The Rise, Expansion, and Decline of the Italian Wool-Based Cloth Industries, 1100–1730: A Study in International Competition, Transaction Costs, and Comparative Advantage

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Introduction: Italy and Textiles in the European Economy[1]

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 preeminence during many of these 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

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[1] An earlier and much shorter version of this study was published as John Munro, "I panni di lana," in *Il Rinascimento italiano e l'Europa*, ed. Luca Ramin, vol. 4: *Commercio e cultura mercantile*, ed. Franco Franceschi, Richard Goldthwaite, and Reinhold Mueller (Treviso, 2007), 105–41. This version is based on a considerable amount of additional research and an elaboration of my key arguments.

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medieval and early modern eras.[2] Their chief rivals during these centuries were, above all, in 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 towns and regions prospered or declined because of their textile trades. While the Low Countries were clearly the preeminent European leader in wool-based textiles from the twelfth to the fifteenth century, 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; and 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 century.

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. By the sixteenth century, England had lost to Spain its former, long-held primacy in producing the world's finest, best wools—to the extent, indeed, that the English cloth

[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" (Venice with its *Terra Firma* possessions).

[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 XV[e] siècle," in *Produzione, commercio e consumo dei panni di lana (nei secoli XII–XVIII)*, ed. Marco Spallanzani, Fondazione Istituto Internazionale di Storia Economica F. Datini, Prato, Serie II: Atti delle Settimane de Studi e Altri Convegni 2 (Florence, 1976), 475–509; idem, *Barcelone: centre économique à l'époque des difficultés, 1380–1462* (Paris, 1967), chap. 6, "La draperie barcelonaise," 423–528; Manuel Riu, "The Woollen Industry in Catalonia in the Later Middle Ages," in *Cloth and Clothing in Medieval Europe: Essays in Memory of Professor E. M. Carus-Wilson*, ed. Negley B. Harte and Kenneth G. Ponting, Pasold Studies in Textile History 2 (London, 1983), 205–29.

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 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 century, 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 century, 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] Cer-

[4] See Douglass North, "Government and the Cost of Exchange in History," *Journal of Economic History* 44 (1984): 255–64; idem, "Transaction Costs in History," *Journal of European Economic History* 14 (1985): 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): 1–47.

[5] See Robert Lopez, *The Commercial Revolution of the Middle Ages, 950–1350* (Cambridge and New York, 1976); idem, *The Birth of Europe* (London and New York, 1967); idem, "The Trade of Medieval Europe: The South," in *The Cambridge Economic History of Europe,* vol. 2: *Trade and Industry in the Middle Ages*, ed. Michael Postan et al. (Cambridge, 1987), 338–412.

tainly this was the period in which all the west European textile industries first achieved international prominence, well 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 Italy's 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, the nature, qualities, and values of which have to be carefully delineated. Many, indeed most, of the common errors in the current literature arise from a failure to make such distinctions clearly. Those errors in turn stem from a 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 observing changes in relative prices (the price of one textile relative to

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

[7] Goldthwaite, *Economy of Renaissance Florence,* 269.

prices of other goods) and changes in "real" prices during, and adjusted for, periodic inflations and deflations over these centuries.

We must begin by understanding the universal market demand for textiles, which, along with food and shelter, has always supplied one of the basic needs of mankind. As clothing, textiles provide protection from the elements: from the cold, to be sure, but also from 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. 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 homespun 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

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 changes in technologies, raw materials costs, and market conditions together determined changes in relative prices, which in turn directly affected cloth sales. These changes may be better understood in terms of the tripartite division of the chief products of the European

cloth industries: woolens, worsteds, and hybrid woolen-worsted serges. The chief differences were determined primarily by the wool contents of these 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 pp. 57–58 below).[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]

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

[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," both in *The Cambridge History of Western Textiles*, ed. David Jenkins, 2 vols. (Cambridge and New York, 2003), 1:181–227, 228–324; and idem, "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 *The Medieval Broadcloth: Changing Trends in Fashions, Manufacturing and Consumption*, ed. Kathrine Vestergård Pedersen and Marie-Louise B. Nosch, Ancient Textile Series 6 (Oxford, 2009), 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* 58 (2005): 431–84; see pp. 104–14, 120–22, 153, 179–80 below.

[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 pp. 100–103 below), royal officials decided 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; therefore, these wools came to be exempt from the Staple requirements in the reign of Richard II (1377–99), an exemption confirmed by

from the Welsh Marches, namely, the borderland counties of Herefordshire and Shropshire; the next best came from the adjacent Cotswolds regions, in the counties of Gloucestershire, Worcestershire, Oxfordshire, and Berkshire (south-central England); and, finally, those from the Lindsey, Kesteven, and Holland districts of Lincolnshire, in the northeast, ranked a distinct third.[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 reestablishing fixed export prices, they ranged from a low of £2.500 sterling per sack for Sussex wools to a high of £13.000 a sack for the very best, Leominster ("Lemster Ore") wools from Herefordshire (that is, 5.2 times as much in value).[12] The actual market-value ranges may not, however, have been quite as great. In a market price list dated 1499, for the Calais wool staple (see p. 101 below), 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]

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): 118–69, esp. 145–46; repr. in idem, *Textiles, Towns, and Trade: Essays in the Economic History of Late-Medieval England and the Low Countries* (London, 1994), no. III.

[11] See Munro, "Wool Price Schedules," 135–43.

[12] *Rotuli parliamentorum ut et petitiones et placita in Parliamento*, 6 vols. (London, 1767–77), 5:275, no. 5. See Munro, "Wool Price Schedules," table 8, pp. 147–51 (n. 10 above).

[13] Algemeen Rijksarchief (Belgie), Rekenkamer, reg. no. 1,158, fol. 226. See Munro, "Wool Price Schedules," table 8, pp. 147–51 (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 (1956): 296–314; repr. in eidem, *A Perspective of Wages and Prices* (London, 1981), 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.

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 its price. From one sack of English wool, officially weighing 364 lb (= 165.107 kg), a late-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 area of 42 sq yds (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 outerwear could have been tailored.[17]

[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, including the one-inch selvage, the dimensions of a broadcloth become 22.555 m by 1.645 m. See *Tudor Economic Documents: Being Select Documents Illustrating the Economic and Social History of Tudor England*, ed. R. H. Tawney and Eileen Power, 3 vols. (London, 1924), vol. 1: *Agriculture and Industry*, doc. no. 5: *Estimates of Exports of Wool and Cloth*, 6 Oct. 1547, 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 thus wool of 45 sheep per broadcloth). According to Eleanora M. Carus-Wilson and Olive Coleman, *England's Export Trade, 1275–1547* (Oxford, 1963), 14–15, "some 4 or 4½ 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 (1955): 195–206; repr. in eidem, *Perspective of Wages and Prices,* 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," 16; 56, n. 48 (n. 8 above). See also Raymond Van Uytven, "Cloth in Medieval Literature of Western Europe," in *Cloth and Clothing in Medieval Europe*, ed. Harte and Ponting, pp.151–83, at 151 (n. 3 above): "[F]or 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: The Struggle for Markets," table 5.7, pp. 314–15 (n. 8 above); and also nn. 31, 69, 162–63, 205–8, 211, 246, 271, and 301 below.

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 (made from stone or bone). Those required for the weaker weft yarns, though once also prepared by combing, came to be fashioned, from about the thirteenth century, by carding (wired metal brush-like 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 the wheel-spinning of carded wools into strong yarns, strong enough for warps as well as wefts.[20] There is no evidence, however, that the Saxony wheel was used in fifteenth- and sixteenth-century Italy,

[18] For an evident but curious exception, concerning the sixteenth-century Florentine *rascie*, made exclusively from Spanish wools, see pp. 118, 122, 131–39, and 198 below.

[19] See the passages on spinning in Henri Michelant, ed., *Le livre des mestiers: dialogues français-flamands composés au XIV^e siècle par un maître d'école de la ville de Bruges* (Paris, 1875), composed at Bruges ca. 1349. See also Munro, "Medieval Woollens: Technology," 200–202 (n. 8 above).

[20] See John Munro, "Textile Technology," in *Dictionary of the Middle Ages*, ed. Joseph R. Strayer et al. (New York, 1988), 11:693–711; Munro, "Medieval Woollens: Technology," 200–204 (n. 8 above); Patrick Chorley, "The Evolution of the Woollen, 1300–1700," in *The New Draperies in the Low Countries and England, 1300–1800*, ed. Negley B. Harte, Pasold Studies in Textile History 10 (Oxford, 1997), 7–34, which is devoted almost entirely to this issue but offers an interpretation different from mine. See nn. 69 and 197–98 below.

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.[22] 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, which one weaver passed to the hands of the other. The weavers then used a flat wooden laysword to beat the weft into the fell of the cloth, using levers to wind the cloth on to the cloth beam while feeding more warps from the warp beam.

Although 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

[21] For evidence of this difference between combed, 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): 13–33; repr. in idem, *Business Banking, and Economic Thought in Late Medieval and Early Modern Europe: Selected Studies of Raymond De Roover*, ed. Julius Kirshner (Chicago, 1974), 85–118. See also Florence Edler, *Glossary of Medieval Terms of Business: Italian Series, 1200–1600* (Cambridge, MA, 1934; repr. New York, 1970), 147 (entry for *lana*), 279–81 (entries for *stamaiuolo, stame*); and appendix 8, 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).

was about 20–25 such broadcloths.[23] 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 m = 39.385 yds), producing annually about 12 bolts of cloth (= 432.14 m), the equivalent of about 15.5 Flemish broadcloths.[24] Over the next two centuries, weaving productivity did not enjoy any increase. A 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.[25]

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[23] Walter Endrei, "The Productivity of Weaving in Late Medieval Flanders," in *Cloth and Clothing in Medieval Europe*, ed. Harte and Ponting, 108–19 (n. 3 above); idem, "Manufacturing a Piece of Woollen Cloth in Medieval Flanders: How Many Work Hours," in *Textiles of the Low Countries in European Economic History*, Proceedings of the Tenth International Economic History Congress, ed. Erik Aerts and John Munro (Leuven, 1990), 14–23.

[24] Richard Goldthwaite, "The Florentine Wool Industry in the Late Sixteenth Century: A Case Study," *Journal of European Economic History* 32 (2003): 527–54: esp. 544, 553. A bolt of Florentine woolen cloth contained 61.77 *braccia*; the *braccio* was 0.583 m long, so that a bolt was 36.012 m (according to Florentine records of 1580). See Edler, *Glossary of Medieval Terms*, 52 and 59 (n. 21 above). See also Raymond Van Uytven, "Technique, productivité, et production au moyen âge: le cas de la draperie urbaine aux Pays-Bas," in *Produttività e tecnologia nei secoli XII–XVII*, ed. Sara Mariotti, Fondazione Istituto Internazionale di Storia Economica F. Datini, Atti delle Settimane di Studi et altre Cnvegni, no. 3 (Florence, 1981), 283–94; Francesco Ammannati, "Francesco di Marco Datini's Wool Workshops," in *Francesco di Marco Datini: The Man and the Merchant*, ed. Giampiero Nigro (Florence, 2010), 489–514; and n. 126 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 processes; however, that total estimate is reduced to 138 days if overlapping procedures are taken into account. For the length of the *braccio*, see nn. 46, 67, 77, 98, and 216 below.

[25] See Ephraim Lipson, *The History of the Woollen and Worsted Industries* (London, 1921; repr. New York, 1965), appendix 2, p. 258, based on Great Britain, *Parliamentary Papers, 1840* (London, 1840), 23:439–42: Two men weaving a superfine broadcloth of 34 yds (= 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); 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 1,459.35 hours in total cloth manufacturing. For a late seventeenth-century estimate (Matthew Hale, 1683) of three weeks for the production of a fine woolen broadcloth, see ibid., appendix 1, p. 257.

Fulling, Tentering, and Shearing: The Crucial Processes in Manufacturing Woolens

When those warp and weft yarns were woven together 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, fullers then hung the cloth along a large structure known as a tentering frame, stretching the woollen onto the tenterhooks, 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 or "cards" 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.[26]

From the tenth century, however, the fulling process in Italy became mechanized: with the water-powered fulling mill.[27] Italy was indeed

[26] See Munro, "Medieval Woollens: Technology," 1:204–12 (n. 8 above).

[27] Documented at Abruzzo, 962; Parma, 973; Verona, 985; and Lodi (near Milan), 1008. See Paolo Malanima, "The First European Textile Machine," *Textile*

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 20 percent of the value-added manufacturing costs (before cloth finishing), mechanical fulling accounted for only 5 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, and the industry's reputation, and thus the market value of the cloths.[28] 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.[29]

Worsteds and the "Light Draperies," Draperies Légères, Draperies Sèches

The other major products of the wool-based cloth manufacturing industries are known, at least to English historians, as worsteds (after the medieval Norfolk textile town of Worstead), but to continental textile historians by the French terms *draperies légères* and *draperies sèches*. One of the most common textiles of this industrial branch was the *say* or *saie* (from the Latin *sagum*, a Roman soldier's wool cloak), and the crafts producing them (in many varieties) were known as *sayetteries*.[30] As the

History 17 (1986): 115–28; and Eleanora Carus-Wilson, "An Industrial Revolution of the Thirteenth Century," *Economic History Review*, 1st ser., 11 (1941): 39–60; repr. in eadem, *Medieval Merchant Venturers: Collected Studies* (London, 1954), 183–211.

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

[29] De Roover, "Florentine Firm of Cloth Manufacturers" (n. 21 above).

[30] See, in particular, John Munro, "The Origins of the English 'New Draperies': The Resurrection of an Old Flemish Industry, 1270–1570," in *The New Draperies,* ed. Harte, 56–64, and "An Appendix on Says," 87–93 (n. 20 above).

first French terms suggest, they were comparatively light textiles—about one-quarter to one-third the weight of a fulled woolen broadcloth.[31] 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" spindle 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/teaseling, 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 the 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.

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 "rock" and short-stapled, greased, carded woolen weft yarns, spun on the spinning wheel.[32] 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,

[31] See Munro, "Medieval Woollens: The Struggle for Markets," tables 5.7–5.8, pp. 312–16 (n. 8 above); and pp. 59–63, 67–68, and 121–38 below. For a comparison of cloth dimensions and weights in medieval and early modern Europe, see n. 17 above and nn. 69, 162–63, 205–8, 211, 246, 271, and 301 below.

[32] See Ursula Priestly, "Norwich Stuffs," in *The New Draperies*, ed. Harte, 275–88 (n. 20 above).

especially those known as *saga, sargia,* and *stanfortes*, were of this type, as were the Hondschoote *saies* of both the thirteenth and the fifteenth to 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.[33]

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, in terms of both 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 northwest 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.[34]

[33] See pp. 111–12, 121, 131–37, 148, and 168–71 below; and nn. 140, 164, 191, 196, 199, 201, 208, 250, 300–302, and 304–7 below.

[34] See Hilmar Krueger, "The Genoese Exportation of Northern Cloths to Mediterranean Ports, Twelfth Century," *Revue belge de philologie et d'histoire* 65 (1987): 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): 831–50; Hektor Ammann, "Die Anfänge des Aktivhandels und der Tucheinfur aus Nordwesteuropa nach dem Mittelmeeregebiet," in *Studi in onore di Armando Sapori*, 2 vols. (Milan, 1957), 1:275–310, esp. "Beilage I–II: Norwesteuropäische Tuche in Genua (1182–1213)," 1:308–9, including *sagie, stanfortes*; Sharon Farmer, "Biffes, Tiretaines, and Aumonières: The Role of Paris in the International Textile Markets of the Thirteenth and Fourteenth Centuries," *Medieval Clothing and Textiles* 2 (2006): 73–79.

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 century. Chorley 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.[35]

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, Venice, Cyprus (Venetian-controlled), and also Provence.[36] Better studied are the accounts of the rival Del Bene firm, for 1318–23.[37] Table 1 presents a summary of Patrick Chorley's analysis of the prices for northern textiles in these accounts. If we group those designated as *rays* and *says* in the cheaper category, we find that their mean value was less than half (46.71 percent) of the mean value of the northern (chiefly Flemish) colored woolens. Indeed, the prices for white says from Caen (Normandy) and Ghistelles (Flanders) were only 23.66 and 31.92 percent, respectively, of the mean value for woolens.[38]

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[35] Patrick Chorley, "The Cloth Exports of Flanders and Northern France during the Thirteenth Century: A Luxury Trade?" *Economic History Review*, 2nd ser., 40 (1987): 349–79, esp. 360–61, 367 (table 9). See also, for similar evidence on textile types and prices, idem, "English Cloth Exports during the Thirteenth and Early Fourteenth Centuries: The Continental Evidence," *Bulletin of the Institute of Historical Research* 61:144 (1988): 1–10, and see the sources cited in. 34 above.

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

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

[38] Chorley, "Cloth Exports," adapted from his table 3, p. 355 (n. 35 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/a*, see n. 24 above, and nn. 46, 67, 77, 98, and 216 below.

Subsequently, Hidetoshi Hoshino, the most prominent historian of the medieval Italian textile trades, also analyzed 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.[39] His results are presented in table 2, which shows a somewhat higher mean value for the northern says: 52.66 percent of the mean value of the northern dyed woolens, excluding *scarlets* from this comparison because of their singularly high value.[40] But that arithmetic mean disguises a wide variance of prices for these northern says and similar cheaper textiles, which ranged from 23.10 percent (for Ghistelles says) to 59.02 percent (for Caen says) of the mean prices for the northern woolens. The prices for good-quality Hondschoote says were 53.38 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-material costs, as well as 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 century.

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[39] Based on Hidetoshi Hoshino, "The Rise of the Florentine Woollen Industry in the Fourteenth Century," in *Cloth and Clothing in Medieval Europe*, ed. Harte and Ponting, 184–204 (n. 3 above), here table 11.2, p. 190; and idem, *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), 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 Goldthwaite, *Economy of Renaissance Florence*, 265–70 (n. 6 above).

[40] For a discussion of the luxury woolens known as *scarlets*, see below, pp. 61–65, 81, 125, and 138 and n. 49.

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 but a fustian: another lightweight hybrid, composed of a linen (flax) warp yarn and a cotton weft yarn.[41] 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 century, 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 relatively very cheap—if more expensive than domestic homespun—as well as light, and very popular amongst the lower middle classes in this region (Lombardy) during the later twelfth, thirteenth, and early fourteenth century. 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.[42] In many towns in Lombardy, and also

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

[42] See John Munro, "Origins of the English 'New Draperies,'" (n. 30 above); idem, "Industrial Transformations in the North-West European Textile Trades, c. 1290–c. 1340: Economic Progress or Economic Crisis?" in *Before the Black Death: Studies in the 'Crisis' of the Early Fourteenth Century*, ed. Bruce M. S. Campbell (Manchester and New York, 1991), 110–48; idem, "The Symbiosis of Towns and Textiles: Urban Institutions and the Changing Fortunes of Cloth Manufacturing in the Low Countries and England, 1270–1570," *Journal of Early Modern History* 3 (1999): 1–74; idem, "The 'Industrial Crisis' of the English Textile Towns, 1290–1330," in *Thirteenth-Century England* 7, ed. Michael Prestwich, Richard Britnell, and Robin Frame (Woodbridge, 1999), 103–41.

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,* and *saia cotonata*. Also manufactured were *tiretaines*, closely resembling fustians—in weight and market values—which were 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.[43]

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 and Northern France]."[44] 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: these coarse and relatively cheap fabrics accounted for the majority of these firms' 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 (excluding from this comparison the very expensive ultraluxury scarlets—*scarlatti*).[45] Similarly, a study of the early fourteenth-century cloth market in the Provençal town of Grasse (1308–9) 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's *rubeum* (red) woolens.[46]

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[43] Eleanora Carus-Wilson, "The Woollen Industry," in *Cambridge Economic History of Europe*, vol. 2: *Trade and Industry in the Middle Ages*, ed. M. M. Postan and E. E. Rich (Cambridge, 1952), 355–428, esp. 390–91; rev. ed., ed. M. M. Postan and Edward Miller (Cambridge, 1987), 614–90, esp. 649–50. For *tiretaines*, see Farmer, "Biffes, Tiretaines" (n. 34 above).

[44] Carus-Wilson, "Woollen Industry," 390–91.

[45] Hoshino, *L'arte della Lana,* 65–113, esp. tables 4–15, pp. 95–114; idem, "The Rise of the Florentine Woollen Industry" (both in n. 39 above); and see also Goldthwaite, *Economy of Renaissance Florence*, 265–70 (n. 6 above). For scarlets, see below, pp. 61–65, 81, 125, and 138 and n. 49.

[46] R. Aubenais, "Commerce des draps et vie économique à Grasse en 1308–9," *Provence historique* 9:37 (1959): 201–12, esp. 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

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, especially from Cistercian monasteries, for export during the later thirteenth century indicates that some such high-priced wools were then reaching the textile manufacturing towns in Lombardy and Tuscany. England was then Europe's overwhelmingly predominant supplier of wool, exporting an annual average of 25,480 sacks in the 1290s, from which about 110,400 broadcloths of assize could have been woven (table 4).[47]

A far more important textile import into later thirteenth-century Italy was that group of dyed and undyed woolens, woven from English wools, that had been manufactured in the towns of the southern Low Countries and northern France, and was 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, in NE France, 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 di Calimala* prospered by dyeing and finishing these Franco-Flemish woolens and by having them reexported to various Mediterranean and Asian markets, including especially those of the Islamic world.[48] Particularly renowned were the extremely costly and ultralux-

canna. The Florentine canna = 2.333 meter = 4.0 *braccia*. Northern French *biffes* had an intermediate value: 24s to 28s per *canna*, though some were as cheap as 10s per *canna* (205). See also Hoshino, *L'arte della Lana*, 71 (n. 39 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*; 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), 117–18. For dimensions of the *canna* and *braccia*, see also nn. 24, 38 above, 67, 77, 98, and 216 below.

[47] Munro, "Medieval Woollens: The Struggle for Markets," 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.

[48] Sapori, *Una compagnia di calimala* (n. 37 above). See also Goldthwaite, *Economy of Renaissance Florence*, 269–72 (n. 6 above); Eliyahu Ashtor, "L'exportation de

urious "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.[49]

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 northwest Europe: 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 among Christian and Muslim states); the wars in Italy commencing with the Sicilian Vespers (1282–1302), which were then followed by the Italian Guelf-Ghibelline wars (1313–43), which in turn provoked various foreign invasions of Italy by Germans, Hungarians, Angevins, and Catalans, to the 1380s; and finally, in northwest Europe, the Anglo-Scottish, Anglo-French, and Franco-Flemish wars, as well as the civil wars, which raged almost unceasingly from 1294 to 1328.

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textiles occidentaux dans le Proche-Orient musulman au bas Moyen-Age (1370–1517)," in *Studi in memoria di Federigo Melis*, 5 vols. (Naples, 1978), vol. 2, ed. Luigi de Rosa, 303–77; idem, "Les lainages dans l'orient médiéval: emploi, production, commerce," in *Panni di lana*, ed. Spallanzani, 657–86 (n. 3 above).

[49] See John H. Munro, "The Medieval Scarlet and the Economics of Sartorial Splendour," in *Cloth and Clothing in Medieval Europe*, ed. Harte and Ponting, 13–70 (n. 23 above); idem, "The AntiRed Shift—to the Dark Side: Colour Changes in Flemish Luxury Woollens, 1300–1550," *Medieval Clothing and Textiles* 3 (2007): 55–95; idem, "Luxury Textile Consumption" (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), repr. in idem, *Industria tessile e commercio internazionale nella Firenze del tardo Medioevo*, ed. Franco Franceschi and Sergio Tognetti, Biblioteca storica toscana 39 (Florence, 2001), 23–39.

Certainly, by the 1320s, the combination of those wars had raised both the transportation and the general transaction costs in long-distance international trade: often to prohibitive levels for the commerce in relatively low-valued textiles.[50] The chief costs did not rise so much from destruction but rather from the breakdown of authority, which promoted 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 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 on a continuous basis from the 1320s did generally prove to be a more cost-effective alternative than the war-torn land routes. Nonetheless it was certainly not the major advance in commercial transportation that so many historians have portrayed because this sea route, from the major Italian maritime city-states (Genoa, Florence, Venice) to Bruges or Southampton, was about five times longer than overland routes, and most of it was insecure, for it was 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 much of the long coastlines from Gibraltar to Bruges and Southampton.[51] Because the Atlantic route, in particular, was so often threatened in this fashion, Venetian galleys sailed only intermittently during the later fourteenth and early fifteenth century.[52]

[50] For the following, see Munro, "'Industrial Crisis'"; "Industrial Transformation," (both in n. 42 above); idem, "Origins of the English 'New Draperies'" (n. 30 above); idem, "'New Institutional Economics'" (n. 4 above).

[51] Munro, "'New Institutional Economics'" (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 *The Political Economy of Merchant Empires: State Power and World Trade, 1350–1750*, ed. James Tracy (Cambridge, 1991), 228–75.

[52] According to Venetian state records, the Flanders galleys made only 24 northbound voyages between 1332, when state subsidies commenced, and 1400; but in the relatively more peaceful and commercially more propitious fifteenth century,

Thus ocean shipping did not provide so cheap a form of transport, especially for the lower-priced northern textiles destined for Mediterranean markets.[53]

The Plight of the Cheaper-Line Cloth Industries in Northwestern 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, by the 1320s, of those *sayetteries* and the related *draperies légères (sèches*) and similar industries in northern France, the southern Low Countries, the Rhineland, 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

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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 (1961): 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 XIII^{e}–milieu XV^{e} 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'" (n. 4 above).

[53] In 1398, the Italian merchant Guglielmo 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. He also explicitly noted, however, 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. 3: *Medioevo* (Milan, 1962), 219–43, quotation on 233–34, n. 30. In contrast, we can 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*, 97–99 (n. 37 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 florins per say, or 9.5 percent more per say in the smaller shipment. See below, p. 73, for the high costs of shipping English wool to Venice by sea.

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," possibly English.[54] In England, some towns in Norfolk and Suffolk (East Anglia) continued to export worsteds 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 to prohibitive levels. The drastic decline in European population during the later fourteenth century itself exacted a severe toll in rising transaction costs because the transactions sector, 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

There is much evidence for a similar decline in exports of the cheaper-line textiles in fourteenth-century Italy, though on a lesser scale than that experienced in northwest Europe. Obviously, the demand for cheaper textiles did not disappear—demand still came, as noted earlier, from domestic 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 decline is found in the once-renowned Lombard fustians industry, from about the 1320s. By this time, it should be noted, both Provence and parts of Tuscany had already experienced a significant fall in their populations, and thus well before the ill-famed Black Death (from 1348).[55] Warfare may have been the initial major

[54] See evidence cited in sources in nn. 4, 42, 45, 48, 50, 53, and above.

[55] See Philippe Wolff, "Trois études de demographie médiévale en France méridionale," in *Studi in onore di Armando Sapori*, 2 vols. (Milan, 1957), 1:493–503, esp. the table on 502, noting the fall in the number of foyers in the town of Millau: from 1,835 in 1309 to 1,541 in 1346, that is, before the Black Death. See also Edouard Baratier and Félix Reynaud, *Histoire du commerce de Marseille*, vol. 2: *De 1291 à 1480* (Paris, 1951), 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

cause of that demographic and economic decline, not so much from battle deaths as from disrupting food supplies and spreading diseases.

No part of western Europe was more continuously ravaged by warfare than was Italy, from the 1290s well into the 1380s; and no region was more afflicted by the financial costs of warfare, especially in steeply rising regressive taxation (in excise taxes on consumption) to pay interest on civic public debts. Indeed, not only for Italy, but for many other war-torn regions of western Europe, the rising fiscal burden of warfare in public debt and taxation was one that could not readily be repudiated and that had to borne by an ever smaller number of survivors, especially after the Black Death. Most historians seem to ignore the fact that rising per capita taxation largely negated any rises in real incomes for wage earners in the supposed "Golden Age of the Artisan," following the Black Death. As David Herlihy has commented on the economy of Tuscany in this era,[56]

depopulation of Marseille; doc. no. 7, pp. 184–86: on the serious decline of Marseilles's population from the 1290s. In Tuscany, Prato's urban population declined by 26.9 percent from 1300 to 1339, and its rural population by 38.7 percent. In neighboring 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), 60–92, esp. fig. 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; see also David Herlihy, *Medieval and Renaissance Pistoia: The Social History of an Italian Town, 1200–1430* (London and New Haven, 1967), 55–77, esp. graph 1 and table 1, pp. 69–70, and appendix 1, pp. 271–82. See also John Day, "Crises and Trends in the Late Middle Ages," in idem, *The Medieval Market Economy* (Oxford, 1987), 185–224. [Translation of "Crisi e congiunture nei secoli XIV e XV," in *La Storia: I grandi problemi* (Turin, 1988).]

[56] Herlihy, *Pistoia*, 145, presenting, in contrast, a view of the period from 1290 to 1340 as an age of "brilliant prosperity." On warfare and its costs, see William Caferro, "Mercenaries and Military Expenditure: The Costs of Undeclared Warfare in XIVth Century Siena," *Journal of European Economic History* 23:2 (1994): 219–47; idem, *Mercenary Companies and the Decline of Siena* (Baltimore, 1998); idem, "Warfare and Economy in Renaissance Italy, 1350–1450," *Journal of Interdisciplinary History* 39:2 (2008): 167–209; Samuel Cohn, *Creating the Florentine State: Peasants and Rebellion, 1348–1434* (Cambridge and New York, 1999), 80–109 ("Fiscality and Change, 1355–1487"); Anthony Molho, *Florentine Public Finances in the Early Renaissance, 1400–1433* (Cambridge, MA, 1971); John Munro, "The Usury Doctrine and Urban Public Finances in Late-Medieval Flanders (1220–1550): Rentes (Annuities), Excise Taxes, and Income Transfers from the Poor to the Rich," in *La fiscalità nell'economia Europea, secoli XIII–XVIII/Fiscal Systems in the European Economy from the 13th to the 18th Centuries*, ed. Simonetta Cavaciocchi, Fondazione Istituto Internazionale di Storia Economica F. Datini, Prato, Serie II: Atti delle Settimane de

> By most measures, the period between approximately 1340 and 1400 must be considered an age of deep depression. . . . High food prices, frequent famines, repeated protests in the sources concerning shortages of grain and meat within the city, present a uniformly somber picture of disrupted production and continuing want. The bad times were bred by the shock of drastic population decline and by destructive wars and social unrest in the countryside.

War and the Decline of the Italian Fustians Industry

Certainly Italian-based 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 Swabian towns of this region—Ulm, Augsburg, Ravensburg, Constance, and Basel—began converting their own domestic-oriented, low-quality linen 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.[57]

Studi e altri Convegni 39 (Florence, 2008), 973–1026; and idem, "'New Institutional Economics'" (n. 4 above).

[57] See Maureen Mazzaoui, "The Cotton Industry of Northern Italy in the Late Middle Ages, 1150–1450," *Journal of Economic History* 32 (1972): 262–86; eadem, *Italian Cotton Industry*, 129–53 (n. 41 above); Hermann Kellenbenz, "The Fustian Industry of the Ulm Region in the Fifteenth and Early Sixteenth Centuries," in *Cloth and Clothing in Medieval Europe*, ed. Harte and Ponting, 259–78 (n. 3 above); Wolfgang von Stromer, *Die Gründung der Baumwollindustrie im Mitteluropa: Wirtschaftspolitik im Spätmittelalter* (Stuttgart, 1978).

The Long-Term Consequences of Rising Transactions Costs: The Shift to Luxury Cloth Production for the Export Trades in Northwestern and Mediterranean Europe

The severely acute problems facing the northern European textile producers, in particular, or those for whom the Italians had been their chief commercial agents and customers, were twofold. First, their transport and transaction costs were so much higher, as just indicated, than those of 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, that is, 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 southern Low Countries (Flanders and Brabant), and subsequently England (from the 1350s) and Holland (from the 1360s), as well, had chosen to reorient 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 northwest Europe and Italy, albeit for a much 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 in 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 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).[58]

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 pp. 50–61 and 64 above). That vital dependence soon put these luxury draperies at the mercy of English royal fiscal policy (that is, in the taxation of wool exports) the consequences of which will later be shown for the textile industries in both the Low Countries and Italy. 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.[59]

[58] For these economic changes, see the sources cited in nn. 4, 42, 45, 48, 50, and 53 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," *International Journal of Maritime History* 11 (1999): 1–30; idem, "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 *Von Nowgorod bis London: Studien zu Handel, Wirtschaft und Gesellschaft im mittelalterlichen Europa: Festschrift für Stuart Jenks zum 60. Geburtstag*, ed. MarieLuise Heckmann and Jens Röhrkasten (Göttingen, 2008), 97–182.

[59] Munro, "Spanish *Merino* Wools," 431–84 (n. 9 above). See pp. 50–53 above and pp. 103–7, 109–22, 123–24, 133–38, 153, 173, 176, and 179–80 below.

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 become quite evident by the early fourteenth century, certainly by the 1320s, was the decline of the Florentine *Arte di Calimala* and, conversely, the rise of the previously less important guild of cloth manufacturers, the *Arte della Lana*. Thus, 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*, namely, those that imitated Franco-Flemish luxury cloth styles. The rapid rise of this import-substitution industry took place at the direct expense of the *Arte di Calimala,* whose decline must also be blamed upon the virtual collapse of their commercial networks based on the now virtually extinct Champagne Fairs.[60]

Though one might instead attribute their plight more directly to the sharp rise in transportation and transaction 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 same English wools. One might also 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.[61] 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

[60] See also Goldthwaite, *Economy of Renaissance Florence*, 272–73 (n. 6 above), for other reasons, including the establishment of import-substitution industries.

[61] See below, p. 135 and table 11, for evidence from Italian cloth industries on weight loss in cloth manufacturing.

were far safer to operate (with lower insurance rates) for the very valuable cargoes of English wool and Tuscan luxury woolens.[62]

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 in serving as papal tax collectors and international bankers, especially in utilizing the recently devised bill of exchange. Both of these roles had allowed the Italians to gain control of the English wool trade from the 1270s.

The turning point, in 1275, was King Edward I's imposition of a tax on the export of English wools (table 4), which was then and for a long time England's overwhelmingly predominant and most valuable export. These wool-export taxes, initially modest at 6s 8d or half a mark per sack (about 5 percent of the value), would determine the fate of both the English government and its overseas commerce for the next two centuries.[63] First, that extremely lucrative wool-export tax allowed Italian merchant bankers to lend large sums to the English crown on the security (collateral) of the export tax; such loans also enabled the Italians, especially the Florentines, to gain control over the administration of the wool customs and thus assume a predominant role in the English wool export trade. In 1294 the English wool-export trade was dominated by eight Florentine

[62] See Edmund B. Fryde, "Italian Maritime Trade with Medieval England ca. 1270–ca. 1530," *Recueils de la Société Jean Bodin* 32 (1974): 291–337, repr. in idem, *Studies in Medieval Trade and Finance* (London, 1983), no. 14; and also idem, "Anglo-Italian Commerce in the Fifteenth Century: Some Evidence about Profits and Balance of Trade," *Revue belge de philologie et d'histoire* 50 (1972): 345–55; idem, "The English Cloth Industry and the Trade with the Mediterranean, c. 1370–c. 1530," in *Panni di lana,* ed. Spallanzani, 343–67 (n. 3 above)

[63] Known as the *Magna et antiqua custuma*, or "ancient custom," the half-mark export tax also applied to 300 woolfells (= one sack); and the tax was a full mark (13s 4d) on a last of animal hides. For the following discussion on the Italian role in the English wool trade, see Terence Lloyd, *The English Wool Trade in the Middle Ages* (Cambridge, 1977), 60–98, 136–40, 185–89; and Goldthwaite, *Economy of Renaissance Florence*, 203–55 (n. 6 above); Adrian Bell, Chris Brooks, and Paul Dryburgh, *The English Wool Market, c. 1230–1327* (Cambridge and New York, 2007), 11–67.

and two Lucchese firms: the Frescobaldi Bianchi, the Frescobaldi Neri, the Cerchi Bianchi, the Cerchi Neri, the Bardi, the Pulci-Rimbertini, the Mozzi, and the Spini (all from Florence); and the Riccardi and Bettri (from Lucca). But in that year, at the outset of war with France (1294–1303), Edward I drove the Riccardi into bankruptcy with excessive loan demands and thus to the further benefit of the Florentine firms, none of whom was so threatened. In this period, virtually all of the wools that the Italian exported went to the Low Countries, though some small share passed through Flanders overland, en route to northern Italy.

The key to Florence's success was its very strong ties to the Papacy, which had been firmly cemented from the 1260s by the long-ruling, ardently pro-papal Parte Guelfa. The Papacy thus turned to the Florentine merchant banking firms not only to secure loans but more especially to collect papal taxes from all across Europe. Thus, from the late thirteenth to the later fourteenth century, the majority of the leading merchant firms engaged in intra-European papal banking, papal tax collections, and related international trade transactions came from Florence. Nevertheless, the Florentine and, indeed, Italian dominance began to wane in the early fourteenth century, when many of the Florentine firms encountered financial difficulties for a variety of complex reasons (some involving English politics). By 1306, only four of the original eight Florentine firms were left in the wool trade, whose dominance temporarily passed to German Hanseatic merchants. Despite a subsequent revival of Italian influence with the arrival of new firms, the Peruzzi and the Portinari, and despite their leading role, along with the Bardi, as the crown's chief bankers at the outset of the Hundred Years War, the wartime fiscal policies of Edward III (1327–77) soon contributed to the bankruptcy of these Italian firms as well, so that control of English wool exports passed from the Italian to native English financiers and merchants, for reasons to be seen later in this study.[64]

[64] For the role of Florentine merchant firms—the Pulci, Rimbertini, Mozzi, Frescobaldi, Scali, Spini, Bardi, Cerchi Bianchi, Buonaccorsi, Acciaiouli (from 1282), and later (from the 1360s), the Alberti, Guardi, and Soderini, see Goldthwaite, *Economy of Renaissance Florence*, 245–55 (n. 6 above), and John Najemy, *A History of Florence, 1200–1575* (Oxford, 2006), 151–52. During the Western Papal Schism (1378–1417), with rival popes in Avignon and Rome (and then Pisa), the Florentines briefly lost their predominant leadership in papal banking. For the impact of the English wool-export taxes on Italian participation in the wool-export trade, see pp. 100–103 below.

The Bill of Exchange, Papal Taxes, and English Wool Exports

Our principal concern now is to see how the international bill of exchange facilitated the Italian supremacy in the wool export trade in the later thirteenth and much of the earlier fourteenth century, up to the Hundred Years' War. Indeed, this bill of exchange, which had no Arab or other foreign antecedents, was the single most important financial innovation in the later medieval European economy.[65]

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.[66] 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*, namely, 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

[65] 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): 111–28; Raymond de Roover, *L'evolution de la lettre de change, XIV^e–XVIII^e siècles* (Paris, 1953); John Munro, "Bullionism and the Bill of Exchange in England, 1272–1663: A Study in Monetary Management and Popular Prejudice," in *The Dawn of Modern Banking*, ed. Center for Medieval and Renaissance Studies, University of California (New Haven and London, 1979), 169–239; John Munro, "The Medieval Origins of the Financial Revolution: Usury, *Rentes*, and Negotiablity," *The International History Review* 25 (2003): 505–62; Markus A. Denzel, "The European Bill of Exchange: Its Development from the Middle Ages to 1914," in *Cashless Payments and Transactions from the Antiquity to 1914*, ed. Sushil Chaudhuri and Markus A. Denzel (Stuttgart, 2008), 153–94.

[66] Because of the crucial importance 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; to this present day, acceptance bills have been the chief mechanism for financing international trade. See sources in n. 65 above.

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 avoiding 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 the 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 proportionally 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 of the *Arte della Lana*'s cloth production, that proportion had fallen to just one-quarter in 1336–39; so that three-quarters of the Florentine cloth output for the export trades was now in the much higher-priced luxury woolens.[67] Of course, throughout

[67] Hoshino, "Rise of the Florentine Woolen Industry," table 11.1, p. 189 (n. 39 above): the cheaper range was from 20 to 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 4, p. 229 (n. 53 above), one bolt of

the late-medieval era, the *Arte della Lana* continued to produce cheaper and coarse fabrics for domestic and regional Italian consumption. The evidence is indisputable that, in producing luxury-quality woolens, not just English wools but only the best English wools, were being used. 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).[68]

The Florentine *Arte della Lana* had engaged in this marked reorientation to luxury-cloth production for much the same reasons as did the northern draperies (in Normandy, Flanders, Brabant, and England), even though the Italian cloth producers enjoyed a far greater advantage over their northern rivals in transaction costs in marketing cheaper textiles within the Mediterranean basin.[69] Indeed, for that reason, the cheaper textiles 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

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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. 76 below, and Goldthwaite, "Florentine Wool Industry," table A1, p. 553 (n. 24 above). See also nn. 24, 38, and 46 above; and nn. 77, 98, and 216 below.

[68] Hoshino, *L'arte della Lana*, table 26, p. 216 (n. 39 above). See also nn. 91 and 94 below.

[69] Hoshino, "Rise of the Florentine Woollen Industry," 191–204; idem, *L'Arte della Lana*, 153–229 (both in n. 39 above). See also Goldthwaite, *Economy of Renaissance Florence*, 270–74 (n. 6 above). Goldthwaite errs, however, in his contrast of northern and Florentine textile production, in stating that "[t]he expensive cloths imported from the north were true woolens, 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" (272). 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" (n. 20 above); Munro, "Medieval Woollens: Technology" (n. 8 above), esp. table 5.7, pp. 312–13. For comparative cloth weights, see also pp. 120–22, 134–37, 141–44, 147–48, and 168 below; nn. 17 and 31 above; and nn. 162–63, 205–8, 246, 271, and 301 below.

woolens in Mediterranean markets, they eventually lost considerable ground to the Tuscan and Lombard cloth industries in these markets. Consequently, by the later fourteenth century, these Low Countries' draperies became ever more dependent on the Hanseatic markets in Germany, Poland, Russia, and Scandinavia, as subsequently did the English and Dutch woolen cloth industries, from the 1360s.[70]

Not until the later fourteenth century did the Florentine *Arte della Lana* really achieve its much more complete, though by no means ever fully complete, shift to luxury production for its export markets.[71] 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.[72] 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

[70] See Munro, "Hanseatic Commerce in Textiles," 97–102 (n. 58 above); idem, "Medieval Woollens: The Struggle for Markets," 239–49, 269–85 (n. 8 above); Hektor Ammann, "Deutschland und die Tuchindustrie Nordwesteuropas im Mittelälter," *Hansische Geschichtsblätter* 72 (1954): 1–63; Marian Małowist, "Quelques observations sur la structure de la production et du commerce du drap au cours du XIV^{e} et XV^{e} siècle," in ed. Spallanzani, *Panni di lana*, 595–601 (n. 3 above); Carsten Jahnke, "Some Aspects of the Medieval Cloth Trade in the Baltic Sea Area," in ed. Pedersen and Nosch, *Medieval Broadcloth*, 74–89 (n. 8 above). Note that these various studies are not fully in agreement with one another.

[71] 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 pp. 94, 100–104, 124–26, 140, and 173 and nn. 105 and 117 below), with the remainder, based on non-English wools, in the so-called Garbo sector (see pp. 103–16, 123–26, 130–32, 140, 143, 173–75 below). How much of the latter was for local markets and how much for exports cannot be determined. See Hoshino, *L'arte della Lana*, 153–229; idem, "Rise of the Florentine Woollen Industry," 191–204 (both in n. 39 above).

[72] See also Goldthwaite, *Economy of Renaissance Florence*, 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.

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 among 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: for example, 38.5 florins (£5.78 sterling) for those from Mechelen and 19.2 florins (£2.88 sterling) for those from Wervik. Florentine woolens were, however, 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 far less popular than Flemish and Brabantine broadcloths, and less expensive than the very finest from the Low Countries. Priced in terms of a standardized length of 35 ells (24.5 m), the Florentine woolens sold, on average, for 32 florins (£4.80 sterling) while those from Bruges and Brussels sold for an average of 43.75 florins (£6.56 sterling) and 46.67 florins (£7.00 sterling).[73]

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.[74] 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.[75]

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[73] For the various textile prices, see table 3 below; and Munro, "Industrial Transformations," appendix 4.1, tables A–D., pp. 143–48 (n. 42 above); idem, "Medieval Woollens: The Struggle for Markets," table 5.10: 3–6, pp. 318–24 (n. 8 above). For cloth dimensions, see n. 17 above, and pp. 120–22, 134–37, 142–44, 147, and 168–69 below.

[74] See also Stephan R. Epstein, *Freedom and Growth: The Rise of States and Markets in Europe, 1300–1750* (London and New York, 2000), 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" (128–29). See the next note, n. 75.

[75] For the Lombard cloth industry, see ibid., 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.

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 the Tuscan and Lombard woolens were, it must be noted, far more expensive than even the very best English broadcloths exported during this era—about £2.00 to £2.50 sterling each, except for the very few, very costly English scarlets—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.[76]

In the Datini accounts for cloth sales in Spain from 1394 to 1410, only a few other Italian woolens competed with the overwhelmingly dominant Florentine woolens: just 86 cloths from Prato and Genoa, with a mean value of 30.78 florins (£4.62 sterling), compared to sales of 2,652 Florentine woolens, with a mean value of 64.43 florins (£9.67 sterling).[77] All of these textiles sold in these markets would have cost a master mason or carpenter well more than a year's wage income.[78]

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[76] 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 (1959): 321–65; tables 1, 5, 6, and 10, on 326–27, 342–43, 347, 363–64. For cloth dimensions, see 325–29, nn. 12–15, and 353, no. 56. This important study has been reprinted in idem, *Industria e commercio nella Toscana medievale* (Florence, 1989), 108–56.

[77] Cloth sales in Barcelona, Valencia, and Majorca by the Datini firm of Prato: in Melis, "Diffusione," table 4, p. 229 (n. 53 above). The Florentine woolens were then also about 30–40 percent longer than the Flemish Lys valley cloths: 18.875 *canne* (44.035 m) 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*, 52 (*braccio*), 59 (*canna*), indicating that a *canna* was 3–4 *braccia* (n. 21 above). In the sixteenth century, Florentine woolens were evidently shorter: 15.443 *canne* = 36.012 m. See the source for table 13 below.

[78] In the early 1390s, the average daily wage for a Florentine master mason was 16.84 *soldi*. To purchase a single Florentine San Martino woollen (see nn. 71 above, and nn. 105 and 117 below), priced on average at 56 florins (n. 73), at 75s per florin, he would have had to spend 249.41 days' wages (1.188 years' money income, with 210 days annual employment). For Florentine wages, see n. 217 below; for comparable evidence in Flanders, see John Munro, "Textiles as Articles of Consumption in Flemish Towns, 1330–1575," *Bijdragen tot de geschiedenis* 81 (1998): 275–88; Munro, "Luxury Textile Consumption," tables 1.5–1.7, pp. 27–32 (n. 8 above).

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 this plague-infested, war-wracked era of economic contraction commonly known as the late medieval Great Depression.[79]

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 sociopolitical history, which in turn requires a basic understanding of its organizational structure. As noted earlier, cloth production had come to be governed by the mercantile guild known as the *Arte della Lana*, whose predominant governing members were known as *lanaiuoli*. They were entrepreneurs in the cloth trade, consisting of family firms or, more commonly, commercial partnerships; and they organized production under a putting-out system of 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.[80]

[79] For the literature on the Great Depression, see Robert Lopez and Harry Miskimin, "The Economic Depression of the Renaissance," *Economic History Review*, 2nd ser., 14 (1962): 408–26; eidem and Carlo Cipolla, "Economic Depression of the Renaissance: Rejoinder and Reply," *Economic History Review*, 2nd ser., 16 (1964): 519–29; Robert Lopez, Harry Miskimin, and Abraham Udovitch, "England to Egypt, 1350–1400: Long-Term Trends and Long-Distance Trade," in *Studies in the Economic History of the Middle East*, ed. M. A. Cook (London, 1970), 93–128; Guy Bois, *La grande dépression médiévale: XIV^e–XV^e siècles: le précédent d'une crise systémique* (Paris, 2000); Ferdinand Seibt and Winifried Eberhard, eds., *Europa 1400: Die Krise des Spätmittelalters* (Stuttgart, 1984); Day, "Crises and Trends" (n. 55 above).

[80] For an excellent summary, see Goldthwaite, *Economy of Renaissance Florence*, 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), 33–231; Ammannati, "Datini's Wool Workshops," 493, 498–507, for the Prato

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, who employed other weavers to assist them, but did not control the other key textile artisans (the fullers, dyers, shearers, and finishers), certainly not in the way that the Florentine *lanaiuoli* usually did. These skilled and fully professional craftsmen in northwestern Europe generally enjoyed their own independent guilds, for whom the weaver-drapers and cloth merchants were their fee-paying clients.[81]

In contrast, the late medieval Italian *lanaiuoli*, even if they were not the great industrial capitalists misleadingly portrayed by Alfred Doren (see below, n. 83), 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 the *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 "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 piecework wages.[82] The *lanaiuoli* also employed, but under their own direct supervi-

cloth industry (n. 24 above); Edler, *Glossary of Medieval Terms*, appendixes 6–9, pp. 409–26 (n. 21 above).

[81] 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), 153–205; idem, "Symbiosis of Towns and Textiles" (n. 42 above); idem, "Medieval Woollens: Technology," 217–27 (n. 8 above).

[82] See Ammannati, "Datin's Wool Workshops," 493 (n. 24 above), noting that

sion, urban weavers, fullers, dyers, shearers, and other skilled textile artisans (who may have worked in *botteghe*, if not in their own homes), who also earned piecework wages. Their direct subordination to the *lanaiuoli* and the *Arte della Lana* can be further explained by the fact that this textile guild was a leader of the seven-member *Arti Maggiori*, which, along with the elite families of the pro-papal Parte Guelfa, had long dominated the Florentine government (even if sharing some power with the fourteen guilds of the *Arti Minori*).[83]

Labor Strife in the Florentine Cloth Industry during the Fourteenth Century (1342–82)

Both the political-economic powers and the economic tribulations of the *Arte della Lana,* indeed the socioeconomic tribulations of Florentine society itself, are clearly revealed in two major episodes of labor strife during the fourteenth century: both before and after the Black Death, specifically in the four decades from 1342 to 1382.[84]

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 503, for 1396–99).

[83] For the classic (now outdated) view of medieval industrial capitalism, see Alfred Doren, *Studien aus der Florentiner Wirtschaftsgeschichte*, vol. 1: *Die Florentiner Wollentuchindustrie vom XIV. bis zum XVI. Jahrhundert* (Stuttgart, 1901); idem, *Storia economica dell'Italia nel medioevo*, trans. Gino Luzzatto (Bologna, 1965), 462–95. For the modern view, see Edler, *Glossary of Medieval Terms*; De Roover, "Florentine Firm of Cloth Manufacturers" (both in 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. The *lanaiuoli* paid the fullers piecework wages, and then a fee to the guild for the use of the mills.

[84] The following analyses are drawn from Najemy, *History of Florence,* 124–86 (n. 64 above); Samuel Cohn, *The Laboring Classes in Renaissance Florence* (New York, 1980); idem, "Florentine Insurrections, 1342–1385, in Comparative Perspective," in *The English Rising of 1381*, ed. Rodney H. Hilton and T. H. Aston (Cambridge and New York, 1984), 143–64; idem, *Popular Protest in Late Medieval Europe: Italy, France, and Flanders: Selected Sources* (Manchester and New York, 2004), 201–60; idem, *Lust for Liberty: The Politics of Social Revolt in Medieval Europe, 1200–1425:*

The Government of Count Walter of Brienne, and Its Aftermath

The first episode occurred during the brief rule of Count Walter of Brienne: Gualtiero de Candia (1304–56), also known as the Duke of Athens. Earlier, in 1326–28, Brienne had served Florence with some distinction as vicar-general, in the government of Charles, Duke of Calabria. In 1342, the Signoria (the Florentine civic government) invited him to assume both political and military leadership of the city, when the governing elite was encountering severe difficulties in financing wars with Lucca and Pisa and in dealing with threats to the viability of the major merchant-banking houses. Brienne quickly ended the disastrous war with Pisa and began instituting some necessary financial reforms, including restoration of direct taxation, especially in the form of the *estimo* (a form of property tax), a measure that the wealthy elite saw as a threat to their wealth and hence power, all the more so when Brienne sought to curry public support to defend himself against these wealthy elites. For the elites, Brienne's fatal sin was to accept, in November 1342, a petition from the dyers and allied soap makers to form their own independent guild (*Arti di Tintori e Saponai*), free from any subordination to and "exploitation" by the *Arte della Lana*.[85] Brienne then also appointed civic officials to oversee wage settlements and working conditions of textile artisans, independently of the *Arte della Lana*, and to permit the new guild artisans to march with their own banners and insignia.

Italy, France, and Flanders (Cambridge, MA, and London, 2006), 57–65; and idem, *Creating the Florentine State* (n. 56 above), 80–109. Other sources consulted were: Ferdinand Schevill, *History of Florence: From the Founding of the City through the Renaissance* (New York, 1936), 194–309, 336–53; Nicolai Rubinstein, ed., *Florentine Studies: Politics and Society in Renaissance Florence* (Evanston, 1968); Brian Pullan, *A History of Early Renaissance Italy, from the Mid-Thirteenth to the Mid-Fifteenth Century* (London, 1973), 203–30. See also the sources cited in n. 86 below.

[85] In their petition, the dyers and soap makers contended that they had suffered ever more severe exploitation from the *lanaiuoli*, acting as their sole employers. While the original *Arte della Lana* statutes of 1317 had permitted dyers, finishers, and other like-skilled artisans to hold guild offices and be represented in the Council of 48, amendments that the *lanaiuoli* imposed in 1333 removed these rights, separated all such artisans from the *lanaiuoli*, and prohibited any but the *lanaiuoli* from undertaking the manufacture of woollen cloths. Many of the over 600 *lanaiuoli* recorded in the guild membership roles in 1332 came from the elite families (Albizzi, Corsini, Ridolfi, Pitti, Peruzzi, Capponi, Alberti, etc.), but a majority were still non-elite. Najemy, *History of Florence*, 126–27 (n. 64 above).

Angered by these measures, and by the brief uprising led by Pannotto degli Strozzi, a renegade family member, in March 1343, the very elites who had appointed Brienne succeeded in having him overthrown and expelled, on 26 July 1343, while also abolishing the new dyers' guild. After two further if brief uprisings—one on 25 September 1343, involving wool carders and others of the *gente minuto*, and the other on 9 October, led by Aldobrandino di Ciercharino da Siena—the restored ruling Signoria revised the communal statutes specifically to prohibit the formation of any new *corpus* or *collegium* of artisans in the cloth industry. Less than two years later, in May 1345, an artisan named Ciuto Brandini (of S. Pier Maggiore), evidently undeterred by these harsh measures, attempted to organize the industry's carders and skinners into a *fraternitas* or *fratellanza*, with elected consuls—and even a strike fund. He was arrested and, despite an abortive strike to seek his release, he was summarily executed for sedition.

The Ciompi Revolt and the Arte Minori Regime, 1378–82

As unprecedented as were these events, worse was yet to come for the *Arte della Lana*: the famous revolt known as the *Tumulto dei Ciompi*, one of the most significant social revolts of the later Middle Ages.[86]

[86] The following analysis of the Revolt of the Ciompi (pp. 86–92), is based on sources cited above in n. 84 (especially those by Cohn and Najemy); and on the following: various articles in *Il Tumulto dei Ciompi: Un momento di storia fiorentina ed Europea*, ed. Eugenio Garin (Florence, 1981), in particular: Victor I. Rutenberg, "I Ciompi nel 1378," 1–12; Charles-Marie de La Roncière, "La condition des salariés à Florence au XIV[e] siècle," 13–58; John M. Najemy, "*Audiant Omnes Artes*: Corporate Origins of the Ciompi Revolution," 59–93; and Nicolai Rubinstein, "Il regime politico di Firenze dopo il Tumulto dei Ciompi," 105–24. See also Gene Brucker, "The Ciompi Revolution," in *Florentine Studies*, ed. Rubinstein, 314–56 (n. 84 above), with a more nuanced version in idem, *The Civic World of Early Renaissance Florence* (Princeton, 1977); Niccolò Rodolico, *Il popolo minuto: note di storia fiorentina (1343–1378)*, new ed. (Florence, 1968); idem, *I Ciompi: una pagina di storia del proletariato operaio*, new ed. (Florence, 1980); Franco Franceschi, "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), 1:76–117; Franceschi, *Oltre il 'Tumulto'*, esp. 211–31 (n. 80 above); Christiane Klapisch-Zuber, *Retour à la cité: Les magnats de Florence, 1340–1440* (Paris, 2006), 109–92; Francesco Franco, "I 'Ciompi' a Firenze, Siena e Pergia," in *Rivolte urbane e rivolte contadino nell'Europea dei Trecento: un confront*, ed. Monique Bourin, Giovanni Cherubini, and Giuliano Pinto (Florence,

The actual revolt lasted for only six weeks, from 22 July to 30 August 1378, but it created a revolutionary civic regime that managed to endure for another three and half years, until January 1382. The fundamental cause was a now severe economic depression—widespread in western Europe during the 1370s and 1380s (following the relatively prosperous 1360s). As already noted, the depression, combined with the costs of war, was especially harsh in Italy, and it evidently led to considerable unemployment in the Florentine cloth industry (see pp. 89–90 below).

The proximate cause and one that so severely aggravated that depression and civic unrest was Florence's war with the papacy, known as the War of the Eight Saints, after the civic *Otto della Guerra* or *Otto di Balìa* (Committee of Eight) that governed Florence and conducted this war from July 1375. Though Pope Gregory XI (r. Dec. 1370–Mar. 1378) had evidently provoked the war from as early as 1372, by intruding on Florence's territorial rights (threatening the vital passage from Tuscany to Lombardy), such a war was undoubtedly a shock to many in the traditionally pro-papal Parte Guelfa, which had long dominated the Florentine government. Yet many Florentines feared that, after Gregory XI had ended his war with Visconti Milan in mid-1375, he would then use his large mercenary army to besiege Florence. To obviate that threat, the Florentine government paid an enormous bribe (130,000 florins) to John Hawkwood, the pope's English *condottiere,* while levying heavy taxes on the clergy to finance these payments. Even worse for the papacy was Florence's alliance with Visconti—and Ghibelline—Milan in July 1375. That, along with Florence's continued incitement of rebellion in the Papal States, soon provoked the actual outbreak of war, which was conducted by the *Otto di Balìa*, now containing some "new men" who were opposed to the traditional oligarchy of the Parte Guelfa. On 31 March 1376, Gregory XI retaliated by imposing a papal interdict on Florence, excommunicating the Florentine leaders, and authorizing the arrest of all Florentines and confiscation of their goods anywhere in Europe, amounting to a total economic blockade.

2008), 277–303; Richard Trexler, *Dependence in Context in Renaissance Florence*, MRTS 11 (Binghamton, 1994); idem, *Power and Dependence in Renaissance Florence*, vol. 3: *The Workers of Renaissance Florence* (Binghamton, 1993).

That economic distress served to aggravate the already dire plight of Florentine artisans long subject to regressive excise taxes, levied to pay interest on steeply rising public debts from previous and current wars, as well as obligations imposed by frequent forced loans (*prestanze*). As stressed earlier, this per capita tax burden had increased very substantially with the continued decline in Florence's population, especially after the Black Death. The War of the Eight Saints itself cost the Florentine state and public the very sizeable sum of 2.5 million florins, requiring yet more regressive excise taxes, forced loans, and confiscation of clerical properties. Approximately 80 percent of all households and 90 percent of the textile artisans were forced to borrow from others to pay for as much as two-thirds of their tax assessments, at often high interest rates. Fortunately for the Florentines, however, the sudden death of Gregory XI on 27 March 1378 brought about an end to the war; even so, the settlement in July with the new pope, Urban VI (r. 1378–89), to end the interdict and embargo, cost Florence another 200,000 florins in indemnities (along with the restoration of all confiscated church properties).

The actual origins of the ensuing Ciompi Revolt can be found during the last phase of the war, from September 1377 to March 1378, when some elite, strongly pro-papal, Parte Guelfa families (including the Albizzi, Soderini, Strozzi, Canigiani, Altoviti, Castellani, and Rucellai), supported by some magnate houses (including the Bardi, Rossi, Pazzi, and Adimari), spoke out against the "new men" and the "war party" in the government for its conduct of this ruinous war, accusing some opponents of being traitorous Ghibellines. In doing so, they provoked fears that they (and disenfranchised magnates) were attempting to seize full power, and certainly hatred of these Parte Guelfa members was a factor in the ensuing Ciompi Revolt. On 18 June 1378, Salvatore de'Medici, in becoming the new Standard-Bearer (*Gonfaloniere*) of Justice in the Priorate (Signoria), proposed that the Ordinances of Justice (of 1293) be reissued in order to check the ambitions of these extremist Parte Guelfa families. In so doing, he gained support from representatives of the twenty-one guilds (if not from the *Arte della Lana*), who, on 21 June, launched protests against these Parte Guelfa families—to the extent of burning some of their homes. On that same day, a new governing *Balìa* was formed under the leadership of Salvatore de'Medici, with one consul from each of the twenty-one guilds, and it quickly disenfranchised some their opponents as "magnates." On 9–10 July, a new council of the Priorate (Signoria), assuming full power

from the June *Balìa*, issued more decrees to limit the powers of those opponents allied with the Parte Guelfa.

Ten days later, on 20 July, a mob of disenfranchised artisans, principally from the textile trades, stormed the palace of the Podestà (*Bargello*); and on 22 July, they stormed the palazzo of the Signoria (Priorate), under the leadership of Michele di Lando, a wool-comber (or carder) and former corporal in the civic army. Indeed, it should be noted that one unintended consequence of the War of the Eight Saints was to give a large number of artisans valuable military experience. With the support of representatives from all the traditional guilds—with the notable exception of the *Arte della Lana*—they forced the Priorate to establish a new *Balìa* of thirty-two, supported even by some Parte Guelfa members: the so-called Ciompi regime, with Michele di Lando serving as the *Gonfaloniere* of Justice.

Included in the ranks of the *Balìa* of thirty-two syndics were consuls from the guilds, whose number had now increased from the traditional twenty-one (as in 1293) to twenty-four: with the establishment of three additional craft guilds, largely if not exclusively textile-based, collectively covering virtually all cloth workers. The first was the restored *Arte dei Tintori e Saponai*, in part if not totally the same as the 1343 guild, which represented the most highly skilled artisans. According to the later ordinance of 21-22 September 1378 (see n. 87 below), it was composed of dyers, shearers, finishers, card-makers, soap-makers, teasellers or cloth-carders (those using teasels to raise the nap on fulled cloths), combers, wool-drawers, wool-washers, cloth weavers, and other related artisans. The second guild was entirely new, the *Arte dei Farsettai*, composed of shirt-makers, cloth-cutters, tailors, cloth-retailers, hatters, flag makers, stocking-makers, and related artisans. The third new guild was by far the largest, the *Arte dei Popolo Minuto* (the actual so-called Ciompi), representing basically unskilled wage-earning workers, whose actual composition remains difficult to define, though probably including, *inter alia*, wool-sorters, journeymen wool-beaters, and journeymen combers, and possibly also spinners; and it may have also included apprentices and other disenfranchised unskilled workers in other Florentine crafts. Collectively these three guilds may have represented about 13,000 artisans, perhaps two-thirds of the total guildsmen in Florence (according to Najemy).

On 4 August, the new government divided the civic offices according to a tripartite division of the now twenty-four guilds, with equal representation given to each of the three divisions: the seven major guilds (*Arte Maggiori*), the fourteen minor guilds (*Arti Minori*), and the three new largely textile-based guilds. Obviously, the fortunes of the three new guilds would depend on continued support from the *Arti Minori*.

The new *Balìa* also sought to meet the chief demands that the Ciompi had proclaimed in July. The most important economic issues, apart from the right to organize themselves into self-governing guilds with civic representation, were the following: (1) the abolition of the *Arte della Lana*'s office of the *forestiere*, an arbitrary, often harsh court that had judged and punished artisans for deemed transgressions; (2) a ban preventing any member of the Parte Guelfa from serving as rector of the commune or from appointing any electors for Councils of the People or the Commune (but not the Colleges); (3) representation of the three new guilds in the courts of the *Arte della Lana*; (4) a two-year moratorium on debt repayments for sums under 50 florins; (5) a six-month moratorium on the levy of forced loans (*prestanze*); (6) the amortization and full repayment of Florence's civic debt (the *monte*) over two years; (7) the restoration of the *estimo* or other direct taxes (evidently in lieu of both new *prestanze* and the highly regressive excise taxes); and, as perhaps the most significant demand, (8) a requirement that the *Arte della Lana's lanaiuoli* be compelled, collectively, to produce a minimum of 2,000 cloths (*panni*) a month, whether they wanted to do so or not.

This new regime lasted just six weeks, doomed because of continued revolutionary ferment within the ranks of the Ciompi, that is, the *Popolo di Dio* (or *Popolo Minuto*). On 29 August, a group of disgruntled Ciompi met to elect a committee of eight, with two representatives from each quarter, known as the *Otti de Santa Maria Novella* (after their meeting place). When they demanded veto powers in civic affairs for the *Otti*, Michele de Lando dispatched troops to arrest their leaders. In the armed struggle that ensued on 31 August, the Ciompi rebels, lacking any support from the other guilds, were crushed. The next day, the Florentine government abolished their guild and reorganized the Florentine guild federation into two groups—the seven major and the sixteen minor guilds—so that the other two new guilds were spared, though only temporarily. It should be noted especially that an ordinance of 22 September, in ratifying the continuing privileges of these two other guilds, specifically

excluded from their membership anyone from the former *Popolo Minuto* (those "prohibited and excluded from the benefits examined and made in August of this year"), on penalty of £100 *lira di piccioli*, and "anyone who does not practice one of the crafts of these guilds."[87]

The government that followed, lasting for two and half years, was dominated by the *Arti Minori*, though with necessary support from important nonelites within the seven *Arti Maggiori* (if not from the *Arte della Lana*). Of 189 positions in the reconstructed Signoria or Priorate, 94 were from the major guilds, and 95 from the minor guilds; only 15 priors came from recognized elite (but nonmagnate) families. On 29 October 1378, the Priorate did indeed levy—despite considerable hostile opposition—a new *estimo*, as a property tax based on an assessment of household wealth (conducted in 1379); and in December 1380, against similarly bitter elite opposition, the government reduced interest payments on the *monte* and all other civic debts to 5 percent. Thus some important elements of the Ciompi revolution continued under the *Arti Minori* regime. For the elite in the *Arte della Lana*, indeed, for almost all the *lanaiuoli,* an even more vexing development was a continuing dispute with the dyers (*Arte dei Tintori*) over their fees and production schedules—and some dyers dared go on strike to enforce their demands.

Finally, on 20 January 1382, the elites of the *Arte della Lana* had secured sufficient political support from the other *Arti Maggiori, popolani grassi* (wealthy patrician families), and an armed militia to overthrow the *Arti Minori* government and to appoint a new *Balìa*. The very next day, the new *Balìa* agreed to four of the *Arte della Lana's* major demands: (1) the abolition of the two "new" guilds, thus restoring the *Arte della Lana*'s former jurisdiction over all their textile workers; (2) a reduction in the civic powers of the fourteen *Arti Minori* guilds; (3) the abolition of all ordinances enacted since July 1378; and (4) the restoration of full rights to those Parte Guelfa supporters who had been exiled or excluded from office. Thus, in short order, the old patrician regime of the Parte Guelfa's elite families, the *Arti Maggiori*, and the former powers of the *Arte della Lana* had been restored. Yet, as Samuel Cohn

[87] See the sources cited in nn. 84 and 86, above, especially those by Cohn and Najemy. For the specific composition of the two new guilds that survived from September 1378 to January 1382, see Cohn, *Popular Protest* (n. 84 above), doc. no. 128 (22 September 1378), pp. 249–51, also containing provisions for readmittance into these two guilds of former members of the *Popolo Minuto.*

cogently points out, this "counter-revolution" was not followed by any of the mass executions or mass exiles of opponents prominent in later counterrevolutions, despite continued signs of social unrest. Furthermore, many guildsmen of the *Arti Minori* did continue to hold civic offices—indeed, the Florentine government remained one that still formally contained twenty-one guilds.[88]

In the light of this history, both Franco Franceschi and Richard Goldthwaite have put forward the novel hypothesis that the Florentine cloth industry became even more decentralized after the Revolt of the Ciompi, so that textile production more and more came to resemble the classic late medieval model of the European putting-out system. In their view, after the *lanaiuoli* had experienced the bitter consequences of having large numbers of discontented wage-earning artisans congregated together in large urban workshops, they sought to have cloth manufacturing undertaken in more highly dispersed production units, that is, in the homes of the artisans themselves, scattered through both town and countryside. In particular, the wool-preparation, combing, carding, and spinning tasks were increasingly put out in the adjacent countryside to peasant women, who were far more willing to work for lower wages.[89]

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

[88] Cohn, *Popular Protest*, 203–4; idem, *Lust for Liberty*, 62 (both in n. 84 above): noting nine civic revolts or riots from January to July 1383, waving flags of the three outlawed guilds. But in Cohn, "Florentine Insurrections," 158 (n. 84 above), he notes that, in September 1383, the Esecutore degli Ordinamenti di Giustizia condemned 82 rebels to death. He also specifies the prominent role of the following elite families in the counterrevolution: the Alberti, de Castigliona, Albizzi, and Medici (158). See also Najemy, *History of Florence*, 170–84 (n. 64 above), and other sources cited in nn. 84 and 86 above.

[89] Franco Franceschi, "L'imposa mercantile industriale nella Toscana dei secoli XIV–XVI," *Annali di storia dell'impresa* 14 (2003): 229–49, cited in Goldthwaite, *Economy of Renaissance Florence*, 320–21 (n. 6 above); and also Franceschi, *Oltre il 'Tumulto'*, 211–37 (n. 80 above).

The Volume of Florentine Cloth Production in the Fourteenth Century

The extent of that decline may now, with recent evidence, be much better estimated, though 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, from 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.[90] Villani's estimate of the latter output's value, at 1.2 million gold florins, and thus with a mean value of 16 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."[91] Partly relying on Villani's data and other contemporary evidence, John Najemy has recently contended that in the early fourteenth century the *Arte della Lana* were employing about 10,000 artisans, that is, presumably about one-sixth of Florence's adult population; that proportion would have been increased by adding the *lanaiuoli* entrepreneurs, their office staff, and merchants in the cloth trade.[92]

Villani's statement of the number of *botteghe* or textile firms producing those higher-valued bolts of cloth in 1338—about 200—would

[90] Giovanni Villani, *Nuova Cronica*, ed. Giuseppe Porta, 3 vols. (Parma, 1991; 2nd ed., 2007), vol. 3: *Libri XII–XIII,* bk. 12, chap. 94, pp. 197–202, esp. 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 "Nuova Cronica"* (Rome, 2002), bk. 12, chap. 94, pp. 863–55.

[91] See Hoshino, *L'arte della Lana*, chap. 4, pp. 153–211, esp. 194–200 (n. 39 above); and see also idem, "La produzione laniera nel trecento a Firenze," in *Il Tumulto dei Ciompi,* ed. Garin, 41–58, at 42 (n. 86 above).

[92] Najemy, *History of Florence*, 102–3 (n. 64 above), based on an estimated population of 120,000. For other population estimates, see n. 99 below.

indicate an average annual output from each firm of about 375 bolts.[93] That is almost triple the estimated mean annual output of each Florentine *bottega* in the years 1355 to 1374: 122 bolts. From May 1355 to September 1369, one of the most prominent *Arte della Lana* firms, the famed Del Bene company, produced a total of 2,023 bolts, for an annual mean of 154.62 bolts. But markets suddenly and sharply diminished in 1368–69, as did profit margins (which had been as much as 40 percent), when the firm produced only 51 bolts; then, on 5 September 1370, after sustaining major losses, the Del Bene firm ceased all operations.

In the next decade, in the early 1380s—as already seen, one of severe industrial depression—the mean output of the remaining cloth *botteghe* had fallen to just 68.2 pieces, less than 20 percent of the estimated output per firm in 1338.[94] These differences are open to interpretation: either Villani had exaggerated both total and average outputs for the 1330s or more and more of the *lanaiuoli* cloth firms had come 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. Yet the evidence supports the alternative view in indicating that, in 1349, immediately after the Black Death, the *Arte della Lana* had established firm quotas for each *bottega*: a maximum of 220 *panni* for established firms and no more than 50 *panni* for any new firm in its first year of *Arte* membership. The same evidence also indicates that, while total cloth output had fallen, the number of fine woolens from the English-wool based, luxury-oriented San Martino sector was increasing, certainly as a share of total output.[95]

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[93] See the texts cited in n. 90 above.

[94] For the Del Bene firm, see Hoshino, "La produzione laniera nel trecento," esp. the tables on 57 (n. 91 above). The 2,023 *panni* were woven from 145,985 lb English wools and just 1,959 lb Burgundian wools (1.32 percent). For the other data, see Franceschi, *Oltre il 'Tumulto'* (n. 80 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* (bolts) per *bottega* 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 *bottega*.

[95] Hoshino, *L'arte della Lana*, 194–200 (n. 39 above). Villani contended (n. 90 above) that annual cloth outputs could not have exceeded 24,000 to 30,000 woolens in

Whatever was the true output of the Florentine cloth industry in the 1330s, this industry indisputably experienced a very dramatic and rapid decline thereafter, especially—as would be fully expected—after the Black Death. By 1373, according to almost all historians, the output of the Florentine cloth industry was no more than 30,000 bolts: that is, only 40 percent of Villani's estimate for 1338.[96] When the Ciompi staged their revolt in 1378, they had demanded, as noted earlier, 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 counterrevolution against the Ciompi took place.[97] 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 below).[98]

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the 1330s, with a production of about 80 to 100 cloths a year on average from each of about 300 *botteghe*. 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. For the quota system, see Najemy, *History of Florence*, 149–50 (n. 64 above); idem, "Corporate Origins of the Ciompi Revolution," 70–71 (n. 86 above); Hoshino, "Produzione laniera," 50 (n. 91 above), noting that the Del Bene firm was also under its quota. Najemy contends that, during the relatively prosperous years of the 1360s, some firms demanded an increase in their quotas: presumably those in the San Martino sector. Hoshino (ibid., 50–51), notes that in 1349 the *Arte della Lana*, admitted 33 new members to replenish its membership after the plague: of these, 22 or two-thirds belonged to the luxury-oriented San Martino sector, using fine English wools exclusively. See n. 71 and p. 94 above, and pp. 100, 103, 104, 124–26, 140, and 173 below.

[96] See nn. 24, 38, 46, and 77 above and n. 216 below for the *braccio* unit of cloth measurement.

[97] See Hoshino, *L'Arte della Lana*, table 26, p. 227 (n. 39 above), providing a total of 19,296 bolts; Robert Davidsohn, "Blüte und Niedergang der Florentiner Tuchindustrie," *Zeitschrift für die gesamte Staatswissenschaft* 85 (1928), here p. 250, stating 19,474 bolts in 1381–82); and Franceschi, *Oltre il 'Tumulto'*, table 2, p. 13, also stating 19,296 bolts for 1381–82 (n. 80 above).

[98] See Hoshino, *L'arte della Lana*, chap. 4, pp. 194–200 (n. 39 above); Franceschi, *Oltre il 'Tumulto'*, table 2, p. 13 (n. 80 above); Goldthwaite, *Economy of Renaissance Florence*, 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*,

Macroeconomic 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 reorientation), and changes in the wool supply. First and foremost was the precipitous drop in Florence's population, though the extent of the fourteenth-century decline remains a matter of considerable dispute. In their pathbreaking demographic study, *Tuscans and Their Families*, David Herlihy and Christiane Klapisch-Zuber (published in 1978, in French), contended that in 1338 Florence had a population of 120,000; that same population figure is repeated for Florence, though earlier, for 1300, in Najemy's *History of Florence, 1200–1575* (published in 2006). But Richard Goldthwaite, in his *Economy of Renaissance Florence* (published in 2009), is rather less decisive about Florentine demography: citing various estimates ranging from 90,000 to 130,000, he generally uses an estimate of 100,000. Whether or not Florence's population suffered any subsequent decline before the Black Death in 1348 is not discussed by any of these historians. It is important to note, however, that Herlihy and Klapisch-Zuber provide evidence that the urban population of neighboring Prato, also an important Tuscan textile-making town, declined by 26.9 percent from 1305 to 1339 (from 14,996 to 10,559), and its rural population declined even more, by 38.7 percent. Similarly, their demographic data indicate that neighboring Pistoia's population declined by a similar amount before the Black Death: by 36.3 percent from 1244 to 1344.[99]

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see nn. 24, 38, 46, 67, and 77 above and n. 216 below; the width is unknown. See table 14 below.

[99] Herlihy and Klapisch-Zuber, *Tuscans and Their Families*, 67–79 (n. 55 above), disputing Giovanni Villani's well-known population estimate of just 90,000; Najemy, *History of Florence*, 97 (n. 64 above); Goldthwaite, *Economy of Renaissance Florence*, 22, and table 4.1, p. 278 (n. 6 above). For his demographic

If Florence itself had not suffered any similar pre-Plague decline (an unlikely supposition), then we may conclude that the Black Death of 1348–49 destroyed about two-thirds (65.33 percent), or even more, of its former population of 120,000: tax records indicate only 41,600 to 41,711 inhabitants for 1352 and 1355, though those numbers may include recent, post-Plague rural immigrants.[100] Subsequently, by about 1380, Florence had evidently experienced some demographic recovery (again from rural immigration), for a tax-based census in that year lists 54,747 inhabitants. Florence's population probably grew even more in the next decade, to about 60,000 in the late 1390s.[101] But further waves of plague—especially in 1400, but also in 1417 and 1424—reduced her population to a nadir of 37,144 in 1427, as recorded in that year's well-known *Catasto* (tax census), representing an overall decline of 69 percent from that estimated for 1338 (120,000).[102] In neighboring Prato, the urban population had similarly fallen from the aforementioned estimate of 10,559 in 1339 to 6,070 in 1357, finally reaching a nadir in 1427, as well, with just 3,533 inhabitants, so that Prato had suffered an even greater overall decline of 76 percent. The combined urban and rural population of neighboring San Gemignano also experienced a decline of 76 percent: from about 13,000

estimates, Goldthwaite cites Maria Ginatempo and Lucia Sandri, *L'Italia della città: Il popolamento urbano tra Medioevo e Rinascimento (secoli XIII–XVI)* (Florence, 1990), 148, but their table for Florence's population in 1300 on 148 states: "oltra 100 mila." A population of 90,000 for Florence in 1300 is also given in David Nicholas, *Urban Europe, 1100–1700* (New York, 2003), fig. 1.3, p. 19. For the demography of medieval Tuscany, see ibid., 105–15. For the demographic data on Prato and Pistoia, see the two publications of Herlihy and Herlihy with Klapisch-Zuber in n. 55 above.

[100] Herlihy and Klapisch-Zuber, *Tuscans and Their Families*, 69, n. 23 (n. 55 above), indicating taxable hearths of 9,955 (1352) and 9,904 (1355), for which they apply a household multiplier of 4.19, which may be too high. These estimates, and the household multiplier, are also given in Najemy, *History of Florence*, 100 (n. 64 above), who also cites Matteo Villani on the drastic demographic impact of the Black Death: a mortality of 60 percent.

[101] Herlihy and Klapisch-Zuber, *Tuscans and Their Families*, 69 (n. 55 above); Najemy, *History of Florence*, 100 (n. 64 above): 13,074 households, with the same multiplier of 4.19 (in 1380).

[102] Herlihy and Klapisch-Zuber, *Tuscans and Their Families,* table 3.5, p. 74 (n. 55 above): 9,780 households, with the lower family multiplier of 3.80 = 37,144 inhabitants. Slightly different figures are given in Goldthwaite, *Economy of Renaissance Florence*, table 4.1, p. 278 (n. 6 above): 40,000 inhabitants. Najemy, *History of Florence*, 100: 37,225 (in 10,171 households, with a multiplier of 3.65).

in 1332 to just 3,138 in 1427. Finally, Samuel Cohn's recent study of the Florentine *contado* demonstrates similarly drastic population declines for many, if by no means all, of the mountain and hillside villages surrounding Florence from 1356 to 1427.[103]

Certainly no technological innovations, for an essentially labor-intensive cloth industry, could have possibly compensated for such a drastic reduction in the available labor supply (both urban and rural).[104] And yet, as we shall see later, we cannot attribute the plight of the late medieval Florentine cloth industry merely to reductions in its potential labor supply simply because the extent of the decline in cloth production evidently exceeds the fall in population (of both the city and its contado). Indeed, the aforementioned demands from the cloth workers (Ciompi) for increased levels of production indicate that the problem lay more with market demand than with the number of available cloth artisans.

A population decline has seriously negative consequences for the demand side as well, namely, in terms of the size of the available markets. Thus, the obviously disastrous fall in western Europe's population in general, at least 40 percent by the late fourteenth century—combined with disruptions of traditional trade routes and markets from plague, war, and brigandage—led to a serious contraction in aggregate cloth sales. To some extent, however, that overall decline was offset by the success of the Tuscan and Lombard textile towns in displacing Flemish, Brabantine, and northern French woolens in Mediterranean markets, and in (temporarily) denying access to English woolens.

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[103] Herlihy and Klapisch-Zuber, *Tuscans and Their Families*, fig. 3.1, p. 62, and table 3.1, p. 63 (n. 55 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 1427 *Catasto*). See Herlihy, *Pistoia,* table 1, p. 70 (n. 55 above). For the Florentine rural *contado*, see Cohn, *Creating the Florentine State* (n. 56 above), figs. 3.1–3.3, pp. 86–88. Unfortunately there are no such published data prior to 1356; again, the demographic nadir came in the 1420s. See also the perceptive comments on Italian demography in Pullan, *History of Early Renaissance Italy*, 205–11 (n. 84 above), contending that no more than 10 percent of Tuscan villages disappeared in this era, compared to a probable loss of 25 percent of villages around Rome (in Lazio).

[104] For rural textile production, in combing, carding, and spinning, see pp. 114–20 below; and Munro, "Medieval Woollens: Technology," 191–204 (n. 8 above); idem, "Textile Technology" (n. 20 above).

Relative Price Changes with Luxury Reorientation of Production

The second reason to explain that dramatic decline in cloth output is the previously discussed market reorientation toward luxury goods and the consequent rise 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 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 about a tripling of cloth prices by the 1390s, 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.[105] If we also accept standard microeconomic theory (that is, that demand varies inversely with the price), then we must also assume that aggregate sales had fallen even more, indeed quite substantially, since presumably demand would have become much less elastic at higher prices.[106] At the same time, however, if western Europe had experienced 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 to explain the general reorientation of west European textile production toward very high-value fabrics.[107] That industrial and commercial reorientation also included, of course, the rise and expansion of the late medieval Italian silk industry, which posed the most ominous threat to the luxury woolen textile industries.[108]

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[105] Goldthwaite, *Economy of Renaissance Florence*, table 4.1, p. 278 (n. 6 above): cloths known as San Martino woolens (see nn. 71, 78 above; and p. 100, 103, 104, 124–26, 140, 173 below). He cites principally Franceschi, *Oltre il 'Tumolto'*, 13 (n. 80 above).

[106] See John Munro, "Urban Regulation and Monopolistic Competition in the Textile Industries of the Late Medieval Low Countries," in *Textiles of the Low Countries in European Economic History*, ed. Erik Aerts and idem (Leuven, 1990), 41–52; idem, "Symbiosis of Towns and Textiles" (n. 42 above).

[107] See Robert Lopez, "Hard Times and Investment in Culture," in *The Renaissance: Medieval or Modern?*, ed. K. H. Dannenfeldt (New York, 1959), 50–63; Lopez and Miskimin, "Economic Depression" (n. 79 above); Harry Miskimin, *The Economy of Early Renaissance Europe, 1300–1460* (Cambridge, 1976), 116–63; Herman Van der Wee and Theo Peeters, "Un modèle dynamique de croissance interseculaire du commerce mondiale, XII^{e}–XVIII^{e} siècles," *Annales: Économies, sociétés, civilisations* 15 (1970): 100–128.

[108] For the silk industry, see Goldthwaite, *Economy of Renaissance Florence*, 282–96, 336–40 (n. 6 above); Anna Muthesius, "Silk in the Medieval World," in *The*

The Wool Supplies for the Florentine and Other Italian Cloth Industries during the Fourteenth and Early Fifteenth Century, 1: English Wools and Export Taxes

The third 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, the San Martino sector's luxury cloth production vitally depended on the exclusive use of the finer English wools (see pp. 50–52 and 94 above). 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-organized 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, as noted earlier (p. 74), quite modest: at 6s 8d sterling per sack, just 4.91 percent of the average value then exported (see table 4 below). But when his grandson Edward III commenced the Hundred Years' War, 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 (that is, 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.

Cambridge History of Western Textiles, ed. David Jenkins, 2 vols. (Cambridge, 2003), 1:325–54; Edoardo Demo, "Wool and Silk: The Textile Urban Industry of the Venetian Mainland (15th–17th Centuries)," in *At the Centre of the Old World: Trade and Manufacturing in Venice and the Venetian Mainland, 1400–1800*, ed. Paola Lanaro (Toronto, 2006), 217–43; and especially Bruno Dini, "L'industria serica in Italia, secc. XIII–XV," in *La seta in Europa, secc. XIII–XX,* ed. Simonetta Cavaciocchi, Istituto Internazionale di Storia Economica F. Datini, Atti delle Settimane di Studi e altrie Convegni 24 (Florence, 1993), 91–123; repr. in idem, *Saggi su un economia-mondo: Firenze e l'Italia fra Mediterraneo ed Europa (secc. XIII–XVI)* (Pisa, 1995), 51–85; idem, *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).

That export-tax policy would never have succeeded, politically, unless the English crown had been able to ensure that this tax burden was fully passed on to foreign wool-buyers (through higher prices), rather than allowing it to be passed back to English wool-growers (through lower wool 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 allowed the new Company of the Staple to function as a cartel of wool merchants in order to fix wool-export prices. In 1388, Parliament granted Italian merchants an important 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.[109]

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 (table 4). 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.[110] The impact of that tax burden can be seen in fifteenth-century Flemish and Dutch documents specifying that English wools from the Calais Staple accounted for 65–70 percent of their draperies' prefinishing production costs.[111]

The rising tax burden certainly contributed to the very sharp decline in aggregate English wool exports. From the decade 1361–70 to 1401–10, they

[109] *The Statutes of the Realm*, ed. T. E. Tomlins, J. Raithby, et al., 6 vols. (London, 1810–22), 2:8: statute 2 *Ricardi* 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), 38–29; Lloyd, *English Wool Trade,* 225–56 (n. 63 above).

[110] See Munro, "Medieval Woollens: The Struggle for Markets," 278–85, table 5.1–2, pp. 299–303 (n. 8 above); Lloyd, *English Wool Trade*, 144–256 (n. 63 above), for a detailed history of the wool export taxes.

[111] John Munro, "Industrial Protectionism in Medieval Flanders: Urban or National?" in *The Medieval City,* ed. David Herlihy, H. A. Miskimin, and A. L. Udovitch (New Haven, 1977), table 13.2, p. 256 (Leuven in 1434 and 1442: 76.2 percent and 68.8 percent); Munro, "Medieval Scarlet," table 3.12, p. 52 (n. 49 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; however, the evidence for cloth production from English wools at Prato in the 1390s does not substantiate that conclusion. See n. 148 and tables 6–7 below.

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 most estimates of overall 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. Thus, the Italian share of English wool exports fell from 34.17 percent of the total in 1361–70 to a mere 9.60 percent in 1401–10.[112] 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, luxury-cloth production could not have avoided a very substantial contraction, though presumably production from domestic wools for local markets did not decline as much.[113]

By the early fifteenth century, the worst phase of decline in Florence's *Arte della Lana* cloth output had evidently come to an end, so that thereafter the industry experienced some recovery. According to Hoshino, production oscillated between 11,000 and 12,000 cloths annually in the years 1425–30, that is, about 42 percent below the level of the 1380s, during the Ciompi Revolt.[114] 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 early 1380s).[115]

Quite obviously, the 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

[112] For the statistical data, see Munro, "Medieval Woollens: The Struggle for Markets," tables 5.3–5.4, pp. 304–7 (n. 8 above).

[113] For the decline of the English wool trade from the later fourteenth century, see Lloyd, *English Wool Trade*, 257–87 (n. 63 above).

[114] Hoshino, *L'Arte della Lana*, 204–5 (n. 39 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 tessile," 326 (n. 6 above). See also Goldthwaite, *Economy of Renaissance Florence*, 278, table 4.1 (n. 6 above), indicating 11,000 bolts in 1425–30, possibly worth a total of 437,662 florins.

[115] Franceschi, *Oltre il 'Tumulto'*, table 2, p. 13 (n. 80 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," *Journal of European Economic History* 32 (2003): 487–526, esp. 488.

other wools as fine as the better English wools, and there would not be until the sixteenth century.[116]

The Wool Supplies for the Florentine and Other Italian Cloth Industries during the Fourteenth and Early Fifteenth Century, 2: 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 aforementioned San Martino branch, which continued to manufacture very costly, ultraluxury-quality woollens, exclusively from the very finest English wools—a requirement reiterated in an ordinance of the *Arte della Lana* issued in 1408.[117] The second 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 bolts of cloth, according to Hoshino (see p. 102 and n. 114 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* = £9.125 sterling); the remaining 63 percent (275,727 florins) was produced by the larger Garbo sector, with an average value of 31.00 florins (= £126 *lira di piccioli* = £5.167 sterling). By these calculations, we may estimate that annual output from the San Martino sector was about 2,958 bolts and that of the Garbo sector was about 8,894 bolts (for a total of 11,852 bolts).[118]

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[116] See Epstein, *Freedom and Growth*, 136–37 (n. 74 above): while 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 a major 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.

[117] Hoshino, *L'Arte della Lana*, 208 (n. 39 above); Franceschi, *Oltre il 'Tumulto'*, 22 (n. 80 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*, 273 (n. 6 above).

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

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 (as noted earlier) forbidden to use any wools except the finer English varieties. The reason was twofold. 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, the *Arte della Lana* was determined to prevent the Garbo sector from using the now scarce supplies of English wool in order to reserve that now scarcer and more costly wool supply for the San Martino sector. Indeed, in 1407, for the same protectionist motives, the *Arte della Lana* prohibited, on the pain of heavy fines, all rural cloth producers in the neighboring *contado* from using any but the worst quality local Tuscan wools, a ban reiterated in the *Arte della Lana* guild ordinances of 1428 and 1430.[119] According to these guild ordinances, the Garbo wools consisted of those from Majorca and Minorca (the Spanish Balearic Islands), those from 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 crossbreeds of domestic Castilian

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The florin in the 1420s was worth £4.00 *lira di piccioli* = 80 *soldi*. See Spufford, *Handbook*, 17–19 (n. 46 above). 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 each. 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.

[119] See Epstein, *Freedom and Growth*, 136–37 (n. 74 above): for the *Arte della Lana* guild ordinances, citing in particular Franco Franceschi, "Criminalità e mondo del lavoro: il tribunale dell'Arte della lana a Firenze nei secoli XIV e XV," *Ricerche storiche* 18 (1988): 551–90, esp. 586. See also idem, "Istituzioni e attività economica," esp. 94–97, 108–13 (n. 86 above).

sheep (ewes) with imported rams from the 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.[120] Since the pre-*merino* Spanish wools had been regarded as among 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 to early seventeenth century, the finest wools in the world—a primacy in quality that *merino* wools 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 dependent on devising the proper techniques of crossbreeding and also of the famed transhumance sheep grazing and flock management, all very important considerations.[121]

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 in the Low Countries.[122] 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 neighboring Aragon, where Italian merchants acquired most of these wools.[123] 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,

[120] See Robert Lopez, "The Origin of the Merino Sheep," in *The Joshua Starr Memorial Volume: Studies in History and Philology* (New York, 1953), 161–68; see also n. 121.

[121] Munro, "Spanish *Merino* Wools" (n. 9 above). See also the sources cited in n. 137 below.

[122] The Milan cloth industry was possibly the first to use *merino* wools, around 1375. See sources cited in n. 125 below. For the southern Low Countries, see also Munro, "Spanish *Merino* Wools."

[123] See Angela Orlandi, "A Man from Prato in the Maestrazgo: Tuccio di Gennaio, Wool Merchant," in *Francesco di Marco Datini*, ed. Nigro, 377–84 (n. 24 above). The wools came from the region bordered by Madrid, Zaragoza, Valencia, and Tortosa. The Catalonian branch of Prato's Datini firm was one of the major Italian buyers in the 1390s.

Prato, and Genoa.[124] 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* (that is, even less, at 33.00 to 38.46 percent of the English values).[125] 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 ca. 1450–90). Thus, Spanish *merino* wools 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 century.

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. The documents of particular importance, first published by Federigo Melis and more recently analyzed by Francesco Ammannati, concern the woolen workshops of Agnolo di Niccolò, financed by Franceso di Marco Datini, in the later

[124] Note that Minorca and Majorca (Mallorca)—in the Balearic Islands—were Spanish: a part of the kingdom of Aragon from James I's conquest in 1229. See the following notes for relative wool values.

[125] For the various wool price lists, see Federigo Melis, "La lana della Spagna mediterranea e della Barberia occidentale," in *La lana come materia prima: I fenomeni della sua produzione e circolazione nei secoli XIII–XVII*, ed. Marco Spallanzani, Fondazione Istituto Internazionale di Storia Economica F. Datini, Prato, Serie II: Atti delle Settimane de Studi e Altri Convegni 1 (Florence, 1974), 241–51; idem, *Aspetti della vita economica medievale: studi nell'archivo Datini di Prato* (Florence, 1962), doc. no. 350 (Aug. 1390), 1:488, as well as 1:536–37, 542, and table facing 554; Jacques Heers, "Il commercio nel Mediterraneo alla fine del XIV secolo e nei primi anni del secolo XV," *Archivo storico italiano* 113 (1955): 192–95; Caterina Santoro, *Gli offici del comune del Milano del dominio visconteo-sforzesco (1216–1515)* (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): 571–624; Iris Origo, *The Merchant of Prato: Francesco di Marco Datini* (London, 1957; repr. 1963), 69–70, 74–76.

1390s (see table 5). 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 Apennines, 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.[126] 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, 20.75 percent; Minorcan wools, 18.62 percent; Majorcan wools, 13.57 percent; Romagnola and Barbary wools (together), 8.38 percent each of wide and narrow cloths; English wools, 6.89 percent; and mixed wools, 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 fully clear, may have involved difficulties in acquiring Spanish wools.[127] Stephan Epstein has contended that the "interruption of

[126] Ammannati, "Datini's Wool Workshops," esp. table 1, p. 500 (n. 24 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): 31–60, 150–90; repr. idem, *Industria e commercio nella toscana medievale*, ed. Bruno Dini (Florence, 1989), 212–307; and idem, *Aspetti della vita economica,* 455–729 (n. 125 above). The local Tuscan pound weighed 339.542 grams.

[127] See Goldthwaite, *Economy of Renaissance Florence*, 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, *L'arte della Lana*, 210–11, 233–36 (n. 39 above).

Spanish wool supplies after mid-century" was a major factor in the crisis of the Milanese woolen industry: "Lombardy's most oft quoted example of late-medieval industrial decline."[128] According to Hoshino's archival research for the period 1454–80, 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, and Viterbo. In those years, they accounted for 71.8 percent of wool purchases of "numerous firms of the Florentine *lanaiuoli*" producing *panni di Garbo*. The Spanish wools now ranked a distant second, accounting for 13.9 percent of wool purchases; and Provençal wools ranked a close third, with 12.3 percent of purchases.[129] Evidence for the Florentine Ridolfi cloth firm, in the years 1464–68, indicate that they also used primarily *matricina* wools.[130] 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.[131] 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 changing to silk production).[132]

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[128] Epstein, *Freedom and Growth*, 127 (n. 74 above): "[C]ompetition 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" (n. 9 above).

[129] Hoshino, *L'Arte della Lana*, 210–11, 233–36, 279, and table 58, p. 302 (n. 39 above). See also Benigo Casale, "The Wool Trade in L'Aquila during the Second Half of the Fifteenth Century," in *Wool: Products and Markets (13th–20th Century)/La laine: produits et marchés (XIII^{e}–XX^{e} siècle)/La lana: prodotti e mercati (XIII–XX secolo)/La lana: productos y mercados (siglos XIII–XX)*, ed. Giovanni Luigi Fontana and Gérard Gayot (Padua, 2004), 551–72.

[130] Goldthwaite, "Florentine Wool Industry," table 2, pp. 537, 543 (in n. 24 above).

[131] Hidetoshi Hoshino, "Il commercio fiorentino nell'Impero Ottomano: costi e profitti negli anni 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 idem, "Alcuni aspetti del commercio dei panni fiorentini nell'Impero Ottomano ai primi del '500," *Annuario dell'Istituto giapponese di cultura* 21 (1985–86), both republished in idem, *Industria tessile e commercio internazionale nella Firenze del tardo Medioevo*, ed. Franco Franceschi and Sergio Tognetti, Biblioteca storica toscana, no. 39 (Florence, 2001), 113–23, 125–35. See also table 8 below.

[132] See n. 128 above.

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*).[133] Prices for fine-quality *matricina* wools ranged from about 10.5 to 15.5 gold 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 most of those for English wools, 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.[134]

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.[135] 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

[133] For the use of the term *lana francesca* to mean English wools (transported via France), see Edler, *Glossary of Medieval Terms*, 148 (n. 21 above); Hoshino, *L'arte della Lana*, 337 (n. 39 above)

[134] Hoshino, *L'Arte della Lana*, table 57, p. 299 (n. 39 above). See also idem, "Il commercio della lana e della seta tra Firenze e l'Abruzzo nel basso Medioevo," in *Mercati e consumi: organizzazioni e qualificazione del commercio in Italia dal XII al XX secolo*, ed. Gianni Morlini (Bologna, 1986), 67–78. The unit of quantity for the wools is not specified. See also Goldthwaite, "Florentine Wool Industry," 539 (n. 24 above), contending that *matricina* wools in the fifteenth century "cost one-third to one-half less than English wools"; for the sixteenth century, he contends (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*, 498 (n. 6 above), and the appendix, "Changing Values of the Florin," 609–14; Spufford, *Handbook*, 25–26 (n. 46 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 1, p. 31, using a weight of 339.542 grams to the Florentine pound (n. 21 above). On subsequent changes in the florin, see also n. 150 below.

[135] See n. 134 above.

now-direct participation of Castilian merchants displacing Italian merchants.[136] Perhaps this radical change in prices for Spanish wools in the course of the later fifteenth century reflects a greater ability to acquire better-quality *merino* wools (and thus the difficulties in doing so earlier in the century), with the more direct participation of Castilian merchants. Nevertheless, this is a mystery 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 management, especially in the modes of transhumance grazing.[137] According to the English writer Clement Armstrong, in his *Treatise Concerning the Staple and the Commodities of this Realme* (ca. 1519–35), "Spaynysh woll

[136] Hoshino, *L'Arte della Lana*, 281 (n. 39 above). On this point, see also Goldthwaite, "Florentine Wool Industry," 534–35 (n. 24 above); and idem, *Economy of Renaissance Florence*, 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 Bruno Dini, "Mercanti spagnoli a Firenze (1480–1530)," in *El Consulado del Mar de Burgos, 1494–1994* (Burgos, 1995), 321–47, repr. in idem, *Saggi su un economia-mondo: Firenze e l'Italia fra Mediterraneo ed Europa (secc. XIII–XVI)*, 289–310.

[137] See Angel Cabo Alonso, "Medio natural y trashumancia en la España peninsular," in *Mesta, transhumancia y lana en la España moderna*, ed. Felipe Ruiz Martin and Ángel García Sanz (Barcelona, 1998), 11–41; Gonzalo Anes, *Cultivos, cosechas y pastoreo en la España moderna* (Madrid, 1999), 11–56; Claude Carrère, "Aspects de la production et du commerce de la laine en Aragon au milieu du XV^{e} siècle," in *La lana come materia prima*, ed. Spallanzani, 205–19 (n. 125 above); Marie-Claude Gerbet, *L'élevage dans la royaume de Castille sous les rois Catholiques (1454–1516)* (Madrid, 1991); Reyna Pastor de Togneri, "La lana en Castilla y Léon antes de la organizacion de la Mesta," *Moneda y crédito* 112 (Mar. 1970): 47–70, repr. in *La lana come materia prima,* ed. Spallanzani, 253–67; Carla Phillips 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), 7–23, 33–39, 97–125 (esp. 99); Julius Klein, *The Mesta: A Study in Spanish Economic History, 1273–1836* (Cambridge, MA, 1920), 8, 12–15, 17–21, 28–30, 320, 607, 708; Melis, "La lana della Spagna" (n. 125 above); H. B. Carter, *His Majesty's Spanish Flock: Sir Joseph Banks and the Merinos of George III of England* (London, 1964), 6, 9, 420–21; and Munro, "Spanish *Merino* Wools," esp. 438–40, 470–75 (n. 9 above). See also Michael Ryder, *Sheep and Man* (London, 1983), 427–36, for the importance that he ascribes to Spanish transhumance, noting that *transhumantes merinos* are "larger, more slender and long-legged, with finer wools" than those in more sedentary flocks (428); and also idem, "Medieval Sheep and Wool Types," *Agricultural History Review* 32 (1984): 14–28.

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."[138]

Armstrong's treatise was, to be sure, an attack on the contemporary Tudor enclosures, whose richer feeding of sheep flocks many then held responsible for a deterioration in English wool qualities. But this seemingly paradoxical view on the deleterious effects of enclosures on sheep (that is, from richer pastures and year-round fodder supplies) has found support from Peter Bowden, the modern expert on Tudor wools, and 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 also a 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 growing urban meat markets; but these larger, fatter sheep had far longer and far coarser fleeces. 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 fineness of *merino* wools was improving.[139] The consequences of these changes for the decline of England's traditional

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[138] Text in *Tudor Economic Documents,* ed. Tawney and Power, 3:90–114, quotations on 102 (n. 15 above).

[139] Peter Bowden, "The Wool Supply and the Woollen Industry," *Economic History Review*, 2nd ser., 9 (1956): 44–58; idem, *The Wool Trade in Tudor and Stuart England* (London, 1962), 4–6, 26–27. See also Julia de Lacy Mann, *The Cloth Industry in the West of England from 1640 to 1880* (Oxford, 1971), 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 *Textile History and Economic History: Essays in Honour of Miss Julia de Lacy Mann*, ed. N. B. Harte and K. G. Ponting (Manchester, 1973), 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, enabled landlords to acquire more capital to buy breeding rams while also permitting the necessary segregation of flocks required for selective breeding. Such breeding produced much larger, fatter sheep for the urban meat markets: larger sheep with longer, coarser fleeces. That may provide a better explanation for this undoubted change in English wool types and qualities. See also Munro, "'New Draperies'" (n. 30 above); idem, "Medieval Woollens: Technology," 186–89 (n. 8 above). See the next note.

Old Draperies and the corresponding so-called New Draperies will be explored later.[140]

Clement Armstrong also 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."[141] 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 requiring that they be mixed with some fine English wools.[142] 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.[143]

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[140] For the New Draperies, see p. 59 above and pp. 121, 132–36, 148, and 168–71 below; and also nn. 191, 196, 199, 201, 208, 250, 271, 300–302, and 304–7.

[141] Text in *Tudor Economic Documents*, ed. Tawney and Power, 3:90–114, quotations on 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 101–2). See also Bowden, *Wool Trade*, 4–6, 26–27, and idem, "Wool Supply and the Woollen Industry," 44–51; Mann, *Cloth Industry,* 257–79; and Youatt, *Sheep*, *passim* for similar arguments (all in n. 139 above). See also Munro, "'New Draperies'" (n. 30 above), idem, "Medieval Woollens: Technology," 186–91 (n. 8 above); Hartwell, "Destiny of British Wool," 328–35 (also n. 139 above).

[142] See the drapery regulations for Armentières in *Recueil de documents relatifs à l'histoire de l'industrie drapière en Flandre*, II[e] partie: *Le sud-ouest de la Flandre depuis l'époque bourguignonne*, ed. Henri De Sagher et al., 3 vols. (Brussels, 1951–66), vol. 1, no. 36: pp. 102–3, 103–17 (25 Oct. 1510); revised keure issued 14 Aug. 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" (n. 9 above).

[143] 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*, 9, 11, 413, 420–22 (n. 137 above); Bowden, *Wool Trade*, 27 (n. 139 above), citing in particular (anonymous) *England's Glory by the Benefit of Wool Manufactured Therein* (London, 1669); Mann, *Cloth Industry*, 257–59 (n. 139 above); John Smith, *Chronicon Rusticum-Commerciale: or Memoirs of Wool,* 2 vols. (London, 1747; repr. New York,

During the sixteenth century, *merino* wools certainly 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 from the 1530s to the 1550s (table 9).[144] 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), their 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. 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.[145]

1972), 2:410–11, 499, 514–15, 542; Hartwell, "Destiny of British Wool," 336–38 (n. 139 above), on the English Merinos, from 1788. Mann, *Cloth Industry*, 266–67, 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 inches for Herefordshire wools. But both Carter, *His Majesty's Spanish Flock*, 421, and A. P. Usher, *The Industrial History of England* (Boston, 1920), 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.

[144] De Roover, "Florentine Firm," 85–118, esp. 101, appendix 1, p. 113 (n. 21 above).

[145] See pp. 108–9 above. 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 (2008): 13–71. See also n. 181 below.

The total absence of any English wools used in the Garbo sector has already been explained by guild ordinances 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 Raymond 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."[146] 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, a topic to be discussed later in this study.

Italian Cloth Manufacturing Costs, Fourteenth to Sixteenth Centuries

The proposition that the wool content was the single most important determinant of both quality and market prices (followed by dyestuffs) permits us now to investigate cloth manufacturing costs, as undertaken in the previously described putting-out or domestic system of production.[147] 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 begin with the accounts of the Datini-financed woolen workshops of Agnolo di Niccolò in Prato, in 1396–98 (tables 6 and 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

[146] De Roover, "Florentine Firm," 19 (n. 21 above).
[147] See pp. 82–84 above.

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); finishing, including fulling, tentering, and shearing, 10.40 percent (9.82 percent); and dyeing, 10.16 percent (9.59 percent).[148] Another method of reckoning the shares of production costs is by the number of days that each process 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 processes for the other 56 percent of total costs (with no administrative costs listed).[149]

For the fifteenth century, the only available account of Florentine cloth-manufacturing costs is for Garbo cloths produced in the mid-1480s, as analyzed by Hoshino (table 8 below). Woven exclusively from domestic Italian *matricina* wools,[150] these cloths were exported directly

[148] Ammannati, "Datini's Wool Workshops," table 3 and text, pp. 506–7 (n. 24 above); Melis, *Aspetti*, 560 (n. 125 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" (n. 28 above); idem, "Gold, Guilds, and Government" (n. 81 above); and Malanima, "First European Textile Machine" (n. 27 above).

[149] Melis, *Aspetti*, doc. no. 27, as cited in Goldthwaite, "Florentine Wool Industry," table 2, p. 537 (nn. 24 and 125 above).

[150] Note that the monetary term *florin* had, in this era, acquired an entirely different meaning from that of the pre-1530 era: it was no longer a gold coin and no longer related to gold. The Florentine gold florin coin itself had ceased to be issued 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 century. In fact, the gold florin had been effectively superseded in June 1530 by another, new gold coin: the *scudo* (*écu* in French = shield), with only 22.5 carats (93.75 percent 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*

to the Ottoman Empire, with an average total cost and market value of £104.363 *lira di piccioli* = 16.700 gold florins (florins valued at £6.250).[151] Direct manufacturing costs (£15.286) accounted for 91.54 percent of total production costs; and the remaining 8.46 percent 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, and less detailed, but still allows us to compute component shares of the major costs of production (that is, 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 12,453.721 kg). 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 dyeing costs (labor and raw materials) for the remaining 19.39 percent.[152]

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di piccioli, was initially 7 *lire* (= 140 *soldi*)—that is, the previous value of the florin. In 1533, the *scudo's* fineness was reduced to 22 carats (91.67 percent 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 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 *Europe 1450 to 1789: Encyclopedia of the Early Modern World*, ed. Jonathan Dewald, et al. (New York, 2004), 4:174–84. Thus, in 1556–58, the total production costs of these woolens was 3,076.746 florins = £23,075.595 in *lira di piccioli*.

[151] Hoshino, "Il commercio fiorentino" (n. 131 above). See also n. 170 below.

[152] De Roover, "Florentine Firm," table on 25 (n. 21 above). The total number of cloths produced is not stated in this account. In de Roover's table, the cost of the wool

Much more complete and thus more illuminating is the second Medici account (table 12), for the partnership cloth firm of Giuliano di Raffaello de'Medici and Co., in the years 1556–58, 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*).[153] This account also includes overhead costs: for tools, rent, administrative expenses, staff wages, and brokerage, which amounted to 299.208 florins of account, for 9.72 percent of total costs—so that the manufacturing costs (including raw materials) were 2,777.538 such florins, or 90.28 percent of the total.[154]

The following percentage shares of costs are again based on the total of manufacturing costs, excluding overhead costs; and the percentages based on total costs (including overhead) are given in parentheses. In this Medici account book, the wools accounted for 33.17 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 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).[155]

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is given as 3,899.950 florins, but according to my calculations, based on his appendix 1, 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.

[153] See n. 150 above on the current value of the florin = £7.500 *lira*.

[154] See table 12 below, based on de Roover, "Florentine Firm," appendix 4, p. 33 (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 6 on Dyeing costs, under Manufacturing. A table based on de Roover's appendix 4, unaltered, is presented in Munro, "Medieval Woollens: The Struggle for Markets," table 5.9, p. 317 (n. 8 above). Note that Goldthwaite, "Florentine Wool Industry," table 2, p. 537 (n. 24 above), cites De Roover's appendix 4 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.

[155] 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

Finally, Richard Goldthwaite has more recently provided an even more detailed and precise analysis of manufacturing and total production costs for the Brandolini firm of Florence, based on its account books for 1580–81 (table 13). It produced a special type of very fine woolen cloth known as *rascia*, whose great importance will be discussed later (see pp. 131–39 below).[156] The production costs, reckoned in terms of one bolt of this cloth (when finished = 61.77 *braccia* = 36.012 m) and in terms of the current silver-based *lira di piccioli* (in which 1 florin of account = £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).[157]

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 the 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

itself accounted for 11.13 percent of manufacturing costs. Rather remarkably, the sum of the raw materials for 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.

[156] Goldthwaite, "Florentine Wool Industry," table A1, p. 553 (n. 24 above). I have disregarded his deceptively alternative tables 2 and 3 on 537, which are based on average prices for other cloths as well. See also Goldthwaite, *Economy of Renaissance Florence*, 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 *lira di piccioli* = 14.97 percent of total costs.

[157] For the *braccio* unit of cloth measurement, see nn. 24, 38, 46, 67, 77, and 98 above, and n. 216 below. For the value of the post-1530 silver-based florin money-of-account, see n. 150 above. For the sales prices of the Florentine *rascie*, see pp. 136–39 below.

processes, fulling (burling, scouring, felting, and fulling-mill fees) cost £9.730, accounting for just 2.16 percent of direct manufacturing costs (1.84 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 £52.300, 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 Tuscany) 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 = £3.708 English sterling). In doing so, the Leuven drapers allocated 62.50 percent of total manufacturing costs for the English wools (76.2 percent of prefinishing costs); and the finishing costs of dyeing, shearing, and dressing the cloth accounted for 18.00 percent of total costs, chiefly in the dyestuffs rather than in 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, the Flemish urban drapery in Ypres, in producing a far finer, more costly black woolen broadcloth, then worth £12.725 *groot* Flemish (= 38.175 gold florins = £8.748 sterling), allocated 52.00 percent of total manufacturing costs (64.2 percent of prefinishing costs) for its fine Cotswolds wool. In the finishing processes, dyeing, shearing, 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.[158] Since, as just noted, the wools accounted for a low of 33.21

[158] For the data sources, see John Munro, "Industrial Protectionism," table 13.2, p. 256 (n. 111 above); idem, "Medieval Scarlet," table 3.12, p. 52 (n. 49 above); and idem, "Hanseatic Commerce," 97–105 (n. 58 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*, 221–23 (n. 46 above).

percent to a high of 46.20 percent of direct manufacturing costs in the Tuscan draperies (1396–1589), the finer English wools clearly accounted for a greater share of direct manufacturing costs in these two Low Countries' luxury-oriented draperies.

The Weights of Late Medieval and Early Modern Woolen Cloths

All of these cloths were, of course, 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 century, 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.[159]

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.[160] That observation is very important for this study because the long-traditional and quite false view (first stated by Henri Pirenne) has been that Spanish wools were used to weave much lighter and cheaper cloths in the Low Countries, Italy, and elsewhere.[161] In fact, the contrary was true: Spanish

[159] Munro, "Medieval Woollens: The Struggle for Markets," table 5.7, pp. 314–15 (n. 8 above).

[160] Munro, "Spanish *Merino* Wools," table 1, p. 435 (n. 9 above): from *Recueil de documents,* ed. De Sagher, vol. 1, no. 36:2, p. 102 (n. 142 above).

[161] Henri Pirenne, "Une crise industrielle au XVI^{e} siècle: la draperie urbaine et la nouvelle draperie en Flandre," in *Bulletin de l'Académie royale de Belgique: Classe des Belles Lettres* (Brussels, 1905), repr. in idem, *Histoire économique de l'occident médiéval,* ed. Emile Coornaert (Bruges, 1951), 621–43. See also Munro, "Spanish *Merino* Wools" (n. 9 above); idem, "Medieval Woollens: Technology," 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. 111–12 and nn. 139–41.

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, as noted earlier, the key determinants of woolen cloth weights by compressing the area of the cloth.[162]

In contrast, the genuine lightweight 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.[163] The Hondschoote says were hybrid worsted-woolen serges while the Bergues-St. Winoc says were true worsteds (in both warp and weft). Thus, the weights (per square meter) of the Hondschoote double says and of the Bergues-St. Winoc says were only about 32.5 percent and 34.0 percent, respectively, of the Armentières *oultreffins* and the English Suffolk woolens. Subsequently, we shall see that the products of the English New Draperies (strongly influenced by the Hondschoote *says*) had similar low weights.[164]

Because many authors still refer to Italian woolen cloths as lighter-weight (whether or not made from Spanish wools),[165] we should offer the following comparisons of the weights of Prato woolens produced in the late 1390s in

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[162] See pp. 56–57 above. Since cloth weights are measured here 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, see nn. 17, 31, and 69 above and nn. 163, 205–8, 211, 246, 271, and 301 below.

[163] Munro, "Three Centuries of Luxury Textile Consumption," table 1.1, pp. 10–11; idem, "Medieval Woollens: The Struggle for Markets," tables 5.7 and 5.8, pp. 312–16 (both in n. 8 above); idem, "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). See the preceding note on comparative cloth weights (n. 162).

[164] See pp. 134–36, 142, 144, 148, 168–69 below; for comparative cloth weights, see nn. 17, 31, 68–69, and 162–63 above; and nn. 205–8, 211, 246, 271, and 301 below.

[165] Goldthwaite, *Economy of Renaissance Florence*, 272 (n. 6 above); Donald C. Coleman, "An Innovation and Its Diffusion: The 'New Draperies,'" *Economic History Review*, 2nd ser., 12 (1969): 417–29, esp. 420.

the Datini wool workshops (table 6), 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 87.02 m^2. Their weights ranged from 64.17 lb (21.788 kg) to 81.83 lb (27.785 kg). By any definition, these were all 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.[166] Similarly, woolens produced in the mainland Venetian 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.[167] 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.[168]

The Markets for Florentine Woolens in the Fifteenth and Sixteenth Centuries

With this information on the composition of the Tuscan cloths, wool contents, weights and production costs, we can better understand the marketing of these woolens during the fifteenth and sixteenth centuries. We must ask if their primary markets were local, and for the lower income strata of Tuscan towns, or foreign; and if the latter, which overseas markets?[169]

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[166] Ammannati, "Datini's Wool Workshops," table 2, p. 505, and n. 57 (n. 24 above), from Melis, *Aspetti* (n. 125 above).

[167] Demo, "Wool and Silk," esp. 220–22 (n. 108 above). They were similarly woven with combed warps and carded wefts. They were known as *panni pessanti* (heavy woolens). See also n. 236 below.

[168] See pp. 131–39 and 173–78 below, and also nn. 18, 115, and 157 above and nn. 170, 174, and 192–99 below.

[169] De Roover, "Florentine Firm," 101 (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 within the city limits of Florence." At the same time, 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

According to both Hoshino and Chorley, the partial revival of the Florentine woolen cloth industry, from the 1430s to the 1450s, was based largely on its success in gaining access to Levantine textile markets (chiefly via Mamlūk Alexandria and Beirut), and especially in marketing its much cheaper-line *panni de Levante*, manufactured from Garbo wools, whose mean value per cloth in the mid-fifteenth century was about 31 florins (£5.813 sterling).[170] Indeed, the Garbo sector was evidently responsible for almost all of the Florentine cloth industry's mid-century recovery from the later fourteenth-century depression.[171] Chorley had assumed that such Garbo wools were Spanish, a supposition that became valid only in the sixteenth century, when the Medici firm was also producing fine woolens for export chiefly to Ottoman markets in the Levant.[172]

As Hoshino has accurately demonstrated for the mid- and later fifteenth century, however, the wools for Garbo cloths then being exported to the Levant were principally Italian *matricina* wools, which then had two principal advantages, according to Hoshino. First, the quality of the *matricina* wools was superior to that of the then-available Spanish *merino* wools (the latter of surprisingly poorer quality). But, second, their relative cheapness accounted for their relatively low prices, or low prices for those exported to the Ottoman markets in the 1470s and 1480s: a

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wools, often very coarse wools.

[170] Hoshino, *L'Arte della Lana*, 267–75 (n. 39 above); idem, "Il commercio fiorentino nell'Impero Ottomano" (n. 131 above); idem and Maureen Mazzaoui, "Ottoman Markets for Florentine Woolen Cloth in the Late Fifteenth Century," *International Journal of Turkish Studies* 3 (1985–86): 17–31; Patrick Chorley, "The Volume of Cloth Production in Florence, 1500–1650: An Assessment of the Evidence," in *Wool: Products and Markets*, ed. Fontana and Gayot, esp. 568 (n. 129 above); idem, "*Rascie* and the Florentine Cloth Industry," 488–89 (n. 115 above). For values, see Goldthwaite, *Economy of Renaissance Florence*, table 4.1, p. 278 (n. 6 above): £124 = 31 florins (at £4 per florin in 1430; but £5.40 in 1461); Bernocchi, *Le Monete*, 3:215 (n. 150 above).

[171] See also Epstein, *Freedom and Growth*, 137–38 (n. 74 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 its medieval reputation to the more down-market *panni di Garbo* for the Levantine markets. The conversion in effect cannibalised the medium quality production which Florence had assigned to its subjects [that is, the small Tuscan towns under its jurisdiction]."

[172] See De Roover, "Florentine Firm," 10, 19 (n. 21 above).

much lower mean value than for previous exports—of 16.70 gold florins per woolen (= 802 Turkish *aspres or akçe* = £3.966 sterling)—and thus evidently considerably cheaper than those exported in the 1430s.[173] In the 1470s, according to Chorley, Florentine cloth exports to the Levant and the Ottoman Empire amounted to 7,000–8,000 bolts a year, accounting for perhaps half of the output of the Garbo sector.[174] From Venetian reports dated 1488, Hoshino has estimated that Florentine cloth production was then about 17,000 bolts a year—a significant recovery from the 1420s—about two-thirds of which now were produced by the Garbo sector.[175] 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."[176] 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 ultraluxury San Martino woolens, still woven exclusively from 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 Martino woolens continued to enjoy a considerable importance in Italian and

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[173] Hoshino, "Il commercio fiorentino nell'Impero Ottomano," table 1, p. 120 (n. 131 above); see also 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 £5.750 *lira di piccioli*). Spufford, *Handbook*, 30, 206 (n. 46 above). For cloth values in the 1390s and 1420s, see pp. 99, 102, and 123 above.

[174] Chorley, "*Rascie* and the Florentine Cloth Industry," 489 (n. 115 above). See also Hoshino, *L'arte della Lana*, 270 (n. 39 above), citing the testimony of the Levant-based merchant Benedetto Dei: that 8,000 woolen cloths (bolts) were exported to Ottoman markets in 1470; 7,500 bolts in 1471; 8,000 in 1472; but only 3,300 in 1474, and 3,000 bolts in 1476.

[175] Hoshino, *L'Arte della Lana*, 239–44 (n. 39 above), estimating a total of 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).

[176] Chorley, "*Rascie* and the Florentine Cloth Industry," 489 (n. 115 above); Hoshino, *L'Arte della Lana*, 268–75 (n. 39 above). See nn. 285–88 below for the seventeenth-century English trade in silk.

especially papal markets. As Goldthwaite points out, the San Martino 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 Western Papal Schism (1378–1417), and the full return of the now-unified papal court from Avignon to Rome, which soon enjoyed a very considerable economic and demographic expansion. The second was the establishment of the Aragonese court in Naples, from 1442–43, as the capital of the Kingdom of the Two Sicilies, under King Alfonso V of Aragon (d. 1458).[177] Indeed, in the later fifteenth and sixteenth century, Naples rivaled Paris as the largest European city while Rome itself, having finally recovered from the demographic decline and malaise suffered during the Babylonian Captivity of the church (1309–77) and the ensuing Papal Schism, once again became one of Europe's larger cities.[178]

Thus, of the woolens imported into in Rome in the quarter-century period of 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*). In contrast, only 821 English broadcloths and 805 Flemish woolens were sold in Rome during this quarter-century.[179] In these domestic Italian

[177] Goldthwaite, *Economy of Renaissance Florence*, 273–74 (n. 6 above). For export markets, he also contends that the Florentine cloth industries benefited from the Ottoman conquest of Constantinople and its establishment as the new capital of its now vast empire. See p. 140 below.

[178] See Jean Delumeau, *Rome au XVI^e siècle* (Paris, 1975), 71–72, stating that Rome's population grew rapidly from ca. 20,000 in 1450 to 55,000 in 1526–27, thus well more than doubling, and almost doubling again to 100,000 by 1600. See also Goldthwaite, *Economy of Early Renaissance Florence*, 52 (n. 6 above); and Jan de Vries, "Population," in *Handbook of European History, 1400–1600: Late Middle Ages, Renaissance and Reformation*, ed. Thomas A. Brady, Heiko Oberman, and James D. Tracy, 2 vols. (Leiden and New York, 1994), vol. 1: *Structures and Assertions*, 1–50, esp. 12, also noting that the Kingdom of Naples "more than doubled its population between 1505 and 1595" and that the city's population rose to 281,000 by 1600 (but providing no data on Rome). Surprisingly, no specific population totals for early modern Italian cities are presented in either de Vries, *European Urbanization, 1500–1800* (London, 1984)—Rome appears only once, on 178—nor in Paul M. Hohenberg and Lynn Hollen Lees, *The Making of Urban Europe, 1000–1950* (Cambridge, MA, 1985). Thus, by far the most useful historical urban survey is Nicholas, *Urban Europe*, fig. 1.3, p. 19 (n. 99 above), indicating Rome's population at 50,000 in 1500 and 110,000 in 1600.

[179] Hoshino, *L'arte della Lana*, tables 42–43, pp. 286–87 (n. 39 above). For the

markets, the traditional San Martino sector remained more than competitive, even if the Florentine cloth industry's destiny lay with the Garbo sector.

Macroeconomic 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

Demographic and other macroeconomic factors certainly played important roles in both the recovery and the expansion of Florentine cloth production, but especially for the increasing share of that production provided by the relatively cheaper *panni di Garbo*. 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 for the Italian textile industries. By the 1520s, the population of Florence itself had recovered to perhaps 70,000 (that is, almost double that registered in the 1427 Catasto), while the populations of Rome and Naples, as indicated earlier, grew even more during the sixteenth century: to over 100,000 for the former, and 281,000 for the latter.[180]

nature and importance of medieval woolen scarlets (*scarlatti*), see Munro, "Medieval Scarlet" (n. 49 above) and pp. 61–65 and 81 above and p. 138 below.

[180] The population estimates for sixteenth-century Florence are even more disputed than those for the fourteenth century. Herlihy and Klapisch-Zuber, *Tuscans and Their Families* (n. 55 above), in table 3.5, p. 74, present an estimate of only 59,191 for 1552, but that low estimate is taken directly from an old source: P. Batara, *La popolazione di Firenze a metà del '500* (Florence, 1935), 33 (including clergy, other religious personnel, and servants). This same figure is repeated in Ginatempo and Sandri, *L'Italia della città*, 148 (n. 99 above). A far higher figure of 70,000 is presented in Goldthwaite, *Economy of Renaissance Florence*, table 4.1, p. 278 (n. 6 above); and an even higher figure of 80,000 is given in Chorley, "*Rascie* and the Florentine Cloth Industry," 494 (n. 115 above). See

Monetary Factors: The Central European Silver-Copper Mining Boom

The recent and then-current South-German-Central European silver-copper mining boom strongly stimulated western Europe's combined economic and demographic recovery. From the 1460s to the 1530s, that mining boom quintupled European outputs of silver and copper. That vast increase in silver production 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, a sustained long-term inflation, lasting until the 1650s, that itself promoted a greater economic expansion, especially in reducing the real costs of labor and borrowed capital.[181] Much of that newly mined South German silver and copper allowed Venice to expand its commerce with the Levant, bringing back larger quantities of Syrian and Cypriot cotton to furnish the rapidly expanding fustian industry of South Germany.[182]

Commercial Factors: The Revival of Overland Long-Distance Trade Routes and European Fairs

A related development of even greater importance was the revival of long-distance overland or continental trade routes, chiefly running from Venice through South Germany to the Frankfurt Fairs, and then along

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also de Vries, "Population," 12 (n. 178 above), noting an "explosive growth [of population that] characterized Tuscany between 1490 and 1552"—though he neglects to mention the Florentine plague of 1526. See ibid. for the populations of Rome and Naples.

[181] John Munro, "The Monetary Origins of the 'Price Revolution': South German Silver Mining, Merchant-Banking, and Venetian Commerce, 1470–1540," in *Global Connections and Monetary History, 1470—1800*, ed. Dennis Flynn, Arturo Giráldez, and Richard von Glahn (Aldershot, 2003), 1–34; idem, "The Price Revolution," in *The New Palgrave Dictionary of Economics*, 2nd ed., ed. Steven N. Durlauf and Lawrence E. Blume, 6 vols. (London and New York, 2008), 6:631–34; and idem, "'Profit Inflation'" (n. 145 above).

[182] Munro, "Monetary Origins of the 'Price Revolution'"; and esp. idem, "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 *Relazioni economiche tra Europa e mondo islamico, secoli XIII–XVIII/ Europe's Economic Relations with the Islamic World, 13th–18th Centuries*, ed. Simonetta Cavaciocchi, Fondazione Istituto Internazionale di Storia Economica Francesco Datini, Atti delle Settimana di Studi e altri convegni 38 (Florence, 2007), 907–62.

the Rhine to the new Brabant Fairs, whose expansion helped to make Antwerp the commercial and financial capital of northern Europe from the 1460s to 1560s. As Herman Van der Wee has demonstrated, these overland continental trade routes (less than 20 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 area with many hundreds of towns.[183] That overland continental trade also led to the revival of the large-scale international fairs, which served 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 Besançon, Geneva, and especially Lyon.[184]

Both demographic and economic recovery were strongly promoted by the restoration of relative peace in western Europe, or at least by a diminution in the scale of warfare, with the end of the Hundred Years' War in 1453, and more especially for Italy, the Peace of Lodi (in 1454, between Venice and Milan), a peace that lasted until the French invasions of 1494, which, however, had surprisingly little effect on the Tuscan economy. In more general macroeconomic terms, these combined demographic-economic forces 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 produced a very significant reduction in transaction costs in international trade—all the more since cost reductions in the transaction sector were partly based on enlarged scale economies, that is, with much larger, more concentrated, and more efficient urban markets.

[183] 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 *The Rise of Merchant Empires: Long-Distance Trade in the Early Modern World, 1350–1750*, ed. James Tracy (Cambridge, 1990), 14–33; and Van der Wee and Peeters, "Un modèle dynamique" (n. 107 above).

[184] See sources cited in nn. 181–83, and in Munro, "'New Institutional Economics'" (n. 4 above).

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 armed, three-masted, full 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.[185]

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; 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 northwest Europe into the Mediterranean.[186] 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 50 percent reduction in real interest rates by the mid-sixteenth century.[187]

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[185] Frederic Lane, *Venetian Ships and Shipbuilders of the Renaissance* (Baltimore, 1934), 26–28; idem, "Technology and Productivity in Seaborne Transportation," in *Trasporti e sviluppo economico, secoli XIII–XVIII*, ed. A. Vannini Marx, Fondazione Istituto Internazionale di Storia Economica F. Datini, Prato, Serie II: Atti delle Settimane de Studi e Altri Convegni 5 (Florence, 1986), 233–44; Richard Unger, *The Ship in the Medieval Economy, 600–1600* (London and Montreal, 1980), 201–50; Carlo Cipolla, *Guns, Sails and Empires: Technological Innovation and the Early Phases of European Expansion, 1400–1700* (New York, 1965), 90–131.

[186] See Herman Van der Wee, *Growth of the Antwerp Market and the European Economy, 14th to 16th Centuries*, 3 vols. (The Hague, 1963), 2:177–94, 325–64; idem, "Structural Changes in European Long Distance Trade" (n. 183 above).

[187] Herman Van der Wee, "Anvers et les innovations de la technique financière aux XVI^{e} et XVII^{e} siècles," *Annales: Économies, sociétés, civilisations* 22 (1967): 1067–89, republished in English trans. as "Antwerp and the New Financial Methods of the

Economic Consequences for Long-Distance Trade in Cheaper Textiles

Just as the late medieval forces for economic contraction and disruption had seriously hindered long-distance trade in cheaper-line textiles, especially by raising transaction costs, 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.[188] 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 "rock," and a short-stapled, carded, greased weft, spun on the spinning wheel.[189] 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 *sayetteries* in the sixteenth-century Low Countries proved to be Italy, the Mediterranean basin in general; and this time, the Spanish colonies in the Americas as

16th and 17th Centuries," in idem, *The Low Countries in the Early Modern World*, trans. Lizabeth Fackelman (Aldershot, 1993), 145–66.

[188] Emile Coornaert, "Draperies rurales, draperies urbaines: l'évolution de l'industrie flamande au moyen âge et au XVI siècle," *Belgische tijdschrift voor filologie en gescheidenis/Revue belge de philologie et d'histoire* 28 (1950): 60–96; Herman Van der Wee (with John Munro), "The Western European Woollen Industries, 1500–1700," in *Cambridge History of Western Textiles,* ed. Jenkins, 439–58 (n. 8 above); Hugo Soly and Alfons Thijs, "Nijverheid in de zuidelijke Nederlanden," in *Algemene geschiedenis der Nederlanden*, 12 vols. (Haarlem, 1977–79), vol. 6, ed. J.A. Van Houtte, et al., 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 (that is, about 76 percent greater).

[189] See above, pp. 58–59, 62, and 121 and nn. 163–64, 188.

well.[190] 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.[191]

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 reintroduce 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 Low Countries.[192]

By far the most important new textile was, however, an entirely different fabric: the *panni di rascia* or *rascie*, known in England as "rashes." The introduction of this fabric 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

[190] 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): 249–65.

[191] See below, pp. 132–37, 148, and 168–71 and nn. 196, 199, 201, 208, 250, 271, 300–302, and 304–7.

[192] Hoshino, *L'arte della Lana*, 235–36 (n. 39 above). See also Edler, *Glossary of Medieval Terms*, 202–3 (n. 21 above), on *panno perpignano*, "medium priced cloth, used esp. for men's hose" (420); Chorley, "*Rascie* and the Florentine Cloth Industry," 504 ("low cost *perpignani*"), 510 (n. 115 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. 567–69 (n. 170 above), but see also notes for his table, which indicate that the *saie* were then more expensive textiles, classed with *panni ricchi* (years 1586–1639). See also tables 16–17 below.

rascie, which posed a seeming threat to the Florentine textile industries.[193] Most recently, Ammannati has correctly noted that the generic European *rascie* of the later fifteenth century were low-quality fabrics; in his view, entrepreneurs in the *Arte della Lana*, very familiar with such new products, "used their experience and ability to transform low-quality imitations into higher-level products."[194] Indeed, the *Arte della Lana* soon became so successful in producing their own varieties of *rascie* that this fabric 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, have called it a "serge" fabric; and, as has been demonstrated earlier, generically *serges* had long been much lighter-weight and much cheaper 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*.[195] 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, see pp. 58–59, 62, and 120–21 above).[196]

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[193] Hoshino, *L'arte della Lana*, 235–39 (n. 39 above); Chorley, "*Rascie* and the Florentine Cloth Industry," 496 (n. 115 above), stating that the 1488 *Arte della Lana* petition was directed specifically against imports of *rascie di Schiavonia*, from Serbia, via Dalmatia. The resulting Florentine *rascie* were far finer woolens.

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

[195] Goldthwaite, *Economy of Renaissance Florence*, 274 (n. 6 above). See also Chorley, "*Rascie* and the Florentine Cloth Industry," 487 (n. 115 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"; 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 2, "*Rascie*: Technical Characteristics," 520–23, as well as the companion article: Goldthwaite, "Florentine Wool Industry" (n. 24 above).

[196] In having a combed, long-stapled, dry worsted warp and a carded, short-stapled, greased woolen weft, they can be classified as serges. See Emile Coornaert,

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).[197] Even though a shift to all carded yarns had taken place in many draperies of the southern Low Countries in the later fifteenth century, the Italian cloth industries continued with the older technology in producing fine woolens with combed, "rock"-spun warps.[198]

The important distinction between the new Florentine *rascia* cloth 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

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La draperie-sayetterie d'Hondschoote, XIV^e–XVIII^e siècles (Paris, 1930); idem, *Une industrie urbaine du XIV^e au XVII^e siècle: l'industrie de la laine à Bergues-Saint-Winoc* (Paris, 1930); idem, "Draperies rurales, draperies urbaines" (n. 188 above); Munro, "'New Draperies,'" 83–87 (n. 30 above); B. A. Holderness, "The Reception and Distribution of the New Draperies in England," in *The New Draperies*, ed. Harte, 217–44 (n. 20 above); Luc Martin, "The Rise of the New Draperies in Norwich," in ibid., 245–74. See also pp. 135–37, 148–49, and 168–71 below.

[197] See Munro, "Medieval Woollens: Technology," 197–204 (n. 8 above); and see also pp. 53–54 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 n. 198 below.

[198] See pp. 53–54 and n. 69 above, and De Roover, "Florentine Firm of Cloth Manufacturers" (n. 21 above), 11–15, esp. 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 8, "Spinning," 413–18 (n. 21 above); Munro, "Medieval Woollens: Technology," 197–204 (n. 8 above). But see also, Chorley, "Evolution of the Woollen," 7–13 (n. 20 above), offering the hypothesis that the general introduction of all-carded woolens took place in continental Europe only from 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.

Draperies ever used Spanish wools for either warps or wefts.[199] The staple length of early Spanish *merino* wools was certainly far too short (possibly only 0.50–0.75 inch = 1.27 cm–1.91 cm) for true combed worsted warps, which required a staple length of 6 to 10 inches (15.24 cm–25.4 cm).[200]

As stressed earlier, the key distinction between true woolens and the products of the *sayetteries* and other *draperies légères*—as the very name "light draperies" suggests—and then the English New Draperies was their weight.[201] As also indicated earlier, we lack sufficient evidence on finished dimensions to measure Florentine cloth weights properly in grams per square meter. Nonetheless, the accounts of the Florentine Brandolini firm in the 1580s do provide two sets of data that permit an approximate estimate of the weight of its *rascia* 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

[199] Chorley, "*Rascie* and the Florentine Cloth Industry," 520–21 (n. 115 above). Note that the Florentine producers of *rascie* used the very same fine Spanish (Castilian) wools as were 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 (indicating that the wools were not scoured and so retained their natural lanolin). But the wools 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 and 196 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," 552, and table A1, p. 553 (n. 24 above): indicating that 18.52 percent of the wool weight for producing *rascie* from Spanish wool was lost in the wool washing and scouring. That is especially puzzling, since 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," 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," 197–204 (n. 8 above); and table 11 below.

[200] See Mann, *Cloth Industry*, 266–67 (n. 139 above), but other sources cited in nn. 139 and 143 above contend that the modern *merino* sheep have a staple length of 2.25–2.50 inches, compared to 10.5 inches for Lincolnshire wools.

[201] See pp. 57–58 above. For the New Draperies, see nn. 191, 196, and 199 above and nn. 208, 250, 271, 300–302, and 304–7 below.

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. Indeed, they were still heavy-weight woolens, very different from the far lighter-weight Hondschoote says, true serges: 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.[202]

The second or alternative method of comparison involves the relative wool contents of the textiles. The Brandolini accounts indicate that one bolt of *rascia* cloth contained 108 lb Florentine = 36.671 kg 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.[203] After fulling, that weight was reduced to 67 lb = 22.749 kg (see above), for an overall loss of 37.96 percent of the original wool weight.[204] 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 was the 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.[205]

We may compare the 36.671 kg of Spanish wool used in the Florentine *rascia* (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 (Lincolnshire), in 1434: 30.391 kg; (2) another such Leuven broadcloth (also from

[202] See pp. 121–22 above. See also n. 201 above, and for comparative cloth weights, see nn. 17, 31, 69, 162–63 above and nn. 205–8, 211, 246, 271, 301 below.

[203] Goldthwaite, "Florentine Wool Industry," table 1, p. 529; table A1, p. 553 (n. 24 above).

[204] Ibid., 552, and table 11, p. 553 (his weight differs slightly from mine).

[205] 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 (n. 8 above). Unfortunately, neither of the widths—on the loom after fulling—are known for either the Hondschoote says or the Florentine *rascie*. For comparative cloth weights, see nn. 17, 31, 69, and 162–63 above and nn. 206–8, 211, 246, 271, and 301 below.

Lincolnshire 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 Spanish wools, in 1558: 39.372 kg.[206] Those wool weights in turn may be compared to 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.[207] Clearly, the sixteenth-century Florentine *rascie* were far heavier (before and after finishing) than almost all products of the Flemish *sayetteries* and English New Draperies.[208]

The other chief and 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, a very notable feature of the sixteenth-century Flemish *sayetteries* and the post-1560 English New Draperies was the very low prices of their products compared to those for traditional broadcloths from the Old Draperies. If we begin again in England during the sixteenth century, for the period 1578–99, 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).[209] Thus, the prices for serges

[206] See the sources cited in the tables in Munro, "Industrial Protectionism," table 13.2 (Leuven in 1434 and 1442), p. 256 (n. 111 above); idem, "Medieval Scarlet," table 3.12, p. 52 (n. 49 above), for Ypres in 1501; De Roover, "Florentine Firm of Cloth Manufacturers" (n. 21 above).

[207] Kevin H. Burley, "An Essex Clothier of the Eighteenth Century," *Economic History Review*, 2nd ser., 11:2 (1958): 289–301, esp. 297, table 3.

[208] See pp. 121–22 above. 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/m^2—and thus a very heavy cloth for the New Draperies. See Munro, "Medieval Woollens: The Struggle for Markets," table 5.7, pp. 312–13 (n. 8 above). See also n. 207 above.

[209] Carole Shammas, "The Decline of Textile Prices in England and British America Prior to Industrialization," *Economic History Review*, 2nd ser., 47 (1994): 483–507: esp. 484, table 1. 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. 15 above.

(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, the very same difference is found in the values of thirteenth-century wool-based European textiles in the contrast between prices of true woolens and those of serges and worsteds.[210]

More specific details on cloth types and prices for Flemish textiles can be found at the Antwerp market somewhat earlier in the sixteenth century. First, for the years 1538 to 1544, the mean price of Hondschoote single says (made from Flemish, Frisian, and Pomeranian wools) was £0.879 (= 17.58s) *groot* Flemish; that of a Hondschoote double say (same wools) was £2.023 *groot* (= 40.46s); and that of a Ghent *dickedinnen* broadcloth (made from fine English March and Cotswolds wools) was £13.657 *groot*.[211] 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*.[212] That comparison surely indicates the vast difference between the values of luxury woolens and those of the mixed worsted-woolen serges.

Second, at the Antwerp market, forty years later, in 1575, we find that the Florentine *rascie* were vastly more expensive than the Hondschoote *saies*.[213] With market values expressed in pence and pounds *groot* Flemish per Antwerp ell (0.695 m), the price for a large Florentine *rascia* cloth ranged from 252d to 324d (£31.500 to £40.500 *groot* for 30 ells). In comparison, the market

[210] See above, pp. 59–61 and nn. 35, 38–39, and 46, and below, table 2.

[211] 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. For comparative cloth weights, see nn. 17, 31, 69, 162–63, and 205–8 above and nn. 246, 271, and 301 below.

[212] Ibid., table 1.2, pp. 14–15.

[213] The following prices are taken from Alfons Thijs, "Les textiles au marché anversois au XVI^{e} siècle," in *Textiles of the Low Countries*, ed. Aerts and Munro, 81–84 (n. 106 above). Note that Thijs lists the prices for the Florentine *rascie* under the heading, *produites de la draperie légère* (84), evidently also believing them to be light serge cloths; but the other *ras* in this list undoubtedly were such serge cloths.

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 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). 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 *groot*. Clearly, most of these were cheaper than the Florentine *rascie*.[214]

Obviously, by any measure taken, the sixteenth-century Florentine *rascie* were very high-priced luxury woolens. As noted earlier, the average value of a Florentine *rascia* produced by the Brandolini firm in the 1580s was, per bolt (36.013 m), £529.48 *lira di piccioli* = 70.597 florins of account (that is, in terms of total production and marketing costs, including the entrepreneur's profit).[215] 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).[216]

The best way of expressing such a value is, again, to measure the cloth price in terms of the purchasing power of a skilled craftsman's daily wages. In Florence during the 1580s, a master mason, then earning 35.83 *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* costing 70.60 florins, or 98.52 days' wages to buy one-third of a bolt (12 m) to

[214] Ibid., 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 m).

[215] See p. 118 above. The values of this florin of account in English sterling and Flemish money *groot* in the 1580s are not known to me.

[216] Chorley, "*Rascie* and the Florentine Cloth Industry," 504 (n. 115 above). These values are based on the assumption that 1 *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 yds. For dimensions of the *canna* and *braccia*, see nn. 24, 38, 46, 67, 77, and 98 above. Chorley also notes that Brandolini's *rascie* prices in 1592–93 were slightly higher than this mean value. Note that 1 florin of account = £7.500 *lira di piccioli*. See n. 150 above.

buy a man's full dress suit.[217] All of this evidence, therefore, fully supports Florence Edler's contention that the Florentine *rascia* was a very costly luxury textile, a view published much earlier, in 1934, and one that Chorley did not cite.[218]

Chorley was, however, perfectly correct in contending that the *rascia* came to be Florence's most important textile product from about the late 1540s to the 1570s. That was all the more important when, as will be seen shortly, its wool-based industry as a whole had been in decline from the 1520s, after losing its overall Italian supremacy to Venice.[219] While the importance of *rascie* as export products 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.[220] We have already noted the far earlier presence of Florentine luxury woolens on the Polish markets (Cracow) in the 1390s.[221] The very important mid-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, will be examined later in this study (see pp. 173–78 below).

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[217] 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 A1, p. 613 (n. 6 above), which regrettably does not inform the reader that the wages are those for unskilled laborers, not for master building craftsmen. See also n. 78 above.

[218] Edler, *Glossary of Medieval Terms*, 238, and appendix 9, p. 420 (n. 21 above): "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." Edler also notes that in England it was called a *rash*.

[219] Chorley, "*Rascie* and the Florentine Cloth Industry," 487–526 (n. 115 above).

[220] Ibid., 487, 514.

[221] See p. 80 above; table 3D below; and also Jerzy Wyrozumski, "The Textile Trade of Poland in the Middle Ages," in *Cloth and Clothing in Medieval Europe*, ed. Harte and Ponting, 248–57 (n. 3 above).

The (Temporary) Decline of Florentine Cloth Production, ca. 1525 to ca. 1550

In his admirable, pathbreaking study on the sixteenth-century Florentine cloth industry and its new *rascie* textiles, Chorley also demonstrated that the Renaissance Florentine cloth industry had reached its apogee in the mid-1520s, that is, before the *rascie* first appeared on export markets. Chorley has estimated the industry's output then at 20,000 bolts of woolen cloth, almost double that estimated for a century earlier (ca. 1420).[222] Other estimates of this peak output in the mid-1520s provide a range from 18,000 to 24,000 bolts.[223] At this time, the luxury-oriented San Martino branch accounted for about 25 percent of the 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 for the remainder: about 75 percent by volume and 50 percent by value.[224] What is most remarkable about these statistics is that the French invasions of Italy, led by Charles VIII (r. 1470–98) and followed by Louis XII (1498–1515), evidently had had little impact on Florentine cloth production while other Italian wars of this same era evidently proved to be deleterious to the Venetian cloth industry (see pp. 141–68 below).

To explain the subsequent and 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 Ottoman 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 (on the south coast of Sea of Marmara, across from Constantinople) to Aleppo, where the Florentines "had no established presence." The Venetians, however, certainly did have a major presence there. 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.[225]

[222] Chorley, "Volume of Cloth Production" (n. 170 above); idem, "*Rascie* and the Florentine Cloth Industry," 487–89, and appendix 1, pp. 515–19 (n. 115 above). Chorley cites reports of the Venetian ambassadors in 1527 and 1528 indicating outputs of 20,000–23,000 pieces and 22,000–24,000 pieces per year, respectively. See also p. 102 above.

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

[224] See sources in nn. 115 and 170 above.

[225] Chorley, "*Rascie* and the Florentine Cloth Industry," 491 (n. 115 above).

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 also afflicted the unfortunate city. The Spanish-German sack of Rome in 1527, and the apparent weakness of the Medici pope Clement VII (r. 1523–34), sparked a revolt against Medici rule in Florence, which led to the brief reestablishment 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 has been estimated at over 30,000.[226] Both of these disasters had a serious impact on Florentine textile production—chiefly to the advantage of the Venetian cloth industry. Support for that thesis lies in Peter Earl's statistical evidence for the sharp decline in Florentine cloth sales in Mediterranean markets in and from the 1520s, with a concurrent rise in English cloth sales.[227]

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 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.

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, 1999).

[226] Najemy, *History of Florence*, 446–61 (n. 64 above); Chorley, "*Rascie* and the Florentine Cloth Industry," 487–93 (n. 115 above); Chorley, "Volume of Cloth Production," 552–53 (n. 170 above).

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

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.[228] More recently, however, the Italian historian Andrea Mozzato has challenged that traditional view, on the basis of two reports issued in 1423. In the first, Doge Tommaso 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.[229] Much of those cloth imports were presumably reexported, though the report is silent on that issue.[230] In the second report, the city's woolen cloth guild recorded that its annual production was also about 3,000 woolens. 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 hardly

[228] See Domenico Sella, "Rise and Fall of the Venetian Woollen Industry," in *Crisis and Change in the Venetian Economy in the Sixteenth and Seventeenth Centuries*, ed. Brian Pullan (London, 1968), 106–26, at 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): 72–212; and the following notes.

[229] Andrea Mozzato, "The Production of Woollens in Fifteenth- and Sixteenth-Century Venice," in *At the Centre of the Old World*, ed. Lanaro, 73–107 (n. 108 above). See also idem, "Il mercato dei panni di lana a Venezia nel primo ventennio del XV secolo," in *Wool: Products and Markets*, ed. Fontana and Gayot, 1035–66 (n. 129 above); idem, ed., *La mariegola dell'arte della lana di Venezia (1244–1595)*, 2 vols. (Venice, 2002).

[230] On this famous report, see Gino Luzzatto, *An Economic History of Italy from the Fall of the Roman Empire to the Beginning of the Sixteenth Century*, trans. Philip Jones (London, 1961), 156. He indicates that the Lombard towns alone exported 48,000 woolens a year: Como, 12,000 pieces; Monza, 6,000 pieces; Brescia, 5,000 pieces; Pavia, 3,000 pieces; and 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 p. 103 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*, 127 (n. 74 above), also indicating 48,000 woolens plus 40,000 fustians, in total worth about 900,000 ducats (or florins), and Dini, "L'industria tessile," 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.

trivial.[231] 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), thus somewhat cheaper than the Florentine Garbo woolens of this era (with, as noted earlier, an estimated average value of 31 florins).[232]

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.[233] 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. As noted earlier, the Florentine cloth industry similarly enjoyed a partial revival in this period from a rapid expansion of Garbo woolen cloth exports to the Ottoman markets.[234] Mozzato estimates that, in the mid-1460s, the Venetian industry was producing about 6,380 woolens a year, and still about 6,000 in the 1490s.[235] 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

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[231] 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. 114–15.

[232] Mozzato, "Il mercato dei panni di lana," table 1, p. 1,046 (n. 229 above). Ducats and florins, both supposedly 24 carats fine, had approximately the same gold contents (3.53–3.56 g fine gold) and thus usually the same market values. See Spufford, *Handbook*, 19 (n. 46 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 198–206, 215–23. But Bernocchi, *Le monete*, 3:208–20 (n. 150 above), indicates that in the mid-fifteenth century the florin had only 3.45–3.51 g pure gold.

[233] Mozzato, "Production of Woollens," 80 (n. 229 above), stating that this figure probably pertains only to high-quality woolens "destined for the internal market, not the cheaper cloths produced for export."

[234] See above, pp. 123–24 and nn. 127–34 and 170–76, for the production of such Garbo woolens from domestic *matricina* wools and cloth exports to the Levant. The sources of wool for Venetian cloth production in the mid-fifteenth century cannot be ascertained, but subsequently this industry came to rely exclusively on Spanish wools for its finer woolens.

[235] Mozzato, "Production of Woollens," 82–83 (n. 229 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).

to high quality," similarly for export to the Ottoman Empire.[236] Verona alone exported many woolens as well to southern Italy: 3,686 pieces in 1475–77, and 7,889 pieces in 1503–5.[237]

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 or 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 research 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 two hundred years.[238]

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[236] Demo, "Wool and Silk," 217–43, esp. 220–22 (n. 108 above). He found evidence for declining outputs only at Treviso (late fifteenth century) and Brescia (from the mid-sixteenth century). See also n. 167 above, and idem, *L' 'Anima della città': L'industria tessile a Verona e Vicenza (1400–1550)* (Milan, 2001); idem, "Lane, lanai[u]oli e mercanti nella manifattura laniera Vicentina (secoli XIV–XVI)," in *Wool: Products and Markets*, ed. Fontana and Gayot, 381–410 (n. 129 above); idem, "L'industria tessile nel Veneto tra XV e XVI secolo: tecnologie e innovazione dei prodotti," in *Dalla corporazione al mutuo soccorso: organizzazione e tutela del lavoro tra XVI e XX secolo*, ed. Paolo Massa and Angelo Moioli (Milan, 2004), 329–41; idem, "'Da Bressa se traze panni fini e altre sorte de panni de manco precio': L'esportazione dei prodotti tessile bresciani nel '400," *Annali Queriniani* 6 (2005): 101–30.

[237] Demo, "Wool and Silk," 226–29 (n. 108 above).

[238] The sixteenth-century statistics (1516–1605) were first published in Pierre Sardella, "L'Épanouissement industriel de Venise au XVI[e] siècle: Un beau texte inédit," *Annales: Économies, sociétés, civilisations* 2 (1947): 195–96. Most of the rest of the data, to 1713, were published in Sella, "Rise and Fall of the Venetian Woollen Industry" (n. 228 above). However, this 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* (Treviso, 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 photocopy 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

In Sella's view, the primary reason for this rapid expansion of the Venetian 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 previously discussed French and then Habsburg invasions of Italy, from 1494 to 1559 (Treaty of Cateau-Cambrésis), which ravaged Lombardy and Tuscany especially. In his view, however, Venice, with its supposedly protected location and extensive military power, was left relatively untouched.[239] Unfortunately, that thesis does not correspond with the facts of Italy's political history in this period.[240] As already noted, the French invasions under Charles VIII and Louis XII had little impact on the Florentine cloth industry, though the same cannot be said for the Habsburg assaults of the 1520s.

Yet Venice did suffer drastically from warfare, especially from December 1508. Venice then 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 (Julius II), and the king of Hungary (Vladislaus II). Their objective was to recapture Venice's recent mainland Italian acquisitions, outside her traditional *Terra Firma* 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 recent mainland acquisitions—found herself 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 cloth 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.

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statistics for the following four years: 1521, 1618, 1639, and 1662. See also *La mariegola dell'arte della lana*, ed. Mozzato (n. 229 above).

[239] See Sella, "Rise and Fall," 113–15 (n. 228 above).

[240] A. J. Grant, *A History of Europe from 1494 to 1610*, 5th ed. (New York, 1951), 52–54, 65–69; Frederic Lane, *Venice: A Maritime Republic* (Baltimore and London, 1973), 242–45.

The far more convincing explanation for the subsequent expansion of the Venetian cloth industry and its success in gaining control of much of Ottoman markets lies in 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 Persian silk trade with the Ottomans, from about 1514; the second was the severe disruptions in production from the ravages of the bubonic plague and the domestic political crisis during the years 1526–30.[241] Furthermore, it is important to remember that Florentine cloth production had achieved its apogee, in the mid-1520s (about 20,000 bolts a year)—thus again, some thirty years after Charles VIII's French invasion of Italy in 1494.[242]

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 early fifteenth century, in their diplomatic and commercial relations with the former Mamlūk Sultanate (in the Levant). Even before that Ottoman conquest, Venice had been frequently engaged in war with the Turks, especially in 1463–79 and 1499–1503, after the Venetians had suffered a crucial defeat at the naval Battle of Zonchio. 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 had recognized that their only hope of regaining the spice trade lay in cooperating with the Ottomans, who—in a triple Muslim alliance with Gujarat in India and Aceh (Atjeh) in Sumatra—succeeded in breaking the Portuguese hold over the Indian Ocean trades, including the spice trade. By the 1540s or 1550s, the Venetians had regained a significant share of the lucrative East Indies spice trade—perhaps as much as half—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.[243]

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 of

[241] See above, pp. 140–41 and n. 226.

[242] See above, pp. 140–41 and nn. 222–25.

[243] Halil İnalcik, *An Economic and Social History of the Ottoman Empire*, 2 vols. (Cambridge, 1994), vol. 1: *1300–1600*, pp. 327–59; Lane, *Venice,* 242–43, 265, 284–94 (n. 240 above).

1566–70, when cloth production reached a temporary peak of 18,513 pieces (quinquennial 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 (that is, in effect exchanging woolens for some spices). But in 1570, production suddenly slumped to just 9,462 pieces, a sharp drop undoubtedly related to the Ottoman seizure of Cyprus, followed by the Ottoman defeat at the famous naval Battle of Lepanto (7 October 1571), the vital importance of which will be noted later. Thereafter, though only after the drastic plague of 1575, cloth production did recover, at a much slower rate of annual growth, with a series of often-severe oscillations.[244] That diminished growth rate may in turn reflect not the effects of that plague but also 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 analyzed later (see pp. 173–78 below).[245] 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 1601–5, and thus 27.3 percent higher than the earlier sixteenth-century peak.

The Nature and Value of Venetian Cloths

The type of woolens that the Venetians were then producing for export now needs to explained. 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

[244] For the consequences of the Battle of Lepanto and of the 1575 plague, see Ian Fenlon, *The Ceremonial City: History, Memory and Myth in Renaissance Venice* (New Haven and London, 2007), 175–93 and 217–29, respectively.

[245] See Chorley, "*Rascie* and the Florentine Cloth Industry," table 1, p. 516 (n. 115 above): in *panni corsivi*; idem, "Volume of Florentine Cloth Production," table 1, p. 556 (n. 170 above), 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," 101 (n. 21 above).

indicate that they were indeed genuine heavy-weight woolen broadcloths.[246] Such woolens had been, from some time much earlier in the sixteenth century, manufactured chiefly from Spanish *merino* wools (substituted for the finer English wools). The production statistics, however, evidently cover a wide range of textiles, some made from Italian or other wools. From the 1550s, according to Panciera, Venice also began manufacturing cloths of the "light draperies," in imitation of the Flemish Hondschoote says, also made from worsted warps and woolen wefts, which were also exported chiefly to the Levant.[247]

According to Edoardo Demo, the Venetian towns of Verona and Vicenza were following suit, so to speak, from the 1550s, in similarly producing lighter cloths (*alleggeriti*) as imitations of products from the Flemish *sayetteries*: *sarze* (that is, serges), *stametti lezeri, palpignani lezeri . . . et altri simil lanifici*, which also included *rasse* (presumably different from the Florentine *rascie* discussed above).[248] But these new light-cloth industries did not succeed for long, and they did not "avoid the rapid decline in production that, in the 1570s, affected both the Vicentine wool industry and wool manufacturing in Verona and Padua," which was probably affected by the terrible plague of 1575.[249] 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 English and Dutch New Draperies (or *lichte draperie*, in Holland), both of which benefited, from the 1580s, from a large influx of Flemish Protestant refugees.[250]

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[246] See Demo, "Wool and Silk," esp. 220–22 (n. 108 above), for evidence that woolens from the mainland towns, measuring about 30 meters in length, weighed from 20 kg to 25 kg each. See also sources in n. 236 above. For comparative cloth weights, see nn. 17, 31, 69, 162–63, 205–8, and 211 above, and nn. 271 and 301 below.

[247] Walter Panciera, "Qualità e costi di produzione nei lanifici veneti (secoli XVI–XVIII)," in *Wool: Products and Markets*, ed. Fontana and Gayot, 419–46 (n. 129 above), at 420–22, 429–31 (tables 1–2); Panciera, *L'Arte matrice*, 39–51 (n. 238 above).

[248] Demo, "Wool and Silk," 222–23 (n. 108 above), noting also that in 1557 Vicenza was producing *rasse o sagie fiorentine*. For Florentine production of these lighter fabrics from about this period, see pp. 131–32 above.

[249] Ibid., 222. For the plague of 1575, see n. 244 above.

[250] See pp. 121 and 131–37 above; for the English New Draperies, see the extensive discussion below, on pp. 168–71. See also nn. 140, 164, 191, 196, 199, 201, and 208, above, and nn. 271, 300–302, and 304–7 below. For the Dutch industry, see Leo Noordegraaf, "The New Draperies in the Northern Netherlands, 1500–1800," in *The New Draperies*, ed. Harte, 173–95 (n. 20 above). In Leiden, for example (179), the

The Decline and Fall of Venetian Cloth Production in the Seventeenth Century, 1: 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 a mere 1,689 pieces when the series ends in 1723.[251] 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 below). 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, and Alexandria, as well as Candia; it also forced the Venetian Senate to impose ever heavier taxes to finance that warfare.[252]

Most other historians, however, have attributed the seventeenth-century decline 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, especially with ravages once more of plague in 1630 (with some recovery, to about 120,000 in 1642), and thus

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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 (1960): 209–21; repr. in idem, *Economic History and the Historian: Collected Essays* (London, 1969), 94–113.

[251] For the source of these statistics, see n. 238 above.

[252] Walter Panciera, "The Industries of Venice in the Seventeenth and Eighteenth Centuries," in *At the Centre of the Old World*, ed. Lanaro, 185–214, esp. 188–90 (n. 108 above). Panciera also contends that the early seventeenth-century decline is not as serious as the statistics indicate because the Venetian *Terra Firma* towns were producing up to 10,000 cloths a year for export, until the disasters of the 1640s; furthermore, 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 that 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 damaged Venetian cloth markets—as they did for the English cloth trade, even more (see pp. 159–60 below).

a decline *preceding* the War of Candia—reflects a much deeper malaise within the Venetian economy.[253] According to such renowned historians as Domenico Sella, 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 to do both were, supposedly, increasingly rigid guild restrictions, the enforcement of which 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*.[254]

Many of these historians, in seeking to prove their cases, 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. One may doubt, however, that the English truly did enjoy advantages in

[253] Statistics from ibid., 185. Note that Panciera offers severe criticism of Richard Rapp's publications, as cited in the next note (n. 254). Some of that sharp fall in Venice's population was undoubtedly due to several visitations of bubonic plague, especially in and from 1575 (n. 244 above). Even more serious was the plague of 1630, the last to afflict Venice, reportedly reducing the population by one-third, from 150,000 to 100,000 (though that population recovered to about 120,000 by the 1640s). See Lane, *Venice*, 400, 424 (n. 240 above).

[254] See, *inter alia,* Domenico Sella, *Commerci e industrie a Venezia nel secolo XVII* (Venice and Rome, 1961); idem, "Crisis and Transformation in Venetian Trade," in *Crisis and Change in the Venetian Economy in the Sixteenth and Seventeenth Centuries*, ed. Brian Pullan (London, 1968), 88–105; idem, "Rise and Fall," (n. 228 above), quotations on 120–21; Brian Pullan, "Wage Earners and the Venetian Economy, 1550–1630," in *Crisis and Change,* ed. Pullan, 146–74; Carlo M. Cipolla, "The Economic Decline of Italy," in *Crisis and Change*, ed. Pullan, 127–45, and in *The Economic Decline of Empires*, ed. Cipolla (London, 1970), 196–214; Fernand Braudel, P. Jeannin, J. Meuvret, and R. Romano, "Le déclin de Venise au XVII siècle," in *Aspetti e cause della decadenza veneziana nel secolo XVII: Atti del convegno 27 giugno 2 luglio 1957, Venezia*, ed. Gian Piero Bognetti (Venice and Rome, 1961), 22–85, and Carlo Levi, Domenico Sella, and Ugo Tucci, "Un problème d'histoire: la decadence économique de Venise," in *Aspetti e cause*, ed. Bognetti, 289–317; Richard T. Rapp, "The Unmaking of the Mediterranean Trade Hegemony: International Trade Rivalry and the Commercial Revolution," *Journal of Economic History* 35 (1975): 499–525; and idem, *Industry and Economic Decline in Seventeenth-Century Venice* (Cambridge, 1976).

the two primary sets of manufacturing costs, labor and wool. We have already seen that the direct labor costs in the prefinishing manufacturing processes were much less important than were raw material and dyeing costs; we have also seen evidence that productivity in the eighteenth-century English woolen industry (that is, just before the Industrial Revolution) was no higher than the west European norm in the fifteenth century.[255]

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 may 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. Still, such a comparison involves confusions between nominal and real wages and 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, namely, the market value of the last unit of the commodity produced by the last unit of labor hired. Low rural wages may have reflected not only lower living costs but also a lower labor productivity, with inferior education and 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, as well as 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 indicates that guild regulations specifically designed to ensure quality controls in industries subject to price-making monopolistic-competition structures did assist cloth industries of Tuscany and the Low Countries in gaining and securing foreign markets.[256]

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[255] See above, p. 55 and esp. nn. 22–26.

[256] Munro, "Urban Regulation and Monopolistic Competition" (n. 106 above); idem, "Symbiosis of Towns and Textiles" (n. 42 above); idem, "Three Centuries of Luxury Consumption" (n. 8 above). On European guilds in general, see Peter

Furthermore, even the rural English woolen cloth industry was subjected to considerable, detailed Parliamentary legislation and government inspections from the mid-sixteenth century.[257]

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 prefinishing manufacturing costs and of the quality of the woven textiles, and thus of market prices. We have also seen earlier, from the fourteenth to sixteenth century, that the English woolen cloth industry had enjoyed two major advantages in its wool supply: first, in having close by, and thus with low transport costs, Europe's finest wools, in abundant supply; and second, 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.[258]

The seventeenth-century English woolen cloth industries, those known as the Old Draperies, no longer enjoyed any such advantages.[259]

Berezin, "Did Medieval Craft Guilds Do More Harm Than Good?" *Journal of European Economic History* 32 (2003): 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).

[257] See *Statutes of the Realm*, vol. 4:i, 136–37: 5–6 Edwardi VI, chap. 6, pt. 1 (n. 109 above).

[258] See pp. 50–52, 94, and 100–103 above. For relative wool costs as a share of total production costs in the Florentine cloth industry, see Goldthwaite, "Florentine Wool Industry," tables 2–3, p. 537 (n. 24 above); De Roover, "Florentine Firm," appendix 4, p. 118 (n. 21 above).

[259] 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 (1979): 437–51, in particular, tables 1 and 2, p. 441; tables 3 and 4, pp. 444–45; idem, "The Rise and Fall of Salonica Woollens, 1500–1650: Technology Transfer and Western Competition," *Mediterranean Historical Review* 6 (1991): 216–36; repr. in *Jews, Christians and Muslims in the Mediterranean World after 1492*, ed. Alisa Meyuhas Ginio (London, 1992), 216–36, esp. 228–36. In both publications, Braude 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

As also noted earlier, both the quantity and the quality of England's finer wools had diminished, whereas 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 Spanish Medleys and Superfine broadcloths: a mixture of Spanish wools with some of the 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 lower than those from Spain to England.[260] 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.

The Decline and Fall of Venetian Cloth Production in the Seventeenth Century, 2: 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 skillfully exploited from the 1570s. They did so through their new Levant Company, which, first of all, enjoyed enormous advantages as one of England's new joint-stock companies, and its most important one. This was a vital innovation in commercial-financial organization that England had introduced in 1552 (with the Russia or

1640s. See Şevket Pamuk, *A Monetary History of the Ottoman Empire* (Cambridge and New York, 2000), 131–48; appendix 2, pp. 235–40, esp. graph A-1, p. 236. For English prices, see Phelps Brown and Hopkins, "Seven Centuries of the Prices of Consumables," 296–314 (n. 14 above).

[260] See Munro, "Spanish *Merino* Wools," 470–71 (n. 9 above). For the seventeenth and eighteenth centuries, see Carter, *His Majesty's Spanish Flock*, 9, 11, 412, 420–22 (n. 137 above); Mann, *Cloth Industry*, 257–59 (n. 139 above).

Muscovy Company), a half century before the Dutch. There was not, 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 more capital, and thus to achieve vastly greater and thus lower-cost economies of scale in commercial organization and shipping, especially when later fortified by charters of incorporation containing limited liability clauses to reduce risks for investors. The English merchants 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 reorganized on a more permanent basis as the Levant Company.[261]

The ability of the new Levant Company to gain dominance in the Mediterranean textiles market, most especially in the Levant, also lay in its abilities to exercise superior naval power and superior diplomacy in its trade relations with the Turks.[262] 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 to the European horror over subsequent Turkish massacres of Christians. The victory at Lepanto can be credited to the role of the papacy and Venice in organizing an anti-Ottoman alliance and the latter, especially, in organizing the heavily armed fleets, with far superior naval artillery, which inflicted 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 the continued decline of Ottoman naval power, while English naval power continued to grow.

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[261] John Munro, "Tawney's Century (1540–1640): The Roots of Modern Capitalist Entrepreneurship," in *The Invention of Enterprise: Entrepreneurship from Ancient Mesopotamia to Modern Times*, ed. David Landes, Joel Mokyr, and William J. Baumol (Princeton, 2010), 107–55, esp. 128–34. See the following note (n. 262).

[262] See Gigliola Pagano de Divitiis, *English Merchants in Seventeenth-Century Italy*, trans. Stephen Parkin (Cambridge, 1997), 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, 1935), 1–42; and the following notes.

English Naval Power and Mediterranean Commerce in the Seventeenth Century

Certainly the growing gap in naval power, with 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, the English, during the later sixteenth and seventeenth century, were building and operating increasingly larger, far stronger oak-based carracks, which were also more heavily armed (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 total tonnage: rising from just 50,000 tons in 1572 to 340,000 tons in 1686.[263] The once-feared multinational pirates and Muslim corsairs, who 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.[264] 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 10 percent higher than those of many rivals—that cost increase was more than offset by significantly

[263] Pagano di Divitiis, *English Merchants*, table 2.1, p. 43 (n. 262 above); Ralph Davis, "Merchant Shipping in the Economy of the Late Seventeenth Century," *Economic History Review*, 2nd ser., 9 (1956): 59–73.

[264] For Venice's difficulties in competing with English and Dutch shipping, and their disadvantages in shipbuilding in the seventeenth century, see Lane, *Venice*, 338–89, esp. 378–89 (n. 240 above). 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 (1930): 261–90; Richard Unger, *Dutch Shipbuilding before 1800: Ships and Guilds* (Asseu, 1978); Richard Unger, *Ships and Shipping in the North Sea and Atlantic, 1400–1800* (Aldershot, 1997); Davis, "Merchant Shipping" (n. 263 above).

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 to explain why the English gained such a large share of the Mediterranean carrying trades.[265] At the same time, Venetian, other Italian, and Spanish shipbuilding industries were experiencing an irredeemable crisis from the 1570s, from soaring costs that 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, and even oaks within England itself. For the Italians, importing northern timber or buying northern-built ships, though an obvious and increasingly used alternative, was still relatively costly in terms of transport and transaction costs.[266]

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 especially beneficial to English commerce. The Turkish sultan quickly sought to achieve a new and more effective alliance with a European nation that would be more reliable than vacillating France had been and that would serve as a commercial counterweight to Venice.[267] England proved to be that country, and it was confident that any such alliance with the Turks would no longer threaten the safety of Christian Europe.[268] The English could hardly resist this opportunity, for it was their

[265] Ralph Davis, *English Overseas Trade, 1500–1700* (London, 1973), 20–31; idem, *The Rise of the English Shipping Industry in the Seventeenth and Eighteenth Centuries* (London, 1962), 1–57, 228–56; idem, "England and the Mediterranean, 1570–1670," in *Essays in the Economic and Social History of Tudor and Stuart England*, ed. F. J. Fisher (London, 1961), 117–37, esp. 126–37; idem, "Merchant Shipping," 59–73 (n. 263 above); Pagano di Divitiis, *English Merchants*, 41–55 (n. 262 above).

[266] See Pagano di Divitiis, *English Merchants*, 36–46, and other sources cited in nn. 262–63 above.

[267] Fernand Braudel, *The Mediterranean and the Mediterranean World in the Age of Philip II*, trans. Sian Reynolds, 2 vols. (London and New York, 1972–73), 1:615–29.

[268] The Ottoman threat did not fully disappear for another century, when, in September 1683, a Polish army led by Jan Sobieski (King John III), assisted by French and German forces under Duke Charles of Lorraine, destroyed a much larger

very first major opportunity to engage in Mediterranean trade.[269] What the Levant Company offered 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.[270] 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, for the English, it was 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 English woolen textiles, in order to invade the less competitive lower price ranges of the market, especially with the relatively cheap but still heavy-weight kerseys.[271] Soon, however, from the later 1590s, Levant Company mer-

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Turkish army led by grand vizier Kara Mustafa, which had besieged Vienna for several months. Subsequently, by 1688, the newly formed Holy League armies (of the Papacy, Habsburg Empire, Poland, Venice) under Emperor Leopold recaptured all of neighboring Hungary from the Turks, who never again would pose a threat to the West. See David Maland, *Europe in the Seventeenth Century*, 2nd ed. (London, 1983), 412–38.

[269] The first successful English maritime venture into the Mediterranean took place on 23 June 1573, when the English ship *Swallow* reached the harbor of the Italian port of Livorno (Leghorn); Livorno would continue to be very important for English trade in the Mediterranean. See Pagano de Divitiis, *English Merchants,* 5 (n. 262 above).

[270] Salim Aydüz, "Firearm and Munitions Trade between the Ottoman Empire and Some European States, 1350–1660," in *Relazioni economiche tra Europa e mondo islamico,* ed. Cavaciocchi, 843–62 (n. 182 above), 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 851.

[271] The common contention that English kerseys were lightweight textiles is false. In the sixteenth century, East Anglian kerseys had an official weight of 693.185 g/m^2 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

chants 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. 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. 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 (table 19b).[272]

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

these genuine woolens 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*, 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 (1578), 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: The Struggle for Markets," table 5.7, pp. 312–15; idem, "Three Centuries of Luxury Textile Consumption," table 1.1, pp. 10–11 (both in 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 XVII^e siècle," in *Relazioni economiche tra Europa e mondo islamico*, ed. Cavaciocchi (n. 182 above), 519–49, here table 3, p. 529, n. 1 ("serge de laine mélangée"). For comparative cloth weights, see nn. 17, 31, 69, 162–63, 205–8, 211, and 246 above and n. 301 below.

[272] See pp. 160–62 below. For the revival 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, 1908–39), vols. 2 and 3; Jonathan Israel, "The Phases of the Dutch *Staatsvaart*, 1590–1713: Chapter in the Economic History of the Mediterranean," *Tijdschrift voor geschiedenis* 99 (1986): 1–30; Wilson, "Cloth Production and International Competition," 209–21 (n. 250 above).

annual export was achieved in 1634, with a shipment of about 17,000 broadcloths to Ottoman ports.[273] 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.[274]

The English Cloth Export Trade during the Early Seventeenth Century: A European Perspective

These commercial events should also be placed in the historical context of the English cloth-export trade during the seventeenth century. First, the failure of the ill-advised royal Cockayne Project in 1614–17 (requiring English woolens to be fully dyed and dressed for export) and then the disastrous Thirty Years' War (1618–48) 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, a decline of 40.5 percent. Despite some subsequent recovery in England's overseas cloth trade, exports in 1640 were still only 86,924 broadcloths.[275] The opening of Mediterranean markets thus offered the English a very major and most important avenue for long-term recovery

[273] Davis, "England and the Mediterranean," 119–21 (n. 265 above). These statistics differ from those presented in Ralph Davis, "Influence de l'Angleterre sur la déclin de Venise au XVII siècle," in *Aspetti e cause della decadenza veneziana nel secolo XVII*, ed. Bognetti, 185–235, at 204–5 (n. 254 above): 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," 528–29 (n. 271 above). See also Israel, "Dutch *Staatsvaart*," 1–30, esp. 15–17 (n. 272 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 for 1605 with English statistics for 1630. The evidence cited below, however, fully vindicates the Davis thesis for the 1630s, and especially for the 1680s. See pp. 160–68.

[274] Pagano de Divitiis, *English Merchants*, 32 (n. 262 above). See also Rapp, "Unmaking of the Mediterranean Trade Hegemony" (n. 254 above).

[275] 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 (1950): 151–61, table 1, p. 153; Davis, *English Overseas Trade*, 11–25, 32–40 (n. 265 above).

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 broadcloth exports went to Mediterranean markets (73 percent were sent to northern Europe), though that former percentage rose to 25 percent in 1640—when total cloth exports accounted for 92.3 percent of all exports by value.[276] The Mediterranean share continued to grow thereafter. The major breakthrough in English foreign trade took place from the 1660s, in what Ralph Davis calls the early modern "Commercial Revolution," one fundamentally based on Mediterranean, American, Caribbean, and Asian markets, which ultimately reduced English dependence on northern markets from about 85 to 90 percent in the 1660s to just 30 percent by the late eighteenth century.[277]

The Levant Company's Trade with the Ottoman Empire after 1660

Our next set of textile trade statistics for the Levant comes from the late 1660s, in the first decade of the Commercial Revolution, when the Levant Company's cloth exports to Ottoman ports had risen to an annual average of 13,672 broadcloths (for 1666–71); in the 1670s, they had risen even more, to an annual average of 20,075 broadcloths (for 1672–77).[278] In the

[276] Fisher, "London's Export Trade," table 2, p. 153 (n. 275 above); C. G. A. Clay, *Economic Expansion and Social Change: England, 1500–1700*, vol. 2: *Industry, Trade, and Government* (Cambridge and New York, 1984), table 13, p. 144. If colonial reexports are included (6 percent of the total), the value of wool-based textiles falls to 88 percent of total exports. See Pagano de Divitiis, *English Merchants*, table 5.7, p. 177 (n. 262 above), and also the next note (n. 277 below).

[277] Davis, *English Overseas Trade*, esp. 20–26, 32–40 (n. 265 above); idem, "English Foreign Trade, 1660–1700," *Economic History Review*, 2nd ser., 7 (1954): 150–66. The West European Commercial Revolution was largely based on the new colonial reexport 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* 5 (May 1954): 33–53; and idem, "The Crisis of the 17th Century: II," *Past & Present* 6 (Nov. 1954): 44–46, repr. as "The Crisis of the Seventeenth Century," in *Crisis in Europe, 1560–1660: Essays from Past and Present*, ed. Trevor Aston (London, 1965), 5–58.

[278] Wood, *Levant Company*, 102 (n. 262 above); but on 42, Wood states, without any real authority, that the Levant Company's cloth exports had "increased by two

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 below). 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 2,058.20 cloths a year (table 18), though about 30 percent greater in length. Collectively, western woolens accounted for 94.32 percent of all textile sales in Smyrna by value, and 74.22 percent of all merchandise sales.[279]

Smyrna, to be sure, was only one Ottoman port, but it was the singlemost important 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, but only 13.61 percent of western purchases by value.[280] Of the western nations that traded with all

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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 6,493.20 pieces (but their woolens were 30 percent longer than English broadcloths). See table 18 below.

[279] Statistics from Fontenay, "Commerce des Occidentaux," annexe A, pp. 545–46 (n. 271 above). The total value of woolens sold at Smyrna was 1,576,610 piastres (1,169,009 m^2). 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 to 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*; from ca. 1600, however, 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," 415–22, esp. 421–22. See also table 19 below.

[280] Statistics from Fontenay, "Commerce des Occidentaux," table 6, p. 532 (n. 271 above), and from idem, "Le commerce des Occidentaux dans les échelles du Levant en 1686–1687," in *Chrétiens et musulmans à la Renaissance: Actes du 37e Colloque International du Centre d'Études Supérieures de la Renaissance (1994)*, ed. Bartolomé Bennassar and Robert Sauzet (Paris, 1998), 337–70, here table 1, p. 351:

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 goods 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 just 12.6 percent of total purchases.[281]

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 Ottomans' European and West Asian domains contained at least sixteen million people, and their African domains contained another six million (according to 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.[282]

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table 2, p. 352. The six ports included in this survey for 1686–87 are Constantinople, Smyrna (Izmir), Sidon, Athens, Sadak (Satala), and Candia (Iráklion, in Crete); not included are Beirut, Tripoli (connected to the inland caravan trading center of Aleppo, in northwest Syria), and Alexandria—but these ports were not important markets for woolen textiles.

[281] Fontenay, "Commerce des Occidentaux" (1998), table 1, p. 351 (n. 280 above); idem, "Commerce des Occidentaux" (2007), table 6, p. 532 (n. 271 above).

[282] Braudel, *The Mediterranean*, 1:395–98 (n. 267 above); Ömer Lûtfi Barkan, "La 'Mediterranée' de Fernand Braudel vue d'Istamboul," *Annales: Économies, sociétés, civilisations* 9 (1954): 189–200, here 191–93; İnalcik, *Ottoman Empire*, 1:25–43 (n. 243 above); de Vries, "Population," table 1, p. 13 (n. 178 above); Earle, "Commercial Development of Ancona," 40–41 (n. 227 above).

Equally important were the geographic and climatic factors. 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 neighboring 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 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."[283]

The growing importance of the Mediterranean basin in the seventeenth century, with its links to Asian and African markets, can be demonstrated by the following comparative statistics. In 1640, the Mediterranean region accounted for 45.5 percent of all English cloth exports (woolen, worsteds, and serges), a quantity almost identical to the cloth sales volume in northern Europe, which accounted for 46.9 percent (while the remaining 7.6 percent went to the Americas). Just twenty years later, by the 1660s, 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).[284]

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, 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 Pagano de Divitiis.[285] We have already seen that Florentine trade with the Levant in the fifteenth century

[283] Davis, "England and the Mediterranean, 1570–1670," 117–26, with quotation on 22–23 (n. 265 above).

[284] Ibid.

[285] Pagano di Divitiis, *English Merchants*, 33 (n. 262 above); Davis, "Influence d'Angleterre," 206–7 (n. 273 above); idem, "England and the Mediterranean," 125 (n. 265 above). On European silk consumption and manufactures, see Van der Wee, "Western European Woollen Industries," 456–61 (n. 188 above).

was essentially an exchange of Italian woolens for silk (and not spices, as might be assumed).[286] Indeed, silk was the single most valuable commodity imported into seventeenth-century England, 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.[287] If 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.[288]

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 frequently created a severe balance of payments deficit for western 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, 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 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.[289]

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[286] See above, pp. 124, 140, 146 and n. 176.

[287] Pagano de Divitiis, *English Merchants*, table 1.1, p. 33 (n. 262 above).

[288] Fontenay, "Commerce des Occidentaux" (2007), table 4, p. 529 (n. 271 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, 1988), 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.

[289] See Munro, "Venetian Trade with the Levant," table 1, p. 953 (n. 182 above), based on Eliyahu Ashtor, "The Venetian Supremacy in Levantine Trade: Monopoly or Pre-Colonialism?" *Journal of European Economic History* 3 (1974): 5–53; idem, "Profits from Trade with the Levant in the Fifteenth Century," *Bulletin of the School of Oriental and African Studies* 37 (1975): 250–75; idem, "The Volume of Levantine Trade in the Later Middle Ages (1370–1498)," *Journal of European Economic History*

According to Pagano di Divitiis's 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.[290] Even better data come from Michel Fontenay's research on western European trade with Ottoman ports for the years 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 payments in specie; the French, 47.84 percent; and the Venetians, 21.08 percent.[291] 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 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 now have to consider an alternative thesis that Benjamin Braude has offered to explain the

4 (1975): 573–612; idem, *Les métaux précieux et la balance des payements du Proche-Orient à la basse-époque* (Paris, 1971); idem, *A Social and Economic History of the Near East in the Middle Ages* (London, 1976), 319–31; and idem, *Levant Trade in the Later Middle Ages* (Princeton, 1983), 476–78 and table 54. See also Alan Stahl, "European Minting and the Balance of Payments with the Islamic World in the Later Middle Ages," in *Relazioni economiche tra Europa e mondo islamico*, ed. Cavaciocchi, 889–904 (n. 182 above).

[290] Pagano de Divitiis, *English Merchants*, 25 (n. 262 above), also citing Ralph Davis, *Aleppo and Devonshire Square: English Traders in the Levant in the Eighteenth Century* (London, 1967), 196–97.

[291] Fontenay, "Commerce des Occidentaux" (1998), table 1, p. 351 (n. 280 above); idem, "Commerce des Occidentaux" (2007), table 5, p. 532 (n. 271 above). For the piastre, see n. 279 above.

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 the Company, in the 1620s, was selling English woolens in Istanbul for prices below those prevailing within England.[292] However, the prices that Braude cite lack validity because they are not linked to specific types of cloths, the values of which 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 and, especially, abroad. Such competition was designed to permit merchants to charge higher, profit-producing, prices—not lower prices—which 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 kerseys with the much more expensive Suffolk colored broadcloths, which, ca. 1600, were worth on average 2.5 times as much as standard kerseys per yard; moreover, as noted earlier, kerseys disappeared from the Levant Company's trade during the 1620s, as it "upscaled" its cloth trade.[293]

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[292] Braude, "International Competition and Domestic Cloth," in particular, tables 1 and 2, p. 441; tables 2 and 4, pp. 444–45. His contentions are repeated, but with no new evidence, in Braude, "Rise and Fall of Salonica Woollens," 216–36, esp. 228–36 (both in n. 259 above). Part of his case rests on the validity of the Levant Company's records for exchange rates (pence sterling to *aspres*), which cannot be tested here.

[293] See Shammas, "Decline of Textile Prices," table 1, p. 484 (n. 209 above): an average ratio of 80:32 in 1578–99 and 65:37 (pence per yard) in 1600–1640. See Davis, "England in the Mediterranean," 120, n. 3 (n. 265 above), contending that officially (for customs purposes) broadcloths were worth four times as much as kerseys; however, 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: The Struggle 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. 80 and 161 and n. 278). But see also Pagano di Divitiis, *English Merchants*, 32 (n. 262 above), contending (incorrectly, in my view) that the Levant Company's broadcloths were different from standard broadcloths and that English producers (unnamed) had "counterfeited the Venetian woollens 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.

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.[294] In his one single domestic source for English woolen cloth prices—those for mixed colored broadcloths that Westminster Abbey purchased each year for its servants—such distinctions are not clearly made.[295] 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.[296] Braude does not, however, cite another cloth price series from this same source: the price for broadcloths purchased for Westminster scholars, which were far cheaper during these same years, averaging only 7s 4d per yard (55 percent as much).[297] Nor does he cite an even cheaper range of English cloth prices: the price for woolens supplied to the servants and scholars at Winchester College and Eton College, which, for the period 1615–40, averaged just 5s 0d and 6s 6d per yard, respectively.[298] 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 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

[294] See, for example, the text cited in n. 227 above.

[295] The prices are taken from William Beveridge, *Prices and Wages in England from the Twelfth to the Nineteenth Century*, vol. 1: *Price Tables: Mercantile Era* (London, 1939; repr. London, 1965), 183. Braude's publications preceded the publication of Shammas, "Decline of Textile Prices" (n. 209 above).

[296] 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" (n. 16 above).

[297] Beveridge, *Prices and Wages*, 193 (n. 295 above).

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

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 adopted a strategy that required the export of even more specie, especially when such exports (without a costly license) were still illegal, and remained so until 1663?[299]

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

The history of the Levant Company's textile trade in the Mediterranean during the seventeenth century cannot be complete without an examination of its equally great success in selling a growing quantity of products from England's so-called New Draperies: the far lighter and far cheaper semi-worsted or serge-type cloths.[300] 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.[301] According to Carole Shammas's survey of English textile prices, those for products of the New Draperies in the period 1578–99 ranged from 12.50 percent to 30.00 percent of those for heavy-weight broadcloths, with an average of 22.92 percent; in 1600–1640, they averaged

[299] From January 1364, by Statute 36 Edwardi III, stat. 1, c. 2, England had forbidden the export of any English coin (without a royal license), as well as all forms of bullion: *Statutes of the Realm*, 1:383 (n. 108 above). In May 1663, Parliament repealed its provisions concerning bullion exports: in Statute 15 Carolus II. c, 7, in *Statutes of the Realm*, 5:451, sec. 9. That legislation was influenced by arguments set forth by the East India Company: in Thomas Mun, *England's Treasure by Forraign Trade* [1664] (reissued Oxford, 1937).

[300] See pp. 121, 131–37, and 148 above. For England's New Draperies, see nn. 140, 164, 191, 196, 199, 201, 208, 250, and 271 above, and nn. 301–2 and 304–7 below.

[301] See Munro, "Medieval Woollens: The 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 square 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. For comparative cloth weights, see nn. 17, 31, 69, 162–63, 205–8, 211, 246, and 271 above.

29.85 percent of the value of such broadcloths; and in 1660–99, 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.[302] Such a fall in relative textile prices (not explained by any technological factors) may have stimulated demand, unless the decline in cloth prices was relative only to rising prices for European foodstuffs, since rising food prices with fixed household budgets would necessarily have reduced consumer demand for textiles.[303]

As noted earlier (p. 148), 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. Nevertheless, 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 again favored long-distance trade in cheaper textiles, in particular, but also changes in consumer demand, including changes in textile fashions.[304] The just-observed fall in real prices would not, however, have necessarily favored foreign demand for products of the New Draperies over demand for the traditional woolens of the Old Draperies, especially since the observed real

[302] Shammas, "Decline of Textile Prices," table 1, p. 484 (n. 209 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 31.33d per yd to 15.25d per yd.

[303] Between 1576–80 and 1696–1700, mean nominal English grain prices had risen by 148.04 percent while mean English textile prices had risen by only 42.98 percent, only 29 percent as much (in nominal terms). See the statistical sources cited in n. 14 above.

[304] See pp. 127–29 above and various essays in *The New Draperies in the Low Countries and England*, ed. Harte (n. 20 above), esp. those by B. A. Holderness, "The Reception and Distribution of the New Draperies in England," 217–44; Luc Martin, "The Rise of the New Draperies in Norwich, 1550–1622," 245–74; and Ursula Priestley, "Norwich Stuffs, 1600–1700," 275–88.

price-decline was greater for the woolen products of the Old Draperies than for the worsteds and serges of the New Draperies.

An equally important supply factor, one also mentioned earlier (pp. 111–12), was the benefit that the New Draperies had derived, and at the direct expense of the Old Draperies, from the aforementioned Tudor-Stuart enclosures: a much higher proportion of England's sheep population came to be raised in the form of much larger, meatier animals, 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.[305]

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, p. 160) 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.[306] By 1700, English exports of textiles from the New Draperies had 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.[307]

Just as England had earlier, in the fifteenth century, gained supremacy in European cloth markets for the woolens of the Old Draperies, based essentially on a comparative cost advantage in wools (short-stapled),[308] so England now, in the seventeenth and eighteenth centuries, gained an equal supremacy in both European and overseas American colonial markets for

[305] See pp. 111–12 above, and esp. Bowden, *Wool Trade,* 1–76 (n. 139 above); Van der Wee, "Western European Woollen Industries," 423–25, 452–61 (n. 188 above).

[306] Clay, *Economic Expansion,* vol. 2, table 13, p. 144 (n. 276 above). In the 1660s, 24.23 percent of textiles from the New Draperies sold in the Mediterranean went to Italy; 10.1 percent 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. 262 above).

[307] Mann, *Cloth Industry*, appendix 1: table B, p. 309 (n. 139 above): total value of £2,818,871, excluding hosiery; Van der Wee, "Western European Woollen Industries," table 8.6, p. 457 (n. 188 above); Clay, *Economic Expansion*, table 15, p. 146 (n. 276 above).

[308] See Munro, *Wool, Cloth, and Gold*, 155–83 (n. 109 above); idem, "Symbiosis of Towns and Textiles" (n. 42 above); idem, "Medieval Woollens: The Struggle for Markets," 278–96 (n. 8 above).

the products of its New Draperies, based now on some comparative advantage in its wool supplies (long-stapled), but more especially its advantages in transaction costs, certainly in the Mediterranean basin. That supremacy may well explain why Venice's attempts to diversify 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 its *Terra Firma* 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.[309]

The East India Companies, the Spice Trade, and the Decline of Venice in the Seventeenth Century

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, ending the 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 1570s, when the arrival of the Levant Company provided some access to the Asian overland caravan trade that terminated in Aleppo (in northwest Syria); but, as noted earlier, silks were far more important than spices in the Levant trade.[310]

Of much greater importance, therefore, is the fact that leading merchants and investors in the Levant Company took part in setting up 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 incorporated, limited-liability, joint-stock companies engaged in overseas trade. But, at the very same time, the Dutch were also seeking

[309] See nn. 108 and 167 above; Mozatto, "Production of Woollens," 99 (n. 229 above); Panciera, *L'Arte matrice*, 13–66 (n. 238 above); idem, "Qualità e costi di produzione" (n. 247 above); and idem, "Industries of Venice," 189–90 (n. 252 above). See also Demo, "Wool and Silk," 222–23, 229 (n. 108 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.

[310] Steensgaard, *Asian Trade Revolution*, 31–42, 74–81, 114–25, 405–12 (n. 279 above); Wood, *Levant Company*, 15–58 (n. 262 above).

their own monopoly on the East Indies spice trades. For that purpose, they established (in 1602) their own joint-stock company: the United East India Co. better known by its Dutch initials as the VOC (*Vereenigde Oost-indische Compagnie*). Taking advantage of wars that beset 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 a direct sea route to the East Indies, circumventing both the ancient Asian overland caravan routes to the Mediterranean (to the Levant) and the Indian Ocean routes to the Persian Gulf and the Red Sea (ultimately to Alexandria).[311]

The VOC was chiefly responsible for destroying much (if not all) of the remaining Portuguese power in the Indies. Of even greater importance was the Dutch 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 one of the key Spice Islands, in the so-called Massacre of Amboyna (modern-day Ambom, in the Celebes) in 1622. Forced to concentrate on the Indian subcontinent, the English ultimately gained a much greater share of Asian trade: not only from India, which had its own secondary, but still important, spice trades (especially on the Coromandel coast of the Bay of Bengal), 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 (post-1600) by the Dutch and English.[312] The loss of that power, and the once vast profits gained from the spice trade in Ottoman ports, may have contributed to the decline in Venetian woolen sales in Turkish markets, since sales of woolens depended in part on Venetian purchases. However, the other factors previously cited were probably more important than Venice's loss of the spice trades.

[311] For the debate about the origins of Dutch limited-liability, joint-stock companies, see Steensgaard, *Asian Trade Revolution*, 127, and 114–53, 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; 2nd ed., The Hague, 1981).

[312] See Steensgaard, *Asian Trade Revolution*, 53–55, 102–6, 185–91, and 226–36 (n. 279 above).

The Indian Summer of the Florentine Cloth Industry and Its Decline and Fall: ca. 1550–ca. 1670

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, p. 140, producing about 20,000 bolts), only to be followed by a severe slump that greatly benefited the recovery and expansion of the Venetian cloth industry.[313]

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 mid-fifteenth-century industrial expansion, which had been based almost entirely on the Garbo sector's cheaper-line woolens 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 that included not only fine woolen broadcloths (*panni larghi*) of the old San Martino sector but also the aforementioned *rascie*, which enjoyed a greater market orientation within Europe itself.[314] Since the latter were composed solely of Spanish *merino* wools, they would have been classed earlier as Garbo woolens; in view of their very high value (about 68–70 florins of account, see above, p. 138), however, they were indisputably *panni ricchi*. Though originally introduced in 1488 (see above, p. 131), they became prominent in Florentine textile exports, as noted earlier, only from the later 1540s or 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 higher-priced *panni ricchi* (dominated then by the *rascie*) and that much of the remainder was in the much cheaper serge fabrics known as *panni perpignani*.[315]

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[313] See above, pp. 140–47 and nn. 170, 174–79, and 222–27.

[314] The following is based on Chorley, "*Rascie* and the Florentine Cloth Industry" (n. 115 above), and idem, "Volume of Cloth Production," 551–67 (n. 170 above).

[315] Chorley, "*Rascie* and the Florentine Cloth Industry," 500, 516–17 (n. 115

The Peace of Câteau-Cambrésis in April 1559 (evicting the French from Italy), 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 be seen 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).[316] 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, misleading, because they combine outputs of high-valued *panni ricchi*—including 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 (*scudi*), we would find that total Florentine cloth output rose from 8,820 *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 13,285 *panni ricchi* and 6,642 *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 below).[317]

Adding to this apparent confusion, Ammannati has recently 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

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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. 131, and below, p. 174–76.

[316] 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," 6 (n. 194 above), *panno corsivo* means coarse cloth. For the relationship of the Florentine *scudo* and the *fiorino*, see n. 150 above.

[317] See the sources cited in nn. 319–20 below.

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 on the relative shares that each contributed to total output each year.[318] First, he contends 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, whereas the share for the *panni ricchi* correspondingly rose from 75 to 85 percent. Tables 15–16 below present these estimates, along with the original guild statistics. Whatever was the actual peak output, in 1571, it was possibly below, and certainly not much higher than, the estimated output for the 1520s: that is, about 18,000 to 24,000 bolts (a mean of 21,000).[319]

From that peak of 1571, total Florentine cloth outputs reckoned in notional *panni corsivi* fell by over about one-third, to 15,723 *panni* in 1586. 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, to only 1,500–2,000 pieces in 1720.[320] The much cheaper *panni perpignani* by now

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[318] Ammannati, "Florentine Woolen Manufacture," 6, n. 18; fig. 1, p. 7; and table 1, p. 8 (n. 194 above).

[319] 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. 115 above); idem, "Volume of Cloth Production," 560 (n. 170 above). See tables 15–16 below.

[320] Chorley, "*Rascie* and the Florentine Cloth Industry," tables 1 and 2, pp. 516–18 (n. 115 above); idem, "Volume of Cloth Production," table 1, p. 556; table 2, p. 3; p. 565 (n. 170 above); Paolo Malanima, *La decadenza di un'economia cittadina: L'industria di Firenze nei secoli XVI–XVIII* (Bologna, 1982), 289–305, esp. table on 302; and idem, "An Example of Industrial Reconversion: Tuscany in the Sixteenth and Seventeenth Centuries," in *The Rise and Decline of Urban Industries in Italy and the Low Countries (Late Middle Ages-Early Modern Times)*, ed. Herman Van der Wee (Leuven, 1988), 63–74, esp. 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 1601–2; 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 Malanima's data, from 1604 to 1620 (in the monograph only—not the essay, which he does not cite) in his "Volume of Cloth Production," 570–71. See also table 17 below.

had progressively displaced the very costly *panni rascie* as the primary product of the Florentine export industry.[321] 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.[322] In the early seventeenth century, several guild complaints contended that some producers had been weaving *rascie* with inferior wools and lower yarn densities.[323] 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 Florentine industry to return once more to domestic *matricina* wools, now of much lower quality.[324]

According to archival data supplied by Ruggiero Romano, for the first half of the seventeenth century only (table 17 below), the proportion of total cloths produced as *panni perpignani* rose from a mean of 66.68 percent in 1616–20 to a peak of 74.54 percent in 1626–30, but then declined, rising only slightly to a mean of 66.15 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 10.97 percent in 1626–30, temporarily

[321] See Maurice Carmona, "La Toscane face à la crise de l'industrie lainière: techniques et mentalités économiques aux XVI^{e} et XVII^{e} siècles," in *Panni di lana*, ed. Spallanzani, 151–68, at annexe 2, p. 159 (n. 3 above), for 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*. See also table 17 below.

[322] Chorley, "Volume of Cloth Production," table 3, p. 565 (n. 170 above). As indicated earlier (nn. 319–21 above), 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," 6, n. 18; and table 1, p. 8 (n. 194 above).

[323] Ammannati, "Florentine Woolen Manufacture," 3–4 (nn. 194 and 318 above), citing in particular a guild letter of 1603 to Grand Duke Ferdinand I de'Medici.

[324] Ibid., 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," 569 (n. 170 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.

recovering in the 1630s, but falling again to 12.35 percent in 1641–45.[325]

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 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.[326] Commerce within the Low Countries, and with Spain itself, suffered enormous 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 in 1621, finally ending in 1648, with the Treaty of Westphalia). Antwerp's role as the commercial and financial capital of northern Europe effectively ended with the combination of the Spanish Fury in 1576 and the Duke of Anjou's brutal sack of this city in 1583.[327] 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 both Dutch maritime commerce and the Dutch textile industries. Spain itself was continuously involved in wars, not only with Holland, but also with France and England, while trying to annex rebellious Portugal, from 1580.

In the seventeenth century, Florentine cloth exports undoubtedly lost most of any remaining northern markets during the Thirty Years' War 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 the high-quality woolens and the lower-priced, lighter-weight serges and worsteds.[328] 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

[325] Ruggiero Romano, "À Florence au XVII[e] siècle: industries textiles et conjoncture," *Annales: Économies, sociétés, civilisations* 7 (1952): 508–12, esp. table 1, p. 511 (for the years 1616–45). See table 17 below.

[326] See Richard Gascon, *Grand commerce et vie urbaine au 16 siècle: Lyon et ses marchands (environs de 1520–environs de 1580)*, 2 vols. (Paris and The Hague, 1971), vol. 2: *Conjonctures: de la prospérité au déclin*, 460–672.

[327] Van der Wee, *Growth of the Antwerp Market*, 2:245–68 (n. 186 above).

[328] For silks, see n. 108 above; for linens, see Romano, "Florence au XVII[e] siècle," table 2, p. 512 (n. 325 above); for both, see Goldthwaite, *Economy of Renaissance Florence*, 296–98 (n. 6 above).

cloths woven chiefly from Italian wools.[329] According to his data on wool 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 Spanish.[330] 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 only 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."[331]

Some Conclusions: Comparative Advantages in Wool Supplies and Transaction Costs

This study of the rise, splendor, and fall of the Italian cloth industries—principally in Florence and Venice—over these six centuries demonstrates the importance of comparative advantage in international trade, which also involves changes in transaction costs. That comparative advantage never lay in the technologies of cloth production, if only because, as stressed earlier, 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 century,

[329] Malanima, "Industrial Reconversion," 67–68 (n. 320 above); Carmona, "La Toscane" (n. 321 above), 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 XVII secolo: produzione e commercio* (Turin, 2007), esp. the appendices, 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).

[330] Malanima, *Decadenza*, 95 (n. 320 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 they probably do not represent a change from the mid-century.

[331] Ammannati, "Florentine Woolen Manufacture," 9; see also idem, "L'Arte della Lana a Firenze," 26–39 (both in n. 194 above).

in northwest Europe, a shift not 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, so that it finally gained European dominance, lay primarily in its wool supplies: in having close access, and especially tax-free access, to its own fine wools, which were then by far the finest available in Europe and 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, beginning in the 1330s.

Nevertheless, late-medieval Florence did not immediately lose its preeminence in southern and Mediterranean markets, despite its earlier, fourteenth-century dependency on those same fine English wools. The plight of the Florentine and other Italian cloth industries that had earlier relied on English wools should have been even worse than it was because their English wools were burdened with even heavier alien export duties. Furthermore, the far more distant routes involved in transporting the wools, by land or by sea, involved much greater perils and thus higher costs. 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 seemingly 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. Moreover, problems in supplying Italy with *merino* wools evidently forced the Tuscan cloth industries to resort to domestic Italian *matricina* wools during the middle and later decades of the fifteenth century.

The compensating advantages for the Florentine cloth industry, in continuing to dominate the later 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, earlier than in northern Europe. By the later fifteenth century, furthermore, the Florentines were switching back to Spanish *merino* wools, now of far higher quality (and

with cheaper access). In the early sixteenth century, certainly by the later 1520s, the Florentines 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 also was using Spanish *merino* wools—but rather in transaction costs in the Levant trades, especially when the vital Persian 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 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 transaction 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.[332] Combined with its governmental support and its skilled diplomacy, the Levant Company had gained, by the 1660s, an overwhelming dominance in the Ottoman textile markets, not just over Venetian competitors, but over other European competitors as well, of whom only the Dutch were a serious rival. The northern European, and especially English, supremacy stifled any hope that the Florentine cloth industry could have benefited 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 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

[332] 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," *Journal of European Economic History* 39 (2010): 67–99.

Venetian cloth trade, that role had utterly ceased by the virtual monopoly that the Dutch had established by the 1620s.

Table 1
Prices of Northern Woolens and Says Sold in Florence by the Del Bene Firm in 1318–23

Cloth Type and Textile Town	Type/ Color	Avg. Price in £ *Affiorini*	Avg. 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%
Châlons	green	52	35.862	43	24.19	106.91%
Châlons	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 meter; 4 braccia = 1 canna = 2.33 meters

Source

Patrick Chorley. "The Cloth Exports of Flanders and Northern France during the Thirteenth Century: A Luxury Trade?" *Economic History Review*, 2nd ser., 40 (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 1318–23

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

Cloth Type and Textile Town	Max. Price in Gold Florins	Min. Price in Gold Florins	Mean: Price in Gold Florins	Percent of Woolens Mean	Percent of Douai Mean	Percent of Ypres Mean
Woolens from						
Douai	5.586	3.172	4.379	130.37%	100.00%	170.47%
Mechelen	5.241	2.000	3.621	107.78%	82.68%	140.94%
Brussels	4.241	2.931	3.586	106.76%	81.89%	139.60%
Châlons	4.241	2.172	3.207	95.47%	73.23%	124.83%
Ghent	3.690	1.897	2.793	83.15%	63.78%	108.72%
Ypres	3.655	1.483	2.569	76.48%	58.66%	100.00%
Mean Value	**4.443**	**2.276**	**3.359**	**100.00%**	**76.71%**	**130.76%**
Says and Other Lighter and/or Cheaper Cloths from						
Lille*	3.069	2.034	2.552	75.96%	58.27%	99.33%
Aalst*	3.000	2.379	2.690	80.07%	61.42%	104.70%
Caen	2.621	1.345	1.983	59.02%	45.28%	77.18%
Orchies	2.345	1.828	2.086	62.10%	47.64%	81.21%
Hondschoote	2.172	1.414	1.793	53.38%	40.94%	69.80%
Arras	1.724	1.690	1.707	50.81%	38.98%	66.44%
Paris	1.724	1.552	1.638	48.76%	37.40%	63.76%
Poperinghe	1.621	1.310	1.466	43.63%	33.46%	57.05%
Saint-Denis	1.000	1.000	1.000	29.77%	22.83%	38.93%
Ghistelles	0.828	0.724	0.776	23.10%	17.72%	30.20%
Mean Value	**2.010**	**1.528**	**1.769**	**52.66%**	**40.39%**	**68.86%**
Percent of Woolens Prices	**45.25%**	**67.12%**	**52.66%**			

* The nature of the cloths from Lille and Aalst (Alost) cannot be determined

Source
Calculated from the data presented in Hidetoshi Hoshino, "The Rise of the Florentine Woollen Industry in the Fourteenth Century," in *Cloth and Clothing in Medieval Europe*, ed. Negley B. Harte and Kenneth G. Ponting, Pasold Studies in Textile History 2 (London, 1983), table 11.2, p. 190. Hoshino's prices were given in *soldi affiorini*. For this table, they have been converted into gold florins (*fiorini doro*) at the rate of 29 *soldi* = 1 florin (fixed rate from 1279). See Peter Spufford, *Handbook of Medieval Exchange* (London, 1986), 34, 39.

Tables 3A–3D
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

3A. Prices of Italian, Catalan, French, and Flemish Woolens Sold in Naples and Sicily, 1380–1410

Place Country and Town	Textile	Rank Order	Value in Florentine Florins	Value in £ Sterling 36d per Florin	Value in £ Groot Flemish 34d per 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 woolen broadcloths	lowest	40.000	6.000	5.667
Milan, Como	dyed woolen broadcloths	mean	43.360	6.504	6.143
Milan, Como	dyed woolen broadcloths	highest	45.000	6.750	6.375
Prato, Pisa, Siena	dyed woolen broadcloths	lowest	21.680	3.252	3.071
Prato, Pisa, Siena	dyed woolen broadcloths	mean	26.020	3.903	3.686
Prato, Pisa, Siena	dyed woolen broadcloths	highest	30.350	4.553	4.300
Catalonia					
Perpignano	dyed woolen broadcloths	mean	17.000	2.550	2.408
Villefranca	dyed woolen broadcloths	mean	9.370	1.406	1.327
France					
Languedoc	dyed woolen broadcloths	mean	16.000	2.400	2.267
Gignac, Beziers	dyed woolen broadcloths	mean	17.500	2.625	2.479
Carcassonne	dyed woolen broadcloths	mean	19.000	2.850	2.692
Flanders					
Wervik	dyed woolen broadcloths		26.000	3.900	3.683

***3B*. Prices of Italian, Flemish, Brabantine, French, Spanish, and English Woolens in Spain (Barcelona, Valencia, Majorca): Sales by the Datini Firm, 1394–1410**

Place Country and Town	Textile	Rank Order	Value in Flor-entine Florins	Value in £ Sterling 36d per Florin	Value in £ Groot Flemish 34d per Florin
Italy					
Florence	dyed woolen broadcloths	mean	64.430	9.665	9.128
Prato, Genoa	dyed woolen broadcloths	mean	62.630	9.395	8.873
Flanders					
Wervik, Kortrijk	dyed woolen broadcloths	mean	27.900	4.185	3.953
Comines, Menin	dyed woolen broadcloths	mean	27.900	4.185	3.953
Bruges	dyed woolen broadcloths	mean	44.010	6.602	6.235
Brabant					
Brussels	dyed woolen broadcloths	mean	44.180	6.627	6.259
Mechelen	dyed woolen broadcloths	mean	44.180	6.627	6.259
France					
Montivilliers	dyed woolen broadcloths	mean	31.480	4.722	4.460
Spain					
Perpignano	dyed woolen broadcloths	lowest	10.670	1.601	1.512
Perpignano	dyed woolen broadcloths	mean	13.620	2.043	1.930
Perpignano	dyed woolen broadcloths	highest	18.670	2.801	2.645
Puigcerda	dyed woolen broadcloths	mean	10.670	1.601	1.512
Villefranca	dyed woolen broadcloths	mean	8.800	1.320	1.247
Villefranca	dyed woolen broadcloths	mean	8.400	1.260	1.190
Barcelona	dyed woolen broadcloths	mean	11.860	1.779	1.680
England					
Essex	straits (dozens)	mean	6.120	0.918	0.867
France					
Languedoc	dyed woolen broadcloths	mean	16.000	2.400	2.267
Gignac, Beziers	dyed woolen broadcloths	mean	17.500	2.625	2.479
Carcassonne	dyed woolen broadcloths	mean	19.000	2.850	2.692
Flanders					
Wervik	dyed woolen broadcloths		26.000	3.900	3.683

3C. **Prices for Italian, Catalan, French, Flemish, Brabantine, and English Textiles Sold in the Levant (Alexandria, Damascus, and Constantinople), ca. 1390–1435**

Place/Town	Textile	Place of Sale and Date	Value in Flor-entine Florins	Value in £ Sterling 36d/Florin 40d/Florin	Value in £ Groot 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 woolen broadcloths	D: 1390	16.500	2.475	2.338
Villefranca	dyed woolen broadcloths	D: 1395	14.500	2.175	2.054
Barcelona	dyed woolen broadcloths	D: 1390	15.500	2.325	2.196
Barcelona	dyed woolen broadcloths	D: 1395	12.000	1.800	1.700
Puigcerda	dyed woolen broadcloths	D: 1395	12.500	1.875	1.771
Perpignano	woolen "simples"	D: 1395	14.500	2.175	2.054
Perpignano	panni alla francesca	D: 1395	17.300	2.595	2.451
France					
Louviers	dyed woolen broadcloths	A: 1390	25.500	3.825	3.613
Narbonne	dyed woolen broadcloths	A: 1396	10.500	1.575	1.488
Narbonne	dyed woolen broadcloths	D: 1396	10.500	1.575	1.488
Narbonne	dyed woolen broadcloths	A: 1399	19.440	2.916	2.754
Flanders					
Wervik	dyed woolen broadcloths	D: 1395	19.200	2.880	2.720
Wervik	dyed woolen broadcloths	C: 1436	28.300	4.717	5.896
Wervik	dyed woolen broadcloths	C: 1436	22.000	3.667	4.583
Brabant					
Mechelen	dyed woolen broadcloths	D: 1395	38.500	5.775	5.454
England					
Worcestershire	Cotswolds	D: 1405	35.000	5.250	4.958
	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

***3D.* Prices for Italian, English, Flemish, Brabantine, Dutch, French, and Rhenish Textiles in Poland (Cracow), ca. 1390–1400: Prices for Woolens of 35 Flemish Ells**

Place/Town	Textile	Value in Flor-entine Florins	Value in £ Sterling 36d/ Florin	Groszes per Ell	Value in £ Groot Flemish 34d/Florin
Italy					
Florence	dyed woolen broadcloths	29.170	4.376	20	4.132
Florence	dyed woolen broadcloths	32.080	4.812	22	4.545
Flanders					
Bruges	dyed woolen broadcloths	43.750	6.563	30	6.198
Dendermonde	dyed woolen broadcloths	21.870	3.281	15	3.098
Kortrijk	dyed woolen broadcloths	17.500	2.625	12	2.479
Geraardsbergen	dyed woolen broadcloths	17.500	2.625	12	2.479
Brabant					
Brussels	dyed woolen broadcloths	29.170	4.376	20	4.132
Brussels	dyed woolen broadcloths	46.670	7.001	32	6.612
Mechelen	dyed woolen broadcloths	24.790	3.719	17	3.512
Leuven	dyed woolen broadcloths	23.330	3.499	16	3.305
Lier	dyed woolen broadcloths	35.000	5.250	24	4.958
Lier	dyed woolen broadcloths	26.250	3.938	18	3.719
Tienen	dyed woolen broadcloths	20.420	3.063	14	2.893
Tienen	small cloths	13.120	1.968	9	1.859
Herentals	dyed woolen broadcloths	26.250	3.938	18	3.719
Holland					
Leiden(?)	Ostrodommensis	21.870	3.281	15	3.098
England					
London	dyed woolen broadcloths	17.500	2.625	12	2.479
London	dyed woolen broadcloths	35.000	5.250	24	4.958
unspecified	dyed woolen 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					
Aachen	unspecified	11.670	1.751	8	1.653

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Table 4

Customs and Subsidies as Export Duties on English Woolsacks in Shillings per Sack of 364 lb (165.108 kg), in Quinquennial Means, 1271–75 to 1496–1500, with Woolsack Prices (Better Quality) in £ Sterling per Sack

5-Year Periods Michaelmas Year (from 29 Sept.)	Export Duties: Denizen Total Shillings	Export Duties: Alien Total Shillings	Woolsack (364 lb) Price in £ (Better Wools)*	Denizen Export Duty as % of Wool Price	Alien Export Duty as % of Wool Price	Denizen Wool Exports	Alien Wool Exports	Total Sacks	Denizen % of Total	Alien % of Total
1276–80	6.667	6.667	6.791	4.91%	4.91%					
1281–85	6.667	6.667	5.700	5.85%	5.85%			26,897.20		
1286–90	6.667	6.667	6.281	5.31%	5.31%			26,040.80		
1291–95	14.667	14.667	5.402	13.58%	13.58%			27,919.20		
1296–1300	22.667	22.667	5.508	20.58%	20.58%			23,041.20		
1301–5	6.667	8.667	5.441	6.13%	7.96%			32,344.00		
1306–10	6.667	10.000	7.006	4.76%	7.14%	23,041.60	15,974.60	39,016.20	59.06%	40.94%
1311–15	6.667	6.667	6.087	5.48%	5.48%			35,328.60		
1316–20	8.332	9.166	7.012	5.94%	6.54%			26,084.60		
1321–25	8.000	12.000	7.834	5.11%	7.66%	14,074.30	11,241.73	25,316.03	55.59%	44.41%
1326–30	12.227	15.560	6.649	9.19%	11.70%	17,888.87	7,108.73	24,997.60	71.56%	28.44%
1331–35	10.373	14.559	5.370	9.66%	13.56%	24,633.00	9,012.60	33,645.60	73.21%	26.79%
1336–40	29.556	41.501	4.646	31.81%	44.67%	13,180.00	7,344.80	20,524.80	64.21%	35.79%
1341–45	40.247	43.333	4.947	40.68%	43.80%	10,565.51	7,510.07	18,075.58	58.45%	41.55%
1346–50	40.000	43.333	4.713	42.43%	45.97%			27,183.13		
1351–55	40.000	43.333	4.446	44.99%	48.74%	10,169.40	20,581.00	30,750.40	33.07%	66.93%
1356–60	40.000	43.333	5.243	38.14%	41.32%			32,666.40		
1361–65	44.110	46.110	5.606	39.34%	41.13%	20,899.95	9,229.25	30,129.20	69.37%	30.63%
1366–70	49.650	50.000	6.689	37.11%	37.37%	16,345.60	10,106.20	26,451.80	61.79%	38.21%
1371–75	51.584	53.333	7.895	32.67%	33.78%	16,712.02	9,155.78	25,867.80	64.61%	35.39%
1376–80	51.584	53.333	7.536	34.22%	35.38%	16,898.00	3,572.20	20,470.20	82.55%	17.45%
1381–85	51.584	53.333	5.995	43.02%	44.48%	13,886.80	3,630.60	17,517.40	79.27%	20.73%

one sack of wool = 364 lb = 165.108 kg

5-Year Periods Michaelmas Year (from 29 Sept.)	Export Duties: Denizen Total Shillings	Export Duties: Alien Total Shillings	Woolsack (364 lb) Price in £ (Better Wools)*	Denizen Export Duty as % of Wool Price	Alien Export Duty as % of Wool Price	Denizen Wool Exports	Alien Wool Exports	Total Sacks	Denizen % of Total	Alien % of Total
1386–90	50.100	52.166	5.071	49.40%	51.43%	15,574.20	3,737.80	19,312.00	80.65%	19.35%
1391–95	51.414	53.163	4.953	51.90%	53.66%	13,593.20	4,920.60	18,513.80	73.42%	26.58%
1396–1400	51.584	56.555	5.241	49.21%	53.95%	14,515.80	2,373.80	16,889.60	85.95%	14.05%
1401–5	52.771	61.187	5.702	46.28%	53.66%	11,803.40	1,100.80	12,904.20	91.47%	8.53%
1406–10	51.584	60.000	6.219	41.47%	48.24%	13,392.80	1,575.40	14,968.20	89.48%	10.52%
1411–15	51.584	60.000	5.954	43.32%	50.39%	12,633.20	960.00	13,593.20	92.94%	7.06%
1416–20	51.584	68.000	4.592	56.17%	74.05%	13,355.40	1,009.60	14,365.00	92.97%	7.03%
1421–25	45.425	62.658	5.269	43.11%	59.46%	13,363.60	881.60	14,245.20	93.81%	6.19%
1426–30	41.584	53.333	5.015	41.46%	53.18%	12,429.00	929.60	13,358.60	93.04%	6.96%
1431–35	41.584	57.103	5.613	37.04%	50.86%	8,679.40	705.20	9,384.60	92.49%	7.51%
1436–40	41.584	62.267	5.322	39.07%	58.50%	4,197.80	1,181.00	5,378.80	78.04%	21.96%
1441–45	41.584	63.333	5.201	39.97%	60.88%	6,502.20	1,527.20	8,029.40	80.98%	19.02%
1446–50	41.584	63.333	5.379	38.66%	58.88%	9,176.80	588.40	9,765.20	93.97%	6.03%
1451–55	44.564	77.244	4.699	47.42%	82.19%	7,654.60	1,136.20	8,790.80	87.08%	12.92%
1456–60	51.584	110.000	3.775	68.32%	145.69%	5,246.80	1,139.60	6,386.40	82.16%	17.84%
1461–65	50.416	106.110	5.186	48.61%	102.31%	5,902.40	483.60	6,386.00	92.43%	7.57%
1466–70	41.584	76.667	5.645	36.83%	67.91%	8,508.80	784.80	9,293.60	91.56%	8.44%
1471–75	42.783	80.667	4.968	43.06%	81.19%	7,381.20	1,072.20	8,453.40	87.32%	12.68%
1476–80	41.583	76.667	5.847	35.56%	65.56%	7,822.80	913.20	8,736.00	89.55%	10.45%
1481–85	41.583	76.667	8.621	24.12%	44.46%	6,669.60	951.80	7,621.40	87.51%	12.49%
1486–90	41.583	76.667	7.462	27.86%	51.37%	8,923.60	827.40	9,751.00	91.51%	8.49%
1491–95	41.583	76.667	5.768	36.05%	66.46%	5,881.20	874.00	6,755.20	87.06%	12.94%
1496–1500	41.583	76.667	5.265	39.49%	72.81%	8,676.80	260.40	8,937.20	97.09%	2.91%

* Prices for wools from Wiltshire, Hampshire, and St. Swithin's manors (all of the Bishop of Winchester's manors), Wiltshire and the Berkshire Downs, the Vale of White Horse to Thames Valley; Oxfordshire, Berkshire, and adjacent Wiltshire; Worcestershire, the Cotswolds (Oxfordshire, Gloucestershire, and adjacent Wiltshire); the Chilterns (Oxon, Bucks, Herts); northeast Oxfordshire and north Bucks.

Sources

(1) English Wool Prices:

Terence H. Lloyd. *The Movement of Wool Prices in Medieval England*. Economic History Review Supplements, no. 6. Cambridge, 1973. Statistical appendix, pp. 35–51: cols. 2–5, 10–13.

(2) English Wool Export Duties, including the Calais duty on denizen exports to Calais (from 1363):

Calendar of the Fine Rolls, *Edward II–Henry VII*. Vols. 4 (*1327–1337*) to 11 (*1471–1485*). In *Rotuli parliamentorum ut et petitiones et placita in Parliamento*. By Great Britain, Parliament. 6 vols. London, 1767–77. Vols. 2–5.

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W. M. Ormrod. "The Crown and the English Economy, 1290–1348." In *Before the Black Death: Studies in the 'Crisis' of the Early Fourteenth Century*. Ed. Bruce M. S. Campbell. Manchester, 1991. 149–83.

(3) English Wool Exports, calculated from:

E. M. Carus Wilson and Olive Coleman, eds. *England's Export Trade, 1275–1547*. Oxford, 1963. 13–16, 36–74.

Table 5
Wools Used in the Workshop of Agnolo di Niccolò and Franceso di Marco Datini, in Prato, in 1396–98

Wools from	Weight in lb Florentine	Weight in kg 339.542 g	Percent 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 *Francesco di Marco Datini: The Man and the Merchant*. Ed. Giampiero Nigro. Fondazione Istituto Internazionale di Storia Economica F. Datini. Florence, 2010. 489–514. Adapted from table 1, p. 500.

Table 6
Woolen Cloths Produced in the Workshop of Agnolo di Niccolò and Francesco di Marco Datini, in Prato, 1396–98

Source of Wools Used	Percent of Total	Number of Cloths	Average Weight in lb*	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 sq. meters	Final Area after Fulling sq. meters	Grams per sq. meter
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**	

*The Florentine pound weighed 339.542 grams; see further, p. 109 and n. 134.

Source
Francesco Ammannati. "Francesco di Marco Datin's Wool Workshops." In *Francesco di Marco Datini: The Man and the Merchant*. Ed. Giampero Nigro. Fondazione Istituto Internazionale Storia Economica F. Datini. Florence, 2010. 489–514, esp. table 2, p. 505.

Table 7A
Cost of Manufacturing Woolen Cloths in the Prato Workshop of Agnolo di Niccolò and Francesco di Marco Datini, 1396–98, for Six Pieces of Woolen 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	100.00
General Costs	5.61	
Total	100.00	

Table 7B
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 mean of 48.65 days, with a very wide variance.

Source

Francesco Ammannati. "Francesco di Marco Datin's Wool Workshops." In *Francesco di Marco Datini: The Man and the Merchant.* Ed. Giampero Nigro. Florence, 2010. [Based on Federigo Melis, *Aspetti della vita economica medievale: studi nell'archivo Datini di Prato*, vol. 1 (Florence, 1962), pt. 5: "L'industria laniera," 455–729; and idem, "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; repr. in idem, *Industria e commercio nella toscana medievale*, ed. Bruno Dini (Florence, 1989), 3:212–307.]

Table 8
Costs of Producing Florentine Woolens of the Garbo Sector, 1484–88, 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	**104.364**	**16.698**		**100.00%**

Source

Hidetoshi Hoshino. "Il comerio 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. 81–90; republished in idem. *Industria tessile e commercio internazionale nella Firenze del tardo Medioevo.* Ed. Franco Franceschi and Sergio Tognetti. Florence, 2001. Table 1, p. 120.

Table 9
Wool Purchases for the Medici Woolen 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	57.030
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	43.110
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	52.880
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
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 Provençal wools		6.81%	

Source

Raymond de Roover. "A Florentine Firm of Cloth Manufacturers: Management of a Sixteenth-Century Business." *Speculum* 16 (1941): 3–33. Repr. in idem. *Business Banking, and Economic Thought in Late Medieval and Early Modern Europe*. Ed. Julius Kirshner. Chicago, 1974. Appendix 1.

Table 10
The Woolen 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 (1941): 3–33, esp. p. 25.

Table 11
Wool Washing in the Medici Cloth Workshop, 1556–57: 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	Percent Loss
1	1,660	563.64	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 (1941): 3–33. Repr. in idem. *Business Banking, and Economic Thought in Late Medieval and Early Modern Europe*. Ed. Julius Kirshner. Chicago, 1974. P. 12, n. 2.

Table 12
Cloth Production Costs in Florence, 1556–58, Firm of Francesco di Giuliano di Raffaello de'Medici and Co. for the Production of 71 Woolen Cloths from Spanish Wools

Component of Production Costs	Florins (Decimal)	Percentage of Manufacturing Costs	Amount per Woolen 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	22.250	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%		
Felting (with Fulling)	13.958	0.50%		
Tentering	9.442	0.34%		
- subtotal	70.050	2.52%	0.987	2.28%

Component of Production Costs	Florins (Decimal)	Percentage of Manufacturing Costs	Amount per Woolen Cloth in Florins	Percent of Total Costs
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%		
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 and Organization of a Sixteenth-Century Business. *Speculum* 16 (1941): 3–33. Appendix 4, p. 33.

Table 13
Production Costs of the Brandolini Firm in Florence, 1580–81, from the Records of Producing 64 rascie nere *from Spanish Wools: Production Costs for Producing One Bolt of* rascia nera

Manufacturing and Other Production Costs	Weight in kg	Length *braccio* 0.583 m	Length Meters	Lira di piccioli per Unit (Decimal)	Florins of Account	Percentage of Manufacturing 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)	29.880			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			
- 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			

Manufacturing and Other Production Costs	Weight in kg	Length *braccio* 0.583 m	Length Meters	Lira di piccioli per Unit (Decimal)	Florins of Account	Percentage of Manufacturing Costs	Percentage of Total Costs and of Price
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%
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:				30.710			
- subtotal				79.280	10.571		14.97%
Total Costs And Average Price				**529.477**	**70.597**		**100.00%**

one bolt of finished cloth = 61.77 *braccia* = 15.443 *canne* = 36.012 meters (at 0.583 m per *braccio*)

Source

Richard Goldthwaite. "The Florentine Wool Industry in the Late Sixteenth Century: Case Study." *Journal of European Economic History* 32 (2003): 487–526. 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							120,000
1338	75,000							120,000
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						
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		

Year	Villani	Franceschi	Goldthwaite	Chorley A	ChorleyB/ Ammannati	Ammannati	Romano	Population Estimates
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
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

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Giovanni Villani. *Nuova Cronica*. Ed. Giuseppe Porta. 3 vols. Parma, 1990–91. vol. 3: *Libri XII–XIII*, bk. 12, chap. 94, pp. 197–202.

Table 15
Estimates of Florentine Cloth Production in the Sixteenth-Century Arte della Lana (Estimates by Patrick Chorley; Amended by Francesco Ammananti)

Year	Total Value in *scudi* (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

* 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.

Chorley's Assumptions:
(1) The average price of the cheaper *panni corsivi* is 30 scudi (or florins); 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.

Sources

Francesco Ammannati. "Florentine Woolen Manufacture in the Sixteenth Century: Crisis and New Entrepreneurial Strategies." *Business and Economic History On-Line* 7 (2009): 1–9.
Patrick Chorley. "*Rascie* and the Florentine Cloth Industry during the Sixteenth Century." *Journal of European Economic History* 32 (2003): 487–526.
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Table 16
Florentine Cloth Production in the Sixteenth Century (1553–71), According to Francesco Ammannati

Year	*Panni corsivi*	*Panni ricchi*	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 Ammanati. "L'Arte della Lana a Firenze nel Cinquecento: Crisis del settore e riposte degli operatori." *Storia economica: Rivista quadrimestrale* 11 (2008): 1–39.

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

Table 17
Outputs of the Florentine Cloth Industry, 1616–45

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%
						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 XVII[e] siècle: industries textiles et conjoncture." *Annales: économies, sociétés, civilisations* 7 (1952): 508–12.

Table 18
Woolen Cloth Production in Venice (Urban Jurisdiction Only), 1516–1723, in Quinquennial Means

Years 5-Year Means	Woolen Cloths	Years 5-Year Means	Woolen 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	**1696–1700**	2,426.40
1596–1600	21,567.20	**1701–5**	2,453.80
1601–5	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**	1,822.33

Sources

Walter Panciera. *L'Arte matrice: I lanifici della Repubblica di Venezia nei secoli XVII e XVIII.* Treviso, 1996. Table 2, pp. 42–43 [which also extends the series from 1713 to 1723]. [I wish to offer my sincere thanks to Professor Panciera, who sent me a photocopy of the document from the Venetian archives (ASCW, *Cinque savi* b. 476) containing the original data. His table corrects many errors that had been reproduced in the much better-known series of statistics on Venetian woolen cloth production, in Domenico Sella, "Rise and Fall of the Venetian Woollen Industry," in *Crisis and Change in the Venetian Economy in the Sixteenth and Seventeenth Centuries*, ed. Brian Pullan (London, 1968), 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): 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 Smyrna (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%	11,880
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
subtotal	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%	
subtotal industrial	185,055			8.71%	
Raw materials					
Dried Rruit	4,740			0.22%	
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%	
Cinnamon, 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)	Percent Woolens	England (Values in Piastres)	Percent Woolens	Holland (Values in Piastres)	Percent Woolens	Venice (Values in Piastres)	Percent Woolens	Livorno (Values in Piastres)	Percent Woolens	Totals
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%			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
subtotal							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**

Sources

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