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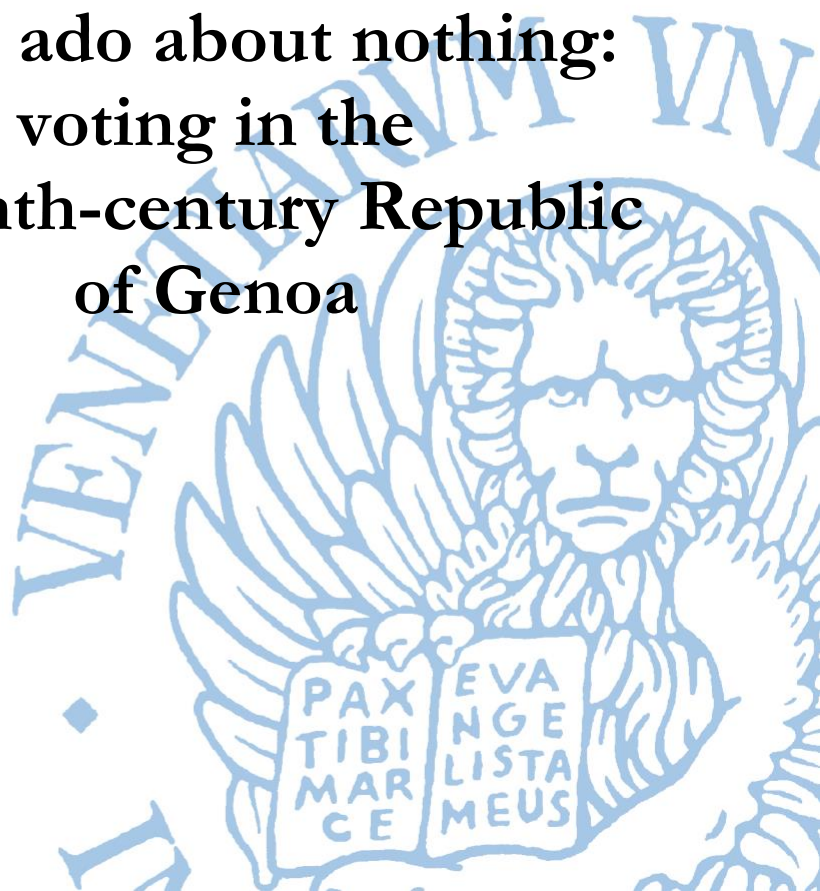
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voting in the
sixteenth-century Republic
of Genoa**

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When the constitution of the Republic of Genoa was rewritten in 1528, the traditional distinction between nobili and popolari was abolished and the now unified ruling class was organised into 28 groups called alberghi, which were granted equal political representation by an elaborate and bizarre voting mechanism. Using data on the composition of the Genoese nobility in 1528, we simulate the rounds of voting, nominations, and sortition of the electoral protocol to reveal how they determined the allocation of power. Our analysis shows that the constitutional reform could not succeed in bringing concord to the nobility, as the system was heavily biased towards the popolari (later renamed nobili nuovi), who could gain control over all key magistracies. We also show that the use of the alberghi for office allocation made the system less favourable to the nobili nuovi, but only marginally so. These results help explain the persistence of political instability in Genoa after the 1528 reform, and they shed light on the voting system reforms that followed.

Keywords

Early modern elections, factionalism, Genoese alberghi, voting protocols

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Much ado about nothing: voting in the sixteenth-century Republic of Genoa*

M. Cristina Molinari**

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When the constitution of the Republic of Genoa was rewritten in 1528, the traditional distinction between *nobili* and *popolari* was abolished and the now unified ruling class was organised into 28 groups called *alberghi*, which were granted equal political representation by an elaborate and bizarre voting mechanism. Using data on the composition of the Genoese nobility in 1528, we simulate the rounds of voting, nominations, and sortition of the electoral protocol to reveal how they determined the allocation of power. Our analysis shows that the constitutional reform could not succeed in bringing concord to the nobility, as the system was heavily biased towards the *popolari* (later renamed *nobili nuovi*), who could gain control over all key magistracies. We also show that the use of the *alberghi* for office allocation made the system less favourable to the *nobili nuovi*, but only marginally so. These results help explain the persistence of political instability in Genoa after the 1528 reform, and they shed light on the voting system reforms that followed.

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1 Introduction

In 1528, after a revolt led by Andrea Doria and backed by the Spanish, the Republic of Genoa underwent a constitutional reform that redesigned its political institutions and reduced the doge's tenure to two years. The previous medieval regime, in place under various guises since the early tenth century, was notorious for its political instability and endless rivalries between the *nobili* and the *popolari*, that is, the older ruling families and those who came to power later (Bitossi 2018, Shaw 2012).

Because of this intense factional strife, Genoa had often fallen to partial foreign control and had seen its territorial integrity repeatedly threatened. Therefore, the 1528 reform stated in its preamble that its goal was to overcome the city's internal divisions and that the terms *popolari* and *nobili* were to be "completely extinguished." (*Le leggi et riforme*, 1575:2). The new, undivided ruling class was identified through the drafting of the *Liber descriptionum*, the list of all patricians, with no distinction in terms of faction, who were acknowledged as nobles and were eligible to hold the highest political offices.

An important part of the reform was the overhaul in how offices were allocated. Traditionally, appointments were based on a quota system that recognised parity between the *nobili* and the *popolari*, and between merchants and artisans within the latter (Ferente 2018; Kirk 2005:23; Salonia 2017; Shaw 2001; 2005). The only exception to the parity rule was the dogate, each member of which had to be a *popolare*. Once the two factions were abolished, a new organising principle had to be found, and the choice fell to the *alberghi*.

The Genoese *alberghi* were long-established organisations in which several noble families, not necessarily of the same lineage or status, formed a clan for mutual support, including economic partnerships and military protection. (Costantini 1978:20-21, Grendi 1975; Hughes 1975; Pacini 1990:32–35). Before 1528, the *alberghi* were private institutions, but the reform gave them constitutional relevance by arbitrarily aggregating all families in the *Liber* into the 28 most populous *alberghi*, thus mixing nobles and *popolari*.¹

¹ The reformers' choice fell to the *alberghi* who had at least six houses open in Genoa

These “artificial” *alberghi* replaced factional quotas in the distribution of power, as the new electoral law stipulated that seats in the councils and in most electoral colleges were to be distributed evenly among the *alberghi*. In addition, the reform provided that elections be organised using complicated protocols that encompassed various rounds of nominations, voting, and sortition. The intent of such rules was to ensure equitable political representation for the Genoese aristocracy and to overcome disagreements between the two factions, now renamed *nobili vecchi* and *nobili nuovi* (old nobility and new nobility). But was this intent realised? This paper seeks the answer to this question.

To this end, we use the composition of the nobility in 1528 to analyse the functioning of the Genoese voting protocols. The electoral laws were so complicated that only a mathematical analysis can reveal their real impact on election results and on the distribution of power between the two factions. Accordingly, we model the various steps of the procedure, including the rounds of sortition (described by a hypergeometric distribution), to reach two main findings: That electoral results were heavily skewed in favour of the *nobili nuovi* and that the use of the *alberghi* prevented this bias to only a small degree. As for the first of these findings, taking into account that due to sortition our predictions are necessarily expressed in probabilistic terms, we find that the system allowed the new nobles to gain almost certain control of all the important institutions—the councils, the colleges, and the dogate; in fact, the *nuovi* had a probability close to 1 of winning a majority of seats in the great council, an advantage that they could leverage to prevent the old nobles from being elected to the senate and from becoming doge. Thus, even though the old nobles accounted for close to half of the patricians, the election rules allowed them to be excluded. We also show that the only element of the law that gave some decision-making power to the *nobili vecchi* was the two-thirds qualified majority that was required for decisions other than those related to the distribution of offices. Our second finding, that

in 1528, with the exception of the archbishop’s *albergo*, the Cybo, which had fewer than six (Bitossi 2018:96; Pacini 1990:350). The number of the Genoese private *alberghi* peaked at about 100 at the end of the fourteenth century, declining afterwards. Before 1528 there were no mixed *alberghi*, as each one included either noble or popular families, but not both (Grendi 1975:245).

the constitutional provision of rotating appointments among the *alberghi* may have had a bearing on which person or family came to power, but had a limited effect on the majority obtained in the governing institutions. In particular, the rotation rule decreased the probability that the *nuovi* would have control of the *Maggior consiglio*, but the probability was still above 90 percent. To sum up, our analysis suggests that the Genoese designed an inequitable and politically untenable voting system.

Our results contribute to a better understanding of the persistence of political instability after 1528 and shed light on the resulting electoral reforms. As we have seen, the electoral system under the 1528 constitution favoured the *nuovi* and ineffectively based the distribution of power on the *alberghi*. A number of changes were needed to remedy these shortcomings. The first adjustment sought to avoid the exclusion of the *vecchi*, which would have surely caused riots. Within a few years, the practice of dividing offices equally re-emerged: By means of an unwritten rule, the dogate alternated between *vecchi* and *nuovi*, and in the semi-annual election of the two members of the senate, one senator belonged to the new nobility and the other to the old. Since these rules for the allotment of offices brought back the traditional factions abolished by the constitution, they were necessarily informal; however, ignoring them was not without consequences, as the few times they were not observed resulted in political turmoil. (Costantini 1978:45, 104; Pacini 1996:655). To avoid the strains entailed in an informal rule, in 1547 a minor revision of the constitution reduced the use of sortition in favour of voting. But also this new arrangement ended up being a source of tensions. The inadequacy of the *alberghi* as a criterion for regulating access to power was finally acknowledged in 1576 when the system of the 28 *alberghi* was abrogated. The voting mechanism then introduced underwent no further changes until the fall of the republic in 1797.

An additional contribution of this paper is that it opens the field to comparative studies of lot-based voting protocols used in some Italian city-states.

To the best of our knowledge, ours is the first mathematical analysis of voting protocols in the Republic of Genoa. Much more attention has been devoted to elections in Venice, the other long-lasting Italian maritime repub-

lic. The election of the doge of Venice was delegated to a small college of 41 nobles chosen by alternating sortition and voting in a ten-round procedure. Each of a number of formal models of this election focus on one of its features: Lines (1986) studies the minorities' incentive to misreport their preferences and shows that the use of approval voting in the last round of the election induces truth-telling. Coggins and Perali (1998) analyse the qualified majority of 25 votes out of 41 required in the final vote and show that, under appropriate assumptions about the number of voters and the distribution of their preferences in the society, this quorum produces a unique winner and avoids voting cycles. Mowbray and Gollmann (2007) and Molinari (2020) limit their attention to situations in which the nobility is divided into two factions and conduct comparative analyses of various protocols in terms of fairness in the minority's political representation: Mowbray and Gollmann (2007) focus on the practice of iterating voting and sortition and show that the more rounds of voting, the more the minority is favoured. Molinari (2020) looks at the role played by the size of the quorum and the electoral college and shows that the larger the quorum, the better the minority is represented, and that small electoral colleges favour spare minorities.

A major difference between our paper and previous literature is that these other studies identify general properties of (simplified versions) of the Venetian voting protocol, whereas we use historical records on the relative strength of the two factions at the time Genoa's law was introduced. Two other papers use historical data in the analysis of voting systems: Belloc *et al.* (2022) study the manipulation of the office allocation mechanism by the Medici family in the Florentine Republic, whereas Baronchelli, Ricciuti and Viale (2023) use election outcomes between 1338 and 1353 to analyse the effect of the Black Death on the distribution of offices in the Republic of Venice.

The remainder of the paper is organised as follows. Sections 2 and 3 present the main features of Doria's reform, that is, the institutions that govern the Republic and the rules for conducting elections, respectively. Section 4 contains the mathematical simulation of Genoa's elections, and Section 5 concludes. Technical details are relegated to the appendix.

2 The governance of the Genoese Republic of 1528

According to the 1528 reform, Genoa's ruling college was the *Supremo magistrato*, the senate, which was constituted of the doge and the *Collegio dei governatori*. The *Collegio dei procuratori* assisted the senate in some matters. The other main institutions were the *Maggior consiglio*, the *Minor consiglio*, and the *Supremi sindicatori* (Costantini 1978:22–25; Piergiovanni 1965; Savelli 1981:39–80).

The doge, the highest official of the Republic, was first among equals in the *Supremo magistrato*, a collegial body with executive and legislative powers.² In addition to the doge, eight *governatori* were members of the senate, each serving two-year terms. The senate made most of its decisions with a qualified majority of two-thirds.

The *Collegio dei procuratori* consisted of past governors who, at the end of their tenures, were appointed procurators for two more years, and of past doges who became *Procuratori perpetui*, (procurators for life). Before being appointed *Procuratori*, past governors and doges underwent an assessment of their performance while in office. Under these rules, the number of *Procuratori* varied, but we know that the college averaged twelve members (Costantini 1978:24). Procurators presided over the republic's financial matters but also had judiciary power. In addition, they played an advisory role for the senate (Savelli 1981:44).

The colleges' legislative activity was limited, as the councils decided important matters. The main deliberative functions were divided between the *Maggior consiglio* and the *Minor consiglio*, which had 400 and 100 members, respectively. The approval of the great council was required for death and exile sentences and for expenses larger than 15.000 lire per annum, while the small council made decisions on expenses between 6.000 and 15.000 lire per annum. Of all the duties of the *Maggior consiglio*, by far the most important was the election of the highest officials, including the doge and the governors. The *Minor consiglio*, together with the colleges, decided on war and peace and had jurisdiction over the doge and the governors when procu-

² Genoa had been ruled by a doge since 1339, but before 1528 the doge had monocratic powers and was elected for life, although few doges held office for that long. The position was reserved to the popular faction.

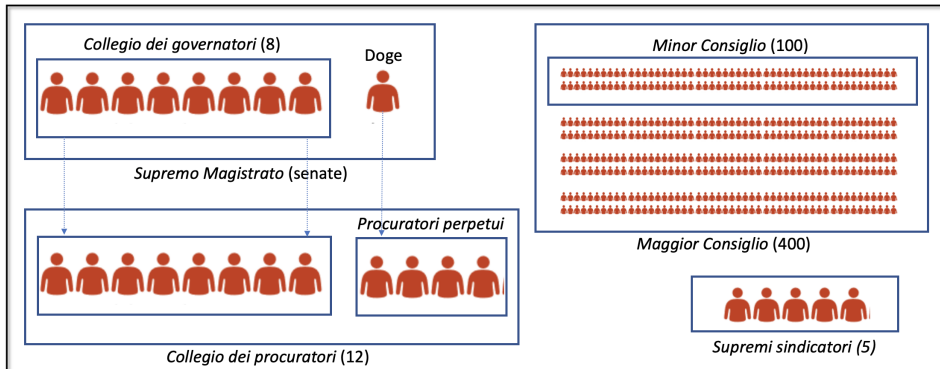


Figure 1: Governance of the Genoese Republic

rators brought charges against them. Finally, the small council elected the *Supremi sindacatori*, a committee of five members on which Doria reserved a permanent seat for himself and whose main task was to decide whether past governors were to become *Procuratori* and past doges were to become *Procuratori perpetui* (Constantini 1978:23; Piergiovanni 1986:145-6).

This system of councils and colleges (see Figure 1), inspired in part by Venice’s successful experience, did not undergo major changes until the end of the Republic in 1797, with the exception of the duties of the *Minor consiglio* which were considerably increased in 1576. The same cannot be said of the electoral mechanisms put in place by the reform, which we describe next.

3 Voting, sortition and nominations

Genoa was an aristocratic republic, and all major government positions were reserved to the male patricians who were enlisted in the *Liber descriptionum*.³ Access to the *Liber* was hereditary, and patricians were enlisted when they turned eighteen. The reform also provided for ten new entries each year, although in practice new inclusions were more irregular and far fewer in number. (Bitossi 2018:97; Grendi 1974; Pacini 1990:302).

Offices were filled using a combination of elections and lotteries. To ensure equal access to members from every *albergo*, the law provided that,

³ The book, also known as *Liber civilitatis*, was renamed *Liber nobilitatis* after 1580.

whenever sortition was involved, the drawings were made from 28 individual bags, one for each *albergo*.⁴ Sortition was used to fill the two councils, and in the multi-stage procedures to elect the doge and the governors.

The 400 patricians in the *Maggior consiglio*, who held office for one year and could not be re-elected for the following term, were chosen by lot from among all the nobles listed in the *Liber* (Pacini 1990:339).⁵ Of course, exactly equal representation of the *alberghi* was not possible because 400 is not a multiple of 28, but the law stipulated that “the greatest care will always be taken to ensure that, as far as possible, an equal proportion of those elected is preserved among the twenty-eight *alberghi*.” (*Le leggi et riforme*, p. 5). Each *albergo* was entitled to have either 14 or 15 people in the council, although the rule was applied with some flexibility. For example, in the *Maggior consiglio* formed in 1529, most *alberghi* had 14 people, but 6 of them had fewer or more, with a minimum of 13 and a maximum of 17 members (Pacini 1990:395).

A similar arrangement was used for the *Minor consiglio*, although the 100 members were drawn at random from the *Maggior consiglio*. Equal representation in this council amounted to three or four members from each *albergo* (Pacini 1990:340).

Turning our attention to the doge, the head of state had to be over age 50, and no nobles from *alberghi* that had provided a doge in the past five years could stand for office. The doge’s elaborate election was organised in two steps, as shown in Table 1: After a nomination process that identified a shortlist of four candidates, a voting phase by the *Maggior consiglio* was used to choose among the four (Pacini 1990:341–2).

The nomination process was a multi-round procedure of elections with

⁴ The reform has sometimes been misunderstood on this point, as it reads “let all the names and surnames of the noble citizens of the twenty-eight families be placed in an urn or bag.” However, a report on the formation of the *Maggior consiglio* in 1529 says that “Today the greater council of four-hundred citizens was extracted by lot from twenty-eight bags, in which each family was placed individually”. (Pacini 1990:305, 394). We believe that the reference to “one bag” is to be interpreted as yet another attempt to suggest that the nobility was undivided.

⁵ In the law passed in 1528, 300 patricians were to be chosen at random and the remaining 100 by ballot, and only a quarter of the council was up for renewal each year. However, the law was amended in March 1529, before it was ever applied (members of the first *Maggior consiglio* were chosen by the twelve reformers). (Pacini 1990:304, 340; Petracchi 1989:40, 57).

Table 1: Election of the doge

Nomination phase	
SELECTORATE 1	(2/3 majority)
Formed by	D-GP + Group 1 Group 1: Each D-GP nominates 28 nobles. From among those nominated, 28 are chosen by lot
Outcome of vote	Slate 1: 4 candidates out of all eligible nobles Group 2: 28 nobles
SELECTORATE 2	(2/3 majority)
Formed by	D-GP + Group 3 Group 3: 28 nobles chosen by lot out of the 56 of Group 1 and Group 2 combined
Outcome of vote	Slate 2: 4 candidates out of the longlist of Slate 1 and Q-GP combined
Election phase	
MAGGIOR CONSIGLIO	(1/2 majority)
Formed by	400 nobles chosen by lot from the 28 <i>alberghi</i>
Outcome of vote	Doge elected out of Slate 2

D-GP are governors and procurators disqualified to run for doge.
Q-GP are governors and procurators qualified to run for doge.
Every set of 28 must include a noble from each *albergo*.

a qualified majority of two-thirds and sortition. It involved two groups of nobles, Selectorate 1 and Selectorate 2, whose task was to come up with a long list and a short list of candidates, respectively. This phase started with the governors and procurators (GP for short) being divided into two subsets: those who were not qualified to run for doge because they were younger than age 50 or came from an ineligible *albergo*, and everyone else. We refer to the two groups as D-GP and Q-GP, where D stands for disqualified and Q for qualified.

To create the first selectorate, each D-GP nominated 28 nobles, one from each *albergo*, from which 28 were drawn at random. This first group of 28 joined the D-GP to form Selectorate 1, whose task was to vote on a slate of four nobles. These four, together with the Q-GP, formed a long list of candidates to be submitted to Selectorate 2. Selectorate 1 was also in charge of electing a second group of 28 nobles, who were added to the group from

Table 2: Election of the governors

Nomination phase	
SELECTORATE 1	(2/3 majority)
Formed by	GP + Group 1 Group 1: 28 nobles chosen by lot as in the Doge's election
Outcome of vote	Group 2: 28 nobles
SELECTORATE 2	(does not vote)
Formed by	GP + Group 3 Group 3: 28 nobles chosen by lot as in the Doge's election
Outcome of nomination	Slate 1: candidates nominated by Selectorate 2 (each noble in Selectorate 2 nominates one candidate from each eligible <i>albergo</i>)
Election phase	
MAGGIOR CONSIGLIO	(1/2 majority)
Formed by	400 nobles chosen by lot from the 28 <i>alberghi</i>
Outcome of vote	Two governors out of Slate 1

GP are governors and procurators.

Every set of 28 must include a noble from each *albergo*.

the first selectorate to provide 56 names. Sortition was used again to find a third group of 28 patricians out of the 56. Selectorate 2 was then obtained by joining this third group with the D-GP. Selectorate 2's vote to reduce the long list of candidates to a shortlist of four names concluded the convoluted nomination phase. Because the governors and procurators in the D-GP were involved in forming the selectorates, and those in the Q-GP were placed on the long list of candidates by default, members of the councils were at the heart of the nomination procedure.

The voting phase of the protocol was simpler: The shortlist was submitted to the *Maggior consiglio*, and the candidate who received the majority of votes was elected doge.

The last institution we consider is the *Collegio dei governatori*. The eight governors each had a two-year tenure, but the terms were staggered such that two seats were up for election every six months. An age requirement articulated that four be older than age 50 and the other four be between 45 and 70. In addition, a rotation requirement stipulated that anyone from

an *albergo* that had provided a governor in the past three years or who had been a member of the college in the past five years was disqualified. This rotation rule meant that, when the two seats were up for renewal, only ten *alberghi* were usually eligible.⁶

The governors' election procedure was a simplified version of that used for the doge, as illustrated in Table 2. All the governors and procurators were disqualified, so they all participated in the nomination phase. Three groups of 28 nobles were chosen, as in the doge's election, with the first group chosen by lot from the names proposed by the GP, the second group elected by the first group and the GP with the usual two-thirds majority, and the third group obtained by a new round of sortition of the 56 people in the first and second groups. Every noble in this third group submitted a list of candidates, one for each eligible *albergo*. All those thus nominated entered the slate of candidates to be voted on by the *Maggior consiglio*, and the two with the most votes were elected (Pacini 1990:342-3).

It is worth noting that the governors' nomination phase contained no election to reduce the pool of candidates, so the number of aspirants presented to the great council was likely to be large and almost certainly much greater than four, the number of final contenders in the doge's election. This difference had political implications: usually the selectorate's gatekeeping role implies a transfer of power at the expense of the final voters (Hazan and Rahat 2010) but the number of candidates submitted to the *Maggior consiglio* in the governors' election was presumably so large that the final voters were not disenfranchised. The same cannot be said of the election of the doge, where a slate of only four candidates placed a great deal of control in the hands of those who selected them.

4 A simulation of the Genoese elections

To simulate the functioning of the electoral system, we use the actual distribution of new and old nobles among the 28 *alberghi* in 1528, as Pacini (1990)

⁶ Three years include six semesters and, therefore, 12 *alberghi*. Six more were excluded if they had an incumbent governor, leaving 10 out of 28. The actual number could be lower if some governors died while in office.

Table 3: Nobles in the *Liber descriptionum* in 1528

<i>Albergo</i> ^a	LIST 1			LIST 2			LIST 3		
	Approved (April)			Approved (October)			Total (October) ^b		
	<i>Vecchi</i>	<i>Nuovi</i>	Total	<i>Vecchi</i>	<i>Nuovi</i>	Total	<i>Vecchi</i>	<i>Nuovi</i>	Total
Calvi	19	29	48	15	21	36	17	39	56
Cattaneo	40	34	74	24	25	49	33	41	74
Centurione	43	27	70	37	25	62	42	40	82
Cybo		50	50	3	38	41	4	57	61
Cicala	22	30	52	9	26	35	18	43	61
Doria	86	25	111	72	23	95	81	36	117
Fieschi	27	36	63	17	28	45	22	38	60
Fornari		68	68		44	44		59	59
Franchi		104	104		74	74		116	116
Gentile	37	28	65	29	18	47	34	35	69
Giustiniani		92	92		59	59		95	95
Grillo	19	28	47	17	18	35	19	39	58
Grimaldi	50	31	81	41	33	74	43	38	81
Imperiale	18	30	48	12	19	31	16	38	54
Italiano	25	38	63	14	30	44	19	48	67
Lercaro	41	26	67	28	19	47	38	31	69
Lomellino	83	26	109	59	23	82	64	39	103
Marini	37	26	63	21	18	39	32	31	63
Negro	30	28	58	20	26	46	25	39	64
Negrone	33	27	69	26	22	48	29	35	64
Pallavicino	36	31	67	22	25	47	28	38	66
Pinelli	23	46	69	14	34	48	17	58	75
Promontorio		42	42		26	26		50	50
Salvago	39	36	75	28	28	56	32	39	71
Sauli		61	61		50	50		65	65
Spinola	200	27	227	159	28	187	188	39	227
Usodimare	23	26	49	18	18	36	21	31	52
Vivaldi	21	28	49	21	13	34	21	37	58
Total	952	1080	2032	706	811	1517	843	1294	2137
	(47%)	(53%)		(47%)	(53%)		(39%)	(61%)	

Source: Pacini (1990:378–80), Tables VII, VIII, and IX.

^a Popular only *alberghi* are in bold.

^b Includes approved and waiting to be approved nobles.

documents based on two versions of the *Liber descriptionum*. The first was compiled in April 1528 by the 12 reformers who wrote the constitution, and the second dated from October of the same year. These two sets of data are summarised in Table 3 and are referred to as List 1 and List 2, respectively. The two lists differ because in April approved nobles numbered 2.032, and in October only 1.517 were left. The difference can be attributed in part to about 300 names that were listed as approved in April having their status changed to *approbandi* (waiting for approval). If we include these people in the ranks of the nobility, we get List 3, as shown in Table 3. We have no reason to believe that all those waiting for approval were granted access to the nobility, so we interpret List 3 as an upper bound. Comparing the nobles enrolled in the first two lists reveals that, besides the *approbandi*, in just six months about 150 names were added and almost 400 were deleted. If the additions were due to names that had been accidentally left off the list in April, the large number of deletions can probably be traced to the plague that struck Genoa over the summer.

Table 3 provides a picture of the Genoese nobility at the time of the reform. Two observations stand out: First, the *alberghi* were uneven in terms of both total number and the proportion of new to old nobles. In particular, the *alberghi* of the older and most prestigious families, such as the Doria, the Spinola and the Lomellino families, were in much greater number than the others, so they were penalised when the law required an equal distribution of places among the *alberghi*. Second, of the 28 *alberghi*, 23 were named after families of the old nobility and only the remaining 5 were (former) *popolari*. However, many more new nobles were placed in other family groups and, despite having only 5 *alberghi*, the new nobles constituted the majority, albeit by a small margin. Moreover, according to the law, the *nuovi* were bound to increase their share over time because 10 new members could enter the ranks of the nobility every year, and any new person accepted into the ruling class automatically became a new noble. In practice, however, once deaths are taken into account, the number of nobles in the *Liber* changed very little from 1528 to 1575. The additions were mostly due to names left out in 1528 and to the entry of sons who came of age; between 1528 and 1575, the average annual number of new

entries from these two sources was 3.3 and 48.5, respectively. Over the same period, “truly new” admissions averaged only 4.4 per year, less than half of those provided for in the constitution (Grendi 1974:411–16). In summary, if we restrict our attention to the approved nobles (Lists 1 and 2), votes were divided almost equally between the two factions, but if we include those waiting to be approved (List 3), the new nobles were about 61 percent of the total.

We use these data on the size of the two factions and on their distribution among the *alberghi* to determine whether they were converted into seats in the same proportions. Our model is based on two assumptions: (i) patricians voted according to their factional affiliation, i.e., candidates from their own faction were always preferred to those from the rival faction, and (ii) the factions coordinated their votes on a single candidate when two or more of their own were in the running. In other words, we focus on electoral competition between factions, thus skirting the analysis of intra-party rivalry. While this is a simplified scenario, we believe it deserves attention because in the sixteenth century Genoa’s rivalries between factions were so strong that they prevailed over those between families. Only later on new social and economic stratifications emerged among the *nobili nuovi* and the wealth and prestige of the families became relevant in defining alliances across factions. By then, however, new voting protocols had come into use (Bitossi 2018, Savelli 1981).

If, as assumed, the two factions are undivided, their electoral strategy boils down to a choice between their two preferred candidates. This implies that a voter cannot gain from misrepresenting his preferences; accordingly, in our simulation we assume sincere voting. In what follows we look first at the great council’s composition, then at the two colleges’ elections, and finally at the doge’s election.

4.1 Majorities in the *Maggior consiglio*

This section discusses the probability that the new nobles had enough votes to control decisions in the great council. Participation in the council was determined by sortition and by the rule that required an equal number of

members from each *albergo*. In particular, nobles were drawn from each bag without replacement, so the number of *nuovi* in the council is the sum of 28 hypergeometric independent random variables, which are not identically distributed because the *alberghi* are uneven both in terms of total number of members and in their ratio of *nobili vecchi* and *nobili nuovi*. As discussed in Johannssen *et al.* (2022), there is no closed form solution for the probability mass function of the sum of hypergeometric random variables. Moreover, a numerical evaluation exceeds the capabilities of standard softwares, such as R.⁷ As the exact probabilities cannot be calculated, we must settle for an estimate.

Notice that the 5 former popular *alberghi* were comprised only of new nobles, so the share of great council seats a faction could obtain was random only for the remaining 23 mixed *alberghi*. We simulate sortition over these mixed *alberghi* in two ways. In the first, we pool them into a single group and estimate the probability as if drawings were made from a single bag pooling the mixed *alberghi*. This procedure is likely to underestimate the new nobles' share of votes because it does not take into account that the more prestigious old families were larger than the other *alberghi*, so they were underrepresented when they were restricted to having the same number of members in the council as any other *albergo*. In other words, by merging the mixed *alberghi* into one group, we get a lower bound on the probability that the *Maggior consiglio* will be controlled by the *nobili nuovi*. In the second simulation, we account for the differences among the *alberghi* by dividing the 23 mixed *alberghi* into two groups based on their size. We assume that sortition over the 23 mixed *alberghi* was made from two bags, one that pooled the smaller *alberghi*, and the other that pooled the larger *alberghi*. This second computation overestimates the probability of the *nuovi* getting the quorum in the great council because it amplifies the diversity of the bags; therefore, it provides an upper bound for the true probability. Although these two ways of pooling the mixed *alberghi* are arbitrary, we believe they can offer some insight into the true probability. Technical details on the

⁷ If 14 nobles are taken from a bag, the number of new nobles drawn can take values in $\{0, 1, \dots, 14\}$. Then, over the 23 mixed *alberghi*, there are 15^{23} possible outcomes to consider.

Table 4: *Maggior consiglio*. *Nuovi*'s probability of simple majority

	LIST 1	LIST 2	LIST 3
Estimate 1 (five popular <i>alberghi</i> + one pooled <i>albergo</i>)	95.46%	97.51%	$\approx 100\%$
Estimate 2 (five popular + two pooled asymmetric <i>alberghi</i>)	99.90%	99.99%	$\approx 100\%$
Estimate 3 (<i>ordo unicum</i>)	91.19%	94.05%	$\approx 100\%$

The symbol $\approx 100\%$ is used for probabilities larger than 99.999%.

pooled *alberghi* and probability calculations are given in the Appendix; the results are summarised in Tables 4–6 and discussed below.

Our analysis shows that the system to fill the *Maggior consiglio* could be used to deprive the *nobili vecchi* from any control over the appointment of the highest officials of the republic, including the doge and the *Governatori*, but left them some say in decisions that required a qualified majority. If we look at the results in more detail, we must consider two quorums: the simple majority that was used in the election of the doge and the *Governatori*,⁸ and the two-thirds majority that was used for other decisions. These two cases are illustrated in Table 4 and Table 5, respectively.

The first two rows of Table 4 show the lower and upper bounds of the *nuovi*'s probability of gaining a simple majority. Regardless of the list used, the probability is above 95 percent and can reach almost 100 percent. This result suggests that, even though the *nobili vecchi* accounted for slightly less than half of the nobles—as shown in Table 3, they had a share of 47 percent in both List 1 and List 2—with high probability they could be excluded from appointments. If the share of the *nuovi* increased, as in List 3 and as was bound to happen with the annual admissions of new nobles provided for in the constitution, the *nuovi*'s control over appointments would have been virtually certain. Admittedly, the same thing happens in any majoritarian two-party contest, where up to 49.9 percent of the voters may have to accept what is decided by the representatives of the remaining 50.1 percent. But in modern democracies, comparing policies is part of the

⁸ The elections of the doge and the governors required a relative majority, which is equivalent to a simple majority under our assumptions (i) and (ii).

Table 5: *Maggior consiglio*. *Nuovi*'s probability of a qualified majority

	LIST 1	LIST 2	LIST 3
Qualified majority	$\approx 0\%$	$\approx 0\%$	0.063%
Irrelevance	$\approx 0\%$	$\approx 0\%$	$\approx 0\%$

The symbol $\approx 0\%$ is used for probabilities smaller than 0.001%.

voting decision, so consensus is mobile over time, and electoral turnover can decrease tensions between the losers and the winners. In Genoa, on the other hand, as in most oligarchies of the early modern age, allegiance to a faction relied mostly on family ties and long-standing alliances, so social cleavages remained fairly constant from one period to the next. This is not to say that political divisions among patricians were fixed, but their evolution could take decades or even centuries. Hence, unlike modern democracies, political alternation in Genoa was guaranteed neither by the electoral system nor by the evolution of political consensus.

One last aspect we investigate is the role played by the *alberghi* on the simple majority in the *Maggior consiglio*. As we said, two factors determined the probability that the *nuovi* would prevail: sortition and the equal distribution of seats over the unequal *alberghi*. To disentangle these factors' roles, the last row of Table 4 provides a third estimate based on the assumption that sortition is applied to the ranks of the nobility as an *ordo unicum*, regardless of the *albergo*. As the table shows, the *alberghi* had a small impact on the proportion of new and old nobles in the great council: the difference in the probabilities is less than 10 per cent. However, the *alberghi* could still affect the council's composition, as they had a bearing on which families entered the *Maggior consiglio*. In other words, the rule of distributing an equal number of seats to each *albergo* seemed to interfere more with the competition between families than it did with that between factions. Table 4 also shows that the *alberghi*, which were devised to ensure a fair distribution of power among the nobles, favoured the *nuovi* over the *vecchi*, as the *alberghi* increased the probability that the *nuovi* would reach a majority. However, the composition of the great council remained highly skewed in terms of representation even without the *alberghi*.

Now we turn to the two-thirds quorum. As Section 2 explained, the *Maggior consiglio* used a qualified majority to decide on resolutions other than the appointment of the Republic's magistracies. With this requirement, it was possible that neither faction would have enough votes to control the council, in which case a compromise with the opposing faction became necessary. Thus, a faction could have a say in decisions even when it did not have a qualified majority, as long as it had at least a third of the seats, as that would prevent an opponent from having a qualified majority. Any faction became irrelevant when it controlled less than a third of the votes.

The results summarised in Table 5 show that the new nobles' chance of reaching a qualified majority of two-thirds was virtually nil, but so was their chance of being irrelevant. Therefore, when a quorum of two-thirds was required, compromise was the rule because neither the *nuovi* nor the *vecchi* were likely to get the two-thirds quorum. By dispersing power among the groups, qualified majorities helped reduce factionalism and increased the degree of political representation in the system. However, few decisions were taken with a qualified majority because the *Maggior consiglio's* main task in the sixteenth century was the allocation of public offices, and this was decided by a simple majority (Costantini, 1978:23; Piergiovanni 1986:145–6).

Overall, the results shown in Tables 4 and 5 suggest that sortition could hardly change the status of the two factions in the council because the size of the Genoese *Maggior consiglio* amounted to just under a quarter of the entire nobility. With such a large number of draws, a faction's share in the council was likely to be close to its share in the ranks of the nobility.⁹ Consequently, the *nobili nuovi*, who made up just over half of the council, were likely to have a simple majority but virtually no chance of having a qualified majority.

⁹ Molinari (2020) shows that, when sortition is used to form a smaller electoral college, as in the election of the Venetian doge, the probability that a minority will become a majority in the electoral college is close to the minority's share of the population. This result corresponds to a probabilistic version of proportional representation.

4.2 Composition of the colleges

As reported in Section 3, two governors were up for election every six months and were picked from a large slate of candidates. The *Maggior consiglio* chose the winners from among the candidates using a simple majority.

How this election worked in practice is best understood starting from the election phase (last part of Table 2). In this final vote, the faction that controlled at least half of the *Maggior consiglio* could secure both positions as long as it had at least two of its people among the candidates.¹⁰

Going backwards, we now look at the nomination phase. Candidates on the slate that was submitted to the great council had to be from the 10 *alberghi* not disqualified by the rotation rule; their names were proposed by the 28 members of Selectorate 2, the latter having been chosen by lot. Moreover, the list of names to be voted upon by the council was not filtered by the selectorate's vote. As it turns out, the rule about the *alberghi* having equal representation benefited the new nobles once more because, no matter how sortition turned out, there were at least five new nobles in Selectorate 2—those from the former popular *alberghi*—who could propose candidates from their own faction. Things were less obvious for the *nobili vecchi* because we cannot exclude the possibility that they were missing from Selectorate 2 due to an unlucky draw. However, this scenario was unlikely, given the large number of people involved.

This analysis suggests that, if the new nobles controlled the council, both newly elected governors were bound to be *nobili nuovi*. In contrast, in the (much less likely) event that the old nobles had a majority in the council, winning both governors was possible but not certain.

Building on these results, we turn to the composition of the two colleges of the *Governatori* and the *Procuratori*. Governors had a two-year tenure, the *Maggior consiglio* was renewed every year, and renewal of the governors was scattered over time, so each council chose only four governors out of eight. Thus, a faction had to control the council twice in a row if it was to secure all of the governors' seats. Since governors became *Procuratori* at the

¹⁰ Assumption (ii) above ensures that if a faction had more than two nominees, votes were not squandered by dividing the ballots among them.

Table 6: Composition of the colleges. Estimated probabilities

College composition		LIST 1	LIST 2	LIST 3
<i>Governatori</i>	8 new	91.13%	95.09%	≈ 100%
	4 new/4 old	8.66%	4.85%	≈ 0%
	8 old	0.21%	0.06%	≈ 0%
<i>Governatori</i> and <i>Procuratori</i> ^a	16 new	83.05%	90.41%	≈ 100%
	12 new/4 old	15.79%	9.23%	≈ 0%
	8 new/8 old	1.13%	0.35%	≈ 0%
	4 new/12 old	≈ 0%	≈ 0%	≈ 0%
	16 old	≈ 0%	≈ 0%	≈ 0%

Symbols ≈ 100% and ≈ 0% as defined in Table 4 and 5.

^a*Procuratori Perpetui* are excluded.

end of their term, the composition of the elected GP was influenced by four successive great councils. This was bad news for the *nobili vecchi* because we know that it was unlikely that they could reach a simple majority in the council and, therefore, even less likely that they could secure the majority more than once successively. In the Appendix, we use the colleges' scattered renewal times and the probabilities of a simple majority in the *Maggior consiglio* (Table 4) to assess how likely it was for the new nobles to control the two colleges. Our results are illustrated in Table 6, which shows the (estimated) probability distribution of the possible compositions of the two colleges, with the exclusion of the *Procuratori Perpetui*.

Table 6 reveals how power was distributed between the two factions in the *Supremo magistrato* and, consequently, in the nomination phase of the governors' and doge's elections. In the *Supremo magistrato*, a college of nine members in which the doge participated alongside the governors as *primus inter pares*, most decisions were taken with a qualified majority of two-thirds, so the senate could be controlled with six or more votes. As the table shows, the probability that the *Supremo magistrato* would be in the hands of the new nobles was more than 91 percent, and when it was not, a consensus decision had to be reached because neither faction was likely to have a qualified majority. In fact, the probability of the new nobles' being superfluous was no more than 0.21 percent.

We can be less precise about the college formed by the *Governatori*

and *Procuratori* because we do not know to which faction the *Procuratori perpetui* belonged. As mentioned in Section 3, an average of four former doges were in the college, so a qualified majority could be reached with 14 seats of 20. Therefore, even if no *Perpetui* were new nobles, the probability that the *nuovi* were in control was more than 83 percent, increasing to 99 percent if past doges were split between the two factions. Even in the unlikely scenario that all past doges were old nobles, the probability that the *nobili vecchi* would reach the qualified majority was virtually nil.

Based on the results in Table 6, we conclude that political representation in the *Supremo magistrato* and in the *Collegio dei procuratori* could be severely skewed towards the new faction and that, as a result of the unbalanced representation in the *Maggior consiglio*, combined with the colleges' scattered renewal times and the qualified majority used by the latter, the old nobles may have had to struggle to make their requests heard.

4.3 Election of the doge

What we have said about the election of the *Governatori* also applies to the doge's election, with two exceptions: The slate of candidates was filtered by two ballots, each of which required a qualified majority of two-thirds, and the nomination process was initiated by a subset of the GP along the lines of their eligibility to become doge. As a result, we cannot track the D-GP majorities or estimate their probabilities precisely, so we restrict our analysis to a qualitative assessment.

As before, we start from the election phase and go backwards. We notice that the new nobles could fail to elect one of their members as doge under only two circumstances: when the faction controlled less than half the seats in the *Maggior consiglio* while at least one old noble was on the slate of four candidates, and when all four nobles chosen in the nomination phase were old nobles. Given the probabilities computed in Table 4 and Table 6, both events were unlikely, as the probability that the new nobles did not have a simple majority in the great council is less than 5 percent and the probabilities on the colleges' composition suggest that the D-GP's failing to put at least one of their men in the slate of candidates was unlikely. We

conclude that, by the rule of the constitution, the *nobili nuovi* could almost certainly avoid a doge from the *vecchi*, as long as they could coordinate on a single alternative candidate.

5 Conclusions

We use historical data on the distribution of the new and old nobles among the 28 *alberghi* in 1528 Genoa to study the elaborate voting protocols of Doria’s republic. Our analysis shows that the use of the *alberghi* to deliver political pluralism was ineffective and that the voting mechanism provided by the 1528 constitution, despite its convoluted procedures that allow broad participation in the process of office allotment, did not ensure adequate political representation for the old nobles. This problem is probably why the Genoese returned soon after 1528 to the long-standing practice of dividing offices equally. They used this unwritten rule to correct the ill-conceived system that they had created, although the rule was often a source of conflict. After a few more revolts and an attempted revision in 1547 known as the *Garibetto*, a new electoral law was passed in 1576, but because of its previous, poorly designed voting system, Genoa had to wait fifty years after Doria’s reform before it could find some peace.

A Appendix

A.1 Simple majorities in the *Maggior consiglio* (Table 4)

Let T denote the population size in the bag and N be the number of *nobili nuovi* it contains. We denote by $H(T, N, d, x)$ the hypergeometric cumulative distribution function that gives the probability of getting x or less *nobili nuovi* in d drawings without replacement.

Estimate 1: first row of Table 4

We fix the number of nobles drawn from each of the 5 popular only *alberghi* to 14 to get 70 sure *nobili nuovi* in the council.¹⁵ In List 1, Cybo is also

¹⁵ As explained in Section 3, each *albergo* gets between 14 and 15 members in the *Maggior consiglio*, then 14 is arbitrarily chosen. However, the changes in the estimated

not mixed and, therefore, the number of sure *nobili nuovi* is raised to 84. The remaining 330 members (316 for List 1) are drawn without replacement from the pool of the mixed alberghi.

To get a simple majority for the *nobili nuovi*, strictly more than $200 - 70 = 130$ (or $200 - 84 = 116$) of its members must be drawn from the mixed *alberghi*. Therefore, the probability of the *nobili nuovi* having a simple majority in the great council can be computed as $1 - H(T, N, 316, 116)$ for List 1 and $1 - H(T, N, 330, 130)$ for List 2 and 3, where the values for T and N are given in the following table.

Mixed *alberghi* pooled

LIST 1		LIST 2		LIST 3	
<i>Nuovi</i>	Total	<i>Nuovi</i>	Total	<i>Nuovi</i>	Total
N	T	N	T	N	T
663	1615	558	1264	909	1752

Estimate 2: second row of Table 4

In our second estimate, we take into account the asymmetries of the mixed *alberghi*, by assuming that for the 23 non-popular *alberghi* sortition is made from only two very asymmetric bags, which are formed by pooling together the *alberghi* according to their size. To keep things simple, Cybo is now included in the group of small *alberghi* and we deal with the odd number of *alberghi* by splitting the 12th smaller *albergo* between the two bags. The composition of the bags is described below. Notice that the new nobles are distributed between the non-popular alberghi quite evenly. The *nobili vecchi*, instead, are concentrated on the larger *alberghi*.

Non-popular *alberghi* pooled in two groups based on size

Bag	LIST 1		LIST 2		LIST 3	
	<i>Nuovi</i>	Total	<i>Nuovi</i>	Total	<i>Nuovi</i>	Total
	N	T	N	T	N	T
small	363	618	264	445	446	684
large	350	1047	294	819	463	1068

probabilities are negligible if we choose 15.

As before, we assume that each popular only *albergo* gets 14 members. Half of the remaining 330 are drawn from each bag. The number of *nuovi* drawn from each group is a hypergeometric random variable and drawings from each urn are independent. We use these two facts to numerically evaluate the cumulative distribution function of the sum of *nobili nuovi* drawn from the two groups, and from this we compute the probability that the nuovi drawn from the mixed *alberghi* are more than 130.

Estimate 3: third row of Table 4

To assess the role of the *alberghi*, imagine to draw all the 400 members of the *Maggior consiglio* from the pool of all the nobles, without distinction of *alberghi*. In this case the composition of the bag is as follows.

Unicum ordo

LIST 1		LIST 2		LIST 3	
<i>Nuovi</i>	Total	<i>Nuovi</i>	Total	<i>Nuovi</i>	Total
<i>N</i>	<i>T</i>	<i>N</i>	<i>T</i>	<i>N</i>	<i>T</i>
1080	2032	811	1517	1294	2137

A simple majority is gained by getting strictly more than 200 members in the council. Therefore, the probability of the *nobili nuovi* having a simple majority can be computed as $1 - H(T, N, 400, 200)$.

A.2 Qualified majorities in the *Maggior consiglio* (Table 5)

To estimate the new nobles' probability of, respectively, reaching a qualified majority and being irrelevant, we use the same assumptions of Estimate 1, i.e. we consider the sure result of the non-mixed *alberghi* and pool all other nobles together. A qualified majority in the great council is reached with at least 267 members. Since the new nobles have 70 sure members (84 if we use List 1), a qualified majority is obtained if they get at least $267 - 70 = 197$ members in $400 - 70 = 330$ drawings (for List 1 the numbers are $267 - 84 = 183$ out of $400 - 84 = 316$ drawings). This probability can be computed as $1 - H(T, N, 330, 197)$ or, for List 1, as $1 - H(T, N, 316, 183)$.

By a similar reasoning we obtain the probability that the new nobles are irrelevant, that is they have less than 133 votes in the council. This can

be computed as the probability that the new nobles drawn from the pool of the mixed *alberghi* is less than $133 - 70 = 63$ out of 330 draws, that is $H(T, N, 330, 63)$. For List 1 irrelevance comes with less than $133 - 84 = 49$ draws out of 316, and therefore the probability is $H(T, N, 316, 49)$.

A.3 Composition of the colleges (Table 6)

To give a conservative estimate of the advantage held by the *nobili nuovi*, we (i) rule out the possibility that the *nobili vecchi* fail to elect their own governors when in control of the great council, that is we assume that they always have enough candidates, and (ii) use the lower bound for the probability p that the *nobili nuovi* have a simple majority in the great council (Estimate 1 in Table 4).

Let $q^G(4i)$, where $i \in \{0, 1, 2\}$, be the probability that there are $4i$ members for the *nuovi* in the *Collegio dei Governatori*. Because each great council elects four governors and the compositions of successive councils are independent experiments, the number of governors of the new faction divided by four has a binomial distribution with parameters 2 and p . Therefore,

$$q^G(4i) = \binom{2}{i} p^i (1-p)^{2-i}.$$

A similar argument can be made for the elected *Governatori* and *Procuratori* combined. For $i \in \{0, 1, 2, 3, 4\}$, the probability $q^{GP}(4i)$ that there are $4i$ members for the *nuovi* among the elected GP is

$$q^{GP}(4i) = \binom{4}{i} p^i (1-p)^{4-i}.$$

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