The Limits of Wool and the Potential of Cotton in the Eighteenth and Nineteenth Centuries

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Why did wool textiles, so prominent in the textile production of Western Europe, particularly Britain, in the seventeenth and eighteenth centuries, fail to become the focus of the globalisation of the textile trades during the great divergence? Why did cotton, an insignificant industry in mid eighteenth century Europe, succeed where wool did not? Was it a question of the constraints of raw material supply, as some have argued, or were rigidities in production and distribution more important? Were cotton cloths intrinsically more suited to socially and culturally differentiated global markets? What role did merchants and consumers, as well as manufacturers play in the relative dynamics of wool and cotton? What were the limits of wool?

We know that cotton manufacturing in Europe, Britain in particular, benefited from the elastic and cheap transatlantic supply of slave plantation cotton and from the innovation of the Whitney gin. We also know that cotton fibres were more suited to mechanical handling, steam powered mass production, and to colourful printing than wool. We know that Western-produced cotton cloths appealed in a range of world markets and climates that were often already used to indigenous supplies of similar fabrics. And we know that basic and even printed cottons were generally cheaper than substitutable ranges of wool textiles, and getting much cheaper with increasing productivity following the innovations of the late eighteenth and early nineteenth centuries. Cottons even travelled better and more cheaply

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than woollens, they held less moisture and were not so susceptible to mould and moth infestation in distant shipment. The answer to the question 'Why cotton rather than wool?' seems pretty straight forward, particularly with the benefit of hindsight, and a lot easier to address than the relative success of cotton versus linen. Europe as a whole was much more geared to flax and linen production than to wool or cotton in the 18th century, and linen was more directly comparable with cotton in functional terms. One thus might more reasonably ask why linen lost out (eventually) during cotton's rise.

The relative success of wool

Before considering the success of cotton vis a vis wool it is important to emphasise that we are looking at two successful global industries of the period since the 17th century. To use cotton as a yardstick against which wool can be judged to have failed is to mis-specify the problem and to distort our understanding of the dynamics of the textile sector as a whole. The European, and particularly the British, wool textile industry continued to be massively successful between the 17th and the early 20th centuries, finding markets across the globe and proving innovative and responsive to competition and to fashion changes. Processes of restructuring, regional concentration and technological innovation allowed diversification, specialisation and cheapening of production. If wool was not *the* global textile industry of the 19th century, it certainly had that role, alongside cottons and silks, in the 18th century and by the late 19th century it continued to vie with cotton as the leading global textile sector as the globalisation of cotton waned for a time. Wool was always a *front ranking* global industry. Even in the case of Britain, the premier and earliest seat of cotton manufacturing's industrialised success, cotton textile exports did not exceed wool textile exports until the Napoleonic war period, long after the point at which the success of Western cotton relative to wool is generally assumed. And if cotton exports thereafter grew much faster, as prices

declined, they were certainly prone to the major cyclical crises of overproduction and profit variability that characterised the speculative overseas markets of the period. In Britain, at least, and I suspect in many of the older textile centres of Europe, steadier fortunes were often made by those who invested in wool textile manufacture. The Yorkshire textile magnates of the nineteenth century left fortunes comparable to those generated in the cotton sector. Bankruptcy rates were high in both sectors but higher in cotton manufacture than in wool (Hoppit, 1987, pp. 76-8). In the wool textile sector of Britain and West Europe, taken as a whole, it is hard to sustain the notion of a long term let alone terminal crisis of wool in the face of competition from cotton, as implied in some of the literature. And perhaps one should not expect this as the two industries were only directly competitive with each other, in terms of the end uses of the fabrics that they produced, in a small proportion of their respective ranges. I would calculate not more than 25% at most. Wool often benefited from markets forged or opened up by cotton *and* vice versa. Technological innovation spilled from one sector to the other. Cotton's gains were by no means always made at the expense of wool.

Wool textiles proved flexible in response to change. The sector generated an increasingly differentiated array of mass produced products from the early eighteenth century. Some were lighter and cheaper than many of the earlier woollens, more suited to design innovations in weaving and dyeing, and sometimes directly competitive with cottons in domestic and in a range of overseas markets for both clothing and household fabrics. Crucially the industry readily adopted cotton warps, in worsted manufacture in particular, first in flannels, baizes and cords and later, as dyeing techniques advanced, in a range of higher quality fabrics. In addition, the worsted branch incorporated a wider variety of wools and silk in the manufacture of lustre goods. Worsted manufacture was only a decade or so behind cotton in its take up of Arkwright type steam powered spinning in Britain and in mechanised weaving

from the 1840s. The size and nature of worsted factories of the nineteenth century paralleled those of the cotton sector: the productivity growth and price fall of worsted yarns and cloths from horizontally specialised firms had a similar impact in extending the global reach of markets. The longer-stapled wools used in worsted cloths became easier and cheaper to obtain, not just from specialised domestic flocks but partly also as a by- product of domestic mutton production rather than in competition with it. Worsted cloths became an increasingly large proportion of wool textile output in Britain: some 40% by the 1770s with a further 30% of output in mixed woollens-worsteds according to Bischoff (1842). The same was the case in other wool textile regions of Western Europe, mostly notably in France. In this way the wool sector became more responsive to the challenge from cotton in those fabric ranges where there was most substitutability of demand (i.e. between cottons and worsteds). Many Yorkshire and Lancashire firms, in particular, incorporated mixed worsteds with cotton manufacture as a way of hedging bets and spreading the risks of a narrow dependence on either cotton or wool in the face of market changes.

At the same time woollen (as opposed to worsted) production adapted itself to serve both domestic and external markets more effectively in the eighteenth and nineteenth centuries even though (or because) it was not so directly troubled by the stiff winds of competition from cotton. Fortunes were made in military contracting in the later eighteenth century and Napoleonic war period when British firms contributed to the clothing of North American and most European armies. If slaves wore cottons and linens for working they were supplied with woollen blankets (mostly from Yorkshire) for sleeping. And, like their West European brethren, North American and Caribbean colonists and planters were as fond of woollens as cottons. The fabrics were often not in direct competition in the Atlantic, European and other global markets, being used for different purposes, and adding to the variety of consumer goods available for different seasons, and occasions. Mercantile innovations in

cloth finishing at the fine end of the spectrum, in broadcloths and overcoatings, stimulated the market in fine woollen goods, for both clothing and household use, by the growing middling and upper classes of the Atlantic and European worlds. And at the cheaper end of the market for wool textile output, catering for the needs of workers, for occupational durability and warmth, woollens held their own in the 19th century, aided by the falling prices of mixed cloths and mass production (Lemire, 2003).

The wool textile sector was buoyant and adaptable: its limits can easily be exaggerated as we look at the successes of cotton rather than seeing the woollen industry in its own right. However the sector did face some obstacles relative to cotton as a globally expansive industry in the early 19th century and it is useful to rehearse and to evaluate the arguments that have been made in this regard.

Wool supply

Let's tackle the issue of rigidities of wool supply first but I would suggest avoiding the temptation to compare these directly with cotton supply or to regard this as a prime determinant of cotton's success vis a vis wool. If the cheapness of raw cotton and its efficient supply were the main drivers of cotton as a global commodity one would have to explain how the manufacturing sector was able to respond to the cheap imports of raw cotton and why it wished to do so. What was the incentive structure in terms of markets, profit margins, state support? Cheap raw material supply can be shown to have retarded mechanical innovation in other sectors and cannot comprise an answer in itself to the question of cotton's relative success. Economic history is replete with examples where 'the mere existence of resources does not explain the capacity to exploit them.' (Parsatharathi, 2002 p. 176) Imports of raw cotton into the Yangzi delta from Madras and Bombay in the

eighteenth century (conveniently not mentioned by Pomeranz) did not result in further development of the industry there through the overcoming of pressures on the land.

Nor, I feel, are we much helped by imagining the ecological constraints facing Britain implied in calculations of ghost acreages for wool. Counting sheep and calculating the acreage required for particular levels of wool production only makes sense as a counterfactual exercise if there is no improvement in breeding and yields over time, and if domestic wool is the sole source of raw material supply to the industry. Sheep can be raised on marginal and infertile land at zero opportunity cost and requires little labour except during the clip. The elasticity of domestic supply was not therefore constrained, as implied in these calculations, by a (hypothetical) ability to double the amount of agricultural land in by 1840. If Britain had required six times as many sheep as it had in 1840 for the wool textile industry to rival the amount of cotton cloth produced at that time (Riello, 2005 p. 5), it would not have been impossible to arrange, and certainly France had the capacity to do this (had the incentive structure demanded it), having much potential grazing land unused in the period. But it was cheaper, particularly in Britain, to use other fibres and readily available imported wools, initially from Ireland, long the main source of imported agricultural produce, and with much grazing land underutilized.

The rigidities of European wool supply were eased by superior breeding, by the global spread of merino breeds and by the growth, especially in Britain, of a worsted industry able to make best used of the plentiful supplies of increasingly coarse, long stapled domestic wool. So plentiful were supplies of long wool that Lincolnshire growers agitated for permission to export their stockpiles in the1780s, and Irish exports to England dropped to such an extent that the manufacture of worsted cloth in Ireland was extended to absorb the surplus wool there (James, 1857, p. 302; Hudson 1986, pp. 110-111). Contemporaries such

as James Bischoff loudly lamented the decline in the British short stapled wool clip and agitations for repeal of the tax on imported wools were persistent in the post Napoleonic War period, eliciting Privy Council examinations of the wool supply. But historians rarely appreciate that the temporary difficulties of the Leeds fine woollen trade upon which laments and agitations focused, during the post war boom, were accompanied by a boost for worsteds (Bischoff, 1828; H of L 1820(56)XII). In the three decades up to 1820 the number of sheep in Britain had 'vastly increased' along with the proportion of long wool to short in the new breeds (James, 1857, p. 299). After this, improved domestic supplies were supplemented by increasing imports subject to only a nominal tariff after 1823 (Hudson, 1986, p. 111).

Additional elasticity of wool supply especially for woollens was provided from the later eighteenth century by the growth of primary production in the Iberian Peninsula. And in the 1830s and 40s a significant proportion of the industry's wool began to come from countries specialising in producing this primary product on the basis of comparative advantage. The development of Australian ranching and, to a lesser extent, the growth of the South American, African and New Zealand clips during the nineteenth century ensured growth of the wool textile industry as a global hub around which many trades revolved. Equally important, in terms of the elasticity of raw material supply, was the increasing production of mixed cloths incorporating cotton, linen and even silk threads. This not only increased the flexibility of the industry in the face of increases in the price of wool, or obstacles to its supply, but it had the added bonus (indeed this was often the main motivation behind the development of mixed cloths) of making the industry more adaptable to mechanical handling and to steam powered innovation, particularly in spinning. By the 1820s cotton accounted for a large proportion of the warps used in the British wool textile sector (in woollen 'union cloths' and in a range of worsteds). By 1850 almost all of Yorkshire worsteds

were made with cotton warps which helped to secure the success of the industry in that county. Indeed the trade in cotton yarn for warps both domestically and within Europe, underpinned the development of horizontal specialisation in both cotton spinning and cotton weaving. The use of cotton warps with woollen wefts was hastened by the introduction of bichromate of potash as a substitute for copperas as a mordant for dyeing, allowing animal and vegetable fibres to be dyed together with good results.

By the 1830s and 1840s, and continuing into the 20th century, the rigidities of raw wool supply were further eased by a growing use of skin or slipe wool and recycled wool. Skin wool accounted for around 12% of British wool supply by the 1830s but took off in importance in Europe as a whole with the growing interregional and international trade in sheep's pelts. Some of the most successful textile regions of continental Europe from Yorkshire to Belgium and to Northern Italy also developed a substantial textile sector benefiting from national and international trades in rags. By the 1840s specialised firms depended upon rags for between 20 and 60% of their raw wool supply. By the late nineteenth century the British woollen industry was using as much recovered wool as new wool (Jenkins 2003, p. 768). Other raw material mixes were introduced in the second quarter of the 19th century that aimed less at cost cutting at the lower end of the market than at extending the range and variety of the finest cloths. Mixes of wools from mohair, alpaca and vicuna and including cashmere and angora all featured in the development of lustres and fine worsteds (Hudson 1986, ch. 5).

Thus, throughout the eighteenth century and certainly by the mid 19th century, it is important to consider not just the relative success of cotton versus wool or versus linen but the fortunes of a rapidly growing range of textile sub sectors attuned to global as well as to domestic market niches. They produced cloths with more than one fibre, including cotton,

rare wools, slipe wool and recycled wools. If we sum up the role of recovered wool and of cotton, linen and other fibres within the wool textile sector it is clear that by the mid 19th century (in Britain at least) it was dependent upon virgin sheep's wool (whether home produced or imported) for less than 50% of its raw material needs. And in any case, value added on average was significantly higher in woollen and worsted production (and even in linen manufacture) than in cotton meaning that raw material prices played a less important role in the fortunes of the industry than was the case in cotton.

There is no quantitative evidence supporting the notion that the British wool supply had reached its limits during the period of the rise of cotton, or even that they were under strain. Figures of the domestic wool clip show an uninterrupted rise before plateauing in the 1870s at a time when almost unlimited and superior Australasian supplies were assured, accounting for two thirds of wool imports, and amounting to twice the domestic clip (Mitchell, 1988, pp.336-340). Had the constraints of raw material supply really started to bite in the crucial decades of the late eighteenth and early nineteenth centuries when cotton was overtaking wool in Britain in output levels and exports this would also surely have been reflected in prices? Figure 1 shows relative indices of imported American raw cotton prices compared with wool prices represented by Lincoln half hogs and Kent long (reasonable proxies for the longer stapled wools used in worsted manufacture) and Southdown wool (the main domestic source of short stapled wool for the woollen sector). The high prices of cotton supply during the Napoleonic war period are the most obvious feature. Less dependent upon imports, wool supply was under no such strain. And there is no marked divergence between the movement of wool and cotton prices before the mid 1830s. Given the lower value-added in most cotton compared with wool textile manufacture, one might suggest that wool textile manufacture was at no great disadvantage from raw material price rises, compared with cotton, until the 1840s by which time imported wools were coming to the rescue. The cost

of Southdown wool in pence per lb (the shorter stapled wool most likely to feel the pinch of tight domestic supplies and limitations to imports) was markedly lower 1820 to 1845, in all years bar four (1833-6), than had been the case in the 1790s. This may have indicated a decline in quality and have been both cause and consequence of a turn to mutton breeds domestically, but such prices are hardly indicative of a domestic wool supply reaching its ecological limits. And further evidence of this is provided by comparing wool price indices with the domestic price index from the estimations of Gayer, Rostow and Schwartz. Wool prices show no marked divergence from the domestic price index during the whole period to mid century (and beyond): Figure 2. If wool supply was constrained it was no more constrained than other domestically-produced goods.

Wool may not have reached its ecological limits and the industry was insulated from the impact of stable or rising virgin wool prices by the introduction of other fibres, recycled and slipe wool but raw wool prices were nevertheless 3-4 times higher than cotton prices per lb by the second quarter of the 19th century. Even allowing for the higher percentage of waste in cotton fibres, the lower value added in the sector (on average) and for the impact of powered spinning, in the success of the industry through the cheapening of production, the relatively high elasticity of raw material supply was clearly a factor in cotton's success. During the cotton famine the price differential between raw cotton and virgin wool prices was eliminated for several years causing a discernible shift away from cottons to all wool worsteds in Europe during these years (much favouring the French industry). This gives one a taste of the market share (in the ranges of more directly substitutable fabrics) that might have been captured by wool textiles if raw wool prices had been closer to those of cotton. Raw material supply was undoubtedly one factor of several in accounting for the success of cotton but not one with causal primacy, and there is certainly no evidence to suggest that the

West European wool textile industry was in crisis in the early 19th century, brought on by competition from cotton or by a wool supply that was reaching its limits.

Import substitution industrialisation and the political economy of cotton

British woollen goods had been amongst the best and most competitive in European and world markets for over a century, before cotton manufacture made a serious appearance in Europe. Practically all of the consumption of wool textiles in Britain throughout the seventeenth and eighteenth centuries was domestically produced. Cotton by contrast, can be seen as the classic component of the import substitution industrialisation (ISI) that characterised Britain in the eighteenth century. As with the most successful examples of ISI in recent times (in South Korea, Taiwan, Hong Kong and Singapore) import substitution policies were quickly transformed into export-led growth as the limits of the domestic market approached. This ISI coupled with competitive export promotion benefited disproportionately from state support, tariff structures, mercantilism, militarism and imperialism.

Although the process of state protection was contingent and partly accidental, brought on by lobbying from the woollen, linen and silk interests more than from cotton manufacturers themselves, driven at times by purely fiscal motives and partly successful because of the need to promote political stability by protecting the Celtic linen interests, it was nevertheless a key to cotton's success. By the 1750s, and long before mechanisation, '…the British economy produced a greater volume of yarn, cloth, and finished textiles, manufactured wholly or partly from cotton fibres, than any other economy outside India' (O'Brien et al. 1991, p. 395). It was this that provided the platform for later successes. The platform had been built

upon international trading success, competition and imitation but also upon the protection of markets at home and state promotion of markets overseas.

We know that from the middle decades of the seventeenth century East India cotton piece goods became increasingly popular amongst English consumers particularly in the upper classes and wealthy bourgeoisie who much prized the texture, brilliance and colourfastness of patterned wares in particular. Imported cottons, like Chinese silks, made serious inroads into domestic markets substituting for domestic woollens and silks in household furnishing fabrics and in ladies dresswares where Indian muslins and calicoes were much favoured. The penetration of imported cottons and silk lower down the social scale was much more limited but such was the outcry of domestic woollen, linen and silk producers that protective action was soon taken. A law of 1701 stipulated that no imported silk goods or coloured calicoes could be worn in England and Wales. It allowed such goods to be warehoused in Britain for re-exportation and allowed white Indian calicoes to be printed in England for domestic and export markets. This prohibition stimulated the growth of calico printing in Britain in the early eighteenth century. White cotton imports from India rose commensurately increasing 4 fold to over two million pieces by 1719 (Inikori 2003, p. 432) and creating further pressure for protection which resulted in import duties on white calicoes plus export duties upon printed calico manufactures that are estimated together to have amounted to a tax of 82% ad valorem. (Thomas, 1926, pp. 125-6).

An Act of 1721 effectively closed the British market to Asian textiles: the purchase in England of all printed calicoes made from imported Indian white goods was prohibited and the printing of all cotton British cloths was also restricted but neckcloths, muslins and fustians were exempted from this prohibition. The exemption of fustians was particularly important as it allowed for the manufacture and printing of cloth made from linen warps and

cotton weft. Such cloths became the mainstay of the Lancashire industry in the middle decades of the eighteenth century, provided a market for Celtic linen warps and cloths and left the woollen and silk industries exposed to competition in the fancy and figured areas of the trade, a feature endorsed in the Manchester Act of 1736 which further promoted fustians. (O'Brien et al. 1991 p. 409). Thus, although this piece of mercantilism was primarily designed to protect the woollen and silk sectors and had partly been introduced in response to pressure from those quarters it was the fustian industry (and later cottons) that benefited most. Wadsworth and Mann place particular stress upon the role of the 1721 tariff in providing the incentive for English producers to mass produce plain white cloths at a satisfactory and uniform standard for the calico printing sector (Wadsworth and Mann, 1930, p. 144). The evidence of retained raw cotton imports suggests a doubling of cotton manufacture in Britain in the period 1711 to 1760. By the 1750s this used an average of 2.76 million lbs of cotton per year (Mitchell 1962, p. 177). This was not a spectacular growth and probably did little more than replace Indian white cloths but it was the springboard from which the success in exports was launched. By the mid 1770s 'political imperatives no longer required the conciliation of Celtic linen interests' (O'Brien et al 1991, p. 412) and in 1774 manufacturers were freed to make and finish all cotton cloths for the domestic and export markets. By this time the mechanisation of spinning had also started to reduce the cotton industry's dependence upon linen warps.

Cotton and cotton linen mixes remained insignificant textile sectors through the first half of the eighteenth century suggesting that domestic demand for cottons was limited, a fact borne out by evidence from court records and poor law accounts. And even with the abolition of restrictions on all cotton cloths the preference in the mass domestic market of the third quarter of the century was for linens and fustians. Only in the upper end of the market for figured cottons and expensive dresswares did cottons succeed in the domestic markets over

linen and cotton before the end of the eighteenth century (Styles, 2005). The major growth of cotton when it came was focused upon exports: export markets that grew quicker than any domestic market would have been capable of doing, particularly with the absence of increasing real incomes for wage earners (Feinstein 1997). By the time that cotton overtook woollens in Britain, as an export commodity, just after 1800, exports provided over 60% of the market for British manufactured cottons, for woollens the proportion at this time was around 35% (though some firms and regions concentrated much more on exports than others). 'In the case of cottons there is abundant evidence that the need to out-produce Indian textiles propelled the innovative activities of British cotton producers, and there is much to suggest that the manufacturers themselves saw their activities in this light' (Parsatharathi 2002 p. 288, 1998). Design and product innovation was driven, for example, by the need for British manufacturers to substitute their wares for Indian checks and printed calicoes that found favour in exchange for slaves in the African seaboard and that later penetrated the transatlantic markets. In the third quarter of the eighteenth century cotton checks accounted for around two thirds of English cotton exports and these went largely to West Africa and to the American slave plantations (Inikori, 2003, p.435). The Manchester calico printing sector that mushroomed at the end of the eighteenth century built its success upon conscious copying of the colours and designs of Indian competitors. If 'The pressures of competition emanating from global and regional markets were a necessary condition for European industrialisation and divergence' (Parthasarathi 2002 p. 298) then British cotton manufacturers were more exposed to this, including in their domestic markets, than their counterparts in wool. 'Born out of trade in Asian cloth, English cottons grew up with an in-built sensitivity to the demands of the metropolitan and cosmopolitan markets' (O'Brien et al. p. 413). It also resulted in a drive to imitate, to need to protect domestic markets and a desire to expand exports in competition with Asian cloths. These developments took place with a great deal of State promotion and support.

New growth theory emphases the importance of comparative market size as cause rather than effect of change (Crafts 1995, p.745). Given cotton's export success, relative to wool, even before the favourable impact of spinning innovations upon cloth prices became fully apparent (Harley, 1999), the dynamic of combining import substitution with aggressive export promotion must be considered a vital ingredient in the success of the sector relative to wool.

Markets and prices

As indicated above, cottons and woollens were rarely directly competitive in terms either of price or direct substitutability. Their varying fabrics were used for different purposes, by different groups in the population and as product markets became more differentiated so also did the range of niches into which specialist cloths of all kinds could fit. In late eighteenth century sources '… cotton emerges as a hugely successful fabric in its decorated forms, both printed and woven, for use in both clothing and furnishing', where it had a distinct technical advantage over wool. But its success appears to have depended more upon its superior properties than on its cheapness. In the 1770s Assize data show little difference in price between gowns made of cotton and of silk whilst linen and worsted gowns were half to two thirds of the price. Old Bailey theft data show that in fabric for shirtings, cotton was slow to capture even 10% or so of the market from linens in the course of the eighteenth century and barely appears to have made an inroad into the market for sheeting. As reflected in overseers' accounts, the poor appear to have depended almost entirely upon coarse linens, woollens and worsteds until well into the 19th century (Styles 2005).

Thus British price and domestic market data suggest that cotton had a restricted penetration in the eighteenth century beyond the sphere of high class and high priced figured calicoes and woven checks. In mass markets for lower goods and for the everyday wear of the working population woollens, worsteds and linens held their own.

Why was cotton so much more successful in export markets? Clearly its ability to mimic indigenous patterns and colours in West Africa and Asia was important and it more easily substituted for domestic manufactures in many global markets where indigenous production was cotton-based. It was successful not because it was competing with wool textiles or even linens but because it was promoted in export markets in competition with indigenous cloths that it had consciously emulated. Here prices were important. Thanks to the work of Cuenca Esteban and ensuing debates between Esteban and others, principally, C. Knick Harley, we now know much more about cotton piece goods prices than hitherto. In 1994 Esteban calculated that the price of cotton cloth fell dramatically by around one third 1770-1801 and by 50% more by 1815. Harley's more modest estimates of the price fall based upon price data provided by American importers, for a range of counts of wefts and warps, especially of the coarser cloths and of cotton/linen mixes, suggest that the decline was much less significant. Initially it was only warp yarns and superfine calicos that were significantly affected as these felt the impact of mechanised spinning most directly. Common calico prices were roughly stable to the end of the eighteenth century and declined much less sharply thereafter. It was only in the 1820s and 1830s, with the mechanisation of weaving, that coarser cloth prices saw marked decline. Assuming Harley's estimates to be more accurate than Esteban's, how much did wool textile prices need to fall to compete with cotton in mass markets for everyday textiles in the crucial early decades of the nineteenth century? How big was the price gap in the substitutable ranges of goods for the mass market?

Data collected by Harley from the records for American importers can be supplemented with additional price data from 81 importing firms for both cotton and wool textile imports that are the subject of a recent PhD by Peter Maw (Unpublished, Manchester 2006). Maw's data shows first and foremost the great variability of types and prices of wool textiles, mixes and cotton fabrics (as well as linens and silks) in transatlantic trade, suggesting that competitiveness in variety, function and fashion was as important, if not more important, than price competition between the two sectors. Nevertheless prices for many of the wool textile and worsted ranges were some 50% or so cheaper by the 1820s than they had been prior to the Napoleonic war period. The cheapest fustians, and checks in importers' hands were half the price of low worsteds in the last third of the eighteenth century but many cotton cloths, such as sattinets, velverettes and quilts were of similar price to the middle ranges of Yorkshire worsteds. Prints and muslins were slightly cheaper per piece than middling worsteds by the first quarter of the nineteenth century. High order woollen goods were two or three times more expensive but nevertheless represented in considerable quantities. There is no evidence that they were being priced out of the market by cottons. Cotton shirtings, sheetings and checks were the cheapest fabrics in town by piece and by yardage but these had no easily substitutable equivalent in wool and neither did cotton handkerchiefs which were stocked in great variety and wide price ranges. It is difficult directly to compare price data for different fabrics by yard or by piece because of different widths and lengths and also because of big differences in thickness, weight and purpose. There is a lack of comparability of the cloths outside of narrow overlaps between coarse cottons and low worsteds and between patterned cloths in cotton and wool at the upper end of the market for household furnishings. However, the data is suggestive of two things: first that competition between cotton and wool textiles was not simply or even largely a question

of price and second, that the price differentials of substitutable cloths was not marked before the 1830s.

If price is of only limited explanatory value in the rise of cottons over wool textiles before the 1830s perhaps we should focus upon markets and market institutions. The meteoric rise of cotton involved multiple innovations in marketing and the finance of trade as much as in mechanisation. One might expect that the rise of new entrepreneurial dynasties in cotton would be less fettered by traditional and entrenched marketing and credit practices than those in wool but there is little evidence to support this (Wadsworth and Mann, 1931; Hudson, 1986; Maw 2006). A good illustration would appear to be the role of London factors in the wool textile trade of the eighteenth century. They flourished at the expense of more direct trade between manufacturers and their clients although it is important to remember the extent to which the cotton trade of Lancashire was also conducted through London before 1815. Bowen has shown that the East India Company relied upon Blackwell Hall Factors in their late eighteenth century attempts to find woollen cloths suitable for the Asian market. The tender system used by the company in dealing with the London factors made it vulnerable to combinations of suppliers who could control the price. (Bowen 2006, p. 256). As Yorkshire manufacturers and merchants were increasingly bypassing these factors by the later eighteenth century, the Company became concerned largely with West Country and Norwich suppliers, who were not the most competitive particularly in the sorts of cloths that might have competed in price and weight with native Indian producers. It was difficult for Yorkshire manufactures to be accepted in this trade (Smail, 1999 pp. 38-9). In 1773 it was revealed that over £400,000 worth of woollen cloth was lying unsold in Indian warehouses (Bowen 2006, p. 246). European woollen cloth appears not to have been in great demand in India. China was regarded as a better prospect and Company exports of long ells and worsteds to China increased threefold in the early 1790s. But considerable losses appear

to have been made by the East India Company in these trades. After 1814 the Company decided that woollens represented such a risk of loss that exports to both India and China declined steeply thereafter. There is no evidence that private or contraband traders fared much better although the bulk of trade was done this way, particularly via American merchants and at somewhat lower prices.

In the late 1780s the company despatched samples from Halifax, Manchester and Norwich to Calcutta where the authorities were asked to assess whether such cloths could be sold 'without interfering with or proving injurious to the interests of the native manufacturers whom we conceive ourselves likewise bound to protect to the utmost of our power'. (Directors to Bengal, 12th April 1786, quoted in Bowen 2006 p. 249). In the eyes of the Company it is clear that wool textiles represented a conflict of interest between the policy of promoting the 'National object' and fear of undermining the native economy and its buoyancy as a tax base. This may well have been more important than the conservatism and cost of relying upon Blackwell Hall factors in explaining the company's limited success with wool and it might also account for concentration upon cloths at the upper end of the market.

By the end of the Napoleonic War period, it is difficult to argue that there were any major differences in the marketing and associated financial and credit practices of British cotton and wool textile cloths though this may be worth further investigation. Success for both sectors was based upon non-metropolitan networks of northern manufacturers and merchants and their counterparts in the Americas and elsewhere. Maintenance of close links between merchanting and manufacturing was important in adapting production to suit varied markets. The same merchants often handled both cottons and wool textiles. Both trades

were characterised by similar trends, for example towards British merchants exporting at their own risk and experimenting with the auction system in low cloths (Hudson, 1986).

Conclusion

My brief was to discuss the limits of wool in relation to the success of cotton as a global industry in the period of Britain's industrialisation. The outcome of the exercise has been to emphasise the distortions created by using cotton as a yardstick against which to mark the 'failings' of the wool textile sector: there is no evidence to suggest that wool textiles were in crisis, that their markets were being undermined, or that the limits to wool supply were in danger of being reached. British cotton benefited disproportionately from the ISI and export promotion that characterised the fiscal military state. Though protectionism was contingent and focused upon promoting woollens, silks and Celtic linens, it was cotton that benefited most from having felt the wind of Asian competitiveness that provoked the desire to supplant Asian calicos in domestic and export markets. Cotton was therefore set for success long before the mechanisation of spinning was completed and the falling prices of finer cottons in particular were set in train. The wool textile sector was flexible and innovative, seeking to produce new ranges of cloth to fit markets at all levels. It did well in the bulk of ranges that avoided direct competition with cotton cloths. Profit rates and risk levels were no more testing in woollen manufacture than in cotton. The mechanisation of spinning and of weaving were necessarily slower in wool textiles because of the nature of the fibre but extensive use of cotton warps and expansion of the worsted and mixed sectors ensured a high degree of price competitiveness and, more importantly, high levels adaptability to varied markets. If cotton was the first industry with a global reach it achieved this with high levels of state support, and alongside wool, not at the expense of the older-established sector.

A note on the definition of 'a global commodity' and the short lived nature of the global commodity that was cotton.

A global commodity can be defined as one in which the bulk of consumption takes place in regions and countries other than, and distant from, where it is produced. If cotton was the first global industry then its key position in this respect was short lived. By the 1860s cotton cloths were increasingly produced in the national markets that they served. By the 1870s, after a spectacular recovery from the cotton famine, British cotton cloth exports entered a long climacteric, caused by international competition, particularly from Europe and India and later from China and especially Japan, from which they never recovered. Britain's share of world cotton cloth production dropped from a peak of 32% in the early 1870s to less than 12% just before WW1 during a period in which world output had grown 5 fold. By the interwar period Britain's share was under 5%. As European and North American markets sheltered behind tariffs in the later 19th century, market expansion was focused upon Asia and Latin America. India became Britain's main market from 1843 to 1939 and China ranked 2nd 1869-1926. The growing importance of Asian markets encouraged the spinning of coarser counts and the manufacture of cheaper unfinished cloths for export. But India was a serious competitor as well as the main market for English cottons. Indian fine and patterned cloths outstripped the British in both Indian and external markets even before Indian export duties were removed in 1882. The Bombay cotton spinning industry benefited particularly from this tariff relief and Indian yarn exports to China expanded thereafter at the expense of British which 'undermined the whole position of the British cotton industry in the world market' dependent as it was so significantly on yarn exports. (Farnie 2003 p. 749). In short, the success of cotton as a globally traded industry was short lived and confined to the few decades of Britain's hegemony. (The global nature of cotton since the mid 20th century

represents a new phase of globalism based resting on different foundation). A much smaller proportion of world cotton cloth production was traded internationally by the last quarter of the19th century than during the short lived period of 'free trade' when cotton was king. At the same time the global nature of wool was enhanced by increasingly long distance trade in the raw materials and by specialisation of regional production for niche markets internationally as well as domestically.

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