

CEP Discussion Paper No 956

November 2009

**Networks in the Premodern Economy: the Market for
London Apprenticeships, 1600-1749**

Tim Leunig, Chris Minns and Patrick Wallis

Abstract

This paper examines the importance of social and geographical networks in structuring entry into skilled occupations in premodern London. Using newly digitised records of those beginning an apprenticeship in London between 1600 and 1749, we find little evidence that networks strongly shaped apprentice recruitment. The typical London apprentice did not have an identifiable connection to his master in the form of a kin link, shared name, or shared place or county of origin. The majority of migrant apprentices' fathers came from outside of the craft sector. Our results suggest that the market for apprenticeship was strikingly open: well-to-do families of all types were able to access a wide range of craft and trade apprenticeships, and would-be apprentices had considerable scope to match their perceived ability and aptitude to opportunity.

Keywords: Apprenticeship, human capital formation, training, migration, networks, UK, early modern

JEL Classifications: N3, J2, J6

This paper was produced as part of the Centre's Productivity and Innovation Programme. The Centre for Economic Performance is financed by the Economic and Social Research Council.

Acknowledgements

Cliff Webb has been very generous in sharing his data, and Ian Galbraith kindly supplied it to us in an electronic format. Gill Newton at CAMPOP supplied us with the Double Metaphone algorithm we use for linking names, and Keith Snell supplied population data. Christopher Fish provided excellent research assistance. We thank Herb Emery, Gillian Hamilton, Eric Jones, Joel Mokyr, Leigh Shaw Taylor and participants at the 2008 World Cliometrics Congress, the 2008 CEPR/CREI "Rags to Riches" conference in Barcelona, and seminars at All Souls College, Oxford, Harvard and the London Migration Research Group for their comments. All remaining errors are our responsibility. Elements of this research were funded under the project "The Nature of Evidence: How Well Do 'Facts' Travel?" (Grant F/07 004/Z from The Leverhulme Trust and ESRC held at the Department of Economic History, LSE).

Tim Leunig is an Associate of the Centre for Economic Performance and Reader in the Department of Economic History, London School of Economics. Chris Minns is a Lecturer in the Department of Economic History, LSE. Patrick Wallis is a Senior Lecturer in the Department of Economic History, LSE.

Published by
Centre for Economic Performance
London School of Economics and Political Science
Houghton Street
London WC2A 2AE

All rights reserved. No part of this publication may be reproduced, stored in a retrieval system or transmitted in any form or by any means without the prior permission in writing of the publisher nor be issued to the public or circulated in any form other than that in which it is published.

Requests for permission to reproduce any article or part of the Working Paper should be sent to the editor at the above address.

© T. Leunig, C. Minns and P. Wallis, submitted 2009

Introduction

Understanding how workers are matched to particular employers has been the subject of extensive research in the social sciences. Of particular interest in recent years has been the role of social networks in shaping outcomes. Networks may be built around kin and other personal contacts. Granovetter, Montgomery, and others have illustrated that friends and relatives dominate formal channels in the job finding process in modern labour markets.¹ Links may also be forged between individuals from a common region, or neighbourhood within a region. Bayer, Ross, and Topa show that social interactions in a community influence where workers are employed, while Munshi demonstrates that community networks in the place of origin improve outcomes for Mexican migrants to the present-day United States.²

Scholars of historical labour markets have placed similar or even greater emphasis on the importance of social capital transmitted through community and kin in directing the recruitment and training of workers. This is perhaps best articulated in the literature on early modern apprenticeship. In England, apprenticed youths entered into indentures that were formally seven years in length. Apprentices trained and resided with masters who were usually located in urban areas, often a considerable distance from the place of origin of the apprentice. Many London apprentices migrated over 100 miles to the metropolis. In characterising apprentice migration, Peter Clark emphasised the importance of personal connections and kinship: “residual contact with one’s place of origin was a characteristic of betterment migration as a whole ... the urban immigrant was expected to look after the education as well as employment of his rural kinsman coming to town.”³ Rappaport also pointed to the importance of networks of relatives and friends, and suggested that “trade routes between London and other towns aided the placement of prospective apprentices.”⁴ Ben-Amos, Yarborough, and others put forward similar explanations for how labour movement was managed in pre-modern England.⁵ Limited quantitative evidence for continental Europe appears to support these claims, with Sheilagh Ogilvie finding that the vast majority of new masters in Wildberg (Württemberg) were in fact the sons of existing masters.⁶ Parisian apprenticeship in the late 18th century appears to be dominated by local apprentices, though guild connections between those presenting youths for apprenticeship (typically fathers or a surrogate) and masters do not appear to be especially common.⁷

The operation of such networks may have profound implications for the degree of social mobility within a society. The extent to which this is true, and how it may have changed over time or differed between societies, are questions of long lineage in the social sciences. John Stuart Mill argued that the onset of industrialisation served to reduce the importance of family connections and class in recruitment for particular forms of employment. Prior to industrialisation, different jobs were “almost equivalent to an hereditary distinction of caste”, with “each employment being chiefly recruited from the children of those already employed in it”. Now, however, “the habits or disabilities which chained people

¹ Granovetter, *Getting a Job*; Montgomery, ‘Social Networks’, Table 1.

² Bayer, Ross, and Topa, ‘Place of Work’; Munshi, ‘Networks in the Modern Economy.’

³ Clark, ‘Migrant in Kentish Towns’, p.136.

⁴ Rappaport, ‘Social Structure’, p.102.

⁵ Ben-Amos, ‘Service and Coming of Age’, p.48; Yarborough, ‘Bristol Apprentices’, p.115; Clark, ‘Migrants in the City’, p.273; Kitch, ‘Capital and Kingdom’, p.247.

⁶ Ogilvie, ‘Guilds, Efficiency, and Social Capital’, Table 5. See also: Shephard, ‘Social and Geographic Mobility’, pp.122-124; Dolan, ‘Artisans’, pp.186-188.

⁷ Crowston, Kaplan, and Postel-Vinay, ‘Where and Why Apprentices’, p.18.

to their hereditary condition are fast wearing away, and every class is exposed to increased and increasing competition from at least the class immediately below it.”⁸ Marx, on the other hand, saw “recruitment from below” as a key mechanism through which ruling classes absorbed the energy and intelligence of other social strata, identifying this practice as one that predates industrial capitalism: “the Catholic Church in the Middle Ages formed its hierarchy out of the best brains in the land, regardless of their estate, birth, or fortune.”⁹ Modern sociologists, including Goldthorpe, Porter, and Young and Willmott, have continued to emphasize the linkages between social contacts and social mobility, while historians have debated their evolution during industrialisation.¹⁰

Uncovering the importance of social networks in historical labour markets may have important implications for our understanding of English economic development prior to industrialisation, as well as its potential for growth during the Industrial Revolution. Individuals with access to networks, in the form of strong or weak ties to people available to provide employment or referrals, can use this form of social capital to better their economic positions. This affects their own future productivity, since access to networks is unlikely to be distributed evenly across the population, a strong role for connections and kinship can create a considerable mismatch between the aptitudes of workers and the opportunities available. Those who are well-connected are better able to gain training opportunities than are those with greater aptitude but worse connections. Furthermore, since no-one is likely to have good connections with every opportunity, even those with extensive networks may find their career choices are constrained. If important, ties will also allow ‘insiders’ to further their own individual and familial position by excluding outsiders. In a world in which connections were critical, human capital accumulation was likely to be dynastic, with well-connected families able to transmit economic opportunities to their descendants. If connections were less crucial to training placements, aptitude and opportunity would be better matched, and craft skills would have the potential to diffuse more widely across the English population, with obvious implications for innovation and the ability to adopt and adapt new technologies.¹¹

In this paper, we use a new, extensive body of evidence from London’s apprenticeship records to evaluate the importance of social and geographical networks in apprentice recruitment between 1600 and 1800. Over this period, London was the largest labour market in the Western world, and dominated the English economic landscape to a greater degree than major continental rivals such as Amsterdam and Paris. Apprenticeship was the principal method of training for skilled workers in the city. We have used City Livery Company records to construct a comprehensive statistical portrait of apprentice recruitment in metropolitan London, which is in itself an important contribution to the historiography of early modern London. The source allows us to create approximations to the ties associated with belonging to personal or social networks – potential ties between masters and apprentices based on kinship, common geographical origin, and the economic background of the apprentice’s family. We find evidence that many apprentices possessed the characteristics

⁸ Mill, *Principles of Political Economy*, Vol. 1, pp.462-463.

⁹ Marx, *Capital*, Book 3, p.601.

¹⁰ Goldthorpe, *Social Mobility*; Porter, *Vertical Mosaic*; Young and Willmott, *Family and Kinship*. For contrasting positions on the effect of industrialisation on intergenerational occupational homogeneity, compare: Horrell and Humphries, ‘Exploitation of Little Children’, p.495; Stearns, *Lives of Labour*, p.75; Anderson, *Family Structure*, p.101 & pp.118-121.

¹¹ Growth economists have argued that the matching of talent to productive opportunity has implications for macroeconomic outcomes, with economic mobility both a cause and consequence of technical change. See Murphy, Shleifer, and Vishny, ‘The Allocation of Talent’, and Galor and Tsiddon, ‘Technological Progress’. For a discussion of the role of the diffusion of craft skills for early industrial growth, see Mokyr, *The Gifts of Athena*, p.73.

associated with these ties. Clearly, matching between apprentices and their masters was not “random”. On the other hand, it is equally clear that the majority of apprentices did not have an obvious link to the master with whom they were training: being connected was by no means a requirement. The evidence suggests that, if anything, the ties and personal connections we would associate with social networks were less important in London’s premodern apprenticeship market than they are in present-day job search.

Premodern Apprenticeship

Premodern apprenticeship operated in a well-documented legal and institutional framework. In England, apprenticeship during the period discussed here largely operated under national rules established by the Statute of Artificers (1562) based on London’s existing customs.¹² Apprenticeship terms were set at a minimum of seven years, and apprentices were to be at least 24 years of age upon completion. Successful completion of an apprenticeship was the main method by which apprentices became citizens of the town or city in which they had trained, if it was incorporated, and this allowed them to use their occupation independently thereafter.¹³ In corporate towns, artisans were required to be citizens to take apprentices, and apprenticeship was monitored by local guilds and the civic authorities. The extent to which the Statute was enforced and training for occupations is fully accounted for through formal apprenticeship, is subject to debate.¹⁴ However, the substantial scale of formal apprenticeship is clear from the large number of apprentice contracts surviving in guild records in London and elsewhere.

Some of the characteristics of premodern apprentices are well-established. Apprentices in this era were almost invariably young, almost all male, migrated further than subsistence migrants, and came from relatively affluent backgrounds. Some studies point to a rise in the economic status of apprentices’ backgrounds over this period, and the outlines of apprentices’ migrations are also well-studied.¹⁵ By the seventeenth century, masters increasingly expected apprentices to pay a premium for their training. Premiums varied by trade, but could easily exceed a year’s agricultural wages for a moderately prosperous trade.¹⁶ Apprentices resided with their master during the training period, but received little or no wage, and their board and clothing might be subsidised by their parents or sponsors. The costs of apprenticeship meant that it was available mainly to youths from moderately prosperous families. By and large, it was not a practice that would allow poor families to improve their economic status, but rather one that middle class families could use to provide human capital and economic opportunities for their children.¹⁷

¹² Apprenticeship rules are surveyed in Wallis, ‘Apprenticeship and Training’, pp.834-836; Epstein, *Wage Labor*, pp.82-84 & pp.140-144; Hanawalt, *Growing Up* pp.133-144; Lane, *Apprenticeship*, pp.2-8; Dunlop and Denman, *English Apprenticeship*, pp.27-59.

¹³ Withington, *Politics of Commonwealth*, pp.29-30; Kahl, ‘Apprenticeship and the Freedom’, pp.17-18.

¹⁴ Davies, *Enforcement of English Apprenticeship*; Ben-Amos, ‘Failure to Become Freeman’, pp.162-171; Walker, ‘Extent of Guild Control’, pp.50-57, p.111 & pp.292-298; Schwarz, ‘London Apprentices’; Wallis, ‘Apprenticeship and Training’; see also Epstein, ‘Craft Guilds’.

¹⁵ Brooks, ‘Apprenticeship’, pp.53-62; Clark and Souden, ‘Introduction’, pp.23-25; Stone, ‘Social Mobility’, pp.31-32; Kitch, ‘Capital and Kingdom’, pp.245-248; Wareing, ‘Geographical Distribution’; Smith, ‘Social and Geographic Origins’; Whyte, ‘Migration’; Ramsay, ‘Recruitment’.

¹⁶ Minns and Wallis, ‘Apprenticeship and Skill’, pp.9-11; Brooks, ‘Apprenticeship’, pp.65-69, cf. Mitchell ‘British Historical Statistics’.

¹⁷ The exception to this was pauper apprenticeship, arranged and funded for poor children through parish rates. On this, see: Hindle, *On the Parish*, pp.191-223; Levene, ‘Pauper Apprenticeship’; Honeyman, *Child Workers*.

Given the costly nature of apprenticeship, it is likely that families investigated the possibilities thoroughly. Not only did families need to be sure of the quality of training that their son would receive, the master also had to have a sense of the quality of the prospective apprentice. Surprisingly little is known about how individuals chose their master, or about how masters chose their apprentices. Only a tiny proportion of apprenticeships were advertised. Rather, knowledge of apprenticeships spread through informal channels. Parents' personal knowledge of London may have helped: as Wrigley showed, around one in six English men and women would have spent at least some part of their life in the city.¹⁸ Beyond this, it appears that most would-be apprentices and their family used friends, acquaintances and kin in London as agents to find a master.¹⁹ This London agent would then seek out a master that they knew of, but to whom they had no particularly deep relationship. The agent was known to the family, but the master was not, nor is there evidence of a close relationship between master and agent. For example, the apprenticeship of Bartholomew Adsworth to Mr Walton, a cooper, in 1688 had been arranged by Adsworth's cousin, George Fox, who was a citizen and Vintner of London.²⁰ Graves Baker's brother, Thomas, placed him with his master, Thomas Bland, a gold and silver wiredrawer.²¹ Daniel Clarke of Tring, Hertfordshire arranged the service of his son Francis with the help of 'friends', probably including Francis's uncle, who together sought a 'freeman & one that dealt Considerably in his way of trade & was a fair dealing man'.²² Unfortunately the master they found, the haberdasher Samuel Booth, proved to be abusive.²³ George Long of Ludlow also arranged for his friends to make a 'diligent enquiry' for a 'fit person' for his son to serve, choosing John Crundall, a clothworker.²⁴ On a few occasions, the organisation of training was partially integrated into the company system. In the Goldsmiths' and Carpenters' Companies, for a period in the mid seventeenth century the company clerk bound large numbers of apprentices himself before quickly turning them over to new masters for the majority of their terms.²⁵

At first glance, the strict terms of apprenticeship indentures seems to imply a rigid training system. However, there are at least two pieces of evidence that suggest arrangements were made to match youths' aptitude to opportunity, and enable those without commercial connections to get a foothold into the trades. First, trial periods, in which apprentices and masters established their respective suitability, were a standard practice. For example, before his indentures were sealed, Adsworth spent between six and twelve months with his master 'on liking'. Second, it appears that turnover and early departure was common among apprentices.²⁶ This may reflect the establishment of apprentice-master relationships in which both parties were willing to set terms in variance with standard arrangements prescribed by Statute. It is also consistent with a training market in which bad matches, perhaps the result of limited information available to both contracting parties, were allowed to dissolve should it be in the interest of either party. This flexibility would make it easier for apprentices and masters to sign indenture contracts with parties with whom they had little prior contact.

¹⁸ Wrigley, 'Simple Model', p.221.

¹⁹ Ben-Amos, *Adolescence*, pp.62-67; Houlbrooke, *English Family Life*, pp.182-190.

²⁰ London Metropolitan Archive (hereafter LMA), MC6/500A (Sept 1689).

²¹ LMA, MC6/520B.

²² 'Friends' was used to indicate both family and non-kin connections.

²³ LMA, CLA/024/07/81, #4. Clarke v Booth (c. 1695).

²⁴ LMA, CLA/024/07/81, #5, Long and Long v Crundall (c. 1695).

²⁵ David Mitchell, personal communication; Alford and Barker, *Carpenters*, p.117.

²⁶ Wallis, 'Apprenticeship and Training', pp.839-845; Minns & Wallis, 'Rules and Reality'.

Livery Company Data

Previous studies of apprenticeship have been constrained by the nature of the data available. Most work has concentrated on a particular time period or Company.²⁷ Our analysis is based on a database of apprentice records several orders of magnitude larger than that available to previous authors. Our dataset is based on a new series of extracts, largely by Cliff Webb, from London Companies' manuscript records. These contain most surviving records of apprentices registered in 65 London Companies in the early modern period.²⁸ We focus our study on the years between 1600 and 1750, for which we have records for 118,000 apprentices and 42,000 masters. The data include apprentices' name and place of origin, their parents' name and occupation or status, whether their father was still alive, their master's name, and the Company and date on which they were bound.²⁹

We estimate that our data cover around 4% of the entire English male population of relevant age in the period 1600-1750.³⁰ The records do not include all the large, prominent companies; for example, the Goldsmiths and Merchant Tailors' Companies are not included. However, our dataset does include a wide range of companies, from large, well-established ones such as the Stationers and Vintners, to smaller, more specialised companies that came into existence over the course of the seventeenth and eighteenth centuries, such as the Apothecaries and the Spectaclemakers. It seems likely that at least a third, and perhaps even a half or more of all London apprentices in the seventeenth and eighteenth centuries are included in our dataset.³¹

In themselves, apprenticeship records provide few details on apprentices' masters, but because most London masters were themselves originally apprentices in London we have been able to identify the details of 12,320 masters from their own apprenticeships. This matched sample contains over a quarter of the total number of masters taking on apprentices over this interval.³² These masters took on 35,838 apprentices for whom we therefore know not only their own place of origin, but also the place of origin of their master.³³

In our analysis, we focus on developments between 1600 and 1750. This is a period in which the importance and organisation of London apprenticeship changed, as did the city and

²⁷ For examples: McKenzie, 'Stationers Company'; Ben-Amos 'Service'; Riello, 'Cordwainers'; Davies and Saunders, *The History of the Merchant Taylors*'.

²⁸ Webb, *London Apprentice Series*. Webb's extracts largely end by 1800, even where records survive beyond that date. In a few cases, he excludes partial entries where the source is fragmentary or the information recorded by the Company is very limited. In addition, we include records of apprentices in the Stationers Company apprentices in Michael Turner, *The London Book Trades – A Biographical Resource* (2007), available at: <http://sas-space.sas.ac.uk/dspace/handle/10065/224>. The full number of indentures in Webb's data is larger (c. 200,000), however to avoid errors from duplicate entries that may be re-bindings or clerical or transcription errors, we restrict ourselves to different master and apprentice name and surname combinations.

²⁹ It is important to emphasise that London Companies included members working in a variety of trades outside the occupation they formally governed and represented. Company is therefore a weak indicator of occupation.

³⁰ Minns and Wallis, 'Rules and Reality'.

³¹ Minns and Wallis, 'Apprenticeship and Skill', Table 1.

³² We use the Double Metaphone algorithm to generate phonetic codes for the full list of apprentice and master names, and search for unique name matches within the appropriate company and time interval. We use company and names to identify individual masters, so the number of potential masters is larger than the number of unique name combinations. We search for the apprentice record of masters 7 to 50 years before they take on their first apprentice, and excluded all duplicate names within the same company.

³³ The ratio of to the number of apprentices to masters in this matched sample is within 5% of the ratio for the full sample, suggesting no material bias towards masters with either a large number, or a small number of apprentices.

its economy more generally. Two points about this should be made at the outset. First, the number of youths entering corporate apprenticeships in London changed over time: there was an absolute expansion (and per capita decline) in apprentice numbers as the city grew from 200,000 in 1600 to 575,000 in 1700, followed by a slow decline in both the absolute and per capita number of apprentices over the eighteenth century, as the City Companies' control of occupations weakened and the variety of trades expanded.³⁴ This is partly visible in our data, as can be seen in Figure 1, although better survival of records as much as growing numbers of apprentices largely explains the rise from 1600 to 1700. Second, the size of London's recruitment field shrank dramatically.³⁵ As Figure 2 shows, in the early seventeenth-century (Figure 2a) apprentices were drawn from a wide area across England, with only Cornwall and Devon sending minimal numbers of apprentices to London. By the late 18th century (Figure 2c), London, Middlesex and Surrey youths dominated apprentice recruitment. Numbers had declined substantially from other southern and Midland counties, and very few apprentices were coming from Northern England after 1750 as opportunities expanded with the growth of trade and manufacturing in the areas that would soon become the heartland of the industrial revolution.

The role of networks in apprentice recruitment

Kin ties

Kinship ties are often seen as crucial elements of early modern social networks.³⁶ Few direct kin relations are recorded explicitly in the company records and the bulk of these were father-son relationships, with this mode increasingly common after 1750. However, masters may also have taken on more distant relatives who are not identified as kin in the company records. These more extended links are arguably more important to our understanding of the role of kinship in migration. One proxy for a distant paternal family relationship is whether a master and apprentice share a surname.³⁷ For common surnames such as Smith, a shared name may not indicate kinship, but if masters and apprentice share an unusual surname it is likely that they are kin.

Few apprentices were recorded as being directly related to their master. As Table 1 shows, on average only 0.5% of apprentices were bound to a declared relative (column 1). The figure for kin links is somewhat higher for London-born apprentices at 2.3% (column 2), but this is still small.³⁸ If we focus on apprentices with unusual surnames, fewer than 7% shared their surname with their master (column 4).³⁹ Similarly, masters do not appear to have sought out kin apprentices. Even among masters who recruited heavily, taking on more than 10 apprentices, almost 2 in 3 never trained an apprentice with the same name at any stage in

³⁴ Kahl, 'Apprenticeship and the Freedom'; Schwarz, 'London Apprentices'; Minns and Wallis, 'Apprenticeship and Skill'.

³⁵ Wareing, 'Geographical Distribution'; Brooks, 'Apprenticeship', pp.63-65.

³⁶ Boulton, *Neighbourhood*, pp.249-51; Cavallo, *Artisans*, pp.112-121. Cressy, 'Kinship'; Mitson, 'Significance of Kinship Networks', pp.24-73; Ben-Amos, *Adolescence and Youth*, pp.305-309. Cf. Wrightson and Levine, *Poverty and Piety*, pp.86-91 & p.94.

³⁷ On the limits of this approach: Cavallo, *Artisans*, p.123.

³⁸ For Bristol, Yarborough observed 3.3% of apprentices with the same name as their masters: Yarborough, 'Bristol Apprentices', p.115.

³⁹ Unusual names were defined as those that occur fewer than six times among the 356,000 people named in marriage licenses issued by the Vicar-General's of the Archbishopric of Canterbury for the period 1694-1800. This list is available at <http://www.sog.org.uk/vg/index.html>. We used Double Metaphone to identify shared surnames. This allows the possibility that matches will be made between names that appear five times or less on the Archbishopric list and more common names with a similar phonetic structure.

their careers.⁴⁰ Among masters who did take family members as apprentices, it was rare to train more than one: only 13 of the 147 masters with an explicitly recorded kin apprentice trained more than one identified family member. Nor were there significant numbers of masters who did not usually take on apprentices, but who made an exception for members of their family: only 1 in 10 of those who took only one apprentice shared a surname with that apprentice.

Inevitably, these measures miss any links through maternal relatives, and those paternal relatives who do not share the same family name as the apprentice (for example, the brother-in-law of an apprentice's father), as well as capturing an unquantifiable number of non-kin surname matches. It is unclear what multiplier would apply to the figures in Table 1 to adjust for these missing links. Under the simple assumption that "kin" consists of parents, uncles and aunts, and their spouses, only around one quarter of a youth's uncles and cousins would share their surname. However, there is little certainty that the multiplier of four that this would suggest is actually correct, as it relies on assumptions about the distance and strength of kin ties for which we have little evidence.⁴¹ Whether kinship rates are 7% or 28%, these rough approximations still indicate that kinship was not the main method of joining masters and apprentices.⁴² In this regard, apprentices seem somewhat less tied to kin than single women in early modern London, 22% of whom lived with kin.⁴³ Using a kinship tie may well have been common for those who had access to them, and would-be apprentices with kin may have possessed advantages in becoming apprentices, but it was not a critical factor in explaining who migrated to London to take up an apprenticeship.⁴⁴ Being related to one's master was not required, or even usual, among London apprentices.

Professional ties

Kin ties do not appear to have been a major factor in enabling youths to enter London apprenticeships. It is possible, however, that their opportunities were structured by their family background. The occupation of youths' relatives in particular may have shaped their access to apprenticeships. For example, it may have been easier for the children of weavers to obtain suitable positions with weavers. More generally, master artisans may have viewed the sons of artisans as being more likely to have productive abilities in the crafts, either through inheritance or experience. Parents in relevant occupations may also have been able to use their professional networks, or at least recognition of their skill and status, to place their sons in apprenticeships that were relatively closed to "outsiders." We can explore some aspects of the importance of occupational links between apprentices' families and the occupation they entered in London through the information about apprentices' fathers' occupations, which were recorded when the apprentice was bound.

The Statute of Artificers had established some limits on who could be apprenticed in non-agricultural occupations in England – primarily targeting the exclusion of children from poorer rural families – but in practice these barriers seem to have had little effect.⁴⁵ As can be

⁴⁰ We intend to explore patterns of selection into apprenticeship for those with and without kin ties in the trade at a later date.

⁴¹ Tadmor, *Family and Friends*; Ben-Amos, 'Gifts and Favors', pp.305-309. Laslett also suggests a multiplier of four: Laslett, 'Introduction', p.57.

⁴² As we will see, relatively few people were apprenticed to someone from the same place, but with whom they did not share a name. This suggests that omitting such people from our definition of kin introduces a relatively small error.

⁴³ 37% of migrant women also had kin present in London: Brodsky Elliot, 'London Marriage Market', p.93.

⁴⁴ Several studies find that apprentices with kin ties were more likely to become masters: Stabel, 'Social Mobility', pp.174-175; De Munck, *Technologies*, pp.161-169.

⁴⁵ 5 Eliz I c. 4, s. pp.26-29.

seen in Table 2, using Wrigley's matching of specific occupations to occupational categories, we find that only about 40 percent of apprentices were sons of men employed in manufacturing, distribution, or sales occupations: sectors where apprentices might seek training in London.⁴⁶ A larger share (45 percent), were the sons of gentlemen or men in the primary, predominantly agricultural, sector. Almost half of apprentices could not, by definition, follow in their father's footsteps since they came from an agricultural background. The final column of Table 2 provides a rough breakdown of occupational groups based on King's 1688 Social Tables. Comparing this distribution to that of apprentice fathers confirms that these were boys of well-off parentage, with gentlemen fathers strongly over-represented relative to population. Primary sector fathers are under-represented as a whole, but many apprentices (close to 18 percent) were the sons of well-off yeomen, rather than husbandmen (8 percent) or agricultural labourers.

Table 3 summarizes the extent of occupational overlap between father and son, both for the data set as a whole and for apprentices who had fathers engaged in sectors in which they could have obtained training in London. We look first at whether the father's occupation matches the company to which his son was apprenticed. This would be the case if, for example, the father of an apprentice apothecary was himself an apothecary. This is a narrow definition of intergenerational continuity; an apprentice apothecary may have had a father who was in some other medical occupation, which we might well want to consider a relevant professional tie. We use Wrigley's P.S.T. coding for English occupations to link companies to occupations in three tiers of successively wider groupings. In this schema, the apprentice apothecary would be said to match their father's occupation at the third tier level if their father was in an occupation classified as "medical worker, other." They would match their father at the second tier if their father was involved in medicine in any form, and at the first tier if their father was a 'professional' of any type.

There are two main limitations to this exercise. First, there was substantial occupational heterogeneity within London companies: members might use a range of occupations other than that which the company notionally controlled. Second, we will miss linkages across clusters that may indicate a degree of continuity – the ties between a butcher father and a leatherworker son for example. Nonetheless, enough overlap between company and trade survives to make it useful as a rough approximation.

The figures in Table 3 reinforce the view that apprentices were rarely following in the occupational footsteps of their father. Less than five percent of apprentices were training in a company matching their father's occupation (Panel A). We find more father-son overlap when we look at broader occupational clusters, but even at the broadest cluster, only about a third of metropolitan apprentices, and a quarter of provincial apprentices, were entering the same sector as their father. When we restrict attention to the sons of men in manufacturing, distribution, or sales occupations (Panel B), we continue to find relatively few sons in the same broad clusters as their fathers. Only about 15 percent were in the same second tier cluster, and less than ten percent were in a company that matches their father's occupation. While a significant minority of London apprentices did come from a craft and trade background, their training appears to have expanded the range of economic activity in the family, rather than be limited by their reliance on the occupational connections of their parents' generation.

⁴⁶ The occupation categories were constructed by matching occupational responses to Wrigley's Primary, Secondary, Tertiary codes. The PST coding is discussed in Wrigley, *Poverty, Progress, and Population*, chapters 5 & 11.

Distance and networks

Economic theories of migration emphasize the role of costs in shaping migration decisions.⁴⁷ Distance in particular affects costs. It does so directly, through travel costs, and indirectly through the effects of costs on access to different forms of information. We have already seen that people travelled from across England to London to start an apprenticeship. But to what extent did distance alter the training choices made by apprentices? Distant apprentices may have been more reliant on social networks, as their ability to receive information through alternative channels was more limited. If the reliability of information networks declined with distance, it is also possible that apprentices from distant counties would be less responsive to changing opportunities in London than apprentices from counties where many residents were within walking distance of the City.

We first analyse the importance of distance by examining the distribution of apprentices across London companies over time. If distance-related migration costs were significant, apprentices originating from a particular place far from London would be likely to cluster in a distinctive group of companies about which they had information, while apprentices from near to the capital would be able to respond more rapidly to changing opportunities.⁴⁸ To gain a sense as to how the relative company distributions differed over space, we calculated Duncan Dissimilarity Indices (DDI) to compare the company distributions of apprentices from each county to the distribution of London-origin apprentices.⁴⁹ Yorkshire apprentices will have a DDI equal to 100 if no apprentice from Yorkshire was training in any company containing a London apprentice, and a value of zero if the distribution of apprentices from Yorkshire across the different companies was identical to that of apprentices from London. While a DDI of zero indicates perfect similarity, it is in some sense an unrealistic benchmark, as variation in recruitment patterns unrelated to place of origin will lead to differences in the company choices between groups of apprentices within the population from a particular county of origin. To provide a sense of the extent of this “natural variation” (as opposed to variation caused by distance-induced reduced information), we include the county of Middlesex as a separate observation to London in our analysis. Middlesex, which encompassed the city of Westminster and several large suburban parishes, and London were an integrated and unified urban market. For this reason, the variation between London and Middlesex can be seen as a reasonable measure of the variation in company choice between subsets of the same population.⁵⁰

Figure 3 plots county DDI scores against distance to London. Here, the DDI was calculated by pooling data for each county for all years between 1600 and 1749. There is no obvious correlation between distance and similarity of company choice. An OLS regression of DDI against the log of distance yields a positive coefficient (.77), but one that is far from

⁴⁷ Baines, ‘European Emigration’; Sjaastad, ‘Costs and Returns.’

⁴⁸ Occupational heterogeneity within London companies means that their relative expansion or decline is only a partial indicator of the fortunes of particular trades. However, as their membership was still frequently oriented to particular occupations (even if they were no longer the original focus of the company), they serve as an acceptable proxy for economic shifts.

⁴⁹ The DDI is equal to $0.5 \times \sum_i \left| 100 \times \frac{C_i}{\sum C_i} - 100 \times \frac{L_i}{\sum L_i} \right|$, where C_i is the number of apprentices in

company i in the county, and L_i is the number of apprentices in company i in London. If two distributions are identical, the DDI will take the value zero. If the two distributions are orthogonal, DDI will be equal to 100.

⁵⁰ If we randomly divided the London apprentice population into 2 groups, we would not expect the DDI to be zero. As both counties were fully integrated into the metropolitan labour market, comparing London to Middlesex should approximate this sort of split.

statistically significant, with a t-statistic of less than one.⁵¹ Strikingly, Middlesex has a DDI score of about 29, which is near the middle of the results for all 39 counties.

Aggregating company outcomes over a 150 year period may conceal important trends in recruitment patterns over time. This may be compounded by the decline in recruitment from distant counties which occurred in parallel to the rising importance of particular companies in the overall distribution of apprentice records. We explore this possibility by calculating DDI scores over rolling 25 year windows. Given the large number of companies under consideration, and the declining numbers of apprentices after 1700, we limit this part of the analysis to 1625 to 1700, and to the counties of Leicestershire, Yorkshire, and Middlesex for which data are most abundant.⁵² Leicestershire and Yorkshire, which are located about 100 and 200 miles from London, provided more apprentices than any other relatively distant county in this period, and Middlesex remains useful as a quasi control group for the reasons described above.

Figure 4 presents rolling DDI scores for Yorkshire, Leicestershire, and Middlesex relative to London. The figure shows that there is some variance in county outcomes over time, with a pronounced dip in dissimilarity for Leicestershire apprentices towards the middle of the period. That said, for most of the 75 years a clear ranking emerges: the distribution of apprentices from Yorkshire were closer to those of apprentices from London than were the choices of apprentices from Middlesex, and that the choices of both groups were more similar to those of Londoners than were the choices of apprentices from Leicestershire, who seem over-represented in particular companies.⁵³ Evidence over these shorter intervals reinforces the message from Figure 3, with average DDI scores for Yorkshire, Middlesex and Leicestershire are 24, 27 and 33. Would-be apprentices from Yorkshire were able to make choices approximating those of London-born apprentices to at least the same degree as those originally residing much closer to the city.

Geographical ties

Most masters were themselves migrants to London, and their links to their places of origin could have led to them recruiting apprentices from the same locality. These home connections would in theory allow masters to acquire information about a youth's suitability at relatively low cost, while taking apprentices from their birthplace would also serve to meet expectations about helping friends and neighbours. Regional specialisation could also affect apprentices' opportunities, as Knotter and van Zanden have argued for Amsterdam.⁵⁴

If local ties had an important role in facilitating apprentice recruitment, we might expect to observe a degree of "home bias," with masters tending to hire apprentices from their place of origin. A strand of the literature on apprenticeship has emphasized the importance of local connections in various trades and cities.⁵⁵ In Table 4, we examine whether geographical connections were common between migrant masters and migrant apprentices by comparing place of origin for the matched sample.⁵⁶ To reduce the effect of

⁵¹ Distance is measured as the straight-line distance between each county town and London. A broadly similar result is obtained if observations are weighted by county population.

⁵² The 25-year window means that data from 1613 to 1712 are used in our calculations.

Large samples are needed because of the effect of the large number of companies involved, and to ensure that integer constraints do not prevent the migrant sample from matching the London sample.

⁵³ A connection between this area and butchers is noted by Keene, 'Metropolitan Values', p.109.

⁵⁴ De Munck, *Technologies*, p.172.

⁵⁵ Wareing, 'Geographical Distribution', p.247; Keene, 'Metropolitan Values', pp.109-110; Lovett, Whyte and Whyte, 'Poisson Regression Analysis', p.330; McKenzie, 'Stationers Company', p.299.

⁵⁶ In this table and the ones that follow, we limit our attention to migrant apprentices and masters, excluding those originating in London or Middlesex.

kin ties, we also report the results excluding any master and apprentice who shared a surname, however common that name may be (columns 3 and 4). For the reasons discussed above, this is still far from a perfect measure of non-familial geographic connections, and the inclusion of apprentices indentured to kin with a different surname means that the figures should be thought of as an upper bound on non-kin town links. The results suggest that links through common place of origin did matter, but that they were not particularly important in apprentice recruitment. Less than 5 percent of apprentices were trained by a master without the same name from their place of origin. Including apprentices and masters with a shared name raises this to 8 percent. There is little indication that these connections were more important among masters who took few apprentices: 6% of masters who took only one apprentice recruited that youth from their place of origin, suggesting that there were few masters who did not take apprentices but made an exception for someone from their place of origin.

There is little sign that masters who took many apprentices favoured apprentices from their own place of origin. Just over one-third of masters who recruited over 20 apprentices through their career had at some point trained an apprentice from their home town who didn't share their name. In other words, even the largest recruiters were unlikely to use their provincial connections to find apprentices. Some masters with large numbers of apprentices had several from their home place, but barely ten percent of all masters ever trained a non-relative from their place of origin. Of those training at least one non-relative from their place of origin, only 12 percent took on more than two from home.⁵⁷

Many apprentices came from small places, and could not have had a master from their place of origin even had they wanted to. Even would-be apprentices from places that had produced London masters in the previous generation might not find a master from their home in the relevant trade. In both cases our "same place test" may be too severe and the region may be a better unit of analysis. We might expect to find that the home bias was apparent in the probability of youths being apprenticed to someone from their county even if that person was not from the same place.⁵⁸

Unsurprisingly, the figures for apprentices joining masters from the same county shown in Table 5 are somewhat larger than the "same place" shares in Table 4, with 19 percent of apprentices having masters with a different name from the same county. This is significantly higher than the same county rate predicted if migrant masters and apprentices were matched entirely by chance (4 percent).⁵⁹ As before, the figures in Table 5 are an upper bound estimate of the importance of geographical ties, as they will include kin ties where surnames are different. They nonetheless reveal a degree of home bias in the hiring of apprentices. However, over 80 percent of migrant apprentices were indentured to masters from a different county, suggesting again that geographic networks had only a limited role in channelling apprentices to masters. These figures seem to indicate that possibilities for migrant apprentices were unlikely to have been limited by the presence or absence of masters from their region in particular trades.

It is possible that the importance of geographical connections changed over time. For example, if the importance of social networks based on geography in arranging

⁵⁷ Ideally we would like to compare the figures in Table 2 to the proportion of apprentices who could have been bound to a home town master. We do not know the full distribution of place of origin for London masters, as only a minority of masters' origins are known.

⁵⁸ A shared county is, of course, only a rough proxy for common region of origin. Its utility will vary with size of county, topography, and the proximity of the apprentice and master to county boundaries.

⁵⁹ This figure was calculated as the sum across counties of the product of master and apprentice shares for each county: $p_{chance} = \sum_i \%masters_i * \%apprentices_i$, where i is a county index.

apprenticeships declined between 1600 and 1750, we would expect a parallel decline in the share of home county recruitment. Figure 5 shows that the share of home county apprentices remained fairly constant, remaining below 20 percent throughout the period.⁶⁰ This suggests that geographical networks between masters and apprentices were uncommon throughout the premodern period; there is no evidence that weaknesses in the market in the earlier period led to greater use of local networks.

An alternative possibility, and one that may be concealed in the analysis above, is that apprentices from more remote counties signed relatively more indentures with home county masters. This would occur if distance and costs are positively correlated, with Yorkshire apprentices more likely to agree terms with Yorkshire masters than Leicestershire apprentices would with Leicestershire masters. We investigate this possibility in Figure 6, which for each county plots the propensity to be apprenticed to a home county master against distance to London.⁶¹ There is no discernible relationship between the share of home county masters and distance from London.⁶² Taken as a whole, there is no compelling evidence that apprentices arriving from more distant parts of England were constrained in their choice of company or master.

Conclusion

The capacity of a society to enable geographical, occupational and social mobility – and the matching of ability to opportunity that this facilitates – has obvious implications for economic development. Where barriers exist that prevent people exploiting their talents, societies as well as individuals will suffer. Apprenticeship was a major avenue for skill formation in premodern England. Even when its potential for migration is recognised, the market for the recruitment and training of apprentices has, however, been characterised as being constrained by barriers to mobility arising due to the nature of premodern society – reliance on kin and communal networks, and poor information flows between the metropolis and the provinces.

Our analysis shows little evidence of “immutable order” in the recruitment process. Apprentices to London were drawn widely from all parts of England. The typical London apprentice between 1600 and 1750 does not appear to have used the social networks emphasized in the qualitative literature. Less than ten percent of apprentices were indentured to a master who was kin or from their place of origin. Less than twenty percent were matched to a master from their home county. Parental connections to the London trades do not appear critical to gaining access to training: remarkably few apprentices were training in a Company linked to their father’s occupation – perhaps ten percent of metropolitan apprentices, and five percent of migrants. Further calculations indicate that 60 percent of migrant apprentices had no discernible link to their London master, be it though a family connection, a shared name,

⁶⁰ We have also calculated how the counterfactual share that would receive a same county match by chance changed over the period. For migrant apprentices, this figure rises only marginally to 5 percent for the interval 1700-1749.

⁶¹ Distance to London is taken as the straight line distance from the county town to London.

⁶² An OLS regression of home country share against the natural log of distance to London yields a coefficient of 0.08, with a t-statistic of 1.00. Separate regressions for the three sub-periods yield similarly small and insignificant coefficients, as do regressions where observations are weighted by county population. These supplementary results are available on request.

common county of origin, or a father employed in the same broad occupational grouping.⁶³ These figures suggest that kin, professional, and geographical ties played only a limited role in shaping the opportunities of prospective apprentices. Overall, it appears that modes of social, geographical and occupational mobility were more open than is often assumed for premodern societies.

Our findings also suggest that apprentices' choices were not constrained by poor quality information flows about opportunities in London. We find no evidence that apprentices from distant counties were more likely to sign indentures with masters from their home county, or that apprentices from distant counties were more concentrated in a subset of London companies. The company profiles of apprentices from distant counties were as similar to those of Londoners as apprentices hailing from much closer to the City. Whether this flexibility was achieved through information obtained about opportunities before movement or the ability to respond to opportunities on arrival in the capital, it is clear that one major market in England, and one which was particularly important for the transmission of human capital, was fluid and relatively unconstrained by segmented information and social barriers as early as 1600. The cost of acquiring training meant that becoming an apprentice was a choice available primarily to the sons of the middling sorts and the wealthy: apprenticeship in this period did not allow many youths to escape poverty. Within this broad income band, however, there is little evidence that social networks were particularly important. Apprenticeship was not rationed and reserved for the sons of the commercial and mercantile classes or those with strong connections to training masters. Rather, well-to-do families of all types were able to access a wide range of craft and trade apprenticeships.

This pattern has several implications for our understanding of the operation of the premodern economy. First, it implies the potential for larger spillovers and greater social returns to skill formation than would be the case were apprenticeship dynastic in nature. Craft skills were able to diffuse widely through the English economy, with families and communities well away from the main training and trading centres establishing connections to the London trades. This characteristic of apprenticeship may help to explain the persistently low English skill premium identified by van Zanden.⁶⁴ Secondly, it demonstrates that the ability of individuals to undertake long-term training contracts with parties outside their own social networks and with one interested party – the apprentices' parents – separated by long distances was remarkably well-developed even as early as 1600, and plausibly well before then. Credit provision may have been deeply embedded in the local social setting, but training was a much more open market, despite the risks of opportunism involved and the sums invested.

The preponderance of non-networked apprentice recruitment suggests that these families were able to match aptitude to opportunity to a much greater degree than in an economy where personal connections offer tight constraints to training and employment opportunities. It is difficult to draw direct comparisons to the work of contemporary economists and sociologists. Granovetter, Montgomery, and others find that personal contacts account for the majority of employment matches in present-day markets. We do not observe direct contacts through friends or co-workers (though these would generally share a place and county of origin) that are quantitatively important in contemporary findings. It is also possible that apprentices had links to London masters operating with several degrees of separation that are not captured through origin, family, or the occupation of their father.

⁶³ We assigned the presence of a kin link, name link, county link, or having a father in the same third tier cluster as the master's company to each apprentice in the matched sample. Sixty percent is the proportion of this sample of apprentices who do not possess any of these attributes.

⁶⁴ Van Zanden, *Long Road*, pp.153-157.

These shortcomings, however, do not detract from the overall conclusion that premodern markets were no more dependent on social networks than present day markets. The potentially unobserved ties discussed above would have to be of a large order of magnitude for premodern England to be more bound by personal contacts than societies today. This is unlikely given what is known about the relative importance of direct and indirect ties in employment outcomes; Granovetter demonstrates that “long chains” of contacts linking positions to workers hired are relatively uncommon.⁶⁵ It is hard to imagine that the indirect ties would be stronger in the premodern environment than today. Overall, the openness of London’s trades to children of parents in different occupations suggests that returns to parent-specific human capital were relatively low prior to industrialisation. This finding has ramifications for theoretical models of economic growth that link technological change and industrial transformation to changes in economic mobility.⁶⁶

Finally, it is worth considering whether London was the unique, extreme case among European markets of the day. If the metropolitan training market was distinctive in its openness to outsiders, there is scope for a previously unidentified contribution to precocious economic development in England. Existing studies for continental cities such as Milan, Württemberg, Antwerp and Nordlingen suggest exclusive behaviour by early modern corporate communities. This behaviour is often associated with downturns in trade and other pressures on the local economy.⁶⁷ By contrast, England’s capital city was undergoing a period of unprecedented, if not always unproblematic, economic and spatial growth in these centuries.⁶⁸ Was recruitment and training in London (and by extension, England) fundamentally different from the continent, or is evidence from London simply an example of how fluid these markets become during periods of rapid growth and expansion? Future comparative research is needed for this distinction to be made.

⁶⁵ Granovetter, *Getting a Job*, p.57.

⁶⁶ Galor and Tsiddon, ‘Technological Progress, Mobility, and Economic Growth.’

⁶⁷ Friedrichs, ‘Capitalism’, pp.24-49; D’Amico, ‘Crisis and transformation’; Ogilvie, *State Corporatism* pp.162-179; De Munck, *Technologies*, pp.90-96..

⁶⁸ Boulton, ‘London’.

References

London Metropolitan Archive, LMA and CMA series.

Alford, B. W. E and T. C. Barker (1968), *A History of the Carpenters' Company*, London: Allen and Unwin.

Anderson, M. (1971), *Family Structure in 19th Century Lancashire*, Cambridge: Cambridge University Press.

Baines, D. E. (1994), 'European Emigration, 1815-1930: Looking at the Emigration Decision Again', *Economic History Review*, 47, no. 4, pp.527-544.

Bayer, P., S. Ross, and G. Topa (2008), 'Place of Work and Place of Residence: Informal Hiring Networks and Labor Market Outcomes', *Journal of Political Economy*, 116, no. 6, pp.1150-1196.

Ben-Amos, I. K. (1994), *Adolescence and Youth in Early Modern England*, New Haven: Yale University Press.

Ben-Amos, I. K. (1991), 'Failure to Become Freeman: Urban Apprentices in Early Modern England', *Social History*, 16: pp.155-172.

Ben-Amos, I. K. (1988), 'Service and the Coming of Age of Young Men in Seventeenth Century England', *Continuity and Change* 3, no. 1, pp.41-64.

Ben-Amos, I. K. (2000), 'Gifts and Favours: Informal Support in Early Modern England', *Journal of Modern History*, 72: pp.295-338.

Boulton, J. P. (1987), *Neighbourhood and Society: A London Suburb in the Seventeenth Century*, Cambridge: Cambridge University Press.

Brodsky Elliot, V. (1981), 'Single Women in the London Marriage Market: Age, Status and Mobility, 1598-1619', in R. B. Outhwaite (ed.), *Marriage and Society: Studies in the Social History of Marriage*, pp.81-100, London: Europa Publications.

Brooks, C. W. (1994), 'Apprenticeship, Social Mobility and the Middling Sort, 1550-1800', in J. Barry and C. W. Brooks (eds.), *The Middling Sort of People: Culture, Society and Politics in England, 1550-1800*, pp.52-83, Basingstoke.

Boulton, J. (2000), 'London 1540-1700', in P. Clark (ed.), *The Cambridge Urban History of Britain, Vol. 2 : 1540-1840*, pp.315-346, Cambridge: Cambridge University Press.

Cavallo, S. (2007), *Artisans of the Body in Early Modern Italy*, Manchester: Manchester University Press.

Clark, P. (1987), 'Migrants in the City: The Process of Social Adaptation in English Towns 1500-1800', in P. Clark and D. Souden (eds.), *Migration and Society in Early Modern England*, pp.267-291, Rowman & Littlefield Publishers, Inc.

- Clark, P. (1972), 'The Migrant in Kentish Towns, 1580-1640', in P. Clark and P. Slack (eds.), *Crisis and Order in English Towns, 1500-1700: Essays in urban History*, pp.117-63, London: Routledge.
- Clark, P. and D. Souden (1987), 'Introduction', in P. Clark and D. Souden (eds.), *Migration and Society in Early Modern England*, pp.11-48, London: Hutchinson.
- Cressy, D. (1986), 'Kinship and Kin Interaction in Early Modern England', Past and Present, 113: pp.38-69.
- Crowston, C. H., S. L. Kaplan, and G. Postel-Vinay, 'Where and Why Apprentices? Examples From mid-Eighteenth-Century France', paper presented at the 2009 World Economic History Congress, Utrecht.
- D'Amico, S. (2000), 'Crisis and Transformation: Economic Organization and Social Structures in Milan, 1570-1630', Social History 25, no. 1, pp.1-21.
- Davies, M. and A. Saunders (2004), *The History of the Merchant Taylors' Company*, Leeds: Maney.
- Davies, M. G. (1956), *The Enforcement of English Apprenticeship: a Study in Applied Mercantilism, 1563-1642*, Cambridge (Mass): Harvard University Press.
- De Munck, B. (2007), *Technologies of Learning. Apprenticeship in Antwerp from the 15th Century to the End of the Ancien Régime*, Turnhout: Brepols.
- Dolan, C. (1989), 'The Artisans of Aix-en-Provence in the Sixteenth Century: a Micro-analysis of Social Relationships', in P. Benedict (ed.), *Cities and Social Change in Early Modern France*, pp.174-194, London: Unwin Hyman.
- Dunlop, J. and R. D. Denman (1912), *English Apprenticeship and Child Labour: a History*, London: T. Fisher Unwin.
- Epstein, S. A. (1995), *Wage Labor and Guilds in Medieval Europe*, Chapel Hill: University of North Carolina Press.
- Epstein, S. R. (1998), 'Craft Guilds, Apprenticeship, and Technological Change in Preindustrial Europe', Journal of Economic History, 58, 3: pp.684-713.
- Friedrichs, C. R. (1975), 'Capitalism, Mobility and Class Formation in the early Modern German City', Past and Present, 69: pp.24-48.
- Galor, O. and D. Tsiddon (1997), 'Technological Progress, Mobility, and Economic Growth', American Economic Review, 87, no. 3, pp.363-382.
- Goldthorpe, J. H. (1987), *Social Mobility and Class Structure in Modern Britain*, Oxford: Clarendon Press.
- Granovetter, M. (1974), *Getting a Job: A Study of Contacts and Careers*, Chicago University Press.

- Hanawalt, B.A. (1995), *Growing up in Medieval London: the Experience of Childhood History*, Oxford: Oxford University Press.
- Hindle, S. (2004), *On the Parish? The Micro-Politics of Poor Relief in Rural England c. 1550-1750*, Oxford: Oxford University Press, 2004.
- Honeyman, K. (2007), *Child Workers in England, 1780-1820: Parish Apprentices and the Making of the Early Industrial Labour Force*, Aldershot: Ashgate.
- Horrell, S. and J. Humphries, (1995), ‘The Exploitation of Little Children’: Child Labor and the Family Economy in the Industrial Revolution’, Explorations in Economic History 32, no. 4, pp.485-516.
- Houlbrooke, R. A. (1989), *English Family Life, 1576-1716: an Anthology From Diaries*, New York: Blackwell.
- Kahl, W. F. (1956), ‘Apprenticeship and the Freedom of the London Livery Companies, 1690-1750’, *Guildhall Miscellany*, No.7.
- Keene, D. (2000), ‘Metropolitan Values: Migration, Mobility and Cultural Norms, 1300-1700’, in L. Wright (ed.), *The Development of Standard English, 1300-1800*, pp.93-114, Cambridge: Cambridge University Press.
- Kitch, M. J. (1986), ‘Capital and Kingdom: Migration to Later Stuart London’, in A. L. Beier and R. Finlay (eds.), *The Making of the Metropolis*, pp.224-251, Harlow: Longmans.
- Lane, J. (1997), *Apprenticeship in England, 1600-1914*, Boulder: Westview Press.
- Laslett, P. (1980), ‘Introduction: Comparing Illegitimacy Over Time and Between Cultures’, in P. Laslett, K. Oosterveen and R. M. Smith (eds.), *Bastardy and its Comparative History: Studies in the History of Illegitimacy and Marital Nonconformism in Britain, France, Germany, Sweden, North America, Jamaica, and Japan*, pp.1-68, Cambridge (Mass): Harvard University Press.
- Levene, A. ‘Pauper Apprenticeship, the Industrial Economy, and the Old Poor Law in London’, Unpublished manuscript, Oxford Brookes University.
- Lovett, A. A., I. D. Whyte, and K. A. Whyte. (1985), ‘Poisson Regression Analysis and Migration Fields: the Example of the Apprenticeship Records of Edinburgh in the Seventeenth and Eighteenth Centuries’, Transactions of the Institute of British Geographers 10, no. 3, pp.317-332.
- Marx, K. (1966), *Capital: a Critique of Political Economy, Book III: The Process of Capitalist Production as a Whole* (ed. F. Engels), Moscow: Progress Publishers.
- McKenzie, D. F. (1958), ‘Apprenticeship in the Stationers' Company 1555-1640’, The Library, 5th series, 13: pp.292-299.
- Mill, J. S. (1848), *Principles of Political Economy, Vol I*, Longmans: London.

- Mitson, A. (1996), 'The Significance of Kinship Networks in the Seventeenth Century: South West Nottinghamshire', in C. Phythian-Adams (ed.), *Societies, Culture and Kinship, 1500-1850: Cultural Provinces and English Local History*, pp.24-76, Leicester: Leicester University Press.
- Minns, C. and P. H. Wallis, 'Apprenticeship and Skill in Eighteenth Century England', Paper presented at the 2009 World Economic History Congress, Utrecht.
- Minns, C. and P. H. Wallis (2009), 'Rules and Reality: Quantifying the Practice of Apprenticeship in Early Modern Europe', LSE Economic History Working Paper No.118, March.
- Mitchell, B. R. (1988), *British Historical Statistics*, Cambridge: Cambridge University Press.
- Mokyr, J. (2002), *The Gifts of Athena: Historical Origins of the Knowledge Economy*, Princeton: Princeton University Press.
- Montgomery, J. D. (1991), 'Social Networks and Labour-Market Outcomes: Towards an Economic Analysis', *American Economic Review*, 81, no. 5, pp.1408-1418.
- Munshi K. (2003), 'Networks in the Modern Economy: Mexican Migrants in the U.S. Labour Market', *Quarterly Journal of Economics*, 118, no. 2, 549-599.
- Murphy, K. M., A. Shleifer, and R. W. Vishny (1991), 'The Allocation of Talent: Implications for Growth', *Quarterly Journal of Economics*, 106, no. 2, pp.503-530.
- Ogilvie, S. C. (2004), 'Guilds, Efficiency, and Social Capital: Evidence from German Proto-Industry', *Economic History Review*, 57, no. 2, 286-333.
- Ogilvie, S. C. (1997), *State Corporatism and Proto-industry: the Württemberg Black Forest, 1580-1797*, Cambridge: Cambridge University Press.
- Porter, J. A. (1965), *The Vertical Mosaic: An Analysis of Social Class and Power in Canada*, Toronto: University of Toronto Press.
- Ramsay, G. D. (1978), 'The Recruitment and Fortunes of Some London Freemen in the Mid-Sixteenth Century', *Economic History Review*, 31, no. 4, pp.526-540.
- Rappaport, S. L. (1983), 'Social Structure and Mobility in Sixteenth-Century London', *London Journal* 9, no. 2, pp.107-135.
- Riello, G. (2002), 'The Shaping of a Family Trade: The Cordwainers' Company in Eighteenth-Century London', in I. Gadd and P. H. Wallis (eds.), *Guilds, Society and Economy in London, 1450-1800*, pp.141-159. London: Centre for Metropolitan History.
- Schwarz, L. (1987), 'London Apprentices in the Seventeenth Century: Some Problems', *Local Population Studies*, 38: pp.18-22.

- Shephard, E. J. (1986), 'Social and Geographic Mobility of the Eighteenth Century Guild Artisan: an Analysis of Guild Receptions in Dijon, 1700-1790', in S. L. Kaplan and C. J. Koeppe (eds.), *Work in France: Representations, Meaning, Organization, and Practice*, pp.97-131, Ithica: Cornell University Press.
- Sjaastad, L. (1962), 'The Costs and Returns of Human Migration', Journal of Political Economy, 70, no. 5, part 2, pp.80-93.
- Smith, S. R. (1973), 'The Social and Geographical Origins of the London Apprentices, 1630-60', Guildhall Miscellany, 4: pp.195-206.
- Stabel, P. (2007), 'Social Mobility and Apprenticeship in Late Medieval Flanders', in B. De Munck, S. L. Kaplan and H. Soly (eds.), *Learning on the Shop Floor: Historical Perspectives on Apprenticeship*, pp.158-178, Oxford: Berghahn.
- Stearns, P. N. (1975), *Lives of Labour: Work in a Maturing Industrial Society*, New York: Holmes and Meier.
- Stone, L. (1966), 'Social Mobility in England, 1500-1700', Past and Present, 33: pp.16-55.
- Tadmor, N. (2001), *Family and Friends in Eighteenth-Century England: Household, Kinship, and Patronage*, Cambridge: Cambridge University Press.
- Thrupp, S. L. (1989), *The Merchant Class of Medieval London 1300-1500*. Ann Arbor: University of Michigan Press.
- Van Zanden, J. L. (2009), *The Long Road to the Industrial Revolution: The European Economy in a Global Perspective, 1000-1800*, Leiden: Brill.
- Walker, M. J. (1985), *The Extent of Guild Control of Trades in England, c1600-1820: a Study Based on a Sample of Provincial Towns and London Companies*, Unpublished Ph.D. thesis, University of Cambridge.
- Wallis, P. H. (2008), 'Apprenticeship and Training in Premodern England', Journal of Economic History 68, no. 3, pp.832-861.
- Wareing, J. (1980), 'Changes in the Geographical Distribution of the Recruitment of Apprentices to the London Companies, 1486-1750', Journal of Historical Geography, 6, no. 3, pp.241-249.
- Webb, C. (1998-2009), *London Apprentice Series*, 48 vols, London: Society of Genealogists.
- Whyte, I. (2000), *Migration and Society in Britain, 1550-1830*, Basingstoke: MacMillan.
- Withington, P. (2005), *The Politics of Commonwealth: Citizens and Freemen in Early Modern England*, Cambridge: Cambridge University Press.
- Wrightson, K. and D. Levine (1979), *Poverty and Piety in an English Village: Terling, 1525-1700*, Oxford: Clarendon.

Wrigley, E. A. (1967), 'A Simple Model of London's Importance in Changing English Society and Economy, 1650-1750', Past and Present, 37: pp.44-70.

Wrigley, E. A. (1989), *People, Cities, and Wealth: The Transformation of Traditional Society*, Oxford: Blackwell.

Wrigley, E. A. (2004), *Poverty, Progress, and Population*, Cambridge: Cambridge University Press.

Yarborough, A. (1980), 'Geographical and Social Origins of Bristol Apprentices, 1542-1565', Transactions of the Bristol and Gloucestershire Archaeological Society, 98: pp.113-130.

Young, M. and P. Willmott (1954), *Family and Kinship in East London*, London: Pelican.

Table 1: Was a kinship relation between master and apprentice common, 1600-1750?

	(1)	(2)	(3)	(4)	(5)
Number of apprentices taken by master in his career	% of apprentices recorded as being kin to their master	% of apprentices recorded as being kin to their master, London apprentices	% of masters recorded as having at least one kin apprentice	% unusual name apprentices with same name as their master	% unusual name masters with same name as one of their apprentices
1	0.9	4.4	0.9	10.5	10.5
2	0.5	2.3	1.0	10.7	18.8
3	0.5	2.6	1.3	5.1	14.7
4	0.6	2.6	1.6	6.1	19.0
5	0.4	2.3	1.8	7.9	32.3
6 to 9	0.3	1.4	1.7	4.2	24.7
10 to 20	0.2	1.4	2.0	4.2	37.8
More than 20	0.3	2.4	6.7	No observations	No observations
All Masters	0.5	2.3	1.2	6.9	16.3
N	35838	3185	12,320	1,726	649

Notes: From matched sample where apprentice and master origins are known. Column 3 includes some apprentices who do not share a name with their master.

Table 2: Father's occupation categories, 1600-1749

	All apprentices (%)	Metropolitan Apprentices (%)	Provincial Apprentices (%)	1688 Social Tables
Father primary	30	11	36	60
Father manufacturing	33	45	29	25
Father distribution/sales	7	10	6	4
Father labourer	3	5	2	--
Father service	7	14	5	6
Father professional	5	3	5	4
Father gentleman	15	12	16	1
N	110881	28127	82684	---

Notes: Social Tables distribution is based on a revised version of King's tables, using Wrigley's suggestions for the allocation for King's cottagers and labourers to sectors: Wrigley, *People, cities and wealth*, p. 171, n.19. King's category of labourers are divided between primary (78%) and manufacturing (22%).

Table 3: Intergenerational continuity, 1600-1749

	All apprentices	Metropolitan Apprentices	Provincial Apprentices
Panel A: all father occupations			
Father's occupation matches company	3.8	5.8	3.1
Father in same third tier cluster	4.5	6.3	3.9
Father in same second tier cluster	6.7	9.6	5.7
Father in same first tier cluster	26.5	35.2	23.5
N	110881	28127	82684
Panel B: fathers in distribution, sales, manufacturing			
Father's occupation matches company	9.1	10.2	8.6
Father in same third tier cluster	10.7	10.9	10.6
Father in same second tier cluster	15.9	16.4	15.6
Father in same first tier cluster	61.2	60.2	61.7
N	44034	15399	28635

Notes: Occupations classified according to Wrigley's P.S.T occupational classification. See text for details.

Table 4: Did masters and apprentices come from the same place?

Number of apprentices taken by masters	All names		Excluding apprentices with same name as master	
	% of apprentices from same place of origin as master	% of masters with one or more place of origin apprentice	% of apprentices with a place of origin master	% of masters with one or more place of origin apprentice
1	12.7	12.7	6.0	6.0
2	11.4	17.4	6.5	9.5
3	8.3	17.8	4.6	9.5
4	7.8	20.7	4.7	12.0
5	7.6	21.8	4.9	13.2
6 to 9	6.5	26.2	4.1	15.8
10 to 20	4.3	27.8	3.0	18.4
More than 20	5.6	50.0	4.7	37.5
All Masters	8.0	18.2	4.7	10.3
N	22,079	8,716	21,259	8,314

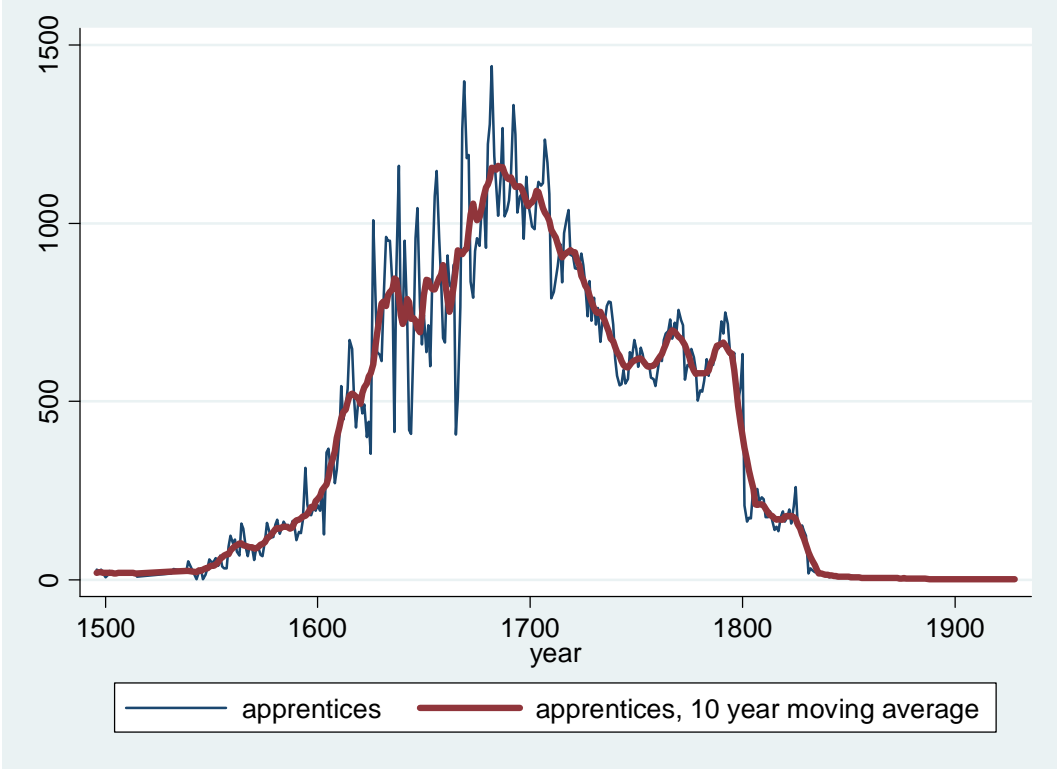
Notes: From matched sample where apprentice and master origins are known. Masters from London and Middlesex are excluded. Data apply to 1600-1750

Table 5: Did masters and apprentices come from the same county?

Number of apprentices taken by masters	All names		Excluding apprentices with same name as Master	
	% of apprentices with home county master	% of masters with one or more home county apprentice	% of apprentices with home county master	% masters with one or more home county apprentice
1	29.3	29.3	22.1	22.1
2	27.3	38.4	21.9	30.0
3	23.8	42.5	19.4	33.6
4	23.1	50.2	19.5	42.5
5	23.0	55.2	19.9	46.1
6 to 9	21.1	58.3	18.2	52.2
10 to 20	17.1	68.4	14.9	62.3
More than 20	13.8	79.2	12.7	79.2
All	23.0	42.3	19.0	35.1
N	22,679	8,716	21,259	8,314

Notes: from 1600-1749 matched sample where apprentice and master origins are known. London and Middlesex masters excluded. Data apply to 1600-1750

Figure 1: The number of London apprentices recorded in the data over time



Notes: See text for data details.

Figure 2 a,b,c: Apprenticeship rates over time per head of population: 1600-1625, 1700-1725 and 1750-1775

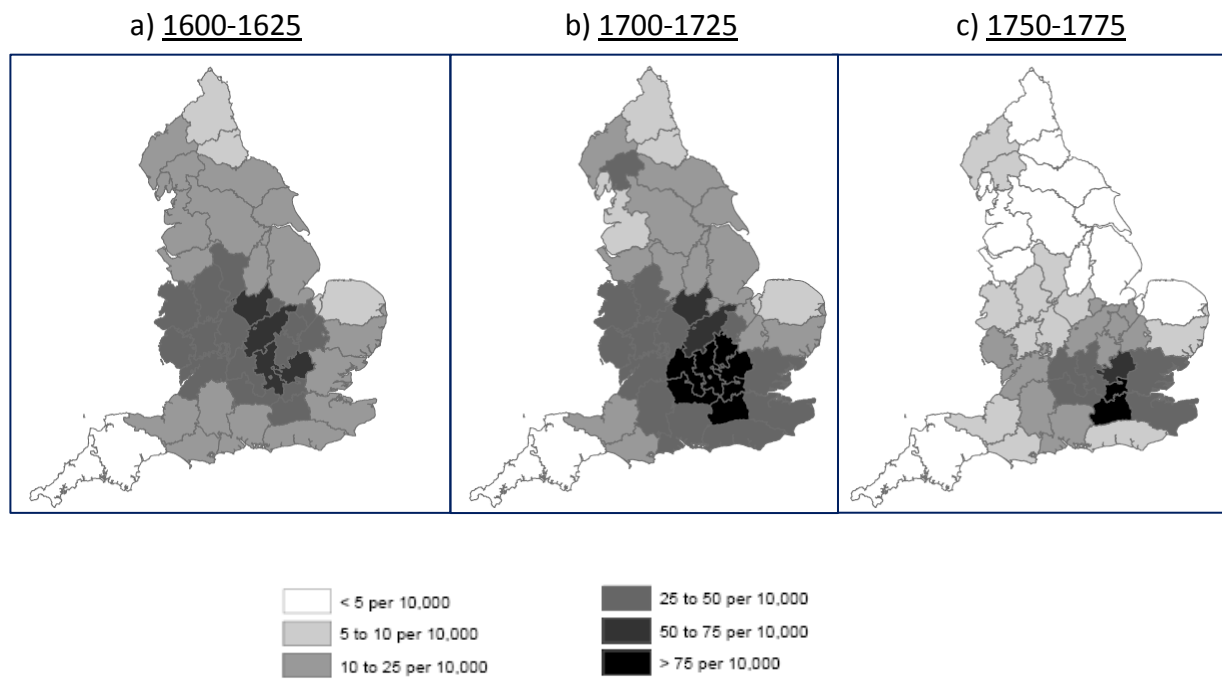
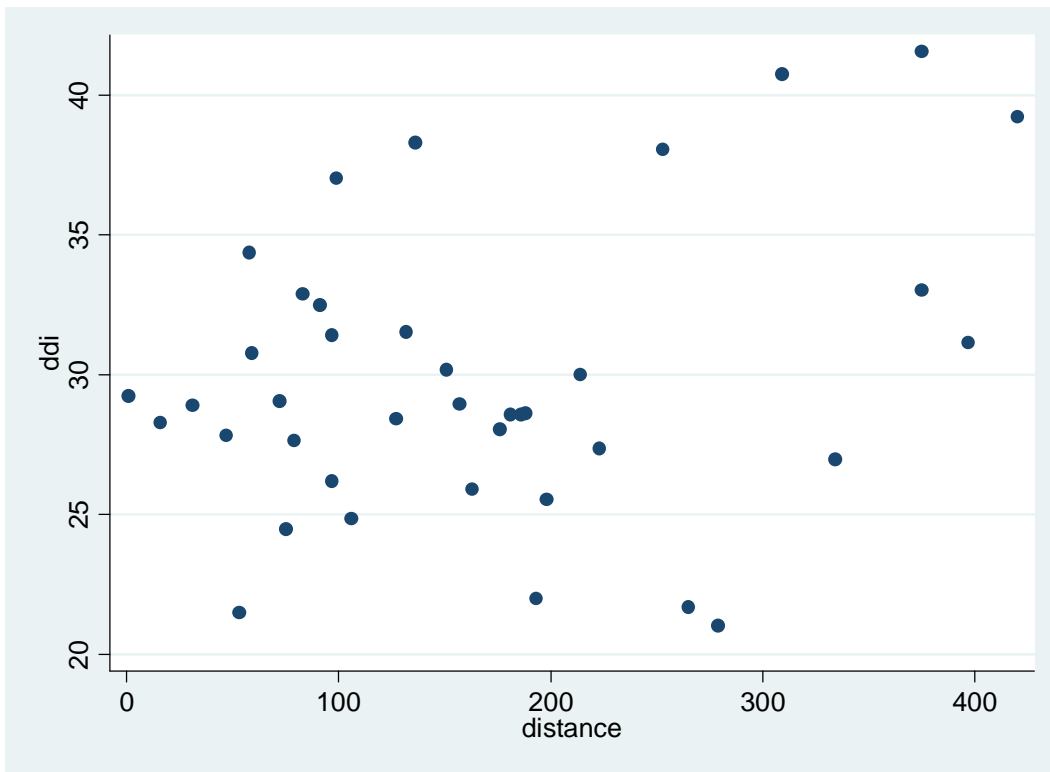
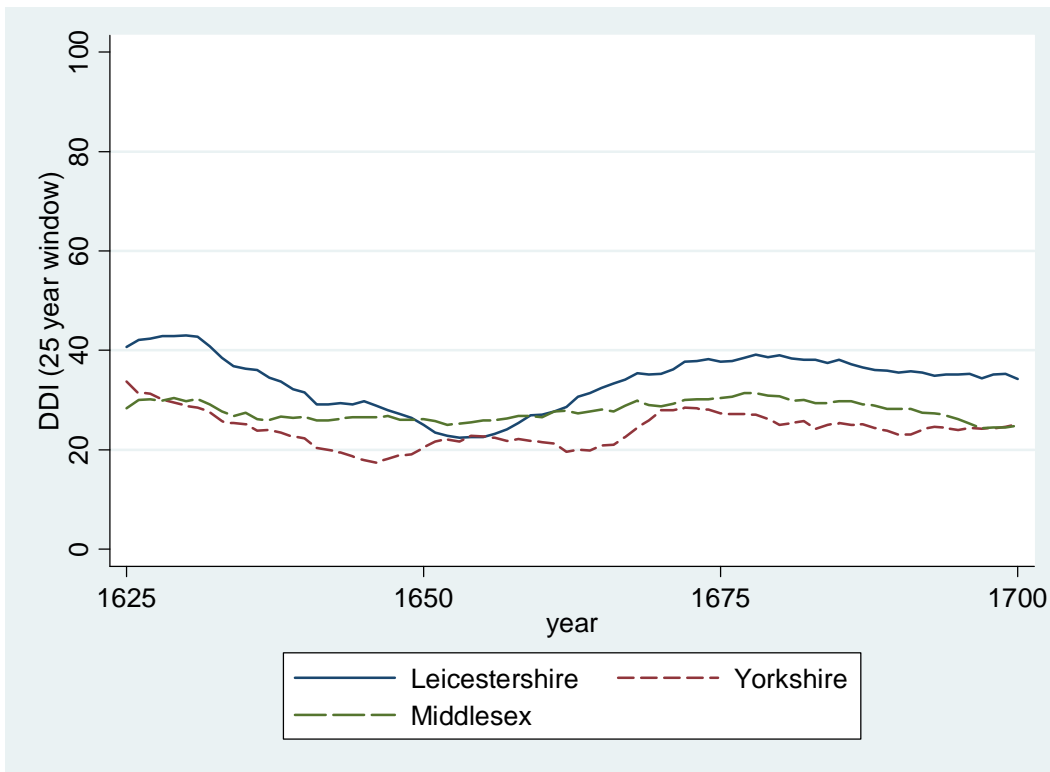


Figure 3: Apprentice dissimilarity and distance from London, 1600-1749



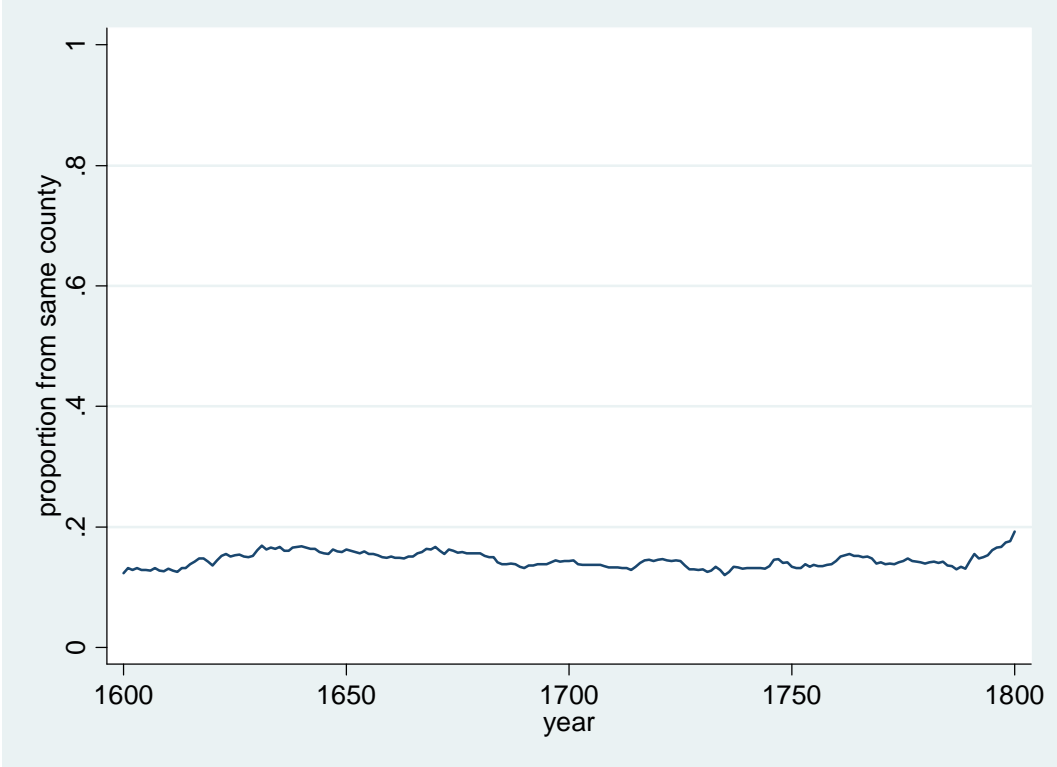
Notes: DDI calculations are described in the text (see footnote 50). Distance is measured as the straight line distance between each county town and London.

Figure 4: DDI scores for Leicestershire, Middlesex and Yorkshire, 1625-1700



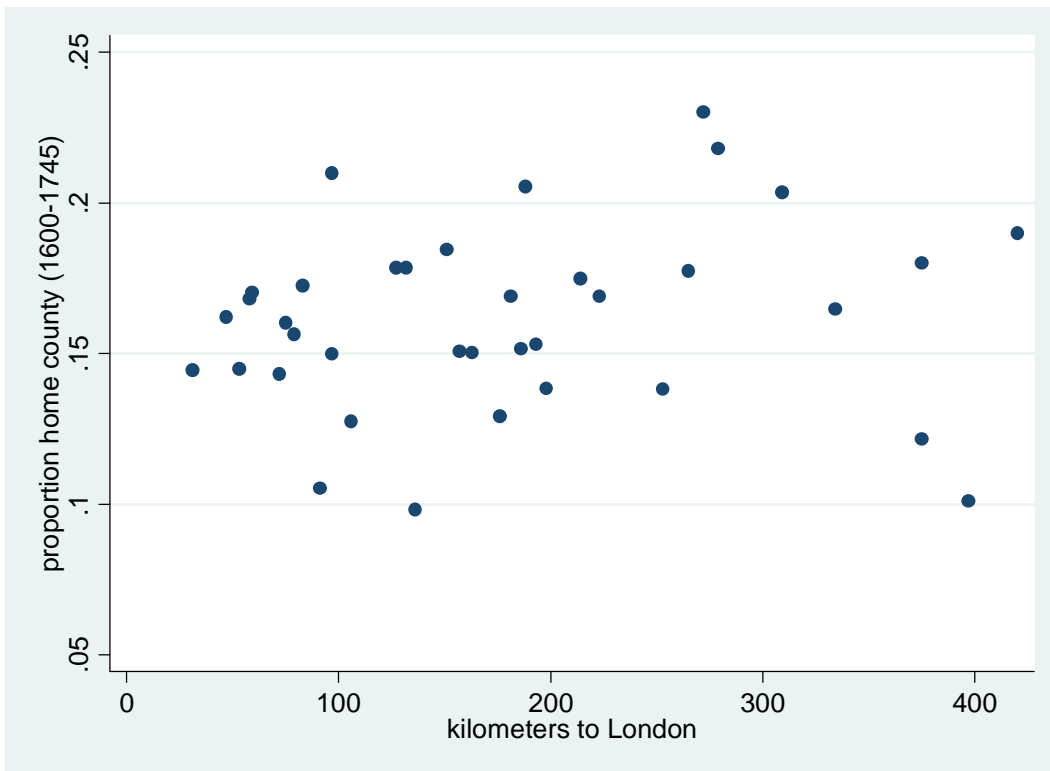
Notes: DDI calculations are described in the text (see footnote 50). See text for further details.

Figure 5: The proportion of apprentices apprenticed to a master from their home county over time (London and Middlesex excluded)



Notes: See text for details.

Figure 6: Propensity to be apprenticed to a master from your home county against distance



Notes: Observations are county level values between 1600 and 1749. London, Middlesex, and Surrey are excluded. Distance is measured as the straight line distance between London and each county town.

CENTRE FOR ECONOMIC PERFORMANCE
Recent Discussion Papers

- | | | |
|-----|--|--|
| 955 | Urban Sila | Can Family-Support Policies Help Explain Differences in Working Hours Across Countries? |
| 954 | John T. Addison
Alex Bryson
Paulino Teixeira
André Pahnke
Lutz Bellman | The Extent of Collective Bargaining and Workplace Representation: Transitions between States and their Determinants. A Comparative Analysis of Germany and Great Britain |
| 953 | Alex Bryson
Harald Dale-Olsen
Erling Barth | How Does Innovation Affect Worker Well-being? |
| 952 | Nathan Foley-Fisher
Bernardo Guimaraes | US Real Interest Rates and Default Risk in Emerging Economies |
| 951 | Yann Algan
Christian Dustmann
Albrecht Glitz
Alan Manning | The Economic Situation of First- and Second-Generation Immigrants in France, Germany and the United Kingdom |
| 950 | Jérôme Adda
Francesca Cornaglia | The Effect of Bans and Taxes on Passive Smoking |
| 949 | Nicholas Oulton | How to Measure Living Standards and Productivity |
| 948 | Alex Bryson
Bernd Frick
Rob Simmons | The Returns to Scarce Talent: Footedness and Player Remuneration in European Soccer |
| 947 | Jonathan Wadsworth | Did the National Minimum Wage Affect UK Wages? |
| 946 | David Marsden | The Paradox of Performance Related Pay Systems: ‘Why Do We Keep Adopting Them in the Face of Evidence that they Fail to Motivate?’ |
| 945 | David Marsden
Almudena Cañibano | Participation in Organisations: Economic Approaches |
| 944 | Andreas Georgiadis
Alan Manning | One Nation Under a Groove? Identity and Multiculturalism in Britain |
| 943 | Andreas Georgiadis
Alan Manning | Theory of Values |

- | | | |
|-----|---|---|
| 942 | Kristian Behrens
Giordano Mion
Yasusada Murata
Jens Südekum | Trade, Wages and Productivity |
| 941 | David Marsden
Richard Belfield | Institutions and the Management of Human Resources: Incentive Pay Systems in France and Great Britain |
| 940 | Elhanan Helpman
Oleg Itskhoki
Stephen Redding | Inequality and Unemployment in a Global Economy |
| 939 | Norman Ireland
Robin A. Naylor
Jeremy Smith
Shqiponja Telhaj | Educational Returns, Ability Composition and Cohort Effects: Theory and Evidence for Cohorts of Early-Career UK Graduates |
| 938 | Guy Mayraz
Jürgen Schupp
Gert Wagner | Life Satisfaction and Relative Income: Perceptions and Evidence |
| 937 | Nicholas Bloom
Raffaella Sadun
John Van Reenen | The Organization of Firms Across Countries |
| 936 | Jean-Baptiste Michau | Unemployment Insurance and Cultural Transmission: Theory and Application to European Unemployment |
| 935 | João M. C. Santos-Silva
Silvana Tenreyro | Trading Partners and Trading Volumes: Implementing the Helpman-Melitz-Rubinstein Model Empirically |
| 934 | Christian Morrisson
Fabrice Murtin | The Century of Education |
| 933 | João M. C. Santos-Silva
Silvana Tenreyro | Further Simulation Evidence on the Performance of the Poisson Pseudo-Maximum Likelihood Estimator |
| 932 | João M. C. Santos-Silva
Silvana Tenreyro | On the Existence of the Maximum Likelihood Estimates for Poisson Regression |
| 931 | Richard Freeman
John Van Reenen | What If Congress Doubled R&D Spending on the Physical Sciences? |
| 930 | Hector Calvo-Pardo
Caroline Freund
Emanuel Ornelas | The ASEAN Free Trade Agreement: Impact on Trade Flows and External Trade Barriers |