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Long-term trends in economic inequality: the case of the Florentine state, c. *1300–1800*†

By GUIDO ALFANI and FRANCESCO AMMANNATI*

This article provides an overview of economic inequality, particularly of wealth, in the Florentine state (Tuscany) from the early fourteenth to the late eighteenth century. Regional studies of this kind are rare, and this is only the second-ever attempt at covering such a long period. Consistent with recent research conducted on other European areas, during the early modern period we find clear indications of a tendency for economic inequality to grow continually, a finding that for Tuscany cannot be explained as the consequence of economic growth. Furthermore, the exceptionally old sources we use allow us to demonstrate that a phase of declining inequality, lasting about one century, was triggered by the Black Death from 1348 to 1349. This finding challenges earlier scholarship and significantly alters our understanding of the economic consequences of the Black Death.

In recent years, research on economic inequality has seen significant change. First, in many countries the Great Recession that began in 2007 has altered the perception of economic inequality—which has increasingly been seen as a problem, with a growing call for public action to moderate it. Second, the study of long-term dynamics has tended to become central to the analysis of current inequality levels. Although the most notable example of both trends is probably Piketty's recent and controversial book,[1] which calls for placing distribution back at the centre of economic analysis, it is only part of a more general process. If we focus on post-2007 scholarship, regarding long-term dynamics it is interesting to note that research covered not only the nineteenth and twentieth centuries—see in particular the works co-authored by Piketty himself[2] and Prados de la Escosura's studies of Spain and Latin America[3]—but also, and with maybe even greater frequency, the pre-industrial period. Areas covered by recent studies include the Sabaudian state

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[1] Piketty, *Capital*.

[2] Atkinson, Picketty, and Saez, 'Top incomes'; Alvaredo, Atkinson, Picketty, and Saez, 'Top 1 percent'.

[3] Prados de la Escosura, 'Inequality and poverty'; idem, 'Kuznets curve'.

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in north-western Italy,[4] the Low Countries,[5] Spain,[6] Portugal,[7] and Turkey.[8] All this research is characterized by the use of new databases built from fresh archival research. To these, the paper by Milanovic et al.[9] which introduced the notion of the 'inequality possibility frontier' should be added, as well as Hoffman et al.'s study of 'real' inequality in Europe (a concept also applied by Hanus to his recent study of 's-Hertogenbosch in the Low Countries).[10]

The change in focus towards the preindustrial period is an interesting development, considering that before 2007 the only study of long-term trends in pre-industrial economic inequality based on quantitative data was van Zanden's analysis of the Dutch Republic.[11] This work made reference to Kuznets's original hypothesis, according to which income inequality would follow an inverted-U path through the industrialization process (the so-called 'Kuznets curve'), with a rising phase at the beginning of industrialization.[12] Van Zanden suggested that a 'super-Kuznets curve' could be described for the Dutch Republic, connecting pre-industrial and industrial economic growth. His study was an exception, in a field in which most research generated by Kuznets's seminal paper focused on the industrialization period.[13] However, Kuznets's ideas are currently the object of deep criticism, especially regarding his 'promise' of declining inequality which seems not to have been fulfilled by actual historical developments.[14] The notion of a super-Kuznets curve has been criticized, too, in at least two respects: first, as was originally hypothesized by Alfani in his study of the Sabaudian state, in the long run substantial inequality growth (especially of wealth) can also be found in stagnating or declining areas of Europe (requiring us to individuate drivers of inequality growth different from economic growth);[15] and second, as argued by Reis, the paradigm of the super-Kuznets curve does not apply to the whole of Europe. Particularly in Portugal, income inequality declined during most of the early modern period.[16]

All recent revisionist work has called for more empirical research, as the amount of information we have about long-term inequality trends is still fairly limited. Our article contributes to this general debate by developing the case study of the Florentine state which covered most of Tuscany and was not only one of the main pre-Unification Italian states, but also one that occupied a truly central position in the medieval European economy. The methods we use are meant to make our

[4] Alfani, 'Wealth inequalities'; idem, 'Effects'; idem, 'Economic inequality'; Alfani and Frigeni, 'Inequality (un)perceived'.

[5] Ryckbosch, 'Consumer revolution'; idem, 'Economic inequality'; Hanus, 'Real inequality'.

[6] Nicolini and Ramos Palencia, 'Comparing income and wealth inequality'; Santiago-Caballero, 'Income'; Santiago-Caballero and Fernández, 'Income inequality in Madrid'; Garcia Montero, 'Long-term trends'.

[7] Reis, 'Deviant behaviour?'.

[8] Canbakal, *Wealth*.

[9] Milanovic, Lindert, and Williamson, 'Pre-industrial inequality'.

[10] Hoffman, Jacks, Levin, and Lindert, 'Real inequality'; Hanus, 'Real inequality'.

[11] van Zanden, 'Tracing'; Soltow and van Zanden, *Income*.

[12] Kuznets, 'Economic growth'.

[13] For example, Williamson, *British capitalism*, for Britain; Picketty, Postel-Vinay, and Rosenthal, 'Wealth', for France; Rossi, Toniolo, and Vecchi, 'Kuznets curve', for Italy; Lindert and Williamson, *American inequality*, for the US.

[14] Piketty, *Capital*.

[15] Alfani, 'Effects'; idem, 'Economic inequality'.

[16] Reis, 'Deviant behaviour?'.

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case study as comparable as possible to Alfani's work on Piedmont/the Sabaudian state, as well as to other research currently underway for other regions of Italy and Europe. The exceptional sources available for the Tuscan area allow us to cover a particularly long period, from the early fourteenth to the late eighteenth century. We contribute to the current critical debate on the super-Kuznets curve, as in the case of Tuscany, too, substantial inequality growth was found both in periods of economic growth and stagnation.

I

The 'Tuscany' considered in this work does not coincide exactly with the present administrative region, as we do not cover the Republic of Lucca, and a series of territories that were annexed during the eighteenth century.[17] The area we study corresponds to the territory of the Republic of Florence with its development into the Duchy (from 1532) and subsequently the Grand Duchy (from 1569) of Tuscany. This large area was split into two parts administratively, differing both for the intensity of the political control exerted by the capital city of Florence and for the system of taxation. The *Contado* was the surrounding hinterland that originally embraced the dioceses of Florence and Fiesole and then expanded as Florence brought more territory under its control. Later, when larger cities like Arezzo and Pisa came under Florentine rule together with their rural territories (in 1384 and 1406 respectively), they were referred to as the *Distretto*.

From the fiscal standpoint, the distinction between *Contado* and *Distretto* was maintained until the eighteenth century, not only because of the existence of a series of *gabelle* ('duties'), but primarily for the different systems of direct taxation in force over the two areas. The *Contado* consisted of more than 1,100 medium and small communities all under a single fiscal system set up by Florence which, however, suffered some major changes during the period considered. From 1315 Florentine citizens were spared direct taxation based on the *estimo*, and it was kept only for the communities of the *Contado*. The capital was subject to indirect taxation and forced loans.[18] Athough evidence exists of *estimi* for the *Contado* dating back to 1259,[19] the first surviving ones are those of 1350. From 1350 to 1415 there were eight revisions of the *estimo* of the Florentine *Contado*: 1350, 1357, 1364–5, 1372–3, 1384, 1394, 1401–2, and 1412–15. The determination of the *quota d'estimo*—that is, the amount due from each taxpayer—took place in two stages: once the overall amount to be imposed on the whole *Contado* was established, by law 'Officers of the *estimo*' were given the mandate to distribute it among the various communities. The quota was then split between the households of each single community on the basis of an evaluation of the household's approximated ability to pay. Such evaluation was mostly based on the real estate (lands and buildings) owned by each household.

The *estimo* represented a significant technical advance compared to the previous forms of taxation based on the feudal *focatico* at a fixed value. However, in 1427 Florence introduced its famous *catasto*, a complex and very innovative attempt to

[17] Fasano Guarini, *Lo stato*.
[18] Barbadoro, *Le finanze*.
[19] Conti, *I catasti*.

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change the state's fiscal policy in favour of a better and more efficient distribution of taxation.[20] In May 1428 the law was extended to the *Contado*: here the *catasto* was renewed in 1435–7, 1451–5, 1458–60, 1469–71, 1487–90 and 1504–5 and it was prepared in accordance with the same criteria as used for the city, representing a clear improvement over the *estimi*, which had become increasingly complex to manage. The sum expressed in the *catasto* was the capital value: the property was valued by capitalizing the income declared (in kind for land, in cash for rents of urban properties) at the rate of 7 per cent, and the house of residence was excluded. Household goods, commodities, credits, and debts also had to be reported. The difference between assets and liabilities formed the '*sustanze*' or '*valsente*' ('patrimony' or 'capital') that was taxed. Although in theory the *catasto* involved a very wide and varied tax base, in practice after 1427 the system became much simpler. In all subsequent *catasti*, almost always only real estate was recorded, and this is definitely the case for all the archival sources we consulted. According to Conti, 'in the registers of the countryside it is possible to see, after 1427, a gradual deterioration of the assessments ... Livestock, credits, *traffici*, and any other easily concealable property rarefy or disappear entirely in the new surveys'.[21] The reason for this development is presumably that 'no financial administration would have been able, given the technical means of the time, to exert a truly effective control over the multifaceted rural world. What could be improved were the records of landed property'.[22] This problem was not limited to the country. It was also encountered in the city, and in fact, from the 1440s urban assessments, it ceased to show movable goods and components of wealth other than real estate.[23] As a matter of fact, these developments prepared the introduction, in 1495, of a new, simpler system of taxation that was based on the *decima*, an annual tax of 10 per cent (hence the name) to be applied to the income from immovable property owned by citizens and peasants. The house of residence was exempted. In the countryside the *decima* was introduced only from 1507–8, while in 1516 Pope Leo X granted the extension of taxation to ecclesiastical property, albeit restricted to the assets purchased after that date.[24] The introduction of the *decima* system led to a complete replacement, in both the city and the countryside, of the previous registers by a direct survey of all real estate. The *decima* was abolished in 1776. Contextually, however, each community was ordered to survey the assets situated in their territory and to collect the *decima* one last time (in 1779). As a final comment on these sources, it should be noted that as the post-1427 *catasti* and the *decima* do not include financial assets, which tended to be more unevenly distributed than real estate, inequality measures calculated from them have to be considered a lower-bound estimate of overall wealth inequality. As financial assets tended to be concentrated in the hands of city dwellers, this is mostly a problem when estimating urban inequality. However, this also means that after 1427 there will be a systematic underestimation of urban–rural differentials in inequality levels.[25]

[20] Herlihy and Klapisch-Zuber, *Tuscans*.
[21] Conti, *I catasti*, p. 114, our translation.
[22] Ibid., p. 117, our translation.
[23] Procacci, *Studio*, pp. 62–6.
[24] Conti, *I catasti*, p. 132; Procacci, *Studio*, pp. 75–9.
[25] Regarding the distribution of financial assets in 1427 Tuscany, see Herlihy, 'Family'.

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Regarding the *Distretto*, each main centre had its own tax system that levied tax both within the city walls and in the countryside. The Florentine fiscal policy aimed to leave each main centre some freedom in the choice of the tax system, merely requiring periodic global contributions. A fiscal study of the cities belonging to the *Distretto* therefore requires analytical work on a case-by-case basis. This is presented in online appendix S1.[26]

II

Our database includes 14 communities, 12 belonging to the *Contado* (including Prato) and two, San Gimignano and Arezzo, to the *Distretto.* The analysis of economic inequality will be carried out using tax records, even though we are well aware of the limitations of this type of documentation (see below). Table 1 provides an overview of the communities studied and the sources used, as well as some essential information about the status of each community (urban/rural) and its demographic size across time.

The problems related to the processing of our database can be grouped into three main points. The first is the incidence of exempt property (owned by religious and charitable institutions) which was not subject to taxation. This problem is briefly discussed in the next section. The second is the amount of property owned by Florentine citizens in rural areas, especially in the *Contado* and to a much lesser degree in the *Distretto*. Few earlier studies have assessed this problem, as it requires the complex matching of the sources available for the capital city with those of the subject communities.[27] As Florentine property is simply invisible in the sources we used, we will not debate the matter further (see online appendix S2 for details). Third, the taxable base used in our sources changes over time. In particular, the evolution, which occurred throughout Tuscany, from a system of relatively rough estimation of the ability to pay to a precise assessment of the overall capitalized income of taxpayers on the basis of statements or surveys (fifteenth-century *catasti*) was later replaced by a fiscal system based on real estate only (land and buildings). Although contemporaries considered the introduction of the *decima* an improvement, in terms of greater fairness,[28] it could also be seen as a limitation as some components of wealth become unobservable, in particular the public debt. However, this is of little practical consequence, as we know that in 1427 the citizens of Florence owned 99.75 per cent of the public debt and, more generally, 78 per cent of all the movable property in the state.[29] A more serious problem lies with the houses of residence: in the *catasti* such assets were valued but not considered for calculating the tax due, while in the *decima* they were indicated but not given a value. An obvious distortion is that those who owned only one house in which they resided were fiscally equivalent to the propertyless. However, those who were genuinely poor did not appear at all in the tax records, due to the nature of the fiscal system. This issue is analysed in section V.

[26] The appendices to this article can be downloaded from http://didattica.unibocconi.eu/Alfani_database and are available online from the *Economic History Review*.
[27] See, for example, Conti, *La formazione*; Fiumi, *Demografia*; Curtis, 'Florence'.
[28] Pagnini del Ventura, *Della decima*, vol. I, p. 41.
[29] Herlihy, 'Distribution', p. 137.

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Table 1. *Composition of the database*

Community	*Urban/ rural*	*Contado/ Distretto*	*Sources used (year)*	*Population (year of reference between parentheses)*[a]
Antella	Rural	*Contado*	1357; 1394; 1458; 1504; 1536; 1570; 1621; 1715	*748* (1319), *645* (1356), *656* (1365), *650* (1373), *622* (1384), *622* (1394), 584 (1427), 401 (1458), 551 (1504), 773 (1551), 780 (1562), *874* (1622), 1,352 (1784), 1,515 (1792)
Arezzo	Urban	*Distretto*	1390; 1443; 1501; 1558; 1602; 1650; 1710; 1751; 1792	13,000 (early 1300s),[b] 9,000 (1389), 7,000 (1393), 4,152 (1427), 4,500 (1480), 5,000 (1490), 7,750 (1551), 6,927 (1562), 8,286 (1622), 6,562 (1632), 6,897 (1642), 6,719 (1745), 10,402 (1833)
Borgo San Lorenzo	Rural	*Contado*	1357; 1402; 1460; 1504; 1536; 1570; 1621; 1715	*1,969* (1350), *1,779* (1356), *1,660* (1365), *1,580* (1373), *1,629* (1384), *1,068* (1427), 800 (1460), 664 (1504), 1,889 (1551), 1,848 (1562), *2,005* (1622), 2,498 (1784), 2,718 (1792)
Castel San Giovanni	Rural	*Contado*	1357; 1402; 1469; 1504; 1536; 1570; 1621; 1715	*964* (1350), *1,762* (1356), *2,087* (1373), *1,916* (1384), 1,466 (1427), 1,147 (1469), 1,215 (1504), 2,050 (1551), 2,217 (1562), *2,483* (1622), 1,997 (1632), 1,769 (1642), 2,195 (1745), 2,852 (1792)
Castelfiorentino	Rural	*Contado*	1365; 1402; 1458; 1504; 1536; 1570; 1621; 1715; 1779	1,456 (1350), 1,497 (1364), 1,583 (1371), 1,380 (1383), 1,467 (1393), 1,353 (1402), 1,243 (1414), 1,301 (1427), 1,023 (1487), 1,087 (1551), 955 (1562), *1,228* (1622), 793 (1632), 1,486 (1745), 1,574 (1784), 1,835 (1792)
Cerreto Guidi	Rural	*Contado*	1357; 1402; 1458; 1504; 1536; 1570; 1621; 1715	*1,399* (1356), *1,215* (1365), *1,265* (1373), *1,274* (1384), *946* (1427), 542 (1458), 789 (1504), 1,119 (1551), 998 (1562), *1,057* (1622), 1,070 (1632), 1,452 (1745), 1,576 (1792)
Gambassi	Rural	*Contado*	1357; 1402; 1458; 1504; 1536; 1570; 1621; 1715	*583* (1350), *723* (1356), *516* (1365), *516* (1373), *848* (1384), 618 (1427), 452 (1458), 469 (1504), 577 (1551), 611 (1562), *785* (1622), 989 (1642), 1,294 (1792)
Monterappoli	Rural	*Contado*	1357; 1402; 1458; 1504; 1536; 1570; 1621; 1715	*1,243* (1350), *1,247* (1356), *1,026* (1365), *1,035* (1384), 708 (1427), 357 (1458), 342 (1504), 778 (1551), 614 (1562), *789* (1622), 334 (1632), 443 (1784), 367 (1792)
Poggibonsi	Rural	*Contado*	1338; 1357; 1365; 1384; 1394;1402; 1458; 1504; 1536; 1570; 1621; 1715; 1779	*3,611* (1338), *2,741* (1350), *2,736* (1356), *2,431* (1365), 1,902 (1371), 1,393 (1428), 1,274 (1551), 1,120 (1562), *1,440* (1622), 798 (1632), 685 (1642), 1,162 (1745), 1,514 (1792)
Prato	Urban[c]	*Contado*	1325; 1372; 1428; 1487; 1546; 1621; 1671; 1763	10,559 (1339), 6,504 (1372), 3,533 (1428), 6,845 (1551), 7,624 (1622), 5,788 (1632), 5,676 (1642), 6,623 (1672), 6,620 (1745), 9,968 (1784)
San Gimignano	Urban/ rural[d]	*Distretto*	1277–90; 1314;1318-1336; 1332; 1375; 1419; 1428; 1475; 1549; 1674	7,637 (1277–90), 8,726 (1332), 3,997 (1350), 3,138 (1428), 4,675 (1551), 4,405 (1622), 3,075 (1674), 4,461 (1784)

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Table 1. *Continued*

Community	*Urban/ rural*	*Contado/ Distretto*	*Sources used (year)*	*Population (year of reference between parentheses)*[a]
San Godenzo	Rural	*Contado*	1357; 1402; 1461; 1504; 1536; 1570; 1621; 1715; 1779	*654* (1350), *1,639* (1356), *911* (1365), *944* (1373), *1,036* (1384), *698* (1427), 405 (1461), 381 (1504), 486 (1551), *457* (1622), 638 (1745), 768 (1792), 814 (1833)
San Martino alla Palma	Rural	*Contado*	1357; 1402; 1458; 1504; 1536; 1570; 1621; 1715	*822* (1350), *852* (1356), *772* (1365), *827* (1384), 589 (1427), 592 (1458), 626 (1504), 559 (1551), 487 (1562), *626* (1622), 423 (1632), 623 (1784), 676 (1792)
Santa Maria Impruneta	Rural	*Contado*	1307; 1319; 1330; 1365; 1373; 1384; 1394; 1402; 1414; 1427;1458; 1504; 1536; 1570; 1621; 1715	*725* (1307), *689* (1319), *730* (1330), *600* (1350), *600* (1356), *600* (1365), *534* (1384), 426 (1427), 613 (1458), 745 (1504), 1,025 (1551), 1,186 (1622), 940 (1632), 1,546 (1745), 1,688 (1784), 1,766 (1792)

Notes and sources:
a Our own estimates from archival documentation, integrated with figures published by Dini, *Arezzo*, and del Panta, *Una traccia*, for Arezzo and Prato; Fiumi, *Storia economica*, and idem, *Demografia*, for San Gimignano and Prato; Fiumi, 'La demografia', and Conti, *La formazione*, for the *Contado* of Florence. *In italics*: (a) our estimates obtained by multiplying the number of hearths by the average size of a hearth according to the fiscal data of each community of the *Contado* for the breakpoint years 1450 and 1500 (and, when available, for 1427), or (b) only for 1622, our estimates obtained by multiplying the population in 1562 (in 1551 for Santa Maria Impruneta and San Godenzo) by the average growth rate of the relevant *vicariato* (each *vicariato* included a group of rural communities).
b Uncertain estimate.
c An important centre of the valley of the Bisenzio, Prato and the rural areas under its jurisdiction became part of the *Contado* of Florence after it was annexed in 1351. In the earlier periods, Prato was not formally a 'city' as its territory fell under the jurisdiction of the Diocese of Pistoia. Only in 1653 did Prato become an episcopal see.
d City + countryside. Data from Fiumi, *Storia economica*, p. 174.

Before proceeding, the nature of the information we used to measure inequality needs further clarification. All of our sources (*estimi*, *catasti*, and *decime*) record the fiscal capacity of the taxpayers—that is, they tend to reflect their actual ability to pay tax. From this point of view, there is consistency over time in the kind of information they provide, a conclusion further strengthened by the fact that changes in the sources used do not mark structural breaks in our series of inequality measures (see the next section). However, one might wonder whether our sources provide information about 'wealth' or 'income'. A consolidated historiographic tradition has assimilated the 'capitalized income' recorded by the *catasti* to wealth,[30] with good reasons: as shown by Lindert, although it is possible to use the *catasto* (at least the first and most detailed one, in 1427) to estimate income inequality, a number of hypotheses and related transformations have to be made.[31] It is also clear that the *decime* record wealth (or more precisely, its main component: real estate), and as a matter of fact, the tax base of the *catasti* following the 1427 one was very similar to that of the *decime*, especially in rural communities. Regarding the *estimi*, earlier literature considered them directly comparable to the *catasti*, as the evaluations they reported were based mostly on the real estate owned by each household. Herlihy in particular used them explicitly to study wealth distribution

[30] Ibid.; Herlihy and Klapisch-Zuber, *Tuscans*.
[31] Milanovic et al., 'Pre-industrial inequality', p. 269.

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in a variety of Tuscan communities.[32] This being said, the Tuscan sources are more complex to use than the property records available for northern Italy, which also focus on wealth but are compiled according to the same criteria throughout the medieval and early modern periods.[33] A complete list of the archival sources we used is provided in online appendix S3.

As a final consideration, and although our sources basically reflect wealth inequality, for most pre-industrial societies wealth inequality can be considered a decent proxy of income inequality—and in most circumstances it is the *only* possible proxy.[34] As recently noted by Lindert, 'data on households' wealth inequality are particularly helpful as clues about income inequality before the twentieth century, when direct income measures were sparse'.[35] In fact, given the nature of the Tuscan fiscal sources, it seems possible that they offer better clues to this than the sources available elsewhere.

III

The change over time in the nature of the available sources requires some standardization of the data used, as well as a degree of caution in interpreting them. To clarify the matter as well as to introduce our discussion of long-term changes in economic inequality, we will start with a specific case: the large rural community of Poggibonsi, which throughout the period considered had a population of 2,000 to 2,500 people and for which we have collected a large number of observations in time: 13, covering 1338 to 1779. Of these, five relate to the fourteenth century, offering quite a precise picture of the distributive consequences of the Black Death, which spread to Tuscany in 1348. As can be seen in figure 2, in Poggibonsi the Black Death apparently triggered a period of decline in economic inequality, as measured by a standard indicator such as the Gini index. As early as the late fourteenth century, however, inequality had started to recover and, although the levels reached in the pre-Black Death decades would be exceeded only in the early sixteenth century, the tendency from 1384 to 1789 was that of an almost monotonic growth in inequality.

By and large, the long-term tendencies found for Poggibonsi reflect those of the Florentine *Contado*, as will be shown shortly. However, we must first dispel any doubt that such tendencies are not simply the result of certain characteristics of the sources used, and do indeed reflect real changes in inequality. In fact, the sources available for Poggibonsi change in nature over time: they are rural *estimi* for 1357, 1365, 1384, 1394, and 1402; *catasti* for 1458 and 1504; and *decime* for 1536, 1570, 1622, 1715, and 1779. These three kinds of sources are the ones we also used for the other communities of the Florentine *Contado* (see section I); however, in the case of Poggibonsi we have an additional source, used for 1338 only—a particularly useful source, then, as it pre-dates the Black Death—a local *estimo* that provides us with the total value of the real estate owned by each household. Importantly, the date when the kind of source used changes does not affect the trend, nor has it any

[32] Herlihy, *Medieval and renaissance Pistoia*; idem, 'Santa Maria Impruneta'.
[33] Alfani, 'Economic inequality'; Alfani and Barbot, eds., *Ricchezza*.
[34] See the discussion in Alfani, 'Economic inequality'.
[35] Lindert, 'Making the most of capital', p. 8.

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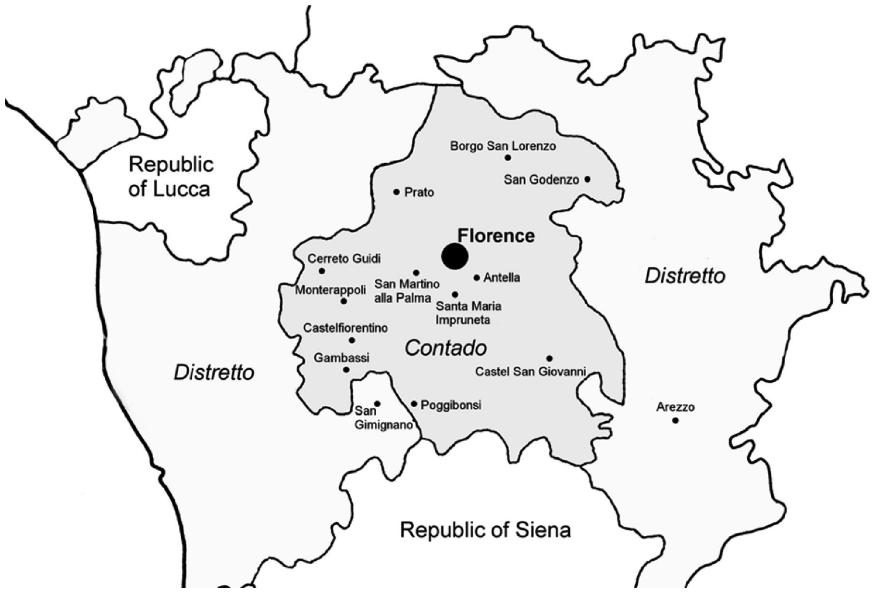

Figure 1. *The Florentine state: Contado and Distretto (c. 1406)*
Note: Only the communities included in our analysis, plus the capital city of Florence, are indicated on the map.

significant impact on the level of the Gini index. It is true that a minimal decline in the Gini level is found between 1402 and 1458 and between 1504 and 1536, but this does not change the overall long-term tendency of inequality to grow. The less homogeneous source is probably the 1338 local *estimo* but in this case too, the tendency from 1338 to 1357 seems to continue from 1357 to 1365, so we have no reason to suspect that it is not genuine.

The 1357, 1402, 1458, 1504, 1536, 1570, 1622, 1715, and 1779 sources are the same as those used for the other communities of the *Contado* included in this study (small variations in date may occur, reflecting exactly when the process of renewal of the fiscal record was completed in each community), and for them the same considerations as above are valid. Some additional clarification is needed. The measures presented in figure 2 are also comparable because some standardization was applied. In fact, in certain sources and years, people or goods not usually included in the records were listed. In the *Contado* of Florence, this is particularly the case of the people with 'zero *valsente*', that is, those who were so poor that they were exempt from taxation. In the *Contado*, these poor were listed only in 1458 and 1504. To make the time series as homogeneous as possible and to produce the standard inequality measures presented below, these people were simply removed from the distribution, so that the type of households included is exactly the same over time. The other problem lies in the property of religious institutions, which was exempt from taxation and consequently does not usually appear in the records—in Tuscany as elsewhere in Italy. This is less of a problem than one might think, as even today household surveys do not include institutional incomes or property. In fact, some of our Tuscan sources are exceptional in that they provide unusually good and regular information about church property. This is especially the case

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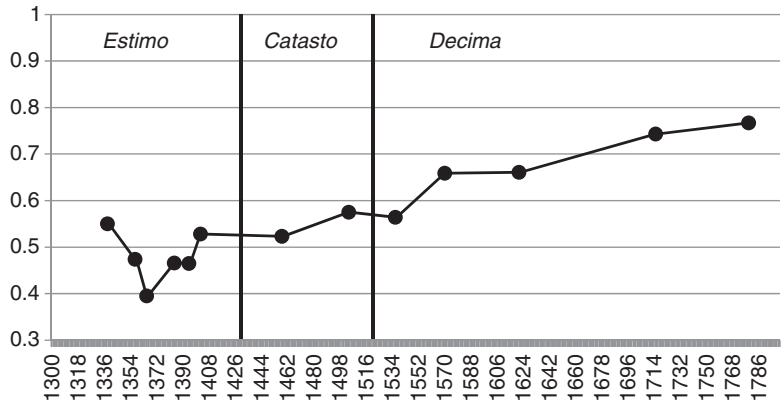

Figure 2. *Economic inequality in Poggibonsi, 1338–1789 (Gini indexes)*
Sources: See online app. S3.

for San Gimignano (see below), while in the Florentine *Contado*, only in the 1338 local *estimo* of Poggibonsi was church property listed and given a value. Also in this case, to improve comparability of inequality measures through time, it has simply been removed from the distribution—although as explained earlier, even after standardization there remain some differences in the property recorded by the sources we use. However, it can be shown statistically that changes in the kind of sources considered (from *estimo* to *catasto* to *decima*) do not seem to generate structural breaks in our database of standardized inequality measures. Before doing this, however, we will perform a detailed descriptive analysis of our time series.

As already mentioned, for the communities of the *Contado* we collected fewer data than for Poggibonsi. In fact, we used Poggibonsi as a pilot study, which helped us to select the most complete, reliable, and comparable sources. For each community we decided to take, when available, one observation close to 50-year breakpoints (1300, 1350, 1400, and so on). We selected the communities to study taking into account various parameters, and principally the availability and the quality of the surviving documentation, and the adequate territorial coverage of the whole area (see online appendix S1 for a discussion of our sampling strategy). Overall, we researched 11 communities (excluding Prato). The Ginis we calculated for all of them and covering the whole period are presented in table 2, where measures have been clustered around reference years (the above-mentioned breakpoints) to ease comparison with the communities of the *Distretto* (see below). The indices vary within the value 0 (perfect equality: all households are equal) and 1 (perfect inequality: one household owns everything). Note that we have pre-Black Death information (coming from local *estimi*) for only three communities, and similarly we could reconstruct the situation around 1800 for only three (due to substantial changes in the administrative boundaries of the other communities that occurred during the eighteenth century).

Overall, in the five centuries we covered, economic inequality grew everywhere. In each single community of the *Contado* we studied, the Gini value for 1700 is higher than that found for any earlier period, ranging from 0.658 in San Godenzo

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Table 2. *Economic inequality in the* Contado *of Florence,* c. *1300–1800 (Gini indexes clustered around reference years; actual year between parentheses)*

	Antella	*Borgo San Lorenzo*	*Castel San Giovanni*	*Castelfiorentino*	*Cerreto Guidi*	*Gambassi*	*Monterappoli*	*Poggibonsi*	*San Godenzo*	*Santa Maria Impruneta*	*San Martino alla Palma*
1300	0.452							0.550		0.462	
	(1319)							(1338)		(1307)	
1350	0.462	0.504	0.352	0.505	0.463	0.248	0.528	0.474	0.501	0.439	0.531
	(1357)	(1357)	(1357)	(1365)	(1357)	(1357)	(1357)	(1457)	(1357)	(1365)	(1357)
1400	0.523	0.665	0.592	0.574	0.433	0.546	0.567	0.528	0.468	0.449	0.526
	(1394)	(1402)	(1402)	(1402)	(1402)	(1402)	(1402)	(1402)	(1402)	(1402)	(1402)
1450	0.490	0.517	0.463	0.473	0.455	0.429	0.558	0.523	0.438	0.491	0.461
	(1458)	(1460)	(1469)	(1458)	(1458)	(1458)	(1458)	(1458)	(1461)	(1458)	(1458)
1500	0.499	0.494	0.526	0.504	0.629	0.545	0.573	0.575	0.512	0.456	0.426
	(1504)	(1504)	(1504)	(1504)	(1504)	(1504)	(1504)	(1504)	(1504)	(1504)	(1504)
1550	0.447	0.543	0.503	0.480	0.572	0.526	0.577	0.564	0.515	0.465	0.610
	(1536)	(1536)	(1536)	(1536)	(1536)	(1536)	(1536)	(1536)	(1536)	(1536)	(1536)
1600	0.474	0.53	0.563	0.679	0.579	0.582	0.575	0.659	0.543	0.520	0.617
	(1570)	(1570)	(1570)	(1570)	(1570)	(1570)	(1570)	(1570)	(1570)	(1570)	(1570)
1650	0.642	0.599	0.619	0.588	0.652	0.682	0.657	0.661	0.618	0.513	0.722
	(1621)	(1621)	(1621)	(1621)	(1621)	(1621)	(1621)	(1621)	(1621)	(1621)	(1621)
1700	0.764	0.678	0.745	0.723	0.759	0.725	0.748	0.743	0.658	0.736	0.939
	(1715)	(1715)	(1715)	(1715)	(1715)	(1715)	(1715)	(1715)	(1715)	(1715)	(1715)
1800				0.788				0.767	0.752		
				(1779)				(1779)	(1779)		

Sources: See online app. S3.

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to 0.939 in San Martino alla Palma. On the whole, these values are similar to the Ginis measured for rural areas in other parts of Italy. For example, in Piedmont around the same date, the Gini was 0.579 in Cumiana and 0.733 in Vigone.[36] In these communities, like in San Godenzo, Poggibonsi, and Castelfiorentino where the Gini rose respectively to 0.752, 0.767, and 0.788 by 1779, inequality continued to grow during the eighteenth century, to 0.675 in Cumiana by 1749 and to 0.809 in Vigone by 1764. In another part of Italy, Romagna, in 1783 rural Ginis were in the range 0.76–0.82 in the territory of Brisighella and 0.67–0.75 in that of Russi.[37] Both for Piedmont and Romagna, the measures refer to inequality in ownership of real estate (excluding the propertyless), and can be cautiously compared with those we provide based on the *decima*. Consequently, our communities do not seem to be exceptional from the point of view of inequality levels, save for San Martino alla Palma, where the Gini for 1700 equals 0.939 (in fact, from around 1550 San Martino is invariably the most unequal community). This very high level—the highest found to date in any Italian rural community at any time—could be due to specific dynamics affecting this community, particularly its apparent de-population over time (as reflected in the steady decline in the number of recorded taxpayers: from more than 100 until the early sixteenth century, to a few scores in the final dates) with consequent extreme concentration of local real estate in few 'surviving' hands. It should also be noted that such a high level of rural inequality is not altogether unrealistic, as similar levels are attested to in other areas of Europe (for example, the real estate Gini was 0.92 in the French village of Saint-Etienne-de-Bailleul in 1826).[38]

If Tuscan rural inequality was high, it was even higher in the cities. Table 3 presents similar measures for the three cities considered in this study: Arezzo, Prato, and San Gimignano. In the case of the latter, the Ginis include the '*contado*' (the area subject to San Gimignano was not formally a *contado*, but for the sake of simplicity we will use the term here to indicate the rural areas surrounding the town and subject to its jurisdiction). Table 3 also presents proxy information about the Florentine *Contado* in general (resulting from the combination of the distributions of the 11 rural communities mentioned above)[39] as well as for the whole of the *contado* of San Gimignano, which for some years at least we could separate from the general distribution. As will be remembered, the case of San Gimignano is exceptional because here church property and more generally 'institutional' property was also recorded. As a consequence, we provide measures both including and excluding institutions (the latter being the time series that is more comparable to the other cities). Notice that, in the case of San Gimignano, excluding institutions determines a slight distortion of the inequality measures over time—towards inequality until 1400, and towards equality from about 1450. Were this result generalizable to the whole of the Florentine state, we would have to conclude that the tendency of wealth inequality to grow in time was even steeper than that described below. Unfortunately, the data currently available do not allow

[36] Alfani, 'Economic inequality'.
[37] Mazzotti, 'Alcune considerazioni'.
[38] Boudjaaba, 'La distribuzione', p. 390.
[39] That is, the overall distribution for the *Contado* is the simple aggregation of all the household-level entries of each single rural community we studied.

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Table 3. *Economic inequality in selected areas of Tuscany,* c. *1300–1800 (Gini indices clustered around reference years; actual year between parentheses)*

	Arezzo	*Prato*	*San Gimignano (including the contado)*	*San Gimignano (including the contado, excluding institutions)*	*Contado of San Gimignano*	*Contado of Florence*
1300		0.703 (1325)		0.712 (1277–90)	0.674 (1290)	
1350		0.591 (1372)	0.657 (1375)	0.658 (1375)	0.585 (1375)	0.53
1400	0.481 (1390)		0.634 (1419)	0.639 (1419)	0.499 (1419)	0.57
1450	0.600 (1443)	0.683 (1428)	0.674 (1428)	0.671 (1428)		0.504
1500	0.627 (1501)	0.624 (1487)	0.648 (1475)	0.631 (1475)	0.582 (1475)	0.546
1550	0.651 (1558)	0.575 (1546)	0.627 (1549)	0.592 (1549)	0.630 (1549)	0.540
1600	0.722 (1602)	0.737 (1621)				0.613
1650	0.725 (1650)	0.807 (1671)	0.682 (1674)	0.641 (1674)		0.645
1700	0.810 (1710)					0.737
1750	0.846 (1751)	0.831 (1763)				
1800	0.832 (1792)					0.855[a] (1779)

Note: a Measure calculated from three communities out of 11.
Sources: See online app. S3.

us to test such a hypothesis—consequently, also for reasons of synthesis, we will not discuss the issue of church property further.

The data presented in tables 2 and 3 allow for some general considerations about the relative inequality levels in different Tuscan environments. There was, in fact, an earlier attempt to do this: Herlihy's rightly famous study of economic inequality in the Florentine state.[40] This study was based on a single source, the *catasto* of 1427. Herlihy reached a number of relevant conclusions. First, for cities, there exists a positive correlation between population size, average per capita wealth, and concentration of property. In fact, in the smaller cities under Florentine rule (Cortona, Volterra, Prato) average per capita wealth was about 45 *fiorini* versus the 70–85 of medium-sized cities like Arezzo, Pistoia, and Pisa and the 273 of the capital city, Florence, where the richest families resided. Moreover, the Gini was higher in the capital (0.788) than in all other cities (0.747 in the aforementioned six cities taken together—unfortunately city-per-city measures are not provided),[41] declining, as a tendency, with population. Second, when comparing inequality in cities and in rural communities, the first were almost invariably wealthier (in per capita terms) and more unequal. According to Herlihy, average rural wealth equalled 32 *fiorini* per capita in the villages,

[40] Herlihy, 'Distribution'.
[41] Ibid., pp. 136–9; Herlihy and Klapisch-Zuber, *Tuscans*, p. 341.

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and just 14 in sparsely populated areas.[42] Although Herlihy did not calculate concentration indexes for rural communities in the *Contado* of Florence, in his study of the village of Santa Maria Impruneta he underlined the fact that the share of wealth owned by the poorest 50 per cent of the population was about double in the country compared to Florence (6 per cent versus 2.68 per cent).[43] We can add considerably to this comparison, as our database suggests that around 1450 the Ginis for rural communities ranged from 0.429 (Gambassi) to 0.523 (Poggibonsi)—considerably lower than the 0.600 found for Arezzo, 0.683 for Prato, and 0.671 for San Gimignano. A similar urban–rural differential is to be found in the territory of Pistoia in the Florentine *Distretto*. Here, in 1427 the city had a Gini of 0.713, while rural inequality varied between 0.634 for the villages on the plain taken together and 0.515 for those in the mountains.[44] Finally, in Livorno, which at the time was still a small town with less than 7 per cent of the households of Pisa and about 1 per cent of those in Florence, a study reported a Gini of 0.520.[45]

Herlihy's pioneering intuitions were fundamentally right, but his analysis lacked long-term perspective. This not only prevented him from noticing other interesting and important phenomena but also (and surely, independently from Herlihy's intentions) it helped to spread the idea among international scholars that the 1427 *catasto* was an exceptional source, the like of which was not to be found in any other place, or at any other time. However, although it is true that the 1427 *catasto* is particularly informative about many components of wealth, not-too-different sources also exist for other parts of Italy and Europe that allow for a systematic study of economic inequality and wealth or income distribution, as demonstrated by the recent case study of Piedmont[46] as well as research on various Italian communities.[47] Moreover, exceptional sources providing information as rich as the *catasto* exist elsewhere, such as the 1613 Sabaudian 'census'.[48] Regarding the availability of sources across time, Tuscan records redacted with criteria similar to the 1427 *catasto* cover a much longer period of about one century (the last we used for the *Contado* dates from 1504) and, as the data presented here show, other sources can be used in addition to produce information comparable in many regards to that provided by the *catasto*, covering many centuries.

If we overcome the limitations implicit in single-source studies of economic inequality and focus on long-term dynamics, very interesting phenomena appear. In figure 3, long-term trends in economic inequality are represented, in the cities, in the two *Contadi* of Florence and San Gimignano, and in selected communities of the Florentine *Contado*.

Overall, our time series of inequality strongly suggest that in the very long term, economic inequality was orientated towards growth, both in rural and in urban areas. In fact, only the post-Black Death period seems to be associated with inequality decline (see below). Regarding the later periods, we found that in rural

[42] Herlihy, 'Distribution', p. 136.
[43] Herlihy, 'Family', p. 8; idem, 'Santa Maria Impruneta', p. 259.
[44] Herlihy, *Medieval and Renaissance Pistoia*, pp. 186–8.
[45] Casini, *Il catasto.*
[46] Alfani, 'Economic inequality'.
[47] Alfani and Barbot, eds., *Ricchezza.*
[48] Alfani, 'Wealth inequalities'.

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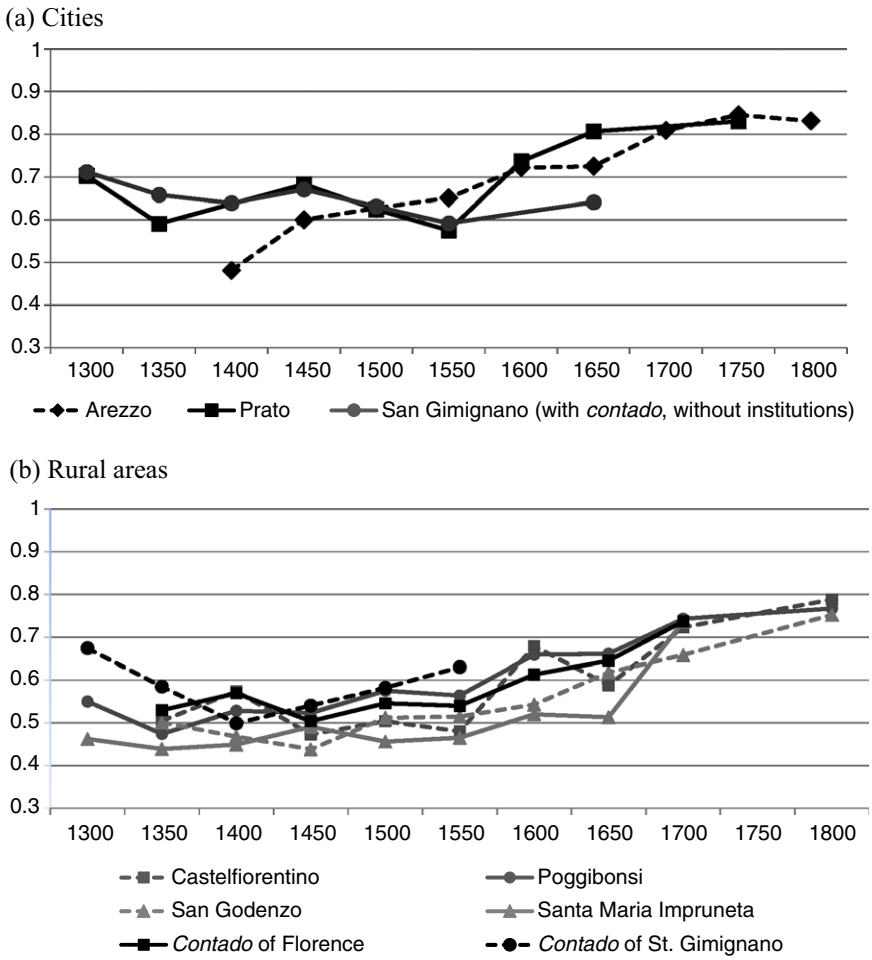

Figure 3. *Long-term trends in economic inequality (Gini indexes)*
[Colour figure can be viewed at wileyonlinelibrary.com]
Sources: See online app. S3.

communities, from about 1450 inequality tended to grow almost monotonically. In the overall Florentine *Contado*, inequality stagnated or slightly declined only from 1500 to 1550, while continuing to rise in the *contado* of San Gimignano. In the cities the situation is more complex. In fact, although from about 1400 the overall tendency is towards an increase in inequality, the process is much more linear in Arezzo than in Prato or San Gimignano. While for San Gimignano the absence of information after 1650 complicates the interpretation of the data, for Prato the impression is that the century from 1450 to 1550 marks the temporary interruption of an overarching process of increasing inequality spanning a much longer period. This could be partly the consequence of the terrible sack suffered by the city in 1512, which cost the lives of many citizens and peasants[49] and, as the

[49] Ammannati, 'Il costo', p. 41.

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rich were usually targeted in such instances as the better able to provide bounty and ransoms,[50] could have caused a downward levelling of the wealth distribution. Inequality decline, however, was already underway before the sack (the Gini index diminished from 0.683 in 1428 to 0.624 in 1487, before reaching a floor of 0.575 in 1546).

Our urban time series also allow us to explore in some detail the relationship between population growth and inequality growth. On the one hand our data largely confirm Herlihy's intuition that smaller centres were less unequal than the larger ones. Around 1427 (the date to which Herlihy referred), all our communities were less unequal than the capital, Florence, and all cities were more unequal than the villages of the Florentine *Contado*. Importantly, the second finding also remains true at other points in time, as for 1407 we could calculate the Gini for a larger city, Pisa, whose value of 0.640 is higher than that which we found at similar dates in all other cases we studied. However, within the group of cities we studied, the hierarchy of inequality levels does not match univocally that of population size (Arezzo, which in the first half of the fifteenth century was the largest city in our database, is the least unequal), a fact that could reflect differences both in local socio-economic structures and the sources used. On the other hand, considering the development of each specific city or rural community, we find that the correlation between population growth and inequality growth seems weaker than reported by studies involving other areas, from Piedmont to Veneto,[51] and as also confirmed by our regression analysis (section VI).

Before proceeding, we would like to provide further evidence that the trends emerging from our descriptive analysis, and in particular the long-term tendency for inequality to grow, are not a statistical artefact, resulting from the change in sources used. To this end, we performed a Chow test to see if there were structural breaks in 1427 and in 1507.[52] In other words, we divided all the observations available for our 11 rural communities (overall, $N = 99$) into three groups: the post-Black Death *estimi* (1350–1426, $N = 29$), the *catasti* (1427–1506, $N = 23$), and the *decime* (after 1507, $N = 47$). We then calculated the coefficient of the linear fit (β) by means of a simple linear regression (with time as the independent variable). Differences in the coefficients related to each period did not prove significant, and consequently we conclude that there is no structural break in 1427 and 1507.[53] Figure 4 provides a graphical representation of the linear fits for the three periods. As can be seen from the figure, the passage from *catasti* to *decime* seems particularly smooth—possibly because, as discussed above, at least in the case of rural communities, these sources reflected basically the same fiscal base. In the passage from the *estimi* to the *catasti* a small drop is noticeable; however, the source dummies we included in the regression analysis (section VI) proved non-significant.

[50] Alfani, *Calamities*, p. 27.
[51] Alfani, 'Prima'; idem, 'Economic inequality'; Alfani and Caracausi, 'Struttura'.
[52] The *decima* system was introduced in the countryside in 1507–8; see section I.
[53] $Chi^2 = 2.05$; $Prob > Chi^2 = 0.36$

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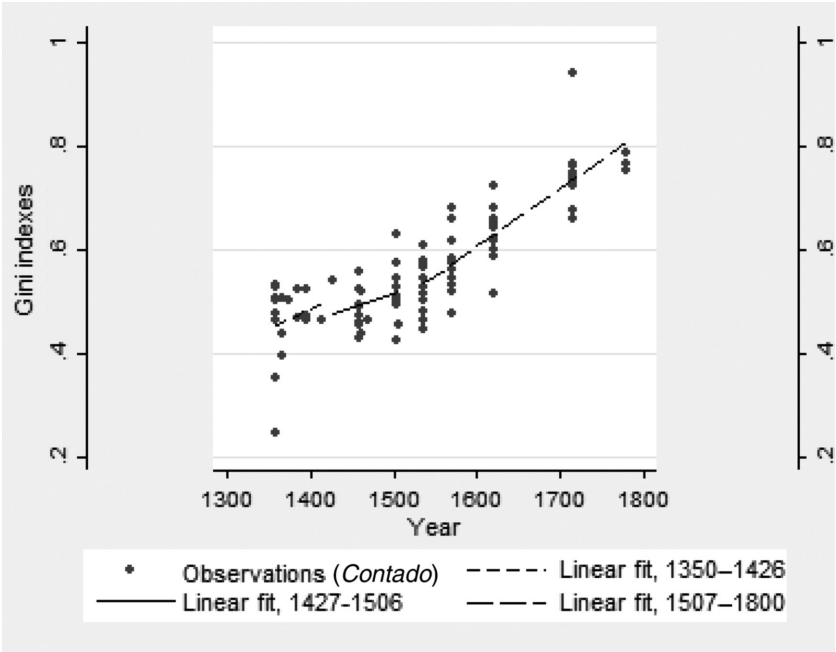

Figure 4. *Economic inequality in the Florentine Contado—looking for sources-induced structural breaks*

Sources: See online app. S3.

IV

If population growth is often associated with inequality growth, during the fourteenth and fifteenth centuries we also find that huge demographic losses caused by the Black Death are associated with inequality decline. Since our findings contradict older publications, the distributive effects of the Black Death will be analysed in some detail. Herlihy's pioneering works are once more the unavoidable starting point, particularly those on Santa Maria Impruneta, a village in the Florentine *Contado*, and on Pistoia and a village placed in the Pistoiese *Contado*, Piuvica—although, as Pistoia city statutes ordered that all old *estimi* be burned,[54] the village is much more important than the city in Herlihy's analysis of the consequences of the pandemic. In Piuvica, where a rare *estimo* dated 1243 survived, Herlihy compared it with the 1427 *catasto* and described a wealth distribution becoming markedly more unequal after the Black Death.[55] In Santa Maria Impruneta, the comparison of three pre-Black Death *estimi* (dated 1307, 1319, and 1330) with the 1427 *catasto* yielded much the same result.[56] In both instances, a higher concentration of wealth was the result of the weakening in numbers and in collective assets of the 'middle class'; for example, in the Pistoiese area, 'In the city and on the plain—the economic heart of the territory—

[54] Herlihy, *Medieval and Renaissance Pistoia*, p. 185.
[55] Ibid., pp. 182–3.
[56] Herlihy, 'Santa Maria Impruneta', pp. 258–60.

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a few families with great wealth had come to confront many with few assets or none. The troubles of the fourteenth century had not been favorable to the growth or even the defense of small fortunes'.[57] The process would have been strengthened by inheritance systems and managerial factors. Inheritance might have played a particularly important role, as 'The shrinking of the population also undoubtedly favoured with accumulated inheritances a few lucky survivors'.[58] Overall, Herlihy believed that by 1427, in the whole of Tuscany the urban (and the rural) middle class was 'crushed between the rich, distinguished by their huge possession, and the poor, distinguished by their numbers', and that probably 'the highly skewed distribution of wealth in the fifteenth-century was a comparatively new development, and ... wealth had been somewhat more evenly distributed across the population in the thirteenth century, before the onslaught of the great epidemics'.[59]

It is sufficient to look at figure 3 to note that as far as our case studies are concerned, the situation seems to be very different from that described by Herlihy. Apparently the Black Death triggered a phase of reduction in inequality that continued until about 1400 in the cities, and until about 1450 in rural communities. In all but one of the cases for which we have pre-Black Death measures of inequality, they are much lower in 1427 or around that date than before the Black Death—the exception being Antella (see table 2), possibly due to the fact that it was affected in a milder way by the plague (137 households are recorded in 1319 and 116 in 1357: a 15.3 per cent decline, which compares favourably to the 34.5 per cent decline of Santa Maria Impruneta between 1319 and 1365 and the 24.2 per cent decline of Poggibonsi between 1338 and 1357). However, even in Antella the Gini trend between 1319 and 1357 is almost flat, and some decline in inequality occurred in the early fifteenth century. These results find support in the only other area for which a study of the impact of the Black Death on inequality levels has been conducted: Piedmont. Here, the pandemic seems to be the root of a fairly long phase of inequality decline, which even in the cities lasted until about 1450. In Chieri, for example, a Gini index of 0.715 has been calculated for 1311, which is much higher than that calculated for 1437 (0.669), while in Cherasco the Gini of 0.630 calculated for 1350 contracted first to 0.546 in 1395–1415 and then to 0.521 in 1447–50 (Piedmontese measures refer to inequality in real estate only).[60]

The findings for Piedmont should not be considered surprising, as they are 'consistent with the hypothesis that the Black Death determined a significant increase in real wages of skilled and unskilled workers, who consequently would have had more resources to buy property'.[61] Studies of labour conditions in the aftermath of the Black Death confirm that in Tuscany, wages showed a tendency to rise,[62] although Florence tried to contain the process, at least in the rural areas and—presumably—with limited success.[63] In Florence there is also evidence of a

[57] Herlihy, *Medieval and Renaissance Pistoia*, p. 189.
[58] Ibid., p. 190.
[59] Herlihy, 'Distribution', p. 139.
[60] Alfani, 'Economic inequality'.
[61] Ibid., p. 1079.
[62] Goldthwaite, *Building*, pp. 317–42, app. 3; la Roncière, 'La condition'; idem, *Prix*.
[63] Cohn, 'After the Black Death', pp. 469–70.

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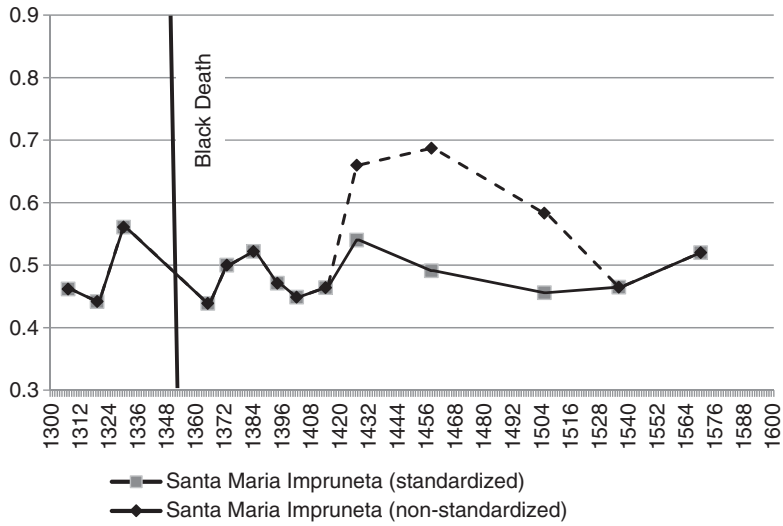

Figure 5. *Economic inequality in Santa Maria Impruneta, 1307–1570 (Gini indexes, with or without standardization)*

Sources: See online app. S3.

'huge tidal wave' in the formation of new lineages after the Black Death, which reflect particularly good opportunities for entering the elite.[64] We could wonder, then, why Herlihy's data seem to differ. In fact, we detected two problems with his analysis. First of all, he compared very different points in time (separated by more than a century in the case of Santa Maria Impruneta, and by almost two in Piuvica) without considering potentially crucial in-between dynamics. For example, as suggested by the case of Poggibonsi (figure 2), a recovery before 1427 could hide the short- and medium-term egalitarian consequences of the Black Death. Second, he compared the thirteenth- and fourteenth-century *estimi* directly (without standardization) with the 1427 *catasto*—but the poor unable to pay tax are absent from the *estimi* records, while the *catasto* recorded almost everybody. Standardization of the sources with elimination of the propertyless from the 1427 distribution (a necessary step to compare, insofar as possible, like with like) possibly overturns the result, exactly as in Poggibonsi where, when the individuals with 'zero *valsente*' are taken out, the Gini calculated for 1338 (0.550) is higher than that calculated for 1458 (0.523) but much lower than the Gini calculated when they are included (0.704). In fact, after collecting the first data for the *Contado*, we decided to add Santa Maria Impruneta to the original sample, replicating the research done by Herlihy but also considering additional sources in-between those used by him and continuing the analysis until the early eighteenth century. We discovered that here, too, including the propertyless in the calculation of the Gini from the *catasto* dramatically alters the index values—from 0.540 to 0.660 in 1427, and from 0.491 to 0.687 in 1458. Figure 5, which presents particularly dense yearly data for the fourteenth to sixteenth centuries, shows how forgetting standardization can distort interpretation of the data (notice that if we consider the standardized data only, the

[64] Padgett, 'Open elite?'.

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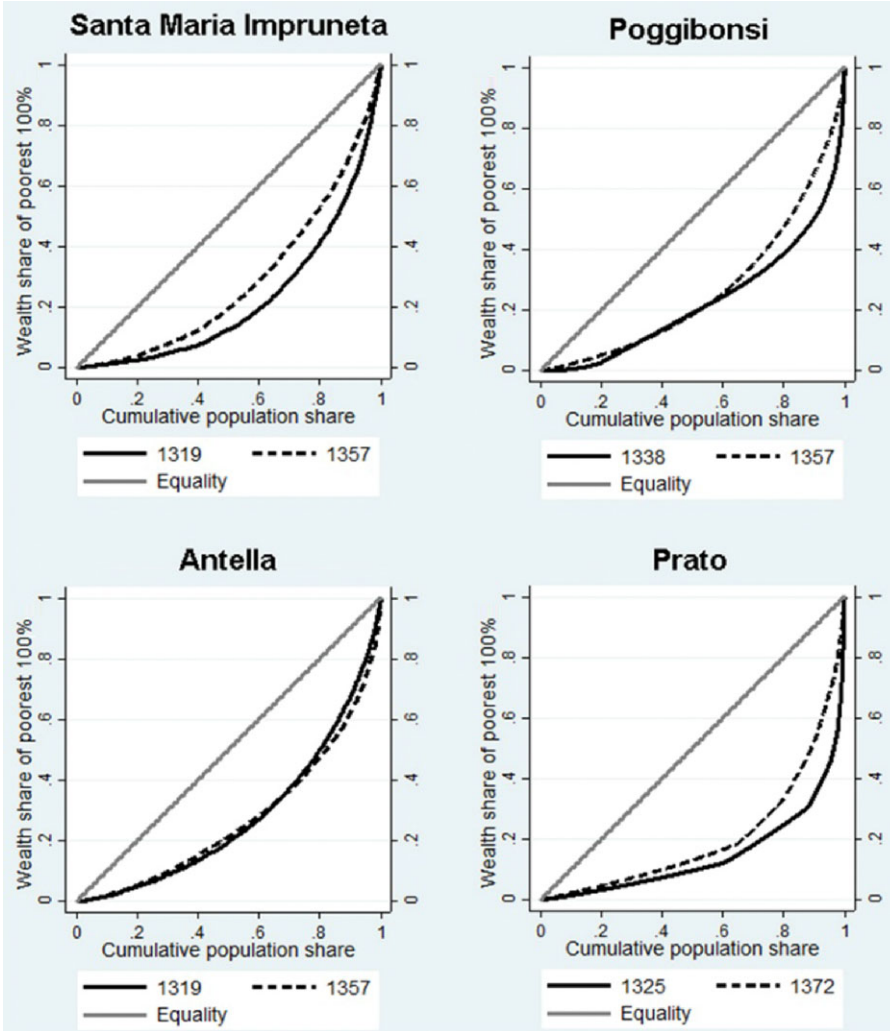

Figure 6. *Wealth distribution in the pre- and post-Black Death years (Lorenz curves)*
Note: *Lorenz curves have been drawn using the glcurve Stata package.*
[Colour figure can be viewed at wileyonlinelibrary.com]
Sources: See online app. S3.

high point for the whole period pre-dates the Black Death, being reached in 1330 when the Gini is equal to 0.561).

Our data provide strong support for the idea that the Black Death had an 'egalitarian' impact on wealth distributions, as first hypothesized by Alfani.[65] To gain a better understanding of how such an event affected the overall distributions, in figure 6 we present Lorenz curves for the four communities for which we have pre-Black Death information. For Santa Maria Impruneta and Prato we find that

[65] Alfani, 'Economic inequality'.

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the post-plague distribution lies entirely above the pre-plague one, suggesting an improvement in the relative conditions of those placed at the bottom, middle, and upper-middle parts of the distribution, to the detriment of the very richest. Overall this is also the case in Poggibonsi, with the exception of a slight worsening of the relative conditions of the lower-middle levels. Only in Antella do the pre- and post-plague distributions cross each other. While the relative share of wealth of the bottom 50 per cent of the distribution increases, the upper-middle levels lose position to the advantage of the top 10 per cent (the overall result is an almost unchanging Gini). Notice that in all cases, changes in the Ginis were coupled with an increase in per capita (or per household) property determined by the huge population decline—so that the society emerging from the Black Death was both more egalitarian and 'richer'.

It is quite clear from our data that the Black Death was able to alter deeply the social-economic structures of medieval Tuscany, partly due to the pure magnitude of the shock, and partly because Tuscan society was totally unprepared for this new threat. In particular, the 'unmitigated' partible inheritance system that existed on the eve of the Black Death caused, at least in the short run, a (undesired) patrimonial fragmentation (as patrimonies were divided evenly among inheritors) that surely contributed to the quick decline in inequality immediately after the pandemic. However, the impact of the plague on inequality levels following the Black Death is less clear, mostly due to the adaptation that occurred in inheritance practices, as has been argued for early modern Piedmont[66] and, again for reasons of synthesis, this will not be discussed in this article. We will now analyse in greater detail the distribution of wealth in medieval and early modern Tuscany, paying particular attention to the problems presented by the absence of the propertyless from most of our sources.

V

Several studies have shown that the Tuscan society of the late middle ages was profoundly unequal. In fourteenth- and fifteenth-century Florence, a huge mass of poor families were in close contact with a small number of people enjoying immense wealth, and in the secondary cities of the state the concentration of riches was equally strong.[67] The situation in the Florentine *Contado* does not seem very different. Table 4 provides key information about the distribution of wealth in different parts of the Florentine state.

The distribution of wealth by deciles shows the extraordinary concentration of property in the hands of a few people. In San Gimignano, from the middle ages to modern times, 10 per cent of the richest taxpayers held on firmly to about 50 per cent of the wealth. In the *Contado* of Florence, about 40 per cent was owned by the richest 10 per cent of the population, a percentage that exceeded 50 per cent in the seventeenth century and reached 60 per cent at the beginning of the eighteenth. Shares are even higher for the very richest of Arezzo and Prato.

While the top of the distribution is reflected very well by our sources, it is much more difficult to get a clear picture of the bottom, as medieval and early modern

[66] Alfani, 'Effects'; idem, 'Economic inequality'.
[67] Herlihy, 'Distribution'; Herlihy and Klapisch-Zuber, *Tuscans*, pp. 97–102; Stella, *La révolte*, pp. 185–92.

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Table 4. *Distribution of wealth in the Florentine* Contado, *Arezzo, Prato, and San Gimignano (1300–1750, data clustered around reference years)*

	Year	*D1*	*D2*	*D3*	*D4*	*D5*	*D6*	*D7*	*D8*	*D9*	*D10*	*Top 5%*	*Top 1%*
Contado of Florence	1350	0.92	2.17	2.98	3.84	5.05	6.79	9.08	12.42	17.96	38.79	25.84	9.12
	1400	1.24	1.64	2.57	3.44	4.6	6.02	8.16	11.35	17.1	43.88	30.65	12.39
	1450	1.39	2.26	3.13	4.08	5.44	7.21	9.29	12.35	17.81	37.05	22.99	6.75
	1500	0.9	1.8	2.71	3.82	5.04	6.63	8.89	12.04	17.45	40.72	27.28	10.61
	1550	1	2.04	2.82	3.87	5.15	6.66	8.85	11.56	17.36	40.68	27.42	10.5
	1600	0.59	1.48	2.26	3.16	4.18	5.43	7.35	10.32	16.47	48.76	34.86	13.67
	1650	0.42	1.15	1.84	2.66	3.66	4.97	6.91	10.17	16.59	51.62	36.49	13.85
	1700	0	0.08	0.73	1.52	2.55	3.91	5.7	8.94	16.06	60.52	44.52	17.46
Arezzo	1400	2.08	3.54	3.89	5.06	5.77	7.13	7.63	10.02	14.09	40.8	30.27	15.55
	1450	1.5	1.57	1.87	2.74	3.66	5.45	7.57	11.06	17.65	46.92	31.9	11.24
	1500	1.51	1.58	1.59	2.21	3.21	4.62	6.83	10.73	18.56	49.16	33.21	13.59
	1550	0.22	0.57	1.1	1.98	3.41	5.49	7.95	11.98	19.6	47.71	31.46	8.94
	1600	0.17	0.49	0.86	1.43	2.3	3.85	6.07	9.9	17.72	57.21	42.44	21.59
	1650	0.18	0.5	0.86	1.34	2.21	3.67	5.99	9.9	18.04	57.3	42.7	20.52
	1700	0	0.02	0.26	0.57	1.14	2.11	3.8	7.13	15.89	69.08	51.57	25.3
	1750	0	0	0.05	0.27	0.6	1.29	2.66	6.01	14.87	74.24	57.11	26.36
	1800	0	0	0	0.22	0.68	1.73	3.61	6.62	14.32	72.82	56.03	20.9
Prato	1300	1.58	1.82	1.98	2.14	2.27	2.49	5.93	6.69	9.39	65.72	55.26	29.18
	1350	2.26	2.39	2.62	2.76	3.06	3.57	6.44	10.22	18.58	48.12	31.99	10.81
	1450	0.61	0.61	0.97	1.81	2.71	3.82	7.03	11.46	17.39	53.59	35.96	13.04
	1500	1.69	1.83	1.9	2	2.09	2.79	9.41	10.65	20.24	47.4	32.25	8.11
	1550	0.77	1.57	2.26	3.25	4.7	6.19	8.42	12.09	18.03	42.71	28.51	10.77
	1600	0	0.24	1.08	1.74	2.54	3.56	4.89	8.09	16.59	61.25	44.38	17.32
	1650	0	0	0.18	0.79	1.46	2.35	3.8	6.62	15.39	69.41	52.78	21.32
	1750	0	0	0	0.29	0.79	1.53	3.2	7	15.16	72.03	54.74	23.32
San Gimignano (with *contado*, without institutions)	1300	0.74	0.76	1.17	1.51	1.64	2.66	5.3	10.06	20.1	56.05	38.29	16.74
	1350	0.49	0.79	1.31	2.38	2.99	5.29	6.06	12.18	19.24	49.28	36.47	15.44
	1400	0.43	1.08	1.53	3.01	3.3	5.15	7.14	11.82	16.97	49.56	35.23	11.31
	1450	0.66	0.64	0.66	1.7	2.83	5.07	7.63	11.95	18.86	50.01	35.47	13.8
	1500	0.41	1.02	1.43	2.88	3.08	6.48	7.06	13.14	17.76	46.74	34.96	15.85
	1550	0.67	1.54	1.84	3.54	3.92	6.42	7.89	11.82	17.61	44.75	29.76	10.44
	1650	0.31	0.76	1.67	2.08	3.54	6.03	7.55	13.17	16.82	48.08	34.25	14.46

Note: Zero-entries in the books of the *decima* (used for reference years from 1550 onwards) come from accounts only including exempt assets (houses of residence), or whose value is nullified by fees or other charges.
Sources: See online app. S3.

fiscal sources do not usually include the propertyless. This problem has also been encountered in other studies of long-term trends in inequality, in particular those on Piedmont and Holland.[68] The solution used by such studies is simply to exclude the propertyless (when reported) from the calculation of inequality measures, and we applied the same procedure to produce comparable information. This means that the distributions we study are truncated to the left, and that all Gini indexes are distorted towards greater equality. Our measures, however, are still a valid lower bound on inequality. Note that the information currently available—either collected by us or provided by the literature—is simply insufficient to use the alternative method of estimating the prevalence of the propertyless and correcting the distributions, as, for example, Hanus attempted in his detailed study of 's-Hertogenbosch in the Low Countries during the period 1500–1660.[69]

[68] Alfani, 'Economic inequality'; van Zanden, 'Tracing'.
[69] Hanus, 'Real inequality'.

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Only in some exceptional circumstances, and in particular for the period covered by the *catasti*, can we measure the prevalence of the propertyless. In 1427 the law allowed Florentine citizens to deduct 200 florins for each member of the family, a sum which could have reduced even a good fortune to zero.[70] This rule, however, was not extended to the taxpayers of the *Contado*, who only shared with the citizens the deduction for the house of residence. Luckily, the sources indicate the value of these properties, even if they were not included in the calculation of the total taxable amount, and we were able to incorporate them in our reconstruction. Using the data of our 11 communities of the *Contado* for the years 1450 and 1500, the overall percentage of taxpayers with a *valsente* of 0 (without considering deductions) is 33.1 and 30.6 per cent respectively. Earlier research showed that in 1427, net of deductions, 21 per cent of households of the whole of rural Tuscany were recorded in the *catasto* with a *valsente* of 0, while almost two-thirds were taxable at a value of under 100 florins. In the central area of the *Contado*, where more than half of the land was involved in sharecropping, the percentage of taxpayers with a *valsente* of 0 was about 50 per cent.[71] Including deductions obviously inflates these 1427 measures. For example, for the city of Florence in that year, available estimates of propertyless citizens range from 28.8 per cent[72] to 31 per cent—but these figures are net of deductions and, in fact, those who did not have anything at all regardless of deductions were just 14 per cent.[73] For Prato, we only have estimates net of deductions, according to which the propertyless would constitute 17.9 per cent and 32.2 per cent respectively in the *catasti* of 1428 and of 1487. For this city, we also have a figure from the *estimo* of 1372, when 37.6 per cent of households had no taxable property.

Overall, it seems that the part of population excluded by the Tuscan fiscal sources might have been exceptionally high compared to other areas of Italy. In Piedmont, for example, the scattered information available suggests that the population entirely devoid of real estate varied, in the period 1393–1613, within the fairly tight band of 8.5 to 11 per cent, both in cities and in rural areas.[74] This difference was probably due, at least to a large degree, to the relative abundance of sharecropping and to the system of deductions used in the Florentine state. As a consequence, the distortion towards equality of our estimates is also relatively large. As shown by table 5, the decrease in the Gini values caused by the exclusion of the propertyless is around 20 per cent, except in the case of Prato in 1450, where the decrease was much lower, at 7.7 per cent—very close to the 7.1 per cent that can be calculated from data published by van Zanden for the Florentine *catasto* of 1457.[75] A decrease of 11.7 per cent has been measured instead by excluding the propertyless from the calculation of the Gini index in Ivrea, in north-western Italy, in 1613.[76]

We leave to future research a more systematic analysis and measurement of the prevalence of poverty in late medieval and early modern Tuscany. We will only

[70] Conti, *L'imposta*.
[71] Herlihy and Klapisch-Zuber, *Tuscans*, pp. 118–20.
[72] de Roover, *Il banco*, p. 42.
[73] Herlihy and Klapisch-Zuber, *Tuscans*, p. 100.
[74] Alfani, 'Economic inequality'.
[75] van Zanden, 'Tracing', p. 645.
[76] Alfani and Caracausi, 'Struttura', pp. 199, 203.

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Table 5. *Variation in the Gini index including and excluding the propertyless*

Year	*Contado of Florence*			*Prato*		
	Gini index	*Gini index without propertyless*	*% var.*	*Gini index*	*Gini index without propertyless*	*% var.*
1350				0.745	0.591	−20.67
1450	0.662	0.504	−23.86	0.740	0.683	−7.70
1500	0.682	0.546	−19.94	0.747	0.624	−16.46

Sources: See online app. S3.

mention one final point. Although it is difficult to assess how the prevalence of the propertyless changed in any particular region over time given their mobility, the general literature on poverty suggests that across Italy, their prevalence declined in the decades following the Black Death and grew during the early modern period.[77] Consequently, if we could include some estimate of them in our sample, some of our key findings would probably be strengthened: in particular, the phase of diminishing inequality from 1350 and the rise of inequality during the early modern period.

VI

In order to provide further support to the main conclusions from the descriptive analysis given in the earlier sections and also to discuss in greater detail our findings and their implications, we ran an econometric test. We used as the dependent variable the Gini indices of wealth inequality. We formally tested two hypotheses proposed by the literature, namely, that inequality is positively correlated to population size and/or to per capita GDP.

The specification of the complete model is:

$$\begin{aligned} \mathrm{GINI_{it}} = {} & \beta_0 + \beta_1 \mathrm{POPULATION}_{it} + \beta_2 \mathrm{PerCapitaGDP_t} + \beta_3 \mathrm{YEAR_t} \\ & + \beta_4 \mathrm{PreBD}_{1348} + \beta_5 \mathrm{ESTIMO_{it}} + \beta_6 \mathrm{CATASTO_{it}} + \gamma_i \mathrm{D_i} + \mathrm{u_{it}} \end{aligned}$$

where $\mathrm{POPULATION_{it}}$ is the population of community i at time t (derived with some simple interpolation from the data presented in table 1), $\mathrm{PerCapitaGDP_t}$ is Malanima's estimate for central-northern Italy's GDP per capita[78] (in the absence of any regional- or state-level GDP estimates, Malanima's measures are quite suitable for our aims, as most of the original material he used relates to Tuscany and Lombardy), $\mathrm{YEAR_t}$ is a time variable that we include to test for the presence of a long-term trend not explained by any other variable, PreBD_{1348} is a 'Pre-Black Death' dummy (value = 1 for years < 1349) to test for structural breaks caused by the pandemic, $\mathrm{ESTIMO_{it}}$ and $\mathrm{CATASTO_{it}}$ are dummies used for testing structural differences between sources (the reference category here is 'Decima'), and $\mathrm{D_i}$ are community-level fixed effects. Note that, differently from the Chow test performed in section III which was limited to the rural communities of the

[77] Pullan, 'Poveri'; Woolf, *Porca miseria*.

[78] Malanima's estimates cover the period 1300–1913. We used the 'filtered' yearly measures published in Malanima, 'Long decline', pp. 205–17.

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Table 6. *Determinants of inequality (dependent variable is community-level Gini index)*

	(1)	*(2)*	*(3)*	*(4)*	*(5)*	*(6)*
Year	0.0007***	0.0007***	0.0008***	0.0008***	0.0008***	0.0008***
	(0.0001)	(0.0001)	(0.0001)	(0.0001)	(0.0001)	(0.0001)
Pre-Black Death	0.1089***	0.1211***	0.1215***	0.1303***		
	(0.0288)	(0.0309)	(0.0309)	(0.0307)		
Population (ln)	0.0446***	0.0465***	0.0076	0.0025	−0.0008	−0.0157
	(0.0068)	(0.0066)	(0.0120)	(0.0209)	(0.0124)	(0.0228)
Per capita GDP (ln)		0.1431	0.1750**	0.1637*	0.1807*	0.1761*
		(0.0902)	(0.0869)	(0.0919)	(0.0913)	(0.0993)
Urban(ref.: rural)			0.0884***		0.0869***	
			(0.0280)		(0.0307)	
Estimo (ref.: *decima*)			0.0172	0.0228	0.0325	0.0358
			(0.0216)	(0.0235)	(0.0279)	(0.0285)
Catasto (ref.: *decima*)			−0.0243	−0.0226	−0.0197	−0.0235
			(0.0205)	(0.0230)	(0.0224)	(0.0249)
Fixed effects (community dummies)				Yes		Yes
F	123.5***	90.55***	49.53***	24.24***	31.41***	13.85***
R^2	0.6597	0.6674	0.7030	0.7405	0.6490	0.6919
N	130	130	130	130	115	115

Notes: Standard errors are clustered per community and are in parentheses. ***p<0.01, **p<0.5, *p<0.1. Models (1) to (4) cover the whole period 1300–1800. Models (5) and (6) are balanced panels covering only the period 1350–1700.
Sources: See text and online app. S3.

Contado, the variables $ESTIMO_{it}$ and $CATASTO_{it}$ are not equivalent to time dummies, as for the *Distretto* we also used some *estimi* which date from after 1427, when the *catasti* system was introduced in the *Contado* (see online appendix S1). As a consequence, their inclusion does not test for structural breaks in 1427 and 1507, but for structural differences related to different sources partly overlapping in time. Finally, in some specifications without fixed effects, we add the time-invariant dummy $URBAN_i$ to test for structural differences between cities and rural communities.

Table 6 summarizes the regression results. We start by including $POPULATION_{it}$, the time variable $YEAR_t$, and the pre-Black Death dummy (column 1). In column 2 we also include $PerCapitaGDP_t$. Then we add the urban dummy and the source dummies (column 3). In column 4 we test the complete model including community-level fixed effects. The panel in columns 1 to 4 is unbalanced as we do not have Ginis for all communities covering the earlier and the later periods (see table 2). Although attrition can be considered random in this case (it depends solely on the availability of sources in the archives), as an additional robustness check we tested a balanced panel in columns 5 and 6, which are the same as 3 and 4 but only cover the period 1350–*c.* 1700 (the number of observations declines from 130 to 115).

In column 2, we note that $POPULATION_{it}$ is highly significant ($p<0.01$), while $PerCapitaGDP_t$ is borderline significant ($p<0.12$). The fact that $YEAR_t$ is also highly significant ($p<0.01$) suggests that there is a tendency for inequality to grow over time that is not explained by changes in per capita GDP or population. The fact that the pre-Black Death dummy is highly significant ($p<0.01$) confirms

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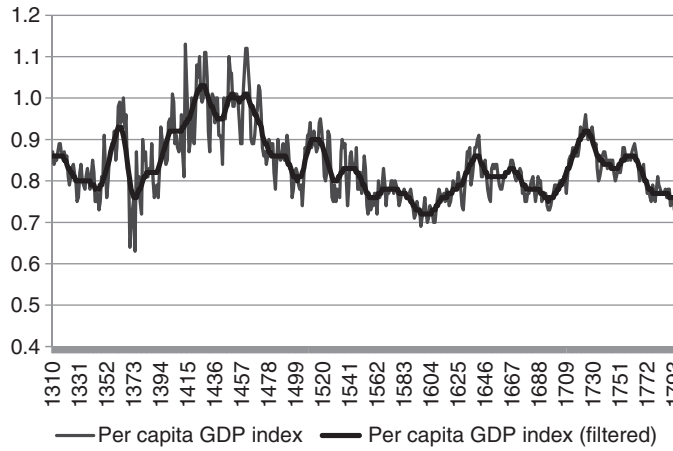

Figure 7. *Per capita GDP in central and northern Italy, 1310–1800 (indexed in base: average 1420–40) Note: The filter applied by Malanima is Hodrick-Prescott (λ = 100)*
Source: Malanima, 'Long decline', pp. 205–17.

our finding that the pandemic marked a structural break in long-term inequality trends. When we add the source and urban dummies (column 3), the significance of $PerCapitaGDP_t$ increases ($p<0.05$), while that of $POPULATION_{it}$ drops and the variable becomes insignificant. This is because its effect is captured by the urban dummy ($p<0.01$). $ESTIMO_{it}$ and $CATASTO_{it}$ are not significant, which supports the idea that differences in sources have little impact on our standardized inequality measures. $YEAR_t$ and the pre-Black Death dummy remain significant at $p<0.01$. These results are not altered by the inclusion of community-level fixed effects (column 4), nor by restricting the analysis to a balanced panel (columns 5 and 6), although $PerCapitaGDP_t$ becomes significant at 10 per cent only.

From columns 3 and 5, we find strong confirmation that cities were more unequal than rural communities. Generally speaking, this also confirms the fact that inequality levels were positively correlated to population size. However, although the large difference in population size between cities and rural communities presumably was one of the main reasons for their differing levels of inequality (other reasons are the concentration in cities of specific institutions and magistratures and of the related high-skill, high-paid jobs), in the sub-databases related to cities and to rural communities $POPULATION_{it}$ does not explain inequality changes. Interestingly, a low significance of population as a predictor of inequality has also been reported by Ryckbosch for cities in the Low Countries.[79]

Our results also support the idea that pre-industrial economic growth (as measured by improvements in per capita GDP) could induce inequality growth. The correlation, though, is relatively weak (as can also be seen graphically, by comparing figure 7 with the trends shown in figure 3). It is possible that if regional- or state-level estimates of GDP could be obtained, correlation would improve—but as the available estimates are already heavily dependent on Tuscan data, it seems

[79] Ryckbosch, 'Economic inequality'.

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reasonable to assume that changes in per capita GDP could explain only a fairly limited part of the tendency for inequality to grow in time. Indeed, the literature on the Florentine state agrees in describing the early modern period, from at least the first decades of the seventeenth century, as one of decline following a glorious 'early' Renaissance when Florence was one of the main economic centres of Europe.[80]

Our regression analysis, then, provides evidence that, after the decline caused by the Black Death, something that *was not* economic growth was driving a continuous increase in inequality: on average, in the period 1300–1800 and independently from the Black Death break, our time variable accounts for an increase in the Gini index between 0.07 and 0.08 points every hundred years. Consequently, our article supports recent works suggesting that during the early modern period, in many areas of Europe economic inequality was growing even in times of economic stagnation or decline. In Italy, this would be the case of the Sabaudian state (Piedmont) in the north-west during the seventeenth century and possibly (if some recently presented preliminary results are confirmed) also of other areas, such as the Republic of Venice in the north-east.[81] Beyond Italy, inequality growth in periods of economic stagnation/decline seems to have happened in the Southern Low Countries (Belgium) and in central Spain.[82] Only for Portugal do we have strong evidence of a correlation between early modern economic stagnation and (income) inequality decline.[83]

Generally speaking, our regression analysis suggests that in order to account fully for the trend we detected, we need to focus on variables that are not currently comprised in the model—variables whose joint effect is captured by the $YEAR_t$ variable. This requires more research, possibly incorporating micro-level case studies, and is beyond the aims of this article. We can, however, point out at least two other areas that would be worthy of further exploration. One is demography—as has been shown, on the basis of a micro-analysis of Ivrea in Piedmont, that in cities inequality growth could result from immigration of poor rural dwellers even in the presence of a stable overall population (as the natural growth rates in early modern cities were usually negative).[84] A similar point has also recently been made for 's-Hertogenbosch in the Low Countries.[85] The impact of out-migration and population pressure on inequality in rural areas is, however, more complex to assess, as shown by other studies.[86] Additionally, especially during the early modern period, in rural areas population pressure on the available resources determined the crisis of small holdings, a process further exhacerbated by the partible inheritance system, which determined the fragmentation of the original plot among an increasingly larger number of heirs—making property fragile and more liable to be sold. This was suggested by a classic work by le Roy Ladurie on the Languedoc in France, where an increasing concentration of wealth (land)

[80] Carmona, 'La Toscane'; Malanima, *La decadenza*; Goldthwaite, *Economy*; Ammannati, 'Florentine woollen manufacture'.
[81] Alfani, 'Economic inequality'; idem, 'Wealth inequalities'; Alfani and di Tullio, 'Dinamiche di lungo periodo della disuguaglianza'.
[82] Ryckbosch, 'Economic inequality'; Santiago-Caballero and Fernández, 'Income inequality in Madrid'.
[83] Reis, 'Deviant behaviour?'.
[84] Alfani, 'Wealth inequalities'; idem, 'Effects'; idem, 'Prima'.
[85] Hanus, 'Real inequality', p. 742, with additional information in idem, 'Income mobility', pp. 25–6.
[86] Alfani, 'Prima'.

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resulted from a kind of 'natural selection' favouring the main owners,[87] and has also been found in Piedmont and elsewhere in Italy.[88] Presumably Tuscany was no exception, as the population of the region increased steadily from about 561,000 in 1500, to 885,000 in 1600, to 936,000 in 1700, reaching 1,270,000 in 1800.[89]

Another factor to consider is the institutional framework, and in particular the evolution of fiscal systems underpinning the rise of the fiscal state. In his study of the Sabaudian state in the seventeenth century, Alfani suggested that fiscal developments allowed the extraction of more resources—and, in the presence of inegalitarian redistribution, this also made it possible to 'extract' more inequality from the theoretical maximum represented by the Inequality Possibility Frontier.[90] More recently, the deepening of regressive taxation has been singled out as a possible causative factor of inequality growth in the Low Countries.[91] Future research will assess whether processes of this kind could also have played a role in promoting inequality growth in Tuscany.

VII

This article has presented a broad picture of economic inequality from about 1300 to about 1800 in the Florentine state (Tuscany), an area characterized by the availability of exceptionally rich and ancient sources. To date, Tuscany is one of the very few regions of Europe to have been the object of a comprehensive attempt to study inequality in the long run. Many of our findings are consistent with those of earlier studies, particularly Alfani's work on Piedmont and van Zanden's on Holland.[92] In all three regions, a continuous increase in inequality has been found from at least the sixteenth century onwards. The interpretation of the process, however, varies: van Zanden connected it to pre-industrial economic growth, while Alfani suggested that this explanation was not sufficient for Piedmont, whose economy stagnated during the seventeenth century when inequality continued to grow. In Piedmont, other factors, including institutional (the development of a more 'extractive' fiscal state) and demographic ones, allowed for rises in inequality even in the absence of significant economic growth.[93] The case of Tuscany supports the hypothesis that in early modern Europe, inequality was also growing in many areas that were economically stagnating. Possibly also in Tuscany inequality growth was at least partially driven by changes in the institutional framework. This is, however, an aspect on which further research is needed.

The middle ages, although overall characterized by economic growth, were not a period of continuous increase in economic inequality. The Black Death, in fact, seems to have triggered a phase of declining inequality that lasted about a century. Very similar dynamics were found in the only other study—that on Piedmont—which allows for a comparison. Interestingly, until now the only attempt to uncover

[87] le Roy Ladurie, *Les paysans*, p. 572.
[88] Alfani, 'Economic inequality'; idem, *Calamities*, pp. 76–7.
[89] Figures from Breschi and Malanima, 'Demografia'.
[90] Alfani, 'Economic inequality'. For the notion of extraction of inequality, see Milanovic, Lindert, and Williamson, 'Pre-industrial inequality'.
[91] Ryckbosch, 'Economic inequality'.
[92] Alfani, 'Economic inequality'; van Zanden, 'Tracing'.
[93] Alfani, 'Wealth inequalities'; idem, 'Economic inequality'.

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the impact of the Black Death on Tuscan property structures and general economic inequality levels suggested exactly the contrary.[94] We partly replicated this earlier work, thereby detecting the probable cause of a misinterpretation of the data. Therefore, on the grounds of all the evidence currently available, we can argue that among the consequences of the Black Death in Europe, a significant (albeit temporary) decline in economic inequality must also be counted.

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[94] Herlihy, *Medieval and Renaissance Pistoia*; idem, 'Santa Maria Impruneta'.

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Supporting information

Additional Supporting Information may be found in the online version of this article at the publisher's web-site:

Appendix S1. Additional information about sources and data collection in the *Contado* and in the *Distretto* of Florence
Appendix S2. The spread of Florentine property
Appendix S3. Archival sources

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