

Labour productivity and human capital in the European maritime sector of the eighteenth century



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Abstract

Pre-modern growth was to a large extent dependent on processes of commercialization and specialization, based on cheap transport. Seminal interpretations of the process of economic growth before the Industrial Revolution have pointed to the strategic importance of the rise of the Atlantic economy and the growth of cities linked to this, but have not really explained why Europeans were so efficient in organizing large international networks of shipping and trade. Most studies concerning early modern shipping have focused on changes in ship design (capital investments) in explaining long-term performance of European shipping in the pre-1800 period; in this paper we argue that this is only part of the explanation. Human capital – the quality of the labour force employed on ships – mattered as well. We firstly demonstrate that levels of human capital on board European ships were relatively high, and secondly that there were powerful links between the level of labour productivity in shipping and the quality of the workforce. This suggests strongly that shipping was a ‘high tech’ industry not only employing high quality capital goods, but also, as a complementary input, high quality labour, which was required to operate the increasingly complex ships and their equipment. © 2014 The Authors. Published by Elsevier Inc. This is an open access article under the CC BY license (<http://creativecommons.org/licenses/by/3.0/>).

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1. Introduction

Shipping was a key sector of the economies of Europe before 1800. In the pre-modern period, growth was largely dependent on processes of commercialization and specialization, based on cheap transport within and beyond national borders. Seminal interpretations of economic

growth before the Industrial Revolution have pointed to the importance of the rise of the Atlantic economy and the resulting expansion of cities (Acemoglu et al., 2005; Allen, 2009; Wrigley, 1985). But such accounts have not adequately explained why Europeans could so efficiently organise large international networks of shipping and trade. Concerning shipping, there is a more qualitative story to

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tell about the evolution of shipbuilding, encompassing the major innovations in the High Middle Ages (as a result of the merging of Mediterranean and northern traditions of ship design), the development of the *fluyt* in the sixteenth century, and ultimately the transformative developments in navigation and in ship construction in eighteenth-century England (Unger, 1978; Davids, 2008; Lucassen and Unger, 2011). We argue in this paper that these forms of technological change only partly explain the long-term performance of European shipping in the pre-1800 period. The quality of the labour force employed on ships – their human capital – was also important.

The central thesis of our paper is that not only were such human capital levels aboard European ships exceedingly high, but that labour productivity in shipping was strongly linked to the quality of the workforce. Because shipping was a ‘high tech’ industry (Rediker, 1989) not only did it employ high-quality capital goods (increasingly efficient ships), but it also needed, as a complementary input, high-quality labour across *different* ranks, which was required to operate the increasingly complex ships and their equipment (Lucassen and Unger, 2011). We explain in this paper that the growth and performance of European shipping was therefore not simply a technological trajectory representing a shifting ratio between capital and labour. ‘Raw labour’ was improved by both capital goods and *complementary* human capital. The latter point is key for the ongoing discussion about the role of human capital in the pre-1800 economy. Some scholars have argued that the skills of ‘common workers’ were negligible ingredients of pre-1800 economic growth (Allen, 2009; Mokyr, 2002, 2010), but our findings concerning a major segment of the European labour market (Van Lottum, 2007) suggest that such skills were indeed important.

Eighteenth-century observers were quite aware of the significance of ordinary maritime workers (i.e., not only the officers) and their skills. In his *Wealth of Nations*, Adam Smith observes that common sailors were highly skilled when compared to their peers on land. And yet, ‘Though their skill and dexterity are much superior to that of almost all artificers, and though their whole life is one continual scene of hardship and danger, yet for all this dexterity and skill [...] they receive scarce any other recompence but the pleasure of exercising the one and of surmounting the other’ (Smith, 1778: 134–35). Although Smith does not explicitly link *seamanship* (the term used to describe a wide variety of maritime skills) to performance in the sector, it was common knowledge in the eighteenth century that productivity was greatly affected by the quality of a crew. Take, for example, what we would now call an op-ed piece from April 1791,

in the magazine *The Bee* (Anglicus, 1791). The anonymous contributor ‘Anglicus’ argues that the notion that ‘one Englishmen was a match for three of the Gallic race’ (176) could in fact be proven by looking at shipping statistics. His jingoism notwithstanding, the author makes some pertinent observations. To prove his point he lists the average burden of English, Swedish, Danish, French, and Spanish ships and compares these to the average number of men serving on board these ships – thereby creating so-called tonnage-per-man ratios, a measure we will also adopt in our analysis. The figures presented (177) show that the French did indeed ‘employ three times as many hands’ on their ships as the English – the ton-to-man ratio turns out to be three times as low in England. Anglicus then makes the point that this is not (or rather cannot be) a matter of comparing different types of ships. Indeed, he claims he has assessed comparable merchant vessels, and the difference can solely be explained by the quality of the crews: ‘[the] seamanship [of] one Englishman is literally, and without exaggeration, a match for three Frenchmen’ (176).

In a recent evaluation of the skill level of maritime workers (Van Lottum and Poulsen, 2011) it was shown for the first time that compared to other sectors of the economy, the maritime sector was generally characterised by relatively high levels of human capital, thus confirming Smith’s claim in *The Wealth of Nations*. However, the latter paper looked only at the human capital indicators of numeracy and literacy for seamen according to country of origin, and was limited to the end of the eighteenth century. As such, it could not measure the development of skill levels in national fleets, nor did it allow for an analysis of the possible effect of the two indicators on productivity. Using the same source but constructing a new (and much larger) relational database, containing a variety of data concerning the crews *and* the ships to which they belonged for the beginning and end of the eighteenth century, in the present paper we are for the first time able to analyse the effect of human capital on labour productivity in the European maritime sector.

2. The dataset

The source we use for our analysis is the so-called Prize Paper archive (Van Lottum et al., 2011; van Rossum et al., 2010). The archive consists of documents concerning actions by the Royal Navy taken with regard to privateering, and is part of the extensive archive of the High Court of Admiralty (HCA), which can be found at The National Archives in Kew (TNA). The section of the collection we have used for our analysis is the court’s interrogations of crewmembers of

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