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The Rise, Expansion, and Decline of the Italian Wool-Based Textile Industries, ca. 1100 - 1730: a study in international competition, transaction costs, and comparative advantage

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Abstract:

This much revised study seeks to examine the rise, expansion, and ultimate decline of the Italian wool-based textile industries over a period of six centuries (from ca. 1100 to ca. 1730). An international trade model combining transaction costs and comparative advantage is employed to explain the changing fortunes of the Italian cloth industries over these six centuries, in competition with their major northern rivals, in the Low Countries and England. The transaction costs model is used to explain in particular which branches of this textile industry fared better and which fared worse during the Commercial Revolution era (ca. 1100-ca.1320), the so-called "Great Depression era" (ca. 1320-ca. 1460), the ensuing economic recovery and Price Revolution era (ca. 1460-ca. 1620), the "General Crisis" of the seventeenth and early eighteenth centuries (ca. 1620-ca.1740), to the eve of the Industrial Revolution era. One of the major errors in the literature is the failure to distinguish between the two main branches of the wool-based cloth industries, the technology of their industrial production, their relative prices, and markets, and the impact of transaction costs in international trade. For much of this era, the leading branch was the luxury-oriented woollens industry (Old Draperies), based on very fine, short-stapled English and then Spanish merino wools, producing fulled, heavy-weight, and generally high priced cloths. In the earlier and later periods, the other branch prevailed (New Draperies): the lighter-weight (unfulled), generally coarser and cheaper fabrics that were either full worsteds (cheap, coarse, long-stapled wools) or serges (hybrids with worsted warps and woollen wefts). The transition from a predominance of the lighter, worsted-style fabrics to the heavy-weight woollens, throughout western Europe, took place from the 1290s, with a rapid rise in transaction costs that were the direct and indirect result of a spreading stain of international warfare, especially injurious to overland trade routes, combined with a drastic fall in population, that engulfed most of Europe and the Mediterranean basin until the 1460s. That rise in transportation and transaction costs (determined by market scale economies) set a cost-price floor below which international trade in cheaper textiles became unprofitable: so much so that most West European wool-based industries re-oriented their production towards luxury markets, with far higher prices sustained by "price-making" monopolistic competition better able to withstand the rise of such costs, an impossible solution for those marketing cheap textiles as "price-takers" in Mediterranean markets. Such problems were less severe for the Italian industries, whose markets were chiefly in the Mediterranean; and thus the transition to luxury production was far less complete than in the north.

The comparative advantage model is based on the price that woollen-cloth producers in both the Low Countries and Italy had to pay in that luxury re-orientation: a total dependence on the finest English wools as the prime component of luxury quality. From the late 1330s, English monarchs took advantage of that dependence by imposing exorbitant taxes on wool-exports, with even higher taxes imposed on Italian merchants, ultimately depriving them of almost all such wools by the early fifteenth century. At the same time, English clothiers were able to weave luxury-quality cloths from the very same wools, but free of any such taxes, giving them an almost insuperable cost advantage over all foreign woollen manufacturers. But England's comparative advantage in its wool supply, though finally giving them mastery of northern markets for luxury woollens, was undermined, during the later fifteenth, early sixteenth century, by the development of fine but much cheaper merino wools in Spain, which Italians could acquire with lower transport costs. The other change undermining the supremacy of English and other woollens industry was the sharp fall in transaction costs by the late fifteenth, early sixteenth centuries: with the decline in warfare, the recovery and growth of population, and with technological advances in both ocean and land transport, especially the latter with a major transition in long-distance trade from maritime to overland continental routes. Along with that decline in costs came a revival and expansion of the lighter, cheaper textile industries, though chiefly in the Low Countries and England, more so than in Italy, despite the continued predominance of Mediterranean markets. For woollens, the Italian industries, especially the Venetian, gained the comparative advantage in wools: with much cheaper access to (now more expensive) Spanish merinos. But in the Mediterranean and especially Ottoman markets the English finally gained supremacy over both the Florentine and Venetian woollens industries, by the later seventeenth century, from a new comparative advantage, in capital formation: from superior business organization (the new joint stock companies) and naval power (large, heavily gunned, swift carracks). The so-called "General Crisis" era of the later seventeenth century had again favoured maritime routes, and thus sea-power, over land routes. At the same time the Tudor-Stuart enclosure movements, in transforming English sheep -- from small sheep with fine short-stapled to larger (meatier) sheep with coarser, long-stapled fleeces, gave England's worsted-style New Draperies a comparative advantage in wool supplies over all its continental rivals, including the Italian; and by the 1730s, both branches of the Italian wool-based textile industries had succumbed to foreign competition, and become moribund.

JEL Classifications: D23; D43; E32; F10; F12-14; H25; J11; J21; L14; L23; L79; L91; N63; N73

The Rise, Expansion, and Decline of the Italian Wool-Based Cloth Industries, 1100 - 1730: a study in international competition, transaction costs, and comparative advantage [1]

by John H. Munro (University of Toronto)

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Introduction: Italy and Textiles in the European Economy

In the history of the West European economy from the twelfth to the eighteenth centuries, wool-based textiles constituted the single most important manufactured commodity to enter both regional and international trade. For this reason such textiles proved to be vitally important for Italian economic development and for Italy's economic pre-eminence during many these many centuries, especially up to the sixteenth. Italy was in fact one of the three most important regions that supplied good to high quality wool-based textiles to much of Christian Europe and to the Islamic world in the Mediterranean basin and the Near East during the medieval and early-modern eras.[2] Their chief rivals, during these centuries, were, above all, the Low Countries (Flanders, Brabant, Holland) and England.[3]

This study is not a mere descriptive narrative in European economic history, but an analysis of the role of international competition, transaction costs, and comparative advantage in determining how the Italian textile industries fared during these centuries, and which Italian regions prospered or declined because of their textile trades. While the Low Countries were clearly the pre-eminent European leader in wool-based textiles from the twelfth to the fifteenth centuries, England in fact proved to be the more important region influencing the development of the Italian textile industries: first, as the producer of the very finest wools on which the Italian industry came to be so dependent for the production of luxury woolens, at least until the fifteenth century; but second as the region that came to pose the most powerful threat to Italian international commerce in wool-based textiles, from the sixteenth to the eighteenth centuries. Although this study will demonstrate that, particularly for higher grade woolen cloths, wool was the primary determinant of textile quality, production costs, and retail prices, the final English threat no longer had anything to do with England's own wools. For, by the sixteenth century England had lost its primacy in producing the world's best wools to Spain – to the extent, indeed, that the English cloth industry itself, along with all other European producers of fine woolen cloths, came to be dependent on imported Spanish wools, for which the Italian industries had closer and cheaper access. Instead, England's overwhelming comparative advantage in the Mediterranean cloth trade – in the very region in which Florence and then Venice had once been so dominant – was based on its various commercial advantages, which, in combination, are now known as transaction costs. Such costs -- including transportation, marketing, and protection costs — were always historically more important

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[1] An earlier and much shorter version of this study was published as: John Munro, "I panni di lana," in Luca Ramin (editor in chief), *Il Rinascimento italiano et l'Europa*, vol. IV: *Commercio e cultura mercantile*, ed. by Franco Franceschi, Richard Goldthwaite, and Reinhold Mueller (Treviso, 2007), pp. 105-41. This version is based on a considerable amount of additional research and an elaboration of my key arguments.

[2] Since Italy did not exist as a unified nation state before 1871, the term Italy in this study will refer to the three principal textile producing regions, all in the north: Tuscany, Lombardy, and Venetia.

[3] Normandy, Languedoc, and Catalonia were also important woolen cloth producers, but, for reasons of space their competition will not enter into this study. For Languedoc and other regions of southern France, see Dominique Cardon, *La draperie au moyen âge: essor d'une grande industrie européenne* (Paris, 1999). For Catalonia, see in particular Claude Carrère, "La draperie en Catalogne et en Aragon au XVe siècle," in Marco Spallanzani (ed.), *Produzione, commercio e consumo dei panni di lana (nei secoli XII - XVIII)*, Instituto internazionale di storia economica, Prato, Serie II: Atti della Seconda Settimana de Studio, 10-16 April 1970 (Florence, 1976), pp. 475-509; Claude Carrère, *Barcelone: centre économique à l'époque des difficultés, 1380 - 1462* (Paris, 1967), chapter 6: "La draperie barcelonaise," pp. 423-528; Manuel Riu, "The Woollen Industry in Catalonia in the Later Middle Ages," in Negley B. Harte and Kenneth G. Ponting (eds.), *Cloth and Clothing in Medieval Europe: Essays in Memory of Professor E.M. Carus-Wilson*, Pasold Studies in Textile History no. 2 (London: 1983), pp. 205-29.

considerations than manufacturing costs in determining advantages in international trade. More particularly they also determined which types of textiles predominated in international markets over these centuries and which textiles often disappeared from international (if not regional and local) trade.[4]

Medieval Italy's advantages in cloth production and international trade

Italy's importance in both cloth production and the cloth trade, from the thirteenth to the sixteenth centuries, was symbiotically linked to its overwhelming predominance in medieval and early-modern Europe's trade and finance. Indeed, the Italians – led by Venice, Florence, Genoa, and Milan in particular – had created the fundamental mercantile and financial institutions of what historians now call the medieval "Commercial Revolution," a distinct era from the eleventh to early fourteenth centuries, with a commercial transformation and expansion that certainly proved to be the most powerful force in propelling the rapid growth of Europe's economy and population – more than doubling the size of both.[5] Certainly this was the period in which all the west European textile industries first achieved international prominence, one beyond Europe itself. Richard Goldthwaite, one of the most eminent historians of medieval and Renaissance Florence, has contended that the importance of textiles for its urban economy was clearly evident by the thirteenth century:[6]

> The production of textiles gave the Florentine economy a solid industrial base that few other Italian cities enjoyed. More than any other activity, it generated the extraordinary growth of the city's wealth.

In particular, he contends that the rapid growth of Florence's population in the thirteenth century can be explained only by the rapid expansion of the wool-based textile industry, "since no other industry can explain how so many people were employed."[7] Yet Italy's true eminence or apogee in both the production of and trade in woolen textiles came only in the ensuing era of economic contraction and population decline, during the fourteenth and fifteenth centuries, the era of the so-called Great Depression, when its predominance in international commerce and finance became even stronger.

Though the Italians achieved renown in other textiles – especially in fustians (linen-cotton hybrids) at the lower price range, and silks at the upper-price range – this study necessarily focuses on the wool-based export-oriented textile industries. In turn, these industries produced a wide range of fabrics, whose nature, qualities, and values have to be carefully delineated. For many, indeed most of the common errors in the current literature arise from a failure to make such distinctions clearly; and those errors in turn stem from the

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[4] See Douglass North, "Government and the Cost of Exchange in History," *Journal of Economic History*, 44 (1984), pp. 255-64; Douglass North, "Transaction Costs in History," *Journal of European Economic History*, 14 (1985), pp. 557-76; John Munro, "The 'New Institutional Economics' and the Changing Fortunes of Fairs in Medieval and Early Modern Europe: The Textile Trades, Warfare, and Transaction Costs," *Vierteljahrschrift für Sozial- und Wirtschaftsgeschichte*, 88:1 (2001), pp. 1 - 47.

[5] See Robert Lopez, *The Commercial Revolution of the Middle Ages, 950-1350* (Cambridge and New York, 1976); Robert Lopez, *The Birth of Europe* (London and New York, 1967); Robert Lopez, "The Trade of Medieval Europe: the South," in Michael Postan et al.(eds.), *The Cambridge Economic History of Europe,* Vol. II: *Trade and Industry in the Middle Ages* (Cambridge, 1987), pp. 338-412.

[6] Richard Goldthwaite, *The Economy of Renaissance Florence* (Baltimore, 2009), p. 265. See, in general, chapter 4: "The Textile Industries," pp. 265-340, discussing as well the silk and linen industries. For another good survey of the Italian textile industries, see Bruno Dini, "L'industria tessile italiana nel tardo medioevo," in Sergio Gensini (ed.), *Le Italie del tardo medioevo*, Centro de studio sulla civilità del tardo medioevo San Miniato, Collana di Studi e Ricerche 3 (Pisa, 1990), pp. 321-59.

[7] Goldthwaite, *Economy of Renaissance Florence,* p. 269 (n. 6 above). He does not indicate or demonstrate, however, that Florence's demographic growth was substantially greater than that of any of Italian city, nor consider the role of commercial functions in Italian demographic growth.

failure to understand the composition of these cloths, in terms of wools and dyestuffs, and the technological processes for their manufacture. A closely related failure lies in not properly observing changes in relative prices (the price of one textile relative to prices of other gods), and changes in "real" prices that were consequences of periodic inflations and deflations over these centuries.

We must begin by understanding the universal market demand for textiles, which, along with food and shelter, have always supplied one of the basic needs of mankind. As clothing, textiles provide protection from the elements: from the cold, to be sure, but from also excessive heat, and inclement weather. They also provide protection from the shame of nakedness, since most societies have prohibited (or restricted) public nudity and still require decorum in various forms of socially acceptable clothing. For medieval and early-modern markets, varieties in clothing were important means of indicating or asserting social status. Such market demands were also driven by related but often elusive changes in fashions, amongst both the middle and upper classes. For the purposes of this study, which focuses on international trade, we can exclude demand from the lower income strata of urban and rural societies, if only because most of their needs were met by the almost universal, ubiquitous producers of textiles, often of the home-spun variety, whose cloths never entered regional let alone international markets.

For such international markets, many historians assume, especially for the medieval era, that luxury textiles (in woolens and silks) had always predominated in international commerce, if only because their high value to weight ratios provided merchants with the necessary profits to justify conducting long-distance trade. Nevertheless, as just indicated, the range of textile values in medieval and early-modern international trade was indeed often surprisingly wide, in seeming defiance of that economic principle on value:weight ratios.

The medieval technology of wool textile production: woolens, worsteds, and serges

At the same time, the changing roles of Italian textiles in international trade must also be understood in terms of the evolving technology required in the manufacture of the widely varying wool-based products, generically known as "cloths." Those changing technologies, changing costs of raw materials, and changing market conditions together determined changes in relative prices, which in turn directly affected cloth sales. The European cloth industries had three major divisions: woolens, worsteds, and hybrid woolen-worsted serges. This tri-partite division was primarily determined by the wool contents of the individual textiles.

- *woolens and their wools: the medieval primacy of English wools*

True medieval woolens were composed of curly, short-fibered yarns, in both warp and weft; and these wools were especially important for their excellent felting properties in fulling, a crucial process in manufacturing woolens and in distinguishing them from worsteds (see below, pp. 000).[8] In medieval Europe, by far the finest, and thus the most expensive, of these short-fibered wools came from England. Not before the sixteenth century would the finer English wools face any rivals for quality, in any European markets: and then only from the more fully evolved *merino* wools of Spain, whose later importance figures strongly in this study.[9]

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[8] For the following see John Munro, "Medieval Woollens: Textiles, Textile Technology, and Industrial Organisation, c. 800 - 1500" and "Medieval Woollens: The Struggle for Markets," in David Jenkins (ed.), *The Cambridge History of Western Textiles*, 2 vols. (Cambridge and New York, 2003), Vol. I, pp. 181-227; 228-324; and John Munro, "Three Centuries of Luxury Textile Consumption in the Low Countries and England, 1330 - 1570: Trends and Comparisons of Real Values of Woollen Broadcloths (Then and Now)," in Kathrine Vestergård Pedersen and Marie-Louise B. Nosch (eds.), *The Medieval Broadcloth: Changing Trends in Fashions, Manufacturing and Consumption*, Ancient Textile Series, vol. 6 (Oxford, 2009), pp. 1-73.

[9] See John Munro, "Spanish *Merino* Wools and the *Nouvelles Draperies*: an Industrial Transformation in the Late-Medieval Low Countries," *Economic History Review*, 2nd ser., 58:3 (August 2005), pp. 431-84.

Medieval England produced, however, a very wide range of wools, including many inferior, coarse wools that were either rarely exported or exempted from official export regulations, because of their uncompetitive poor qualities.[10] The very best and thus the costliest wools came from the Welsh Marches, i.e., the borderland counties of Herefordshire and Shropshire; the next best, from the adjacent Cotswolds regions, in the counties of Gloucestershire, Worcestershire, Oxfordshire, and Berkshire (south-central England); and, as a distinct third, those from the Lindsey, Kesteven, and Holland districts of Lincolnshire, in the north-east. [11]

The range of values of those exported English wools was very wide, especially from the mid-fifteenth century. Thus in a parliamentary ordinance of 1454, re-establishing fixed export prices, they ranged from a low of £2.500 per sack (364 lb = 165.107 kg.) for Sussex wools to a high of £13.000 a sack for the very best, Leominster ("Lemster Ore") wools from Herefordshire: i.e., 5.2 times as much in value.[12] The actual market-value ranges may not, however, have been quite as great. In a price list dated 1499, for the Calais wool staple (see below, pp. 000), the most expensive wool, again from Leominster, and priced far higher at £25.807 a sack, was only 3.914 times as costly as the cheapest listed, Middle (middle quality) Rutland wools, at £6.548 sterling; but Sussex and Suffolk wools were no longer included in this list.[13] Inflation cannot account for this marked difference in wool prices, between 1454 and 1499, because the Phelps Brown and Hopkins consumer price index numbers (base 1451-75 = 100) were virtually the same for both years: 105.97 in 1454, and 103.86 in 1499.[14]

As will be demonstrated in this study, the single most important cost involved in producing a woolen cloth was its wool, which was thus the primary determinant of both its quality and price. From one sack of English wool, officially weighing 364 lb (= 165.107 kg.), a medieval clothier could have produced (on average) 4.333 broadcloths of assize, measuring 24 yds (21.946 m) by 1.75 yd (1.600 m), and thus with an

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[10] After Edward III had established the recently conquered French port of Calais as the official staple for English wool exports to northern Europe, in 1363, to provide a more efficient mechanism for collecting export taxes (see below pp. 000), royal officials found that the coarse "sleight" wools, especially those from the northern counties of Northumberland, Cumberland, Westmorland, and Durham, and those from Cornwall (SW England), had values too low to bear the fixed taxes and heavy charges for the Calais Staple trade; and therefore these wools came to be exempt from the Staple requirements, in the reign of Richard II (1377-99), an exemption confirmed by Parliament in 1399 (under Henry IV). See John Munro, "Wool Price Schedules and the Qualities of English Wools in the Later Middle Ages," *Textile History*, 9 (1978), pp. 118-69, esp. pp. 145-46; reprinted in John Munro, *Textiles, Towns, and Trade: Essays in the Economic History of Late-Medieval England and the Low Countries*, Variorum Collected Studies series CS 442 (London, 1994).

[11] See Munro, "Wool-Price Schedules," pp. 118-69 (see n. 10 above).

[12] Great Britain, Parliament, *Rotuli parliamentorum ut et petitiones et placita in Parliamento*, 6 vols. (London, 1767-77), vol. V, p. 275: no. 5. See Munro, "Wool-Price Schedules," Table 8, pp. 147-151 (n. 10 above).

[13] Algemeen Rijksarchief (België), Rekenkamer, reg. no. 1158, fol. 226. See Munro, "Wool-Price Schedules," Table 8, pp. 147-151 (n. 10 above).

[14] E. H. Phelps Brown and Sheila V. Hopkins, "Seven Centuries of the Prices of Consumables, Compared with Builders' Wage Rates," *Economica*, 23:92 (November 1956), 296-314; reprinted in E.H. Phelps Brown and Sheila V. Hopkins, *A Perspective of Wages and Prices* (London, 1981), pp. 13-59. The figures used here are those that I revised from the Phelps Brown and Hopkins working papers in the British Library of Political and Economic Science and posted on the web, in Excel, at this URL: http://www.economics.utoronto.ca/munro5/ResearchData.html. The five-year means of this English consumer price index (1451-75 = 100) are: 101.750, for 1451-55; and 98.538, for 1496-1500.

area of 42 sq yards (35.117 m ^{2}).[15] On that basis, one broadcloth woven from one sack of Leominster wool in 1499 (worth £25.807) would have contained wool worth £5.956 – the equivalent value of 238.25 days' wages for a master mason or master carpenter at Oxford.[16] From such a broadcloth, weighing 64 lb = 29.030 kg. (in the sixteenth century), about three full suits of men's outer wear could have been tailored.[17]

- wool preparation, spinning, and weaving in the woolens industry

These wools – both the medieval English and early modern Spanish *merino* wools – were heavily greased, with olive oil in Italy and butter in northern Europe, to protect their delicate fibers from damage in the ensuing production processes.[18] For that reason a common French name for the true woolen industry was *draperie ointe*. In medieval Europe, the wools required for the warp yarns, necessarily the stronger of the two, when stretched on the horizontal loom between warp and cloth roller beams, were prepared by combing -- even though fine and short-fibered – and spun on the old, traditional "rock" or drop spindle. Those required for the weaker weft yarns, though once also prepared by combing, came to be fashioned, from about the thirteenth century, by carding (metal wired cards) and were then spun on the spinning wheel, both of which related instruments were introduced from the cotton industry of Muslim Spain. This spinning wheel, which greatly increased labor productivity over the drop spindle, was well adapted to spinning carded short-fibered materials, both cotton and woolen; but the yarns so spun were uneven and weak – too weak for warps.[19] Sometime in the later fifteenth-century, however, the introduction into the southern Low Countries of a far superior spinning wheel, known as the Saxony wheel, with separately revolving bobbins for spinning and winding-on, finally permitted wheel-spinning of carded wools into strong yarns, strong enough for warps

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[15] The metric conversion in length and width are based on the standard yard: 36 in = 0.9144 m; but if the English cloth yard of 37 in (= 0.9398 m) is taken, i.e, including the one-inch selvage, the dimensions of a broadcloth become 22.555 m by 1.645 m. See R. H. Tawney and Eileen Power (eds.), *Tudor Economic Documents: Being Select Documents Illustrating the Economic and Social History of Tudor England*, 3 vols. (London: Longmans Green, 1924), Vol. I: *Agriculture and Industry*, doc. no. 5: *estimates of exports of wool and cloth*, 6 Oct. 1547 [from *State Papers Domestic Edward VI*, vol. II, no. 13], pp. 178-84, stating that the sack of wool (364 lb = 165.108 kg.) contains 13 Tods, each tod weighing 28 lb (13 * 28 = 364 lb.), and that there is "allowed for every clothe iii Todde." Thus 13 Tods per woolsack divided by 3 = 4.333 broadcloths (with the wool of 15 sheep per Tod, and and thus wool of 45 sheep per broadcloth). According to Eleanora M. Carus-Wilson and Olive Coleman, *England's Export Trade, 1275-1547* (Oxford, 1963), pp. 14-15, "some 4 or 4 ½ cloths of assize" were produced from one sack of English wool.

[16] At 6d sterling per day in 1499: see , E.H. Phelps Brown and Sheila V. Hopkins, "Seven Centuries of Building Wages," *Economica*, 22:87 (August 1955), pp. 195-206; reprinted in E.H. Phelps Brown and Sheila V. Hopkins, *A Perspective of Wages and Prices* (London, 1981), pp. 1-12.

[17] This estimate is based on documents for cloth consumption in fifteenth-century Mechelen, indicating that one official-length *rooslaken* (30 ells by 2 ells = 27.0 meters by 1.4 m.) supplied the cloth required to provide three suits for the alderman (about 12 m^2). For this evidence, see Munro, "Three Centuries of Luxury Textile Consumption," p. 16; n. 48, p. 56 (see n. 8 above). See also Raymond Van Uytven, "Cloth in Medieval Literature of Western Europe," in Negley B. Harte and Kenneth G. Ponting (eds.), *Cloth and Clothing in Medieval Europe: Essays in Memory of Professor E. M. Carus-Wilson*, Pasold Studies in Textile History 2 (London, 1983), p. 151: stating that, "for a complete outfit, a surcoat, a coat, a hood, and a pair of trousers some fifteen ells [10.5 m] were needed." For cloth dimensions and weights, see Munro, 'Medieval Woollens: Struggle for Markets', Table 5.7, pp. 314-15 (n. 8 above).

[18] For an evident but curious exception, concerning the sixteenth-century Florentine *rascie*, made exclusively from Spanish wools, see below pp. 000-00.

[19] For proof, see the passages on spinning in Henri Michelant (ed.), *Le livre des mestiers: dialogues français-flamands composés au XIVe siècle par un maître d'école de la ville de Bruges* (Paris, 1875), composed at Bruges ca. 1349. See also Munro, "Medieval Woollens: Technology," pp. 200-02 (n. 8 above).

as well as wefts.[20] There is no evidence, however, that the Saxony wheel was used in fifteenth- and sixteenth century Italy, whose cloth industries retained the long traditional difference between combed yarns for warps and carded yarns for wefts.[21]

The introduction of the horizontal foot-powered treadle loom in the eleventh century, displacing the ancient vertical warp-weighted loom, and its transformation into the two-weaver broadloom in the thirteenth century, made possible — more so than the spinning innovations – the European victory of the woolen broadcloth, as a far larger cloth, in both length and width, and far heavier cloth, over rival wool-based fabrics. The weaving process simply involved the insertion of the weft yarns, wound inside and dispensed from a wooden shuttle, between the tautly stretched warp yarns. A pair of weavers operated foot-powered treadles to operate a series of heddle-harnesses that separated alternate warp yarns (attached to the treadles) to allow the insertion and passage of the weft-shuttle that one weaver passed to the hands of the other. The weavers then used a wooden laysword to beat the weft into the fell of the cloth, using levers to to wind the cloth on to the cloth beam, while feeding more warps from the warp beam.

While the horizontal loom increased both the quality and the productivity (quantity per unit of time) over the ancient vertical loom, productivity still remained low by any modern standards. In late-medieval Flanders, weaving a standard broadcloth of 42 ells by 3.5 ells (29.4 m by 2.45 m = 71.0 m^2), containing 38.2 kg. of wool (16.3 kg. of warp and 21.8 kg. of weft), required at least two weeks, for the two weavers. With a working year of 210 to 240 days, the annual output from a typical loom was about 20 - 25 such broadcloths.[22] Evidence from sixteenth-century Florence indicates an even lower-level of productivity: a full-time weaver took from three to four weeks to weave a single bolt of woolen cloth (61.77 *braccia* = 36.012 meters = 39.385 yds), producing annually about 12 bolts of cloth (=432.14 m), the equivalent of about 15.5 Flemish broadcloths.[23] Over the next two centuries weaving productivity did not enjoy any increase. For, a

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[20] See John Munro, "Textile Technology," in Joseph R. Strayer, et al. (eds)., *The Dictionary of the Middle Ages*, Vol. XI (New York, 1988), pp. 693-711; Munro, "Medieval Woollens: Technology," pp. 200-04 (see n. 8 above); Patrick Chorley, "The Evolution of the Woollen, 1300 - 1700," in Negley B. Harte (ed.), *The New Draperies in the Low Countries and England, 1300 - 1800*, Pasold Studies in Textile History no. 10 (Oxford, 1997), pp. 7-34: devoted almost entirely to this issue, but offering an interpretation different from mine. See below, pp. 000 and n. 68.

[21] For evidence of this difference between combed and drop-spindle spun warps and carded, wheel-spun wefts in the Florentine cloth industry in the sixteenth century – but using fine, short-fibered wools (Spanish *merino* wools), see Raymond de Roover, "A Florentine Firm of Cloth Manufacturers: Management of a Sixteenth-Century Business," *Speculum*, 16 (1941), pp. 3-33; reprinted in his *Business Banking, and Economic Thought in Late Medieval and Early Modern Europe: Selected Studies of Raymond De Roover*, ed., Julius Kirshner (Chicago, 1974), pp. 85-118. See also Florence Edler, *Glossary of Medieval Terms of Business: Italian Series, 1200 - 1600* (Cambridge, MA, 1934; New York: Kraus Reprint Co, 1970), pp. 147 (entry for *lana*), 279-81 (entries for *stamaiuolo, stame*); and Appendix VIII, pp. 413-26.

[22] For the transition from the ancient vertical to the horizontal loom, and the productivity differences, see Marta Hoffmann, *The Warp-Weighted Loom: Studies in the History and Technology of an Ancient Implement* (Oslo, 1964). For changes in the medieval horizontal loom, see Walter Endrei, *L'evolution des techniques du filage et du tissage: du moyen âge à la revolution industrielle* (The Hague, 1968); Walter Endrei, "The Productivity of Weaving in Late Medieval Flanders," in N.B. Harte and K. G. Ponting (eds.), *Cloth and Clothing in Medieval Europe: Essays in Memory of Professor E. M. Carus-Wilson*, Pasold Studies in Textile History no. 2 (London, 1983), pp. 108-19; Walter Endrei, "Manufacturing a Piece of Woollen Cloth in Medieval Flanders: How Many Work Hours," in Erik Aerts and John Munro (eds.), *Textiles of the Low Countries in European Economic History*, Proceedings of the Tenth International Economic History Congress, Studies in Social and Economic History, Vol. 19 (Leuven, 1990), pp. 14-23.

[23] Richard Goldthwaite, "The Florentine Wool Industry in the Late Sixteenth Century: a Case Study," *The Journal of European Economic History*, 32:3 (Winter 2003), pp. 527-54: esp. pp. 544, 553. A bolt of Florentine woolen cloth contained 61.77 *braccia*; the *braccio* was 0.583 m long, so that a bolt was

report of a British Parliamentary commission on the woolen cloth industry, in the 1790s, stipulates clearly that two weavers still took at least two weeks to weave a superfine broadcloth.[24]

- fulling, tentering, and shearing: the crucial processes in manufacturing woolens

When those two yarns were woven on the loom, the resulting fabric was still too weak to produce a durable cloth, so that the woven fabric, taken down from the loom, then had to be subjected to a process known as fulling in order to compress the cloth, and give it the required density, cohesion of fibers, strength, and long-term durability. In traditional foot-fulling, the cloth (about 30 meters long from the loom) was immersed in a long, shallow stone or earthenware vessel filled with warm water, urine, fuller's earth (kaolonite), and soap. Two journeymen fullers, aided by their master, then trod, with great force, on the woolen cloth for three days or more (depending on the quality and size) to achieve three objectives: to scour and cleanse the cloth of its grease (butter, olive oil); to force the short, curly and scaly wool fibers to interlace and interlock – in effect, to felt the yarns; and to shrink the cloth, chiefly in its length, by about 50 percent of its surface area. The fulled and felted cloth then had a density and cohesion that made it virtually indestructible – and also very heavy.

To begin the finishing processes, the cloth was then placed and hung along a large structure known as a tentering frame, stretched on to the tenter-hooks, on all four sides. While the cloth was drying on this frame, all of the creases from the fulling processes were removed, and minor repairs were effected (by burling). The fulled and tentered woolen cloth was then delivered to the finishers, who used thistle-like teasels to raise the nap, to bring up all of the loose fibers, which were then repeatedly shorn with foot-long razor-sharp steel shears. After the combined processes of fulling, napping, and shearing, the weave was totally obliterated and the resulting texture was almost as smooth and fine as silk. The cloth was then usually dyed in the piece, which generally meant redyeing, since preliminary dyeing often took place in either the wools, usually with woad, to produce a uniform blue base, or in the yarns, if a variety of colors was desired, in the form of rayed (striped) or medley cloths.[25]

From the tenth century, however, the fulling process in Italy became mechanized: with the water-

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36.012 m. (according to Florentine records of 1580). See Edler, *Glossary of Medieval Terms*, pp. 52, 59 (n. 21 above). See also Raymond Van Uytven, "Technique, productivité, et production au moyen âge: le cas de la draperie urbaine aux Pay-Bas," in Sara Mariotti (ed.), *Produttività e tecnologia nei secoli XII-XVII*, Fondazione Istituto Internazionale di Storia Economica F. Datini, Atti delle Settimane de Studi et altre Convegni, vol. 3 (Florence, 1981), pp. 283-94; Francesco Ammannati, "Francesco di Marco Datini's Wool Workshops," in Giampiero Nigro (ed.), *Francesco di Marco Datini: The Man and the Merchant*, Fondazione Istituto Internazionale di Storia Economic F. Datini (Florence, 2010), pp. 489-514; and n. 124 below. He indicates a total of 250 days for all processes: 51 days for wool preparation, 76 days for spinning, 65 days for warping/weaving, and 58 days for the finishing procesee; but that total estimate is reduced to 138 days if overlapping procedures are taken into account. For the length of the *braccio*, see below nn. 45, 66, 76, 214.

[24] See Ephraim Lipson, *The History of the Woollen and Worsted Industries* (London, 1921; reprinted New York, 1965), Appendix II, p. 258, based on Great Britain, *Parliamentary Paper, 1840* (London, 1840), vol. 23, pp. 439-42: two men weaving a superfine broadcloth of 34 yards (=31.09 m), with 70 lb. of wool = 31.75 kg. (26 lb in warp and 44 lb in weft), then required 364 man-hours (= about 15 days per man); and another 888.3 man-hours were spent in wool preparation, spinning, reeling, and warping; and a further 207 hours in cloth finishing, for a total of 1459.35 hours in total cloth manufacturing. For a late seventeenth-century estimate (Matthew Hale, 1683) three weeks for the production of a fine woolen broadcloth, see *Ibid*., Appendix 1, p. 257.

[25] See Munro, "Medieval Woollens: Technology," pp. 204-12 (see n. 8 above).

powered fulling mill.[26] Italy was indeed the first industrial region to adopt this significant innovation, which represented not just the initial but in fact the only significant process to be so mechanized in the wool-based textile industries before the nineteenth century. Recent estimates indicate that, while traditional foot fulling accounted for about twenty percent of the value-added manufacturing costs (before cloth finishing), mechanical fulling accounted for only five percent of such costs, thus representing a net cost savings of 75 percent. In some luxury-oriented woolen cloth industries in western Europe, mechanical fulling was resisted on the grounds that it injured the fine delicate wool fibers, the industry's reputation, and thus the market value of the cloths.[27] Whether such considerations ever influenced production decisions in Florence's late-medieval cloth industry, producing equally expensive woolens, is not known. But certainly mechanical fulling was employed in the Medici's sixteenth-century Florentine workshops, and likely far earlier, as it was in Prato's cloth industry in the 1390s .[28]

-worsteds and the "light draperies," draperies légères, draperie sèches

The other major products of the wool-based cloth manufacturing industries are known, at least to English historians, as worsteds, but to continental textile historians by the French terms: *draperies légères* or *draperies sèches*. One of the most common names for this type of textile was *say* or *saie* (from the Roman Latin *sagum*: a soldier's wool-cloak); and the industries producing them (in many varieties) were known as *sayetteries*.[29] As the first French terms suggest, they were comparatively light textiles – about one quarter to one third the weight of a fulled woolen broadcloth.[30] They were composed of wools that were not greased or oiled, for they did not require the same protection as did the fine, short-stapled scaly-fibered wools used in manufacturing true woolens. For that reason a common French name for this branch of the industry was *draperie sèche*. Instead, these fabrics were composed, in both their warp and weft yarns, of much longer-fibered, coarse, straight, and very strong wools, both of which were combed rather than carded (but with longer combs than those used in woolens). The yarns, spun by the rock in the medieval era, were so strong and tightly twisted that manufacturing was virtually complete with the weaving process, except for bleaching or dyeing and pressing. Thus the classic true worsteds underwent no fulling, napping/teaselling, or shearing; and indeed their coarse, much straighter wool fibers lacked the felting properties required for these finishing processes. The distinguishing visible feature of these worsteds, therefore, was their highly visible weave, of various designs, chiefly twilled, designs that normally could not be seen in a true woolen. The absence of fulling (and thus lack of felting and compression) largely explains their light weight. The combination of much lower-cost wools and far simplified production processes similarly explains their relative cheapness.

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[26] Documented at Abruzzo, 962; Parma, 973; Verona, 985; and Lodi (near Milan), 1008. See Paolo Malanima, "The First European Textile Machine," *Textile History*, 17 (1986), pp. 115 - 28; and Eleanora Carus-Wilson, "An Industrial Revolution of the Thirteenth Century," *Economic History Review*, 1st series 11:1 (1941), pp. 39-60; reprinted in her *Medieval Merchant Venturers: Collected Studies* (London, 1954), pp. 183-211.

[27] See John Munro, "Industrial Entrepreneurship in the Late-Medieval Low Countries: Urban Draperies, Fullers, and the Art of Survival," in Paul Klep and Eddy Van Cauwenberghe (eds.), *Entrepreneurship and the Transformation of the Economy (10th - 20th Centuries): Essays in Honour of Herman Van der Wee* (Leuven, 1994), pp. 377-88; and the sources cited in n .8 above.

[28] De Roover, "Florentine Firm of Cloth Manufacturers," pp. 1-33 (see n. 21 above).

[29] See in particular: John Munro, "The Origins of the English 'New Draperies': The Resurrection of an Old Flemish Industry, 1270 - 1570," in Negley B. Harte (ed.), *The New Draperies in the Low Countries and England, 1300 - 1800*, Pasold Studies in Textile History no. 10 (Oxford and New York, 1997), An Appendix on Says, pp. 87-93.

[30] See Munro, "Medieval Woollens: Struggles for Markets," Tables 5.7 - 5.8, pp. 312-16 (n. 8 above); and below, pp. 000-00 and nn. 68, 160-62, 199-206, 209, 269, 299 for a comparison of cloth weights in medieval and early-modern Europe.

-Serges: hybrid worsted-woolen fabrics

The third variety of wool-based textiles, commonly called serges, was simply a combination of these two basic types: a hybrid fabric composed of long-stapled dry combed worsted warp yarns, spun on the distaff (rock), and short-stapled greased carded woolen weft yarns, spun on the spinning wheel.[31] These textiles were only partially fulled, chiefly to remove the grease; and, like true worsteds, they were often neither napped nor shorn, or only superficially shorn. Many textiles of the twelfth and thirteenth centuries, especially those known as *saga, sargia,* and *stanfortes* were of this type, as were the Hondschoote *saies* of both the thirteenth and the fifteenth-sixteenth centuries. They in turn served as the model for the so-called New Draperies, which were introduced into East Anglia, from the 1560s, by Flemish refugees after the Revolt of the Netherlands against Spanish rule.[32]

International trade in textiles in Italy and the Mediterranean basin: ca. 1100 - ca. 1320

Between the twelfth and early eighteenth centuries, when this study ends, the Italian and other European cloth industries underwent some dramatic changes, both in terms of manufacturing and international trade. During the twelfth and thirteenth centuries, from the earliest records on cloth sales in the Mediterranean basin, we find that textiles from north-west Europe (northern France, the Low Countries, the Rhineland, England) predominated over those manufactured within the Mediterranean basin itself.

In his study on the Genoese textiles trade with Sicily, Syria, Egypt, and Constantinople in the late twelfth century, Hilmar Krueger found that northern French and Flemish says and serges (*sagie, sargie, saie*) "were exported more frequently than other type of cloths;" and that northern cloths, including especially the cheaper, relatively light English *stanfortes* [stamforts], predominated over Mediterranean textiles. Of those textiles produced within Italy itself, he contended, "only the Lombard fustians formed an impressive item of export" to the Byzantine and Islamic realms.[33]

More than a hundred years later, the composition of that Mediterranean trade had not changed substantially, according to Patrick Chorley's analysis of Mediterranean textile markets during the later thirteenth and early fourteenth centuries. He similarly found that the majority of the textiles sold in this region, by both value and volume, were relatively cheap, coarse northern European woolens and worsteds; and the latter were chiefly lighter serges (hybrid woolen-worsteds) and full worsteds: specifically, says, biffes, burels, rays, etc. The values of the latter category were "typically about 40-60 percent of that of the *lowest* grade of [Franco-Flemish] colored woollens." In two Iberian price-lists (ca. 1293) in particular, their values were only 25 - 33 percent of those for such fine northern woolens.[34]

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[31] See Ursula Priestly, "Norwich Stuffs," in Negley B. Harte (ed.), *The New Draperies in the Low Countries and England, 1300 - 1800*, Pasold Studies in Textile History no. 10 (Oxford and New York, 1997), pp. 275-88.

[32] See below, pp. 000-00.

[33] See Hilmar Krueger, "The Genoese Exportation of Northern Cloths to Mediterranean Ports, Twelfth Century," *Revue belge de philologie et d'histoire*, 65 (1987), pp. 744-47. For such trade, see also R. L. Reynolds, "The Market for Northern Textiles in Genoa, 1179-1200," *Belgische tijdschrift voor filologie en gescheidenis/Revue belge de philologie et d'histoire*, 8 (1929), pp. 831-50; Hektor Ammann, "Die Anfänge des Aktivhandels und Der Tucheinfur aus Nordwesteuropa nach dem Mittelmeeregebiet," in *Studi in onore di Armando Sapori*, 5 vols. (Milan, 1957), vol I, pp. 275-310, esp. Beilage I-II: Norwesteuropäische Tuche in Genua (1182-1213) , pp. 308-09: including *sagie, stanfortes.*

[34] Patrick Chorley, "The Cloth Exports of Flanders and Northern France During the Thirteenth Century: A Luxury Trade?" *Economic History Review*, 2nd ser. 40:3 (August 1987), pp. 349-79, esp. pp. 360-61, 367 (Table 9). See also, for similar evidence on textile types and prices: Patrick Chorley, "English Cloth Exports During the Thirteenth and Early Fourteenth Centuries: the Continental Evidence," *Historical Research: The Bulletin of the Institute of Historical Research*, 61:144 (February 1988), pp. 1-10.

In early fourteenth-century Italy, at least two prominent Florentine merchant firms specialized in the sales of northern textiles: the Peruzzi and Del Bene companies. The former, according to Richard Goldthwaite, imported "sayes from Ireland, Caen [Normandy], Hondschoote [Flanders] , and nearby Altopascio;" but it also sold many competing cheaper textiles from many Italian producers: Genoa, Milan, Naples, the Romagna, Provence, Venice, and Cyprus (Venetian-controlled).[35] Better studied are the accounts of the rival Del Bene firm, for 1318-23.[36] Table 1 presents a summary of Patrick Charley's analysis of the prices for northern textiles in these accounts; and if we group those designated as *rays* and *says* in the cheaper category, we find that their mean values was less than half (46.71 per cent) of the mean value of the northern (chiefly Flemish) colored woolens. Indeed, the prices for says from Caen (Normandy) and Ghistelles (Flanders) were only 23.66 and 31.92 percent, respectively, of the mean value for woolens.[37]

Subsequently, Hidetoshi Hoshino, the most prominent historian of the medieval Italian textile trades, also analysed the Del Bene accounts, though using a somewhat different set of cloth prices, which include those for Hondschoote says, not given in Chorley's table.[38] His results are presented in Table 2, which shows a somewhat higher mean value for the northern says: 59.54 percent of the mean value of the northern dyed woolens, excluding *scarlets* from this comparison, because of their singularly high value.[39] But that mean disguises a wide variance of prices for these northern says and similar cheaper textiles, which ranged from 24.34 percent (for Ghistelles says) to 62.20 precent (for Caen says) of the mean prices for the northern woolens. The prices for good quality Hondschoote says were 56.25 percent of the mean values of those northern woolens and only 40.94 percent of the mean price for woolens from Douai, then the leading Flemish textile town (later superseded by Ghent, Bruges, and Ypres).

As Chorley and other textile historians have found, medieval cloth prices present a very wide continuum from the most valuable (*scarlet* woolens) to the very cheapest, with very fine gradations in prices, complicated by wide variations in prices for textiles with the same names, differentiated by dyestuff and other raw materials costs, and cloth-widths (rarely defined). As a consequence, segregating textiles into distinct categories by prices is fraught with difficulties. Nevertheless, the burden of the evidence still supports the view that relatively cheaper, coarser, and often lighter textiles predominated in Mediterranean markets from the twelfth to early fourteenth centuries.

Italian textile production, ca. 1100 - ca. 1330: fustians, serges, and coarse woolens

Within Italy itself during this era, as Krueger clearly stated, and as Maureen Mazzaoui has subsequently demonstrated, the most important textile industry was not a woolen, serge, or worsted fabric

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[35] Goldthwaite, *Economy of Renaissance Florence*, p. 270 (see n. 6 above).

[36] The most important documentary source is Armando Sapori, *Una compagnia di calimala ai primi del trecento*, Biblioteca storica toscana vol. 7 (Florence, 1932).

[37] Chorley, "Cloth Exports," adapted from his Table 3, p. 355 (n. 34 above). In this table 1, I have grouped the towns and textile prices into these two categories, and recalculated the values in terms of gold florins and *soldi affiorini* (29s = 1 gold florin) per *braccio* (0.583 m). For the *braccio*, see n. 23 above; nn. 66, 76, 214 below.

[38] Based on Hidetoshi Hoshino, "The Rise of the Florentine Woollen Industry in the Fourteenth Century," in N.B. Harte and K.G. Ponting (eds.), *Cloth and Clothing in Medieval Europe*, Pasold Studies in Textile History, no. 2 (London, 1983), Table 11.2, p. 190; and Hidetoshi Hoshino, *L'arte della lana in Firenze nel basso medioevo:il commercio della lana e il mercato dei panni fiorentini nei secoli XIII-XV* (Florence, 1980), pp. 70-71 (unnumbered table). For other comparisons of northern and Italian textile prices in the later thirteenth and early fourteenth century, see *Ibid*, Tables 1-3, pp. 50-63; and Richard Goldthwaite, *The Economy of Renaissance Florence* (Baltimore, 2009), pp. 265-70 (see n. 6 above).

[39] For a discussion of the luxury woolens known as *scarlets*, see below pp. 000 and n. 48.

but a fustian: another light-weight hybrid, composed of a linen (flax) warp yarn and a cotton weft yarn.[40] The term is thought to be derived from al-Fustāt, an important industrial suburb of Cairo, which had reputedly inaugurated the production of such textiles, in the tenth or eleventh centuries, by using local Egyptian flax for the linen warps and imported Syrian-Palestinian or South Asian cotton for the weft yarns. By the thirteenth century, the manufacture of these very light and comfortable textiles had spread through the Mediterranean basin and even into Flanders, in northwestern Europe; but clearly the undisputed leader in the European production of these linen-cotton fustians was Lombardy. Whether or not Mazzaoui was justified in describing this as a "mass-production, mass-consumption" industry, there can be no doubt that its products were also relatively very cheap– if more expensive than domestic home-spun -- as well as light, and very popular amongst the lower middle classes in this region (Lombardy) during the later twelfth, thirteenth, and early fourteenth centuries. Some of the market for such textiles came from aristocratic households, in supplying clothing for their servants.

During this same era, Italians were also manufacturing a very wide variety of other light and relatively cheap chiefly wool-based fabrics, in as great a profusion as was then to be found in northern France, the Low Countries, and England.[41] In many towns in Lombardy, and also in Tuscany and Venetia, we find evidence for a wide variety of worsted or semi-worsted says, and very coarse woolens, variously woven from low-priced, mediocre Italian, North African, and other western Mediterranean wools, which were marketed under a variety of names: such as *stametto, trafilato, tritana, taccolino, saia, saia cotonata*. Also to be found is the manufacture of *tiretaines*, closely resembling fustians – in weight and market values – composed of mixtures of woolen, linen, and/or cotton fibers. During this era, the Umiliati of Florence, a lay brotherhood that had been founded in 1140 (reaching its peak in the 1270s) became important for producing very cheap textiles for the lower classes.[42]

Eleanora Carus-Wilson, after having examined a very detailed Venetian price-list of both imported and domestic textiles, dated 1265, stated that "almost without exception the Italian cloths are cheap; even the costliest do not approach in value those of Ypres, Douai, and Cambrai" [from Flanders].[43] Hidetoshi Hoshino's analysis of cloth sales in various Italian cities from ca. 1250 to ca. 1330s, including the sales registers of the great Florentine merchant firms, provides a similar picture: that these coarse and relatively cheap fabrics accounted for the majority of their textile sales transactions. Most of these textiles, including the *saia e tritana,* were valued at from 23 percent to 43 percent of the market prices for standard luxury quality woolens from the northern towns (with the very expensive ultra-luxury scarlets – *scarlatti* – again

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[40] Maureen Mazzaoui, *The Italian Cotton Industry in the Later Middle Ages, 1100 - 1600* (Madison, 1981), pp. 28-72, 87-104.

[41] See John Munro, "Origins of the English New Draperies," pp. 56-64 (see n. 29 above); John Munro, "Industrial Transformations in the North-West European Textile Trades, c. 1290 - c. 1340: Economic Progress or Economic Crisis?," in Bruce M. S. Campbell (ed.), *Before the Black Death: Studies in the 'Crisis' of the Early Fourteenth Century* (Manchester and New York, 1991), pp. 110 - 48; John Munro, "The Symbiosis of Towns and Textiles: Urban Institutions and the Changing Fortunes of Cloth Manufacturing in the Low Countries and England, 1270 -1570," *The Journal of Early Modern History: Contacts, Comparisons, Contrasts*, 3:1 (February 1999), pp. 1-74; John Munro, "The 'Industrial Crisis' of the English Textile Towns, 1290 - 1330," in Michael Prestwich, Richard Britnell and Robin Frame (eds.), *Thirteenth-Century England*, VII (Woodbridge, 1999), pp. 103-41.

[42] Eleanora Carus-Wilson, "The Woollen Industry," in M.M. Postan and E.E. Rich, eds., *Cambridge Economic History of Europe*, Vol. II: *Trade and Industry in the Middle Ages* (Cambridge, 1952), pp. 355-428, esp. pp. 390-91; rev. edn (ed. M. M. Postan and Edward Miller, Cambridge, 1987), pp. 614-90, esp. 649-50.

[43] *Ibid*., pp. 390-91.

removed from this comparison).[44] Similarly, a study of the early fourteenth-century cloth market in the Provençal town of Grasse (1308-09) shows that Florentine cloths had only about a third of the value of cloths from Ypres: a mean of 14s *royaux coronats* per *canna* vs. a mean of 40.5s per *canna* for Ypres' *rubeum* (red) woolens.[45]

English wools, *panni alla francesca*, the Champagne Fairs, and the *Arte di Calimala*

Nevertheless, the significant role that so many prominent Italian mercantile firms – the Riccardi, Pulci, Frescobaldi, Cerchi Bianchi, and Bardi firms, in particular – played in purchasing high grade English wools for export, during the later thirteenth century, especially from Cistercian monasteries, indicate that some such high-priced wools were then reaching the textile manufacturing towns in Lombardy and Tuscany. England was then also Europe's overwhelmingly predominant supplier of wool, exporting an annual average of 25,480 sacks in the 1290s, from which 110,405 broadcloths of assize could have been woven.[46]

A far more important textile import into later thirteenth-century Italy were those undyed and undyed woolens, woven from English wools, that had been manufactured in the towns of the southern Low Countries and northern France, and were generically called *panni alla francesca* (and English wools were similarly known as *lana francesca*). Most of these cloths had been acquired by Italian merchants trading at the Champagne Fairs, the commercial hub of western Europe, and transported down the Rhone Valley, and then, via Genoa, to Tuscany in particular. In Florence, merchants and industrial entrepreneurs in the *Arte della Calimala* prospered by dyeing and finishing these Franco-Flemish woolens and by having them re-exported to various Mediterranean and Asian markets, including especially those of the Islamic world.[47] Particularly renowned were the extremely costly and ultra-luxurious "scarlets" or *scarlatti:* woolens dyed a vivid scarlet with kermes (*kermès* in French; *chermes* in Italian; *carmes* in Spanish), extracted from the desiccated eggs of various Mediterranean shield lice.[48]

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[44] Hoshino, *L'arte della lana,* pp. 65-113, esp. tables IV-XV, pp. 95-114 (see n. 38 above); Hoshino, "The Rise of the Florentine Woollen Industry," pp. 184-204 (n. 38 above); and see also Goldthwaite, *Economy of Renaissance Florence*, pp. 265-70 (n. 6 above). For scarlets, see below pp. 000 and n. 48.

[45] R. Aubenais, "Commerce des draps et vie économique à Grasse en 1308-09," *Provence historique: revue trimestrielle*, 9:37 (Jul - Sep 1959), pp. 201-12, esp. pp. 204, 206: with a range from 14s to 15s per *canna* of dyed Florentine cloths; but those of Genoa were even cheaper, at 8s. per *canna*. The Florentine canna = 2.333 meter = 4.0 *braccia.* Northern French *biffes* had an intermediate value: at 24s to 28s per *canna*, though some were as cheap as 10s a *canna* (p. 205). See also Hoshino, *Arte della Lana*, p. 71 (n. 38 above), for other prices from this source (without specifying the currency). The Angevin counts of Provence struck their own silver coinage, independent of France, called *royaux coronats*; and in this money of account a Florentine gold florin was worth about 18s - 20s in the early fourteenth century. See Peter Spufford, *Handbook of Medieval Exchange* (London, 1986), pp. 117-18.

[46] Munro, "Medieval Woollens: Struggles for Markets," pp. 278-83; Tables 5.1 - 5.4 (n. 8 above). For the ratio of 4.333 broadcloth per sack of wool (364 lb), see n. 15 above.

[47] Sapori, *Una compagnia di calimala* (see n. 36 above). See also Goldthwaite, *Economy of Renaissance Florence*, pp. 269-72 (n. 6 above); Eliyahu Ashtor, "L'exportation de textiles occidentaux dans le Proche Orient musulman au bas Moyen Age (1370-1517)," in Luigi de Rosa (ed.), *Studi in memoria di Federigo Melis*, 5 vols. (Naples, 1978), vol. II, pp. 303-77; Eliyahu Ashtor, "Les lainages dans l'orient médiéval: emploi, production, commerce," in Marco Spallanzani (ed.), *Produzione, commercio e consumo de panni di lana nei secoli XII - XVII*, Istituto internazionale di storia economica 'F. Datini' Prato, Series II: Atti delle 'Settimane di Studio' e altri convegni (Florence, 1976), pp. 657-86.

[48] See John H. Munro, "The Medieval Scarlet and the Economics of Sartorial Splendour," in Negley B. Harte and Kenneth G. Ponting (eds.), *Cloth and Clothing in Medieval Europe: Essays in Memory of Professor E. M. Carus-Wilson*, Pasold Studies in Textile History No. 2 (London, 1983), pp. 13-70; John

Warfare, transaction costs, and transformations in international textile commerce: 1290s - 1330s

This structure of Italian textile production and textiles trade underwent dramatic and far-reaching changes from the onset of widespread, virtually continuous, and ever more disruptive warfare from the 1290s, leading into the far better known era of the Hundred Years War (1337-1453). Those wars began almost simultaneously in the eastern and western Mediterranean and in north-west Europe: with the Egyptian-based Mamlūk conquest of the last Crusader outposts in Palestine (1291); the consequent Genoese-Venetian wars to control the alternative trade by the Black Sea (1291-99); the Ottoman Turkish invasions of the Byzantine Empire in Anatolia and the Balkans (from 1303); the North African Merinid (or Marinid) invasions of Spain (1291-1340, with ancillary wars amongst Christian and Muslim states); the wars of the Sicilian Vespers in Italy (1282-1302), followed by the Guelf-Ghibelline wars (1313-43), which in turn provoked various foreign invasions of Italy, by Germans, Hungarians, Angevins, Catalans; and, finally, in north-west Europe, the Anglo-Scottish, Anglo-French and the Franco-Flemish wars, and civil wars, which raged almost unceasingly from 1296 to 1328.

Certainly, by the 1320s, the combination of those wars had raised both the transportation and general transaction costs in long-distance international trade: often to prohibitive levels for the commerce in relatively low valued textiles.[49] The chief costs did not rise so much from destruction or even violence, but from the break-down of authority, promoting increased brigandage and piracy; from Church and state-imposed bans on trade with the enemy, especially with Mamlūk Egypt, bans that were circumvented only by costly Papal trade licences; from the ever more costly construction of heavily armed ships, especially with the new artillery; and from the various forms of war-financing, in taxes, requisitions, forced loans, and coinage debasements. In particular, these wars were chiefly responsible for the rapid decline and fall of the Champagne Fairs, on which the north-south commerce in textiles had so fundamentally depended for over a century.

The new direct sea route by the Mediterranean and the Atlantic that the Italians developed from the 1320s did indeed generally prove to be a more cost-effective alternative than the war-torn land routes. But it was certainly not the major advance in commercial transportation that so many historians have portrayed, because this sea route, from Venice to Bruges or Southampton, was about five times longer than overland routes, and most of it was insecure, threatened by pirates, corsairs, and ocean storms. Consequently, with still primitive navigation techniques (especially the inability to calculate longitude), most Italian mariners were forced to hug the long coastlines from Gibraltar to Bruges and Southampton.[50] Because the Atlantic route in particular was so often threatened in this fashion, Venetian galleys sailed only intermittently during the

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H. Munro, "The Anti-Red Shift – to the Dark Side: Colour Changes in Flemish Luxury Woollens, 1300 - 1550," *Medieval Clothing and Textiles*, 3 (2007), pp. 55-95; Munro, "Luxury Textile Consumption," pp. 1-73 (see n. 8 above); and for Italy, see Hidetoshi Hoshino, "La tintura di grana nel basso medioevo," *Annuario dell'Istituto giapponese di cultura,* 19 (1983-84), republished in Hidetoshi Hoshino, *Industria tessile e commercio internazionale nella Firenze del tardo Medioevo*, ed. by Franco Franceschi and Sergio Tognetti, Biblioteca storica toscana no. 39 (Florence, 2001), pp. 23-39.

[49] For the following, see Munro, "Industrial Crisis," pp. 103-4 (n. 41 above); Munro, "Industrial Transformations," pp. 110 - 48 (n. 41 above); Munro, "Origins of the English New Draperies," pp. 56-64 (n. 29 above); Munro, " New Institutional Economics," pp. 1 - 47 (n. 4 above).

[50] Munro, "New Institutional Economics," pp. 1-47(n. 4 above). See also Russell Menard, "Transport Costs and Long-Range Trade, 1300 - 1800: Was There a European 'Transport Revolution' in the Early Modern Era?," in James Tracy (ed.), *The Political Economy of Merchant Empires: State Power and World Trade, 1350 - 1750* (Cambridge, 1991), pp. 228 - 75.

later fourteenth and early fifteenth centuries.[51] Thus ocean shipping did not provide so cheap a form of transport, especially for the lower-priced northern textiles destined for Mediterranean markets.[52]

- *The plight of the cheaper-line cloth industries in north-western Europe*: *sayetteries and worsteds*

The evidence for the harm that this warfare-induced rise in transportation and transaction costs had inflicted on the European textile trades can be seen in the virtual disappearance of those *sayetteries* and the related *draperies légères (sèches*) and similar industries in northern France, the southern Low Countries, and England, especially those that had specialized in producing relatively light and cheap worsted or semi-worsted fabrics for export to Mediterranean markets. Abundant evidence on textile sales in the Mediterranean basin, from the 1330s, also reveals the virtual disappearance of these cheaper, light northern textiles from Mediterranean markets, except for a few, occasional, random says, chiefly the so-called "Irish says."[53] England (East Anglia), to be sure, continued to produce worsteds for export to Germany and the Baltic, for several more decades, until they too virtually disappeared, by the 1380s, when various adverse conditions, especially a rise in piracy and Polish-German warfare, similarly increased transaction costs in this northern commerce. The drastic decline in European population during the fourteenth century itself exacted a severe toll in rising transaction costs, because, the transactions sector in international trade, with very high fixed costs, was subject to significant scale economies, so that smaller, contracted markets meant far higher unit costs in trade.

-*The plight of the Italian (Lombard) fustians industry in the fourteenth century*

In fourteenth-century Italy, we find evidence of similar relative declines of those cheaper-line textile industries oriented to export markets, though on a lesser scale than that experienced in north-west Europe. Obviously the demand for cheaper textiles did not disappear – demand that came often from aristocratic households for their servants. Just as obviously Italian producers of such textiles enjoyed a comparative advantage over their northern rivals in lower transportation and transaction costs. The most important example of such industrial decline is the once-renowned Lombard fustians industry. For it, too, began a slow

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[51] According to Venetian state records, the Flanders galleys made only 24 northbound voyages from 1332, when state-subsidies commenced, to 1400 (i.e. a mean of 2.8 per decade); but in the relatively more peaceful and commercially more propitious fifteenth century they made 86 such northbound voyages. Alberto Tenenti and Corrado Vivanti, "Le film d'un grand système de navigation: Les galères marchandes vénitiennes, XIV^{e} - XVI^{e} siècles," *Annales: Économies, sociétés, civilisations*, 16 (Jan.-June 1961), pp. 83-86, and pull-out chart. A more accurate record can be found in Doris Stoeckly, *Le système de l'Incanto des galées du marché à Venise, fin XIIIe-milieu XVe siècle* (Leiden-Cologne-New York, 1995); but unfortunately her study ceases in 1453, thus preventing a valid comparison of these two centuries.. See also Munro, "New Institutional Economics," pp. 1-47 (n. 4 above).

[52] In 1398, the Italian merchant Gulgielmo Barberi, employed by the Datini firm of Prato, reported that the cost of shipping Wervik woolens from Bruges to Barcelona by sea amounted to 15 percent of the price (22 florins), while shipping them overland, when routes were safer, cost 22 percent of that price. But he also explicitly noted that some other merchants had "lost all their profit" by so foolishly choosing to send their woolens overland. Letter of Gulgielmo Barberi to the Datini Co. in Barcelona, 10 May 1398: cited in Federigo Melis, "La diffusione nel Mediterranea occidentale dei panni di Wervicq e delle altre citta della Lys attorna al 1400," in *Studi in onore di Amintore Fanfani*, vol. III: *Medioevo* (Milan,1962), pp. 219-43, quotation on pp. 233-4, n. 30. In contrast, we may note that, around 1310, the costs of transporting far cheaper Caen *sayes* overland via the Champagne Fairs and the Rhone valley route to Florence had cost only 8.8 percent of their much lower value (11.5 florins). Sapori, *Una compagnia di calimala*, pp. 97-99 (n. 36 above): 1.01 florin per say in transporting 133 says; but total marketing costs amounted to 2.20 florins per say (19.2 percent). In another account, total marketing costs for 64 Caen says were 2.41 fl. per say, or 9.5 percent more per say in the smaller shipment. See below, pp. 000, for the high costs of shipping English wool to Venice, by sea.

[53] See evidence cited in sources provided in nn. 4, 41, 44, and 49 above.

if irredeemable decline from the 1320s; and by this time, it should be noted, the populations of both Provence and Tuscany (and possibly also Lombardy) had already experienced a significant fall in population, and thus well before the ill-famed Black Death (from 1348).[54] Before the Black Death, warfare may have been the major cause of that demographic and economic decline, not so much from battle deaths, as from disrupting food supplies (producing malnutrition) and spreading diseases. No part of western Europe was more continuously ravaged by warfare than was Italy, well into the 1380s.[55]

Certainly such warfare was the major factor responsible for the rise of the very competitors who would become the chief nemesis responsible for the final downfall of the Lombard fustian industry. For in the 1370s, after military strife in northern Italy had seriously disrupted the supply of fustians marketed in South Germany, the major towns of this region -- Ulm, Augsburg, Ravensburg, Constance, and Basel -- began converting their own domestic-oriented, low-quality linens crafts into the manufacture of linen-cotton fustians. Though beginning as a local import-substitution industry, the South German fustian manufacturers subsequently expanded to become, by the mid fifteenth century, the most important supplier of these relatively inexpensive light textiles for European markets. They represent the first important example of a cheaper-line textile industry that achieved a major growth in output in the later-medieval European economy.[56]

-The long-term consequences of rising transactions costs: the shift to luxury cloth production for the export trades in north-western and Mediterranean Europe

The severely acute problems facing the northern European textile producers, in particular, or those

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[54] See Philippe Wolff, "Trois études de demographie médiévale en France méridionale," in *Studi in onore di Armando Sapori*, 5 vols. (Milan, 1957), vol. I, pp. 495-503, esp. the table on p. 562, noting the fall in the number of foyers in the town of Millau: from 1835 in 1309 to 1541 in 1346, i.e., before the Black Death. See also Edouard Baratier and Félix Reynaud, *Histoire du commerce de Marseille*, vol. II: *De 1291 à 1480* (Paris, 1951), pp. 38-40, 207-28, 304-13; Georges Lesage, *Marseille angevine: recherches sur son evolution administrative économique et urbaine de la victoire de Charles d'Anjou à l'arrivée de Jeanne Ire, 1264 - 1348* (Paris, 1950), doc. no. 6, p. 184: letter of Robert d'Anjou (King of Naples), dated 21 Oct. 1331, concerning the serious depopulation of Marseille; doc. no. 7, pp. 184-6: on the serious decline of Marseilles' population from the 1290s. In Tuscany, Prato's urban population declinedby 26.9 percent from 1300 to 1339; and its rural population by 38.7 percent. In neighbouring Pistoia, the population declined by 36.3 percent from 1244 to 1344 (again, before the Black Death). See David Herlihy and Christiane Klapisch-Zuber, *Tuscans and Their Families: A Study of the Florentine Catasto of 1427* (New Haven and London, 1985), pp. 60-92, esp. Figure 3.1, p. 62 and Table 3.1, p. 63, Table 3.3, p. 71, Table 3.4, p. 73, Table 3.5, p. 74; David Herlihy, *Medieval and Renaissance Pistoia: the Social History of an Italian Town, 1200 - 1430* (London and New Haven: Yale University Press, 1967), pp. 55-77, esp. Graph I and Table 1, pp. 69-70; and Appendix I, pp. 271-82. See also John Day, "Crises and Trends in the Late Middle Ages," in John Day, *The Medieval Market Economy* (Oxford: Blackwell, 1987) pp. 185-224. [Translation of "Crisi e congiunture nei secoli XIV e XV," in *La Storia: I grandi problemi* (Turin, 1988).]

[55] See in particular William Caferro, "Mercenaries and Military Expenditure: The Costs of Undeclared Warfare in XIVth Century Siena," *Journal of European Economic History*, 23:2 (Fall 1994), pp. 219-47; William Caferro, *Mercenary Companies and the Decline of Siena* (Baltimore, 1998); William Caferro, "Warfare and Economy in Renaissance Italy, 1350 - 1450," *Journal of Interdisciplinary History,* 39:2 (Autumn 2008), pp. 167-209; and Munro, "New Institutional Economics," pp. 1-47 (see n. 4 above).

[56] See Maureen Mazzaoui, "The Cotton Industry of Northern Italy in the Late Middle Ages, 1150 - 1450," *Journal of Economic History*, 32 (1972), pp. 262-86; Mazzaoui, *The Italian Cotton Industry*, pp. 129-53 (see n. 38 above); Hermann Kellenbenz, "The Fustian Industry of the Ulm Region in the Fifteenth and Early Sixteenth Centuries," in Negley B. Harte and Kenneth G. Ponting (eds.), *Cloth and Clothing in Medieval Europe: Essays in Memory of Professor E. M. Carus-Wilson*, Pasold Studies in Textile History no. 2 (London, 1983), pp. 259-78; Wolfgang von Stromer, *Die Gründung der Baumwollindustrie im Mitteluropa: Wirtschaftspolitik im Spätmittelalter* (Stuttgart, 1978).

for whom the Italians had been their chief commercial agents and customers, were two-fold. First, their transport and transactions costs were so much higher, as just indicated, than those for the Mediterranean producers of competing low-priced textiles. Second, because all these producers, northern and Mediterranean, had been manufacturing very similar products with very close substitutes, i.e., with a very elastic demand for their products, they had to act as price-takers in Mediterranean markets. Thus northern producers could not have increased prices to cover rising costs without losing all their customers to lower-cost and thus lower-priced competitors. Consequently, and evidently by the 1330s, most of the surviving traditional northern draperies in northwestern France (Artois, Normandy), the Low Countries (Flanders and Brabant), and subsequently England (from the 1350s) and Holland (from the 1360s), as well, had chosen to re-orient most if not all of their export-oriented production to the manufacture of much higher priced luxury woolen textiles, while retaining production of the cheaper textiles for local, domestic markets

Such a radical industrial and commercial transformation had two related objectives or justifications that better ensured the survival of cloth-manufacturing, commerce, and some prosperity in both north-west Europe, and then also in Italy, as well, albeit for a smaller number of producers and merchants. First, the value:weight ratios for these luxury cloths meant that they could far better sustain the steep rise in transport and transaction costs, which would have obviously constituted a smaller proportion of retail prices than those costs did for the *saies, biffes, stanfortes,* and other relatively cheap textiles. Second, and more important, such production involved a far higher degree of product differentiation – especially in those techniques designed to convince consumers of superior quality over competitors' products. Thus these cloth-manufacturing towns, at least collectively in terms of the cloth guilds each town, rather than in terms of individual producers or drapers, became price-makers engaged in *monopolistic competition*, creating a much more inelastic demand for their distinctively different woolens. That allowed them to raise prices, to some reasonable degree, to meet any rising costs, without necessarily losing so many customers– certainly not as many as did the cheaper line northern cloth producers (facing a far more elastic demand schedule).

This shift to luxury-cloth production, however, later exacted a heavy cost for many of these more luxury-oriented woolen-cloth industries – especially the more traditional and conservative draperies, in both the Low Countries and Italy -- because the *sine qua non* for such luxury production was the exclusive use of the finer grade English wools (see above, pp. 000). That vital dependence soon put these luxury draperies at the mercy of English royal fiscal policy, i.e., in the taxation of wool exports, whose consequences will later be shown for the textile industries in both the Low Countries and Italy.[57] By the later fourteenth century, in Italy, and from the early to mid-fifteenth century in the Low Countries, some cloth industries (especially in Italy) did achieve some degree of salvation in switching to the new Spanish *merino* wools; but these wools did not really rival the best English wools in quality, as noted earlier, until the mid to late sixteenth-century.[58]

The transformations of Italian textile production from the 1330s: **Tuscany and Lombardy**

-the shift to luxury cloth production within Italy: the decline of the Arte di Calimala and the rise of the Arte della Lana in Florence from the 1330s

The other major commercial-industrial transformation that had also become quite evident by the early fourteenth century, certainly by the 1320s, was the decline of the Florentine *Arte di Calimala* and, conversely,

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[57] See sources cite in nn. 4, 41, 44, and 49 above; and also John Munro , "The Low Countries' Export Trade in Textiles with the Mediterranean Basin, 1200-1600: A Cost-Benefit Analysis of Comparative Advantages in Overland and Maritime Trade Routes," *The International Journal of Maritime History*, 11:2 (Dec. 1999), pp. 1 - 30; John Munro, "Hanseatic Commerce in Textiles from the Low Countries and England during the Later Middle Ages: Changing Trends in Textiles, Markets, Prices, and Values, 1290 - 1570," in Marie-Luise Heckmann and Jens Röhrkasten (eds.), *Von Nowgorod bis London: Studien zu Handel, Wirtschaft und Gesellschaft im mittelalterlichen Europa: Festschrift für Stuart Jenks zum 60. Geburtstag*, Nova Mediaevalia, Quellen und Studien zum europäischen Mittelalter, vol. 4 (Göttingen, 2008), pp. 97-182.

[58] Munro, "Spanish *Merino* Wools," pp. 431-84 (see n. 9 above). See below, pp. 00-00.

the rise of the previously less important guild of cloth manufacturers, the *Arte della Lana.* For textile firms in the latter guild had begun to shift production more and more from the cheaper textiles to woolens of the so-called *panni alla francesca* – i.e., those that imitated Franco-Flemish cloth styles. Obviously the rapid rise of this import-substitution industry took place at the direct expense of the *Arte della Calimala,* whose decline must also be blamed upon the virtual collapse of their commercial networks based on the now virtually extinct Champagne Fairs.[59]

Though one might instead attribute their plight more directly to the sharp rise in transportation and transactions costs involved in importing Franco-Flemish woolens, that argument becomes less convincing when we realize that the success of the *Arte della Lana* was dependent on another very costly import from an even greater distance: namely those English wools. One might well assume, in terms of the economics of value:weight ratios, that it would have been cheaper to transport semi-finished woolens than sacks of raw wool, especially when so much of the weight (about 35 percent) was removed in the production processes.[60] Even though that wool came to be increasingly imported by sea, rather than overland, directly from Southampton, that maritime transport was very costly, adding 25 percent to the price paid for a sack of English Cotswold wool transported by galleys to Venice. Although galleys were far more expensive to operate than were cogs and the later carracks, they were far safer to operate (with lower insurance rates) for the very valuable cargoes of English wool and Tuscan luxury woolens.[61]

-Italian merchant bankers: bills of exchange, papal taxation, and the trade in English wools

There was, however, an important external economy that justified the high costs of shipping English wools (from Southampton) to Italian ports: the Italian merchants' role as papal tax collectors and as the international merchant-bankers who were the first to devise the *cambium* or bill of exchange, in the later thirteenth century.[62] The bill of exchange, which had no Arab or other foreign antecedents, was the single most important financial innovation in the later medieval European economy.[63] Indeed, the long-held Italian

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[59] See also Goldthwaite, *Economy of Renaissance Florence*, pp. 272-73 (n. 6 above), on import-substitution industries.

[60] See below, pp. 000 and Table 11 for evidence from the Italian cloth industries on weight-loss in processing.

[61] See Edmund B. Fryde, "Italian Maritime Trade with Medieval England ca. 1270- c. 1530," *Recueils de la société Jean Bodin*, 32 (1974), pp. 291-337, reprinted in his *Studies in Medieval Trade and Finance* (London, 1983), pp. 309-10; and also Edmund Fryde, "Anglo-Italian Commerce in the Fifteenth Century: Some Evidence about Profits and Balance of Trade," *Revue belge de philologie et d'histoire*, 50 (1972), pp. 345-55; Edmund Fryde, "The English Cloth Industry and the Trade with the Mediterranean, c. 1370 - c. 1530," in Marco Spallanzani (ed)., *Produzione, commercio e consumo de panni di lana nei secoli XII - XVII*, Istituto internazionale di storia economica 'F. Datini' Prato, Series II: Atti delle 'Settimane di Studio' e altri convegni (Florence, 1976), pp. 343-67.

[62] See Goldthwaite, *Economy of Renaissance Florence*, pp. 203-55 (n. 6 above). For the role of the Italians in the English wool trade, see Terence Lloyd, *The English Wool Trade in the Middle Ages* (Cambridge, 1977), pp. 60-98.

[63] On the evolution of the bill of exchange, see Raymond de Roover, "Le contrat de change depuis la fin du treizième siècle jusqu'au début du dix-septième," *Revue belge de philologie et d'histoire*, 25 (1946-47), pp. 111-28; Raymond de Roover, *L'evolution de la lettre de change, XIVe-XVIIIe siècles* (Paris, 1953); John Munro, "Bullionism and the Bill of Exchange in England, 1272-1663: A Study in Monetary Management and Popular Prejudice," in Center for Medieval and Renaissance Studies, University of California (ed)., *The Dawn of Modern Banking* (New Haven and London, 1979), pp. 169-239; John Munro, "The Medieval Origins of the Financial Revolution: Usury, *Rentes*, and Negotiablity," *The International History Review*, 25:3 (September 2003), pp. 505-62; Markus A. Denzel, "The European Bill of Exchange: Its Development from the Middle Ages to 1914," in Sushil Chaudhuri and Markus A. Denzel (eds.), *Cashless*

supremacy in bills-of-exchange transactions, using far-flung networks of family-based commercial agents, along with their role as papal tax collectors throughout Europe, provides a fundamental explanation for their dominance in both international trade and banking from the thirteenth to sixteenth centuries, and also their power in the English wool trade (if only to the era of the Hundred Years' War).[64]

The Italian bill-of-exchange was simply a letter or holograph document (unnotarized) that involved four parties: two principals in one city A and their two financial agents abroad, in a foreign city B.[65] The first principal, the *datore* (giver), lent the other principal in city A, the *prenditore* (taker), the necessary funds to finance his export trade. In return for those funds, the *prenditore* sold his *cambium* to the *datore*: a bill that was drawn for payment on the *prenditore's* agent in that foreign city B, the *pagatore* (payer or acceptor). That bill commanded that agent *pagatore* to make the stipulated payment, on the due date (*usance* – usually in 90 days), to the designated payee or *beneficiario*, i.e., the *datore's* foreign agent resident in city B.

By this very novel and cost-effective mechanism, Italian merchants were able to use the papal taxes so collected in England to buy high-grade English wools for export to Italy, and at the same time to use these bills in remitting taxes to Rome: once their agents had collected the proceeds of the second bill (*recambium*). In this particular example, the two principal merchants were Italian merchants resident in London or Southampton; and their two agents were members of their own banking firms resident in Florence (or Siena). Those agents were, in turn, responsible for remitting the taxes to Rome.

Note that all payments were made in the local currencies of the two cities – in English pounds sterling and Florentine florins (or Venetian or Roman ducats) – thus obviating the need to ship precious metals to Italy by sea, and hence avoid the increasingly severe risks of loss from warfare, piracy, or Atlantic storms. The profits that the *datore* (in effect, the lender) gained from this two-part transaction were derived from the elevation of the exchange rates on the two currencies: in order to circumvent the universal medieval usury ban on interest payments. In sum, the Italian merchants profited from both the commercial and banking transactions: by earning profits on the exchange rates in the bills, by collecting commissions, and above all by selling the wools at a substantial profit in Tuscan and Lombard towns.

-The growing importance of Florentine luxury woolens in the Italian export trade: competition with northern woolens, from the 1330s

Whatever the high price that the cloth-producing *lanaiuoli* firms of the *Arte della Lana* paid for these English wools, they were so successful in producing and marketing high-priced luxury quality woolens, from the 1330s, that they soon reduced the production of their once prominent cheaper-line textiles for their export markets. According to Hoshino, while the cheaper, coarser fabrics had earlier, in 1321-22, accounted for about two- thirds – more precisely 68 percent – of *Arte della Lana*'s cloth production, that proportion had fallen to just 25 percent in 1336-39: so that three-quarters of the Florentine cloth output was now in the much higher-priced luxury woolens.[66] Of course, throughout the late-medieval era, the *Arte della Lana* continued

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Payments and Transactions from the Antiquity to 1914, Beiträge zur Wirtschafts-und Sozialgeschichte no. 114 (Stuttgart, 2008), pp. 153-94.

[64] For the reasons why Edward III wartime-fiscal policies so seriously undermined the Italian supremacy in the English wool export trade, see pp. 000-00 below.

[65] Because of the crucial important that the payer or acceptor played in this principal-agent transaction, bills of exchange came to be more commonly known as acceptance bills by the seventeenth-century; and to this present day, acceptance bills have been the chief mechanism for financing international trade. See sources in n. 63 above.

[66] Hoshino, "Rise of the Florentine Woolen Industry," Table 11.1, p. 189 (n. 38 above) : the cheaper range was from 20 - 35 *soldi affiorino* per *canna*; and the more expensive range was from 45s. to 55s per *canna*. In the Florentine *affiorino* money-of-account, 29s. = 1 gold florin. Note: 1 *canna* = 4 *braccia* = 2.333 m; 1 *braccio* = 0.583 m. According to Melis, "La diffusione," Table IV, p. 229 (n. 52 above), one bolt

to produce cheaper and coarse fabrics for domestic and regional Italian consumption. In producing luxury-quality woolens, the evidence is indisputable that not just English wools but only the best English wools were being used. There can be no doubt about the very high quality of the English wools that were being imported and used in the Florentine *Arte della Lana*. Thus in the years 1355 to 1368, the Del Bene firm of Florence alone imported 49,568 kg. (145,985 lb. Florentine) of English wools, almost 80 percent of which came from the top three wool producing regions: the Cotswolds (46.03 percent), the Welsh Marches – especially Shropshire (25.73 percent), and Lincolnshire Lindseys (7.29 percent).[67]

The Florentine *Arte della Lana* had engaged in this marked re-orientation to luxury cloth production for much the same reasons as did the northern draperies (in Normandy, Flanders, Brabant, England), even though the Italian cloth producers enjoyed a far greater advantage over northern rivals in transaction costs in marketing cheaper textiles within the Mediterranean basin.[68] Indeed, for that reason, the cheaper textiles continued constituted a much greater share of the Italians' textile trade than that of the northern cloth industries during the fourteenth century.

While the northern and especially the Flemish and Brabantine draperies did maintain some success in marketing their high-priced luxury woolens in Mediterranean markets, they eventually lost considerable ground in these markets as well to the Tuscan and Lombard woolen cloth industries. Consequently, by the later fourteenth centuries, these Low Countries' draperies became ever more dependent on the Hanseatic markets in Germany, Poland, Russia, and Scandinavia, as subsequently so did the English and Dutch woolen cloth industries (from the 1360s).[69]

But not until the later fourteenth century, did the Florentine *Arte della Lana* really achieve its much

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of woolen cloth in the later fourteenth century = 18.875 *canne* = 44.035 meters; but in the mid sixteenth century, one bolt = 15.443 *canne* = 36.012 m. See n. 73 below, and Goldthwaite, "Florentine Wool Industry," Table A1, p. 553 (see n. 23 above). See nn. 23 and 45 above; and nn. 76, 214 below.

[67] Hoshino, *Arte della Lana*, Table 26, p. 216 (see n. 38 above).

[68] Hoshino, "Rise of the Florentine Woollen Industry," pp. 191-204 (n. 38 above); Hoshino, *L'Arte della Lana*, pp. 153-229 (n. 38 above). See also Goldthwaite, *Economy of Renaissance Florence*, pp. 270-74 (n. 6 above). Goldthwaite errs, however, in his contrast of northern and Florentine textile production, in stating (p. 272) that: "The expensive cloths imported from the north were true woolen, both warp and weft made from carded, wheel-spun yarns, whereas the Florentines produced lighter, half-worsted fabrics, making the warp from rock-spun, combed wools." In fact the Florentine textiles were also true heavy-weight woolens, as heavy as the northern products, and were also made from short-fibered, greased wools for both warps and wefts. While the warps of Florentine (and other Italian woolens) were combed, rather than carded, the same was true of all northern woolens before the mid to later fifteenth century. See Chorley, "Evolution of the Woollen," pp. 7-34 (n. 20 above); Munro, "Medieval Woollens: Technology," pp. 181-227 (n. 8 above), and especially Table 5.7, pp. 312-13. For comparative cloth weights, see also below pp. 000-00 and nn. 160-62, 199-206, 269 below.

[69] See Munro, "Hanseatic Commerce in Textiles," pp. 97-102 (n. 57 above); Munro, "Medieval Woollens: Struggles for Markets," pp. 239-49, 269-85 (n. 8 above); Hektor Ammann, "Deutschland und die Tuchindustrie Nordwesteuropas im Mittelälter," *Hansisches Geschichtsblätter*, 72 (1954), pp. 1-63; Marian Małowist, "Quelques observations sur la structure de la production et du commerce du drap au course du XIVe et XVe siècle," in Marco Spallanzani (ed.), *Produzione, commercio e consumo de panni di lana nei secoli XII - XVII*, Istituto internazionale di storia economica F. Datini, Prato, Series II: Atti delle Settimane di Studio e altri convegni (Florence, 1976), pp. 595-601; Carsten Jahnke, "Some Aspects of The Medieval Cloth Trade in the Baltic Sea Area," in Kathrine Vestergård Pedersen and Marie-Louise B. Nosch (eds.), *The Medieval Broadcloth: Changing Trends in Fashions, Manufacturing and Consumption*, Ancient Textile Series vol. 6 (Oxford, 2009), pp. 74-89. Note that these various studies are not fully in agreement with each other.

more complete, though by no means ever fully complete, shift to luxury production for its export markets.[70] In the second half of the fourteenth century, especially by the 1390s, Florentine woolens had clearly become by far the most expensive to be found in Mediterranean markets.[71] In the Pisan market, during the years 1354 to 1371, the mean recorded price of Florentine woolens was 43.35 gold florins (*fiorino d'oro)* or £6.50 sterling; and the highest priced woolens were 115 florins or £17.25 sterling; by the 1390s, their mean price had risen to 55.9 florins (£8.38 sterling). By the later fourteenth century, Florentine woolens were also the single most important textiles that the Datini firm of Prato were selling in Catalonia, with an average value of 64.43 florins (£9.66 sterling), in total accounting for 27 percent of its sales revenues there. In the Syrian and Egyptian markets of this same era (ca. 1390-1405), Florentine woolens were also the most expensive and amongst the most popular, selling at prices ranging from 35 to 54 florins (£5.25 to £8.10 sterling), compared to the sales prices for Flemish woolens: e.g., 38.5 florins (£5.78 sterling) for those from Mechelen and 19.2 florins (£2.84 sterling) for those from Wervik; but Florentine woolens were much longer than those produced in Flanders, by about 30 percent. In Poland, the most popular Italian woolens marketed during the 1390s were certainly again the Florentine. But in Polish markets, the Italian woolens were then far less popular than Flemish and Brabantine broadcloths, and less expensive than the very finest from the Low Countries. Priced in terms of a standardised (and thus shorter) length of 35 ells (24.5 meters), the Florentine woolens sold for 32 florins (£4.81 sterling), while those from Bruges and Brussels sold for 43.75 florins (£6.56 sterling) and 46.67 florins (£7.00 sterling).[72]

During the second half of the fourteenth century, other northern Italian towns were also producing very fine, luxury-quality woolens, if rather less expensive than the Florentine cloths. In Tuscany (and adjacent regions), apart from Florence as the undisputed leader, the other major cloth towns were Prato, Pisa, Lucca, Bologna, and Perugia.[73] In Lombardy, by far the most important producer was Milan (reputedly with 363 drapery firms in the 1390s); but Como, Monza, Cremona, Parma, Bergamo, Brescia, Verona, Padua, Vicenza, Treviso, and Mantua were also important cloth-manufacturing towns.[74]

In Pisan commercial accounts for the years 1354-71, Lombard woolens from Milan and Como, evidently of very high quality, had an average price of 27.55 florins (£4.13 sterling), while Tuscan cloths from Prato, Siena, and Pisa sold for a somewhat lower average price of 20.43 florins (£3.06 sterling). Both

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[70] See also Goldthwaite, *Economy of Renaissance Florence*, Table 4.1, p. 278 (n. 6 above). His estimates differ, however, from those of Hoshino, who contends that in the years from 1373 to 1395, only about 40 to 43 percent of total Florentine cloth production was based on fine English wools (in the San Martino sector – see below, pp. 000), with the remainder, based on non-English wools, in the so-called Garbo sector (see below pp. 000 - 00). How much of the latter was for local markets and how much for exports cannot be determined. See Hoshino, *Arte della Lana*, pp. 153-229 (n. 38 above); Hoshino, "Rise of the Florentine Woollen Industry," pp. 191-204 (n. 38 above).

[71] See also Goldthwaite, *Economy of Renaissance Florence*, p. 272 (n. 6 above), contending that: "Florentine cloth came to enjoy the distinction of being the most luxurious and costly of all," but presumably only in comparison with other Italian or Mediterranean woolens of this era.

[72] For the various textile prices, see Table 3 below; and Munro, "Industrial Transformations," Appendix 4.1, Tables A - D. pp. 143-48 (n. 41) ; Munro, "Medieval Woollens: Struggle for Markets," table 5.10: I - VI, pp. 318-24 (n. 8 above). For cloth dimensions, see n. 17 above, and pp. 00 below.

[73] See also Stephan R. Epstein, *Freedom and Growth: The Rise of States and Markets in Europe, 1300 - 1750*, Routledge Explorations in Economic History no. 17 (London and New York, 2000), pp. 127-36, contending that before the Florentine industry's conversion to luxury cloth production with English wools, in and from the 1320s, the Tuscan cloth industries were "quite unsophisticated compared to the best of the Lombard industries" (pp. 128-29). See the next note.

[74] For the Lombard cloth industry, see *Ibid* , pp. 115-16, 122-27; but this section is chiefly on rural proto-industrialization and domestic markets. See also fig. 6.1 (pp. 112-13), listing 121 cloth-making towns in fifteenth-century Italy (by map), with a large concentration in Lombardy.

the Tuscan and Lombard woolens were, it must be noted, far more expensive than even the very best English broadcloths (except for the very few English scarlets) exported during this era; and the Lombard cloths were also priced higher than all but the very best woolens from the lesser ranking *nouvelles draperies* of fourteenth-century Flanders and Brabant. Despite their high sales prices, the Tuscan and Lombard woolens collectively accounted for over half (57 percent) of the Pisan cloth sales of this era.[75]

In the Datini accounts for cloth sales in Spain from 1394 to 1410, however, only a very few other Italian woolens competed with the overwhelmingly dominant Florentine woolens: just 86 cloths from Prato and Genoa, with a mean value of only 30.78 florins (£4.62 sterling), compared to the sales of 2,652 Florentine woolens, with a mean value of 64.43 florins (£9.67 sterling).[76] All of these textiles sold in these markets would have cost a master mason or carpenter well more than a year's money wage income.[77]

In none of these late fourteenth-century accounts for overseas trade -- whether Spanish, Pisan, Sicilian, Byzantine, Syrian, Egyptian, or Polish -- do we find any evidence for the sale of those very cheap Florentine and Lombard woolen-worsteds and *saia* that had featured so prominently in twelfth- and thirteenth-century Mediterranean markets. Thus, the luxury woolens made from the finest English wools were the mainstay of the Florentine overseas cloth export trade, which, however rested on very insecure foundations during the that plague-infested, war-wracked era of economic contraction commonly known as the late-medieval "Great Depression." [78]

Industrial organization: the *Arte della Lana,* the *lanaiuoli* and the putting-out system of production

The changing fortunes and then the plight of the later-fourteenth century Florentine woolen cloth industry can be better revealed by an examination of its socio-political history, which in turn requires a basic understanding of its organizational structure. As noted earlier, cloth production had come to be governed by the guild known as the *Arte della Lana*, whose predominant governing members were known as *lanaiuoli*. They were mercantile and industrial entrepreneurs in the cloth trade, consisting of family firms or more commonly commercial partnerships; and they organized production under a putting-out (*Verlag*) system of

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[75] From the accounts of the Pisan firm Baldo da Sancasciano et figli, in Federigo Melis, "Uno sguardo al mercato dei panni di lana a Pisa nella seconda metà del trecento," *Economia e storia*, 6:1 (March 1959), pp. 321-65; Tables I, V, VI, X, on pp. 326-7, 342-43, 347, 363-4. For cloth dimensions, see pp. 325-9, nn. 12-15 and p. 353, no. 56. This important study has been reprinted in Federigo Melis, *Industria e commercio nella Toscana medievale*, Istituto Internazionale di Storia Economica 'F. Datini', Prato, Opere sparse di Federigo Melis no. 3 (Florence, 1989), pp. 108-56.

[76] Cloth sales in Barcelona, Valencia, and Majorca by the Datini firm of Prato: in Melis, "Diffusione," Table IV, p. 229 (see n. 52 above). The Florentine woolens were then also about 30 - 40 percent longer than the Flemish Lys valley cloths: 18.875 *canne* (44.035 meters) vs. 13.333 *canne* (31.106 m): 1 *canna* = 4 *braccia* = 2.333 m.; 1 *braccio* = 0.583 m. See Edler, *Glossary of Medieval Terms*, p. 52 (*braccio*), p. 59 (*canna*), indicating that a *canna* was 3 - 4 *braccia* (see n. 21 above). In the sixteenth-century, Florentine woolens were evidently shorter: 15.443 *canne* = 36.012 m. See the sources for Table 13.

[77] Certainly in the late-medieval Low Countries: see John Munro, "Textiles as Articles of Consumption in Flemish Towns, 1330 - 1575," *Bijdragen tot de geschiedenis*, 81:1-3 (1998), pp. 275-88.

[78] For the literature on the Great Depression, see in particular: Robert Lopez and Harry Miskimin, "The Economic Depression of the Renaissance," *Economic History Review*, 2nd ser. 14 (1962), pp. 408-26; Robert Lopez, Harry Miskimin; and Carlo Cipolla, "Economic Depression of the Renaissance: Rejoinder and Reply," *Economic History Review*, 2nd ser., 16 (1964), pp. 519-29; Robert Lopez, Harry Miskimin, and Abraham Udovitch, "England to Egypt, 1350-1400: Long-Term Trends and Long-Distance Trade," in M.A. Cook (ed.), *Studies in the Economic History of the Middle East* (London, 1970), pp. 93-128; Guy Bois, *La grande dépression médiévale: XIVe - XVe siècles: le précédent d'une crise systémique* (Paris, 2000); Ferdinand Seibt and Winifried Eberhard (eds)., *Europa 1400: Die Krise des Spätmittelalters* (Stuttgart, 1984); John Day, "Crises and Trends," pp. 185-224 (see n. 54 above).

production. It is often called (especially in northern Europe) the domestic system of production, since so many manufacturing processes took place within the homes of the artisans, who used their own tools.[79]

The Italian *lanaiuoli* had no exact counterparts in northern Europe, the closest being the thirteenth-century Flemish and Artesian merchant-drapers, and the early-modern Dutch (Leiden) merchant-drapers and English clothiers. Rather different were the late-medieval Flemish and Brabantine weaver-drapers: petty artisan-industrialists, who also functioned as master-weavers, even though employing other weavers to assist them, but who did not control the other key textile artisans -- the fullers, dyers, and shearers. These skilled craftsmen generally enjoyed their own independent guilds, for whom the weaver-drapers and cloth merchants were their fee-paying clients.[80]

In contrast, the late-medieval Italian *lanaiuoli*, even if they were not the great industrial capitalists misleadingly portrayed by Alfred Doren, did exercise far greater economic and social control over the cloth industry and trade than did their Flemish counterparts, in securing the wools and other raw materials, in organizing most of the cloth production, and in arranging for the sales of the finished cloths. In general, they subcontracted the preparatory production processes to various *fattori* or factors who themselves put out the textile inputs to a variety of domestic workers and artisans. Thus, for example, the *lanaiuoli* employed *capodieci*, who were in charge of having the wools sorted and cleansed; the *fattore delle pettine* and the corresponding *fattore di cardo,* who supervised, separately, the putting-out and preparation of the combed and carded wools respectively; the *stamaiuoli* who put out the combed wools (*stame*) to the warp rock-spinners (warps); and the *lanini* who put out the carded wools (*lana*) to the wheel-spinners (wefts). Many of these industrial artisans were rural women, especially the spinners, though some combers and carders were urban and male (in northern Europe, as well). They generally worked, as just indicated, in their own homes, and always for piece-work wages.[81] The *lanaiuoli* also employed, but under their own direct supervision, urban weavers and other textile artisans (who may have worked in *bottega*, if not in their own homes), who also earned piece-work wages, and whose direct subordination to the *lanaiuoli* and the *Arte della Lana*, can be further explained by the fact that this guild was a leader of the seven-member *Arti Maggiori*, which had long dominated the Florentine government.[82]

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[79] For an excellent summary, see Goldthwaite, *Economy of Renaissance Florence*, pp. 296-336 (n. 6 above). See also Franco Franceschi, *Oltre il 'Tumulto': i lavoratori fiorentini dell'Arte della Lana fra Tre e Quattrocento* (Florence, 1993), pp. 33-231; Ammannati, "Datini's Wool Workshops," pp. 493, 498-507, for the Prato cloth industry (n. 23 above); Elder, *Glossary of Medieval Terms*, Appendixes nos. 6-9, pp. 409-426 (n. 21 above).

[80] For industrial organization in the Low Countries' draperies, see John Munro, "Gold, Guilds, and Government: The Impact of Monetary and Labour Policies on the Flemish Cloth Industry, 1390-1435," *Jaarboek voor middeleeuwsche geschiedenis*, 5 (2002), pp. 153 - 205; Munro, "Symbiosis of Towns and Textiles," pp. 1-74 (n. 41 above); Munro, "Medieval Woollens: Technology and Industrial Organization," pp. 217-27 (n. 8 above).

[81] See Ammannati, "Datin's Wool Workshops," p. 493 (n. 23 above): noting that Piero di Giunta del Rosso (in partnership with Datini), in 1390-92, employed 88 carders in his own urban workshops and at least 356 spinners working in their own homes both within Prato and in the *contado*, in villages as far away as Piana, Montalbano, Valdagna, Val di Marina, and the Mugello (see also the map on p. 503, for 1396-99).

[82] For the classic view of medieval industrial capitalism, see Alfred Doren, *Studien aus der Florentiner Wirtschaftsgeschichte*, Vol. I: *Die Florentiner Wollentuchindustrie vom XIV. bis zum XVI. Jahrhundert* (Stuttgart, 1901); Alfred Doren, *Storia economica dell'Italia nel medio evo*, trans. by Gino Luzzatto (Bologna: Fornie Editore, 1965), pp. 462-95. For the modern view, see Edler, *Glossary of Medieval Terms of Business* (n. 21 above); De Roover, "Florentine Firm of Cloth Manufacturers," pp. 85-118 (n. 21 above), concerning the partnership of three merchants, all *lanaiuoli* of the *Arte della Lana*, who formed the firm of Raffaello di Francesco de' Medici & Co, in February 1531. Perhaps enjoying a quasi-independence were the fullers, often rural, either foot-fullers (with vats) or mechanical fullers (using water-powered fulling mills); but by the later-medieval era the *Arte della Lana* came to lease or own fulling-mills.

Labor Strife in the Fourteenth-Century Florentine Cloth Industry: the Revolt of the Ciompi

Some dramatic political events of the fourteenth-century reveal the current powers of the *Arte della Lana.*[83] In 1324 and again in 1338 the *Arte della Lana* forbade any subordinate artisans (*sottoposti*) of the *lanaiuoli*, or their employees, to organize their own guilds on penalty of complete expulsion from the industry, a dreaded fate known as the *divieto*. Subsequently, in 1342, a foreign adventurer, Walter de Brienne, known as the Duke of Athens, gained military control over Florence. Seeking popular support, he exploited the many grievances against the *Arte della Lana* by allowing the cloth-dyers and soap-makers to form their own combined and independent guild, the *Arti di Tintori e Saponai*. But less than a year later, in August 1343, the *Arte Maggiori* deposed Brienne, regained power, and abolished these new guilds. Undeterred, a group of male wool-carders and combers nevertheless continued to agitate for higher wages, and for the right to have their own guild — until the Florentine government hanged their leader, Ciuto Brandini, in May 1345. The government just as ruthlessly crushed the next strike, by cloth-dyers, during the famine of August 1368, when the *Arte della Lana* imposed its dreaded *divieto* on rebellious textile artisans.

Just ten years later Florence and its cloth industry was subjected to the most famous revolutionary strife in later-medieval Italy: the famous Revolt of the Ciompi, known as *Il Tumulto*.[84] The fundamental cause was on ongoing economic depression – widespread in western Europe during the 1370s. It was especially severe for the Florentine cloth industry, producing considerable unemployment. The proximate cause, however, was the current reversal of fortunes in Florence's ruinous War of the Eight Saints against the Papacy. When the Pope placed Florence under a papal interdict, in June 1378, pro-papal Guelfs attacked the pro-war governing Ghibellines, fomenting widespread violence; but they quickly suffered a brusque defeat. Then, in mid-July, a revolutionary mob, composed chiefly of cloth artisans, the so-called Ciompi, did succeed in overthrowing the Ghibelline government, replacing it with a new regime, temporarily led by an artisan named Michele di Lando (whom Gene Brucker describes as a foreman in a cloth factory).[85]

By early August, the new regime also succeeded in creating three new textile guilds, who were then admitted to the communal government in the form of the collective *Arte del Popolo di Dio*: the *Arte dei Tintori* (the dyers guild, which also included master carders and master fullers); the *Arte dei Farsettai* (shirt-

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The *lanaiuoli* paid the fullers piece-work wages, and then a fee to the guild for the use of the mills.

[83] For the following, see: Ferdinand Schevill, *History of Florence: from the Founding of the City through the Renaissance* (New York, 1936), pp. 194-309, 336-53; Marvin Becker, *Florence in Transition*, vol. II: *Studies in the Rise of the Territorial State* (Baltimore, 1968), pp. 93-149; Nicolai Rubinstein (ed.), *Florentine Studies: Politics and Society in Renaissance Florence* (Evanston, 1968); Brian Pullen, *A History of Early Renaissance Italy, from the Mid-Thirteenth to the Mid-Fifteenth Century* (London, 1973), pp. 203-301; John Najemy, *A History of Florence, 1200 - 1575* (Oxford, 2006), pp.124-55.

[84] See sources in n. 83 above; and Eugenio Garin (ed.), *Il Tumulto dei Ciompi: Un momento di storia fiorentina ed Europea* (Florence, 1981), in particular: Victor I. Rutenberg, "I Ciompi nel 1378," pp. 1-12; John M. Najemy, "*Audiant Omnes Artes*: Corporate Origins of the Ciompi Revolution," pp. 59-93, Nicolai Rubinstein, "Il regime politico di Firenze dopo il Tumulto dei Ciompi," pp. 105-24. See also Gene Brucker, "The Ciompi Revolution," in Nicolai Rubinstein (ed.), *Florentine Studies: Politics and Society in Renaissance Florence* (Evanston, 1968), pp. 314-56; Niccolò Rodolico, *Il popolo minuto: note di storia fiorentina (1343-1378)*, new edn (Florence, 1968); Niccolò Rodolico, *I Ciompi: una pagina di storia del proletariato operaio*, new edn (Florence, 1980); Franco Franceshi, "Istituzioni e attività economica a Firenze: considerazioni sul governo del settore industriale (1350 - 1450)," in *Istituzioni e società in Toscana nell'età moderno: Atti delle giornate di studio dedicate a Giuseppi Pansini,* 2 vols. (Rome, 1994), vol. I, pp. 76-117; Franceschi, *Oltre il Tumulto*, esp. pp. 211-31 (n. 79 above); Najemy, *History of Florence*, pp. 156-87 (n. 83 above).

[85] Brucker, "The Ciompi Revolution," p. 354 (n. 84 above).

makers guild, including master shearers); and the *Arte dei Popolo Minuto* (the Ciompi itself, by far the largest, with wool-beaters, and journeymen combers, carders, spinners, weavers and fullers). But soon the leaders of the *Ciompi* overplayed their hand by demanding even greater powers from what had seemed to be their own government. Exasperated by demands deemed to be excessive, the communal government quickly crushed the Ciompi and then abolished the *Arte dei Popolo Minuto*. The other two guilds had wisely sided with the government, to earn a temporary reprieve. But then, four years later, in 1382, another communal crisis led to the restoration of the old regime – i.e., the seven *Arti Maggiori*, including the *Arte della Lana* – which then abruptly abolished these remaining textile guilds.[86]

In the light of this history, both Franco Franceschi and Richard Goldthwaite have put forward the hypothesis that the Florentine cloth industry became even more decentralized after the Revolt of the Ciompi, so that it came more and more to resemble the classic late-medieval model of the European putting-out system. In their view, after the *lanaiuloi* had experienced the bitter consequences of having large numbers of discontented wage-earning artisans congregated together in large workshops, the *lanaiulo* sought to have their cloth production undertaken in highly dispersed production units: i.e., in the homes of the artisans themselves, scattered in both town and countryside. In particular, the wool-preparation, combing, carding, and spinning task were increasingly put out in the adjacent countryside to peasant women, who were also far more willing to work for lower wages.[87]

Thus ended the final challenge to the authority of the *lanaiuoli* and the *Arte della Lana*, who, however, proved unable to prevent the Florentine cloth industry's continuing and irredeemable decline.

The volume of Florentine cloth production in the fourteenth century

The extent of that decline may now, with recent evidence, be much better estimated, thought not yet with full certainty. The most famous contemporary account of Florence's cloth production in the first half of the fourteenth century, and one that in certain respects accords well with this thesis of radical industrial reorientation in that era, is that presented by the Florentine chronicler Giovanni Villani (d. 1348, in the Black Death). He contended that Florentine cloth production had fallen from about 100,000 pieces around 1310 to about 75,000 in the years 1336-38.[88] Villani's estimate of the latter output's value, at 1.2 million gold florins, and thus with a mean value of 16 gold florins per cloth, was nevertheless still much higher than the value for the much larger output of 1310, "when English wools were not imported," because those earlier cloths "were coarser and worth only half as much."[89] Partly relying on Villani's data and other contemporary evidence, Prof. John Najemy has recently contended that in the early fourteenth century the Arte della Lana were employing about 10,000 artisans: i.e., about one sixth of Florence's adult population; and that proportion would have been increased by adding the *lanaiuloi* entrepreneurs, their office staff, and merchants

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[86] See the sources in cited in nn. 83-84.

[87] Franco Franceschi, "L'imposa mercantile industriale nella Toscana dei secoli XIV-XVI," *Annali di storia dell'impresa*, 14 (2003), pp. 229-49, cited in Goldthwaite, *Economy of Renaissance Florence*, pp. 320-21 (n. 6 above) ; and also Franceschi, *Oltre il Tumulto*, pp. 211-37 (n. 79 above).

[88] Giovanni Villani, *Nouva Cronica*, ed. Giuseppe Porta, 3 vols. (Parma: Pietro Bembo/Ugo Guanda, 1991; 2nd edn. 2007), Vol. III: *Libri XII - XIII,* libro XII, cap. XCIV, pp. 197-202, esp. p. 199: "Le botteghe dell'arte della lana erano CC et più, e faceano da LXX^{m} in LXXX^{m} di panni, di valuta di più du MCC migliaia di fiorini d'oro." Thus 75,000 *panni* is the mean of his two estimates for 1336-38. But earlier, ca. 1310: "Ben trovamo che da XXX anni adietro erano CCC bottegha or circa, e faceano per anno più di C^{m} panni; ma erano più grossi della metà valuta, però ch'allora non ci venia né sapeano lavorare lana d'Inghilterra, com'janno fatto poi." See also Giuseppe Sansone and Giulio Curà (eds.), *Giovanni Villani: La "Nouva Cronica"* (Rome, 2002), Libro XII, cap. XCIV, pp. 863-55.

[89] See Hoshino, *Arte della Lana*, chapter 4, pp. 153-211, especially pp. 194-200 (n. 38 above).

in the cloth trade.[90]

Villani's statement of the number of *bottegha* or textile firms producing those higher-valued bolts of cloth in 1338 – about 200 – would indicate an average annual output from each firm of about 375 bolts.[91] That is almost triple the estimated mean annual output of each Florentine *bottegha* in the years 1355 to 1374: 122 bolts. In the next decade, admittedly one of industrial depression, the mean had fallen to just 68.2 pieces, less than 20 percent of the estimated output per firm in 1338.[92] These differences are open to several interpretations: either Villani had exaggerated both total and average outputs for the 1330s; or more and more of the *lanaiuloi* cloth firms came to concentrate on producing fewer but far higher valued woolens. At the same time, the number of surviving firms in the *Arte della Lana* may not have contracted in proportion to declining market demand, so that each had to accept a smaller and smaller output each year. Hoshino seems to support the former view more than the latter, contending – though not convincingly – that Villani had greatly exaggerated cloth outputs for the 1330s.[93]

Whatever was the true output of the Florentine cloth industry in the 1330s, subsequently the Florentine cloth industry indisputably experienced a very dramatic and rapid decline, especially – as would be fully expected – after the Black Death of 1348. By 1373, according to almost all historians, the output of the Florentine cloth industry was no more than 30,000 *panni* or "bolts" of standard measure (36 meters): i.e., only 40 percent of Villani's estimate for 1338.[94] When the Ciompi staged their revolt in 1378, they had demanded a guaranteed annual production of 24,000 bolts and we may safely assume that the annual production was then well less than that figure. Indeed, according to Davidsohn, Hoshino, and Franceschi, Florence's annual production had fallen to about 19,000 bolts in 1382, when the counter-revolution against the Ciompi took place.[95] By the 1390s, according to several historians – Hoshino, Franceschi, and Goldthwaite – Florence's woolen cloth output had fallen to about 13,000 bolts a year (see Table 14).[96]

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[90] Najemy, *History of Florence*, pp. 102-03 (n. 83 above). He estimates that in 1300 the total population of Florence was about 120,000 – an estimate higher than that given by most other historians.

[91] See the texts cited in n. 88 above.

[92] Franceschi, *Oltre il Tumulto* (n. 79 above): (1), for 1355-74, p. 8: 402 firms producing an annual mean output of 49,044 *panni* and thus a mean of 122 *panni* per *bottegha* or *azienda*, but a mean output per firm rising to 135 *panni* in 1355-57 and to 140 *panni* in 1368-70; (2) for 1381-82, p. 7: 283 *botteghe* producing an annual mean output of 19,296 *panni* and thus a mean of 68.2 *panni* per *botteghe*.

[93] Hoshino, *Arte della Lana*, pp. 194-200 (n. 38 above). Villani contended (n. 88 above) that annual cloth outputs could not have exceeded 24,000 to 30,000 woolens in the 1330s: with a production of about 80 to 100 cloths a year from about 300 *bottega*. That estimate, however, is too close to the accepted data on annual cloth outputs for the years from 1373 to 1381. Thus his figures most improbably suggest that Florence had been able to maintain its general level of cloth production over these five tumultuous decades, despite having suffered drastic depopulation from plagues (and other causes), and severely contracted Mediterranean markets.

[94] See nn. 23, 45, 66, 76 above an n. 214 below for the *braccio* unit of cloth measurement.

[95] See Hoshino, *L'Arte della Lana* (n. 38 above), Table XXVI, p. 227: providing a total of 19,296 pieces; Robert Davidsohn, "Blüte und Niedergang der Florentiner Tuchindustrie," *Zeitschrift für die gesamte Staatswissenschaft*, 85 (1928), p. 250 (stating: 19,474 pieces in 1381-82); see also Franceschi, *Oltre il Tumulto* (n. 79), Table 2, p. 13, also stating 19,296 pieces for 1381-82.

[96] See Hoshino, *Arte della Lana*, chapter 4, pp. 194-200 (n. 38 above); Franceschi, *Oltre il Tumulto*, Table 2, p. 13 (n. 79 above); Goldthwaite, *Economy of Renaissance Florence*, p. 278, Table 4.1 (n. 6 above). For the years 1391-95, the mean output is 13,358 bolts (for Franceschi's data). For the length of the cloth bolt, and the *braccio* see n. 94 above; the width is unknown. See Table 14 below.

Macro-economic factors to explain the decline of the Florentine cloth industry:

- *demographic factors in late-medieval Europe*

There are at least three reasons to explain why such a drastic decline in output had been virtually inevitable for the Florentine cloth industry, even apart from the recent tumultuous labor disruptions (which were more consequences than primary causes): demographic factors, market changes (luxury re-orientation), and changes in the wool supply. First and foremost was the precipitous drop in Florence's population, which evidently began before the Black Death (1348). In 1300, according to the most recent estimate, by Najemy, the city of Florence itself (apart from its rural *contado*) then had about 120,000 in inhabitants, but only about 90,000 in 1338 (according to other historians).[97] The Black Death itself may have destroyed 60 percent of Florence's urban population; and tax records for 1352 indicate only 40,000 to 45,000 inhabitants.[98] Subsequently, by about 1380, Florence evidently experienced some demographic recovery, for a tax-based census in that year lists 54,747 inhabitants.[99] But further waves of plague – in 1400, 1417, and 1424 - reduced that population to a nadir of 37,225 in 1427, as recorded in that year's well-known *Catasto* (tax census): only 41.4 percent of Florence's estimated population in 1338 (90,000).[100] In neighbouring Prato, also an important Tuscan textile-making town, the urban population had similarly fallen from 14,996 in 1305 to 10,559 in 1339, and then to 6,070 in 1357, finally reaching a nadir in 1427, as well, with just 3,533 inhabitants (an overall decline of 76.44 percent).[101]

Certainly no technological innovations, for an essentially labor-intensive cloth industry, could have then possibly compensated for such a drastic reduction in the labor supply (even if some textile processes took place in the *contado*).[102]. Similarly, a disastrous decline in Western Europe's population in general – again about forty percent by the late fourteenth century – and disruptions of traditional trade routes and markets obviously meant a serious decline in aggregate cloth sales. To some extent, however, that decline was offset by their success in displacing Flemish, Brabantine, and northern French woolens in Mediterranean markets.

- *relative price changes with luxury re-orientation of production*

The second reason to explain that dramatic decline in cloth outputs is the previously discussed market re-orientation towards luxury goods and the consequent rises in Florentine woolen cloth prices. We have already observed the sharp rise in the gold-florin values of Florentine and other Italian woolen cloths from

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[97] Najamey, *History of Florence*, p. 97 (n. 83 above); Goldthwaite, *Economy of Renaissance Florence*, Table 4.1, p. 278 (n. 6 above). For a similar decline in the population of Prato, Pistoia, and other parts of Tuscany, before and after the Black Death, see the sources cited in n. 54 above (especially those by Herlihy and Klapisch-Zuber).

[98] Najemy, *History of Florence*, p. 100 (n. 83 above), citing Matteo Villani on the demographic impact of the Black Death. The 1352 tax rolls records 9,955 households (with a household multiplier of about 4.5).

[99] *Ibid.*: 13,074 households, with an estimated multiplier of 4.19.

[100] Goldthwaite, *Economy of Renaissance Florence*, Table 4.1, p. 278 (n. 6 above). Najemy, *History of Florence*, pp. 96-100 (n. 83 above).

[101] Herlihy and Klapisch-Zuber, *Tuscans and Their Families*, fig. 3.1, p. 62, and Table 3.1, p. 63 (see n. 54 above). The population of the countryside around Pistoia declined from an estimated 23,964 in 1344 to 11,772 in 1427 (also according to the *Catasto*). See Herlihy, *Pistoia,* Table 1, p. 70 (n. 54 above).

[102] For rural textile production, in combing, carding, and spinning, see below, pp. 000; and Munro, "Medieval Woollens: Technology," pp. 191-204 (n. 8 above); Munro, "Textile Technology," pp. 693-711 (n. 8 above).

the about the mid fourteenth century. If we accept Villani's estimate of the mean value for such cloths in the late 1330s (16 florins), then we find that by the 1390s about a tripling of cloth prices, and in *real* terms. According to Goldthwaite's estimates (based on many sources), the mean value of the finer woolens woven from English wools was then 50 gold florins.[103] If we also accept standard microeconomic theory, with the law of supply and demand – i.e., that demand varies inversely with the price – then we must also assume that aggregate sales had fallen even more, indeed quite substantially, since presumably (according to the micro-economics of monopolistic competition) demand become much less elastic at higher prices.[104] At the same time, however, if western Europe did experience a more highly skewed distribution of wealth and income in the second half of the fourteenth century, as several historians have contended, then such income-directed market changes may have helped sustain sales of these luxury woolens. That may also help explain the general reorientation of West European textile production towards very high value fabrics.[105] That industrial and commercial re-orientation also includes, of course, the rise and expansion of the late-medieval Italian silk industry, which posed perhaps the most ominous threat to the luxury woolen textile industries.[106]

The wool supplies for the Florentine and other Italian cloth industries during the fourteenth and early fifteenth centuries: I, English wools and export taxes

The third and related factor to be considered in understanding the steep decline in Florentine luxury cloth production during the later fourteenth century concerns the industry's wool supplies. As already stressed, that luxury cloth production vitally depended on the use of the finer English wools – those from the Welsh Marches, the Cotswolds, and Lincolnshire, still unrivalled in quality. In that dependence, the Florentine and other Italian luxury-oriented cloth industries were literally hostages to fortune, as were those of the Low Countries, all of which soon fell victim to English fiscal policies that made those wools and thus the cloths woven from them increasingly and almost prohibitively expensive.

In providing England's overwhelmingly predominant and most lucrative export, the well organised

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[103] Goldthwaite, *Economy of Renaissance Florence*, Table 4.1, p. 278 (see n. 6 above): woolens known *San Martino* cloths (see below, pp. 000). He cites principally Franceschi, *Oltre il Tulmolto*, p. 13 (n. 79 above).

[104] See John Munro, "Urban Regulation and Monopolistic Competition in the Textile Industries of the Late-Medieval Low Countries," in Erik Aerts and John Munro (eds.), *Textiles of the Low Countries in European Economic History,* Studies in Social and Economic History, Vol. 19 (Leuven, 1990), pp. 41 - 52; Munro, "Symbiosis of Towns and Textiles," pp. 1-74 (n. 41 above).

[105] See in particular, Robert Lopez, "Hard Times and Investment in Culture," in K.H. Dannenfeldt (ed.), *The Renaissance: Medieval or Modern?* (New York, 1959), pp. 50-63; Lopez and Miskimin, "Economic Depression," pp. 408-26 (n. 78 above); Harry Miskimin, *The Economy of Early Renaissance Europe, 1300-1460* (Cambridge, 1976), pp. 116-63; Herman Van der Wee and Theo Peeters, "Un modèle dynamique de croissance interseculaire du commerce mondiale, XIIe-XVIIIe siècles," *Annales: Économies, sociétés, civilisations*, 15 (1970), pp. 100-28.

[106] For the silk industry, see Goldthwaite, *Economy of Renaissance Florence*, pp. 282-96, 336-40 (n. 6 above); Anna Muthesius, "Silk in the Medieval World," in David Jenkins (ed.), *The Cambridge History of Western Textiles*, 2 vols. (Cambridge, 2003), vol. I, pp. 325-54; Edoardo Demo, "Wool and Silk: The Textile Urban Industry of the Venetian Mainland (15th - 17th Centuries)," in Paola Lanaro (ed.), *At the Centre of the Old World: Trade and Manufacturing in Venice and the Venetian Mainland, 1400- 1800*, Essays and Studies no. 9, Centre for Reformation and Renaissance Studies (Toronto 2006), pp. 217-43; and especially Bruno Dini, "L'industria serica in Italia, secc. XIII - XV," in Simonetta Cavaciocchi (ed.), *La seta in Europa, secc. XIII - XX,* Atti delle 'Settimane di Studi' e altrie Convegni, Istituto Internazionale di Storia Economica, F. Datini, vol. 24 (Florence, 1993), pp. 91-123; republished in Bruno Dini, *Saggi su an economia-mondo: Firenze e l'Italia fra Mediterraneo ed Europa (secc. XIII-XVI*) (Pisa, 1995), pp. 51-85; Luca Molà, *The Silk Industry of Renaissance Venice* (Baltimore, 2000); Luca Molà, Reinhold Mueller, and Claudio Zaniers (eds.), *La seta in Italia dal Medioevo al Seicento: dal baco al drappo* (Venice, 2000).

wool-export trade was by far the most important object of that fiscal policy, especially after the onset of the Hundred Years War (1337-1453). When export taxes on wool had first commenced under King Edward I, in 1275, they were quite modest: at 6s 8d sterling per sack, just 4.91 percent of the average value exported. But when his grandson Edward III commenced the Hundred Years' War (1337-1453), he sought to finance his conquest of France with sharp increases in wool export duties. They rose from 26s 8d per sack for denizen exports and 30s 0d per sack for alien (i.e., Italian) exports in 1337 to 50s 0d per sack for denizens and 53s 4d per sack for aliens in 1370. In 1399, the alien duty was raised again to 60s 0d (£3 sterling) per sack.

That export-tax policy would never have succeeded, politically, unless the English crown could ensure that this tax burden was fully passed on to foreign wool-buyers, in higher prices, rather than allowing it to be passed back to English wool-growers (chiefly aristocrats) in lower prices. In 1363, to achieve this goal, Edward III established the recently-conquered French port of Calais as the sole wool-export staple to northern Europe. At the same time, he also allowed the new Company of the Staple to function as a cartel of wool merchants in order to fix wool-export prices. From 1388, by parliamentary statute, Italian merchants were given an exemption: they were permitted to avoid the Calais Staple by shipping English wools directly from Southampton (and only from that port) via the "Straits of Marrock" (Gibraltar) to Mediterranean ports, but only by paying the substantially higher alien export duty.[107]

Because these wool-export duties were fixed (*specific*) rather than *ad valorem*, the real tax burden rose with the general deflation, and the fall in nominal wool prices, during the later fourteenth century. As a consequence, by 1400, the denizen export tax amounted to 49.25 percent of the mean value of exported wools, while the alien export tax burden was obviously higher, at 59.10 percent of that mean value.[108] The impact of that tax burden can be seen in Flemish documentary evidence, from the 1430s: that England's Calais Staple wools accounted for 65 to 70 percent of their pre-finishing production costs.[109]

Certainly that rising tax burden contributed to the very sharp decline in aggregate wool exports. From the decade 1361-70 to 1401-10, total English wool exports fell from an annual mean of 28,290.50 sacks to one of just 13,936.20 sacks – a fall of 51 percent, one greater than any estimate of the aggregate European population decline in this era (Table 4). Because of the growing differential between denizen and alien export taxes, the decline in alien (Italian) wool exports was even more precipitous: from an annual mean of 9,667.73 sacks in 1361-70 to one of just 1,338.10 sacks in 1401-10. That can be expressed more dramatically by calculating that the Italian share of English wool exports fell from 34.17 percent of the total in 1361-70 to just a mere 9.60 percent in 1401-10.[110] Consequently, unless the Florentine *Arte della Lana* had succeeded in finding a suitable substitute form of wool for weaving its luxury-quality woolens, its export-oriented,

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[107] Great Britain, Record Commission (T.E. Tomlins, J. Raithby, et. al, eds.), *The Statutes of the Realm*, 6 vols. (London, 1810-22), vol. II, p. 8: statute 2 Ric. c. 3 (of 1378). See also John Munro, *Wool, Cloth and Gold: The Struggle for Bullion in Anglo-Burgundian Trade, ca. 1340-1478* (Brussels and Toronto, 1973), pp. 38-29; Lloyd, *English Wool Trade,* pp. 225-256 (see n. 62 above).

[108] See Munro, "Medieval Woollens: Struggle for Markets," pp. 278-85, Table 5.1-2, pp. 299-303 (see n. 8 above); Lloyd, *English Wool Trade*, pp. 144-256 (n. 62 above), for a detailed history of the wool export taxes.

[109] John Munro, "Industrial Protectionism in Medieval Flanders: Urban or National?", in David Herlihy, H.A. Miskimin, and A. Udovitch (eds.), *The Medieval City* (London and New Haven, 1977), Table 13.2, p. 256 (Leuven in 1434 and 1442: 76.2% and 68.8%); Munro, "Medieval Scarlet," Table 3.1221, p. 52 (see n. 48 above). In view of the higher wool-export taxes and the much higher transportation costs involved in shipping English wools to Italy, such wools may have accounted for an even higher proportion of production costs in the Italian cloth industries; but the evidence for cloth production from English wools at Prato in the 1390s does not substantiate that conclusion. See n. 146 below.

[110] For the statistical data, see Munro, "Medieval Woollens: Struggle for Markets," Tables 5.3-5.4, pp. 304-07 (see n. 8 above).

luxury-cloth production must have declined very substantially, though production from domestic wools for local markets presumably did not decline as much.[111]

By the early fifteenth century, the worst phase of decline in Florence's *Arte della Lana* cloth outputs had probably come to an end. According to Hoshino's estimates, production was oscillating between 11,000 and 12,000 cloths annually in the years 1425-30 – i.e., about 42 percent below the level of the 1380s, during the Ciompi Revolt.[112] More recently, however, Franco Franceschi and Patrick Chorley have contended that output was even lower: about 9,000 - 10,000 cloths (just about half the output of the 1380s).[113]

Quite obviously that combination of soaring prices for English wools and the continual diminution in the Italian share of the English wool export trade – with the invidious differences between denizen and alien export duties – had forced the Florentine and other Italian cloth industries to find alternative sources of wool, even though there were still no other wools as fine as the best English wools, and there would not be until the sixteenth century.[114]

The wool supplies for the Florentine and other Italian cloth industries during the fourteenth and early fifteenth centuries: II: Spanish *merino,* Italian *matricina,* and other Mediterranean wools

Well before the dark years of the 1420s, the Florentine woolen cloth industry had come to be divided into two sectors. The first was the older: the *San Martino* branch, which continued to manufacture very costly, ultra-luxury quality woolens and exclusively from the very finest English wools– a requirement reiterated in an ordinance of the *Arte della Lana* of 1408.[115] The other was known as the *Garbo* branch, which produced medium or lower quality and thus lower priced woolens, essentially because the Mediterranean wools that they contained were so much cheaper. Goldthwaite estimates that in the mid-1420s, the current annual output of about 11,000 - 12,000 bolts of cloth (see above) was worth 437,662 florins (£1,750,648 *lira di piccioli)*: of which 37 percent (161,935 florins) was produced by the *San Martino* sector, with an average value of 54.75 florins (= £229 *lira di piccioli*); and the remaining 63 percent (275,727 florins) was produced by the larger *Garbo* sector, with an average value of 31.00 florins (=£126). By these calculations, we may estimate that annual output from the *San Martino* sector was about 2,958 bolts; and that

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[111] For the decline of the English wool trade from the later fourteenth century, see Lloyd, *English Wool Trade*, pp. 257-87 (see n. 62 above).

[112] Hoshino, *L'Arte della Lana*, pp. 204-05 (see n. 38 above). This output, with a value estimated at 350,000 to 400,000 florins (an average value ranging from 33.33 to 36.36 florins) is also cited in Dini, "L'Industria re tessile," p. 326 (see n. 6 above). See also Goldthwaite, *Economy of Renaissance Florence* (n. 6 above), p. 278, Table 4.1, indicating 11,000 bolts in 1425-30, presumably worth a total of 437,662 florins.

[113] Franceschi, *Oltre il Tumulto,* Table 2, p. 13 (see n. 79 above): from 9,000 to 10,400 pieces in 1427, and from 9,130 to 10,967 pieces in 1430, but only 8,333 pieces in 1437. See also Patrick Chorley, "*Rascie* and the Florentine Cloth Industry during the Sixteenth Century," *The Journal of European Economic History*, 32:3 (Winter 2003), pp. 487-526 (esp. p. 488).

[114] See Epstein, *Freedom and Growth*, pp. 136-37 (n. 73 above): while also attributing the Florentine industrial decline – a decline of two-thirds from 1373 to 1437 (with a decline in quality as well) – to these difficulties with the English wool supplies, he also contends that Florence's wars with Visconti Milan played some role, especially in disrupting trade routes into Tuscany. At the same time, as he notes, the Florentine conquest of Pisa in 1406 led to the collapse of the latter's cloth industry.

[115] Hoshino, *L'Arte della Lana*, p. 208 (n. 38 above); Franceschi, *Oltre il Tumulto*, p. 22 (n. 79 above). The name *San Martino* comes from the convent of that name, situated between the Duomo (cathedral) and the Palazzo Vecchio, where most of the cloth production using English wools took place. See also Goldthwaite, *Economy of Early Renaissance Florence*, p. 273 (n. 6 above).

of the *Garbo* sector was about 8,894 bolts (for a total of 11,852 bolts).[116]

The crucial difference between the two sectors was the source of their wools. The *Garbo* branch was forbidden to use any English wools, while the *San Martino* branch was, in turn (as just noted), forbidden to use any wools except the finer English varieties. The reason was two-fold. Evidently the *Arte della Lana* feared that the international reputation of its fine San Martino woolens would be seriously at risk if consumers (especially foreign buyers) even suspected that their composition was adulterated by the use of any non-English wools. At the same time, Arte della Lana was determined to prevent the *Garbo* sector from using the now scarce supplies of English wool in order to protect the ever more scarce and more costly wool supply for the *San Martino* sector. Indeed, in 1407, for the same protectionist motives, the *Arte della Lana* (and the Florentine government) prohibited, on the pain of heavy fines, all rural cloth producers in the neighbouring *contado* from using any but the worst quality local Tuscan wools, a ban reiterated in the formal *Arte della Lana* guild ordinances in 1428 and 1430.[117]

According to these guild ordinances , the Garbo wools consisted of those from Majorca and Minorca (the Spanish Balearic Islands), Provence, some domestic Italian wools known as *lana matricina*, and, as the most recent, the *San Matteo* or Castilian-Spanish *merino* wools.

- *Spanish merino wools*

Contrary to many misconceptions in the current literature, Spanish *merino* wools were not used anywhere outside of Spain before the later fourteenth century. Indeed, the evidence indicates that *merino* wools were the relatively recent product of cross-breeds of domestic Castilian sheep (ewes) with imported rams from Merinid realms of North Africa, whose introduction probably occurred soon after, but not before, the Spanish victory over the Merinids at the Battle of Rio Salado, in 1340, which ended forever the threat of Muslim reconquest.[118] Since the pre-*merino* Spanish wools had been regarded as amongst the very worst in Europe, so that their use was forbidden even in the cheaper-line cloth industries, and since North African wools were then mediocre in quality, their evolution to become, by the late sixteenth, early seventeenth century the finest wools in the world – a primacy in quality they retain to this very day – remains a mystery. Possibly it may be explained by the union of two recessive genes from the two sheep breeds. That evolution was also dependent on devising the proper techniques of cross-breeding and also of the famed *transhumance* sheep grazing and flock management, all very important considerations.[119]

Inferior though the early *merino* wools may have been, even decades after slow improvements in Castilian flock management, some Italian cloth industries were experimenting with them in the later fourteenth century: in general from the 1370s to the 1390s, about thirty years before their first real acceptance

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[116] Goldthwaite, *Economy of Renaissance Florence*, Table 4.1, p.278 (n . 6 above). The florin in the 1420s was worth £4.00 *lira di piccioli*. In comparison, cloth production in 1373 is estimated (as noted above) at 30,000 bolts, worth about 1,050,000 florins = £3,570,000 *lira di piccioli* (the florin, at £3.40), of which about 40 percent were *San Martino* woolens, worth on average 50 florins, and thus 60 percent were *Garbo* woolens, worth on average 25 florins. Thus Goldthwaite's estimated output from the *San Martino* sector was 8,400 cloths, and from the *Garbo* sector, 25,200 bolts; but that total comes to 33,600 bolts.

[117] See Epstein, *Freedom and Growth*, pp. 136-37 (n. 73 above): for the Arte della Lana guild ordinances, citing in particular Franco Franceshi, "Criminalità e mondo del lavoro: il tribunale dell'Arte della lana a Firenze nei secoli XIVe XV," *Ricerche storiche*, 18 (1988), pp. 551-90, esp. p. 586. See also Franceschi, "Istituzioni e attività economica," pp. 76-117, esp. pp. 94-97, 108-13 (n. 84 above).

[118] See Robert Lopez, "The Origin of the Merino Sheep," *The Joshua Starr Memorial Volume: Studies in History and Philology* (*Jewish Social Studies* no. 5, New York, 1953), pp. 161-68.

[119] Munro, "Spanish *Merino* Wools," pp. 431-84 (n. 9 above). See also the sources cited in n. 135 below.

in the southern Low Countries.[120] In Italy, these wools were most commonly known as *lane di San Matteo*, a name derived from the Spanish market of San Matteo (St. Matthew), in the Maestrazgo region of northern Valencia and neighbouring Aragon, where Italian merchants acquired most of these wools.[121] During those years, these Spanish *San Matteo* wools originally ranked fourth or even fifth in value, after English, Minorcan, Majorcan, and French (Provençal) wools, in the cloth industries of Milan, Florence, Verona, Prato, and Genoa. [122] In Florence and Prato, in 1396-98, the prices of the best Spanish wools, at 14.50 florins per 100 lb of wool, were just 41.22 percent of the price for Cotswolds wools, at 35.17 florins per 100 lb. weight. In another Prato price schedule for the 1390s, similarly valued Spanish wools, at £21 0s 06 *affiorino*, were also worth 41 percent of the value of the English wools listed here. At Genoa, in March 1395, Spanish wools cost 10 *lire* per *cantaro,* compared to 26-30 *lire* for English wools (including Cotswolds, at 26 to 28 *lire)* per *contaro*, i.e., even less, at 33.00 to 38.46 percent of the English values.[123] Subsequently, during the course of the fifteenth century, the quality of many of the *merino* wools came to be much improved, often ranking second after English wools (with a curious exception in the 1460s). Thus Spanish *merino* wools also gained an increasingly important role in the production of the Garbo woolens, which were evidently even more important for the cloth industries of the other Tuscan and the Lombard towns, from the later fourteenth or early fifteenth centuries.

A more exact appraisal of the use of the various wools, including especially Spanish wools, in the important Tuscan cloth making town of Prato can be gleaned from the wealth of the Datini Archives housed in Prato, especially thanks to the late Federigo Melis. The documents of particular importance, more recently analysed by Francesco Ammannati, concern the woolen workshops of Angolo di Niccolo, which were financed by Franceso di Marco Datini, in the later 1390s. Of the various wools that this firm used to make good quality woolens, the *San Matteo* (*merino)* wools ranked first in importance, accounting for 29.14 percent of the total weight of wools used (13,013 lb = 4,411.41 kg.); the next most important were wools from Majorca, Minorca, and the Romagnola (the area between the Arno river and the Appenines, in Tuscany): accounting for 18.58, 18.10, and 18.53 percent of the total weight of wools used, respectively; following them were English wools (unspecified), accounting for 8.84 percent of the total; and trailing them were wools of Provence and the Barbary Coast of North Africa, accounting for 4.78 and 2.01 percent, respectively (Table

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[120] The Milan cloth industry was possibly the first to use merino wools: around 1375. For the southern Low Countries, see Munro, "Spanish *Merino* Wools," pp. 431-84 (n. 9 above).

[121] See Angela Orlandi, "A Man from Prato in the Maestrazgo: Tuccio di Gennaio, Wool Merchant," in Giampiero Nigro (ed.), *Francesco di Marco Datini: The Man and the Merchant*, Fondazione Istituto Internazionale di Storia Economic "F. Datini" (Florence, 2010), pp. 377-84. The Catalonian branch of Prato's Datini firm was one of the major Italian buyers in the 1390s; and the wools came from the region bordered by Madrid, Zaragoza, Valencia, and Tortosa.

[122] Note that Minorca and Majorca (Mallorca) – major parts of the Balearic Islands – were Spanish (part of the kingdom of Aragon from the conquest of James I in 1229). See the following notes for relative wool values.

[123] For the various price lists, see: Federigo Melis, "La lana della Spagna mediterranea e della Barberia occidentale," in Marco Spallanzani (ed.), *La lana come materia prima: I fenomeni della sua produzione e circolazione nei secoli XIII-XVII*, Instituto internazionale di storia economica, Prato, Serie II (Florence, 1974), pp. 241-51; Federigo Melis, *Aspetti della vita economica medievale: studi nell'archivo Datini di Prato,* Vol. I (Florence, 1962), doc. no. 350 (Aug. 1390), p. 488; and pp. 536-37, 542, and table facing p. 554; Jacques Heers, "Il commercio nel Mediteraneo alla fine del XIV secolo e nei primi anni del secolo XV," *Archivo storico italiano*, 113 (1955), pp. 192-95; Caterina Santoro, *Gli offici del comune dei Milano de del dominio visconteo-sforzesco (1216-1515),* Archivio della Fondazione italiana per la storia amminstratitiva, vol. 7 (Milan, 1968), doc. no. 10, p. 179 (1375); Egidio Rossini and Maureen Mazzaoui, "Società e tecnica nel medioevo: La produzione dei panni di lana a Verona nei secoli XIII-XIV-XV," *Atti e memorie della Accademia di Agricoltura*, *Scienze e Lettere di Verona*, 6th ser., 21 (1969-70), pp. 571-624; Iris Origo, *The Merchant of Prato: Francesco di Marco Datini* (London, 1957; reissued 1963), pp. 69-70, 74-76.

5).[124] Because some of these wools or the spun yarns were mixed in the weaving processes, the allocation of these wools is slightly different in terms of the finished products. For such cloth production, the wools specified in this list accounted for the following percentages of total outputs: San Matteo wools, for 20.75 percent; Minorcan wools, for 18.62 percent; Majorcan wools, for 13.57 percent; Romagnola and Barbary wools (together), for 8.38 percent each of wide and narrow cloths; and English wools, for 6.89 percent; and mixed wools for the remaining 19.67 percent.

- *Italian matricina wools*

Despite the undisputed importance that Spanish *merino* wools came to achieve in the woolen cloth industries of Italy from the later fourteenth century, and those of the Low Countries from the 1420s, their importance in the Florentine cloth industry was evidently displaced by domestic Italian wools from about or just before the mid-century. The reasons not yet fully clear, but they may have involved current difficulties in acquiring Spanish wools.[125] Indeed, Stephan Epstein has contended that the "interruption of Spanish wool supplies after mid-century [the fifteenth]" was a major factor in the crisis of the Milanese woolen industry ("Lombardy's most oft quoted example of late-medieval industrial decline").[126] According to Hidetoshi Hoshino's archival research for the period 1454-1480, domestic Italian wools had indeed gained the ascendancy in this period. Known as *matricina* wools, they came from chiefly the Abruzzi region: L'Aquila, Narni, Orvieto, Perugia, Terni e Viterbo. They accounted for 71.8 percent of the wool purchases of "numerous firms of the Florentine *lanaiuoli*" producing *panni di Garbo*. The Spanish wools, though still important, now came a distant second, accounting for 13.9 percent of wool purchases; and Provençal wools ranked third, with 12.3 percent of purchases.[127] Evidence for the Florentine Ridolfi cloth firm, in the years 1464-68, indicate that they also used primarily *matricina* wools.[128] The same was true for the Florentine Guanti cloth-making firm, in producing *Garbo* woolens for export to the Ottoman Levant in the mid 1480s.[129]

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[124] Ammannati, "Datini's Wool Workshops," pp. 489-514: esp. Table 1, p. 500 (n. 23 above), in part summarizing the data in Federigo Melis, "La formazione dei costi nell'industria laniera alla fine del trecento," *Economia e storia*, 1 (1954), pp. 31-60, 150-90; reprinted in: Federigo Melis, *Industria e commercio nella toscana medievale*, ed. by Bruno Dini, Istituto Internazionale di Storia Economica "F. Datini", Prato, *Opera sparse di Federigo Melis*, vol. 3 (Florence, 1989), pp. 212-307; and Melis, *Aspetti della vita economica,* pp. 455-729 (n. 123 above). The local Tuscan pound weighed 339.542 grams.

[125] See Goldthwaite, *Economy of Renaissance Florence*, p. 273 (n. 6 above): noting that from the late fourteenth century, "the Garbo branch too faced increasing problems of supply from its sources in Catalonia and southern France:" problems attributed to military hostilities in the western Mediterranean, "extending through the 1420s." But Goldthwaite admits that this explanation does not accord with other evidence for " the intensification of regional trade in this area precisely at this time." See also Hoshino, *Arte della Lana*, pp. 210-11; 233-36 (n. 38 above).

[126] Epstein, *Freedom and Growth*, p. 127 (see n. 73 above): "competition from regional proto-industries" is cited as another factor. He also contends that Milan's shift to the "high growth" silk industry more than compensated for the decline of the woolen cloth industry. Neither Epstein nor Hoshino explains this interruption in Spanish wool supplies, which is certainly not evident in Flanders during this era. See Munro, "Spanish Merino Wools," pp. 431-84 (n. 9 above).

[127] Hoshino, *L'Arte della Lana*, pp. 210-11; 233-36; p. 279, and Table LVIII, p. 302 (n. 38 above). See also Benigo Casale, "The Wool Trade in L'Aquila during the Second Half of the Fifteenth Century," in Giovanni Luigi Fontana and Gérard Gayot (eds.), *Wool: Products and Markets (13th - 20th Century)* (Padua, 2004), pp. 551-72.

[128] Goldthwaite, 'Florentine Wool Industry', Table 2, p. 537, and note 24, p. 543 (n. 23 above).

[129] Hidetoshi Hoshino, "Il commercio fiorentino nell'Impero Ottomano: costi e profitti negli anna 1484-1488," in *Aspetti della vita economica medievale*: Atti del Convegno di Studi nel X anniversario della morte di Federigo Melis: Firenze-Pisa-Prato, 10 - 14. III. 1984 (Florence, 1985)]; and Hidetoshi Hoshino,

If these *matricina* wools proved to be so successful for the Florentine cloth industry of this era, one wonders why the Milanese industry evidently failed to use them as well (instead of shifting to silk production).[130]

For Florence, Hoshino has also provided a detailed list of wool prices for the years 1454 to 1500. Those for 1454-75 do indeed indicate that prices for *lana matricina* were generally, if not always, higher than those for *lana spagnola,* but far lower than those for English wools (deceptively called *lana francesca*).[131] In terms of gold florins, prices for fine quality *matricina* wools ranged from about 10.5 to 15.5 florins per bale (average weight of 91.385 kg.), with most of the quotations in the 12 to 14 florins range; the far fewer price quotations for Spanish wools ranged from 10.50 to 11.33 florins per bale ; and those for English wools, from 20 to 33 florins, with most from 25 to 30 florins per bale. In the 1480s, the prices of Spanish wools fell even more to a nadir of 6.8 florins per bale , while those for fine *matricina* wools remained generally within the range of 11.0 to 12.5 florins.[132]

- *the ascendancy of Spanish merino wools in the Florentine cloth industry*

Then, suddenly from 1490, the prices for fine Spanish wools rose strongly to about 14.5 to 15.6 florins per bale.[133] Hoshino notes that, at this very same time, there was a marked increase in the Spanish wool trade with Florence -- *il commercio diretto della lana castigliana* – with the now direct participation of Castilian merchants (displacing Italian merchants).[134] Perhaps these surprisingly radical changes in prices

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"Alcuni aspetti del commercio dei panni fiorentini nell'Impero Ottoman ai primi del '500'," *Annuario dell'Istituto giapponese di cultura*, 21 (1985-86)]: both republished in Hidetoshi Hoshino, *Industria tessile e commercio internazionale nella Firenze del tardo Medioevo*, ed. by Franco Franceschi and Sergio Tognetti, Biblioteca storica toscana no. 39 (Florence, 2001), pp. 113-23, 125-35. See also Table 8 below.

[130] See n. 126 above.

[131] For the use of the term *lana francesca* to mean English wools (transported via France) see Edler, *Glossary of Medieval Terms*, p. 148 (n. 21 above); Hoshino, *L'arte della lana*, p. 337 (n. 38 above)

[132] Hoshino, *L'Arte della Lana*, Table LVII, p. 299 (n. 38 above). See also Hidetoshi Hoshino, "Il commercio della lana e della seta tra Firenze e l'Abruzzo nel basso Medioevo," in Gianni Morlini (ed.), *Mercati e consumi: organizzioni e qualificazione del commercio in Italia dal XII al XX secolo*, I° Convegno Nazionale di Storia del Commercio in Italia: Archivio storico dell'industria Italiana: Studi commercio, Istituto Formazione Operatori Aziendali (Bologna, 1986), pp. 67-78. The unit of quantity for the wools is not specified. See also Goldthwaite, "Florentine Wool Industry," p. 539 (n. 23 above), contending that *matricina* wools in the fifteenth century "cost one-third to one-half less than English wools;" and for the sixteenth century, he contends (p. 541) that *matricina* wools were then cheaper than Spanish wools. Hoshino's prices are given in *fiorino di suggello*, whose values differed from those of the *fiorino d'oro*. See Goldthwaite, *Economy of Renaissance Florence*, p. 498, and the Appendix, "Changing Values of the Florin," pp. 609-14 (n. 6 above); Spufford, *Handbook of Medieval Exchange Rates*, pp. 25-26 (n. 45 above): though not indicating major differences in the florin during the early to mid fifteenth century. The average weight of the wool-bale is based on the Medici accounts of 1531-34 presented in de Roover, "Florentine Firm of Cloth Manufacturers," Appendix I, p. 31, using a weight of 339.542 grams to the Florentine pound (see n. 21 above).

[133] See the previous note.

[134] Hoshino, *L'Arte della Lana*, p. 281 (n. 38 above). On this point, see also Goldthwaite, "Florentine Wool Industry," pp. 534-35 (n. 23); and Goldthwaite, *Economy of Renaissance Florence*, p. 279 (n. 6 above), noting that supplies of Spanish wools increased markedly after the trade with Italy had fallen into the hands of specialized Castilian merchants, who controlled wool supplies outside of the Florentine trading network. See also Bruni Dini, "Mercanti spagnoli a Firenze (1480-1530)," in *El Consulado del Mar de Burgos, 1494 - 1994*, Atti del Simposio International (Burgos: 1995), republished in Bruno Dini, *Saggi su an economia-mondo: Firenze e l'Italia fra Mediterraneo ed Europa (secc. XIII-XVI*)

for Spanish wools in the course of the later fifteenth century a greater ease or ability to acquire better quality *merino* wools from the 1490s (and thus difficulties in doing so earlier in the century), with the more direct participation of the Castilian merchants. Nevertheless this a mystery about the vital Italian trade in wools that remains to be resolved.

Other evidence – from Spain itself, the Low Countries, and England – also indicates that, by the sixteenth century, the quality of *merino* wools had improved substantially over those of the fifteenth century, in part because of improvements in both sheep-breeding and *transhumanc*e sheep management.[135] According to an English commentator named Clement Armstrong, in his *Treatise Concerning the Staple and the Commodities of this Realme* (ca. 1519-35): "Spaynysh woll is almost as good as English woll, which may well be soo, by that Spayn hath housbondid ther wolle frome wurse to better, and England from better to wurse." [136]

To be sure, Armstrong's treatise was in part an attack on the contemporary Tudor enclosures, whose richer feeding of sheep-flocks many then held responsible for a marked deterioration in the fineness of English wools. But his seemingly paradoxical views on the deleterious effects of enclosures on English wool fineness – i.e., from *richer* pastures and year-round fodder supplies – have found support in the publications of the noted modern expert on Tudor wools, Peter Bowden, and also from several other textile historians, who contend that the esteemed fineness of medieval English wools was a product of both sparse feeding and chilly highland pastures. Another factor that neither Armstrong nor Bowden mentions, however, was another by-product of Tudor-Stuart enclosures: selective breeding, which had been virtually impossible with Common Fields and their intermingled sheep flocks. The objective of such sheep-breeding was to produce larger, fatter sheep for the now growing urban meat markets; but these larger, fatter sheep had far longer and far coarser fleeces (an unintended consequence). There can be no doubt that the average quality of English wools (except those from the Welsh Marches) was worsening in fineness at the very time that the average fineness

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(Pisa, 1995), pp. 289-310.

[135] See Angel Cabo Alonso, "Medio natural y trashumancia en la España peninsular," in Felipe Ruiz Martin and Ángel García Sanz (eds.), *Mesta, transhumancia y lana en la España moderna* (Barcelona, 1998), pp. 11-41; Gonzalo Anes, *Cultivos, cosechas y pastoreo en la España moderna*, Clave Historial no. 6 (Madrid, 1999), pp. 11-56; Claude Carrère, "Aspects de la production et du commerce de la laine en Aragon au milieu du XVe siècle," in Marco Spallanzani (ed.), *La lana come materia prima: I fenomeni della sua produzione e circolazione nei secoli XIII-XVII*, Instituto internazionale di storia economica, Prato, Serie II (Florence, 1974), pp. 205-19; Marie-Claude Gerbet, *L'élevage dans la royaume de Castille sous les rois Catholiques (1454-1516),* Publications de la Casa de Valázques: Série Études et Documents no. 6 (Madrid, 1991); Reyna Pastor de Togneri, "La lana en Castilla y Léon antes de la organizacion de la Mesta," *Moneda y crédito*, no. 112 (March 1970), pp. 47-70, reprinted in Marco Spallanzani (ed.), *La lana come materia prima: I fenomeni della sua produzione e circolazione nei secoli XIII-XVII*, Instituto internazionale di storia economica, Prato, Serie II (Florence, 1974), pp. 253-67; Carla Philips and William Phillips, *Spain's Golden Fleece: Wool Production and the Wool Trade from the Middle Ages to the Nineteenth Century* (Baltimore and London, 1997), pp. 7-23, 33-39, 97-125 (esp. p. 99); Julius Klein, *The Mesta: A Study in Spanish Economic History, 1273-1836* (Cambridge, Mass., 1920), pp. pp. 8, 12-15, 17-21, 28-30, 320, 607, 708; Melis, "La lana della Spagna," pp. 241-51 (n. 123 above); H. B. Carter, *His Majesty's Spanish Flock: Sir Joseph Banks and the Merinos of George III of England* (London, 1964), pp. 6, 9, 420-21; and especially Munro, "Spanish *Merino* Wools," pp. 431-84, esp. pp. 438-40, 470-75 (n. 9 above). See also Michael Ryder, *Sheep & Man* (London, 1983), pp. 427-36, for the importance that he ascribes to Spanish transhumance, noting (p. 428) that *transhumantes merinos* are "larger, more slender and long-legged, with finer wools," than those in more sedentary flocks; and also Michael Ryder, "Medieval Sheep and Wool Types," *Agricultural History Review*, 32 (1984), pp. 14 - 28.

[136] Text in Tawney and Power (eds.), *Tudor Economic Documents,* vol. III, pp. 90-114; quotations on p. 102 (see n. 15 above).

of *merino* wools was improving. [137] The consequences of these changes for the decline of England's traditional Old Draperies and the corresponding the so-called New Draperies will be explored later.[138]

Nevertheless, Clement Armstrong still endorsed the long-standing view that Spanish wools had to be mixed with English wools to produce cloths that had any "durable weryng," because "English wolle hath staple and Spaynysh woole hath no staple."[139] Some support for that contention may be found in the regulations of the contemporary Flemish *nouvelles draperies* which had prospered by adopting Spanish *merino* wools, while nevertheless requiting that they be mixed with some fine English wools.[140] As indicated earlier, Spanish *merino* wools did not surpass the finest English wools (the March wools) until the later sixteenth or early seventeenth century, by which time England's Old Draperies were themselves importing and mixing Spanish *merino* wools with their own March wools.[141]

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[137] Peter Bowden, "The Wool Supply and the Woollen Industry," *Economic History Review*, 2nd ser., 9:1 (1956), pp. 44-58; Peter Bowden, *The Wool Trade in Tudor and Stuart England* (London, 1962), pp. 4-6, 26-27. See also Julia de Lacy Mann, *The Cloth Industry in the West of England from 1640 to 1880* (Oxford, 1971), pp. 257-79; William Youatt, *Sheep: Their Breeds, Management, and Diseases* (London, 1837); R. M. Hartwell, "A Revolution in the Character and Destiny of British Wool," in N.B. Harte and K.G. Ponting (eds.), *Textile History and Economic History: Essays in Honour of Miss Julia de Lacy Mann* (Manchester, 1973), pp. 320-38, for similar arguments that enclosures, by producing richer, year round ample feeding, produced much bigger, heavier weight sheep, with longer, coarser-stapled fleeces, whose wools were thus more suited to worsteds than to woolens. Enclosures, however, also permitted segregation of flocks and provided capital for breeding rams; and selective-breeding to produce much larger, fatter sheep for the urban meat markets, larger sheep with longer, coarser fleeces, may provide a better explanation for this undoubted change in English wool types and qualities. See also Munro, "New Draperies," pp. 35-128 (n. 29 above); Munro, "Medieval Woollens: Textile Technology," pp. 186-89 (n. 8 above). For the impact of these changes on the rise of the Elizabethan New Draperies, see below, pp. 000-00.

[138] See below, pp. 000-00.

[139] Text in Tawney and Power (eds.), *Tudor Economic Documents*, III, pp. 90-114; quotations on p. 102 (n. 15 above). Armstrong stated that "because the erthe is now putt to idulnes to bryng forth rank, foggye, wild gresse," it was thereby irreparably impairing the quality of English wools, producing indeed "wild heyry wolle" and thus "so is the gift of fyne wolle yerly lost" (quotations on pp. 101-02). See also Bowden, *Wool Trade*, pp. 4-6, 26-27 (n. 137 above), and his "Wool Supply and the Woollen Industry," pp. 44-51 (n. 137), Mann, *Cloth Industry,* pp. 257-79 (n. 137 above); and Youatt, *Sheep*, *passim* (n . 137 above) for similar arguments. See also Munro, "New Draperies," pp. 35-128 (n. 29 above); Munro, "Medieval Woollens: Textile Technology," pp. 186-91 (n. 8 above); Hartwell, "Destiny of British Wools," pp. 328-35. (n. 137 above).

[140] See the drapery regulations for Armentières in Henri De Sagher et al. (eds.), *Recueil de documents relatifs à l'histoire de l'industrie drapière en Flandre*, IIe partie: *Le sud-ouest de la Flandre depuis l'époque bourguignonne*, 3 vols. (Brussels, 1951-66), vol. I, no. 36: pp. 102-03, 103-17 (25 October 1510); revised keure issued 14 August 1512: no. 37, pp. 118-25; third revision, 19 Nov 1518: no. 38, pp. 126-43 (no changes in wools). For its fine *oultreffins*, the regulations specified a mixture of the two as follows: "le tierch de laine englesse et les deux pars fine laine d'Espaigne," while requiring that "le laine d'Espaigne soit de sy bon poil que pour corespondre alle laine englesse." See Munro, "Spanish *Merino* Wools," pp. 431-84 (n. 9 above).

[141] In England, during the 1640s, Spanish wools cost on average 3s 3d per pound, compared to 3s 0d per pound for the best Herefordshire Ryelands; and in the 1660s, Spanish "superfine" wools averaged 4s 2d per pound, while the better English wools averaged only 1s 5d per pound. See Carter, *His Majesty's Spanish Flock*, pp. 9, 11, 413, 420-22 (n. 135 above); Bowden, *Wool Trade*, p. 27 (n. 137 above), citing in particular (anonymous) *England's Glory by the Benefit of Wool Manufactured Therein* (London, 1669); Mann, *Cloth Industry*, pp. 257-59 (n. 137 above); John Smith, *Chronicon Rusticum-Commerciale: or Memoirs of Wool,* 2 vols. (London, 1747; reprinted, New York, 1972), vol. II, pp. 410-11, 499, 514-15, 542;

Certainly during the sixteenth century, *merino* wools came to play a far larger role in the Florentine woolen cloth industry. Indeed, they were by far the most important wools that the Medici firm used in and from the 1530s to the 1550s (Table 9).[142] Thus, the accounts of Raffaello di Francesco de Medici and Co for the years 1531 to 1534 record the purchase of 127.00 bales of Spanish wools (averaging in weight 269.142 lb Florentine = 91.385 kg.) and a further 11.50 bales (averaging in weight 217.130 lb Florentine = 73.725 kg.) of Provençal wools. The Spanish wools weighed in total 11,605.885 kg. (the equivalent of 70.293 English sack weights); and the Provençal wools weighed 847.836 kg. (the equivalent of 5.135 English sack weights). Thus the Spanish wools accounted for 93.19 percent of the total wools by weight, and the Provençal for the remaining 6.81 percent. The average value of the Spanish wools purchased in this period was 11.00 florins per 100 lb. weight Florentine (33.954 kg.), and thus 0.324 florin per kg.; and in terms of the English sack weight (364 lb = 165.108 kg.), its mean value was 53.476 florins = £401.07 *lira di piccioli* = £12.478 English sterling. The average value of the Provençal wools was about half that of the Spanish wools: 5.47 florins per 100 lb. Florentine weight = 0.161 florin per kg.; and in terms of the English sack weight, 26.619 florins = £199.643 *lira di piccioli* = £6.211 sterling. It will be noted that the value of these Spanish wools in terms of gold florins had risen substantially from those cited by Hoshino for the mid-fifteenth century: from an average of about 11 gold florins per bale (with an average weight of 91.385 kg.) in the 1460s to 15 florins in the 1490s to 29.6 florins a bale in the 1530s.[143]

The total absence of any English wools used in the Garbo sector has already been readily explained by institutional guild constraints of the *Arte della Lana*. The truly surprising feature about the raw material sources for the sixteenth-century *Garbo* cloth sector is that no *matricina* or any other Italian wools appear in these records. According to de Roover, the Garbo sector was also then forbidden from using any Italian wool, "which was of such inferior quality that its use was prohibited within the city limits of Florence."[144] If so – and de Roover does not provide evidence for this assertion – that change in the Garbo sector's wool supply in less than a century is a most remarkable transformation. Given the indisputable improvements in the quality of Spanish wools, that change may reflect entrepreneurial strategies in seeking foreign markets, to be discussed later in this study.

Italian cloth manufacturing costs: fourteenth - sixteenth centuries

If we accept the proposition that the single most important determinant of both quality and market prices in European cloth production was the wool contents (followed by dyestuffs), we may now investigate cloth manufacturing costs, both in terms of the aggregate value of the woolens and in terms of the individual stages of that manufacturing, as undertaken in the previously described putting-out or domestic system of production.[145]

Hartwell, "Destiny of British Wools," pp. 336-38 (n. 137 above): on the English Merinos, from 1788. Mann, *Cloth Industry*, pp. 266-67 (n. 137 above) also states that in the eighteenth century, Spanish *merino* wools had a staple length of only 0.50 - 0.75 inch, compared to one of 1.50 inch for Herefordshire wools. But both Carter, *His Majesty's Spanish Flock*, p. 421 and A. P. Usher, *The Industrial History of England* (Boston, 1920), p. 195 provide the following figures for the modern era: 2.25 - 2.50 inches for *merino* wools, compared to 10.5 inches for Lincolnshire wools.

[142] De Roover, " Florentine Firm," pp. 85-118, esp. p. 101, Appendix I, p. 113 (n. 21 above).

[143] See above pp. 000-00 . Note that the onset of the inflationary Price Revolution era, from the 1520s, cannot explain that rise in prices, because the Price Revolution affected only those prices expressed in silver based moneys-of-account, not those expressed in gold. See John Munro, "Money, Prices, Wages, and 'Profit Inflation' in Spain, the Southern Netherlands, and England during the Price Revolution era, ca. 1520 - ca. 1650," *História e Economia: Revista Interdisciplinar*, 4:1 (2008), pp. 13-71.

[144] De Roover, "Florentine Firm of Cloth Manufacturers," p. 19 (see n. 21 above).

[145] See above, pp. 000 -00.

For detailed information, from archival sources, on Italian cloth production and woolen-cloth weights (as another determinant of product types and relative values), we again commence with the accounts of the Datini-financed woolen workshops of Agnolo di Nicolo in Prato, in 1396-98 (Table 7). In order to provide consistent and reliable comparisons with other data series on Florentine cloth production, the following estimates of the component percentage shares of production are reckoned in terms of the manufacturing costs alone, with the percentage shares of the total costs (including those for management) provided in parentheses. For the production of six woolens made from Spanish Majorcan wools, the raw wools themselves accounted for 40.21 percent of the manufacturing costs (37.95 percent of total production costs). The manufacturing processes themselves, apart from the Spanish wools, accounted for 56.44 percent of total production costs; and general administration costs, for the remaining 5.61 percent (so that marketing costs are not included). The production transformation or value-added costs of manufacturing were allocated as follows: wool preparation, in terms of wool-beating, carding, and combing: 16.77 percent (15.83 percent); spinning : 13.95 percent (13.17 percent); warping and weaving: 8.51 percent (8.03 percent); and finishing, including fulling, tentering, shearing: 10.40 percent (9.82 percent); and dyeing: 10.16 percent (9.59 percent).[146] Another method of reckoning the shares of production costs is by the number of days that each processed required. In a total of 250 work-days for producing these woolens, wool preparation accounted for 51 days (20.40 percent); spinning, for 76 days (30.40 percent); weaving, for 65 days (26.00 percent); and finishing, for 58 days (23.20 percent). In another Datini workshop account for the 1390s, for the production of woolens from English wools (though evidently not the finest such wools), the wools accounted for a somewhat higher share, 44 percent, and the manufacturing costs for the other 56 percent (with no administrative costs listed).[147]

For the Florentine cloth industry in the subsequent fifteenth and sixteenth centuries, we possess several studies on production costs. For the fifteenth century, the only available reckoning of Florentine cloth production costs is that undertaken by Hidetoshi Hoshino for *Garbo* woolens produced in the mid 1480s (Table 8). Woven exclusively from domestic Italian *matricina* wools,[148] these cloths were exported directly to the Ottoman Turkish Empire, with an average total cost and market value of £104.363 *lira di piccioli* =

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[146] Ammannati, "Datini's Wool Workshops," Table 3 and text, pp. 506-07 (see n. 23 above); Melis, *Aspetti*, p. 560 (n. 123 above). These cloths were mechanically fulled in water-powered fulling mills in the Val di Bisenzio, unlike those of the traditional urban draperies in the Low Countries, which were foot-fulled. See Munro, "Industrial Entrepreneurship," pp. 377-88 (n. 27 above); Munro, "Gold, Guilds, and Government," pp. 153 - 205 (n. 80 above); Malanima, "First European Textile Machine," pp. 115-28 (n. 26 above).

[147] Melis, *Aspetti*, doc. no. 27 (n. 123 above), as cited in Goldthwaite, "Florentine Wool Industry," Table 2, p. 537 (n. 23 above).

[148] Note that the monetary term florin had, in this era, acquired an entirely different meaning from the pre-1530 era: it was no longer a gold coin, and no longer related at al1 to gold. The Florentine gold florin had ceased to be issued, as a coin, in 1533, when it had a fineness of 23.820 carats (99.250 percent fine) and contained 3.474 grams of fine gold; and earlier, in March 1531, its money-of-account value had been increased from 7 *lire* to 7 *lire* 10 *soldi* in the Florentine silver-based *moneta di piccioli*. From 1533 the "florin" became a silver-based money-of-account with that fixed value for the rest of the sixteenth and seventeenth centuries. In fact, the gold florin had been effectively superseded in June 1530 by another, new gold coin: the *scudo-i* (*écu* in French = shield), with only 22.5 carats (93.75 per cent fine) and a weight of 3.412 g, and thus a fine gold content of 3.199 g.. Its money-of-account value, in the silver-based *moneta di piccioli,* was initially 7 *lire* (= 140 *soldi*) – i.e., the previous value of the florin. I n 1533, the *scudo's* fineness was reduced to 22 carats (91.67 per cent fine), which was retained thereafter; but by 1548 its weight had fallen to 3.379 g (3.097 g fine gold), while its official value had risen to 7 *lire* 5 *soldi*, increasing to 7 *lire* 12 *soldi* (£7.600) in 1556, but retaining at that fixed value for the rest of the sixteenth century. See Mario Bernocchi, *Le monete della repubblica fiorentina*, 4 vols. (Florence, 1974-78); Richard Goldthwaite and Giulio Mandich, *Studi sulla moneta fiorentina, secoli XIII - XVI* (Florence, 1994); John Munro, "Money and Coinage: Western Europe," in Jonathan Dewald, et al (eds.), *Europe 1450 to 1789: Encyclopedia of the Early Modern World* (New York, 2004), Vol. 4, pp. 174-184. Thus, in 1556-58, the total production costs of these woolens, at 3,076.746 florins = £23,075.595 in *lira di piccioli*.

16.700 gold florins (florins valued at £6.250).[149] In these Florentine accounts, direct manufacturing costs (£15.286) accounted for 91.54 percent of total production costs; and the remaining 8.46 precent were allocated to other business costs, amounting to £1.412. The most important cost component was again the *matricina* wools, which accounted for 48.46 percent of direct manufacturing costs (44.36 percent of total costs). Wool preparation, accounted for 12.99 percent of direct manufacturing costs (11.89 percent); spinning, for 13.38 percent (12.25 percent); weaving, for 8.02 percent (7.35 percent); fulling and shearing, for 4.00 percent (3.67 percent); and dyeing, for 13.14 percent (12.03 percent).

For the sixteenth century, the best known study is the one that Raymond de Roover published on the Medici woolen workshops, with two different partnerships, for the 1530s and the 1550s. The first account, that of Rafaello di Francesco de'Medici and Co. for 1531-34 (Table 10), is the less complete, less detailed, while still allowing us to compute the component shares of the major costs of production: i.e., in producing woolens from the previously discussed wool purchases of 127.00 bales of Spanish *merino* wools and 11.50 bales of Provençal wools (totalling 12,453.721kg.). Of the manufacturing costs — total production costs are unavailable – amounting to 11,283.983 florins, the wools accounted for 34.56 percent; the direct manufacturing costs (wool preparation, combing and carding, spinning, weaving, fulling, shearing) accounted for 46.05 percent; and the dying costs (labor and raw materials), for the remaining 19.39 percent.[150]

Much more complete and thus more illuminating is the second Medici account (Table 12): that for the partnership cloth firm of Giuliano di Raffaello de'Medici and Co., for the years 1556-1558, concerning the production of 71 woolen cloths, again from Spanish wools, whose total cost was 3,076.746 florins (or 43.334 florins per cloth = £325 *lira di piccioli*).[151] This account includes as well overhead costs: for tools, rent, administrative expenses, staff wages, and brokerage, which amounted to 299.208 florins, for 9.72 percent of total costs – so that the manufacturing costs (including raw materials) was 2,777.538 florins, or 90.28 percent of the total.[152]

Again, the following percentage shares of costs are based on the total of manufacturing costs, excluding overhead costs; and again the percentages based on total costs, including overhead are given in parentheses. In this Medici account book, the wools accounted for 33.217 percent of direct manufacturing costs (29.95 percent of the total). Wool preparation for spinning – wool washing, beating, combing warps and carding wefts – accounted for 9.86 percent (8.90 percent of the total); spinning the warp and weft yarns, for 23.42 percent (21.14 percent); weaving (including warping), for 13.95 percent (12.59 percent); mechanized water-powered fulling – including burling, scouring, felting, and tentering) – for just 2.52

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[149] Hoshino, "Il commercio fiorentino," pp. 113-23 (see n. 129 above). See also n. 168 below.

[150] De Roover, "Florentine Firm," table on p. 25 (see n. 23 above). The total number of cloths produced is not stated in this account. In de Roover's table, the cost of the wool is given as 3,899.950 florins; but according to my calculations, based on his Appendix I, p. 31,the cost of the wool was slightly less, at 3,895.663 florins. This Appendix also lists, however, some other wools (of indeterminate types and weights) worth 128.246 florins.

[151] Note that the florin money-of-account is no longer based on the circulating gold coins but upon the silver *lira di piccioli*: one florin = £7.500 *lira*. See n. 148 above.

[152] See Table 12 below, based on de Roover, "Florentine Firm," Appendix IV, p. 33 (see n. 21 above). De Roover allocated the cost of woad-washing (*lavatura di Guado*), 10.979 florins, to Overhead Costs; but I have allocated them here instead to section VI on Dyeing costs, under Manufacturing. A table based on de Roover's Appendix IV, unaltered, is presented in Munro, "Medieval Woollens: Struggle for Markets," Table 5.9, p. 317 (n. 8 above). Note that Goldthwaite, "Florentine Wool Industry," Table 2, p. 537 (see n. 23 above), cites De Roover's Appendix IV for the breakdown of the Medici's woolen cloth production costs in 1556-57 (not specifying the wools) by giving the percentages for each component as those based on total costs, including overhead costs (9.72 percent of the total), and not based on total manufacturing costs, as indicated for the other Italian cloth manufacturing firms in this table.

percent (2.28 percent); shearing and finishing (including mending and twisting the selvage borders), for 1.09 percent (0.98 percent); and dyeing, for 15.99 percent (14.43 percent).[153]

Finally, Richard Goldthwaite has more recently provided a similar but even more detailed and precise analysis of manufacturing and total production costs for the Brandolini firm of Florence, based on its account books for 1581-89 (Table 13): in producing a special type of very fine woolen cloth known as *rascia* (whose great importance will be discussed later).[154] The production costs, reckoned in terms of one bolt of this cloth (when finished = 61.77 *braccia* = 36.012 m.) and reckoned in terms of the current silver based *lira di piccioli* (in which 1 florin = £7.500), were as follows: direct manufacturing costs (see below) were £450.197, accounting for 85.03 percent of total costs; and other business costs (including the firm's profit) were £79.280, accounting for the remaining 14.97 percent of total production costs. Thus the total cost of one bolt of *rascia* cloth was £529.477 = 70.597 florins of account (silver based).[155]

In producing a bolt of this *rascia* woolen cloth, the Brandolini firm also used fine, short-stapled Spanish *merino* wools (weighing raw 36.671 kg.) exclusively, for both the warp and weft yarns. Worth £207.980 (per bolt of cloth), these wools accounted for 46.20 percent of direct manufacturing costs (39.28 percent of total production costs). Wool preparation -- for washing and beating the wools, combing the warps, and carding the wefts – cost £28.687, accounting for 6.37 percent of direct manufacturing costs (5.42 percent of total costs). Spinning the warps and wefts together cost £80.150 – the greatest single production cost: accounting for 17.80 percent of direct manufacturing costs (15.14 percent of total costs), while weaving cost £65.450: accounting for 14.54 percent of direct manufacturing costs (12.36 percent of total production costs). In the finishing processes, fulling (burling, scouring, felting, and fulling-mill fees) cost £9.730, accounting for just 2.16 percent of direct manufacturing costs (1.08 percent of total costs). The shearing processes (including tentering and mending), cost even less, £5.700, thus accounting for just 1.27 percent of direct manufacturing costs (1.08 percent of total costs). Dyeing in woad (materials and labor), costing £5.700, accounted for the remaining 11.66 percent of manufacturing costs (9.92 percent of the total).

These Tuscan production statistics, over two centuries, may be compared usefully with less exact estimates for the production of luxury-quality woolen broadcloths, made exclusively from fine English wools, in draperies of the fifteenth-century southern Low Countries, all purchased directly from the Calais Staple. Regrettably, total production costs that include extra-manufacturing business costs (comparable to those for Florence) are not available. The first example is for the Leuven drapery (in Brabant), in 1434, in producing a woolen black broadcloth worth £4.061 *groot* Flemish (= 21.19 gold florins = £3.678 English sterling). In doing so, the Leuven drapers allocated 62.50 percent of total manufacturing costs for the English wools (76.2 percent of pre-finishing costs); and the finishing costs of dyeing, shearing, and dressing the cloth, accounted for 18.0 percent of total costs (chiefly in the dyestuffs rather than labor). The other manufacturing costs – in wool preparation, combing, carding, spinning, weaving, and foot-fulling – amounted to only 19.5 percent of total costs. Much later, in 1500, Ypres's urban drapery (Flanders), in producing a far finer, more

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[153] As indicated in the previous note, woad-washing (0.40 percent of total manufacturing costs) is included here under dyeing costs, of which the labor in dyeing itself accounted for 11.13 percent of manufacturing costs. Rather remarkably, the sum of oil, dyestuffs, and soap accounted for just 4.85 percent of total manufacturing costs; but the wools were evidently dyed first in woad and the cost of the woad dyestuff may be included in the wool costs.

[154] Goldthwaite, "Florentine Wool Industry," Table A1, p. 553 (see n. 23 above). I have disregarded his deceptively alternative Tables 2 and 3 on p. 537, which are based on average prices for other cloths as well. See also Goldthwaite, *Economy of Renaissance Florence*, pp. 336-40 (n. 6 above). In using his Table A1, however, I have restructured it to separate direct manufacturing from total production costs: allocating brokerage, indirect costs, miscellaneous costs, and the firm's profit to the "other business costs" totalling £79.280 = 14.97 percent of total costs.

[155] For the *braccio* unit of cloth measurement see nn.23, 45, 66, 76 above; n. 214 below. For the value of the post 1530 silver-based florin money-of-account, see n. 148 above. For the sales prices of the Florentine *rascie*, see below, pp. 000.

costly black woolen broadcloth, then worth £12.725 *groot* Flemish (= 38.175 gold florins = £8.645 sterling), allocated 52.00 percent of total manufacturing costs (64.2 percent of pre-finishing costs) for its fine Cotswolds wool. In the finishing processes, dyeing, shearing, and and dressing the cloth, accounted for 19.2 percent of total costs (17.7 percent in dyes and 1.5 percent in shearing costs); but this time, the somewhat more extensive and skilful labor devoted to spinning, weaving, fulling, and tentering accounted for 26.2 percent of total manufacturing costs.[156] Since, as just noted, the wools accounted for a low of 33.21 percent to a high of 46.20 percent of direct manufacturing costs in the Tuscan draperies (1396-1589), clearly the finer English wools accounted for a greater share of direct manufacturing costs in these two Low Countries' draperies.

The weights of late-medieval and early-modern woolen cloths

As is well known, these late-medieval woolens from the southern Low Countries, along with the rival cloths of the Flemish *nouvelles draperies* and the rival English woolen broadcloths were all true heavy-weight woolens. Because dimensions in length and width often varied (though usually not by much in each region), the most useful method of measuring and comparing weights is by grams per square meter of fulled, tentered, and fully finished cloths. Based on the earliest documents providing such cloth weights, for the mid fifteenth and sixteenth centuries, we can provide the following estimates of such weights per square meter: for a Ghent *dickedinnen* broadcloth (1456, 1546), 633.766 g; for a Mechelen *gulden aeren* (1544), 764.421 g, and for a Mechelen *witte griffoen*, 955.520 g.; for an Armentières *oultreffins* (1510, 1546), 820.503 g; and for an English short broadcloth from both Suffolk and Essex (1552), 782.575 g.[157]

The *oultreffin* woolens from Armentières were woven, as indicated earlier, from a mixture of one-third English wools (Cotswolds, Lindsey, Berkshire) and two-thirds Spanish *merino* wools.[158] That observation is very important for this study, because the long-traditional and quite false view (first stated by Pirenne) has been that Spanish wools were used to weave much lighter and cheaper cloths, in the Low Countries, Italy, and elsewhere.[159] In fact the contrary was true: for Spanish *merino* wools were those that were the closest to the finer English medieval wools in having the characteristic short and curly fibers that had such excellent felting properties in fulling, and thus in producing genuine heavy-weight broadcloths – since felting and fulling were, in fact, the key determinants of woolen cloth weights by compressing the area of the cloth.[160]

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[156] For the data sources, see John Munro, "Industrial Protectionism," Table 13.2, p. 256 (n. 109 above); Munro, "Medieval Scarlet," Table 3.12, p. 52 (n. 48 above); and Munro, "Hanseatic Commerce," pp. 97-105 (n. 57 above). The Flemish silver *groot* coinage had suffered considerable debasement between 1434 and 1500, thus explaining the rise in the exchange value of the Florentine florin from 46d to 80d (6s 8d). Exchange rates taken from Spufford, *Handbook of Medieval Exchange*, pp. 221-23 (n. 45 above).

[157] Munro, "Medieval Woollens: Struggle for Markets," Table 5.7, pp. 314-15 (see n. 8 above).

[158] Munro, "Spanish *Merino* Wools," Table 1, p. 435 (n. 9 above): from De Sagher (ed.), *Recueil de documents,* vol. I, no. 36:2, p. 102 (n. 140 above).

[159] Henri Pirenne, "Une crise industrielle au XVIe siècle: la draperie urbaine et la nouvelle draperie en Flandre," *Bulletin de l'Academie royale de Belgique: Classe des Belles Lettres* (Brussels, 1905), reprinted in Henri Pirenne, *Histoire économique de l'occident médiéval,* ed. Emile Coornaert (Bruges, 1951), pp. 621-43. See also Munro, "Spanish *Merino* Wools," pp. 431-84 (n. 9 above); Munro, "Medieval Woollens: Technology," pp. 181-92 (n. 8 above). Note that medieval England's short-stapled wools were largely displaced by longer-stapled wools, with the sixteenth-century Tudor enclosures, as indicated above, pp. 000, and in nn. 137, 139 above.

[160] See above, pp. 000-00. Since cloth weights are measured in terms of grams per square meter of finished cloth, that weight was determined by the extent of shrinkage, compression, and felting imposed on the woven cloth by the fulling processes – which were absent in true worsteds. The other factor, however, was the disproportionate amount of weft yarns in true woolens, as compared to worsteds. For cloth weights,

In contrast, the genuine light-weight semi- or full worsted cloths, as produced in the Low Countries during the sixteenth century – which never used any Spanish wools – had the following weights per square meter: Hondschoote *single says* (1571), 340.052 g; Hondschoote *double says* (1571), 266.334 g; Bergues-St.-Winoc narrow *sayes* (1537), 260.352 g.[161] The Hondschoote says were hybrid worsted-woolen serges, while the Bergues-St. Winoc says were true worsteds (in both warp and weft). Subsequently, we shall see that the products of the English New Draperies (much influenced by the Hondschoote *says*) had similar low weights.[162]

Because many authors still refer to Italian woolen cloths as lighter-weight (whether or not made from Spanish wools),[163] we should offer the following comparisons of the weights of Prato woolens produced in the late 1390s, in the Datini wool workshops, which, when fulled, tentered, and fully finished, had an average length of 34.64 m, an average width of 2.55 m, and an average area of 87.01 m^2. Their weights ranged from 64.17 lb (21.754 kg.) to 81.83 lb (27.74 kg.). By any medieval definition, these were all thoroughly fulled heavy-weight woolens. In terms of grams per square meter of finished cloth, their weights ranged from 561.29 g/m^2 to 788.79 g/m^2.[164] Similarly, woolens produced in the mainland Venetia towns of Padua, Vicenza, Verona, and Brescia in the later fifteenth century, with an average length of 30 meters (but of unknown widths), also had weights ranging from 20 kg. to 25 kg. a piece.[165]

Unfortunately the documents for the fifteenth and sixteenth century Florentine cloth industry do not provide widths and thus sufficient evidence for measuring cloth weights in terms of grams per square meter of finished cloth; but estimates for the weight of a new Florentine woolen cloth, the *rascia*, will be considered below, when this cloth achieved its greatest prominence, in the mid sixteenth century.[166]

The markets for Florentine woolens in the fifteenth and sixteenth centuries

With this very necessary information on the composition of the Prato and Florentine woolens (their wools), their weights, and production costs, we are better equipped to understand the marketing of these Italian cloths during the fifteenth and sixteenth centuries. In particular, we must ask if the markets that the Florentine *lanaiuoli* were primarily serving were local markets, and for the lower income strata of Tuscan

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see n. 30, 68 above, and nn. 199-206, 264 below.

[161] Munro, "Three Centuries of Luxury Textile Consumption," Table 1.1, pp.10-11 (see n. 8 above); Munro, "Medieval Woollens: Struggle for Markets," Tables 5.7 and 5.8, pp. 312-16 (n. 8 above); Munro, "Spanish *Merino* Wools," Table 1, p. 435 (n. 9 above). The slight differences in English cloth weights (grams per m^2) in these tables are due to the two definitions of the English cloth yard: either 37 in, including one-inch for the selvage; or 36 in., without the selvage (and thus of the cloth itself).

[162] See below, pp. 000.

[163] Goldthwaite, *Economy of Renaissance Florence*, p.272 (see n. 6 above); Donald C. Coleman, "An Innovation and its Diffusion: The 'New Draperies'," *Economic History Review*, 2nd ser., 12:3 (Dec. 1969), pp. 417-29, esp. p. 420.

[164] Ammannati, "Datini's Wool Workshops," table 2, p. 505, and n. 57 (see n. 23 above), from Melis, *Aspetti* (see n. 123 above).

[165] Demo, "Wool and Silk," pp. 217-43, esp. pp 220-22 (see n. 106 above): they similarly were woven with combed warps and carded wefts. They were known as *panni pessanti* (heavy woolens). See also n. 234 below.

[166] See below, pp. 000-00.

towns; or foreign markets; and if the latter, which overseas markets? [167]

According to both Hidetosho Hoshino and Patrick Chorley, the partial revival of the Florentine woolen cloth industry, from the mid fifteenth century, was largely based on two factors: its success in gaining access to Levantine textile markets (chiefly via Mamlūk Alexandria and Beirut); and especially its success in marketing its much cheaper-line *panni de Levante* manufactured from Garbo wools, whose mean value in the mid-fifteenth century is estimated at 31 florins.[168] Indeed, the Garbo sector was evidently responsible for almost all of the Florentine cloth industry's mid-century recovery. [169] Chorley had assumed that such Garbo wools were Spanish, a supposition that undoubtedly became valid for the sixteenth century, when the Medici firm was producing fine woolens for export chiefly to Ottoman markets in the Levant, as well.[170]

As Hoshino has accurately demonstrated for the mid and later fifteenth century, however, the wools for Garbo cloths then being exported to the Levant century were principally and probably entirely domestic *matricina* wools, which then had two principal advantages, according to Hoshino. First, the quality of the *matricina* wools was then superior to that of the then available Spanish *merino* wools (the latter of surprisingly poorer quality). But second, their relative cheapness accounted for their attractively low prices, or low prices for those exported to the Ottoman markets in the 1470s and 1480s: a much lower mean value than for previous exports – of 16.7 gold florins per woolen (= 802 Turkish *aspri* = £3.618 sterling) – and thus evidently considerably cheaper than those exported in the 1430s.[171] In the 1470s, according to Chorley, Florentine cloth exports to the Levant and the Ottoman Empire amounted to 7,000 - 8,000 pieces a year,

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[167] De Roover, "Florentine Firm," p. 101 (see n. 21 above) comments that the *lanaiuoli di Garbo* were, as already noted, "not permitted to use English wool," but, as he clearly states, "neither were they supposed to use Italian wool, which was of such inferior quality that its use was prohibited with the city limits of Florence." At the same time, we may assume that the largest share of European cloth production was devoted to local, domestic markets, and primarily, in terms of sales volume, for the lower-income strata, so that such cloths were generally and necessarily woven from cheaper, local wools, often very coarse wools.

[168] Hoshino, *L'Arte della Lana*, pp. 267-75 (n. 38 above); Hoshino, "Il commercio fiorentino nell'Impero Ottomano," pp. 113-23 (n. 129 above); Hidetoshi Hoshino and Maureen Mazzaoui, "Ottoman Markets for Florentine Woolen Cloth in the Late Fifteenth Century," *International Journal of Turkish Studies*, 3 (1985-86), pp. 17-31; Patrick Chorley, "The Volume of Cloth Production in Florence, 1500-1650: An Assessment of the Evidence," in Giovanni Luigi Fontana and Gérard Gayot (eds.), *Wool: Products and Markets (13th - 20th Century)* (Padua, 2004), pp. 551-72, esp. p. 568; Chorley, "*Rascie* and the Florentine Cloth Industry," pp. 488-89 (see 113 above). For values, see Goldthwaite, *Economy of Renaissance Florence*, Table 4.1, p. 278 (see n. 6 above): £124 = 31 florins (at £4 per florin in 1430; but £5.40 in 1461); Bernocchi, *Le Monete*, vol. III, p. 215 (see n. 148 above).

[169] See also Epstein, *Freedom and Growth*, pp. 137-38 (n. 73 above): noting that the Florentine cloth industry was using protective tariffs to gain control over Tuscan markets, in the early fifteenth century, while "shifting production from the high-quality *panni franceschi* [San Martino woolens woven from English wools] on which it had built is medieval reputation to the more down-market *panni di Garbo* for the Levantine markets. The conversion in effect canabalised the medium quality production which Florence had assigned to its subjects [i.e., the small Tuscan towns under its jurisdiction]."

[170] See De Roover, "A Florentine Firm," pp. 10, 19 (see n. 21 above). The Medici actually sold their cloths, labelled *per Levante*, locally, in Florence, to Greek and Ragusan merchants, who shipped them to Ottoman ports.

[171] Hoshino, "Il commercio fiorentino nell'Impero Ottomano," Table 1, p. 120 (see n. 129 above); see also p. 118, n. 2: "Il successo del commercio fiorentina in Turchia era fondato sull'exportazione di panni lavorati essenzialmente con la materia prima abruzzese, la cui qualità era superiore a quella della lana spagnola detta di San Martino." The Florentine florin was worth 4s 4d or 52d sterling in the 1480s (and £6.250 *lira di piccioli*). For cloth values in the 1420s, see above pp. 000-00.

accounting for perhaps half of the output of the Garbo sector.[172] From Venetian reports dated 1488, Hoshino has estimated that Florentine cloth production was then about 17,000 pieces a year – a significant recovery – about two thirds of which now were produced by the Garbo sector.[173]

Chorley contends in particular that Florentine cloth exports to the Levant were to a large extent then based on an east-west exchange trade: "the import of raw Iranian [Persian] silk for the growing Florentine silk industry, which also had significant exports to the Levant." [174] That further demonstrates the integrated nature of the international if not yet global trade in textile products.

This considerable expansion of the Garbo sector does not mean, however, that the ultra-luxury San Martino woolens, those still woven exclusively from those very fine English wools, had lost their importance from the mid-fifteenth century. Even though far fewer were being exported to the Levant, in whose markets the Garbo cloths now predominated, the San Marino woolens continued to enjoy a considerable importance in Italian and especially Papal markets. As Richard Goldthwaite points out, the San Marino branch had benefited greatly from two major political changes directly affecting the Italian market itself. The first and most important was the end of the papal Great Schism (1378-1415), and the full return of the now unified Papal court from Avignon to Rome, which soon enjoyed a very considerable expansion. The second was the establishment of the Aragonese court in Naples, as the capital of the Kingdom of the Two Sicilies, under King Alfonso V of Aragon (from 1442).[175] Indeed, in the later fifteenth and sixteenth centuries, Naples rivalled Paris as the largest European city, while Rome itself, having finally recovered from the demographic decline and malaise suffered during the Babylonian Captivity and Great Schism, had once again become one of the largest in the western world.[176]

Thus, of the woolens imported into in Rome in the years 1451-76, Florentine cloths accounted for 13,528 or virtually half (49.72 percent) of the total 27,210 cloths sold there; and of these Florentine woolens, 5,354 (39.58 percent) were the extremely costly grain or kermes-dyed scarlets (*panni di grana*). Those sales statistics, if accurate, indicate a far larger volume of Florentine woolen cloth output than do the other data offered by both Hoshino and Chorley. In contrast, only 821 English broadcloths and 805 Flemish woolens were then sold in Rome.[177] In these domestic Italian markets, at least, the traditional San Martino sector remained more than competitive, even if the Florentine cloth industry's future, especially from the later

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[172] Chorley, "Rascie and the Florentine Cloth Industry," p. 489 (see n. 113 above). See also Hoshino, *Arte della Lana*, p. 270 (n. 38 above), citing the testimony of the Levant-based merchant Benedetto Dei: 8,000 woolen cloths (bolts) exported to Ottoman markets in 1470; 7,500 bolts in 1471; 8000 in 1472; but only3,300 in 1474, and 3,000 bolts in 1476.

[173] Hoshino, *L'Arte della Lana*, pp.239-44 (n. 38 above): estimating 4,286 San Martino woolens (from English wools) and 12,858 Garbo woolens, from other wools (chiefly *matricina*). The same figure of 17,000 bolts for 1488 is cited in Goldthwaite, *Economy of Renaissance Florence*, Table 4.1, p. 278 (n. 6 above).

[174] Chorley, "Rascie and the Florentine Cloth Industry," p. 489 (n. 113 above); Hoshino, *L'Arte della Lana*, pp. 268-75 (n. 38 above).

[175] Goldthwaite, *Economy of Renaissance Florence*, pp. 273-74 (n. 6 above). For export markets, he also contends that the Ottoman conquest of Constantinople and its establishment as the new capital of the now vast Ottoman Empire also benefited the Florentine cloth industries. See below, pp. 000.

[176] Jan de Vries, "Population," in Thomas A. Brady, Heiko Oberman, and James D. Tracy (eds.), *Handbook of European History, 1400 - 1600: Late Middle Ages, Renaissance and Reformation*, 2 vols. (Leiden-New York: E.J. Brill, 1994), vol. I: *Structures and Assertions*, pp. 1-50, esp. p.12 (also noting that the Kingdom of Naples "more than doubled its population between 1505 and 1595.").

[177] Hoshino, *Arte della Lana*, Tables XLII-XLIII, pp. 286-87 (n. 38 above). For the nature and importance of medieval woolen scarlets (*scarlatti*), see Munro, "Medieval Scarlet," pp. 13-70 (n. 48 above).

fifteenth and early sixteenth centuries, lay more and more with the Garbo sector, in marketing lower priced woolens (from non-English wools) chiefly to the Levant.

Macro-economic factors and falling transaction costs: expansion and change in the international textile trades from the 1460s

- *demographic factors in the European economic revival and expansion*

We should now consider the role of demographic and other macro-economic factors in both the recovery and expansion of Florentine cloth production, but especially the increasing share of that production provided by the relatively cheaper *panni di Garbo*. In the first place, the recovery in Italy's population, and then that of the Mediterranean basin, which occurred much earlier and more rapidly than in northwestern Europe (where demographic recovery did not begin until the 1520s), expanded both the size of consumer markets and the potential labor force within the Italian textile industries. By the 1520s, the population of Florence had recovered to about 70,000 - 80,000 (the latter, about double that of 1427).[178]

- *monetary factors: the Central European silver-copper mining boom*

Second, the recent and now current South-German-Central European silver-copper mining boom. undoubtedly stimulated strongly western Europe's combined economic and demographic recovery. From the 1460s to the 1530s, that mining boom quintupled European silver and copper production. That vast increase in silver outputs in particular not only ended the severe deflation of the mid-fifteenth century but also instigated the essential origins of the famed Price Revolution from about 1515 (see below, pp. 000): a sustained long-term inflation, lasting until the 1640s, that provided a strong stimulus to economic expansion, especially in reducing the real costs of labor and borrowed capital.[179] Much of that newly mined South German silver and copper allowed Venice in particular greatly to expand its commerce with the Levant, bringing back larger quantities of Syrian and Cypriot cotton to furnish the now rapidly expanding fustians industry of South Germany.[180]

- *commercial factors: the revival of overland long-distance trade routes and of European fairs*

The related development, of even greater importance, was the revival of long-distance overland or continental trade routes, now chiefly running from Venice through South Germany to the Frankfurt Fairs, and then along the Rhine to the new Brabant Fairs, whose expansion helped to make Antwerp the commercial and

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[178] De Vries, "Population," p. 12 (n. 176 above), noting an "explosive growth [that] characterized Tuscany between 1490 and 1552" – though passing over the Florentine plague of 1526. See also Chorley, "Rascie and the Florentine Cloth Industry," p. 494 (n. 113 above): for a figure of 80,000; Goldthwaite, *Economy of Renaissance Florence*, Table 4.1, p. 278 (n. 6 above): for a figure of 70,000.

[179] John Munro, "The Monetary Origins of the 'Price Revolution': South German Silver Mining, Merchant-Banking, and Venetian Commerce, 1470-1540," in Dennis Flynn, Arturo Giráldez, and Richard von Glahn (eds.), *Global Connections and Monetary History, 1470 - 1800* (Aldershot, 2003), pp. 1-34; John Munro, "The Price Revolution," in Steven N. Durlauf and Lawrence E. Blume (eds.), *The New Palgrave Dictionary of Economics*, 2nd edition, 6 vols. (London and New York, 2008), vol. 6, pp. 631-34; and Munro, "Profit Inflation," pp. 1 3-71 (n. 143 above).

[180] Munro, "Monetary Origins of the Price Revolution," pp. 1-34 (n. 179); and especially John Munro, "South German Silver, European Textiles, and Venetian Trade with the Levant and Ottoman Empire, c. 1370 to c. 1720: A Non-Mercantilist Approach to the Balance of Payments Problem**,"** in Simonetta Cavaciocchi (ed.), *Relazioni economiche tra Europa e mondo islamico, secoli XIII - XVIII/ Europe's Economic Relations with the Islamic World, 13th - 18th Centuries*, Fondazione Istituto Internazionale di Storia Economica 'Francesco Datini', Atti delle 'Settimana di Studi' e altri convegni, no. 38 (Florence, 2007), pp. 907-62.

financial capital of northern Europe, from the 1460s to 1560s. As Van der Wee and others have amply demonstrated, these overland, continental trade routes (less than twenty percent of the distance by sea) had a far greater economic stimulus in expanding international trade than did the late-medieval maritime routes: in increasing capital investment, production, employment, and aggregate regional incomes, by a combined multiplier-accelerator effect, affecting a vastly greater geographic areas and hundreds of more towns.[181] That overland continental trade, furthermore, led to the revival of the large-scale international fairs, as a very major force in the expansion of European international trade, though with locations entirely different from those of the thirteenth century: not only in the new fairs of Frankfurt and Brabant (Antwerp and Bergen-op-Zoom), but also in those of Bescançon, Geneva, and especially Lyon.[182]

In more general macro-economic terms, these combined demographic-economic forces for expansion, greatly aided by a relative diminution in warfare, with the end of the Hundred Years' War in particular (1453), fully reversed the contractionary forces of the fourteenth-century, indeed to restore the far more propitious and expansionary economic forces of the thirteenth-century Commercial Revolution era. In so doing, they also produced a very significant reduction in transaction costs in international trade – all the more so when we realize how dependent cost reductions in the transaction sector were based on enlarged scale economies, i.e, with much larger, more concentrated, and more efficient urban markets

- *commercial factors in economic expansion: advances in transport technology*.

Those cost reductions were aided by significant technological advances in transportation and communications. In maritime commerce, by far the most important was the development, from the 1450s, of the heavily-gunned, three-masted, fully-rigged ships (with combined square and lateen sails), especially the carracks and galleons. By the early sixteenth century, according to Frederic Lane, these new so-called "Atlantic" ships reduced ocean freight rates, including implicit insurance costs, by about 25 percent. Indeed these were the ships that allowed western Europeans to dominate the world's shipping lanes for the next four centuries.[183]

Equally important were innovations in overland, continental trade: especially, the establishment of professional, specialized cartage firms, which used the new, larger-scale, lower-cost Hesse wagons (carts), in well organized convoys. These firms offered merchants fully insured passage for their goods at predetermined, fixed rates, with reliable travel schedules; and they also provided an efficient overland postal service. They soon made the continental overland routes both speedier and more reliable than Atlantic shipping routes from north-west Europe into the Mediterranean.[184] To these may be added the subsequent "financial revolution" in the development of fully negotiable credit instruments, in both private and public finance (*rentes*), and financial exchanges, from the 1520s, which contributed to a fifty-percent reduction in

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[181] See Herman Van der Wee, "Structural Changes in European Long-Distance Trade, and Particularly in the Re-export Trade from South to North, 1350-1750," in James Tracy (ed.), *The Rise of Merchant Empires: Long-Distance Trade in the Early Modern World, 1350-1750* (Cambridge, 1990), pp. 14-33; and Van der Wee and Peeters, "Un modèle dynamique," pp. 100-28 (see n. 105 above).

[182] See sources cited in n. 181, and in Munro, "New Institutional Economics," pp. 1-47 (n. 4 above).

[183] Frederic Lane, *Venetian Ships and Shipbuilders of the Renaissance* (Baltimore, 1934), pp. 26-28; Frederic Lane, "Technology and Productivity in Seaborne Transportation," in A. Vannini Marx (ed.), *Trasporti e sviluppo economico, secoli XIII - XVIIII,* Atta della quinta settimana di studio, Istituto internazationale di storia economica "F. Datini", Prato 1973 (Florence, 1986), pp. 233-244; Richard Unger, *The Ship in the Medieval Economy, 600-1600* (London and Montreal, 1980), pp. 201-50 ; Carlo Cipolla, *Guns, Sails and Empires: Technological Innovation and the Early Phases of European Expansion, 1400-1700* (New York, 1965), pp. 90-131.

[184] See Herman Van der Wee, *Growth of the Antwerp Market and the European Economy*, *14th to 16th Centuries*, 3 vols. (The Hague, 1963), vol. II, pp. 177-94, 325-64; Van der Wee, "Structural Changes in European Long Distance Trade," pp. 14-33 (n. 181 above).

real interest rates by the mid-sixteenth century.[185]

- *economic consequences for long-distance trade in cheaper textiles*

Just as the late-medieval forces for economic contraction and disruption, in raising transaction costs, had seriously hindered long-distance trade in cheaper line textiles, so the reversal of these forces and the significant reduction in transaction costs promoted a renewed emphasis and greater relative importance of long-distance trade in those cheaper-line textiles: such as the previously mentioned *panni di Garbo* and the South German fustians. In the Low Countries, those structural changes similarly brought about the revival and significant expansion of the Hondschoote-style *sayetteries* and other *draperies légères*, which, by the early sixteenth century, had displaced the traditional woolen draperies to become decisively the leading textile industry of the southern Low Countries.[186] Most of these were, like the thirteenth-century Hondschoote says, a semi-worsted serge. As explained earlier, they had a long-stapled worsted, combed, dry warp, spun on the distaff (rock), and a short-stapled, carded, greased weft, spun on the spinning wheel.[187] Others were pure worsteds, in both warp and weft. Both serges and worsteds were far lighter and far cheaper than traditional woolen broadcloths (as also demonstrated earlier), but the serges, as a hybrid textile, were not as cheap and as light as pure worsteds. As was the case in the thirteenth century, so the major market for the product of Low Countries' *sayetteries* proved to be Italy, the Mediterranean basin in general, and then the Spanish colonies in the Americas.[188] When the Spanish armies ravaged the southern Low Countries during the Revolt of the Netherlands (1568-1609), forcing the flight of Flemish textile artisans to both Holland and England, the English New Draperies, whose rapid expansion the Flemish refugees so effectively promoted, in turn came to displace the *sayetteries* and all other rivals in European and overseas markets, by the mid seventeenth century.[189]

New products of the later fifteenth-century Florentine cloth industry: ***panni perignani, saie a uccellini***, **and *panni di rascia***

Much earlier, as Hoshino notes, the *Arte della Lana* had attempted, with varying degrees of success, to re-introduce the production of similar lighter-weight, semi-worsted fabrics in the second half of the fifteenth century, along with other new textiles. Among the former, the most important were the *panni perpignani:* "leggera stoffa di lana," evidently serge fabrics that used Spanish and possibly other wools for the weft yarns (and possibly domestic wool for the longer-stapled warp yarns); and the *saie a uccellini*, which was either a revival of the older Florentine says or an imitation of the says currently being produced in the

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[185] Herman Van der Wee, "Anvers et les innovations de la technique financière aux XVIe et XVIIe siècles," *Annales: Économies, sociétés, civilisations*, 22 (1967), pp. 1067-89, republished as "Antwerp and the New Financial Methods of the 16th and 17th Centuries," in Herman Van der Wee, *The Low Countries in the Early Modern World*, trans. by Lizabeth Fackelman (Aldershot, 1993), pp. 145-66.

[186] Emile Coornaert, "Draperies rurales, draperies urbaines: l'evolution de l'industrie flamande au moyenâge et au XVI siècle," *Belgische tijdschrift voor filologie en gescheidenis/Revue belge de philologie et d'histoire*, 28 (1950), pp. 60-96; Herman Van der Wee (with John Munro), "The Western European Woollen Industries, 1500-1700," in David Jenkins (ed.), *The Cambridge History of Western Textiles* (Cambridge and New York, 2003), pp. 439-58; Hugo Soly and Alfons Thijs, "Nijverheid in de zuidelijke Nederlanden," in J.A. Van Houtte, et al. (eds.), *Algemene geschiedenis der Nederlanden*, 12 vols. (Haarlem, 1977-1979), Vol. 6, pp. 27-57, with estimates that, in the 1560s, the output of woolen cloths was about 2.07 million meters, while output from the various *sayetteries* and other *draperies légères* (*sèches*) was about 3.64 million meters, i.e., about 76 percent greater.

[187] See above pp. 000.

[188] Florence Edler, "Le commerce d'exportation des sayes d'Hondschoote vers Italie d'après la correspondance d'une firme anversoise, entre 1538 et 1544," *Revue du Nord*, 22 (1936), pp. 249-65.

[189] See below, pp. 000

Low Countries.[190]

By far the most important new textile was, however, an entirely different fabric: the *panni di rascia* – or *rascie*, known in England as "rashes". Their introduction resulted from a petition that the *Arte della Lana* presented in February 1488. Its specific goal was to permit the establishment of an industry for producing imitations of recently imported foreign *rascie*, whose growing volume seemingly presented a threat to the Florentine textile industries.[191] Most recently, Francesco Ammannati has correctly noted that the generic European *rascie* of the later fifteenth century were low-quality fabrics; and in his view, members of the *Arte della Lana*, very familiar with such new products, "used their experience and ability to transform low-quality imitations into higher-level products."[192] Indeed, the *Arte della Lana* soon became so successful in producing their own varieties of *rascie* that this became Florence's most important wool-based textile in the sixteenth century, but most especially from the 1550s to the 1570s.

Its true nature, however, is an intriguing mystery. All of the evidence vindicates Ammannati's view that this successful product was a very high-priced luxury textile. Nevertheless, Chorley, along with Goldthwaite and many others, called it a "serge" fabric; and, as has been demonstrated earlier, generically *serges* had long been much lighter-weight and cheaper-line fabrics. Goldthwaite specifically contended that the new Florentine *rascie* "were much lighter ... than the traditional second line Garbo cloths," and compared them with products of the northern *sayetteries*.[193] The Hondschoote says and many, if not all, products of the Flemish *sayetteries* in the sixteenth century, and subsequently those of the English New Draperies were indeed true serge cloths (as contended earlier): having a combed, long-stapled, dry worsted warp and a carded, short-stapled greased woolen weft.[194]

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[190] Hoshino, *Arte della Lana*, p. 235-36 (n. 38 above). See also Edler, *Glossary of Medieval Terms*, pp. 202-03 (n. 21 above): *panno perpignano*: "medium priced cloth, used esp. for men's hose," p. 420; Chorley, "*Rascie* and the Florentine Cloth Industry," pp. 504 ("low cost *perpignani"*), p. 510 (see n. 113 above). For the role of cheap *perpignani* in later sixteenth- century Florentine cloth exports, see Chorley, "Volume of Cloth Production," Table 3, p. 565, and pp. 567-9 (n. 168 above); but see also notes for his table, which indicate that *saie* were then more expensive textiles, classed with *panni richi* (years 1586-1639). See also Tables 16-17 below.

[191] Hoshino, *Arte della Lana*, pp. 235-39 (n. 38 above); Chorley, "*Rascie* and the Florentine Cloth Industry," p. 496 (n. 113 above): stating the 1488 Arte della Lana petition was directed specifically against importations of *rascie di Schiavonia*, from Serbia, via Dalmatia. The resulting Florentine *rascie* were far finer woolens.

[192] Francesco Ammannati, "Florentine Woolen Manufacture in the Sixteenth Century: Crisis and New Entrepreneurial Strategies," *Business and Economic History On-Line*, 7 (2009), pp. 1-9; quotation on p. 3. See also Francesco Ammannati, "L'Arte della Lana a Firenze nel Cinquecento: Crisis del settore e riposte degli operatori," *Storia economica: Rivista quadrimestrale*, 11:1 (2008), pp. 1-39.

[193] Goldthwaite, *Economy of Renaissance Florence*, p. 274 (n. 6 above). See also Chorley, "Rascie and the Florentine Cloth Industry," p. 487 (n. 113 above): " a 'new drapery' belonging to the category of cloth serge, and they constituted the main Italian contribution to the diversification of wool textile production;" p. 496: "a new line of production, the *rascia fiorentina*, that exploited the growing demand in western Europe for a woollen dress material lighter than the traditional broadcloth.". See also Appendix Two: *Rascie*: Technical Characteristics, pp. 520-23; and also the companion article in this journal: Goldthwaite, "Florentine Wool Industry," pp. 527-53 (n. 23 above).

[194] See Emile Coornaert, *La draperie-sayetterie d'Hondschoote, XIVe-XVIIIe siècles* (Paris, 1930); Emile Coornaert, *Une industrie urbaine du XIVe au XVIIe siècle: l'industrie de la laine à Bergues-Saint-Winoc* (Paris, 1930); Coornaert, "Draperies rurales, draperies urbaines," pp. 60-96 (n. 186 above); Munro, "Origins of the English New Draperies," pp. 83-87 (n. 29 above); B. A. Holderness, "The Reception and Distribution of the New Draperies in England," in Negley Harte (ed.), *The New Draperies in the Low Countries and England*, *1300 - 1800*, Pasold Studies in Textile History no. 10 (Oxford, 1997), pp. 217-44;

But, as the many documents cited by both Chorley and Goldthwaite make clear, the Florentine *rascia* was a fabric entirely different from traditional serges, especially in its wool composition. The fact that the Florentine *rascie* had a combed warp and carded weft is quite irrelevant, because, as noted earlier, all medieval woolens, north and south, from the thirteenth to the fifteenth century, contained the same type of combed warp and carded weft yarns, all made from greased, short-fibered, curly wools (with excellent felting properties).[195] As also noted earlier, even though a shift to all carded yarns had taken took place in many draperies of the southern Low Countries in the mid to late fifteenth century, the Italian cloth industries continued with the older technology in producing fine woolens with combed, rock-spun warps.[196]

The important distinction between the new Florentine *rascie* and the products of both the Flemish *sayetteries* and the English New Draperies is that the Florentine industry used very fine, short-stapled *merino* wools for its warps (as well as for its weft yarns), while the two latter industries used much cheaper, coarser long-stapled wools for their warp yarns. Indeed, neither the Flemish *sayetteries* nor the English New Draperies ever used Spanish wools for either warps or wefts.[197] Certainly the staple length of early Spanish *merino* wools was far too short (possibly only 0.50 - 0.75 inch = 3.04 cm - 1.25 cm) for true combed worsted

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Luc Martin, "The Rise of the New Draperies in Norwich," in Negley Harte (ed.), *The New Draperies in the Low Countries and England*, *1300 - 1800*, Pasold Studies in Textile History no. 10 (Oxford, 1997), pp. 245-74. See also pp. 000- 00 below.

[195] See Munro, "Medieval Woollens: Technology," pp. 197-204 (n. 8 above); and see also pp. 000 above. Note also that before the introduction of both carding and the spinning wheel in the thirteenth century, woolens had been woven from both warp and weft yarns that had been combed (but using shorter combs than those for making worsteds). See n. 20 above and the following note.

[196] See above pp. 000-00; and De Roover, "Florentine Firm of Cloth Manufacturers," pp. 11-15 (n. 23 above), esp. p. 14, n. 3: "In the Middle Ages a cloth contained a warp of combed yarns and a weft of carded yarn in order to give it strength. The weft usually required twice as much material as the warp." See also Edler, *Glossary of Medieval Terms*, Appendix VIII: "Spinning," pp. 413-18 (n. 21 above) . Munro, "Medieval Woollens: Technology," pp. 197-204 (n. 8 above). But see also, Chorley, "Evolution of the Woollen," pp. 7-13 (n. 20 above), offering the hypothesis that the general introduction of all-carded woolens did not come anywhere in continental Europe before the sixteenth century, though possibly earlier in England (where dating is far more difficult). All late-medieval woolens (or most) were of course woven with carded, wheel-spun wefts.

[197] Chorley, "Rascie," pp. 520 -21 (n. 113 above). Note that the Florentine producers of *rascie* used the very same fine Spanish (Castilian) wools as used in the San Martino branch producing *panni larghi*, but with a greater density of warp threads (as great a density, Chorley contends, as in the Hondschoote *saies*). The one other feature that is common to the *rascie* and the northern serge is that the wools for the combed warps were "dry," rather than being greased with olive oil (indicting that the wools were not scoured and so retained their natural lanolin). But the wools were for the carded wefts were also dry, ungreased, while the weft yarns in the Hondschoote and some other Flemish *saies* were greased before carding. See nn. 20, 194 above. On this point, Chorley cites the 1595 *Arte della Lana* regulations for the *rascie* (from Archivio di Stato, Arte della Lana, 16, fo. 40). This is a puzzling feature that neither Chorley nor I can explain. See also Goldthwaite, "Florentine Wool Industry," p. 552, and Table A. 1, p. 553 (n. 23 above): indicating that 18.52 percent of the wool weight for producing *rascie* from Spanish wool was lost in the wool-washing and scouring (not 18.34 percent, as he states). That is especially puzzling, since the normally this process was undertaken to remove the natural lanolin in the wool, thus requiring its replacement with butter or olive oil in the following stages. In true worsteds, the wools were not so scoured, and thus not subsequently greased for the following processes. See also de Roover, "Florentine Firm of Cloth Manufacturers," p. 12, n. 2 (n. 21 above), for the production of 71 regular woolens in 1556-57: indicating that a virtually similar percentage of wool-weight was lost in the washing/scouring processes: 19.45 percent. See also Munro, "Medieval Woollens: Technology," pp. 197-204 (n. 8 above); and Table 11 below.

warps, which required a staple length of 6 to 10 inches (15.24 cm - 25.4 cm.[198]

As stressed earlier, a key distinction between true woolens and the products of the *sayetteries* and other *draperies légères* – as the very name suggests – and then the English New Draperies was weight: the very heavy weights of the former and the light weights of the latter.[199] As also indicated earlier, we lack sufficient evidence on finished dimensions to measure Florentine cloth weights properly: in grams per square meter. But the accounts of the Florentine Brandolini firm in the 1580s do provide two sets of data that allow an approximate estimate of the weight of its *rascie* cloths. First, they specify that one bolt of *rascia* cloth, measuring 61.77 *braccia* = 15.443 *canne* = 36.012 m., weighed, after fulling and finishing, 67 lb. Florentine = 22.749 kg. If it had the same width as the Prato woolens of the 1390s – an average of 2.55 m., with an average finished area of 40.90 m^2 and an average finished weight of 26.15 kg. – the Florentine *rascie* would have been not quite as heavy, but still close. Nevertheless, they were still heavy-weight woolens, and very different from the far lighter-weight, true-serge Hondschoote says: 5.103 kg. for a single say (15.006 m^2) and 7.422 kg. for the much wider double say (27.869 $m^{2)}$, as noted above. [200]

The second or alternative method of comparison involves the relative wool contents of the textiles. The Brandolini accounts indicate that one bolt of *rascie* cloth contained 108 lb. = 36.671 kg. Florentine of raw, unwashed Spanish wool, which was transformed, when scoured, into 31 lb. = 10.526 kg. of warp yarns and 53 lb.= 17.996 kg. of weft yarns, for a total (with warp-sizing) of 85 lb. = 28.861 kg. of yarn in the woven textile.[201] After fulling, that weight was reduced to 67 lb = 22.749 kg. (as given above): an overall loss of 37.96 percent of the original wool weight.[202] That extensive loss – from the combined processes of cleansing, spinning, and especially fulling (with further scouring) – is far more characteristic of woolens than of the hybrid worsted-woolen serges. So indeed is the 18.72 percent contraction in the length: from 76.00 *braccia* (44.308 m.) on the loom to 61.77 *braccia* (36.012 m.) after fulling; and fulling, it bears repeating, was a key determinant of final cloth weights. Furthermore, the high weft to warp ratio, by relative wool weights – 1.71:1 – is also more characteristic of true woolens than of serges.[203]

We may compare the 36.671 kg. of Spanish wool used in the Florentine *rascie* (1556-58) to the following wool-weights (not final cloth weights) in other late-medieval textiles, for: (1) a woolen broadcloth produced in Leuven, woven from fine English wools (Linconshire.), in 1434: 30.391 kg.; (2) another such Leuven broadcloth (also from Linconshire. wools), woven in 1442: 28.441 kg.; (3) a fine woolen broadcloth (from Cotswolds wool) produced in Ypres, in 1501: 33.702 kg.; (4) a Florentine (Medici) broadcloth woven from Spanish *merino* wools in 1534: 34.201 kg.; (5) another Medici woolen broadcloth, also woven from

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[198] See Mann, *Cloth Industry*, pp. 266-67 (see n. 137); but other sources cited in nn. 137, 139, 141 above contend that modern *merino* have a staple length of 2.25 - 2.50 inches, compared to 10.5 inches for Lincolnshire wools.

[199] See above pp. 000

[200] See above pp. 000

[201] Goldthwaite, "Florentine Wool Industry," Table 1,p. 529; Table A.1, p. 553 (see n. 23 above).

[202] *Ibid*., p. 552 and Table 11, p. 553: Goldthwaite states incorrectly that the total loss was 39.13 percent (though this is a very minor error).

[203] The reduction in length of a Hondschoote single or double say was much less: 12.5 percent (from 28.0 to 24.5 m.). See Munro, "Three Centuries of Luxury Textile Consumption," Table 1.1, p. 11 (see n. 8 above). Unfortunately neither the widths – on the loom and after fulling – are known for either the Hondschoote says or the Florentine *rascie*.

Spanish wools, in 1558: 39.372 kg.[204] Those wool weights in turn may be compared the composition of an eighteenth-century (English) Essex full-worsted say, whose length was 27 yds = 24.689 m: just 13.00 lb = 5.897 kg. of wool, equally divided between warp and weft.[205] Clearly the sixteenth-century Florentine *rascie* were far heavier (before and after finishing) than most products of the Flemish *sayetteries* and English New Draperies.[206]

The other chief and indeed most important difference between the sixteenth-century Florentine *rascie*, on the one hand, and the Flemish *saies* and products of the English New Draperies, on the other hand, was their price – a very wide difference in prices. Indeed, the essence of the sixteenth-century Flemish *sayetteries* and the post-1560 English New Draperies was the comparatively low prices their products, compared to traditional broadcloths (from the Old Draperies). If we begin again in England during the sixteenth century, for the period 1578-1599, with products of the Old and New Draperies, we find that the average price of heavy-weight English woolen broadcloths was 80d sterling per yard (= £8.000 sterling for 24 yards); for serges, 32d per yard (£3.200 for 24 yards); for worsted bays (baize), 21d per yard (£2.100 for 24 yards); for flannel, 10d per yard (£1.000 for 24 yards).[207] Thus the prices for serges (worsted warps and woolen wefts) was only 40.00 percent of that for woolen broadcloths (on average) and that for bays was only 26.25 percent As noted earlier, we found the very same difference in the values of thirteenth-century wool-based European textiles: i.e., in the contrast between prices of true woolens and of serges and worsteds.[208]

More specific details on prices and cloth types may be presented for Flemish textiles somewhat earlier in the sixteenth century, for the Antwerp market. First, for the years 1538 to 1544, the mean price of Hondschoote single says (made from Flemish, Frisian, Pomeranian wools) was £0.879 (= 17.58 s) *groot* Flemish*;* that of a Hondschoote double say (same wools) was £2.023 *groot* (=40.46 s); and that of a Ghent *dickedinnen* broadcloth (made from fine English March and Cotswolds wools) was £13.657 *groot*.[209] In order to purchase 12 meters of each of these cloths (for a man's full suit), an Antwerp master mason, then earning just over 12d *groot* Flemish per day (mean of annual summer and winter wages = 12.214d), would have needed to spend 91.413 days' wages for a Ghent *dickedinnen* broadcloth; 16.948 days' wages, for a Hondschoote double say (same wools); and, for a Hondschoote single say, 13.725 days' wages – just 15.0 percent of that required for a Ghent *dickedinnen*.[210] That comparison surely indicates the vast difference

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[204] See the sources cited in the tables in: Munro, "Industrial Protectionism," Table 13.2 (Leuven in 1434 and 1442), p. 256 (see n. 109 above); Munro, "Medieval Scarlet," Table 3.12, p. 52: for Ypres 1501 (n. 48 above); De Roover, "Florentine Firm of Cloth Manufacturers," pp. 3-33 (n. 21 above).

[205] Kevin H. Burley, "An Essex Clothier of the Eighteenth Century," *Economic History Review*, 2nd ser., 11:2 (1958), pp. 289 - 301, esp. Table III, p. 297.

[206] See above, pp. 000. One English exception was the Suffolk *rasse* (1578), possibly an imitation of the Florentine *rascia*: 24 yds by 1.5 yds (narrower than a broadcloth), weighing 42.0 lb = 19.051 kg., with 632.908 g per m^2 – and thus a very heavy cloth for the New Draperies. Munro, "Medieval Woollens: Struggle for Markets," Table 5.7, pp. 312-13 (n. 8 above).

[207] Carole Shammas, "The Decline of Textile Prices in England and British America Prior to Industrialization," *Economic History Review*, 2nd ser., 47:3 (Aug. 1994), pp. 483-507: esp. Table 1, p. 484. Note that 24 yards (=21.946 m.) was the official length of a finished woolen broadcloth of assize (with a width of 1.75 yds). See n. 17 above.

[208] See above, pp. 000

[209] Munro, "Three Centuries of Luxury Textile Consumption," Table 1.1, pp. 10-11; Table 1.2, pp. 14-15 (n. 8 above). Fully finished, the Ghent *dickedinnen* had an area of 34.913 m^2 and a weight of 22.125 kg.; the Hondschoote single say, an area of 15.006 m^2 and a weight of 5.103 kg.; the double say, an area of 27.869 m^2 and a weight of 7.422 kg.

[210] *Ibid*., Table 1.2, pp. 14-15.

between the values of luxury woolens and those of the mixed worsted-woolen serges.

At the Antwerp market, about forty years later, in 1575, we find that the Florentine *rascie* were vastly more expensive than the Hondschoote says.[211] With market values expressed in pence *groot* Flemish per Antwerp ell (0.695 m.), the price for a large Florentine *rascie* cloth then ranged from 252d to 324 d (£31.500 to £40.500 *groot* for 30 ells). In comparison, the market price for a Hondschoote single say was merely 10d per ell (£1.250 for a cloth of 30 ells = 20.85 m); that for a double say, 20d (£2.50 for 30 ells); and that for "counterfeit *ras*" from Bruges – which probably were indeed serge cloths - ranged from 52d - 56d per ell (£6.50 to £7.00 for 30 ells).The most expensive woolen broadcloth on the Antwerp market was an English scarlet or murrey-scarlet *Coggeshall* from Essex, at 480d per ell (£60.00 for 30 ells); the next most expensive was a Mechelen *vergulden arent* (Golden Eagle), at 240d (£30.00 for 30 ells). For another comparison, we find that Italian silk fabrics were priced as follows on the Antwerp market, per ell (lengths per piece unknown): velours, from 240d to 288d; Genoese satins, from 108d to 132d; Florentine satins and damasks, from 90d to 120d – most of which were cheaper than the Florentine *rascie*.[212]

Obviously, by any measure taken, the sixteenth-century Florentine *rascie* were very high-priced luxury woolens. As noted earlier, the average value of the Florentine *rascie* that the Brandolini firm produced in the 1580s was, per bolt (36.013 m), £529.48 *lira di piccioli* = 70.597 florins of account (i.e., in terms of total production and marketing costs, including the entrepreneur's profit). [213] That was also the average sales value, a value that corresponds well with the stable market prices that Chorley has found for Florentine *rascie* from 1540 to 1593: a value of £32 - £33 per *canna* (15.5 *canne* per bolt), and thus £496.00 to £511.50 per bolt of *rascia* (equal to 66.133 to 68.200 florins of account).[214]

The best way of expressing such a value is, again, to measure the cloth price in terms of the purchasing power of skilled labor. In Florence during the 1580s, a master building craftsmen, then earning 5.83 *soldi* per day (mean of daily wages for 1581-90), would have had to spend 295.55 days' wages to buy such a bolt of *rascia*, or 98.52 days' wages to buy one third of a bolt (12 m) to buy a man's full dress suit.[215] All of this evidence, therefore, fully supports the Florence Edler's rather different view about the very costly

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[211] The following prices are taken from Alfons Thijs, "Les textiles au marché anversois au XVIe siècle," in Erik Aerts and John Munro (eds.), *Textiles of the Low Countries in European Economic History*, Proceedings of the Tenth International Economic History Congress, Studies in Social and Economic History, Vol. 19 (Leuven, 1990), pp. 81-84. Note that Thijs lists the prices for the Florentine *rascie* under the heading: *produites de la draperie légère* (p. 84), evidently also believing them to be light serge cloths; but the other *ras* in this list undoubtedly were such serge cloths.

[212] *Ibid.*, p. 78 (for silks). The most expensive Flemish woolen – none from Ghent is listed – was the red *St. Andries* broadcloth from Ypres, at 122d per ell (£15.25 *groot* Flemish for 30 Antwerp ells = 20.85 meters).

[213] See above pp. 000-00.

[214] Chorley, "*Rascie* and the Florentine Cloth Industry," p. 504 (n. 113 above). These values are based on the assumption that one *canna* = 4 *braccia*, so that a bolt of 62 *braccia* (0.583 m. each) contained 15.5 *canne*, and that the bolt (actually 61.77 *braccia* for Brandolini's *rascia*) = 36.012 m. or about 39.383 yd. See nn.23, 45, 66, and 76 above. Chorley also notes that Brandolini's *rascie* prices in 1592-93 were slightly higher than this mean value. Note that one florin of account = £7.500 *lira di piccioli* (see n. 148 above).

[215] Wages for Florentine master masons are taken from Paolo Malanima's data set on "Prices and Wages in Italy, 1270 - 1913,"[http://www. utoronto.ca/munro5/MalanimaItalyPricesWages.pdf]. The wages for this period are based on Richard Goldthwaite, *The Building of Renaissance Florence: An Economic and Social History* (Baltimore, 1980), Appendix 3, pp. 436-39. See also Goldthwaite, *Economy of Renaissance Florence*, Table A.1, p. 613 (n. 6 above), which regrettably does not inform the reader that the mean wages are those for unskilled laborers, not for master building craftsmen.

nature of Florentine *rascie*, published much earlier, in 1934 – views that Chorley did not cite:[216]

> Today *rascia* means a coarse serge, but in the sixteenth century it was apparently a fine woolen cloth, without any nap, or with a very closely sheared one, used especially for men's clothing, and was the most expensive Garbo cloth manufactured in the sixteenth century.

Chorley was, however, perfectly correct in contending that the *rascie* came to be Florence's most important textile product in the years from 1540 to about 1570. That was the all the more important when, as will be seen shortly, its wool-based industry as a whole had begun to decline much earlier, from the 1520s, losing its overall Italian supremacy to Venice.[217] While the importance of *rascie* as an export product to the Antwerp market in the 1570s has already been noted, Chorley is not so correct in asserting that "the Italian industry for the first time succeeded in carving out a major market north of the Alps," in exporting this new product to the northern Fairs.[218] We have already noted, however, the far earlier presence of Florentine luxury woolens on the Polish markets (Cracow), in the 1390s (Table 4).[219] We shall return to the sixteenth-century role of the *rascie*, in producing an Indian summer of relative prosperity for the Florentine cloth industry, before its final and irredeemable decline: from the 1570s into the early seventeenth century.

The (temporary) decline of Florentine cloth production in early the sixteenth century

In his admirable, path-breaking study on the sixteenth-century Florentine cloth industry and its new *rascie* textiles , Patrick Chorley also demonstrated that the Renaissance Florentine cloth industry had reached its apogee in the late 1520s – i.e., before the *rascie* first appeared in any numbers on export markets. Chorley has estimated the industry's output at 20,000 pieces or bolts of woolen cloth – perhaps double that estimated for a century earlier (ca. 1420).[220] Other estimates of this peak output provide a range from 18,000 to 24,000 bolts.[221] In this decade, the luxury-oriented San Martino branch accounted for about 25 percent of industry's output by volume but about half of the industry's revenue, then estimated at 600,000 florins. The industry's Garbo branch accounted therefore for the remainder: about 75 percent by volume and 50 percent by value.[222]

To explain the sudden decline of the traditional Florentine woolen industries from the 1520s, Chorley suggests two major causes. The first, and most important, was the loss of Florence's dominance in western trade with Turkish and Levantine markets. That sudden loss had begun with a "disruption in the trade in Iranian [raw] silk" from an embargo that the Ottoman Sultan Selim I had imposed in the years 1514-20, leading to a shift in the silk transit trade from Bursa (Constantinople) to Aleppo, where the Florentines "had

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[216] Edler, *Glossary of Medieval Terms*, p. 238, and Appendix IX, p. 420 (n. 21 above). She notes that in England it was called a *rash*.

[217] Chorley, "Rascie and the Florentine Cloth Industry," pp. 487-526 (see n. 113 above)

[218] *Ibid*., pp. 487, 514.

[219] See above, pp. 000-00; Table 3 below; and also Jerzy Wyrozumski, "The Textile Trade of Poland in the Middle Ages," in Negley B. Harte and Kenneth G. Ponting (eds.), *Cloth and Clothing in Medieval Europe: Essays in Memory of Professor E. M. Carus-Wilson*, Pasold Studies in Textile History no. 2 (London, 1983), pp. 248 - 57.

[220] Chorley, "Volume of Cloth Production," pp. 551-72 (n. 168 above); Chorley, "Rascie and the Florentine Cloth Industry," pp. 487-89, and Appendix One, pp. 515-19 (n. 113 above). Chorley cites reports of the Venetian ambassadors in 1527 and 1528 indicating output of 20,000 - 23,000 pieces and 22,000 - 24,000 pieces, respectively.

[221] Goldthwaite, *Economy of Renaissance Florence*, Table 4.1, p. 278 (n. 6 above).

[222] See sources in nn. 113, 217, above.

no established presence." The Venetians, however, certainly did have a major presence there.[223] For some Florentine firms, the Turkish share of their exports fell from a high of 42 percent, in 1518-32, to 13 percent in 1544.

The second major cause was Florence's own internal crisis of the years 1526-30, when bubonic plague killed about a quarter of the population, while foreign war and domestic civil strife was also afflicting the unfortunate city. The Spanish-German sack of Rome in 1527, and the apparent weakness of the Medici pope Clement VII, sparked a revolt against Medici rule in Florence ,which led to the re-establishment of the Republic. Three years later, in August 1530, that Republic was finally and brutally crushed by combined Papal and Imperial forces. The combined death toll from plague, hunger, and military strife was estimated to have been over 30,000.[224]

Obviously both of these disasters had a serious impact on Florentine textile production – and chiefly to the advantage of the Venetian cloth industry. Support for that thesis may be found in statistical evidence that Peter Earle has supplied for the sharp decline in Florentine cloth sales in Mediterranean markets in and from the 1520s, with a concurrent rise in English cloth sales there.[225]

The rapid rise (or recovery) of the Venetian woolen cloth industry: cloth production in the fifteenth and sixteenth centuries and the role of the Ottoman Turkish markets

By far the most dramatic development in the history of the Italian textile industries in the sixteenth century was Venice's rapid and almost total displacement of Florence as a producer and exporter of fine, heavy-weight woolen broadcloths in the Levant – and more generally in the Ottoman Empire, which, of course included most of the Balkans, as well as Asia Minor, and then, from the Ottoman conquests of 1516-17, all of the Mamlūk domains in Egypt, Syria, and Palestine.

The sixteenth-century expansion of the Venetian woolen industry seems all the more remarkable because, according to most historians, Venice had never enjoyed a cloth industry of any international importance before 1516, when its production was first recorded.[226] More recently, however, the Italian historian Andrea Mozzato has challenged that traditional view, in particular on the basis of two reports issued in 1423. In the first, Doge Mocenigo contended that Venice was then exporting about 3,000 Venetian woolens a year, while importing about 48,000 cloths from Tuscany, Lombardy, France, Flanders, and England. [227] Much of those cloth imports were presumably re-exported, though the report is silent on that

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[223] Genoese trade with the Ottoman Empire was also important, but is beyond the scope of this study. See Kate Fleet, *European and Islamic Trade in the Early Ottoman State: the Merchants of Genoa and Turkey*, Cambridge Studies in Islamic Civilization (Cambridge, 1999).

[224] Najemy, *History of Florence*, pp. 446-61 (see n. 83 above); Chorley, "Rascie and the Florentine Cloth Industry," pp. 487-89 (n. 113 above).

[225] Peter Earle, "The Commercial Development of Ancona, 1479-1551," *Economic History Review*, 2nd ser., 22:1 (April 1969), pp. 28-44 (esp. p. 39): the English woolens were Winchcombe kerseys, *panni di Londra*, and *ultrafini* – probably Suffolk Superfine broadcloths.

[226] See in particular Domenico Sella, "Rise and Fall of the Venetian Woollen Industry," in Brian Pullan (ed.), *Crisis and Change in the Venetian Economy in the Sixteenth and Seventeenth Centuries* (London, 1968), p. 111: "The Venetian woollen industry, whose origins go back to the thirteenth century, remained a negligible part of the city's economy until the great upsurge of the sixteenth century." But see N. Fano, "Richerche sull'arte della lana a Venezia nel XIII e XIV secolo," *Archivio Veneto*, 55 (1936), pp. 72-212; and the following notes.

[227] Andrea Mozzato, "The Production of Woollens in Fifteenth- and Sixteenth-Century Venice," in Paola Lanaro (ed.), *At the Centre of the Old World: Trade and Manufacturing in Venice and the Venetian Mainland, 1400- 1800*, Essays and Studies no. 9, Centre for Reformation and Renaissance Studies (Toronto,

issue.[228] In the second report, the city's woolen cloth guild reported that its annual production was also about 3,000 woolens; and it would be surprising if all of its output was exported. That figure is just less than a third (about 27 percent) of the estimated cloth output for Florence in the 1420s (about 11,000): small, but still not a trivial amount.[229] Sales prices of Venetian woolens on the local Rialto market in this era (1408-19) indicate a price range from 21.0 to 28.5 ducats (or florins), which were thus somewhat cheaper than the Florentine *garbo* woolens of this era (with, as noted earlier, an estimated average value of 31 florins).[230]

Furthermore, in 1433, Venice's *Provveditori di Comun* stated that production, which had recently been as high as 4,000 - 5,000 cloths had now fallen to just 1,400 cloths.[231] Some substantial industrial and commercial recovery is indicated in 1458 by the Venetian Senate, with an optimistic account of exports recently sent, "in a rush of activity," to Ottoman markets: composed chiefly of Venetian imitations of Florentine Garbo woolens, but evidently woven from Spanish wools. As noted earlier, the Florentine cloth industry was similarly reviving in this period from a rapid expansion of Garbo woolen cloth exports to the Ottoman markets as well, though its woolen were then made from domestic *matricina* wools, not (yet) Spanish *merino* wools.[232] Mozzato estimates that, in the mid 1460s, the Venetian industry was producing

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2006), pp. 73-107. See also Andrea Mozzato, "Il mercato dei panni de lana a Venezia nel primo ventennio del XV secolo," in Giovanni Luigi Fontana and Gérard Gayot (eds.), *Wool: Products and Markets (13th - 20th Century)* (Padua, 2004), pp. 1035-1066; Andrea Mozzato (ed.), *La mariegola dell'arte della lana di Venezia (1244 - 1595)*, Comitato per la pubblicazione della fonti relative all storia di Venezia, Fonti per la storia di Venezia, sez. V - Fondi Vari, 2 vols. (Venice, 2002).

[228] On this famous report, see also Gino Luzzatto, *An Economic History of Italy from the Fall of the Roman Empire to the Beginning of the Sixteenth Century*, trans. by Philip Jones (London, 1961), p. 156. He indicates that the Lombard towns alone exported 48,000 woolens: Como, 12,000 pieces; Monza, 6,000 pieces, Brescia, 5,000 pieces; Pavia, 3,000 pieces; Milan, 4,000 pieces (a total of 30,000 woolens); he also states that Florence exported 16,000 pieces of fine and medium quality woolens – an amount too high in relation to other statistical evidence for the 1420s (see pp. 000 above). The Milanese woolens had an average value of 30 ducats (florins), while those from other Lombard towns had a value of only 15 ducats (those from Bergamo, 7 ducats). Cremona was the sole town to supply fustians: 40,000 pieces. See also Epstein, *Freedom and Growth*, p. 127 (n. 73 above): also indicating 48,000 woolens plus 40,000 fustians, in total worth about 900,000 ducats (or florins); and Dini, "L'industria tessile," p. 342 (n. 6 above): also specifying Lombard woolens from Milan, Como, Bergamo, Monza, Brescia, Pavia, Allessandria, Novara, and Parma, but indicating a total of 50,000 cloths.

[229] Goldthwaite, *Economy of Renaissance Florence*, Table 4.1, p. 278 (n. 6 above). For the value of Florentine *garbo* woolens in the 1420s, see above, nn. 112-13.

[230] Mozzato, "Il mercato di lana a Venezia," Table 1, p. 1046 (see n. 227 above). Ducats and florins, both supposedly 24 carats fine, officially had approximately the same gold contents (3.53-3.56 g fine gold) and thus the usually about the same market values. See Spufford, *Handook of Medieval Exchange Rates*, p. 19 (n. 45 above), stating that in May 1422 the weight of the Florentine florin was increased by 1/240 to approximate that of the Venetian ducat, in order to compete in the Levant trades; for exchange rates, see pp. 198-206, 215-23. But Bernocchi, *Le monete della repubblica fiorentina*, vol., III, 208-220 (n. 147 above) indicates that in the mid fifteenth century the florin had only 3.45 - 3.51 g. pure gold.

[231] Mozzato, "Production of Woollens," p. 80 (n. 227 above): stating that this figure probably pertains only to high quality woolens "destined for the internal market, not the cheaper cloths produced for export."

[232] See above, pp. 000-00.

about 6,380 woolens a year, and still about 6,000 in the 1490s.[233] Also to be noted is an expansion in cloth production from towns in the Venetian *Terra Firma* during the second half of the fifteenth century: from Padua, Vicenza, Verona, and Brescia in particular, all producing heavy-weight woolens of "medium to high quality," similarly for export to the Ottoman Empire.[234] Verona alone exported many woolens as well to southern Italy: 3,686 pieces in 1475-77, and 7,889 pieces in 1503-05.[235]

From about 1490, however, the Venetian cloth industry experienced a quarter-century decline in output, which dropped to only about 3,630 woolens in 1505, and subsequently to just 1,310 cloths, in 1516. Thus this first accurately recorded output, for 1516, by no means marked the beginning of the Venetian cloth industry's expansion, as is so often contended, but rather the nadir of a long decline, and one that may have been peculiar to Venice itself, and not to its *Terra Firma* towns nor to Florence.

From 1516 to the first peak, in 1569, Venetian cloth production grew at a vastly greater rate than ever before: to 26,541 woolens (though a quinquennial mean of only 18,513 in 1566-70). Indeed, thanks to the researches of several Italian scholars – Pierre [Piero] Sardella, Domenico Sella, Walter Panciera, and Andrea Mozatto – we now possess a remarkable, virtually complete annual series of Venetian woolen cloth production statistics from 1516 to 1723, for just over 200 years.[236]

In Domenico Sella's view, the primary reason for this rapid expansion of the Venetian woolen cloth industry in the early sixteenth century (its initial rise, in his view), and for its subsequent ability to displace the Florentine industry so decisively, was warfare: the French and Habsburg invasions of Italy, from 1494 to 1559 (Treaty of Cateau-Cambrésis), which ravaged Lombardy and Tuscany especially, but left Venice, in

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[233] Mozzato, "Production of Woolens," pp. 82-83 (n. 227 above): an output of 7,000 cloths is given for 1466; but on the basis of an estimated average output of 55 cloths for 116 registered drapers, the total should be 6,380 woolens. In 1505, the much smaller number of 66 registered drapers could have produced 3,630 woolens (not the 4,000 given in the text).

[234] Demo, "Wool and Silk," pp. 217-43, esp. pp. 220-22 (see n. 106 above). He found evidence for declining outputs only at Treviso (late fifteenth century) and Brescia (from the mid sixteenth century). See also n. 165 above; and Edoardo Demo, *L' 'Anima della città': L'industria tessile a Verona e Vicenza (1400 - 1550)*, Studi di storia europea protomoderna (Milan, 2001); Edoardo Demo, "Lane, lanaiola e mercanti nella manifattura laniera Vicentina (secoli XIV-XVI)," in Giovanni Luigi Fontana and Gérard Gayot (eds.), *Wool: Products and Markets (13th - 20th Century)* (Padua, 2004), pp. 382-409; Edoardo Demo, "L'industria tessile nel Veneto tra XV e XVI secolo: tecnologie e innovazione dei prodotti," in Paolo Massa and Angelo Moioli (eds.), *Dalla corporazione al mutuo soccorso: organizzaione et tutela del lavoro tra XVI e XX secolo* (Milan, 2004), pp. 329-41; Edoardo Demo, " 'Da Bressa se traze panni fini e alre sorte de panni de manco precio': L'esportazione dei prodotti tessile bresciani nel '400'," *Annali Queriniani*, 6 (2005), pp. 101-30.

[235] Demo, "Wool and Silk," pp. 226-29 (see n. 106 above).

[236] The sixteenth-century statistics (1516-1605) were first published in Pierre Sardella, "L'Épanouissement industriel de Venise au XVIe siècle: Un beau texte inédit," *Annales: Économies, sociétés, civilisations*, 2:3 (April-June 1947), pp. 195-96. Most of the rest of the data, to 1713, were published in Sella, "Rise and Fall of the Venetian Woollen Industry," pp. 106-26 (see n. 226 above). However, this still very well known series contains a number of statistical errors, which have now been largely corrected in: Walter Panciera, *L'Arte matrice: I lanifici della Repubblica di Venezia nei secoli XVII e XVIII*, Studi veneti, no. 5 (Treviso: Fondazione Benetton Studi Ricerche and Canova Editrice, 1996), Table 2, pp. 42-43, which also extends Sella's series from 1713 to 1723. I wish to offer my sincere thanks to Professor Panciera, who sent me a photo-copy of the document from the Venetian archives (ASCW, *Cinque savi* b. 476) containing the original data. Unfortunately, in using this archival document, I found it necessary to correct his statistics for the following four years: 1521, 1618, 1639, and 1662. See also Andrea Mozzato (ed.), *La mariegola dell'arte della lana* (n. 227 above).

his view, with its supposedly protected location and extensive military power, relatively untouched. [237] Unfortunately, however, that view does not correspond with the facts of Italy's political history in this period.[238] For, in December 1508, Venice faced the newly formed League of Cambrai, a seemingly invincible coalition of very hostile formidable enemies who together posed the greatest threat to Venice's existence since the War of Chioggia (with Genoa, 1378-81): the alliance of the Holy Roman Emperor (Maximilian), France (Louis XII), the Papacy (Pope Julius II), and the King of Hungary (Vladislaus II). Their objective was to recapture Venice's recent mainland Italian acquisitions, outside her traditional *Venetia* jurisdiction. In May 1509, at the Battle of Agnadello (on the Adda), the French- led army decisively defeated the Venetians, who were forced to abandon the entire mainland.

Although this coalition soon dissolved, rent by conflicting rivalries, Venice – now stripped of her Papal territories – found itself again at war with the French, who again defeated the Venetians, at the Battle of Marignano, in September 1513. Fortunately, however, Venice was spared further losses by the Concordat of Bologna in 1516. Indeed, Venice regained Padua, and some other mainland territories. These often disastrous wars may well explain the evident fall in woolen production during the early sixteenth century, and why the very first recorded output, in that same year of 1516 (1,310 pieces, as noted above) was so very small.

The far more convincing explanation for the subsequent expansion of the Venetian cloth industry and its success in gaining control of much of the Ottoman cloth markets lies in Patrick Chorley's analysis of the sudden reversal in the Florentine cloth industry's fortunes in the early sixteenth century. As noted earlier, the first was the disruption in the vital Iranian silk trade with the Ottomans, from about 1514; and the second was the severe disruptions in production from the ravages of the bubonic plague and the domestic political crisis, both in the years 1526 - 1530.[239] Furthermore, it is important to remember that Florentine cloth production had achieved its apogee, in the mid-1520s (about 20,000 bolts of cloth a year) – thus some thirty years after Charles VIII's French invasion of Italy, in 1494.[240]

To be sure, the Venetians proved to be less successful in exploiting commercial opportunities in the now vast Ottoman Empire than they had been, from the later fourteenth century through the fifteenth century, in their diplomatic and commercial relations with the former Mamlūk Sultanate (the Levant). Even before that Ottoman conquest, Venice had been frequently engaged in war with the Turks: especially in 1463-79, and 1499-1503, when the Venetians had suffered a crucial naval defeat at the Battle of Zoncio. During that latter period, the Portuguese had established their direct sea route, via southern Africa (the Cape), to the East Indies, thereby threatening Venice with the loss of her vital Asian spice trade. Nevertheless, in the Ottoman peace treaty of 1503, the Venetians recognized that their only hope of regaining that spice trade lay in co-operating with the Ottomans, who – in a triple Muslim alliance with Gujerat in India and Aceh (Atjeh) in Sumatra -- succeeded in breaking the Portuguese hold over the Indian ocean trades, including the spice trade. Thus, by the 1540s, the Venetians had managed to regain a significant share of the lucrative East Indies spice trade – perhaps as much as half by the 1550s – allowing them, with their new cloth export trade to the Ottoman Empire, to enjoy an Indian Summer of renewed prosperity to the beginning of the seventeenth century.[241]

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[237] See Sella, "Rise and Fall," pp. 113-115 (n. 226 above).

[238] A. J. Grant, *A History of Europe from 1494 to 1610* , 5th edn. (New York, 1951), pp. 52-54, 65-69; Frederic Lane, *Venice: A Maritime Republic* (Baltimore and London: The Johns Hopkins University Press, 1973), pp. 242-45.

[239] See above pp. 000-00 and n. 224.

[240] See above, pp. 000-00 and nn. 220-22.

[241] Halil İnalcik, *An Economic and Social History of the Ottoman Empire*, 2 vols. (Cambridge, 1994), vol. I: *1300-1600*, pp. 327-59.

Indeed, the Venetian cloth industry's mean annual production had not exceeded 10,000 pieces until the quinquennium of 1546-50. The much more rapid growth of output to the quinquennium 1566-70, when cloth production reached a temporary peak of 18,513 pieces (mean), as noted earlier, may have been related to Venice's ability to restore at least part of its former spice trade, via Ottoman ports: i.e., in effect exchanging woolens for some spices. But in the year 1570, production suddenly slumped to just 9,462 pieces, a sharp drop undoubtedly related to the Ottoman seizure of Cyprus, followed by the Ottoman naval defeat at the famous Battle of Lepanto (October 1571), whose vital importance will be noted later. Thereafter, cloth production did recover, at a much slower rate of annual growth, with a series of often severe oscillations. That diminished growth rate may in turn reflect the revival of Lombard and Tuscan cloth production, after the 1559 Peace of Cateau-Cambrésis; for, we do know that Florence, also selling woolens in Levantine markets, had enjoyed a brief but remarkable recovery, as will be analysed later (more than doubling production by 1570).[242] Venetian cloth production itself reached its ultimate peak, of 28,728 pieces, in 1602 – or with a quinquennial mean production of 23,573 pieces in 1601-05, and thus 27.3 percent higher than the earlier sixteenth century peak.[243]

The nature and value of Venetian cloths

We must now ask what type of woolens were the Venetians then producing for export. By and large, they seem to resemble the high-quality Florentine woolens. Some evidence on Venetian cloth widths (1.80 meters compared to 1.60 meters for the English) and evidence on actual cloth weights from the contemporary mainland Venetia industries indicate that they were indeed also genuine heavy-weight woolen broadcloths.[244] Such woolens had been, from some time much earlier in the sixteenth century, manufactured chiefly from Spanish *merino* wools (i.e., substituted for the finer English wools). The production statistics, however, evidently also cover a wide range of textiles, some made from Italian or other wools. From the 1550s, according to Walter Panciera, Venice also began manufacturing cloths of the "light draperies," in imitation of the Flemish Hondschoote says, also made from a worsted warp and woolen weft, which were also exported chiefly to the Levant.[245]

According to Edoardo Demo, the Venetia towns of Verona and Vicenza were also following suit, so to speak, from the 1550s: in similarly producing lighter cloths (*alleggeriti)* as imitations of products from the Flemish *sayetteries*: *sarze* (i.e, serges), *stametti lezeri, palpignani lezeri ... et altri simil lanifici*, which also included *rasse* (presumably different from the Florentine *rascie* discussed above).[246] But these new light cloth industries in the Venetia did not succeed for long, nor did they "avoid the rapid decline in production

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[242] See Chorley, "Rascie and the Florentine Cloth Industry," Table 1, p. 516 (n. 113 above): in *panni corsivi*; Chorley, "Volume of Florentine Cloth Production," Table 1, p. 556 (n. 168), noting that while production had fallen to 28,492 *panni corsivi* in or by 1570, it then rose to 33,212 *panni* in 1571 (when Venetian production had slumped to just 9,492 pieces). We also know that the primary overseas market for the Medici firm's woolen cloths was the Levant. De Roover, "Florentine Firm of Cloth Manufacturers," p. 101 (n. 21 above).

[243] See n. 236 above.

[244] See Demo, "Wool and Silk," pp. 217-43, esp. pp 220-22 (n. 106 above): for evidence that woolens from the mainland towns, measuring about 30 meters in length, weighed from 20 kg. to 25 kg. each. See n. 234 above.

[245] Walter Panciera, "Qualità e costi di produzione nei lanifici veneti (secoli XVI-XVIII)," in Giovanni Luigi Fontana and Gérard Gayot (eds.), *Wool: Products and Markets (13th - 20th Century)* (Padua: Libraria Editrice Università Padova, 2004), pp. 420-22, 429-31 (Tables 1-2); Panciera, *L'Arte Matrice*, pp. 39-51 (see n. 245 above).

[246] Demo, "Wool and Silk," pp. 222-23 (n. 106 above), noting also that Vicenza in 1557 was producing *rasse o sagie fiorentine*. For Florentine production of these lighter fabrics from about this period, see below, pp. 000.

that, in the 1570s, affected both the Vicentine wool industry and wool manufacturing in Verona and Padua."[247] While these lighter-cloth industries might have benefited from the disaster that befell the Flemish *sayetteries*, with the brutal Spanish repression of the southern Low Countries from 1568 to 1608, they evidently came to face even stronger competition from both the English and Dutch New Draperies (or *lichte draperie*, in Holland), both of which benefited from a large influx of Flemish Protestant refugees, especially from the 1580s, as noted earlier.[248]

The decline and fall of Venetian cloth production in the seventeenth century: I: Internal Factors?

After Venice's cloth production had peaked in 1602 (at 28,728 pieces), as noted earlier, it experienced a steep downward curve, with some oscillations: to 23,000 pieces in 1620, to 13,275 pieces in 1630, to 10,082 pieces in 1650, to just 5,226 pieces in 1670, to 2,033 pieces in 1700, and then to only a mere 1,689 pieces, when the series ends in 1723.[249] Walter Panciera rightly contends that this decline became precipitous only after 1645, when outputs continued to fall below 10,000 pieces a year (see Table 18). He attributes much of that post-1645 decline to the disastrous and protracted War of Candia with the Ottoman Empire, over control of Crete and the Aegean, from 1645 to 1669, with very major Venetian losses. Unlike earlier Ottoman wars, this one resulted, according to Panciera, in serious long-term disruptions in trade with Istanbul itself, Smyrna, Aleppo, Alexandria, as well as Candia; and it forced the Venetian Senate to impose ever heavier taxes to finance that warfare.[250]

Most other historians, however, have attributed the seventeenth-century decline and then and then virtual collapse of the Venetian cloth industry essentially to internal economic and social factors. It may be observed that the equally precipitous decline in Venice's population – from 189,000 in 1607 to 102,000 in 1633 (with some recovery, to about 120,000 in 1642, and thus a decline *preceding* the War of Candia -- reflects a much deeper malaise within the Venetian economy. [251] According to such renowned historian as Sella himself, Carlo Cipolla, Brian Pullan, and Fernand Braudel, the most common fault attributed to the Venetian textile industry was its "failure both to lower prices and to innovate." Responsible for that failure

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[247] *Ibid*., p. 222.

[248] For the English New Draperies, see the extensive discussion below, on pp. 000 - 000. For the Dutch industry, see in particular Leo Noordegraaf, "The New Draperies in the Northern Netherlands, 1500-1800," in Negley Harte (ed.), *The New Draperies in the Low Countries and England*, *1300 - 1800*, Pasold Studies in Textile History no. 10 (Oxford and New York, 1997), pp. 173-95. In Leiden, for example (p. 179), the production of such lighter serge fabrics rose from 1,086 pieces in 1573 to over 27,000 pieces in 1584 (and to 144,000 pieces in 1664). See also Charles Wilson, "Cloth Production and International Competition in the Seventeenth Century," *Economic History Review*, 2nd ser., 13:2 (1960), pp. 209-21; reprinted in Charles Wilson, *Economic History and the Historian: Collected Essays* (London, 1969), pp. 94-113.

[249] See n. 236 for the source of these statistics.

[250] Walter Panciera, "The Industries of Venice in the Seventeenth and Eighteenth Centuries," in Paola Lanaro (ed.), *At the Centre of the Old World: Trade and Manufacturing in Venice and the Venetian Mainland, 1400- 1800*, Essays and Studies no. 9, Centre for Reformation and Renaissance Studies (Toronto, 2006), pp. 185- 214, esp. pp. 188-90. He also contends that the early seventeenth-century decline is not as serious as the statistics indicate, because the mainland Venetian towns were producing up to 10,000 cloths a year, for export, until the disasters of the 1640s; and, furthermore, that from the 1660s, the continued Venetian decline was somewhat offset by the growth in output in Padua – though an increase from 1,500 pieces in 1660 to 4,000 in 1694 hardly seems important. Panciera also points out that before (and just after) 1645, the even more prolonged Thirty Years War (1618-48), along with wars with Persia, had also damaged Venetian cloth markets – as they did for the English cloth trade, even more (see below, pp. 000).

[251] Statistics from *Ibid*, p. 185. Note that Panciera offers severe criticism of the view of Richard Rapp, whose publications are cited in the next note.

to do both were, supposedly, increasingly rigid guild restrictions, whose enforcement was undertaken by civic officials. Other causes of industrial sclerosis are the usual suspects in the historical literature of this nature: excessive civic taxation and supposedly high wages, causes offered not so much as a reasoned argument fortified by statistical evidence but as an almost inevitable *deus ex machina*.[252]

Many of these historians, in seeking to prove their case, contrast the supposed faults of the Venetian cloth industry with the supposed virtues and advantages of the presumably lower-cost English woolen cloth industry, all the more so since the Venetians lost so many of their Ottoman markets to the English cloth trade in the course of the seventeenth century. We may ask if the English truly did enjoy advantages in the two primary sets of manufacturing costs: labor and wool. We have already seen that the direct labor costs in the pre-finishing manufacturing processes were much less important than were raw material and dyeing costs; and we have also seen evidence that productivity in the eighteenth-century English woolen industry – i.e., before the Industrial Revolution – was no higher than the European norm in the fifteenth century.[253]

Comparing labor costs, especially for the three major processes of wool preparation, spinning, and weaving, in the seventeenth-century Venetian and English cloth industries is not possible, though one might assume that wages in an essentially rural industry (England) would have been lower than those in an essentially urban industry (Venice), even if spinning in the latter had also taken place chiefly in rural areas. But that comparison involves a confusion between nominal and real wages, and a confusion between wage rates and labor costs. Most economists dismiss historical high-wage arguments, because they do not take proper account of productivity differences. Thus high nominal wages in towns may well have reflected higher living costs and higher tax burdens, but supposedly high wages can be justified and maintained only by productivity advantages, or more precisely by a higher marginal revenue product: i.e., the market value of the last unit of the commodity produced by the last unit of labor hired. Low rural wages thus reflected not just lower living costs but also a lower labor productivity, with inferior education, skills, and a more scattered and more costly industrial organization (in a rural putting-out system); in contrast, urban industries typically enjoyed better educated, higher skilled labor, and lower transaction costs.

The equally common argument that guild structures and guild regulations inhibited productivity-enhancing innovations and raised prices through rent-seeking monopoly controls is not a self-evident assumption and requires a proof that is lacking for the Venetian case. On the contrary, the historical evidence can show that guild regulations specifically designed to ensure quality controls in industries subject to price-making monopolistic-competition structures did help to gain and secure foreign markets for the cloth industries of Tuscany and the Low Countries.[254] Furthermore, even the rural English woolen cloth industry

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[252] See, *inter alia*, Domenico Sella, *Commerci e industrie a Venezia nel secolo XVII* (Venice-Rome, 1961); Domenico Sella, "Crisis and Transformation in Venetian Trade," in Brian Pullan (ed.), *Crisis and Change in the Venetian Economy in the Sixteenth and Seventeenth Centuries* (London, 1968), pp. 88-105; Sella, "Rise and Fall of the Venetian Cloth Industry," pp. 106-26 (n. 226 above): quotations on pp. 120-21; Brian Pullan, "Wage Earners and the Venetian Economy, 1550-1630," also in Pullan, *Crisis and Change*, pp. 146-74; Carlo M. Cipolla, "The Economic Decline of Italy," also in Pullan, *Crisis and Change*, pp. 127 - 45, and in Carlo Cipolla (ed.), *The Economic Decline of Empires* (London, 1970), pp. 196-214; Fernand Braudel, P. Jeannin, J. Meuvret, R. Romano, "Le déclin de Venise au XVII siècle," in Gian Piero Bognetti (ed.), *Aspetti e cause della decadenza veneziana nel secolo XVII: Atti del convegno 27 giugno-2 luglio 1957, Venezia* (Venice-Rome, 1961), pp. 22-85, and in the same volume, Carlo Levi, Domenico Sella, and Ugo Tucci, "Un problème d'histoire: la decadence économique de Venise," pp. 289-317; Richard T. Rapp, "The Unmaking of the Mediterranean Trade Hegemony: International Trade Rivalry and the Commercial Revolution," *Journal of Economic History*, 35:3 (Sept. 1975), pp. 499-525; Richard Rapp, *Industry and Economic Decline in Seventeenth-Century Venice* (Cambridge, 1976).

[253] See above, pp. 000-00.

[254] Munro, "Urban Regulation and Monopolistic Competition," pp. 41 - 52 (see n. 104 above); Munro, "Symbiosis of Towns and Textiles," pp. 1-74 (n. 41 above); Munro, "Three Centuries of Luxury Consumption," pp. 1-73 (n. 8 above). On European guilds in general, see in particular Peter Berezin, "Did

was hardly free from government regulation, and was subjected to considerable, detailed Parliamentary legislation and government inspections from the mid sixteenth-century.[255]

As stressed earlier, the most important consideration for medieval and early-modern cloth manufacturing was the industry's wool supply: as the prime determinant of pre-finishing manufacturing costs and of the quality of the woven textiles, and thus of market prices. We have also seen that earlier, from the fourteenth to sixteenth centuries, English woolen cloth industry had indeed enjoyed two very major advantage in its wool supply: in having close by, and thus with low transport costs, Europe's finest wools, in abundant supply; and in being able to buy such wools completely free of the heavy export taxes that so burdened its foreign cloth-producing rivals in Italy and the Low Countries.[256]

The seventeenth-century English woolen cloth industries, those known as the Old Draperies, no longer enjoyed any such advantages.[257] As also noted earlier, both the quantity and quality of England's finer wools had diminished, while Spain's *merino* wools were surpassing the English in quality by the early seventeenth century. Indeed, as also indicated earlier, seventeenth-century England was importing more and more Spanish wools in producing fine woolens known as what were known as Spanish Medleys and Superfine broadcloths: a mixture Spanish wools with some of few remaining high quality March wools. Presumably the Venetian industry enjoyed some relative cost advantages in acquiring its wools, the same Spanish wools: in that the transportation costs from Spain to Venice were obviously far lower than from Spain to England. While the English industry may have benefited from using, in its Spanish Medley mix, its own somewhat cheaper local wools, they were now somewhat inferior in quality to the Spanish *merinos*.[258]

The major problem, however, in attributing the decline of the Venetian cloth industry to its own internal defects, and its supposed "failure to innovate," is that no conceivable combination of cost-raising defects and institutional sclerosis can possibly explain such a sudden and precipitous decline in cloth outputs.

Medieval Craft Guilds Do More Harm Than Good?", *The Journal of European Economic History*, 32:1 (Spring 2003), pp. 171-97; Maarten Prak, Catharina Lis, Jan Lucassen, and Hugo Soly, *Craft Guilds in the Early Modern Low Countries: Work, Power, and Representation* (Aldershot, 2006); Stephan Epstein and Maarten Prak (eds.), *Guilds, Innovation, and the European Economy, 1400 - 1800* (Cambridge, 2008).

[255] See *Statutes of the Realm*, Vol. IV:i, 136-7: 5-6 Edwardi VI, cap. 6, pt. 1 (see n. 107 above).

[256] See above, pp. 000-00. For relative wool costs, as a share of total production costs, in the Florentine cloth industry, see in particular Goldthwaite, "Florentine Wool Industry," Tables 2-3, p. 537 (n. 23 above); De Roover, "A Florentine Firm," Appendix IV, p. 118 (n. 21 above).

[257] For a contrary view (an incorrect view, in my opinion), see Benjamin Braude, "International Competition and Domestic Cloth in the Ottoman Empire, 1500 - 1650: A Study in Undevelopment," *Review (Fernand Braudel Center)*, 2:3 (Winter 1979), pp. 437-51: in particular, Tables I and II, p. 441; Tables III and IV, pp. 444-45; Benjamin Braude, "The Rise and Fall of Salonica Woollens, 1500-1650: Technology Transfer and Western Competition," *Mediterranean Historical Review*, 6 (1991), pp. 216-236; reprinted in Alisa Meyuhas Ginio (ed.), *Jews, Christians and Muslims in the Mediterranean World after 1492* (London, 1992), pp. 216-236, esp. pp. 228-36. In both publications, he also incorrectly contends that the English cloth industry had an advantage over Ottoman producers in its wool inputs, in that English wool prices remained stable for much of the seventeenth century, while Turkish wool prices rose strongly. But he has confused changes in nominal prices with real prices, in not taking account of the drastically inflationary debasements of the Ottoman coinage in the seventeenth century, when England, enjoying a perfectly stable coinage, was experiencing deflation, from the 1640s. See Şevket Pamuk, *A Monetary History of the Ottoman Empire*, Cambridge Studies in Islamic Civilization (Cambridge and New York, 2000), pp. 131-48; Appendix II, pp. 235-40, especially Graph A-1, p. 236. For English prices, see Phelps Brown and Hopkins, "Seven Centuries of the Prices of Consumables," pp. 296-314 (see n. 14 above).

[258] See Munro, 'Spanish *Merino* Wools', pp. 470-71 (see n. 9 above). For the 17th and 18th centuries, see Carter, *His Majesty's Spanish Flock*, pp. 9, 11, 412, 420-22 (see 135 above); Mann, *Cloth Industry*, pp. 257-59 (n. 137 above).

The decline and fall of Venetian cloth production in the seventeenth century: II, the role of England's Levant Company in the Mediterranean textile trades

- The origins of England's Levant Company

The chief advantage for England's cloth-export industry lay not in any purely industrial advantages but rather in commercial opportunities that English merchants skilfully exploited from the 1570s. They did so through their new Levant Company, which, first of all, enjoyed enormous advantages as England's second major joint-stock company. This was a vital innovation in commercial-financial organization that England had introduced in the 1550s, a half century before the Dutch; and there was nor would there be anything comparable in Venetian or any other Italian business organization during the course of this study. Joint-stock organization permitted such companies to amass vastly greater capitals, and thus to achieve vastly greater and thus lower-cost economies of scale in commercial organization and shipbuilding, especially when fortified by charters of incorporation with limited liability clauses to reduce risks for investors. The English merchant and financiers who established this company, originally called the Turkey Company, in 1581, obtained a royal charter that always granted this corporation a monopoly on trade with the Levant. Ten years later, in 1591, it was re-organized on a more permanent basis as the Levant Company, which soon proved to be far the most profitable and certainly powerful of the new joint-stock companies, well before the East India Company (of 1600) finally became successful (in the 1660s).[259]

The ability of the new Levant Company to gain dominance in Mediterranean textiles market, first and most especially in the Levant, also lay in its abilities to exercise both superior naval power and superior diplomacy and trade relations.[260] As indicated earlier, the famous Battle of Lepanto in October 1571 proved to be decisive in the intricate complex of English-Turkish-Venetian commercial relations. That battle had been the European response to the Ottoman conquest of Cyprus – giving the Turks control over the Aegean Sea – and more particularly the European horror over subsequent Turkish massacres. The victory at Lepanto can be credited to the role of both the Papacy and Venice in organizing an anti-Ottoman alliance and the latter, especially, in organizing the heavily armed fleet, with far superior naval artillery, that inflicted such a truly decisive defeat on the Turkish armada in the Gulf of Corinth. Henceforth, any remaining notions of the supposed invincibility of the Turks soon vanished from the European psyche, all the more so with continued evidence of decline in Ottoman naval power and growth in western, and especially English, naval power.

- English naval power and Mediterranean commerce in the seventeenth century

Certainly the growing gap in naval power, and indeed an English supremacy in naval power, was a major reason, if not the only reason, why England ultimately gained a mastery over Ottoman and other Mediterranean markets and the Mediterranean carrying trades, by the later seventeenth century. As Ralph Davis has demonstrated, in the course of the later sixteenth but especially during the seventeenth century, the English were building and operating increasingly larger, far stronger oak-based carracks, which were also more heavily gunned (with ranks of up to 60 powerful cannons) than were those of any of their rivals. The increase in both the quantity and the average size of the English merchant fleet can be seen in statistics for

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[259] John Munro, "Tawney's Century (1540 - 1640): the Roots of Modern Capitalist Entrepreneurship," in David Landes, Joel Mokyr, and William J Baumol (eds.), *The Invention of Enterprise: Entrepreneurship from Ancient Mesopotamia to Modern Times*, Kauffman Foundation Series on Innovation and Entrepreneurship (Princeton, 2010), pp. 107-55, esp. pp. 128-34. See the following note.

[260] See Giglioa Pagano de Divitiis, *English Merchants in Seventeenth-Century Italy*, trans. by Stephen Parkin, Cambridge Studies in Italian History and Culture (Cambridge, 1997), pp. 1-35 (original version: *Mercanti inglesi nell'Italia del Seicento: Navi, traffici, egemonie* (Venice, 1990); Alfred C. Wood, *A History of the Levant Company* (London: Oxford University Press, 1935), pp. 1-42; and the following notes.

total tonnage: rising from just 50,000 tons in 1572 to 340,00 tons in 1686.[261] The once feared multi-national pirates and Muslim corsairs, which had endangered so much commerce in seventeenth-century Mediterranean shipping lanes, quickly learned that their own survival meant keeping a safe distance from armed English galleons, which showed them no mercy.

That superiority in naval technology also led to lower cost shipping, even in comparison with armed European ships, including French and Dutch shipping.[262] While the costs of building and so heavily arming (and manning) these English galleons, especially those of the Levant Company, did raise freight rates – perhaps to ten percent higher than those of many rivals – that cost increase was more than offset by much lower insurance rates. Furthermore, Levant Company ships gained a great competitive advantage in simply ensuring customers that their cargoes would safely and speedily reach their destinations, unmolested. All such factors help explain why the English gained, as well, such a large share of the Mediterranean carrying trades.[263]

At the same time, Venetian, other Italian, and Spanish ship-building industries were experiencing a veritable crisis from the 1570s, from soaring costs that primarily reflected a scarcity of suitable ship timbers in the Mediterranean zone, compared to the very abundant and low cost supply available in the Baltic zone, even oaks within England itself. For the Italians to import northern timber or to buy northern-built ships, though an obvious and increasingly used alternative, was still relatively costly in terms of transport and transaction costs.[264]

- The Ottoman responses in welcoming English commerce and the Levant Company

The Ottoman response to the post-Lepanto changes in Mediterranean naval power proved to be, in fact, beneficial to European but especially English commerce. For the Turkish Sultan quickly sought to achieve a new and more effective European alliance with a power that would be more reliable than vacillating France had been and serve as a commercial counterweight to Venice.[265] England offered to be that European power, confident that any such alliance with the Turks would no longer threaten the safety of Christian

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[261] Pagano di Divitiis, *English Merchants*, Table 2.1, p. 43 (n. 260 above); Ralph Davis, "Merchant Shipping in the Economy of the Late Seventeenth Century," *Economic History Review*, 2nd Ser., 9:1 (1956), pp. 59-73.

[262] The much vaunted Dutch superiority in seventeenth-century shipping pertained only to its *fluitschip* used in the low-priced bulk cargo trades (grains, timber, iron and copper ores) of the Baltic and the North Sea – ships whose low cost was based largely on carrying no cannon and no gunners. See Violet Barbour, "Dutch and English Merchant Shipping in the Seventeenth Century," *Economic History Review*, 1st Ser., 2:2 (January 1930), pp. 261-90; Richard Unger, *Dutch Shipbuilding Before 1800: Ships and Guilds* (Van Gorcum, 1978); Richard Unger, *Ships and Shipping in the North Sea and Atlantic, 1400 - 1800*, Variorum Collected Series CS 601 (Aldershot, 1997); Davis, "Merchant Shipping," pp. 59-73 (n. 261 above).

[263] Ralph Davis, *English Overseas Trade, 1500 - 1700*, Studies in Economic History (London: MacMillan, 1973), pp. 20-31; Ralph Davis, *The Rise of the English Shipping Industry in the Seventeenth and Eighteenth Centuries* (London, 1962), pp. 1-57, 228-56; Ralph Davis, "England and the Mediterranean, 1570-1670," in F.J. Fisher (ed.), *Essays in the Economic and Social History of Tudor and Stuart England* (London, 1961), pp. 117-37, esp. pp. 126-37; Davis, "Merchant Shipping," pp. 59-73 (n. 261 above); Pagano di Divitiis, *English Merchants*, pp. 41-55 (n. 260 above).

[264] See Pagano di Divitiis, *English Merchants*, pp. 36-46 (n. 260 above), and other sources cited in n. 263 above.

[265] Fernand Braudel, *The Mediterranean and the Mediterranean World in the Age of Philip II*, translated by Sian Reynolds, 2 vols. (London and New York, 1972-73), vol. I, pp. 615-29.

Europe.[266] The English could hardly resist this opportunity – their very first major opportunity to engage in Mediterranean trade.[267] What the Levant Company could offer the Ottoman Empire, certainly by the 1590s, was not only a large and expanding supply of a wide varieties of textiles, as alternatives to the Venetian textiles – and a supply more immune to the travails of war – but also badly needed Western arms and munitions (including such metals as lead and tin).[268] Meanwhile, the English government was also offering diplomatic support. In turn, the Ottoman Empire offered the English the largest available market for its textiles, and – equally important – direct access to the even more lucrative trades in silks and spices, indeed the only available entrée into such trades.

- the Levant Company's cloth trade with the Ottoman Empire

The Levant Company commenced its trade with the Ottoman Empire, in the 1580s, by selling relatively less expensive woolen textiles, in order to invade the less competitive lower price ranges of the market: especially the cheap but still heavy-weight kerseys.[269] Soon, however, and from as early as the later 1590s, Levant Company merchants began changing the composition of their Levant-bound cloth trade, by selling more and more of the far finer, much more costly Suffolk broadcloths, and then even more of the Spanish Medleys and Superfines, while reducing the volume of their kersey exports, as a less profitable trade.

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[266] The Ottoman threat did not, however, truly disappear; and a century later, in July - September 1683, the Turks (led by the grand vizier Kara Mustafa) almost succeeded in their second attempt to conquer Vienna, the capital of the Habsburg Empire. Their defeat, by a Polish and French army, led by Jan Sobieski, "marked the beginning of the decline of Turkish domination in eastern Europe." (*Britannica Concise Encyclopedia).*

[267] The first successful English maritime venture into the Mediterranean took place on 23 June 1573 when the English ship *Swallow* reached the harbour of the Italian port of Livorno (Leghorn); and Livorno would continue to be very important for English trade in the Mediterranean. See Pagano de Divitiis, *English Merchants,* p. 5 (n. 260 above).

[268] Salim Aydüz, "Firearm and Munitions Trade between the Ottoman Empire and Some European States, 1350 - 1660," in Simonetta Cavaciocchi (ed.), *Relazioni economiche tra Europa e mondo islamico secc. XIII - XVIII/ Europe's Economic Relations with the Islamic World, 13th - 18th Centuries,* Fondazione Istituto Internazionale di Storia Economica 'F. Datini' di Prato, Serie II: Atti delle Settimane di Studi e altre Convegni no. 38 (Florence, 2007), pp. 843-62: noting that Ottoman rulers sometime made grants of commercial privileges conditional upon the western supplicant's willingness to sell arms, despite long-standing papal bans (which did not, of course, affect seventeenth-century England). For England and the Levant Company, see. p. 851.

[269] The common contention that English kerseys were light-weight textiles is false. In the sixteenth century, East Anglian kerseys had an official weight of 693.185 grams per sq. meter, compared to 633.766 g.m^2 for a luxurious Ghent *dickedinnen* woolen broadcloth (1546), and 764.416 g/m^2 for a Mechelen *gulden aeren* broadcloth (1544); but these genuine woolen were all somewhat lighter than Suffolk and Essex short colored broadcloths, which officially weighed 826.656 g/m^2. Compare these cloth weights with those for products of the Flemish *sayetteries* and English New Draperies, and southern fustians: (1) a Bergues-St. Winoc worsted say (1537), at 260.352 g/m^2; (2) a Hondschoote single say (1586), at 340.052 g/m^2 and a double say at 260.416 g/m^2; (3) a Colchester (Essex) broad say, at 149.185 g/m^2; (4) a Norfolk single mockado (1578), at 116.248 g/m^2; (5) a Naples fustian (1587), at 232.497 g/m^2. See Munro, "Medieval Woollens: Struggle for Markets," Table 5.7, pp. 312-15 (n. 8 above); Munro, "Three Centuries of Luxury Textile Consumption," Table 1.1, pp. 10-11(n. 8 above). Similarly false is the contention that English kerseys were worsted-woolen serges, as contended in, for example, Michel Fontenay, "Le commerce des Occidentaux dans les échelles du Levant au XVIIe siècle," in Simonetta Cavaciocchi (ed.), *Relazioni economiche tra Europa e mondo islamico, secoli XIII - XVIII/ Europe's Economic Relations with the Islamic World, 13th - 18th Centuries*, Fondazione Istituto Internazionale di Storia Economica 'Francesco Datini', Atti delle 'Settimana di Studi' e altri convegni no. 38 (Florence, 2007), Table 3, p. 529, n. 1 ("serge de laine mélangée").

Sales of the fine English woolens soon surpassed – and to a considerable extent, displaced – Venetian and other Italian fine woolens from Ottoman and other Mediterranean and Persian markets; and while Dutch woolens, principally from Leiden, also achieved considerable success in Ottoman markets in the seventeenth century, especially from the 1630s, they never surpassed the sales of English woolens (by value).[270]

The Levant Company's shift from kerseys to broadcloths and the victory of the latter in Ottoman markets are both well demonstrated in the trade statistics. From 1598 to 1621, the Company's exports of kerseys fell from 18,031 to 2,300 pieces a year, but those of fine woolen broadcloths -- from Suffolk, Essex, and then the West Country – rose dramatically from just 750 to about 7,500 broadcloths a year. By 1629, the Company accounts record an export of 12,000 broadcloths, but no longer any kerseys. The Levant Company's pre-Civil War maximum annual export was achieved in 1634, with a shipment of 17,000 broadcloths to Ottoman ports.[271] In that latter year, according to Giglioa Pagano di Divitiis, English woolens had captured 40 percent of cloth sales in Ottoman markets, thereby reducing the Venetian and French shares to 26 percent each, and the Dutch share to just 8 percent.[272]

- the English cloth export trade during the early seventeenth century: in European perspective

These commercial events should also be placed in the historic context of the English cloth export trade during the seventeenth century. First, the failure of the ill-advised royal Cockayne Project (requiring English woolens to be fully dyed and dressed for export) in 1614-17, and then the disastrous Thirty Years' War (1618-48) had led to a dramatic fall in total English cloth exports (from London): from a peak of 127,215 short-cloths in 1614 to a low of 75,631 cloths in 1622. Despite some subsequent recovery in England's overseas cloth trade, exports in 1640 were still only 86,924 broadcloths.[273] The opening of Mediterranean markets thus offered the English a very major and most important avenue for long-term recovery of their cloth trade, since the Thirty Years War (and concomitant protectionism in Germany and Poland) had inflicted long-term damages on chiefly the northern markets. Even so, in 1632 , only 18 percent of total broadcloths exports went to Mediterranean markets (73 percent sent to northern Europe), though that former percentage

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[270] See below, pp. 000. For the rise of the Leiden cloth industry in Holland and the expansion of the Dutch cloth trade in the Mediterranean, see Nicholaas W. Posthumus, *Geschiedenis van de Leidsche lakenindustrie*, 3 vols. (The Hague, 1908-1939), II and III: ii: *De nieuwe tijd (zestiende tot achttiende eeuw) De lakenindustrie en verwante industrieën*; Jonathan Israel, "The Phases of the Dutch *Staatsvaart*, 1590 - 1713: a Chapter in the Economic History of the Mediterranean," *Tijdschrift voor geschiedenis*, 99:1 (1986), 1-30; Wilson, "Cloth Production and International Competition," pp. 209-21 (n. 248 above).

[271] Davis, "England and the Mediterranean," pp. 119-21 (see n. 263 above). These statistics differ from those presented in Ralph Davis, "Influence de l'Angeleterre sur la déclin de Venise au XVII siècle," in Gian Piero Bognetti (ed.), *Aspetti e cause della decadenza veneziana nel secolo XVII: Atti del convegno 27 giugno-2 luglio 1957, Venezia*, Civiltà venezianea: studi, vol. 9 (Venice-Rome, 1961), pp. 204-05: a mean of 6,000 broadcloths and 1,000 kerseys in 1621-26, and a mean of 6,500 broadcloths in 1629-35. This table is reproduced in Fontenay, "Le commerce des Occidentaux," pp. 528-29 (see n. 269 above). See also Israel, "Dutch *Staatsvaart*," pp. 1-30, esp. pp. 15-17 (n. 270 above), using these statistics to attack the Davis thesis on the victory of the English cloth trade over the Venetian cloth industry. Israel contends in particular that the Levant Company's sales of English cloth in Aleppo, in the early seventeenth century, were no larger than the Venetian sales, though he is improperly comparing Venetian statistics of 1605 with those for England in 1630. The evidence cited below, however, fully vindicates the Davis thesis, for the 1630s, and especially for the 1680s. See pp. 000-00 below.

[272] Pagano de Divitiis, *English Merchants*, p. 32 (n. 260 above). See also Rapp, "Unmaking of the Mediterranean Trade Hegemony," pp. 499-525 (n. 252).

[273] Astrid Friis, *Alderman Cockayne's Project and the Cloth Trade: the Commercial Policy of England in Its Main Aspects, 1603-1625* (Copenhagen, 1927); F. J. Fisher, "London's Export Trade in the Early Seventeenth Century," *Economic History Review*, 2nd ser., 3:2 (1950), pp. 151-61, Table 1, p. 153; Ralph Davis, *English Overseas Trade, 1500 - 1700* (London, 1973), pp. 11-25, 32-40.

rose to 25 percent in 1640 – when total cloth exports accounted for 92.3 percent of all exports by value.[274] The Mediterranean share would continue to grow thereafter. The major breakthrough and expansion in English foreign trade took place from the 1660s, in what Ralph Davis calls the early-modern "Commercial Revolution:" a revolution, fundamentally based on Mediterranean, American, Caribbean, and Asian markets, that ultimately reduced English dependence on northern European markets from about 85 to 90 percent in the 1660s to just 30 percent by the late eighteenth century.[275]

- the Levant Company's trade with the Ottoman Empire after 1660

Our next set of textile trade statistics for the Levant come from the late 1660s, in the first decade of that Commercial Revolution, when the Levant Company's cloth exports to Ottoman ports had now risen to an annual average of 13,672 broadcloths (for 1666-71 inclusive); and in the 1670s they had risen even more, to an annual average of 20,075 broadcloths (for 1672-77).[276] In the 1680s, the evidence for English domination in western cloth sales is even more impressive. According to Michel Fontenay's published research on western trade with Smyrna (now Izmir in Turkey) in 1686-87, the English accounted for 63.27 percent of all woolens and 59.68 percent of all textiles sold by value (Table 19). Their closest competitor were the Dutch merchants, whose woolens accounted for 33.30 percent (most of the rest) of all such cloth sales. Venetian merchants in that year sold no woolens at all in Smyrna – only some silk fabrics; and the output of Venetian woolens in 1686-90 averaged only 2,058.2 cloths a year (though 30 percent longer: see Table 18). Collectively, the western woolens accounted for 94.32 percent of all textile sales in Smyrna by value, and 74.22 percent of total merchandise sales. [277]

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[274] Fisher, "London's Export Trade," Table 2, p. 153 (n. 273 above); C. G. A. Clay, *Economic Expansion and Social Change: England, 1500 - 1700*, Vol. II: *Industry, Trade, and Government* (Cambridge and New York, 1984), Table XIII, p. 144. If colonial re-exports are included (6 per cent of the total) , the value of wool-based textiles falls to 88 per cent of total exports. See Pagano de Divitiis, *English Merchants*, Table 5.7, p. 177 (n. 260 above); and also the next note.

[275] Davis, *English Overseas Trade*, esp. pp. 20-26, 32-40 (n. 273 above); Ralph Davis, "English Foreign Trade, 1660 - 1700," *Economic History Review*, 2nd ser., 7:2 (1954), pp. 150-66. The West European Commercial Revolution was largely based on the new colonial re-export trades, from the 1660s, which accounted for about a third of total English export revenues throughout the eighteenth century, and it proved to be a major factor in developing American and Asian markets for both the Dutch and the English. An alternative term is thus "New Colonialism," as expounded in Eric Hobsbawm, "The General Crisis of the European Economy in the 17th Century: I," *Past & Present*, no. 5 (May 1954), pp. 33 - 53; and "The Crisis of the 17th Century: II", *Past & Present*, no. 6 (November 1954),pp. 44 - 6: republished as "The Crisis of the Seventeenth Century," in Trevor Aston (ed.), *Crisis in Europe, 1560 - 1660: Essays from Past and Present* (London, 1965), pp. 5 - 58.

[276] Wood, *Levant Company*, p. 102 (n. 260 above); but on p. 42, Wood states, without any real authority, that the Levant Company's cloth exports had "increased by two thirds" from ca. 1600 to 1620, and that "by 1635 from 24,000 to 30,000 pieces were being sent out yearly, half of them to Constantinople and half to Smyrna and Aleppo." In 1671-75, average annual Venetian cloth outputs were 6,493.10 pieces (but their woolens were 30 percent longer than English broadcloths). See Table 19.

[277] Statistics from Fontenay, "Commerce des Occidentaux," Annexe A, pp. 545-46 (see n. 269 above). The total value of woolens sold at Smyrna was 1,576,610 piastres (1,169,009 sq. meters). English sales were valued at 997,500 piastres; Dutch sales were 525,000 piastres; French sales were only 31,910 piastres. From the late sixteenth, early seventeenth century, the piastre was a unit of account = 80 *aspres* (the small Turkish silver coin).Until the Turkish debasements of 1584, 60 *aspres* were reckoned to be worth one ducat or *veneziano*; but from ca. 1600, the *veneziano* as a unit of account was worth double: 120 *aspres* or 1.5 piastres. See Niels Steensgaard, *The Asian Trade Revolution of the Seventeenth Century: the East India Companies and the Decline of the Caravan Trade* (Chicago, 1974). Appendix: Currency and Weights, pp. 415-22, esp. pp. 421-22. See also Table 19 below.

Smyrna, to be sure, was only one Ottoman port, but it was the most important single Levantine port for western commerce, accounting for 55.47 percent of the total value of all European exports to the major Ottoman ports in the 1686-87 survey (in Turkey, Greece, Crete, and Palestine) and 64.79 percent of the total value of all western European purchases from these Ottoman ports. Constantinople ranked second, accounting for 26.85 percent of western export sales to the Empire and only 13.61 percent of western purchases by value.[278] Of the western nations that traded with all the Ottoman ports in that year of 1686-87, the English were the single most important, accounting for 30.55 percent of the value of all good sold there (in both merchandise and bullion); the Dutch ranked second, accounting for 25.70 percent; the French were third, accounting for 22.08 percent; and the Venetians were a poor fourth, accounting for only 12.58 percent. Conversely, in the value of goods imported from all Ottoman ports that year, the English were again first, accounting for 28.4 percent of total purchases; the Dutch were second, accounting for 25.7 percent; the French were third, accounting for 22.1 percent; and the Venetians were again fourth, accounting for 12.6 percent of total purchases.[279]

- *Why the Ottoman Empire was such an important market for European woolen textiles*

That the Ottoman Empire then offered such an important and strongly growing market for such-heavy weight European woolens may seem puzzling, since such cloths were presumably better suited to the much colder, wintry north European and Russian markets. The explanation lies in both demographic and geographic factors. First, the Ottoman Empire was by far the largest organized and accessible foreign market available to western European textile producers in the later sixteenth century, when the Ottoman's European and Asian domains contained at least sixteen million people, and its African domains contained another six million (Braudel and Barkan). According to other estimates, the aggregate population of the Ottoman Empire in 1600 was 35 million, almost half the size of Christian Europe, whose population was then about 77.9 million.[280]

Equally important are the geographic and climatic factors. For much of the Ottoman Empire, both in the Balkans and in Asia Minor itself, consisted of high-plateaux lands, which became very cold at night even in the summer months, and certainly very cold throughout the winter months. The same was true for much of neighbouring Safavid Persia to the east, with whom English cloth merchants also traded, via Ottoman ports and overland links (via Aleppo). In such regions, in the eloquent words of Ralph Davis, "when the cold gales of autumn blew from the uplands of Asia Minor and the Balkans, the prosperous Turk or Persian counted himself lucky to be wrapped in the thickest and heaviest of English woollens."[281]

The growing importance of the Mediterranean basin (with its links to Asian and African markets) in

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[278] Statistics from Fontenay, "Commerce des Occidentaux," Table 6, p. 532 (n. 269 above); and from Michel Fontenay, "Le commerce des Occidentaux dans les échelles du Levant en 1686-1687," in Bartolomé Bennassar and Robert Sauzet (eds.), *Chrétiens et musulmans à la Renaissance: Actes du 37e Colloque International du Centre d'Études Supérieures de la Renassaince (1994)* (Paris, 1998), Table 1, p. 351, Table 2, p. 352. The six ports included in this survey for 1686-87 are Constantinople, Symrna (Izmir), Sidon, Athens, Sadak (Satala), and Candia (Iráklion, in Crete); not included are Beirut and Tripoli (connected to the inland caravan trading center of Aleppo, in NW Syria), and Alexandria – but these ports were not important markets for woolen textiles.

[279] Fontenay, "Commerce des Occidentaux" (1998), Table 1, p. 351 (n. 278 above); Fontenay, "Commerce des Occidentaux" (2007), Table 6, p. 532 (n. 269 above).

[280] Braudel, *The Mediterranean*, Vol. I, 395-98 (n. 265 above); Ömer Lûtfti Barkan, "La 'Mediterranée' de Fernand Braudel vue d'Istamboul," *Annales: Économies, sociétés, civilisations*, 9 (Jan.-March 1954), pp. 191-93; İnalcik, *Ottoman Empire*, vol. I, pp. 25-43 (n. 241 above); de Vries, "Population," Table 1, p. 13 (n. 176 above); Earle, "Commercial Development of Ancona," pp. 40-41 (n. 225).

[281] Davis, "England and the Mediterranean, 1570-1670," pp. 117-26, with quotation on pp. 122-23 (see n. 263 above).

the seventeenth century can be demonstrated by the following comparative statistics. In 1640, the Mediterranean region accounted for 45.5 percent of English of all cloth exports (woolen, worsteds, and serges): a quantity almost identical to the cloth sales volume in northern Europe, which took 46.9 percent (while the remaining 7.6 percent went to the Americas). By the 1660s, just twenty years later, over half of English cloth exports, 56.5 percent, went to the Mediterranean basin, while the North European share was reduced to only 37.6 percent (and the rest again went to the Americas).[282]

- English and European imports from the Ottoman Empire and the balance of payments problem

In return for the English cloths sold in the Ottoman Empire, the chief commodity that the Levant Company acquired was Asian silk, most of which came from Persia. Indeed Ralph Davis had earlier commented that the Levant Company's seventeenth-century trade was largely "the exchange of broadcloth for raw silk" – a view fully endorsed by Gigliola Pagano de Divitiis.[283] We have already seen that Florentine trade with the Levant in the fifteenth century was essentially also an exchange of Italian woolens for silk (and not spices, as might be assumed).[284] Indeed, for seventeenth-century England, silk was its single most imported commodity: accounting for 29.5 percent of all such imports by value in 1622, 28.4 percent in 1640, 20.9 percent in 1669, and 23.4 percent in 1701.[285] If, however, the comparison is based solely on the total value of imports from the Levant, silk accounted for 50.0 percent of that value in 1669 and 70.0 percent in 1701.[286]

As in centuries past, the insatiable European appetite for Oriental silks, spices, and other luxury goods – but also for cotton and other cheaper goods – had created an often severe balance of payments deficit for the West in its trade with the Levant. Thus chronically unable to sell a sufficient value of merchandise, foodstuffs, and raw materials to purchase all of these Asian imports, western Europeans were forced to pay for the difference in coin and bullion (*aka* specie) Nevertheless, the balance of payments problem was less severe for Europeans in the seventeenth century than it had been in the fifteenth century, undoubtedly because Europeans were now better able to sell a greater value of merchandise, especially in textiles, to the Levant.

For western Europe's balance of payments deficit in the late fifteenth century (1490s), we may rely on Eliyahu Ashtor's research on Venetian trade with the Levant. The Venetians were then importing a total value of Asian and African goods worth about 655,000 ducats (or florins), while exporting European goods, in merchandise – including of course Italian and other European woolens – foodstuffs, and raw materials, with a the value of just 245,000 ducats, so that the balance, about 409,375 ducats – or 62.50 percent of the total value – was necessarily paid in European specie.[287]

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[282] *Ibid.*

[283] Pagano di Divitiis, *English Merchants*, p. 33 (n. 260 above); Davis, "Influence d'Angleterre," pp. 206-07 (n. 271 above); Davis, "England and the Mediterranean," p. 125 (n. 263 above). On European silk consumption and manufactures, see Van der Wee, "Western European Woollen Industries," pp. 456-61 (n. 186 above).

[284] See above, pp. 000-00.

[285] Pagano de Divitiis, *English Merchants*, Table 1.1, p. 33 (n. 260 above)

[286] Fontenay, "Commerce des Occidentaux" (2007), Table 4, p. 529. (n. 269 above). For the importance of the Iranian-Ottoman-European silk trade, see also Bruce Alan Masters, *The Origins of Western Economic Dominance in the Middle East: Mercantilism and the Islamic Economy in Aleppo, 1600 - 1750*, New York University Studies in Near Eastern Civilization no. 121 (New York, 1988), pp. 22-31, but especially for the century 1630-1730, after the Iranian shahs failed to maintain their silk monopoly, so that the silk trade returned to Aleppo and nearby Ottoman ports.

[287] See Munro, "Venetian Trade with the Levant," Table 1, p. 953 (n. 180): based on Eliyahu Ashtor, "The Venetian Supremacy in Levantine Trade: Monopoly or Pre-Colonialism?," *Journal of European Economic History*, 3:1 (Spring 1974), pp. 5 - 53; Eliyahu Ashtor, "Profits from Trade with the Levant in the

According to Pagano di Divitiis' analysis of the Levant Company's trade in the 1630s, its requirements to make payments in specie ranged from only 20 to 35 percent of the total value of trading transactions.[288] Even better data comes again from Michel Fontenay's research on western European trade with Ottoman ports a half-century later, in 1686-87. The total value of the Levant trade that year was 5,735,079 Turkish piastres, of which 67.20 percent was in merchandise sales and the remaining 32.80 percent was in specie (coin and bullion). The English Levant Company's trade (again accounting for 30.55 percent of the total value of western trade) was composed of 80.76 percent in merchandise sales and thus of only 19.24 percent in specie payments. In comparison, the Dutch (accounting for 25.70 percent of the total trade), had to make 37.12 percent of their purchase payment in specie; the French, 47.84 percent; and the Venetians, 21.08 percent.[289] In view of the overwhelming dominance of textiles in western merchandise sales in this Levant trade, and in view of England's equally impressive dominance in sales of woolens (at least at Smyrna: 63.27 percent of the total), we may conclude that England's own woolen cloth export trade had proved to be the decisive factor in reducing that long chronic balance of payments deficit.

The Braude thesis on the victory of the Levant Company: English "dumping"

Finally, historians of Venice and the Levant trade must consider an alternative thesis that Prof. Benjamin Braude has offered to explain the decline of the Venetian (and Turkish) cloth industry: that the duplicitous Levant Company had engaged in "dumping" English textiles. In full accordance with the technical definition of "dumping," Braude contends that, in the 1620s, the Company was selling English woolens in Istanbul for prices below those prevailing within England; and part of his case rests on the validity of the Levant Company's records for exchange rates (pence sterling to *aspres*).[290] Whether or not these exchange rates permit an accurate comparison of market prices, the prices that Braude cite lack validity because they are not linked to specific types of cloths, whose types and thus values ranged so widely. With a considerable degree of product differentiation, producers and merchants engaged in monopolistic competition (as noted earlier) to convince consumers that there were no suitable substitutes, in terms of quality and price, for the specific, highly individual textile product being marketed, both at home but especially abroad. Such competition was designed to permit merchants to charge higher, profit-producing, prices – not lower prices; that is what economists call "rent-seeking." We must also remember that the Levant Company's initial success in Ottoman textile markets came from replacing the cheap-line woolen kerseys with the much more expensive Suffolk colored broadcloths, which, ca. 1600, were worth on average worth 2.5 times as much as standard kerseys, per yard; and as noted earlier, kerseys disappeared from the Levant

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Fifteenth Century," *Bulletin of the School of Oriental and African Studies*, 37 (1975), pp. 250-75; Eliyahu Ashtor, "The Volume of Levantine Trade in the Later Middle Ages (1370 - 1498)," *Journal of European Economic History*, 4:3 (Winter 1975), pp. 573 -612; Eliyahu Ashtor, *Les métaux précieux et la balance des payements du Proche-Orient à la basse-époque* (Paris, 1971); Eliyahu Ashtor, *A Social and Economic History of the Near East in the Middle Ages* (London, 1976), pp. 319-31; Eliyahu Ashtor, *Levant Trade in the Later Middle Ages* (Princeton, 1983), pp. 476-78 and Table LIV. See also Alan Stahl, "European Minting and the Balance of Payments with the Islamic World in the Later Middle Ages," in Simonetta Cavaciocchi (ed.), *Relazioni economiche tra Europa e mondo islamico, secoli XIII - XVIII/ Europe's Economic Relations with the Islamic World, 13th - 18th Centuries*, Fondazione Istituto Internazionale di Storia Economica F. Datini, Atti delle 'Settimana di Studi' e altri convegni, no. 38 (Florence, 2007), pp. 889-904.

[288] Pagano de Divitiis, *English Merchants*, p. 25 (n. 260 above), also citing Ralph Davis, *Aleppo and Devonshire Square: English Traders in the Levant in the Eighteenth Century* (London, 1967), pp. 196–97.

[289] Fontenay, "Commerce des Occidentaux" (1998), Table 1, p. 351 (n. 275 above); Fontenay, "Commerce des Occidentaux" (2007), Table 5, p. 532 (n. 269 above) . For the piastre, see n. 279 above.

[290] Braude, "International Competition and Domestic Cloth": in particular, Tables I and II, p. 441; Tables III and IV, pp. 444-45 (see n. 257 above). His contentions are repeated, but with no new evidence, in Braude, "Rise and Fall of Salonica Woollens," pp. 216-236, esp. pp. 228-36 (n. 257).

Company's trade during the 1620s, as it "upscaled" its cloth trade.[291]

Braude's price lists unfortunately do not specify whether the English cloths – those sold in both London and Istanbul – are, for example: Winchombe kerseys, Devonshire dozens, West Country broadcloths, *panni di Londra*, Essex or Sussex Superfines, or Spanish Medleys.[292] In his one single domestic source for English woolen cloth prices, such distinctions are not clearly made: those for mixed colored broadcloths that Westminister Abbey purchased each year for its servants.[293] Those prices, from 1613 to 1641, were generally 13s 4d per yard; and they do not appear to be actual current market prices (but those for long-term contracts). At these prices, these woolens were certainly in the luxury category.[294] Braude does not, however, cite another cloth price series from this same source: for broadcloths purchased for Westminister scholars, which were far cheaper during these same years, averaging only 7s 4d per yard (55 percent as much). [295] Nor did he cite an even cheaper range of English cloth prices: for woolens supplied to the servants and scholars at Winchester and Eton Colleges, which, for the period 1615-40, averaged just 5s 0d and 6s 6d per yard, respectively.[296] Thus Braude's citation of one single price series for unusually expensive woolens (at Westminster) cannot possibly justify his charge that the Levant Company was "dumping" woolens in Ottoman markets; nor is there any other evidence to make that case, which would require a comparison of English and Turkish prices for very similar if not identical fabrics, in the same years.

In any event, we may well ask why would the Levant Company would have chosen to engage in "dumping," in selling its woolens presumably at a loss (or loss of profits). For there is no evidence that such a potentially harmful sales technique was a loss-leader that was necessary and thus justified in order to gain access to Ottoman commerce in silks and spices. Furthermore, any such "dumping" would have reduced the sales revenues and net incomes necessary to purchase the silks and spices – even if that import trade was more profitable than the export trade to the Ottoman Empire. In other words, why would the Levant Company have

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[291] See Shammas, "Decline of Textile Prices," Table 1, p. 484 (see n. 207 above): an average ratio of 80:32 in 1578-99 and 65:37 (pence per yard) in 1600-40. See Davis, "England in the Mediterranean," p. 120, n. 3, contending that officially (for customs purposes) broadcloths were worth four times as much as kerseys; but that does not take account of size differences. A standard kersey was less than half the size of a short broadcloth (as fully finished): 18 yds by 1 yd (16.459 m by 0.914 m = 15.050 m^2) vs. 24 yds by 1.750 yds (21.946 m by 1.600 m = 35.117 m^2). See Munro, "Medieval Woollens: Struggles for Markets," Table 5.7, pp. 312-15 (n. 8 above). Note that Venetian and Florentine woolens were about 30 percent longer than English broadcloths (see above pp. 000). But see also Pagano di Divitiis, *English Merchants*, p. 32 (n. 260 above), contending (falsely, in my view) that the Levant Company's broadcloth were different from standard English broadcloths, and that English producers (unnamed) had "counterfeited the Venetian woolens stamped with the lion of St. Mark, though they were of inferior quality and cost less." She provides absolutely no proof for this dubious assertion.

[292] See, for example, the text in n. 225, above.

[293] The prices are taken from: Lord William Beveridge, *Prices and Wages in England from the Twelfth to the Nineteenth Century*, Vol. I: *Price Tables: Mercantile Era* (London: Longman Green, 1939; reissued London: Frank Cass and Co, Ltd., 1965), p. 183. Braude's publications preceded the publication of Shammas, "Decline of Textile Prices," pp. 483-507 (n. 207 above)

[294] Their purchase, in the 1620s, would have cost a master mason (in Oxford-Cambridge) more than two weeks' wages per yard; and for a complete broadcloth of 24 yards, that mason would have had to spend 320 days' wages, well more than a year's annual wage income (at 210 days' employment). The daily wage for master masons in Oxford and Cambridge was then 12d sterling (1s). Phelps Brown and Hopkins, "Seven Centuries of Building Wages," pp. 195-206 (see n. 16 above).

[295] Beveridge, *Prices and Wages*, p. 193 (see n. 293 above)

[296] Archives of the British Library of Economic and Political Science: Phelps Brown Papers, Box Ia:324 .

adopted a strategy that required the export of even more specie, especially when such exports (without a costly licence) were still illegal, and remained so until 1663? [297]

The English Levant Company's Mediterranean Trade in Products of the New Draperies

The history of the Levant Company's textile trade in the seventeenth century can hardly be complete without examining its even greater success in Mediterranean markets in selling a growing quantity of products from England's so-called New Draperies: i.e., far lighter and far cheaper semi-worsted or serge-type cloths.[298] Manufactured in a very wide variety of products, the serges and worsteds of the New Draperies had weights (in grams per square meter of cloth) that ranged from 18.75 percent to 53.57 percent of the weight of Suffolk and Essex short broadcloths, with a mean weight of 31.69 percent.[299] According to Carole Shammas' survey of English textile prices, those for products of the New Draperies in the period 1578-1599 ranged from 12.50 percent to 30.00 percent of those for heavy-weight broadcloths, with an average of 22.92 percent; in 1600-40, they averaged 29.85 percent of the value of such broadcloths; and in 1660-1699, they averaged about the same, 27.23 percent of the value of current broadcloths. By calculating constant values (based on the 1660-99 mean prices), Shammas estimated that the real values of all these textiles had fallen substantially over this 125 year period, in relation to the Consumer Price Index: by 82 percent for broadcloths, and by 51.33 percent for the selected products of the New Draperies.[300] Such a fall in relative textile prices (not explained by any technological factors) may have stimulated demand, unless that decline in cloth prices was relative only to rising prices for European foodstuffs. If that had been the case, rising food prices with fixed household budgets would have reduced consumer demand for textiles.

As noted earlier, the so-called New Draperies had been effectively transplanted from Flanders into England's East Anglia (Norfolk and Suffolk), following the outbreak of the Revolt of the Netherlands against Spanish rule (1568-1609). Their rise and expansion is indeed a complex story; but the essential reasons to explain how and why they finally became the predominant form of textile manufacturing in seventeenth-century England can be found in the structural changes in international markets discussed earlier: supply factors that favoured long-distance trade in cheaper textiles, in particular, but also changes in consumer demand, including changes in textile fashions. [301] The just observed fall in real prices would not, however, have necessarily favoured foreign demand for products of the New Draperies over demand for the traditional

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[297] From January 1364, Statute 36 Edwardi III, stat. 1, c. 2 had forbidden the export of any English coin (without a royal licence) as well as all forms of bullion. *Statutes of the Realm*, vol. I, 383 (see n. 107 above). In May 1663, Parliament repealed its provisions concerning bullion exports: in Statute 15 Carolus II. c, 7, in *Statutes of the Realm*, vol. V, p. 451, sec. 9. That legislation was influenced by argument set forth by the East India Company: in Thomas Mun, *England's Treasure by Forraign Trade* [1664] (reissued Oxford, 1937).

[298] See above, pp. 000-00.

[299] See Munro, "Medieval Woollens: Struggle for Markets," Table 5.7, pp. 312-15 (n. 8 above): according to English documents of 1578. The weight of a Suffolk short cloth, in grams per sq. meter, was 826.656 g/m^2; and the weights of New Drapery textiles ranged from a low of 154.998 g/m^2 to a high of 351.025 g/m^2, depending on whether they were serges or pure worsteds. See also nn. 30, 68, 160-62, 199-206 above.

[300] Shammas, "Decline of Textile Prices," Table 1, p. 484 (n. 207 above). In current terms, the mean price of heavy woolen broadcloths had fallen from 80d per yd in 1578-99 to 56d per yd in 1660-99; in constant terms (base 1660-99), the average real price had fallen from 138d per yd to 56d per yd over this period. Similarly, in current terms, the mean prices for serges, baize, flannels, and stuffs had fallen from 18.33d per yd to 15.25d per yd; and the real price, from 31.33 d per yd to 15.25 d per yd.

[301] See above, pp. 000-00; and several essays in Negley Harte (ed.), *The New Draperies in the Low Countries and England, 1300 - 1800*, Pasold Studies in Textile History no. 10 (Oxford, 1997), especially those by Holderness (pp. 217-44), Martin (pp. 245-74), and Priestley (pp. 275-88).

woolens of the Old Draperies, since the observed price-decline was about the same for both types of textiles.

An equally important supply factor, one also mentioned earlier, was the benefit that the New Draperies derived, and at the direct expense of the Old Draperies, from the aforementioned Tudor Stuart Enclosures: in that a much higher proportion of England's sheep population came to be raised in the form of much larger, meatier sheep, with (on average) far longer, coarser, and straight-fibered fleeces whose wools were far more suitable for the worsteds, serges, and stuffs of the New Draperies than for the fine woolen broadcloths of the Old Draperies. [302]

By the mid-seventeenth century, the results of these agrarian, industrial and commercial changes had become readily evident in the statistical data on English textile exports. In 1640, when (as noted earlier) textiles still accounted for over 90 percent of aggregate English export revenues), woolens of the Old Draperies still exceeded the value of the products of the New Draperies (bays, says, serges, perpetuanas, etc.), but not by much: 48.9 percent for the former vs. 43.3 percent, for the latter.[303] By 1700, English exports of textiles from the New Draperies had now increased, in both absolute and relative terms, to account for 58.8 percent of the total textile exports by value (£2.82 million); high-quality broadcloths, accounted for 25.4 percent; and the cheaper, coarser kerseys, dozens, and other "narrow" woolens, accounted for the remaining 15.8 percent.[304]

Just as England had earlier, in the fifteenth century, gained supremacy in European markets for its woolens of the Old Draperies, based essentially on a comparative cost advantage in wools (short-stapled),[305] so England now, in the seventeenth and eighteenth century, gained an equal supremacy in both European and overseas American colonial markets for the products of its New Draperies, based now on perhaps some comparative advantage in its wool supplies (long-stapled), but more especially in shipping and other transaction costs, certainly in the Mediterranean basin. That supremacy may well explain why Venice's attempts to diversity its textile production, during the later sixteenth and seventeenth centuries, by producing lighter-weight serges (some in imitation of those of the Flemish *sayetteries*), were doomed to failure, proving no more successful than those of the Terra Firma Venetia towns. But Venice did prove much more successful, without similar effective competition, in producing various silk fabrics, which are beyond the scope of this wool-focused study.[306]

The East India Companies, the spice trade, and the decline of Venice in the seventeenth century

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[302] See pp. 000-00 above; and especially Bowden, *Wool Trade,* pp. 1-76 (n. 137 above); Van der Wee, "The Western European Woollen Industries," pp. 423-25, 452-61 (n. 186 above).

[303] Clay, *Economic Expansion,* Vol. II, Table XIII, p. 144 (see n. 274 above). In the 1660s, 24.23 percent of textiles from the New Draperies sold in the Mediterranean went to Italy, 10.1 per cent to Portugal, and the largest share, 65.71 percent to Spain and its American colonies. Pagano de Divitiis, *English Merchants*, Table 5.6, p. 170 (n. 260 above).

[304] Mann, *Cloth Industry*, Appendix I: Table B, p. 309: total value of £2,818,871, excluding hosiery (n. 137 above); Van der Wee, "Western European Woollen Industries," Table 8.6, p. 457 (n. 186 above); Clay, *Economic Expansion*, Table XV, p. 146 (n. 274 above).

[305] See Munro, *Wool, Cloth, and Gold*, pp. 155-83 (n. 107 above) ; Munro, "Symbiosis of Towns and Textiles," pp. 1-74 (n. 41 above); Munro, "Medieval Woollens: Struggles for Market," pp. 278-96 (n. 8 above).

[306] See nn.106, 165, above; and Mozatto, "Production of Woollens," p. 99 (n. 227 above); Panciera, *L'Arte matrice*, pp. 13-66 (n. 236 above); Panciera, "Qualità e costi di produzione,", pp. 419-446; Panciera, "Industries of Venice," pp. 189-90 (n. 250 above); Demo, "Wool and Silk," pp. 222-23, 229 (n. 106 above): contending that the growth of the Venetian silk industry "served to offset the almost complete decline of the urban wool industry," but without offering statistical proof for this assertion.

Finally, the seventeenth-century decline of the Venetian cloth industry was undoubtedly also influenced by the very adverse developments in Venetian access to the spice trade, indeed ending its Indian Summer of prosperity that Venice had enjoyed from the mid-sixteenth century. The English, unlike the Dutch, had long been excluded from the Asian spice trade, until the advent of the Levant Company in the 1570s, which provided some access to the Asian overland caravan trade that terminated in Aleppo (in north-west Syria); but, as we have already seen, silks were far more important than spices in the Levant trade.[307]

Of much greater importance, therefore, is the fact that leading merchants and investors in the Levant Company took part in setting up for the famed East India Company, to gain direct maritime access to the East Indies and its spice trades, via the Cape of Good Hope (South Africa). Chartered in 1600, with a monopoly on English trade with the Indian Ocean basin, the East India Company ultimately became by far the most powerful of the new joint-stock overseas trading ventures. But at the very same time the Dutch were also seeking their own monopoly on the East Indies spice trades. For that purpose they established (in 1602), their own first joint-stock company: the Vereinige Oost-Indisch Compagnie, the United East India Co, better known by its initials as the VOC. Taking advantage of wars that plagued both the Portuguese and the Venetians in the 1590s, with serious disruptions to the European spice trade in general, the Dutch and English both sought that direct sea route to the East Indies, circumventing both the ancient Asian overland caravan routes to the Mediterranean (i.e., to the Levant) and the Indian Ocean routes to the Persian Gulf and the Red Sea (Alexandria).[308]

The Dutch VOC was chiefly responsible for destroying much (if not all) of the remaining Portuguese power in the Indies. Of even greater importance was their success in securing an almost complete monopsony (as a single buyer) over the East Indies spice trade – a task in which the Portuguese had abysmally failed. Initially, the Dutch appeared to be the complete victors over the English as well, especially after evicting all the English merchants from the key Spice Islands, in the so-called Massacre of Amboyna (modern Ambom, in the Celebes) in 1622. Forced to concentrate on the Indian subcontinent, the English ultimately gained a much greater share of Asian trade: from not just India, which had its own secondary but still important spice trades (on western and eastern Cormandel coasts), but also from India's own commercial links with the rest of southern and eastern Asia. Of greater concern for this current study was the drastic consequences to the Venetian economy from its rapid loss of direct access to the Asian spice trades, now controlled by the Dutch and English.[309] The loss of that power, and the once vast profits gained from the spice trade in Ottoman ports, may have also contributed to the decline in Venetian woolen sales in Turkish markets – since sales of woolens depended in part on Venetian purchases. But the other factors previously cited were probably more important than the Venetian loss of the spice trades.

The Indian Summer of the Florentine Cloth Industry and its Decline and Fall: c. 1550 - c. 1670

Finally, the story of the early-modern Italian cloth industries may be concluded with the final decline and then collapse of the Florentine cloth industry from the late sixteenth century, but especially during the early seventeenth century, now paralleling the final decline of the Venetian industry. As previously noted, the Florentine industry had enjoyed a remarkable recovery and expansion from the early fifteenth century, one that culminated in the early 1520s (as noted earlier, producing about 21,000 bolts), only to be followed by that severe slump that so much benefited the recovery and expansion of the Venetian cloth industry.[310]

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[307] Steensgaard, *Asian Trade Revolution*, pp. 31-42, 74-81, 114-25, 405-12 (see n. 278 above); Wood, *Levant Company*, pp. 15-58 (n. 260 above)

[308] For the debate about the origins of Dutch limited-liability joint stock companies, see Steensagaard, *Asian Trade Revolution*, p. 127; and pp. 114-53 (n. 278 above), for the early history of both East India companies. See also Kurti N. Chaudhuri, *The English East India Company: the Study of an Early Joint-Stock Company, 1600 - 1640* (London, 1965); Kristof Glamann, *Dutch-Asiatic Trade, 1620 - 1740* (Copenhagen and The Hague, 1958; second edition: The Hague, 1981).

[309] See Steensgaard, *Asian Trade Revolution*, pp. 53-55, 102-106, 185-91, 226-36 (n. 278 above).

[310] See above pp. 000-00.

Subsequently, from the 1550s, the Florentine cloth industry enjoyed another remarkable recovery and final Indian Summer of prosperity that lasted until the 1570s. Unlike the fifteenth-century industrial expansion, which had been based almost entirely on the Garbo's cheaper-line woolens sector, directed principally to Levantine markets, the Florentine industry's revival in the mid-sixteenth century was based far more on the so-called *panni ricchi*, expensive textiles which included not only the fine woolen broadcloths (*panni larghi*) of the old San Martino sector, but now most especially the aforementioned *rascie* with a greater market orientation on Europe itself.[311] Since the latter were composed solely of Spanish *merino* wools, they would have been classed earlier as Garbo woolens; but in view of their very high value (about 68 - 70 florins of account: see above, pp. 000), they were indisputably *panni ricchi*. Though originally introduced in 1488 (see above, pp. 000), they became prominent in Florentine textile exports, as noted earlier, only from the 1550s, achieving a remarkable success in Spain, the Kingdom of the two Sicilies (Naples), and especially at the fairs of Lyon and Antwerp, though only for about twenty years. Chorley assumes that about 80 percent of the total value was in the form of high-priced *panni richi* (dominated then by the *rascie*); and that much of the remainder was in the much cheaper serge fabrics known as *panni perpignani.*[312]

The Peace of Câteau-Cambrésis in 1558, which finally restored stability to much of western Europe, was undoubtedly responsible for much of the ensuing boom in Florentine cloth production and export sales. That boom can been in statistical series for Florentine cloth output in terms of purely notional *panni corsivi* (with a fixed value of 30 *scudi* or florins of account, representing the mean value of lower-quality Garbo woolens).[313] The official Arte della Lana guild records state that outputs of these *panni corsivi* rose quite dramatically (Tables 15-16): from 14,700 *panni* in 1553 (when totals were first recorded), with an estimated value of 441,000 florins (*scudi*), to a peak of 33,212 *panni* in 1571, with an estimated value of 996,360 florins. Such data are, however, highly misleading, because they combined the outputs of high-valued *panni ricchi* – including especially the *rascie* – with those for much coarser, lower-valued fabrics, such as the *panni perpignani*.

If we accept Chorley's assumption that about 80 percent of this total output was in the form of the *panni ricchi*, with an estimated mean value of 60 florins (*scudi)* per cloth, and thus that the remaining 20 percent were in the cheaper *panni corsivi*, with an estimated mean value of just half, 30 florins, we would find that total Florentine cloth output rose from 8,820.00 *panni* in 1553 (with 5,880 *panni ricchi* and 2,940 *panni perpignani* or other *panni corsivi*) to a peak of 19,927.20 *panni* in 1571 (with 13,284.80 *panni richi* and 6,642.40 *panni corsivi*). Chorley, however, provides a lower peak estimate of 18,333 *panni* (but evidently for 1561) – one that regrettably does not accord with his own arithmetic (Table 16).

To add to this apparent confusion, Francesco Ammannati has provided new, and even lower, estimates of Florentine cloth production during these years (Tables 15-16): with an estimated peak, for 1571, of 16,892 *panni* (with 14,358 *panni ricchi* and 2,534 *panni corsivi*). Based on his close analyses of the sixteenth-century Florentine *Arte della Lana* and other industrial documents, Ammannati has come to different conclusions on the values of the two major textiles (*panni ricchi* and *panni corsivi*, or *panni perpignani*) during this era and the relative shares that each contributed to total output, each year.[314] First,

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[311] The following is based on Chorley, "Rascie and the Florentine Cloth Industry," pp. 487-526 (n. 113 above); and Chorley, "Volume of Cloth Production," pp. 551-67 (n. 168 above).

[312] Chorley, "Rascie and the Florentine Cloth Industry," pp. 500, 516-17 (n. 113 above). He also notes that Naples had replaced the Levant as the chief supplier for the Florentine silk industry, thus explaining its importance for Florentine cloth sales. For *panni perpignani* see above, p. 000, and below p. 000.

[313] *Ibid*., Table 1, p. 516.; these figures are not given in Goldthwaite, *Economy of Renaissance Florence*, Table 4.1, p. 278 (n. 6 above): none at all between 1526 and 1591. According to Ammannati, "Florentine Woolen Manufacture," p. 6 (n. 192 above), *panno corsivo* means coarse cloth. For the relationship of the Florentine *scudo* and the *fiorino*, see n. 148 above.

[314] Ammannati, "Florentine Woolen Manufacture," p. 6, n. 18; figure 1, p. 7; and Table 1, p. 8 (n. 192 above).

he believes that the mean price of the *panni corsivi* had risen from 30 florins in 1553 to 32 florins (*scudi*) by 1558, remaining at that level until 1571, while the mean value for the *panni ricchi* was and remained at 64 florins (*scudi*) throughout the whole period. Second, he concludes that share of total output accounted for by the cheaper *panni corsivi* fell from 25 percent in 1553-54 to 20 percent in 1558-60 and then to 15 percent in 1561-71 (while the share for the *panni ricchi* correspondingly rose from 75 to 85 percent). The accompanying Tables 15-16 present these estimates, along with the original guild statistics. Whatever was the actual peak output, in 1571, it was probably below, and certainly no higher than, the estimated output for the 1520s: from about 18,000 to 24,000 bolts (i.e., a mean of 21,000).[315]

From that peak of 1571, total Florentine cloth outputs reckoned in notional *panni corsivi* fell by over half to just 15,723 *panni* in 1586; and production continued to fall, though much less steeply, to a mean of just 13,347 *panni* in 1591-1605, then to 10,717 *panni* in 1610-19, to 6,428 *panni* in 1630-39, to about 3,400 *panni* per year in the 1660s, and, finally, only 1,500-2,000 pieces in 1720.[316] The much cheaper *panni perpignani* had by now progressively displaced the very costly *panni rascie* as the primary product of the Florentine export industry.[317] Thus, the *panni perpignani*, which had accounted for 20 to 25 percent of export sales in the 1550s, but possibly only 15 percent in the 1560s, increased that share to 40 percent in the 1590s and to 71 percent in the 1620s, according to Chorley's data.[318] According to some guild complaints from the early seventeenth century, some producers had been weaving *rascie* with inferior wools and lower yarn densities.[319] Indeed, a very major problem that Florence's Arte della Lana was experiencing precisely from the 1570s was not just competition from the rapidly expanding Venetian cloth industry, but the almost complete diversion of the better quality Castilian *merino* wools to the Venetian industry, thereby forcing the

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[315] A total of 30,000 *panni corsivi* (in 1560) was worth 900,000 florins of account, so that: (1) 80 percent = 720,000 florins = 12,000 *panni ricchi* at 60 florins, and (2) 20 percent = 180,000 florins = 6,000 *garbo* woolens at 30 florins. See Chorley, "Rascie and the Florentine Cloth Industry," Table 1, p. 516, and p. 517 (n. 113 above); Chorley, "Volume of Cloth Production," p. 560 (n. 168 above). See Tables 15-16 below.

[316] Chorley, "*Rascie* and the Florentine Cloth Industry," Tables 1 and 2, pp. 516-18 (n. 113 above); Chorley, "Volume of Cloth Production," Table 1, p. 556, Table 2, p. 3, p. 565 (n. 168 above); Paolo Malanima, *La decadenza di un'economia cittadina: L'industria di Firenze nei secoli XVI-XVIII* (Bologna, 1982), pp. 289-305, especially the table on p. 302; and Paolo Malanima, "An Example of Industrial Reconversion: Tuscany in the Sixteenth and Seventeenth Centuries," in Herman Van der Wee (ed.), *The Rise and Decline of Urban Industries in Italy and the Low Countries (Late Middle Ages - Early Modern Times)* (Leuven, 1988), pp. 63-74, esp. pp. 67-68. Malanima estimates that output had fallen to about 13,000 pieces in the late 1590s, with a brief recovery to 17,000 cloths in 1601-02; but after a new crisis in 1616, output fell to 8,000 pieces in the 1620s, to 6,000 by the 1630s and 1640s; and to only 1,500-2,000 pieces ca. 1720. See Chorley's criticisms of Malinima's data, from 1604 to 1620 (in the monograph only – not the essay,which he does not cite) in his "Volume of Cloth Production," pp. 570-71. See Table 17.

[317] See the memorandum of Vicenzo Pitti, *Provveditore* of Florence's *Arte della Lana* (dated 18 Jan 1620), contending that in the years 1590-1604, when cloth production averaged 13,347 pieces a year, half was in *rascie* and other *panni ricchi* and the other half in *perpignani*. Cited in Maurice Carmona, "La Toscane face à la crise de l'industrie lainière: techniques et mentalités économiques aux XVIe et XVIIe siècles," in Marco Spallanzani (ed.), *Produzione, commercio e consumo de panni di lana nei secoli XII - XVII*, Istituto internazionale di storia economica 'F. Datini' Prato, Series II: Atti delle 'Settimane di Studio' e altri convegni (Florence, 1976), Annexe II, p. 159. See Table 17.

[318] Chorley, "Volume of Cloth Production," Table 3, p. 565 (see n. 168 above). As indicated earlier (n. 000), the production of the cheaper *panni corsivi*, principally *panni perpignani*, had fallen, as a proportion of total output, from 25 percent in 1553 to 15 percent in 1561: see Ammannati, "Florentine Woolen Manufacture," p. 6, n. 18; and Table 1, p. 8 (n. 192 above).

[319] Ammannati, "Florentine Woolen Manufacture ," pp. 3-4 (n. 192 above), citing in particular a guild letter of 1603 to Grand Duke Ferdinand I de'Medici.

Florentine industry to return once more to domestic *matricina* wools of much lower quality.[320]

According to archival data supplied by Ruggiero Romano, for the first half of the seventeenth century only (Table 17), the proportion of total cloths produced as *panni perpignani* rose from a mean of 66.58 percent in 1616-20 to a peak of 74.54 percent in 1626-30, but then declined, rising only slightly to a mean of 61.69 percent in the final quinquennium documented, 1641-45. Conversely, the share in *panni rascie* fell from a mean of 17.85 percent in 1616-20 to a 10.97 percent in 1626-30, temporarily recovering in the 1630s, but falling again to 10.73 percent in 1641-45.[321]

The final decline and fall of the Florentine cloth industry, of its export sector especially, from the 1570s can be explained in part by current political events that so seriously injured its markets in Spain and its commerce at the international fairs of Antwerp and Lyon. The latter, the Lyon Fairs, suffered ruin from the truly vicious French Wars of Religion (1562-98), which also endangered overland trade routes to the Low Countries.[322] Commerce in the Low Countries, and with Spain itself , suffered enormous and very long-term damages from the Revolt of the Netherlands and the first phase of the Eighty Years War between Spain and Holland (1568-1609; resumed, 1621-48). Antwerp's role as the commercial and financial capital of northern Europe effectively ended with the combination of the Spanish Fury in 1576, and then the Duke of Anjou's brutal sack of this city in 1583.[323] As the immediate consequence, almost all international merchants deserted Antwerp for the relative safety of Amsterdam, a commercial shift that both hastened and augmented the already impressive growth of Dutch maritime commerce, and of the Dutch textile industries. Spain itself was continuously involved in wars not only with Holland (or the young Dutch Republic), but also France and England, while invading and trying to absorb rebellious Portugal, from 1580.

In the seventeenth century, Florentine cloth exports undoubtedly lost most if any remaining northern markets during the Thirty Years War (1618-1648), and experienced corresponding losses in Mediterranean markets for the same reasons as did the Venetians: with the continuous onslaught from both English and Dutch competition, in both high quality woolens and in the lower-priced, lighter-weight serges and worsteds.[324]

By the later seventeenth century, according to Paolo Malanima, the Florentine cloth industry, had lost the Spanish, French, southern Italian, and Levantine markets, "one by one," and was now restricted to its own local domestic markets, producing cloths woven chiefly from Italian wools.[325] According to his data on wool

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[320] *Ibid.,* p. 9, citing in particular the Florentine Consul's recommendation of 1573 to Grand Duke Cosimo I. Compounding that problem, in the 1570s, was a monetary revaluation (1570) and the combined banking and liquidity crisis of 1574-79, also cited by Chorley, "Volume of Cloth Production," p. 569 (see n. 168 above). While that commercial and credit crisis undoubtedly contributed to the turning-point of the 1570s, it cannot adequately explain the ensuing long-term decline of the Florentine cloth industry.

[321] Ruggiero Romano, "À Florence au XVIIe siècle: industries textiles et conjoncture," *Annales: Économies, sociétés, civilisations*, 7:4 (1952), pp. 508-12, esp. Table 1, p. 511 (for the years 1616-1645). See Table 17 below.

[322] See Richard Gascon, *Grand commerce et vie urbaine au 16 siècle: Lyon et ses marchands (environs de 1520 - environs de 1580*), École Pratique des Hautes Études, VIe section: Sciences économiques et sociales, 2 vols. (Paris and the Hague, 1971), II: *Conjonctures: de la prospérité au déclin*, pp. 460-672.

[323] Van der Wee, *Growth of the Antwerp Market*, vol. II, pp. 245-68 (see n. 184 above).

[324] For silks, see n. 106 above; for linens, see Romano, "Florence au XVIIe siècle," Table 2, p. 512 (n. 321 above); for both, see Goldthwaite, *Economy of Renaissance Florence*, 296-98 (n. 6 above).

[325] Malanima, "Industrial Reconversion," pp. 67-68 (n. 316 above); Carmona, "La Toscane face à la crise de l'industrie lainière," pp. 151-68 (n. 317), esp. for the plight of other Tuscan cloth industries. For the Naples cloth industry in the seventeenth century, see Roberto Rossi, *La lana nel regno di Napoli nel*

supplies in 1687, 85.25 percent were *matricina* wools, 10.94 percent were North African *barbaresca* wools and only a minuscule 3.78 percent were now Spanish.[326] The once glorious days of the Italian woolen cloth industry had finally come to a dismal end – though not an end, of course, for all Italian textiles (certainly not for silks, or even linens). For both the Florentine and Venetian cloth industries, the end of their prosperity and the onset of their final doom was clearly evident for Florence, by the late sixteenth century, and for Venice, by the early seventeenth century. As Ammannati has commented for Florence in particular, its industry was unable to shift to alternative and more competitive woolen textile products, in view of its having not just higher wages than its competitors, especially those in northern Europe, but also "the impossibility of integrating rural and urban labor, and the lack of an adequate supply of good quality native raw materials."[327]

Some conclusions: comparative advantages in wool supplies and transaction costs

What we should learn from this study of the rise, splendour, and fall of the Italian cloth industries over these six centuries – dominated by Florence from the mid fourteenth until the early sixteenth century, and by Venice thereafter, though far more briefly, until just the early seventeenth century – is the importance of comparative advantage in international trade. That advantage certainly never lay in the technologies of cloth production, if only because there were no significant technological innovations in cloth making between the thirteenth century and the eighteenth-century Industrial Revolution. The shift to all-carded woolens in the later fifteenth and sixteenth centuries, in north-west Europe, a shift that cannot be found in Italy, did nothing to prevent or even delay the irredeemable decline of the woolen cloth industries in the Low Countries, nor did it prove to be a significant factor contributing to England's ultimate victory over all their European textile rivals in the course of the fifteenth and sixteenth centuries.

The chief comparative advantage for the late-medieval English woolen cloth industry, ultimately allowing it to achieve European dominance, was in its wool-supplies: in having close access and especially tax-free access to its own fine wools, then by far the finest available in Europe, and wools that were most suitable for producing heavy-weight luxury woolens. Conversely, continental buyers of these same fine wools had to pay increasingly exorbitant English export taxes, from the 1330s.

Nevertheless, Florence did not immediately lose its pre-eminence in the southern and Mediterranean markets, despite its earlier, fourteenth-century dependency on those same fine English wools. For Florentine and other Italian cloth industries that had earlier relied on English wools, their plight from this disadvantage should have been even worse than it was, most indisputably, for the Low Countries draperies. For their wools were burdened with the even heavier alien export duties; furthermore, the far more distant routes involved in transporting the wools, by land or by sea, involved far greater perils and thus higher costs; and finally, by the early fifteenth century Italian merchants had been virtually excluded from the English wool-export trade. By this time, however, the Italian woolen cloth industries were switching to what had become a viable alternative: in the form of Spanish *merino* wools. Just the same, these Spanish wools still remained, through most of the fifteenth century, much inferior to the better quality English wools. Furthermore, problems in supplying Italy with *merino* wools evidently forced both the Tuscan and Lombard cloth industries to resort to domestic Italian *matricina* wools during much of the fifteenth century.

The compensating advantages for the Florentine cloth industry, in continuing to dominate the later-

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XVII secolo: produzione e commercio (Turin, 2007). See especially the appendices, pp. 235-82; and for the previous period, see : Alessandro Clementi, *L'arte della lana in una città del regno di Napoli (Secoli XIV - XVI)* (L'Aquila, 1979).

[326] Malanima, *Decadenza*, p. 95 (see n. 316 above): the *matricina* wools accounted for 88.49 percent of the total values of the wools consumed; the Spanish, for only 3.46 percent. These data are for a later period: 1686-87, but probably they do not represent a change from the mid-century.

[327] Ammannati, "Florentine Woolen Manufacture," p. 9 (n. 192); see also Ammannati, "L'Arte della Lana a Firenze," pp. 26-39 (n. 192).

medieval Mediterranean cloth markets, lay in its comparative advantage in transaction costs, when such costs combined with Italian primacy in international trade and finance still virtually denied English merchants any viable access to the Mediterranean. At the same time, the Florentines had managed to increase their trading volumes with the vital markets in the Levant (then under Mamlūk control), and in Italy when population growth had resumed before it did in northern Europe. By the later fifteenth century, furthermore, the Florentines were switching back to Spanish *merino* wools, now of far higher quality (with cheaper transport access). In the early sixteenth-century, certainly by the later 1520s, the Florentine finally lost their Mediterranean supremacy – not (yet) to the English, but to the Venetian cloth industry and trade.

The Venetian cloth industry's advantages again lay not in technology or even in wool supplies – for it was also using Spanish *merino* wools – but rather than in transaction costs in the Levant trades, especially when the vital silk trade routes, controlled by the Ottoman Turks, changed to their advantage, at the very time that Florence was experiencing severe disruptions in production (from plague and civil war). The Venetian supremacy in Levantine and Ottoman markets remained unchallenged until the early seventeenth century – and now the most crucial challenge did come, this time, from the English woolen cloth trade, in the form of the Levant Company, as one of the very first European joint-stock companies.

That novel form of business organization allowed the Levant Company to achieve vastly greater economies of scale than any competing Venetian enterprise, and thus much lower unit costs: in its commercial organization and in the shipping trades, especially thanks to its massive heavily gunned ships, whose lower insurance rates more than offset any increased freight rates.[328] Combined with its government support and its skilled diplomacy, the Levant Company had gained, by the 1660s, an overwhelming dominance in the Ottoman textile markets, not only over its Venetian competitors but other European competitors as well (of whom only the Dutch were a serious rival). Certainly that northern European and especially English supremacy stifled any hope that the Florentine cloth industry could benefit from the irredeemable plight of the Venetian industry to stage any form of recovery in the seventeenth century.

Finally, the death knell to Venetian commercial power and prosperity was struck by the combined victories of the English and especially the Dutch East Indies Companies in the Asian spice trades, in the very early seventeenth century. To what extent Venetian commerce in its woolen textiles had ever depended on an exchange of woolens for spices – in the same way that both Florentine and English commerce in the Levant had depended on an exchange of woolens for Asian silks – is a question that demands further research. Whatever role the spice trade had played in the Venetian cloth trade, that role had utterly ceased by the virtual monopoly that the Dutch had established by the 1620s.

[328] For the subsequent history and successes of this company, see Despina Vlami, "Corporate Identity and Entrepreneurial Initiative: the Levant Company in the Eighteenth and Nineteenth Centuries," *The Journal of European Economic History*, 39:1 (Spring 2010), pp. 67-99.

Table 1.

Prices of Northern Woolens and Says
Sold in Florence by the Del Bene Firm in 1318 - 1323

Town	Type/ Color	Average Price in £ affiorini	Average Price in gold florins	Length in braccia	soldi per braccio	Percent of Woolens Mean
COLORED WOOLENS						
Douai	dyed	62	42.759	40	31.00	137.03%
Ypres	dyed	51	35.172	42	24.29	107.35%
Chalons	green	52	35.862	43	24.19	106.91%
Chalons	blue	44	30.345	43	20.47	90.46%
Ghent	white	40	27.586	44	18.18	80.37%
Lille	blue	37	25.517	42	17.62	77.88%
Mean					22.62	100.00%
RAYS AND SAYS						
Ghent	ray	38	26.207	47	16.17	71.48%
Caen	say blue	44	30.345	62	14.19	62.74%
Orchies	blue	29	20.000	44	13.18	58.27%
Ypres	ray	14	9.655	24	11.67	51.57%
Paris	blue/green	32	22.069	56	11.43	50.52%
Poperinghe	ray	24	16.552	47	10.21	45.14%
Arras	dyed stanfort (?)	31	21.379	61	10.16	44.93%
Ghistelles	say white	13	8.966	36	7.22	31.92%
St Denis	white (?)	17	11.724	56	6.07	26.84%
Caen	say white	19	13.103	71	5.35	23.66%
Mean					10.57	46.71%

* 1 braccio = 0.583 metre; 4 braccia= 1 canna = 0.233 metre

Source:
Chorley, Patrick, 'The Cloth Exports of Flanders and Northern France During the Thirteenth Century: A Luxury Trade?' *Economic History Review*, 2nd ser. 40:3 (August 1987): adapted from Table 3, p. 355.

Table 2. Prices of Textiles from Northern France and the Low Countries Sold in Florence by the Del Bene Company in 1318 - 1323

Prices in gold florins: per canna of Florence = 4 braccia = 2.333 meters

Cloth Type and Textile Town	Minimum: florins	Maximum: florins	Mean: florins	Percent of Woolens mean	Percent of Douai mean	Percent of Ypres mean
Woolens						
Douai	5.59	6.62	6.10	120.07%	100.00%	142.17%
Mechelen	5.24	5.45	5.34	105.14%	87.57%	124.50%
Brussels	4.24	6.38	5.31	104.47%	87.01%	123.69%
Châlons	4.24	5.62	4.93	97.00%	80.79%	114.86%
Ghent	3.69	5.34	4.52	88.86%	74.01%	105.22%
Ypres	3.66	4.93	4.29	84.45%	70.34%	100.00%
Mean value	4.44	5.72	5.08	100.00%	83.29%	118.41%
SAYS and other lighter cloths						
Lille	2.03	3.07	2.55	50.20%	41.81%	59.44%
Caen	1.34	2.62	1.98	39.01%	32.49%	46.18%
Orchies	1.83	2.34	2.09	41.04%	34.18%	48.59%
Hondschoote	1.41	2.17	1.79	35.27%	29.38%	41.77%
Arras	1.69	1.72	1.71	33.58%	27.97%	39.76%
Paris	1.55	1.72	1.64	32.22%	26.84%	38.15%
Poperinghe	1.31	1.62	1.47	28.83%	24.01%	34.14%
Saint-Denis	1.00	1.00	1.00	19.67%	16.38%	23.29%
Ghistelles	0.72	0.83	0.78	15.26%	12.71%	18.07%
Mean value	1.43	1.90	1.67	32.79%	27.31%	38.82%

Source:

Hidetoshi Hoshino, "The Rise of the Florentine Woollen Industry in the Fourteenth Century," in N.B. Harte and K.G. Ponting (eds.), *Cloth and Clothing in Medieval Europe*, Pasold Studies in Textile History, no. 2 (London, 1983), Table 11.2, p. 190.

The prices were given in *soldi affiorini*; and, for this table, they have been converted into florins (*fiorini doro)* at the fixed rate of 29s = 1 florin (fixed rate from 1279). See Peter Spufford, *Handbook of Medieval Exchange* (London: Royal Historical Society, 1986), pp. 34, 39.

Table 3.

Prices of Woolens Manufactured in Italy and sold in Italian and Foreign Markets

with Prices for Competitors' Woolens: sold by the piece

(whole cloth of 21 - 30 meters), 1380-1435

Place Country and Town	Textile	Rank Order	Value in Florentine Florins	Value in £ sterling 36d/ florin	Value in £ groot Flemish 34d /florin
A. Prices of Italian, Catalan, French, Flemish Woolens sold in Naples and Sicily, 1380 - 1410:					
priced by the whole cloth					
Italy					
Florence	San Martino woolens	lowest	58.540	8.781	8.293
Florence	San Martino woolens	mean	60.740	9.111	8.605
Florence	San Martino woolens	highest	62.930	9.440	8.915
Milan, Como	dyed woollen broadcloths	lowest	40.000	6.000	5.667
Milan, Como	dyed woollen broadcloths	mean	43.360	6.504	6.143
Milan, Como	dyed woollen broadcloths	highest	45.000	6.750	6.375
Prato, Pisa, Siena	dyed woollen broadcloths	lowest	21.680	3.252	3.071
Prato, Pisa, Siena	dyed woollen broadcloths	mean	26.020	3.903	3.686
Prato, Pisa, Siena	dyed woollen broadcloths	highest	30.350	4.553	4.300
Catalonia					
Perpignano	dyed woollen broadcloths	mean	17.000	2.550	2.408
Villefranca	dyed woollen broadcloths	mean	9.370	1.406	1.327
France					
Languedoc	dyed woollen broadcloths	mean	16.000	2.400	2.267
Gignac, Beziers	dyed woollen broadcloths	mean	17.500	2.625	2.479
Carcassonne	dyed woollen broadcloths	mean	19.000	2.850	2.692
Flanders					
Wervik	dyed woollen broadcloths		26.000	3.900	3.683

Place Country and Town	Textile	Rank Order	Value in Florentine Florins	Value in £ sterling 36d/ florin	Value in £ groot Flemish 34d /florin

B. Prices of Italian, Flemish, Brabantine, French, Spanish, and English Woolens in Spain

(Barcelona, Valencia, Majorca): Sales by the Datini Firm, 1394 - 1410

Place/Town	Textile	Rank	Value in Florentine Florins	Value in £ sterling 36d/florin	Value in £ groot Flemish 34d/florin
Italy					
Florence	dyed woollen broadcloths	mean	64.430	9.665	9.128
Prato, Genoa	dyed woollen broadcloths	mean	62.630	9.395	8.873
Flanders					
Wervik, Kortrijk	dyed woollen broadcloths	mean	27.900	4.185	3.953
Comines, Menin	dyed woollen broadcloths	mean	27.900	4.185	3.953
Bruges	dyed woollen broadcloths	mean	44.010	6.602	6.235
Brabant					
Brussels	dyed woollen broadcloths	mean	44.180	6.627	6.259
Mechelen	dyed woollen broadcloths	mean	44.180	6.627	6.259
France					
Montivilliers	dyed woollen broadcloths	mean	31.480	4.722	4.460
Spain					
Perpignano	dyed woollen broadcloths	lowest	10.670	1.601	1.512
Perpignano	dyed woollen broadcloths	mean	13.620	2.043	1.930
Perpignano	dyed woollen broadcloths	highest	18.670	2.801	2.645
Puigcerda	dyed woollen broadcloths	mean	10.670	1.601	1.512
Villefranca	dyed woollen broadcloths	mean	8.800	1.320	1.247
Villefranca	dyed woollen broadcloths	mean	8.400	1.260	1.190
Barcelona	dyed woollen broadcloths	mean	11.860	1.779	1.680
England					
Essex	straits (dozens)	mean	6.120	0.918	0.867

Place Country and Town	Textile	Rank Order	Value in Florentine Florins	Value in £ sterling 36d/ florin	Value in £ groot Flemish 34d /florin

C. Prices of Italian, Catalan, French, Flemish Woolens sold in Naples and Sicily, 1380 - 1410:

Place/Town	Textile	Rank	Value in Florentine Florins	Value in £ sterling 36d/florin	Value in £ groot Flemish 34d/florin
Italy					
Florence	San Martino woolens	lowest	58.540	8.781	8.293
Florence	San Martino woolens	mean	60.740	9.111	8.605
Florence	San Martino woolens	highest	62.930	9.440	8.915
Milan, Como	dyed woollen broadcloths	lowest	40.000	6.000	5.667
Milan, Como	dyed woollen broadcloths	mean	43.360	6.504	6.143
Milan, Como	dyed woollen broadcloths	highest	45.000	6.750	6.375
Prato, Pisa, Siena	dyed woollen broadcloths	lowest	21.680	3.252	3.071
Prato, Pisa, Siena	dyed woollen broadcloths	mean	26.020	3.903	3.686
Prato, Pisa, Siena	dyed woollen broadcloths	highest	30.350	4.553	4.300
Catalonia					
Perpignano	dyed woollen broadcloths	mean	17.000	2.550	2.408
Villefranca	dyed woollen broadcloths	mean	9.370	1.406	1.327
France					
Languedoc	dyed woollen broadcloths	mean	16.000	2.400	2.267
Gignac, Beziers	dyed woollen broadcloths	mean	17.500	2.625	2.479
Carcassonne	dyed woollen broadcloths	mean	19.000	2.850	2.692
Flanders					
Wervik	dyed woollen broadcloths		26.000	3.900	3.683

D. Prices for Italian, Catalan, French, Flemish, Brabantine, and English Textiles in the Levant (Alexandria. Damascus, and Constantinople), c.1390 - 1435

Place/Town	Textile	Place of Sale	Value in Florentine	Value in £ sterling	Value in £ groot

Place Country and Town	Textile	Rank Order and date	Value in Florentine Florins Florins	Value in £ sterling 36d/ florin 36d/florin 40d/florin	Value in £ groot Flemish 34d /florin Flemish 34d/florin 50d/florin
Italy					
Florence	grade 1 woolens	D: 1390	35.000	5.250	4.958
Florence	grade 2 woolens	D: 1390	46.000	6.900	6.517
Florence	grade 3 woolens	D: 1390	54.000	8.100	7.650
Florence	panni di fontego	D: 1390	27.000	4.050	3.825
Florence	grade 1 woolens	D: 1398	30.000	4.500	4.250
Florence	grade 2 woolens	D: 1398	43.300	6.495	6.134
Florence	grade 2 woolens	D: 1398	45.000	6.750	6.375
Florence	grade 1 woolens	A: 1400	30.000	4.500	4.250
Florence	grade 1 woolens	A: 1402	37.500	5.625	5.313
Catalonia					
Villefranca	dyed woollen broadcloths	D: 1390	16.500	2.475	2.338
Villefranca	dyed woollen broadcloths	D: 1395	14.500	2.175	2.054
Barcelona	dyed woollen broadcloths	D: 1390	15.500	2.325	2.196
Barcelona	dyed woollen broadcloths	D: 1395	12.000	1.800	1.700
Puigcerda	dyed woollen broadcloths	D: 1395	12.500	1.875	1.771
Perpignano	woollen 'simples'	D: 1395	14.500	2.175	2.054
Perpignano	panni alla francesca	D: 1395	17.300	2.595	2.451
France					
Louviers	dyed woollen broadcloths	A:1390	25.500	3.825	3.613
Narbonne	dyed woollen broadcloths	A: 1396	10.500	1.575	1.488
Narbonne	dyed woollen broadcloths	D: 1396	10.500	1.575	1.488
Narbonne	dyed woollen broadcloths	A: 1399	19.440	2.916	2.754
Flanders					
Wervik	dyed woollen broadcloths	D: 1395	19.200	2.880	2.720
Wervik	dyed woollen broadcloths	C: 1436	28.300	4.717	5.896
Wervik	dyed woollen broadcloths	C: 1436	22.000	3.667	4.583
Brabant					
Mechelen	dyed woollen broadcloths	D: 1395	38.500	5.775	5.454
England					
Worcestershire	Cotswolds	D: 1405	35.000	5.250	4.958

Place Country and Town	Textile	Rank Order	Value in Florentine Florins	Value in £ sterling 36d/ florin	Value in £ groot Flemish 34d /florin
	Cotswolds	D: 1410	14.700	2.205	2.083
	Panni Bastardi	D: 1414	25.000	4.167	3.542
	Panni Bastardi	D: 1414	28.000	4.667	3.967
	Panni Bastardi	D: 1416	20.000	3.333	2.833
Salisbury	Wiltshires	D: 1416	20.000	3.333	2.833
Essex	straits (dozens)	D: 1416	6.000	1.000	0.850
Norfolk or Ireland?	Saia d'Irlanda	D: 1394	4.500	0.675	0.638
Norfolk or Ireland?	Saia d'Irlanda	D: 1395	5.300	0.795	0.751
Norfolk or Ireland?	Saia d'Irlanda	D: 1397	6.000	0.900	0.850
Norfolk or Ireland?	Saia d'Irlanda	D: 1398	3.550	0.533	0.503

E. Prices for Italian, English, Flemish, Brabantine, Dutch, French, and Rhenish Textiles in Poland (Cracow), c. 1400: Prices for Woolens of 35 Flemish Ells

Place/Town	Textile	Value in Florentine Florins	Value in £ sterling 36d/florin	Groszes per ell	Value in £ groot Flemish 34d/florin
Italy					
Florence	dyed woollen broadcloths	29.170	4.376	20	4.132
Florence	dyed woollen broadcloths	32.080	4.812	22	4.545
Flanders					
Bruges	dyed woollen broadcloths	43.750	6.563	30	6.198
Dendermonde	dyed woollen broadcloths	21.870	3.281	15	3.098
Kortrijk	dyed woollen broadcloths	17.500	2.625	12	2.479
Geraardsbergen	dyed woollen broadcloths	17.500	2.625	12	2.479
Brabant					
Brussels	dyed woollen broadcloths	29.170	4.376	20	4.132
Brussels	dyed woollen broadcloths	46.670	7.001	32	6.612
Mechelen	dyed woollen broadcloths	24.790	3.719	17	3.512
Leuven	dyed woollen broadcloths	23.330	3.499	16	3.305
Lier	dyed woollen broadcloths	35.000	5.250	24	4.958
Lier	dyed woollen broadcloths	26.250	3.938	18	3.719
Tienen	dyed woollen broadcloths	20.420	3.063	14	2.893
Tienen	small cloths	13.120	1.968	9	1.859
Herentals	dyed woollen broadcloths	26.250	3.938	18	3.719
Holland					
Leiden ?	Ostrodommensis	21.870	3.281	15	3.098
England					
London	dyed woollen broadcloths	17.500	2.625	12	2.479
London	dyed woollen broadcloths	35.000	5.250	24	4.958
unspecified	dyed woollen broadcloths	20.420	3.063	14	2.893
Artois					
Arras	sayes	4.370	0.656	3	0.619
Enghien	unspecified	11.670	1.751	8	1.653
Rhineland					

Place/Town	Textile	Value in Florentine Florins	Value in £ sterling 36d/florin	Groszes per ell	Value in £ groot Flemish 34d/florin
Aachen	unspecified	11.670	1.751	8	1.653

Sources:

Eliyahu Ashtor, "L'exportation de textiles occidentaux dans le Proche Orient musulman au bas Moyen Age (1370-1517)," in Luigi de Rosa (ed.), *Studi in memoria di Federigo Melis*, 5 vols. (Naples: Giannini, 1978), vol. II, pp. 303-77.

Eliyahu Ashtor, *Levant Trade in the Later Middle Ages* (Princeton and Oxford: Princeton University Press, 1983), pp. 151-56, 341-66.

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John Munro, "Medieval Woollens: The Western European Woollen Industries and their Struggles for International Markets, c.1000 - 1500," in David Jenkins (ed.), *The Cambridge History of Western Textiles*, 2 vols. (Cambridge and New York: Cambridge University Press, 2003), Vol. I, Table 5.10, pp. 318-24.

Table 4. The Role of the Italians (Aliens) in the Exports of English Wools (in sacks) in quinquennial means, 1301-05 to 1496-1500

Year from Michaelmas 5 year means	Denizen Wool Exports	Percent Total	Alien Wool Exports	Percent Total	Total Wool sacks
1301-05					32,344.00
1306-10	23,041.60	59.30%	15,974.60	40.70%	39,016.20
1311-15					35,328.60
1316-20					26,084.60
1321-25	14,074.30	55.56%	11,241.73	44.44%	25,315.40
1326-30	17,888.87	70.76%	7,108.73	29.24%	24,997.60
1331-35	24,633.00	72.97%	9,012.60	27.03%	33,645.60
1336-40	13,180.00	69.44%	7,344.80	30.56%	20,524.80
1341-45	10,565.51	58.09%	7,510.07	41.91%	18,075.58
1346-50					27,183.13
1351-55	10,169.40	34.39%	20,581.00	65.61%	30,750.40
1356-60					32,666.40
1361-65	20,899.95	69.03%	9,229.25	30.97%	30,129.20
1366-70	16,345.60	56.81%	10,106.20	43.19%	26,451.80
1371-75	16,712.02	64.39%	9,155.78	35.61%	25,867.80
1376-80	16,898.00	82.67%	3,572.20	17.33%	20,470.20
1381-85	13,886.80	78.97%	3,630.60	21.03%	17,517.40
1386-90	15,574.20	80.07%	3,737.80	19.93%	19,312.00
1391-95	13,593.20	72.00%	4,920.60	28.00%	18,513.80
1396-1400	14,515.80	86.15%	2,373.80	13.85%	16,889.60
1401-05	11,803.40	91.57%	1,100.80	8.43%	12,904.20
1406-10	13,392.80	89.41%	1,575.40	10.59%	14,968.20
1411-15	12,633.20	92.72%	960.00	7.28%	13,593.20
1416-20	13,355.40	92.98%	1,009.60	7.02%	14,365.00
1421-25	13,363.60	93.77%	881.60	6.23%	14,245.20
1426-30	12,429.00	92.60%	929.60	7.40%	13,358.60
1431-35	8,679.40	85.18%	705.20	14.82%	9,384.60
1436-40	4,197.80	41.65%	1,181.00	58.35%	5,378.80
1441-45	6,502.20	69.96%	1,527.20	30.04%	8,029.40
1446-50	9,176.80	88.50%	588.40	11.50%	9,765.20
1451-55	7,654.60	84.61%	1,136.20	15.39%	8,790.80
1456-60	5,246.80	81.17%	1,139.60	18.83%	6,386.40
1461-65	5,902.40	90.94%	483.60	9.06%	6,386.00
1466-70	8,508.80	91.12%	784.80	8.88%	9,293.60
1471-75	7,381.20	86.13%	1,072.20	13.87%	8,453.40
1476-80	7,822.80	81.99%	913.20	18.01%	8,736.00
1481-85	6,669.60	88.46%	951.80	11.54%	7,621.40
1486-90	8,923.60	91.51%	827.40	8.49%	9,751.00
1491-95	5,881.20	83.48%	874.00	16.52%	6,755.20
1496-1500	8,676.80	96.98%	260.40	3.02%	8,937.20

one sack of wool = 364 lb = 165.108 kg.

Source:

Calculated from Eleanora M. Carus-Wilson and Olive Coleman, *England's Export Trade, 1275-1547* (Oxford, 1963), pp. 13-16, 36-74.

Table 5.

Wools Used in the Workshop of Agnolo di Niccolo and Franceso di Marco Datini, in Prato, in 1396-98

Wools from:	**Weight in lb Florentine**	**Weight in kg 339 g**	**Per cent of the total wool used**
England	1,151.00	390.81	8.84%
Minorca	2,355.50	799.79	18.10%
Majorca	2,418.50	821.18	18.58%
San Matteo	3,792.50	1,287.71	29.14%
Provence	622.50	211.36	4.78%
Barbary Coast	262.00	88.96	2.01%
Romagnola	2,412.00	818.98	18.53%
Total	**13,014.00**	**4,418.80**	**100.00%**

Source:

Franceso Ammannati, "Francesco di Marco Datin's Wool Workshops," in Giampiero Nigro (ed.), *Francesco di Marco Datini: The Man and the Merchant*, Fondazione Istituto Internazionale di Storia Economic "F. Datini" (Florence: Firenze University Press, 2010), adapted from Table 1, p. 500.

Table 6.

Woollen Cloths Produced in the Workshop of Agnolo di Niccolo and Franceso di Marco Datini , in Prato in 1396-1398

Source of Wools Used	Percent of Total	Number of Cloths	Average Weight in lb. 339.542 g	Average Weight in kg	Average Length in Braccia 0.583 m	Average Length in meters	Width in braccia	Width in meters	Area on the Loom in square meters	Final Area after Fulling sq. meters	Grams per square metre
England	6.89%	15.32	81.53	27.683	63.00	36.73	4.50	2.62	96.36	45.29	611.26
Minorca	18.62%	41.44	81.29	27.601	59.32	34.58	4.50	2.62	90.73	42.64	647.26
Majorca	13.57%	30.20	80.23	27.241	55.52	32.37	4.50	2.62	84.92	39.91	682.55
San Matteo: **Spain**	20.75%	46.17	69.76	23.686	54.52	31.79	4.50	2.62	83.39	39.19	604.36
Provence	3.74%	8.33	64.17	21.788	54.00	31.48	4.50	2.62	82.59	38.82	561.29
Mixed wools	19.67%	43.77	75.51	25.639	55.00	32.07	4.50	2.62	84.12	39.54	648.47
Romagnola-Barbary	8.38%	18.64	81.83	27.785	49.00	28.57	4.50	2.62	74.95	35.22	788.79
Romagnola-Barbary (narrow cloths)	8.38%	18.64	81.73	27.751	85.00	49.56	3.00	2.00	99.11	46.58	595.74
Total	100.00%	222.50	77.01	26.15	59.42	34.64	4.31	2.55	87.02	40.90	

Source:

Francesco Ammannati, "Francesco di Marco Datin's Wool Workshops," in Giampiero Nigro (ed)., *Francesco di Marco Datini: The Man and the Merchant*, Fondazione Istituto Internazionale di Storia Economic "F. Datini" (Florence: Firenze University Press, 2010), pp. 489-514, esp. Table 2, p. 505.

Table 7 a. Cost of Manufacturing Woollen Cloths in the Prato Workshop of Agnolo di Niccolo and Francesco di Marco Datini in 1396- 1398

for six pieces of woollen cloths woven from Majorcan wools

Item	Percentage of Total Production Costs	Percentage of Direct Manufacturing Costs
Majorcan Wools	37.95	40.21
Wool Preparation	15.83	16.77
Spinning	13.17	13.95
Weaving	8.03	8.51
Finishing	9.82	10.4
Dyeing	9.59	10.16
Total Manufacturing	94.39	100
General Costs	5.61	
Total	100.00	

Table 7 b.

Number of Days required for the production of six woolens from Minorcan wools: 35 meters long, with weight of 27.559 kg

Item	Days	Percent
wool preparation	51	20.40%
spinning	76	30.40%
warping/weaving	65	26.00%
finishing	58	23.20%
Total days *	250	100.00%

* 138 days in total, if we take into account the overlapping of several of these prices. For the combination of warping and weaving, Ammanati indicates a a mean of 48.65 days, with a very wide variance.

source:

Francesco Ammannati, "Francesco di Marco Datin's Wool Workshops," in Giampiero Nigro (ed.), *Francesco di Marco Datini: The Man and the Merchant*, Fondazione Istituto Internazionale di Storia Economic "F. Datini" (Florence: Firenze University Press, 2010), pp. 489-514. Based on Federigo Melis, *Aspetti della vita economica medievale: studi nell'archivo Datini di Prato*, Vol. I (Florence: Leo S. Olschki, 1962), part 5: "L'industria laniera," pp. 455-729; and Federigo Melis, "La formazione dei costi nell'industria laniera alla fine del trecento (dalla "tosura," della pecora alla vendito del panno)," *Economia e storia*, 1(1954), 31-60, 150-90; reprinted in: Federigo Melis, *Industria e commercio nella toscana medievale*, ed. by Bruno Dini, Istituto Internazionale di Storia Economica "F. Datini", Prato, Opera sparse di Federigo Melis, vol. 3 (Florence: Le Monnier, 1989), pp. 212-307.

Table 8. **Costs of producing Florentine woolens of the Garbo sector, 1484 - 1488**

in lira di piccioli and equivalent florins

Component Costs	**Lira (decimal)**	**in florins £6.250**	percentage shares of manufacturing costs	percentage shares total costs
Raw Materials:				
wool (Italian matricina)	46.296	7.407	48.46%	44.36%
Manufacturing Costs				
wool preparation	12.413	1.986	12.99%	11.89%
spinning	12.788	2.046	13.38%	12.25%
weaving	7.667	1.227	8.02%	7.35%
fulling-finishing	3.825	0.612	4.00%	3.67%
dyeing	12.550	2.008	13.14%	12.03%
total manufacturing costs		15.286	100.00%	91.54%
other production costs	8.825	1.412		8.46%
Total costs	104.3625	16.698		100.00%

Source:

Hidetoshi Hoshino, "Il commerio fiorentino nell'Impero Ottomano: costi e profitti negli anna 1484-1488," in *Aspetti della vita economica medievale*: Atti del Convegno di Studi nel X anniversario della morte di Federigo Melis: Firenze-Pisa-Prato, 10 - 14. III. 1984 (Florence: Università degli Studi, 1985)]; republished in Hidetoshi Hoshino, *Industria tessile e commercio internazionale nella Firenze del tardo Medioevo*, ed. by Franco Franceschi and Sergio Tognetti, Biblioteca storica toscana no. 39 (Florence: Leo S. Olschki, 2001), Table 1, p. 120.

Table 9.

Wool Purchases for the Medici Woollen Workshops in 1531-34: Rafaello di Francesco de'Medici and Co.

Type of Wool	No. of Bales	Net weight in kg.	kg. per bale	Price per kg in florins	English Sack equivalent 165.1076 kg	Value of English Sack Equivalent in florins
Spanish	6.00	580.277	96.713	0.367	3.515	60.552
Spanish	3.00	292.685	97.562	0.345	1.773	57.032
Spanish	3.00	301.853	100.618	0.345	1.828	57.03
Spanish	2.00	193.199	96.600	0.287	1.170	47.345
Spanish	9.00	758.876	84.320	0.314	4.596	51.868
Spanish	8.00	777.551	97.194	0.337	4.709	55.634
Spanish	1.00	80.811	80.811	0.261	0.489	43.11
Spanish	16.00	1,266.831	79.177	0.294	7.673	48.565
Spanish	10.00	819.654	81.965	0.303	4.964	50.083
Spanish	6.00	565.677	94.279	0.279	3.426	46.107
Spanish	4.00	375.873	93.968	0.309	2.277	50.964
Spanish	3.00	229.530	76.510	0.346	1.390	57.133
Spanish	2.00	193.539	96.769	0.309	1.172	51.058
Spanish	3.00	247.526	82.509	0.346	1.499	57.131
Spanish	6.00	542.588	90.431	0.297	3.286	49.021
Spanish	2.00	192.520	96.260	0.320	1.166	52.879
Spanish	8.00	758.537	94.817	0.339	4.594	55.918
Spanish	2.00	189.125	94.562	0.368	1.145	60.783
Spanish	2.00	173.506	86.753	0.368	1.051	60.783
Spanish	2.00	160.943	80.471	0.320	0.975	52.88
Spanish	2.00	168.073	84.037	0.353	1.018	58.254
Spanish	4.00	378.589	94.647	0.338	2.293	55.819
Spanish	3.00	384.701	128.234	0.272	2.330	44.893
Spanish	6.00	560.244	93.374	0.353	3.393	58.352
Spanish	2.00	186.409	93.204	0.324	1.129	53.491
Spanish	2.00	187.088	93.544	0.324	1.133	53.488
Spanish	3.00	298.797	99.599	0.346	1.810	57.136
Spanish	3.00	291.667	97.222	0.351	1.767	57.965
Spanish	3.00	290.648	96.883	0.323	1.760	53.389
Spanish	1.00	158.566	158.566	0.431	0.960	71.183
TOTAL	**127.00**	**11,605.885**	91.385	**0.324**	**70.293**	53.476
Provençal	2.00	149.059	74.529		0.903	26.639
Provençal	2.00	146.682	73.341		0.888	26.696
Provençal	1.00	77.416	77.416		0.469	25.486
Provençal	2.00	150.078	75.039		0.909	25.478
Provençal	4.00	281.480	70.370		1.705	27.652

Type of Wool	No. of Bales	Net weight in kg.	kg. per bale	Price per kg in florins	English Sack equivalent 165.1076 kg	Value of English Sack Equivalent in florins
Provençal	0.50	43.122	86.244		0.261	25.542
TOTAL	**11.50**	**847.836**	73.725		**5.135**	26.619
TOTAL WOOLS	**138.500**	**12,453.721**			**75.428**	
	Percentage in Spanish wools				93.19%	
	Percentage in Provencal wools				6.81%	

Source:

Raymond de Roover, "A Florentine Firm of Cloth Manufacturers: Management of a Sixteenth-Century Business," *Speculum*, 16 (1941), pp. 3-33; reprinted in his *Business Banking, and Economic Thought in Late Medieval and Early Modern Europe: Selected Studies of Raymond De Roover*, ed. Julius Kirshner (Chicago: University of Chicago Press, 1974), Appendix I, p. 31.

Table 10.

The Woollen Cloth Production Account of

Raffaello di Francesco de' Medici and Co in 1534

Component Costs	florins: decimal	percentage share
Wool: Spanish	3,899.950	34.56%
Dyeing	1,967.621	17.44%
Dyestuffs	219.608	1.95%
Manufacturing	5,196.738	46.05%
Sundries	0.067	0.00%
Total	11,283.983	100.00%

Source:

Raymond de Roover, "A Florentine Firm of Cloth Manufacturers: Management of a Sixteenth-Century Business," *Speculum*, 16 (Jan. 1941), pp. 3-33, esp. p. 25; reprinted in his *Business Banking, and Economic Thought in Late Medieval and Early Modern Europe: Selected Studies of Raymond De Roover*, ed. Julius Kirshner (Chicago: University of Chicago Press, 1974), pp. 85-118.

Table 11.

Wool Washing in the Medici Cloth Workshop: 1556-1557

Weight losses from washing wools

Lot no.	Wool Weight in lb. 339.542g	Wool Weight in kg.	Wool Weight washed in kg	Loss of Weight in kg.	Percent Loss
1	1,660	563.640	458.382	105.258	18.67%
2	1,450	492.336	390.473	101.863	20.69%
3	1,235	419.334	342.937	76.397	18.22%
4	1,485	504.220	390.473	113.747	22.56%
5	945	320.867	261.447	59.420	18.52%
6	1,456	494.373	407.450	86.923	17.58%
Total	8,231	2,794.770	2,251.163	543.607	19.45%
Average for 71 cloths	115.93	39.363	31.707	7.656	19.45%

Source:

Raymond de Roover, "A Florentine Firm of Cloth Manufacturers: Management of a Sixteenth-Century Business," *Speculum*, 16 (Jan. 1941), pp. 3-33; reprinted in his *Business Banking, and Economic Thought in Late Medieval and Early Modern Europe: Selected Studies of Raymond De Roover*, ed. Julius Kirshner (Chicago: University of Chicago Press, 1974), p. 12, n. 2.

Table 12. Cloth Production Costs in Florence: 1556 - 1558

Firm of Francesco di Giuliano di Raffaello de'Mecici and Co.

For the production of 71 woolen cloths from Spanish wools

Component of Production Costs	florins: decimal	percentage of manufacturing costs	amount per woollen cloth in florins	percent of total costs
Wool Purchases	**921.346**	**33.17%**	**12.977**	**29.95%**
Manufacturing Expenses				
I. Wool Preparation				
wool washing	19.700	0.71%		
wool beating	56.983	2.05%		
combing (warp yarns)	106.788	3.84%		
carding (weft yarns)	90.429	3.26%		
- subtotal	**273.900**	**9.86%**	**3.858**	**8.90%**
II. Spinning	**650.554**	**23.42%**	**9.163**	**21.14%**
III: Weaving				
Warping	22.25	0.80%		
Weaving	365.113	13.15%		
-subtotal	**387.363**	**13.95%**	**5.456**	**12.59%**
IV: Fulling				
Burling	18.879	0.68%		
Scouring	27.771	1.00%		
Fulling	13.958	0.50%		
Tentering	9.442	0.34%		
- subtotal	**70.05**	**2.52%**	**0.987**	**2.28%**
V. Finishing				
Shearing	23.300	0.84%		
Mending	1.433	0.05%		
Twisting selvage	5.538	0.20%		
- subtotal	**30.271**	**1.09%**	**0.426**	**0.98%**
VI. Dyeing				
labor	309.275	11.13%		

Component of Production Costs	florins: decimal	percentage of manufacturing costs	amount per woollen cloth in florins	percent of total costs
oil	53.421	1.92%		
dyestuffs	36.642	1.32%		
soap	33.738	1.21%		
woad washing	10.979	0.40%		
- subtotal	**444.054**	**15.99%**	**6.254**	**14.43%**
TOTAL Manufacturing	**2,777.538**	**100.00%**	**39.120**	**90.28%**
Overhead or Management Charges				
tools	12.500			
rent	52.000			
administration	98.292			
staff wages	128.667			
brokerage	7.750			
- subtotal	**299.208**		**4.214**	**9.72%**
TOTAL COSTS	**3,076.746**		**43.334**	**100.00%**

Source:

Raymond de Roover, "A Florentine Firm of Cloth Manufacturers: Management of a Sixteenth-Century Business," *Speculum*, 16 (1941), pp. 3-33; reprinted in his *Business Banking, and Economic Thought in Late Medieval and Early Modern Europe: Selected Studies of Raymond De Roover*, ed. Julius Kirshner Chicago: University of Chicago Press, 1974), Appendix IV, p. 33 (p. 118).

Table 13. **Production Costs of the Brandolini Firm in Florence: for 1580 - 1581**

From the records of producing 64 rascie nere from Spanish wools

Production Costs for producing one bolt of rascia nera
one bolt of finished cloth = 61.77 braccia = 15.443 canne = 36.012 meters (at 0.583 m per braccio)

Manufacturing and Other production costs	Weight in kg	Length braccio 0.583m	Length meters	lira di piccioli per unit decimal	Florins of account	Percentage of Manufact-uring Costs	Percentage of Total Costs and of price
Raw Spanish Wool	36.671			**207.980**	27.731	46.20%	39.28%
Wool Preparation							
washing wools	36.671			1.080			
alum	36.671			1.620			
capodieci (wool foreman)	29.88			5.867			
warp beating				0.590			
warp combing				9.350			
warping on distaff	11.205			0.550			
weft carding	18.675			9.630			
- subtotal				**28.687**	3.825	6.37%	5.42%
Spinning							
warp: stamaiuolo	10.526			43.400			
- warping				4.000			
- marking				0.950			
weft: lanino	17.996			31.800			

Manufacturing and Other production costs	**Weight in kg**	**Length braccio 0.583m**	**Length meters**	**lira di piccioli per unit decimal**	**Florins of account**	**Percentage of Manufact-uring Costs**	**Percentage of Total Costs and of price**
- subtotal				**80.150**	10.687	17.80%	15.14%
Weaving	28.861	76.000	44.308	**65.450**	8.727	14.54%	12.36%
Finishing: Fulling	22.749	61.770	36.012				
burling: dizzeccolatura				1.750			
burling: riveditori				2.500			
scouring cloths				4.000			
fulling (mechanical)				1.000			
fulling: Arte della Lana fee				0.480			
- subtotal				**9.730**	1.297	2.16%	1.84%
Finishing: Shearing							
tentering				1.000			
mending				0.450			
shearing: cimatura di molte				2.000			
shearing: cimatori				2.250			
- subtotal				**5.700**	0.760	1.27%	1.08%
Dyeing							
- dyeing in woad: guado				37.000			
- fees of Arte Maggiore				15.500			
- subtotal				**52.500**	7.000	11.66%	9.92%

Manufacturing and Other production costs	**Weight in kg**	**Length braccio 0.583m**	**Length meters**	**lira di piccioli per unit decimal**	**Florins of account**	**Percentage of Manufact-uring Costs**	**Percentage of Total Costs and of price**
Total Value-Added Costs				**242.216**			
Total Direct Manufacturing Costs				**450.197**	60.026	100.00%	85.03%
Other Business Costs							
brokerage fees				3.000			
indirect business costs				12.150			
miscellaneous costs				33.420			
profit:				30.71			
- subtotal				**79.280**	10.571		14.97%
TOTAL COSTS AND AVERAGE PRICE				**529.477**	70.597		100.00%

Source:

Richard Goldthwaite, "The Florentine Wool Industry in the Late Sixteenth Century: a Case Study," *The Journal of European Economic History*, 32:3 (Winter 2003): adapted from Table A1, p. 553

Table 14.

Estimated Outputs of the Florentine Cloth Industry and the Urban Populations of Florence:

cloth outputs: in bolts of about 36 meters in length (width unknown)

Year	Villani	Franceschi	Goldthwaite	Chorley A	ChorleyB/ Ammannati	Ammannati	Romano	Population Estimates
1300	100,000							100,000-120,000
1338	75,000							90,000
1352								42,250
1355-73		49,000						
1373		30,000	30,000					60,000
1380								54,747
1381-82		19,296	19,000					55,000
1389		16,482						
1390		10,000						
1391		13,162	13,000					
1392		12,690						
1393		14,026						
1394		13,240						

Estimated Outputs of the Florentine Cloth Industry and the Urban Populations of Florence:

cloth outputs: in bolts of about 36 meters in length (width unknown)

Year	Villani	Franceschi	Goldthwaite	Chorley A	ChorleyB/ Ammannati	Ammannati	Romano	Population Estimates
1395		13,672						
1425		9,052						
1427		9,750	11,000					37,144
1430		10,049						
1433		8,333						
1488			17,000					42,000
1526			21,000					70,000
1553				8,820	8,148	7,928		59,191
1554				9,900	9,167	8,919		
1558				9,600	8,889	8,333		
1559				12,000	11,112	10,417		60,000
1560				18,000	16,667	15,625		
1561				19,800	18,333	16,723		60,000
1570				17,095	15,829	14,439		
1571				19,927	18,519	16,892		60,000

Estimated Outputs of the Florentine Cloth Industry and the Urban Populations of Florence:

cloth outputs: in bolts of about 36 meters in length (width unknown)

Year	Villani	Franceschi	Goldthwaite	Chorley A	ChorleyB/ Ammannati	Ammannati	Romano	Population Estimates
1591			13,437					65,000
1616			10,717				10,783	75,000
1619								
1616-20							9,216	
1621-25							8,720	
1626-30							8,767	
1631-35							5,900	
1636-40							6,217	
1641-45							6,114	

Sources:

Giovanni Villani, *Nouva Cronica*, ed. Giuseppe Porta, 3 vols. (Parma, 1990-91), Vol. III: *Libri XII - XIII,* libro XII, cap. XCIV, pp. 197-202.

Franco Franceschi, *Oltre il 'Tumulto': i lavoratori fiorentini dell'Arte della Lana fra Tre e Quattrocento* (Florence, 1993).

Goldthwaite, Richard, *The Economy of Renaissance Florence* (Baltimore, 2009).

Francesco Ammannati, "L'Arte della Lana a Firenze nel Cinquecento: Crisis del settore e riposte degli operatori," *Storia economica: Rivista*

quadrimestrale, 11:1 (2008), pp. 1-39; Francesco Ammannati, "Florentine Woolen Manufacture in the Sixteenth Century: Crisis and New Entrepreneurial Strategies," *Business and Economic History On-Line*, 7 (2009), pp. 1-9.

Patrick Chorley, "*Rascie* and the Florentine Cloth Industry during the Sixteenth Century," *The Journal of European Economic History*, 32:3 (Winter 2003), pp. 487-526.

Patrick Chorley, "The Volume of Cloth Production in Florence, 1500-1650: An Assessment of the Evidence," in Giovanni Luigi Fontana and Gérard Gayot (eds.), *Wool: Products and Markets (13th - 20th Century)* (Padua, 2004), pp. 551-72.

Ruggiero Romano, "À Florence au XVIIe siècle: industries textiles et conjoncture," *Annales: Économies, sociétés, civilisations*, 7:4 (1952), pp. 508-12.

David Herlihy and Christiane Klapisch-Zuber, *Tuscans and Their Families: A Study of the Florentine Catasto of 1427* (New Haven and London, 1985).

John M. Najemy, *A History of Florence, 1200 - 1575* (Malden, MA; Oxford, 2006).

Table 15. Estimates of Florentine Cloth Production in the Sixteenth Century

	Arte della Lana Guild Reports		Estimates by Patrick Chorley (amended by Francesco Ammananti)				
Year	**Total Value in iscudi (florins)***	**Unit Price in scudi (florins)**	**No. of Cloths in Notional Panni Corsivi**	**panni corsivi**	**panni ricchi**	**Total no. of cloths Chorley**	**Total no. of cloths Ammananti**
1553	441,000	30	14,700	2,940	5,880	8,820	8,148
1554	495,000	30	16,500	3,300	6,600	9,900	9,167
1558	480,000	30	16,000	3,200	6,400	9,600	8,889
1559	600,000	30	20,000	4,000	8,000	12,000	11,112
1560	900,000	30	30,000	6,000	12,000	18,000	16,667
1561	990,000	30	33,000	6,600	13,200	19,800	18,333
1570	854,760	30	28,492	5,698	11,397	17,095	15,829
1571	996,360	30	33,212	6,642	13,285	19,927	18,519

Chorley's Assumptions:

(1) The average price of the cheaper panni corsivi is 30 scudi (or florins); and the average price of the panni ricchi is double: 60 scudi
(2) the cheaper panni corsivi accounted for 20 percent of total cloth production and the more expensive panni ricchi accounted for the other 80 percent:

* The gold *scudo* (shield: replacing the gold florin in 1533) had a fixed value of £7 12s 0d in the *lira di piccioli* money of account from 1556 through the rest of the sixteenth century. The florin of account had a fixed value of £7 10s 0d.

Sources:

Patrick Chorley, "*Rascie* and the Florentine Cloth Industry during the Sixteenth Century," *The Journal of European Economic History*, 32:3 (Winter 2003), pp. 487-526

Patrick Chorley, "The Volume of Cloth Production in Florence, 1500-1650: An Assessment of the Evidence," in Giovanni Luigi Fontana and Gérard Gayot (eds.), *Wool: Products and Markets (13th - 20th Century)* (Padua, 2004), pp. 551-72.

Francesco Ammannati, "Florentine Woolen Manufacture in the Sixteenth Century: Crisis and New Entrepreneurial Strategies," *Business and Economic History On-Line*, 7 (2009), pp. 1-9.

Table16. Florentine Cloth Production in the Sixteenth Century (1553 - 1571) According to Francesco Ammannati

Year	panni corsivi	panni richi	percent corsivi	percent ricchi	total no. of cloths
1553	1,982	5,946	25.00%	75.00%	7,928
1554	2,230	6,689	25.00%	75.00%	8,919
1558	1,667	6,666	20.00%	80.00%	8,333
1559	2,083	8,334	20.00%	80.00%	10,417
1560	3,125	12,500	20.00%	80.00%	15,625
1561	2,508	14,215	15.00%	85.00%	16,723
1570	2,166	12,273	15.00%	85.00%	14,439
1571	2,534	14,358	15.00%	85.00%	16,892

Source:

Francesco Ammannati, "Florentine Woolen Manufacture in the Sixteenth Century: Crisis and New Entrepreneurial Strategies,: *Business and Economic History On-Line*, 7 (2009), pp. 1-9; Francesco Ammannati,, "L'Arte della Lana a Firenze nel Cinquecento: Crisis del settore e riposte degli operatori," *Storia economica: Rivista quadrimestrale*, 11:1 (2008), pp. 1-39.

Table 17. Outputs of the Florentine Cloth Industry 1616-1645

Year	Panni Saie	Rascie	Perpignani	Stametti	Pannetti	Total	Percent in Rascie	Percent in Perpignani
1616	1,540	1,670	7,390	150	33	10,783	15.49%	68.53%
1617	926	1,222	5,038	57	37	7,280	16.79%	69.20%
1618	1,246	1,839	5,861	110	7	9,063	20.29%	64.67%
1619	1,290	1,605	5,152	311	9	8,367	19.18%	61.58%
1620	1,221	1,891	7,288	124	65	10,589	17.86%	68.83%
1621	1,903	2,467	7,951	79	63	12,463	19.79%	63.80%
1622	1,374	1,642	6,017	153		9,186	17.88%	65.50%
1623	1,162	1,132	4,280	79	34	6,687	16.93%	64.00%
1624	1,287	605	6,467	43	42	8,444	7.16%	76.59%
1625	1,149	492	5,092	39	47	6,819	7.22%	74.67%
1626	1,183	683	6,265	42	40	8,213	8.32%	76.28%
1627	1,074	1,068	5,029	24	35	7,230	14.77%	69.56%
1628	1,362	1,270	7,428	52	63	10,175	12.48%	73.00%
1629	1,227	1,003	7,862	24	78	10,194	9.84%	77.12%
1630	1,091	785	6,094		55	8,025	9.78%	75.94%
1631	1,033	788	3,505	41	31	5,398	14.60%	64.93%
1632	1,199	931	3,342	111	56	5,639	16.51%	59.27%
1633	1,514	895	2,842	57	178	5,486	16.31%	51.80%
1634	1,309	858	3,421	104	49	5,741	14.95%	59.59%
1635	800	1,209	4,362	152	711	7,234	16.71%	60.30%
1636	1,687	759	4,414	63		6,923	10.96%	63.76%
1637	1,623	744	4,062	54		6,483	11.48%	62.66%
1638	2,094	589	3,081	28	7	5,799	10.16%	53.13%
1639	1,744	741	3,692	49		6,226	11.90%	59.30%
1640	1,362	569	3,678	47		5,656	10.06%	65.03%
1641	1,772	717	3,498	35	11	6,033	11.88%	57.98%
1642	1,474	521	4,612	44	11	6,662	7.82%	69.23%
1643	1,382	658	3,461	20	3	5,524	11.91%	62.65%
1644	1,647	618	3,325	57		5,647	10.94%	58.88%
1645	1,743	766	3,962	166	66	6,703	11.43%	59.11%

Year	Panni Saie	Rascie	Perpignani	Stametti	Pannetti	Total	Percent in Rascie	Percent in Perpignani
	Quinquennial Means							
1616-20	1,245	1,645	6,146	150	30	9,216	17.85%	66.68%
1621-25	1,375	1,268	5,961	79	37	8,720	14.54%	68.37%
1626-30	1,187	962	6,536	36	54	8,767	10.97%	74.54%
1631-35	1,171	936	3,494	93	205	5,900	15.87%	59.23%
1636-40	1,702	680	3,785	48	1	6,217	10.94%	60.88%
1641-45	1,353	859	4,605	59	87	6,961	12.35%	66.15%

Source:

Ruggiero Romano, "À Florence au XVIIe siècle: industries textiles et conjoncture," *Annales: Économies, sociétés, civilisations*, 7:4 (1952), pp. 508-12.

Table 18. Woollen Cloth Production in Venice (urban jurisdiction only) from 1516 to 1723 in quinquennial means

Years 5 - yr means	Woollen Cloths	Years 5 - yr means	Woollen Cloths
1516-20	2,416.60	**1621-25**	15,659.40
1521-25	3,647.80	**1626-30**	16,818.40
1526-30	4,593.80	**1631-35**	12,340.20
1531-35	5,492.20	**1636-40**	12,393.40
1536-40	5,078.40	**1641-45**	12,780.40
1541-45	7,891.40	**1646-50**	9,810.00
1546-50	10,151.60	**1651-55**	10,696.00
1551-55	11,547.80	**1656-60**	8,567.20
1556-60	16,131.60	**1661-65**	7,966.40
1561-65	16,075.80	**1666-70**	6,464.00
1566-70	18,513.20	**1671-75**	6,493.20
1571-75	17,512.20	**1676-80**	4,069.40
1576-80	17,986.00	**1681-85**	3,673.80
1581-85	19,709.40	**1686-90**	2,058.20
1586-90	19,093.20	**1691-95**	2,863.00
1591-95	23,393.00	**1696-00**	2,426.40
1596-00	21,567.20	**1701-05**	2,453.80
1601-05	23,572.80	**1706-10**	2,132.20
1606-10	18,535.40	**1711-15**	2,019.00
1611-15	17,917.40	**1716-20**	2,141.00
1616-20	19,682.80	**1721-23**	1822.33

Sources:

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476) containing the original data. His table corrects many errors that had been reproduced in the much better know series of statistics on Venetian woollen cloth production, in Domenico Sella, "Rise and Fall of the Venetian Woollen Industry," in Brian Pullan (ed.), *Crisis and Change in the Venetian Economy in the Sixteenth and Seventeenth Centuries* (London, 1968), pp. 106-26; translated by the author, in a revised and expanded form, from "Les mouvements longs de l'industrie lainière à Venise," *Annales: Économies, sociétés, civilisations*, 12 (1957), pp. 29 - 45. Unfortunately, I found it necessary to correct his statistics, from the original archival document, for the following four years: 1521, 1618, 1639, 1662.

Table 19a.

Textiles and Other Western Merchandise entering

Symrna (Izmir), Turkey, in 1686 - 87

Merchandise	Value in Piastres	percent woolens by value	percent total textiles by value	percent total merchandise by value	sq meters of cloth
Woolens					
-Mahouts	67,500	4.28%	4.04%	3.18%	25,251
- Nims	150,000	9.51%	8.97%	7.06%	71,543
- Londrins	555,000	35.20%	33.20%	26.13%	318,729
- 'London'	796,950	50.55%	47.68%	37.52%	741,606
- other	7,160	0.45%	0.43%	0.34%	11880
subtotal	1,576,610	100.00%	94.32%	74.22%	1,169,009
Silk Fabrics					
Brocards	24,000		1.44%	1.13%	2,535
Damask	16,800		1.01%	0.79%	6,025
Satins	32,000		1.91%	1.51%	10,876
Tabis	1,800		0.11%	0.08%	1,307
sub-total	74,600		4.46%	3.51%	20,743
Bonnets	20,266		1.21%	0.95%	
Total Textiles	1,671,476		100.00%	78.68%	1,189,752
Industrial Products					
lead	20,000			0.94%	
tin	60,600			2.85%	
mercury	12,000			0.56%	
iron/steel	21,000			0.99%	
metalwork	41,100			1.93%	
glasswares	19,450			0.92%	
paper products	5,180			0.24%	
dyestuffs	5,725			0.27%	
sub-total industrial	185,055			8.71%	
Raw materials					
dried fruit	4,740			0.22%	

Merchandise	Value in Piastres	percent woolens by value	percent total textiles by value	percent total merchandise by value	sq meters of cloth
coral	6,000			0.28%	
subtotal raw materials	10,740			0.51%	
Colonial Products					
indigo	8,950			0.42%	
cochenille	40,500			1.91%	
logwood, brazilwood	9,900			0.47%	
sugar - white & brown	3,320			0.16%	
pepper	152,250			7.17%	
cinammon, cloves	42,150			1.98%	
subtotal colonial	257,070			12.10%	
Total Merchandise	2,124,341			100.00%	
Coin and Bullion	1,057,000				
Total Value of Trade	3,181,341				

Table 19b.

Textiles entering Smyrna (Izmir), Turkey, by value in 1686 - 87

Merchandise	FRANCE values in piastres	per-cent woolens	ENGLAND values in piastres	per-cent woolens	HOLLAND values in piastres	per-cent woolens	VENICE values in piastres	per-cent woolens	LIVORNO values in piastres	percent woolens	Totals Values in piastres
Woolens											
-Mahouts			67,500	4.28%							67,500
- Nims			150,000	9.51%							150,000
- Londrins	15,000	0.95%			525,000	33.30%			15,000	0.95%	555,000
- 'London'	9,750	0.62%	780,000	49.47%					7,200	0.46%	796,950
- other	7,160	0.45%									7,160
subtotal	31,910	2.02%	997,500	63.27%	525,000	33.30%	0.00%		22,200	1.41%	1,576,610
Silk Fabrics											
Brocards							18,000		6,000		24,000
Damask							16,000		800		16,800
Satins									32,000		32,000
Tabis									1,800		1,800
sub-total							34,000		40,600		74,600
Bonnets	20,266										20,266
Total Textiles	52,176		997,500		525,000		34,000		62,800		1,671,476

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