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Famines in late Medieval and Early Modern Italy: A test for an advanced economy

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Abstract

This paper analyzes how advanced Medieval and Early Modern Italian economies attempted to cope with famines. First, it provides an overview of the occurrence of famines and food shortages in Italy from the fifteenth to the seventeenth century, underlining the connections with overall climatic and demographic trends. Second, it focuses on the 1590s famine (the worst to affect Italy in the period), providing a general discussion and interpretation of its causes and characteristics, and describing and evaluating the strategies for coping with the crisis that developed within the Republic of Genoa and the Duchy of Ferrara. The article argues that when such a large-scale food crisis as that of the 1590s occurred, public action played a key role in providing relief.

Keywords

Famine; mortality crises; subsistence crises; Italy; early modern period; 1590s; markets integration; grain trade; agrarian innovation.

In the late Middle Ages and at the beginning of the Early Modern period, Italy was without a doubt one of the most advanced areas of Europe economically, socially, and regarding its institutions. Even if the old theory of a 'seventeenth century crisis' (*crisi del Seicento*) has been considerably mitigated by the research conducted in the last decades, from the seventeenth century Italy started losing position in relation to the dynamic northern European economies. The reasons for this 'relative decline', as well as its overall intensity, are still the subject of heated debate.

Related to this, recent works provided an overall reappraisal of Italian economic conditions during the sixteenth century (Alfani 2013a). They suggest that most Italian states possessed considerable economic vitality also in the second half of the sixteenth century, when a large part of the peninsula had already lost its political independence. The recovery after the damage and economic instability caused by the Italian Wars (1494-1559) was not an 'Indian summer', as Carlo M. Cipolla put it (1993, 243), but was a sound recovery that led Italy to reach, from many points of view, a multi-secular peak.

However, it is towards the end of the century, in the 1590s, that Italy had to endure the worst famine of the late Medieval and Early Modern period. This famine struck a very advanced area, characterized by a vital economy, flourishing markets, and vast and integrated merchant networks. It put the social-economic structures and the institutions of the peninsula to the test—a test that, however, often failed.

This paper analyzes how advanced Medieval and Early Modern economies tried to cope with famines. In the first section, it provides an overview of the occurrence of famines and food shortages in Italy from the fifteenth to the seventeenth century, underlining the connections with overall climatic and demographic trends. In the second section it focuses on the 1590s famine, providing a general discussion and interpretation of its causes and its characteristics, and describing and evaluating specific strategies for coping with the crisis.

1. Italian famines, 1400-1700: An overview

In Italy during the Medieval and Early Modern period, famines were a fairly common occurrence. This was not exceptional per se, as it seemingly reflects the overall (continental) European situation. According to the estimate provided some years ago by Slicher Van Bath (1977), in preindustrial Europe there was a bad harvest every four years. A bad harvest, however, did not automatically lead to a famine as reserve stocks cumulated in good years and foodstuffs could be imported from other areas. It was the occurrence of back-to-back harvest failures, or of longer sequences of poor harvests, that could transform "normal" dearth into the more exceptional "famine"[1]. This was especially the case when harvest failures occurred over vast areas, thus compromising the ability of markets and food provisioning authorities to compensate for a local shortage of foodstuffs; I will develop these topics in the next section.

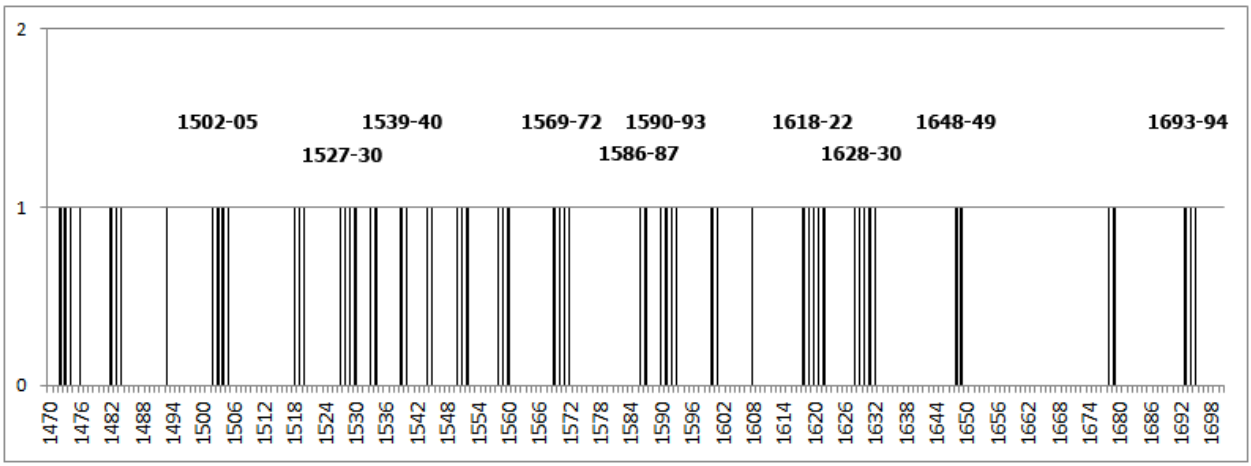
If the frequent occurrence of famines in preindustrial Europe is no surprise, it could be expected that the most advanced areas of the continent, like Italy, were at least partly spared of these dramatic events. Truth be told, much comparative research is needed before we are able to properly evaluate famine intensity in time throughout a very diverse European continent—research that is currently underway (Alfani and Ó Gráda 2016). What we can already affirm is that when particularly severe food shortages occurred, even very advanced states were unable to fully escape the most dire consequences of famine. As shall be seen, this was the case for many Italian states at the time of the 1590s crisis. Furthermore, in the case of Italy at least, until the first decades of the seventeenth century famines were fairly frequent, a situation that began to change only after the great 1630 plague epidemic.

The reasons for this failure experienced by advanced economies are related partly to the very nature of preindustrial famines, and partly to the Italian long-term demographic trend as it connected with long-term climatic change. To clarify this point, the first task is to identify the chronology of the famines that struck Italy, or at least a large part of the peninsula. As famines are not simply the consequence of levels of production and/or of price levels, to identify them I made use of an "expert" method, which basically consists of relying on the analyses conducted, for a certain number of case studies, by scholars who specialize in the history of famines or of food provisioning. This method is intended to solve, at least in part, the problem of

[1] In Cormac Ó Gráda's recent definition, 'famine refers to a shortage of food or purchasing power that leads directly to excess mortality from starvation or hunger-induced diseases' (Ó Gráda 2009, 4). Overall, this definition can be accepted here, although it must be pointed out that the demographic consequences of a preindustrial famine are far more complex than a mere increase in mortality. For a discussion of this, see Alfani 2011; 2013a.

differentiating between "famine" and simple "dearth"[2]. By using this method, it has been possible to reconstruct a chronology for the period 1470-1700, which is charted in Graph 1, where the main events are also indicated[3].

Graph 1. Years of famine and main events, 1470-1700



Notes: Value '1' indicates a famine year.
Sources: For the period 1470-1629, the database of famine years has been published in Alfani 2013a, 176-177. For the rest of the seventeenth century, see the reconstruction provided by Alfani 2010, 37-41.

Graph 1 suggests that famines were fairly frequent in the last decades of the fifteenth century and intensified in the first half of the sixteenth. In fact, all the available reconstructions of the Italian long-run population trend suggest that, after the demographic decline caused by the Black Death of 1348-49 and the many subsequent decades of stagnation that followed, the population of the peninsula entered a phase of rapid growth around 1450, so that, on the eve of the sixteenth century, the population levels were not far from the pre-Black Death ones (see also later, Table 1). Focusing on the fifteenth century, this could account for the relative scarcity of famines in the first half of the century that has been underlined by some authors as well as for the increase in their frequency as the sixteenth century approached.

In 1494, with the Italian campaign of the French king Charles VIII, the Italian Wars began (1494-1559). These were a string of different military campaigns involving changing alliances and covering different parts of the Italian peninsula. Demographically, this period was characterized by stagnation that ended only with the peace of Cateau-Cambrésis in 1559. Apart from the military events, in these years a number of serious famines and epidemics occurred,

[2] About this distinction, see Ó Gráda 2009, pp. 4-5.
[3] For the period 1470-1629, the database of famine years has been published in Alfani 2013a, pp. 176-177. For the rest of the seventeenth century, see the discussion in Alfani 2010.

which the vicissitudes of the war weld in a kind of *continuum* of events that, however, were often only of local or regional importance (about the complex interaction of wars, famines, and epidemics in sixteenth century Italy, see Alfani 2013a). This complex situation makes it difficult to clearly identify the cause of the famines, but two aspects can be underlined: first, that surely the military events, especially in the periods of most intense confrontation, made it easier for a dearth to turn into famine (as war damages the harvest directly, consumes food reserves, and also disrupts trade and the actions of institutions); second, that the demographic growth of the second half of the fifteenth century was causing a certain amount of strain on the available resources (in terms of the production capacity of agricultural systems and of the possibility of provisioning urban centres), a situation partly tempered by agricultural innovations introduced precisely as a reaction to such shortages (I will return to this topic in the concluding section).

After the peace of Cateau-Cambrésis, a couple of decades followed that were mostly famine-free. This seems to be associated with the quick demographic growth following the end of the Italian Wars, a growth that was possibly due, in part at least, to improving expectations after the end of the turbulence generated by the conflict (Alfani 2007; 2013a). The demographic growth was also coupled with a phase of sound economic recovery and growth.

This lucky period came abruptly to an end with the terrible famine of the 1590s, which had been foreshadowed by a crisis affecting much of central and northern Italy in 1586-87[4]. The 1590s famine was, by far, the most terrible to occur in Italy during the entire period considered here, and does not have any match in Italian history since at least the food crises preceding the Black Death and possibly much earlier. This famine struck the Italian economies when they were still prominent in the European world, albeit facing increasing international competition. The crisis left abundant documentation in the Italian archives, which makes it the perfect occasion for studying how advanced preindustrial economies faced severe famines. In the next section, the main characteristics of this exceptional event are described and a number of case studies, each related to a specific Italian state, are analyzed.

After the 1590s crisis, famine continued to be a fairly common occurrence. The very first years of the seventeenth century were characterized by severe food shortages, but the food problems of the Italian states intensified especially during the 1620s, with famines both at the beginning and end of that decade. Demographically, this was a period of stagnation (after the recovery from the 1590s crisis) that ended (in the North) only with the catastrophic 1630 plague. This epidemic, which killed in the affected area (almost all of the North, plus Tuscany) about one-third of the

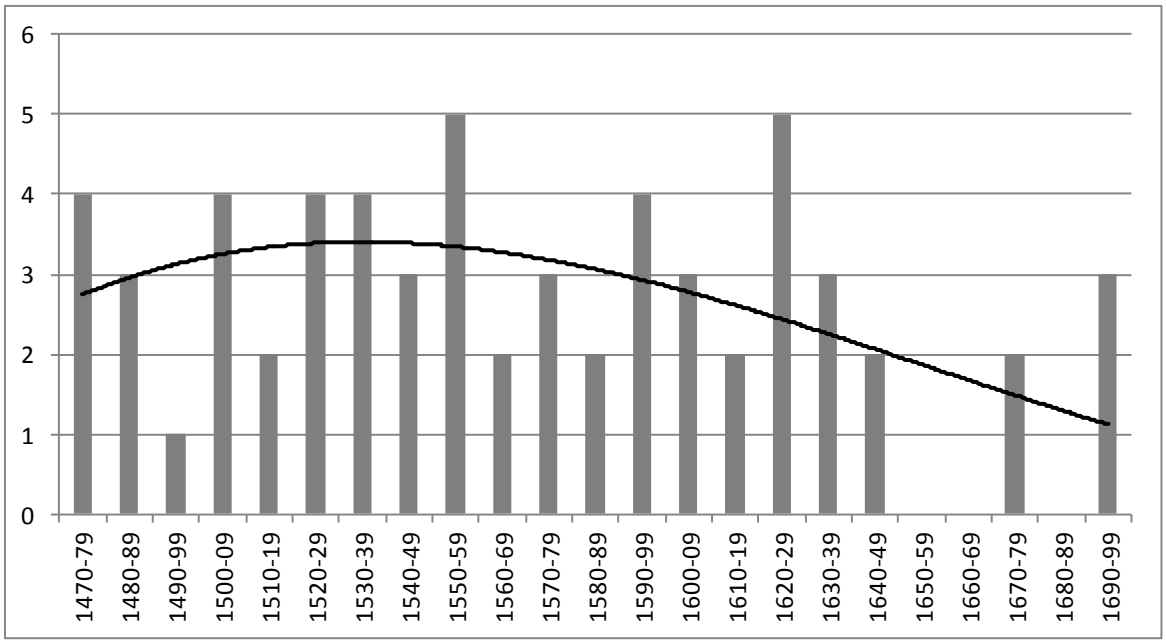
[4] For details about this episode, see Alfani 2013a, p. 57.

overall population, changed for good the balance between population and resources and seemingly had a very significant impact on the occurrence of famines in the peninsula. If we consider the fact that the South and most of central Italy were struck by a plague of comparable intensity in 1656-57 (note that the 1630 and 1656-57 plagues were events on a scale absolutely exceptional for seventeenth century Europe: as suggested in Alfani 2013b), it seems obvious to look here for the reasons why, in the second half of the seventeenth century, famine became a comparatively rare event—until at least the very end of the century, with a particularly severe famine around 1693-94 closely followed, in the first decade of the eighteenth, by the worst famine of that century—a terrible event that affected much of Europe and was triggered by the "great winter" of 1708 (Alfani 2010; Bellettini 1987).

The relative scarcity of famines in the second half of the seventeenth century is also confirmed by detailed research conducted on specific case studies. For example, Gian Luigi Basini, who studied the case of Modena in Emilia, writes: "it was lucky for the Modenese that the subsistence crises of the second half of the seventeenth century had less dramatic characteristics than those which had preceded them" (Basini 1970, 85, my translation). Similarly, Dante Zanetti, who studied Pavia in Lombardy, suggests that the forty years following 1651 were characterized by a relative abundance of foodstuffs, as confirmed by price series oscillating less, and around much lower levels, than was the case both before and after (Zanetti 1964, 95-96); in his long-term analysis, which covers the late fourteenth to the early eighteenth century, it is clearly the sixteenth century that stands out as the most unstable (from the point of view of food prices) and famine-ridden period.

This synthetic overview of the trend in the occurrence of famines in Italy during the years 1400-1700 can also be presented graphically, for example by charting the number of famine years per 10-year periods. The result is Graph 2, where the series is also interpolated with a polynomial 3rd order function. The graph shows clearly the relative intensity of famines during certain phases of the Wars of Italy, during the 1590s and the 1620s. It also shows the relative scarcity of famines in the second half of the seventeenth century, as well as the tendency toward an increase at the turn of that century.

Graph 2. Number of years of famine per 10-year period



The interpolant in Graph 2 suggests that famine frequency in the three centuries considered followed an inverted-U path: It increased from the middle of the fifteenth century, reached a maximum in the sixteenth, and started to decline again after the plague crises of the seventeenth. This path closely reflects the overall trend in population levels: They increased from around 1450 after the long stagnation following the Black Death, reached a maximum in the 1580s, stagnated around that maximum level for some decades, and then dropped abruptly as a consequence of the seventeenth-century plague-induced mortality crises. The overall trend is also summarized in Table 1.

Table 1. The Italian population per macro-area, 1450-1700 (millions of inhabitants)

	North	**Centre**	**South and Islands**	**TOT**
1450	3.9	1.4	2.2	7.5
1550	5.5	2.0	4.0	11.5
1600	6.5	2.2	4.8	13.5
1650	5.2	2.1	4.4	11.7
1700	6.7	2.1	4.8	13.6

Sources: Pinto 1996 for 1450; Pinto 1996 and Sonnino 1996 for 1550; Sonnino 1996 for 1600 to 1700.

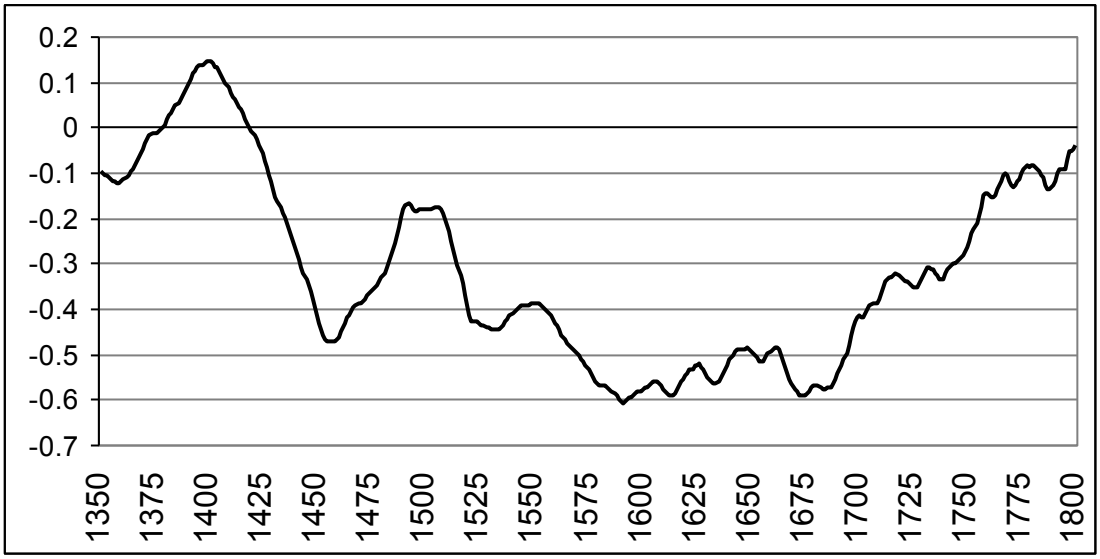
The high population density reached by Italy around 1580 and maintained up until 1629 corresponds to a multi-secular maximum of about 14 million people, which had been reached just twice in the past—at the time of the late Roman Empire, and immediately before the Black Death (Lo Cascio and Malanima 2005). Every time it was reached, it was also quickly lost, due to severe epidemic crises. Elsewhere, I suggested that this high level of population corresponds to the long-term maximum carrying capacity of the Italian demographic system (Alfani 2013c). From this perspective, we can provide a typically "malthusian" interpretation of the exceptionally severe famines of the 1590s and 1620s. While famine was not able to solve the problem of overpopulation (or, more precisely, of a difficult and strained relationship between population and resources), it signalled that the advanced Italian economies were facing a problem that they could not solve in the short term. While a "solution", of a sort, would be provided by the seventeenth-century plagues, the Italian economic actors had indeed tried to find the means by which to feed a larger number of people, investing in new crops and extremely advanced new forms of cultivation (Alfani 2010; 2013a; 2013c). This process, which required many decades to be completed, explains why, when the recovery after the seventeenth-century plagues had finished, the Italian population could exceed, for the first time, limits to growth that had constrained it from Antiquity. I will return to agrarian innovation in the concluding section, as this is a key aspect to consider in order to understand how advanced societies, and possibly also less-advanced ones, reacted to a perceived strain on the available resources.

As I have shown, overall the frequency in the occurrence of famines seems to be related to levels of population and rates of demographic growth. However, a high population density does not, per se, 'cause' a famine. For a crisis to occur, something must trigger it; in the case of food crises, this is usually a turn of weather particularly unfavourable to crops, especially if this happens over some consecutive years. If one considers climate and weather in the 1400-1700 period, it is imperative to mention the theory of the Little Ice Age. According to this theory, which early on attracted the interest of distinguished economic historians like Emmanuel Le Roy Ladurie (1967), the Early Modern Age saw a period of cold climate (the Little Ice Age), which followed a quite hot Middle Ages (the Medieval Warming Period).

The theory of the Little Ice Age has been questioned and, according to some, it is simply false as what occurred is no more than a modest cooling of the northern hemisphere (Crowley and Lowery 2000). However, most scholars accept the idea that a Little Ice Age did indeed occur and, even if its start and end are debated (see Alfani 2010 for a brief discussion), all the different reconstructions suggest that temperatures reached a minimum in the second half of the sixteenth

century. This is also the case of the most recent attempt at reconstructing long-term trends in global temperatures (Loehle and McCulloch 2008), to which Graph 3 refers.

Graph 3. Reconstructed global temperature anomalies, 1350-1800 (measured in Celsius degrees of variation from the 16-1935 average)

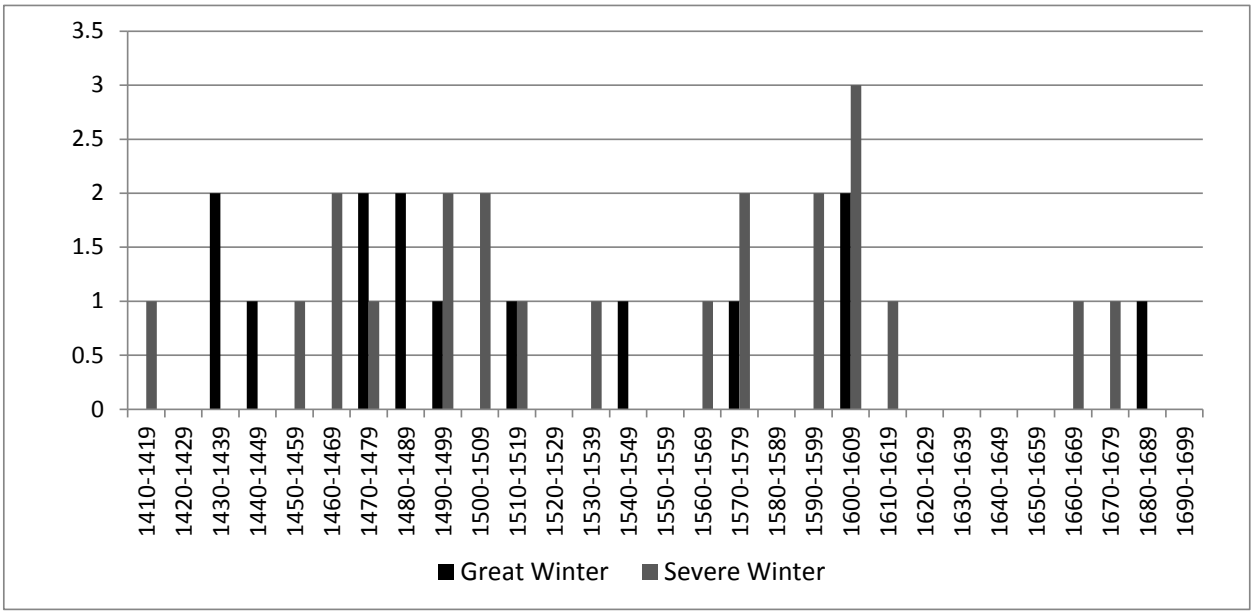


Sources: Elaboration based on data by Loehle and Mc Culloch (2008); data downloadable from http://www.econ.ohio-state.edu/jhm/AGW/Loehle/.

Notes: "Anomalies" are defined as divergences of 29-year mobile averages from the mean 16AD to 1935AD; see Loehle and Mc Culloch (2008) for further details.

As suggested by the graph, temperatures dropped during the fifteenth century, recovered at the beginning of the sixteenth, then around 1550 a final phase of decline began, which brought temperatures to a minimum in 1591—that is, at the peak of the terrible famine striking the Italian peninsula. Afterwards, temperatures recovered slowly throughout the seventeenth century, even if a short-period minimum was reached again in the last quarter of the century; during the following century instead temperatures rose steadily. This general trend finds confirmation in other data, for example that related to the occurrence of particularly severe winters, originally published by Camuffo and Enzi (1992) and presented in Graph 4.

Graph 4. Severe Winter conditions in Northern Italy, 1410-1699



Sources: My elaboration based on data published by Camuffo and Enzi (1992).

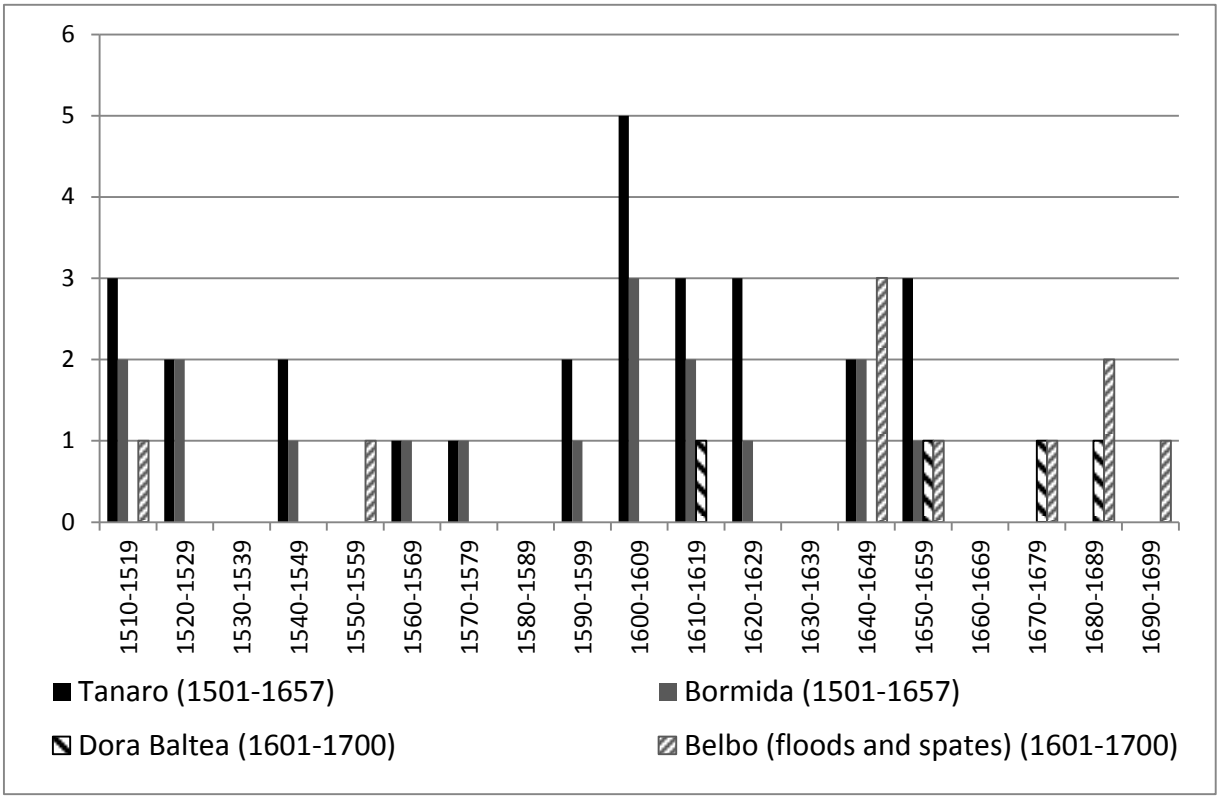
Notes: Winters were classified on the basis of their effects: "A 'Great Winter' was defined when the cold was particularly severe and lasted for a relatively long time over a large area, i.e. when reliable and widespread descriptions of large bodies of water (e.g. great rivers, Venetian lagoon) froze over and ice supporting people were found. (...) A 'severe winter' was defined when the cold was severe but lasted only a few days, causing the death of animals or plants but not the complete freezing of large water bodies" (Camuffo and Enzi, 1992, 149).

The graph shows clearly that the beginning of the cooling phase of the fifteenth century was introduced by a series of very severe winters, especially after 1450. The drop in temperatures characterizing the sixteenth century worldwide is confirmed in our area by the frequency of exceptionally cold temperatures. The end of the cooling phase during the seventeenth century is confirmed by the less-common occurrence of severe winter conditions. The occurrence of exceptionally cold winters, however, is not per se the signal of particularly low yearly average temperatures. It should be taken as a sign of climatic instability, or of a changing climate pattern, and not as a proxy for temperatures across the year (Camuffo and Enzi 1992). In fact, other information confirms that in Italy as well, and together with the general picture presented in Graph 3, a minimum in average temperatures was reached in the final decades of the sixteenth century; for example, this is what is suggested by the periods of expansion of the Alpine ice fields (Le Roy Ladurie 2004, 184-190).

Wheat and other grain, however, are able to survive very different temperatures, including relatively cold ones (from –14°C to more than 43°C). The real problem, then, was not really the

decline in temperatures occurring in the Early Modern period, but the risk of wet seasons unfavourable to key crops. The information available about river floods and spates, episodes indicative of heavy rain, suggests clearly that in the last quarter of the sixteenth century weather instability was on the rise, a condition that would continue during the first decades of the following century. In Graph 5, some of the available flood time series are charted. As shall be seen in the next section, the occurrence of the 1590s catastrophic famine (as well as of many others) is closely connected to the occurrence of weather conditions particularly unfavourable to wheat and, generally, we can accept Bruce Campbell's statement that "[the most notable famines] can have been the product of no ordinary runs of adverse weather. Instead, each was almost certainly the outcome of some abnormal and extreme short-term climatic perturbation" (Campbell 2009, 10).

Graph. 5. River floods in Northern Italy, 1510-1699



Sources: My elaboration based on data published by Pavese *et al.* (1992) for Tanaro, Bormida, and Belbo. I personally reconstructed the time series of Dora Baltea from archival data preserved in the Ivrea City Archive.

The available data about climate, weather, and exceptional environmental conditions is discussed elsewhere in much greater detail, and for a longer time period (Alfani 2010). What must be stressed here is that it was not simply the occurrence of bad weather that produced the worst

famines, but the fact that this happened at a time when the carrying capacity of a demographic-environmental system had been reached, or at least at a time when the relationship between population and food resources was fragile. Also the combination of these two factors, however, is not sufficient to explain the occurrence of a severe famine. A third circumstance must occur, that is, that markets and/or public institutions are unable to provide effective answers to a long-lasting shortage of foodstuffs. This is what happened, even in advanced economies, at the time of the longest and most widespread famines—among which we surely must include that of the 1590s.

2. Advanced (pre-modern) economies facing famine: The case of the 1590s

The famine of the 1590s was introduced by the heavy rain that, during the autumn of 1589, ravaged many parts of Italy, with floods occurring in Campania and Tuscany, as well as in the city of Rome. This was just the beginning of a long period of climatic instability: in Spring 1590 there was heavy rain in Emilia and Lombardy, and storms and floods in the mainland domains of the Republic of Venice (Davidson 1985; Basini 1970; Corradi 1973). Soon, the bad weather led to the spread of grain diseases such as wheat rust, which further damaged the harvest (Alfani 2013a; Aymard 1973; Ferrarese 2010).

Already by 1590, in much of Italy it was clear that crops would be extremely poor. Also, it quickly became clear that the famine covered an exceptionally vast geographical area, and that obtaining grain from abroad would prove difficult. It was not until the following year, though, that the real crisis exploded. In fact, the harvest was no better than that of 1590, and what's more, reserve stocks had run out throughout the Italian peninsula. In a dramatic escalation, the situation further deteriorated in 1592, when after three years the harvest amounted overall to what was normally obtained in just one "normal" year. In 1593, the crops were still suboptimal and some parts of Italy continued to suffer, but generally the situation had changed and the availability of foodstuffs, particularly grain, had markedly improved.

I provide elsewhere a detailed description and an overall interpretation of the characteristics and the inherent dynamics of the 1590s famine (Alfani 2011; 2013a; 2013c), which can be considered part of a "European crisis" of the 1590s that, however, in other parts of the continent peaked in 1596 (Clark 1985; Alfani and Ó Gráda 2016). I refer to these other publications for a general account, while here I will follow a case-by-case approach, providing narratives about how some of the most economically and socially advanced states of the peninsula reacted to this famine, which was a real test for them—and finally resulted in "a «system shock» affecting

demographic, social and economic structures: a shock that occurred when the crisis continued beyond expectations, causing the depletion of all reserves stored by individuals and food provision institutions and authorities, thus leading to the final failure of the institutions themselves" (Alfani 2011, 28).

The narratives relate to the Republic of Genoa and the Duchy of Ferrara. Other narratives will be added in future versions of this paper.

The Republic of Genoa

Even in normal years, the Republic of Genoa had to manage a serious deficit of foodstuffs, particularly grain, of which it was able to produce just about 40% of what it needed at the beginning of the early modern period (Grendi 1970, 113). This was partly due to the morphology of the territory subject to the Republic, which was mostly mountainous or hilly and not well suited to crops of grain. For many centuries, the Republic had amply compensated this deficit with imports of grain from the areas surrounding the Black Sea, where it also had colonies and controlled vast lands. In other words, from very early times the Republic, and particularly the city of Genoa, was an exemplary case of excellent integration in the Mediterranean international grain market[5].

During the fifteenth and sixteenth century, however, the Ottoman empire's expansion westwards had drastically reduced and, at a certain point, completely interrupted the traditional flow of grain from the Black Sea, a problem that was not typically Genoese, but affected Italy as a whole. Also during the sixteenth century, the Genoese economic elites lost part of their interest in the sea trades and focused instead on financial services, where they were consolidating a Europe-wide leadership (Costantini 1978, 166-7). Whatever the reasons, it is clear that, when the famine struck, the Republic could not rely on its traditional Black Sea routes. Neither could it rely on imports from Sicily or other grain-exporting areas of south Italy, as they were also badly affected by the famine (Aymard 1975; Del Panta 1980, 144-150). Even if it could make relatively ample use of rustic crops and arboreal crops like chestnuts and olives, which were more resistant than wheat to the meteorological adversities of the 1590s (Alfani 2007; 2013a),

[5] The import of grain from the Italian regions surrounding the Republic (and particularly from Piedmont, Lombardy, and Emilia) through land routes crossing the Apennines, although non-negligible, covered a minority share of Genoa's needs. See Grendi 1986, 1027.

the systematic alimentary deficit of the Republic resulted initially in an extreme shortage, on a scale comparable to that of other Italian states[6].

One point that must be stressed is that even in a rich state with easy access to the sea and a sound (if somewhat tarnished) tradition of a long-distance grain trade, the famine's occurring could not be avoided. In the short run, then, not even in Genoa was the 1590s famine a distributive problem but instead a production problem, as all the areas from which grain could have quickly been imported were also experiencing harvest failures and did not have much grain to spare. Admittedly, grain could have been imported from farther away (the Baltic) but this required time to reach agreements, establish trade routes and physically transport the foodstuffs. A couple of years into the crisis, the Republic was able to do just that, but significantly, this was accomplished only thanks to action of the institutions and heavy investments of public money, and not by means of private initiatives (if not for a small part).

Genoa had its own *Magistrato dell'Abbondanza* ("Magistrate of the Abundance") from 1564 (an *Ufficio delle Vettovaglie*, or "Office for Victuals", had existed from the fourteenth century; see Grendi 1970, 143). The main task of this institution was to guarantee the city's provision of grain suitable for bread-making, which also implied keeping an emergency stock of grain (Grendi 1971, 25). In 1588 a similar institution was introduced for wine (the *Provvisori del Vino*), and this was possibly already the consequence of a perceived difficulty in guaranteeing an adequate provisioning to a growing city. Surely the famine of the 1590s favoured the introduction, in 1593, of another institution for oil provisioning (the *Provvisori dell'Olio*) (Massa 2000). Differently from grain, in normal years the Republic produced a surplus of wine and especially oil, which were exported, but in times of famine the *Provvisori* were also under pressure to prevent these foodstuffs from leaving the State, and specifically to keep the city of Genoa well-provisioned with both (Grendi 1986, 1023-1027).

During the crisis, the *Magistrato dell'Abbondanza* played a particularly significant role, working closely with the Senate. Already in 1590, the Senate had guaranteed free port rights (*portofranco*) to all ships bringing foodstuffs to the city of Genoa. This move brought little relief as the geographic extension of the food crisis implied that there was no grain to bring to Genoa. However, the following year the Senate renewed the free port decree, and even extended it to the rest of the harbours of the Republic. The decree was then renewed for the third year in a row, but was never very effective (Costantini 1978; Kirk 2001).

[6] See the graph published in Alfani 2013a, p. 161, where the region Liguria (most of which belonged to the Republic of Genoa) is compared to the other northern Italian regions.

Theoretically, free port should have provided a considerable incentive to private freight to bring grain to the Republic of Genoa. In normal times, this strategy had been very effective in favouring the development of new ports, such as Leghorn in Tuscany, and in the seventeenth century free port would become a key component of a long-term strategy of protecting the role of Genoa as a trading port, a role that was increasingly challenged by Leghorn itself (Kirk 2001). However, the fact that the harvest failures covered an exceptionally large area, coupled with the fact that the traditional trade routes could not be used to provision Genoa, implied that the private sector per se, even in conditions of (for the time) excellent market integration and access to information, was unable to solve what was not a distribution problem, but primarily a production one.

In December 1592, at last, grain came to Genoa, and in increasing quantities. According to a chronicle by Antonio Roccatagliata, on 18 January 1592 alone, 130 ships filled with grain entered the port of Genoa (cited in Kirk 2001, 7). Supply of grain to Genoa continued to be steady in the following months, even causing some problems due to the inadequate size of the existing grain deposits, a problem that was temporarily solved by stocking large quantities of grain in the Lazzaretto (the plague ward), in some convents and monasteries, even in private houses, etc. (Piccinno 2004, 21). Huge profits were obtained by reselling part of this grain to other Italian regions (Grendi 1971; Costantini 1978). This impressive outcome, however, was the result of public action, as the Genoese institutions had themselves dispatched merchant missions to the Baltic with the task of placing orders of grain. In doing so, the *Magistrato dell'Abbondanza* had actually exceeded its statutory authority, a fact that raised some eyebrows in the private sector, which feared competition from the public sector (Grendi 1971, 25). Admittedly, to place its orders the magistrate had secured the help of the Genoese community residing in Anversa, as well as of the northern European merchants based in Genoa itself. The Genoese institutions, however, rented ships for this trade with public money and activated the Genoese diplomats to obtain passports from England and Spain in order to safely bring back the cargo (Spain was particularly interested in providing safe passage to the Genoese, as it hoped to provision from Genoa its own Italian domains: the State of Milan and the Kingdom of Naples; see Kirk 2001, 7). Private ships joined the convoy, attracted by the possibility of making good profits in the starving Republic, but the convoy itself had a decidedly "public" character. Furthermore, the decision of the *Magistrato dell'Abbondanza* to "*andare appresso alla navigazione*" ("be involved directly in the sea trade", cit. in Grendi 1971, 25) helped establish a provisioning route from Northern Europe that was, for Genoa at least, entirely new. In the

following years, private economic actors would consolidate and even expand this route, but they had not created it themselves[7].

Duchy of Ferrara

While not entirely land-locked, the Duchy of Ferrara did not have anything similar to the privileged access to the Mediterranean sea routes and markets enjoyed by the Republic of Genoa. Placed under the rule of the Este family, this small but important and very rich state would suffer, a few years after the famine, from a dynastic crisis that led in 1598 to the loss of the capital city, Ferrara, which its feudal lord (the Pope) reclaimed together with its *contado*. The Este, under the rule of Cesare (the natural son of Alfonso I of Este and nephew of Alfonso II), moved their court to the city of Modena. For this city, a classic study of food production and provisioning in the early modern period is available, by Basini (1970). Furthermore, detailed studies of the consequences of famine in nearby rural towns are available, particularly Finale (Cattini 1977) and Nonantola (Alfani 2011). This is why the area is an excellent example of how public and private actors reacted to the famine, beginning with a situation of particularly severe scarcity of food, and particularly complicated access to the main sea routes.

According to a *relazione* (an official report) of the governor of Modena dated 1557, in that year the crop of grain was particularly good—but this fact notwithstanding, the city and its *contado* were unable to reach alimentary self-sufficiency. In fact, the governor explained, in a normal year Modena received from its territory just about two-thirds of its global needs of grain (56,000-64,000 *stara*[8] of grain out of an estimated need of 96,000 to feed a population of about 18,000 "mouths". The governor's estimate can be considered correct on the grounds of other available sources. Basini 1970, 49-50; 58). The city, then, was well-used to returning to markets to compensate for its deficit in food production, importing grain from the most fertile areas of Emilia or from Lombardy while at the same time forbidding, including in years of good crops, any export of grain produced in the Modenese territory, which instead had to be delivered to the city (Basini 1970, 26-27).

Given the tight food balance run by Modena, it is no wonder that in 1590 the news about the terrible crops to be expected caused considerable alarm to the city authorities. Another *relazione* of the governor addressed to the Este dukes, from July 1590, estimates the crop of grain to be

[7] The initiatives of many Italian public authorities during the famine (not only the Genoese but also, for example, those of the Grand-Duchy of Tuscany), who actively sought the Baltic grain, helped strengthen the presence of Nordic traders in the Italian ports; about this process, see for example Braudel, Romano 1951, or Grendi 1971.

[8] One *staro* was equal to a volume of 63.25 liters.

just one-third of what was harvested in 1589 (Basini 1970, 67-68). Even if the latter was particularly good, we can deduce that in 1590 the Modenese territory produced no more than 27% to 30% of the grain needed by the city. This circumstance was not that exceptional or particularly alarming per se, but it became a promise of a catastrophic shortage when considering that the geographical extension of the crop failure made it impossible to count on the usual areas of production to import grain. Of this fact the Modenese food provisioning authorities (such as the *Impresa Formentaria*), so well trained in managing and monitoring food deficits, became immediately aware. They also came to realize that private economic actors could not be trusted with provisioning the city in acceptable ways during the crisis—they did not have the diplomatic clout, the willingness to take risks, and possibly not even the knowledge of the conditions of the international markets to do this. While a rich city, Modena was not a merchants' capital like Genoa and in fact, when later on during the crisis it was needed to secure letters of credit accepted in Florence, Venice, and Naples, food provisioning officials noted gloomily that getting them was difficult as "here [in Modena] there are no merchants having trades and friendship with those places"[9]. Finally, the private sector might also have lacked the financial means to fund what quickly became a very expensive enterprise (see later). Already in early August 1590, then, the city authorities sent agents to Milan, the greatest food market in northern Italy, but with little success—almost no wheat was to be found, and both lesser grain, such as millet, and rice were scarce. Immediately after receiving this news, other agents were sent to the Duchy of Mantua and to Tuscany, both reachable from Modena by means of land routes, as well as to farther-flung areas like Apulia and Sicily. Even in the traditional grain-exporting areas of southern Italy, though, finding grain was very difficult—as it will be remembered, these areas were affected by crop failures as bad as those occurring in the North.

Other circumstances made importing grain from overseas particularly difficult for Modena as well as for the other cities of the Duchy of Ferrara. During the famine years, in fact, navigating the Adriatic sea became particularly perilous for the Ferrarese ships, due to the presence of Venetian "pirates" ready to intercept any shipment of foodstuffs (Basini 1970, 69). The Duchy of Ferrara was definitely no great naval power, while Venice undoubtedly was. This is a fact whose importance cannot be understated as, during a famine as severe as that of the 1590s, one which affected all the Italian states including its merchant republics, a lesser power like Ferrara, even if it had some access to the sea, could become, for all intents and purposes, land-locked, at least as far as the grain trade was concerned. Compared to the Republic of Genoa, which at the end of the

[9] State archive of Modena, Annona I, filza 56, August 1590 (cited in Basini 1970, 69).

sixteenth century was still a not-insignificant naval power in the Mediterranean and also had the diplomatic influence necessary to obtain passports for its shipments of grain from rising European nations like Spain and England, the Duchy of Este in general and the city of Modena in particular had a significantly smaller set of options to choose from.

All such options were very expensive ones. From very early on (July 1590) the governor of Modena realized that it was necessary to invest public money in order to ensure adequate provisioning. He estimated the immediate financial needs of the city at around 50,000 gold *scudi*, of which 20,000 to 25,000 could be borrowed by the city, 5,000 to 10,000 could come from emergency funds such as the *Formentaria*, and 25,000, which is half of the total, could be asked directly of the Duke of Este as an exceptional loan (Basini 1970, 68). As can be seen, this early estimate already required making ample use of "emergency finance" instruments. As soon as the city delegates and ambassadors had verified the availability of foodstuffs and the prices asked for the little that was available, though, the estimate was revealed to be too optimistic and by far—already by September 1590 it was clear that the sums urgently needed were closer to 250,000 than 50,000 *scudi*. As the crisis continued one year after another, the expenses increased. It is possible to estimate that by 1593 Modena had spent the enormous sum of about 650,000 gold *scudi* for emergency food provisioning (Alfani 2013a, 58), and was left completely drained of gold and silver and deeply in debt, not only to the Duke, but also to religious institutions and wealthy individuals.

The point to underline here is not so much the deep damage done to the city finances by the famine (damage from which Modena recovered only thanks to new economic activities that flourished locally from the final decades of the sixteenth century, particularly the production of silk, wine, and spirits), but that the kind of action needed to overcome the crisis was public in nature and could not have been supplemented by private actors. First of all, a very large part of the funds used had come directly from the central authorities of the Duchy (including personally from Duke Alfonso II). Secondly, at the peak of the crisis the price paid became almost non-relevant, the real issue being finding significant amounts of grain; so for example in 1593 the city was pleading with the Duke to provide it directly with the physical amount of food it needed to survive, whatever the price (about the real meaning of grain prices in the acute phase of a famine, see Alfani 2011; 2013a). Thirdly, the grain brought to the city was distributed at a price well below what had been paid, or entirely free of charge, with a huge cumulative loss that no private actor would have any reason to accept. Only in this way could the city authorities not only preserve the lives of (most of) the local population, but also avoid violent rebellions.

The issues of the need for public authorities to create debt to manage the crisis, and of the rising violence and social disorder during the famine years, can also be considered from the point of view of the rural communities. Regarding the first point, a study of Finale Emilia, a rural town to the northeast of Modena, revealed how, during the crisis, the public deficit was not only the consequence of an increase in expenditures, but also of a decrease in revenues. In 1590, the *colta ordinaria*, the main tribute, fell by 14% compared to the previous year, and in 1591 by another 54.5% (Cattini 1977). As the revenues from the *colta ordinaria* were proportional to the real income of each household, these figures clearly underline how a harvest failure resulted not only in a shortage of food to be consumed but also of financial means to spend (both by the private and by the public, after taxation) on provisioning from outside the boundaries of the community. From the point of view of public balances, in times of high extraordinary expenditure the consequence was, in most Italian rural communities, a huge increase in the public deficit, with an accumulation of debt that had non-negligible consequences in the post-crisis years as well, being responsible, for example, for the sale of many communal assets in order to reduce it.

Generally speaking, as for rising violence in times of famine, here it will suffice to say that it was not limited to cities, whose population was prone to rebellions much feared by the local governments and institutions. It also involved rural areas, traversed during the famine by bands of desperate people and organized groups of bandits (Alfani 2013a). A study of the rural town of Nonantola, to the east of Modena, is illustrative of such a situation, which saw rural houses attacked at night by bandits looking for food (and ready to torture the peasants if they thought that some was hidden from them), increasing suspicion and hostility between neighbours, and generally the progressive breakdown of the traditional communitarian ties of solidarity and mutual help (Alfani 2011; 2013a). This was also a field in which public intervention was sorely needed but, as with public sale and distribution of food reserves, during a severe famine the cities were clearly favoured over the rural areas, which tended to become a kind of no man's land into which it was dangerous to venture without taking precautions—a fact that surely had also a further damaging impact on food production.

The narratives proposed exemplify the kinds of answers provided by the Italian governments and food provisioning authorities when faced with a serious famine. The policies implemented included tightened control over production of foodstuffs within the boundaries of the State (a production that they meant to reserve for national consumption); active "public" commercial strategies, aimed at importing grain from far-away markets, including some with which there

were no consolidated commercial ties; subsidies and fiscal help given to the affected communities; control over the distribution of grain within the communities themselves, including distribution of free rations (but also control over who was entitled to ask for those rations, and to reside within the city walls during the crisis: see Alfani 2009); increased control over unlawful or unethical behaviour, including smuggling, black marketing, hoarding, and cheating on quality and weight of foodstuffs (particularly of bread); etc.

This activism of the public institutions reflects the expectations of the local populations. The comment of a speaker (*relatore*) at the Genoese senate is the clear expression of a sentiment widespread throughout the peninsula: "The commoners of this city believe for a fact that the abundance and the unavailability of bread depends on the will of our *dogi*" (cit. in Grendi 1970, 143, my translation). Consequently, the population, especially that of the cities, was watchful of the activity of the government and the food provisioning institutions, and was ready to riot and create tumult if they became convinced that the city was not doing all it could, and should, have done to ensure the availability of food (Alfani 2013a; Guenzi 1982; 1995). As Alberto Guenzi rightly noted, "the credibility of government choices in the eyes of the population consisted of their ability to guarantee at any time the «right to bread»". (Guenzi 1984, 68, my translation).

The public authorities had much to fear, also in terms of personal safety, from the kind of violent revolts that could be the result of a food crisis perceived as "unmanaged" or badly managed so as to give rise to "injustice"; consequently, they were powerfully stimulated to act. But was that action truly needed? Or were the public actors, and particularly the food provisioning authorities, simply hindering the functioning of other, private institutions—the markets—that, if left free to operate, would have provided by themselves a solution to the food shortages, and in a quicker and more efficient way?

Answering this question involves some discussion of one crucial argument of debate in the historiography about famines: were famines the result of production problems, or of distribution problems? In other words, were they "natural", as Malthus (1798) had it, or were they the consequence of human actions? When neo-malthusian views were prevalent (from the 1950s to about the end of the 1970s), the tendency among historians was to consider them a production problem. Since Amartya Sen proposed his "entitlement approach" (Sen 1976; 1981), however, the pendulum has been swinging clearly towards the view that famines were (and are) chiefly the result of inefficient distribution, or more precisely, of non-generalized and overall inadequate entitlement to food resources. It is impossible here to analyze in detail the production vs. distribution debate, instead I refer to existing accounts (Alfani 2013a; Strangio 1998; 2012; Ó

Gráda 2009; Palermo 2012). I will note, though, that in international historiography the entitlement paradigm has become so prevalent that the burden of the proof lies squarely on the shoulders of those stressing the importance of production issues. Among scholars working on Italy, admittedly, the situation seems to be different and "malthusian" views are still widespread, even if many recent works explicitly adhere to the distribution/entitlement paradigm: see for example Palermo (1990) and Epstein (2001).

After decades of debate on the topic, it seems to me that there are no longer many reasons for perpetuating a clash between opposing paradigms. In fact, one can easily accept the idea that distribution is important and that men can "create" a famine, without rejecting the possibility that, in certain specific circumstances, a famine can essentially be the result of inadequate production, and not of inefficient distribution. After all, Cormac Ó Gráda recently defined famines as the consequence of "a shortage of food *or* purchasing power" (Ó Gráda 2009, 4, my emphasis). Starting with this consideration, we can go back to the issue of whether the management of a famine requires public action, or may simply be delegated to private actors operating in efficient markets. One first point to stress is that we should be very careful in implying the existence of "free" markets in the Late Medieval and Early Modern times (on this fundamental issue, see Hatcher and Bailey 2001, 63-65). One second point to stress is that even if we take the case of merchant cities, like Genoa, that were well integrated in the larger trade networks and used to manage food shortages by turning to the market, we discover that *not even in this case* when a particularly severe and long-lasting harvest failure occurred was the private sector, or the "market forces", able by themselves to provide an adequate solution.

Some of the Italian states analyzed here were among the most advanced areas of Europe. They can be taken, then, as representative of the way in which an advanced economy of the sixteenth or early seventeenth century reacted to a famine. This reaction basically implied a strong public action, and was not delegated to market forces—in fact, the public action became all the more decisive when market institutions had shown their failure to provide answers. One could argue that free port decrees, like that introduced by Genoa from 1590, were actually aimed at removing hindrances to the action of market forces, but in reality they were part of complex diplomatic and geopolitical strategies and were not generalized but related to specific ports—those towards which the state authorities intended to orientate trade. What's more, they were largely ineffective.

Conclusion: Agrarian innovation and the (quasi-)end of famine

The history of Italian famines in the years 1400-1700 suggests that the ability of a demo-economic system to produce foodstuffs is a key factor to consider when attempting to explain the occurrence of a famine, and even more so if the distribution of famines over time is considered. In fact, in the Italian experience during the Early Modern period, famines became more frequent as population density increased and severity peaked from the 1590s to the 1620s, when a long-term population maximum had been reached. At the same time, the case of Italy confirms that distribution is a key factor to consider to explain the overall development and the severity of specific events.

When severe famines did occur, the advanced Italian economies relied heavily on public intervention to provide effective answers. The action of governments and food provisioning authorities made up for the inability of market forces to bring food to starving States and communities, and also made up for the inadequate access to the food resources of much of the population (especially in the cities). The case studies related to two Italian states during the 1590s famine, the worst to affect the peninsula during the medieval and early modern times, demonstrate the huge variety of ways in which the public authorities tried to contain the crisis. At the same time, they suggest that during the worst famines not only a harvest failure occurred, but also a market failure and an institutional failure—as the unprecedented stress to which public institutions were subject during the crisis rarely gave rise to effective solutions (particularly if we measure them in terms of their universality). Elsewhere I suggest that all this is part of a more general "human failure" that also involved social behaviour, psychological factors, and culture (Alfani 2011, 29).

In the second half of the seventeenth century, after the terrible plagues that devastated most of the peninsula, famine became a markedly rarer event. This surely can be connected with the relatively low population density, a consequence of the plagues, but it is also true that the situation had changed for good, as the eighteenth century was less affected by famine than the two preceding centuries, although it experienced an intense demographic growth that finally allowed it to exceed population limits that until then had proved unbreakable. This was the result of another component of the reaction of advanced economies to famine and, more generally, to pressure on food resources: agrarian innovation.

Elsewhere I relied on interpretative models that try to combine Malthusian views with the demo-economic theories proposed by Ester Boserup (1965; 1981) to show how population pressure can stimulate continuously agrarian innovation (and consequently can bring about increasing food

production), but also how, in most of Early Modern Italy, this process tended to be too slow to avoid the periodic occurrence of crises (Alfani 2013a; 2013c). Here I will simply underline that, as the population pressure increased from the middle of the fifteenth century, we find both an increase in the frequency and the severity of famines, and an acceleration of that kind of agrarian innovation that allowed for the production of more calories per hectare. Suffice to say, the case of eastern Emilia, where the slow move from open fields to the *chiusura* ('enclosed field') and then the *piantata* ('planted field'), begun at the end of the fifteenth century and completed around 1620, meant sacrificing food variety in favour of a simple increase in calories produced (Cattini 1984), establishing a nutritional regime based on bread and wine, which made the population of Emilia even more dependent on cereal crops. As will be remembered from the narrative presented about the Duchy of Ferrara, this did not allow this area to fare particularly well during the 1590s famine (also see the case study of the region Emilia-Romagna in Alfani 2011).

The failure of Emilia in preventing a catastrophe like the 1590s famine is part of the overall short-term failure of the advanced Italian agriculture, which proved unable to feed a population that tended to exceed long-term limits to demographic growth. Even with the best and most innovative techniques, agrarian innovation could happen only slowly, while population, à la Malthus, was able to grow quickly. In much of Italy, most agrarian economic actors were aware of a growing tension between population and resources; those who were not had their eyes opened by the famine of the 1590s. In the decades that followed the famine, the introduction of new forms of irrigated agriculture, the expansion of rice, and most of all the spread of the cultivation of maize, provided the conditions for increased food security, as suggested by the relative scarcity of famine and dearth in the second half of the seventeenth century and, most notably, by the fact that for the first time, during the eighteenth century, the Italian population grew beyond the limits that had constrained it from the times of the Roman Empire (Alfani 2013c).

This (quasi-)victory over famine was obtained mostly thanks to economic decisions that originated in the private sector (albeit with crucial help from the public, especially with regard to the increased availability of water for irrigation, which required huge investments in digging canals and the direct intervention of state and local institutions). Investment in a more efficient and productive agriculture, then, can be considered one of the ways in which an advanced economy reacts to famine, meant as a "perceived risk". Also in this case, however, the focus is mostly on production, not on distribution. Producing for the market, and especially for the

foreign markets, was indeed one of the intentions of the Italian agrarian entrepreneurs who, especially in the North, flooded the territory with capital, not just water. But the kind of solution they ultimately adopted—growing rice in paddy fields surrounded by maize (rice being produced for the market and export; maize for local or self-consumption)—developed after the 1590s crisis to solve the problems that began with a *too* market-oriented agriculture that, at the end of the sixteenth century, had proved not to be fully compatible with the survival of one of the densest populations of Europe (Alfani 2013a; 2013c). The solution (a combination of paddy fields for rice with maize cultivation) meant squaring the circle: It provided goods in high demand from European markets (goods that, of course, in times of crisis could be consumed locally) but also resulted in a very significant increase in the average output of calories per hectare; as such, this solution was extremely "rational".

Population density is the last aspect deserving some comment. In fact, if we compare the behaviour of the Italian advanced economies with that of some other European economies, especially in the North-West—notably, England—we find very different strategies in trying to find a definitive solution to the issue of providing generalized food security to the inhabitants. In Italy, a choice was made favouring production and public controls. In England, from the seventeenth century (with some precedent in the sixteenth) a choice was made in favour of freer grain markets as the means to ensure better distribution; consequently the public institutions became less and less interventionist. In the medium-long term, both the Italian and the English strategies succeeded (although Italy never became as famine-free as England). I will conclude this paper asking a question that still requires an adequate answer. The question is not whether one strategy was better than the other (as the answer to this would be prone, I fear, to ideological debates), but whether the Italians *could* have followed a different path, or whether the English solution succeeded only because Early Modern England was still a relatively under-populated area, a fact that made it much easier to produce a food surplus compared to crowded Italy?

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