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Abstract

This article analyses wealth inequality in the territories of the Republic of Venice in mainland Italy during 1400-1800. The availability of a particularly large database of homogeneous local inequality measurements allows us to produce the most in-depth study of the determinants of inequality at the local level available so far for any preindustrial society. First, we explore the ability of economic development, population and the intensity of regressive taxation to explain overall inequality trends in the long run, arguing for a particularly strong impact of regressive taxation. Then, to explain inequality variation between communities, we introduce a full set of geo-morphological variables. Finally we explore the impact of the terrible 1630 plague, which killed 40% of the inhabitants of this area. Although the plague itself had only a limited egalitarian impact (if any), it was able to determine a structural break in the way in which some key variables affected inequality.

Keywords
Economic inequality; wealth concentration; poverty; middle ages; early modern period; plague; Black Death; Italy; Republic of Venice

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Recent years have seen a flourishing of studies on inequality in preindustrial times. It is increasingly clear that some of the most pressing questions about the factors shaping inequality trends can be answered only by taking a long-term perspective, or at the very least, looking at the long run changes significantly our perception of today inequalities (see for example Piketty 2014; Milanovic 2016; Scheidel 2017; Alfani 2020). The vast majority of new studies of preindustrial inequality has focused on laboriously collecting new archival data in order to produce reliable measures of inequality, and this collective effort has changed dramatically our ability to study inequality in the past. Most of this research has focused on Europe, where some countries have been the object of particular attention due to the exceptionally good documentation preserved in their archives, sometimes dating back to the fourteenth century. This is especially the case of Italy (Alfani 2015; 2017; Alfani and Ammannati 2017; Alfani and Di Tullio 2019), the Low Countries (Ryckbosch 2016; Alfani and Ryckbosch 2016) and Spain (Santiago-Caballero 2011; Fernández and Santiago-Caballero 2013; García-Montero 2015; Nicolini and Ramos Palencia 2016a; 2016b; Espín-Sánchez et al. 2019). However, we also have recent detailed studies of preindustrial inequality for Finland (Bengtsson et al. 2019), Germany (Wegge 2018; Alfani, Gierok and Schaff 2020), Poland (Malinowski and Van Zanden 2017), Portugal (Reis 2017), and Sweden (Bengtsson et al. 2017)[4].

While these studies have provided a general picture of long-term distributional developments in the areas they covered, or have made use of exceptionally good information for selected years or for given communities to assess general questions, only a few had the opportunity to collect information for a sample large enough to allow for a systematic analysis of the determinants of community-level inequality. The main exceptions are Alfani and Ammannati (2017) study of Tuscany during 1300-1800 and Nicolini and Ramos Palencia (2016a; 2016b) works on the Spanish province of Palencia around 1750. The largest existing database for any single European area, however, is the one introduced by Alfani and Di Tullio (2019) in their book on the Republic of Venice during 1400-1800. Alfani and Di Tullio used this information to reconstruct the general trends in wealth inequality in the Republic of Venice (see Section 1) and to formulate hypotheses about the factors leading inequality to grow continuously throughout the early modern period, but not to explore and to quantitatively assess the determinants of inequality at the local level. Such is the purpose of this article.

Indeed, while we can now glimpse the general picture regarding broad tendencies in inequality across preindustrial Europe (see Alfani 2020 for a synthesis) - although surely much remains to be done - there is a clear need for more detailed research, at least on selected areas. In fact, studies of this kind,

[4] Some recent studies have gone even further back in time, using archaeological data to study inequality in the Classical Age (Scheidel and Friesen 2009) or during prehistory (Kohler et al. 2017, Bogaard et al. 2019; Fochesato et al. 2019).

that could not be undertaken everywhere due to the paucity of surviving documentation, have the potential to illuminate new aspects, and to flesh out and to nuance significantly our understanding of the very nature of inequality in the past. Additionally, they offer the opportunity to test in a different context some recent hypotheses. For example, Milanovic (2017), based on a relatively large database of country-level measures of income inequality, has argued for a strong and negative empirical association between population density and inequality. This is highly relevant to current debates given that population growth, as well as economic growth, has to be counted among the "usual suspects" in attempts to explain inequality increases in preindustrial times (Alfani 2020) – but this view has not been supported by recent empirical analyses (Alfani and Ammannati 2016; Alfani and Di Tullio 2019; Milanovic 2017). The idea that population density could replace population *per se* in our interpretation of the determinants of relative inequality levels is quite appealing- but possible explanations for the mechanism at work remain highly hypothetical and indeed, the correlation identified by Milanovic remains to be confirmed by further studies. Hence our database for the Republic of Venice allows us to test whether Milanovic's findings also stand for wealth inequality at the community level and to try and identify, in a controlled environment for which we have in-depth knowledge of the overall historical context, which are the most plausible underlying mechanisms and alternative explanations.

Beyond population density, our database offers the unique opportunity of exploring a much broader range of potential determinants of local inequality levels. This is because, compared to other areas (like the Low Countries: see Ryckbosch 2016) where econometric analysis could be performed only on cities given the scarcity of good-quality information for the countryside, our database includes, beyond three major cities, a large number of rural communities. This allows us to explore whether geo-morphological variables (altitude, ruggedness, distance from the closest city or from the capital…) affected local inequality levels, for example by inducing different landownership patterns, or whether different crop regimes (themselves reflecting physical characteristics of the terrain, as well as historical developments like the spread of new American crops) played a similar role. These analyses are performed in Section 2, while Section 3 provides an overall discussion.

1. Data and historical context

For many centuries, the Republic of Venice was one of the economic superpowers of preindustrial Europe and of the broader Mediterranean area, a position matched by its commercial and military dominance over sea routes. According to the classic reconstruction of Braudel (1984), after the Black Death of 1348 the city of Venice became the very centre of the European and Mediterranean economy. Yet, during the period covered by this article, Venice lost its primacy and even became, by the eighteenth century, an economic backwater. Without doubt the position of Venice was compromised by the opening of the Atlantic trade routes during the sixteenth century, as well as by the end of its expansionist ambitions in Italy after the devastating defeat at Agnadello (1509) during the Italian Wars (1494-1559) (Alfani 2013a) and by the growing hostility of the Ottoman Empire in the Mediterranean and the Levant. However, the exact timing and the extent of the Venetian economic decline remain uncertain. Many historians – mostly Italian – have introduced the notion of "relative decline" to describe the fortunes of Italy during the seventeenth century (Sella 1997; D'Amico 2004; Lanaro 2006), arguing that economic growth continued, especially in the countryside and at the cost of a painful restructuring of urban economies. Others have tried to identify the onset of relative decline – which is in fact the onset of the European "Little Divergence" (Van Zanden 2009; Alfani and Ryckbosch 2016). On this point, recent literature remains divided. While some argue for a relatively early origin of at least the roots of divergence, from the sixteenth century or even from the Middle Ages (Fochesato 2018), others have noticed that by the late sixteenth-early seventeenth century at least some of the most advanced Italian economies were still very healthy and competitive (Alfani 2013a). This would be the case of the Republic of Venice, where relative decline seems to begin for good only from the mid-seventeenth century. A crucial role was probably played by the devastating plague of 1629-30, which killed about 35% of the population of the affected areas of North Italy and up to 40% in the *Terraferma* (the Venetian domains in the Italian mainland). This localized catastrophe (plague affected much less North Europe than the South during the seventeenth century, acting as a possible factor of divergence unto itself: Alfani 2013b) was hugely instrumental in precipitating the situation[5], especially considering that soon after the plague Venice had to face

[5] Consider for example the impact of the plague on the crucial textile sector. The production of woollen cloth disappeared completely in the city of Verona and suffered lasting damage in Bassano and Treviso. Production of woollen cloth suffered in Venice as well, where additionally the silk sector, which had been booming until 1630, went through its first crisis ever (Panciera 1996). Admittedly, part of the production of woollen cloth moved from the city to the country (Demo 2013, 302) and the silk sector resumed growing in the second half of the seventeenth century, especially in cities of the western *Terraferma* like Bergamo and Brescia (Mocarelli 2006, 323-4). Additionally, the decline of textile production was partly compensated for by growth in other sectors, for example glass beads (Trivellato 2006). However, the fact remains that "[After the plague] the deconstructing of urban industry was an obstacle to recovery" (Lanaro 2006, 49) and the plague-induced damage suffered by the urban economies was not without enduring consequences for the whole system (Alfani and Percoco 2019), as even the agrarian sector suffered decades of stagnation after the plague (Knapton 1995, 429).

another crisis, the War of Candia (1645-69) against the Ottomans. The long war (which Venice finally lost) ruined public finances and compromised what was left of the Venetian economic interests in the Levant and the East Mediterranean area (Alfani and Di Tullio 2019; Alfani and Percoco 2019).

It would be impossible to provide here a fuller account of the fascinating economic history of the Republic of Venice, for which we refer to recent encompassing studies (for example, Fusaro 2015; Alfani and Di Tullio 2019). We will focus instead on an aspect of direct relevance to this article: the general inequality trends in the Republic of Venice. In particular, Alfani and Di Tullio (2019) have reconstructed long-term trends in wealth inequality across the *Terraferma*, applying to information collected from Venetian archives a method introduced by Alfani (2015) to reconstruct distributions representative of broad territorial aggregates. Unfortunately, it would be impossible to produce a similar reconstruction for income inequality as well, due to the lack of the sources needed. However, as argued for example by Peter Lindert (1991, 215; 2014, 8), as in preindustrial societies land was usually the main source of income for the vast majority of the population, in this specific context it might also offer useful insights into tendencies in income inequality.

Figure 1 provides an overview of the overall trends in wealth inequality in the Venetian mainland. After a phase of stagnation in inequality during the fifteenth century (which might be the last phase of some post-Black Death levelling: compare Scheidel 2017; Alfani and Murphy 2017; Alfani 2020), wealth inequality started to grow: monotonically if we look at the Republic of Venice as a whole, almost so if we only consider cities. This overall tendency could not be easily explained by looking simply at population growth or at economic growth, which tend to be the first variables considered by the literature on preindustrial inequality since the seminal article by Van Zanden (1995) on the Dutch Republic. Indeed the population of Venice and the *Terraferma*, after having grown from the fifteenth to the mid-sixteenth century, thereafter entered a phase of stagnation until it was drastically curtailed by the plague. From a level of 1.8 million reached before 1630, population fell to about 1.1-1.2 million in the immediate post-plague years, after which it started to grow at a quick pace (based on Zannini 2010, 144 with integrations from Alfani and Di Tullio 2019 and Alfani and Percoco 2019). However, this huge wave of demographic collapse and recovery did not leave a dent in the overall tendencies reported in Figure 1.

Economic growth, which we can proxy by urbanization rates in the absence of other country-specific relevant measures, does an even poorer job than overall population in predicting inequality changes. Indeed, the trend in urbanization rates reflects closely the picture of late onset of relative decline in the Republic of Venice, as well as of economic stagnation during the eighteenth century. Urbanization rates, which had reached very high levels in the decades before the 1630 plague (23-24% for cities >5,000), collapsed to about 15% after the plague, but never fully recovered: it had grown just to

18.2% by 1700, stagnating thereafter (18.4% in 1800) (Alfani and Di Tullio 2019, 141, 190; Alfani and Percoco 2019).

Recently, a different explanation for early modern inequality growth has been proposed: increases in per-capita taxation in the presence of a regressive fiscal system (Alfani 2015; Alfani and Ryckbosch 2016). The regressive nature of the fiscal system used in the Venetian *Terraferma* has been described in detail by Alfani and Di Tullio (2019), and "was the consequence of a regime of systematic privilege, enrooted in law and institutions as well as in a culture that favoured nobles over commoners, citizens over rural dwellers, and so on" (Alfani 2019, 1198). This system did not change much from the sixteenth century until the end of the Republic in 1797. What changed, quite considerably, was the per-capita fiscal pressure imposed by the central state. Around 1550-70, per-capita fiscal pressure in the Republic of Venice was very high for contemporary European standards: if measured in daily wages of labourers in the construction industry, it was 6.2 compared to 4.7 in the Dutch Republic and 2.8 in England. It grew further in the following decades, by +16% until the eve of the 1630 plague, and (exactly as inequality) it did not stop increasing thereafter (+46% between 1620-29 and 1760-80) (Alfani and Di Tullio 2019, 146-7). In many European countries, including the Dutch Republic, England and France, growth in per-capita taxation during the same period was much more intense. Increasing per-capita taxation is a crucial feature of the rise of the fiscal-military state and indeed, the main reason for collecting more and more resources was meeting the growing cost of warfare and of servicing the public debt, which itself had been cumulated mostly because of war, while social spending was a negligible component of state expenditure. This means that not only the state increased inequality by (regressively) taxing more, it also failed to reduce inequality through public expenditure: exactly the opposite situation compared to what is today common in western countries, where taxation is progressive and welfare and social spending represent the largest component of the public budget. Therefore it has been concluded that "the increase in the per capita fiscal burden is a feature of early modern Europe way more homogeneous and continuous in time than any other factor which has been proposed by earlier research as the possible cause of the widespread tendency for inequality to grow. Consequently, we have identified a common factor that surely favored the increase in economic disparities across the continent" (Alfani and Di Tullio 2019, 178-179). In our regression analyses per-capita taxation will be included, side by side with population and inequality, as one of three potential macro-level causes of inequality change.

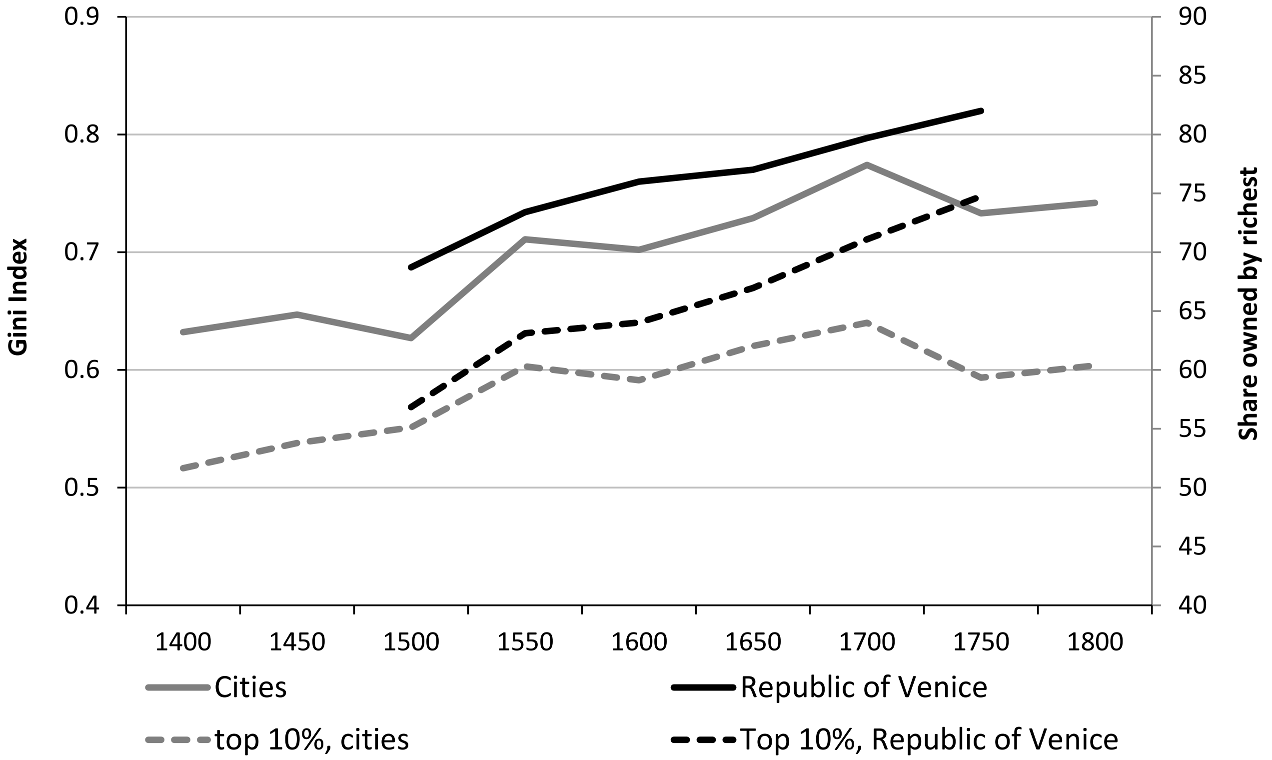

Figure 1. Wealth inequality in the Republic of Venice, 1400-1750 (Gini indexes and share of the richest 10%)

Before proceeding, we need to provide some information about the data we use. The database of inequality measures (our dependent variable) has been produced based on the ancient *estimi*, or property tax records, of the Venetian *Terraferma*. These sources provide information about the taxable wealth owned by each household. They always include real estate (lands and buildings), which was by far the main component of wealth in preindustrial rural societies, and in the period that we cover had very similar characteristics across the *Terraferma* so that the information that we use is homogeneous across observations. A detailed description of these sources is provided elsewhere (Alfani and Di Tullio 2019). Here it will suffice to note that sources entirely analogous to the *estimi* exist for many other European areas, especially in the South, and have already been used to study long-term trends in wealth inequality in different parts of Italy, in Germany, southern France, and north-eastern Spain. The main drawback of these sources is that they do not include the propertyless (defined as those having no taxable wealth whatsoever). These, however, were just a small percentage of all households (usually 3-7%), as even tiny properties were recorded, like a small orchard or a fraction of vineyard, hence their absence leads to only a slight distortion in inequality measures (see Alfani 2020 for further discussion). We perform our analyses on two alternative measures: the Gini index and the wealth share of the richest 10%.

We use information for three distinct provinces of the *Terraferma*: from west to east, Bergamo, Verona and Padua. Beyond the three capital cities of each province, we have information about a range of rural communities. For the province of Padua, our information covers the entire province, which is quite unique for this period – although here, the information for rural areas refers to groups of communities called either *podesterie* or *vicarie* (*podesterie* in the following). Overall, we use data for three cities, 13 rural communities (four in the province of Bergamo and nine in that of Verona), and 12 *podesterie*. The *podesterie*, being groups of communities, had a large population numbering in the thousands, but also the single rural communities in our database were relatively large, with in-between 200 and 2200 inhabitants according to the place and time. Figure 2 shows the geographic position of each city, rural community or *podesteria*. Note that Alfani and Di Tullio (2019) used some additional information for the provinces of Vicenza and Treviso, but as this is quite limited and much more fragmented compared to the other provinces, we decided to drop it in order to ensure greater coherence in the database.

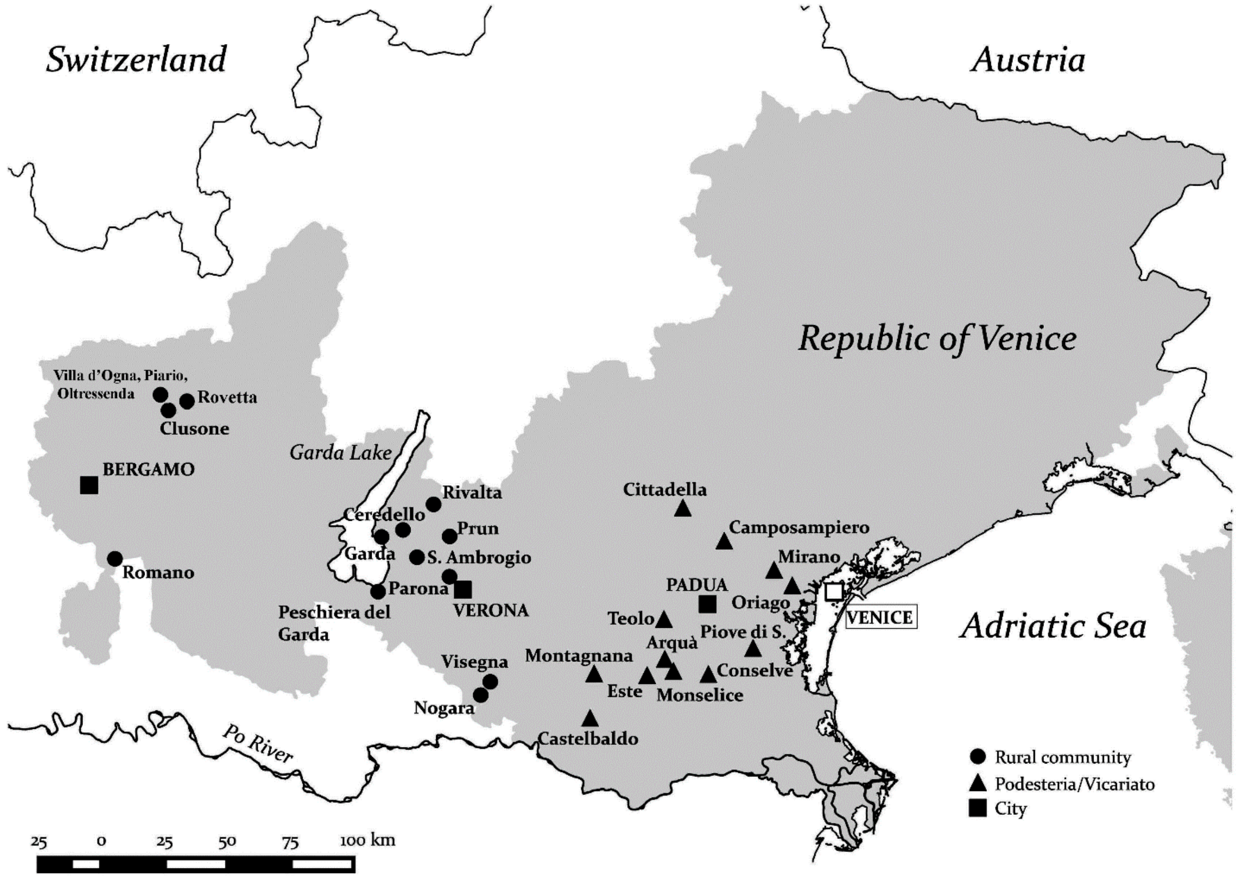

Figure 2. Territorial coverage of the database. Note: political boundaries of the Republic of Venice ca. 1560 (after the peace of Cateau-Cambrésis that ended the Italian Wars, the boundaries of the Republic remained basically unaltered until its end in 1797)

The *podesterie* cover rural areas and can be treated as rural communities. However, they present specific challenges when we need to measure some variables. Given the impossibility of distinguishing households belonging to each community comprised in a *podesteria*, we have to assign the same inequality value to the *podesteria* as a whole. Also population and population density are measured at the *podesteria* level. To measure population, we used all the information available from disparate historical sources and the literature (see Alfani and Di Tullio 2019) and we also produced additional estimates by distributing the total population of the province (excluding that of the city of Padua) proportionally to the number of households recorded in the *estimi* for each *podesteria*. For population density, we added up the size of the territory of all communities comprised in each *podesteria*, in today boundaries, which as far as we could check did not generally change much compared to the ancient boundaries. However, for other geo-morphological variables (altitude, ruggedness, distance from the main city, distance from Venice, suitability to maize and suitability to wheat) we divided the *podesterie* into their constituent communities, each being assigned the proper local values. So for example in the case of the *podesteria* of Castelbaldo, when introducing in the analyses geo-morphological variables we assigned to the three constituent communities (Castelbaldo, Masi and Piacenza d'Adige) the same values for inequality and population density, but different values for each of the geo-morphological variables listed above.[6] Note that our results are robust to the exclusion of the province of Padua: see next section and Appendix A. For the provinces of Bergamo and Verona collecting information about population and geo-morphological variables was simpler because inequality measures referred to specific communities and was not grouped into *podesterie*, and we used the same approach and sources as per the province of Padua.

2. Econometric analysis of the determinants of inequality

The relatively large availability of estimates of wealth inequality across centuries for a range of communities of the Republic of Venice allows us to construct a panel dataset to assess the role of different potential determinants of historical inequality. The dataset consists of 28 communities or *podesterie* (or of 130 communities, for the analyses in which the *podesterie* are broken down in their constituent communities: see Section 1) whose wealth inequality is observed, at best, every fifty years. Obviously, given the gaps in the archival sources, our panel dataset is unbalanced, as measures of wealth inequality are not always available for all communities and periods. Nevertheless, the information on the sources and the characteristics of the dataset (Alfani and Di Tullio 2019) suggest that the missing observations are random and eventually uncorrelated with the error component of our quantitative models.

Following the discussion introduced in the previous sections, we firstly test the potential macro-level determinants of inequality suggested in the literature: population, economic growth and per-capita taxation. We do so by setting up the following linear model

$$ineq_{it} = b_0 + b_1 * ln\_pop_{it} + b_2 * ln\_tax\_pc_t + b_3 * urb_t + u_{it} \qquad (1)$$

where $ineq_{it}$ is the measure of inequality (either the Gini coefficient or the top 10% share) in the community i at time t and ln_pop_{it} is the natural logarithm of the population of the community i at

[6] Information about ruggedness is an elaboration based on data from the Elevation Model at 75mt in ISTAT 2013; information about surface and altitude has been collected from ISTAT 2011.

time *t*. Both the natural logarithm of per-capita taxation, $ln\_tax\_pc_t$, and the urbanization rate, urb_t, refer to the whole *Terraferma* and only vary across time. In particular, for preindustrial societies urbanization growth might be considered a proxy for economic growth (Van Zanden 1995; Acemoglu et al. 2005). We also include a full set of century dummies in the estimation. Finally, u_{it} is the error term, and $b_0,\ldots,b_3$ are the coefficients to be estimated. Following the results in Milanovic (2017), we also estimate the model in eq. (1) using the natural logarithm of population density instead of the natural logarithm of population. We test the model with and without community effects, as shown in Table 1.

	GINI COEFFICIENT				TOP 10%			
	(1)	**(2)**	**(3)**	**(4)**	**(5)**	**(6)**	**(7)**	**(8)**
ln_pop_{it}	0.020*	-0.057	-	-	3.725***	-4.503	-	-
	(0.011)	(0.051)			(0.836)	(5.619)		
$ln\_pop\_density_{it}$	-	-	0.017*	-0.057	-	-	2.901***	-4.510
			(0.012)	(0.051)			(0.907)	(5.620)
ln percapita tax_t	0.029	0.277**	0.034	0.278***	-4.101	22.841*	-2.047	22.854*
	(0.116)	(0.128)	(0.109)	(0.129)	(13.288)	(15.743)	(11.771)	(15.746)
Urbanization $rate_t$	-0.005	-0.008	-0.005	-0.008	-0.379	-0.781	-0.397	0.781
	(0.007)	(0.007)	(0.006)	(0.007)	(0.943)	(0.888)	(0.840)	(0.889)
Constant	0.528***	0.743***	0.618***	0.491***	37.443**	59.617*	53.118***	39.867**
	(0.155)	(0.262)	(0.160)	(0.133)	(17.940)	(29.442)	(16.819)	(15.730)
Community FE	N	Y	N	Y	N	Y	N	Y
N	108	108	108	108	108	108	108	108
Wald chi-square	44.29	-	28.60	-	50.55	-	12.29	-
F-test	-	10.09	-	10.09	-	2.08	-	2.08

Table 1. Analysis of the effect of macro-level variables on long run wealth inequality. Columns (1-4) and (5-8) show the results when the dependent variable is respectively the Gini coefficient and the top 10% share. The results when the demographic variable is the natural logarithm of population are in columns (1-2) and (5-6). Columns (3-4) and (7-8) show the results when the demographic variable is the natural logarithm of population density. Standard errors are clustered at the community level to control for serial correlation in the unobservables and they are shown in parentheses. ***Significant at 99%, **Significant at 95%, *Significant at 90%.

When using the Gini coefficient as the dependent variable, the results show that the estimated coefficient of per-capita taxation is the only one that has the expected positive sign and is statistically significant. The rate of urbanization is never significant while the demographic determinants are significant only when excluding community fixed effects. Similar results hold when using the top 10% as the dependent variable.

These results suggest that of the traditional macro-level variables only taxation per capita plays a significant role in accounting for the variation of inequality in our dataset, while the case of population is doubtful (see general discussion). An important conclusion is that overall, these macro-level variables could not elucidate between-communities differences in inequality levels, which, in the case of preindustrial societies highly reliant on agriculture, can be expected to result from the large variation of the main geo-morphological characteristics that might have affected agrarian systems and the ownership structure, hence wealth inequality, in the territory of the Republic. This suggests a modification of the previous quantitative model, unpacking the community effects into a set of potentially relevant community-specific explanatory variables. In particular, we test the relationship between inequality, macro-level variables and geo-morphological characteristics of the communities setting up the following linear model:

$$ineq_{it} = b_0 + b_1 * ln\_pop\_density_{it} + b_2 * ln\_tax\_pc_t + b_3 * urb_t + b4 * altitude_i + b_5 * ruggedness_i + b_6 * distance\_city_i + b_7 * distance\_Venice_i + b_8 * Maize\_suitability_i + b_9 * Wheat\_suitability_i + u_{it} \quad (2)$$

where $ineq_{it}$, $ln\_pop\_density_{it}$, $ln\_tax\_pc_t$ and urb_{it}, have the same interpretation as in model (1), while $altitude_i$ and $ruggedness_i$ are respectively the altitude in meters and the ruggedness of the community *i*. The variables $distance\_city_i$ and $distance\_Venice_i$ are the distances of the community *i* from respectively the main city in the province and the capital of the state, Venice. In both cases, we have computed the distances as the number of hours needed to reach a city from the community *i* on foot, assuming no substantial variation in the main communication routes during the period under study. $Maize\_suitability_i$ and $Wheat\_suitability_i$ are respectively the indexes of maize and wheat suitability in the community *i*[7]. Also in this case we include a full set of century dummies in the estimation. Finally u_{it} is the error term, and $b_0, \ldots, b_9$ are the coefficients to be estimated.

The geo-morphological characteristics are time invariant (although the practical meaning of maize suitability is not, due to the timing of the introduction of maize cultivation from the New World: see discussion in the next section) but their variation is potentially substantial across communities. For this reason, as mentioned in the previous section, when including them in the analysis we also exploit the information from the single communities composing each *podesteria*. As a result, we estimate the model on a panel of 130 communities. As a robustness check, we also test the same model on a restricted dataset in which the *podesterie* are not split into their constituent components, and we show

[7] The maize and wheat suitability values are those for intermediate input level rain-fed cereals and have been collected from FAO 2019.

that the extension of the analysis to those units does not relevantly bias the results (Appendix A, Table A1).

	GINI COEFFICIENT		TOP 10%	
	(1)	(2)	(3)	(4)
$ln\_pop\_density_{it}$	-	0.002 (0.010)	-	1.561* (1.079)
ln per capita tax_t	-	0.249*** (0.044)	-	22.312*** (5.241)
Urbanization $rate_t$	-	-0.013*** (0.002)	-	-1.378*** (0.364)
$Altitude_i$	0.0002*** (0.00008)	0.0002** (0.0001)	0.039*** (0.009)	0.027* (0.014)
$Ruggedness_i$	-0.0002* (0.0001)	-0.0002 (0.0001)	-0.023* (0.015)	-0.013 (0.020)
Distance from the main $city_i$	-0.0009 (0.001)	-0.001 (0.001)	-0.542** (0.214)	-0.468* (0.249)
Distance from $Venice_i$	-0.002*** (0.0009)	-0.002** (0.001)	-0.404*** (0.102)	-0.393*** (0.111)
Suitability to $maize_i$	0.006** (0.002)	0.007** (0.002)	0.829*** (0.307)	0.899*** (0.337)
Suitability to $wheat_i$	-0.003* (0.002)	-0.003* (0.002)	-0.449* (0.255)	-0.442* (0.275)
Constant	0.665*** (0.034)	0.457*** (0.064)	54.879*** (3.533)	36.133*** (7.401)
N	518	508	518	508
Wald chi square	110.95	131.79	18577.36	201.61

Table 2. Analysis of the effect of macro-level and geo-morphological variables on long run wealth inequality. Columns (1-2) and (3-4) show the results when the dependent variable is respectively the Gini coefficient and the top 10% share. The results when only the geo-morphological variables are included are in columns (1) and (3). Columns (2) and (4) show the results when also the macro-level variables are included. Standard errors are clustered at the community level to control for serial correlation in the unobservables and they are shown in parentheses. ***Significant at 99%, **Significant at 95%, *Significant at 90%.

Columns (1) and (3) of Table 2 show the results of the estimation of the model in eq. (2) when the dependent variable is respectively the Gini coefficient and the top 10% share and only the geo-morphological variables are included in the analysis. In both cases, the results show that almost all these variables account for a significant variation of community-level inequality.

Columns (2) and (4) show the results of the estimation of the model in eq. (2) when the dependent variable is respectively the Gini coefficient and the top 10% share and all the variables are included in the analysis. In both cases the result of taxation per capita is confirmed. In addition, now urbanization has a significant and negative effect on inequality, while the effect of population density is statistically significant (and positive) only when the dependent variable is the top 10%. Among the geo-morphological variables, some had positive effects on inequality, as altitude and suitability to maize, while others had negative effects on the concentration of wealth, such as suitability to wheat and distance from Venice.[8]

The period we study was deeply marked by the demographic and economic shock caused by the 1630 plague, a structural break that can be identified as a potential turning point in the economic and social development of the Republic of Venice (Alfani and Percoco 2019). For this reason, we also check the role that such a structural break might have had on wealth inequality. We do so by testing the model in eq. (2) in two sub-periods, before and after 1630.

Indeed, the results in Table 3, which suggest similar conclusions when using either the Gini coefficient or the top 10% wealth share, show that the 1630 plague impacted, in particular, on the effects of the macro-level variables on wealth inequality. For example, population density, which, in the case of the Gini as dependent variable, is not statistically significant looking at the whole 1400-1800 period nor in the pre-1630 period, has a positive and significant effect on inequality in the two centuries after the plague. This might result from a differential effect of the plague across communities. This and other hypotheses are discussed in the next section.

[8] Note that the inclusion of the geo-morphological variables leads to a high number of community-specific variables, some of which might tend to capture the same effects. To address this concern, we checked the pairwise correlation of all community-specific variables (Appendix A, Table A3), which is generally found to be quite low.

	GINI COEFFICIENT		TOP 10%	
	Pre 1630	**Post 1630**	**Pre 1630**	**Post 1630**
	(1)	**(2)**	**(3)**	**(4)**
$Ln\_pop\_density_{it}$	-0.003	0.016*	0.803	3.556***
	(0.011)	(0.006)	(1.281)	(0.619)
ln per capita tax_t	0.558***	-0.294*	53.348***	-39.661**
	(0.092)	(0.149)	(12.170)	(15.555)
Urbanization $rate_t$	0.003	0.017*	0.179	2.133**
	(0.005)	(0.009)	(0.667)	(1.041)
$Altitude_i$	0.0004***	0.0001	0.046***	0.006
	(0.0001)	(0.001)	(0.011)	(0.018)
$Ruggedness_i$	-0.0002*	-0.0001	-0.029*	0.002
	(0.0001)	(0.0001)	(0.019)	(0.022)
Distance from the main $city_i$	-0.0007	-0.0006	-0.320*	-0.458**
	(0.002)	(0.001)	(0.277)	(0.224)
Distance from $Venice_i$	-0.003***	-0.003**	-0.419***	-0.461***
	(0.001)	(0.001)	(0.110)	(0.114)
Suitability to $maize_i$	0.008***	0.002	1.026***	0.379*
	(0.002)	(0.002)	(0.274)	(0.347)
Suitability to $wheat_i$	-0.004**	-0.003	-0.498**	-0.360*
	(0.002)	(0.002)	(0.215)	(0.307)
Constant	0.226	1.074***	0.740	107.330***
	(0.346)	(0.218)	(51.983)	(23.816)
N	247	261	247	261
Wald chi square	172.21	703.83	118.27	808.70

Table 3. Analysis of the effect of macro-level and geo-morphological variables before and after the 1630. Columns (1-2) and (3-4) show the results when the dependent variable is respectively the Gini coefficient and the top 10% share. The results in the pre-1630 period are in columns (1) and (3). Columns (2) and (4) show the results in the post-1630 period. Standard errors are clustered at the community level to control for serial correlation in the unobservables and they are shown in parentheses. ***Significant at 99%, **Significant at 95%, *Significant at 90%.

3. General discussion

Overall, our analyses confirm the ability of some of the variables proposed by the literature on preindustrial inequality to contribute to explaining inequality change in the long run. This is especially the case for taxation per capita. In the models in Table 1, when using community fixed effects, taxation per capita has a positive and significant effect on inequality (p-value<0.01 for the

Gini index, p-value<0.1 for the top 10% share), and the size of the effect is also quite large. Regarding urbanization rate, we have referred to it as the best proxy for general economic development currently available for the Republic of Venice, following a consolidated literature. In a study of the Florentine State covering the same period, Alfani and Ammannati (2017) found a positive correlation between economic growth and inequality growth, although not very strong. In our case study, urbanization rate is never significant in the models presented in Table 1. The coefficient even turns negative (and significant) when introducing the geo-morphological variables (Models 2 and 4 in Table 2), although with very small size. However, when splitting the analysis in two pre- and post-1630 periods, urbanization rate is found to be positive and significant (p-value<1 for the Gini index, p-value<0.05 for the top 10% share), but only after the plague. Overall, our results confirm the view, which is becoming prevalent in the literature (Alfani 2015; 2020; Alfani and Ryckbosch 2016; Milanovic 2018), that in preindustrial societies economic growth is not a necessary cause of inequality growth, hence it could not be simply assumed as a general explanation.

Regarding taxation per capita, overall it seems to be a better explanation for inequality change, not only because it had a larger impact on inequality, but also because when splitting the analysis between pre- and post-1630 it remains strongly significant (p-value<0.1) – although only before the plague. After the plague, there is no doubt that increases in taxation remained a factor leading to inequality growth across the *Terraferma* as a whole: as the structure of taxation in the Venetian *Terraferma* was regressive the simple fact of raising any tax led to inegalitarian consequences (Alfani and Di Tullio 2019). However, in the perturbed post-plague situation, it appears that *state-level* taxation was not an important factor of divergence in *local* inequality levels (which are what we explore in this article). Possibly, this was also due to a temporary increase in per-capita resources and to some inheritance-led redistribution in the immediate post-plague years, as well as to some heterogeneity in the local severity of the plague (see below). In Models 2 and 4 of Table 3, the coefficient of taxation per capita even turns negative - but this is a spurious result, related to the perturbation caused by the plague: as shown in Appendix A (Table A2), if we replicate such models while removing from the analysis the immediate post-plague decades, taxation per capita becomes not significant.

Regarding a third variable, population, our study confirms what has been reported for other European areas, where population proved either statistically insignificant (as in Tuscany: Alfani and Ammannati 2017) or weakly significant (as in the southern Low Countries: Ryckbosch 2016). Indeed, in our study this is true for both population per se, and population density. Our results about population density are particularly interesting as they might seem not to support the recent hypotheses by Milanovic (2018), who by analyzing a sample of 41 social tables for preindustrial societies found that population density was quite strongly (p-value<0.05) and negatively correlated with the calculated Gini indexes of (income) inequality. However, it must be pointed out that the meaning of the covariates is not exactly the same if we consider whole societies (as Milanovic did) or single communities within societies. Indeed, to explain his results, Milanovic advanced two “conjectures”: either in less-extractive (and, generally speaking, less unequal) societies the poor experienced better living conditions, leading to quicker population growth and higher population density, or high population density might have made the position of the rulers relatively precarious, forcing them to employ policies “milder and less extractive principally because of the fear of being overthrown” (Milanovic 2013, 13). As is clear, the direction of causality is the opposite in the two explanations, which are probably to be considered as not mutually exclusive. However, it is also clear that both explanations are better applicable to entire societies than to single communities. Especially in the case of the second, it seems that the “check on local rulers” path towards egalitarianism might have characterized territorial aggregates much broader than single communities.

This being said, also regarding population we have some indications that the 1630 plague caused a structural break: as seen in Table 3, if we focus solely on the post-1630 period population density becomes significant (p-value<0.1 for the Gini index, p-value<0.01 for the top 10% share), with a positive coefficient. This suggests that in the context of the post-plague *Terraferma*, population density might have affected local inequality levels through channels entirely different from those proposed by Milanovic. The plague, which exacted a terrible death toll across North Italy, nevertheless affected single communities in very uneven ways. Although we could not estimate plague mortality levels for each community in our dataset given the absence of specific studies of local plague mortality in the rural areas that we cover, we do have information about mortality in cities, which is found to be quite heterogeneous across the *Terraferma*. Even if we restrict the analysis to the three cities included in our sample, mortality in Bergamo (381 per thousand) was almost 40% lower than in either Padua (594 per thousand) or Verona (615 per thousand) (Alfani and Di Tullio 2019, 115). Higher mortality might have allowed for greater local redistribution in the most-affected communities, leading to a positive correlation between inequality and population density (as post-plague population density is expected to be lower, the higher local plague mortality rates). This does not contrast with Alfani and Di Tullio (2019) findings about the 1630 plague having limited inequality-reducing power across the Republic of Venice (see discussion in Section 1), as what our results mean is simply that the heterogeneous local impact of the plague tended to increase inequality differences *between* communities. This does not contrast with Milanovic (2013) either, as we should distinguish between the effects of an exceptional episode affecting population, and the “normal” relationship between population (and population density) and inequality.

The plague caused a structural break also regarding the impact of other variables. First, however, we need to provide a general discussion of the relevance of the other local-level variables that we were able to explore. Regarding geo-morphological variables, as seen in Table 2, the strongest results regard altitude and distance from Venice. When only geo-morphological variables and land suitability are considered (Models 1 and 3), altitude is highly significant (p-value<0.01) and remains significant, although less so, when population density, taxation per capita and urbanization rates are included. Interestingly, ruggedness is significant at 10% only in Models 1 and 3, and not significant in other models. For ruggedness, the sign of the coefficient is negative, as expected, and it reflects the lesser suitability of morphologically irregular territories to agricultural systems organized by large fields (and large landownership). Also in the case of altitude, we expected a negative sign, because it can be presumed that in the context of the Po Plain, where north of the river Po (see Figure 1) higher altitude basically means being closer to the Alps, this variable proxies the prevalence of geo-climatological conditions less viable to cereal monoculture (especially of wheat and rice), favouring instead a crop regime characterized by greater fragmentation of the land into small fields cultivated with a variety of crops[9]. The reason why in the context of our database higher altitude is associated with higher inequality instead is that we have a limited coverage of properly alpine communities – the exception being Clusone, a commercial town placed in the Val Seriana, north of Bergamo. This town, which was very rich in early modern times and the reference point of the entire valley, was also exceptionally unequal for most of the period covered by this article (compare Alfani and Di Tullio 2019, 96). If Clusone is removed from the analyses, altitude becomes statistically insignificant and negative in the full models (results not reported).

Also for distance from the state capital (Venice) and distance from the province capital (Bergamo, Padua or Verona) we expected – and found – a negative coefficient, for partly different reasons. In the case of Venice, one of the main harbours and commercial hubs of the Mediterranean and a large market for foodstuffs on its own, the lands closer to it experienced an incentive towards focusing on market-oriented agrarian production (p-value<0.01 in most models in Tables 2 and 3). This not only meant focusing on high-value cereal crops like wheat or rice which were more easily cultivated in large fields, but also that wealthy families were readier to invest in land, leading to an overall distribution of local taxable wealth dominated by few, and sometimes just one, great landowners and driving inequality up (dynamics of this kind are particularly clear and well documented for the province of Padua[10]). This second point can also be applied, in a slight variant, to the province capitals. In this case, what led to the higher the inequality the closer to the city was the economic

[9] For an overview of northern Italian crop regimes and agrarian systems in early modern times, see Alfani 2013a.

[10] See Maifreda 2002, Knapton 2017, and for a recent synthesis, Alfani and Di Tullio 2019.

penetration into the countryside of the patriciate and of other components of the urban economic elite. The economic dominance of the main cities on the surrounding rural areas had been a feature of the *Terraferma* since at least the late Middle Ages, and this tendency intensified further as the early modern times progressed. Indeed, when urban-centred commercial and manufacturing activities began to feel the pressure of northern European competition (see Section 1), investment in land looked increasingly appealing, also because in many parts of the Republic agrarian innovation allowed to achieve substantial profits from land (Zannini 2010). However, while distance from the province capitals shows the expected negative sign across models in Tables 2 and 3, it is significant only when looking at the share of the richest 10% (p-value<0.05 in Model 3 <0.1 in Model 4 of Table 2).

Some deeper exploration of the impact on local inequality levels of agrarian innovation can be achieved by focusing on maize, a crop imported from the New World which, while it had been present in Italy since the sixteenth century, did not easily spread because of cultural resistance against a mysterious crop which was so productive as to arise suspicion. Maize cultivation started to spread across North Italy in the final decades of the sixteenth century, and was initially used as animal fodder only (Doria 2002, 570-1). Indeed, the 1630 plague by making suffering from famine, beside from the epidemic, a very real possibility convinced farmers and landowners to plant maize for their own consumption, thus triggering a period of very rapid expansion of its cultivation across much of north Italy (Levi 1984; Finzi 2009). While it is assured that in some parts of north Italy the cultivation of maize for human consumption had started spreading since a few decades earlier, and particularly since the famine-ridden 1590s (Doria 2002; Alfani 2012, 172-3; 2013c), it is also certain that in the Venetian *Terraferma* the spread of maize took place mostly after the 1630 plague (Fassina 1982, 46-7; Fornasin 1999, 13). In our dataset, suitability to maize is found to be positive and significant (p-value<0.05 for the Gini index, p-value<0.1 for the share of the richest across models in Table 2). However, when we split the analyses in a pre- and post-plague period, we detect a marked decline in significance after 1630 (in Table 3, maize suitability is insignificant in Model 2 and significant with p-value<0.1 in Model 4).[11] This apparent paradox can be solved by considering that in fact, for the pre-1630 period suitability to maize proxies that to another crop, sorghum. This was a poor crop cultivated mostly for family consumption on lands that were not suitable for other cereals (for example, lands close to rivers or otherwise subject to flooding, or fields with narrow and very irregular shapes), as well as in complex systems of agrarian rotation[12]. Across north Italy, maize

[11] If we restrict the analysis to even later periods, like in Table A2 of Appendix A where they are performed on the post-1650 period only, suitability to maize becomes insignificant.

[12] Sorghum, as well as millet, was used in a complex “three-field” system, in which sorghum/millet rotated with wheat/rye and with fallow. Maize replaced sorgum/millet and also allowed farmers to eliminate fallow, establishing a more productive “two-field” system (Pitteri 1994, 131-4). These changes potentially affected all lands, hence in distributive

basically replaced sorghum for family consumption – because it was way more productive and also better-tasting (compare with the case of Piedmont: Levi 1984; Alfani 2012, 171-4). In the *Terraferma*, maize was so successful that it led to the establishment of a new scourge, the pellagra disease, caused by a diet too dependent on such a crop and consequently, too poor in vitamins. But for the purposes of this article, it seems reasonable to assume that the main effect on inequality of the spread of maize was increasing the relative value of marginal lands that were previously cultivated with sorghum[13]. While the physical presence of these lands (measured by suitability to maize) in the territory of any given community continued to lead to relatively higher inequality among local owners, the spread of maize increased to some degree their value, thus reducing the significance of the variable as well as the size of the effect.

Conclusions

This short article has provided an in-depth analysis of local wealth inequality in the territories of the Republic of Venice in mainland Italy during the early modern period. The availability of a particularly large database of local inequality measurements for an area relatively homogeneous in many respects (for example, from the political and institutional point of view) but showing high variation in others (like the morphology of the territory and the forms of agrarian organization) allowed us to produce the most in-depth analysis of the determinants of inequality at the local level available so far for any preindustrial society. In general, our study confirms the ability of intensity of regressive taxation to shape overall trends. This is not the case for urbanization rate (interpreted as a proxy for economic development), for population, and not even for population density as proposed by some recent studies, as these variables are found to be insignificant in most analyses. The relevant exception are the years immediately following the terrible 1630 plague. As in the follow-up to the epidemic population density also reflects local plague mortality rates, the fact that this variable becomes significant and positively correlated with inequality suggests that the plague had some "egalitarian" distributive effects able to determine relevant differences in local inequality levels.

Indeed, our study suggests that the plague caused a structural break in the way in which some key variables affected inequality: beyond population density, this seems to be the case for per-capita taxation, urbanization rates and maize suitability. In the case of the first two, this has to do with the overall "game-changing" character of an event that in this area might have killed up to 40% of the

terms (the relative wealth of different categories of landowners) they had limited impact. Much more important, from this point of view, is the fact that sorghum replaced maize on marginal or semi-marginal lands not suitable for wheat, a process which can be expected to have advantaged mostly the poorest owners.

[13] About the low yield of sorghum in the early modern *Terraferma*, see Pitteri 1994, 142.

overall population. In the case of maize suitability, the post-plague inequality dynamics seem to fit quite well a crucial process of agrarian innovation (the spread of maize). Other variables that are found to significantly affect inequality are ruggedness, which by favouring small ownership and cultivations organized in small fields leads to lower local inequality, as well as the closeness to Venice or to provincial capitals: the closer to them, the higher the incentives toward large-scale agrarian production and the penetration into the countryside of wealthy landowners, and the higher inequality. Overall, our analyses show that when moving from the big picture (inequality measures across societies, for example by means of social tables) to closer inspection of local inequality levels, an in-depth knowledge of the historical context is of crucial relevance to make sense of what remains one of the most complex, fascinating and unfortunately persistent features of human societies.

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Appendix A. Robustness checks

Podesterie *robustness check*

Concerns might arise on whether the inclusion of each single community belonging to each *podesteria*, to whom we have assigned the same values for inequality and population density as the ones calculated at the *podesteria* level, might bias the results of the estimation of the general model in eq. (2). For this reason, in Table A1 we test the models that include the geo-morphological variables without subdividing the *podesterie*. All the main results of the econometric estimations when the larger dataset is used are confirmed.

	GINI COEFFICIENT			TOP 10%		
	Whole period	Pre 1630	Post 1630	Whole period	Pre 1630	Post 1630
	(1)	(2)	(3)	(4)	(5)	(6)
$Ln\_pop\_density_{it}$	0.010	-0.00001	0.024***	2.006*	1.688	3.066***
	(0.014)	(0.018)	(0.007)	(1.159)	(1.580)	(0.884)
ln per capita tax_t	0.086	0.407**	0.020	3.236	37.656*	-59.208**
	(0.097)	(0.178)	(0.017)	(10.797)	(23.095)	(26.668)
Urbanization $rate_t$	-0.007	-0.0001	-0.421	-0.578	-0.458	3.007*
	(0.006)	(0.006)	(0.240)	(0.879)	(0.617)	(1.971)
$Altitude_i$	0.0003*	0.0005***	0.0001	0.040**	0.066***	0.022
	(0.0001)	(0.0001)	(0.0001)	(0.016)	(0.012)	(0.021)
$Ruggedness_i$	-0.0002 *	-0.0003	-0.0001	-0.013	-0.029*	-0.005
	(0.0002)	(0.0002)	(0.0002)	(0.029)	(0.022)	(0.031)
Distance from the	0.0009	-0.001	0.00003	-0.338	-0.547**	-0.582
main $city_i$	(0.004)	(0.004)	(0.004)	(0.406)	(0.433)	(0.515)
Distance from	-0.003**	-0.0034***	-0.003**	-0.515***	-0.627***	-0.537***
$Venice_i$	(0.001)	(0.001)	(0.001)	(0.154)	(0.144)	(0.172)
Suitability to $maize_i$	0.009*	0.010***	0.003	0.867	0.823**	0.207
	(0.004)	(0.003)	(0.005)	(0.518)	(0.400)	(0.662)
Suitability to $wheat_i$	-0.005*	-0.005**	-0.004	-0.443	-0.346	-0.333
	(0.003)	(0.002)	(0.004)	(0.389)	(0.308)	(0.440)
Constant	0.620***	-0.006	1.289***	54.674***	-9.830	139.152***
	(0.161)	(0.434)	(0.350)	(16.437)	(46.223)	(38.818)
N	108	47	61	108	47	61
Wald chi square	37.01	57.51	617.56	71.95	115.26	638.69

Table A1. Analysis of the effect of macro-level and geo-morphological variables without subdividing the *podesterie*. Columns (1-3) and (4-6) show the results when the dependent variable is respectively the Gini coefficient and the top 10% share. The results for the whole periods are in columns (1) and (4), those for the pre-1630 period are in columns (2) and (5). Columns (3) and (6) show the results in the post-1630 period. Standard errors are clustered at the community level to control for serial correlation in the unobservables and they are shown in parentheses. ***Significant at 99%, **Significant at 95%, *Significant at 90%.

Post-1650 robustness check

When dividing the observations in a pre- and post-1630 plague period, the highly-perturbed conditions of the decades immediately following the plague might lead to some spurious effects. This is particularly the case for taxation per capita, whose coefficient turns negative in Models 2 and 4 of Table 3: a clearly spurious result given that the Venetian fiscal system was regressive. However, if we eliminate from the analysis the immediate post-plague decades (focusing on the post-1650 period only), spurious correlations become insignificant (all other results are confirmed).

	Gini coefficient Post 1650 (1)	Top 10% Post 1650 (2)
$Ln\_pop\_density_{it}$	0.024** (0.010)	3.343*** (0.966)
ln per capita tax_t	-0.122 (0.229)	-34.271 (34.650)
$Altitude_i$	0.0001 (0.001)	-0.009 (0.027)
$Ruggedness_i$	-0.0001 (0.0002)	0.028 (0.020)
Distance from the main $city_i$	-0.001 (0.002)	-1.039*** (0.360)
Distance from $Venice_i$	-0.003** (0.001)	-0.525*** (0.150)
Suitability to $maize_i$	0.0008 (0.004)	0.121 (0.464)
Suitability to $wheat_i$	-0.001 (0.002)	-0.94 (0.326)
Constant	1.000** (0.482)	138.572* (77.449)
N	135	135
Wald chi square	52.21	80.24

Table A2. Analysis of the effect of macro-level and geo-morphological variables after the year 1650. Columns (1) and (2) show the results when the dependent variable is respectively the Gini coefficient and the top 10% share. The coefficient of urbanization is omitted because of collinearity. Standard errors are clustered at the community level to control for serial correlation in the unobservables and they are shown in parentheses. ***Significant at 99%, **Significant at 95%, *Significant at 90%.

Pairwise correlation across community-specific variables

In table A.3 we check the pairwise correlation across all the community-specific variables used in the model. Note that population density is, to some extent, significantly correlated with the geo-morphological variables. However, the correlations are not so high to suspect that it might affect the standard errors of the variables in the main analyses in the text.

	Gini	**Top10**	**$Ln\_pop\_density_{it}$**	**$Altitude_i$**	**$Ruggedness_i$**	**Distance from the main $city_i$**	**Distance from $Venice_i$**	**Suitability to $maize_i$**	**Suitability to $wheat_i$**
Gini	1								
Top10	0.903 (0.000)	1							
$Ln\_pop\_density_{it}$	0.101 (0.022)	0.210 (0.000)	1						
$Altitude_i$	-0.042 (0.315)	-0.059 (0.177)	0.261 (0.000)	1					
$Ruggedness_i$	-0.138 (0.001)	-0.133 (0.002)	0.052 (0.237)	0.747 (0.000)	1				
Distance from the main $city_i$	-0.079 (0.072)	-0.232 (0.000)	-0.308 (0.000)	0.096 (0.028)	0.054 (0.215)	1			
Distance from $Venice_i$	-0.148 (0.001)	-0.186 (0.000)	0.257 (0.000)	0.818 (0.000)	0.655 (0.000)	0.209 (0.000)	1		
Suitability to $maize_i$	0.095 (0.030)	0.127 (0.003)	0.229 (0.000)	-0.338 (0.000)	-0.402 (0.000)	-0.047 (0.285)	-0.069 (0.115)	1	
Suitability to $wheat_i$	0.048 (0.275)	0.0846 (0.054)	0.119 (0.006)	-0.523 (0.000)	-0.585 (0.000)	-0.061 (0.163)	-0.290 (0.000)	0.897 (0.000)	1

Table A.3. Correlation matrix across community-specific variables. Each cell shows the correlation coefficients between the correspondent pair of variables. P-values of the correlation are in parentheses.