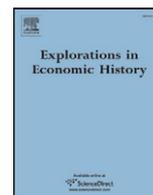


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The price of human capital in a pre-industrial economy: Premiums and apprenticeship contracts in 18th century England[☆]

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ABSTRACT

Training through apprenticeship provided the main mechanism for occupational human capital formation in pre-industrial England. This paper demonstrates how training premiums (fees) complemented the formal legal framework surrounding apprenticeship to secure training contracts. Premiums varied in response to scarcity rents, the expected productivity of masters and apprentices, and served as compensation for the anticipated risk of default. In most trades premiums were small enough to allow access to apprenticeship training for youths from modest families.

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1. Introduction

The price of education and training, and how these costs are distributed within a society, are major determinants of the extent of human capital formation. The advance of mass schooling was most rapid in nations where the cost of educating children was lower relative to incomes, and the financing of public schools reduced the burden of costs faced by poorer members of society. The evidence suggests that this mattered for growth: the early leaders in human capital formation through mass schooling were among the most precocious national or regional economies prior to 1900 (Lindert, 2004; Go and Lindert, 2010).

The importance of human capital formation did not begin in 1800, however. A number of economic historians have suggested that high levels of occupational skill were one of the root causes of industrialisation in England and Europe (Mokyr, 2009; van Zanden, 2009; Humphries, 2003). Apprenticeship inevitably plays a major role in these discussions: it was the leading formal source of vocational skills outside the agricultural sector in pre-modern England, with roughly nine percent of English male teenagers having entered apprenticeships in London alone around 1700 (Minns and Wallis, 2012).

Financing an apprenticeship prior to 1800 posed many of the same problems faced by families wishing to educate their children through formal schooling after industrialisation. One of apprenticeship's potential advantages is that it can allow youths to finance training by working for their employers at wages below their marginal product. Apprenticeship therefore reduces the regressive effects that credit constraints impose on people's capacity to invest in their human capital. Industrial apprenticeships in

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the nineteenth and twentieth centuries often operated on these terms (More, 1980; Smits and Stromback, 2000). In the seventeenth and eighteenth centuries, indentured servitude utilised a similar system: English youths obtained passages across the Atlantic by committing themselves to work for an employer for a period thereafter (Galenson, 1981). It is striking, therefore, that English apprentices in the eighteenth century were often required to make an up-front payment, known as the premium, to their master in order to obtain a position.

The existence of premiums is well known to historians, who have often suggested that they were large and ubiquitous. As a result, premiums have been interpreted as lowering the extent of economic mobility through apprenticeship. If this was the case, it offers a potentially powerful counter-argument against suggestions that the relative openness of apprenticeship, and by extension of guilds and skilled occupations, was one of the distinguishing features of the European economy (Epstein, 1998). Large, uniform premiums would reinforce more pessimistic accounts of apprenticeship as a socially exclusive device that preserved rents for insiders (Ogilvie, 2004). Premium size is thus an important variable for wider economic performance – if it presented a significant barrier to training, this would have implications for productivity, economic mobility and the extent to which aptitude and opportunity were matched (Ben-Amos, 1994; Brooks, 1994; de Munck, 2007. See also: Ogilvie, 1997, 2004).

Premiums also have significant implications for a second element in ongoing debates about apprenticeship: whether masters and apprentices were able to write viable, self-enforcing contracts. Several studies have argued that apprenticeship contracts in Paris, Montreal and Antwerp were tightly specified in order to reduce opportunism (Hamilton, 1996; Kaplan, 1993; de Munck, 2007). No parallel study exists for English apprenticeship, however, and recent work has focused on external enforcement mechanisms (Humphries, 2003; Minns and Wallis, 2012; Wallis, 2012). Indeed, despite the significant role attributed to apprenticeship in pre-industrial economic development, there is relatively little systematic evidence about the incidence and level of premiums that English apprentices actually paid, and no detailed analysis of what factors determined the level of premiums in this period.

In this paper we explore the price of apprenticeship training in England in the eighteenth century, the effect of fees on access to training, and the role of fees in permitting contracts to be agreed in an environment with limited institutional flexibility. Using a large sample of premium records from the eighteenth century, we show that the financial barrier presented by premiums has been overstated, varied widely between occupations and individuals, and was in many cases dwarfed by the cost of starting a business following a successful apprenticeship. We find that premiums fit well with a standard human capital model, expanded to incorporate the risk of early departure. They reflected variations in the anticipated costs and benefits of individual training contracts, including apprentices' expected productivity, and the likely availability of economic rents following training. However, we also suggest that one of the main purposes of premiums appears to have been to solve the problem of potential holdups in the training market due to the high risk of default. Premiums allowed masters to accept apprentices readily and invest in training their apprentices despite high rates of attrition.

2. Training contracts in pre-industrial England: theory and history

As a system of on-the-job training, apprenticeship involved skill transmission over an extended period. For apprentices and masters to be willing to enter into contracts, both parties must expect to receive positive net benefits as an outcome of training. At first glance, apprenticeship in pre-industrial England fits well with a stylised model of general human capital acquisition (Becker, 1964): apprentices had greater productivity and earnings capacity after training, and masters had ample opportunity to recover costs from trained apprentices over long terms of seven years or more. However, the long-term contracting required in this model presents a fundamental problem for all parties. The specification of apprenticeship contracts is problematic, with both parties struggling to commit to incomplete contract over a long period (Grubb, 1997; Humphries, 2003). Masters may shirk on training or wages. Apprentices may quit prematurely once the wage they could obtain in the outside labour market exceeds that received from the master.

The price of training in pre-industrial England can be analysed through a simple model of apprenticeship. In a competitive equilibrium, the price paid by apprentices to train will equal to the costs borne by masters who provide training. Eq. (1) describes the master's problem in this market. Apprentices who secure training receive a wage (subsistence payment) (w) in every training period, and may receive a post-training benefit on completion (B). Masters receive the product of apprentice labour in each period (v), pay training costs (c) in the form of instruction or supervision, and may receive a training premium (P) from the apprentice. We also include the probability of persistence in the indenture (ρ). With r as the discount rate and T as the length of the indenture, Eq. (1) illustrates equilibrium in present value terms²:

$$\sum_{t=0}^T \rho^t \frac{w_t}{(1+r)^t} + \rho^T B = \sum_{t=0}^T \rho^t \frac{v_t - c_t}{(1+r)^t} + P. \quad (1)$$

Eq. (1) outlines the key parameters of the apprenticeship indenture that could, in theory, be varied to generate successful matches between apprentices and masters. As is sometimes observed in present-day apprenticeship, training wages (w) can be varied to offset planned training inputs (c) and apprentices' anticipated productivity (v). The length of the indenture term (T) can also be adjusted; several historical studies of indenture contracts find that productivity and length of term were inversely correlated.³ Post training incentives (B) can be used to make contracts self-enforcing. Today, this might include ongoing

² This model is an extended version of that found in Hamilton (1996).

³ See Kaplan (1993) and De Munck (2007) for apprenticeships in Paris and Antwerp, Hamilton (1996) for Montreal apprentices, and Galenson (1981) for indentured servants bound for the Americas.

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