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Risk sharing in agriculture: institutions and practices of cooperation in early modern Lombardy

1. Introduction

Between the late Middle Ages and the Early Modern period, significant changes occurred in the countryside of Lombardy. These transformations facilitated the spread of capitalist agricultural practices, particularly in the lower plains (Cipolla 1957; De Maddalena 1958; Chittolini 1978; 1989; Chiappa Mauri 1995; 1997). As a consequence, the region became one of the most advanced agricultural areas in Europe, but it also experienced high demographic pressure, with around 50 to 100 inhabitants per square kilometre (Di Tullio 2014a, 25-27; 2016). The precarious balance between population and resources was therefore also characteristic of this part of the Po Valley, giving rise to various forms of risk management at individual and collective levels.

This article analyses how early modern Lombard society promoted risk-sharing as a means of dealing with the possibility of agricultural failure. The focus is on the *collective* dimension of risk distribution. As it is impossible to consider all types of risk related to the pre-industrial agrarian economy, we examine *ordinary* risks, i.e. events that occurred with a certain frequency. These events were no more predictable because they occurred regularly. However, their cyclical nature has led to the implementation of policies and the creation of institutions aimed at mitigating their consequences. This study focuses on specific institutions and practices that have changed in response to evolving socio-economic contexts.

To achieve these objectives, Section 2 defines ordinary risks associated with agriculture and reflects on the shared system of values by different social groups, particularly those of the urban and rural populations. Having defined the various concepts of agricultural risk, Section 3 analyses how local and urban societies seek to strike the necessary balance between population, resources, and risk mitigation. To this end, the article focuses on four key aspects: firstly, tenancy and the various forms of land ownership and access to land; secondly, the actions of urban, state and rural institutions in relation to food supply; thirdly, the establishment of institutions and practices for managing environmental resources; and fourthly, rural servants' role in informal risk sharing. It is evident, however, that these risk-sharing institutions and practices were not always coordinated, and may even oppose each other directly.

In this article, I explore the various forms of risk management by reviewing, revising and systematising some of my previous research on related subjects, referred

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Referee List (DOI 10.36253/fup_referee_list)

FUP Best Practice in Scholarly Publishing (DOI 10.36253/fup_best_practice)

Matteo Di Tullio, *Risk sharing in agriculture: institutions and practices of cooperation in early modern Lombardy*, © Author(s), CC BY 4.0, DOI 10.36253/979-12-215-0963-2.15, in Angela Orlandi (edited by), *Gestione del rischio, insolvenza e bancarotta nel mondo premoderno (secc. XIII-XVIII) / Risk management, insolvency, and bankruptcy in the pre-modern world (13th-18th centuries)*, pp. 207-224, 2026, published by Firenze University Press, ISBN 979-12-215-0963-2, DOI 10.36253/979-12-215-0963-2

to in the following pages. This enables me to emphasise the complexity of the various experiences and the range of objectives pursued at local and regional levels.

2. Definition and perception of risk

Risk can be defined as the variability of future outcomes. In the context of agriculture, it is defined as the possibility that unpredictable and uncertain events will negatively impact the production, the income or the economic sustainability of agricultural activity.

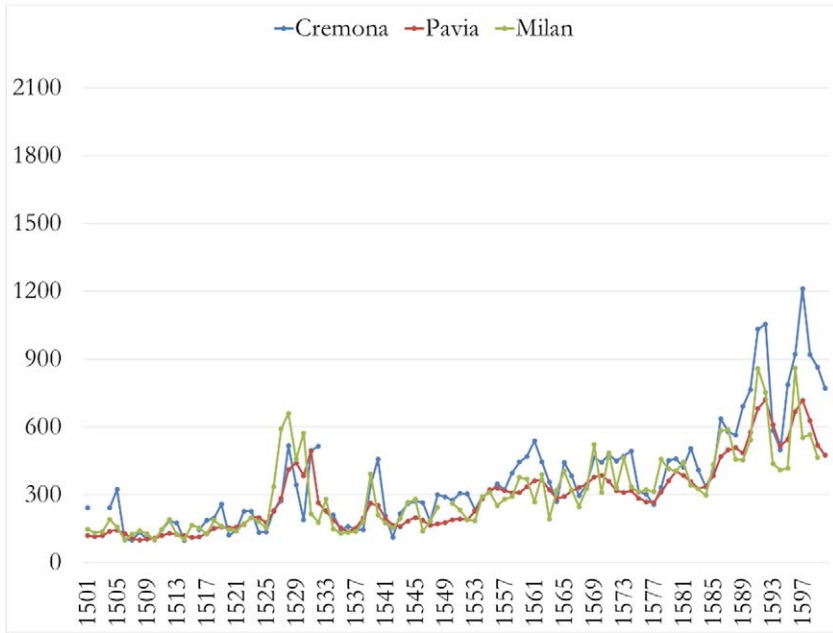
These risks can be categorised into different types. In preindustrial societies, the main risks were climatic (e.g. drought, hail, frost or floods damaging crops), biological (e.g. plant diseases, pest infestations, human or animal epidemics), technical (e.g. agricultural tool failure, cultivation or breeding technique errors) and political (e.g. riots, wars, tax increases). In addition to these factors, the impact of market risks must also be recognised (see, i.e. Stead 2004; Akerberg and Botticini 2000). It is well known that pre-industrial markets had very different characteristics from those of today. This issue will therefore be examined in more detail later in the article.

While some of these risks were more individual in nature, their aggregate consequence had a collective impact. The precarious balance between population and resources was a defining feature of pre-industrial society. Ensuring an adequate food supply was a fundamental political, social, and economic objective (Di Tullio 2012). To understand agricultural risk in early modern Lombardy (and more broadly in regions of Western Europe where peasants enjoyed a certain degree of freedom, feudalism was relatively weak, and there was a strong communal tradition), it is necessary to consider the prevailing collective values held by different social groups.

The relationship between agricultural products and urban and rural societies was different. The urban population's challenge was to ensure a steady supply of affordable produce from the countryside (Corritore 2007, 490-94). Revolts, such as bread riots, were also common during the Ancien Régime, although urban institutions tried to limit them by controlling the regular supply, and lowering the prices, of basic goods (Alfani and Ó Gráda 2017; Cohn 2021). Nevertheless, in general, we must remember that the sixteenth century was characterised by the so-called 'price revolution', which was caused by the influx of silver from the Americas and population growth, and which affected almost all European societies (Braudel and Spooner 1967; Boldizzoni 2005). Graph 1 shows the price of wheat in some towns in Lombardy, while Graph 2 proposes the case of other towns in the Po Valley. These independent series use the price of wheat in grams of silver to consider currency depreciation.¹

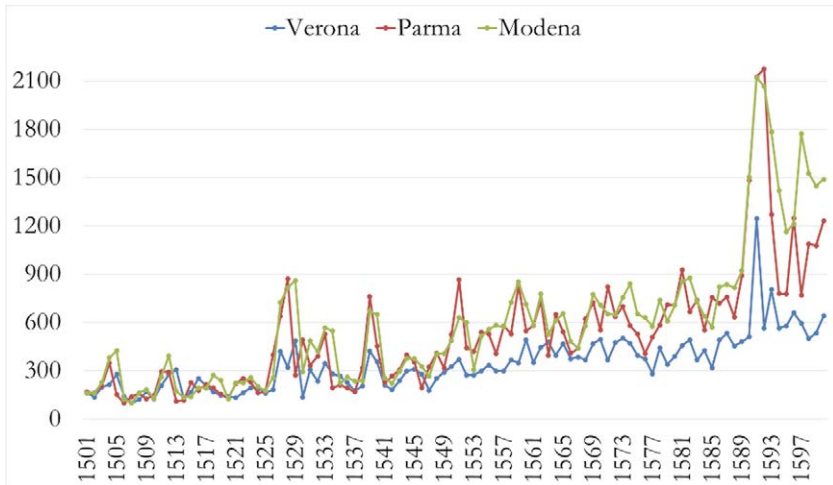
¹ On the price of wheat, the currency depreciation and the conversion of values in grams of silver see Boldizzoni 2005 for the Cremona, Pavia, Verona, Parma and Modena series; Di Tullio 2015 for the Milan series. This last series is built on the average prices recorded on the ledgers of two important welfare institutions of the city of Milan, the Ospedale Maggiore and the Schola delle Quattro Marie, provided by Di Raimondo 1975/1976 and Biasibetti 1976/1977.

Graph 1. Price series of wheat in Cremona, Pavia, and Milan 1501-1600 (independent series; 1508 = 100 for Pavia, 1506-1507 = 100 for Cremona, and 1506 = 100 for Milan)



Source: Our elaboration from Di Raimondo 1975/76; Biasibetti 1976/77; Boldizzoni 2005, 1033-35.

Graph 2. Price series of wheat in Verona, Parma, and Modena 1501-1600 (independent series; 1507 = 100 for Verona, 1506 = 100 for Parma, and 1507 = 100 for Modena)



Source: Our elaboration from Di Raimondo 1975/76; Biasibetti 1976/77; Boldizzoni 2005, 1033-5.

Although prices in pre-industrial economies did not necessarily reflect the exact equilibrium between supply and demand suggested by neoclassical theory, it is true that the price of staple foods broadly reflects the tension between harvests, available food stocks and the population to be fed. In other words, changes in grain prices in cities and towns are a reliable indicator of a population's ability to feed itself. Therefore, a significant increase in cereal prices in a given market can be reasonably interpreted as resulting from a decline in agricultural production and/or an increase in the local population. It could also be the result of an inadequate supply system, resulting in scarce public and private food reserves or limited market connections (Malanima 1997, 135-36; Sen, 1997; Alfani 2010; Mocarelli 2013; Ferrari and Vaquero Piñero 2015).

Taking all this into account, graphs 1 and 2 illustrate the price dynamics observed in the analysed cases (note that both graphs use the same scale). Price growth is evident everywhere, but the rate of increase varies from Lombardy to the rest of the Po Valley. Lombardy's indices (Graph 1) are lower and more stable than those of Verona, Parma and Modena. This seems to confirm Lombardy's higher productivity and better overall economic performance (especially in districts that experienced the aforementioned 'agrarian revolution' [Cafagna 1957], such as Milan and Pavia), compared with other Po Valley districts. In other words, despite all of them being close to extensive lowland areas, price growth was more pronounced in Verona, Parma and Modena. As Graph. 2 shows, growth was sustained overall, with wheat prices rising to more than ten times their initial value by the end of the century – even when the peak observed in the 1590s (which was associated with a substantial famine) is excluded. In short, Lombardy's high agricultural productivity enabled its cities to provide better urban subsistence, even in the face of high population pressure. However, the price of wheat also rose in Lombardy during the sixteenth century, primarily due to increasing demographic pressure on agricultural resources.

The question of the risks associated with farming obviously differs for rural people. For most people engaged in agriculture, the primary objective of their activity was reproduction. In summary, the aim was to produce enough to fulfil the following purposes: Firstly, to give a portion of the harvest to the landowner; Secondly, to sell some of the harvest in order to accumulate sufficient funds for small transactions and, above all, to pay taxes; Thirdly, to set aside what was needed for sowing the following year; Finally, to feed the household until the next harvest. (Cattini 1977).

The composition and quantities of these four elements were related to the conditions of the land and the agricultural contracts, as argue below, but they were also, of course, related to the size of the harvest each year. Since the dominical portion and the part devoted to the market for paying taxes were difficult to reduce, it is reasonable to assume that the portion planned for food or sowing was reduced when the harvest was insufficient. As mentioned above, fluctuating production and its more or less serious consequences were a constant feature of pre-industrial economies.

In the most serious cases, when poor harvests occur for several consecutive years, the situation of the peasants becomes particularly precarious in terms of subsistence. This is partly due to the debt they accumulate. Poor harvests often meant

that peasants could not afford to buy seeds for the following year, so they had to borrow from their landlord, typically at interest. If the debt was not repaid on time, the creditor would take the debtor's few possessions, such as tools, animals, or small plots of land. This process of debt-based dispossession led to the proletarianisation of the peasants, making them increasingly vulnerable (Cherubini 1978; Cattini 1984; Roveda 1984; Cazzola 2014).

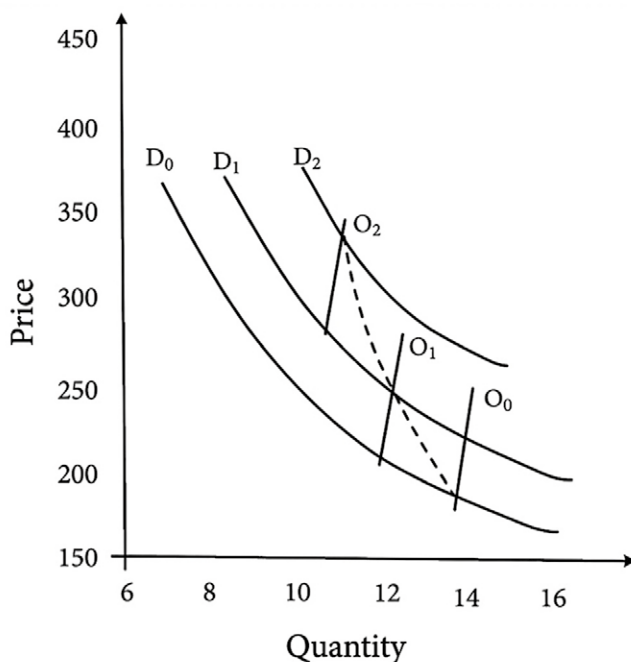
The objective of landowners was different: they aimed to obtain regular rent (in kind or in cash) by leasing out their land. This rent was then used to meet household needs and savings, and possibly to invest in other assets or improve existing infrastructure. A difficult year or series of bad years might lead to reduced investment or savings, but would rarely lead to reduced household consumption or debt. At least this was the case for large landowners, as the risk of losing their property increased greatly if their wealth decreased. It should also be noted that most of the food routinely available on urban or rural markets came from these rents. To these were added the cereals destined for the market from small farmers and peasants (either freely or through rationing), as well as those from tenants on larger farms – the so called *fittabili*.

During the early modern period, large tenants became increasingly important in Lombardy and other parts of Western Europe, particularly around large urban centres and in densely populated areas where land was suitable for major infrastructural investment, especially for irrigated agriculture. Put simply, large tenant farmers became progressively significant in a more commercial form of agrarian economy, where the market became central to regulating the factors of production – land, labour and capital – which were treated as commodities. This was particularly evident in the Po Valley, Flanders and certain regions of France, as well as later in England, where the agrarian economy shifted towards market production according to a capitalist model. Broadly speaking, tenant farmers sought to maximise the use of production factors to boost productivity and produce as much as possible for urban and rural markets. A difficult year or series of bad years would lead to reduced production, affecting the rate of reinvestment or savings. However, serious consequences for their household's subsistence were rare.

Considering the various groups' different objectives, it is clear that one of their main aims was to achieve a certain yield to ensure reproduction, income or profit. Consequently, a poor harvest was their primary 'ordinary' risk, and managing the inevitable irregularities in agricultural production was their primary risk management objective.

Moreover, the decline in harvests posed a particular danger to early modern agriculture due to the peculiar way in which the grain market functioned. Given the high level of self-consumption among peasants and in rural communities (i.e. the majority of the population), collective demand for cereals increased significantly ($D_0 \rightarrow D_1 \rightarrow D_2$) during periods of poor harvests ($O_0 \rightarrow O_1 \rightarrow O_2$), when the rural population could not produce enough food to meet their needs. Consequently, rural people were increasingly forced to buy grain on the market when supplies were scarce, which put pressure on prices. The rapid increase in grain prices created a challenging situation for farmers, landlords and tenants in rural and urban areas (Cattini, 1977, 121-50; 1984) (Graph 3).

Graph 3. Theoretical collective demand curve for cereals in rural areas in preindustrial period



Source: our elaboration from Cattini 1984, 110, fig. 10

Clearly, rising prices affected different social groups in different ways. When high prices had serious consequences for buyers, they could work in favour of sellers. While rising prices obviously favoured indebtedness among the poorest in society and wealth distribution, severe food shortages became a social problem that worried governments and the entire population, rich and poor alike.

3. Different ways to sharing the risk

Fluctuating harvests and the resulting strong pressure on the grain market can therefore be considered one of the main 'ordinary' risks of pre-industrial societies, particularly in relation to agricultural activity. To address this widespread issue, early modern societies implemented various measures to mitigate the potential negative effects. Due to the variety of social groups and interests related to crop dynamics, the actions taken varied in type and involved different institutions, actors, and resources.

First and foremost, the various types of land tenure and ownership, and access to land, can influence the distribution of risk associated with fluctuations in agricultural yields (Giorgetti 1974; Roveda 1984b). During the early modern period, there

was a tendency to shift the risks associated with irregularities in agricultural production onto the rural population, particularly peasants and small tenants. More specifically, leases were increasingly based on a predetermined fixed rate, which generally favoured landlords over tenants. The situation became even more difficult where market and capitalist agriculture spread, as in Lombardy. This was because the leases changed from a fixed rate to an annual fixed rent in kind, or even worse, in cash. A similar system was instrumental in overcoming the sharecropping system and facilitating the spread of large-scale capitalist tenancy (Di Tullio 2009a; 2009b). However, although this was originally a way for landowners to transfer agrarian risk to their tenants, in the long run, this process could sometimes backfire on the landowners themselves. This was particularly true of large landowning institutions, which were more interested in generating income than managing their estates. Tenants often became creditors of their landlords due to the constant improvements they made to the estate. Sometimes, these debts were so high that the owners were forced to sell their properties to their tenants (Cipolla 1947; Chittolini 1973; Di Tullio 2017). This process could only occur under certain conditions: a specific geo-pedological context, certain demographic developments, the presence of important urban markets and a fair grain price level.

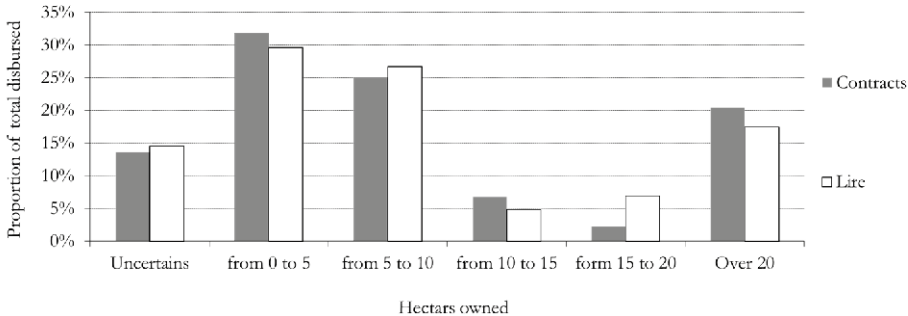
Therefore, this cannot necessarily be a universal or linear process. However, it has become increasingly prevalent in the Lombard countryside (as well as in other parts of Western Europe), alongside the 'privatisation' of access to land and collective resources. I am referring to the well-known shift from village management agricultural system to so-called agrarian individualism, which was also evident in the enclosure of the open fields and the attacks on collective resources. The issue of common pool resources has been widely debated (see i.e. Bailey 1989; Moreno and Raggio 1992; De Moor, Shaw-Taylor, and Warde 2002; Alfani and Rao 2011). I don't wish to revisit that debate here, except to emphasise that open fields and common goods were effective systems for risk sharing. As many scholars have argued, including in the case of Lombardy, they enabled peasants to supplement their meagre incomes, which proved particularly useful in years of poor harvests (Roveda, 1979, 30-31; 1984). The products obtained (e.g. fruit, wood or pasture) meant that cereals originally intended for subsistence could be sold on urban markets, or in the case of chestnuts, used for producing flour. This limited inflation and social unrest. Even during the French Revolution, many communities called for a return to village agriculture and the open field system, or for the restoration of collective domains in various ways (Bloch, 1931).

These final aspects are directly linked to the institutional dimension of risk management in agriculture, particularly about the reduction of production irregularities. While agricultural contracts transferred the risk to peasants and the poorest sections of society, the early modern period also saw the creation or consolidation of institutions designed to manage this type of risk. The most important of these were the *annone*, institutions responsible for controlling the supply of grain to towns and cities (Vecchiato, 1979; Romani, 1986-87; Guenzi 1995; Corritore 2007; Parziale 2009). They became an integral part of the bureaucratic apparatus of early modern states. In the event of a potential famine, *annone* officers travelled from village to village to assess the food available in relation to the population to be fed. This was a complex

and expensive process that was not always effective, but it did limit sudden price rises in urban and rural markets. Often, the corollary was the seizure of part of the rural stock, which was forcibly transported to the markets (Galletti 1994; Di Tullio 2009a).

At the same time, rural communities often organised themselves in order to cope with poor harvests, as well as to mitigate the effects of growing agrarian individualism and the loss of collective assets. Solutions varied, but public granaries or charitable institutions were generally set up, often with the support of municipalities and parishes. These institutions distributed bread to the poor in normal times and grain to the whole population in times of famine. They also supplied local markets with grain that had previously been stored, thereby limiting price rises. These charitable institutions constantly grew in wealth through inheritances from the local population and tax exemptions.² As well as their various social activities, these institutions also fulfilled an important microcredit function, which was essential for defending rural property and the local socio-economic structure. I studied this phenomenon in some rural communities on the border between the State of Milan and the Republic of Venice during the Italian Wars of the sixteenth century. In short, these charitable institutions, known as *scholae*, played a key role in limiting the influence of urban capital in a highly prosperous agricultural context, by providing credit to rural communities and small rural landowners (Graph 4). This limited local indebtedness, even during a long period of difficult war (with the consequent burden of taxation, expensive military billeting, and disruption to economic activity) (Graph 5).

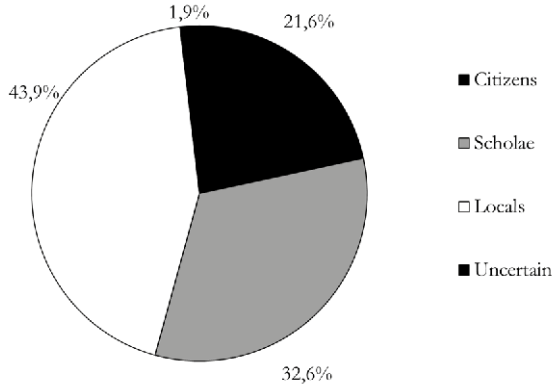
Graph 4. Relationship between the beneficiaries of the loan and landed property (Vailate, Geradadda, 40s of sixteenth century)



Source: Di Tullio 2014a

² For an overview of this kind of institutions and their role in the preindustrial economy see Ago 1998; Muldrew 1998; Todeschini 2002; Fontaine 2008; Bianchi 2009; Ammannati, 2013

Graph 5. Source of the capital obtained by the communities of Geradadda (1495-1555)



Source: Di Tullio 2014a

Agricultural risk-sharing institutions could also provide an opportunity to organise environmental management and promote agricultural innovation. This is illustrated by my third example: the consortia that manage irrigation canals. I will draw on my experience of reclamation in Lombardy in particular, where the relationship between human societies and water is (and always has been) crucial and significant. In early modern Lombardy, for instance, water management was primarily an ecological concern because some areas of the plain were unpassable without prior hydraulic stabilisation. For this reason, draining the marshes was one of the main steps taken to settle these areas. This does not mean that economic activities or temporary settlements were impossible in the plain of Lombardy before the hydraulic arrangements were put in place. Rather, it suggests that stable rural settlements and the systematic adaptation of natural resources to human needs only became possible once the environment had been domesticated (Di Tullio 2012).

Clearly, control of water was important in terms of social and political power, as well as being a significant economic issue. In any case, participation in the irrigation networks was not limited to the wealthiest section of society. While the construction of a large canal or the abstraction of water from rivers required a ducal licence (since river water was considered the property of the state) and these licences were mainly obtained by urban and rural communities, large religious institutions, noble families and 'social' institutions, the development of the secondary network was favoured by the «servitù d'acquedotto» (literally «aqueduct easements»). This consuetudinary legal institution, recognised by municipal statutes and then by the state, allowed anyone to build a canal on another's land by paying the price of the occupied land plus a quarter of its market value (Roveda 1984; Bigatti 1995).

For all these reasons, water management can be considered a collective objective involving public and private institutions, as well as local and central government, the rich and the poor. In addition to the main ecological value mentioned above, the water network had many other general values, such as protection, disinfection, nutrition and trade. In many cases, this public value was guaranteed by common ownership of part of the water system by local communities or the state. In many other cases, collective ownership or management was possible through the creation of consortia or other collective action institutions among the beneficiaries of a particular canal. Consortia also ensured the sharing of start-up and maintenance costs and any extraordinary expenses, as well as allowing for effective conflict management. In other words, consortia were necessary institutions for managing the environment and guaranteeing the agricultural use of these areas, and for sharing environmental and economic risks. At the same time, however, they were both a cause and an effect of other factors, each playing a fundamental role in the process of creating this artificial landscape and the agricultural avant-garde in Lombardy, especially thanks to the integration of agriculture and livestock farming. In a broader sense, therefore, irrigation consortia have been fundamental in ensuring high agricultural yields and limiting the risk of famine (Di Tullio 2023).

Finally, we consider an informal form of risk sharing associated with irregularities in production: the spread of *famulato*, whereby servants lend domestic or agricultural labour to families other than their own.³ This is a practice of labour mobility that changes over time and across different regions. Indeed, while the early modern peasant family was primarily a labour unit, the *famulato* was the most effective means of balancing land and labour availability. In some studies of rural Lombardy in the mid-sixteenth century, I observed an almost perfect correlation between the amount of available land (owned or rented) and family unit size. I concluded that this was due to the prevalence of *famulato* (Di Tullio 2009a; 2009b; 2014b; 2016). Graphs 6 and 7 clearly demonstrate this correlation for the various agricultural occupations and geographical regions examined. As my objective was to examine the progress of the “agrarian revolution” in various regions of Lombardy, I selected case studies from the hills, the middle plains, and the lower plains. At the same time, I thought it would be useful to categorise households according to the occupation of the head of the family. For this reason, graphs 6 and 7 show different values for *braccianti* (agricultural workers), *massari* (tenants of medium or large estates who generally own the means of production – labour, seeds, animals and tools – and are subject to leases that provide for sharing the harvest in exchange for a fixed rent), and *fittabili* (tenants of estates and the aforementioned promoters of the capitalist transformation of Lombard agriculture).

This almost perfect balance between agricultural land and family size was made possible by the widespread use of *famuli*, as shown in Graph 8. The *famuli*, who were mostly very young (see Graph 10), ensured that the surplus labour of the *braccianti* or *massari* became available to other *massari* and *fittabili* families. In addition to hiring

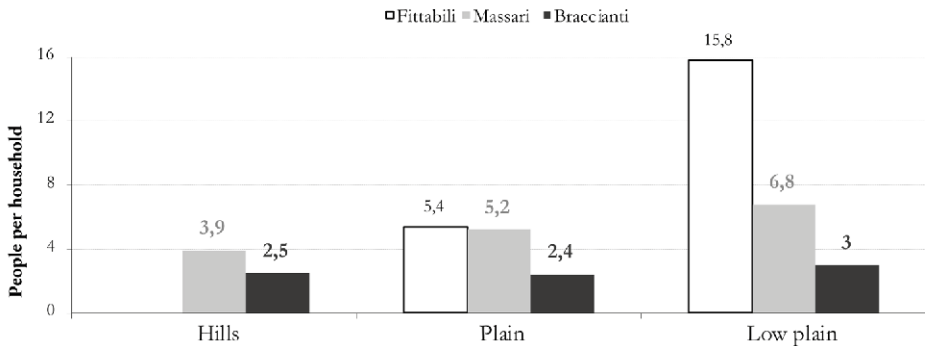
³ About the rural servants in Europe see Whittle 2017. For Italy, see Sarti 2017a e 2017b; For Lombardy, a part from the above mentioned articles of mine, see Beonio-Brocchieri 2000; Leverotti 2001; Gioia 2004.

external agricultural labourers, these latter groups welcomed *famuli* into their households for domestic and agricultural work, particularly to care for livestock. For young people from families with limited resources, working as a *famulo* was a necessary step to earn the small amount of capital required to start a family. However, the desire to avoid overburdening the group of origin certainly stimulated the development of *famulato* before the desire to accumulate capital. For this reason, *famulato* can be viewed as a family risk-sharing practice that has collective value.

This assumption appears to be confirmed when we consider the spread of *famulato* in mountainous and hilly areas (see graphs 9 and 10). Here, despite the limited expansion of cultivated land, the use of *famuli* by *massari* families clearly indicates a double movement of labour. As in the domestic groups of *braccianti*, young people in the *massari* families left to work as servants for other households. At the same time, the *massari* took in other young people, which ensured the flexibility of the family unit. The *famuli* were “temporary” members of the family group (as opposed to biological children), so their numbers could increase or decrease according to the availability of land and food.

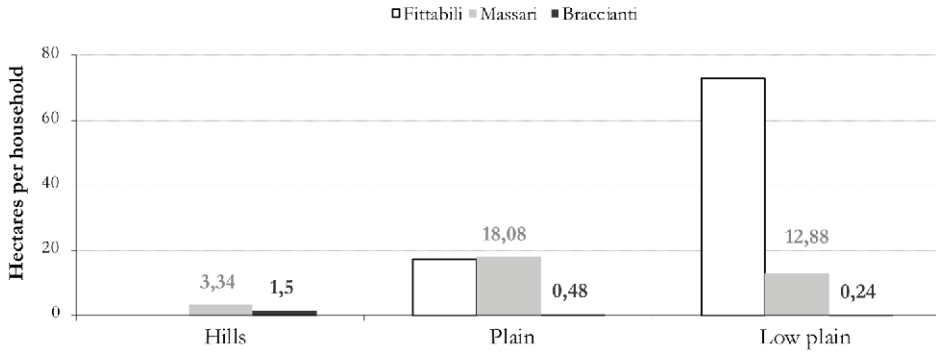
In conclusion, *famulato* was a collectively accepted system for coping with hazards and sharing the risk of fluctuating harvests or contractual conditions at a local, if not regional, level (Di Tullio 2019).

Graph 6. People per household and by occupation in different regions of Lombardy (mid sixteenth century)



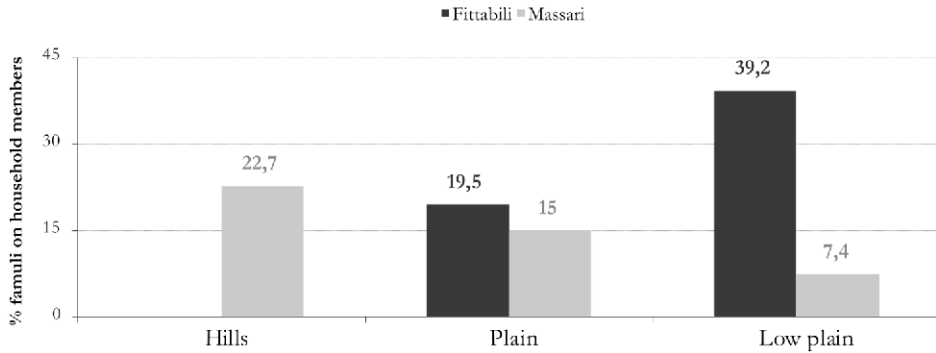
Source: Di Tullio 2009

Graph 7. Hectares per household and by occupation in different regions of Lombardy (mid sixteenth century)



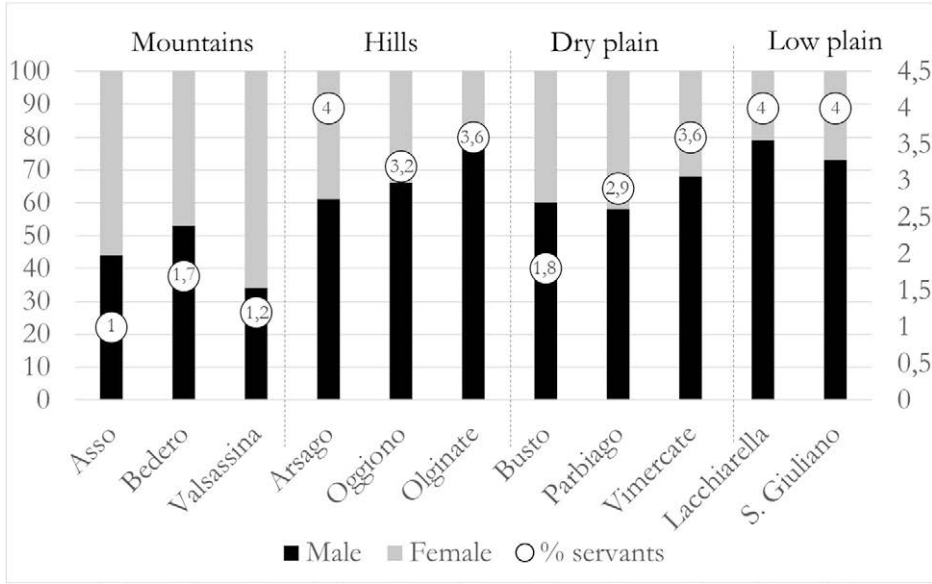
Source: Di Tullio 2009

Graph 8. Percentage of famuli on household members



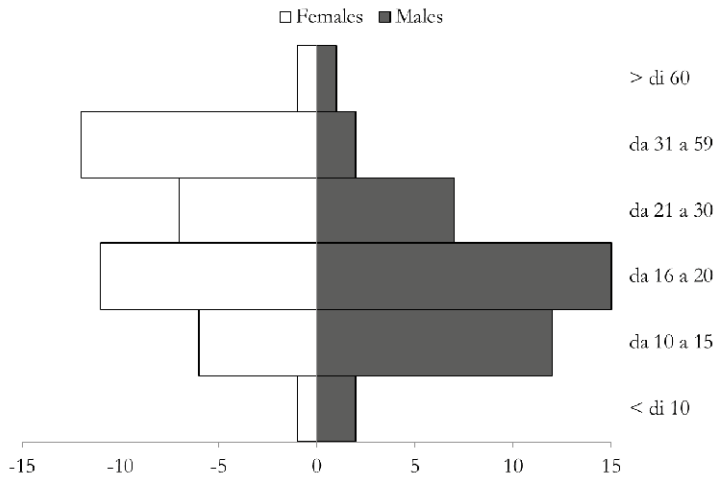
Source: Di Tullio 2009

Graph 9. Gender (principal y-axis) and incidence (% of total population - secondary-axis) of famuli in some *pievi* of the Milanese *contado* at the end of the sixteenth century



Source: Di Tullio 2019

Graph 10. Age composition of rural servants in mid-16th-century Lombardy (Pievi di Angera, Brebbia, Varese and Valcuvia. c. 1540)



Source: Dalla Zuanna *et al.* 2012

4. Concluding remarks

This article discusses the institutions and practices of risk sharing in agriculture, focusing on Lombardy during the early modern period. In order to address such a broad topic, I decided to concentrate solely on the ‘ordinary’ and ‘collective’ aspects of risk in preindustrial agrarian economies.

Having defined the risks associated with farming in early modern Lombardy, I examined the different objectives pursued by the various social groups involved in agrarian activities. First, I defined the difference between rural and urban objectives. Then, the article explains the differences in interests between landlords and tenants, and between tenants and farmers.

To provide a multi-perspective analysis of this phenomenon, the article focuses on four main aspects of early modern agrarian Lombardy: tenancy; urban and rural food supply instructions; environmental management institutions; and the rural servant system. By describing these aspects, I illustrate the complexity of the collective dimension of risk sharing and highlight the differences that occurred during the early modern period, as well as the contrasting interests involved in each of these practices and institutions.

Although Lombardy had an advanced agricultural economy, the main risk to be addressed was managing crop cycles due to high demographic pressure. Also due to the spread of the market economy, during the early modern period there was a general attempt to shift this risk to the ‘peripheries’ and the less well-off, for example from cities to the countryside and from landowners to tenants and farmers. This trend was mitigated not only by urban and rural institutions, but also by uncoded social practices such as the *famulato*. These practices were nonetheless widespread and effective.

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