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Human Capital, Migration, and Birth Order in  
Seventeenth and Eighteenth Century England

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**Abstract**

This paper uses linked apprenticeship-family reconstitution records to explore the influence of family structure on human capital formation in preindustrial England. We observe a small but significant relationship between birth order, resources and human capital investments. Eldest sons were less likely to be apprenticed, particularly among farming families. Mortality shocks in the household led to significant delay in the timing of apprenticeship. We also find that many apprentices maintained contact with their home parish, returning to wed and establish a new household. The “middling sorts” that dominated apprenticeship behaved more like modern families than the pre-industrial elite.

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## Introduction

How families structured their investments in the human capital of their children is an important part of several historical debates. The emergence of endogenous growth theory has raised interest in the dynamics of human capital formation prior to industrialisation, particularly the so-called quantity-quality tradeoff. The internal workings of the pre-industrial family are crucial to de Vries notion of an “Industrious Revolution” (1994), and have a central place in historical demography. Youths’ ability to find work and training outside of the family is an important element in explanations of the European Marriage Pattern (Hanjal 1965; 1982; de Moor and van Zanden 2010). As this literature recognizes, the behaviour of adolescents prior to marriage is directly related to their future prospects. As Wall (1978) documented, the majority of children in early modern England above the age of 15 had left their parental home. The decade that followed before they married was a key stage in the economic development of youths; residence in another household, as a servant or apprentice, provided experience, training, savings, and for some the potential to develop professional and commercial networks (Ben-Amos 1988; Kussmaul 1981; Wallis 2008; Minns and Wallis 2012).

Economic theory has generated a set of predictions regarding the economic relationships between parents and children within a household. (Becker 1960; Becker and Lewis 1973; Becker and Tomes 1976; Becker and Tomes 1994). One of the key predictions is an inverse relationship between family size and investment in the human capital of children. Empirical studies of modern data have generated mixed results: some find that children in smaller families receive greater parental investments, while others report that large differences between earlier and later-born children are of greater significance (Hanushek 1992; Black, Devereux, and Salvanes 1995; Kessler 1991; Behrman and Taubman 1986). In theory, the investments made by parents in their children prior to industrialisation should have major consequences for much the emergence of sustained economic growth in Europe. Two recent studies suggest that smaller family size led to greater

investment in human capital formation in both pre-industrial Prussia and pre-industrial England (Becker, Cinnirella and Woessman 2009; Klemp and Weisdorf, 2011).

However, for pre-industrial families contemplating investing in the skills of their children, the question was about much more than simply how much to invest in each child. Given the large, private costs associated with education and training, an important consideration was *who* would receive the investment, and *when* in life the investment would take place. Families' answers to these questions have broad implications for the efficiency of human capital investments in this period. If dictated by custom or ascription, we would expect poorer long-term outcomes than if shaped by aptitude and interest. Families would also want to take into account the effect of providing training on the long-term economic relationship they would have with their children. Departure from the family home for a period of service or training could well mean permanent departure from the family's economic sphere, increasing the risk of 'nuclear hardship' for parents as they aged (Laslett 1988).

Given the potential importance of how families allocated opportunities *between* children, it is surprising how little is known about the process in historical settings. Differences in the way families raised male and female children leave no doubt that all children were not treated equally. Female literacy was uniformly lower than male literacy, while at most one in twenty apprentices were female (Burnette 2009). For male children, inheritance customs often differentiated between eldest and younger sons, implying that earlier investments might also be expected to differ. Yet while scholars of early modern Europe have extensively debated the extent, process and economic and social effects of primogeniture (Thompson 1976; Birdwell-Pheasant 1998; Landes 2003; Bonfield 2010), much less has been written on whether birth order was an important determinant of how opportunities other than the inheritance of agricultural land were determined, how it affected social reproduction outside the elite, and its relative importance outside rural society. Similarly, the literature on adolescent service generally takes youths as a relatively homogenous group,

distinguished by resources and status, but not by birth parity, and says little about how short term family dynamics affected youths' prospects.

Among the English landed elite, it is clear that birth order strongly affected educational opportunities (Thirsk 1969; Pollock 1989; Wallis and Webb 2011). For eldest gentry sons, university and legal training dominate. Few were apprenticed. The share of second-born sons apprenticed is more than double that of eldest sons, and nearly doubles again among sons born fourth or higher (Figure 1, see Wallis and Webb 2011 for more details on this database). However, this evidence provides only a limited window into how departure and economic investments were related to the structure and characteristics of the household, and tells us nothing about practices in other sections of society. Primogeniture was not, after all, universally adopted in England, and even when it was the devolution of resources between generations often provided substantial provision for non-heirs. Urban inheritance was often partible. The custom of London, for example, required a third of the personalty to be divided equally between sons and daughters, leaving a third to the discretion of the testator (Grassby 2001:343). Studies of the English urban middle class and rural non-elite groups suggest that in wills equal treatment of children was common, in contrast to the testaments of the gentry (Earle 1989; Cooper 1992; Grassby 2001; Johnston 1995). Among relatively elite professions, elder and younger sons appear in roughly equal numbers (Brooks 1986: 245). Direct studies of intergeneration investments tend, however, to be limited in scale. Howell's exploration of rural inheritance patterns under primogeniture concentrates on a single community, Kibworth (Howell 1976). Field's exploration London apprentices from North East England found a large proportion were first sons, but was limited to a sample of 87 (Field 2010: 8). Horwitz's suggestion that younger sons of London's 'big' business families tended to follow the same path as their elder brothers is based on seventeen individuals (Horwitz 1987). Cooper's conclusion that parents sought 'for the most part' 'to give their children equality of opportunity' derives from 97 wills from late seventeenth century King's Lynn (Cooper 1992: 296).

This paper combines apprenticeship records with information from a range of parish reconstitutions to explore family decision making over one of the most important human capital investments available prior to the emergence of mass education. An apprenticeship was a major outlet for families seeking to invest in the human capital of their children in pre-modern societies. It was an expensive choice, in terms of opportunity costs and, often, direct payments in the form of training premiums. We focus on three key interactions: how families chose to direct investments in apprenticeship between their children, how this investment decision was linked to household conditions, particularly demographic shocks, and its implications for permanent migration away from the home parish. The first two allow us to contrast the role of custom versus economic incentives in human capital investment decisions. The third provides a window into the extent to which departure from the household economy was typically “permanent”, as those we observe returning to their home parish to form a new household may have kept closer economic ties with parents and extended family than those who remained away. Our findings show that apprenticeship decisions largely reflect economic circumstances in the family. A birth order effect was present, but was not large. Apprenticeships were fairly evenly distributed among children of households that did not possess indivisible capital and assets, but were more biased among those with land. Shocks to the household that reduce wealth accumulation delay apprenticeship, but appear to leave the choice of who to apprentice unchanged. Evidence of ongoing contact between apprentices and their home parishes suggest that the motivation to pay for an indenture could plausibly include the benefits of long-term economic relationships with more skilled children

### **Opening the black box: linking apprenticeship and migration to parish reconstitutions**

To generate new evidence on household decision making, we linked household records from seventeenth and eighteenth-century parish reconstitutions to two sets of apprenticeship records. The sample of apprentices and children identified is the first substantial group of non-elite youths in

early modern England for whom it is possible to explore the relationship between household conditions and decisions about leaving home and entering training.

Figure 2 displays the location of the reconstituted parishes. The first group includes twenty-four provincial parishes reconstituted by the Cambridge Group (Wrigley 1997). These parishes range from market towns, such as Banbury and Reigate, to parishes that were almost entirely agricultural. The second group of reconstitutions includes eight London parishes: five small central parishes in Cheapside, All Hallows Honey Lane, St Mary le Bow, St Pancras Soper Lane, St Mary Colechurch and St Martin Ironmonger Lane, two larger parishes in the growing suburbs north of the city in Clerkenwell, St James Clerkenwell and St John Clerkenwell, and one large parish on the eastern edge of the city, St Botolph Aldgate. These have been assembled recently as part of the People and Place project.<sup>2</sup> The reconstitutions included 105,389 children from the provincial parishes and 33,854 children from the London parishes who were born between 1600 and 1800 for whom their forename, and their father's forename and surname were given, and who were not recorded as dying before the age of 12.<sup>3</sup>

Our evidence of apprenticeship is drawn from two sources. First, our sample of London Livery Company registers records just over 300,000 apprentices who were indentured (ie contracted) between 1600 and 1800 (Webb 1994-). It covers eighty one Companies for some or all of this period, comprising between a half and two-thirds of all London apprentices. Our second sample contains around 330,000 apprentices who paid premiums (fees paid by apprentices to masters on binding) that were assessed for Stamp Tax between 1711 and 1774. This provides evidence on apprenticeship nationwide. However, it omits the many apprentices who did not pay a premium (Minns and Wallis 2011). The quality and completeness of the records in each source varies. In

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<sup>2</sup> We thank Gill Newton for providing these records in electronic form.

<sup>3</sup> The London reconstitutions end in the 1750s.

particular, a large and rising proportion of Stamp Tax records lack details on the place of origin of apprentices, hindering linkage.

We were able to link 1,375 children with apprentices. To achieve this, we utilised four linkage strategies, each of different strength. All include a nominal component, with apprentices identified with children from these parishes where we were able to match the child and their father's names within a plausible time period. First, in most cases (1,030) we combined nominal linkage with a match between the parish and the place of origin of the apprentice given in the indenture.<sup>4</sup>Second, for a small group (121), we combined nominal linkage with a match between the occupations of apprentices and children's fathers; this was only used to link apprentices for whom no parish of origin was recorded with children from London reconstitutions.<sup>5</sup>Third, for 206 apprentices, we identified a strong match by name, place *and* occupation. Finally, where the Stamp Tax listed apprentices bound to masters who lived in the provincial reconstitution parishes, but included no information about the apprentices' place of origin, we assumed that there was a high likelihood that these masters were binding local boys. This linked 18 apprentices bound locally with children in the parish.

Because our main concern was to avoid 'false positives' in the linkage, we applied a set of restrictive rules to the linkage. We matched genders. We only accepted links for children with an implied age when indentured of between 12 and 20 years.<sup>6</sup> We excluded duplicate observations where more than one child could be linked to an apprentice, and vice versa, although this will

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<sup>4</sup> Place linkage is less precise for the London reconstitutions than those outside because apprentices are often identified as coming from a street or area of the city, not a specific parish. We only link apprentices identified with places co-located with the London parishes. For example, for Clerkenwell, of 532 linkages, 332 specified a parish name, 27 specified streets within the parish (Clerkenwell Green; Red Lion Street; St John Street, Woods Close; Goswell Street; and Albermarle Street), and 173 specified the area 'Clerkenwell'.

<sup>5</sup> For 109 of the 121 apprentices we have supplementary evidence that they came from the city: 28 were described as coming from 'London'; 90 were the sons of London citizens.

<sup>6</sup> The average age of indenture for seventeenth and eighteenth century apprentices ranged between 16 and 18 years (Wallis, Webb, and Minns, 2011).

exclude some cases where apprentices were re-indentured.<sup>7</sup> One effect of this was to exclude all links to ‘same name’ children in a single family, unless the death of one is recorded. All nominal linkages used names converted into phonetic strings using Double Metaphone. This increased the pool of potential links, by reducing the impact of variant spellings, but also increased the number of excluded duplicate identifications. Finally, we hand-checked the linked sample to check the links generated by our name algorithm.

Table 1 measures the success of our linkage, reporting the share of apprentices reportedly from one of the reconstituted parishes that we were able to link to the reconstitutions. We linked about 20 percent of Livery Company apprentices, and about 25 percent of Stamp Tax apprentices. Most of our matches were with apprentices trained in London: 138 of the Stamp Tax apprentices were trained in London. The slightly higher match rates we achieved for apprentices from provincial parishes is probably due to the greater ambiguity in indentures over the place of origin of apprentices from London; for example, not all those described as coming from ‘Clerkenwell’ would have had births registered in the parishes that have been reconstituted. Figure 3 plots the temporal distribution of linked observations. These are concentrated in the first half of the eighteenth century, when parish reconstitutions are most abundant and the number of youths entering apprenticeships in London reached its peak. As a result, we rarely have a long run of a large number of observations within a single parish with which we could evaluate the effect of local shocks on apprenticeship decisions.

The information we possess about the youths in our sample varies somewhat. For apprentices enrolled with London’s Livery Companies, the records provide us with information about the master’s guild (which may be different to his occupation), and usually the occupation of the apprentice’s father. The Stamp Tax offers more detail on the occupation of the master (for those outside London), the value of the premium, and, sometimes, the occupation of the apprentice’s

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<sup>7</sup> To limit the chance of false positives checking for duplicates used a pool of links aged 9 to 30 when indentured.

father; parental occupation is often missing in the Stamp Tax Registers. The family reconstitutions provide a wealth of detail about the family from which the apprentice came. Births that occur in the parish are recorded, from which we can compute birth order and sibship size. We also know about deaths in the parish, with which we can correct birth order and sibship size for sibling mortality, and examine the effects of paternal and maternal mortality on apprenticeship.

Studies of the socioeconomic background of youths placed in pre-modern craft apprenticeship typically show that these were mainly the sons of the “middling sorts” (Earle 1989; Leunig, Minns and Wallis, 2011). This broad characterization appears to hold up well for the linked sample we have created. Nearly all the apprentices we linked were male. Provincial apprentices predominantly had fathers in the primary sector (ie. agriculture) and manufacturing occupations, with a some sons of merchants and traders (distribution and sales) and a smattering of gentry children also present (Table 2). A few managed to secure an apprenticeship from the lower rungs of society, such as labourers’ sons. Fewer apprentices with primary sector or gentlemen fathers are in evidence in London, where intake was dominated by the sons of tradesmen whose clustering in ‘manufacturing’ may reflect their Livery Company affiliation more than their actual trade. For apprentices linked to the Stamp Tax records, we know that their premiums, usually of around 15 to 20 pounds, were in line with those paid by larger samples of apprentices (Minns and Wallis 2011). On these observable characteristics, the apprentices we linked appear to be fairly representative of the apprentice population as a whole.

We have no benchmark for apprentices’ family characteristics, but there are some striking features. Many were the eldest surviving son in their family – in London, two-thirds of apprentices had this position, but even a third of provincial apprentices were eldest sons. The number of surviving male children in an apprentices’ family (measured here to age 5) differs markedly between the two groups. London families were small, with under two surviving sons. In the provinces, almost twice as many sons survived on average. Record linkage may be artificially lowering the number of sons in London, but demographic pressures were much harsher in the city (Landers 1993).

Aside from the uncertainties that attach to any linkage between different sets of records, our approach comes with some important limitations that need to be noted. First, in principle, the reconstitutions describe the structure of all resident families, and supply a history of demographic events within the family so long as these take place in the parish of observation. In practice, migration, uncertainties in record linkage and limits in the comprehensiveness of the original records mean that the amount of evidence available for each individual child and family varies greatly.<sup>8</sup> Vital events that occurred outside the parish and departures from the parish (other than through a local death) are not recorded. This may cause us to underestimate family and sibship size if children had been born outside the parish, and to overestimate the number of surviving siblings competing for family resources if some died outside the parish. Both types of error will affect our assignment of a birth order position to children.<sup>9</sup>

Second, apprenticeship, and in particular formal guild-regulated apprenticeship, was only one avenue through which youths could acquire skills in this period. Our sources do not tell us about placements in agricultural or domestic service, informal apprenticeships, or training within the parental family.<sup>10</sup> Nor, obviously, do they tell us anything about apprenticeships in London Livery Companies outside our sample or about provincial apprenticeships for which no premium was paid (or, more precisely, no tax was paid on the premium). The likely effect is to bias our sample to those able to obtain 'high quality' opportunities, as masters who did not charge premiums were generally

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<sup>8</sup> Wrigley et al. 1997

<sup>9</sup> The first type of error can be addressed to some extent by restricting the sample to 'completed' families where the marriage is observed in the parish and the mother is still observed in the parish after her reproductive period ends. Estimates of the share of first-born apprentices with mothers who were born and buried in the parish of origin are extremely close to that found in the full regression sample. No secure correction method exists for the second type of error. Wrigley et al. 1997.

<sup>10</sup> The exception to training within the family is when fathers registered their sons with their guild. Twenty nine of our linked apprentices from the Livery Company records were bound by their father. No provincial fathers training sons are recorded, because such arrangements are unlikely to appear in the Stamp Tax records, as fathers don't charge a premium to themselves.

in lower-income trades, and training in London was relatively costly but sufficiently attractive to draw in a uniquely broad pool of youths.<sup>11</sup>

Third, while we are able to link a reasonable share of those Stamp Tax and Company apprentices who are known to have come from these parishes to their roots, our sample includes just under 0.7 percent of male children in provincial parishes and 3.8 per cent of male children in London. The handful of female apprentices we identify account for a trivial share of female children.<sup>12</sup>

These limitations affect the type of questions that we can usefully address. Any attempt to explain why some children were apprenticed and others were not in a population where (a) the proportion of children we observe as apprentices is so small and (b) so many children who were apprenticed are not identified, is unlikely to yield sensible econometric results. As with most studies of apprenticeship, we thus cannot say anything about how those who ended up in apprenticeship were selected from the broader pool of youths in their town or parish of origin. For this reason, we treat our linked group of apprentices as a random sample of children entering these kinds of apprenticeships, and concentrate mainly on the allocation of apprenticeship places among children *within* households where we observe at least one child being apprenticed. The question that we pursue here is how families that did have the resources necessary to finance an indenture decided *which* child to place in apprenticeship.

### **Which children became apprentices?**

In deciding how to allocate opportunities between children, families are likely to be influenced by custom, economic constraints, aptitude and the impact of demographic events, such

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<sup>11</sup>Minns and Wallis 2012; LeunigMinns and Wallis 2011.

<sup>12</sup> Approximately 72,823 male and 71,451 female children were born who are not known to have died before age 12 in the provincial reconstitutions; they are identified with 80,703 'families'. For Cheapside and Clerkenwell the figures are 14,695 male, 14,933 female children, and 26,003 'families'. Many 'families' are identified through the record of a single child's baptism.

as the death of a parent or a sibling. In particular, as the division of family property following the death of the father or mother was shaped by formal and informal legal and social expectations, earlier decisions about the education and migration of children would anticipate and foreshadow later inequalities. Where the inheritance system favoured primogeniture, families with large portfolios of relatively illiquid resources, most notably land holdings in agriculture, would transmit these to the eldest surviving son. Under northern European expectations that extended families would rarely cohabit, children further down the birth order would need to find a separate way to support themselves.<sup>13</sup> As the evidence for English gentry families demonstrates, younger children would therefore be more likely to be placed in an apprenticeship that would provide them with entry into a different occupation and, often, a new location -- always, of course, subject to the family having the resources necessary to finance an apprenticeship premium and to forgo the potential income of these children.

However, one might also expect apprenticeship decisions to represent a rational response to the economic circumstances facing the family. If maximizing intergenerational wealth accumulation was an important consideration, the aptitude of children for a trade should play a prominent role in deciding which child to place in an apprenticeship. Families might want to “pick winners” in this way, but they would also be constrained by the prospect of parent mortality, child mortality, and uncertainty over ultimate family size. All else being equal, aptitude should lead to a random distribution of apprenticeships, although uncertainty may favour devoting resources to earlier children.

To evaluate the presence of a birth order effect on non-elite family investments we compare the chance allocation of apprenticeships by birth order to the allocation observed in our sample. Suppose that families select one son for apprenticeship, that aptitude for apprenticeship is independent of birth order, and that parents selected the son they thought had the greatest

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<sup>13</sup> Although see Ruggles.

aptitude for training. Given these conditions, we would expect that the share of apprentices who were eldest sons would be no different to the share of all sons who were eldest sons. Families with two sons should put half of eldest sons into apprenticeships, those with three sons should put a third and so on. In general, if the share of apprentices who are eldest sons diverges significantly from share predicted by the inverse of the number of surviving male children, then we have prima facie evidence of families differentiating between boys by birth order.

Figures 4 to 6 report the results of this comparison (Appendix Table A1 contains the underlying data). In provincial England, apprentices were more likely to be younger sons in all families with more than one surviving son (Figure 4). This tendency is more pronounced in those whose families were working in primary sector occupations (Figure 5). In London (Figure 6), the share of apprentices who were eldest sons is much closer to share predicted by the size of their family, and few of the differences by birth parity are statistically significant.

The tendency for apprentices to be used for sons who were lower down the birth order varied according to the economic background of their parents. There are clear occupational differences in the percentage of eldest sons who were apprenticed by parent occupation group. In provincial parishes (Figure 7), apprentices from with fathers in the primary sector or distribution and sales were the least likely to be eldest sons, while sons of fathers in the service sector or labourers were much more likely to come from the top of the birth order. These differences may in part reflect unobserved differences in family size within each group, as richer parents typically had more surviving male children (Clark and Hamilton 2006; Boberg-Fazlic, Sharp, and Weisdorf, 2011), but the eldest sons of servants are clearly over-represented, while the opposite is true for the eldest sons of merchants and traders in distribution and sales. A similar pattern is also evident in London (Figure 8). In the metropolis we find similarly large differences in the share of apprentices who are eldest sons, despite a smaller range of surviving male sons between occupation groups.<sup>14</sup> On average,

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<sup>14</sup> Figure 7 and 8 are constructed for families with at least two surviving male sons. This eliminates the mechanical bias resulting from the inclusion of single-son families where the eldest son must be the one who

eldest sons were less likely to be the one put up for an apprenticeship where there were other siblings to consider, but families with limited resources who were able to acquire a training place appear more likely to have directed opportunities towards older sons.

Regression analysis allows us to undertake a more fine-grained examination of the effects of birth parity. For samples of all male children surviving to age 5 in both the provincial and London linkage sets, we have estimated linear probability regressions of the determinants of which child or children in each family received an apprenticeship.<sup>15</sup> These results confirm the visual evidence from the previous sets of figures. In the provinces (Table 3), eldest sons are significantly under-represented relative to later sons, a pattern that is robust to the inclusion of controls for occupation (model 2) and female sibship size. For London (Table 4), the eldest son effect is much closer to zero. In both samples, models 3 and 4 in the regressions explore patterns of apprenticeship by parent occupation. We find parents in farming (primary) diverting training opportunities to younger sons to a greater degree than other groups in the provinces, and those from the distribution and sales sector doing the same in London. In other sectors, and especially in London, the data suggest that parents were less influenced by the birth order, with eldest boys treated in a similar way to their younger brothers. Birth order biases would appear to be strongly conditioned by the nature and likely divisibility of family resources, and are significantly weaker in urban than rural contexts, suggesting a further dynamic relationship between urbanisation and development.

### **Apprenticeship and household shocks: evidence from parental mortality**

How did families respond to economic shocks faced by the household? Work on child and adolescent labour in later periods by Jane Humphries and others has suggested that the patterns of

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was indentured. There are a lot more single surviving son families in London, which we suspect reflects both fertility and mortality conditions, and movement into the parish where only local births are properly recorded. If single sons are included in the calculations underlying Figures 7 and 8, the eldest son share rises sharply (especially for London), but the relative differences between parent occupation groups remain.

<sup>15</sup> We have also estimated probit regressions, which yield strikingly similar marginal effects.

children's entry into the workforce and their departure from their natal home need to be understood in the context of family income, the morbidity and mortality of parents, and the numbers of siblings and other kin needing support. We lack detailed evidence on short term economic dynamics in apprentices' parishes of origin, but family reconstitutions do provide good evidence on two shocks that could have had large effects on apprenticeship outcomes: the death of the father or mother of a future apprentice.

The ways in which families responded to crisis will reflect the interaction of a complex of factors and the outcomes may be surprising. For example, Humphries finds that father and mother's mortality each had a different effect: when fathers died, children remained in co-residence with mothers. When mothers died, there was only an even chance they would remain resident with fathers (Humphries 2009: 81). For apprenticeship, the most direct measure of the impact of a shock is through the age at which a child was apprenticed. If financing an apprenticeship was a major constraint for most families, the father's death might delay the age of entry into apprenticeship, as it would slow subsequent wealth accumulation. In the early seventeenth century, Arise Evans' experiences of being 'put away from all, and tossed from place to place to do any drudgery, as a forlorne childe' in the years after his widowed mother remarried reflect this kind of disruption (Evans 1653). Evans was eventually bound to a tailor, but some families who had intended to apprentice at least one child might no longer have the resources to do so. However, if the father's death led to a youth receiving his inheritance it might advance entry into apprenticeship. The death of a mother would in almost all cases have much less of an effect on wealth accumulation, but could slow human capital accumulation if maternal time was an important component of education. If death led to the breakdown of the household, it might advance apprenticeship as a way to provide a stable position for a child, as Mayhew has suggested occurred in Rye (1991).

We have linked age of binding to paternal and maternal mortality in both the provincial and London samples (Figures 9 and 10). We find that parental mortality had striking effects on the age of binding in both series. Apprentices with fathers who were still alive were on average 6 months

younger when bound than apprentices with fathers who were deceased. Age of binding was higher if more time had passed since the father had died. In the provincial parishes, those whose fathers had been dead more than 10 years were almost three years older at indenture than those with fathers who were still living. This second finding in particular offers strong support for the view that the main effect of losing a father was delayed apprenticeship. It seems plausible that this was because paternal mortality reduced family income and made it harder to release older children from the household economy. We also find that maternal mortality has a similar, somewhat smaller effect on age of binding. This supports the argument that loss of a mother reduced the capacity of a family to allocate time to the education and training of children, but the magnitude of this effect is surprising, particularly in the London sample (Figure 8). Finally, those unfortunate enough to lose both parents in childhood often had a very long wait before apprenticeship began. We only observe a small number of orphan apprentices with parents dead for 10 years or more, but these boys had to wait well into adulthood before securing their indentures.

### **Returning to the parish: marriage and death**

The discussion so far has focused on how family structure influenced apprenticeship placements. We now turn to the question of what followed apprenticeship, and in particular the extent to which apprenticeship outside of the place of origin marked a permanent out-migration, or if parents might anticipate their children returning after training.

Many apprenticeships involved long-distance migration, usually to London. The traditional literature on apprenticeship emphasizes that this was a first step to corporate citizenship; successful apprentices would therefore have little reason to return to their original place of residence after training (Rappaport 1988). It is also well-known, however, that between a third and a half of apprentices did not complete their term of apprenticeship, and that fewer than half of apprentices settled to become citizens or freemen of the place in which they trained after their training (Ben-Amos 1991; Wallis 2008; Minns and Wallis 2012; Humphries 2011).

Thus far, historians have only been able to speculate about what happened to those apprentices who disappeared from training and the corporate system. Colourful examples from criminal records can give the impression that non-completion could be equated to failure. However, it is also plausible that many apprentices entered their training with some anticipation of early departure. The patterns of apprentices' departures in late seventeenth century London and Bristol suggest that some had probably entered service to obtain training and connections that they could use if they returned to their family home (Minns & Wallis 2012). Premiums paid by apprentices also appear to reflect the higher likelihood that some apprentices were likely to leave early, with apprentices from groups who were more likely to leave early paying higher fees to their masters (Minns & Wallis 2011). Actual evidence that youths engaged in apprenticeship as part of circular migration has been fragmentary at best, however.

The linkage between apprenticeship lists and parish reconstitutions provides three types of evidence about the return of youths who had taken up apprenticeships: records of ex-apprentices marrying, being buried and establishing a family within their parish of birth. The share of apprentices who are observed in each of these three ways is given in table 5, along with a measure of the share observed in any of them. Only the third type of evidence, establishing a family, offers firm proof that an apprentice had taken up residence, assuming that the linkage in the reconstitution was accurately made. A marriage might precede a further migration, or simply be an apprentice returning to collect a bride. A death may record a youth who had returned home when sick, or an adult who had returned in retirement to their place of origin. Nonetheless, at the very least, marriage and death records indicate the persistence of strong connections with the community of origin, and in some cases it seems likely that they can be interpreted as evidence of circular migration, while starting a family offers strong evidence of circular migration.

How often did apprentices marry in their home parish? Overall fifteen percent of apprentices would later wed in their parish of origin. Because we have a substantial number of apprentices who remained in their place of origin to train, we have a benchmark against which to

evaluate the effect of migrating to train the probability of later marrying at home. As table 4 shows, fifteen percent of apprentices from London (all of whom trained in the city) eventually wed in their home parish. That a relatively small share of Londoners were observed marrying locally is not surprising given the large number of parishes in the city, and the popularity of non-parochial marriage at the Fleet and other liberties. Presumably, many more were married elsewhere in the metropolis.

Among provincial apprentices, the marriage pattern is more interesting. As one would expect, the marriage rate declines for apprentices who migrated for their training. Thirty percent of those training in their home community would wed there.<sup>16</sup> The marriage rate fell to 16 percent among youths apprenticed elsewhere but outside London, and to 10 percent for those who migrated to London to enter apprenticeships. Moving to another non-London location to train lowered the chance of marrying at home by a half. But moving to London cut the chance of being observed marrying at home by two-thirds. It is unsurprising that the likelihood of returning for marriage declines with distance from home, but it is remarkable that one in ten youths who migrated to London as apprentices married in their home parish. To put this in context, if marriage does indicate return migration, this would account for one in five of London apprentices who did not become citizens in the city.

The chance that apprentices would marry in their parish of origin varied according to the local economic characteristics of their home parish. We use Wrigley et al's classification of the reconstitution parishes as agricultural, industrial, retail, metropolitan (i.e London), and 'other', for mixed economies. As table 6 shows, there were clear contrasts between agricultural, industrial and retail parishes. Apprentices from agricultural parishes had relatively few incentives to return to wed,

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<sup>16</sup> One of our linkages – that between local children and provincial apprentices bound locally for whom we have no information on the place of origin – would appear particularly vulnerable to producing a false positive finding of local marriage if our linkage is in error. We therefore tested the propensity to marry locally for the sample excluding this group. The likelihood of an apprentice marrying locally actually increases to 33% (16/49) once this group are excluded, although the sample size shrinks.

given their occupational orientation, and few trained locally for the same reason. Industrial parishes were more likely to see migrants returning, and to retain local apprentices. The most striking pattern is in retail parishes, where locally trained apprentices were very likely to be seen marrying, but those who left were unlikely to return.

Apprentices were buried in their parish of origin with much the same frequency as they were wed there. Only 7 percent of London apprentices were buried locally, compared to 33 percent of provincial apprentices who trained in their parish of origin. Again, there is considerable evidence of apprentices returning to their parish, with 18 percent of provincial apprentices trained in London and 31 percent of those trained elsewhere buried at home.<sup>17</sup>

The distribution of apprentices who are identified as fathering their own family in their parish of origin provides a similar impression of the likelihood of settling in one's own place of origin. Table 5 reports the distribution of the 169 apprentices who are identified in the reconstitutions as heads of later families. Among apprentices from London, only one in twenty are thought to have started their own family in their parish of origin. As with marriages and burials, the level of this figure should not be over-interpreted, given the number of parishes where they could have settled in the city. Among provincial apprentices, 30 percent of those trained locally were recorded starting their own family. Strikingly, 16 percent of those trained elsewhere and 14 percent of those trained in London are thought to have baptised children in their parish of birth. It needs to be noted that the group of apprentices from provincial parishes who are identified baptising children is not just a subsample of those who are identified marrying in their parish of origin. Forty of eighty-eight apprentices with families have no marriage record.<sup>18</sup>

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<sup>17</sup> As with marriage rates, it is sensible to test the effect of excluding apprentices linked on the basis of local masters taking apprentices without information of place of origin. Again, if we exclude these potentially weak links, the proportion of apprentices buried locally increases to 37% (18/49)

<sup>18</sup> The London reconstitutions appear to follow slightly different rules: all apprentices with children also have a marriage link.

When we combine these different indicators to look at the cumulative likelihood that apprentices would re-appear in their parish of origin, we find one in four apprentices have a vital event in their home parish's records after they were bound. A reasonable amount of this is due to continuity in the place of training. Almost half of provincial, and just over a fifth of London, apprentices who were bound locally registered some later event in their parish records. However, there is also substantial evidence of apprentices returning to their parish of origin after entering training elsewhere: 25% of provincial apprentices bound in London and 35% of provincial apprentices bound outside their home but not in London re-appear in later parish records. No doubt some of these later appearances reflect errors of linkage. Yet the underlying pattern of distance affecting the probability of return is credible, and some account should also be taken of the effect of inter-generational linkages that might have been missed or excluded in the reconstitutions, and which will bias our estimates downwards.

## **Conclusions**

An apprenticeship was one of the main human capital investment opportunities available to pre-modern families. The decision to undertake such an investment brought with it a series of important economic considerations. Which child should receive the apprenticeship? At what age should the investment take place? What were the effects of indenturing a child on their continued connections to the family and home community? The answers to these questions reveal the importance of culture, economic constraints, and intergenerational relationships in shaping private human capital investment decisions prior to industrialisation.

In this paper, we provide the first substantial body of evidence on the way non-elite pre-modern families determined the allocation of this kind of human capital investment. In families in which a child was apprenticed, we find evidence of a modest bias against apprenticing the eldest surviving son. This bias was greatest among the sons of provincial farmers. For the children of

Londoners bound in their own city there is much less evidence of a distinctive birth order pattern, likely reflecting their parents own direct experience of apprenticeship, its utility as an entry route to citizenship, and the continued proximity of those sons who were bound out. Among the poor, the bias may have been in favour of eldest sons. It seems that the social and economic significance of apprenticeship varied between families depending on the nature of their other property, particularly the relative significance of land holdings, and their economic position. For most of the broadly defined middling sorts of English provincial society, apprenticeship was an investment favoured for junior sons, suggesting some commonality of practice with the landed elites. However, it is important not to lose sight of the fact that the scale of the bias was entirely different. Among the gentry, eldest sons were almost never apprenticed. Outside the gentry, a large number of apprentices were eldest sons, even from farming families. This implies a relatively large place for a child's aptitude and interest in shaping their career (Ben Amos 1994) compared to custom or inheritance practices. The contrast is even sharper if drawn against the much stricter birth order rules apparent in studies of Spain and Italy (Barrera-Gonzalez 1992; Ago 1992).

That apprenticeships were very much investments for families is underlined by the effect of parental mortality on the age when apprentices started their contracts. Apprenticeship was dominated by middling sorts, but even so children would find their access to training severely disrupted by the death of a parent. Losing a parent appears to have little effect on birth order, suggesting that aptitude for training remained a prime consideration even when a parent was lost to the family unexpectedly. Our investigation of returns to the home parish shows a surprisingly high rate of return migration, questioning the emphasis on neo-locality in most studies of family structures. Many apprentices returned to wed, while others made their way home with a spouse from outside the parish to establish a new family in their home parish. Even apprenticeships with London did not necessarily lead to an irrevocable break with the family and home community. Given this, it seems plausible that parents could anticipate benefiting from positive externalities arising from the training provided to children.

These findings have several implications for the role of apprenticeship-based human capital formation in supporting economic growth. Limited evidence of bias against first sons (or towards second sons) suggests that human capital investments were mainly distributed according to aptitude rather than on the basis of cultural norms based on birth parity. Even in farming families, land did not entirely extinguish alternative options. That many apprentices maintained connections with their home parish after training would have reinforced the incentives of parents to provide training opportunities to those most able to succeed. Our results suggest that pre-industrial parents were interested in allocating opportunities in order to maximize the potential to produce “quality” children, but that poverty and economic disruption imposed large barriers on how much families could provide.

In this, the families that supplied apprentices behaved quite differently from the English elite. English families from the urban and provincial middling sort acted in ways that contradict some recent attempts to attribute economic growth to the diffusion of elite genes or values (Clark 2006). Given the numerical and economic importance of this broad social group, their behaviour also casts doubt on arguments that assign profound consequences – in entrepreneurship, politics and even imperial adventure - to the application of primogeniture in premodern societies (Goody 1983; Thompson 1976; Landes 2003: 67). Where pre-industrial elites were bound by tradition, or constrained by the high costs of partition of part of their estate, they preferred birth position to aptitude; below the upper crust, pre-industrial families behaved much as families do in studies of labour markets in the present day.

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Table 1: Linkage Results, by parish and apprentice source

	Livery Companies			Stamp Tax		
	number of apprentices	number linked	% linked	number of apprentices	number linked	% linked
Banbury	258	128	50	77	44	57
Reigate	249	55	22	60	39	65
Other parishes	640	160	25	229	55	24
<i>Total provincial</i>	<i>1147</i>	<i>343</i>	<i>30</i>	<i>590</i>	<i>155</i>	<i>26</i>
Cheapside	98	16	16	15	1	7
Clerkenwell	1951	479	25	288	74	26
St Botolph	1997	314	16	224	28	13
<i>Total London</i>	<i>4046</i>	<i>809</i>	<i>20</i>	<i>527</i>	<i>103</i>	<i>20</i>
<b>TOTAL</b>	<b>5193</b>	<b>1152</b>	<b>22</b>	<b>1017</b>	<b>258</b>	<b>25</b>

Notes: See text for more details on sources.

Table 2: Descriptive statistics for linked samples

	Provincial parishes	London parishes
<b>Parent Occupation</b>		
% primary father	23	5
% manufacturing father	31	56
% distribution and sales father	8	2
% labourer father	5	6
% service father	4	6
% professional father	11	17
% gentleman father	7	1
% unknown	11	7
<b>Family structure</b>		
% eldest sons	39	66
% second sons	31	22
% > second sons	30	11
% female apprentices	1.7	0.6
Male siblings surviving to age 5 (mean)	4.7	1.8
(st deviation)	2.4	1.1
<b>Training</b>		
% in London	76	99
Premium paid, mean (st. error)	15 (21)	20 (31)
N	484	886

Notes: Parent occupation observations for London will be affected by fathers reporting Livery Company membership not occupation.

Table 3: Birth order, sibling, and apprenticeship in provincial parishes

	(1)	(2)	(3) primary	(4) not primary
eldest male	-.10 (-3.5)	-.12 (-3.8)	-.24 (-3.7)	-.08 (-2.3)
one male				
two males	-.44 (-7.2)	-.47 (-6.9)	-.43 (-2.8)	-.46 (-6.1)
three males	-.64 (-10.3)	-.68 (-9.8)	-.67 (-4.2)	-.68 (-8.7)
four males	-.72 (-11.6)	-.75 (-10.8)	-.82 (-5.2)	-.73 (-9.4)
five males	-.79 (-11.4)	-.82 (-10.9)	-.88 (-5.2)	-.80 (-9.3)
six males	-.82 (-11.2)	-.85 (-10.4)	-.95 (-5.4)	-.82 (-8.8)
seven males	-.84 (-9.9)	-.88 (-9.6)	-1.0 (-5.3)	-.84 (-8.2)
eight males	-.84 (-6.6)	-.88 (-6.6)	-.94 (-4.9)	---
ten males	-.93 (-5.9)	-.96 (-6.0)	---	-.94 (-5.7)
female sibship size dummies	Y	Y	Y	Y
parent occupation dummies	N	Y	N	N
constant	1.06 (16.9)	1.10 (14.7)	1.18 (7.0)	1.07 (13.9)
R-square	.17	.17	.21	.17
N	1212	1060	251	809

Notes: The dependent variable is a dummy indicator of whether or not the individual was indentured to an apprenticeship. The sample consists of male children who survived to age five in households where at least one male child was identified as being apprenticed. We use the number and rank of siblings (male or female, depending on the case) surviving to age five. Estimated by OLS, t-statistics in parentheses.

Table 4: Birth order, sibling, and apprenticeship in London

	(1)	(2)	(3) distribution & sales	(4) not distribution & sales
eldest male	-.015 (-0.6)	.002 (0.1)	-.109 (-1.3)	.013 (0.5)
one male	-		---	---
two males	-.473 (-14.8)	-.463 (-14.0)	-.437 (-3.8)	-.464 (-13.4)
three males	-.621 (-16.8)	-.611 (-15.7)	-.705 (-5.7)	-.604 (-14.8)
four males	-.701 (-17.0)	-.690 (-15.8)	-.824 (-6.2)	-.674 (-14.5)
five males	-.781 (-15.6)	-.771 (-15.1)	-.889 (-6.1)	-.759 (-13.9)
six males	-.816 (-11.7)	-.829 (-11.1)	-.922 (-4.7)	-.828 (-10.4)
seven males	-.821 (-8.3)	-.856 (-8.4)	---	-.056 (-0.2)
eight males	-.893 (-5.9)	-.879 (-5.8)	---	---
female sibship size dummies?	Y	Y	Y	Y
parent occupation dummies?	N	Y	N	N
constant	1.02 (29.7)	0.98 (17.1)	1.11 (9.7)	.99 (26.5)
R-square	.31	.32	.39	.31
N	1637	1514	144	1370

Notes: The dependent variable is a dummy indicator of whether or not the individual was indentured to an apprenticeship. The sample consists of male children who survived to age five in households where at least one male child was apprenticed. We use the number and rank of siblings (male or female, depending on the case) surviving to age five. Estimated by OLS, t-statistics in parentheses.

Table 5: Evidence of Continued Activity in Place of Origin

		Provincial Apprentices	London Apprentices	All Apprentices
Number of apprentices	Apprenticed locally	66	889	955
	Apprenticed in London	369		1258
	Apprenticed elsewhere	49		49
% married in home parish	Apprenticed locally	30	15	16
	Apprenticed in London	10		14
	Apprenticed elsewhere	16		16
% buried in home parish	Apprenticed locally	33	7	9
	Apprenticed in London	18		11
	Apprenticed elsewhere	31		31
% with children baptised in home parish	Apprenticed locally	30	5	7
	Apprenticed in London	14		8
	Apprenticed elsewhere	16		16
% any presence in home parish	Apprenticed locally	44	22	24
	Apprenticed in London	25		23
	Apprenticed elsewhere	35		35

Notes: See text for sample details, and Appendix table A2 for detailed statistics by parish of origin.

Table 6: Marriage rates by type of home parish

Parish Type	% Marrying in home parish			N		
	Apprenticed locally	Apprenticed elsewhere	All	Apprenticed locally	Apprenticed elsewhere	All
Agricultural	0.0	7.3	7.1	1	41	42
Industrial	36.4	13.9	19.1	11	36	47
Metropolitan	15.4	0.0	15.4	889	2	891
Other	18.5	13.3	14.1	27	143	170
Retail	40.7	8.6	12.4	27	198	225
Total	16.4	10.5	14.6	955	420	1375

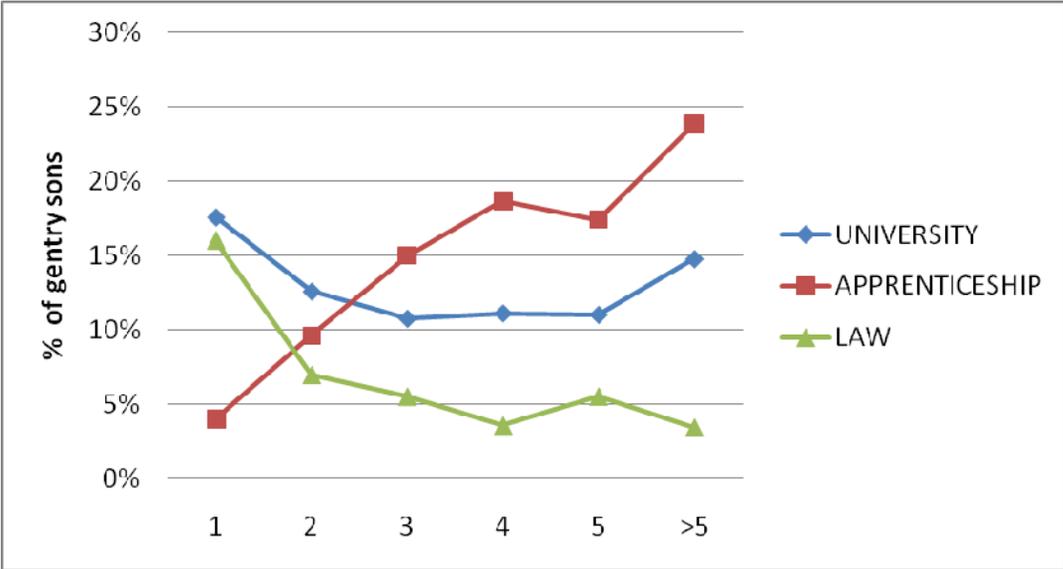
Appendix Table A1: Apprenticeship and birth order by sibship parity

London parishes				
Male sibship size	% eldest, all males	% eldest, apprentices	t-statistic on eldest coefficient	N apprentices
1	100	100		388
2	50	51	0.37	248
3	33	33	>0.01	126
4	25	18	-1.65*	77
5	20	11	-1.40	28
6+	16	29	0.49	14
Provincial parishes				
Male sibship size	% eldest, all males	% eldest, apprentices	t-statistic on eldest coefficient	N apprentices
1	100	100		75
2	50	45	-1.75*	137
3	33	29	-1.19	94
4	25	14	-2.84***	91
5	20	15	-.79	33
6+	16	11	-.82	36
Provincial parishes, primary sector				
Male sibship size	% eldest, all males	% eldest, apprentices	t-statistic on eldest coefficient	N apprentices
1	100	100		75
2	50	39	-1.75*	137
3	33	22	-1.19	94
4	25	5	-2.84***	91
5	20	0	-.79	33
6+	16	0	-.82	36

Appendix Table A2: Evidence of Continued Activity in Place of Origin , County Detail

Parish	N			% any return			% children			% marry			% buried		
	London	Local	Non local	London	Local	Non local	London	Local	Non local	London	Local	Non local	London	Local	Non local
March	5	9	3	20	22	0	0	22	0	20	22	0	0	11	0
Alcester	36	6	7	19	50	14	11	17	14	6	33	14	17	33	14
Aldenham	40	0	1	33		0	13		0	8		0	28		0
Austrey	7	0	2	29		0	14		0	0		0	14		0
Banbury	138	18	10	18	61	40	7	50	30	8	44	20	10	56	40
Birstall	5	0	0	20			0			20			0		
Bottesford	6	2	3	17	50	33	17	50	33	17	50	33	17	50	33
Colyton	8	0	0	63			38			25			63		
Great Oakley	0	1	0		100			100			0			100	
Lowestoft	4	3	3	25	33	67	25	0	0	25	33	0	25	0	67
Odiham	31	3	3	32	0	67	32	0	33	13	0	33	26	0	67
Reigate	61	13	14	34	15	36	21	15	14	11	15	14	28	0	21
Shepshed	28	11	3	18	73	67	11	36	0	11	36	33	14	64	67
<i>Provincial</i>	369	66	49	25	44	35	14	30	16	10	30	16	18	33	31
St Botolph Aldgate	332	333	1	12	12		4	4		9	9		2	2	
Cheapside	16	16	0	6	6		0	0		6	6		0	0	
Clerkenwell	538	540	1	29	29		6	6		19	19		11	11	
<i>London</i>	889	889	0	22	22		5	5		15	15		7	7	
Total	1255	955	51	23	24	35	8	7	16	14	16	16	11	9	31

Figure 1: Apprenticeship and birth order among the elite



Source: Wallis and Webb 2011

Figure 2: Parish locations

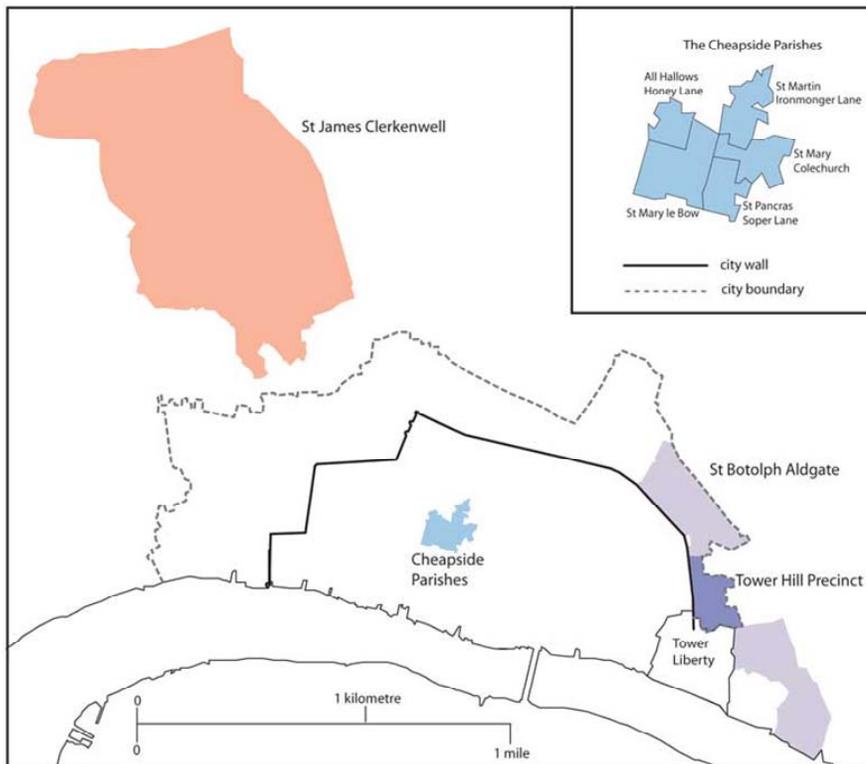
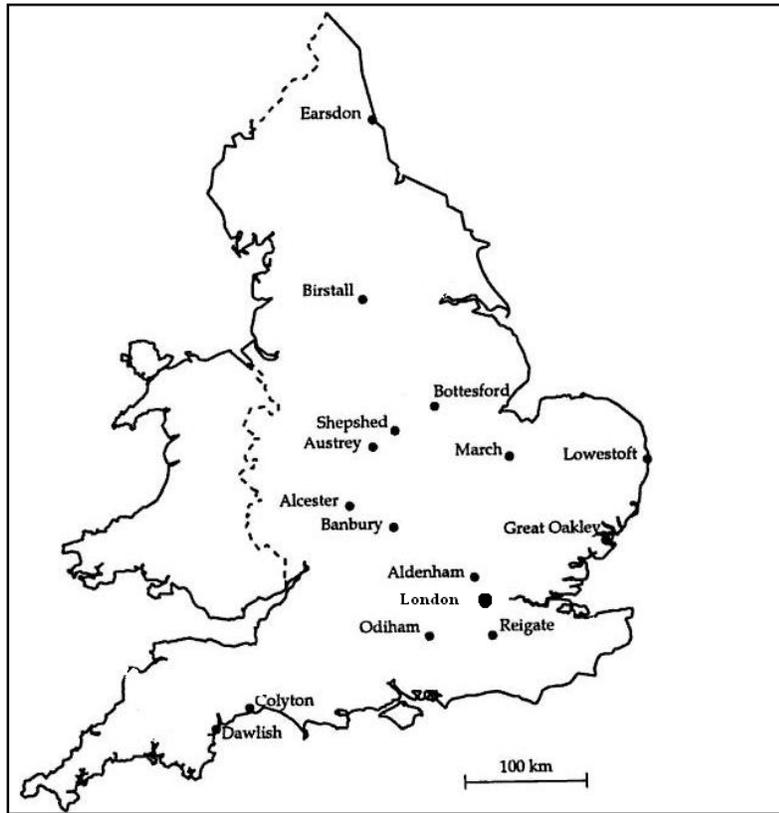


Figure 3: Temporal distribution of linkage results

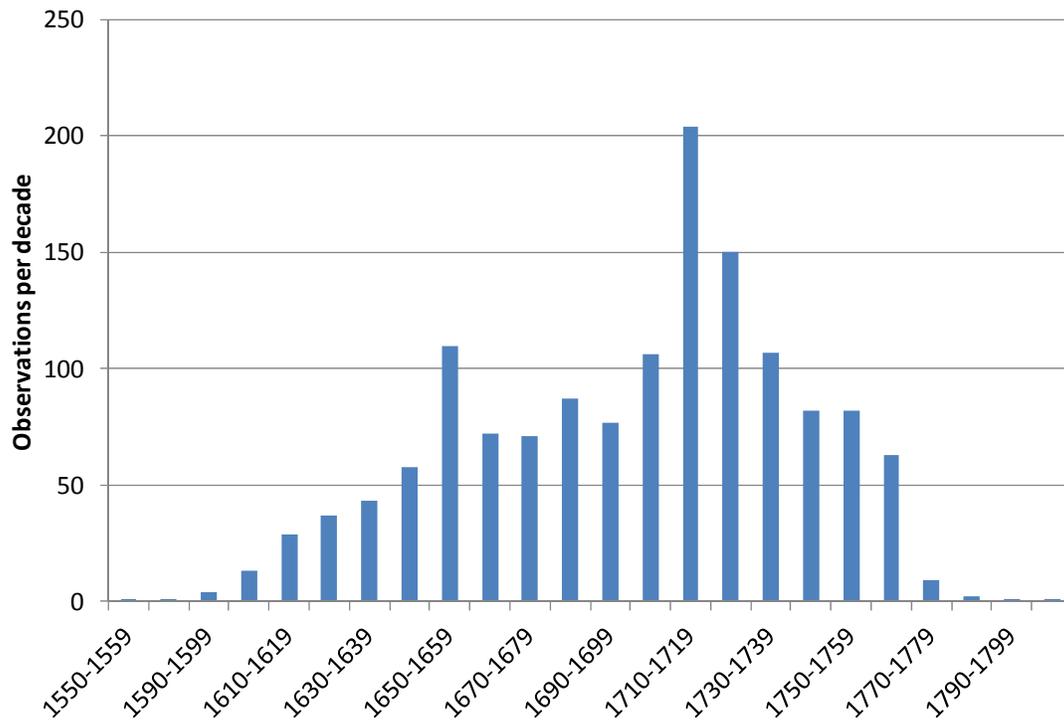
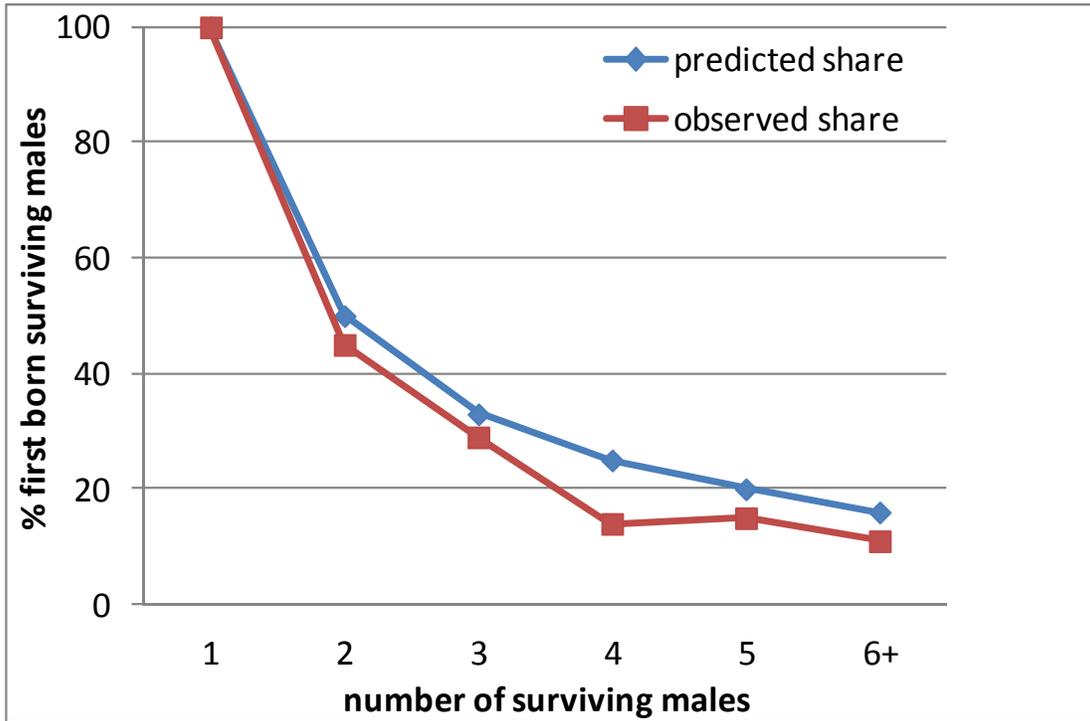
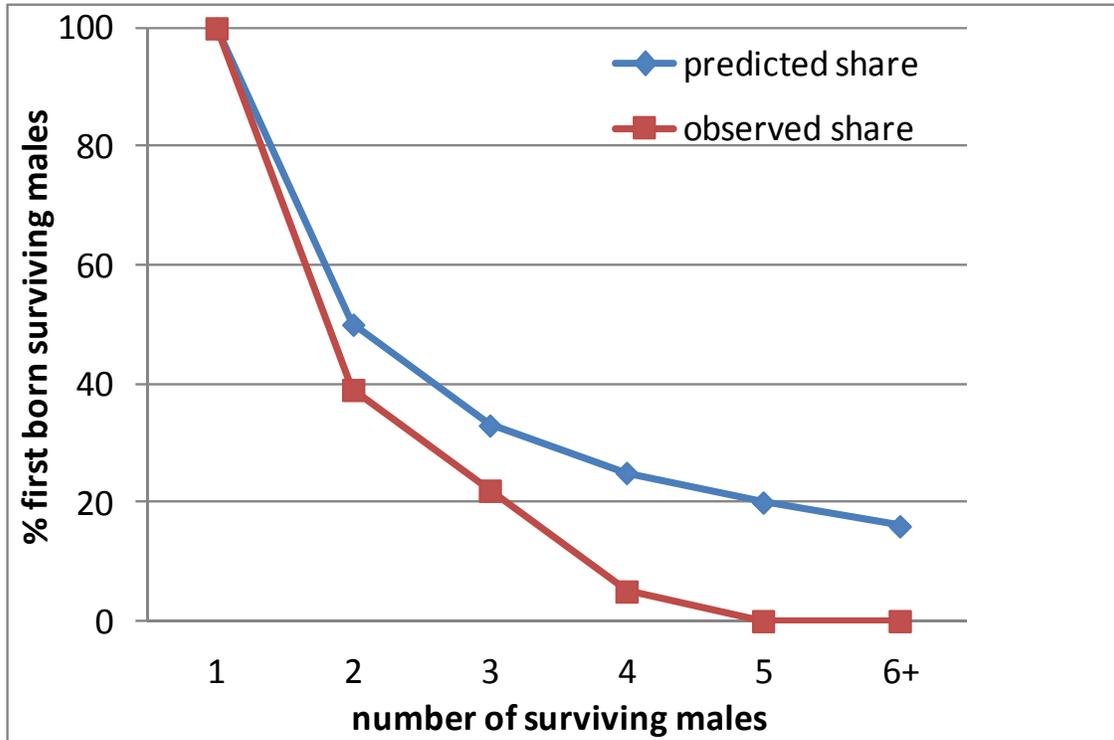


Figure 4: Eldest son shares in apprentice families, provincial parishes



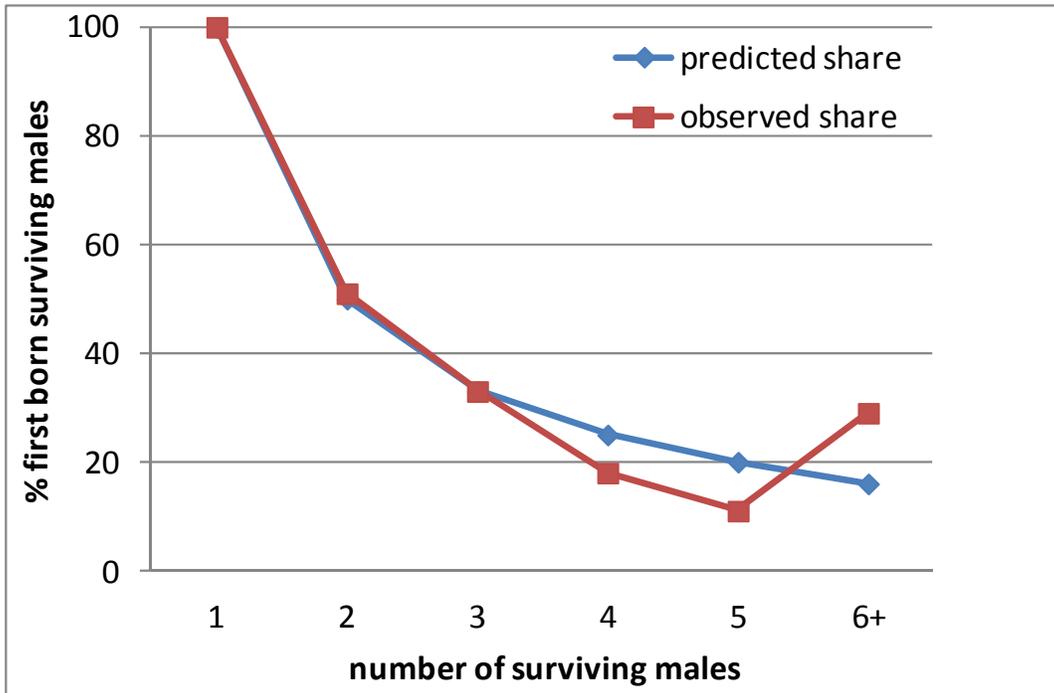
Notes: predicted share are the surviving first born shares that hold in a general population. Observed shares are the first born shares among apprentices.

Figure 5: Eldest son shares in apprentice families, provincial parishes, primary sector



Notes: predicted share are the surviving first born shares that hold in a general population. Observed shares are the first born shares among apprentices.

Figure 6: Eldest son shares in apprentice families, London parishes



Notes: predicted share are the surviving first born shares that hold in a general population.  
Observed shares are the first born shares among apprentices.

Figure 7: Eldest shares, by occupation, provincial parishes

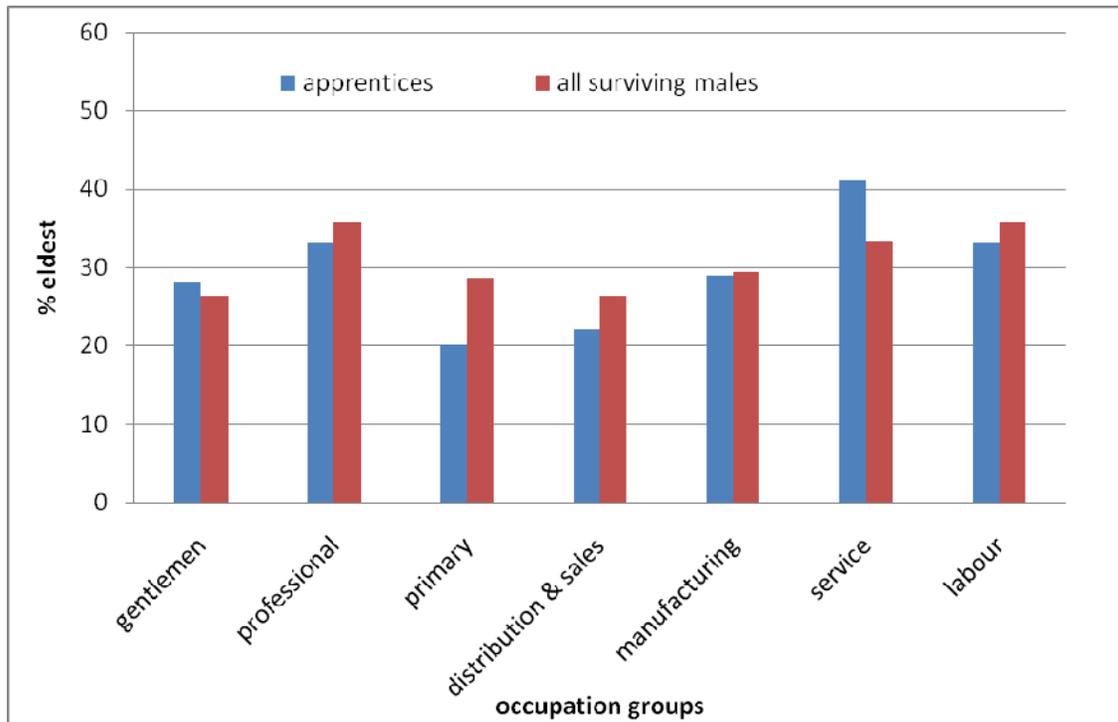


Figure 8: Eldest shares, by occupation, London sample

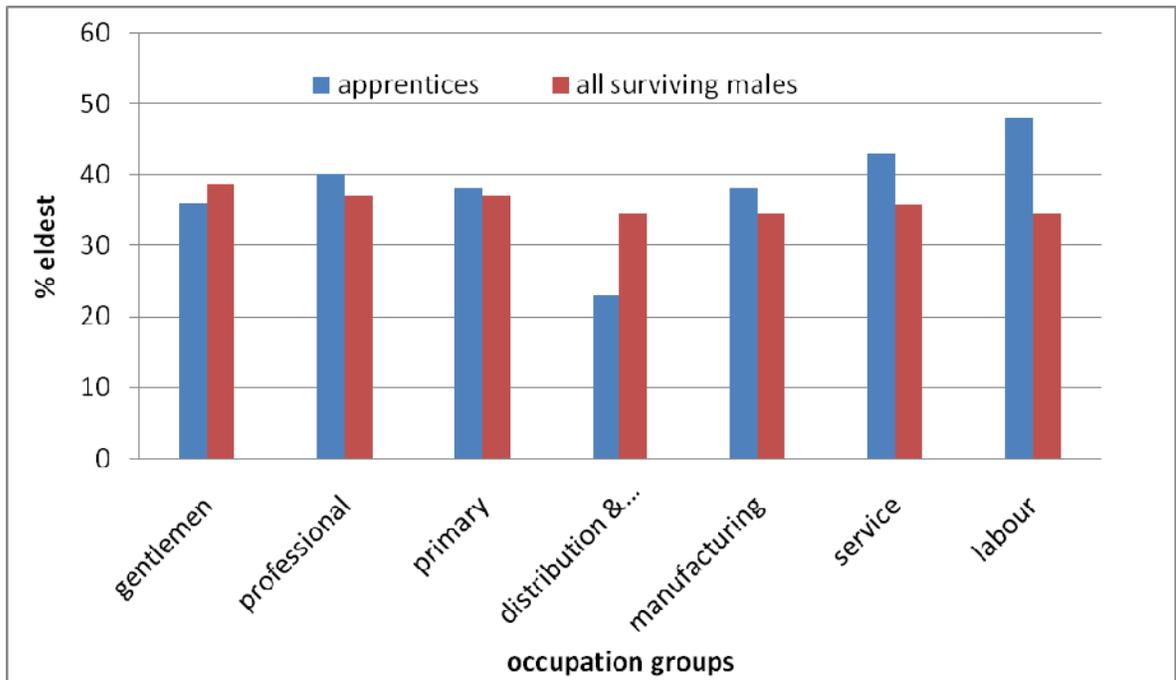


Figure 9: Age of binding and parental mortality, Provincial England

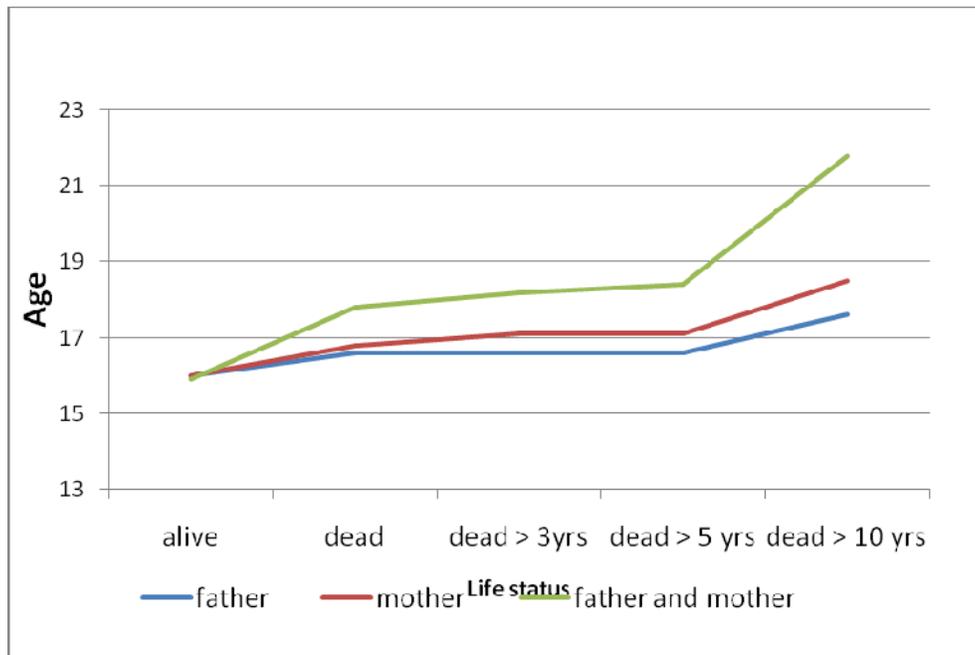
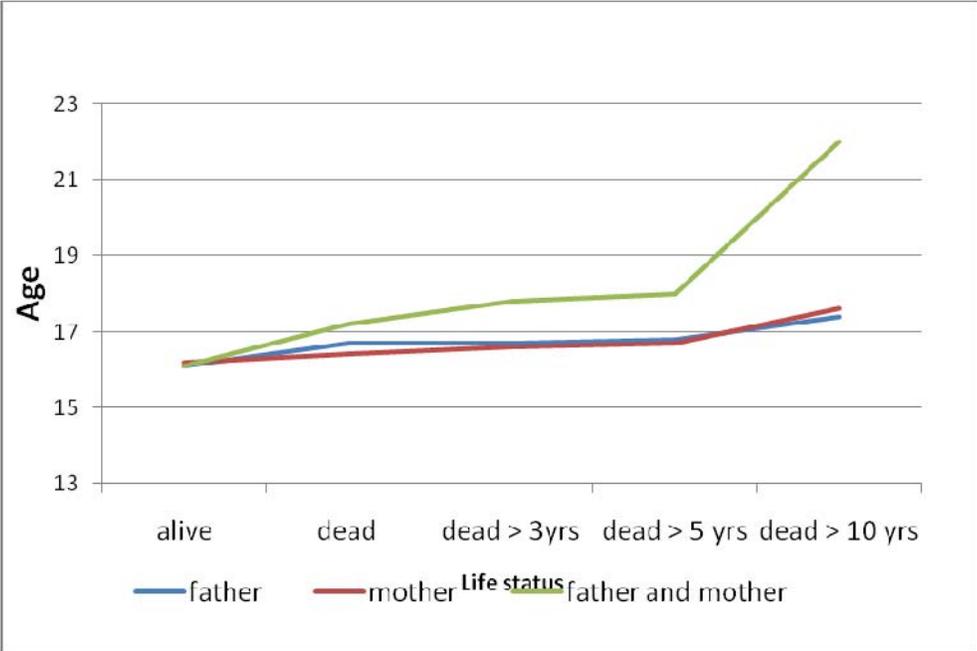


Figure 10: Age of binding and parental mortality, London



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