By-employments and occupational structure in pre-industrial England

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Note
This paper is preliminary and should not be cited without written permission. Some of the findings and discussions presented were published in an earlier article co-authored with Leigh Shaw-Taylor in Agricultural History Review. This paper extends the AgHR article geographically and temporally, addresses a much wider range of issues, and presents/applies a number of new methodologies.

Abstract
Based on the evidence from probate inventories, by-employments have been presumed ubiquitous in pre-industrial England. However, the wealth bias in this source leads to a significant exaggeration of both incidence and size of by-employments. New estimates, corrected for wealth bias, are presented in this paper, for six English counties/regions. It is found that typically only twenty to thirty per cent of the manufacturers’ households engaged substantially in agricultural activities. By-employments in manufacturing (excluding spinning) were even (and substantially) rarer. Regional differences in by-employment incidence appear to be best explained by the relative maturity of the local manufacturing environment. It is shown that by-employments were, for the most part, of the household rather than the individual kind, that is, several members of one household engaging in different gainful activities, rather than one person having several occupations. This means that by-employments do not significantly compromise the recently published male occupational structures derived from principal-occupation-only data sources such as parish registers. It is found that by-employed households generated a significant share of their income in the by-employments, but a comparison of by-employed and non-by-employed households yields little evidence for the industrious revolution thesis. And neither does the development of household by-employment incidence over time; analyses show it is likely to have declined from the mid seventeenth century onward.

Introduction
By-employments, that is, gainful activities in addition to a person’s principal occupation, are generally presumed to have been a ubiquitous element in the socio-economic framework of early-modern England and, indeed, the Western world. Joan Thirsk contended that about half those employed in agriculture in seventeenth-century Britain were also engaged in manufacturing. 2 Fernand Braudel argued that European peasants depended on manufacturing income for sheer economic survival and that by-employments must therefore have been ubiquitous. 3 Lamenting the ‘evil day when rural industries left the countryside and returned to the towns,’ Alan Everitt used probate evidence to calculate that sixty per cent of agricultural labourers in the 1560-1640 period were by-employed in manufacturing. 4 Jack Langton has claimed that manufacturing by-employment was so widespread amongst the agricultural population that it renders the very term ‘agricultural sector’

essentially meaningless in its application to the early-modern world. Historians have also argued for the widespread existence of by-employment ‘in the opposite direction’, that is, of manufacturers with significant subsidiary income from the land. For example, Mark Overton et al calculated that nearly sixty per cent of early-modern Kentish weavers’ inventories showed signs of farming, leading them to conclude that ‘by-employment was the norm’. Many others have come to similar conclusions on the basis of probate inventory evidence. Alan Armstrong contended that even town-dwelling artisans continued to fill part of the peak demand for agricultural labour in the harvest season well into the nineteenth century.

Armstrong’s excursion into the nineteenth century notwithstanding, by-employments have usually been considered a typically pre-industrial phenomenon. It is therefore perhaps not surprising that they have been awarded an important – though often rather implicit – role in several historical theories aiming to explain the transition to an industrial society. Household by-employments feature implicitly in De Vries’s concept of an industrious revolution, in which the apparent paradox of households’ increasing ability to acquire ‘the new consumer goods’ despite stagnant hourly wages is explained by positing a growth in hours worked, by the male ‘household head’ but primarily by the increasing involvement of other, often female household members in market-oriented manufacturing. Households moved away from production for own use to production for the market, thus simultaneously producing the new consumer goods and generating the cash-income to purchase them. As De Vries stresses, female market-directed activities typically differed from the principal occupation of the male ‘household head’ – in other words: these households were by-employed. Thus, as Thirsk had put it earlier, ‘industrial by-employments heralded the development of a consumer society … [which] included humble peasants, labourers, and servants.’


In proto-industrial theory, the role of by-employments is equally central, and equally subtle.\textsuperscript{11} On the one hand, proto-industrial manufacturing depended on access to land, because this meant that rural households could provide in their own food, which reduced their costs and, thereby, allowed them to successfully compete with urban manufacturing in extra-local, even international trade.\textsuperscript{12} Households in proto-industrial regions were thus almost by definition small farmers by-employed in manufacturing – at least initially.\textsuperscript{13} On the other hand, for households in areas of above-average fertility, it made more economic sense to specialize in agriculture, producing for local consumption but also for export to urban- and proto-industrial regions. For these areas, proto-industrialisation elsewhere meant the demise of their own manufacturing by-employments. The surpluses produced in such specialized agricultural regions could, in turn, adversely affect the competitiveness of agricultural production in proto-industrial regions. Combined with growing opportunities for work in export-oriented manufacturing, this stimulated households in proto-industrial areas to shift their activities further towards manufacturing, turning them from peasants by-employed in manufacturing into artisans by-employed in farming. Indeed, Kriedte \textit{et al} have stated that only at this stage can we truly call them proto-industrial.\textsuperscript{14} It might even lead to a portion of such households specialising in industry altogether. This complex of changes ‘prepared the ground for even greater changes later, namely the factory system and modern industrialisation’.\textsuperscript{15}

Indeed, local stimuli for by-employments have been perceived as explaining the historical geography of these ‘even greater changes’. 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’. These men were not only the first to become involved in early-modern cottage industry but, aiming to protect their local dual economy, also the first to experiment with mechanisation and steam-powered mine pumps.\textsuperscript{16} Franklin Mendels contended that proto-industrialisation 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. This seemingly beneficial circumstance cost Southern Europe dear in terms of very late industrialisation.\textsuperscript{17}

\textsuperscript{12} Kriedte \textit{et al}, \textit{Industrialization before Industrialization}, p. 23.
\textsuperscript{13} Indeed, Mendels has stated that ‘the most significant aspect of Protoindustrialization concerns the participation of peasant populations in handicraft production for the market’, see: Mendels, ‘Proto-Industrialization: Theory and Reality: General Report’, ‘A’ Themes, Eighth International Economic History Congress, Budapest, 1982, p. 79.
\textsuperscript{14} Kriedte \textit{et al}, \textit{Industrialization before Industrialization}, p. 25.
\textsuperscript{16} Thirsk, ‘Horn and Thorn in Staffordshire: The Economy of a Pastoral County’ in her \textit{Rural Economy}, pp. 170, 172-3, 181.
\textsuperscript{17} Mendels, ‘Seasons and Regions’, pp. 180-1, 197.
My personal interest in by-employments was the result of my involvement in the Cambridge Group’s ongoing ‘Occupational Structure of Britain 1379-1911’ project. In this project, much progress has been made in establishing the composition of England’s eighteenth- and nineteenth-century labour force, in particular of its male component; first results were recently published in the new edition of the Cambridge Economic History of Modern Britain. The eighteenth- and early-nineteenth-century components of these results are based on parish baptism registers. Occupational information in these sources is virtually limited to men’s principal occupations. However, if by-employments were really as ubiquitous and important as argued by the historians above, an early-modern occupational structure based on main employments only may not adequately represent the economic activities of contemporary men. John Swain has contended that ‘the exceptionally high degree of participation in industry is largely hidden if undue reliance is placed on occupational data’ in early-modern Lancashire. 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’. Indeed, the single question posed at every seminar and conference at which the results of the ‘Occupational Structure’ project have been presented is whether results based on counts of principal occupations are compromised by the ubiquity of by-employments. A key goal of the research underpinning this paper was therefore to evaluate the need for, and quantify the size of a ‘by-employment correction’ on the existing principal-employment-only estimates of the male occupational structure.

Despite their obvious importance in the socio-economic historiography of the early-modern West, the evidence for the presumed ubiquity of by-employments is not particularly strong. This becomes clear when we revisit the historians discussed above. Thirsk’s estimates are methodologically non-transparent. Braudel’s argument is a traditional one, which presumes that income from manufacturing provided vulnerable peasant households with a level of economic protection through differentiation of income, as well as a means to utilize spare hours in the slack periods of the farming year and day. Such an argument sounds intuitively compelling but there is little actual evidence for its validity. For example, ‘the seasonality of farming often coincided with the seasonality of manufacture’. And it is not obvious that manufacturing incomes would have provided an effective buffer against economic distress in the agricultural sector, since economic crises, then and now, have a tendency to hit all sectors simultaneously. As Leigh Shaw-Taylor has shown, Everitt’s calculations are simply wrong. Everitt assumed all inventories with a total value below a certain threshold to refer to agricultural labourers, ignoring the decedent’s stated occupation. But, such a selection would consist mostly of secondary-sector workers instead of agricultural labourers, making it entirely unsurprising that so

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18 See http://www.campop.geog.cam.ac.uk/research/occupations for a description of this project.
22 Personal communication Leigh Shaw-Taylor, as well as my personal experience.
many of the inventories showed signs of manufacturing.\textsuperscript{24} Langton’s evidence is limited to a number of tiny, isolated peasant communities in seventeenth-century Sweden, at the time one of the more economically backwards areas in Europe. His implicit application of this evidence to much more advanced and integrated economies such as England is questionable. Most quantitative analyses of by-employments, such as those by Overton \textit{et al}, Woodward, Hey, Frost and Holderness, are based on straightforward counts of indications of multiple occupations in probate inventories. Such calculations are flawed because, as will be discussed at length below, probate inventories significantly exaggerate by-employments.

Weak or flawed historical evidence has not been the only obstacle to reliable insight into the true importance of early-modern by-employments; they have also been inadequately conceptualized. Firstly, the historical evidence has generally been interpreted in terms of individual men having multiple occupations, even though that evidence generally only provides insight into the activity mix at household level, as will be discussed.\textsuperscript{25} It is important to figure out whether by-employments were truly of an \textit{individual} nature, undertaken by one and the same principal earner, or a \textit{household} phenomenon, with different household members engaging in different economic activities. This distinction is crucial because, arguably, only \textit{individual} by-employments truly distinguish the pre-industrial from the industrial world. After all, several members of the same household engaging in different occupations remained quite common after industrialisation; indeed, most households today are, in that sense, by-employed. Whether by-employments were of an individual or household nature is particularly important from the perspective of their potential impact on male occupational structures derived from principal-employment-only sources like parish registers. After all, if by-employments were solely of the household type, with the individual men in those households engaging only in a single occupation, no by-employment correction would be necessary at all.

Secondly, almost all discussions of by-employment are restricted to determining the \textit{proportion} of individuals (or households) which engaged in multiple occupations. But incidence is too narrow a measure for properly gauging by-employments’ socio-economic importance and their impact on the occupational structure. It is also necessary to assess the share of available household labour they occupied and the economic value they created for the household in return.

Thirdly, it is generally unclear which activities are to be considered ‘true’ by-employments and which are correctly interpreted as ‘merely’ domestic. Overton \textit{et al} have tackled this ambiguity by considering all households with several economic activities as by-employed, regardless of whether these activities produced a significant surplus for sale. This approach is clear-cut, but becomes problematic in the context of the industrious revolution thesis, which argues for a shift in household production from ‘for use’ to ‘for sale’.\textsuperscript{26} In this paper, only activities that generated a substantial surplus have therefore been considered true by-employments.

In short, there is a clear requirement for more thorough, quantitative historical analysis here, both from the perspective of getting the male historical occupational structure ‘right’ and, more generally, to base our understanding of the early-modern household economy on a firmer evidential footing. It is

\textsuperscript{25} This applies for example to much of the literature listed in footnote 7 of this section.
the aim of this paper to meet this need by addressing six issues which, together, express the historical significance of by-employments in early-modern England, namely their incidence, their geographic variation across the country, whether they were an individual or household affair, the share of available household labour they engaged, their significance for household incomes, and their development over time throughout the period. But before doing that, it is necessary to first discuss the main historical data source on which the research was based: probate inventories.

1. Probate inventories as a historical data source on by-employments
Probate inventories – such as the example in illustration 1 – provide a wealth of occupational information.\footnote{This discussion of probate inventories as a source for by-employment analyses was published earlier in Keibek and Shaw-Taylor, ‘Rural by-Employments’, pp. 251-61.} When the decedent was male, his principal occupation was often specified in the inventory preamble; if not, it can usually be derived from other probate documents referring to him. Overton et al have claimed that such information is unreliable, as the occupation stated in the inventory ‘often differed from that stated by the decedent in his or her will’.\footnote{Overton \textit{et al}, \textit{Production and Consumption}, p. 34.} However, such alleged differences were only recorded in a handful of cases in the dataset constructed for this paper, and clear evidence for the reliability of probate-derived occupational descriptors will be provided below.\footnote{Craig Muldrew also found only very few such cases in his dataset. See Muldrew, \textit{Food, Energy and the Creation of Industriousness: Work and Material Culture in Agrarian England, 1550-1780} (Cambridge: Cambridge University Press, 2011), p. 166. See also the discussion on this issue in Shaw-Taylor, ‘Cottage Economy’, pp. 11-12.}

Inventories also provide more indirect information on gainful activities in the form of tools, materials, livestock and rooms that are listed and valued in them. The male ‘household head’ 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 be considered the individual property of his wife. His probate inventory therefore presents material evidence of all significant gainful activities within the household, whether carried out by him, his wife, living-in children and relatives, or servants. They thus enable an assessment of both the validity of the principal, stated employment of the deceased and the presence of potential by-employments within his household. It is therefore not surprising that estimates of by-employment incidence have almost universally been based on probate inventories.

In addition to information on the type of gainful activities within the household of the deceased, inventories also provide insight into the scale of these activities. They will usually not merely mention 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 a different kind – which can therefore not simply be summed in terms of quantities – into a single 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.
Illustration 1. The probate inventory of John Porter, Blacksmith, and the indications it provides on, amongst others, the gainful activities, wealth, and size of his household.

Valuations in inventories have also extensively been used to measure the wealth of probated households. Two inventory-derived wealth measures have been employed in this research. Material wealth, that is, the inventory total minus leases and debts, provides a good indication of the overall

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value of the deceased’s estate, excluding real estate. As such, it is to be preferred over the inventory total, as Overton has shown by comparing probate inventories with — much rarer but more complete — wealth evidence from probate accounts. A second wealth measure, domestic wealth, that is, the combined value of all household goods excluding those intended for market-directed production, captures what one might argue the other inventory goods are merely there to provide: the household’s standard of living. It serves, as Margaret Spufford wrote, as ‘an index of domestic comfort and consumption’.

Finally, probate inventories usually list the number of beds and/or bed chambers in the deceased’s house. As far as this author is aware, this information has not been systematically exploited in the literature. However, it provides an impression of the size of the deceased’s household, which will prove very useful in later sections of this paper.

Probate inventories may be detailed and broad source of historical information, but they are far from unproblematic. Indeed, as sources on individual people and households, probate inventories suffer from, as Overton et al have phrased it, ‘a depressingly long list of possible reasons why any single inventory may be misleading’. As Peter Lindert has rightly argued, these shortcomings are generally much diluted when probate inventories are used as a statistical source, that is, employed in large numbers to ‘build aggregate estimates’. However, even when using them in large numbers, probate inventories exhibit certain weaknesses as a source on (by-)employments.

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

A second, related problem is that some occupations leave few traces in probate records. This problem can be illustrated by comparing the decedents’ occupational descriptors with indications on gainful activities provided by the goods and rooms listed in the inventory. Figure 1 shows that for occupations

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31 The omission of real estate enhances the reliability of the measure, as this was inconsistently recorded, ‘the major defect’ in inventories, as Margaret Spufford has called it. See: Spufford, ‘The Limitations of the Probate Inventory’ in Chartres and Hey (eds), English Rural Society, 1500-1800: Essays in Honour of Joan Thirsk (Cambridge: Cambridge University Press, 1990), p. 144.
33 This is the equivalent of what Carole Shammas has termed ‘consumer goods’ in her research — see, Shammas, The Pre-Industrial Consumer in England and America (Oxford: Clarendon Press, 1990), p. 88.
35 Overton et al, Production and Consumption, p. 31.
which produced high-value output or which required expensive capital goods, significant quantities of raw materials, or tools of non-trivial value, this comparison is very encouraging. For example, only seven per cent of all yeomen’s inventories used in this research contained no or merely very weak indications of agricultural activities. For many manufacturing occupations, for example for weavers, tanners and brewers, the figure is comparably low. This is clear evidence for the reliability of the occupational descriptor of probate documents. It also indicates that such occupations will likely leave clear traces in inventories for which they are ‘merely’ by-employments.

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

![Figure 1](image-url)

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

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

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37 As announced on page 6.
For male trace-poor male manufacturing occupations such as tailoring, this problem can be resolved because a reliable occupational structure is available for eighteenth-century men from c.1700 onwards.\(^{38}\) An approximate correction can then be applied to the by-employment calculations based on such occupations’ general importance in the occupational structure. Nevertheless, figure 1 does show that, in general, probate inventories are simply not a good source of information on by-employments that required and produced little stock and used no or merely very cheap tools. This is the case for many tertiary-sector by-employments, for wage labour outside the household and for certain female occupations. The analyses in this paper therefore generally exclude such by-employments. But this is, with one notable exception which will be discussed below, not a great loss. The tertiary sector was relatively small, and the by-employment historiography is almost exclusively concerned with primary- and secondary-sector activities. Wage labour outside the household as a subsidiary activity for farmers and manufacturers would have been limited to low-skilled work in periods of extreme labour shortage, such as helping out during the agricultural harvest. Such labour was occasional, therefore represented only a limited – although undoubtedly welcome – contribution to household income.\(^{39}\) And many trace-poor female employments, such as straw plaiting and lace making, were geographically concentrated and not particularly relevant for the counties analysed in this paper.

But this was not the case for the most important and widespread female manufacturing activity: spinning. Jane Whittle has argued that probate inventories allow for reliable assessment of the prevalence of spinning, at least where this was carried out using a spinning wheel rather than a distaff.\(^{40}\) However, even spinning wheels were relatively cheap, often valued at merely half a shilling 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: materials connected to spinning were encountered in fifty per cent of the most detailed inventories, compared to only twenty-three per cent of the entire inventory set. The conclusion, unfortunately, has to be that inventories are not great sources for estimating the incidence and economic importance of spinning – with the possible exception of a small minority of exceptionally detailed ones. Unless otherwise stated, calculations in this paper therefore exclude spinning.

Some inventories suffer from a very specific, third problem: they fail to provide clear occupational evidence even though the deceased’s (stated) occupation was not ‘trace poor’. This was, for example, the case for seven per cent of yeoman farmers’ inventories, as already mentioned above. One potential explanation would be that the occupational descriptor of these inventories is simply a misnomer, and they were really left by, say, weavers or carpenters. Alternatively, agricultural indications could be missing because the deceased was no longer an active farmer at the time of death due to ill health, or because cattle and equipment had already been transferred to his descendants before the inventory was taken. An analysis of the affected inventories shows that this second explanation is the more likely. None of the farmers’ inventories without agricultural indications showed evidence of any other male occupation. Their households were, as Overton et al have called them, ‘unproductive’.


\(^{39}\) For a discussion on what constitutes a by-employment in the sense in which the term has been used in this research, see the discussion on the ‘fifth problem’, on page 11-2. See also page 4.

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

Age bias represents a potential fourth problem: one would logically expect the elderly to be overrepresented in probate collections. Actually, systematic analysis by Overton et al found no evidence of age bias – although others have observed it. But even if Overton et al have got it wrong, and age bias was significant, this does not necessarily affect probate-based by-employment analyses. Osamu Saito’s study of two late-eighteenth-century rural communities in the south of England provides some indications of how household by-employment may have varied over the life of the inventoried ‘household head’. His analyses indicate that women often stopped working after marriage, suggesting relatively low household by-employment in very young families. Children started working in their early teens, when they might still be living at home, which would suggest a somewhat higher chance of households being by-employed when the male ‘household head’ was in his late thirties to early fifties. The study also suggests that women’s involvement in gainful employment may have risen after children left the home, which would have compensated at least partly for by-employments previously carried out by living-in children. Based on this (simplified) interpretation of Saito’s data, it may be assumed that by-employment incidence amongst the presumably overrepresented elderly households was probably not very different from the average.

A fifth problem lies in the occasional lack of clarity of inventories’ by-employment indications. Evidence for manufacturing activities is sometimes multi-interpretable. For example, the inventory of Joshua Walker, a butcher from Capesthorne in Cheshire, lists a large number of livestock of all kinds as well as agricultural equipment such as ploughs and harrows, making his household’s agricultural by-employment pretty indisputable. However, 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 paper, as discussed, activities in the
household have only been considered true by-employments if their fruits were sufficiently large as to
not be wholly consumed within that same household. Activities like baking bread, brewing beer,
sowing or washing clothes could be undertaken on such a scale that a substantial surplus was
available for sale ‘in the market’. But, if small in size and solely intended for members of the own
household, perhaps combined with some very limited barter trade with neighbouring households, such
activities are correctly considered as domestic rather than as by-employments in the full meaning of
the word, even though they of course reduced the need for purchasing the same products or services
on the market and therefore constituted economic value for the household. It is, however, not always
easy to infer from inventories whether an activity was ‘for the market’ or ‘merely domestic’. The
inventory of Samuel Sayer, a yeoman from Wheaton Aston in Staffordshire lists two little brewing
looms, some malt and a malt mill, altogether valued at less than £2; this likely only indicates small-
scale brewing for purely domestic use, but it is impossible to be entirely certain about this.

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

For agricultural by-employments, a slightly different approach was taken. Ambiguity of indications is
only rarely a problem here; ownership of, say, a pig or some poultry is, after all, a clear sign of
involvement in agriculture. However, if there are no indications of additional agricultural activities, it
signifies a very marginal agricultural activity and, in the meaning of the term adopted in this paper,
not a true by-employment at all. Therefore, employing a cut-off point in the total value of agricultural
assets of the inventoried household, agricultural by-employments were divided into ‘substantial’ and
‘marginal’ ones – in addition to the ‘strength-of-indication scale’ described above. For the eighteenth
century, a cut-off point of £3 10s in agricultural assets’ value was chosen, which equalled five per
cent of the value of the agricultural assets of the average husbandman’s inventory. It is perhaps worth
pointing out however that something which denoted marginal economic value to most households
may, nevertheless, have represented substantial economic value to a very poor one. £3 10s in
agricultural assets can, in livestock terms, roughly be translated as a single cow and, perhaps, its
young calf. As Jane Humphries has calculated, such assets would still have represented significant
value for a poor labourer’s household.43

With the exception of spinning, the above five problems with probate inventories may have proved to
be fairly easily resolvable, but that is not the case for a final issue: wealth bias. As Daniel Smith
phrased it, ‘like other seemingly broad, sources in social history, probate records represent the

43 Humphries, ‘Enclosures, Common Rights, and Women: The Proletarianization of Families in the Late
experience of an atypically prosperous segment of the population’.\textsuperscript{44} Wealthier estates were much more likely to be inventoried than poorer ones 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 simply more positive for wealthy than poor estates. Financial disincentives for the church courts in registering and exhibiting inventories for low-value estates probably exacerbated the inherent wealth bias.\textsuperscript{45}

The presence of expensive capital goods or large quantities of raw materials or finished products was an important determinant of the overall value of an estate. Occupations characterized by such goods – such as farmers with their crops and livestock or tanners with their stocks of bark and hides – were much more likely to leave an inventory than less capital-intensive ones. This means that the probate record is far from representative of the occupational structure of the population – quantitative evidence for which is presented in another working paper.\textsuperscript{46} Some measures can be and were taken to manage the problem. In this paper, comparison are always made within one (principal) occupational sector, to ensure that the major overrepresentation of farmers in the probate record does not distort the comparison with manufacturers’ households, which were much less likely to leave an inventory. Furthermore, a targeted, non-random selection of inventories was made to ensure that all (principal) occupations within the two major sectors were well represented, roughly in line with their share of the male occupational structure.\textsuperscript{47} It is worth nothing here that this approach differs fundamentally from the one taken by Overton et al for early-modern Kent and Cornwall. They ignored the ‘stated’ occupation of the ‘male household head’ and picked inventories entirely at random from the extant probate record in their selected parishes. This implies that their dataset must have had a very considerable overrepresentation of yeomen compared to husbandmen, of tanner and brewers compared to weavers and tailors, and more generally, of farmers compared to manufacturers. This means that, for example, the production activity mixes that they derived from inventories are not representative of actual, contemporary society.\textsuperscript{48}

However, from the perspective of examining early-modern by-employments the probate record’s inherent wealth bias represents a serious problem which cannot be adequately solved merely by sensible sampling of the probate record, and which has been ignored by those who have taken the probate evidence at face value. 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 agriculture, or farmers who also worked as tanners more likely to leave an inventory than their non-by-employed colleagues. This means that the by-employed are likely to be overrepresented in the probate record.

In other words: the probate inventory evidence needs to be corrected for wealth bias if it is to be used as a reliable gauge of by-employments. A new methodology to do just that was therefore developed,

\textsuperscript{44} Smith, ‘Underregistration and Bias in Probate Records: An Analysis of Data from Eighteenth-Century Hingham, Massachusetts’, \textit{The William and Mary Quarterly}, 32:1 (1975), p. 106.
\textsuperscript{47} Remaining small differences between the ‘weight’ of occupations in the dataset and the overall occupational structure could, in principle, have been removed by working with weighted averages, but in practice this turned out to be unnecessary.
which is discussed in detail in a separate working paper.\footnote{Keibek, ‘From probate inventories to households: correcting the probate record for wealth bias’, Campop paper, http://www.campop.geog.cam.ac.uk/research/projects/occupations/abstracts/paper29.pdf.} But before applying this wealth-bias-correction methodology, it is profitable to look at the by-employment indications in the\footnote{I would like to thank Craig Muldrew, Ken Sneath and Leigh Shaw-Taylor for their generosity in sharing with me a substantial number of transcribed inventories from their own research, which were incorporated in this dataset.} uncorrected probate record, because that provides a basis for comparison with the numbers presented in the historiography, all of which are based on the uncorrected probate record.

2. By-employment indications from probate evidence, at first sight
The analyses in this and following sections are based on a set of nearly 1,900 probate inventories, most of which were collected, transcribed and interpreted specifically for this research.\footnote{Whittle, ‘Housewives and Servants’, p. 69; see also Overton et al, Production and Consumption, p. 60.} These covered six counties and wider geographic areas in early modern England in the 1700-1760 period and, for two of these areas, the 1560-1700 period as well. In addition to the need for a reasonable degree of geographic spread across England, the choice of counties was informed by the desire to include areas with arable and pastoral farming regimes, areas with well-developed manufacturing sectors as well as those which were overwhelmingly agricultural, and areas which industrialized in the eighteenth century and those which de-industrialized. Inventories were selected from lists provided by the several record offices. To ensure that principal employments could be distinguished from potential by-employments, only male inventories with known, principal occupations were considered. Thus, a good spread across the occupational spectrum within the primary and secondary sectors could be ensured. The geographic and occupational composition of the inventory set is described in some detail in table 1.

Each of the inventories was transcribed and, subsequently, evaluated individually as to the degree to which its occupational indications corroborated the stated occupation of the deceased, and on whether it provided any additional information on his specialisation within that occupation, for example, pastoral rather than arable farming. Subsequently, a judgement was made on the strength of all by-employment indications contained in the inventory, along the lines discussed in the previous section. Two common manufacturing activities were excluded from the analyses: spinning, for reasons already discussed, and dairying. In her analysis of indications for women’s work in probate inventories, Whittle has counted dairying as an independent activity.\footnote{However, an analysis of the inventories strongly suggests that this activity is more correctly considered a subsidiary activity of dairy farming than as a separate (by-)employment. Virtually no secondary-sector inventories were found that contained dairying equipment such as butter churns or cheese presses, but lacked independent evidence of cattle farming and, vice versa, virtually all inventories with clear and substantial evidence of cow keeping also contained distinct proof of dairying.} However, an analysis of the inventories strongly suggests that this activity is more correctly considered a subsidiary activity of dairy farming than as a separate (by-)employment. Virtually no secondary-sector inventories were found that contained dairying equipment such as butter churns or cheese presses, but lacked independent evidence of cattle farming and, vice versa, virtually all inventories with clear and substantial evidence of cow keeping also contained distinct proof of dairying.
Table 1. The inventory dataset.

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

<table>
<thead>
<tr>
<th>Sector</th>
<th>Occupation</th>
<th>Lancashire</th>
<th>Cheshire</th>
<th>Staffordshire</th>
<th>Northamptonshire</th>
<th>Lincolnshire &amp; Rutland</th>
<th>Salisbury Diocese</th>
<th>All</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Yeoman</td>
<td>32</td>
<td>41</td>
<td>32</td>
<td>76</td>
<td>45</td>
<td>34</td>
<td>65</td>
</tr>
<tr>
<td></td>
<td>Husbandman</td>
<td>48</td>
<td>24</td>
<td>28</td>
<td>24</td>
<td>31</td>
<td>21</td>
<td>54</td>
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<tr>
<td></td>
<td>Shepherd</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>36</td>
<td>0</td>
<td>36</td>
<td>36</td>
</tr>
<tr>
<td></td>
<td>All农业</td>
<td>80</td>
<td>65</td>
<td>60</td>
<td>136</td>
<td>76</td>
<td>55</td>
<td>119</td>
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<tr>
<td></td>
<td>Blacksmith</td>
<td>15</td>
<td>27</td>
<td>14</td>
<td>31</td>
<td>14</td>
<td>15</td>
<td>12</td>
</tr>
<tr>
<td></td>
<td>Baker</td>
<td>6</td>
<td>0</td>
<td>8</td>
<td>29</td>
<td>5</td>
<td>3</td>
<td>5</td>
</tr>
<tr>
<td></td>
<td>Brewer/Maltster</td>
<td>8</td>
<td>6</td>
<td>0</td>
<td>0</td>
<td>2</td>
<td>7</td>
<td>4</td>
</tr>
<tr>
<td></td>
<td>Butcher</td>
<td>10</td>
<td>16</td>
<td>10</td>
<td>37</td>
<td>10</td>
<td>10</td>
<td>8</td>
</tr>
<tr>
<td></td>
<td>Carpenter/Joiner</td>
<td>26</td>
<td>38</td>
<td>11</td>
<td>41</td>
<td>18</td>
<td>12</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>Mason</td>
<td>11</td>
<td>11</td>
<td>2</td>
<td>29</td>
<td>2</td>
<td>3</td>
<td>6</td>
</tr>
<tr>
<td></td>
<td>Miller</td>
<td>5</td>
<td>9</td>
<td>5</td>
<td>1</td>
<td>1</td>
<td>12</td>
<td>9</td>
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<td></td>
<td>Shoemaker/Cordwainer/Glover</td>
<td>12</td>
<td>20</td>
<td>0</td>
<td>28</td>
<td>1</td>
<td>3</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>Tailor</td>
<td>17</td>
<td>23</td>
<td>0</td>
<td>35</td>
<td>6</td>
<td>2</td>
<td>17</td>
</tr>
<tr>
<td></td>
<td>Tanner/Skinner</td>
<td>8</td>
<td>12</td>
<td>8</td>
<td>4</td>
<td>5</td>
<td>18</td>
<td>4</td>
</tr>
<tr>
<td></td>
<td>Weaver/Clothmaker</td>
<td>62</td>
<td>23</td>
<td>18</td>
<td>32</td>
<td>9</td>
<td>18</td>
<td>31</td>
</tr>
<tr>
<td></td>
<td>Other type of artisan</td>
<td>8</td>
<td>0</td>
<td>13</td>
<td>0</td>
<td>3</td>
<td>8</td>
<td>4</td>
</tr>
<tr>
<td></td>
<td>All manufacturers</td>
<td>188</td>
<td>185</td>
<td>89</td>
<td>263</td>
<td>75</td>
<td>85</td>
<td>112</td>
</tr>
<tr>
<td></td>
<td>All Labourers</td>
<td>5</td>
<td>20</td>
<td>0</td>
<td>84</td>
<td>2</td>
<td>1</td>
<td>59</td>
</tr>
<tr>
<td></td>
<td>All</td>
<td>273</td>
<td>270</td>
<td>149</td>
<td>483</td>
<td>153</td>
<td>141</td>
<td>290</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Year</th>
<th>1560-1570</th>
<th>1580-1590</th>
<th>1590-1600</th>
<th>1610-1620</th>
<th>1630-1640</th>
<th>1640-1650</th>
<th>1650-1660</th>
<th>1660-1670</th>
<th>1670-1680</th>
<th>1680-1690</th>
<th>1690-1700</th>
</tr>
</thead>
</table>
So, what do these inventories suggest about by-employment incidence in eighteenth-century England? Table 2 provides a summary of their indications for manufacturing by-employments. As it shows, the incidence of such by-employments was, actually, quite low. Overall, only about one in eight farmers’ and secondary-sectors’ inventories showed clear signs of manufacturing by-employments. And although there was a certain geographical variation, in none of the investigated geographic areas were clear indication of such activities found in more than a quarter of the inventories. The inventories thus provide surprisingly limited support for the prevalence of manufacturing by-employments that is suggested by much of the literature. Robert Malcolmson wrote that in eighteenth-century Lancashire, ‘the term “yeoman” often indicated a landholder who divided his time between farming and weaving’. In fact, of the twenty-seven suitable yeoman’s inventories from that county, only three showed clear signs of weaving. Furthermore, manufacturing by-employments were generally not of the supposed ‘artisanal-industrial’ kind. Rather than textiles or metal working, it was brewing which was by far the most frequent.

Table 2. Indications for (ancillary) manufacturing activities in probate inventories for farmers and manufacturers (eighteenth-century inventories only, all areas except Northamptonshire)

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

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

These low by-employment incidence figures are not the result of lack of detail within the inventories leading to by-employment indications being missed; contrary to spinning, manufacturing by-employment incidence was not significantly higher amongst the sub-set of especially detailed inventories. Nor are the low figures caused by ‘trace-poor’ secondary-sector occupations; a correction for these occupations raises the incidence figure by only two percentage points, to eighteen per cent. Nor can agricultural labourers revivify the image of ubiquitous manufacturing by-employment within the agricultural sector. By-employments amongst labourers are inherently difficult to pin down, as the term ‘labourer’ does not with certainty indicate an agricultural labourer but might indicate a ‘general’

53 Something also found by Overton et al – see Overton et al, *Production and Consumption*, p. 77.
labourer, working in a manufacturing trade such as construction. However, only one in every seven labourers’ inventories showed any signs of manufacturing so even if all inventoried labourers in the dataset were of the agricultural kind, manufacturing by-employment was as low amongst them as amongst farmers. Indeed, the dominance of brewing in the above figures suggests that table 2 is actually more likely to over- than underestimate manufacturing by-employment. Substantial brewing activities were counted as clear indications of by-employment but, as will be discussed in section 3, in some of the surveyed areas, farms were actually often very large and ‘capitalist’, employing many agricultural labourers; it is very well possible that the ale and beer produced on such farms was consumed in its entirety by the household and its hired workforce.

Indications for by-employments in the opposite direction, that is, manufacturers’ inventories with clear evidence of farming, were much more common in the dataset, as is clear from table 3. Sixty-one per cent of the manufacturing inventories indicated some agricultural activities, and for fifty-two per cent these activities were sufficiently substantial to call them truly agriculturally by-employed. Within rural inventories, these percentages go up to sixty-six and fifty-seven per cent respectively.

<table>
<thead>
<tr>
<th>Table 3. Share of eighteenth-century manufacturers’ inventories with strong to indisputable indications of agricultural by-employment – by substance, environment and geography</th>
</tr>
</thead>
<tbody>
<tr>
<td>All inventories (N=863)</td>
</tr>
<tr>
<td>-------------------------</td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td>Lancashire</td>
</tr>
<tr>
<td>Cheshire</td>
</tr>
<tr>
<td>Staffordshire</td>
</tr>
<tr>
<td>Northamptonshire</td>
</tr>
<tr>
<td>Lincolnshire &amp; Rutland</td>
</tr>
<tr>
<td>Salisbury Diocese</td>
</tr>
<tr>
<td>All</td>
</tr>
</tbody>
</table>

Here, indeed, the high incidences found by Overton et al in Kentish weavers’ inventories, by Hey for South-Yorkshire metalworkers, by Frost for Staffordshire metalsmiths, by Holderness for Lincolnshire artisans, and by Rowlands for West-Midland metalworkers are confirmed. As table 3 indicates, these figure showed considerable regional variation, the reasons for which will be explored in section 3.

The analysis of agricultural assets’ quantities and values listed in inventories suggests that farming by-employments amongst probated manufacturers were, on average, of considerable size (table 4).

54 A more thorough discussion of the by-employment incidence amongst labourers can be found in Keibek and Shaw-Taylor, ‘Rural by-Employments’, pp. 266-7.
56 Something also found by others – see, for example, Overton et al, Production and Consumption, pp. 69-70; Shaw-Taylor, ‘Cottage Economy’, pp. 7, 18-9.
The average agriculturally-by-employed manufacturer’s inventory in the dataset lists nearly £27 in agricultural assets, which is the equivalent value of about ten heads of cattle.

Table 4. Mean agricultural assets by occupational sector in probate inventories
(all areas, eighteenth-century inventories only)

<table>
<thead>
<tr>
<th>Type of asset</th>
<th>Quantities</th>
<th>Valuations</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>All farmers</td>
<td>Agric. by-empl. manufacturers*</td>
</tr>
<tr>
<td></td>
<td>(358 inv.)</td>
<td>(431 inv.)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cows</td>
<td>6.4</td>
<td>3.1</td>
</tr>
<tr>
<td>Heifers, stirks etc.</td>
<td>2.9</td>
<td>0.8</td>
</tr>
<tr>
<td>Calves</td>
<td>2.3</td>
<td>0.7</td>
</tr>
<tr>
<td>Bulls and oxen</td>
<td>0.6</td>
<td>0.1</td>
</tr>
<tr>
<td>All cattle</td>
<td>12.2</td>
<td>4.7</td>
</tr>
<tr>
<td>Horses of all kinds</td>
<td>4.0</td>
<td>1.4</td>
</tr>
<tr>
<td>Swine of all kind</td>
<td>2.8</td>
<td>1.2</td>
</tr>
<tr>
<td>Sheep of all kind</td>
<td>48.3</td>
<td>9.4</td>
</tr>
<tr>
<td>Total (excluding equipment)</td>
<td>£ 106.98</td>
<td>£ 26.56</td>
</tr>
</tbody>
</table>

* Strong to indisputable indications of substantial agricultural activities in the inventory.
** Including poultry and bees

So, at first sight, the probate evidence suggests not only a high incidence of agricultural activities amongst secondary-sector workers, but also that these activities were very sizeable. However, as discussed above, the probate data suffer from strong wealth bias, with wealthier households, such as those with relatively large numbers of livestock, severely overrepresented. This also means that manufacturers who possessed livestock or other expensive agricultural assets were more likely to be inventoried than non-by-employed manufacturers and, thus, that probate inventories significantly overstate agricultural by-employments amongst secondary-sector workers. Defoe observed on the textile industry of the contemporary West-Riding that ‘every manufacturer generally keeps a cow or two, or more, for his family’. But he also observed that amongst them lived, in ‘an infinite number of cottages or small dwellings’, the lesser weavers and labourers, ‘all hard at work, and full employed upon the manufacture’.\(^{57}\) This second group was much less likely to be probated than the first.

In a recent article, Shaw-Taylor and I calculated the contemporary livestock numbers and agricultural acreages which the probate data, taken at face value, suggest existed in early eighteenth century Cheshire and Lancashire. A comparison of those estimates with those from unbiased sources showed

that the probate-derived estimates were, unsurprisingly, far too high. A correction for wealth bias is required if the probate data are to yield reliable insights into pre-industrial by-employments.

3. By-employment incidence after correcting the probate evidence for wealth bias

The distorting effects of the inherent wealth bias of the probate record are obviously not limited to by-employment investigations. They affect virtually every analysis with probate inventories as its main data source, such as statistical investigations into early-modern material culture or wealth structure. Indeed, wealth bias is arguably the most serious and tenacious defect of probate documents as a historical source. I have analysed this general issue in much more detail in another working paper. In that paper, a methodology is presented to correct the probate inventory dataset for wealth bias by reconstructing the probability function describing the relationship between the decedent’s estate value and the chance of being inventoried. By applying the inverse of this probability function to the probate data, those data are re-weighted with the appropriate factors to, as it were, recreate the full population of households, inventoried and non-inventoried. Thus, a view of contemporary society as a whole is provided rather than merely of its probated sub-section. In figure 2, this has been done, as an example, for secondary-sector workers in the county of Cheshire, in the early eighteenth century.

As is clear, and unsurprising, the actual household wealth distribution differed considerably from that of the probate inventories. And, more importantly for the purposes of this paper, so did by-employment incidence and size. At thirty per cent of households, the incidence of substantial agricultural by-employments amongst manufacturers was only half that suggested by the uncorrected probate inventory set. And the average manufacturer’s household had less than a third of the agricultural assets listed in the average manufacturer’s inventory. And rather than every one in six manufacturers being by-employed in another form of manufacturing, as the inventories would have it, reality was closer to one in seventeen. In short, as suspected, probate inventories indeed strongly exaggerate by-employments.

This methodology thus makes it possible to compare actual early-eighteenth-century by-employment amongst contemporary households, rather than merely amongst inventories, across the regions selected for this study – as presented in figure 3. Probate inventories, as expected, turn out to severely exaggerate by-employment incidence in each county, often by a factor two or more. By-employments were not nearly as ubiquitous in early-modern England as probate inventories have led us to believe. In most counties, only twenty to thirty per cent of the manufacturers’ households engaged substantially in agricultural activities. And typically merely ten per cent or fewer off all households were by-employed in manufacturing (excluding spinning).

Figure 2. The reconstruction of the population of manufacturers’ households in early-eighteenth-century Cheshire.
Figure 3. The share of households that was (substantially) by-employed, per county/region (early eighteenth century)

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

But, figure 3 also shows that differences in wealth bias are not the cause of the regional variation in by-employments exhibited by the probate record. Large geographic differences remain after the correction, particularly in agricultural by-employments, with a high share of the manufacturers’ households substantially active in agriculture in Lincolnshire and Rutland (53%) compared to a very low share in Salisbury Diocese (9%) and, to a lesser degree, in Lancashire (19%). Manufacturing by-employment incidence was low in all counties but relatively large in Salisbury Diocese (22%) and, to a lesser degree, Lancashire (11%). This begs the question how these regional differences can be explained, particularly in agricultural by-employments.

The variation might be connected to differences in the type and ‘economic regime’ of agriculture. It has been assumed, for example by Thirsk, that in pastoral areas manufacturing ‘activities could be readily fitted into the farm routine, as it was not nearly so labour-intensive as in arable countryside’.  

It might therefore be expected that agricultural by-employments were more frequent in areas dominated by livestock farming. It could also be presumed that there would have been less room for agricultural by-employments in regions where agriculture was dominated by large, ‘capitalist’ farms. Indeed, it is a premise common to all proto-industrialist literature that manufacturing developed in the

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‘small-farm zone’, whereas the ‘large-farm zone’ remained purely agricultural, with the latter zone drawing on the labour force from the former zone to fulfil its harvest peak demand.\textsuperscript{62}

As foreseen by Thirsk and as demonstrated in figure 4, probate inventories provide a wealth of quantitative information on both type and ‘economic regime’ of local agriculture.\textsuperscript{63} There is a clear demarcation in the combined value of the agricultural assets and their composition between the counties in the North-West and the others. Inventoried farmers in the North-West were much smaller, and depended more on dairy farming, compared to the much larger farms in the East and South of the country which were more heavily involved in arable and, particularly in Lincolnshire, sheep farming. Using the numbers of beds per inventory as an indicator for the size of the inventoried households, the relationship between farm size and household size is explored in the bottom graph of figure 4.\textsuperscript{64} It demonstrates the agricultural-capitalist nature of the Southern and Eastern farms, compared to the North-West which, it would seem, was still dominated by family farms in the early-eighteenth century.\textsuperscript{65}

However, as an explanation for regional variation of agricultural by-employments, the division highlighted by figure 4 falls short. If combining manufacturing with pastoral farming was ‘so much easier than [with] ploughing and tilling’, why was agriculture no more common amongst manufacturers in the North-West than amongst those in, say, arable-farming-dominated Northamptonshire?\textsuperscript{66} And why are the by-far highest and by-far lowest incidence figures both found in the ‘capitalist-farming’ region, in Lincolnshire and Salisbury Diocese, respectively?\textsuperscript{67}

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\textsuperscript{62} Mendels, ‘Seasons and Regions’, in Pollard and Hölscher (eds), \textit{Region and Industrialisation}, p. 183.

\textsuperscript{63} In other words, the probate evidence roughly divides agricultural England in a manner reminiscent of Eleonora Carus-Wilson’s sub-division of Wiltshire into ‘the cheese and butter countries [which] were the lands of family farmers and self-employed persons’ and ‘the manorialised, champion, sheep-and-corn counties [which] were the main field for the development of agrarian capitalism’. See Carus-Wilson, ‘The Woollen Industry before 1550’ in Crittall (ed.), \textit{A History of Wiltshire. Vol. 4} (London: Victoria County History, 1959), p. 115.

\textsuperscript{64} It is possible but unlikely that the difference between the two graphs is partly explained by farms in the North-West employing living-in servants rather than out-working labourers, as the difference between regions in this respect only became pronounced in the nineteenth century. See Kussmaul, \textit{Servants in Husbandry in Early Modern England} (Cambridge: Cambridge University Press, 1981), figure 2.5, p. 21. But even if part of the difference between the two regions were explained in this way, it could be argued that the bottom chart of figure 4 still displays a clear difference between \textit{household} and capitalist farming.


\textsuperscript{66} The quote here is from Hey, \textit{An English Rural Community: Myddle under the Tudors and Stuarts} (Leicester: Leicester University Press, 1974), pp. 60-1.

\textsuperscript{67} A connection between local agricultural conditions and the prevalence of manufacturing by-employments has, as discussed, been presumed in the proto-industrial literature, but there too it has generally been found wanting. See Houston and Snell, ‘Proto-Industrialization? Cottage Industry, Social Change, and Industrial Revolution’, \textit{The Historical Journal}, 27:2 (1984), p. 478.
Figure 4. An investigation of the nature of farming in the different areas: type and size of the agricultural activities of local farmers, and their relation to (a measure of) household size

Notes: the data in this figure were derived from the (wealth-bias-corrected) probate inventory record for the farmers in each county. The averages in the upper part of the figure are so-called ten-per-cent-trimmed means, that is, the lowest and highest 5% of values were discarded, so as to ensure that potential outliers (i.e. a few exceptionally large or small farms) did not reduce representativeness. The points in the scatter plot are each derived from ten inventories (but, after the wealth-bias correction, corresponded to a significantly larger number of households).
Differences in access to common land are another possible explanation. Parliamentary enclosure has often been blamed for further impoverishing cottagers by removing the possibility of side-earnings in agriculture.\textsuperscript{68} Parliamentary enclosure itself only really became important after the 1700-1760 period studied here but by that time, enclosure ‘by agreement’ had already left England with only a quarter of its agricultural land still in common hands.\textsuperscript{69} The effects of such earlier enclosures on agricultural by-employment are generally difficult to assess, as records are poor, but for Northamptonshire, a list of the dates of enclosure per settlement is available.\textsuperscript{70} Villages listed as unenclosed may have already been partly enclosed, so a perfect comparison between open and enclosed villages is not possible. Even so, the results of a comparison are revealing. If very small agricultural activities are included in the analysis, a statistically significant difference is indeed found between enclosed and open settlements, with forty-four per cent of manufacturers’ households involved in some agriculture for the former, compared to only twenty-seven per cent in the latter ($\chi^2 = 34.0, p<.001$). However, if the analysis is limited to true by-employments, that is, if only significant agricultural activities are considered, no difference between open and enclosed areas is observed, with twenty-four per cent of manufacturers’ households agriculturally by-employed in both. This suggests that enclosure negatively affected the chances for a poor artisan to keep a single cow, but not the opportunity for more substantial farming activities, that is, true agricultural by-employment.\textsuperscript{71}

But even if enclosure is not the explanation, perhaps regional differences in access to land may nevertheless have been an important factor. It might reasonably be assumed that areas of low population density had more room for agriculture and would therefore offer better opportunities for agricultural by-employments to manufacturers. In figure 5, the relationship between local population density and agricultural by-employment incidence is explored. Using Wrigley’s recent work on the development of hundredal populations from 1761 onwards, parish populations provided by the (corrected) 1801 census were back-projected to allow for calculation of approximate population densities at a parish level for c.1760.\textsuperscript{72} The wealth-bias-corrected set of manufacturers’ inventories was, subsequently, grouped into subsets of increasing population density.


\textsuperscript{70} Hall, \textit{The Open Fields of Northamptonshire} (Northampton: Northamptonshire Record Society, 1995).

\textsuperscript{71} Which is in line with Richard Moore-Colyer’s findings regarding the effects of enclosure on this county’s rural artisans. See Moore-Colyer, ‘The Small Land Occupier in East Northamptonshire, Ca. 1650-1850’, \textit{Midland history}, 23 (1998), pp. 94-5, 99.

\textsuperscript{72} Wrigley, \textit{The Early English Censuses} (Oxford: British Academy Records of Economic and Social History, new series, 2011), table A.2.7.
Figure 5. The relationship between population density and (substantial) agricultural by-employment (left), and the and the degree of explanation this provides for regional variation in by-employment incidence (right).

Note: for a description of sources and calculations, see main text. The dots in the left graph are the average by-employment incidences for sub-sets of 75 inventories (or, rather, a larger but varying number of households, after wealth-bias correction).

As the left-hand side of figure 5 shows, a strong, negative correlation between local population density and agricultural by-employment incidence did, indeed, exist – a correlation which, by the way, pointed in the opposite direction of what is generally assumed in the proto-industrial literature. This relationship can be used to calculate what agricultural by-employment incidence one would expect for each county, if population density were the only determining factor. Such a model calculation consists of applying the curve in the left-hand side of figure 5 to all individual households, which are subsequently combined into counties. In the right-hand side of figure 5, the ‘model results’ are compared to the actual incidence figures. It would seem that relatively high population densities do indeed explain the relatively low share of Lancashire manufacturers that was active in agriculture. But population density apparently only partly explains why agricultural by-employment was so prevalent in Lincolnshire, and does not explain at all why it was so infrequent in Salisbury Diocese.

And even in the case of Lancashire one can question what is actually ‘explained’ here. Perhaps the high population density in Lancashire was not so much a cause of low agricultural by-employment but a consequence of the same circumstance. Perhaps manufacturing in (parts of) Lancashire was so profitable that no agricultural by-employment was required, which then also allowed very high local population densities. Perhaps, in other words, regional variation in agricultural by-employment incidence was more determined by the local prospects for manufacturing than those for agriculture. It is, after all, remarkable that agricultural by-employment was low in the two areas most heavily industrial in the early eighteenth century: Salisbury Diocese and Lancashire. It is equally remarkable that manufacturing by-employment amongst farmers was much higher in these two counties than anywhere else. And, on the other side of the spectrum, is it really a coincidence that agricultural by-employment was much higher than elsewhere in the least manufacturing-oriented area in the dataset: Lincolnshire and Rutland?

73 The ‘demographic hothouse of protoindustrialization’ is presumed to have led to agricultural by-employments being prevalent in areas with high population densities. Kriedte et al, Industrialization before Industrialization, p. 76.
Based on the process of elimination followed in this section, it would seem that the most likely explanation for regional differences in by-employment incidence is to be found in the contemporary local manufacturing environment. Where this was mature, manufacturers specialized in manufacturing alone. And, local farmers would have had (relatively) good opportunities to engage in some manufacturing as well. Where industry was underdeveloped, agricultural activities were often necessary to sustain household incomes for manufacturers, leading to relatively high agricultural and low manufacturing by-employment incidences.

But, as discussed in the introduction section, incidence is just one aspect of the by-employment question. It is now time to look at some of the other aspects.

4. The occupational importance of by-employments

As will become clear, an exploration of the relationship between the size of households and the kind and scale of gainful activities in which these households were involved, provides an excellent starting point for examining the occupational importance of by-employments. As was clear from figure 4 above, the ‘economic mode’ of farming affected this relationship as well. Therefore the following analyses have all been limited to one such ‘mode’ namely that of family farms, by restricting the analyses to the three north-western counties. As figure 6 shows, there was a clear and positive relationship between the number of different activities which households engaged in and their average size, approximated here by the number of beds listed in the probate inventory.

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<table>
<thead>
<tr>
<th></th>
<th>Farmers</th>
<th>Manufacturers</th>
</tr>
</thead>
<tbody>
<tr>
<td>'Pure' farmer</td>
<td>2.1</td>
<td>1.8</td>
</tr>
<tr>
<td>By-employed in manufacturing</td>
<td>3.4</td>
<td>2.6</td>
</tr>
</tbody>
</table>
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*Figure 6. Beds per household as a function of the number of by-employments (North-West England, early eighteenth century)*

For agricultural activities, figure 6 can be improved upon, as for them not merely their presence or absence can be determined from probate inventories but their approximate scale as well, using the total value of agricultural assets listed in the inventory. This leads to figure 7, which should be read clockwise, starting in the top left (panel A) with pure farmers. It is clear from figure 7 that farm size and household size were strongly correlated for pure farmers – which is of course entirely unsurprising. Next up, in panel B, manufacturers that were not by-employed in an additional form of
manufacturing have been plotted. Again, household size and farm size were clearly correlated. Starting at 1.8 beds for pure manufacturers, household size increased with growing farm size, initially quite slowly but, for larger farms, increasingly similar to pure farmers.

Indeed, manufacturers with very substantial farming activities would appear to have traced the pure farmers’ trend line. This is not surprising, as for these households, agriculture must actually have been the dominant household activity, and one would therefore expect them to ‘behave’ like farmers’ households.

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

It is clear from figures 6 and 11 that both the number of different gainful activities and the scale of those activities were strongly and positively correlated to the number of people in the household. Larger households apparently – and quite logically – had more ‘room’ for by-employments than smaller ones. And the bigger the household, the larger in scale those by-employments could be. This is clear evidence that by-employments were predominantly a household instead of an individual phenomenon, the preserve not so much of the male ‘household head’ but of his wife, children and/or living-in servants. Comparing the by-employment evidence with contemporary sources on women’s work – such as the frontispiece of Natham Bailey’s 1736 Dictionarium Domesticum reproduced in illustration 2 – confirms that the most prevalent by-employments, namely livestock farming and dairying, brewing and baking lay very much in the female domain, providing further evidence for the predominantly household nature of by-employments.\footnote{For a similar contemporary overview of typically-female activities, see F., The Office of the Good House-Wife: With Necessary Directions for the Ordering of Her Family and Dairy, and the Keeping of All Such Cattle as to Her Particular Charge the over-Sight Belongs (London, 1672) See also Wrightson, Earthly Necessities: Economic Lives in Early Modern Britain (New Haven: Yale University Press, 2000), pp. 44-48; Verdon, “Subjects Deserving of the Highest Praise”: Farmers’ Wives and the Farm Economy in England, C. 1700–1850’, The Agricultural History Review, 51:1 (2003).}

As in the case of Richard Millward, an agriculturally by-employed collier from Shropshire, for whom ‘the management of the ground [was], in great measure, left to his wife Jane’, although he did help out with some of the especially heavy digging at the start of the agricultural year ‘after his hours of ordinary labour’.\footnote{Pulteney, ‘Account of a Cottager’ in Communications to the Board of Agriculture (London, 1805), pp. 344, 345.}
The relationship between farm size and household size for different types of households (North-West England, early-eighteenth century).

Notes: the data points in the panels are the arithmetic average values for groups of inventories (or, rather, larger groups of households, since the dataset is wealth-bias-corrected). A compromise needed to be reached between, on the one hand, the need to make these groups large enough for a meaningful average and, on the other hand, the need for a sufficiently large number of data points to visualise potential trends. Because the number of inventories differed strongly per panel, this compromise worked out differently too, resulting in different numbers of inventories per data point: 17 for pure farmers, 5 for farmers by-employed in manufacturing, 17 for agriculturally by-employed manufacturers and 12 for manufacturers by-employed in both manufacturing and agriculture.
Illustration 2. Frontispiece of Natham Bailey’s *Dictionarium Domesticum* (London, 1723), showing the female head of the household engaged in livestock farming, dairying, brewing, bee keeping, in the still room, preparing food and baking bread.

As discussed, probate inventories are not great sources on undoubtedly the most prevalent female early-modern employment: spinning. However, by limiting the analysis to inventories that had a high level of detail and were therefore above-average suitable for assessing the presence or absence of spinning, a revealing comparison can nevertheless be made. Manufacturers’ households whose inventories showed no signs of spinning were an average 1.8 beds in size, considerably smaller than

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the 2.5 beds for those with clear spinning indications. For farmers too, spinning raised the household size from 1.9 beds for those with no evidence of spinning to 2.5 beds for households that clearly engaged in that activity, such as Richard Latham’s, an eighteenth-century small farmer from Lancashire, whose daughters continued living at the parental home well into adulthood whilst contributing to the household’s income through spinning.\footnote{The Account Book of Richard Latham, 1724-1767, ed. Lorna Weatherill (Oxford, 1990); Foster, Seven Households : Life in Cheshire and Lancashire, 1582-1774 (Northwich: Arley Hall Press, 2002), pp. 142-65.}

Additional evidence for the predominantly household character of by-employments can be found by examining the scale of the activities in the male decedents’ principal, stated occupation. If by-employment had been an individual phenomenon, one would, on average, expect the scale of the ‘principal’ activities of a by-employed individual to have been smaller than those of his non-by-employed colleague, since the latter was not forced to divide his time between the principal and subsidiary employment. This was not the case. On the contrary: in the North-West, the average by-employed farmer owned £30 in agricultural assets, compared to £23 for the average ‘pure’ farmer. Similarly, the average manufacturer who was substantially by-employed in both agriculture and manufacturing owned £16 in agricultural assets, compared to £12 for his colleague who was by-employed in agriculture alone.

In addition to providing evidence for their predominantly household character, the trend lines in figure 10 also provide the means for estimating the occupational importance of early-modern, cross-sectoral by-employments, that is, the average share of available household labour that they employed. Manufacturer’s household \(i\) in illustration 3 was by-employed in agriculture. Based on the scale of its agricultural activities – as measured on the horizontal access via the value of its agricultural assets – it can be estimated how much labour – in terms of beds, on the vertical axis – was required for farming \((LA_i)\), with the remainder of the household engaged in manufacturing \((LM_i)\). By calculating \(LA_i\) and \(LM_i\), for all households in the dataset, the occupational importance of farming for agriculturally by-employed manufacturers can be determined as a straightforward average, its value depending on the distribution of households across the spectrum of farm sizes. The same approach can be followed for farmers by-employed in manufacturing and, after switching to the upper, purple curve in panel D of figure 7, for manufacturers by-employed in both farming and manufacturing.

It can thus be calculated that agricultural activities utilized around one-third of the combined ‘labour force’ of manufacturing households that were, in some form or scale, involved in farming. If the analysis is restricted to manufacturers’ households with substantial farming activities, i.e. those that were truly by-employed, that share rises to nearly two-fifth. For by-employed farmers, circa one quarter of household labour was engaged in manufacturing rather than agriculture. And for manufacturers by-employed in both farming and manufacturing, roughly one in four household members was, on average, working in agriculture and one in three in the manufacturing by-employment – leaving only two-fifth of the household labour power for the principal occupation of the male ‘household head’.
Based on these figures, it is now possible to determine the need for a by-employment correction on the principal-employment-only, male occupational structures derived for the early eighteenth century from parish data in the ‘Occupational Structure of Britain 1379-1911’ project. It can be concluded that there is, actually, no compelling reason to apply any correction to the male occupational structure itself, as by-employment was a household rather than an individual phenomenon and in all probability carried out by household members other than the male ‘household head’. Saito was correct in concluding about individual, male by-employments that, ‘in England … the overall level of by-employment had already been insignificant by the industrial revolution’.  

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Even if one ignores the evidence of the predominantly household character of by-employments and, incorrectly, treats the probate evidence as indicating individual, male by-employments, one would have to conclude that the by-employment correction on the principal-employment-only male occupational structure would be limited – as shown in figure 8, below, in which the county of Cheshire has been used as an example. Because of the dominance of agricultural over manufacturing by-employments, the resulting occupational structure would be less industrial than the original one, but the size of the correction is small everywhere. Note: this correction should be treated as an unrealistic maximum as it presumes that by-employments were individual rather than, as discussed above, mostly of the household kind (necessitating no correction at all).

<table>
<thead>
<tr>
<th></th>
<th>Principle occupation only shares</th>
<th>Share of households by-employed in the other sector</th>
<th>Share of household income from those by-employments</th>
<th>Resulting correction for these household by-employments</th>
<th>Resulting occupational share</th>
</tr>
</thead>
<tbody>
<tr>
<td>Primary sector</td>
<td>48%</td>
<td>6%</td>
<td>c. 25%</td>
<td>c. 1%</td>
<td>c. 51%</td>
</tr>
<tr>
<td>Secondary sector</td>
<td>41%</td>
<td>31%</td>
<td>c. 33%</td>
<td>c. 4%</td>
<td>c. 38%</td>
</tr>
</tbody>
</table>

*Figure 8. The by-employment correction to the male occupational structure if probate-indicated by-employments are (incorrectly) presumed to be predominantly of the individual kind (Cheshire, c.1725)*

5. **By-employments and the ‘industrious household’**

The thesis of the industrious revolution essentially describes a dual transition during the 1650-1850 period: stimulated by the appeal of new consumer goods, individuals exchanged ‘leisure preference’ for ‘industriousness’ whilst households increasingly produced for and acquired goods in the market. Men increased the number of hours they worked. Women and children worked harder too and, even more importantly, switched from producing things consumed in their own households to manufacturing consumer goods for sale in the market. The cash income thus generated allowed households to purchase things they had formerly produced themselves, whilst still leaving a surplus with which to acquire the new consumer goods that had started off this whole virtuous circle of supply and demand in the first place. Only in the later stages of industrialisation were non-male and non-adult household members progressively pushed back into the domestic sphere, leading to the late-nineteenth-century male-breadwinner household. But that ‘precocious and patchy development’ lies firmly outside the temporal scope of this paper.79

When interpreting the theory in by-employment terms, it is important to stress that neither ‘traditional’ nor ‘industrious’ households were co-operative units of production. Labour was gender divided, with men and women producing different things.80 Also, even traditional households had not

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79 Humphries, ‘Household Economy’ in Floud and Johnson (eds), *Cambridge Economic History*, p. 260.
80 On this observation see, for example, De Vries, *Industrious Revolution*, pp. 101-103. Peter Earle found quantitative evidence for the gendered division of work in an urban setting, see Earle, ‘The Female Labour
been truly autarkic, with men typically producing at least partly for the market but, here at least
women and children had produced primarily for use. In industrious households, all family members
worked predominantly for the market. In short: industrious households differed from traditional ones
not by accommodating several different activities but by accommodating several market-oriented
ones. They were by-employed in precisely the way that term has been used in this paper: engaging in
multiple activities of sufficient scale to generate a substantial surplus for sale.

A favourable interpretation of the previous sections could certainly generate some support for the
industriousness of eighteenth-century households. After all, by-employments were indeed
predominantly of the household rather than the individual kind. More encouraging still are the
significant shares of household labour that were engaged in such household by-employments, as
calculated in section 4. Also, if the path to the Industrial Revolution was prepared by households
becoming progressively involved in manufacturing, it is reassuring that manufacturing by-
employments were more frequent in the birthplace-to-be of that seminal historical event, Lancashire,
than in most other counties.

But a critical view of the same facts is much less kind to the industrious revolution thesis. Yes,
household by-employments existed, but they were much less common than has generally been
presumed – a presumption typically based on a prima facie interpretation of the uncorrected probate
record. And yes, by-employments consumed a significant share of labour in households that happened
to be by-employed but, as figure 8 showed, they did not represent a sufficiently large share of the
overall labour force to materially affect the occupational structure. And yes, manufacturing by-
employments were relatively frequent in Lancashire, about to industrialize, but not nearly as frequent
as in Salisbury Diocese, which was about to deindustrialize.

Particularly damaging is the fact that by-employments were not only much less frequent than
presumed but that they were also generally of the wrong type. For the industrious revolution to have
been, as De Vries called it, a ‘helpmate’ to the Industrial Revolution, household by-employments are
not only supposed to have generated the boost in income that allowed industrious households to
acquire the longed-for ‘new consumer goods’, but also and simultaneously to have been the very
source of these goods.\(^{81}\) In other words: by-employments should mainly have been found in
manufacturing of the new consumer goods. The analyses show however that by-employments were
mostly agricultural, and that those manufacturing by-employments which did exist mostly produced
traditional, semi-domestic goods such as beer and bread for local consumption.\(^{82}\)

Actually, the wealth-bias-corrected probate record is quite insightful regarding the supposed boost to
household income as well. If the thesis is correct, one would expect multiple-earners’ households to
have had a higher standard of living than male-breadwinner-only households. In particular, on a per-
head basis, they should have had more of the domestic consumer goods which had, presumably,
kindled their industriousness in the first place. Figure 9 therefore provides a comparison between by-
employed and equally-sized non-by-employed households in terms of average domestic wealth.\(^{83}\) As
the figure demonstrates, by-employed household do not in fact appear to have enjoyed a higher


\(^{82}\) A point also made by Overton et al – see Overton et al, Production and Consumption, pp. 33, 57, 63-78, 173-
4.

\(^{83}\) That is, the total value of all non-production-related household goods, as discussed in more detail in section 1.
standard of living – unless, oddly, their higher prosperity was *entirely* restricted to expenditure not registered in probate inventories, that is food and the wearing apparel of household members other than the deceased.

Figure 9 is not unique in confronting the industrious revolution thesis with a lack of differentiation in inventory-indicated living standards between industrious and traditional households. Indeed, a key problem for historians promoting the industrious revolution and, for that matter, the consumer revolution theses has been to explain why probate inventories show so little evidence of domestic wealth increasing during the 1650-1800 period. De Vries has attempted to reconcile this observation with his theory by pointing to the shorter life-span of the new consumer goods. Traditional pewter dishes lasted a lifetime, but the new ceramic tableware was vulnerable, relatively cheap and fashion dependent and was therefore replaced several times during that same period. This replenishment ‘flow’ is invisible in probate inventories, which are pure ‘stock’ measures. Such an argument is credible when explaining the lack of development in domestic wealth between durable-goods-dominated inventories at the start of the period in comparison to perishable-goods-dominated inventories at the end of the period. However, in figure 9, the inventories compared stem from the *same* period, rendering the stock-flow argument void.

In short, the analyses so far do not lend much credence to the formative historical role awarded to household by-employments in the industrious revolution thesis. But, it could be argued, the

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industrious revolution is first and foremost a theory of historical development, aiming to describe socio-economic change over the 1650-1850 period. Perhaps an exploration of the developments in by-employments over such a long period of time would yield supportive evidence?

To address this question, the probate evidence was pursued backwards in time into the seventeenth and even sixteenth centuries for two of the six geographic areas in the dataset: Cheshire and Salisbury Diocese. Beginning and end of the resulting 1560-1760 period lie at the boundaries of what can be studied using inventories, as the probate record grows exceedingly thin outside it. The 1560 boundary is early enough, but it is unfortunate that the probate evidence does not enable tracking by-employment developments into the early nineteenth century. However, the concept of the industrious revolution derives much of its appeal from the role it is presumed to have played in paving the way for industrialisation. Given the precociousness of socio-economic developments in England, the 1560-1760 period, leading right up to the English Industrial Revolution, should be sufficient for a reliable comparison between theory and practice.

There is however a more serious problem in using probate inventories for this purpose: the share of decedents which was probated changed over time, which means that the selectiveness of the probate process also likely changed over time. Therefore, if one compares inventory evidence from period X with that from a later period Y, one is unlikely to be comparing the same subsection of society. This is a problem for all temporal analyses based on probate evidence, and one commented on by Thirsk as long ago as 1957, when she considered that a drop in probate-indicated farm sizes in the early seventeenth century might be merely a statistical defect resulting from ‘a sudden change in the class composition of persons who left wills in the local probate court’. Nevertheless, the problem is generally ignored in probate-based temporal analyses. Such a casual reaction is hard to justify in light of the major differences between the probate record and the actual household population, discussed above. Unfortunately, the wealth-bias-correction approach developed for eighteenth-century inventories in that section cannot presently be adapted for use on earlier probate data because it requires reliable occupational structures, which are not currently available before 1700.

All this does not mean that it is impossible to deduce anything from probate evidence, but it does mean that such deductions need to be made with special care. For example: during a period in which the probated share of decedents increased, the chances of being inventoried are likely have risen considerably for poorer households. If probate inventories show a decline in by-employment incidence in such a period, it is not clear whether that was caused by a decreasing share of households being by-employed or simply by non-by-employed households, with their generally lower material wealth, being more likely to be inventoried than before. It is therefore not clear whether the observed development is real or – as Greg Clark has recently argued with regards to probate-based evidence on the consumer revolution – merely an artefact of the inventory record. Only when the inventoried share of the overall population and the by-employed share of the inventoried population increased or decreased simultaneously can one be fairly certain that by-employment incidence was truly changing. In other words: when probate inventories are used for temporal analyses, their indications should always be interpreted against the background of overall developments in the share of decedents that was inventoried.

To make this easier, figure 10 displays the developments in by-employment incidence figures during the 1560-1760 period in parallel to an index of the probated share of the local population. A number of important conclusions can be drawn. Firstly, the relatively low share of Salisbury Diocese manufacturers that was agriculturally by-employed was not a phenomenon restricted to the eighteenth century. The share is likely to have declined during the early seventeenth century, although it is impossible to be certain, as the observed decline in inventory indications may merely be a result of the general growth of the probate record during that century. But it almost certainly declined during the last quarter of the seventeenth and throughout the eighteenth century, in view of stable to slightly declining inventory indications against the backdrop of a rapidly shrinking and therefore probably increasingly wealth-biased probate record.

Secondly, the low share of Cheshire households that was by-employed in manufacturing was not an eighteenth-century phenomenon either. That share increased after the interregnum, but then decreased again after 1700. Since inventory numbers also started to fall rapidly then, it is very likely that manufacturing by-employments amongst Cheshire households decreased considerably from then on.

Thirdly, agricultural by-employment increased in Cheshire up until the interregnum, but then declined quite clearly. Agricultural by-employments not only declined in incidence but also in scale, as is evident in the fall in cattle numbers per by-employed manufacturers’ inventory. This means that the contribution to household incomes from agriculture must have declined strongly for Cheshire manufacturers from the start date of the presumed industrious revolution onwards.

All in all, the story told by figure 10 is quite clear. There is little evidence in these geographic areas of a clear growth in household manufacturing by-employments paving the way for the Industrial Revolution. They remained infrequent at best but in all likelihood declined from the beginning of the eighteenth century onwards. Cash-incomes from agricultural by-employments decreased in Cheshire from the interregnum onwards, and at most remained stable (and infrequent) in Salisbury Diocese but in all likelihood shrank there too. This decline of agricultural by-employments during the latter half of the seventeenth and the early eighteenth century has also been observed by Rowlands, Frost and, as long ago as the 1930s, by Court.88 Overall, it would appear that by-employments were not merely much less frequent than has generally been presumed, but also that they were well on their way to disappearing altogether by the middle of the eighteenth century.

Figure 10: Developments over time in (a) employment incidence within the (uncorrected) probate record and (b) the inventoried share of the population.

Notes: (1) The interregnum (1649-1660) is excluded as probate inventories for that period are not held in the county record offices. (2) The division of the pre-interregnum period into smaller intervals was determined by the statistical need to have sufficient numbers of inventories in each interval and the need to roughly tie into population data for these counties, which was only available for 1600, 1700, and 1760. Intermediate values have been estimated using national population trends. (3) The probated share of the population is indexed relative to the 1661-1699 period, which was set at 100. (4) The error bars indicate the standard error in the mean. (5) The probated share of the population is indexed relative to the 1661-1699 period, which was set at 100. (6) The interregnum (1649-1660) is excluded as probate inventories for that period are not held in the county record offices. (7) The division of the pre-interregnum period into smaller intervals was determined by the statistical need to have sufficient numbers of inventories in each interval and the need to roughly tie into population data for these counties, which was only available for 1600, 1700, and 1760. Intermediate values have been estimated using national population trends. (8) The probated share of the population is indexed relative to the 1661-1699 period, which was set at 100. (9) The error bars indicate the standard error in the mean. (10) The division of the pre-interregnum period into smaller intervals was determined by the statistical need to have sufficient numbers of inventories in each interval and the need to roughly tie into population data for these counties, which was only available for 1600, 1700, and 1760. Intermediate values have been estimated using national population trends.
Except, perhaps, for by-employments which are not picked up by the probate record. It cannot be ruled out that the decline in household by-employments in agriculture and semi-domestic manufacturing activities like brewing came about because the mostly female household members that undertook them were increasingly occupied in activities that left few or no material traces in inventories. If that were the case, said decline might be interpreted as *consistent with* the concept of an industrious revolution, with production that was probably partly for household use being replaced by production purely for the market.\(^{89}\) The undoubtedly most common ‘trace-poor’ female gainful activity was spinning. Based on national textile outputs and labour productivity estimates, Muldrew has indeed recently calculated that ‘employment in spinning increased dramatically from the late seventeenth century, and continued to increase until there were probably over one million women and children employed in spinning by the mid-eighteenth century’.\(^{90}\) This development, he writes, ‘supports the supply-side aspect of the theory of an industrious revolution’.\(^{91}\)

Probate inventories, particularly those that were of above-average level of detail, are certainly not entirely silent about spinning. But even if the analysis is limited to more detailed inventories, it does not confirm significant growth in this household by-employment. On the contrary, as figure 11 shows for Cheshire.\(^{92}\)

\[\text{Figure 11. The share of highly-detailed inventories which showed clear signs of spinning (Cheshire, 1560-1760, except the interregnum)}\]

It is of course possible that Cheshire was atypical in this respect, and that evidence of rapid growth in spinning would have been found if it had been possible to track developments over longer periods of time for other counties in the dataset. There is, however, also little evidence of spinning leading to

\(^{89}\) Indeed, Overton *et al*’s main argument against the industrious revolution thesis is that production for use did not decline. See Overton *et al*, *Production and Consumption*, p.


\(^{91}\) Ibid, p. 522.

\(^{92}\) The eighteenth-century decline of spinning according to the probate record was also found by Overton *et al* – see Overton *et al*, *Production and Consumption*, p. 82.
wealthier households, neither in Cheshire nor in other counties. For example, domestic wealth per bed for farmers in the North-West was identical for households with and without clear indications of spinning, whilst for manufacturers, households with spinning were twenty per cent poorer on a per capita basis than those without. In short, as far as the inventory evidence goes, spinning by-employments do not seem to have ‘behaved’ differently from other manufacturing by-employments in terms of providing support for the industrious revolution thesis.

6. Conclusions
The discussion ending the previous section reminds one that probate inventories are not ‘all-powerful’ as historical sources on early-modern by-employments. Interesting deductions can be made from them regarding the economic importance and temporal development of such capital-extensive, ‘trace-poor’ activities as spinning, but there is always the nagging doubt that one is pushing the source to do something it is not truly suited for. However, no such doubts need be entertained for by-employments in agriculture, in almost all ‘typically male’ manufacturing activities and in the ‘typically female’ manufacturing activities which did require tools and materials of more than minimal value, such as brewing.

And for these by-employments, the conclusions are quite clear. Their prevalence has been greatly exaggerated in the historiography. By the early-eighteenth century, only a small fraction of agricultural households was still active in manufacturing in all six explored geographic areas and, based on the evidence from Cheshire, this fraction had likely been small throughout the preceding one-hundred years at least, and was in a state of decline. More common was the converse situation, with households of manufacturers meaningfully involved in farming, but this too applied only to a clear minority of households, particularly where manufacturing was relatively mature. Again, evidence from Cheshire and Salisbury Diocese suggests that agricultural by-employment had been declining from the interregnum at the latest, and continued to do so during the eighteenth century.

It is also clear that the by-employments which did exist must have been overwhelmingly of a household rather than individual character, with a clear division of labour in the household between the male ‘household head’ working in the household’s ‘stated’, principal employment of, say, husbandman or weaver, with his wife, children and, potentially, servants carrying out the household’s other gainful activities. This means that there is no clear need to correct historical male occupational structures for by-employments; such a need would only have existed had the by-employments been of the individual rather than the household kind. And, as was shown, even if they had been of the individual kind, the necessary correction would have been very modest.

Household by-employments occupied a significant portion of the total labour that a household could provide. But, they do not seem to have resulted in wealthier households, able to participate in a consumer revolution which would otherwise have been out of reach. Indeed, little evidence in support of the industrious revolution thesis has been uncovered in the analyses of the probate data. If anything, the results are more easily reconciled with certain premises of the older concept of proto-industrialisation. The disappointing living standards of by-employed households suggest that their

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93 Muldrew has calculated that ‘earnings from spinning could contribute over 30 per cent of household income for poorer families’, so one would expect to see spinning make a differences to domestic wealth, although not generally of thirty per cent, as Muldrew’s household example is that of a poor farm labourer. See: Muldrew, ‘Ancient Distaff’, pp. 522, 510.
‘industriousness’ was not so much the result of a desire for the ‘new consumer goods’ as of the necessity to make up for insufficient male earnings, a reaction to scarcity rather than abundance. The low share of households involved in manufacturing by-employments and the declining shares involved in farming, particularly in the more industrial areas, suggest a process of occupational specialisation at the level of both households and geographic regions. And the decline of agricultural by-employments, both in terms of incidence and size, suggests the development of an increasingly landless population of manufacturers, if perhaps not quite the ‘industrial proletarians’ of orthodox proto-industrial theory.

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94 Something also reflected in the negative correlation between female labour force participation and male wage levels as noted, for example, in Saito, ‘Who Worked When’, pp. 14-29. See also Earle, ‘Female Labour in London’, p. 338.