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Introduction into the Study of Production

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The three introductory chapters on how to study production, market, and money and credit provide frames for the following reviewed sample studies. They offer some guidance to find your bearings in the jungle of

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concepts and debates which makes premodern economic history such an interesting, but challenging subject to study. Each chapter structures important and current debates in the field and explains the basic concepts used in these discussions. Most debates concern the premodern European economy in general. Whenever possible, we refer to corresponding studies for the Holy Roman Empire. We point to classic texts as well as to newer studies but offer no exhaustive compilation of all the research done in the area.

We recommend reading one of the handbooks, such as Epstein (2009), Malanima (2009) or, for the Holy Roman Empire, Scott (2002), alongside this book to gain a deeper understanding of the processes and phenomena that shaped premodern production, market, money and credit.

We would like to briefly present a commented and pointed research context for the research in German on the topic of premodern production. We mention the subsequent and seminal studies and highlight those that are decisive for the reviewed sample studies. There is no claim of completeness, of course, and non-German studies were used in addition where necessary. Following Fisher (1935), Clark (1940) and Fourastié (1954), the section on production is divided into the three sectors of agriculture, crafts and manufacturing, and services. Before turning to these three sectors, the questions of population and the topic of work are discussed, because production in all its facets cannot be explained without workers.

Population (Ulf Christian Ewert)

Naturally, most people in the Middle Ages and the early modern period remain anonymous, but one can nevertheless make statements about the aggregate population as well as about a population's abilities of reproduction, growth and respondence to economic change (Livi-Bacci 1991, [2]1997; Pfister 1994; Bardet and Dupâquier 1997). This is one of the subjects of historical demography and economic history. However, one should be well aware that the concept of 'population' and the associated field of 'demography' are relatively modern concepts which originate from the country reports and early statistics that were systematically produced in the era of cameralism in the eighteenth century.

At first glance, it might seem extremely difficult if not impossible to give a reliable estimate of the population size for individual European regions or even for the whole of Europe in the time before 1700. Available sources often are too inaccurate to allow any establishment of precise population estimates. This is especially the case for the Holy Roman Empire (Fehring 1987; Pfister 1994; Scott 2002). For the countryside—in Northern France, for example—lists of hearths exist that were recorded for collecting a hearth tax (Fossier 1979). For earlier periods rent rolls can also be used for estimation purposes, because in most of these documents dues are prescribed and thus also the servants of a demesne are enlisted who had to deliver the dues. For late medieval towns sometimes lists of taxation are preserved. Examples are Göttingen (Steenweg 1994), Dortmund (Fehse 2005) and Greifswald (Igel 2010). Since in medieval and early modern towns commonly assets, and not income, were taxed, such lists show the distribution of wealth, at least for those who were rich enough to become a subject of communal taxation. Thus, all sources cover only part of the total population, and population estimates depend on the assumptions made about household size or about the proportion of those people not recorded in the documents. In addition, the number of mills and their output of flour can also be used to estimate population size; for example, this was done for medieval towns in Northern France (Guillerme 1988).

Those problems notwithstanding, many attempts have been made since the 1950s to reconstruct medieval and early modern populations, or to at least give some estimates. Especially for Western European regions, namely France and England, population size was estimated (Dollinger 1956; Fourquin 1958; Neveux 1971; Harvey 1966; Russell 1966). Thus, the idea of reconstructing the population based on church records, like it was done first for England in the period 1541–1871 by the famous Cambridge Group for the History of Population and Social Structure, can certainly be considered as an important scientific breakthrough (Wrigley and Schofield 1989). The births, deaths and marriages recorded in church books became the basis for extensive historical-demographic studies on the early modern period.

Population certainly is an important element in production (see section "Population, Demography and Economic Growth" in Chap. 2), and demography therefore is useful for explaining production, economic development and growth. This becomes clear by looking at a typical neo-classical macroeconomic production function, as is commonly assumed in economic growth theory: output Q (of the economy) is related to input factors labour (L) and capital (K), and in the analysis of agricultural economies also to land (T) (Solow 1956). With such an exogenously given technology, changes in output are caused by either increasing or decreasing inputs. Newer versions of this model elaborate more on the labour variable inasmuch as raw labour input is amended by the educational level and skills of labourers, which then allows incorporating a human capital variable (Mankiw et al. 1992). Newer approaches also emphasise the endogeneity of economic growth. In the long run, production technology is not assumed to be exogenous, since growth usually determines technological change as well (Romer 1990, 1994, 2011; Aghion and Howitt 1997; Acemoglu 2009).

As long as the labour force in the economy is always a constant proportion of the total population, and as long as working schemes are identical for all labourers, population may serve as a proxy for the input factor of labour. Vice versa, a compositional change of the population would also alter the supply of labour. A rapidly growing population is becoming younger on average to the effect that the labour force is shrinking in relative terms even though it might be growing in absolute numbers. As a consequence, both the land-labour ratio and the capital-labour ratio would be affected, which in turn might lead to shifts of power within the society and which might also provoke institutional change.

Given the fact that both size and composition of population are highly correlated with labour as well as with human capital, population growth, reproduction and migration all have an impact on production potentials and on production itself. Therefore, they also drive economic growth, economic development and the development of living standards, to some extent at least.

See reviewed sample studies 4, 18, 34.

Labour (Niels Petersen)

Before any attempt can be made to analyse the phenomenon of labour in the context of economic history, the term labour itself has to be defined and categorised. Labour, from Latin *labor* means to toil and indeed to labour, in English as well as in German. It seems that it was early on rather negatively connotated with hard work, especially when undertaken by servants. Rather positively beset was the term *opus*, in German *werk*, a more creative form of work, as it also includes the product of work. These connotations may be rooted in the form of work which could have been either free or dependent, voluntary or forced. Unfree labour had been drawn on in the manorial system or any other feudal context as compulsory, or in cities as part of communal agreements such as the night watch or fortification works. In these cases, money would usually not have been involved, though some sort of compensation in kind like meals became normal at the beginning of the fifteenth century. Wage labour seems to have spread widely at the end of thirteenth century, at the same time when the manorial system declined and urban markets rose. Wage labour could be found in agriculture at times of a peak in the demand for workers like at harvest time, when socage was not enough to cover the workload on the demesnes and *Meierhöfe*. With the change from manorialism to other forms of landownership (*Grundherrschaft*) like the rent-based lordship (*Rentengrundherrschaft*, rent manorialism) and a growing orientation of crop growing towards the markets, wages paid in money became more common, even socage work was at least compensated by meals. The rise of towns and cities gave rise to a new labour market with a high percentage of free, low qualified day labourers and diverse specialists in crafts. In the late fifteenth century, many peasants grew special cash crops like flax for consecutive refinement in the towns. Market production, public works and services were based on all sorts of wages and payments in money and additionally in kind, mixed wages were common. It is important to consider that town and country were connected tightly by economic relations (see below "Town and Country" in this chapter), hence, rural population could buy and sell on the urban markets and they could work in the town, while urban dwellers often worked on the fields.

Research Topics

Besides the relationship between different kinds of payment, the kind and height of the wages and their volatile nature in relation to the prices for goods are another challenge for research on work in premodern times. Prices and wages have been a subject of local research since the late nineteenth century, though systematic research only set in with the publication of Elsas (1936/49), followed by other national collections (Verlinden 1959–1972). In order to recreate business cycles, grain prices were the subject of several analyses, most intensely in the 1970s (Hauschild 1973; Tits-Dieuaide 1975). In this time Wilhelm Abel published his theory of agrarian crisis based on the development of grain prices (Abel [3]1978). He stated that after the Plague grain lost its value, in relation to rising wages as well as to silver. Prices were thus soon connected by research to wages in order to get an image of the real wages and the cost of living (Freiburg 1977; Schulz 1979). The public construction sector featured very prominently in German research as the sources were readily and widely available, furthermore labour within towns was free from feudal ties (Dirlmeier 1978, 1991).

Unfree Labour

Traditional research acknowledged strong ties between unfree physical work and a social stigma of those who had to undertake this labour. On the one hand medieval theology proclaimed that God had placed everybody in his or her class. On the other hand, hard labour has been regarded by medieval theologians as a result of the original sin and therefore as a kind of penitence (Hertz 1980). While this image has been repeated for most of the twentieth century in German literature, current research modifies this view. Cassian of Marseille proclaimed as early as the fifth century that the will to work and to create could be seen as a human way of preparing for salvation. This position had been discussed well up to the ninth century, most prominently by Hrabanus Maurus and Ratherius of Verona, who

saw the *opus* of labour as one central part of human striving for salvation, that is, if it is being done by those who work in a way that is agreeable to God. Manual work was part of Benedictine life, even though work in the fields and vineyards had at some point been replaced by work in the scriptorium, which still was seen as labour in apostolic tradition. In the twelfth century Peter Abelard stressed the free will of man and right labour as a product of it (Postel 2009; Rijkers 2009; Schreiner 2006).

The Rise of Employment Contracts

The philosophical and theological discourse certainly influenced the normative regulation of labour. Every form of labour relation needs regulation, because conflicts about the terms of work and the disposal of the product are inevitable. The silence of the written sources about this might indicate that these terms were indeed regulated by social power and convention. The first medieval centuries still know the *servus* (servant) and *ancilla* (maidservant) as property of the *dominus* (master), who had the exclusive right over their labour, time and product of work. The only way such an unfree labourer could articulate power in this relationship was by escape. On the other hand, around the ninth century free men with only small pieces of land placed themselves under the 'protection' of wealthier landowners. They lost part of their freedom and remained poor, but could at least survive (*libera servitus*, 'free servitute'). Their labour changed from being the property of the master to a legal framework, which contained a differentiated scale between free and unfree. Peasants with land that they were entitled to inherit but which wasn't their own were subject to regular payments (*servitium*) and socage to the manors of private landowners, royal *iudices* or monasteries. A specialisation, for example, in a craft could open social mobility even without owning any land. While the protection of the unfree and the mobility of the free grew, still all had to give most of their labour force and of the products of their work away to a master or landowner.

Wage labour didn't appear much in the sources before the late thirteenth century, though it existed in the agrarian world as well. This was especially the case in times of harvest when a greater number of labourers

were needed than were available through socage. The fourteenth century then saw growing dynamics in the field of labour. The successive dissolution of the manorial system only left relatively small demesne land to be worked on. The influential law codex of the Sachsenspiegel mentions wage labour in several articles under the terms of *lôn*, *knecht* and *ingesinde*. These groups had a just right to their wages. In the case of the death of their employer their usually lifelong contract automatically ran out. They could either negotiate the continuation of the existing contract, or the outstanding wages had to be paid. Payment, though, was given often as a mix of payments in kind, like food and housing, and money wages. The planned settlement of the colonisation within the Reich and during the eastward expansion from the twelfth century onwards fostered this development, because it in its wake, institutions for cooperative forms of judgement and the setting of frameworks for labour relations were developed. Still, all this meant a slow shift from feudal bonds to contracts in agrarian labour, partly due to the rising importance and availability of money as a means of payment for work.

The dynamic thirteenth and fourteenth centuries, the time of intense urbanisation (see section "Urbanisation" in Chap. 2) as well as adverse climate conditions and demographic crises such as the Plague (see section "Great and Little Divergence" in Chap. 2) and the beginning of the time period covered in this book, saw an intense rise of wage labour. The towns opened up a completely new and different market for goods and products as well as for labour. Ideally, free persons could now, independent of status, dispose of their own manpower, their means of production and their products as well as their income. An echo of status-based labour relations survived in forms of household economy, though now the contract constituted the basis of this relationship. The city councils as well as the guilds were the major players in developing rules of labour including tariffs, a framework within which the individual could offer his or her manpower. While work within the crafts, divided into masters and journeymen, was strictly controlled by guilds, there also existed a free labour market mainly for handymen and unskilled day labourers, in which the poorer social strata could participate. The cities' communal institutions offered further opportunities for workers, most prominently in public construction works. This is perceived as a revolution in the history of labour: away from status based, mostly unfree

work, to contract based, mostly free work. Cities and the agrarian hinterland were by no means strictly divided. Municipal tariffs often were adapted for similar work in the fields and on the farms (Dilcher 2006).

Payment by Geding and Time Wage in the Agrarian World

Research has focused on the well-documented urban construction sector, while far less is known about late medieval rural wage labour. Furthermore, any supra-regional analysis of wages and labour in the agrarian sector has yet to be undertaken. Two kinds of workers can be identified in the rural context: Servants who worked for long periods in the house and on the farm, and versatile day labourers who were hired when needed. Both groups belonged to the lower and lowest strata of the late medieval society. Payment could be set to daily or weekly wage or *Geding*, a fixed payment for a certain kind of work irrespective of the time needed to complete the task. Employers then seemed to have been flexible concerning the way of payment, either in money and/or in kind, often timber, food or clothing. Different tasks were paid according to complexity or physical burden. Some tasks were traditionally given to women, like the harvesting of peas and the cutting of spelt, sometimes some, like herding, were also given to boys. The different steps of work were paid individually, while the reaping of meadows, a measurable work, was paid by *Geding*. As tasks varied over the season, for some experienced workers it would have been possible to be employed over the whole season. Still, it was seasonal work and in winter they had to find income elsewhere. Craftsmen like carpenters or bricklayers had chances of work for longer periods. Additional manpower on the fields and vineyards was needed everywhere at the same time, for example, during harvest. Therefore, employers had to make concessions to workers, thus unwittingly creating a certain form of labour market. Rural families could generate significant additional income by offering the labourpower of all their members including the children and women for different kinds of work at different times. How far workers travelled to get an employment is not known, though it seems that villagers concentrated on the nearby big landowners (Fuhrmann 2009; cf. reviewed sample study 13).

Piece Rates and Time Wage in Urban Crafts

The scholars of the Historic School of Economics (*Historische Schule der Nationalökonomie*) assumed that before the industrialisation crafts were generally characterised by a certain hostility towards any form of innovation in processes and technology to be found in the crafts (see section "Crafts" below). They saw one reason for that in the payment of wages by time instead of by piece, which would have fostered a certain unproductivity. That workers before the industrialisation contented themselves in subsistence and did not have any idea of competitiveness is a view that can still be found in the literature. In contrast, fifteenth-century urban sources do show different ways of incentives to increase productivity. Bakers were paid a weekly wage given a minimum number of doughs produced, while the wage of apprentices could be reduced in case of mediocre work. The Austrian textile production knew payment by share of the profit. The specialised workers of the Steyr knife forges were paid at a tariff that had been agreed between the 170 workshops of the region; in 1488 this was 42 denarii (or most commonly *pfennig*) a week plus 5 denarii per 100 blades produced. In the crafts hardly any wages were paid only on the basis of time. There has always been a component based on the output by piece. Be it real piece rate or something like a gratification of work over the top or a minimum output included in wages based on time. This gave the masters the flexibility to react to business cycles. This, in fact, means that the pre-industrial economy was not as defensive towards innovation and markets as the *Nationalökonomen* would have us believe (Reith 2003).

See reviewed sample studies 5, 7, 8, 9, 12, 13, 17, 21, 28.

Agriculture and Mining

Manorialism and Landownership (Marco Veronesi)

This section has to start with some terminological considerations, since the term 'manorialism' has different correspondents among the European languages. They all have in common that they have been elaborated for the Early and High Middle Ages, and they also have

in common the notion that power derived from real estate property, a concept which originated among the liberal historians of the nineteenth century (van Caenegem 1988: 197f.; Blickle 1995; Schreiner 2000). They nonetheless differ markedly in terms of their, in a narrower sense, 'political economy' (Dilcher and Violante 2000; Bourin and Martínez Sopena 2004, 2007; Wickham 2004; for further reading on this topic see Zangger 2012).

The *Grundherrschaft* defined in German historiography points to an all-embracing economic, political and juridical power of the landlords, even more so since the concept was combined and aligned with the *autogene Adelsherrschaft*, an idea brought forward by the historians of the German *Neue Verfassungsgeschichte* (new constitutional history, Tabacco 1960; Böckenförde 1961; Reuter 2004). They claimed that power was not only derived from landed property, but also, and at the same time, from the power of being noble on its own terms, from an idea of power inextricably linked with the concept of nobility. The concept found its possibly most prominent expression in the dictum of 'shelter and protection' (*Schutz und Schirm*) guaranteed by the powerful, in reward of counsel and aid (*Rat und Hilfe*) offered by the subjected—which in general, without a doubt, consisted in working the fields (Brunner 1939). The French and Italian terms, in contrast, are more restricted to the economic sphere. The political and jurisdictional authority of the noble landowners was not an *autogene Adelsherrschaft*, but delegated by a still existing and functioning public authority guaranteed by the king. However, these public, state-like structures vanished during the tenth and the twelfth centuries. The aristocracy now assumed the former public prerogatives—which they always held *de facto* in their hands—mostly by violent usurpation and by the invoking of the public power of their ancestors (Duby 1953; Sergi 1999) and forged peasants with their economic power to the so-called *seigneurie territoriale* or, in Italy, the *signoria rurale* or *territoriale*—a *de jure* lordship (Wickham 2004).

It is not of relevance here to discuss whether in Germany such a 'feudalisation' did come to pass or not, but it seems clear that the German model, blamed for downplaying the violent character of medieval power (Algazi 1996), shows almost no reference to any public authority. In France and Italy, the *seigneurie foncière* and the *signoria curtense* are conceived as

based on rights deriving directly from the possession of land, while there has been a second dimension of lordship delegated by or usurped from a public or royal authority. In contrast, the German *Grundherrschaft* acts as an all-in-one term for early and high medieval lordship. The English 'manorialism' seems, in its reference to the manor as the principal unit of agrarian production, similar to the *signoria curtense* or *seigneurie foncière*. Thanks to the wholesale conquest of England by the Normans and their fostering of a large stratus of free peasants enjoying the king's juridical protection, no such thing as a *seigneurie banale* ever developed in England. 'Manorialism', thus, was a form of lordship restricted to the unfree serfs of the manor (and much more tied and bounded to the royal authority as e.g. in Germany), while it found its political and juridical counterpart in the kingdom (Fourquin 1970; Reynolds 1994; Comninel 2000; Britnell 2008). Regarding monastic and ecclesiastical lords, the differences between the European countries turn out to be less important because of the juridical immunities granted to them by the kings. These entities could therefore easily bind together their economic power on the one side and political and juridical authority on the other side (Rosenwein 1999: 185).

Manorialism and the Decline of Serfdom

Manorialism as a form of exploitation of the soil (and of the peasants) existed for many centuries, in many areas until the end of the eighteenth century, or even until the twentieth century (Sundberg et al. 2004). The extent to which such manorial forms of agriculture persisted has been at the heart of fierce debates. It has been mainly the English case which has been under investigation since the 1960s, and the debate concentrated on the question of serfdom and its decline in the fourteenth century. With the term 'serfdom' scholars labelled the peculiar form of personal bonds which existed between the landlords and the peasants working on the manor and the legal status of the latter. With reference to terms like *servi*, *mancipia*, *ancillae*, *coloni*, *massari*, which were used in the English as well as in the continental sources, serfdom was conceived of as an "inherently exploitative relationship, skewed heavily to the benefit of

landlords" (Bailey 2014: 3). In 1300, of five million people living in England two million were bondmen, and unfree land comprised nearly half of all peasant land (Bailey 2014: 3f.; Epstein 2009: 51). The peasants not working directly on the demesne (who did not dispose of any own land apart from, maybe, some parcels for the cultivation of vegetables and fruit) were endowed with hides (*mansus*, *huba*) and own houses. They had to perform labour services; they had to deliver fixed amounts of kind to the manor; they had to hand over their best cattle, if they wanted to inherit the hide; they had to ask for permission if they wanted to marry, and, before all: they could not move away without the permission of the lord (Hanawalt 1986; Rösener 1991; Bourin and Martínez Sopena 2004, 2007; Cortonesi et al. 2006).

However, in 1400, the share of bondmen among peasants had significantly diminished. Three primary explanatory factors of change have been identified, but their share and relevance are contested (Dyer and Schofield 2007: 33–38). Promoters of a Malthusian approach (see section "Population, Demography and Economic Growth" in Chap. 2) argued that the massive increase in population during the thirteenth century must have exceeded the capacities of agrarian production, a theory which was brought forward in 1935 by Wilhelm Abel for the German-speaking regions (Abel ^{2}1935; Postan 1949/50; Le Roy Ladurie 1966). This led to a demographic crisis which was dramatically reinforced by the terrifying waves of the Black Death, beginning in 1348/49.

This story has been challenged by Marxist-inspired historians since the 1970s (Brenner 1976; Aston and Philpin 1985). In their opinion, the exogenous factors of famine and plague alone could not have caused the decline of serfdom and, in general, the late medieval crisis. In their eyes it was predominantly a question of class relations, the political rather than the economic relations between landlords and peasants which were decisive. The landlords did not see any need to invest in the soil, in the facilities and in the techniques of their demesne, as it has been easier to achieve higher rents by squeezing them out of the farmers. "Thus", wrote Robert Brenner (1976), "the surplus-extraction relations of serfdom tended to lead to the exhaustion of peasant production per se; in particular, the inability to invest in animals for ploughing and as a source for manure led to deterioration of the soil, which in turn led to the extension

of cultivation to land formerly reserved for the support of animals. This meant the cultivation of worse soils and at the same time fewer animals – and thus in the end a vicious cycle of the destruction of the peasant's means of support" (Brenner 1976: 33). Ultimately, according to Brenner and others, it had been this productivity crisis which led to the demographic crisis, not vice versa. A third model of explanation, the so-called Commercial Revolution (see section "Commercial Revolution" in Chap. 2), argues that the monetisation of society in the thirteenth and in the early fourteenth centuries led to the commutation of labour duties into money rents. This model has rarely been adopted for the German-speaking countries. Only recently Gosh took up the topic, scrutinising the accountability of the Scheyern abbey in Bavaria (Gosh 2017).

All three models, ultimately, reach the conclusion that there had been a shortage of labour since the mid-fourteenth century. Combined with falling grain prices due to lesser demand, a 'seigneurial reaction' was inevitable. The landlords tried to control the mobility of their subjects, they augmented the labour and money rents and they also cooperated to cap the rising wages of the rural workers, in order to avoid further incentives for their bondmen to move away. But, at least according to the Brenner model, they were successful only in the eastern European countries, while they failed in France and western Germany. In England, the uprisings of peasants against the pressure exerted from the landlords ultimately did not lead to improve the peasant's conditions, but to the 'enclosure movement'—the beginning of an English 'agrarian capitalism' (see section "The Emergence of Capitalism" in Chap. 2). In France and in western Germany, peasants had long before been able to establish the right to use the commons, to fix their rents, to secure hereditability and to elect village representatives. They had thus been in a much better position against their lords even before the fourteenth century, and serfdom and with it manorialism had been on the retreat long before the Malthusian crisis and the Black Death, as has been pointed out for the manorial organisation of several monastic communities in the German Southwest, after studying their extant real estate registers (Rösener 1991). This argument is backed by a large amount of international research, and in large parts of Europe the decline of serfdom is still seen as a century-long

process beginning in the High Middle Ages (Freedman and Bourin 2005; Bois 1985: 109).

The 'seigneurial reaction' following the shortage of labour, on which most scholars agree, hints however to a phenomenon whose agents are not satisfactorily explained yet: the 'second serfdom' (zweite Leibeigenschaft), which Brenner sees evolving in the eastern European countries—including the lands of the German eastward expansion—since the fourteenth century, but which is very well attested for other areas too, that is, larger parts of Southern Germany. It is, however, much debated whether we have to conceive such forms of servitude as remainders of the medieval serfdom and, therefore, as a result of the 'seigneurial reaction', or, rather, as a new form promoted not by landlords but by the princes who wished to create a uniform stratus of subjects (Kula 1976; Freedman and Bourin 2005; Blickle 2003). Against the former hypothesis it has been argued that the earliest evidence for the 'second serfdom' stems from the second half of the fifteenth century—it cannot, therefore, be seen as a reaction of landlords to the shortage of labour provoked by Malthusian crises and the Black Death (Aston and Philpin 1985). For the East Elbian regions the 'second serfdom' has recently been negated as a general phenomenon, stipulating regionally restricted case studies (Cerman 2012).

Newer research on the topic has focused on a greater variety of factors to explain the decline and persistence of serfdom in the Later Middle Ages, among them peculiar family structures and inheritance customs (Dyer 1998: 120). For Germany, the environmental factors have recently been pointed out (Rösener 2012).

Rentengrundherrschaft (rent manorialism), Agrarian Capitalism and the Late Medieval Village

If serfdom and with it the manorial organisation of agriculture, as conveyed since Carolingian times, stopped being an organisational principle of rural society, other principles must have taken its place. For most of the European countries we can detect such a new pattern in the commutation of customs—essentially labour dues—into rents—dues in kind and in money. The shortage of labour since the fourteenth century, along with increasing

market opportunities for rural producers, led the lords not only to increase the pressure on the peasants but also to an adaption of the mode of production, that is, to the diminishing of the former demesne land of the manors and the subsequent leasing out of the former customary parcels (Brenner 1976; Whittle 2000). As was said above, in Germany and France this process was still underway in the thirteenth century. German scholars called this emerging system rent manorialism (*Rentengrundherrschaft*). Sometimes, the landlords leased out a greater part of the former demesne to one single tenant (*Meier*), who was responsible for collecting the rents and who also played an important role in the jurisdiction within such tenures. In this respect the development on the continent seems similar to the 'enclosure' movement and the corresponding unfolding of an agrarian capitalism in England (see section "The Emergence of Capitalism" in Chap. 2). But the 'manor' in Germany was, by rule, substituted not by large estate farms, but by village communities. In Germany, the study of such communities has been most prominent since the end of the 1950s, and they can be seen as a starting point for the investigation of late medieval manorialism (Patze 1983; Haverkamp 1983: 316–321). Such villages bundled many of the smaller farms belonging to different landlords and gave birth to cooperative associations, in legal as well as in economic perspective as described above. The power and control of the landlords over single peasants diminished, and the village community negotiated the rights and terms of use with the landlords and adopted fiscal and jurisdictional rights (Blickle 2000; Teuscher 2007). Most recently Brun, using tax registers and court rolls of the Cistercian abbey of Salem, has argued that such a development need not have been conflictous, as long as there was a legitimate 'government' (Brun 2013). But terminological problems still constitute a major part of the debate (Schreiner 2000).

Landownership

Several recent studies of late medieval agriculture and manorialism have brought forward the necessity of new approaches in dealing with the different legal forms of landownership. In the manor of the Early Middle Ages there were very different forms of customs and rents, be they labour

dues, customs in kind or money rents, and in any case not all the land around a given manor house belonged to the same landlord (Schreiner 1996). Only a small part of the cultivated land was free property, that is, free of all customs and other dues. In many parts of Europe such land was called *alod* or *hereditas*, because in most cases the land was inherited and had to be entailed again (see below "Collective goods"). The overwhelming part of the cultivated land was held by lease. The leasing out of land was the fundamental, all-embracing idea of possessing land, but the legal forms by which such land was held by the tenants were manifold. Apart from the fact that there was contractual freedom in all parts of Europe and that, as we have seen above, peasants were always able to bargain the specific terms of their tenancy with the landlord, we may discern a few very common forms of land lease. Only recently the insight has been gaining ground that the wealthier peasants, bailiffs, stewards and other officers and administrative personnel of the lords (*baillis*, *ministeriales*, *maiores*), castle custodians, forest wardens, blacksmiths, fishermen and also many lesser servants held their land by the rules of feudal law, which mainly regulated the respective questions of succession and inheritance (Kasten 2013; Andermann 2013). Other common contractual forms stated that the peasant had to deliver a third or even half of all their produce to the locator, leaving them not much more than the seed for the next season. But the names for such contractual forms were manifold, and their meaning always oscillated between denoting a form of contract and denoting the conditions of the contract (Cortonesi et al. 2006; Toch 1986). As with the fiefs, giving such copyhold or customary land in inheritance required the permission of the proprietor, be he a 'landlord' or just a 'land owner'.

Methodologically, the question of discerning these forms of contracts is one of the current problems for the studies of late medieval manorialism, as very often the terms of lease for the fiefs were recorded in the same registers as the customary land; and the difference between the two is actually not very clear, all the more as the conditions of holding a fief in many cases were not less burdensome than in the case of customary or copyhold land (Thoma 2010; Kasten 2013). One further problem is the fact that very often several duties and rights, belonging to several persons, continued to be attached to the same real estate. With the purpose of focussing the economic instead

of the legal aspects of landholding, it has been pointed out that economic historians should rather focus on the network of customs, rents and other duties enduring on the ground—instead of asking for the 'legal quality' of the ground itself. This way we are also able to discern social groups within the common idea of a dualism of peasants and landlords (Stamm 2010, 2013; Sonderegger 2012, 2015). As another way to this purpose the study of land markets has been brought forward (Ertl 2017).

Finally, one very common form of landholding is the life rent (*Leibgeding*, *Erblehen*), that is, the right to hold and use land for one's life time. Fiefs as well as leasehold land and copyhold land could be given as life rent. This contractual form was often used to keep hold of land given to the church as a memorial donation, as a reward for servants for their longstanding service, or as a security for maintenance, mostly disposed by men for their wives in case of their own passing away (Kasten 2013).

See reviewed sample studies 1, 5, 10, 13, 52.

Collective Goods, in the Middle Ages (Ulf Christian Ewert)

Collective Goods in the Medieval World

From the point of view of a rather conservative economist, medieval towns are thought of as being the very model of places of production and sale of private goods. Town inhabitants handled various types of private goods. These were the foodstuffs, commodities and services they either were consuming, producing, refining or trading. Thus, it seems as if both the wealth of medieval towns and the inhabitants' welfare were based on the exchange of private economic goods only. However, the medieval world was full of collective goods, too. Common lands (*Allmende*) are the classical example of a common-pool resource that was in widespread use within agricultural production in medieval and early modern Europe. And daily life in medieval towns was also shaped by a variety of collective goods. Such collective goods were not necessarily always physical objects. Some of them like streets or common water were of material nature. Some others like security, fire protection, civil rights, jurisdiction, price stability (Persson 1999)

or even the notice of time on public clocks (Dohrn-van Rossum 1992) were intangible because of their immaterial character. A town's defence is an illustrative example of a non-material collective good—defending the community's integrity—to be materialised in a physical collective good—the massive town walls, probably the best-known symbol of the town in medieval Europe, that in many places were constructed in twelfth to fourteenth centuries to protect everyone living inside these walls.

Definition and Typology of Collective Goods

Economics provides us with a definition and a typology of collective goods. The economic characteristics of a certain good can ideally be grasped by distinguishing four categories. This classification is based on the good's subtractability and excludability (Dionisio and Gordo 2006). In general, collective goods are non-private and they do allow collective use. This definition includes (pure) public goods, common-pool resources and club goods. Pure public goods are neither subtractable nor excludable (Olson 1965; Buchanan 1999). Once a public good is produced, the good itself is not depletable and the marginal benefit consumers derive from it is constant for everybody, because it can be used by more than one person at the same time. Thus, there is no rivalry between the consumers of a public good. Also, none of the potential consumers can be excluded from consumption, either because it is impossible or too costly to get accepted. In contrast, private goods are both subtractable and excludable. Security, fire protection and price stability are examples of pure public goods that were common in medieval towns (Table 3.1).

Table 3.1 Typology of economic goods following the classification made by Dionisio and Gordo 2006

	No rivalry (degree of substractability = 0)	**Rivalry** (degree of substractability = 1)
No exclusion possible (degree of excludability = 0)	Public good	Common-pool resource
Exclusion possible (degree of excludability = 1)	Club good	Private good

Other types of collective goods are club goods and common-pool resources. A club good is excludable but not subtractable. Like a public good it is not depletable, but consumption can be restricted to a particular group of people who pay a fee in return of their privilege to consume. Vice versa, common-pool resources are subtractable but not excludable, meaning that they are open to everybody, to the effect that everyone's use makes them depletable. Civil rights are a typical example of a club good, because in medieval towns only those inhabitants formally accepted as citizens were enjoying political rights, for instance. The economic benefits that craft guilds—acting like a cartel—generated in favour of their members are another example. In contrast, water is an example of an important common-pool resource within medieval town communities. Its use and pollution by the town inhabitants made water a highly depletable good.

Problems of Provision, Maintenance and Management of Collective Goods

Economic reasoning also helps to better understand the various problems that are inherent to collective goods. Each of the four ideal types of goods causes specific problems of provision, maintenance and/or management. Private goods require a definition of ownership, whereas for club goods it is necessary to distinguish clearly between those who are eligible to consume ('members') and those who are not ('non-members'). As mentioned above, common-pool resources are constantly in danger of being depleted because of their lacking excludability and the prevalent 'over exploitation' resulting from it, a phenomenon commonly called 'the tragedy of the commons' (Hardin 1968, 1994; Ostrom 1994; Ostrom et al. 1994). Finally, public goods usually do not have a real price because of the positive externalities coming with them, a benefit which none of the consumers wants to pay for. As a result, there is no incentive for private persons to either produce or maintain a public good, which in fact means that usually communities have to provide their members with public goods and are responsible for their maintenance and management.

Typical problems of the provision, maintenance and management of collective goods in the medieval society and some of the solutions found to solve such problems are described in two reviewed sample studies here—on the peasants' cooperation in production and marketing of agricultural produce (Volckart 2004a, b) and on the provision and management of common waters in medieval towns (Ewert 2007).

See reviewed sample studies 4, 19.

Town and Country (Niels Petersen)

In the Late Middle Ages, the relationship between towns and cities and their respective *Umland* (the surrounding countryside), had already become complex. While inhabitants of small towns to a large degree had rural property on which they worked and produced (hence those towns are commonly called *Ackerbürgerstädte*), the big cities show less personal exchange with the countryside, but rather a lot of structural connections. Current research identifies four main categories of town-country relations: demography, power relations including legal regulations, market relations and economic relations in general, and finally cultural and ecclesial relations (Isenmann 2012).

The admittance of new citizens (*Neubürger*) is well documented, so that from the origin of these persons the sphere of urban influence can be deduced. Citizenship, though, could be differentiated. There were citizens living outside the cities (*Pfahlbürger*, *Ausbürger*) while most of the urban population did not enjoy citizenship. The population of the suburbs was subject to yet other forms of regulation. Sometimes inhabitants of nearby villages were obliged to contribute to urban fortification or the maintenance of important infrastructure like bridges.

Earlier research has focussed on urban rule over nearby villages, that is, on urban territories. This can mostly be found in the biggest cities and especially in the *Reichsstädte*, for example Nuremberg, Lübeck, Ulm or Rothenburg. They had the resources and the political ability to maintain their rule over the *Umland* (Dannenbauer 1928; Düker 1932; Wunder 1979). From the second half of the fourteenth century onwards the urban economic elites often invested parts of their capital in landed

property close to their home cities. This was possible due to the falling prices for grain and hence land which led to the disposition of land by the local nobility who were looking for alternative investment opportunities like rents. Mostly in the Southern parts of the Reich these citizens aimed at an imitation of noble lifestyle in the countryside (Kießling 1979; Krieger 1985; Orth 1985; Schnurrer 1985). Some historiographers emphasised the element of exploitation of the rural population by urban landowners, while others regarded this as an opportunity for the rural population to gain money (Fritze 1976; Rippmann 1990).

In the wake of a new appreciation of economic history German research on urban-rural interactions saw a boom around the late 1960s. It aimed at describing the power and influence of the urban markets, speaking of the countryside as urban hinterland. These studies were often based on the central place theory, developed by Walter Christaller as early as 1933, paving the way for the Nazi's settlement programme in eastern Europe. It defines centre and periphery and different spheres of economic centrality between these poles, like the *Nahmarkt* (close to the market), the wider market region and the long-distance trade (Ammann 1963; Hill 2004). For the late medieval situation this concept has been discussed in manifold ways (Jäger 1998; Irsigler 1983; Meynen 1979) and by the early 2000s had been rediscovered by archaeologists (Biermann 2015). It has been noted that the urban markets influenced the directions of traffic and trade (due to staple rights) and led in part to a commercialisation of agrarian production (Kießling 2011; see also Chap. 4) and sometimes created or at least highly influenced the structure of the rural landscape in respect to the growing of cash crops like woad or flax or by creating labour opportunities in the putting-out system, especially in textile production (Kießling 1989; Kirchgässner 1974; Scott 2002). To analyse the relations between the centres is an obvious consequence. In these cases, research tends to use methods of network analysis to make these relations visible and quantifiable, a field in which in the future digital tools will be crucial.

Taking the perspective of the city furthermore fostered the reception of the concept of von Thünen (1783–1850). In the model of Thünen's circles, peasants would produce what brought them the highest income,

resulting in a special pattern of land use from horticulture to extensive agriculture (Trossbach 2012; Padberg 1996). This model explains particularly the close surroundings of the towns and cities. This area is somewhat special when it comes to power relations, property and legal rights. Often this so-called *Stadtmark* or *Stadtfeld* stretched up to 7 km around the towns, and here, almost exclusively urban property would be found like gardens, fields, beekeeping, meadows and pasture, brickyards and mills or places to wash and bleach, and not least chapels, leproseries and the gallow and often ephemeral suburbs (Köppke 1967; Johanek 2008).

Recent works synthesise these concepts in their case studies (Bönnen 1995; Hirschmann 1996; Hafer 1993; Butt 2012; Petersen 2015).

New concepts regarding the constitution of space(s) are currently being adopted for research on the medieval city. Following the works of the *Annales*, Foucault, Lefebvre and Bourdieu, spaces are regarded as being socially constructed. Most research focuses on interurban spaces, but questions arise of how towns could get hold of extramural property and power and how they managed to keep it over centuries against nobility and princes (Hochmuth and Rau 2006; Ehrich and Oberste 2009; Petersen 2015).

See reviewed sample studies 9, 10, 13, 29, 57.

Mining (Ivonne Burghardt)

In medieval times (and later) precious mining (silver and gold) was distinguished from non-precious mining (tin, copper, lead, coal, stone etc.) by the legal definition that the first was subject to a 'regalia right' (royal right, *Bergregal*), while concerning the latter all rights belonged to the landlord. Due to its insignificance to the sovereign, regulations regarding non-precious mining were often not worth writing down or preserving before the fifteenth century (Bartels and Slotta 2012: 113). Therefore, research has so far focused mainly on the subject of precious mining. During the twelfth and thirteenth centuries new considerable silver ore deposits were discovered all over Europe. The question whether this took place by accident or as a result of extensive prospection is still a controversial issue. Some areas

became widely known as most prosperous mining districts, such as Freiberg in Meissen (c. 1168), Jihlava (c. 1230s) and Kutná Hora (c. 1290s) in Bohemia, and became significant economic centres for the whole region. Due to the sovereigns' regalia rights over the mines, he received considerable revenues from mining in his territory. By the *Bergregal* the sovereign claimed himself to be the owner of all metals in the underground in his territory. He, or, as the case may be, his highest mining official (*Bergmeister*), was allowed to assign the mines to anyone. The *Bergregal* also ensured the sovereign a share of every mined silver (*Bergzehnt*). The early formation and legal handling of the regalia of the mines remain to be studied (Asrih 2013). By the Golden Bull (a royal decree) in 1356 the *Bergregal* became officially assigned to the electoral princes (*Kurfürsten*).

According to the *Bergregal* the sovereign alone was allowed to buy all silver from the mines of his territory for his mint while he also set the purchase price. Furthermore, only the sovereign was permitted to regulate the currency (*Münzregal*). His profit was yielded by the difference of the purchase price for the silver from the mines and the silver content or the number of the coins. To gain a higher profit the sovereigns often reduced the silver content of the coins or increased the number of coins which were minted out of the same amount of silver, while purchasing the precious metal for a constant price. The mint and currency development are a favoured research topic for innumerable regional and transregional studies (Spufford 1988).

The discovery of rich new silver ore deposits came along with a fast growing and therefore permanently changing economic and social infrastructure in its immediate environment. This caused progressive improvements in mining regulations, administrational practices and business models. During the nineteenth and early twentieth centuries research focused basically on mining codes, which resulted in editions including detailed commentaries (e.g. Trient: Hägermann and Ludwig 1986; Freiberg: Ermisch 1887; Iglau: Zycha 1900; Kuttenberg: Pfeifer 2002; Goslar: Frölich 1953).

Another specific development concerning the mining branch was the formation of different types of owning and operation organisations in the mines, which was accompanied by a simultaneous emergence of special legal and economic structures. On one side there was one worker

(*Eigenlehner, Lehnhauer*) or a small group of miners (*Gewerke*), who leased a part of a mine and worked for their own outcome and on their own risk. They gave shares to the owners of the mine, for example, a group of other miners who held a mine with no temporary limitation (*Erbgewerke*) from the sovereign. On the other side were the miners, who worked for weekly wages. They were employed by investors who could be non-miners, merely shareholders of a mine. This process of the forming of early capitalist business models was a main topic in scientific research (see section "The Emergence of Capitalism" in Chap. 2), particularly in the socialist era (Strieder 1925; Köhler 1955).

For the time from the twelfth to the fourteenth centuries technical and social aspects were hardly considered in scientific terms. For example, questions concerning the degree of migration between mining districts or religious and gender-related studies are still outstanding issues. The same applies to working conditions and smelting techniques, which are rarely considered, due to a lack of written sources. Therefore, in order to deal with these aspects, it is necessary to work on an interdisciplinary level by including art and linguistic history, as well as the results of archaeological, anthropological or geological studies.

In the Late Middle Ages precious metal mining declined in all major mining districts in Europe, and several regions abandoned the silver production completely. This development has been characterised already in the 1980s as an understudied aspect of mining history (Westermann 2004: 9). It remains so until today.

In the second half of the fifteenth century new significant discoveries of rich silver ore deposits initiated a second mining period in Europe. Major mining districts evolved in Schwaz (c. 1420s; Bartels and Slotta 2012: 390), in Schneeberg (1471) and Annaberg (c. 1490s) in the Erzgebirge (Laube 1974) and in Joachimsthal in Bohemia (1516; Schenk 1967/1968). The increased mining activities in Europe since the second half of the fifteenth century were accompanied by essential changes in administration, economic structures and technical innovations. New mining regulations constituted an intense control of the sovereigns (*Direktionsprinzip*) especially in mining administration (Laube 1974: 52).

Principally, mining remained the business of the territorial lords as their regalia right and was not regulated by the administration of the empire.

Next to silver mining, lead and copper exploitation became more and more important during the course of the fifteenth century. The reason was a significant technical improvement in the smelting process, which brought a major increase of production by the segregation of silver from copper with lead (*Seigerprozess*; Suhling 1976). Considerable copper and lead mining districts were Mansfeld (Südharz), Schwaz (South Tyrol) or in Slovakia. Trading companies like the Fugger and Thurzo, who early on monopolised the copper and lead trade in some of these mining districts, became one of the wealthiest families in Europe (Palme 2000: 29). Most of these mining deposits were exploited in the course of a few decades and abandoned completely during the Thirty Years' War at the latest.

See reviewed sample study 2.

Crafts (Julia Bruch)

In premodern times the secondary sector, identified in economic theory as the sector which produces goods from raw materials, played an elemental role beside the bigger primary—agricultural—sector. Craftsmen and craftswomen dominated the producing of goods in premodern society. They combined their labour energy with (raw) materials or natural resources for production. The concentration of capital was minimal in premodern times. Most products were handmade articles, generally produced single-handedly by masters in workshops, or with a few apprentices and assistants. Unlike self-sufficient peasants, who produced goods for their own supply, craftsmen and craftswomen were normally specialised in one work process (Cipolla 1976: 112; Malanima 2009: 203–4).

Craftsmanship can be found in towns but there was also craftsmanship in the rural environment, mostly carpenters, cartwrights and smiths. These crafts were needed in the agricultural context and diversified especially during the sixteenth century. Most research focuses on crafts in towns, a fact reflected in this chapter.

In the Middle Ages, a profession creating goods by working with knowledge and tools on rough materials (such as baker or cooper) or

recycling materials (*Altgewänder*) is called a craft. Someone who maintained goods can be called a craftsman or woman (e.g. tinker or mason), likewise someone who provided food (fisherman) and even the 'artisans of the body' (e.g. barber; Cavallo 2007). Characteristics of crafts were small-scale production, handicraft and skill rather than the use of machines as well as the regulation of apprenticeship and a corporate organisation (Reith 2008a). Like most of the research on medieval crafts, this chapter will focus on 'manufacturing' crafts, as Epstein has called them (Epstein 2008: 53). In medieval society, there were also crafts associated with the third sector, like that of the barber (see section "Services" below).

The history of premodern craftsmanship can be described either as the history of guilds or as a dynamic history of innovation, specialisation and differentiation. In this chapter both narratives will be followed.

Guilds

The majority of research on crafts and craftsmen and craftswomen is carried out within the framework of with research on guilds as their typical form of corporation. Therefore, it is difficult to give a definition of crafts excluding guilds. Guilds are organisations of craftsmen and craftswomen and merchants (for the particular case of merchant guilds, see Gelderblom and Grafe 2010 and Chap. 4). Guilds were a sworn association of members similar to other medieval corporations. Guilds can be described as institutions (Epstein 2009; Pfister 2008; see section "Transaction Costs and Institutions" in Chap. 2) or as social groups (Heusinger 2009: 29). Usually, guilds had written statutes establishing their constituting rules and norms; for instance, they regulated aspects such as the conditions of membership and apprenticeship, the quality of their products and the election of the guilds' masters. Heusinger identifies the following four main functions of guilds within German cities: "professional representation, religious and charitable service, political participation and tasks of defence" (Heusinger 2010: 64). Guilds as craft guilds emerged in cities in the eleventh and twelfth centuries (in particular in Mainz, Worms, Würzburg and Cologne; Heusinger 2009: 49).

Research on the economic history of medieval cities in the German-speaking parts of the Holy Roman Empire mostly focuses on two players: merchants and guilds. Merchants and their organisations (see Chap. 4), like trading companies or the Hanseatic League, are often associated with investments, innovation, wealth and power. In contrast, guilds, understood as corporations of craftsmen and craftswomen, are often linked to regulation, cartel formation, rent-seeking and prevention of innovation. This negative connotation originated from Adam Smith and the reception of his economic thinking. "Guilds […] were seen as part of an economic system that had prevented the European economy from realising its full economic potential" (Epstein and Prak 2008a: 1). Epstein was one of the first economic historians who argued against this opinion in 1998. In focussing on apprenticeship and transfer of skills he could show how innovations and technological change took place in workshops and guilds (Reprinted: Epstein 2008). Current research on medieval guilds in German cities now is based on that fundamental study.

Guilds were important social groups in medieval cities and often participated in city governments (*Zunftverfassung*). Recent studies discuss these assumptions primarily by including different kinds of sources besides the statutes of the guilds (*Zunftstatuten*) and by looking at social and political aspects of guilds beside their economic functions. For a survey, see Epstein and Prak (2008b) and Heusinger (2011). Other studies question the roles of craftsmen and craftswomen and guilds in the processes of innovation (Reith 2000) and of proto-industrialisation (Pfister 2008). Additional recent publications concerning these economic players assess the following aspects: political influence (Heusinger 2009; Rogge 1995; Steensel 2016), women in guilds (González Athenas 2016; Heusinger 2016), guilds and their military function within cities (Heusinger 2009), social and spatial mobility (Brenner 2016; van Gassen 2016; Schulz 2016), transmission of knowledge (Holbach, 2001; Reith 2005, 2008b; Schulz 2016) as well as guilds and their culture (Schmidt 2009). A survey concentrating on German literature discusses current research tendencies (Holbach 2016).

While craftsmen and guilds in cities are most relevant in research, there were also corporations of craftsmen in rural areas (Kießling 1998; Ogilvie 1997, 2004; Pfister 2008).

Specialisation and Differentiation

As previously mentioned, craftsmen and craftswomen produced goods by combining energy and (raw) materials, and were normally particularly specialised in one working process. Such working processes tended to be very complex, and included a lot of different steps until the product was finished. In late medieval times, many craft branches subdivided these production processes. This differentiation of the working process was accompanied by the specialisation of workers and a division of labour.

With the process of urbanisation (see section "Urbanisation" in Chap. 2), the number of artisan producers increased, and it also promoted professional differentiation and specialisation within late medieval cities. In addition, long-distance trade relations and economic ties favoured a supra-regional division of labour. While the refinement of the products often remained inside the city walls, the extraction of raw materials and the preparation of semi-finished products were increasingly shifted to the surrounding areas. There, division of labour had also successfully taken place (Holbach 1994: 13–5). Research on this topic usually promotes the city as the main driver of development, but Mitterauer has already pointed out that specialisation and differentiation of work—and thus a greater division of labour—were also apparent in rural areas without urban impulses (Mitterauer 1992: 13–32). He distinguishes between regional division of labour, local division of labour and intra-family division of labour.

The interaction of towns—where goods were produced, and the final products were sold within new (mass) markets—and countryside—which supplied raw materials—frequently created rural industry or so-called proto-industry (see section "Commercial Revolution" in Chap. 2). The cultivation of flax and the production of linen (e.g. in Upper Swabia and Northern Switzerland) can serve as examples. In areas of rural industry, for instance, crops for textile production were cultivated. In proto-

industrial areas, the entire landscape (town and countryside) was shaped by the demands of proto-industrial production (Scott 2002: 91–3).

In contrast to the crafts, the proto-industry produced goods for export to other regions rather than for local markets. It was usually concentrated on a particular branch. Proto-industry can be found throughout Europe; in some parts of the Netherlands as early as 1500, in other regions it flourished in the seventeenth and eighteenth centuries. Most of the proto-industries belonged to the textile industry, but it also extended to regions with mining and metal processing, and later on glass, wood, clay, straw and so on (Ogilvie 1997: 1–3). Mendels invented the term proto-industry in his work on the region of Flanders (Mendels 1970). The theory of proto-industrialisation claims that the introduction of this type of production brought about profound changes in demographics, economy and society. With the relocation of production to the countryside, structuring it as proto-industry, the urban institutions, which had previously regulated production, and the rural institutions, which had governed demographic behaviour, were destroyed. In effect, this led to a tremendous increase of population which demanded further proto-industries. These developments evolved into a "self-sustaining spiral which ultimately generated the supplies of labour, capital, entrepreneurship, agrarian output, and foreign markets required for factory industrialisation" (Ogilvie 1997: 2). Mendels' theory fell on fertile ground. Based on the proto-industry theory, the concept of 'industrialisation before industrialisation' was discussed. It was interpreted as a step on the course to capitalism (Kriedte et al. 1978). Ogilvie critically questioned the impact on social institutions such as village communities, guilds and merchant companies that had previously been ascribed to proto-industry. Therefore, the interaction between proto-industry and social institutions must be considered individually for each single case. Also, the aforementioned development from agricultural society to proto-industry to capitalist society, through differentiated studies, suffers distractions (Ogilvie 1993; see section "The Emergence of Capitalism" in Chap. 2).

Epstein and Prak reach similar conclusions: They suggest that proto-industry located mostly in rural areas stood beside guilds as the urban form of organised work in late medieval Germany. However, regional guilds dominated proto-industry through the majority of the German-speaking regions and the rural production was mostly linked to urban production (Epstein and Prak 2008a: 20).

From a socio-economic point of view, peasant families for example started to work in textile production in order to provide an additional income, particularly in areas with low fertility (Malanima 2009: 206). Huang provides a good example of a study focussing on textile production by using the concept of proto-industry while being unaware of it (Huang 2015).

Furthermore, as a precursor of proto-industry, another form of organisation, the so-called putting-out system (*Verlagssystem*), is discussed: here the production took place in family workshops, but included a more structured division of labour. Separately from the individual steps of production, a merchant coordinated the craftsmen's and craftswomen's works as an entrepreneur. He bought the raw materials and organised their processing by craftsmen and craftswomen. "Putting-out industry is a sort of network of numerous independent small workshops. The merchant-entrepreneur is the director of this kind of scattered manufacturing process" (Malanima 2009: 205–6, quotation 206). Before 1600, the putting-out system mostly remained in towns. Following Scott, it arose from the fustian manufacturing which existed since the late fourteenth century. Fustian (*Barchent*) was made of linen (warp) and cotton (weft). Linen could be cultivated north of the Alps, whereas cotton needed the climate of the Mediterranean area. These facts led to long-distance merchants being involved in fustian production, and finally inventing a new form of organisation (Scott 2002: 97). Putting-out did not only organise work in a more rational and effective way in order to produce for the mass market, it also endowed peasants with citizen's rights, introducing them to urban jurisdiction (*outburghership*; Scott 2002: 95). Towns and their hinterlands were brought together. Proto-industry did potentially involve putting-out by including merchants as entrepreneurs and sellers of the products.

Nuremberg and the surrounding area can be described as the most 'advanced industrial region' in Germany. The metalworking crafts in particular must be stressed. The iron ore was mined in the Upper Palatinate, where it was processed in the metallurgical centres of Sulzbach and Amberg, and finally brought to Nuremberg. The city's crafts pioneered in the technique of tin-plating iron (*Verzinnen*) in the fourteenth century—beside Wunsiedel (Fichtelgebirge)—and wire-drawing (*Drahtzieherei*) in

wire mills from the fifteenth century onwards (but not completely automated until the late sixteenth century). Nuremberg fulfilled the function of the 'region's economic powerhouse'. The city "sought less to control all stages of the metallurgical process than to secure supplies of semi-finished ironware through recourse to putting-out, which it could then manufacture into specialised finished goods" (Scott 2002: 110). Crafts organised by putting-out in Nuremberg (mentioned in the records of 1535) included the making of hooks, blades, compasses, knives, needles, wire, armourers and tinsmiths, alongside with clothing trades like fustian-weaving, glovemaking and printing. Nuremberg traders controlled local production (in its hinterlands): the supply of raw material and fabrication of semi-finished goods in the country and smaller towns around Nuremberg, the fabrication of the finished good and organisation of the export to foreign markets within the city (Scott 2002: 110).

Other important and very dynamic industrial regions of premodern Germany were Saxony and Thuringia (cultivation of woad and production of dyestuff), and the Süderland (Mark in western Sauerland) near Cologne (metalwork; Scott 2002: 109).

Knowledge and Innovation

Schumpeter's definition of 'innovation' (first published in 1912) has had a distinct impact on economic history up until today (see, e.g. Malanima 2009). Innovation, in Schumpeter's theory, is discontinuous and results from a new combination of production factors: the making of a new product or a product with a new quality, the introduction of a new method of production, the exploration of a new market, the conquest of a new source of supply for raw material or unfinished goods, and the reorganisation of the branch of production (like establishing or deconstructing a monopoly; Schumpeter [9]1997: 100–1).

For premodern times, this definition is not unquestioned. Most medieval and early modern innovations—maybe with the exception of printing—were anonymous and happened in small steps in workshops during daily work (Epstein 2008: 52). Epstein and Prak emphasised this understanding of innovation by using the term 'micro innovations' in contrast

to 'macro innovations' like printing (Epstein and Prak 2008a: 5). Habitually, there have been many forces behind innovation, like the yearning for a better life, the hope to produce more crops in order to feed more people, more, better, cheaper (or more luxurious) clothes to dress people, the aim to minimise the use of people or animal power by using wind, water and solar energy instead, the wish to do things more efficiently (e.g. with less workers), the prospect to get richer, and not least, the wish to wage war successfully (Epstein 2009: 190–2, 210).

According to the textbook story, that the Black Death increased the speed of technological innovation (Epstein 2009: 213). This understanding is based on Adam Smith's idea of apprenticeship organised in guilds. Such a form of training with entry barriers, he claimed, encouraged nepotism, prevented a free labour market and hindered innovation by excluding intelligent people. With the Black Death and the losses of such a large quantity of people, the labour market became more open and there were numerous new opportunities (Epstein 2009: 214). However, on taking a closer look, it becomes apparent that many of these innovations had begun well before the plague, and consequently labour shortages were not the only reason for this development (Epstein 2009: 213–4). There were further events with a far-reaching effect which possibly triggered innovations. Epstein names the loss of the crusader states and the following crusades in Europe (in the North and Northeast against Poles, Russians, Prussians; in Iberia against Muslims; in the Southeast against Ottoman Turks; and in France against 'heretics'), the Hundred Years' War (fourteenth century till 1450s), the Papal Schism, the Hussite wars (fifteenth century) and the Peasants War (1525; Epstein 2009: 223–249). For the German-speaking lands, the changes in city councils (inclusion of guilds in the fourteenth century and exclusion of guilds in the sixteenth century), the princely state-building (*Territorialisierung*) and the 'confessional age' in the wake of the reformation should also be taken into account.

Cipolla divides technological innovation into three categories: firstly, techniques borrowed from others (e.g. compass, harness or paper); secondly, technologies which were invented abroad (e.g. wind mills) or which had been known for a long time (e.g. water mills) and changed to fit in European conditions; thirdly, independent innovations (e.g. eye glasses or clocks). Technological innovation in medieval times proceeded

slowly and resulted from tiny countless improvements in everyday work without having been influenced by theoretical thinking (Cipolla 1997: 8). Technological change and new developments affected people in premodern times differently from today, as "tradition remained strong and the pace of change imperceptible" (Epstein 2009: 190). "With a few rare exceptions, the common theme in medieval technology will be the accomplishments of nameless tinkerers making small improvements in existing ways of doing things" (Epstein 2009: 191). The invention of new techniques costs money. The entrepreneurs embody the transition of innovations into the economy. However, it is generally difficult to distinguish between innovation and replication, not only for premodern times (for discussion about the difficulty of this term see Whaples 2013).

Historians do not question that a lot of important innovations took place in late medieval and early modern times, which had immediate effects on most people's everyday lives. Where had they been launched, though? To answer this question, economic historians have looked at education, apprenticeship, and the labour organisation of medieval workshops.

It is emphasised that craftsmen and craftswomen were skilled, trained and educated for their special jobs. Their education and training had been acquired in workshops, working as an apprentice for a master, and learning by experience (Malanima 2009: 203–6). Van Zanden also emphasises the aspect that education was formally organised by the guild system (van Zanden 2009: 165–6). Transmission of knowledge is a crucial part of the success and survival of every workshop. Modern researchers differentiate between propositional (explicit, overt) and tacit (implicit, covert) types of knowledge. It is well known that propositional knowledge can be learned from text books, while tacit knowledge can only be gained face-to-face. Experience-based knowledge, for instance, can be transmitted as hands-on training during an apprenticeship and was spread by journeymen and journeywomen on their journeys and migration as trained workers (Epstein and Prak 2008a: 5–7; Epstein 2009: 212). "Over time, social forms like the guild system of education sustained these improvements and institutionalised the process of passing best practices down from one generation to the next" (Epstein 2009: 197). The most important publication on the question of innovation in crafts—edited by Epstein and Prak—focusses

on craft guilds, and assembles contributions by all the foremost experts on European premodern guild (Epstein and Prak 2008b).

To explain technological change, it is necessary to look at the process of innovation in addition to the transmission of knowledge, since innovation as well as common skills and knowledge must be transmitted. For technological change to become effective, innovations have to be widely spread. In this context, the connection between transmission of knowledge and mobility is discussed. Two aspects are at the centre of attention: firstly, new technologies or innovations in the process of crafting goods were carried to different parts of Europe by travelling craftsmen and craftswomen; secondly, know-how from moving craftsmen and craftswomen might have been combined with local traditions, so that innovation could have happened in this way (Epstein and Prak 2008a: 16–7). Guilds contributed to new technologies and were at the core of their diffusion. However, guilds might have been somewhat biased when it comes to labour-saving innovations as their members might have been affected negatively. But in towns, where political guilds included merchants and entrepreneurs, this strategy seems counterproductive. There, guilds are very likely to have been the main supporters of innovations (Epstein and Prak 2008a: 18–9).

As a conclusion: "[…] most technological change in pre-industrial Europe was the result of incremental, micro improvements, discovered more or less unintentionally by craftsmen practicing their trade. In other words, technological change and progress was the unintended outcome of craftsmen doing about their normal business, which was to produce industrial products to the best of their abilities" (Epstein and Prak 2008a: 17–8). This result contradicts Adam Smith's prejudices against guilds.

The history of technological change could be written either as a history of techniques in isolation or in interaction with economic, political, cultural and social history (Cipolla 1997: 14). It is difficult to write a history of technical improvement with the surviving records: New technologies were seldom mentioned, the mostly nameless inventors seldom wrote down their thoughts on, or ways of doing, things, eye witnesses did not focus on new techniques either, and illustrations of new tools or buildings (e.g. looms or mills) are rare and are not necessarily true to reality. Premodern tools were often made of wood which is less likely to survive

in meaningful condition than other materials (Epstein 2009: 191). All this changed during the course of the fifteenth century: The latest technological innovations were to be described and neatly collected by historiographers like Giovanni Tortelli and Polydore Vergil alongside with philosophers like Francis Bacon and writers like Antonio Persio (Cipolla 1997: 9).

Another approach to tell a history of innovations is by referring to the history of the institution in which the innovations had happened (see section "Transaction Costs and Institutions " in Chap. 2).

See reviewed sample studies 3, 6, 7, 8, 9, 11, 12, 14, 16, 20, 30, 32, 37.

Services (Julia Bruch)

The services sector is concerned with the production of immaterial goods. Services and their contribution to economic growth are very important in our society today; but this field has received little attention in premodern research (Gilomen et al. 2007b). The service sector has a definition problem, often those sectors of the economy that do not fit into the first (agriculture and mining) or the second category (craft, manufacturing and trade) are simply grouped together (Gilomen et al. 2007b: 12–3). However, we deem it important because services of all kinds constitute important preconditions of market exchange: financial services, insurance, transportation and transport services, communication, finance, documentation, generating knowledge and disseminating knowledge and also spiritual services. Producers include lawyers, notaries, messengers and transporters, scribes, teachers, consultants, servants as well as clerics. Financial services and financial intermediaries, however, are topics of the chapter on money and credit (see Chap. 5).

A major problem of the historical analysis of this sector is that services are very difficult, if at all, to quantify. Furthermore, the proportion of unpaid services in this area is particularly high (Carreras 2007). Important to mention is the volume of services in Switzerland, which spans the period from the fifteenth to twentieth centuries and includes good ideas for follow-up studies (Gilomen et al. 2007a). Two of the articles are particularly exemplary and noteworthy: the first deals with the '*Läuferamt*,

an urban messenger in late medieval cities (Hübner 2007), and the second is about legal and medical consultants at the Hohenzollerhof (Baeriswyl-Andresen 2007). Both articles impressively show that different kinds of services were needed both in the city and at the courts of the nobility.

See reviewed sample study 15.

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