

THE EXPANSION OF TRADE AND THE TRANSFORMATION OF AGRICULTURE IN PRE-INDUSTRIAL EUROPE*

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ABSTRACT: The expansion of trade in pre-industrial Europe led to a transformation of agriculture. It induced specialization to exploit comparative advantage as well as a restructuring of the process of production, with manorial agriculture giving way to an agriculture of family farms. Technological progress was not itself a driving force, but rather a consequence of this transformation. Merchants and urban investors played a central role in the transformation of agriculture. They purchased land and restructured it into family farms. They pioneered new forms of land tenure. They were active in developing new agricultural land. And it was their efforts in lowering trading costs that made possible the expansion of trade that was the cause of it all.

JEL Categories: F14, N53, N13, N23, N53, O13, O31, O52, Q15, Q16, Q17, R00

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Pre-industrial Europe was overwhelmingly agrarian and agricultural. In the sixteenth century, over 90% of the population lived in the country; agriculture—including fisheries and forestry—accounted for over 80% of output.¹ While the agrarian economy was predominantly agricultural, it was not exclusively so: mining, construction, transportation, and manufacturing were all important occupations in the countryside.² Conversely, agriculture was an important activity in the towns. Many townspeople raised crops in and near town, and even in the sixteenth century stray cattle wandered city streets.³ Agriculture produced food, of course, but it also produced most of the raw materials used in manufacturing. Textiles, leather, dyeing, brewing and distilling, baking, rope-making, shipbuilding, and furniture-making: these were some of the industries that depended wholly or partly on agricultural raw materials.⁴ In addition, agriculture was a major source of energy. It provided motive power for inland transportation in the form of draft animals and the fodder that fueled them as well as firewood for heating.⁵

Because agriculture was so important, economic growth and rising standards of living depended crucially on agricultural productivity. Indeed, some historians have seen rising agricultural productivity as the *cause* of economic growth in this period, and they have attributed this rising productivity to technological progress. The story goes like this. There was a ‘revolution’ in agricultural technology in the early Middle Ages.⁶ Application of the new, better technology created a surplus of food that allowed

¹Hohenberg and Lees (1995) quotes estimates of 9.9% (de Vries) and 9.7% (Bairoch) for the percentage of the population living in cities of over 5,000 in 1600. Nef (1987) quotes a figure of 2-3 million in industry in the sixteenth century (workers and families) out of a total European population of 60-80 million. Braudel (1972) estimates total output of the Mediterranean basin in the sixteenth century at 1.1-1.4 billion ducats; of this agriculture accounted for 80-86% (p420).

²Allen (2000) comes up with a figure of 80% for the proportion of the rural population engaged in agriculture.

³Lipson (1959) Ch V

⁴Slicher van Bath (1977); Masschaele (1997) Ch. 2

⁵Fisher (1961)

⁶The three allegedly key innovations were the heavy plough, improved horse harness, and three-course rotation in place of the two-course rotation(White (1962))

population to grow and supported urbanization and the expansion of trade.⁷ The result was the economic and cultural flowering of the Middle Ages from the twelfth to fourteenth centuries. Excessive population growth and technological stagnation led to a Malthusian crisis in the fourteenth century, with growth resuming in the fifteenth.⁸

This traditional interpretation of events has the sequence of causation exactly backwards. As we shall see, the sequence was not technology-growth-urbanization-trade, but just the reverse.

It was the expansion and contraction of trade, not the pace of technological progress, that was the driving force. The expansion of trade promoted urbanization; expanding trade and urbanization stimulated growth. They did so by inducing a ‘commercialization’ of agriculture—especially in the vicinity of the towns—that raised agricultural productivity.⁹ Commercialization raised productivity through a reorganization of agricultural production that made better use of available resources and technology. Technological progress did play a role, but it was itself a consequence of expanding trade and of improving organization—a *symptom* of economic growth rather than the fundamental cause.¹⁰

⁷“Cities could not develop until the rural economy could feed a large number of people who, instead of growing their own food, compensated the farmer by reconsigning his products and later by manufacturing items that the more prosperous peasants desired. The ‘takeoff’ of the European economy in the central Middle Ages is closely linked to changes in the rural economy that created an agricultural surplus that could feed large cities.” (Nicholas (1997) p 104)

⁸See Grantham (1999) and Kohn (2001)a for a discussion and critique of this interpretation.

⁹“Current theory in many fields—economics, history, anthropology—assumes that cities are built upon a rural economic base. If my observations and reasoning are correct, the reverse is true: that is, rural economies, including agricultural work, are directly built upon city economies and city work.” (Jacobs (1969) p 3)

¹⁰Agricultural output depends on the resources employed—on land, labor, and capital. Productivity—the quantity of output that can be produced from given resources—depends on how these resources are utilized. It depends on technology—on the “collection of known ways of converting resources into output”—and on the way production is organized to exploit technology and resources. There are, therefore, two possible sources of increasing productivity—better technology and better organization. (Griliches (1987)) We shall see that it was better organization that was pivotal and that better technology was a consequence of better organization.

The overall impact of commercialization in this period should not, however, be exaggerated. It was quite limited, and it touched only a small part of European agriculture. Consequently, average economic growth was quite slow by modern standards. Most agricultural production continued to be for the producer's own consumption or at most for the local market. Of the principal food crop, grain, most was consumed directly by producers themselves or given as rent in kind to landowners for the landowners' own consumption.¹¹ Only a very small proportion of the total crop found its way into international trade: even major exporters like Sicily and Poland exported less than 10% of their total output.¹²

THE DEVELOPMENT OF MARKET INFRASTRUCTURE

The extent of commercialization of agriculture differed from region to region depending on the region's exposure to trade. As trade expanded, it exposed an increasing number of regions to the pressures of the market. The expansion of trade was largely driven by increasing urban demand.¹³ As urban population grew, it pressed on local supplies of food; and as urban manufacturing expanded, it increased the local demand for industrial raw materials. Increasing demand for agricultural produce raised local prices and provided merchants with an incentive to seek supplies further afield. Trade over longer distances was constrained by trading costs—the cost of transportation, the cost of transactions (the cost of dealing with other people), and the cost of finance.¹⁴ In order to

This is the 'Smithian' view of economic growth, in contrast to the 'Ricardian' view that informs the conventional interpretation. See Kohn (2001)a and Grantham (1999) for a more extensive discussion of the differences between the Ricardian and Smithian views of economic growth.

¹¹Ball (1977) Ch 6; de Vries (1974)

In England: "In the early sixteenth century, around 80 per cent of farmers were only growing enough food for the needs of their family household" (Overton (1996) p 8). "Quite possibly the bulk of agricultural produce still never reached the market." (Everitt (1990?)).

¹²Kohn (2001)b

¹³"In most cases, the source of additional commercial demand for produce was urban demand." (Grantham (1999) p 213). See, for example, Jones (1997) on Italy, Thoen (1993) on Flanders, Hoffman (1996) on France, Gras (1915) on England, and de Vries (1974) on the Netherlands.

¹⁴See Kohn (2001)a for a more extensive discussion of trading costs and Kohn (2001)b for a discussion of their effect on the pattern of trade.

expand trade in agricultural produce beyond the local level, merchants had to lower trading costs enough to make such trade profitable.

THE IMPORTANCE OF TRANSPORTATION COSTS

The primary limiting factor in the trade in agricultural produce was the cost of transportation.¹⁵ Most agricultural produce was heavy or bulky relative to its value, and the cost of carriage was therefore often decisive in determining the profitability of trade. To the cost of carriage had to be added the cost of predation—the possibility of loss to pirates and brigands and the certainty of loss to collectors of tolls and taxes. For perishable items, the slowness of transportation was an additional obstacle to trade. If merchants were to expand trade, they had to bring down transportation costs. They did so primarily by improving the organization of transportation services—providing protection against predation, improving logistics, and finding profitable backcargo.¹⁶ Better organization led to improvements in the means of transportation—especially better ship design—and improvements in infrastructure—in roads, bridges, rivers, canals, and harbors.¹⁷

The Netherlands provides the most striking example of merchant success in lowering transportation costs. Dutch merchants, motivated by high local grain prices, developed low-cost shipping that enabled them to tap more distant, lower-cost sources of grain.¹⁸ So successful were they, that by the 1570s it was worthwhile for a Friesian farmer, Rienck Hemmema, to sell nearly all his wheat—his only grain crop—and to feed his household with imported rye. The Dutch reputedly exported their own high-quality butter while importing inferior butter from Brabant and Ireland for their own consumption. In addition, the greater speed of transportation enabled the Dutch to export perishable

¹⁵See Kohn (2001)b.

¹⁶“... in early modern France—England was hardly different—cheaper transportation often resulted from organizational changes, not from the roads or the canals themselves. One thinks of how the grain trade was reorganized around Paris, or of how the network of merchants and farmers arose to ship wine from the Beaujolais” (Hoffman (1996) p 183)

¹⁷See Kohn (2001)d for a full discussion of transportation costs

¹⁸See Kohn (2001)b.

produce—vegetables, fruits, and flowers—which had not until then been items of long-distance trade.¹⁹

In general, there were two categories of region that benefited from low transportation costs and that were therefore the first to feel the touch of the market. One category consisted of regions that were in immediate proximity to urban areas. In Flanders, in parts of Northern Italy, and in the vicinities of Paris and London, agriculture soon became highly commercialized. The second category consisted of regions close to the sea or to inland waterways. Their access to transportation by water, far less costly than transportation by land, brought such regions ‘economically close’ to urban markets (cities were themselves almost invariably accessible by water). The maritime regions of the southern Low Countries, of the Netherlands and of northern France were soon far more commercialized than regions further inland. The same was true of coastal regions of Italy, Sicily, Spain, and Portugal.²⁰ Similarly, the valleys of the Po, the Rhine, the Seine, the Garonne, the Thames, the Elbe, the Oder, and the Vistula were all highly commercialized.

TRANSACTIONS COSTS AND FINANCING

After transportation costs, the next obstacle to the expansion of trade was the difficulty of trading with distant customers. At the local level, trade was largely informal, conducted directly between producer and final consumer. Over greater distances, trade required the mediation of a middleman or of a chain of middlemen who could arrange for transportation and for sale of the product to distant customers. It also required markets in the producing region where such middlemen could purchase the product from local producers. The establishment of such commercial infrastructure involved a significant investment of time and capital, and it was worthwhile only when the potential volume of trade was substantial. It was urban demand that offered a sufficient potential volume and that therefore provided the incentive for merchants to invest in the creation of a system of distribution.²¹

¹⁹de Vries and van der Woude (1997), de Vries (1974)

²⁰See, for example, de Vries and van der Woude (1997) Ch 6, Epstein (1998), Epstein (1991) Ch. 4.

²¹“Outside the London area it was nevertheless unusual to find specialised cornmongers. The size of the long-distance trade in normal years was too small to justify such a commitment of trading

The final obstacle to the expansion of trade was the need for financing. At the local level, trade relied on the direct extension of sales credit by producers. Since this practice depended on good information and strong incentives to pay up, it was not readily extended to trade among strangers: producers generally did not know middlemen well enough to extend them credit and would have had difficulty enforcing collection in case of default. As a result, merchant-middlemen generally had to pay their agricultural suppliers in cash.²² They then faced a considerable delay between this outlay and the ultimate sale of the product in a distant market: transportation was slow and the product might have to be stored for a time before it could be sold. Moreover, purchase for resale in a distant market involved not only delay, but also risk. Because prices were volatile and communications slow, there was a danger that the product might have to be sold at a loss.²³ To finance their operations and to cushion them against risk, merchants relied partly on their own capital and for the rest on urban financial markets. The development of urban financial markets was therefore a prerequisite for the expansion of trade.²⁴

MARKET EXPOSURE AND SPECIALIZATION

Exposure to a wider market, by changing the relative prices of different products, offered producers new opportunities and new challenges. Falling trading costs raised the local price of products in high demand in other places (usually in urban markets). They also lowered the local price of other products that were produced more cheaply elsewhere. In this way, the expansion of trade provided both carrot and stick: it encouraged producers to expand the output of those products that had risen in price, and it forced them to cut back on those that had fallen in price. For example, the price of grain was high in the Netherlands in the fifteenth century because growing conditions there were unsuited to its production. When falling trading costs brought in cheaper imported grain, local production became unprofitable and producers switched to industrial crops, to horticulture, and to animal husbandry. These products had become more profitable

capital.”(Britnell (1996) p 86, writing on England 1180-1330). See also Masschaele (1997) on England, Jones (1997) on Italy, and de Vries (1974) on the Netherlands.

²²As we shall see below, they often paid for product in advance of delivery.

²³ See Kohn (2001)b for a discussion of the impact of risk on the grain trade.

²⁴See Part 2 on the development of financial markets.

because lower trading costs had improved access to the great urban market of Antwerp and had therefore raised producer prices in the Netherlands.²⁵

Historians have sometimes described a process such as this as one in which imports of grain ‘allow’ local producers to specialize in non-grain products. While this is true in some functional sense, it makes no sense behaviorally. Producers have no desire to be ‘allowed’ to produce non-grain products: they are forced to do so by changing market prices. And it was not only imports of grain that stimulated change: for example, in fifteenth-century Brabant, imported wines from Bordeaux and the Rhine, and honey and wax from the Baltic made local wine-making and bee-keeping unprofitable and forced producers into other types of production.²⁶

Since all producers in a region faced the same relative prices, they tended to make similar decisions on what to produce. The result was regional specialization. To some extent such specialization reflected classical considerations of comparative advantage, with each region specializing in those products best suited to its growing conditions and to its relative abundance of factors of production. The Baltic, cold and wet and with abundant land, specialized in grain and timber. On the other hand, sunny Portugal and Spain supplied northern Europe with wine, olive oil, citrus, and cork.²⁷ Regions close to urban areas, where land was scarce, specialized in intensive cultivation of garden crops and in intensive animal husbandry.

Comparative advantage was not, however, determined entirely by growing conditions and factor abundance: trading costs, too, played an important role. The prices producers faced, and to which they responded, reflected not only the prices paid in urban markets, but also the cost of getting their produce to those markets. For example, the production for export of bulky crops such as grain was uneconomical in regions not easily accessible by water. If such regions were to benefit from trade, whatever their growing conditions and factor abundance, they had to specialize in products with high value relative to bulk or weight.²⁸ As a result, many isolated regions specialized in raising animals: inland areas

²⁵de Vries and van der Woude (1997) Ch 6

²⁶Van der Wee (1963)

²⁷Davis (1973)

²⁸The result was not always environmentally benign.

of Spain raised sheep, for example, and inland areas of Eastern Europe, cattle.²⁹ Animal products such as wool and hides were more valuable relative to bulk and could bear the cost of overland transportation, and the animals themselves could be walked to market at reasonable cost.³⁰ On the other hand, regions that were close to urban areas could specialize in perishable crops and the fattening of livestock. Also, because of their low trading costs, such regions were competitive with more distant regions having better growing conditions in supplying local industries with raw materials. Examples included silk cultivation in Tuscany, and hops and barley in the Netherlands. The Breckland, a notoriously infertile region of England, nonetheless enjoyed a high per capita income because of its good access to the London market. It raised rabbits for meat and for fur and grew barley for the London breweries.³¹

When internal transportation within a region was sufficiently good, specialization took place within the region. For example, twelfth-century Flanders, because of its navigable rivers and canals, enjoyed excellent intra-regional transportation. As a result, coastal areas specialized in animal husbandry, fishing, and peat-digging; the south supplied the towns with grain via the Scheldt and the Lys, and the center grew oats for the breweries.³² Similarly, from the late fourteenth century, Sicily relied on its excellent coastal transportation to support increasing intra-regional specialization. The west specialized in grain, the northeastern mountains in livestock, and coastal areas generally in wine and sugar.³³

²⁹The German colonization of the East was from the beginning market-oriented. Only those regions with good market access (by water) were settled, and these were soon exporting grain in large quantities via the Baltic (see below). The cattle exporting regions were those that had not been settled by the Germans because of their remoteness from the market. “It is very significant that those areas which competed in exporting the cattle, demanded from the fourteenth century onwards by Central Europe—the Hungarian Puszta, Podolia, Volhynia, Lithuania—were precisely the areas that [German] medieval peasant colonization had not reached.” (Aubin (1966) p 486)

³⁰Overton (1996) argues that one reason for the switch from arable to pasture in some regions of England was that the product was more readily marketed.

³¹Bailey (1989) quoted by Grantham (1999).

³²Thoen (1993)

³³Epstein (1991)

Once exposed to the market, producers continued to tailor their output to changing relative prices. For example, the relative price of grain, the most important crop, changed over time. After a long period of high and rising grain prices, population decline in the wake of the Black Death caused grain prices to fall. At the same time, increasing per capita incomes boosted the demand for non-grain foodstuffs and for agricultural raw materials, so that the price of these either rose or at least fell less than the price of grain. Producers responded accordingly, switching to non-grain crops and to animal husbandry. In the wine regions, arable land was converted to vineyards. French peasants near Aix-en-Provence asked their landlord for permission to grow vines: “it profits us nothing to grow grain” they declared.³⁴ In parts of England, Germany, Italy, and the Low Countries, producers converted arable land to pasture.³⁵ Once population began to recover, from the late fifteenth century, the relative price of grain started to rise again, quite sharply after 1550. Producers responded by expanding the production of grain at the expense of other products. In parts of England, Germany, Norway, the Netherlands, and Spain, producers now converted pasture to arable.³⁶ In some regions, however, despite rising grain prices, producers were still quitting arable farming for various specialties—tulips and cheese in the Netherlands, silk in Italy.³⁷ They were doing this because the prices of these products were rising even faster than the price of grain. It was, of course, relative prices that mattered.

The result of specialization in response to market prices was higher productivity. From the point of view of overall agricultural production, trade allowed each type of output to be produced where this could be done most cheaply. Of course, the ability to exploit differences in conditions to lower the overall cost of agricultural production depended on the extent of trade. As trading costs fell, trade expanded and the gains from specialization according to comparative advantage expanded with it.³⁸

³⁴Thirsk (1997)

³⁵Slicher van Bath (1977)

³⁶Slicher van Bath (1977)

³⁷Hohenberg and Lees (1995)

³⁸“Growth did not result from a sudden conversion to efficiency. Nor was it yet driven by patents and the diffusion of complex scientific knowledge that were beyond the peasants’ ken. The source of

FROM MANORIALISM TO THE FAMILY FARM

Exposure to the market increased agricultural productivity by inducing a reorganization of agricultural production. This reorganization had two parts. The first, as we have seen, involved changes in output—which outputs were produced and where they were produced. The second part involved changes in the way inputs were used to produce these outputs. In particular, exposure to the market increased the value of inputs, and so promoted their better utilization. The most important consequence of this was the replacement of the inefficient command economy of manorialism with an economy of family farms, together with markets for land, labor, and purchased inputs.

Manorial agriculture, which came to dominate large parts of Europe in the early Middle Ages, had a structure not unlike that of Soviet agriculture. Most of the land was taken up by large demesnes (‘state farms’) on which peasants were required to work. The rest of the land was divided up into tiny plots that peasants could cultivate for their own benefit. As in the Soviet model, the peasants were tied to the land and there was no market for land or labor. Again like the Soviet model, manorial agriculture had evolved for essentially non-economic reasons in the absence of markets for agricultural output.³⁹

Manorial agriculture was economically inefficient for much the same reasons as its Soviet counterpart. On demesne lands, managers and workers—stewards and peasants—had little incentive to do their best, since they did not enjoy the benefit of any extra output they produced. When peasants worked on their own plots, the incentives were there, but the resources were not. Because there were no markets for land or labor, resources were immobilized. Resources might be earning a poor return on one demesne when they could have been more fruitfully employed on another. A recent study estimates that agricultural output in Domesday England could have been increased by 40% simply by allowing manorial estates to trade resources with one another.⁴⁰ The developing

productivity growth was in fact much simpler. It was comparative advantage, and it depended on costs of transportation and opportunities for trade with the rest of the economy.” (Hoffman (1996) p 203-4)

³⁹The purpose of both manorial and Soviet structures was to support a predatory elite through control of the factors of production and direct expropriation of their earnings.

⁴⁰McDonald (1998). McDonald finds that, despite these inherent inefficiencies, the variation of overall productivity across manorial estates was not high even by modern standards. This suggests that stewards were not completely remiss in their duties.

market for agricultural output created strong incentives to change this structure and to remove the inefficiencies.

In those regions exposed to the pressure of the market, the manorial structure of production was transformed into an agriculture of family farms.⁴¹ In northern Italy, by the thirteenth century the manorial structure was largely replaced by *poderi* of 25-100 acres—“farms designed to require the labor of a full peasant family.”⁴² In England, by the early fourteenth century, over two thirds of the output of wool was being produced by family farmers—either lower gentry or wealthy peasants.⁴³ In Sicily, by the late fourteenth century, the common unit of production was the *masseria* of 40-100 acres.⁴⁴ In Germany, at this time, “the lords... were turning into rentier-landlords, their demesnes carved up and rented out to peasants... [with] the family farm as the primary unit of production.”⁴⁵ In 1500, in the maritime Netherlands, dairying was dominated by specialized family farmers, each milking a herd of 15-25 cows.⁴⁶

THE FAMILY FARM AND OWNERSHIP OF THE AGRICULTURAL ENTERPRISE

A ‘family farm’ is an agricultural enterprise managed by a full-time specialist with an equity interest in its profits. The farmer controls the enterprise and his reward depends on its success: that is, he is an owner.⁴⁷ Note that the farmer is an owner of the *enterprise*—not necessarily of the *land*. The farmer may own the land or he may not. As we shall see presently, different arrangements with respect to the ownership of the land evolved in different parts of Europe. However, in every case, the farmer was an owner of the enterprise.

⁴¹ “[The] collective economy was now replaced by a system of agrarian individualism This basic change in the system of cultivation, particularly noticeable in Flanders during the 13C, was without doubt stimulated by a more active trade...., mainly in the neighbourhood of the great cities.” (Ganshof and Verhulst (1966) p 298)

⁴² Jones (1968)

⁴³ Masschaele (1997) Ch. 2

⁴⁴ Epstein (1991) Ch. 4

⁴⁵ Toch (1997)

⁴⁶ de Vries (1974)

⁴⁷ This definition of ownership and the discussion that follows are based on Hansmann (1996).

Why did the family farm become the predominant unit of production in agriculture? Any enterprise, agricultural or otherwise, is a complex of relationships among suppliers of inputs and customers. The rights of ownership will reside with one or more of these parties. For example, in a modern public corporation, it is the suppliers of equity finance who are the owners; in a law partnership, it is the suppliers of labor; in a consumers' or producers' cooperative, it is the customers. In general, the arrangement that evolves over time—that passes the 'test of survivorship'—is the one that is economically most efficient. Other things being equal, the most common arrangement—the one that seems to work best in most circumstances—is the owner-manager or family enterprise.

Letting the operator of the enterprise feel directly the consequences of his decisions has obvious incentive benefits. The separation of ownership from management that results from any other ownership arrangement is generally too costly: the losses due to distorted incentives are too high. Only in cases where there is some large countervailing cost do other forms of ownership come to predominate. For example, in many modern manufacturing industries, economies of scale necessitate significant external finance. It seems that this need can be met most cheaply if some of those providing the needed finance receive ownership rights as shareholders. The financial advantages of this arrangement seem to outweigh—most of the time—the disadvantages of separating ownership from management. However, in agriculture, even today, the balance of costs still seems to favor the owner-manager. In all market economies, the family farm remains the predominant form of agricultural organization—a testament to its continuing relative efficiency.⁴⁸

THE ROLE OF URBAN INVESTORS

In the pre-industrial economy, the restructuring that was needed to bring about the transition from manorial agriculture to family farm did not happen automatically. It required deliberate action on the part of individual landowners motivated by the gains that transforming the structure of production would bring: such a transformation increased the return to land and so its value. The potential gains were highest in those

⁴⁸Hayami and Otsuka (1993) finds that in the developing countries tenancy (the family farm) is the predominant form of agricultural organization wherever it is allowed: fixed-wage, permanent-labor contracts are commonly found only in agrarian economies where tenancy is prohibited.

regions most exposed to the market—that is, in those regions economically close to urban areas. This meant primarily the urbanized regions of the Low Countries and Northern Italy and regions close to large cities such as Paris and London. And the individuals most cognizant of the potential gains, and most eager to capture them, were the ones most involved in the market—merchants and other wealthy city-dwellers.

Beginning with the economic expansion of the thirteenth century, city-dwellers throughout Europe began to purchase agricultural land. Sometimes, the purchase had a direct relationship to their urban business—grain merchants purchasing land to ensure their supply or butchers purchasing pastures to fatten livestock.⁴⁹ Sometimes, the acquisition of land conferred social status or tax benefits.⁵⁰ But for the most part, city-dwellers purchased agricultural land as an investment. At a time when the choice of financial assets was limited, land offered a relatively safe place to invest one's wealth.⁵¹ On the supply side of the market, many manorial landowners were forced to sell by straitened circumstances—a consequence of falling incomes or of rising expenditures.⁵² Not infrequently, land came into the hands of urban investors as a result of default on a loan made to a 'needy gentleman'.⁵³ In any event, an increasing proportion of land—especially of land close to cities—came into the hands of urban investors—and the share of traditional landowners declined steadily. By the sixteenth century, Florentines, for example, owned 60% of the land in their *contado*, and in England the combined land-

⁴⁹See Kohn (2001)b on the 'backward vertical integration' of thirteenth-century London grain merchants into the production of grain. de Vries (1974) (p 43) discusses the land purchases of butchers, brewers, and bakers in the Netherlands to support their urban businesses.

⁵⁰In France, in particular, the landowning class was exempt from taxes that the lower orders had to pay. (Hoffman (1996) p 68-9)

⁵¹See Kohn (1999)a for a more extensive discussion of urban investment in rural land and the reasons for it.

⁵²In times of inflation, the real value of fixed money rents could fall sharply (see Kohn (1999)b on debasements of the coinage and their consequences). In times of economic depression, agricultural prices declined and with them rents. Rising expenditures could be the result either of military obligations (the Crusades, for example) or of the conspicuous consumption that was required of nobles at court.

⁵³See Tawney (1925) on sixteenth-century England. The abbeys of Normandy, Flanders, and Lotharingia, early lenders to the landed aristocracy, also acquired land as a result of default on mortgages. (Ganshof and Verhulst (1966))

holdings of the Crown, the Church, and the great nobility had fallen to less than 30% of the total.⁵⁴

Once they had purchased land, urban investors were interested in getting the most they could from it. Some purchased land with improvement and capital gains in mind: for example, “John Gedney, the draper, acquired four manors in Tottenham (Mdx) and developed the village during the 1430s as a centre for pasture farming and rural industry. He greatly increased the profitability of his properties.”⁵⁵ But even when urban investors purchased land merely to hold as an asset, they did what they could to increase the income they derived from it: “As landlords, merchants were perhaps inclined to be more business-like than gentlemen.”⁵⁶ Moreover, they were not much worried about tradition: “An urban monied class invested in lands for the sake of profit, and landlords of this type were more concerned with efficient production than with the preservation of ancient customs.”⁵⁷ The result? “In the space of two centuries the agrarian regime had been transformed, revolutionizing rents, and raising the return on land to rival that from trade.”⁵⁸

Of course, traditional landowners were no fools: they could observe the success of urban investors in increasing the income from their estates, and they did not hesitate to imitate their methods. For example, in the vicinity of Genoa, land largely remained in the hands of manorial lords, with little urban investment. Nonetheless, local agriculture was commercialized and highly productive.⁵⁹ Some of the religious orders, the Cistercians in particular, were especially active landowners and early leaders in the transformation of traditional agriculture.⁶⁰ In some cases, traditional landowners brought in urban entrepreneurs to restructure their land. Much like investment banks called in today to

⁵⁴Clarkson (1971)

⁵⁵Britnell (1996) p 199

⁵⁶Thrupp (1948) p 118, writing of fourteenth-century England.

⁵⁷Smith (1966) p 438, writing of Spain in the late Middle Ages.

⁵⁸Jones (1968) p 221, writing of Northern Italy during the Commercial Revolution.

⁵⁹Laven (1966) Ch. 1

⁶⁰Powelson (1988)

advise on mergers and acquisitions, these entrepreneurs provided expertise and arranged the necessary financing.⁶¹

THE RESTRUCTURING OF LAND USE

The transition from manorial agriculture to an agriculture of family farms required two fundamental changes. The first was a restructuring of land use. This was necessary, because the units of the manorial structure were of the wrong size: the demesnes were too large, and the peasant holdings were too small.⁶² So restructuring involved breaking up the large units and consolidating the small ones. The second fundamental change was a transformation of land tenure—a recasting of the relationship between the owner of the land and the worker of the land. Manorial lords and peasants had to become, or to be replaced by, landlords and farmers.

THE SIZE OF THE FAMILY FARM

Restructuring of land use involved the creation of farm units of the right size. But what was the right size? A recent study has found that in thirteenth century England a farmer would have needed at least 18 acres to provide his family with a subsistence income.⁶³ But subsistence was not the issue. As we shall see, the family farmer, unlike the peasant, was a full-time, skilled, agricultural specialist. For farming to be attractive to him, it had to offer an income at least as good as his best alternative employment—his ‘opportunity cost’. His best alternative, especially in regions close to urban markets, was employment in town—in industry or in trade. So the size of the family farm was determined not by the needs of subsistence but by competition with urban incomes.⁶⁴ The

⁶¹In Italy, “On many properties innovation of farm practice, the arrangement of holdings and the forms of peasant tenure, was the work not of landlords but of enterprising middlemen on the make.” Jones (1966) p 418

⁶²We shall discuss the determination of the ‘right’ size presently.

⁶³Kitsikopoulos (2000). The study found that about half of peasant families had landholdings smaller than this, and were therefore unable to survive from agriculture alone. However, a sizable minority of ‘kulak’ peasants had significantly larger holdings: they had become family farmers.

⁶⁴Kislev and Peterson (1982) explains the increasing size and mechanization of U.S. farms in the twentieth century as a consequence of the need to meet the opportunity cost of the farmer’s labor as urban incomes rise. de Vries and van der Woude (1997) and Allen (1998) apply the same idea to preindustrial

number of acres that this required varied from place to place depending on crops and on growing conditions—50 to 150 acres was the typical range. And the required size grew over time with rising urban incomes.⁶⁵ For example, in the Netherlands during the sixteenth century, as urban incomes rose, dairy herds grew steadily in size.⁶⁶

Family farms were, however, generally no larger than required to meet the farmer's opportunity cost. Not only did land have to compete for farmers, but farmers also had to compete for land. Farming is attention-intensive: because land is so heterogeneous, getting the most out of it requires careful attention to its idiosyncrasies. Indeed, that was one of the main reasons why the family farm was more productive than the large demesne estate. Increasing the size of the farm spreads the farmer's attention ever more thinly over a larger area of land and, beyond some point, begins to reduce its per-acre productivity.⁶⁷ So making the family farm larger, while it may have been necessary to meet the farmer's opportunity cost, tended to reduce the return to land. Owners of land, naturally enough, sought to divide it into units of a size that would yield them the highest rents. In regions exposed to the market, this meant family farms large enough to attract skilled professional farmers—but no larger. In regions remote from the market, where opportunity costs were low, this meant small plots cultivated by peasants.⁶⁸

agriculture, arguing that the restructuring of land use was necessary to provide farmers with an income that would match high urban wages.

⁶⁵Recent work has challenged the supposed fall in real wages during the Commercial Revolution (attributed to rising population and diminishing marginal product of labor). See Grantham (1999) on this.

⁶⁶de Vries (1974)

⁶⁷There do not seem to have been any overwhelming technological economies of scale in agriculture to offset this effect. Researchers find that larger farms were in general no more productive than smaller farms (Bates (1988); Allen (1999); Overton (1996)). The same seems to hold today: Kislev and Peterson (1982).

⁶⁸Writing of a later period and comparing the large family farms of England with the small plots of France, Goldstone (1988) wrote: "There is a persistent belief that much of the magic of English farming was due to its larger farms... compared to the proliferation of tiny plots in France. This is often held to have occurred because Tudor and Stuart landlords were able to expropriate English cultivators, whereas French peasants were able to keep their land. Yet this confuses issues of land *ownership* and land *use*... In both France and England, non-peasant landlords owned the majority of the cultivable land. But farm size in the two countries depended on how landlords chose to exploit their land. The owner of 250 acres can lease his lands in three or four farms of 50 to 100 acres, or as fifteen to twenty farms of 10 to 20 acres. To

THE PROCESS OF RESTRUCTURING

The way land was restructured depended on the circumstances. For historical reasons, the preexisting structure of land use varied considerably from region to region. In some regions, peasant holdings were largely communal: each peasant cultivated scattered strips in large common fields and grazed his animals on common pasture; production decisions were largely set by village assemblies. In other regions, holdings were concentrated and enclosed, and each peasant made his own decisions. These differences did not necessarily respect political boundaries: maritime regions of Flanders and the Netherlands, northern France, the East and Southwest of England were individualistic; inland regions of Flanders and the Netherlands, southern and western France, and the Northwest of England were communal.⁶⁹ The degree to which land rights could be sold freely also varied from region to region. For example, the alienability of land rights seems to have come much earlier in England than it did in France.⁷⁰ Alienability did not, however, necessarily imply freehold ownership. Tenants with hereditary rights to the land, subject to a rent, could sell these rights to others, who then took over payment of the rent. There were markets not only for tenancies but also for 'landlordships' or fiefs: thirteenth-century Sicily, for example, boasted an active market in fiefs among the aristocracy and the urban elite.⁷¹

Where holdings were enclosed, control individualistic, and land alienable, restructuring of peasant holdings took the form of voluntary consolidation via the market. In northern Italy, for example, landowners bought up peasant holdings as part of the 'package' of peasant manumission in order to consolidate them into *poderi* (family farms).⁷² Urban investors bought up holdings from tenants of the Church with the same purpose in mind. This process of *appoderamento* was most pronounced in the Po

understand why small farms were more common in France, we need to examine the opportunities open to English and French landlords." (p 310)

⁶⁹Hopcroft (1999)

⁷⁰Macfarlane (1978)

⁷¹Epstein (1991) Ch. 4

⁷²Jones (1966). In northwest Germany, too, especially in Lower Saxony, lords bought up, as part of the manumission process, reversions of peasant holdings for consolidation into larger units to be let out. (Ganshof and Verhulst (1966))

valley.⁷³ In the individualistic parts of England, peasant smallholders sold out to richer neighbors or to urban investors, enabling the buyers to put together units of a substantial size.⁷⁴

At the same time that peasant smallholdings were being consolidated, landowners were breaking up their demesne estates. In the thirteenth and fourteenth centuries, most of the land still in demesne was broken up into family farms.⁷⁵ Some historians have seen this as a consequence of manumission: with ‘free’ peasant labor no longer available, landlords found hiring labor too expensive, and instead let out their lands. However, the driving force of the process was not the cost of labor but the productivity of the family farm. A landlord could earn more in rent from family farmers than he could in income from cultivating his estate himself with hired labor—or even with ‘free’ labor.

The most difficult land to restructure was peasant land that was held communally. Consequently, this was usually the last to be restructured. Restructuring such land generally meant ‘enclosure’—the privatization of common property and the amalgamation of scattered strips in open fields to form closed consolidated holdings. In many cases, the process of enclosure proceeded peacefully and without opposition. However, sometimes it was resisted and required political action or even the use of force. The best-known enclosures of the period were the mostly peaceful Tudor enclosures of sixteenth-century England. Although they received a great deal of attention at the time, their scale and impact seem to have been, in fact, quite modest.⁷⁶

⁷³Laven (1966) Ch. 1

⁷⁴“The weak manorial control meant that enterprising yeomen and smaller gentry could build up lands and fortunes... Indeed, until the late seventeenth and more often the eighteenth centuries, the larger landowners hardly ever played a role in the process of consolidation, which was carried out by ‘rising’ yeomen and smaller squires.” (Goldstone (1988)p 300). McIntosh (1988) describes how outside investors, mainly London merchants, bought up and consolidated land in the manor of Havering near London in the fifteenth and sixteenth centuries.

⁷⁵Ganshof and Verhulst (1966) p 323, writing of France, the Low Countries and western Germany. Jones (1966) and Laven (1966) report the same phenomenon in Italy.

⁷⁶The Tudor enclosures were often accompanied by a switch from arable to pasture, and, for this reason the government resisted them, concerned about security of the supply of grain. Overton (1996). The enclosures were also condemned for their social costs—displacement of peasant families and their migration to the cities, with accompanying increases in vagrancy and urban unemployment. However, it

Restructuring in general and enclosure in particular were costly. The expense and effort were worthwhile only if the value of the resulting future gains in productivity could be expected to exceed the cost of restructuring.⁷⁷ One study found that enclosure raised rents, and so land values, by about 30%.⁷⁸ This suggests that the cost threshold was quite high. The potential gains from restructuring were, of course, highest in regions exposed to the market, so it is not surprising that restructuring and enclosure occurred there first.⁷⁹ Moreover, in many cases, enclosures were accompanied by radical changes in land use—for example, from arable to pasture or vice versa. The substantial gain from switching to a more profitable use helped to tilt the balance in favor of enclosure. In many regions, however, the barriers to restructuring were so great as to make it uneconomical, and the traditional structure remained. This was true even in some regions that were close to urban markets. For example, the communal structure survived in southwest Germany, a region of intense market activity. Consequently, agricultural productivity there remained low—with the exception of the many highly productive private gardens, which accounted for much of the region’s commercial output (shades of the Soviet Union again!).⁸⁰

FINANCING THE AGRICULTURAL ENTERPRISE

The transition from manorial agriculture to an agriculture of family farms involved not only a restructuring of land use, but also a recasting of the relationship between the owner of the land and its cultivator. Historians have generally understood this relationship in terms of employment or agency—the landowner being the employer or principal and the cultivator his employee or agent. The choice facing the landowner, then, was one of employment contract: he chose between wage labor and different forms of

seems that in fact few were actually dispossessed and that most of the ‘social costs’ were a result not of the enclosures but of rapid population growth at the time. Goldstone (1988)

⁷⁷Goldstone (1988) emphasizes the need to overcome the fixed costs of restructuring.

⁷⁸Overton (1996), writing of the eighteenth-century enclosures in England.

⁷⁹Writing of the eighteenth-century enclosures in England, Szostak (1991) suggests that there was a connection between improvements in transportation linking a region with the London market and subsequent enclosures. (p 29)

⁸⁰Hopcroft (1999) Ch 7

tenancy based on a tradeoff between the cost of supervision and the bearing of risk.⁸¹ The problem with this interpretation is that it confuses ownership of the land with ownership of the agricultural enterprise. As we have seen, efficiency required that ownership of the enterprise pass into the hands of the farmer. In some cases, the farmer himself was the landowner. When he was not, the landowner was not his employer so much as he was a supplier of capital.⁸²

PROVIDING THE FAMILY FARM WITH FIXED CAPITAL

Unlike manufacturing in this period, agriculture required significant fixed capital—long-lived assets necessary to the process of production. Obviously, the most important item of fixed capital was the land itself. But agriculture required, too, investment in land improvement (hedging, drainage and terracing); in structures (barns, mills and presses); in implements and equipment (ploughs, hoes, and harness); in orchards and vineyards; and in livestock. All of this fixed capital needed to be financed. While some farmers had the resources to finance part or all of it themselves, most had to seek financing from others.

The nature of this external financing had to suit the circumstances. Fixed capital has a long life, and it yields its return slowly over time. To match this pattern of returns, the financing of fixed capital generally needs to be long-term too. However, the longer the term of the financing, the more time there is for things to go wrong, and so the greater the risk of default. Consequently, long-term financing, even more than short-term, tends to be secured. The most natural way to do this is with the capital asset itself: if the recipient of finance defaults, the provider of finance gains possession of the asset.

It is in the context of the need for external financing of fixed capital—and of the need that it be secured—that the changing relationship between the ownership of land and its cultivation is best understood. According to the conventional interpretation, merchant landowners preferred tenancy to direct supervision of labor because they were absentee landlords. However, feudal landowners too were typically ‘absentees’, and they always

⁸¹Hoffman (1984) reviews the literature. Galassi (1992) provides a recent example of the application of this interpretation to medieval agriculture in Tuscany.

⁸²Indeed, in most cases, the farmer was himself an employer. Some farmers had permanent employees such as milkmaids and shepherds; almost all hired seasonal labor as needed.

had been. They were warriors, not farmers, and they had left the management of their estates to stewards. In the transition from direct supervision (by stewards) to tenancy *two* things were happening. First, the command economy of manorialism was being replaced by the family farm. Second, ways were being found to provide the family farm with the capital it needed. Merchants preferred tenancy to direct supervision, because in most cases they were not operating the agricultural enterprise, but financing it. In the family farm the needs of agricultural efficiency meshed nicely with the needs of urban investors. The family farm required financing; the urban investor had the necessary funds and sought an outlet for them. The only question was what form the financing should take.

FINANCING SECURED BY THE LAND

There are basically two ways to secure the financing of fixed capital—the secured loan proper and the lease. With a secured loan, the borrower receives a cash loan with which to acquire the asset. The asset acquired, or some other asset that the borrower owns, becomes collateral for the loan: if the borrower defaults, the lender gains ownership of the collateral. With a lease, on the other hand, it is the provider of finance rather than the recipient who owns or acquires the asset. The provider of finance lends the asset itself, rather than a sum of money, to the recipient. The asset remains the property of the provider of finance, and in the case of default he merely has to regain possession. Generally, a lease provides the provider of finance with better legal protection, because the asset is already legally his. The land and the other fixed capital used by the family farmer were financed in one of these two ways—with a secured loan or with a lease. As we shall see, the method that was chosen and how it was implemented depended on the particular circumstances—on who owned the land, on the amount and type of non-land fixed capital involved in production, and on the financial and legal instruments and institutions available to the parties.

In some parts of Europe, the predominant form of agricultural financing was the secured loan. Secured lending depended on the existence of a market for such loans and on the pattern of land ownership. A market for long-term secured debt developed in the Low Countries and in northern France in the twelfth century.⁸³ Initially, it served the needs, not of farmers, but of feudal lords, who borrowed against their lands to finance

⁸³See Kohn (1999)c for details.

their participation in the Crusades. The instrument of these early loans was a form of mortgage, but it was later replaced by the sale of rents (the *rente*, *census*, or annuity). In this, the landowner sold a fixed cash flow, to be derived from the revenue of the land—and secured by it—in exchange for a capital sum paid in advance. By the late thirteenth century, the market for *rentes* was well organized and it was being used by Flemish farmers to finance their investment in fixed capital. Although many of the lenders were rural, urban investors already played a role.⁸⁴ During the general expansion that began in the mid-fifteenth century, the market for *rentes* expanded enormously, spreading to Brabant and the Netherlands and to Germany and Spain, and drawing in enormous amounts of urban capital.⁸⁵

Secured lending was used mainly to finance, not the land itself, but improvements to the land and investment in other non-land fixed capital.⁸⁶ In some cases, family farmers themselves constituted rents on their land to finance improvements.⁸⁷ In other cases, land developers borrowed to finance their projects. For example, the great reclamation schemes of the Netherlands were largely financed in this way. In some cases, it was traditional landowners who took advantage of secured lending. For example, in Spain in the sixteenth century the conversion of the great estates from arable land and pasture to vineyards and olive groves was largely financed through the sale of *rentes* or *censos* to urban investors: the total amount outstanding in 1618 was said to exceed a hundred million ducats.⁸⁸

Of course, one could borrow against the land only if one owned it. In the Low Countries and in the Netherlands many farmers did own their land: in Holland, for example, almost half the land was owned by farmers.⁸⁹ Full, freehold, ownership was not required however. Much land was held under heritable tenure subject to a money rent. In

⁸⁴Thoen (1993), Nicholas (1971)

⁸⁵Van der Wee (1993), de Vries and van der Woude (1997) Ch 6

⁸⁶There seems to be no evidence of secured lending being used to finance the purchase of agricultural land. This practice was common, however, with respect to urban land (see Kohn (1999)c).

⁸⁷That is, they themselves issued debt secured by the land and relying on the income from the land to pay the promised cash flow.

⁸⁸According to Valle de la Cerda, a contemporary. (Braudel (1972) p 425)

⁸⁹de Vries (1974)

many cases, the money rent had become quite nominal, long ago eroded by rising prices. Moreover, as we have seen, land held in this way was alienable and could therefore be used to secure a debt. Consequently, many holders of land under heritable tenure were *de facto* its owners, and they could without difficulty constitute a rent on it.

Not everywhere was there a market for loans secured by land. In much of Europe, the market for rents played this role. However, in Italy there does not seem to have been such a market: perhaps the pattern of land ownership was such that the need did not arise.⁹⁰ In England, a market did exist, but it was moribund for lack of a suitable legal instrument.⁹¹ Consequently, English farmers, landowners, and developers had to rely largely on their own resources. Most agricultural investment in England was financed from the savings of the farmers themselves, from those of the great landowners, or from the resources of urban investors who invested directly in the improvement of the land they owned.⁹² It seems plausible, therefore, that the boom in agricultural investment in late sixteenth-century England was made possible by the increasing prosperity of its farmers— due partly to rising agricultural prices and partly, perhaps, to the erosion of land rents by the ‘hyperinflations’ earlier in the century.⁹³

THE LEASING OF LAND: DEBT VS. EQUITY

When the farmer did not own the land himself, he generally gained use of it through a lease. The lease simultaneously provided him with land and financed his use of it, all in

⁹⁰There was in Italy, however, a very well developed market for long-term *municipal* debt (as there was in the North). See Kohn (1999)c for details.

⁹¹“Prior to about 1620 the types of security in normal use enabled lenders to insist on repayment of their loans at very short notice, and gave them the right of foreclosure on the security if it was not forthcoming on the appointed day. This made it impossibly risky for anyone to sink borrowed money into anything as inconvertible as an enclosure scheme, drainage works or a new set of farm buildings, and in practice additions to fixed capital were hardly ever financed by means of loans in the sixteenth or early seventeenth centuries.” (Clay (1984) p 125)

⁹²Hilton (1965)

⁹³Clay (1984) argues that the high rate of profit in commercial farming during most of the sixteenth and early seventeenth centuries providing farmers with the funds they needed for investment.

one package. Moreover, leasing was applied not only to land, but also to other forms of agricultural fixed capital such as mills, presses, and livestock.⁹⁴

A farmer leasing his farm and a peasant holding his land under feudal tenure were both called ‘tenants’. However, the two situations were entirely different. Under feudal tenure, land was held in perpetuity, heritable subject to a quit-rent, in exchange for labor and other servitudes in addition to rent. In contrast, a lease was for a limited fixed term, and it was purely a commercial contract, requiring payment of a money rent only.⁹⁵ The replacement of feudal tenure with leasing was part of the process of commercialization, as urban investors consolidated smallholdings into family farms and as great landowners dividing up their demesne lands in order to let them out.⁹⁶ The process began in the early twelfth century, and was well advanced by the thirteenth century in regions exposed to the market—especially in the urbanized central regions of the North and South.⁹⁷ However, in the many regions of Europe untouched by commercialization, feudal tenure was to remain the norm, sometimes for centuries.⁹⁸

The lease took one of two forms: the lease for a fixed rent (*bail à ferme* or *fitti*) and the lease for a share of the harvest (*bail à part de fruits*). Under the latter, the share going to the landlord varied—a quarter, a third, or—most commonly—a half (*métayage*,

⁹⁴“[L]ivestock too, with or without land, had also come, from the 13C, to be generally let by lease. Such grants in fact were used by more than landlords: they became a common form of investment for townfolk, village tradesmen, well-to-do peasants; and here the promised profits could be usuriously high.” (Jones (1968) p 221)

⁹⁵Terms initially were quite long, 20 years or more, but generally fell to 5-7 years, although they were frequently renewed (Jones (1968)). Where crop rotations were the custom, the length of the lease would usually be a multiple of the length of the rotation.

⁹⁶“A large part, sometimes even the whole of the land still in demesne, was often divided up and let to farmers for a fixed term.” (Ganshof and Verhulst (1966) p 323)

⁹⁷Ganshof and Verhulst (1966) p323 on France, the Low Countries, the Netherlands, and Germany. Jones (1966) on Italy. The fixed-term lease was not a new idea: examples in Tuscany go back to the ninth century. (Galassi (1992)).

⁹⁸For example, feudal tenure predominated in much of France (Ganshof and Verhulst (1966)). Even in Italy, it was only on restructured land that the fixed lease was used; on unstructured, feudal tenure persisted (Jones (1966)).

mezzadria, *Halbpacht*, or *helftwinning*).⁹⁹ Both types of lease, fixed-rent and share, were initially found wherever leasing was introduced. However, over time, fixed-rent contracts came to predominate in some regions and share contracts in others.¹⁰⁰ To understand why, we need to consider the nature and the relative merits of the two contracts.

The fixed-rent lease had much in common with a secured loan: it was a variety of debt contract. The provider of finance was due a fixed payment, irrespective of how the enterprise fared. He had no control over the enterprise unless the ‘borrower’ defaulted, in which case ownership reverted to him.¹⁰¹ In contrast, the share lease was an equity contract. The payment due the provider of finance depended on the success of the enterprise, and he did have partial control over its management. By our earlier definition, this combination of rights made the provider of equity finance a part owner of the enterprise: he shared ownership with the farmer. Essentially, then, the choice between fixed-rent lease and share lease was a choice between debt financing and equity financing.

The relative merits of debt and equity financing have been studied extensively, although in a somewhat different context—that of the modern public corporation.¹⁰² The insights obtained in that context will prove useful to us here. Under debt financing, the borrower formally bears all of the risk: he is liable for the debt however the enterprise fares. In reality, however, some of the risk falls on the lender, because the borrower, even if liable, may be unable to pay. Moreover, the risk borne by the lender is unattractive: it is purely downside risk, with no upside. At best, the lender receives what is due to him; but

⁹⁹Strictly, the term farmer (*fermier*) was applied only to the holder of a fixed-rent lease. A sharecropper was called a *métayer*.

¹⁰⁰Ganshof and Verhulst (1966) notes that fixed rents dominated in parts of northern France, in Flanders, Hainault, Namur, Liège, and in western Germany, while share contracts remained popular in Artois and most of western and southern France. Share contracts were also popular in northern Italy, especially in Tuscany (Jones (1968)).

¹⁰¹In both cases, the ‘lender’ does have some control *ex ante*, in that conditions can be written into the debt contract in the form of covenants. In Flanders, for example, fixed-rent contracts specified crops and maintenance and improvements required of the tenant (Nicholas (1971)). However, covenants are hard to enforce, and the lender has no day-to-day control.

¹⁰²See any corporate finance textbook such as Brealey and Myers (2000), also Milgrom and Roberts (1992). Particularly illuminating is Baskin (1988).

if the borrower defaults, he receives less. Moreover, if the borrower does default, the lender faces a dilemma. Should he allow the borrower some leeway, or should he enforce the contract immediately? If the failure to pay is the result of ill fortune that is likely eventually to be reversed, patience may well minimize the lender's losses. On the other hand, if the failure to pay is the result of bad performance that is likely to persist, immediate enforcement may be the best course. Because of the problems associated with default, debt financing is most attractive when it is safe—when payment can be expected with some certainty and when default is unlikely.

In cases in which debt financing would not be safe, the provider of finance will often find equity financing to be more appealing. First, with equity the risk does have an upside: the possible gain if things go well balances the possible loss if they go badly. Second, equity financing possesses a built-in flexibility: since the recipient of the financing has no fixed commitment, he cannot by definition default. Of course, this does create incentive problems. Without the threat of default and its consequences, why should the recipient keep his promises to the provider of the financing? Moreover, now that the owner of the enterprise has to share the rewards, why should he work as hard?¹⁰³ To allow the provider of finance to protect his interests in the face of these incentive problems, the equity contract gives him a right to participate in the control of the enterprise. This is, however, a mixed blessing: exercising the right of control is arduous, so that equity financing requires more time and attention than does (safe) debt. Consequently, we would expect the equity contract to promise the provider of finance a higher return and to be more costly for the recipient.

¹⁰³With debt financing, once the debt is paid, the remainder goes to the borrower, giving him every incentive to exert his maximum effort. In contrast, a mezzadria contract imposes a 50% marginal 'tax' on the borrower. Galassi (1992) finds evidence in fifteenth century Tuscany that share tenants, beyond some point, preferred to hire themselves out for wages rather than invest more effort in their leased land (share contracts often prohibited them from doing this). However, this is not necessarily evidence of slacking. Beyond some point, the marginal product of effort devoted to the leased land may fall below what the tenant can earn from wage labor, even if he receives the whole of the marginal product. Since the landowner does not bear this opportunity cost, he would like the tenant to continue to work on his land so long as the marginal product remains positive. In this case, the incentives of both of the parties are distorted by the share contract.

These lessons of corporate finance can be applied to the two types of agricultural lease—the fixed-rent lease (debt) and the share lease (equity). It suggests that the choice between them should depend on the likelihood of default on a fixed-rent lease. That likelihood—and so the relative attractiveness of the two types of lease—depends on two things: on the riskiness of the enterprise and on the farmer’s capacity to absorb that risk.¹⁰⁴ The agricultural enterprise was subject to considerable risk, because both output and price were highly variable. The quantity and the quality of output depended, of course, on the skill, care, and effort of the farmer. However, they depended too on factors outside the farmer's control—on the weather and on the incidence of pests and diseases.¹⁰⁵ Prices were uncertain, because markets for agricultural produce—grain especially—were thin and the supply was erratic: this created a great deal of volatility.¹⁰⁶ The importance of these risk factors varied according to region and crop. Given the risk, the capacity of the farmer to absorb it depended mostly on his wealth. A wealthy farmer with a relatively small burden of debt could survive a bad season; a poor farmer with a large burden of debt could not.¹⁰⁷ Consequently, one explanation for the prevalence of fixed-rent leases in the North and share leases in the South is that farmers may have been wealthier in the North.¹⁰⁸ In support of this conjecture, there is evidence that in regions of the South where farmers were wealthier, such as the Lombardy plain near Milan, debt financing (in the form of fixed-rent leases) was quite common.¹⁰⁹

¹⁰⁴While I have no evidence on the relative size of rents under fixed-rent and share leases, Hayami and Otsuka (1993) finds that in contemporary developing economies rent is significantly higher under share leases, just as we would expect.

¹⁰⁵There was also the risk of damage from war or natural disaster. In some cases, the lease assigned these risks to the landlord: see Nicholas (1971) on Flanders.

¹⁰⁶See Kohn (2001)b.

¹⁰⁷In some cases, tenants provided sureties or pledges against default (Ganshof and Verhulst (1966)). Such credit enhancements were not really alternatives to wealth, since their availability would largely depend on the tenant’s wealth.

¹⁰⁸Hoffman (1984), Toch (1986), and Galassi (1992) all suggest that a lack of wealth on the part of the farmer was an important reason for use of a share contract.

¹⁰⁹Epstein (1998)

THE FINANCING OF NON-LAND FIXED CAPITAL

The wealth of the tenant farmer was important, too, in determining whether it was the farmer or the landlord who invested in non-land fixed capital. The wealthier tenant farmers of the North frequently had the resources to finance such investment themselves. Of course, when they did, the fixed duration of the lease created a new incentive problem. If a tenant invested say, in improving the land or in building a barn, he would stand to lose this investment if the lease was terminated. To protect tenants against this contingency, and to encourage them to invest, leases generally promised them compensation for any capital improvements if the lease was not renewed.¹¹⁰ In many cases the problem did not arise, however, because leases were often routinely renewed for decades or even for generations.¹¹¹ Even so, tenant farmers often preferred to invest in shorter-lived and more mobile capital such as livestock, leaving longer-term and less mobile investment in improvements and structures to the landlord.¹¹²

The less wealthy farmers of the South lacked the resources to invest in non-land fixed capital of any kind, and it was therefore generally the owners of the land who provided the financing. In this case, too, there was an incentive problem that resulted from the fixed duration of the lease. The tenant, uncertain the lease would be renewed, might try to

¹¹⁰de Vries (1974) on Holland. Laven (1966) on northern Italy. Leases there required landlord to compensate tenants for improvements or to renew the lease on the same terms. In the late Middle Ages, the Church, a major landowner, lacked the resources to make such compensation. As a result, it was unable to adjust money rents for the rising level of prices, and tenant farmers paid declining real rents. (p 27).

¹¹¹de Vries and van der Woude (1997) Ch 5. Nonetheless, the option not to renew did allow the landlord to replace relatively easily a tenant who failed to perform (Ganshof and Verhulst (1966) p 326). Periodic renewal also allowed the landlord to adjust the rent to reflect changes in market conditions or changes in the value of money. The length of the renewal period in Italy declined from 10 years and more to 5 or less during the thirteenth century, perhaps in response to greater instability in the price level (Jones (1968)). And Ganshof and Verhulst (1966) suggests that in the late Middle Ages and in the sixteenth century the switch from customary tenure to leases may have been motivated by the erosion of rents by inflation (p 326). One advantage of share leases was that the terms adjusted automatically to reflect changes in the market and in the price level.

¹¹²Clay (1984) reports that while English farmers who owned their land invested in improvements, tenant farmers invested primarily in livestock and equipment.

Landlords do seem to have made considerable investments in improving tenant holdings in order to raise the income from them and in order to attract farmers in times of labor scarcity. Toch (1986)

get the most out of the non-land fixed capital over the life of the current lease even if this was harmful over the long term. For example, a tenant wishing to maximize the short-run yield of a vineyard might prune back the vines to the detriment of the yield in the long run and counter to the interests of the landlord who had planted them.¹¹³ The share lease provided the landlord with better protection against this sort of misbehavior, because it allowed him to intervene directly in the management of the enterprise.¹¹⁴ Share contracts were indeed especially common when the landlord provided significant non-land fixed capital—for example, in the leasing of vineyards, olive groves, and livestock.¹¹⁵ So in this way too, the relative poverty of farmers in the South—which prevented them from financing non-land fixed capital themselves—favored the share lease over the fixed-rent lease.¹¹⁶

THE FINANCING OF WORKING CAPITAL

In addition to fixed capital, agricultural production also involved working capital. Long before output could be sold, the farmer incurred outlays on seed, manure, fodder, and hired labor, as well as on his own living expenses those of his family. Such outlays—which constituted working capital—required financing. Farmers who could generally finance their own working capital or relied on debt financing.

A common form of debt financing of working capital was the forward sale. The lender advanced cash or supplies to the farmer to be repaid at harvest-time in output. The

¹¹³Hoffman (1984)

¹¹⁴“Town merchants therefore increasingly adopted and favoured the *mezzadria* contract because this guaranteed a stable and assiduous labour which they could control (as joint-participants in choices involving production) and ensured conservation of the owner’s invested capital (both in real estate and stock, such as seed and cattle)...” Biagioli (1987) quoted in Galassi (1992) (Galassi dismisses this argument for the share contract).

¹¹⁵Jones (1968) on Italy; Toch (1986) on Germany.

¹¹⁶The incentive problem existed to some extent for land as well as for non-land fixed capital. For example, some crops that were highly profitable in the short run exhausted the soil and so lowered profits in the long run. It seems though that such ‘misbehavior’ was relatively easy to detect, and that covenants written in to fixed-rent leases provided landlords with sufficient protection. de Vries and van der Woude (1997) notes such covenants in fifteenth-century Holland forbidding conversion to arable, prohibiting certain crops, and requiring fallow. Sometimes tenants provided sureties or pledges against the fulfillment of covenants. Ganshof and Verhulst (1966)

amount of output required to discharge the debt would often depend on the market price obtaining at that time.¹¹⁷ For example, in fifteenth-century Sicily, there was a highly organized market for forward sales, known there as *contratti alla meta*. The price at which the debt was paid off in wheat was set at harvest-time by negotiation between representatives of merchant-lenders and producers.¹¹⁸ In a similar arrangement, Frans de Pape, an Antwerp merchant in the fifteenth century, advanced cash to Zealand farmers against repayment in coleseed at a stated discount below the market price.¹¹⁹ As in these two examples, those financing the farmers' working capital were often merchant middlemen seeking to secure their supply. Indeed, in thirteenth century England, Italian merchants succeeded in capturing most of the supply of wool through their willingness to provide cash advances to the producers.¹²⁰

Where farmers lacked the resources to finance their working capital themselves or were too poor to be able to borrow from merchants, the necessary financing often came from landlords. Indeed, the financing of working capital was a common feature of share leases.¹²¹ Equity financing of working capital was sometimes also available independently from private investors: both in northern Italy and in Sicily in the thirteenth century, urban investors advanced cash to farmers in exchange for a share of the crop.¹²²

¹¹⁷Because the price was not set in advance, these were not risk contracts. The risk of the fluctuating market price remained with the farmer—unless he defaulted.

¹¹⁸Epstein (1991) Consistent with the pattern that only substantial farmers could take on debt contracts, the farmers in this case were agricultural contractors (called *gabelotti*) who leased land, raised the necessary finance, and hired and supervised labor.

¹¹⁹Van der Wee (1963) p300

¹²⁰“If the Italians made the widest use of the method of advance payment, this was merely because in the later thirteenth and early fourteenth century they were better provided with capital than most other wool exporters, while the monasteries at this period frequently found themselves in financial difficulties.” (Postan (1973) p 24). In the early 1290s, the Italians were making forward purchases from 49 of the 74 Cistercian abbeys that were the major producers. Sometimes these purchases were for several years ahead (as many as 12). In some cases, the purchases far exceeded the output of the abbeys concerned, with the abbeys meeting their obligations by buying wool in local markets. (Prestwich (1979))

¹²¹Epstein (1998) and Jones (1968) on Italy; Toch (1986) on Germany.

¹²²“By the thirteenth century it was clearly a widespread practice, at least in Upper Italy, for people of all but the poorest classes to speculate by advancing money to peasants, against future delivery of crops,

THE IMPORTANCE OF FINANCIAL STRUCTURE

Other than differences in the wealth of the farmers and in the risk of the enterprise, there may have been an additional reason why debt financing was more common in the North and equity financing in the South—the nature of the pre-existing financial structure.¹²³ As we have seen, in the period of agricultural commercialization, there already existed in the North a market for loans secured by land; such a market does not seem to have existed in the South. However, in the South at this time, the principle instrument for the financing of commerce was the *commenda* contract. *Commenda* was a form of partnership in which one partner provided the capital, generally in the form of goods, and the other traveled with the goods to sell them in a distant market. The traveling partner, being on the spot, made the day-to-day business decisions: he was the owner-manager of the enterprise. The partner who remained at home was an owner-financier. It would have seemed very natural to an Italian merchant investing in agricultural land to write a similar contract with his tenant. In this case, the merchant was the owner-financier and the tenant the owner-manager.¹²⁴ Financial evolution, like biological evolution, generally relies on the adaptation of existing structures to serve new needs.¹²⁵

CHANGES IN THE EMPLOYMENT OF LABOR

The transition from manorial agriculture to an agriculture of family farms involved a restructuring, not only of the use of land, but also of the employment of labor. Since

and by buying up livestock to let out to farmers.” (Jones (1966) p 388). Epstein (1991) reports a similar practice in Sicily in the thirteenth century, before the appearance of the *meta* contract.

¹²³Galassi (1992) suggests that, at least in fifteenth-century Tuscany, not all share tenants were without wealth of their own.

¹²⁴Germany, where share tenancy was also quite common, had a contract similar to the *commenda*, the *wederlegginge*. (Postan (1973) Ch. 3) For more on the *commenda*, see Kohn (1999)c.

¹²⁵Historians have noted that the share contract seems to have been associated with urban investors: for example, “There is little doubt that the spreading of share contracts in the late Middle Ages happened at same time as a large-scale transfer of land to city dwellers.” (Galassi (1992) p 78). On Italy, see also Jones (1968) and Epstein (1998); on Germany see Toch (1986), Toch (1997). Of course, the association could have been because share tenancy came with commercialization and commercialization came with urban investment in agricultural land. However, the natural tendency of urban investors to adapt an instrument with which they were already familiar may also have played a role.

manorialism tied labor to the land, freeing the land necessarily meant freeing the labor. In the eleventh and twelfth centuries, under the pressure of the expanding market economy, feudal servitudes of all kinds were increasingly commuted to money payments. For peasants this meant that instead of having to work on the demesne lands, they now had to pay money rents. As we have seen, the demesnes where they had worked were being broken up and leased out to family farmers.

Commutation did not necessarily mean the end of formal serfdom. However, servile status became more a social than an economic distinction. Serfs could and did become quite rich. For example, in the early sixteenth century, being a serf did not prevent Jack Winchcombe of Newbury from employing over a thousand workers in putting out. While another serf, William Haynes of Castlecombe, had to ask his lord's permission for his daughter to marry outside the estate, he was nonetheless a wealthy man—the owner of three fulling mills.¹²⁶ In some cases, serfdom even brought economic benefits: in Flanders, “the exemption of the abbey of St. Vaast from toll was so lucrative that merchants of the city were surrendering their freedom to become the abbey's serfs and enjoy the financial benefits of bondage.”¹²⁷

Freed from required service on the lord's demesne, some peasants became farmers. That is, they became specialized full-time agricultural producers. In the manorial economy, the peasant had, of course, engaged in some agricultural production on his own small plot in addition to working the land of his lord. However, he had also spent much of his time in other kinds of work: with trade minimal, the peasant household was of necessity largely self-sufficient. In addition to growing and processing most of its own food, it produced its own clothing, shelter, furniture, and tools and utensils. And it relied on its own resources for transportation and entertainment. The development of the market allowed farmers to specialize in agricultural production and to satisfy their various needs through trade. This was one important way in which the development of the market raised agricultural productivity—by allowing farmers to specialize *in* agriculture ¹²⁸:

¹²⁶Kellenbenz (1974)

¹²⁷Nicholas (1992) p 105

¹²⁸Hymmer and Resnick (1969) discusses this in the context of developing economies.

The essentially unspecialized peasant households that characterized Dutch rural society in the early sixteenth century developed in the course of the economic expansion of the sixteenth and early seventeenth centuries into commercial, highly capitalized farm enterprises. Surrounding these new households, nonagricultural specialists in crafts, transportation, marketing, fuel supply, and education arose to provide the goods and services that the unspecialized households of earlier times had endeavored to provide for themselves. In short, the peasantry, *the* rural class, became the farmers, *a* rural class.¹²⁹

Of course, not all peasants could become farmers. As we have seen, the typical peasant holding was far too small by itself to be the basis for a family farm. Some peasants did acquire sufficient additional land to become farmers. Others supplemented their income with part-time work or gave up their land altogether to seek full-time paid employment.¹³⁰ Of these, some found paid work in agriculture itself. Farmers relied heavily on hired workers. Some jobs were permanent, like those of the milkmaids on Dutch dairy farms or of the shepherds and teamsters who accompanied the migratory herds of sheep in Spain. However, most of the jobs were seasonal—harvesting grain and other crops, threshing, planting, hoeing, pruning, or pressing wine and olives. This seasonal demand for labor was met by local peasants and their families, by migrant laborers moving from farm to farm, and sometimes by urban workers from nearby towns.¹³¹

Agriculture alone, however, could not provide sufficient employment for the growing rural population. One reason was the reorganization of agricultural production, which increased efficiency and so reduced the labor required for a given amount of output. Another reason was the seasonal nature of agricultural work: agriculture provided employment for only part of the year. Fortunately, as the market economy developed in the countryside, it offered many other opportunities—in transportation, in domestic and

¹²⁹de Vries (1974)

¹³⁰Hoffman (1996)

¹³¹Van der Wee (1993) Ch 3

outdoor service, in construction, and in mining and manufacturing.¹³² For example, the range of occupations in the rural Netherlands around 1500 included peat digging, boat and wagon transport, reed gathering, freshwater fishing, fowling, spinning, dike and drainage labor, household crafts, and—in the maritime regions—shipping and ocean fishing.¹³³ And, of course, much of the rural population migrated—to the towns and, as we shall see presently, to new lands that were opening up.

This outflow of labor from agriculture can be seen as a consequence of the freeing of servile labor. However, it was also a cause. The expansion of the market economy, the growing towns, and the new lands provided peasants with new opportunities and lured them away from the manor. Indeed, many towns granted runaway peasants asylum: the saying in Germany was “Town air makes free”. Manorial lords were obliged to offer their peasants a more attractive package or face peasant flight or revolt. So in this way too, the expansion of the market contributed to the transformation of manorial agriculture.

THE DEVELOPMENT OF NEW LAND

The restructuring of existing land was accompanied by the opening up of new land. Beginning in the eleventh century, the inter-related processes of expanding trade, urban growth, rising agricultural prices, and increasing productivity due to reorganization, all contributed to a steady rise in the value of agricultural land. The rising value of agricultural land made it profitable to add to its supply—through clearing, drainage, and terracing; through reclamation from the sea; and through colonization. These activities peaked in the thirteenth century, were suspended or even reversed as land prices fell during the ‘depression’ of the fourteenth century, and then resumed again in the fifteenth century.¹³⁴

INTERNAL COLONIZATION

In the eleventh century, European settlement was relatively sparse. In the North, much of the land was covered by forests and swamps; in the South, cultivation was

¹³²Rural industry, in particular, took advantage of this seasonal slack in agricultural employment: see Kohn (1999)c.

¹³³de Vries and van der Woude (1997) Ch. 6

¹³⁴Powelson (1988); Slicher van Bath (1977). See Kohn (2001)a on the ‘Great Depression of the Middle Ages’, its causes and consequences.

largely limited to bottomlands, with the hills remaining barren. However, as the value of agricultural land steadily rose, it became increasingly worthwhile to clear forests, drain swamps, and terrace hillsides. And in the maritime regions, first in Picardy and Flanders and then in the Netherlands, it paid to reclaim land from the sea.

Much of this activity—sometimes referred to as ‘internal colonization’—was small-scale and piecemeal, carried out by landowners expanding into neighboring wasteland. However, in some cases the activity was on a larger scale and was organized by urban entrepreneurs and financed by urban investors. This was particularly true of reclamation projects. In Picardy and Flanders, the Counts granted coastal territories to nobles and religious houses on condition that they reclaim land from the sea. The recipients of these grants generally recruited urban contractors to carry out the actual reclamation. These contractors not only executed the work, they also obtained the necessary funding in urban financial markets. The contractors also recruited settlers, often from a considerable distance. Generally, they structured the new land as family farms: they had to in order to attract the best settlers. And the opening up of new land, by offering farmers an alternative, added to the pressure for restructuring the old.¹³⁵

Later reclamation projects in the Netherlands were on a much larger scale and were entirely an urban initiative. Beginning in the 1560s, merchants from Antwerp and later Amsterdam began to engage in what was essentially speculative land development. They would invest in reclaiming a substantial area ‘on spec’ in the expectation of renting it out to farmers at a profit. In the largest single project, begun in 1608, a group of some one hundred Amsterdam merchants invested over a million and a half gulden to drain the Beemster lake, creating over 5,000 acres of prime agricultural land. The total rental income on the new land was over 250,000 gulden—a return on equity of 17%. The total investment in such schemes was enormous: between 1590 and 1650, Amsterdam investors sank over 10 million gulden into projects in the Noorderkwartier alone—an amount that rivaled the capital of the Dutch East India and West India Companies combined. The specialized contractors and technical experts who undertook these projects went on to apply their skills in reclamation projects in the English Fens and in France,

¹³⁵Slicher van Bath (1977); Jones (1997); Laven (1966); Nicholas (1992); Ganshof and Verhulst (1966).

Italy, and Mexico; in many cases, Dutch investors provided the financing for these projects.¹³⁶

EXTERNAL COLONIZATION: THE EAST

From the twelfth century, ‘internal colonization’ was paralleled by external colonization. Western Europeans expanded the agricultural land under their control by occupying and developing lands outside their own territories. In general, the process was one of conquest followed by development. This was the case in the German expansion into Eastern Europe, in the colonization of the eastern Mediterranean during the Crusades, and in the Iberian expansion into the Atlantic islands and the Americas. Conquest was generally in the domain of ‘government’—kings, nobles, and religious orders. Development was generally in the domain of merchant entrepreneurs.

In the German expansion eastwards, princes and crusading orders conquered vast new territories. The conquered lands were, according to feudal custom, divided up among vassal lords and the Church. They were granted to the former in exchange for military service and to the latter in exchange for rewards in the world to come. However, the value of the land lay largely in its potential: its current sparse settlement yielded little or no income. In some cases, the new feudal landowners developed the land themselves. This was especially true of the religious orders—Templars, Cistercians, and Praemonstratensians—that were prominent in the development of Prussia.¹³⁷ But in most cases landowners brought in urban contractors—known as *locators*—to do the job.¹³⁸ A single project (*locatio*) might involve an area ranging in size from 4,000 acres to almost 100 square miles. In each case, the *locator* would choose the site for a new village or villages (or for the restructuring of existing ones). He would survey and divide the land into fields and construct the necessary infrastructure of roads, churches, and mills. And he would recruit settlers—mainly Germans, but also Flemish and Dutch—paying for their transportation and supporting them until their first harvest. Of course, all of this required considerable financing, which, with the help of financial middlemen, the *locator* would raise in urban financial markets. *Locators* were specialized professionals: after

¹³⁶de Vries and van der Woude (1997); de Vries (1974); Slicher van Bath (1977)

¹³⁷Carsten (1954)

¹³⁸The following is based on Aubin (1966), Carsten (1954), and Powelson (1988).

completing one project, they would move on to the next. They were entrepreneurs with good technical knowledge of agriculture and substantial capital. They needed the capital because development was a risky business, and not all projects were successful.

Colonization was from the beginning oriented, not to subsistence farming, but to the market. To assure potential settlers of market access, villages were generally established in groups together with the market towns that would serve them. All were located with an eye to good river transportation to the Baltic market. Each settler received a compact family farm of from 40 to 60 acres in exchange for a modest money rent (the rent often being waived for an initial period). There was no required labor or other servitude, and settlers could sell their farms freely or bequeath them to their heirs.

The *locator* undertook the project at his own risk. The structure of the *locator's* compensation varied. Sometimes he purchased all of the land from the lord and his profit came from selling it again once it was developed (or, rather, selling the right to collect rents from it). More commonly, however, he received a fraction of the land in payment, and his profit came from selling this fraction; the lord's profit came from selling the rest. The *locator's* usual fraction fell from a third initially to a tenth as more entrepreneurs entered the business and as competition became more intense. In addition to capital gains on the land, the *locator* had two other important sources of profit. He normally received a monopoly on the provision of services to the new villages—mills, inns, bakeries, blacksmiths, butchers' stalls, bathhouses, and so on—each of which he could let out for rent. He was also appointed as the village's judge and administrator (*Schulze*). This position, with its right to collect fees and fines, was valuable, and the *locator* could sell it—sometimes for as much as 50 or 70 marks.

Not all of the agricultural development in the East depended on conquest. Much of it involved the peaceful infiltration of German settlers and German techniques. The native Slav population, observing the success of the German colonists imitated their methods. Native lords recruited German *locators* to establish new settlements on their lands too, recruiting German and other settlers. Some Slav entrepreneurs learned the business and became *locators* themselves. And in some cases, *locators*, of whatever nation, recruited local Slavs as settlers.¹³⁹

¹³⁹Powelson (1988). Some Slav peasants became free by settling in German villages.

The development of a market-oriented agriculture based on family farms led to an enormous increase in the region's output and to a significant increase in its exports—especially of grain. The new settlements supplied the Baltic market and before long, grain from the new lands was finding its way further south. Grain from Brandenburg reached Flanders and England by 1250, and from the fifteenth century the eastern lands became the principal exporters of grain to the rest of Europe.

EXTERNAL COLONIZATION: THE SOUTH

In the southern colonization—the eastern Mediterranean, the Atlantic islands, and the Americas—conquest was generally, as in Eastern Europe, a government function.¹⁴⁰ Sometimes, however, merchant entrepreneurs took on the task themselves. In some cases—as in the Genoese colonization of Chios—this meant forming a company for the purpose—a precursor of later Dutch and English companies of colonization. In other cases—as with the Genoese colonies of Pera and Caffa in the Black Sea and the Catalan and Navarrese colonies in Greece—less formal groups of individual merchant-soldiers acted together. In all cases, however, as in the German colonization, it was merchants who were responsible for development—especially the merchants of Venice, Pisa, and Genoa.

Agricultural development in the southern colonization was closely related to the spread of plantations. Before the Crusades, Europeans imported sugar, cotton, and malmsey (a sweet fortified wine) from the Levant. However, when the Crusaders conquered Palestine, Venetian merchants were quick to take over and expand the sugar and cotton plantations that they found there. And when the Venetians later conquered Crete and Cyprus, they established sugar and cotton plantations there too. When the Genoese took Chios, they set up plantations there to produce malmsey wine.¹⁴¹ From the eastern Mediterranean, the cultivation of sugar, cotton, and malmsey spread westwards. In the fifteenth century, Pisan merchants were instrumental in expanding their cultivation in Sicily, and Genoese merchants played a similar role in Andalusia, the Algarve, and

¹⁴⁰Verlinden (1970), on which much of the following is based.

¹⁴¹Laven (1966) Ch. 3 Trade. When its sugar production declined, because of competition from new, lower-cost producers, Crete turned to the production of malmsey instead. This same pattern—first sugar, then malmsey—was followed later elsewhere as sugar cultivation spread westwards.

North Africa.¹⁴² When the Spanish and Portuguese colonized the Atlantic Islands and the Americas, Genoese developers worked closely with the Iberian conquerors, bringing the cultivation of sugar, cotton, and malmsey to the new territories.

In the southern colonization, and in the spread of plantation agriculture that accompanied it, northern Italian merchants provided financing, management skills, and agricultural know-how. Just like the *locators* in the North, merchant entrepreneurs in the South recruited settlers for the new territories. For example, in the Atlantic islands, the Genoese brought in settlers not only from Spain and Portugal, but also from Italy, Normandy, and Flanders. Plantation agriculture, unlike arable farming in Eastern Europe, was highly labor intensive. To work their plantations in Crete, the Venetians brought in Armenian immigrants, and when these proved insufficient they began to rely on imported slaves. From then on, slave labor spread westwards together with the plantations. The Genoese and Venetians were the main suppliers, initially from the Balkans and the Black Sea. Genoese merchants later played a major role in establishing the African slave trade that supplied the plantations of the Atlantic islands and then of the Americas. Once plantations were established, northern Italian merchants purchased their output, processed it, and brought it to market. Pisan merchants set up sugar mills and refineries in Sicily—large-scale operations, each employing 40 to 50 people. The Genoese set up sugar mills in the Atlantic islands and in the West Indies.¹⁴³ By 1600, the Portuguese colonies in the Atlantic and Brazil were supplying Europe with most of its sugar, with the trade firmly in the hands of Genoese and Florentine merchants.¹⁴⁴

THE ROLE OF TECHNOLOGICAL PROGRESS

The expansion of trade and the consequent reorganization of agricultural production were, as we have seen, the main causes of rising agricultural productivity. Trade induced a change in the mix of outputs to better suit available resources. Trade also induced a restructuring of the process of production to make better use of inputs. However, each of these changes implies only a ‘once-over’ improvement in productivity. How, then, can they account for the steady increase in productivity over time that actually took place?

¹⁴²Epstein (1991) on the Pisans, Davis (1973) Ch. 1 and Scammell (1981) Ch. 4 on the Genoese.

¹⁴³Scammell (1981) Ch. 4

¹⁴⁴Davis (1973) Ch. 1

One answer is that these ‘once-over’ improvements took a very long time to complete. Restructuring, in particular, took centuries, as agricultural markets expanded slowly to encompass ever-more remote regions. But there is another explanation for the continuing rise in productivity: commercialization stimulated technological progress.¹⁴⁵

COMMERCIALIZATION AND TECHNOLOGICAL PROGRESS

Technological progress begins with an invention or discovery that has the potential to raise agricultural productivity. Someone comes up with a new product or process—hopped beer, for example, or a new rotation—or discovers a new crop. For the potential to be realized, however, the new invention or discovery must go through a process of adaptation and modification to make it workable and profitable. This process is generally not a distinct activity but rather a by-product of production: producers, through trial and error, make the necessary adjustments.¹⁴⁶ Consequently, it is only when a new invention or discovery is widely adopted that it can undergo this process of incremental refinement and so have a significant impact on productivity.

It was mainly by promoting adoption, and so setting in motion this process of adaptation and refinement, that the commercialization of agriculture stimulated technological progress. Indeed, much of the ‘new’ technology that was adopted—the ‘new’ crop rotations, for example—had actually been around for quite a long time. However, this technology had remained unutilized because it was not economically viable. By increasing the value both of output and of resources, expanding trade made the use of such technology profitable and so encouraged its adoption. Moreover, as commercialization spread, it promoted the diffusion of better technology to new regions.

Technological progress in this period was slow and incremental—quite unlike the dramatic breakthroughs of more recent times.¹⁴⁷ It was slow mainly because the process of commercialization that drove it was itself slow. Because of the slow pace of

¹⁴⁵“Technical changes and improved practices for which technical change would be too august an appellation played an integral role in raising the efficiency with which farmers used their productive resources. The stimulus to employ new techniques must be sought mainly in the symbiotic relationship between growing urban and international markets and an adaptive rural economy.” (de Vries (1974) p 155)

¹⁴⁶Persson (1988)

¹⁴⁷Persson (1988) has emphasized the incremental and evolutionary nature of technological progress in this period.

technological progress, there was relatively little pressure for new inventions and discoveries: there were plenty of existing inventions and discoveries that could keep the process going. Nonetheless, commercialization did contribute in this area too. The restructuring of agricultural production did raise some novel problems and create some bottlenecks; the consequent search for solutions was a stimulus to invention and discovery.

Because technological progress was slow and incremental, historians have sometimes underestimated its extent. The conventional story is that following a period of rapid technological progress in the early Middle Ages, agricultural technology stagnated for close to a millennium, until the ‘agricultural revolution’ of the eighteenth century.¹⁴⁸ Recent research has challenged this.¹⁴⁹ Much of the ‘new’ technology attributed to the early Middle Ages—crop rotations in particular—had in fact been available much earlier, perhaps as early as the late Iron Age.¹⁵⁰ It seems too that the adoption and diffusion of this technology did not take place in the early Middle Ages, but had to await the commercialization of agriculture that began in the eleventh century.¹⁵¹ Moreover, in the most commercialized areas, technological progress was then quite rapid: by 1300 crop yields in some regions had reached levels not to be surpassed in Europe until the nineteenth century.¹⁵² If technological progress overall was much slower, it was because the impact of commercialization was itself so limited.¹⁵³

¹⁴⁸The revolution in agricultural technology of the early Middle Ages is alleged to have involved three major advances—the substitution of more powerful horses for oxen as a source of traction, the introduction of the heavy plough in the North, making possible the cultivation of the heavy soils there, and the adoption of the three-course rotation and a variety of new crops. (White (1962))

¹⁴⁹Both the conventional story and the evidence against it are reviewed by Grantham (1999). Persson (1988) makes a strong case against the stagnation of medieval agriculture.

¹⁵⁰Grantham (1999) p 205

¹⁵¹Toch (1997)

¹⁵²Grantham (1999); Slicher van Bath (1977) p 82

¹⁵³There are increasing doubts, too, about the ‘agricultural revolution’ of the eighteenth century. It seems that there was no dramatic break, but rather the continuation of a slow and steady progress that had been going on for a very long time. See Allen (2000).

THE NATURE OF TECHNOLOGICAL PROGRESS

The technology of agriculture consists of the crops and animals available, the existing tools and equipment, and the known methods of husbandry. In the period from 1000 to 1600, the greatest advances came in the area of method—specifically, in the adoption and refinement of intensive agriculture.¹⁵⁴ While the idea of intensive agriculture was hardly new—the Romans, for example, had known of the soil-improving properties of legumes¹⁵⁵—the techniques of intensive agriculture underwent extensive adaptation and refinement as they were increasingly put to use.

Intensive cultivation involved a variety of ways of increasing the productivity of land: rotations that included soil-regenerating legumes to eliminate the need for fallow; the application of fertilizer; the elimination of weeds, either through dense seeding or by planting in beds and rows and hoeing; and the use of irrigation.¹⁵⁶ Part of the increase in productivity of land came from simply applying to it more labor and more capital. However, intensive cultivation did also increase overall productivity (total factor productivity). Moreover, intensive cultivation was essential for many of the highly profitable industrial and horticultural crops. These included flax, hemp, hops, coleseed, woad, saffron, madder, hops, and vines.¹⁵⁷

Intensive methods were applied, too, to the raising of livestock. Dairy farmers in Flanders and in Holland, instead of pasturing their animals on fallow, kept them in stalls and fed them fodder crops. These crops included alfalfa, clover, artificial grasses, turnips, and mangel-wurzels.¹⁵⁸ In the Po valley, dairy farmers relied on irrigation to create lush permanent meadows.¹⁵⁹ Beef cattle, driven overland from distant pastures, were fattened for slaughter on feed lots close to urban markets.

Intensive methods of raising crops and of raising animals were, of course, complementary. Dairy farms and feed lots relied on the fodder crops that were produced

¹⁵⁴Mokyr (1990) considers intensive agriculture ('the new husbandry') to be the most important technical change of the period: overall-not just in agriculture.

¹⁵⁵Toch (1997), Grantham (1999)

¹⁵⁶Toch (1997), Van der Wee (1963), Grantham (1999)

¹⁵⁷de Vries (1974), Jones (1997)

¹⁵⁸de Vries (1974)

¹⁵⁹Jones (1997)

by intensive cultivation. Intensive cultivation in turn depended on the manure produced by dairy farms and feed lots. Fodder crops also contributed to the feeding of the large number of horses and mules used for transportation both in the towns and in the countryside, and the manure from these animals too was exploited in intensive cultivation.

Commercialization in general and intensive agriculture in particular stimulated improvements in tools and equipment. For much of the period agricultural implements were made principally of wood, with only the cutting edges made of iron.¹⁶⁰ However, progress in the manufacture of iron, driven largely by the needs of the military, steadily brought down its price, and this led to its increasing use in agriculture. Village blacksmiths began to appear in the early twelfth century.¹⁶¹ With the increasing use of iron, there was steady improvement in the implements themselves—especially in the plough.¹⁶² The scythe was developed and gradually came to replace the sickle as the main tool of harvesting. Seed drills were introduced in the sixteenth century.¹⁶³ Improvements in horse traction—nailed horseshoes, rigid shoulder collars, and methods of harnessing—seem to have had a greater impact on haulage than on plowing, where oxen remained the preferred source of power.¹⁶⁴

There were improvements too in the crops and animals available to farmers. Intensive agriculture permitted the widespread cultivation of crops from the East and from the Americas that were either new to Europe or had previously been no more than garden curiosities. New crops from the Levant and Asia included rice, sugar, citrus, mulberry (silk), cotton, indigo, spinach, artichokes, and eggplants.¹⁶⁵ New crops from the Americas included maize, potatoes, French beans, and chili peppers. There were advances in livestock as a result of selective breeding and of the importation of better breeds from

¹⁶⁰Slicher van Bath (1977)

¹⁶¹Cipolla (1994)

¹⁶²Jones (1997)

¹⁶³Slicher van Bath (1977)

¹⁶⁴Toch (1997), Campbell (1988). Horses were stronger and faster but more delicate and more expensive to feed. Oxen when slaughtered were also more valuable as meat.

¹⁶⁵Jones (1997), Epstein (1998)

overseas.¹⁶⁶ For example, in the late sixteenth century, the highly commercial cattle ranches of eastern Europe developed specialized breeds of beef cattle, larger and sturdier than the dairy cattle that had until then been the primary source of beef.¹⁶⁷ Turkeys were brought to Europe from America.¹⁶⁸

Rising agricultural productivity put increasing pressure on the processing of agricultural output. There were, as a result, improvements in the technology of threshing and milling, in the preservation of fish, and in the production of dairy products.¹⁶⁹

THE ENDOGENEITY OF TECHNOLOGICAL PROGRESS

To some extent, the first stage of technological progress—invention or discovery—is fortuitous. However, the adoption of a new technology is entirely driven by economic incentives.¹⁷⁰ The adoption of a new technology is costly: it requires a lengthy and expensive process of trial and error and the sacrifice in the meantime of the sure income that could have been derived from the old technology. A new technology involves significant risks: costs may be greater than expected and benefits smaller, perhaps to the point where the whole project is a failure. To cover the initial cost of adoption and to compensate for the risk, the expected return must be substantial: only then will producers be willing to take the leap. Generally, it is major changes in relative prices that create a sufficiently large expected return and so stimulate the adoption of new technology.¹⁷¹

Consequently, periods of rising agricultural prices were periods of accelerated technological progress. During the commercial expansion of the twelfth and thirteenth centuries and in that of the fifteenth and sixteenth, growing urban demand for food and

¹⁶⁶Palliser (1983) Ch. 6

¹⁶⁷Blanchard (1986)

¹⁶⁸Masefield (1967)

¹⁶⁹Slicher van Bath (1977), Jones (1997), Epstein (1998)

¹⁷⁰“Figures show that as early as the fourteenth and fifteenth centuries it was possible to attain yield ratios that were not regarded as normal, even in the most advanced European countries, until about 1800. From this it can be concluded that from the fourteenth century it was possible to obtain yield ratios exceeding 10.0. Hence the absence of any rise in the yield ratios was not due to the lack of technical skill but rather to unfavourable economic conditions.” (Slicher van Bath (1977) p 82)

¹⁷¹There is a parallel here with the large potential gains necessary to pay the substantial fixed costs of restructuring.

raw materials raised agricultural prices. The resulting increase in the value of land stimulated the adoption of methods to increase land productivity.¹⁷² An Englishman, William Harrison, noted in the sixteenth century that his compatriots had ‘growne to be more painefull, skilfull, and carefull through recompense of gaine’, and in consequence the land was ‘even now in these our daies growne to be much more fruitfull that it hath beene in times past’.¹⁷³ But even in a time of generally falling agricultural prices, such as the late fourteenth and early fifteenth centuries, changing prices could stimulate innovation, because not all prices fell equally. The decline in population caused the demand for grain to fall, but rising per capita incomes caused the demand for ‘luxury’ foods to fall less or even to rise. The consequent rising *relative* price of non-grain products led producers in the more commercialized regions to switch from grain to dairying, horticulture, and industrial crops.¹⁷⁴

The adoption of new technology could also be driven by rising input prices. In sixteenth-century England, the rising cost of pasture pushed farmers to find ways of raising more livestock on a given acreage. They introduced marling and chalking to neutralize the soil and increase the effectiveness of fertilizers; they adopted rotations that would provide more fodder; and they flooded their meadows to improve pasture quality.¹⁷⁵ Similarly, the rising cost of labor after the Black Death encouraged the adoption of laborsaving technology.¹⁷⁶ Threshing barns reduced the peak-load demand for labor, because they reduced the urgency of threshing in uncertain weather. Teams of specialized harvesters, skilled in the use of scythes, traveled from farm to farm replacing much larger numbers of part-time workers (mainly women) who had employed the easier-to-use sickle. In general, rising labor costs promoted the use of more fixed capita—not only because of the rising cost of hired labor, but also because of the rising opportunity cost of the farmer himself. As we have seen, one way to raise the farmer’s

¹⁷²Slicher van Bath (1977), Miskimin (1977) Ch. 3

¹⁷³Palliser (1983) p 201

¹⁷⁴Van der Wee (1993) and Nicholas (1992) on the Low Countries, Epstein (1991) Ch. 4 on Sicily, Toch (1997) on Germany

¹⁷⁵Clay (1984)

¹⁷⁶Toch (1997)

income is to increase the size of his farm: another is to increase the amount of fixed capital that he employs.¹⁷⁷

TECHNOLOGICAL PROGRESS AND ACCESS TO URBAN MARKETS

The price pressure that promoted the adoption of new technology was obviously most acute in regions with good access to urban markets. Consequently, it was there that most innovation took place. In particular, it was regions that were close to cities that first adopted and developed intensive agriculture. Intensive agriculture was high-cost agriculture. Because it required much more labor and capital per acre than traditional methods, it needed high produce prices to make it profitable.¹⁷⁸ The price of produce at the farm gate, which is what matters to the farmer, is the price in the urban market *less* trading costs. Produce prices were higher for farms close to cities, because trading costs there, including transportation, were lower. Some historians have attributed the adoption of intensive agriculture to the availability cheap labor. However, it was precisely in those regions where labor was the most expensive—in regions close to cities—that intensive agriculture was adopted. Of course, land was expensive there too, so labor may have been cheaper relative to land. But in this case too, as with increasing farm size and with the increasing use of fixed capital, it may have been mainly the high opportunity cost of the farmer that was the decisive factor: an additional way for the farmer to increase his income was to command more hired labor.¹⁷⁹

Not only did regions close to urban markets have the greatest incentives to innovate, they also had the greatest ability to innovate. Commercialization and the consequent restructuring into family farms produced a highly flexible agriculture, alert to profit

¹⁷⁷Kislev and Peterson (1982)

¹⁷⁸“Yield ratios can only rise when more money is invested in cereal growing, i.e. in the form of additional labour, heavier manuring, better implements, more draught animals, a better crop rotation and, most important of all perhaps, a spirit of enterprise in the farmer... Farms with high cereal yields, copious manuring and ‘modern’ management could only exist in densely populated areas and in times of relatively high grain prices...” (Slicher van Bath (1977) p 82). See also Grantham (1999)p 212.

¹⁷⁹Thünen (1783-1850) developed a theory of agricultural specialization determined by transportation costs to urban markets and the consequent differences in factor values. See Samuelson (1983) for a thorough discussion. As Grantham (1999) notes, however, Thünen's theory does not explain higher total factor productivity close to urban markets.

opportunities, and possessing the resources necessary for innovation. The family farmer, specialized in production for the market, could respond more readily to changes in market prices than the peasant whose resources were largely committed to meeting his own needs.¹⁸⁰ The size of the family farm and its access to financing enabled it to support the high fixed costs of innovation and to bear the associated risks. Being close to urban markets had some additional advantages. Towns were an important source of the fertilizer required for intensive agriculture—night soil, manure from stables and feed lots, and organic industrial waste (distillers mash and oilseed cakes, for example).¹⁸¹ Some Italian cities even held public auctions to dispose of their valuable horse manure.¹⁸² And it was urban industry that developed and produced the implements necessary for intensive cultivation.¹⁸³

Existing institutions could hinder or help the adoption of new technology, but they were rarely decisive.¹⁸⁴ Unfavorable institutions, such as communal field systems, could raise the costs of adopting a new technology; favorable institutions, such as enclosed field systems, could lower them.¹⁸⁵ However, institutions—like technology—were to a large extent endogenous.¹⁸⁶ There is a suspicious correspondence between the regions that

¹⁸⁰“As long as the cultivator must produce inputs on his farm, production can hardly become highly specialized. The peasant can respond at the margin to market developments, but a large amount of his land, labor, and capital remains unavoidably committed to the production of intermediate, nonmarketed, products and services.” (de Vries and van der Woude (1997) p 204)

¹⁸¹Britnell (1989), de Vries (1974), de Vries and van der Woude (1997) Ch. 6., Hoffman (1996)

¹⁸²Jones (1997) p 161

¹⁸³Jacobs (1969)

¹⁸⁴Allen (1998) argues that the key to increasing productivity was restructuring under pressure of the market, and not any particular tenurial institution.

¹⁸⁵“The potential for an early breakthrough in the use of new crop rotations was greatest in areas of irregular fields and weak common rights; there investment in new crops and livestock could be justified if wheat acreage could be expanded and markets were readily accessible. In such regions the social obstacles to experimenting with new crops were low, and the opportunities for reaping the benefits of successful change were high.” Goldstone (1988) p 322

¹⁸⁶Goldstone (1988) argues for the endogeneity of institutions in England and France in the post-1600 period: “It is therefore not true that in England and France differences in class power created differences in landownership, which resulted in differences in farm size and productivity. In fact there were few differences in landownership. Instead, differences in regional ecology created different opportunities and

possessed institutions favorable to development and those having good access to markets. For example, the regions of northern Europe that began the period with the most favorable institutions—field systems that were less communal and more enclosed—were precisely those regions that bordered the North Sea and Channel and that therefore also had the best access to urban markets.¹⁸⁷ Presumably, this was no coincidence. Their geographic location meant that these regions had also enjoyed better access to markets in the past. Their field systems had therefore evolved to suit market-oriented agriculture. When trade expanded to regions previously untouched by the market, institutions changed. As we have seen, access to markets created strong incentives to restructure agricultural production in ways that made it more amenable to the adoption of new technology.

Once a new technology had been adopted in regions close to urban markets, it slowly spread to other regions. In the North, for example, intensive cultivation started in northern France, and spread slowly from there to Flanders, Brabant, England, and the Netherlands. The operative word is slowly, because it often took centuries for a new technology to spread across Europe.¹⁸⁸ Partly, this was a result of poor communications. Practically the only means of diffusion in this period was the migration of people who carried the knowledge of the new technology with them. Migrants from Flanders, for example, played a major role in introducing new techniques and crops to England and to the Netherlands.¹⁸⁹ And, as we have seen, northern Italian merchants spread plantation agriculture westwards through the Mediterranean and into the Atlantic. But the main reason for the slow diffusion of new technology was the slow spread of commercialization itself. It was the absence of incentives more than the lack of knowledge that slowed the spread of new technology.

leasing preferences for landlords, which resulted in different farm sizes and different class relationships.”
(p 316)

¹⁸⁷The regions where field systems were less communal and more enclosed were the maritime regions of Flanders and Holland, eastern England, northern France and northern and northwestern Germany.
Hopcroft (1999)

¹⁸⁸“... the often-used term ‘agricultural revolution’ to denote the introduction of the new husbandry is misleading. There was nothing abrupt about it.” (Mokyr (1990) p 59)

¹⁸⁹Clay (1984), Thirsk (1997)

URBANIZATION AND AGRICULTURAL PRODUCTIVITY

Generally, then, the most productive agriculture was to be found in regions with good access to urban markets.¹⁹⁰ Comparing productivity across countries, as is often done, is therefore somewhat misleading. It is true, for example, that before 1500 productivity was higher in the Low Countries than it was in England and France.¹⁹¹ However, some regions of the Low Countries that were isolated from urban markets were relatively backward, while some regions of France and England that had good access to the markets of Paris and London respectively were quite advanced.¹⁹² If productivity was higher in the Low Countries overall, it was because a larger proportion of the population lived in regions close to urban markets. Consequently, it was the urbanized central regions of the two zones of European trade—the Low Countries in the North and northern Italy in the South—that were the leaders in agriculture, as they were in industry.¹⁹³

As we have seen, access to urban markets raised productivity in three mutually reinforcing ways. It encouraged specialization to exploit comparative advantage. It induced a restructuring of the process of production, in which manorial agriculture was replaced by an agriculture of family farms. And it promoted the adoption of better technology. Merchants and urban investors played a particularly important role in bringing about these changes. They made possible the expansion of trade by lowering the costs of transportation, transactions, and finance. They purchased land and restructured it into family farms. They pioneered new forms of land tenure. They developed new land.

¹⁹⁰This has been emphasized in recent work by Grantham (1999), Van der Wee (1993; Allen (1998), Hoffman (1996), and Epstein (1998).

¹⁹¹Allen (1998)

¹⁹²See Britnell (1989) on England, Hoffman (1996) on France.

¹⁹³See Kohn (2001)b on the two zones of trade and their urbanized central regions. That urbanized areas are the leaders in agricultural productivity is a view long advocated by Jane Jacobs: “Current theory in many fields—economics, history, anthropology—assumes that cities are built upon a rural economic base. If my observations and reasoning are correct, the reverse is true: that is, rural economies, including agricultural work, are directly built upon city economies and city work.” (Jacobs (1969) p 3) “The most thoroughly rural countries exhibit the most unproductive agriculture. The most thoroughly urbanized countries, on the other hand, are precisely those that produce food most abundantly.... Surges in agricultural productivity follow the growth of cities.” (p 7)

And they were often the first to introduce new technology, new crops, and better techniques of management.

The traditional view that gives technological progress the leading role in economic growth and urbanization is therefore mistaken. The primary source of rising agricultural productivity was not technological progress but rather the reorganization of agriculture. The reorganization of agriculture was in turn a consequence of increasing urbanization. And both were consequences of the expansion of trade.

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