even for unambiguous indications of manufacturing activities, it can sometimes be difficult to gauge whether they really indicate a by-employment. In this paper, as discussed, activities in the household have only been considered true by-employments if their fruits were sufficiently large as to not be wholly consumed within that same household. Activities like baking bread, brewing beer, sowing or washing clothes could be undertaken on such a scale that a substantial surplus was available for sale ‘in the market’. But, if small in size and solely intended for members of the own household, perhaps combined with some very limited barter trade with neighbouring households, such activities are correctly considered as domestic rather than as by-employments in the full meaning of the word, even though they of course reduced the need for purchasing the same products or services on the market and therefore constituted economic value for the household. It is, however, not always easy to infer from inventories whether an activity was ‘for the market’ or ‘merely domestic’. The inventory of Samuel Sayer, a yeoman from Wheaton Aston in Staffordshire lists two little brewing looms, some malt and a malt mill, altogether valued at less than £2; this likely only indicates small-scale brewing for purely domestic use, but it is impossible to be entirely certain about this.

In short, it is not always feasible to decide with certainty whether an inventoried household was by-employed in manufacturing or not. The solution for this problem chosen in this paper was to therefore not make such ‘binary’ verdicts, but to express the strength of the indication on a nine-point sliding scale, ranging from ‘none’ for no indications whatsoever to ‘indisputable’ for undeniable indications of by-employment. Unless otherwise stated, only indications in the upper half of that scale, ranging from ‘fairly strong’ to ‘indisputable’ were considered sufficiently clear evidence of by-employment. The main conclusions were tested for robustness, however, by varying the by-employment ‘cut-off point’ along the scale.

For agricultural by-employments, a slightly different approach was taken. Ambiguity of indications is only rarely a problem here; ownership of, say, a pig or some poultry is, after all, a clear sign of involvement in agriculture. However, if there are no indications of additional agricultural activities, it signifies a very marginal agricultural activity and, in the meaning of the term adopted in this paper, not a true by-employment at all. Therefore, employing a cut-off point in the total value of agricultural assets of the inventoried household, agricultural by-employments were divided into ‘substantial’ and ‘marginal’ ones – in addition to the ‘strength-of-indication scale’ described above. For the early eighteenth century, a cut-off point of £3 10s in agricultural assets’ value was chosen, which equalled five per cent of the value of the agricultural assets of the average husbandman’s inventory. It is perhaps worth pointing out however that something which denoted marginal economic value to the average household may, nevertheless, have represented substantial economic value to a very poor one. £3 10s in agricultural assets can, in livestock terms, roughly be translated as a single cow and, perhaps, its

young calf. As Jane Humphries has calculated, such assets would still have represented significant value for a poor labourer's household.²⁷

Each of the 1,898 inventories in the dataset was transcribed and, subsequently, evaluated individually as to the degree to which its occupational indications corroborated the stated occupation of the deceased, and on whether it provided any additional information on his specialisation within that occupation, for example, pastoral rather than arable farming. Subsequently, a judgement was made on the strength of all by-employment indications contained in the inventory, along the lines discussed in the previous section. Two common manufacturing activities were excluded from the analyses. Spinning was excluded because the goal was to determine by-employments amongst men, whereas spinning was overwhelmingly the domain of women before industrialisation. Indeed, the fact that evidence of spinning turns up at all in male inventories is, itself, an indication of a problem of interpreting inventory-based by-employment estimates, discussed in detail below. Dairying was also excluded, again because it was mainly undertaken by women but also for another reason: no secondary-sector inventories were found in the dataset which contained dairying equipment such as butter churns or cheese presses, but lacked independent evidence of cattle farming and, *vice versa*, virtually all inventories with clear and substantial evidence of cow keeping also contained distinct proof of dairying. In her analysis of indications for women's work in probate inventories, Whittle has counted dairying as an independent activity but, in light of the evidence given above, I would argue that it should properly be considered a subsidiary activity to dairy farming rather than a separate activity.²⁸

So, what do these inventories suggest about by-employment incidence in eighteenth-century England? Table 3 provides a summary of their indications for manufacturing by-employments. As it shows, the incidence of such by-employments was, actually, quite low. Overall, only about one in eight farmers' and secondary-sector inventories showed clear signs of manufacturing by-employments. And although there was a certain geographical variation, in none of the investigated geographic areas were clear indications of such activities found in more than a quarter of the inventories. The inventories thus provide surprisingly limited support for the prevalence of manufacturing by-employments that is suggested by much of the literature. Robert Malcolmson wrote that in eighteenth-century Lancashire, 'the term "yeoman" often indicated a landholder who divided his time between farming and weaving'.²⁹ In fact, of the twenty-seven yeoman's inventories from that county, only three showed clear signs of weaving. Furthermore, manufacturing by-employments were generally not of the supposed 'artisanal-industrial' kind. Rather than textiles or metal working, it was brewing which was by far the most frequent.³⁰

²⁷ Humphries, 'Enclosures, common rights, and women: the proletarianization of families in the late eighteenth and early nineteenth centuries', *The Journal of Economic History*, 50:1 (1990), p. 24.

²⁸ Whittle, 'Housewives and servants in rural England, 1440–1650: evidence of women's work from probate documents', *Transactions of the Royal Historical Society (Sixth Series)*, 15 (2005), p. 69; see also Overton *et al*, *Production and consumption*, p. 60.

²⁹ Malcolmson, *Life and labour in England, 1700-1780* (London: Hutchinson, 1981), p. 39.

³⁰ Something also found by Overton *et al* – see Overton *et al*, *Production and consumption*, p. 77.

Table 3. Indications for (ancillary) manufacturing activities in probate inventories for farmers and manufacturers (early eighteenth-century only, all areas except Northamptonshire)

		Farmers (319 inv.)			Manufacturers (614 inv.)		
		Fairly strong to indisputable	(Very) weak	None	Fairly strong to indisputable	(Very) weak	None
All geographies and activities		16%	27%	57%	16%	20%	64%
By geography	Lancashire	22%	22%	55%	11%	18%	71%
	Cheshire	10%	30%	60%	17%	20%	62%
	Staffordshire	7%	20%	72%	15%	18%	67%
	Lincolnshire & Rutl.	14%	31%	55%	18%	25%	58%
	Salisbury Diocese	25%	31%	44%	21%	19%	60%
By activity	Brewing	8%	17%		12%	9%	
	Baking	0%	3%		0%	4%	
	Weaving	4%	2%		2%	2%	
	Carpenting	1%	3%		0%	3%	
	Blacksmithing	1%	0%		0%	0%	
	Other or unspecified	<u>1%</u>	<u>2%</u>	—	<u>1%</u>	<u>2%</u>	—
		16%	27%	57%	16%	20%	64%

Note: (1) Northamptonshire was excluded from this and other analyses of manufacturing by-employments as these were not investigated in sufficient detail for that county. (2) Columns may not (seemingly) tally precisely due to rounding of the individual figures.

These low by-employment incidence figures are not the result of lack of detail within the inventories leading to by-employment indications being missed; manufacturing by-employment incidence was not significantly higher amongst the sub-set of especially detailed inventories. Nor are the low figures caused by ‘trace-poor’ secondary-sector occupations; a correction for these occupations raises the incidence figure by only two percentage points, to eighteen per cent. Nor can agricultural labourers revivify the image of ubiquitous manufacturing by-employment within the agricultural sector. Lamenting the ‘evil day when rural industries left the countryside and returned to the towns,’ Everitt calculated that sixty per cent of agricultural labourers in the 1560-1640 period were by-employed in manufacturing from probate evidence.³¹ However, as Shaw-Taylor has shown, Everitt’s calculations are incorrect. Everitt assumed all inventories with a total value below a certain threshold to refer to agricultural labourers, ignoring the decedent’s stated occupation. But, such a selection would consist mostly of secondary-sector workers instead of agricultural labourers, making it entirely unsurprising that so many of the inventories showed signs of manufacturing.³² By-employments amongst labourers are inherently difficult to pin down, as the term ‘labourer’ does not with certainty indicate an agricultural labourer but might indicate a ‘general’ labourer, working in a manufacturing trade such as construction. But since only one in every seven labourers’ inventories showed any signs of manufacturing, even if all inventoried labourers in the dataset were of the agricultural kind, manufacturing by-employment was as low amongst them as amongst farmers.³³

Indeed, the dominance of brewing in the above figures suggests that Table 3 is more likely to over- than underestimate manufacturing by-employment. Substantial brewing activities were counted as clear indications of by-employment but, in some of the surveyed areas, farms were

³¹ Everitt, ‘Farm labourers’, in Finberg (ed.), *Agrian history. Vol. IV*, pp. 428-29.

³² Shaw-Taylor, ‘Cottage economy’, p. 20.

³³ A more thorough discussion of the by-employment incidence amongst labourers can be found in Keibek and Shaw-Taylor, ‘Rural by-employments’, pp. 266-7.

actually often very large and ‘capitalist’, employing many agricultural labourers; it is very well possible that the ale and beer produced on such farms was consumed in its entirety by the household and its hired workforce.³⁴ Furthermore, as discussed above, brewing was often undertaken by the women of the household, in which case the presence of brewing-related goods provides a false by-employment indication for the male ‘household head’.

Indications for by-employments in the opposite direction, that is, manufacturers’ inventories with clear evidence of farming, were much more common in the dataset, as is clear from Table 4.³⁵ Sixty-one per cent of the manufacturing inventories indicated *some* agricultural activities, and for fifty-two per cent these activities were sufficiently substantial to call them truly agriculturally by-employed. Within rural inventories, these percentages go up to sixty-six and fifty-seven per cent respectively.

Table 4. Share of eighteenth-century manufacturers’ inventories with strong to indisputable indications of agricultural by-employment – by substance, environment and geography

	All inventories (N=863)		Rural inventories only (N=687)	
	With (some) agricult. activities	With substantial agricult. activities	With (some) agricult. activities	With substantial agricult. activities
Lancashire	62%	56%	74%	67%
Cheshire	64%	58%	68%	62%
Staffordshire	64%	52%	67%	53%
Northamptonshire	61%	48%	64%	51%
Lincolnshire & Rutland	79%	74%	80%	76%
Salisbury Diocese	<u>36%</u>	<u>28%</u>	<u>38%</u>	<u>30%</u>
All	61%	52%	66%	57%

Here, indeed, the high incidences found by other historians and combined in Table 1 above are confirmed. The analysis of agricultural assets’ quantities and values listed in inventories and summarized in Table 5 suggests that farming by-employments amongst probated manufacturers were, in the mean, of considerable size. The average agriculturally-by-employed manufacturer’s inventory in the dataset lists nearly £27 in agricultural assets, which is the equivalent value of about ten heads of cattle.

In short then, Table 4 and Table 5 suggest that not only was there a high incidence of agricultural activities amongst secondary-sector workers, but also that these activities were quite sizeable. However, first impressions can be a poor guide. In fact, probate-based by-employment indications such as these are misleading, for three reasons, which will now be discussed one by one.

³⁴ Pamela Sambrook does not consider even a separate brew house as evidence of brewing for more than purely domestic use in large farms, see Sambrook, *Country house brewing in England, 1500-1900* (London: Hambledon Press, 1996), p. 166.

³⁵ Something also found by others – see, for example, Overton *et al*, *Production and consumption*, pp. 69-70; Shaw-Taylor, ‘Cottage economy’, pp. 7, 18-9.

Table 5. Mean agricultural assets by occupational sector in probate inventories
(all areas, eighteenth-century inventories only)

Type of asset	Quantities		Valuations	
	All farmers	Agric. by-empl. manufacturers*	All farmers	Agric. by-empl. manufacturers*
	(358 inv.)	(431 inv.)	(358 inv.)	(431 inv.)
Cows	6.4	3.1		
Heifers, stirks etc.	2.9	0.8		
Calves	2.3	0.7		
Bulls and oxen	0.6	0.1		
All cattle	12.2	4.7	£ 25.92	£ 10.71
Horses of all kinds	4.0	1.4	£ 15.31	£ 4.04
Swine of all kind	2.8	1.2	£ 1.87	£ 0.70
Sheep of all kind	48.3	9.4	£ 19.36	£ 3.38
All livestock**			£ 62.55	£ 18.87
Crops			£ 35.60	£ 4.69
Hay and straw			£ 5.70	£ 2.23
Livestock produce (cheese, wool, dung, <i>etcetera</i>)			£ 3.13	£ 0.77
Total (excluding equipment)			£ 106.98	£ 26.56

* Strong to indisputable indications of substantial agricultural activities in the inventory.

** Including poultry and bees

ISSUE 1: WEALTH BIAS

Like all early modern testamentary documents, probate inventories are subject to significant bias towards higher-value estates. Farming was a capital-intensive occupation, requiring expensive tools and draft animals. Crops, whether still growing on the land or stored after the harvest, typically represented significant value. Cattle and other livestock were expensive; the average mature cow in the inventory dataset was valued at £2-13s, more expensive than clocks, the dearest household goods with an average value of £1-15s. No wonder then that farmers were so much more likely to leave testamentary evidence than men occupied in capital-extensive occupations such as weaving and shoemaking. This means that weavers and shoemakers who possessed livestock or other expensive agricultural assets were also more likely to be inventoried than their non-by-employed colleagues and, thus, that probate inventories overstate agricultural by-employments amongst secondary-sector workers. Defoe observed on the textile industry of the contemporary West-Riding that ‘every manufacturer generally keeps a cow or two, or more, for his family’. But he also observed that amongst them lived, in ‘an infinite number of cottages or small dwellings’, the lesser weavers and labourers, ‘all hard at work, and *full employed* upon the manufacture’ (my italicisation).³⁶ This second group was much less likely to be captured in the probate inventory record than the first. Indeed, direct evidence that probate inventories exaggerate the incidence and size of agricultural by-employments can be found by calculating livestock numbers and grassland acreage using inventory-derived figures

³⁶ Defoe, *Tour thro' the whole island of Great Britain* (London, 1742), Vol. II, p. 602.

such as those in Table 4 and Table 5. As shown elsewhere, a comparison with independent estimates demonstrates that the probate-derived figures are far too high.³⁷

By-employment incidence ‘in the other direction’, that is, the fraction of farmers by-employed in a secondary sector occupation is also exaggerated in the probate evidence, for the same reason. Some secondary sector occupations were capital-intensive themselves. Brewers required large and expensive vessels and most brewer’s inventories list substantial stocks of ale and malt. Tanner inventories list large and expensive quantities of hides and bark. Both brewers and tanners are therefore overrepresented in the testamentary evidence, and so were farmers by-employed in brewing and tanners, compared to their non-by-employed colleagues. Even being by-employed as a weaver would have added some capital to a farmer’s estate. The average weaver’s inventory contained £8 in weaving-related assets, about ten per cent of the agricultural capital of the average farmer’s inventory.

In Figure 2, by-employment incidence has been expressed as a function of inventory wealth by dividing the inventory dataset for Cheshire and Lancashire into cohorts of increasing wealth. Inventories have been used extensively as a source on pre-industrial wealth levels and distributions.³⁸ Several wealth measures can be constructed from the documents. The ‘inventory total’ is simply the combined value of all assets listed. A second measure, ‘material wealth’ is the inventory total minus the value of financial assets such as debts owed to the decedent and leases.³⁹ As such, it is arguably to be preferred over the inventory total, as Overton has shown by comparing probate inventories with – much rarer but more complete – wealth evidence from probate accounts.⁴⁰ A final wealth measure, ‘domestic wealth’, is the combined value of all household goods excluding those intended for market-directed production. It captures what one might argue the other inventory goods are merely there to provide: the household’s standard of living.⁴¹ It serves, as Margaret Spufford wrote, as ‘an index of domestic comfort and consumption’.⁴² But whatever wealth measure is adopted, the relationship between estate value and the likelihood of by-employment is clear from Figure 2. It is clear then that a correction for wealth bias is required if the probate data are to yield reliable insights into pre-industrial by-employments.

³⁷ Keibek and Shaw-Taylor, ‘Rural by-employments’, pp. 274-7.

³⁸ See, for example, Shammass, ‘Constructing a wealth distribution from probate records’, *The Journal of Interdisciplinary History*, 9:2 (1978), pp. 297-307; Jones, ‘Wealth estimates for the New England colonies about 1770’, *The Journal of Economic History*, 32:1 (1972), pp. 98-127; Main and Jackson, ‘Economic growth and the standard of living in southern New England, 1640-1774’, *The Journal of Economic History*, 48:1 (1988), pp. 27-46. For a discussion on the wealth indications in inventories see Arkell, ‘Interpreting probate inventories’ in Arkell, Evans, and Goose (eds), *When death do us part: understanding and interpreting the probate records of early modern England* (Oxford: Leopard's Head Press, 2000), p. 95.

³⁹ Real estate was not normally included in English and Welsh inventories, something with Margaret Spufford has called ‘the major defect’ in inventories. See: Spufford, ‘The limitations of the probate inventory’ in Chartres and Hey (eds), *English rural society, 1500-1800: essays in honour of Joan Thirsk* (Cambridge: Cambridge University Press, 1990), p. 144. Real estate was recorded in a small number of inventories in the dataset.

⁴⁰ Overton *et al*, *Production and consumption*, p. 138; Overton, ‘Household wealth’, pp. 13-14, 35.

⁴¹ This is the equivalent of what Carole Shammass has termed ‘consumer goods’ in her research – see, Shammass, *The pre-industrial consumer in England and America* (Oxford: Clarendon Press, 1990), p. 88.

⁴² Spufford, ‘Limitations’, p. 145; see also Levine and Wrightson, *The making of an industrial society: Whickham 1560-1765* (Oxford: Clarendon, 1991), p. 158.

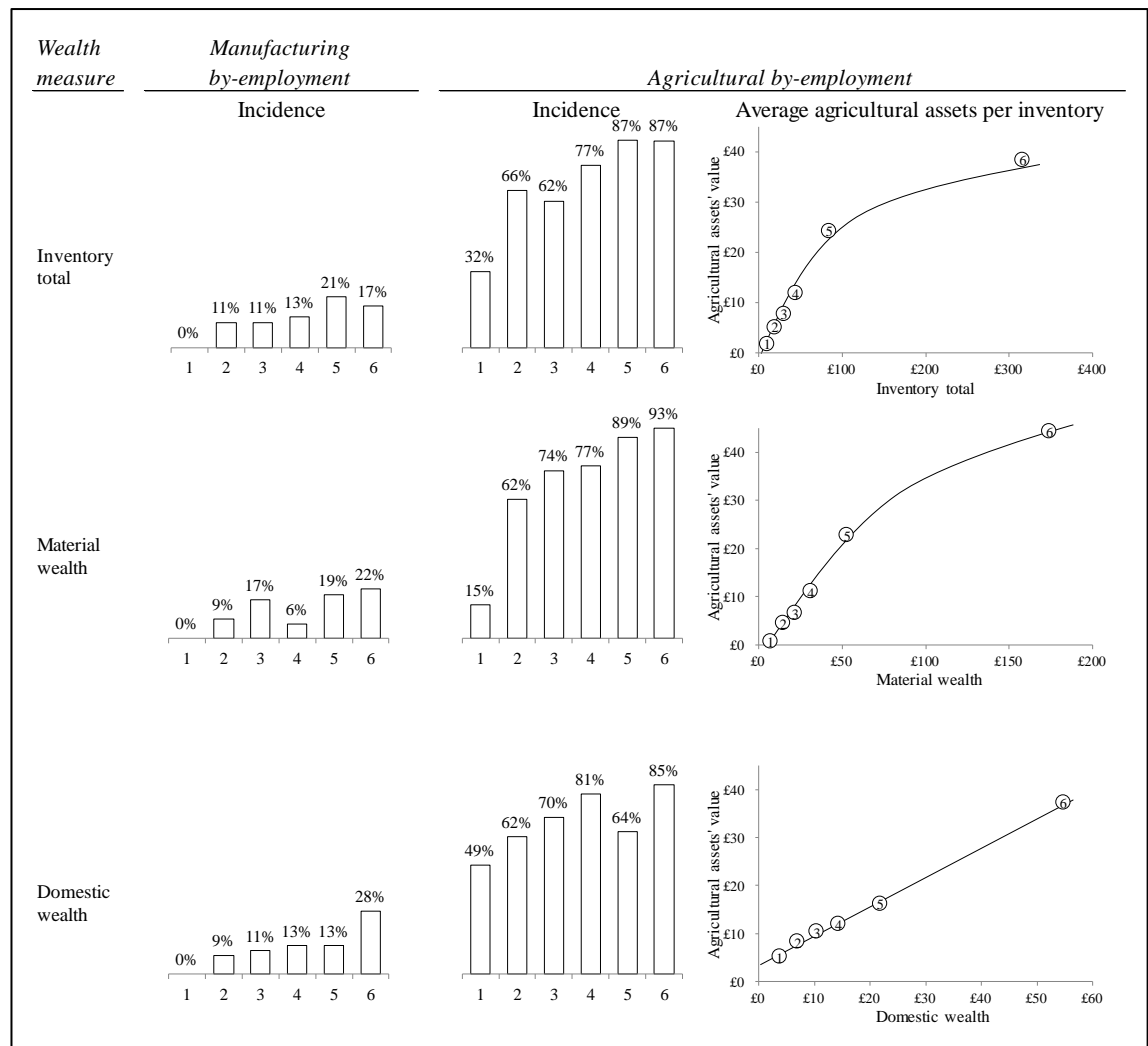


Figure 2. The relationship between wealth and by-employment in probate inventories of rural secondary-sector workers (Chester Diocese, early eighteenth century)

A new, powerful approach to correct the probate inventory record for wealth bias is presented in a separate paper.⁴³ In short, it determines the probability of a decedent being probated as a function of the wealth of his estate. This set of probate inventories is, subsequently, weighted with the inverse of this probability function. In essence, this reverses the historical process which led to the current probate record.

By applying local probability curves to the inventory dataset for each county, the effect of wealth bias on by-employment incidence can be calculated, resulting in Figure 3. Probate inventories, as expected, turn out to severely exaggerate by-employment incidence in each county, often by a factor two or more. By-employment were not nearly as ubiquitous in early as the 'raw' probate inventory record suggests.

⁴³ Keibek, 'Correcting the probate inventory record for wealth bias' (working paper, Cambridge, 2017), http://www.econsoc.hist.cam.ac.uk/docs/CWPESH_number_28_March_2017.pdf.

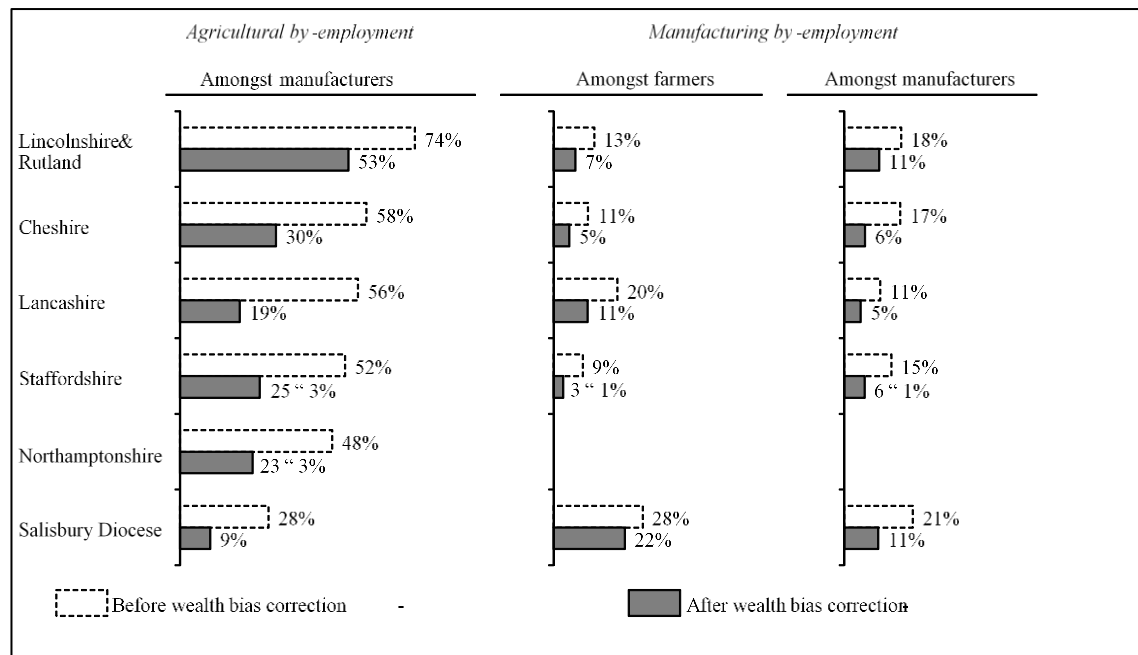


Figure 3. By-employment incidence before and after wealth bias correction (early eighteenth century)

Notes: The wealth-bias correction was carried out using local probability functions derived from comparing probate and parish register data in the same parishes in the early eighteenth century. However, for Staffordshire and Northamptonshire, no reliable parish register data were available for that period. Therefore, the probability functions derived for other the other regions were applied to these two counties, leading to a (manageable) range of values.

Although Figure 3 shows that the probate inventory record exaggerates by-employment incidence, on average, by a factor of two, the wealth-bias-corrected incidence figures remain substantial. They still suggest that, on average, twenty to thirty per cent of the secondary sector workers engaged in substantial agricultural activities and, therefore, that a non-trivial by-employment correction of the male occupational structure may still be necessary. However, even the wealth-bias-corrected estimates in Figure 3 represent, at best, an upper limit for individual male by-employment incidence, since probate inventories provide evidence on *households* rather than *individuals*. That is the topic of the next section.

ISSUE 2: MIXED-OCCUPATION HOUSEHOLDS

Historians generally interpret incidence figures as those in Table 3 and Table 4 to indicate the prevalence of by-employments amongst pre-industrial men. The problem with that interpretation is that the inventories of these male decedents potentially include work-related goods used by other members of the household. The English male ‘household head’ was also the legal owner of his wife’s goods with the possible – and, for the purpose of detecting economic activities, irrelevant – exception of small heirlooms or pieces of women’s apparel, which might be considered her individual property of his wife. Many of the goods used by his living-in children and servants, such as tools and furniture, would also have been his. His probate inventory thus presents material evidence of all significant gainful activities within the household, whether carried out by him or other household members.

An example may help to clarify what this means for inferring by-employment incidence from probate inventories. Illustration 1 presents the probate inventory of John Porter. As the

inventory header indicates, he was a blacksmith. It is therefore not surprising to find a workshop with a number of blacksmithing tools mentioned in the list of goods. Several beds are listed, indicating that John Porter's household probably consisted of several members. The presence of a barn and of several acres of crops indicate agricultural activities.

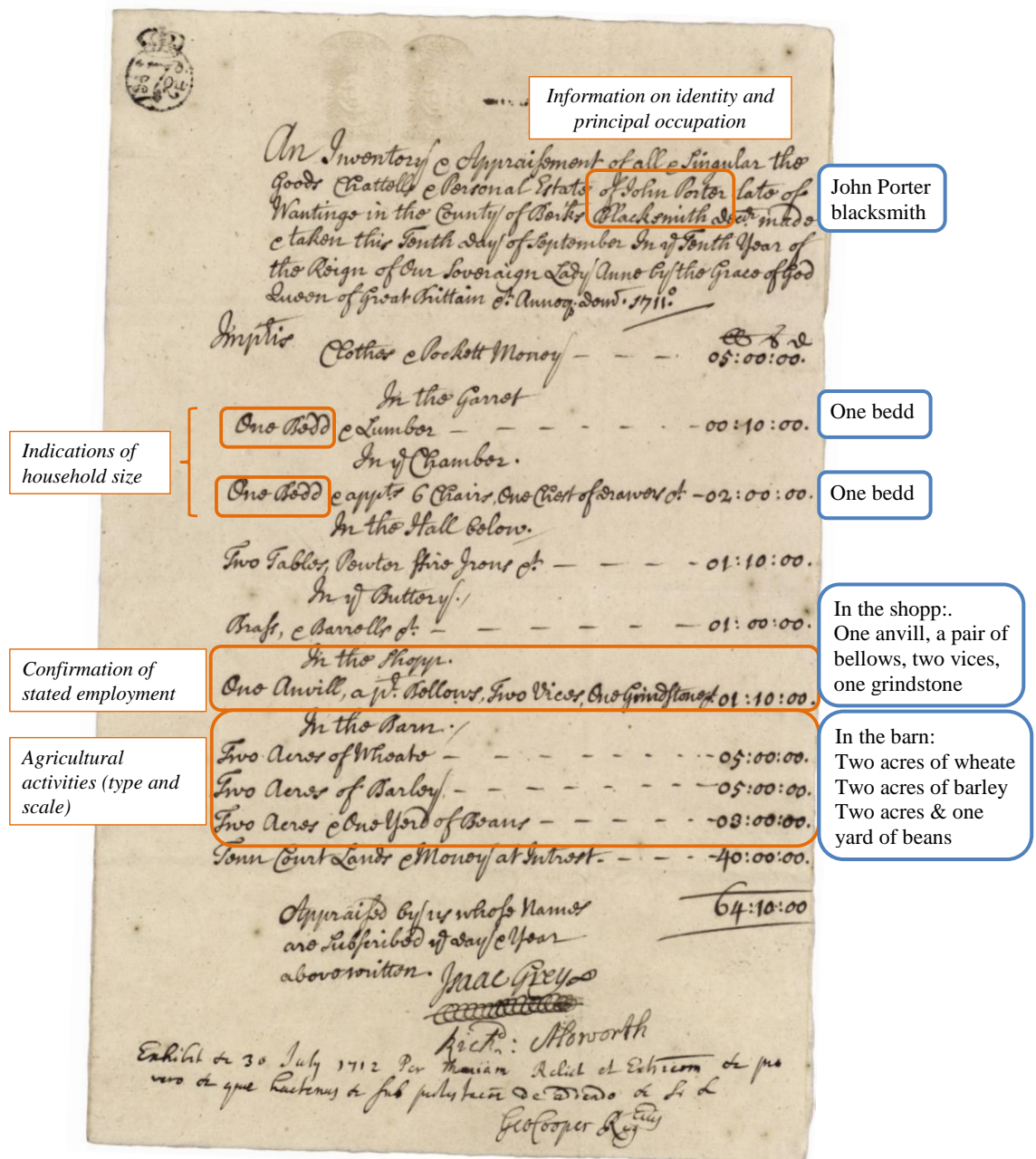


Illustration 1. The probate inventory of John Porter, blacksmith

In terms of by-employments, John Porter's probate inventory can be interpreted in three ways, as listed in Table 6. Historians using frequency counts of inventories with more than one gainful activity as indicating by-employed individuals implicitly follow interpretation A. This is problematic. The presence of several gainful activities in one inventories does not necessarily indicate that the decedent was himself by-employed but, merely, that there were several, different sources of income in his household. At best, one could say that such frequency counts provide an upper limit of the incidence of individual by-employments. Hence, if the inventory evidence is taken at face value, it is likely to – potentially significantly – exaggerate individual

by-employments and, therefore, the by-employment correction of the male occupational structure.

Table 6. Potential interpretations of John Porter's probate inventory

Interpretation	Description	Was John Porter by-employed?
A	All occupational indications in the list of tools, goods, and crops refer to John Porter. He was a blacksmith by-employed in farming.	Yes
B	John Porter was purely a blacksmith. The agricultural activities indicated by his inventory were undertaken by other members of the household, such as his wife and living-in children or farm servants.	No
C	A large share of the agricultural activities indicated in the inventory were undertaken by other members of the household, such as his wife, living-in children or farm servants, but John Porter did contribute to some of them.	Yes

Although other household members are not specified directly, probate inventories do provide some indirect evidence on the size of the household in the number of beds listed. It is not usually clear whether beds were used by a single or by several individuals, but in a large enough inventory sample it would seem justified to presume a strong (and linear) correlation between the number of beds and the size of the household. Examining by-employment incidence as indicated by inventories as a function of household size generates interesting results. As Figure 4 shows, there was a clear and positive relationship between the number of different activities which households engaged in and their average size, approximated by the number of beds listed in the probate inventory.

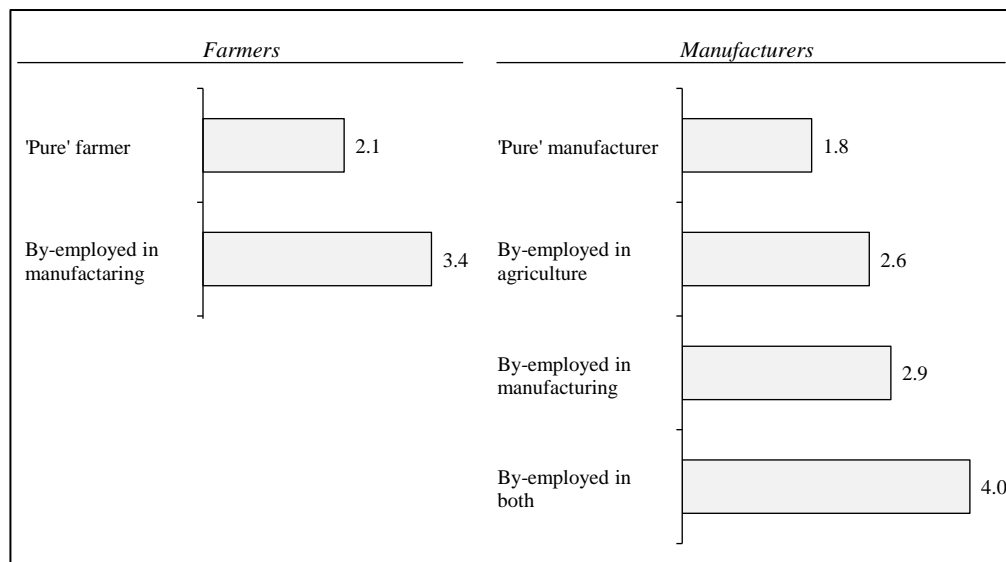


Figure 4. Beds per household as a function of the number of by-employments (Chester Diocese, early eighteenth century)

Very roughly, Figure 4 can be interpreted as indicating that for every bed added, an additional gainful activity is added as well. In other words, Figure 4 suggest that inventories with evidence of more than one gainful activity generally indicate households with different individuals engaged in different occupations. This means that interpretation B from Table 6 is likely to be the correct interpretation for most inventories indicating more than one gainful activity. Even the wealth-bias-corrected estimates depicted in Figure 3 severely exaggerate individual by-

employment incidence. More evidence for this can be gained by focusing on agricultural activities. For these, not merely their presence or absence can be determined from probate inventories but their approximate scale as well, using the total value of agricultural assets listed in the inventory. This leads to Figure 5, which should be read clockwise, starting in the top left (panel A) with pure farmers.

It is clear from Figure 5 that farm size and household size were strongly correlated for pure farmers in the counties of Cheshire and Lancashire. This is entirely unsurprising as those counties were characterised by family farms which employed little outside labour. Next up, in panel B, manufacturers that were not by-employed in an additional form of manufacturing have been plotted. Again, household size and farm size were clearly correlated. Starting at 1.8 beds for pure manufacturers, household size increased with growing farm size, initially quite slowly but, for larger farms, increasingly similar to pure farmers. Indeed, manufacturers with *very* substantial farming activities would appear to have traced the pure farmers' trend line. This is not surprising, as for these households, agriculture must actually have been the dominant household activity, and one would therefore expect them to 'behave' like farmers' households.

Moving to panel C: farmers that were by-employed in manufacturing appear to have roughly followed the same trend line as the manufacturers from the previous panel. There was no fundamental difference between the households of farmers that were by-employed in manufacturing or, vice versa, manufacturers' households that were by-employed in agriculture, except for the fact that, on average, the former were much larger farmers than the latter. Again, this makes intuitive sense. Finally, in panel D, households that were involved in more than one manufacturing activity have been depicted. Starting at 2.9 beds for households with no agricultural activities, household size grew with farm size at increasing speed until, for very large farms, the pure farmers' trend line was traced again.

It is clear from Figure 4 and Figure 5 that both the *number* of different gainful activities and the *scale* of those activities were strongly and positively correlated to the number of people in the household. Larger households apparently – and quite logically – had more 'room' for different occupations than smaller ones. And the bigger the household, the larger in scale those by-employments could be. This is clear evidence that the so-called 'by-employments' were the preserve not so much of the male 'household head' but of his wife, children and/or living-in servants. They were not proper by-employments at all, but simply the result of different household members doing different things.

Comparing the evidence with contemporary sources on women's work – such as the frontispiece of Natham Bailey's 1736 *Dictionarium Domesticum* reproduced in Illustration 2 – confirms that the most prevalent 'by-employments', namely livestock farming and dairying, brewing and baking lay very much in the female domain. They are not male by-employments at all, but represent women's work, undertaken by the householder's wife and other women in the household.⁴⁴

⁴⁴ For a similar contemporary overview of typically-female activities, see F., *The office of the good housewife: with necessary directions for the ordering of her family and dairy, and the keeping of all such cattle as to her particular charge the over-sight belongs* (London, 1672). See also Wrightson, *Earthly necessities: economic lives in early modern Britain* (New Haven: Yale University Press, 2000), pp. 44-48; Verdon, '"... Subjects deserving of the highest praise": farmers' wives and the farm economy in England, c. 1700–1850', *The Agricultural History Review*, 51:1 (2003).

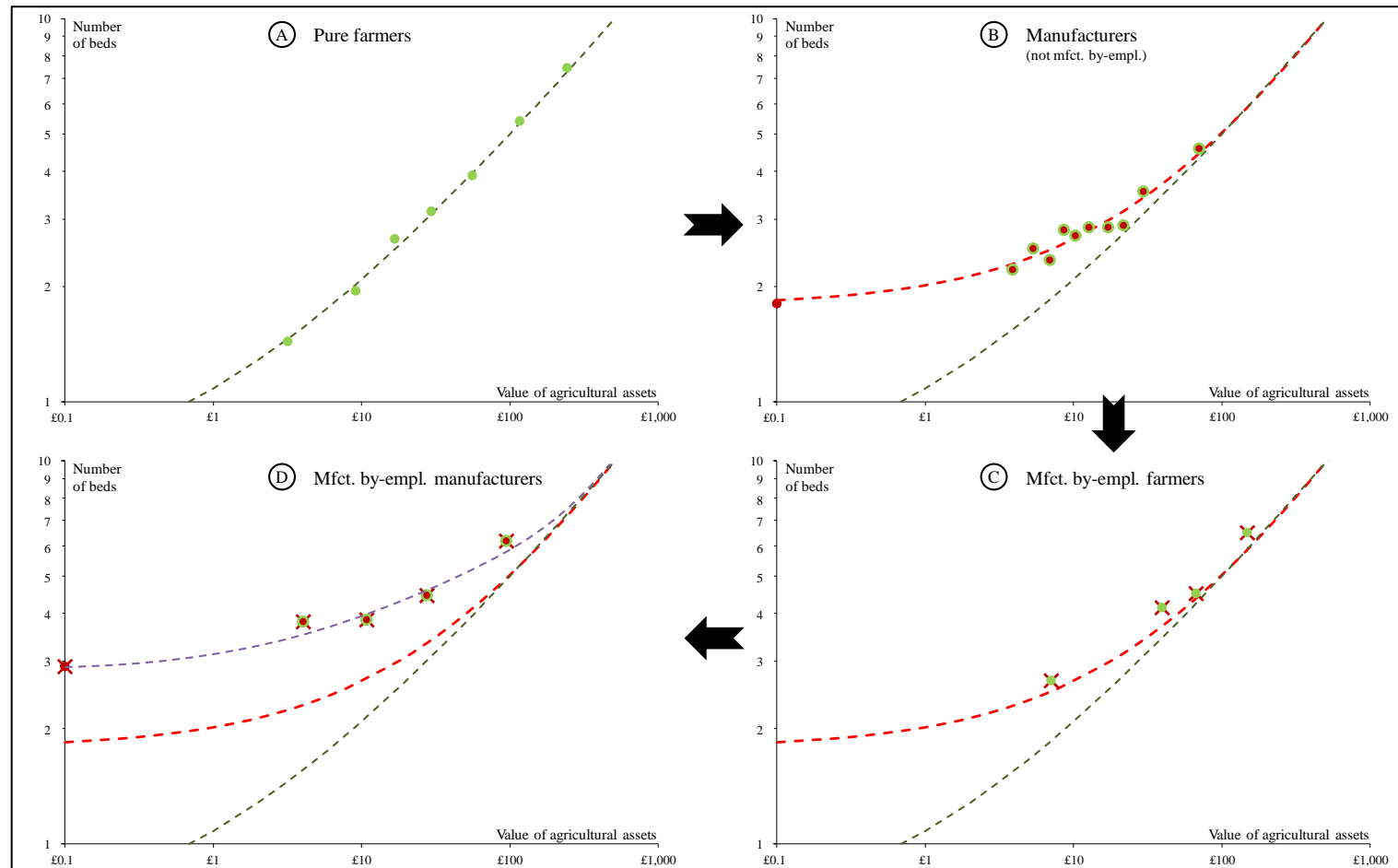


Figure 5. The relationship between farm size and household size for different types of households (Chester Diocese, early-eighteenth century)

Notes: the data points in the panels are the arithmetic average values for groups of inventories. A compromise needed to be reached between, on the one hand, the need to make these groups large enough for a meaningful average and, on the other hand, the need for a sufficiently large number of data points to visualise potential trends. Because the number of inventories differed strongly per panel, this compromise worked out differently too, resulting in different numbers of inventories per data point: 17 for pure farmers, 5 for farmers by-employed in manufacturing, 17 for agriculturally by-employed manufacturers and 12 for manufacturers by-employed in both manufacturing and agriculture.

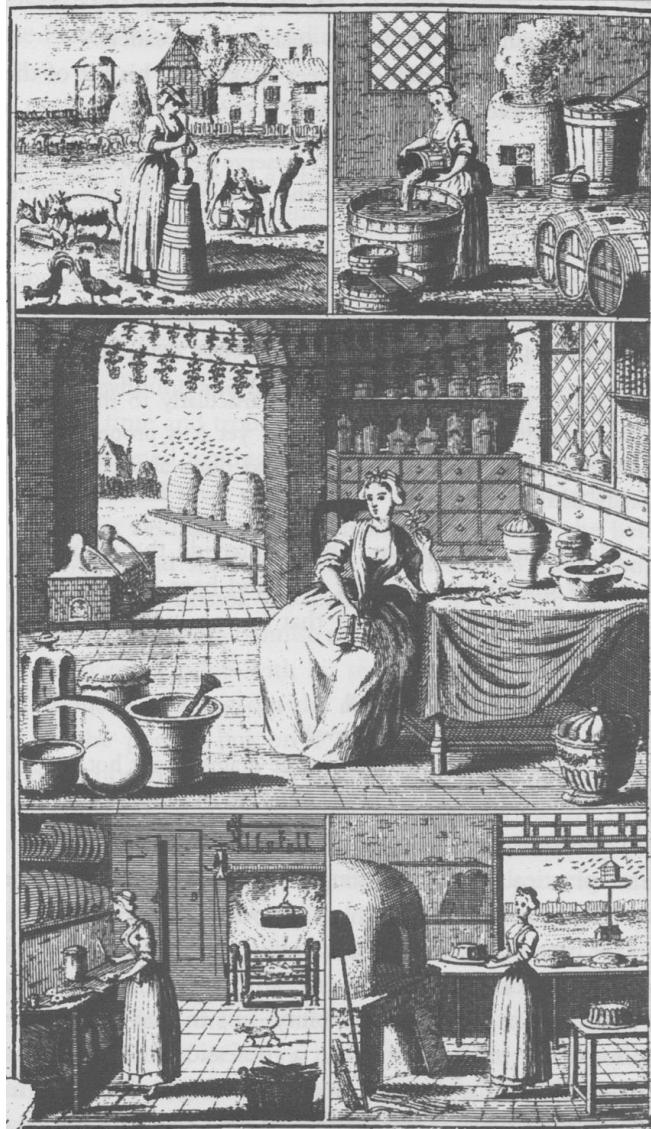


Illustration 2. Frontispiece of Natham Bailey's *Dictionarium Domesticum* (London, 1723), showing the female head of the household engaged in livestock farming, dairying, brewing, bee keeping, in the still room, preparing food and baking bread

Additional evidence can be found by examining the scale of the activities connected to the male decedents' principal, stated occupation. If probate inventories with several occupational indications were left by by-employed men, one would, on average, expect the scale of the 'principal' activities of these by-employed men to have been smaller than those of his non-by-employed colleague, since the latter was not forced to divide his time between the principal and subsidiary employment. This was not the case. On the contrary: in Chester Diocese, the average 'by-employed' farmer owned £30 in agricultural assets, compared to £23 for the average 'pure' farmer. Similarly, the average manufacturer whose inventory suggest that he was substantially by-employed in both agriculture *and* manufacturing owned £16 in agricultural assets, compared to £12 for his colleague whose inventory suggests agricultural by-employment only.

It can be concluded then that by-employment was a household rather than an individual phenomenon with the 'by-employments' – that is, the gainful activities other than the principal occupation of the male household head with which he was described in the inventory header – generally carried out by other household members. They were, in other words, not proper by-employments at all. It could

therefore be argued that there is, actually, no compelling reason to apply *any* correction to the male occupational structure. However, it is still possible and perhaps even likely that some male household heads were involved in some of the ‘by-employments’. For example, Richard Millward, a collier from Shropshire, left ‘the management of the ground, in great measure, to his wife Jane’, but he did help out with some of the especially heavy digging at the start of the agricultural year ‘after his hours of ordinary labour’.⁴⁵ So technically, Richard Millward was by-employed, even though only to a limited degree as he was engaged in farming for only a small fraction of his working hours.

To express this in the terms introduced in Table 6 above, most inventories are probably correctly read along the lines of interpretation B. Nevertheless, as the example of Richard Millward above shows, interpretation will also, from time to time, have been the correct one. In those cases, a by-employment correction on the male occupational structure would still be necessary. For the sake of a model calculation, it is presumed in the next section that *all* inventories should be read along the lines of interpretation C, however unrealistic. In this way, an upper limit by-employment correction for the male occupational structure can be calculated.

ISSUE 3: INCIDENCE MERELY A PARTIAL MEASURE OF BY-EMPLOYMENT

By-employment incidence figures tell only half of the story. Knowing that, say, twenty per cent of weavers was by-employed in agriculture is not sufficient for correcting the number of weavers for by-employments. It is also necessary to know what share of their working hours, or what share of their income was generated in their principal employment – weaving – and what in their by-employment – agriculture.

Fortunately, the trend lines in Figure 5 provide the means for estimating average share of the combined household working hours they employed. How this works has been depicted schematically in Illustration 3 for households of men whose principal occupations fell in the secondary sector but whose inventories also show evidence of agricultural activities. For a given household i , the scale of these agricultural activities is measured on the horizontal axis, in the form of the total value of the agricultural assets of this household. It can be estimated how much labour – in terms of beds, on the vertical axis – was required for farming (LA_i), with the remainder of the household engaged in manufacturing (LM_i). By calculating LA_i and LM_i for all households in the dataset, the occupational importance of farming for these households can thus be determined as a straightforward average, its value depending on the distribution of households across the spectrum of farm sizes. The same approach can be followed for farmers whose inventories show evidence of manufacturing activities and, after switching to the upper, purple curve in panel D of Figure 5, for manufacturers whose inventories show evidence of both farming and (other) manufacturing activities.

It can thus be calculated that agricultural activities utilized around one-third of the combined ‘labour force’ of manufacturing households that were, in some form or scale, involved in farming. If the analysis is restricted to manufacturers’ households with *substantial* farming activities, in line with the definition of ‘true’ agricultural by-employments discussed on page 12, that share rises to nearly two-fifth. For farmers whose households were also engaged in manufacturing, circa one quarter of household labour was expended on manufacturing rather than agriculture. And for manufacturers whose households were involved in both farming and (additional) manufacturing, roughly one in four

⁴⁵ Pulteney, ‘Account of a cottager’ in ‘Communications to the board of agriculture’, (London, 1805), pp. 344, 345.

household members was, on average, working in agriculture and one in three in the manufacturing ‘by-employment’ – leaving only two-fifth of the household labour for the principal occupation of the male ‘household head’.

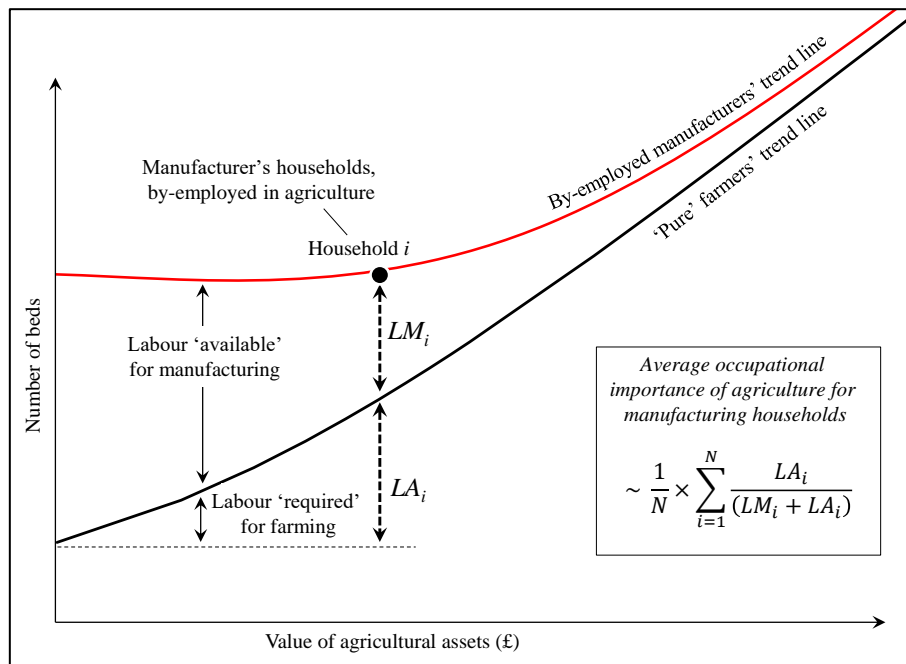


Illustration 3. Schematic description of the methodology to estimate the average occupational importance of agricultural activities in households for which the principle (i.e. stated) occupation of the ‘male household head’ is in the secondary sector

The labour force shares represent the entire household, not the ‘male household head’. As discussed in the previous section, it is likely that, in many households, the male household head was not involved in the ‘other activities’ at all and that in those households in which he did contribute to these activities, he did so for a much lower share of his time than other household members such as his wife and servants. But let us presume, for a moment, that he was as involved in these activities as the entire household. That, in other words, the labour force shares calculated above are representative not just of the household as a whole, but of the male household head too. It is then possible to calculate a by-employment correction on the principal-employment-only, male occupational structure. In Figure 6 this has been done, as an example, for the county of Cheshire. Because of the dominance of agricultural over manufacturing by-employments, the resulting occupational structure would be less industrial than the original one. However, the size of the correction is small, with only a three per cent overall shift from the secondary to the primary sector. So even using the entirely unrealistic assumption that the male household head was as involved in the household’s ‘other’ activities as the rest of his household, the by-employment correction would be very small.

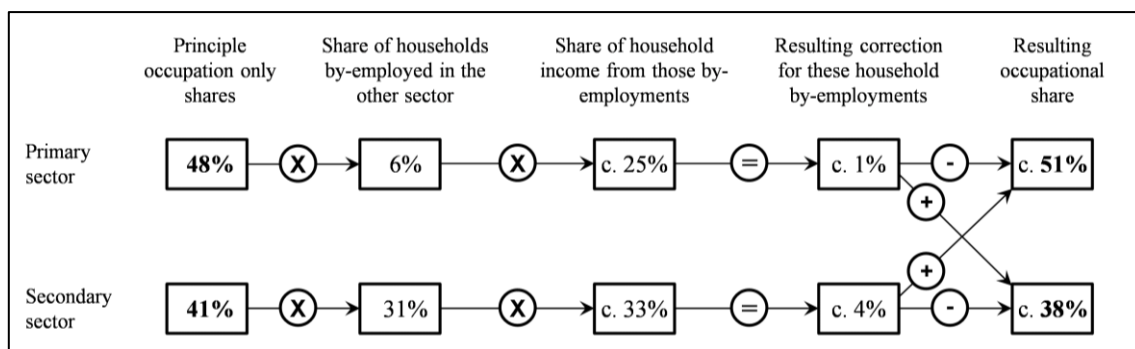


Figure 6. The by-employment correction to the male occupational structure if male ‘household heads’ are (incorrectly) presumed to have been involved in ‘other’ gainful activities (that is, other than his occupational denominator) to the same degree as other members of his household (Cheshire, c.1725)

CONCLUSION

The frequent indications of more than one gainful activity in probate inventories do not invalidate male occupational structures based on single, principal occupations only. Not only do probate inventories, as a result of their wealth bias, strongly exaggerate the number of such households, but it is clear that, in most cases, the male decedent for which the inventory was made did not himself engage in these ‘by-employments’ at all. Rather, they were the preserve of other household members. And even if he had, in all cases, engaged in these activities and had done so to the same degree as other household members – both highly unrealistic assumptions – the resulting by-employment correction on the male occupational structure would be very small. In short: for the purpose of generating reliable male occupational structures, by-employments can safely be ignored.

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