

Early modern rural by-employments: a re-examination of the probate inventory evidence*

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Abstract

It has generally been presumed that most men in early modern rural England significantly augmented the income from their principal occupation by engaging in one or more subsidiary economic activities. The historical evidence for the prevalence of such by-employments is almost exclusively based on probate inventories. Historians have determined by-employment incidences for regions and time intervals throughout early modern England through straightforward frequency counts of inventories that indicate multiple gainful activities. This article argues that such frequency counts are unreliable. Using early eighteenth-century Cheshire and Lancashire as a test case, we demonstrate that the by-employed were more likely to be probated than those with only one source of income. Using occupational data from parish registers and estimates of contemporary livestock numbers, we assess the degree to which the by-employed are over-represented in the probate record. We conclude that inventories vastly exaggerate by-employment incidence. This conclusion has a currency beyond the temporal and geographic bounds of our test case since the cause of the exaggeration – the probate record’s inherent wealth bias – was common to the whole of England, throughout the early modern period. We therefore conclude that by-employments were not nearly as ubiquitous as has been assumed.

Historians of early modern England have often argued that contemporary individuals generated significant income from by-employments, that is, economic activities additional to their principal occupations. Joan Thirsk, for example, contended that about half of the seventeenth-century men employed in agriculture were also engaged in manufacturing.¹ Lamenting the ‘evil day when rural industries left the countryside and returned to the towns’, Alan Everitt used probate evidence to calculate that 60 per cent of agricultural labourers in the 1560–1640 period were by-employed in manufacturing.² Mark Overton *et al.* found for early modern Kent and Cornwall that about half the probate inventories of craftsmen also provided evidence of farming on what they deemed to be a commercial scale, with a further 15 to 20 per cent of inventories indicating involvement in smaller-scale, ‘non-commercial farming’, leading them

* We are grateful to Dr Sara Horrell, Prof. Richard Hoyle, Prof. Tony Wrigley, and three anonymous referees for their comments on an earlier draft.

¹ J. Thirsk, ‘Seventeenth-century agriculture and social change’, in her *Rural economy of England: Collected essays* (1984), p. 211.

² A. Everitt, ‘Farm labourers’, in J. Thirsk (ed.), *The agrarian history of England and Wales*, IV, 1500–1640 (1967), pp. 428–9.

to conclude that ‘by-employment was the norm’.³ As will be discussed, many others have come to similar conclusions on the basis of probate evidence.

By-employments have been awarded an important role in several historical theories on the transition from a predominantly agricultural society of semi-autarkic rural households to a modern market economy. Thirsk, for example, argued that ‘industrial by-employments heralded the development of a consumer society ... [which] included humble peasants, labourers, and servants’, a view echoed in De Vries’s more recent industrious revolution thesis.⁴ By-employments play a central though largely implicit role in proto-industrial theory too.⁵ Local stimuli for by-employments have also been perceived as explaining the historical geography of industrialization. Thirsk pleaded for narrowing down the question, ‘why did the industrial revolution start in England’ to ‘why did it start in the pasture farming areas in England?’ Her answer was clear: because that type of agriculture ‘left men with time for other employments which they could combine with farming’. Aiming to protect their local dual economy, these men were, in Thirsk’s view, also the first to experiment with mechanization. More recently, Sidney Pollard has also emphasized the connection between pastoral agriculture, particularly of ‘stockbreeding and dairying’ with part-time employment in industry.⁶ Franklin Mendels contended that proto-industrialization and, therefore, the Industrial Revolution, occurred in England and, more generally, in the ‘cold climate countries’ of north-west Europe because agriculture here was typified by seasonal labour-demand patterns, stimulating ‘a cost-saving amalgam of agriculture and industry through the intercalation of industrial activity into the annual cycle of agriculture’. In the ‘wine-producing regions’ of southern Europe, seasonal fluctuation in the demand for agricultural labour was much less pronounced, and the need for a dual economy thus much reduced, leading to very late industrialization.⁷

Our interest in by-employments arises from our involvement in the Cambridge Group’s ‘Occupational Structure of Britain 1379–1911’ project. Much progress has now been made in this project in establishing the composition of the eighteenth- and nineteenth-century male labour force.⁸ However, the main data for the eighteenth century are parish registers, which describe contemporary men almost exclusively by their principal occupations. Such ‘principal occupation only’ sources have been criticized from the perspective of by-employments.

³ M. Overton, J. Whittle, D. Dean, and A. Hahn, *Production and consumption in English households, 1600–1750* (2004), pp. 74, 76.

⁴ J. Thirsk, *Economic policy and projects: The development of a consumer society in early modern England* (1988), p. 8; J. De Vries, *The industrious revolution: Consumer behavior and the household economy, 1650 to the present* (2008).

⁵ At least in the ‘classical’ formulations of that theory: F. F. Mendels, ‘Proto-industrialization: The first phase of the industrialization process’, *JECH* 32 (1972); P. Kriedte, J. Schlumbohm, and H. Medick, *Industrialization before industrialization: rural industry in the genesis of capitalism* (1981).

⁶ J. Thirsk, ‘Horn and thorn in Staffordshire: the

economy of a pastoral county’, in her *Rural economy*, pp. 170, 172–3, 181; S. Pollard, *Marginal Europe: the contribution of marginal lands since the Middle Ages* (1997), pp. 225, 251.

⁷ F. F. Mendels, ‘Seasons and regions in agriculture and industry during the process of industrialisation’, in S. Pollard and L. Hölscher (eds), *Region and Industrialisation: Studies on the role of the region in the economic history of the last two centuries* (1980), pp. 180–1, 197.

⁸ See, for example, L. Shaw-Taylor, E. A. Wrigley, R. S. Davies, P. M. Kitson, G. Newton, and A. E. M. Satchell, ‘The occupational structure of England, c.1710 to c.1871, work in progress’ (2010), <http://www.geog.cam.ac.uk/research/projects/occupations/britain19c/papers/paper3.pdf>.

Swain, for example, argued that ‘the exceptionally high degree of participation in industry is largely hidden if undue reliance is placed on occupational data’ for early modern north-east Lancashire.⁹ 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’.¹⁰ Indeed, the single question posed at every seminar and conference at which the project’s preliminary results have been presented has been whether early eighteenth-century figures based on counts of principal occupations are not rendered invalid by the contemporary ubiquity of by-employments.

Despite the importance of by-employments in the socio-economic historiography of early modern England, much of the evidence for their prevalence is actually quite weak. Historians who first drew attention to the phenomenon based their argument mostly on contemporary comment; for example, A. P. Wadsworth and Julia De Lacy Mann, and Henry Fishwick, in their analyses of pre-industrial textile manufacturing in Lancashire, built on contemporary observations from William Radcliffe, John Aiken, Frederick Morton Eden, and Samuel Curwen.¹¹ However, as George Daniels argued nearly a century ago, the evidence of such observations is inconclusive, and more recent economic historians have used them merely peripherally when building a case for the ubiquity of by-employments.¹² Another line of argument has been based on the economic needs and available labour potential of small farmers. Population growth and developments in ownership and tenancy structures led, so the argument goes, to smaller landholdings which were incapable of supporting households by agriculture alone, vulnerable to crop failures and livestock diseases, and unable to fully occupy the household year-round. Thus, additional earnings in industry were both necessary and possible. This argument has been made, for example, for areas within early modern Lancashire by Tupling and Swain.¹³ Although intuitively persuasive, this argument does not, on its own, provide evidence of by-employments being widespread. It may well be that many smallholders attained considerable shares of their income from industry, but that is compatible with a world in which there were also many, and perhaps many more men who worked in agriculture alone or as landless manufacturers. Also, combining agriculture and industry may not actually have been feasible as ‘the seasonality of farming often coincided with the seasonality of manufacture’.¹⁴ Nor is it

⁹ J. T. Swain, *Industry before the Industrial Revolution: north-east Lancashire, c.1500–1640* (1986), p. 207.

¹⁰ J. M. Rosenheim, ‘Review of Swain’s “Industry before the Industrial Revolution”’, *Albion* 20 (1988), pp. 99–100. This sentiment can also be found in other studies of the early modern economy, for example in L. A. Clarkson, *The pre-industrial economy in England, 1500–1750* (1971), p. 77; R. E. Pahl, *Divisions of labour* (1984), p. 47.

¹¹ A. P. Wadsworth and J. de Lacy Mann, *The cotton trade and industrial Lancashire, 1600–1780* (1931), pp. 317–9; H. Fishwick, *The history of the parish of Rochdale in the county of Lancaster* (1889), p. 58; W. Radcliffe, *Origin of the new system of manufacture, commonly called power loom weaving* (1828), pp. 59–60; F. M. Eden, *The state of the poor: a history of the*

labouring classes in England, from the conquest to the present period (1797), p. 296; J. Aiken, *A description of the country from thirty to forty miles round Manchester* (1795), pp. 244, 312; S. Curwen, *Journal and letters of the late Samuel Curwen: An American refugee in England from 1775–1784* (1842), p. 134.

¹² G. W. B. Daniels, *The early English cotton industry: with some unpublished letters of Samuel Crompton* (1920), pp. 135–43.

¹³ G. H. Tupling, *The economic history of Rossendale* (1927), pp. 163–8; Swain, *Industry*, pp. 70–2, 98, 147–8.

¹⁴ P. Hudson, ‘Industrial organisation and structure’, in R. Floud and P. Johnson (eds), *The Cambridge economic history of modern Britain, I, Industrialisation, 1700–1860* (2004), p. 30.

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 all sectors simultaneously.

More direct and much stronger evidence for by-employments has been derived from probate inventories, such as in the analyses by Everitt and Overton *et al.*, mentioned above. The popularity of probate inventories for investigating by-employments is easy to understand. These lists of the moveable goods belonging to the deceased provide valuable indications of economic activities in the form of tools, capital goods, raw materials, finished products and specialized rooms which the deceased possessed. Furthermore, if the decedent was male, his principal occupation is often explicitly stated in the preamble to the inventory itself; if not, it can usually be derived from other probate documents referring to him. Thus inventories allow for the identification of by-employed households. Therefore, they make it possible to quantify by-employment incidence through a straightforward comparison between the number of by-employed and non-by-employed decedents. Many historians of early modern England have exploited this possibility, examples of which are provided in Table 1.

It is the purpose of this article to test such probate-derived figures for robustness. The probate record is a very rich data source but it suffers from a range of problems. This article examines whether one or more of these problems necessitate a re-evaluation of the type of figures presented in Table 1. This examination takes the form of a 'test case' which is itself of limited geographic and temporal scope but the results of which, we argue, have relevance for *all* probate-based calculations of by-employments in early modern England. The focus of the test case is the probate jurisdiction of the episcopal consistory court of Chester for the period 1700–60. The choice for this particular geography and time period was partly informed by our involvement in the Occupational Structure of Britain project, partly by historiographical and practical reasons. Some of the most significant results from the Occupational Structure project so far relate to early eighteenth-century Lancashire, Cheshire, and the West Riding – the future heartland of the Industrial Revolution. It was therefore of obvious interest to us to examine the degree to which the accuracy of the preliminary figures for this region and time period were affected by the prevalence of by-employments. Based on the ready availability and accessibility of well-indexed probate inventories, the geographic extent of the test case was further reduced to the probate jurisdiction of the episcopal consistory court of Chester, that is, Cheshire, and Lancashire south of the Ribble, which contained about 82 per cent of the county's population in 1760.¹⁵ This area (and time period) neatly coincides with what John Stobart has called the 'first industrial region', an area of obvious interest from the perspective of by-employments given the role they are presumed to have played in the transition towards an industrial society.¹⁶ At least for its Lancashire part, this was also an area to which, in the mid-eighteenth century, 'the features of a typical proto-industrial landscape appl[ied] ...

¹⁵ To ensure a balanced sample of inventories, electronic indexes to the probate records were required, which were kindly provided to us by the Cheshire Record Office (for Cheshire) and by Prof. Jon Stobart (for Lancashire south of the Ribble). The West Riding probate records are not indexed and poorly accessible

and therefore had to be excluded. The population estimate is based on E. A. Wrigley, *The early English censuses* (Records of Social and Economic History, new ser., 46, 2011), Table 4.1, pp. 104–5.

¹⁶ J. Stobart, *The first industrial region: North-west England, c.1700–60* (2004).

TABLE 1. Probate-based assessments of by-employment incidence in the literature

<i>Historian</i>	<i>Region</i>	<i>Period</i>	<i>Occupational group</i>	<i>Number of inventories</i>	<i>By-employment type</i>	<i>Incidence (%)</i>
J. T. Swain	N-E corner Blackburn hundred (Lancashire)	1558–1640	Farmers	138	Weaving	c.48 ^a
C. Ironfield	Chipping (Blackburn hundred, Lancashire)	1650–1700	Craftsmen	14	Agriculture	79
D. Hey	South Yorkshire	1694–1769	Nailers and cuttlers	43	Agriculture	84
B. A. Holderness	Lindsey in Lincolnshire	1660–1799	Artisans and shopkeepers	173	Agriculture	84
D. Woodward	Lincolnshire, Lancashire, Cheshire	1550–1650	Carpenters	91	Agriculture	88
			Builders	132	Secondary sector	11
J. Stobart	Cheshire	1700–1760	Tailors and shoemakers	27	Pastoral agriculture	63
P. Frost	South Staffordshire	1601–1640	Craftsmen	c.50 ^b	Agriculture	78
			Craftsmen	c.250 ^b	Agriculture	55
M. B. Rowlands	West Midlands	1660–1710	Metalworkers	434	Agriculture	56
J. M. Martin	South Warwickshire	1727–1749	Craftsmen and traders ^c	98	Agriculture	51
J. S. Moore	Frampton Cotterell and district (Gloucestershire)	1540–1790	Secondary sector	113	Agriculture	33
			Mining	16	Agriculture	19
			Tertiary sector	25	Agriculture	36
M. Overton, J. Whittle, D. Dean, and A. Hahn	Kent	1600–1740	Commercial farmers	1988 ^d	Crafts	18
			Craftsmen	735 ^d	Agriculture	47–63 ^e
	Cornwall	1600–1740	Commercial farmers	2190 ^d	Crafts	13
			Craftsmen	632 ^d	Agriculture	47–66 ^e
			Farm labourers	c.300 ^f	Secondary sector	60

Notes:

^a Determined using several figures provided in the text as no direct figure was given.

^b The inventory numbers have been estimated here, based on shares of probate inventories belonging to the metal trades per time period, provided on pp. 29 and 38 of the article.

^c 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.

^d The Overton *et al.* figures are not readily comparable to the others in this table, since the classification of the occupational 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.

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

^f Estimated based on Everitt's statement, on p. 419, that about 8 per cent of the 3,600 inventories he examined were of labourers.

Sources: J. T. Swain, *Industry before the Industrial Revolution: north-east Lancashire, c.1500–1640* (1986), pp. 127, 134; C. Ironfield, 'The parish of Chipping during the seventeenth century', *Trans. of the Historic Society of Lancashire and Cheshire* 127 (1978), pp. 37, 41–2; D. G. Hey, 'A dual economy in south Yorkshire', *AgHR* 17 (1969), Tables IV and V, pp. 114–6; B. A. Holderness, 'Rural tradesmen, 1660–1850: A regional study in Lindsey', *Lincolnshire Hist. and Archaeology* 7 (1972), pp. 79 (Table 1), 81; D. Woodward, 'Wage rates and living standards in pre-industrial England', *Past & Present* 91 (1981), pp. 39–42; J. Stobart, 'The economic and social worlds of rural craftsmen-retailers in eighteenth-century Cheshire', *AgHR* 52 (2004), p. 151; P. Frost, 'Yeomen and metalsmiths: Livestock in the dual economy in south Staffordshire, 1560–1720', *AgHR* 29 (1981), pp. 29, 38, 40; M. B. Rowlands, *Masters and men in the West Midland Metalware trades before the industrial revolution* (1975), pp. 42–43; J. M. Martin, 'Village traders and the emergence of a proletariat in south Warwickshire, 1750–1851', *AgHR* 32 (1984), p.184 ; J. S. Moore, *The goods and chattels of our forefathers: Frampton Cotterell and district probate inventories, 1539–1804* (1976), pp. 20–1, 26–7; Overton *et al.*, *Production and consumption*, Tables 4.2 and 4.3, pp. 67–8; Everitt, 'Farm labourers', pp. 419, 428–9.

with remarkable accuracy'.¹⁷ Furthermore, this was a region dominated by pastoral farming, considered so conducive to by-employments by Thirsk and Pollard and which, critically, allowed us to cross-check our probate-based by-employment analyses against independent figures – a procedure of central importance to our results, as will become clear. For this procedure to work, high-quality occupational information was also a prerequisite, which was an additional reason to focus on the early eighteenth century – for which such information has been generated by the Occupational Structure project – rather than on pre-1700 data.

The test case is developed in five steps, each forming a section of this article. In section I, the general suitability of probate inventories for by-employment analyses is evaluated. It concludes that they exhibit a number of problems as an historical data source, but that these problems are either fairly small or can be minimized by using the probate data with suitable care. There is one important exception: the problem of social bias, that is, the over-representation of wealthier estates in the probate record. Disregarding that issue for a moment, section II focuses on the incidence and scale of by-employments in the chosen area and time period as suggested by probate inventories *prima facie*. These results provide a basis for investigating the significance of the social-bias issue, in section III, concluding that it is indeed likely to materially distort inventory-based by-employment calculations. The magnitude of this distortion is assessed in section IV, by bringing in evidence from other historical sources. This, then, allows us to generate an estimate of the incidence of by-employments, corrected for social bias, which is valid for the whole contemporary population rather than 'merely' for the inventoried segment. The repercussions of this correction for probate-based by-employment analyses for other areas in England and different time periods are discussed in a brief concluding section.

Before turning to the actual analyses, however, two final key points regarding the historiography of by-employments need to be made. First, in the literature the term 'by-employment' has been used in two quite distinct ways, though the two uses have often been conflated. In the most common usage, as for example by Everitt, Thirsk and Langton, the term has been used to describe *individual* by-employment, that is, one individual having more than one

¹⁷ Pollard, *Marginal Europe*, p. 228.

significant economic activity.¹⁸ In a second, more recent usage, by Overton *et al.*, the term has been used to refer to *household* by-employment, that is, the presence of multiple economic activities within one household. This more recent definition has a methodological advantage when using probate inventories as a data source, as will be discussed. However, it also has clear disadvantages. Household by-employment either refers to households in which one or more individuals are by-employed, in which case it is simply a scaled up-version of individual by-employment, or entails no more than different individuals within the household having different occupations, in which case it is, in practice, merely an opaque term for women's and children's work. Furthermore, it is the norm in the modern world for different individuals within a household to have different occupations. Thus, the use of the term 'by-employment' to refer to households entails making claims that do not clearly distinguish the early modern period from the present. In contrast, the assertion that *individual* by-employments were prevalent is a claim that *does* make a very clear demarcation between the early modern and later periods. Finally, analysing household by-employment using probate inventories introduces serious problems of its own, particularly because the incidence of the most prominent female employment of the early modern period, spinning, cannot reliably be inferred from them, as will be discussed. In this article, we distinguish household by-employment from individual by-employments and our focus is firmly on the prevalence of the latter, in particular amongst the early modern male population.

The second key point is that if individual by-employment was a major feature of the early modern world but not of the modern world, then it is implicit that, from some point in time, by-employment began to decline until it was of very limited importance indeed. Such a decline is, as discussed above, an important component of proto-industrial theory. Some historians have commented explicitly on the timing of the decline in England. Court, in his study of the Midland industries, very tentatively suggested that by-employment probably began to lose significance in the seventeenth century but really went into major decline in the eighteenth century.¹⁹ Rowlands, in her study of the West Midland metalware trades similarly concluded that 'the trend away from the dual economy was already perceptible by 1720'.²⁰ Tupling observed an increase in the number of weavers entirely divorced from the land during the 1740s in the woollen industry of south-east Lancashire.²¹ Overton *et al.* observed a decline in by-employments in early eighteenth-century Cornwall, but not in Kent.²² These passing comments aside, it is remarkable, and indeed peculiar, that there is no study, of which we are aware, focussed on the decline of by-employment. Historians of the nineteenth century have never, so far as we know, suggested that individual by-employment was an important feature of the period.²³ This suggests that if such by-employments were ubiquitous in the early modern

¹⁸ J. Langton, 'Prometheus prostrated?', in P. Slack and R. Ward (eds), *The peopling of Britain: The shaping of a human landscape* (2002), pp. 244–46.

¹⁹ W. H. B. Court, *The rise of the Midland industries, 1600–1838* (1938), p. 42.

²⁰ M. B. Rowlands, *Masters and men in the West Midland metalware trades before the industrial revolution* (1975), p. 43.

²¹ Tupling, *Economic history of Rossendale*, p. 190.

²² Overton *et al.*, *Production and consumption*, p. 76.

²³ Though they have noted the continuing role of urban workers in meeting part of the peak demand for agricultural labour in the harvest season well into the nineteenth century. See for instance W. A. Armstrong, 'Labour I: Rural population growth, systems of employment, and incomes' in G. E. Mingay (ed.), *The agrarian history of England and Wales*, VI, 1750–1850 (1989), pp. 679–80.

period, there is a history of their decline, perhaps beginning in the late seventeenth century and concluding sometime in the second half of the eighteenth century, waiting to be written.

I

As we showed earlier, the probate inventory has, for obvious reasons, been the historian's data source of choice for quantitative analyses of early modern by-employments, and our research is no exception in this respect. Inventories provide indications of economic activities in the listed tools, materials, and rooms. And if, as in the vast majority of inventories, the deceased was male, the inventory itself or other probate documents for the same individual often state his principal occupation. For example, such a 'stated' occupation is known for 87 per cent of the male inventories dating from the 1700 to 1760 held in the Cheshire Record Office.²⁴

Overton *et al.* have argued that occupational denominators provided by probate documents are unreliable, as the occupation stated in the inventory 'often differed from that stated by the decedent in his or her will'.²⁵ However, such differences were only recorded in a handful of cases in the dataset collected for our research, and clear evidence for the reliability of probate-derived occupational descriptors will be provided below.²⁶ Because many probate inventories both provide a stated occupation and list the goods associated with economic activities, they enable an assessment of both the validity of the principal employment of the deceased and the presence of other gainful activities within his household.

In addition to information on the type of economic activities, inventories also provide insight into the scale of these activities. They usually mention not just the presence of certain goods or objects, but also their quantities. And, because they also provide a valuation of the listed goods, they allow for combining assets of different types into a single monetary figure. For example, an impression of the overall scale of the deceased's farming activities can be obtained by combining the values of all his agricultural assets. Valuations in inventories have also been used extensively to measure the wealth of probated households.²⁷ Several such inventory-derived wealth measures are employed in this article.

Probate inventories may be detailed and broad sources of historical information, but they are

²⁴ With only 8 per cent having no stated occupation at all, and 5 per cent being described by status (gentleman, esquire, etc) rather than occupation. This high share of probate documents with a stated occupation is not untypical of the later early modern period; see also Paul Glennie's analysis of the increase of this share over time for Hertfordshire wills: P. Glennie, 'Distinguishing men's trades': *occupational sources and debates for pre-census England* (1990), fig. 3.2, p. 35.

²⁵ Overton *et al.*, *Production and consumption*, p. 34.

²⁶ Craig Muldrew also found only very few such cases in his dataset. See C. Muldrew, *Food, energy and the creation of industriousness: work and material culture in agrarian England, 1550-1780* (2011), p. 166. See also the discussion on this issue in L. Shaw-Taylor, 'The Nature and Scale of the Cottage Economy' (2002),

<http://www.geog.cam.ac.uk/research/projects/occupations/abstracts/paper15.pdf>, pp. 11-12.

²⁷ See, for example, C. Shammas, 'Constructing a wealth distribution from probate records', *J. Interdisc. Hist.* 9 (1978), pp. 297-307; A. H. Jones, 'Wealth estimates for the New England colonies about 1770', *JECh* 32 (1972), pp. 98-127; G. L. Main and T. M. Jackson, 'Economic growth and the standard of living in southern New England, 1640-1774', *JECh* 48 (1988), pp. 27-46. For a discussion on the wealth indications in inventories see T. Arkell, 'Interpreting probate inventories', in T. Arkell, N. Evans, and N. Goose (eds), *When death do us part: Understanding and interpreting the probate records of early modern England* (2000), p. 95; see also Overton *et al.*, *Production and consumption*, pp. 140-2.

far from unproblematic. Some of these problems potentially affect their reliability when used as a basis for assessing by-employments. The first problem is the gendered nature of ownership in early modern England. The male 'head' of a household was the legal owner of all the goods in the household, with the possible – and, for the purpose of detecting economic activities, irrelevant – exception of small heirlooms or pieces of women's apparel, which might have been considered the individual property of his wife. His probate inventory therefore presents material evidence of the significant gainful activities within the household, whether carried out by him, his wife, living-in children, or servants. This means that inventories provide information on the activities of the entire household rather than those of the deceased alone. If a weaver's inventory contains evidence of agricultural activities, it is not clear whether he was himself involved in farming, or whether this was the preserve of other household members such as his wife. In other words, probate inventories provide direct information on *household* by-employment but not on *individual* by-employment. Since the latter is, in essence, a special case of the former, inventories exaggerate the incidence of individual by-employment. Inventory-derived figures, like those presented in this article, should therefore always be considered as *maximum* values for individual by-employment incidence. However, since, as will become clear, one of the main claims of this article is that by-employments were much less prevalent than is presumed in the literature, working with maximum values is not problematic; if anything, we are erring on the side of caution when using probate evidence to support this claim.

A final remark should be made regarding this issue: for some activities, such as spinning, it is fairly certain that they would not have been carried out by the male 'household head' because they were virtually restricted to women. One could therefore simply exclude them from the by-employment incidence count if one is solely interested in individual, male by-employments. Indeed, as discussed below, spinning *is* excluded in this article, albeit for different reasons. However, even activities usually carried out by women could be performed by men, and often were, particularly when they were on a commercial scale. Home brewing and baking may have been typically female activities, but most commercial brewers and bakers were men. It is possible, therefore, that precisely at the point that such 'female' activities became of sufficient scale to qualify as true by-employments, that is, when they generated a significant surplus for sale in the market, they may well have shifted from the female to the male domain. Again, erring on the side of caution, typically female activities have therefore not been excluded from individual by-employment counts in this article.

A second, more general problem with probate inventories is what might be called 'abbreviation', that is, individual items, particularly those of very low value, are not in all cases listed separately. The degree of abbreviation differs between inventories. 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 carpenters' 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. But even when goods *are* included, their quantities

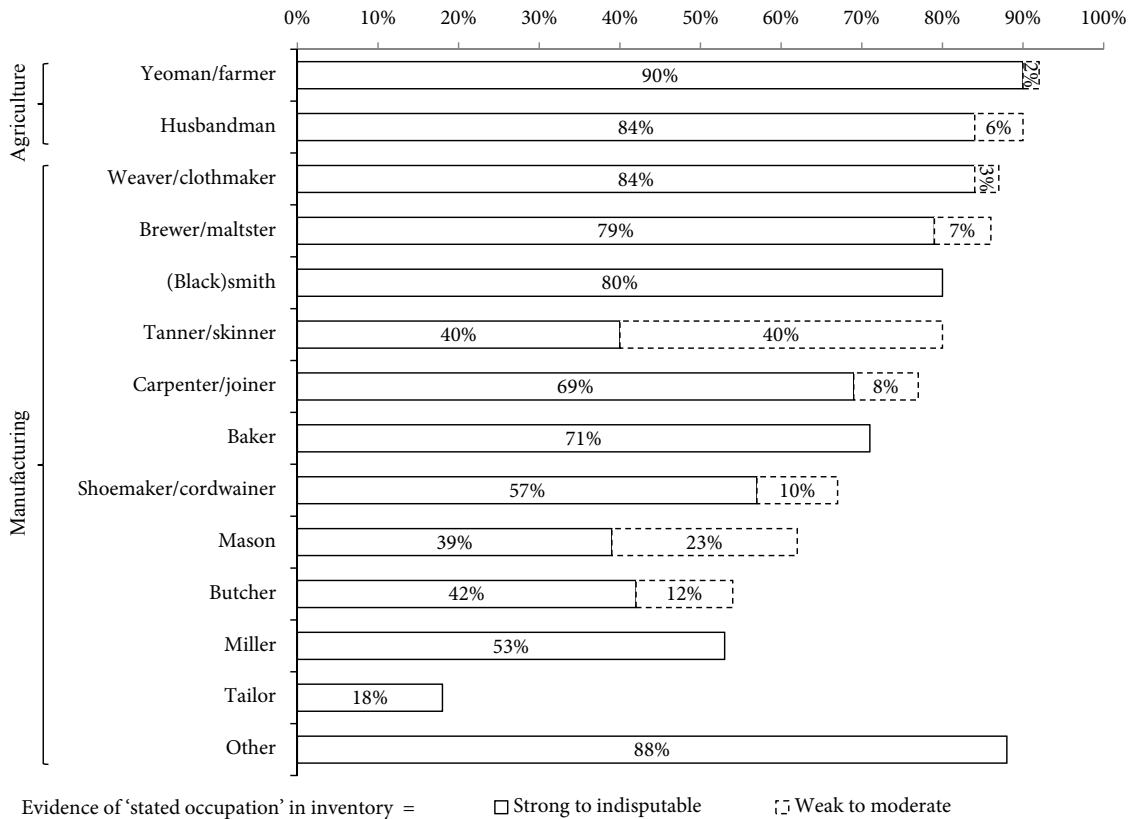


FIGURE 1. Strength of indications for the deceased's principal occupation in the probate inventories of early eighteenth-century men from Cheshire and Lancashire south of the Ribble

Source: Probate inventory dataset.

Note: Only inventories that list goods in sufficient detail for this analysis were used (531 out of a total of 543 inventories).

may be unclear, for example when an unknown number of cattle are simply abbreviated to an entry reading 'cows' or 'horned beasts'. In such cases, the upper and lower limits of the unit price – derived from the inventories in which quantities *are* clear – can be used to estimate upper and lower bounds for the number of items. This approach is preferable to one in which the inventories with unstated numbers of livestock are simply excluded. The monetary values of livestock in these inventories show that these are typically inventories with large numbers of animals. Excluding them would result in erroneously low average livestock numbers.

A third, 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 of 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, the comparison is very encouraging. For example, only ten per cent of the inventories used in this research, of those described as a yeoman in the preamble to the inventory or a related probate

document such as a will, did not contain strong to indisputable indications of agricultural activities.²⁸ For many manufacturing occupations, for example for weavers, tanners and brewers, the figure is similarly low. This is clear evidence for the reliability of the occupational descriptors in these probate documents. It also suggests that such occupations are likely to have left clear traces in inventories for which they were 'merely' by-employments.

But Figure 1 also shows that some occupations did not always leave such clear traces. Nearly half the butchers' inventories used in our research showed no sign of the stated occupation and the same was true for over 80 per cent of tailors' inventories. The low value of the tools used in these occupations means that they often went unmentioned. Furthermore, the lack of any cloth or ready-made clothes being listed in tailors' inventories indicates that they typically worked on commission, so held little or no stock of raw materials or finished goods. Determining by-employment in such 'trace-poor' occupations is problematic. If a farmer's inventory shows no evidence 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 less certain that he was not by-employed as a tailor.

Fortunately, this problem can be resolved, using the data from Figure 1 on male manufacturing occupations. For example, as only one in five decedents with the 'stated', principal occupation of tailor left clear evidence of tailoring in their inventories, we can assume that, similarly, only for one in five decedents for which tailoring was a by-employment will clear evidence of that activity be found in the inventory. Thus, actual by-employment incidence in tailoring amongst the inventoried population can be estimated as having been five times as high as a simple frequency count within the inventory record would suggest. All incidence figures in this article have been upwardly corrected in this way for 'trace-poor' male occupations. Fortunately, the most common by-employments by far, were farming and weaving, and these were not 'trace poor', so the resulting correction was actually quite small.

This correction methodology relies on information on the share of inventories showing clear signs of their stated, principal occupation. Our sample of inventories gave us access to such information for all significant agricultural and manufacturing activities. There is, however, one 'trace-poor', male occupation for which such information is not available: the labourer. But labouring outside the household as a subsidiary activity for farmers and manufacturers would have been limited to low-skilled work in periods of labour shortage, such as helping out during the harvest. Such labour was occasional, and therefore represented only a limited – although undoubtedly welcome – contribution to household income.²⁹ In short: 'trace-poor' activities did not constitute a significant problem for analysing the phenomenon that this article focuses on, that is, male, individual by-employment.

The problem would have been significantly more serious had we focused on *household* by-employment. Typically, important female manufacturing activities were 'trace poor'. For them, the principal occupation-based correction methodology discussed above does not

²⁸ This not only confirms the validity of the occupational descriptor but also dispels possible suspicions about 'yeoman' being used as an indication of status rather than occupation in our inventory sample.

²⁹ For a discussion on what constitutes a by-employment in the sense in which the term has been used in this article, see the discussion on the 'fifth problem', p. 257.

TABLE 2. Indications for spinning as a function of the level of 'abbreviation' of inventories

Level of detail provided by inventory	Farmers		Labourers		Manufacturers	
	Number of inventories	Spinning incidence (%)	Number of inventories	Spinning incidence (%)	Number of inventories	Spinning incidence (%)
Low to moderate	43	5	4	0	68	7
High	90	41	19	37	273	27
Very high	4	50	1	N/A	26	50
	137	30	24	29	367	25

Notes: Only inventories that list goods and/or rooms with a sufficient level of detail for this analysis were used (528 out of a total of 543 inventories). Spinning incidence for labourer with very highly detailed inventory left out of table as only one such inventory, so statistically rather meaningless.

Source: Probate inventory dataset.

work, as women's inventories are much scarcer than men's and only rarely mention principal occupations. 'Trace-poor' female manufacturing activities were sometimes geographically concentrated and not particularly relevant for the counties analysed in this article; examples would be straw plaiting and lace making. But the by far most important and widespread of such activities was prominent in the north-west as well: spinning. Jane Whittle has argued that probate inventories allow for the reliable assessment of the prevalence of spinning, at least where this was carried out using a spinning wheel rather than a distaff.³⁰ However, even spinning wheels were relatively cheap, often valued at merely 6*d.* or less in the early eighteenth century, which meant they could quite easily fall below the surveyors' threshold for a separate inventory listing. Indeed, a comparison of the frequency of indications for spinning between inventories with different levels of abbreviation confirms this. As shown in Table 2, indications of spinning were encountered nearly twice as often in the most detailed inventories as in the average inventory. And there is no guarantee that even in these rare, exceptionally detailed inventories, spinning wheels were *always* recorded. The conclusion, unfortunately, has to be that inventories are not reliable sources for estimating the incidence and economic importance of spinning, with the possible exception of a tiny minority of extremely detailed ones. Given this unreliability of spinning indications and our focus on individual, male by-employment, we have chosen to exclude spinning from all by-employment data presented in this article.

A special form of 'trace poorness' might be feared for agricultural pursuits of a seasonal nature: farming activities might be invisible in the inventory if it was taken in a period of the farming year characterized by a lack of moveable agricultural goods. Such seasonal 'trace poorness' could well have been a problem in arable farming areas, but in the predominantly pastoral farming area under analysis in this article it was not. The bulk of the total value of agricultural goods in the inventories was accounted for by livestock, which was largely non-seasonal. There was therefore very little variation in either the total agricultural values or

³⁰ J. Whittle, 'Housewives and servants in rural England, 1440–1650: evidence of women's work from probate documents', *Trans. Royal Hist. Soc.* 15

(2005), p. 68; see also Overton *et al.*, *Production and consumption*, p. 36.

in agricultural by-employments indicated by the inventories over the year: the seasonal average value in agricultural goods in farmers' inventories varied between a minimum of £46 (spring) and a maximum of £50 (summer), whilst agricultural by-employment incidence amongst secondary sector inventories varied by a mere five per cent between these same two seasons.

Some inventories suffer from a fourth problem: the goods and rooms listed in them do not provide *any* evidence of economic activities. Such 'non-productive' inventories, as Overton *et al* have called them, are problematic for by-employment analyses, particularly when the principal, stated occupation of the male 'household head' was 'trace poor'.³¹ This can best be explained by offering a simple example. John Birtles, a tailor from Henbury, in Prestbury parish, Cheshire, who died in 1746, left an inventory without any indications of gainful activities. His inventory provides room for three alternative interpretations. A first interpretation is that, since tailoring often leaves no evidence in an inventory, it is not surprising that there are no indications of it in this specific inventory. As agricultural activities normally do leave clear indications in inventories, it would seem that the Birtles household was not agriculturally by-employed. A second interpretation, however, is that Birtles (or members of his household) had been active in agriculture, but that this does not show up in the inventory because John Birtles, nearing his death, had been too ill or physically infirm to work, and had sold his livestock and tools to survive economically in this period of little or no income. A third possible interpretation is that John Birtles, or other members of his household, had been active in tailoring and agriculture until Birtles's death, but that all livestock and tools were sold to pay off debts or divided amongst family members in the period between his death and the creation of the inventory. Since it is impossible to determine which of these three interpretations is correct, it is impossible to determine whether this household was agriculturally by-employed or not. But if such 'non-productive' inventories are included in counts of by-employment incidence, the evidence is, implicitly, gauged in terms of the first of the three above interpretations, leading to by-employment incidence potentially being underestimated.

The solution to this problem is simple. For inventories that provide clear confirmation of the stated, principal occupation of the male 'household head' in the goods and rooms listed, the problem of several possible interpretations of the inventory evidence does not exist. The male decedents here were clearly still active at the time of death and their tools had not, apparently, been sold to pay off debts, or divided amongst their descendants between the moment of death and the creation of the inventory. If there is no evidence of other gainful activities in such inventories, the decedent is highly unlikely to have been by-employed. In other words: if the analysis is restricted to this subset of inventories, we are unlikely to underestimate by-employment incidence. There is, obviously, a cost to this solution: the number of usable inventories for by-employment analyses is unavoidably reduced. As Figure 1 shows almost all farmers' inventories and most manufacturers' inventories provide clear indications of the decedent's stated occupation, and can therefore be safely included in the by-employment incidence analyses. But there is a reduction in sample size. There were 139 farmers' inventories that were sufficiently detailed for by-employment analyses, but only 121 of them also provided clear indications of farming; 364 manufacturers' inventories were sufficiently detailed, but only

³¹ Overton *et al.*, *Production and consumption*, p. 84.

230 of them had clear enough traces of the decedent's stated occupation to make them unproblematic for by-employment incidence counts. It should be noted here that although limiting the dataset in this way is methodologically appropriate, it actually has a negligible impact on the by-employment incidence counts. Our analyses show that, had inventories without clear indications of the stated, principal occupations been left in the dataset, by-employment incidence would have been underestimated by less than two percentage points for inventoried manufacturers and by less than one percentage point for inventoried farmers.

Age bias represents a potential fifth problem: one might expect the elderly to be over-represented in probate collections. However, it should be noted that, with the patterns of mortality that prevailed in the early eighteenth century, a high proportion of adult male deaths would have been of those who would not be considered elderly. Life expectancy at age 25 was around 32 years in the early eighteenth century in the villages and small towns that comprised the Cambridge Group's reconstitution sample. In other words, the average age of death for those who survived to 25 was around 57. Put differently, of those who survived to 25, just under half survived to the age of 60; just over a third survived to 65 and only around a quarter reached 70.³² Moreover, a systematic analysis by Overton *et al* found no evidence of age bias amongst the English probate record.³³ But even if age bias *were* significant, this does not necessarily affect probate-based analyses of by-employment. Such a bias towards the later stages in the lifecycle would only affect analyses if the incidence of individual male by-employment in the early modern period varied over the man's lifetime. But there is not much reason to expect that by-employment was more typical of, say, the early than the later stages of life.

A sixth problem lies in the occasional lack of clarity of by-employment indications in inventories. Evidence for manufacturing activities is sometimes open to multiple interpretations. For example, the inventory of Joshua Walker, a butcher from Capesthorpe in Cheshire, lists a large number of livestock. Given his principal occupation as a butcher, livestock ownership in itself is not a definitive indication of agricultural activities, as he may merely have had the listed farm animals for fattening, in preparation for slaughter. But, his inventory also listed all kinds of equipment for arable agriculture, such as ploughs and harrows, making agricultural by-employment 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 'proper' 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 article, 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, sewing 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

³² E. A. Wrigley, R. S. Davies, J. E. Oeppen, and R. S. Schofield, *English population history from family reconstitution, 1580–1837* (1997), Table 6.19 (p. 290).

³³ Overton *et al.*, *Production and consumption*,

pp. 27–28, 208. American probate studies, however, have found evidence of age bias – see for example G. L. Main, 'The standard of living in southern New England, 1640–1773', *William and Mary Q.* 45 (1988), p. 125.

members of their 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 term, even though they reduced the need for purchasing the same products or services on the market and therefore constituted economic value. It is, however, not always easy to infer from inventories whether an activity was 'for the market' or 'merely domestic'. The inventory of William Coppock, a tanner from Timperley in Cheshire lists one load of malt, a brewing stoond and a barrel, altogether valued at less than £2; this probably 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 or not. The solution for this problem chosen in our research 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. For example, the inventory of Joshua Walker, discussed above, was interpreted as providing 'indisputable' indications of agricultural by-employment but 'weak' indications of tanning. William Coppock's inventory, also discussed above, was interpreted as providing only 'weak' indications of brewing. This inventory does not contain a loom, but it does list £60 worth of 'made and unmade' linen cloth, which is an exceptionally high figure. It is therefore likely that he was a clothier, putting out the actual weaving to others. Despite the lack of a loom, the likelihood of Coppock being involved in secondary sector activities was therefore judged as 'strong'. Coppock's inventory also contained 4s. worth of 'old iron'; since old iron is often listed in blacksmiths' inventories, this potentially indicates blacksmithing activities, but given the lack of a smithy, anvil, bellows or metalworking tools, this indication was interpreted as 'very weak'. Finally, the presence of ploughs, harrows, a winnowing fan, a multitude of smaller agricultural tools, and £4 worth of beans and wheat in this inventory led us to interpret it as providing 'indisputable' indications of arable agriculture. Unless otherwise stated, only indications in the upper half of the scale, ranging from 'fairly strong' to 'indisputable' were considered sufficiently clear evidence of by-employment. The main conclusions of the research were, however, tested for robustness by varying the by-employment 'cut-off point' along the scale.

For agricultural activities, in addition to this qualitative 'strength-of-indication' scale, a firmer, more quantitatively based judgement was made on whether they were likely to have been of a sufficient magnitude to result in a surplus for sale in the market. For example, ownership of a pig or some poultry is a clear sign of involvement in agriculture but, if there are no indications of additional agricultural activities, it signifies a very marginal agricultural activity, probably entirely 'consumed' within the household and thus, in the meaning of the term adopted in this article, 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 activities were divided into 'marginal' and 'substantial' ones. Only manufacturers' inventories with substantial farming activities – those which listed at least one adult cow or, if no cows were listed, whose combined value in agricultural assets was at least £3, the average value of an adult cow in the probate sample – have been deemed truly agriculturally by-employed. This £3 cut-off point was chosen to be quite low: it equalled merely six per cent of the value of

the agricultural assets of the average farmer's inventory and would only have denoted limited economic value to most manufacturers' households. Using such a low cut-off point ensures that we were, again, erring on the side of caution. Nevertheless, something which represented merely minor economic value to most households may have represented substantial economic value to a very poor one such as that of a labourer, as Jane Humphries has shown.³⁴

The above six problems with probate inventories may have proved to be resolvable fairly easily, but that is not the case for the final issue: wealth bias. As Daniel Smith phrased it, 'like other seemingly broad sources in social history, probate records represent the experience of an atypically prosperous segment of the population'.³⁵ Wealthier estates were much more likely to be inventoried than poorer ones, probably because the trade-off between, on the one hand, the cost of having an inventory made and, on the other hand, the value of such an inventory in case of disputes over the estate, was more positive for wealthy than poor estates. Since the church courts were not allowed to charge a fee if the inventory value was less than £5, they had a financial disincentive for registering and exhibiting inventories for such low-value estates, which probably serves to exacerbate the inherent wealth bias.³⁶

Although wealth bias amongst probate inventories has always been widely recognized, the repercussions of this bias for by-employment analyses have generally been tacitly ignored. Overton *et al* have been careful to stress that their figures and conclusions only apply to the inventoried share of the population, but few others have so explicitly made this distinction. However, it is not difficult to see why the probate record's inherent wealth bias is likely to lead to by-employments being more prevalent amongst the inventoried than the non-inventoried. The presence of expensive capital goods or large quantities of raw materials or finished products was usually an important determinant of the overall value of an estate. The most prevalent high-cost capital good in early eighteenth-century Cheshire and Lancashire was cattle. An adult dairy cow typically cost between £2 4s. and £3 8s., and the average yeoman's inventory in these counties lists seven of them. Combined with other cattle, horses and farm animals, such inventories on average list £34 in livestock alone, representing more than half the total moveable value of the estate. On top of that comes £21 in arable produce and dairy products. Some secondary sector occupations also required expensive capital goods, such as the large copper vessels used by commercial brewers, or the vast stocks of hides and bark of the typical tanner. But most others did not. For example, the combined value of all work-related goods in the average non-by-employed weaver's inventory was a mere £5.

Consequently, individuals with capital-intensive and stock-rich occupations were much more likely to leave an inventory than those with employments that required little capital or stock. This is clear from Table 3, in which the contemporary male occupational structure, derived from the parish registers of 35 Cheshire parishes and chapelries, is compared to the composition of the surviving probate inventory record for these same parishes. As it demonstrates, the chance of a farmer leaving an inventory was three times that of a manufacturer, and about 20

³⁴ J. Humphries, 'Enclosures, common rights, and women: The proletarianization of families in the late eighteenth and early nineteenth centuries', *JEH* 50 (1990), p. 24.

³⁵ D. S. Smith, 'Underregistration and bias in probate

records: an analysis of data from eighteenth-century Hingham, Massachusetts', *William and Mary Q.* 32 (1975), p. 106.

³⁶ Arkell, 'The Probate Process', in Arkell *et al.* (eds), *When death do us part*, p. 12.

TABLE 3. Male main occupations in anglican baptism registers and probate inventories; Cheshire, selected parishes, 1690–1730

<i>Male principal occupation</i>	<i>Parish records (count)</i>	<i>Probate inventories (count)</i>	<i>Ratio</i> $\left(\frac{\text{Parish records}}{\text{Probate inventories}}\right)$	<i>Chance of leaving inventory relative to farmers</i>
Farmers	2,245	793	2.8	1
Manufacturers				
Capital intensive ^a	30	19	1.6	2:1
Capital extensive ^b	726	54	13.4	1:4
Other	1,026	123	8.3	1:3
All	1,782	196	9.1	1:3
Labourers	1,112	c.20	c.56	1:20

Notes: Both parish records and probate inventories taken from the same 29 Cheshire parishes, in the same time period (1690–1730), to ensure comparability. These parishes represent roughly one quarter of the total, contemporary Cheshire population.

^a Tanners only.

^b Tailors, shoemakers, and weavers.

^c All inventories with ‘labourer’ as stated occupation plus a small share of the inventories with ‘husbandman’ as stated occupation. The size of this ‘husbandman correction’ – connected to the occupational ambiguity in the term ‘husbandman’ – was based on the relatively high share of husbandmen inventories (16%) without strong indications of agricultural activities compared to yeomen (10%). This suggests that roughly 6% of the inventories with a stated occupation of ‘husbandman’ probably relate to a decedent more properly described as ‘labourer’.

Sources: Parish data collected for the ‘Occupational Structure of Britain 1379–1911’ project; electronic index to Cheshire probate documents, provided by the Cheshire Record Office.

times that of a labourer. Only for very capital-intensive secondary sector occupations, such as tanning, were the chances of leaving an inventory comparable to or better than for farmers.

The fact that there are disproportionate numbers of farmers and tanners in the surviving inventory collections, and, for example, very few labourers, is not in itself a problem, as this can be corrected for by using an occupationally stratified sample of inventories or by working with weighted averages when comparing groups of occupations – provided that occupational data are available to allow the selection of a representative sample for determining the ‘weights’ per occupation. But Table 3 suggests a much more serious issue. The same reason that farmers or tanners were relatively likely to leave an inventory, namely their occupational requirement for the possession of livestock or expensive stocks of raw materials, would have made artisans who were by-employed in farming, or agriculturalists who also worked as tanners more likely to leave an inventory than their non-by-employed contemporaries. This means that the by-employed are likely to be over-represented in the probate inventory record. This over-representation is exacerbated by a more general connection between wealth and by-employment, as will be shown in section III. It is not possible to rectify by-employment calculations *a priori*, when drawing the sample, for the social bias of the probate record. But we will show in section IV that the calculations themselves provide the means for gauging the effects of this by-employment overstatement *a posteriori*.

One might fear that the inventory evidence would *underestimate* by-employment at the

other end of the wealth spectrum. Perhaps, the (very) poor, to make ends meet in an 'economy of makeshifts', would also have resorted to combining different employments. If they were not probated, this by-employment would be missed in inventory-based analyses. However, such anxiety would seem unnecessary. It is important to note that the very poor were heavily under-represented in the probate record, but not entirely absent from it. It is often assumed that estates below £5 in value did not require probate.³⁷ This, as Jeff and Nancy Cox have shown, is a misconception.³⁸ The inventory dataset used in this research, described in more detail below, contained 13 inventories with less than £5 in total value, and 37 with less than £5 in moveable goods and cash. Only one of these inventories, of a labourer from Stockport parish, showed signs of possible by-employments.

II

Our research is based on a sample of 543 probate inventories of male household heads, from the 1700–60 period, proved in the episcopal consistory court of Chester.³⁹ This was the principal probate court for Cheshire and Lancashire south of the river Ribble. Inventories for individuals from this area who also held property in probate jurisdictions of one or more other consistory courts would have been proved at one of the two prerogative courts, that is, in York or Canterbury. This, however, was a tiny minority, as can be shown by comparing the numbers of wills, another prominent probate document, proved at the consistory and prerogative courts.⁴⁰ For 1700–60, the index to Cheshire probate documents at the Cheshire Record Office lists 6745 wills. For the same period, only very small numbers of Cheshire wills are to be found in the indexes of the prerogative probate courts, 45 at York and 228 at Canterbury.⁴¹

The indexes to Cheshire and Lancashire probate documents were also used to select the inventories for the sample, as they provide information on the (stated) occupation of the decedent, his place of living and the date the inventory was created.⁴² This allowed us to

³⁷ A. L. Erickson, *Women and property in early modern England* (1993), p. 33; M. Overton, 'English probate inventories and the measurement of agricultural change' in A. M. Van der Woude and A. Schuurman (eds), *Probate inventories: a new source for the historical study of wealth, material culture and agricultural development* (1980), p. 209; J. S. Moore, *The goods and chattels of our forefathers: Frampton Cotterell and district probate inventories, 1539–1804* (1976), p. 18; S. Ogilvie, M. K pker, and J. Maegraith, 'Household debt in seventeenth-century W rttemberg: evidence from personal inventories', in *Cambridge Working Papers in Economics* (2011), p. 12.

³⁸ J. Cox and N. Cox, 'Probate, 1500–1800: a system in transition' in Arkell *et al.* (eds), *When death do us part*, p. 26, n. 65.

³⁹ We are grateful to Dr Craig Muldrew and Dr Ken Sneath for providing 82 already-transcribed inventories, which were included in this set.

⁴⁰ The comparison here is made based on the number of wills rather than inventories because the latter have a low survival rate and are poorly indexed for the prerogative courts, whilst this is not the case for wills, almost all of which have survived and are indexed. Thus, wills provide a much better basis for comparison.

⁴¹ Figures derived from electronic indexes to probate records kindly made available by the Cheshire Record Office and the National Archives, and from the online index to wills at the York prerogative court, accessible at origins.net.

⁴² The catalogue for Cheshire inventories was kindly provided by the Cheshire Record Office. An online version of it can be found at <http://archivedatabases.cheshire.gov.uk/RecordOfficeWillePayments/asearch.aspx>. We are grateful to Professor Jon Stobart for providing a catalogue of inventories for Lancashire south of the River Ribble.

ensure that the sample contained an appropriate occupational and geographic distribution, and a reasonable temporal spread. Had inventories been picked at random, the resulting sample would have predominantly consisted of yeomen and husbandmen, and contained few manufacturers and, probably, no labourers, as is clear from Table 3.

Probate inventories may contain a significant number of occupational indications of varying strength. To help ensure that none of these occupational indications were missed, the inventories were transcribed and imported into computer software developed by the present authors. This software is capable of splitting up the inventory lines into individual items, which can then be electronically matched with a list of 3700 inventory terms, categorized by type and strength of occupational indication. The program produces a standardized report for each inventory, which was a useful aid in the interpretation of the inventory. Using the automated reports as inputs, each inventory was evaluated individually as to the degree to which its occupational indications corroborated the stated occupation of the deceased and as to the strength of indications for additional gainful activities, that is, by-employments.

Two common manufacturing activities were excluded from the analyses: spinning – for reasons already discussed – and dairying. Dairying could theoretically be argued to be an independent activity, but in practice, the inventories showed, it was inextricably linked to cattle farming within the household. No secondary sector inventories were found that contained dairying equipment (such as butter churns or cheese presses) but no cattle and, vice versa, almost all inventories with clear and substantial evidence of cow keeping also contained clear proof of dairying activity.⁴³

Before turning to the by-employment analysis of the inventory data set, it is necessary to discuss its geographical, occupational, and temporal composition. The probate jurisdiction of the consistory court at Chester comprised Cheshire and that part of Lancashire south of the river Ribble. As Stobart has shown, the region was by no means uniform in its economic activities. Commercial agriculture was present throughout, but particularly so in Cheshire and the west of Lancashire. Textile manufacturers were especially important in the east of Lancashire and the north-east of Cheshire. Mineral-based production was found mainly in the south-west of Lancashire and in central Cheshire. Within these broadly defined zones, many smaller, specialized centres of manufacturing and services existed.⁴⁴

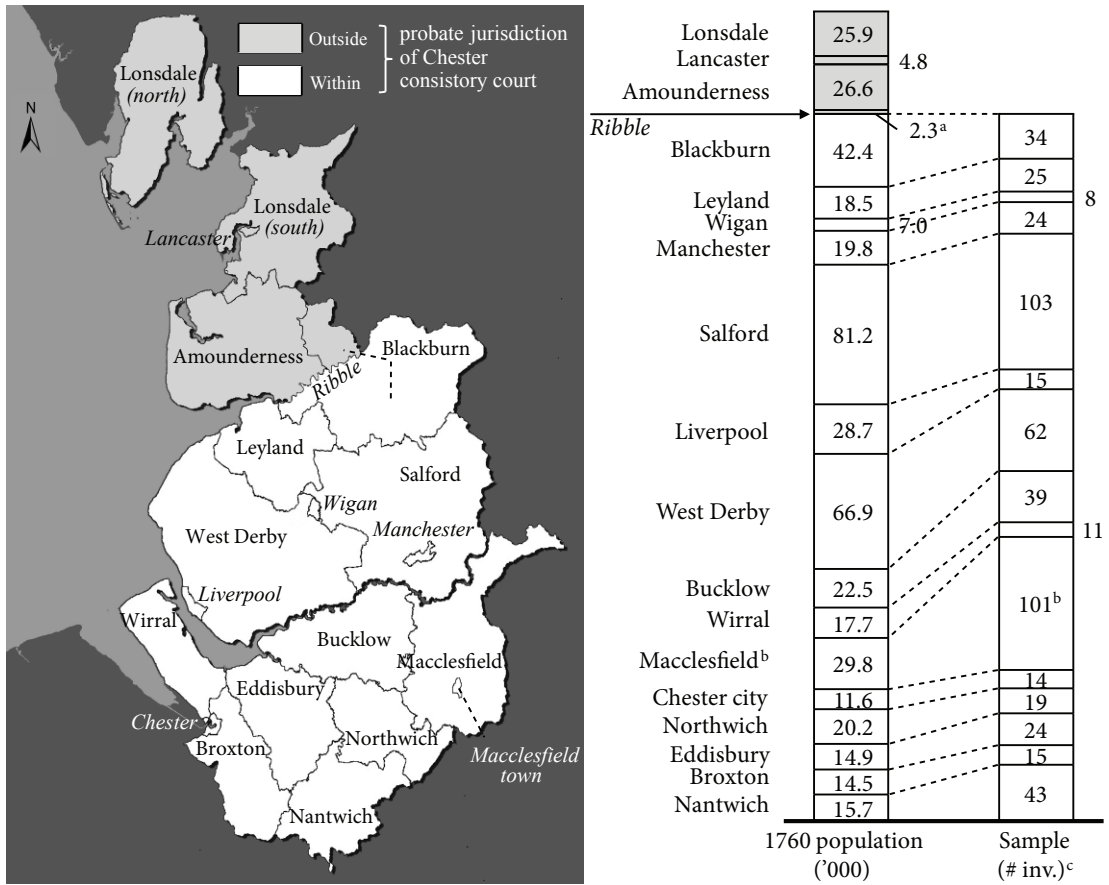
Several historians of early industrialization have addressed the issue of by-employments for small areas within the Chester probate jurisdiction, notably Tupling, Swain, and Ironfield, of whom the latter two have used probate evidence to derive actual incidences. Foster too has touched upon the subject in his work on northern Cheshire.⁴⁵ Stobart has analysed agricultural by-employments amongst Cheshire's rural tailors and shoemakers. However, no broad analysis of by-employment incidence, covering a wide occupational spectrum and the entire area, exists. To enable an assessment of the general prevalence of pre-industrial by-employments

⁴³ Note that this approach, which – for the reasons stated – treats dairying as a direct offshoot of dairy farming rather than as an independent by-employment, differs fundamentally from the one taken by Overton *et al.* and Whittle. See Overton *et al.*, *Production and consumption*, p. 60; Whittle, 'Housewives and

servants', p. 69.

⁴⁴ Stobart, *First industrial region*, pp. 43–6.

⁴⁵ For example in C. F. Foster, *Capital and innovation: how Britain became the first industrial nation. A study of the Warrington, Knutsford, Nantwich and Frodsham area, 1500–1780* (2004), ch. 4.



MAP 1. The geographic composition of the probate sample

Notes: ^a A small part of Blackburn hundred was located north of the Ribble.

^b Includes Macclesfield Town (6 inventories).

^c The number of inventories in this map does not add up to the dataset total because for six inventories, the domicile of the deceased could not unambiguously be located within one hundred, being a place name that occurred in more than one hundred.

Sources: Probate inventory dataset; Wrigley, *Early censuses*, pp. 104–5.

rather than their prevalence in potentially highly distinctive and unrepresentative sub-regions, we took care to provide broad coverage of the Chester probate jurisdiction and occupational structure. The dataset’s geographic coverage is depicted in Map 1. As will be shown, this broad geographic coverage has a critical additional advantage: it allows for a crosscheck of the by-employment analyses against independent data, and thus for the desired test of robustness of the probate-derived figures. A diocese-wide sample means small sub-samples for specific localities, which hampers any comparisons with existing local historical studies. We will therefore first analyse by-employment incidence for the region as a whole, before ‘zooming in’ on smaller areas, and attempting a comparison with the local historiography.

We also took care to provide sufficient coverage of major occupations. The selection of inventories was focused on the agricultural and secondary sectors. We did not include tertiary

TABLE 4. The occupational composition of the dataset (number of inventories)

<i>Sector</i>	<i>Occupation</i>	<i>Lancashire</i>	<i>Cheshire</i>	<i>Combined</i>
Agriculture	Yeoman	32	41	73
	Husbandman	48	24	72
	All farmers	80	65	145
Manufacturing	(Black)smith	15	27	42
	Baker	6	0	6
	Brewer/maltster	8	6	14
	Butcher	10	16	26
	Carpenter/joiner	26	38	64
	Mason	11	11	22
	Miller	5	9	14
	Shoemaker/cordwainer/glover	12	20	32
	Tailor	17	23	40
	Tanner/skinner	8	12	20
	Weaver/clothmaker	62	23	85
	Other type of artisan	8	0	8
	All manufacturers	188	185	373
Labourers	Labourers	5	20	25
	All	273	270	543

Source: Probate inventory dataset.

sector workers in the dataset – nor did we systematically analyse tertiary sector activities as by-employments – because the sector was small, particularly in rural areas, and the by-employment historiography is almost exclusively concerned with primary and secondary sector activities.⁴⁶ Table 4 provides an overview of the occupational composition of the dataset. With the exception of farmers, for which a very large number of probate inventories exists, a significant share of all surviving inventories for the period was utilized, ranging from 30 per cent for tanners and millers to 100 per cent for labourers.

A closer analysis of the farmers' inventories confirms their representativeness in terms of the spread of actual agricultural activities.⁴⁷ As is clear from farm surveys of Cheshire and Lancashire from a slightly later date, local agricultural activity was heavily dominated by pastoral farming, but most farms, particularly larger ones, would have been of the mixed type, with a minority of their land under tillage.⁴⁸ Indeed, 98 per cent of all the 'productive'

⁴⁶ As yet unpublished work, by L. Shaw-Taylor and E. A. Wrigley, based on around 500 rural baptism registers recording occupations in the early eighteenth century, suggests that the tertiary sector accounted for about 5% of adult male employment in rural areas.

⁴⁷ The occupational descriptor of farmers was of

course usually 'yeoman' or 'husbandman' rather than 'farmer'.

⁴⁸ See, for example, J. Holt, *General view of the agriculture of the county of Lancaster* (1792), p. 13 and H. Holland, *General view of the agriculture of Cheshire* (1810), p. 125.

inventories of farmers showed clear signs of pastoral farming, and the remaining two per cent contained indications that animal husbandry had formerly taken place at the farm. Seventy-three per cent also gave indisputable indications of arable activity, so a clear majority of farms was indeed of the mixed type.

In terms of temporal coverage, the sample was skewed towards the earlier decades of the 1700–60 period, because probate inventories became progressively rarer in the diocese of Chester after 1740. The sample contained only 71 inventories from 1740–60. It might be feared that the increasingly low share of the population probated after 1740 went hand-in-hand with increasing social bias, with only the wealthiest estates still being probated. Indeed, Greg Clark has recently built on this assumption to ‘explain away’ the eighteenth-century consumer revolution as a ‘statistical artifact’ of the probate evidence.⁴⁹ However, increasing social bias was not evident in our inventory sample, with average wealth levels being comparable in the pre- and post-1740 subsets of inventories, and the difference in wealth distributions between the two subsets being statistically insignificant.⁵⁰ Nor did the pre- and post-1740 inventories differ in the level of detail with which goods and rooms were recorded. We therefore felt justified to treat the 1700–60 dataset as one sample of comparable inventories.

So, what does this dataset tell us about by-employment incidence in the chosen area and time period? As discussed, agricultural households engaging in manufacturing activities have received most attention in the qualitative literature on by-employments. However, a quantitative analysis of farmers’ inventories does not appear to justify this attention for the region and period researched here. As Table 5 shows, less than one in six farmer’s inventories showed fairly strong to indisputable signs of manufacturing by-employments. This is in line with the low secondary sector by-employment incidence amongst agricultural households found by Overton *et al.* for Cornwall and Kent, included in Table 1 above.

This low figure is not caused by the inventories’ lack of detail, leading to by-employment indications being missed. Unlike the case of spinning, discussed above, manufacturing by-employment incidence was not significantly higher amongst the sub-set of particularly detailed inventories: 17 versus 16 per cent. Neither is it caused by ‘trace-poor’ secondary sector occupations, since their incidences were upwardly corrected, as discussed in section I. Also, by far the most common by-employment amongst farmers was weaving, representing 74 per cent of all manufacturing by-employments, and weaving was not a ‘trace-poor’ occupation. In other words, the inventories provide little support for the prevalence of manufacturing by-employments amongst agricultural households that is suggested by much of the qualitative literature. Robert Malcolmson contended that in eighteenth-century Lancashire, ‘the term “yeoman” often indicated a landholder who divided his time between farming and weaving’.⁵¹ In fact, of the 27 suitable yeoman’s inventories from that county, only three (one in nine)

⁴⁹ G. Clark, ‘The consumer revolution: turning point in human history, or statistical artifact?’ (2010), [http://www.econ.ucdavis.edu/faculty/gclark/papers/Consumer Revolution.pdf](http://www.econ.ucdavis.edu/faculty/gclark/papers/Consumer%20Revolution.pdf).

⁵⁰ The average inventory total of the pre-1740 inventories was £92.62 compared to £90.68 for the 1740–60

inventories. A Student’s t-test showed no statistically significant difference in the wealth distributions of the two sub-sets: $t(509) = 0.08$, $p = .94$.

⁵¹ R. W. Malcolmson, *Life and labour in England, 1700–1780* (1981), p. 39.

TABLE 5. Numbers and shares of farmers' inventories by strength of indication for manufacturing by-employment

<i>Occupation</i>		<i>Strength of indication for manufacturing activities</i>			<i>All inventories</i>
		<i>Strong to indisputable</i>	<i>(Very) weak</i>	<i>None</i>	
Husbandmen	Number	10	12	36	58
	Share (%)	17	21	62	
Yeomen	Number	9	18	36	63
	Share (%)	14	29	57	
All farmers	Number	19	30	72	121
	Share (%)	16	25	60	

Note: The number of farmers' inventories in this table (121) is lower than the total number of farmers' inventories in the dataset (145) because only those inventories were included which were sufficiently detailed for by-employment incidence counts and for which the principal, stated occupation of the decedent (i.e. agriculture) was clearly confirmed in the livestock, tools and rooms listed in the inventory. See main text for background.

Source: Probate inventory dataset.

showed clear signs of weaving. For husbandmen, the share involved in weaving was slightly higher, but still only one in every six.

Nor can labourers restore the impression of ubiquitous by-employments amongst agricultural households. First, there were simply not enough of them. Even if all labourers in the region were agricultural labourers – which is unlikely, as discussed below – they would have constituted no more than a third of all agricultural households, as the parish records counts in Table 3 showed. Second, the inventory evidence suggests that by-employment was limited for them as well. Determining by-employment from labourers' inventories is difficult. The problem is that the term 'labourer' is ambiguous with regards to occupational activity. Although it is clear that a large majority of labourers in early modern England would have been active in agriculture, this is not true for all of them. The majority of labourers not employed in agriculture would have been active in manufacturing, primarily in the building industry.⁵² Therefore, a labourer's inventory with evidence of carpenter's or masonry activities may have been left by a by-employed agricultural labourer, but also by a building labourer with no by-employment at all. Nevertheless, it is possible to obtain a very rough impression of labourers' by-employment, by cross-tabulating the data from labourers' inventories according to the indications of manufacturing and agricultural activities (Figure 2).

Only two small groups of inventories in Figure 2 potentially indicate manufacturing by-employment in the household of an agricultural labourer. First, if an inventory shows signs of both agricultural and manufacturing activities, the household must have been by-employed. Although the 'principal occupation' is still unclear, such an inventory *may* refer to an agricultural household by-employed in manufacturing. Second, if an inventory

⁵² O. Saito and L. Shaw-Taylor, 'The sectoral allocation of male labourers: A solution to the problem for England and Wales, 1700–1911', forthcoming.

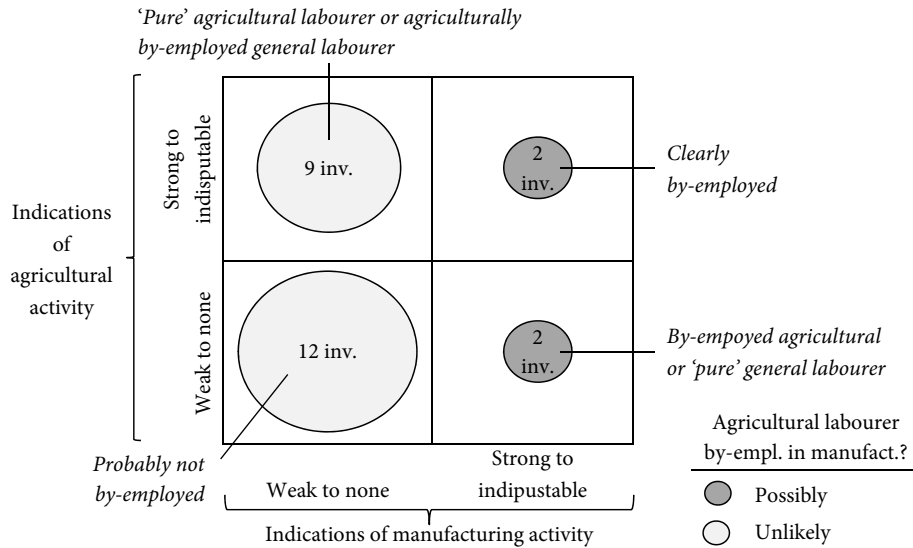


FIGURE 2. By-employment indications in labourers' inventories; a best-estimate approach

Note: The term 'general labourer' has been used here to indicate labourers who performed wage work in the manufacturing trades rather than in agriculture.

Source: Probate inventory dataset.

shows indications of manufacturing but not of agricultural work, it may have been left by a non-agricultural labourer (without by-employment), or by an agricultural labourer whose household was by-employed in manufacturing. Both of these cases *may*, therefore, indicate an agricultural household by-employed in manufacturing. Only four such inventories were found in the dataset. If we, not unreasonably, assume that about 80 per cent of the labourers' inventories in the dataset were those of agricultural labourers, this would suggest that, at most, 20 per cent of those should be identified as by-employed in manufacturing. Given the low number of available labourers' inventories, the statistical significance and arithmetical precision of this simple exercise is limited. Nevertheless, it strengthens the impression of a surprisingly low incidence of manufacturing by-employment amongst agriculturalists' inventories.

This low by-employment incidence amongst labourers contrasts strongly with Everitt's figures, presented in Table 1. Everitt's results refer to a much wider geographic area and an earlier time period, which might explain the difference. Furthermore, his count includes spinning whereas ours does not. There is, however, another and probably more important reason for the difference: Everitt's calculations of by-employments amongst agricultural labourers are defective, as one of the present authors has noted elsewhere.⁵³ Unable to find a sufficiently large sample of inventories left by men who were explicitly described as labourers, he supplemented his sample by assuming that inventories with a total value below a certain threshold and no stated occupation referred to agricultural labourers. But, it is likely that

⁵³ Shaw-Taylor, 'Cottage economy', pp. 20–2.

TABLE 6. Shares of manufacturers' households engaging in gainful activities other than the 'stated' occupation of the male decedent

	Share of inventories (%)		
	All manufacturers (224 inventories)	Rural manufacturers (180 inventories)	Urban manufacturers (44 inventories)
By-employed in agriculture (i.e. engaged in substantial agricultural activities)	59	67	27
Marginally involved in agricultural activities	$\frac{6}{65}^+$	$\frac{6}{73}^+$	$\frac{7}{34}^+$
By-employed in manufacturing (i.e. substantially engaged in additional manufacturing activities)	15	13	20

Note: The by-employment incidences listed in this table are based on inventories with fairly strong to indisputable indications of agricultural or (additional) manufacturing activities. The number of manufacturers' inventories in this table (224) is substantially lower than the total number of manufacturers' inventories in the dataset (373) because only those inventories were included which were sufficiently detailed for by-employment incidence counts and for which the principal, stated occupation of the decedent was clearly confirmed in the assets and rooms listed in the inventory. See main text for background.

Source: Probate inventory dataset.

these inventories would in fact refer mainly to secondary sector workers, making it entirely unsurprising that so many of the selected inventories showed signs of manufacturing.

The picture is very different for manufacturers' inventories. Table 6 presents the results of the analyses of households for which the principal occupation of the deceased lay in the secondary sector. By-employments in (other) manufacturing occupations appear to have been infrequent – indeed, the numbers are even lower than those for the farmers' inventories. But agricultural by-employment does appear to have been prevalent, at least amongst inventoried households. Sixty-seven per cent of the rural manufacturers' inventories showed clear signs of agricultural activities of sufficient scale to rightly call them agriculturally by-employed. A further six per cent listed marginal agricultural assets, that is below the '£3 or one cow' cut-off point for 'true' by-employment, discussed earlier. Less than 30 per cent of all rural manufacturers' inventories showed no sign of any agricultural activities at all. Here, then, we replicate the high incidence of agricultural by-employment in inventories that were derived by other historians from the probate record, as displayed in Table 1. Of course, agricultural assets in male inventories do not necessarily indicate *individual* male by-employment, as the farming may have been largely or entirely carried out by the women and children of the household. As always, the figures in Table 6 are correctly interpreted as upper limits. Still, they at least demonstrate the distinct *possibility* of substantial agricultural by-employment amongst men in the early eighteenth century.

The type of principal manufacturing occupation appears to have had some influence on the presence of by-employment. Clear indications of agricultural by-employment were found in around half the shoemakers', millers', and tailors' inventories, compared to more than 80 per cent of tanners' inventories, the most by-employed occupation. Arguably more important than

TABLE 7. Comparison of average agricultural assets of farmers' and agriculturally by-employed, rural manufacturers' inventories

		<i>Yeomen's and husbandmen's inventories</i>		<i>Agriculturally by-employed rural manufacturers' inventories</i>	
		<i>Mean values</i>	<i>Median values</i>	<i>Mean values</i>	<i>Median values</i>
Numbers	Cows	6.4		3.2	
	Maturing cattle ^a	2.5		0.9	
	Calves	1.6		0.6	
	Bulls and oxen	0.3		0.0	
	All cattle ^b	11.1	8.0	4.8	3.0
	Horses	2.1	2.0	1.0	1.0
	Swine	0.9	–	0.7	–
	Sheep	3.0	–	2.4	–
Values	All livestock ^c	£31.46	£20.94	£15.27	£9.71
	Crops	£7.67	£2.55	£2.65	£0.35
	Pastoral produce ^d	£4.11	–	£0.71	–
	Animal fodder, straw	£4.28	£2.00	£2.06	£1.00
	All agricultural assets ^e	£47.52	£31.23	£20.69	£12.28

Notes:

^a Heifers, stirks, etcetera.

^b This figure differs marginally from the sum of the individual cattle categories because for some inventories, the latter were not available

^c The value of the listed livestock categories, plus those of poultry and bees

^d Cheese, butter, milk, dung, wool, etcetera

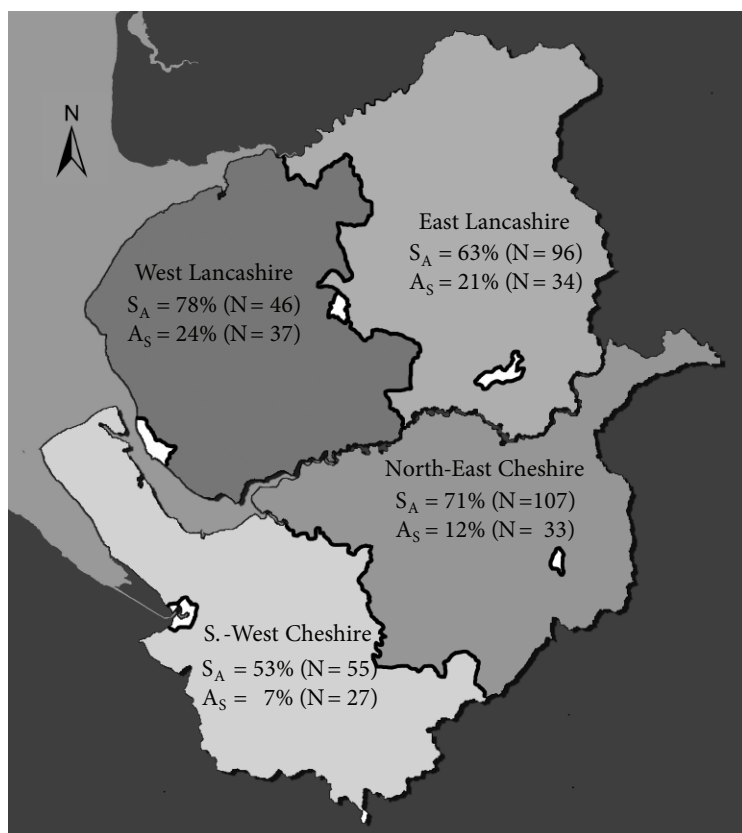
^e Excluding the value of machinery, tools, and agricultural real estate (leases). Mean values add up, but median values do not (as a consequence of their statistical nature).

Source: Probate inventory dataset.

these differences, however, is the conclusion that agricultural by-employment is frequently found in inventories for *all* secondary sector occupations.

The scale of agricultural activities varied greatly from one by-employed manufacturer's inventory to another. However, the average number and value of agricultural assets listed in such inventories were quite considerable, as Table 7 demonstrates. The average rural, by-employed manufacturer's inventory listed nearly five heads of cattle. And the combined value of all agricultural assets in that inventory equalled 44 per cent of the average farmer's inventory. Taken at face value, the inventory evidence suggests that agricultural by-employment was not only prevalent amongst manufacturers' households, but was also, on average, quite sizeable.

As stated above, our sample, aimed at obtaining an impression of the overall incidence of by-employments for the entire Chester probate jurisdiction, is not ideal for a comparison with existing studies touching on the issue of by-employments in the area. These studies are typically restricted to one or a few townships, corresponding to only a handful of inventories in our sample, thus making a direct comparison rather difficult. Nevertheless, the sample is big



MAP 2. Cross-sectoral rural by-employment incidence in the probate sample divided into four sub-regions.

Notes: S_A stands for agricultural by-employment incidence amongst secondary sector inventories, whilst A_S indicates the incidence of by-employments in the opposite direction, and N equals the number of inventories per sector and sub-region. The large towns in the area, depicted in white, were excluded from this (rural) analysis. Contrary to other analyses in this article, inventories with weak or no indications of the stated occupations in the goods and rooms listed were included here, to ensure the largest possible sub-samples. As explained in the main text, this had negligible influence on the results of the calculations.

Source: Probate inventory dataset.

enough for division into a number of sub-regions. This has been done in Map 2, demonstrating that by-employment incidence was not uniform across the inventory sample's geography.

As Map 2 shows, by-employment in both cross-sectoral directions was lowest in south-west Cheshire. Interestingly, farmers in this region held large cattle herds for dairy farming, averaging 12 adult cows and six other beasts (heifers, calves, and male animals). These 18 heads of cattle compared to nine in north-east Cheshire and west Lancashire, and to less than five in east Lancashire. Their large dairy herds may simply have occupied south-west Cheshire farmers day- and year-round, minimizing the time left for by-employments. Conversely, secondary sector workers 'dabbling' in a bit of agriculture on the side may have found it difficult to compete with these commercial dairy farmers, who were producing cheese for the London market.

Foster's work on the Warburton and Leicester estates is geographically located in Cheshire's north-eastern region (Map 2). In a study of 120 inventories from 1560–1646, he found that almost all of them provided evidence of agricultural activities.⁵⁴ Although in our inventory sample, agricultural by-employment amongst secondary sector inventories was high in this area, nearly one in three of them were judged as providing no indication of substantial agricultural activities. This suggests that by-employment incidence may have decreased during the seventeenth century. Again, an increase in the intensity of dairy farming may be part of the explanation; Foster found that herd sizes grew during the seventeenth century, reaching an average of about ten around 1700 – similar to the nine heads of cattle per farmer's inventory in our sample for this area of Cheshire.⁵⁵

Of the four areas in Map 2, the one which has received most attention from historians is east Lancashire. Indications of agricultural by-employment were fairly frequent amongst our secondary sector inventories from this area, which is in agreement with what historians who examined smaller regions within this area have also found for the early eighteenth century, such as Tupling for the Forest of Rossendale, in Whalley parish, Blackburn hundred, and Fishwick for Rochdale, in Salford hundred. A comparison with Ironfield's estimates for Chipping, in Blackburn hundred, displayed in Table 1, suggests that cross-sectoral by-employments may possibly have declined somewhat in the 50 years that divide our sample from hers – but with only 14 inventories, her inventory sample is too small to be sure. Comparing our results to those of Swain, who studied Colne and the Forests of Pendle and Trawden, all in Whalley parish, in north-east Blackburn hundred, provides stronger evidence for a possible decline over time. As displayed in Table 1, approximately half of Swain's farmers' inventories displayed clear signs of weaving for the 1558–1640 period. This suggests that such by-employments may have considerably decreased in importance over the 100 years that separate Swain's and our inventories. As discussed, cattle herds were actually quite small in this area, so dairying squeezing out by-employments is unlikely to explain the decline. Perhaps the explanation should be sought in the level of sophistication which the manufacturing of textiles had achieved in this area by the eighteenth century, leaving little room for such activities to be undertaken 'merely' as a by-employment. However, if that was the case, one would expect that, vice versa, relatively few local weavers would have been by-employed in farming, and this was not the case: with 67 per cent by-employed, they were in line with the overall average. An alternative explanation for the difference between Swain's and our figures is put forward in the next section.

When studying the geographic distribution of cross-sectoral by-employments, a local 'driver' of interest is population density. After all, the lower the number of people per acre, the more room for agricultural by-employments. As Table 6 indicates, the inventories did indeed exhibit a clear urban-rural divide, with agricultural by-employment in urban inventories unsurprisingly much lower than in rural ones. More insight into the relationship between population density and agricultural by-employment can be gained by using Tony Wrigley's recent work on the eighteenth-century populations of the ancient hundreds.⁵⁶ In Figure 3, hundreds of similar population densities were grouped, and for each of these groups, the

⁵⁴ Foster, *Capital*, pp. 110–36.

⁵⁵ C. F. Foster, *Cheshire cheese and farming in the*

north west in the 17th and 18th centuries (1998), pp. 13, 29.

⁵⁶ Wrigley, *Early censuses*, Table 4.1, pp. 104–5.

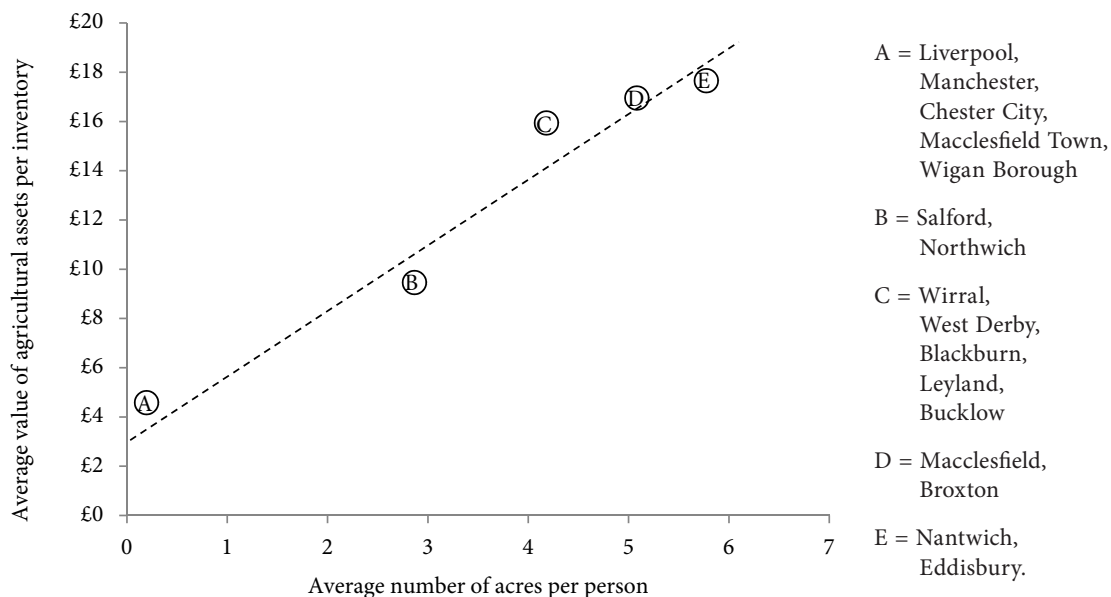


FIGURE 3. The relationship between population density and the scale of agricultural activities in manufacturers' inventories

Sources: Probate inventory dataset; Wrigley, *Early censuses*, pp. 104-5.

average value of agricultural assets listed in manufacturers' inventories was determined. As the figure shows, a clear relationship indeed existed between local population density and the scale of agricultural activities of the population of inventoried manufacturers.

III

In the previous section, inventory evidence was essentially taken at face value. But, as discussed, probate inventories are biased towards wealthier decedents, which leads to a degree of exaggeration of by-employments, particularly of capital intensive ones such as farming.⁵⁷ Such by-employments positively affected the value of estates, which were therefore more likely to be inventoried. Ann Kusmaul found that the 11 per cent of nailers and locksmiths in a seventeenth-century Staffordshire village who left inventories all possessed cows and, from this, quite reasonably, inferred that the other 89 per cent were probably 'cow-less'.⁵⁸ But there is no need to be content with such speculations, however plausible they may be. The inventories themselves, if probed deeply enough, are remarkably revealing as to the degree in which an inbuilt wealth bias affects estimates of by-employment size and incidence.

Several measures for a household's wealth can be derived from inventories: domestic wealth, that is the combined value of all domestic, household goods, including cash; material wealth,

⁵⁷ For an earlier discussion of this point see Shaw-Taylor, 'Cottage economy', p. 9.

⁵⁸ A. S. Kusmaul, *A general view of the rural economy of England, 1538-1840* (1990), p. 10.

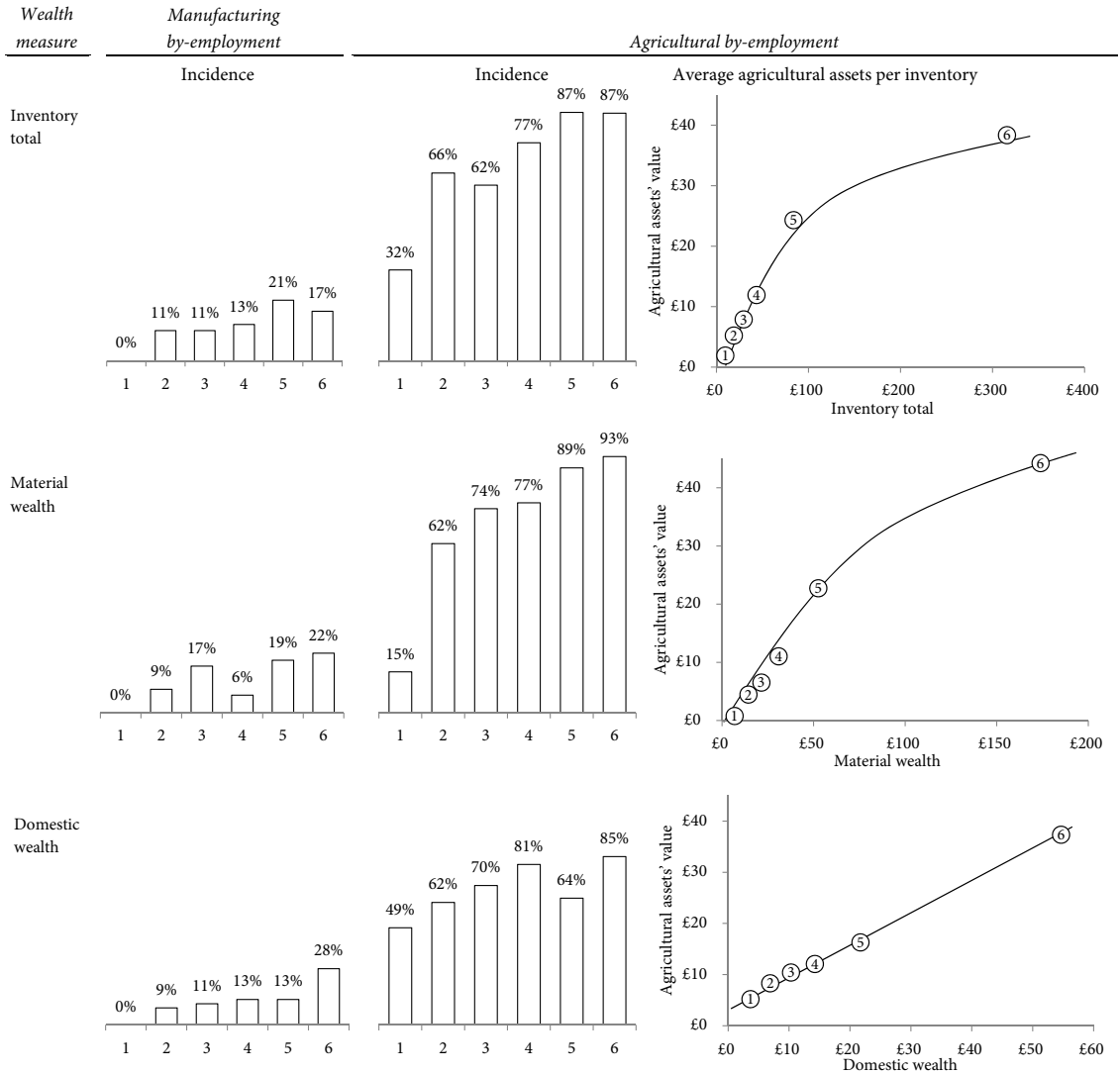


FIGURE 4. The relationship between wealth and by-employments in probate inventories of rural manufacturers

Note: To create these graphs, the set of rural manufacturers’ inventories was ordered in sequence of increasing wealth and subsequently divided into six subsets of equal size.

Source: Probate inventory dataset.

that is the combined value of all material goods, including work-related ones; and the inventory total, which includes leases and debts owed to the decedent. A discussion on the appropriateness and reliability of these wealth measures can be found in the appendix to this article. However, Figure 4 clearly shows that, whichever wealth measure is employed, inventories exhibit a strong, positive correlation between by-employment incidence and size on the one hand, and decedents’ wealth on the other. The wealthier the inventoried rural manufacturer,

the more likely he was to have been by-employed and the more sizeable that by-employment is likely to have been.

Indeed, the differences in by-employment incidence between inventories of different wealth levels are quite remarkable. Inventoried manufacturers in the upper third in wealth were up to three times as likely to be agriculturally by-employed as those in the lower third, and up to four times as likely to be employed in manufacturing. If anything, Figure 4 presents an even more striking picture for by-employment size: the wealthiest third of inventoried manufacturers owned four to ten times the agricultural assets of the poorest third. Since the wealthy are over-represented in the probate record, so too are the by-employed.

The conclusion from these unmistakable correlations is clear: for the purposes of by-employment calculations, probate inventories cannot be taken at face value. The by-employed were considerably wealthier than the non-by-employed. This accords neatly with an observation made by Defoe on the textile industry of the contemporary West Riding, where 'every manufacturer generally keeps a cow or two, or more, for his family' but amongst whom 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'.⁵⁹ It was the wealthier manufacturers who were agriculturally by-employed, whilst the poor workmen were engaged in their principal occupation only. The inherent wealth bias in the probate record thus leads to the by-employed being (potentially significantly) more likely to leave an inventory than the non-by-employed. In other words, probate inventory evidence exaggerates the incidence and size of by-employments.

The correlation between wealth and by-employment incidence may also help provide an explanation for the difference between Swain's and our figures for farmers from north-east Lancashire, discussed above. Swain, regrettably, only had access to so-called supra inventories, that is, inventories of estates of £40 or more in value. Corrected for inflation, £40 in 1600, the midpoint of Swain's time period, corresponded to about £50 in 1722, the average year in which 'our' farmers were probated.⁶⁰ Secondary sector by-employment amongst the group of farmers' inventories with at least £50 in total wealth was more than twice that of the other, poorer farmers in our sample. It is likely, therefore, that the difference between Swain's and our figures is at least partially the result of the excessive wealth bias of the supra inventories on which Swain was forced to base his analyses.

IV

If it were possible to estimate how much the probate record exaggerates by-employment incidence, it would be possible to correct for it, thereby arriving at more reliable estimates. What is required is independent data against which to check the reliability of the picture painted by the probate dataset. In this section we attempt to do just that, using estimates of the agricultural assets of early eighteenth-century Lancashire and Cheshire as the required independent data.

⁵⁹ D. Defoe, *Tour thro' the whole island of Great Britain* (1742) used in the edition by G. D. H. Cole (2 vols, 1968), II, p. 602.

⁶⁰ Inflation correction based on Robert C. Allen,

'Consumer price indices, nominal/real wages and welfare ratios of building craftsmen and labourers, 1260–1913', <http://www.iisg.nl/hpw/allen.rar>.

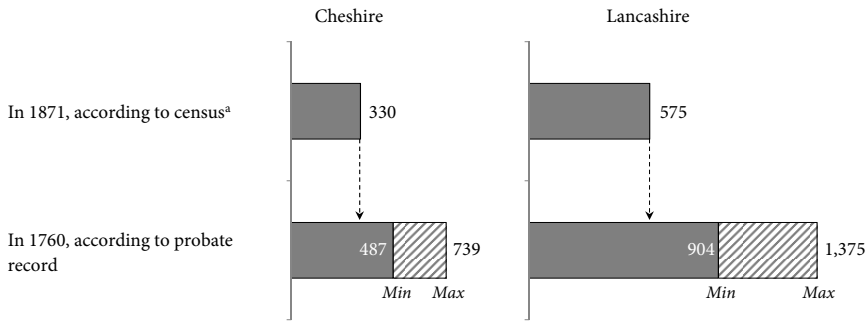


FIGURE 5. Grassland surface in 1760 as implied by the probate record compared to agricultural census figures 1871 (in '000 acres)

Notes: ^a Includes an estimated 15,000 acres of 'rough grazing' for Cheshire and 90,000 acres for Lancashire, based on the 1901 agricultural census. For the assumptions underlying the probate-record-implied figures, see main text. Sources: Probate inventory dataset; agricultural censuses for 1871 and 1901; Wrigley, *Early censuses*; Wrigley and Schofield, *Population history*; Holland, *Cheshire*; Wedge, *Palatine of Chester*; Holt, *Lancaster*; Rothwell, *Lancashire*; 'Occupational Structure' project (parish record counts for Cheshire and Lancashire).

As a first step, we have calculated the agricultural land area and livestock numbers that would have had to exist if the inventories *were* representative. In 1760, there were an estimated 110,000 men above the average age of marriage in Lancashire and Cheshire, which may serve as a proxy for the number of male householders who could, in principle, have left an inventory.⁶¹ If one subtracts one per cent for 'men of leisure' and another for men on poor relief, this leads to an estimated 108,000 relevant 'male-led' households, including one-person households of unmarried men. Combining this with the occupational sector shares deriving from parish baptism registers, and with average livestock numbers per occupation as suggested by the probate inventories, this implies a total of 432,000 mature and maturing cattle, 67,000 calves, 96,000 horses, 181,000 sheep and 49,000 swine in the two counties combined. To feed these animals, it can be calculated, would have required a total grassland area of between 1.4 and 2.1 million acres.⁶²

In Figure 5, this figure is broken down by county and compared to the amount of agricultural land available in 1871, the year of the first truly reliable agricultural census.⁶³ Actual cultivated surfaces in 1760 are likely to have been significantly smaller than those in 1871 when, driven by spectacular population growth, much remaining barren land had been brought under cultivation. Indeed, this process continued after 1871: between that year and 1891, the total

⁶¹ Calculation based on regional population figures from E. A. Wrigley, 'English county populations in the later eighteenth century', *ECHR* 60 (2007), pp. 35–69, and for the relevant shares of those figures from Tables A.3.1 and 7.26 and 7.10 in E. A. Wrigley and R. S. Schofield, *The population history of England, 1541–1871: A reconstruction* (1981).

⁶² Assumptions for grassland requirements per livestock type: 2½–3½ acres for mature cattle and heifers, ½–1 acre for calves, 2½–5 acres for horses, and 0.2–0.3

acres for sheep, as derived from Holland, *Cheshire*; T. Wedge, *General view of the agriculture of the county palatine of Chester* (1793); Holt, *Lancaster*; W. Rothwell, *Report of the agriculture of the county of Lancashire* (1849).

⁶³ Ministry of Agriculture, *Agricultural statistics for 1871 and 1891*, http://www.visionofbritain.org.uk/data_theme_page.jsp?u_id=10061325&data_theme=T_LAND, with the original data transcribed by Robert Schwarz and David Gatley.

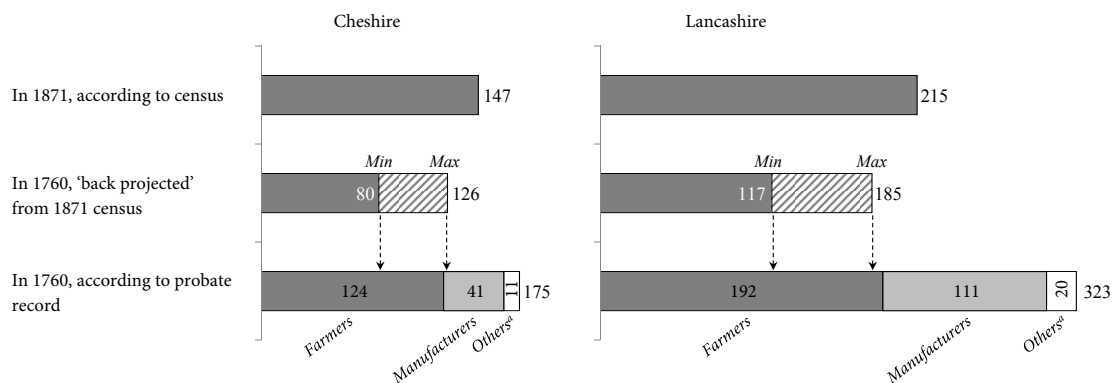


FIGURE 6. Cattle numbers as implied by the probate record compared to census back projections (in '000 heads of cattle of all types).

Note: ^a Labourers and tertiary sector workers. No tertiary sector inventories were actually present in the dataset. Therefore, an assumption had to be made as to their agricultural by-employments. Given the more urban nature of tertiary sector occupations, a by-employment incidence of only one quarter of that of manufacturing households was assumed. Because of the relatively small number of tertiary sector households, however, any variation of this assumption has only a marginal effect on the calculations.

Sources: Probate inventory dataset; agricultural censuses for 1871; Wrigley, *Early censuses*; Wrigley and Schofield, *Population history*; Turner, 'Counting sheep'; 'Occupational Structure' project (parish record counts for Cheshire and Lancashire).

grassland surfaces in the two counties expanded by 19 per cent, with less than a fifth of this expansion generated by arable land being converted to pasture. But, as is clear from Figure 5, the inventory projections vastly exceed even the 1871 figures. The probate record must have been severely biased towards high livestock numbers.

We have also attempted to test inventory projections of livestock numbers more directly, without the intermediary of required grazing acreages per animal. No reliable contemporary estimate of livestock numbers exists. The earliest reliable figures stem from the late nineteenth-century agricultural censuses, but there is a way to estimate figures for earlier dates. Michael Turner has collected and interpreted county livestock data that were accumulated around 1800 to estimate Britain's readiness for the war with France.⁶⁴ The counties for which such livestock overviews exist do not, unfortunately, include Cheshire and Lancashire, but one can use the general trend observed in the eight central and southern English counties for which such data *do* exist as a guide to prospective developments in north-west England.

In Turner's eight counties, cattle numbers increased 21 per cent between 1800 and 1871, that is, at 0.28 per cent per annum. This allows one to estimate a fairly safe range for possible cattle numbers in Cheshire and Lancashire, c.1760, by assuming that these two countries experienced between half and twice the above growth rate between 1760 and 1871. In other words, a lower boundary was calculated by backwardly extrapolating a growth of 0.56 per cent per annum from the 1871 census figures, whilst an upper boundary was determined in the same manner,

⁶⁴ M. Turner, 'Counting sheep; waking up to new estimates of livestock numbers in England c.1800', *AgHR* 46 (1998), pp. 142–61.

using a growth rate of 0.14 per cent. In Figure 6, the inventory-implied cattle numbers are compared to the thus calculated lower and upper boundaries. Again, it is clear that the inventory projections far exceed likely actual numbers.

What is evident, then, from Figures 5 and 6, is that the inventories vastly exaggerate cattle ownership; indeed, the farmers' subtotals alone exceed the likely range of contemporary cattle numbers. This confirms the conclusions put forward in the previous sections: inventories are far from representative of the general working population and must significantly overstate agricultural by-employment amongst secondary-sector workers.

An attempt can now be made to estimate the degree to which inventories exaggerate by-employment. It is evident from the above that high-wealth, cattle-rich inventories are over-represented in the inventory dataset. To make the record of probate inventories more representative of the actual contemporary household population requires that one weights low-wealth inventories more heavily than high-wealth inventories. Figure 6 and Table 3 provide data that allow this 'reweighting' to be effected in a controlled, meaningful way. Figure 6 provides the boundaries between which the cattle numbers resulting from the reweighted inventory dataset should lie. Table 3 provides the necessary information for the difference in strength of the reweighting for farmers, manufacturers and labourers; as discussed, this table demonstrates that farmers were about three times more likely than secondary sector workers to leave an inventory, and roughly 20 times more so than labourers.

A straightforward – though admittedly crude – way to construct a reweighted inventory dataset consists of ranking the inventories in terms of wealth, dividing this ranked series into sub-sets, for example, the poorest one third and the wealthiest two thirds of inventories. Subsequently, the 'poor' subset is given a higher weight in the weighted average. By varying both the 'cut-off point' between the two subsets and their relative weights, reweighted inventory sets can be identified that meet the boundary conditions set by Table 3 and Figure 6. That is: they correct for the approximately three-to-one underrepresentation of manufacturers in the probate record and they lead to a realistic estimate of contemporary cattle numbers.⁶⁵ For example, suppose the cut-off point is, as suggested above, laid at one third of the dataset of inventories. A reweighting that 'works' for that cut-off point is one in which the poorest third of farmers is given a weight of three and the poorest third of manufacturers a weight of thirteen, with the middle and wealthiest third of the inventories in both sectors given a weight of one. This multiplies the number of manufacturers' inventories with the desired factor of approximately three relative to the reweighted farmers' inventories, and leads to a projected number of 295,000 heads of cattle for the two counties combined, just below the upper boundary set by Figure 6. By varying the cut-off point and weights, other reweighted sets that also 'work' can be determined. Each of the resulting reweighted datasets is more representative of contemporary reality than the original, unweighted set of inventories. They thus each provide a more realistic basis for assessing by-employment amongst contemporary households than the 'raw' inventory data, leading to a range of possible by-employment incidence values, as displayed in Table 8.

⁶⁵ To express the described reweighting procedure more mathematically: for each sector, the $x\%$ poorest inventories are weighted with a factor y (>1) compared to the other inventories, with y differing per occupational sector, and x and y chosen thus that (a) resulting cattle numbers lie between the boundary values displayed in Figure 6 and (b) total multiplication per sector is in line with Table 3, that is, $x\% \cdot y_{\text{farmer}} + (1-x\%) = \frac{1}{4} \cdot [x\% \cdot y_{\text{manufacturer}} + (1-x\%)]$.

TABLE 8. Rural by-employment incidence, as derived from probate inventories, before and after 'reweighting'

<i>By-employment</i>	<i>Rural household</i>	<i>Incidence derived from inventories (%)</i>	
		<i>'Unweighted' set</i>	<i>'Reweighted' set</i>
Agricultural	Manufacturer	67	23–37
Manufacturing	Farmer	16	6–14
	Manufacturer	13	4–9

Sources: Probate inventory dataset; model calculation, as described in the main text.

The model calculation described above is crude. However, an important conclusion can safely be drawn from Table 8: actual contemporary rural by-employment incidence must have been much lower than suggested by the (unweighted) inventory record. For early eighteenth-century Cheshire and Lancashire south of Ribble, it would appear that the probate record exaggerates by-employment incidence amongst farmers and rural manufacturers by a factor of two to three.

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It can thus be concluded that rural by-employment was not nearly as prevalent as has generally been assumed in Stobart's 'first industrial region'. Thirsk argued that manufacturing by-employment was 'almost common form' for early modern pastoral farmers, but in the probate jurisdiction of Chester, one of the most pastoral regions of contemporary England, only a very small minority of contemporary households and individuals appears to have been by-employed in manufacturing.⁶⁶ Agricultural by-employment was more common, but, again, not nearly as common as probate inventories would lead one to believe when taken at face value; probably only around one in three to four rural manufacturers' households enjoyed more than marginal income from agriculture.

Although the inventory sample analysed in this research was limited in place and time, a second conclusion can be drawn from it which goes well beyond the data's geographical and temporal bounds: that probate inventories, *the* source of systematic and quantitative assessment of by-employments, greatly exaggerate the phenomenon. The cause of this exaggeration, namely the over-representation of the asset-rich, was common to the probate record of the whole of England, throughout the early modern period. This means that by-employment estimates like those presented in Table 1, if they are to be interpreted as representative of the contemporary local labour force, would all appear to be in need of significant downward correction, perhaps by as much as a factor two or three.

It may be no coincidence then that historians have so rarely discussed individual by-employment after the mid-eighteenth century. This is, after all, precisely the moment when probate inventories, with their misleading impression of the ubiquity of by-employments, dry up as a historical source.

⁶⁶ Thirsk, 'Agriculture and social change', p. 210.

Appendix

Inventories as a source of wealth estimates

Inventories provide information on four types of ‘goods’: household goods, work related goods, financial assets, and certain forms of real estate. These can be combined into several measures of the deceased’s wealth: total inventory value, material wealth and domestic wealth. Each of these measures has its strengths and weaknesses. Domestic wealth, that is, the combined value of all household goods, is in many ways the most accurate and most useful wealth measure. It captures what, one might argue, the other inventory goods are ‘merely’ there to provide: the household’s standard of living. It is also the only measure that does not itself contain the value of the goods directly associated with the by-employments, thus allowing for a truly independent test of the correlation between wealth and by-employment. But, as Figure A.1 shows, in general it represents only a small part of the total value of the deceased’s estate and would therefore not have been the best predictor of the likelihood that an estate was inventoried.

The inventory total is, of course, the most complete measure of the estate’s value, and therefore arguably the best predictor of an estate being inventoried. It is often used as a wealth indicator in historical analyses.⁶⁷ However, inventories are problematic sources of information for both real estate and financial items. As Margaret Spufford has argued, real estate represents ‘the major defect’ in inventories, because some forms of real estate, such as freeholds and copyholds were commonly omitted whilst others, such as leaseholds, were included.⁶⁸ The recording of financial items is equally problematic. As inventories are a record of assets, only debts owing to the deceased are recorded, not his or her financial liabilities.⁶⁹ This makes inventories incomplete and potentially misleading records of the estate’s financial position. Indeed, in the only two inventories in the dataset in which the deceased’s financial liabilities were included, these substantially exceeded the sums that others owed him.

If real estate and financial items are excluded, one is left with what Overton *et al.* have fittingly called material wealth, that is, the combined value of work-related and household assets. This too has been used as an indicator of the deceased’s wealth by historians. It could be argued that it presents a happy medium between the two previous measures, being more complete than domestic wealth and immune to the problems with financial and real estate items in inventories. It is true that some work related goods, particularly certain agricultural ones, were not always reliably recorded either. For example, for complicated legal reasons, certain agricultural assets such as grass, trees, fruit and root crops were often omitted.⁷⁰ But such exceptions are of limited importance in areas dominated by livestock farming such as the north-west of England. Furthermore, as Overton has shown by comparing probate inventories with wealth evidence from – much rarer but also more complete – probate accounts, there was

⁶⁷ For example, in Shammass, ‘Wealth distribution’, pp. 297–307.

⁶⁸ Margaret Spufford, ‘The limitations of the probate inventory’, in John Chartres and David Hey (eds), *English rural society 1500–1800: essays in honour of Joan Thirsk* (1990), pp. 139–74.

⁶⁹ Jeff and Nancy Cox have argued that even debts owing to the deceased were not always recorded, especially in the eighteenth century: Cox *et al.*, ‘Probate, 1500–1800’, p. 12.

⁷⁰ Spufford, ‘Limitations’, p. 146.

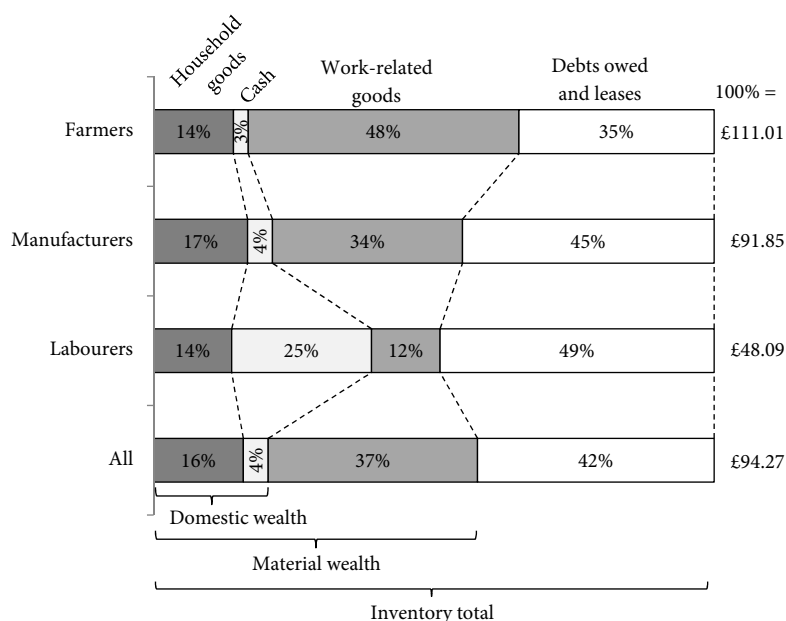


FIGURE A.1 The several inventory-derived wealth measures compared

Source: Probate inventory set.

a strong statistical relationship between the material and net wealth of households.⁷¹ In short, although all three wealth measures have their particular strengths, material wealth is probably the most useful for current purposes.

Of course, the utility and reliability of whatever wealth measure one employs also depends on the quality of the underlying valuations of individual inventory goods. Historians strongly disagree about the accuracy of these valuations, mostly based on anecdotal evidence.⁷² The only systematic analysis is Overton's, which demonstrated that inventory valuations for certain commodity goods followed market price developments quite accurately.⁷³ Also, when using the combined value of groups of inventoried items – as is the case for the three measures employed in this article – there is a danger of goods being omitted. This is problematic for goods that were sometimes included and sometimes left out. Lena Orlin has provided a list of 12 reasons why that might happen.⁷⁴ In the research for this article, the effects of such valuation problems were minimized by a combination of two measures. First, by using average values for sufficiently large sets of inventories rather than individual inventory valuations. Second, by

⁷¹ Overton *et al.*, *Production and consumption*, p. 138; M. 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. 13–14, 35.

⁷² For an overview of opinions see K. G. Sneath, 'Consumption, wealth, indebtedness and social structure in early modern England' (unpublished PhD thesis,

Cambridge, 2009), p. 130; M. Overton, 'Prices from probate inventories' in Arkell *et al.* (eds), *When death do us part*, p. 125; L. C. Orlin, 'Fictions of the early modern English probate inventory', in H. S. Turner (ed.), *The culture of capital: Property, cities, and knowledge in early modern England* (2002), pp. 54–5.

⁷³ Overton, 'Prices from probate'.

⁷⁴ Orlin, 'Fictions', pp. 64–73.

employing such values only in a relative rather than an absolute manner, limiting their use to analyses in which (sets of) inventories are compared to others. These two measures are only effective, of course, if the sample sets have no systematic bias with respect to valuations. In the sets used in this research that was the case. There is, for example, little reason to fear that farmers' inventories were more susceptible to low valuations of household goods than weavers' inventories, or that more goods were omitted from Salford than Wirral inventories. That said, some evidence exists of a potential systematic bias in inventory valuations related to the wealth of the deceased, with goods in wealthy inventories being appraised higher than goods of the same type in poorer inventories. However, it could be argued that this is not evidence of unreliable valuations at all, as it is only to be expected that wealthier households possessed higher quality and therefore more expensive versions of the same type of item than poor ones. Furthermore, this possible defect was neutralised by comparing groups of inventories with a broad mix of wealth levels each.