Gains in labour productivity in ocean sailing shipping between the Middle Ages and its demise at the end of the nineteenth century were impressive. Those achievements, measured in tons served per man, were apparently far in excess of other economic sectors and translated into rapid growth of shipping tonnage and in the economies of port towns and their regions. Port towns were the centres of that economic growth. European expansion to the New World and to Asia, one of the most important events in modern economic history according to Karl Marx, was long attributed among other things to improvements in sailing ships and the exploitation of the potential for economic growth which the new types of ships implied. The gains that have enjoyed the spotlight of scholarly attention, though, are those generally identified as coming from trades beyond Europe. Comparative figures suggest that productivity gains were greater within Europe than in trades outside of European waters in the early modern period.

A breakdown of the available figures per subperiod, per country, and sometimes per ton makes it possible to be more specific about the weight of the different explanations for productivity growth. It is clear that the gains in labour productivity can in part be explained by...
economies of scale. However, the jumps in the gains demand more specific explanation. In the late Middle Ages, in the change from two tons per man to five tons per man, and in the nineteenth century, from 18 tons per man to 32 tons per man, the sources for improvement are to be found more in technical innovations. In the intermediate sixteenth and seventeenth centuries, however, the explanation may also be found in institutional changes, including protection of merchantmen by the navy, the better functioning of labour markets and the organization in the ports.5

In the sixteenth and seventeenth century institutional changes seem to have prevailed as the sources for improvements in manning ratios. The effect showed up in a number of ways, most notably in a fall in turnaround times, a tendency which increased as time went on. Better information and more established and regular shipping along longer and known routes made it possible to keep ships at sea longer each year which in turn allowed productivity per ship to rise. Higher utilization rates meant more output as capital was worked more intensively. The predictability of trades made it possible to assemble cargoes in advance and not delay ships in port waiting to fill their holds. When institutional factors prevented the predictability of trade there was a brake on gains in labour productivity in shipping. That was the case in the west African slave trade where failures in shore organization kept tons per man much the same in the eighteenth century.6 Standardization of shapes and sizes of goods and more efficient packing of goods also yielded greater efficiency.7

The pattern of more intense utilization of production factors appears to have come earlier in trade between the Baltic and western Europe than elsewhere. There the presence of regular commerce led to the establishment of resident factors and agents in distant commercial centres and to a more extensive and frequent exchange of information between ports. In Amsterdam, for example, in the late sixteenth and seventeenth century the increase in total traffic through the port, the appearance of official brokers with their own guild in 1612, of published lists of commodity prices on the newly established commodity exchanges, of newsletters and later newspapers, and the development

5 Heerma van Voss, van Lottum and Lucassen below in this volume; Menard, ‘Transport Costs and long-range Trade, 1300–1800.’
6 Eltis and Richardson, ‘Productivity in the Transatlantic Slave Trade,’ 471.