Self-enforcing Political System and Economic Growth: Late Medieval Genoa

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Abstract
     This paper presents a micro-level historical and theoretical analysis of Genoa's economic and political history during the twelfth and thirteenth century by examining the factors influencing the extent to which its political system was self-enforcing and their change over time. It combines narrative and theoretical analysis to resolve questions that can not be resolved by either narrative or theory alone. Although the Genoese Commune was voluntarily established in the hope to gain from economic and political cooperation, sustaining its self-enforcing nature constrained such cooperation. Cooperation was thus determined by the magnitude of factors, such as external military threat that relaxed this constraint. It took a century before learning and the increasing cost of non-cooperation induced organizational innovation that enhanced economic growth and political order by fostering the extent to which Genoa was a self-enforcing political system irrespectively of external threat.

Introduction

This study investigates empirically and theoretically the factors influencing the extent to which a political system is self-enforcing, their implications, and endogenous alteration. These factors determine the extent to which the political actors follow the rules of political conduct rather than ignoring them and resort to other means, such as violence to advance their objectives. Comprehending these factors is thus crucial for analyzing issues such as political order and disorder, states' formation, states' capacity to mobilize resources to advance their political and economic goals, and, hence, their political and economic performance. Specifically, the analysis concentrates on the self-enforcing political system of the commune of Genoa during the late medieval period. Since this city, by the end of the thirteenth century was, among the Italian maritime cities, a naval and commercial power second at most to Venice a better understanding of its commercial and political rise is also of interest for its own sake.[1]

The paper examines the importance of various factors such as the nature of the economic system, military strength of various social groups, external military threats, and political rules in determining the extent to which Genoa's political system was self-enforcing. It highlights the importance of these factors in influencing Genoa's political and economic history. This was the case even when political order prevailed as the extent to which Genoa's political system was self-enforcing determined the degree to which Genoa was able to mobilize the resources required to advance its economy. At the same time, the extent to which Genoa's political system was self-enforcing depended on the degree to which its economic system provided appropriate economic foundations. In Genoa, economic growth would have eroded, rather than enhanced, the economic foundations of Genoa's self-enforcing political system.

For a while, external threat endangering Genoa provided a political foundations better suitable for economic development. This development, however, implied the collapse of political order when that external threat subsided. It was the later adoption of particular set of self-enforcing political rules that enabled the Genoese to break the link between the extent to which Genoa's political system was self-enforcing, external threats, and economic development. Following a long process of learning and experimentation and taking advantage of a particular historical situation, the Genoese altered their self-enforcing political system in a manner that enhanced political order and enabled the state to mobilize the resources required for economic growth.

The particular historical period examined in this study is of interest to economists and

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[1] For a more detailed exposition of the historical and theoretical issues discussed in this paper, see Greif (1998).

political scientists for its own sake. During and after the twelfth century, economic development of the northern Italian cities was of such magnitude that it had a lasting impact on the economic development of Europe. This economic ascendancy was accompanied by political events that were extraordinary in a world characterized by a feudal political system. The residents of northern Italy voluntary established, organized, and governed city-republics, also known as Communes. In the process, some maritime cities, notably Venice and Genoa, emerged as the main commercial centers linking Europe and the more advanced civilizations of Byzantium, the Muslim world, and the Far East and became among Europe's largest cities.

Yet, neither the manner in which these political units became self-enforcing, nor the inter-relations between these endogenous political systems and economic changes were explored by political scientists or economic historians.[2] In particular, the Italian communes have been viewed as manifestations of the economic needs of their merchants. As the eminent historian of the Commercial Revolution, Robert Sabatino Lopez, has asserted, "the Italian communes were essentially governments of the merchants, by the merchants, for the merchants – an ideal platform for the Commercial Revolution" (Lopez, 1976, p. 71). Similarly, students of the relations between institutions and growth did not explore the relations between self-enforcing political systems and economic development. North and Thomas (1973), for example, stated that early on in the medieval period feudal lords "fought amongst themselves; but gradually, ... the strife declined" (p. 11). Peace enabled population growth and the realization of gains from "commerce between different parts of Europe" that "had always been potentially of mutual benefit" (p. 11).

Indeed, if one examines the commune of Genoa, its early days are marked by internal tranquility. It had been established around 1096, headed by elected consuls, and until 1164 there were no internal military conflicts. Yet, the extent to which this supports view that the Genoese commune was an expression of the economic needs of its members is controversial, and historians of Genoa are divided on this matter. Some argued that the internal tranquility prior to 1164 indicates that the commune was a political manifestation of Genoa's mercantile community. Hence, as conjectured by Lopez, the lack of an "exogenous" benevolent ruler and the reliance on a self-enforcing political system did not constrain economic growth by limiting intra-commune cooperation. Others historians, however, noted that during this time Genoa's prominent merchants were nobles, members of the same clans that later were at the center of Genoa's bitter civil wars that were frequent from 1164 to 1194. Hence, they conjectured that although we have

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[2] Political historians, however, such as Tabacco (1989), Vitale (1955), and Lane (1973) have narrated the political and economic development of various cities.

no record of conflicts, inter-clan antagonism prevailed even before the outbreak of the civil war, implying that Genoa's self-enforcing political system may have hindered economic development by restricting political cooperation between the large clans that dominated Genoa's politics and economics.[3] In other words, there is disagreement regarding the extent to which the commune's self-enforcing political system constrained growth and there is a lack of understanding of the reasons for the breakdown of political order. While there is an agreement regarding the historical facts, there is disagreement regarding their meaning.

Similar disagreement exists also with respect to the inter-relations between economic and political factors following the civil wars. In 1194 Genoa abolished the consulate and instituted an alternative political system, the *podesteria*. At the center of this political system was a *podestà*, namely, a non-Genoese hired by the city to be its military leader, judge, and administrator for a relatively short period of time, usually a year. Under the *podesteria* Genoa enjoyed a long period of relative political stability and rapid economic growth. Political historians have debated how the *podestà* was able to pacify and unite Genoa.[4] Vito Vitale, Genoa's eminent historian, argued that the *podestà* was merely an administrator and his institutionalization reflects the need for professional administration and the desire to limit competition over consular posts. Internal tranquility under the *podesteria* was sustained by the gains from cooperation. Yet, if this was the case, why were these gains insufficient to guarantee cooperation under the consulate? Why was there a need to alter the political system to foster cooperation? Other scholars consider the *podestà*'s military ability a key for enabling cooperation since he was able to impose peace on Genoa's rival clans. Yet, if this was so why didn't the *podestà* become a dictator? Hence, once again, while the historical facts are not disputed, their interpretation is.

In other words, narrative alone was found to be insufficient to comprehend the inter-relations between economics and politics in Genoa's case. One can not infer from the internal tranquility that prevailed from 1096 to 1164 whether inter-clan economic cooperation had been achieved or not. The absence of civil wars can either signal cooperation or mutual deterrence in which neither clan finds it beneficial to attack the other. Behavior does not help us answer the following questions: Was the Genoese commune, as conjectured by Lopez, a self-enforcing response to the needs of trade? Or was Genoa's ability to advance its economy constrained by the extent to which intra commune political order was self-enforcing? Similarly, the historical

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[3] For a recent statement, see Day (1988).

[4] Compare with Vitale (1951), p. 9; Heers (1977), p. 206.

narrative does not indicate the role of the organizational innovation of 1194 – the *podesteria* – in facilitating cooperation. Could peace have been achieved without a *podestà* as conjectured by Vitale? What were the implications of the *podestà* in enhancing the extent to which Genoa was a self-enforcing political unit? How did the *podesteria* itself became self-enforcing political system?

Narrative can not address these questions since they relate to events that <u>did not</u> occur and the motivation for <u>not</u> behaving in a particular way. Addressing these questions requires linking what we observe with what we do not observe, namely, analyzing the relations between expectations regarding off-the-path-of-play behavior and on-the-path-of-play outcomes. It requires an appropriate model. The model developed below enables addressing the above issues by providing a framework for the empirical analysis of the factors determined the extent to which Genoa's political system was self-enforcing.

The rest of this paper is organized as follows. Section I narrates the relevant historical background. Section II provides the foundations of the appropriate theoretical framework. Section III utilizes and extends this framework to examine the political and economic history of Genoa while economic, clans' military strength, and the international environment provided the foundations for Genoa's self-enforcing political system. Section IV examines, theoretically and historically, the role of the *podesteria* as a self-enforcing political organization that provided yet another foundations for Genoa's political system thereby altering Genoa's course of political and economic history. Conclusions follow.

I.   **<u>Narrative: Potential Economic Gains and Inter-clan Political Cooperation</u>**

During and after the second half of the eleventh century several northern Italian cities became major emporiums whose traders bought and sold goods throughout the Mediterranean. The large political units whose navies had previously dominated the sea either collapsed or declined and this political transformation enabled these cities to benefit from piracy, raids, and long-distance commerce. (E.g., Lewis, 1951.) Yet, history indicates that the key to an Italian maritime city's long-term economic growth was commercial expansion. Such expansion, in turn, was fostered by "political exchange" through which "overseas possessions" (commercial privileges in foreign territory) were acquired. In such an exchange, one political unit provided another with possessions in return for an alliance guaranteeing naval and military protection or neutrality. To illustrate the nature of political exchange and possessions, consider the relations between Genoa, the Crusaders, and Saladin (the ruler of Egypt who confronted the Crusaders). In return for past and promised future assistance to the Crusaders, the Genoese received between

1098 and 1110 the right to trade freely within the Crusaders' states without paying a tax, plus storehouses, churches, residential buildings, ports or their parts, castles, and extensive land plots in various trade centers.[5] In 1167 and 1170, the Pisans assisted the Crusaders in attacking Egypt in return for possessions in Tyre and promises of possessions in the captured area of Egypt. In 1170 Saladin gained control over Egypt after fighting against the Crusaders and, rather than retaliating against the Italians, he granted, first to Pisa and then to Genoa and Venice, various possessions, including the right of free trade and security throughout Egypt and additional trade privileges in Alexandria, Egypt's main Mediterranean port.[6]

The commercial importance of various Italian cities rose and fell depending on their possessions, since possessions substantially reduced the risk and cost of commerce, enabling their holders to crowd out unprivileged traders. (E.g., Hicks, 1969, pp. 49-50.) For example, a watershed in Venetian commercial history was a grant from Byzantium rewarding Venice for its naval assistance against the Normans by providing Venetian traders unlimited freedom of trade throughout Byzantium, release from any taxes and custom duties, and the right to possess shops, warehouses, and a landing stage in Constantinople. (E.g., Norwich, 1982, p. 73.) Genoa's trade in North Africa began to prosper after 1161 when the local ruler signed a fifteen-year agreement securing the property rights of the Genoese merchants. Before 1160, Genoese trade with North Africa never exceeded 500 lire, but it more than doubled on the eve of this agreement and remained at the higher level in later years.[7]

Hence, to expand its commerce, Genoa had to mobilize the resources required for the naval and military apparatus enabling raiding and the acquisition of possessions. The Holy Roman Empire that *de jure* controlled Genoa, was too fragmented at the time to *de facto* rule Genoa. It didn't assist the Genoese in acquiring possessions. To raid and to gain possessions, Genoa's residents had to cooperate and to mobilize the appropriate resources. Indeed, the historical records indicate the importance of economic gains in motivating the Genoese to organize themselves politically.[8]

After 1099 Genoa's political, administrative, and military leaders were four to eight *consoli del comune* (communal consuls; henceforth, consuls) who were "publicly elected in

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[5] For discussion, see Heyd (1885), vol. 1. pp. 149-50; Byrne (1920, 1928); Day (1984).

[6] *Annali* (1177), vol. II. For discussion see Day (1984); Heywood (1921), pp. 111-3.

[7] *Annali* (1161), vol. I, p. 84. Giovanni Scriba (1155-1164). For discussions, see Krueger (1932, 1933).

[8] See discussion in Greif (1988).

parlamentum," the gathering of all Genoese with "full rights."[9] The historical sources don't provide any further explicit information regarding the consuls' election process. Implicit evidence, however, indicates that the elected consuls were representatives of the Genoese clans that cooperated through the consulate. Namely, the clans whose resources the commune of Genoa was able to mobilize. (Hughes, 1978, pp. 112-3.) The consulate – like Genoa itself – was a manifestation of inter-clan cooperation.

Genoa's main clans were feudal landholders who, after forming the communes, were involved in any (potentially) profitable activity possible at the time. They supplied the commune with its admirals, Crusaders, raiders, largest landholders, and most prosperous merchants. Clans became the basic unit of Genoa's social and political organization during the years of weak central authority preceding the establishment of the commune.[10] Arguably, two specific clans, the Maneciano and Carmadino viscountal clans, were the most important in Genoa in the early days of the commune.[11] These clans' centrality in Genoa's political and economic life is reflected, for example, in their relative share in the consulate. From 1099 to 1164, members of 61 families served on the consulate but the Carmadinos and the Manecianos held 59 out of 282 consular posts - that is, 20.9 percent.[12] In the two main periods during which Genoa obtained possessions before 1170, namely, circa the First Crusade and from 1154 to 1162, members of both clans served on the consulate and were very active in obtaining possessions.

The importance of the Manecianos and Carmadinos seems to have its roots in the days of their ancestor, Ido, who was a viscount in Genoa under the old Carolingian administrative system. Although by the end of the eleventh century imperial control was nowhere to be found in Genoa, the viscountal clans kept various economic feudal rights in Genoa. Hence they had the military ability and economic resources required for raids and the acquisition of possessions. The extent of their combined resources and the nature of inter-clan cooperation was evident in 1154, when the commune was practically bankrupt. The four consuls, among whom one was a Maneciano and another a Carmadino, built war galleys to protect Genoa's commercial activity and spent more than 15,000 lire to pay the commune's debt. (*Annali* (1154), vol. I, p. 48.)

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[9] CDG, vol. I, no. 285. For the development of the Genoese consulate see Vitale (1955); De Negri (1986); and Pertile (1966). The earliest consuls' oath is from 1143 (CDG, vol. I, no. 128).

[10] E.g., Herlihy (1969, 1978).

[11] For their genealogy, see Belgrano (1873). Byrne (1920), pp. 200-1; Cardini (1978); and Day (1988), p. 74 recognized their political importance.

[12] *Annali* (1154-64), vols. I, II, Olivieri (1861).

These clans' expenses on the behalf of the commune - their willingness to mobilize their resources on behalf of the commune - weren't necessarily an uncalculated investment, since for each of Genoa's main clans the commune was a means for advancing its own political and economic interests.[13] Vitale (1955), in his classic study of the Genoese commune, has noted that the consuls expropriated income from Genoa's possessions. The consuls appointed holders for many lucrative positions, especially licenses for tax collecting and overseas administration, and this power enabled them to favor their kin and friends.[14] Probably more important, participation in the consulate enabled a clan to establish special relations with rulers of other political units, which implied political and economic benefits.[15] These benefits were bestowed by rulers of other political units to influence Genoa's political process in their favor.[16]

That each of Genoa main clans used the consulate to advance its own interest implies a conflict of interest. Income expropriated by one clan could not be expropriated by another and policy that advanced one clan's interest could harm the other. Indeed, the historical records provide more direct evidence for this conflict and the clans' willingness to resort to the sword to resolve contentions. The Carmadinos and Manecianos, were (as discussed below) at the center – although on the opposite sides – of Genoa's two main civil wars of the twelfth century from 1164 to 1169 and from 1189 to 1194. A twelfth-century chronicler observed that these wars were fought over political control: "Civil discords and hateful conspiracies and divisions had risen in the city on account of the mutual envy of the many men who greatly wished to hold office as consuls of the commune." (*Annali* (1190), vol. II, pp. 219-20.)

Despite the conflicting objectives of Genoa's main clans, the mere establishment of the commune suggests that at least in its early days cooperation had been necessary to advance a clan's interests. Indeed, in the early days of the commune no Genoese clan conducted large-scale raids or obtained overseas possessions by itself, and, as discussed at length below, Genoa acquired possessions when members of the Carmadino and the Maneciano clans served jointly on the consulate. It seems that these clans could have gained a great deal from cooperation. Yet their members were men of arms at least to the same extent they were merchants, and there was no state to provide Genoa's clans with political order. Each clan could have used its military

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[13] As noted by Day (1988) "for the great men of the twelfth century commune of Genoa, the government" was a "little more than a businessmen's consortium" (p. 128).

[14] Vitale (1955), pp. 29-30. See also Lopez (1938), pp. 129-30.

[15] CDG, vol. I, nos. 27, 128, 144; and see Abulafia (1977, pp. 62-4); Day (1988).

[16] See, for example, Day (1988) for the relations between the Guertius clan and Byzantium.

ability to gain political dominance in Genoa rather than to advance their common goals.

Did the need of the Genoese clans to ensure that their political system would be self-enforcing - that no clan would resort to violence against the other attempting to gain control over the city and its resources - impact political and economic outcomes? In other words, what were the factors fostering or diminishing each clan's motivation to maintain political order and to cooperate in advancing Genoa's economy rather than using military force against the other clans to gain political supremacy over the city? What were the economic and political implications, if any of the need to ensure that the Genoese commune would be a self-enforcing?

A narrative of the political and economic history of Genoa from 1099 and 1162 would not suggest that the need to political order among Genoa's main clans impact its politics or economics. During this time, no civil war or major violent political confrontation occurred in Genoa. The observed consulate holdings do not shed much light on this issue either. Table 1.1, which presents a detailed listing of consulate holdings over this time, indicates that members of both clans participated in the political life of the city. Furthermore, between 1154 and 1164, both the Carmadino and the Maneciano held prominent roles in the consulate although not necessarily at the same time. That different factions peacefully gained a dominant role in the consulate at different periods neither necessarily implies political confrontation nor lack of cooperation in advancing Genoa's

Thus, evaluating whether the need to ensure that Genoa's political system would be self-enforcing effected the city's politics and economics prior to 1162 - when political order prevailed - requires resorting to theory able to guide an empirical anlsysis.

II .   <u>The Economics of Inter-Clan Cooperation: Theory</u>

Each of Genoa's main clans, the Carmadinos and the Manecianos, could have decided the extent of their cooperation in raiding and the acquisition of possessions. At the same time, each could have also initiated a costly military confrontation with the other to gain supremacy over the commune and its expropriatable income. This situation is depicted below informally as a repetitive, complete information game. (The appendix contained a formal presentation.) Its specification abstracts from intra-period considerations and asymmetric information, but generates robust, inter-period predictions enabling an empirical analysis.

This section's model analyzes the characteristics of the set of mutual deterrence (sub-game perfect) equilibria (MDE). (MDE differ in their distributions.) In such equilibria, inter-clan military confrontation doesn't occur; the clans cooperate in raiding and divide the gains from current raids and the possessions they have acquired in the past. Concentration on these

equilibria is motivated by two considerations. First, the peace that prevailed until 1164 indicates that each clan was indeed deterred from militarily challenging the other: Second, since inter-clan war is costly, refraining from military confrontation is economically efficient. Furthermore, since obtaining possessions was efficient, studying whether the need for the Genoese commune to be self-enforcing impact its economy is to examine whether this need constrained cooperation in reaching a MDE with the efficient number of possessions.

Examining whether Genoa's self-enforcing political system reached a MDE with the efficient number of possessions requires examining the clans' incentives to cooperate in the acquisition of possessions. Yet, for simplicity, the analysis first examines MDE for a given number of possessions and only then it is extended to allows the number of possessions to be determined endogenously. This reveals the distinct political and economic characteristics of efficient and inefficient MDE enabling to confront the insights of the theoretical analysis with the historical evidence..

Model: MDE when the number of possessions is exogenous

There are two clans, each of whom can decide, each period, whether to cooperate with the other in conducting a raid and how much of its resources to invest in military strength. (All decisions within a period are made simultaneously.) Considering investment in military strength by building fortification, soliciting military and political assistance from non-clan Genoese is appropriate in this historical episode.[17] After all, an exchange of military support for material benefits was an essential part of the feudal world in which twelfth-century Genoa was embedded. The strength of the Carmadino and Maneciano viscountal clans themselves was a product of such an exchange between their ancestors and the emperor.

A clan's ability to recruit supporters is limited by its resources that are consisting of the clan's share in the income from the existing stock of possessions and a raid if any, that has been jointly conducted during that period. Note that at this point the analysis assumes that the number of possessions is constant and exogenous. Similarly, the clans' shares in the income are assumed to be constant and exogenous. The historical records don't provide any clue regarding the process through which the clans' shares were determined. Hence, the analysis conducted below is restricted to that appropriate for any allocation of income.

After investing resources in military strength (henceforth equated, for simplicity, with recruiting supporters), each clan, sequentially, can decide whether to militarily "challenge" the

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[17] Hiring outside retainers wasn't an option. See Munz (1969), p. 299.

other clan or not. A clan that has decided to challenge can recruit additional supporters prior to waging war subject to its budget constraint. Once war began, no more supporters can be recruited. If neither clan challenges, the above situation repeats itself. If either clan challenges an inter-clan war transpires. The war is costly to each side and a clan's probability of winning the war depends on its relative military strength: this probability is non-decreasing in the clan's military strength and non-increasing in the other clan's military strength. (As made explicit in the appendix, a tie within a particular period is feasible.) A clan that wins an inter-clan war becomes a "controlling" clan retaining all the income generated from possessions in each of the subsequent periods.[18]

Note how the assumptions above capture the distinct natures and the relationship between possessions and cooperation in raids. Raiding can be conducted in every period, and it yields booty only during the period in which it is taken. A possession, however, once they had been acquired generates income in each subsequent period irrespectively whether the clans cooperated on not in that period. The reason for this specification is that after possessions are acquired they provide a clan with the resources needed to retain them.[19]

Once a clan acquired the position of controlling clan, Genoa might be subject to an "external threat." Such threats were an important element in Genoa's historical reality. In particular, Genoa's autonomy was, during the second half of the twelfth century, threatened by the ambitions of the Emperor Frederick Barbarossa, who aspired to re-impose his empire's control over Lombardy. While such threat could have, and indeed have been transpired even prior to inter-clan conflict, inter-clan war within Genoa weakened the ability of the Genoese as a whole to deter and confront such threats. Accordingly, and to direct the theoretical analysis toward insights that are empirically relevant it is assumed that prior to an inter-clan war, external threat would not transpire. Following a inter-clan war, however, external threat can transpire and the controlling clan can militarily confront it although its military strength is limited by the controlling clan's budget constraint.

The probability of a controlling clan's war against an external threat increases in the <u>absolute</u> military strength of the external threat (e.g., the size of the army Barbarossa was able to

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[18] Allowing a clan to surrender wouldn't alter the analysis. Adding direct benefit from political control to a clan's payoff doesn't qualitatively alter the analysis.

[19] Indeed, the Embriachi family of the Maneciano clan was able to send only two galleys on a private expedition in the First Crusade. Its members were able, however, to gain *de facto* control over many of Genoa's possessions in the Crusader States and became, toward the end of the twelfth century, independent lords.

recruit) and decreases in the controlling clan's <u>relative</u> military strength (namely, its military strength relative to that of Barbarossa). Similarly, if war actually occurred, the probability that the controlling clan would win decreases in the threat's absolute military strength and increases in the clan's relative strength. War against the external threat is costly and defeat implies a zero continuation payoff to the controlling clan. If a war did not occur or was won, the game proceeds as before.

If a clan neither challenges nor being challenged, its per-period payoff equals the income from possessions and raids minus the expenditure on military strength. On the other hand, if the clan challenges it incurs the cost of war but can gain, in a probability depending on its military strength relative to the other clan control over the future stream of income from possessions.[20] More precisely, its gains is the net present value of a controlling clan and hence it increases in the number of possessions but decreases in the extent of the external threat. If the number of supporters to one clan is such that the other clan's net expected gain from challenging is less than the expected gain from not challenging, it can be said that the latter clan is deterred from challenging.

A Mutual Deterrence (sub-game perfect) Equilibrium (MDE) in which neither clan challenges, exists if and only if the following condition (henceforth, condition 1) is satisfied. Each clan invests in military strength the amount that (1) maximizes its net expected value if no clan challenges (given the other clan military strength) and (2) required to deter the other clan from challenging for any investment in military strength that clan can make.

Model: The efficiency attributes of MDE when the number of possessions in endogenous

To understand the implications of condition 1 on the incentives to acquire possessions, the relations between possessions and raids should be made explicit. Assume that there is some finite number, T^*, of possible possessions and that possessions and raids are substitutes in the sense that once a possession is acquired in a specific principality, the Genoese can not raid it without losing the possession. Indeed, this trade-off between raids and possessions was inherent in the nature of the political exchange through which possessions were acquired.[21]

Since having possessions was efficient, assume that there is a positive number of

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[20] The analysis assumes that following inter-clan confrontation the clans can no longer cooperate in raids. The analysis does not qualitatively depend on this assumption.

[21] Indeed, in 1193, in retaliation for attacks by the Genoese pirate Guglielmo Grasso, the Byzantine emperor revoked all Genoa's privileges. CDG, vol. III, no. 35; Day (1988), pp. 109-11. The inability of one clan to raid after possession were acquired (even if this clan lost a civil war) reflects the constraints on Genoa's main clans due to the interest of the other Genoese who gained from trade using these possessions. This point is further elaborated in Greif (1998).

possessions, τ, that maximizes the (gross) income from possessions and raids. Hence, if the number of possessions is lower than that, the total income from possessions and raids increases in the number of possessions but the income from raids decreases in the number of possessions. Note that this specification identifies possessions with economic development that yields expropriatable income and decreases the present value of future inter-clan cooperation in raids.

The analysis can now be extended to examine the number of possessions in the acquisition of which both clan would find optimal to cooperate. In other words, it examines the extent to possible mobilization of resources. The analysis addresses the following question: does the efficient MDE also maximizes the clans' incomes? If the answer to this question is affirmative, it can be concluded that (at least from this static point of view) the need to sustain Genoa's self-enforcing political system did not theoretically entail economic cost.[22] If the answer to this question is negative, however, it can be concluded that theoretically, the need to sustain Genoa's self-enforcing political system hindered economic efficiency since the clans would not cooperate in achieving the efficient MDE. If this is the case, we can also use the model to identify the exact sources of this inefficiency.

Addressing the above questions requires examining when a MDE implies a positive number of supporters. Condition 1 specifies when a MDE exists for a given number of possessions and thus reveals the equilibrium relations between the number of possessions and the clans' endogenous military strength. When there are no possessions, condition 1 holds for any parameter sets, because challenging implies no gains but entails the cost of war and the loss of future gains from cooperation in raids. Hence in the absence of possessions, sufficiently patient clans would neither militarily recruit supporters nor challenge each other. As the number of possessions increases, however, deterrence may or may not be achieved without supporters (no matter how patient are the clans). A necessary condition for the existence of MDE with a positive number of supporters for both clans is that there is a feasible number of supporters to a clan that makes it profitable for it to challenge if the other clan has no supporters.

Theoretically, then, the MDE with the efficient number of possessions may be associated with either no supporters or a positive number of supporters. It is more likely that a MDE with the efficient level of possessions be characterized by a positive number of supporters the lower

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[22] The analysis assumes that acquiring more possessions entails a transition from one MDE to another. It ignores possible hindrances to efficiency due to the difficulties in transition from one equilibrium to another.

the external threat, the (time average) cost of war, and the gains from raids.[23] Since we don't know the relevant functional forms and parameters, we can't theoretically establish what the number of supporters in the efficient MDE had to be in Genoa.

What can be established, however, is that if the equilibrium number of supporters in the efficient MDE is zero, then the efficient MDE maximizes the clans' incomes. If the equilibrium number of supporters in the efficient MDE is positive, however, then the efficient number of possessions does not maximize the clans' incomes. In other words, the clans would not find it optimal to cooperate in obtaining the efficient number of possessions.

This is the case because in considering the profitability of acquiring possessions, a clan takes into account not only the economic cost of acquiring possessions but also the political cost, namely, the expense entailed by the need to ensure deterrence. When deterrence at the efficient level of possessions requires a positive number of supporters, the marginal political cost is positive, since acquiring more possessions entails substituting away from deterrence based on the value of cooperation in raids and confronting the external threat to deterrence based on supporters.[24] Since deterrence implies cost, the number of possessions each clan would find optimal to acquire <u>doesn't</u> equate the marginal economic benefit with the marginal economic cost. Instead, a clan's optimal number of possessions - the number of possessions that maximizes the clan's net income - equates the marginal economic cost with the marginal economic <u>and</u> political costs. (See appendix, proposition 1.)

In other words, political cost creates a wedge between the efficient and optimal number of possessions. Although the MDE with the efficient number of possessions maximizes the clan's gross average payoff, it doesn't maximize its net average payoff. The clan would find it optimal to have an MDE with fewer possessions in which the marginal economic gain from cooperation equals the marginal political and economic cost. Note that this result doesn't depend on the process through which the allocation of incomes from possessions and raids has been obtained. It is a statement about the clan's incentive if a clan's share is such that the related efficient equilibrium entails a positive number of supporters.

The above analysis has been motivated by the quest to identify the possible sources for

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[23] Using the appendix's notations: At the limit, when $\theta \to 0$ (and hence $s(.) \to 1$ and $\omega(.) \to 0$ for $\psi^k = 0$), $c(1 - \delta) \to 0$, and $R(T) \to 0$ the equilibrium number of supporters has to be positive if for k = i or j, $\exists$ $\psi^k \leq \lambda^k[I(T) + R(T)]/r$ s.t. $s^{k,w}(\psi^k,0) > \lambda^k$. That is, there is a feasible number of supporters that makes clan k's probability of winning, $s^{k,w}(.)$, larger than its share in the gains, λ^k, when the other clan has zero supporters.

[24] The result also holds qualitatively when there are no raids.

political order in Genoa and their implications. Specifically, by the inability of narrative to resolve two conflicting interpretations of the prevalence of political order in pre 1164 Genoa. Theory indicates that both interpretations can be correct. On the one hand, efficient MDE and peace can prevail. On the other hand, inefficient MDE and peace can also prevail. Yet, the analysis also indicates how we can further evaluate which one is indeed correct. Analysis, thus complements the narrative. It indicates the conditions under which sustaining political order is likely to hinder the acquisition of possessions and the nature of the economic and political behavior associated with an efficient and inefficient MDE. Particularly, inefficient MDE is more likely to occur when the external threat is low. It would be reached following a period of cooperation in the acquisition of some possessions. It would have the following economic and political attributes. Raiding and less than the efficient number of possessions would provide the economic foundations for the self-enforcing political system. Each clan investment in military strength would provide the military foundations of the political system that would be characterized by inter-clan tranquility.

Evaluating whether sustaining Genoa's self-enforcing political system hindered its commercial expansion thus requires examining the historical evidence in the light of the theory. Theory should be complemented by narrative. Were the Genoese clans facing a situation in which an inefficient equilibrium was likely to prevail? Were the economic and political features of Genoa similar to those found ro be theoretically associated with an inefficient equilibrium?

III. **Back to Narrative:**

IIIa. **The Economic and Military Foundations of Self-enforcing Political System in Genoa, 1099-1162**

From 1099 to 1154 Genoa was not subject to threats by another political unit that endangered its political autonomy. It was involved in a lengthy war against Pisa over Sardinia, but this smaller city didn't pose any real threat to Genoa. Hence its external condition was like that associated with the existence of an inefficient MDE. Indeed, the political and economic situation in Genoa during this time had the features theoretically associated with a mutual deterrence equilibrium with fewer than the optimal number of possessions. It enjoyed internal peace, yet investment in military strength was aimed at confronting internal threats rather than external ones. It exhibited some cooperation in acquiring possessions, yet raids and the acquisition of relatively few possessions remained important feature in the commune's economic life.

As mentioned before, between 1099 and 1162 no civil war or major violent political

confrontation occurred in Genoa. Despite this internal tranquility and consistent with the theoretical features of an MDE with less than the efficient number of possessions, clans invested resources in building fortifications aimed at protecting them from each other and established patronage networks. By 1143 fortified towers were a dominant feature within Genoa (CDG, vol. I, no. 128). Clans bought land and constructed walls and houses to form fortified enclaves well protected by defense towers.[25] The role of these fortifications during civil wars is well reflected in the words of the Jewish Spanish traveler, Benjamin of Tudela, who visited Genoa probably during the civil war of 1164-1169 (which is discussed below). "Each householder has a tower on his house" and "at times of strife they fight from the tops of the towers with each other" (Tudela, 1160-73, p. 62).

Non-clan members moved to live in clans' quarters, benefitting from their economic resources and political and legal powers. In return, a clan's clients provided it with military and political assistance in case of need. Their participation in civil wars alongside the clans can be seen, for example, when Primo de Castro and his supporters battled the supporters of Rolando de Avvocato in the streets of Genoa in 1164. Similarly, in 1179 the Grillo family and its relatives fought against the consul, Ogerius Ventus and his "fellow-men," and in 1192 a fight between the della Volta clan and "part of their [former] adherents" occurred.[26]

Theory indicates why – during a period of inter-clan tranquility – Genoa's clans were pursuing the above policy. It was a manifestation of mutual deterrence, as Genoa's leading clans invested resources to maintain the military balance among themselves. Consistent with the other theoretical predictions, this mutual deterrence also involved fewer than the optimal number of possessions. Raids seem to have remained the most important economic activity of the Genoese, and the city didn't acquire many possessions prior to 1154, although they could have. Benjamin of Tudela who visited Genoa around this time notes that the Genoese have "command of the sea and they build ships which they call galleys, and make predatory attacks upon Edom [that is, the land of the Christians] and Ishmael [that is, the land of the Muslims] and the land of Greece as far as Sicily, and they bring back to Genoa spoils from all these places" (p. 62). At the same time, long-distance trade based on possessions was, in the words of Genoa's historian Gerald W. Day, "unusually slow to develop" (1988, p. 6).

That acquiring possessions was possible during the first half of the twelfth century is

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[25] See, for example, gs342 (January 28, 1158), gs342 (January 28, 1158), gs505 (October 4, 1158). See discussion in Krueger (1957), pp. 270-1; Hughes (1977, pp. 99-100; 1978, pp. 110-112).

[26] *Annali* (1164), vol. II, p. 16. *Annali* (1179), vol. II, p. 192. *Annali* (1192), vol. II, p. 227.

indicated by the success of Pisa, Genoa's smaller neighbor to the south. By 1154 it had already acquired many possessions: in Corsica (since 1091), Sardinia (before 1118), the Crusader States, Byzantine (since 1111), Spain (in Catalonia (1113) and Almeria (1133)), North Africa (in Bona, Tripoli, Sfax, and Bugia (1133)), Egypt (including a bazaar in Cairo since 1153 and a bazaar in Alexandria, which they had acquired much earlier), and probably in various principalities in Provence (1113).[27] In contrast, by 1155 Genoa had possessions only in the Crusader States, Sardinia, Provence, and perhaps Valencia. There is no indication that Genoa had any possessions in important trading areas such as Byzantine, Egypt, Sicily, or North Africa. (CDG, vol. I; *Annali*, vol. I.)

The difference between Genoa and Pisa can't be attributed to exogenous factors such as opportunity, geography, or uneven endowments. Pisa's location is not superior to that of Genoa, and Pisa had no more than 60 percent of Genoa's population throughout the twelfth century. The above theoretical framework suggests why a less-endowed city may acquire more possessions. Such a city would be better able to mobilize its resources to acquire possessions if the need to ensure the self-enforceability of inter-clan relations did not hinder cooperation. Indeed, the available historical sources - although not as complete as those of Genoa - indicate that Pisa's political structure differed from Genoa's. In particular, the sources available for the period prior to 1190 indicate the importance of three clans: the Visconti, Gaetani, and Dodo which together had provided over 35% of the commune's consuls and Vicecomes.[28] Furthermore, for the period up to 1153, the hold of the Visconti over the commune leadership seems to have been undisputed: this clan provided 65% of the known consuls and Vicecome.[29] The base to their power seems to have been the feudal rights they held in Pisa - these extent and concentration provided them with the resources required to acquire possessions without having to fear the implications of additional possessions on mutual deterrence within the city. Their dominance is well reflected also in the Pisan's tradition that the consuls held their posts by "the Grace of God" and had the right to nominate their own successors.[30].

That a lack of political cooperation hindered Genoa's acquisition of possessions is also

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[27] Heywood (1921), pp. 46-82, 108-115.

[28] Annales Pisani, various years; Rosesetti et. al. (1979); Cristiani (1962).

[29] Rosesetti et. al. (1979). For the period as a whole, the Visconti provided more than 20% of the known leaders of the commune. Their dominance was disputed from 1155 to 1164 (when they do not provide any consul) but resumed afterward.

[30] For discussion see Heywood (1921), pp. 8, 253-4; Waley (1988), pp. 35-6.

suggested by Genoa's consulate holdings, which, consistent with the theoretical prediction, indicate cooperation in the early days of the commune. From 1102 to 1105 members of both clans served on the consulate, and it was then that Genoa helped the Crusaders conquer Tortosa, Acre, and Gibelletto, in each of which the Genoese gained substantial possessions.[31] Cooperation during this period is also suggested by the presence of members of both clans in various official documents relating to the acquisition of possessions. After that year, until 1154 members of the Maneciano and Carmadino clans were not involved alongside each other in the acquisition of possessions. Indeed, Caffaro, the author of Genoa's annals who lived during the first half of the twelfth century, attributed this situation to Genoa's political leadership. He reports that by 1154 "the city was asleep and was suffering from apathy and was like a ship wandering across the sea without a navigator" (*Annali* (1154), vol. I, p. 48).

Theory provides a stronger prediction than cooperating in the acquisition of a few possessions. In particular, it indicates why one clan may find it optimal to cease cooperating with the other through the consulate. Suppose that clan k expropriates all the income from existing possessions but will expropriate much less from any additional possessions.[32] (For simplicity of exposition, assume that the other clan will expropriate nothing.) When this is the case, acquiring additional possessions is not profitable for that clan. It is strictly better off by retaining the lower number of possessions, as additional possessions imply that it will have to have a higher number of supporters in the new mutual deterrence equilibrium and a lower net payoff.

Interestingly, the historical records indicate that after 1122, the Manecianos ceased serving on the consulate. As reflected in table 1.1, from 1099 to 1122 the Manecianos dominated the consulate holding more consular posts than any other Genoese clan (18 percent of the total). From 1123 to 1143, however, no Manecianos served on the consulate, and the Carmadinos provided more consuls than any other clan (13 percent of the total). The change in the leading clans was associated with a broader change in the composition of the consulate, suggesting that when a leading clan dominated the consulate, its supporters held consulate posts as well.

Theory predicts that if the Manecianos were in a position to expropriate much income

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[31]Conquest: Caffaro, <u>Libro della Liberazione delle Città d'Oriente</u>, pp. 155-60. For the period from 1099 to 1122, members of the Carmadino clan were also consuls in 1118 and 1119. It should be noted that these seven posts were held by Ido de Carmadino. That Ido was a member of the Carmadino clan, as his name suggests, has been concluded by Belgrano (1873) and accepted by Day (1988), p. 71. Documents: See, for example, CDG, vol. I, nos. 24, 30.

[32] Using the appendix's notations: λ^k equals one with respect to existing possessions and zero with respect to additional possessions.

from existing possessions (even without serving on the consulate) but expected to expropriate relatively little from additional possessions, they were motivated to cease cooperating through the commune. Was this the case? Before 1122, the Manecianos were able to gain *de facto* control over the main Genoese possessions. After the First Crusade members of the Embriachi family of the Maneciano clan became the governors of the Genoese possessions in the Crusader States. They have gained *de facto* independent control over these possessions. Throughout the twelfth century they refused to pay an annual lease to Genoa or to return the holdings into the hands of the commune for reinvestiture.[33] The Embriachi's control over these possessions enhanced the Manecianos' ability to control the consulate and by 1122, the Carmadinos and other Genoese not affiliated with the Manecianos had a reason to be concerned about the Manecianos' ability to gain *de facto* permanent control over Genoa itself.

In 1122, through a process that is neither reflected in the historical records nor explicitly captured by the theoretical framework, the Genoese altered the *compagna*'s regulations to specify that consuls would be elected for only one year, not for the longer term allowed before.[34] Otto, the Bishop of Freising and a twelfth century German chronicler, is explicit that shortening consuls' terms in Italian cities was to prevent domination by a particular clan. Fearing that the consuls "should exceed bounds by lust for power," it was decided that they should be "changed almost every year" (1152-8, p. 127). The year 1122 marked the end of a period in which the Manecianos could have expected to take control in any of Genoa's additional possessions. They no longer had an incentive to lead the commune in gaining possessions; the Carmadino clan then took the lead in attempting to acquire possessions and became very active in the western Mediterranean.[35] They had much to gain from acquiring possessions without the Manecianos, who still retained their control over Genoa's possessions in the Crusader States.

IIIb.   **Self-enforcing Political System and International Insecurity**
A.   **From Pirates to Traders: 1154-1164.**

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[33] *Annali* (1099), vol. I (also quoted in CDG, vol. I, no. 9); CDG, vol. I, 47; CDG, vol. I, no. 170; CDG, vol. I, no. 246-8. For discussion see Heyd (1868, 1885); Rey (1895); Byrne (1920, pp. 202-5, 1928); Cardini (1978); Face (1952).

[34] This episode seems the reflect the political importance of the Genoese who were neither militarily strong nor rich enough to replace the main clans during the first half of the twelfth century but were concerned about the strong clans' aspiration to political control. This issue is not explicitly captured by the model.

[35] CDG, vol. I, various contracts, and *Annali*, vol. I, various years.

The nature of Genoa's economy and its inter-clan relations before 1154 are consistent with the attributes of MDE with less than the optimal number of possessions. Genoa's politics and economy, however, radically changed in 1154. This sub-section presents this change and accounts for it as reflecting a transition from self-enforcing political system based on economic and military foundations to one based on the appropriate international environment.[36] Specifically, a system in which the political costs implied by economic expansion that deterred the clans from cooperating in acquiring possessions were reduced by international threat enabling commercial expansion.

In 1154, members of the Maneciano and Carmadino clans served jointly on the consulate for the first time since 1105 and from 1154 to 1162 the two clans held almost an identical number of consulate posts. As reflected in table 1.1, the broader structure of the consulate changed as well. Consulate posts were held neither by the important families of the Maneciano period of domination (1099-1122) nor by the important families of the Carmadino period (1123-49). Four clans, the della Volta (who also held many consulate posts from 1123 to 1149), the Maneciano, the Carmadino, and the Guertius, held fifty percent of the consulate posts.

To the extent that patterns of consulate holding reflect cooperation in mobilizing resources and such mobilization was essential for acquiring possessions, one would expect that the co-appearance of the Maneciano and the Carmadino clans in the consulate would be associated with a rapid acquisition of possessions. Indeed, from 1154 to 1162 Genoa gained possessions all over the Mediterranean: it reaffirmed its privileges in the Crusader States and acquired possessions in Spain, North Africa, Byzantium, and Sicily and in various cities on the French coast. Furthermore, members of the four clans that dominated the consulate were very active in acquiring possessions. Consequentially, Genoa's long-distance (and hence lucrative) trade substantially increased as displayed in figure 1.1, providing further indication of the importance of possessions in trade expansion.

How should we understand this phenomenon? The model discussed in the previous section provides a sharp prediction regarding a factor that may relax the constraint on cooperation in a self-enforcing political system based on military and economic foundations. The highest MDE level of possessions up to which both clans find it optimal to cooperate increases with the external threat. Such an increase implies a transition from self-enforcing political system based on military and economic foundations to one based on common threat. Intuitively, suppose that the clans are at an MDE with less than the efficient number of

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[36] The anachronistic term "national" is used here for simplicity.

possessions and the external threat increases. The payoff from being a controlling clan declines for each clan, since a controlling clan will recruit more supporters given the higher threat or will have a lower probability of avoiding or wining a war (or both). The reduction in a controlling clan's average payoff, *ceteris paribus*, decreases the gain from challenging to each clan. Hence a new MDE with a higher number of possessions can be reached, in which both clans are better off. This intuition is summarized in the following proposition. (See proposition 2 in the Appendix.) Note that while it is well known that rival clans within various Italian city states often cooperated in confronting external threat, the issue discussed here is different. It is the extent of cooperation in the acquisition of possessions.

Theory predicts that if mutual deterrence limits cooperation in the acquisition of possessions, an increase in external threat would enhance cooperation. History indicates that indeed the renewed cooperation among the Manecianos and Carmadinos followed a substantial increase in the external threat the Genoese faced. Specifically, in 1152 Frederick I Barbarossa became the king of Germany and two years later – the very same year in which members of the Carmadino and Maneciano clans served jointly on the consulate for the first time in 49 years – he crossed the Alps with a large army. Although his military campaign had more than one purpose, it was aimed, or at least had been perceived to be aiming, at *de facto* re-imposing the empire's control on the northern Italian cities of Lombardy. Bishop Otto of Freising, Barbarossa's official chronicler, viewed Lombardy as "a very garden of delights" that "surpassed all other states of the world in riches." Yet its residents refused to pay their lord, namely, the emperor, "what is rightfully his own" (1152-1158, [1952], pp. 126-8). Barbarossa demanded a tax from the Italian cities in 1154 and made his intention to impose his control over the cities known in the decrees of Roncaglia in 1158.[37]

The Genoese perception regarding Barbarossa's intentions and the danger he posed are well reflected in a vivid illustration, contained in the Genoese annals, of the city of Tortona after Barbarossa destroyed it in 1155. In haste the Genoese began to build their city's walls.[38] At this point they probably perceived protection from Barbarossa as more urgent than protecting themselves from each other.

Motivated by the external threat, the Carmadinos and Manecianos were attempting to enhance their ability to cooperate by having both clans marrying into a third one – the della Volta

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[37] See Munz (1969), pp. 119-20; Waley (1988), pp. 88-97.

[38] *Annali* (1154, 1155, 1158, 1159), vol. I.

clan.[39] From 1123 to 1149 the della Voltas' number of consulate posts was second only to that of the Carmadinos, suggesting that the two clans were political allies. Through marriage to both the Carmadinos and the Manecianos, the della Voltas were probably supposed to provide a "balance" between the two rival viscountal clans.[40] (See figure 1.2.) That this was the case is also suggested by an alteration (in an unspecified manner) of the election process in 1155 to ensure that in the future the "best citizens" would be elected. (*Annali*, 1155, vol. 1, p. 59.) Following this alteration in 1156 two of the four consuls were members of the della Volta clan and in the following years this clan provided more consuls than any other.

Since Barbarossa had never attacked Genoa, building the walls was probably the largest cost that his actions imposed on the Genoese. Ironically, his threat seems to have enabled the Genoese to cooperate and prosper by relaxing the constraints ensuring that Genoa's political system would be self-enforcing. Cooperation and attempts to enhance cooperation are reflected in the acquisition of possessions, the building of Genoa's walls, marriages, and consulate holdings. Between 1154 and 1164 the families related by blood and marriage to the della Volta clan, Maneciano, and the Carmadino, held 73 percent of the consulate posts. The threat imposed by Barbarossa enabled a transition from self-enforcing political system based on economic and military foundations to one based on the appropriate international environment.

B.   In the Absence of Self-enforcing Political System: From Order to Dis-order, 1162-1194

The reliance of Genoa's self-enforcing political system on external threat, however, was short lived. In 1164 this threat unexpectedly dissipated. Given this low level of threat and the high level of possessions, neither economic nor military foundations could have enabled the Genoese to maintained political order and civil war was the end result. This eventuality, however, was not insight as late as 1164. Two years early, in 1162 the Emperor Barbarossa defeated Milan, which had led the struggle against his attempt to re-affirm imperial control over Lombardy. The Genoese, now directly exposed to the imperial wrath, promised Barbarossa to provide him with naval assistance for a campaign to conquer Sicily in 1164.[41]

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[39] On political marriage, see Hughes (1975), pp. 127-8.

[40] Section V discusses in detail how such a balance may be created.

[41] *Annali* (1162), vol. I, pp. 88-90 (Ingo della Volta, Lanfrancus Pevere, Rogerone de Ita (de Castro) were among the legates); CDG, vol. I, no. 308. See discussion in De Negri (1986), pp. 289-92; Waley (1988), p. 33; Day (1988), pp. 94-5.

Yet, in 1164, the Emperor's army was no where to been seen in Italy. Internal disarray in Germany and the establishment of the Veronese league in Lombardy for the purpose of fighting him implied that Barbarossa was no longer a threat, at least in the short run.[42] That this development caught the Genoese by surprise is indicated by the fact that in 1164 they had already prepared a navy to assist Barbarossa in the conquest of Sicily.

In 1164 the external threat to the Genoese greatly subsided; it could no longer provided the appropriate foundation for Genoa's self-enforcing political system.[43] Neither could its economy provide the appropriate foundations. There was not much the Genoese could gain from raids while the possessions acquired in the past made controlling the consulate a tempting objective. Following Genoa's treaty with Barbarossa in 1162, his foes – the king of Sicily and the Byzantine emperor – viewed the agreement as an act of hostility. Pisa, Genoa's bitter rival, took advantage of this situation and after attacking and destroying the Genoese compound in Constantinople waged war against Genoa. The hostile navies of Sicily and Pisa blocked the path of the Genoese to the eastern Mediterranean, and most of the Muslim west was now controlled by the powerful Almohades, in whose trade centers Genoa held possessions.[44] At the same time, the possessions acquired in the past still made controlling the consulate more tempting than it was in 1155. In 1164 Genoa's export trade was more than six times its 1155 value and 65 percent of its 1161 level.

In sum, in 1164 neither the international nor the economic situations that previously provided the foundations for Genoa's self-enforcing political system were effective. To the extent that the Genoese clans were in an MDE before 1164, theory predicts that this situation could have led to a breakdown of mutual deterrence. A lower external threat and a high income imply a higher average payoff from being a controlling clan, making challenging more attractive, whereas low gains from raiding imply a lower loss due to challenging. Hence condition 1 is less likely to hold in this situation. (See discussion of the relations between parameters in the existence of MDE in the appendix.)

If an MDE ceases to exist (for a given allocation of income between the clans), the model predicts that inter-clan military confrontation would result. If MDE is not an equilibrium, one

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[42] E.g., Munz, 1969, pp. 234-71; Waley (1988), p. 92.

[43] The war with Pisa was conducted on the sea far away from Genoa's shore, or in the surroundings of Lucca, Pisa's neighbor and Genoa's ally.

[44] *Annali* (1162), vol. I, pp. 91-8; Giovanni Scriba (1162-4). For discussion, see Donaver (1890), pp. 36-7; Abulafia (1977), pp. 127-33; Byrne (1916), p. 131; Byrne (1920), p. 211; Krueger (1932), p. 100.

clan find it best to challenge the other. A more elaborated model in which the allocation of income is endogenous would have indicated that when a particular MDE ceases to exist, one clan may find it more profitable to agree to a smaller share in the income and to avoid the cost of the military confrontation. Yet, note that the model also indicates that once a particular MDE (with particular number of possessions and share or income) ceases to exist, there wouldn't necessarily be another allocation of the income for which a MDE exists and to which both clans would consent.[45]

This is so since the new allocation should be *ex ante* acceptable by both clans and *ex post* self-enforcing despite the link between income and military strength. Specifically, if, for example, clan 1 finds it profitable to challenge at the existing allocation it would decline any new allocation that provides it with a lower share of the income while clan 2 will decline any new allocation that would provide it with a share so low that it would prefer a civil war. Any allocation that provides clan 1 with a higher share in the income, however, further militarily strengthens it relative to clan 2. Hence, although clan 1 has less to gain from challenging in the new allocation, it is also more likely to have the upper hand in an inter-clan confrontation. This implies that there may not be a new allocation that is *ex ante* acceptable and *ex post* self-enforcing.

Theory indicates a rationale for an inter-clan military confrontation in Genoa in 1164. Indeed, a civil war broke out in 1164 to become a semi-permanent feature of Genoa's political lives. Without going into many details, from 1164 to 1194 the Genoese were engaged in civil war at least during 13 years, namely, 43 percent of the time. (*Annali*, various years.) The very same families that had shared the consulate from 1154 to 1164 and cooperated in the acquisition of possessions fought against each other in these civil wars.

The civil war marks the failure of the della Volta clan to provide a balance between the Manecianos and the Carmadino clans. It joined forces with the Manecianos against the Carmadino. The next section will provide a rationale for this failure. The della Volta had too much vested interest in Genoa and inter-relations with other Genoese clans. It could not provide a partial third party with the appropriate incentives required to provide yet another foundation for Genoa's self-enforcing political system. Providing such new foundation - based on self-enforcing political rules - required a more fundamental change in Genoa's politics.

IV.   **Self-enforcing Political System Based on Political Rules: Changing the Rules of the**

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[45] And that this allocation differs from that implied if one clan were to renounce its share in the rent.

Game, Political Order, and Economic Growth

The analytic narrative presented above indicates that comprehending political and economic outcomes in Genoa required examining the foundations of its self-enforcing political system. By 1164, this system, however, was no longer self-enforcing implying political dis-order, dis-integration, and economic cost. In the civil war of 1189-1194, for example, both sides used siege machines to destroy each other's towers while various cities in Liguria, long controlled by Genoa asserted their independence. Furthermore, in 1194 the della Voltas' opponents seceded from the commune and established a rival one.[46] To revitalize their political and economic system, the Genoese needed a different foundation for their self-enforcing political system. Foundation that would break, in a self-enforcing manner, the link between economic growth and political instability in the absence of an external threat.

By 1194 the future of both rival Genoese factions seemed bleak. Neither faction had control over enough income to enable it to have undisputed control over the city, and the military situation in Genoa itself precluded each faction from devoting resources to acquiring possessions. Furthermore, in 1194 the German emperor, Henry VI, was organizing a campaign to conquer Sicily. The Genoese had much to lose if they did not assist Henry. Refusing to assist or alienating an emperor who might soon control the areas north and south of Genoa and who was supported by Pisa, Genoa's naval rival, would have closed off any prospect of receiving possessions in Sicily. Nevertheless, the Carmadinos and their supporters were unwilling to resume cooperation in face of this severe external threat, and their faction seceded from the commune. History may have taught them the fragility of political cooperation sustained by a high external threat. If so, the Carmadinos could have been induced to assist by altering the inter-clan game in a self-enforcing manner that would increase their ability to reap *ex post* the benefit of cooperation even if the external threat subsides.

Indeed, in 1194 the Genoese altered their political system by introducing a particular organization – the *podestà* (from the Latin *potestas*, 'a power'). This transition was influenced by the attempts of the Emperor Henry VI, to use *podestàs* to ensure his control over Italy.[47] In 1194 Henry was planning to attack Sicily and he demanded Genoa to provide him with naval assistance. Genoa, however, couldn't provide this support as long as it was paralyzed by civil war. The seneschal of Henry VI, Markward of Anweiler, who frequented Genoa to organize Genoa's naval support, advised the della Volta consuls to accept a *podestà* who would rule the

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[46] *Annali* (1193-4), vol. II, pp. 228-30.

[47] E.g., Day (1988, p. 147); Heywood (1921, p. 214 (Florence), p. 220 (Pisa)).

city instead of the consuls. Given the deadlock in the fighting on the one hand, and the high cost of refusing naval support (namely, alienating the Emperor and losing all the possessions he promised to Genoa in Sicily) on the other, the della Volta faction conceded. Oberto de Olivano was nominated *podestà* for one year, after which the consulate was to resume. Oberto was from Pavia, Henry's capital as the King of Italy, suggesting that his nomination and activities were backed by the emperor and his army. Under the direction of this *podestà*, both Genoese factions cooperated and supported the emperor, who conquered Sicily in 1194.[48]

During the Sicilian campaign the Genoese *podestà* died. The Genoese decided to continue the *podesteria* and replaced him with Ottone di Carreto, a Ligurian.[49] This displeased the emperor, who probably intended to have a *podestà* nominated and motivated by him providing balance between the Genoese factions. Thus, he refused to recognize the legitimacy of the Genoese *podestà* and threatened to destroy Genoa if the Genoese dared to sail the seas.[50] Despite this threat, and, most likely motivated by it, the Genoese transformed and organized the *podesteria* in a manner that enabled them to cooperate and make Genoa more economically prosperous and politically powerful than ever before.[51]

To understand how the *podestà* fostered the extent to which Genoa was a self-enforcing system, there is a need to examine the implications of having a *podestà*. As mentioned in the introduction, there is dis-agreement regarding the nature and impact of the *podestà*. Vitale has argued that the *podestà* was merely an administrator and his institutionalization reflects the need for professional administration and the desire to limit competition over consular posts. Political order under the *podesteria* was sustained by the gains from cooperation. Other scholars have considered the *podestà*'s military ability as a key for enabling cooperation as he was able to impose peace on Genoa's rival clans.[52] Each of these narratives can be subject to criticism. If the *podestà* was simply an administrator and political order was sustained by the gains from

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[48] *Annali* (1194) vol. II, pp. 231-2. For discussion, see Vitale (1955, vol. I, pp. 51-5); Abulafia (1977, pp. 204-12); Day (1988, p. 149).

[49] *Annali* (1194) vol. II, p. 239. (Explicitly written: "whom the Genoese made *podestà*.")

[50] *Annali* (1194) vol. II, pp. 240-1.

[51] For discussion of the Genoese *podesteria*, see Vitale (1951, pp. 3-39); Day (1988, pp. 148 ff.). For a discussion of this system in Italy, see Waley (1988, pp. 40-5). A *podestà* was also instituted in 1191 and regarding this episode, see Greif (1998). Between 1194 and 1216, the consulate was renewed for several years. It is important to note, however, that from 1194 to 1206 the consulate was renewed only once.

[52] Vitale (1951), p. 9; Heers (1977), p. 206.

cooperation, why were these gains insufficient to guarantee cooperation under the consulate? Yet, if the *podestà* fostered cooperation by having superior military ability, why didn't the *podestà* become a dictator? Hence, once again, while the historical facts are not disputed, their interpretation is.

The following theoretical discussion indicates how and under what conditions a *podestà* can foster cooperation in a self-enforcing manner without becoming a dictator. Conceptually, the introduction of the *podestà* is considered as an organizational change: the Genoese altered the set of the relevant rules of their political game.[53] Accordingly, the theoretical analysis below concentrates on identifying the nature of the alterations in the rules of the inter-clan game required to ensure the *podestà*'s ability to foster inter-clan cooperation. Comparing these alterations to those reflected in the historical records suggests that the Genoese indeed created the conditions that would enable the *podestà* to foster cooperation. Furthermore, it indicates that both the above views regarding the nature of the *podesteria* have a grain of truth. They are not as contradictory as they may seem.

Before turning to this theoretical and historical analysis, however, its path dependent nature should be emphasized. The analysis takes as given the existence of clans, their importance as political decision makers, and the strategies they held in the relations between them, namely, that each clan will challenge the other if the appropriate opportunity would arise. In other words, the analysis's starting point is building on rather than replacing existing rules and strategies. Hence, it takes as given the constraints imposed by Genoa's history on the set of possible alternations of the political game. Indeed, as discussed below, this position is appropriate since historically the *podesteria* system seems to have built on the existing clan structure in a manner that perpetuated its importance.

Theoretically, in the context of the inter-clan game considered above, altering the set of the relevant rules of the game in a matter that limits each clan's incentives to challenge the other entails creating an additional player (the *podestà*) who is motivated to take actions against an aggressor's clan and to assist a clan that stands to lose in an inter-clan war. If a *podestà* with such motivation is sufficiently strong militarily, he reduces each clan's expected gain from challenging and thereby deters it from doing so. Although the *podestà* should be strong enough to reduce each clan's expected gain from challenging he should nevertheless be sufficiently weak not to aspire to gain political control. Hence, there are three difficulties in implementing such an alteration. First, the *podestà* should be deterred from colluding with one clan against the other.

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[53] Such organizational changes are discussed in Greif (1994).

Second, the *podestà* has to be motivated to assist the clan that stands to lose. Third, since the *podestà* has to be weak relative to the clans in order not to aspire to gain control, the clan that in the absence of his intervention stands to lose in an inter-clan war should be motivated to fight alongside the podestà.[54]

To examine how these problems can be mitigated in a self-enforcing manner, it is useful to begin by examining a "collusion game" between a clan and *podestà*. The question that this game addresses is the extent to which a clan can *ex ante* commit to *ex post* reward a podestà who colluded with it against the other. The notations used in this game (and the subsequent analysis) are: $v_i(m_j, m_k; m_i)$ is the probability that i will win a war against j and k given the military strengths of m_j, m_k, and m_i. The probability of i to win is declining in m_j and m_k and increasing in m_i. (For ease of presentation, the parameter m_i is omitted in the equations below and the analysis in of this section ignores clans' ability to increase their military strength.) If a player participates in a military confrontation, it has to bear the cost of c. V_i is the net present value to player i of controlling Genoa and it is assumed that $V_1 \geq V_p$, namely, that a local clan gains more from controlling the city than a *podestà*. (This assumption, as well as the one that the cost of war is the same to all players is not essential of the result and made for ease of presentation.)

Using these notations we can examine the ability of a clan and a *podestà* to collude against the other. The relevant starting point of such an analysis, presented in figure 1.3a, is the situation prevailing after a clan and a *podestà* had colluded against the other clan and gained control over the city. The clan that gained control now has to decide what reward, $R_p > 0$, to provide the *podestà*. Once this reward is announced, the *podestà* can either accept it and not fight the clan over the control of the city or it can reject it and fight. If he accepts the offer, the payoffs are $V_1 - R_p$ and R_p to the clan and the *podestà* respectively. If he rejects it and fights, the payoffs to each is the probability of winning times the value of gaining control minus the cost of war, namely, $(1 - v_1(m_p))V_1 - c$ and $v_p(m_1)V_p - c$.

The *podestà* would not fight if he will get at least the net expected value of fighting against the clan, namely, $R_p \geq v_p(m_1)V_p - c$. Similarly, the clan will not find it profitable to offer R_p higher than the one required to make it indifference between fighting or not, that is, $V_1 - R_p \geq (1 - v_p(m_1))V_1 - c$. Hence, it will willing to offer $R_p \leq v_p(m_1)V_1 + c$ implying that the clan is willing to pay the *podestà* more than is required to prevent the *podestà* from fighting. Hence, in any subgame perfect equilibrium the clan will not offer more than amount making the *podestà*

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[54] The analysis of this last point can also be expanded to include strengthening the *podestà* through the participation of the Genoese not affiliated with Genoa's main clans. For simplicity, this issue is ignored here.

indifference between fighting or not, namely, $R_p = v_p(m_1)V_p - c$. This implies that the only subgame perfect equilibrium is such that the clan offers $R_p = v_p(m_1)V_p - c$ while the *podestà*'s strategy is to fight if paid less than that and not to fight if paid at least that amount. The payoffs associated with this equilibrium are V_p^c to the *podestà*, where $V_p^c = \text{Max} \{0, v_p(m_1)V_p - c\}$ and $V_1 - V_p^c$ to the clan.

The analysis thus implies that after collusion had occurred, the amount that the clan's would reward a *podestà* depends on the *podestà*'s ability to military confront that clan.[55] Specifically, the *podestà* would not get, in any equilibrium, more than his net present value of military confronting the clan, $v_p(m_1)V_p - c$. This implies that *ex ante* - before collusion had occurred - a clan can not credibly commit to *ex post* reward the *podestà* by more that this amount. When $v_p(m_1)V_p - c \leq 0$, for example, the clan can not make his promise to reward the *podestà* credible at all. More generally, the lower is the *podestà*'s military ability, the lower is the extent to which the clan can make his *ex ante* promise to reward the clan credible. This implies that by limiting the military ability of the *podestà* relative to that of a clan, the ability to collude could have been curtailed. Yet, such a reduction in the *podestà*`s military ability implies that it is less plausible to be able to solely rely on the *podestà*`s military might to deter a clan from attempting to gain control over Genoa. To see how a clan could have been nevertheless deterred, there is a need to consider the collusion game within the broader context of inter-clan relations.

To examine this broader context, some additional notations are required. Denote by I_i the per period income for clan i if no clan assumed control; by W the *podestà*'s wage; and by δ, the factor used by the clans to discount future income.[56] Using this notations, this broader context - the *podesteria* game - can be examined to expose how the inter-clan game could have been altered to enhance cooperation by introducing a *podestà* despite his ability to collude and the limit on his military power required to ensure that he would not become a dictator. This game is presented using Figure 1.3b[57] The game begins, without loss of generality with clan 1 having to decide whether to challenge clan 2 or not. If clan 1 challenges, clan 2 can either fight or not. In either case, the *podestà* can respond by either attempting to prevent clan 1 from taking control (an action denoted by p) or by not preventing it (dp), or by colluding with clan 1 (co). If the

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[55] Similar commitment problem also prevailed in the relations between clans and its supporters but could be more easily mitigated through their on-going relations that were not feasible with an outsider.

[56] It is implicitly assumed then that the *podestà* reservation utility after assuming the office is zero.

[57] Note that his is not a stage game, however, since this is a repetitive but not repeated game.

podestà colludes, it is assumed, for ease of exposition, that clan 2 can not gain control over the city and the *podestà* and clan 1 are playing the collusion game (figure 1.3a). Since the collusion game has a unique subgame perfect equilibrium, figure 1.3b presents only the payoffs associated with this equilibrium.

If clan 1 does not challenge, the payoffs are (I_1, I_2, W) to clan 1, clan 2, and the *podestà* respectively and the same game is then played in the next period. If clan 1 challenges and clan 2 does not fight, clan 1 becomes the controlling clan and the associated payoffs are: if the *podestà* does not prevent, $(V_1, 0, 0)$; if the *podestà* colludes, clan 1 will reward him by V_p^c (namely, the *podestà*`s payoff in the equilibrium of the collusion game) and hence the payoffs are $(V_1 - V_p^c, 0, V_p^c)$; if the *podestà* prevents, his payoffs equals the net expected value of him attempting to gain control and hence the associated payoffs are $(v_1(m_p)V_1 - c, 0, v_p(m_1))V_p - c)$. If clan 1 challenges and clan 2 does fight, the associated payoffs are: if the *podestà* does not prevent each clans' payoff equals the net expected value of being a controlling clan while the *podestà* gets zero, that is, $(v_1(m_2)V_1 - c, (1 - v_1(m_2))V_2, 0)$;[58] if the *podestà* colludes, then, as before, clan 1 assumes control and the payoffs are $(V_1 - V_p^c, 0, V_p^c)$. Finally, if the *podestà* prevents than clan 1 will either gain control and gets V_1 or fail to do so and gets only his share in that period's income, I_1. If clan 1 failed to gain control, then clan 2 gets his share in that period's income (I_2) while the *podestà* gets his wage, W. The payoffs are thus $(v_1(m_p, m_2)V_1 - c + (1 - v_1(m_p, m_2))I_1, (1 - v_1(m_p, m_2))I_2 - c, (1 - v_1(m_p, m_2))(W - c))$.

In this game, the strategy combination specifying that clan 1 does not challenge, clan 2 fights if it is challenged, and the *podestà* prevents if 1 challenges and 2 fights but if 2 does not fight, colludes if $V_p^c > 0$ and does not to prevent otherwise is a sub-game perfect equilibrium if the following conditions hold:

(I)   Motivating the *podestà* to prevent and not to collude if 2 fights: $(1 - v_1(m_p, m_2))W - c \geq V_p^c$

(II)   Motivating clan 2 to fight: $(1 - v_1(m_p, m_2))I_2/(1 - \delta) \geq c$

(III)   Deterring clan 1 from challenging: $c \geq v_1(m_p, m_2)(V_1 - I_1)$

The above conditions indicate both how the *podesteria* can provide the appropriate incentives and the delicate balance required to maintain these incentives. Intuitively, condition I implies that the *podestà* is better off preventing if clan 2 fights, although it would not prevent otherwise. Condition II guarantees that clan 2 would fight. Because the *podestà* wouldn't prevent unless 2 fights, and since condition II implies that 2 prefers to fight rather than not fight if the

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[58] The analysis holds if a *podestà* who did not prevent could challenge the clan who won inter-clan confrontation.

podestà prevents, it is clan 2's best response to fight if challenged. Condition III then implies that clan 1, expecting clan 2 and the *podestà* to fight it, finds it optimal not to challenge.

These conditions and the equilibrium strategy indicate how the appropriate incentives can be provided by the *podesteria* system to overcome the problems that can render the system ineffective. Condition I and clan's 2 strategy prevents collusion between clan 1 and the *podestà*. Collusion is curtailed by sufficiently reducing the *podestà* military strength relative to his wage so that the most clan 1 can credibly commit to reward the *podestà* following collusion is not sufficient to induce him to collude. The *podestà*, expecting clan 2 to fight along side him prefers to prevent clan 1 rather then colluding. Clan 2 is motivated to fight along side the *podestà* because, the *podestà*`s strategy implies that otherwise the *podestà* would not confront clan 1 either. At the same time, condition II implies that the combined forces of clan 2 and the *podestà*, relative to clan`s 2 share in the gain (I_2) that the clan find optimal to fight alongside the *podestà*.

The above discussion indicates the dedicate balance of power that has to be maintained for the *podesteria* to provide the appropriate incentives. On the one hand the *podestà* should not be too military strong to deter it from aspiring to gain control by himself or collude with clan 1. (Both sides of condition I decline in m_p but the right side increases in W.) At the same time, he should be sufficiently strong so that his threat to fight alongside clan 2 in case of need sufficiently reduces clan 1's incentive to challenge. (The left side of condition II increases in m_p and the right side of condition II declines in m_p .) This dedicate balance, however, provides the *podestà* with an important incentive which is not explicitly captured in the model. The above equilibrium is more likely to hold and hence the *podestà* is more likely to gain W without being involve in a war, the closer is the military strength of the clans. Hence, the *podestà* is motivated to prevent fighting but not at the cost of severely wakening any clan. Hence, the *podestà* could have credibly commit to a impartial behavior toward the clans aimed at maintaining their relative positions.

Hence, the model identifies how the *podestà* could have fostered inter-clan cooperation using his military ability without being able to become a dictator. He could have achieved that by providing a balance of power between the rival clans. Hence, the model lends support to the view that the *podestà* may have been a self-enforcing organizational change, or political rules aimed at enabling cooperation. Clearly, to verify whether this had been the case required returning to the narrative and examining whether the Genoese *podesteria*'s rules created the conditions identified in the model as required to enable the *podestà* to foster inter-clan cooperation.

The *podestà* was a non-Genoese noble, hired to be the main military leader, judge, and administrator of Genoa for a year, during which he was supported by soldiers, servants, and judges he brought with him.[59] Specifically, he had to bring with him 20 military men and 2 judges (Vitale, 1951, p. 27). This was neither a negligible military force nor a considerable one. (In 1170, when the Genoese desperately needed to enhance their military strength, they knighted 100 Genoese; Barbarossa sailed to the Third Crusade with 600 knights.) The *podestà* provided the military balance between factions, as reflected, for example, in the destruction of the fortified tower of the Castro family after members of this family murdered Lanfrancus Pevere for political reasons (*Annali*, 1190, vol. II, p. 220). The *podestà* was militarily important but presumably not strong enough to defeat a main Genoese clan by himself.

The *podestà* was offered very high wages which in 1226 amounted to 1300 lire, a huge sum given that the annual farm of the toll from Genoa's port was 7,000 lire in about 1200.[60] But the discussion above indicates that a high wage is not sufficient incentive to motivate the *podestà* to intervene in inter-clan war to prevent one clan from defeating the other. Clearly, a large *podestà's* wage is sufficient to compensate him for fighting if the need arose, but for the *podestà* to indeed prevent fighting it had to be the case that he would not be able to get his wage if he does not intervene. In other words, condition I has to hold: the clan who challenge the other should not be able to credibly commit to reward a clan who collude with him. The collusion game indicates why such commitment was not easy. A military powerful clan can credibly commit only to a low reward following commitment. A reward that does not merit even fighting the relatively military weak podestà.

Yet, a clan and a podestà might try to circumvent this problem though the use of other commitment devices such as marriages and joint economic ventures. The *podestà*'s regulations indeed seem to have been aimed at hindering the ability to employ such devices. The incoming *podestà* was selected by a council, whose members were chosen on a geographic basis to prevent its control by any specific clan, and the new *podestà* selection process was governed by the outgoing *podestà*. The *podestà* – as well as his relatives to the third degree - was restricted from socializing with Genoese, buying property, getting married, or managing any commercial transactions for himself or others. Until permanent housing was built for the *podestà*, he had to spend his year in Genoa living in various quarters. The conscious attempt to keep the *podestà*

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[59] An exception to this rule is Fulco de Castro, a Genoese who was a *podestà* in 1205. Gioffredotto Grassello from Milan, who was a *podestà* in 1202, 1203, and 1204.

[60] Vitale (1951), pp. 25. From the mid twelfth to mid thirteenth century there was about 35% inflation in Genoa.

away from the influence of Genoa's main clans is also reflected in years during which rectors assisted the *podestà*. It is rare to find a rector who can be identified with one of the major families involved in the factional wars of the twelfth century.[61] Furthermore, the *podestà*, as well as the soldiers who came with him, had to leave the city at the end of his term and not return for several years. A *podestà*'s son could not replace him in office. To comprehend the meaning of this demand, one should know that it was Genoa's policy to force Ligurian nobles who recognized Genoa's supremacy to live in the city at least several months each year. This was the way to get them involved in Genoa's public life.

The credibility of the Genoese promise to reward a *podestà* at the end of his term if no clan had initiated and won an inter-clan war was probably obtained by the implication of such behavior on their ability to hire a high quality *podestà* in the future. Indeed, Genoese *podestà*s were recruited from a handful of Italian cities, in particular from Milan, and the contracts between Genoa and its *podestà* were read in front of the "parliament" of the city from which the *podestà* was recruited. This does not imply that a *podestà* was given a free hand to mis-manage the city's affairs. After the end of his term a *podestà* had to remain in the city for 15 days during which his conduct was assessed by auditors (*sindicatori*) and deviations from the set of pre-specified rules were punished by fines to be paid before his departure or subtracted from his enumeration.[62] At the same time, additional incentives for the *podestà* to prevent inter-clan confrontation were probably provided by the *podestà*'s own concerns about his reputation. During the end of the twelfth century and the beginning of the thirteenth century many communes adopted the *podesteria* system.[63] Being a *podestà* became the profession of many nobles who competed over this positions in the non-anonymous market for *podestà*'s services.

One should not conclude, however, that the *podesteria* system in various cities was necessarily the same. A seemingly similar organizational change – the introduction of a *podestà* – can reflect distinct motivation and the functioning of distinct self-enforcing system if the underlying relations between the clans are different. For example, if one clan has a decisive military superiority over the other. Once again comparing Pisa and Genoa is instructive. When Emperor Henry VI rose to power in 1190 he nominated Tedici de Gherardesca as the *podestà* of

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[61] After 1196 the *podestà* was assisted by eight *rettori* or *consiglieri* – one per district – who functioned as part of the administration and control. See Olivieri (1861) for the years: 1196, 1199, 1202, 1203, 1205, and 1206. For discussion, see Vitale (1951), p. 11; Day (1988), pp. 150-1.

[62] Vitale (1951), pp. 27-8.

[63] See the above references for the *podesteria* system.

Pisa. From 1190 to (April) 1199 *podestà* post was held only by Tedici de Gherardesca who was the Count of Dondoratico or Count of Bolghieri (near Pisa). Rather than providing the balance of power between two factions, the Pisan *podestà* to this point seems to have been a mean of control by the Emperor.[64] By 1199, however, the Visconti clan that dominated Pisa prior to 1190 was able to reestablish its control. From 1199 to 1229 members of the Visconti clan provided most of the *podestà*s. We know the names of 17 *podestà*s from these years and 10 of them are members of the Visconti clan.[65]

Hence, at least initially, the introduction of a *podestà* in Pisa reflects the domination of a particular faction rather than a balance of power. The Visconti and the de Gherardesca were at the center, but on opposite sides in a civil war that erupted in Pisa in the second quarter of the thirteenth century.[66] It was only after this war that foreign *podestà*s became the rule rather than the exception in Pisa. Prior to 1237 only the names of 27 *podestà*s are reflected in the historical records but only 3 of them were non-Pisan but after 1237 the position of the *podestà* of Pisa was regularly filled by non-Pisans.[67] In sum: for its first 47 years the essence of the Pisan podesteria differed from that of Genoa. While in both city the same term was used, it reflects distinct realities. In Genoa, its essence was to create a balance of power while in Pisa it was the title assumed by those who held power. Yet, the development of Pisa's *podesteria* confirms the above interpretation of the Genoese case: once the two Pisan factions reached a stalemate and external pressures from Genoa mounted, a foreign *podestà* able to maintain balance of power was introduced.

In any case, the broader movement in Italy to place communes under the administration of a *podestà* suggests the process through which cognition regarding the feasibility and working of the *podesteria* emerged in Genoa. The idea of the *podestà*, namely, of an administrator with judicial and police functions who serves for a limited time after which his actions are assessed according to the law resemble that of dictatorship as practices in ancient Rome (Spruyt, 1994, p. 143). The Roman dictator had an absolute power for six months after which he had to account for his actions in the court of law. Perhaps inspired by this example, several Italian communes

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[64] On such use of podestàs by the Emperor, see Day (1988), p. 147.

[65] In 1223, five (!) *podestà*s held the post at the same time and among them were two members of the Visconti clans. The above information omits this year.

[66] Bus, see Cristiani (1962) on the involvement of the People (*popolo*) in this war.

[67] This and the following discussion is based on Rossetti et al. (1979); Cristiani (1962); and Heywood (1921).

experimented during the first half of the twelfth century with a political system guided by a single executive administrator. In 1155, one such administrator, Guido de Sasso, the *rector* or *podestà* of Bologna, met with the Emperor Frederick Barbarossa. In 1162, after Frederick destroyed Milan and subdued the rebellious Lombard communes he nominated an outsider in each city as an imperial vicar, or a *podestà*, to ensure their obedience and to administer it on his behalf. Imperial vicars, counts, and *podestà*s are mentioned in cities such as Sienna, in S. Miniato, in Volterra, and in Florence. After 1168, the Emperor lost control in various cities, yet the historical records reflect that many cities nominated civil officials called rectores, dominatores, and *podestà*s, who seem to have acted as administrators, were bound to follow the law.[68] Hence, the introduction of the organizational innovation of the *podestà* in Genoa in 1194 was not only a reflection of the incentives associated with a particular historical circumstances. It seems to also reflect a process of learning and experimentation that enabled cognition of the feasibility of such alternation.

In addition to the above mechanisms aimed at providing the *podestà* and the clans with the incentives required to foster inter-clan cooperation while preventing the *podestà* from becoming a dictator, an administrator controlling Genoa's finance further reduced the likelihood of civil war. This was the case since a limiting clans' ability to increase their military strength by expropriating income severed the link between commercial expansion and the clans' military might.[69] Under the *podesteria*, each of Genoa's possessions was administered by a consul sent from Genoa. He was appointed for only one year and had to return to Genoa as soon as his successor had arrived, on the very same ship.[70] The consul had to deposit a bond as a guarantee for proper conduct and was prohibited from receiving donations worth more than half a lira or to undertake any commercial venture (Byrne, 1928). Genoese ambassadors who were sent to negotiate commercial treaties and to organize the administration of Genoa's possessions were instructed to prevent any particular family from acquiring or leasing private properties to an extent that would enable it to achieve *de facto* control over that possession.[71] The care to prevent

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[68] See Hyde (1973, pp. 100-1; Heywood (1921), pp. 262; Waley (1988, p. 42).

[69] Concern about the *podestà's* ability to expropriate rent is suggested by the regulation specifying that after the end of his term a *podestà* had to remain in the city for 15 days during which his conduct was assessed by auditors (*sindicatori*) and deviations from the set of pre-specified rules were punished by fines to be paid before his departure. Vitale (1951), pp. 27-8.

[70] Under the consular system, the possessions were leased for prolonged periods of time.

[71] For example, the Guertius family, which as a part of the della Volta faction during the twelfth-century hereditary claim, gained the position of administrator of the Genoese possessions in

factions' control over Genoa's possessions is also suggested by the nomination of possessions' consuls who were not members of any family of importance in the rival factions.[72]

Similarly, to limit the clans' ability to establish patronage networks, their hold over the legal system was reduced. As the chief justice of Genoa, the *podestà* was to provide all residents with impartial justice. During the first years of the *podesteria*, he was assisted by local nobles, but in 1216 justice became even more impartial when foreign judges chosen by the *podestà* replaced the nobles. To further restrict the power of judges to make arbitrary decisions, Jacopo di Balduino, a *podestà* from Bologna, a city known for its law school, codified the existing common law in 1229. (For discussion, see Vitale (1955), vol. I, p. 56.)

The *podesteria* regulations were also aimed at ensuring that the rules the *podestà* had to follow would be difficult to manipulate. These rules had to be approved by a large forum, a "Council," having at least eight representatives from each of Genoa's eight districts. Major policy decisions had to be approved by a larger body, the *parlamentum*, that is, the gathering of all Genoese with "full rights."[73] It is likely that in the larger legislative bodies the families unrelated to the rival factions were given enough weight to safeguard them from fights over controlling these bodies.

The *podesteria* was an organizational innovation that altered the rule of Genoa's political game in a self-enforcing manner that fostered economic cooperation. The *podestà*'s military strength as well as his administrative role fostered inter-clan cooperation by weakening the relations between economic growth and political instability and the dependency of political stability on external threat. Furthermore, policy was determined by those who were expected to benefit from the long-run increase in the volume of trade, and a high, yet conditional, pecuniary reward motivated the *podestà* to follow this policy and to prevent any particular clan from expropriating income.

The Genoese *podesteria* formally lasted about 150 years, during which it faced many

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Constantinople. In a document dated 1201, a Genoese ambassador to Constantinople was explicitly instructed to prevent the office of the Genoese *viscounty* of Constantinople to fall into the hands of Alinerio, the son of Tanto, a member of the Guertius family. That the Guertius possessions in Byzantium benefitted them commercially is suggested by the fact that they invested in trade with Byzantium more than any other Genoese family. See also discussion in Day (1988), pp. 111 ff., 122-5, 166. It is interesting to note that this instruction was given despite the fact that a member of the Guertius family was consul during this year.

[72] This assertion relates only to the partial list of 16 administrators in Syria. See Byrne (1928), pp. 168-70.

[73] See discussion in Vitale (1951, pp. 32 - 40).

challenges as a result of temporary imbalances between factions, the political rise of the *popolo* (that is, the non-noble element), and the conflict between the pope and the emperor that affected Genoa during the thirteenth century. Yet, the *podesteria* retained the same basic structure throughout this period and by enabling cooperation it brought about a period in Genoa's history that Vitale (1955) has considered to be "*veramente l'età aurea del Comune genovese*" (indeed the golden age of Genoa) (p. 69). The ability of the Genoese to cooperate, the operation of an impartial political and legal system, and the few limits it placed on individuals' initiatives seem to have been instrumental in Genoa's economic and political growth. Politically, in 1195, Genoa was peaceful for the first time in many years, and the Genoese joined together to reaffirm their control over the smaller cities around them. In the next hundred years under the *podesteria,* Genoa completely freed itself from the rule of the Holy Roman Empire, destroyed Pisa, its bitter enemy in the western Mediterranean, and was able temporarily to defeat Venice, its commercial rival in the eastern Mediterranean.[74]

Since trade expansion during this period was based on the ability to use force, the military and naval strength brought about by the *podesteria* probably had a significant impact on its economic growth. Indeed, under the *podesteria* Genoa acquired extensive possessions in the Mediterranean, including the city of Syracuse in Sicily and other cities in the Black Sea. (E.g., Vitale, 1951, chapters 2-3.) Although each of the available measures for Genoa's economic growth - such as the growth of trade and population - is imperfect, they are consistent in presenting a uniform picture of spectacular economic performance relative to Genoa's past and to that of Venice, its last rival for supremacy among the Italian maritime cities. Figure 1.4 presents all the information known to me regarding the value of Genoa's imports and exports from 1155 to 1314, and it indicates that by 1314 Genoa's trade was more than 46 times that of 1160.

Quantifying the impact of the political change on trade by measuring changes in its rate of growth is difficult, since trade depended on internal and external political events and only partial information regarding trade is available. (Table 1.2 delineates the sources of information regarding trade value, their quality, and related political events.) In evaluating the change in the rate of growth due to internal events in Genoa, an attempt should be made to control for the impact of external events and deficient sources. Given the difficulties in such control, the best that can be done is to bias the rate-of-growth calculation in a manner that would be against the hypothesis that the transition to the *podesteria* enhanced growth.

Figure 1.4 presents the yearly rate of growth based on such a biased and conservative

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[74] For a historical narrative of this period, see, for example, Vitale (1955); Donaver (1890).

calculation. (The rate of growth from 1160 to 1191 was 4 percent per year.) From 1191 to 1214, that is, directly after the institutionalization of the *podesteria*, it jumped by 50 percent to an annual growth rate 6 percent. A downward bias is induced by taking 1191 as the initial year. (Taking 1186, for example, would have yield 9.45 percent.) The year 1160 is used as the base year because rather detailed records were preserved for that year and Genoa did not face an immediate external threat. (Taking the average of 1160 and 1161, or any of the years before to 1161 (apart from 1159), leads to similar results.) Note that using 1191 biased the results upward, since this year was irregular in the sense that Genoa was on the eve of participation in Henry's attack on Sicily. During this period expectations of war often led to trade increases, as merchants wanted to act before the war. The information regarding 1203's trade was not used because it is fragmentary.

The institutionalization of the *podesteria* was clearly followed by rapid growth of trade. Population grew faster as well. The rate of population growth from 1000 to 1300 indicates an escalation from about 100 percent for the period between 1050 and 1200 to 230 percent for the period between 1200 and 1300. This trend is remarkably different from that of Venice, whose rate of population growth remained around 50 percent in each of these sub-periods. By 1300, Genoa was the second largest maritime city in Northern Italy, having about 100,000 residents, compared to the 110,000 of Venice. At that time a contemporary source estimated that Genoa was the richest among the Lombard cities, followed by Milan and Venice, each of which had less than three quarters of Genoa's wealth.[75]

Conclusion

This paper utilizes analytic narrative to study a self-enforcing political system. Neither narrative nor theoretical considerations could, by themselves, reveal the nature and implications of the factors that led to political order or disorder and their inter-relations with Genoa's economy, social structures, political rules, and the external environment. Analytic narrative indicates that although the Genoese commune was a self-enforcing response to gains from cooperation, its subsequent political and economic history was shaped by the extent to which the political system was self-enforcing.

This extent depended on the particularities of Genoa's economy. Gains from raids and acquisition of possessions motivated initial cooperation but the acquisition of possessions undermined the extent to which cooperation was feasible. Genoa's main clans reached a MDE in

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[75] Population: Bairoch, et al. (1988), pp. 43, 49. Estimate: Hyde (1973).

which they refrained from cooperating in the acquisition of additional possessions due to their political implications, namely, increasing cost, to each clan, of sustaining Genoa's self-enforcing political system. Under the consulate, the factors that determined the extent to which Genoa was a self-enforcing political system hindered economic development. Sustaining political order in Genoa came with an economic price tag: preserving an economy based on piracy and raids that provided the economic foundations of a self-enforcing political system.

For a period, external threat relaxed this constraint on economic development. Yet, in the long run, the induced economic development undermined the sustainability of Genoa's self-enforcing system. Once this threat had subsided, the political system in Genoa was no longer self-enforcing: neither an appropriate economic foundations nor external threat supported a self-enforcing political system in Genoa. Political disorder and the associated economic cost were the result. Both before and after the period of civil war, the relations between economic development, external threat, and the extent to which Genoa's political system was self-enforcing shaped its political and economic history.

The *podesteria* relaxed the constraint on political order and economic development imposed by Genoa's self-enforcing political system thereby altering the course of Genoa's political and economic history. In particular, it motivated clans to further cooperate in the acquisition of possession by reducing each clan's motivation to use military force to gain control over the city in a self-enforcing manner. This self-enforcing organizational innovation was a product of a particular historical learning process inside and outside Genoa and of certain historical circumstances. More generally, the transition to the *podesteria* reflects a path-dependent process that constrained Genoa's political rules from evolving significantly away from the forms and functions shaped by their historical origins.[76] The *podesteria* was a viable political organization because it built on the existing factional structure.

Although the *podesteria* provided Genoa with a relatively impartial political and legal system, it was not a democracy. This system was based on a third party - an outsider with military, legal, and administrative powers strong enough to guarantee that the balance of power between Genoa's factions would be maintained. Hence disintegration of the factions that evolved during the twelfth century did not occur, as each faction had an incentive to maintain its integrity and a sufficient military strength, and the *podesteria*'s functioning was based on their existence. Indeed, when the inter-faction military balance was lost circa 1339, Genoa's political system was

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[76] On the theory of path-dependence, see David (1988).

altered and until 1528 the city was ruled by a doge.[77] Genoa was weakened as a commercial and political unit and defeated by Venice in 1381. In a sense, Genoa's defeat in the fourteenth century was foreordained, although not sealed, during the twelfth century.

This study indicates the complexity of investigating self-enforcing political systems. Such an investigation requires detailed examination of the particularities of the time and place under consideration utilizing a coherent, context specific model. Hence, it may be immature to attempt to generalize based on this study regarding the sources and implications of self-enforcing political systems. Yet, it may be appropriate here to make one general comment.

A general conclusion from this study is that comprehending the sources of political order and disorder, state's ability to mobilize resources for economic and political ends, and the relations between political rules and the importance of particular social groups requires examining the strategic interactions among the political actors which determine the extent to which the political system is self-enforcing. Self-enforcing political system exhibits particular inter-relations between its politics and economy: political order and the ability to mobilize resources are required for economic development. Yet, a developed economy does not necessary provide, in and by itself a better foundations for a self-enforcing political system. The history of Genoa illustrates that the appropriate political rules may be the key to sustain political order while pursuing development. Yet, political rules are only but one of the factors sustaining self-enforcing political system. Hence, the same political rules can reflect and lead to distinct political and economic outcomes. Other, endogenous and exogenous factors determine the extent to which particular rules will indeed be self-enforcing and hence effective in altering behavior. Evaluating the impact of particular rules requires examining it in the broader context of the factors influencing the extent to which the political system is self-enforcing.

Indeed, many of the other Italian communes of the late medieval period had political rules similar to Genoa's under the consulate and even under the *podesteria*. Yet, they had distinct patterns of political and economic histories. Their distinct histories, as well as those of other political units contain the promise that comparative studies of different political units will shed additional light on the process through which various political units were able to, or fail to reach self-enforcing political system conducive to political order and economic development.[78]

More generally, the study of Genoa's self-enforcing political system indicates that

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[77] For discussion, see, for example, Donaver (1990), pp. 86 ff.. It should be noted that prior to 1339 there were short periods of time in which Genoa was not ruled by a *podestà*.

[78] For such a preliminary study, see Greif (1995).

comprehending a state's political and economic history can benefit from examining the factors sustaining it as a self-enforcing political system, their implications, and historical development. Analytic narrative enables combining narrative and theory to facilitate the analysis of the implications of the extent to and the manner in which a political system is made self-enforcing on its trajectories of political, economic, and social development.

Table 1.1:

Rank Order of Families [Clans] that Provided at Least 50 percent of Consuls (in either period):			
Family [Clan]	1099-1122	1123-1149	1154-1164
Rustico	2		
Platealonga	3		
Rufus	4		
Roza	5		
Pedicula	6		
[Maneciano]	1		2
[Della Volta]		2	1
[Carmadino]		1	3
Guertius			4
Caschifellone		3	
Mallonus		4	
Gontardus		5	
Bellamutus		6	
Number of consuls	102	111	53
Source: *Annali*. Olivieri (1861).			

Notes: See text for the reasons to choose these periods. If the period 1123-1149 were extended to 1153, the list would have also included the Platealonga family. There were 127 consuls during that time, and the order rank is: Carmadino, della Volta, Caschifellone, Mallonus, Platealonga, Gontardus, and Bellamutus.

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Figure 1.1: Export Expansion. Two-Year Moving Average.
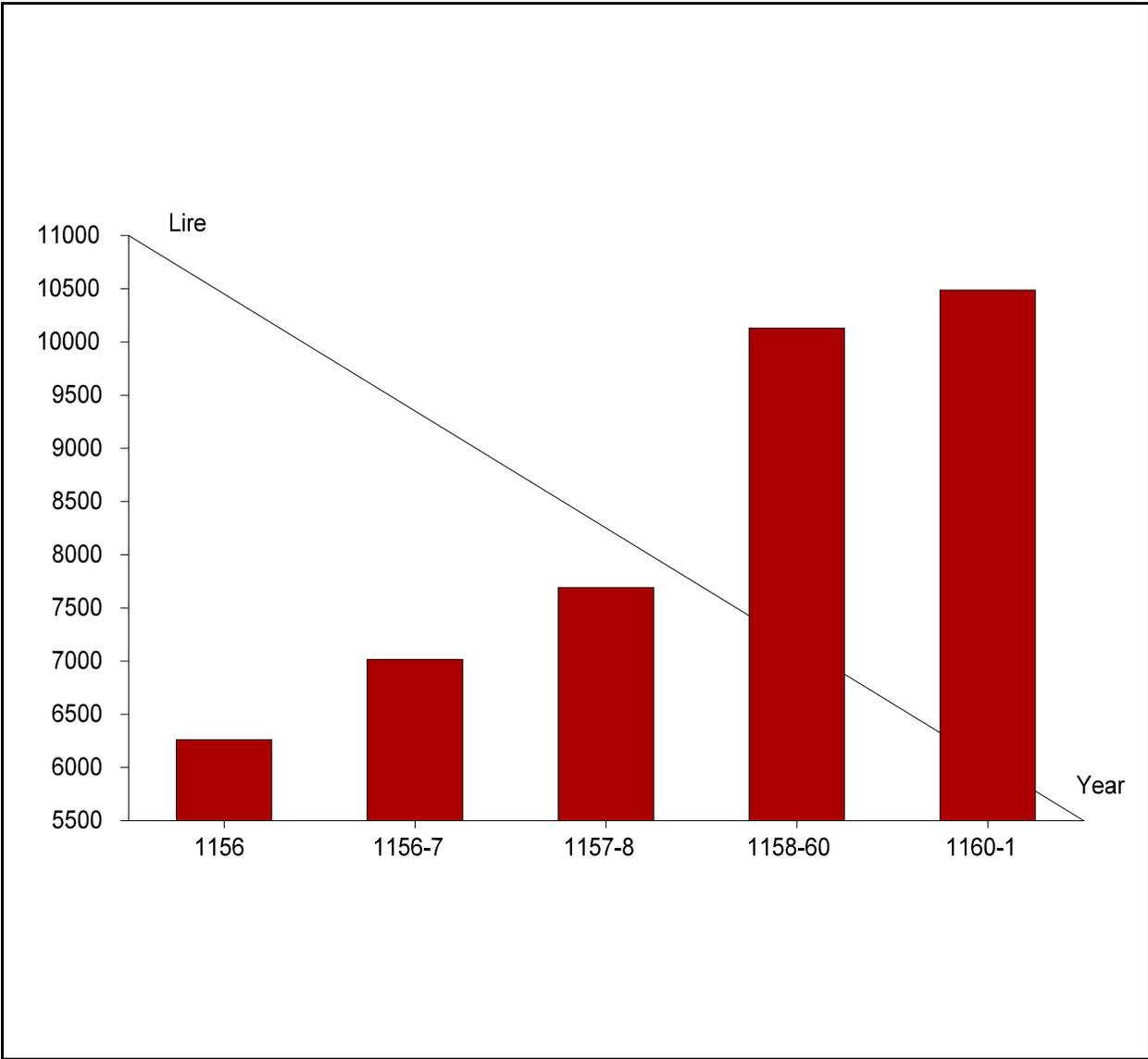
Source: Cartulary of Giovanni Scriba. Notes: The cartulary reflects only exports.[*]The cartulary is very fragmented for 1159 and hence this year was omitted.

Figure 1.2: Family relations among the politically dominant families.

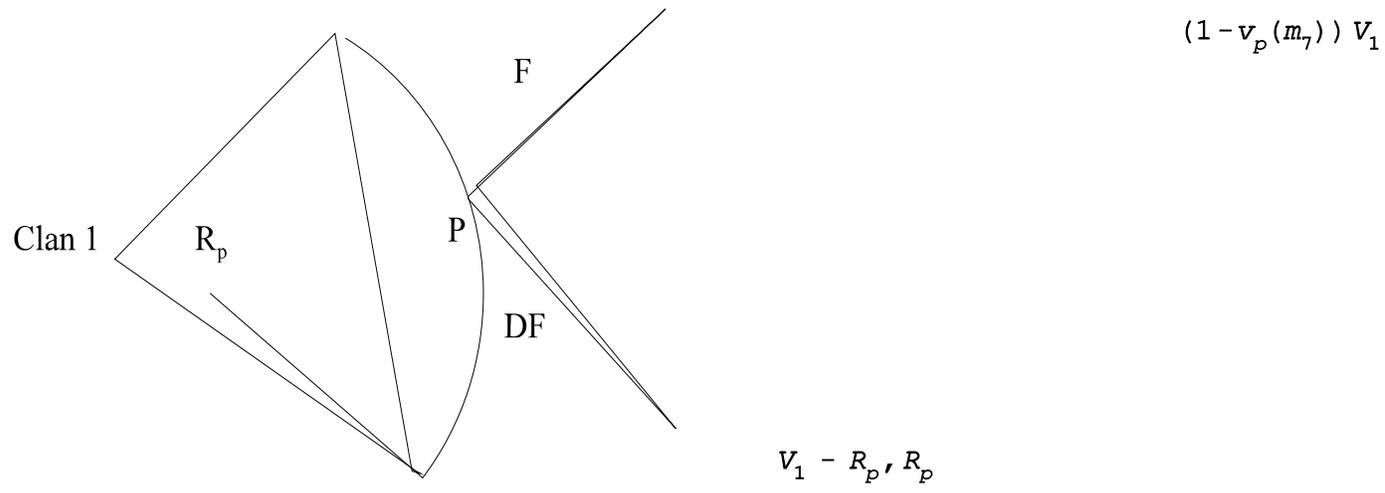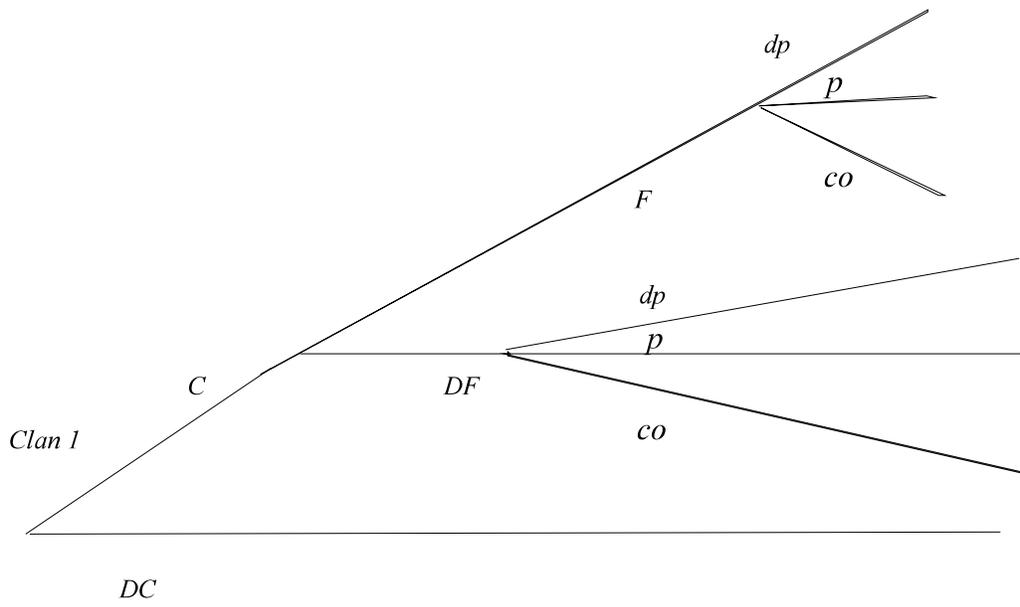**Doria** ——— *Volta* ——— **Burone**

1163, 1160

1160   1156   before 1169

Blancardus   *Spinula*   *Embriaco*   ——— *Castro*   Picamilium

1160   1159

1162   1156 ?   Ventus   d'Albericis   Mallonus

Guertius

1156

Ususmaris   ——— *Pevere*   ——— *Lusius*

Carmadino Clan   *Maneciano Clan*   **Della Volta Clan**

⟹ Marriage, Giving a daugther.   ▬▬ Other family relations
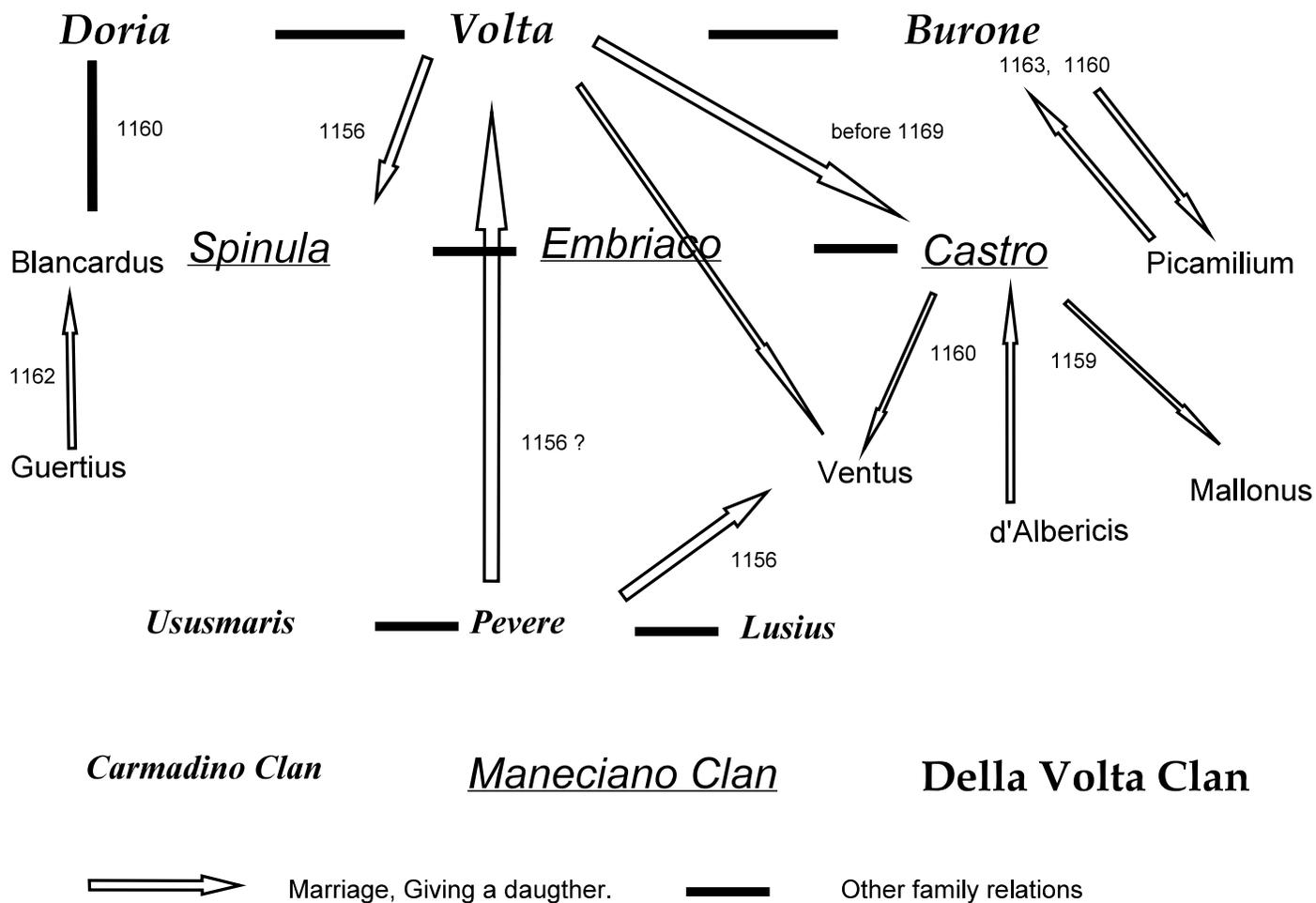
Sources: Greif (1988).

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$$(1 - v_p(m_7)) V_1$$

F

Clan 1 R_p P

DF

$$V_1 - R_p, R_p$$

Figure 1.3a: The Collusion Game

$v_1(m_2) V_1 - c, (1 -$

$v_1(m_p, m_2) V_1 - c$
$(1 - v_1(m_p, m_2)) I$

$V_1 - V_p^c, 0, V_p^c$

$V_1, 0, 0$

$v_1(m_p) V_1 - c, 0, v$

dp

p

co

F

dp

p

C

DF

co

Clan 1

DC

$V_1 - V_p^c, 0, V_p^c$

I_1, I_2, W

Figure 1.3b: The *podesteria* game

Figure 1.3: Value of Trade. Genoa, 1155-1314
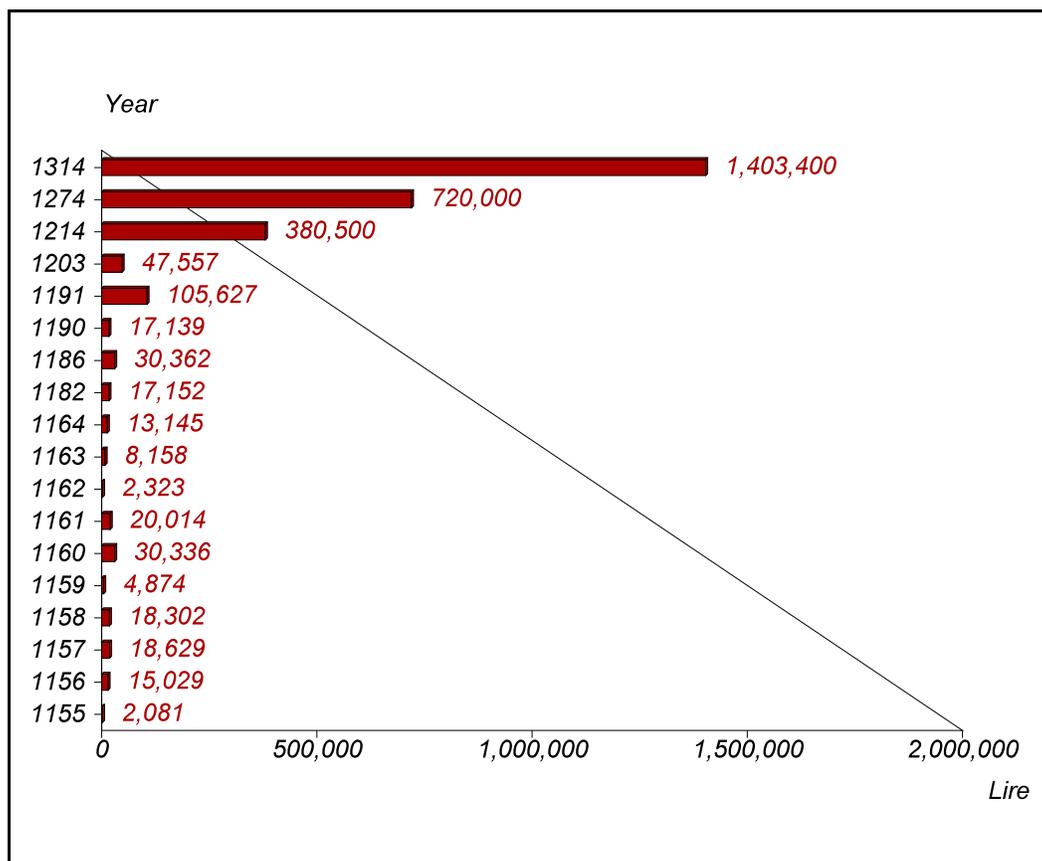
Sources: Greif, 1998. Notes: Whenever trade value was calculated from a cartulary, the export (which the cartulary specified) was multiplied by 2.4 to account for import and profit. No adjustment for inflation was made. According to Bond (1968), p. 33, the Genoese lire lost about 35% of its value between 1155 and 1255.

Figure 1.4 Annual Rate of Growth. Overseas Trade.
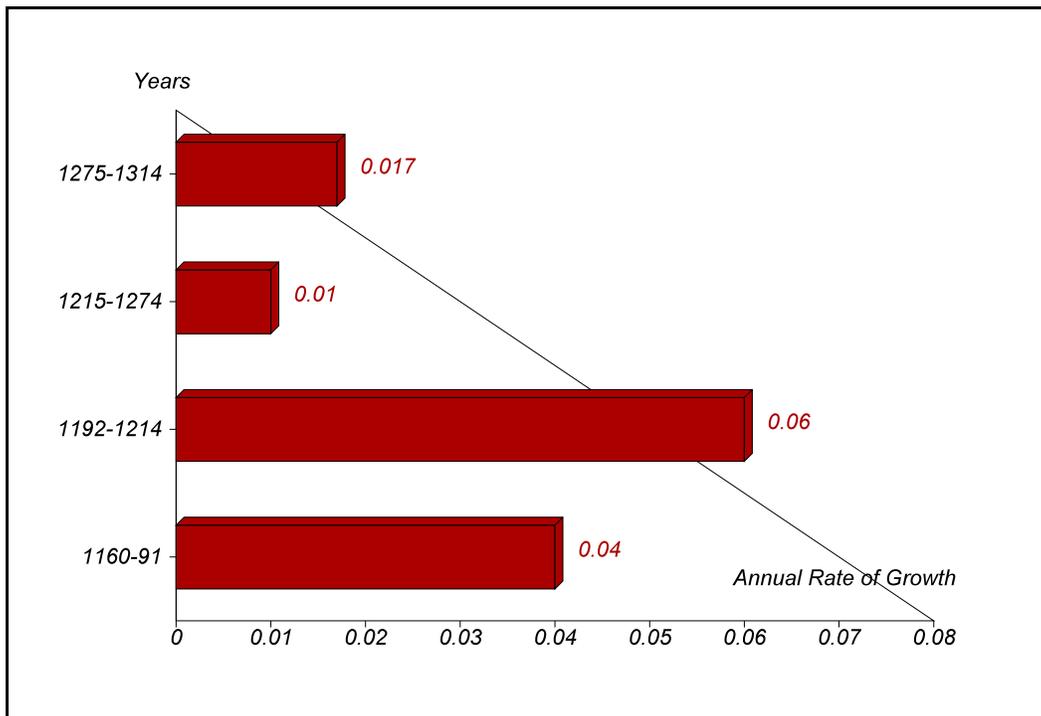
Source: Greif (1998).

Appendix: Model

Set up

Denote a clan by C^k and assume there are two clans, $k = \{i, j\}$. Clans have infinite horizon and a time discount factor of $\delta \in (0, 1)$. Possessions are identified with points in the set $[0, T]$, and T possessions yield the per-period expropriatable income of $I(T)$. The interaction between the clans for a given number of possessions is modeled as a repetitive complete information game. The first period of the game has three stages, in each of which clans move simultaneously. In the first stage, each clan decides whether to cooperate with the other in conducting a raid, the gain from which is $R(T)$. Hence if both clans cooperate in raiding, the total payoff or expropriatable income is $I(T) + R(T)$, and otherwise it is $I(T)$.

The second stage begins by having each clan receive a share in the total income where clan k's share is $\lambda^k > 0$. Accordingly, define a (potential) <u>supporter</u> to be a person with the military ability to assist a clan, and assume that a clan k can recruit ψ^k supporters where $\psi^k \in [0, \bar{y}]$ and $\bar{y}$ is large enough to enable ignoring competition over supporters.[79] A recruited supporter would assist a clan if he is provided with the (per-period) reward of r, and hence a clan's per-period expense is $r\psi$. Clans recruit supporters simultaneously, subject to their per-period budget constraint. As detailed below, a clan's military strength was a function of the number of its supporters.

In a period's third stage the clans simultaneously decide whether to "challenge" each other or not. If neither clan challenges, the period ends and the subsequent period is identical to the first period. If either clan challenges an inter-clan war transpires, and each clan has to bear the cost of war, c. Each clan's probability of winning the war depends on its relative military strength. Specifically, clan k's per-period probability of wining is $S^{k,w}(\psi^k, \psi^{-k})$, but since ties are possible, define $s^{k,w}(\psi^k, \psi^{-k}) = S^{k,w}/(1 - \delta(1 - S^{k,w})(1 - S^{-k,w}))$. The function $s^{k,w}(\psi^k, \psi^{-k})$ captures the probability that clan k will ever win and the implied reduction in the value of winning due to delay. (Henceforth this term will be referred to as the "probability of winning"). Since not much, if anything, is known about the specific details of this function, the only assumption made in the following analysis is that the probability of winning is non-decreasing in the first argument and non-increasing in the second. The clan that wins an inter-clan war becomes a "controlling" clan retaining all the income generated from possessions in each of the subsequent periods. In other words, following a challenge in which clan k won, the game proceeds by having this controlling

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[79] Formally, a clan's potential supporters are identified with points in the interval $[0, \bar{y}]$. If a subset y' of supporters is recruited by clan k, ψ^k denotes the clan's number of supporters, that is, $\psi^k = \bar{y}\mu(y')$ where $\mu(y')$ is the Lebesgue measure of y'.

clan that receives all the income from possessions ($\lambda^k I(T)$ where $\lambda^k = 1$).[80]

To capture the implications of outside threat on inter-clan politics, assume that following an inter-clan war in each period the controlling clan can recruit supporters after receiving that period's payoff. (Similar to the case in stage two of a pre inter-clan war game.) After supporters were recruited, however, Genoa is potentially subjected to a war against an "external threat." The probability of war depends on the magnitude of the external threat, $\theta \in [0, \bar{x}]$ (capturing the threat's <u>absolute</u> military strength) and the military strength of the controlling clan (that is, the threat's <u>relative</u> military strength). Accordingly, define $\omega(\psi^k, \theta)$ as the probability of war when clan k confronts (recalling that ψ^k is clan k's number of supporters) and by $s(\psi^k, \theta)$ the *ex ante* probability either that a war did not transpire or that it did and that clan won. The probability $\omega(\psi^k, \theta)$ decreases in ψ^k and increases in θ, whereas $s(\psi^k, \theta)$ increases in ψ^k and decreases in θ. At the limit, as $\theta \to 0$, $s(.) \to 1$ and $\omega(.) \to 0$. War against the external threat costs c, and defeat implies a zero continuation payoff to the controlling clan. If a war did not occur or was won, the game proceeds as before.

Analysis: A Dichotomy of Mutual Deterrence Equilibria

Since inter-clan war is inefficient, the analysis first concentrates on the set of MDE in which neither clan challenges the other. To examine the trade-off a clan faces in deciding whether to challenge or not, consider first clan k's (time) average expected payoff (henceforth, average payoff) as a controlling clan. It equals $V^{k,c}(T, \theta)$,[81] which is the value function of

(OP) $\qquad \underset{\psi^k}{Max}\ (1 - \delta) \sum_{t=0}^{\infty} \delta^t [s(\psi^k, \theta)]^t\ [I(T) - r\psi^k - c\omega(\psi^k, \theta)]$ [82]

Subject to

(1) The Clan's Participation Constraint: $(1 - \delta)\Sigma\delta^t s(.)^t[I(T) - r\psi^k - c\omega(.)] \geq 0$

(2) The Clan's Budget Constraint $I(T) - r\psi^k - c\omega(.) \geq 0$.

Since OP involves maximizing a continuous function over a compact set, a solution exists and the following analysis assumes an interior solution. Furthermore, it is assumed that a controlling clan finds it profitable to confront an external threat; that is, $\delta V^{k,c}(\bullet) > c$. Before a

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[80] Allowing a clan to surrender wouldn't alter the analysis. Furthermore, although the analysis in this section assumes that a defeated clan ceased existing, section IV relaxes this assumption and extends the analysis to consider inter-clan relations following a challenge.

[81] For simplicity of presentation, parameters not relevant to a stage of the analysis are omitted.

[82] Clans can differ in their military strength in the absence of supporters and hence the function s(.) is not necessarily the same for both clans. For ease of presentation, this issue is ignored.

challenge, if clan k recruits ψ^k supporters each period and neither clan is expected ever to challenge, its average payoff equals $V^{k,u}(\lambda^k, T, \psi^k) = \lambda^k[I(T) + R(T)] - r\psi^k$. If clan k expects to obtain this payoff, it wouldn't challenge if the present value of this average payoff $\delta V^{k,u}(\lambda^k, T, \psi^k)$ is more than the probability of winning, $s^{k,w}(.)$, times its average payoff as a controlling clan from the next period, $\delta V^{k,c}$, minus the (time average) cost of war, $c(1 - \delta)$. That is, clan k wouldn't challenge iff the following Incentive Compatibility Constraint ($ICC^k(T)$) is satisfied: $\delta V^{k,u}(\lambda^k, T, \psi^k) \geq \delta s^{k,w}(\psi^k, \psi^{-k})V^{k,c}(T, \theta) - c(1 - \delta)$.

A Mutual Deterrence (sub-game perfect) Equilibrium, $MDE(\lambda^k, T)$, in which neither clan challenges, exists iff there is a (ψ^i, ψ^{-j}) such that ICC^k is satisfied for $k = i, j$ where each clan recruits a feasible number of supporters that maximizes its expected payoff yet deters the other from challenging for any feasible number of supporters to the other clan. That is, if the following condition a is satisfied. *Condition 1*: There exist $(\psi^{i,u}, \psi^{j,u})$ s.t. for $k = i, j$, $\psi^{k,u} \leq \lambda^k[I(T) + R(T)]/r$ $\psi^{k,u} \in$ argmax $V^{k,u}(\lambda^k, T, \psi^k)$ and $\forall \psi^{-k} \leq \lambda^{-k}[I(T) + R(T)]/r$, $\psi^{-k} \geq \psi^{-k,u}$, $\delta V^{-k,u}(\lambda^{-k}, T, \psi^{-k,u})$ $\geq \delta s^{-k,w}(\psi^{-k}, \psi^{k,u})V^{-k,c}(T, \theta) - c + (\psi^{-k} - \psi^{-k,u})r)(1 - \delta)$. Suppose that a pair $(\psi^{i,u}, \psi^{i,u})$ satisfies condition 1, then the following strategy combination is an $MDE(\lambda^k, T)$. If a challenge has never occurred, clan k recruits $\psi^{k,u}$ supporters, doesn't challenge if $\psi^{-k} \geq \psi^{-k,u}$ and challenges otherwise. If clan k has ever won a challenge, it recruits $\psi^{k,c}$ supporters and confronts the external threat.

Since raids and possessions in a particular locality were mutually exclusive, and since having possessions was efficient, it is assumed that $I(T)$ increases and $R(T)$ decreases in T, that is, $I^\backslash(T) \geq 0$ and $R^\backslash(T) \leq 0$. The function $I(T) + R(T)$ is strictly concave and has a unique maximum, which is the efficient number of possessions $\tau \in (0, T)$, $I^\backslash(\tau) + R^\backslash(\tau) = 0$. (All the model's functions are assumed to be continuous and differential.) Given this relation between raids and possessions, condition one reveals the equilibrium relations between the number of possessions and the clans' endogenous military strength.

A necessary condition for the existence of $MDE(\lambda^k, T)$ with a positive number of supporters for both clans is that there is a feasible number of supporters to a clan that makes it profitable for it to challenge if the other clan has no supporters. That is, for $k = i$ or j, $\exists \psi^k \leq \lambda^k[I(T) + R(T)]/r$ s.t. $\delta s^{k,w}(\psi^k, 0)V^{k,c}(T, \theta) - c + r\psi^k)(1 - \delta) > \delta V^{k,u}(\lambda^k, T, 0)$. This condition is more likely to hold when θ is lower (since $V^{k,c}$ increases in θ), c is smaller, and δ is higher. Hence, theoretically, the MDE with the efficient number of possessions may be associated with either no supporters or a positive number of supporters. Proposition 1 establishes that political cost creates a wedge between the efficient and optimal number of possessions.[83] Although the

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[83] The analysis assumes that acquiring more possessions entails a transition from one MDE to another. It ignores possible hindrances to efficiency due to the difficulties in transition from one equilibrium to

MDE with the efficient number of possessions maximizes the clan's gross average payoff, it doesn't maximize its net average payoff.

Proposition 1[84]

a) Assume that MDE(λ^k, τ) exists, the clans' equilibrium number of supporters, $\psi^{k,*}(\lambda^k, \tau)$ (k = i, j), is strictly positive (wlog), $\partial^2 s(.)/\partial \psi^{k2} < 0$, and $\partial^2 \omega(.)/\partial \psi^{k2} > 0$ (k = i, j). Then each clan's net average payoff is not maximized at τ.

b) If MDE(λ^k, T) exists for every T and the implied number of supporters, $\psi^{k,u}(T)$ is strictly positive for k = i, j (wlog), then if a clan's optimal number of possessions is not zero, its net average payoff is maximized in an MDE(λ^k, T^*) such that $T^* < \tau$ and $\lambda^k \partial I(T^*)/\partial T = \partial h(T^*)/\partial T - \lambda^k \partial R(T^*)/\partial T$, where $h^k(T) = r\psi^{k,u}(T)$.

Proposition 1: Proof

At MDE(λ^k, T), clan k's optimal number of supporters is such that ICC^{-k} is binding at the largest number of supporters feasible for clan -k, that is, $\lambda^{-k}[I(T) + R(T)]/r$. This locally binding constraint implicitly defines ψ^{-k} as a function of T, that is, $\psi^{-k,u}(T)$. The most profitable MDE(T) for clan k is the one that maximizes its per-period income in a MDE, that is, $H(T) = \lambda^k[I(T)) + R(T)] - h^k(T)$ where $h^k(T) = r\psi^{k,u}$. The first order condition for maximization is

$$\lambda^k [\frac{\partial I(T)}{\partial T} + \frac{\partial R(T)}{\partial T}] - \frac{\partial h^k(T)}{\partial T} \geq 0.$$

Evaluated at T = τ, this first order condition holds iff

$$-\frac{\partial h^k(\tau)}{\partial T} \geq 0 \ that \ holds \ iff \ \frac{\partial \psi^{k,u}(\tau)}{\partial T} \leq 0.$$

The equilibrium number of supporters, $\psi^{k,*}(\tau)$ increases in T if $\partial V^{-k,c}/\partial T > \partial V^{-k,u}/\partial T$. By the envelope theorem,

$$\frac{\partial V^{-k,c}}{\partial T} = \frac{(1-\delta)}{(1-\delta s(.))} \frac{\partial I(T)}{\partial T}.$$

another.

Similarly,

$$\frac{\partial V^{-k,u}}{\partial T} = \lambda^{-k}[\frac{\partial I(T)}{\partial T} + \frac{\partial R(T)}{\partial T}].$$

Hence, $\partial V^{-k,c}/\partial T > \partial V^{-k,u}/\partial T$ iff

$$\frac{(1 - \delta)}{(1 - \delta s(.))}\frac{\partial I(T)}{\partial T} > \lambda^{-k}[\frac{\partial I(T)}{\partial T} + \frac{\partial R(T)}{\partial T}].$$

Evaluated at $T = \tau$, the right-hand side of the inequality above equals zero, whereas the left-hand side is strictly positive. Hence the equilibrium number of supporters increases at $T = \tau$, that is, $\partial \psi^{k,u}(\tau)/\partial T > 0$, implying that the clans' expected utility is not maximized in the efficient number of possessions.

As for the second claim, the discussion above indicates that clan's k expected utility is maximized in a MDE in which

$$\lambda^k\frac{\partial I(T)}{\partial T} = [\frac{\partial h(T)}{\partial T} - \lambda^k\frac{\partial R(T)}{\partial T}],$$

which is the required condition. Q.E.D.

Proposition 2:

Suppose that MDE(λ^k, T) with a positive equilibrium number of supporters exists $\forall$ T $\in$ [0, τ]. The number of possessions both clans find optimal to acquire, $T^*(\theta)$, is non-decreasing in θ.

Proposition 2: Proof

Any reduction in $V^{k,c}(.)$ reflexes the mutual deterrence constraints and enables more cooperation. Since θ directly affects only $V^{k,c}(.)$, to prove the proposition it is sufficient to show that a controlling clan's expected utility decreases in θ. A controlling clan's expected utility is the value function of problem OP defined in section II. To see that it is decreasing in θ, define g(.) = I(T) - rψ - cω(.) (> 0) and recall that $\partial s(.)/\partial \theta < 0$ and $\partial \omega(.)/\partial \theta > 0$. These relations and the Envelope Theorem imply that

$$\frac{\partial V^{k,c}}{\partial \theta} = \frac{(1 - \delta)\delta}{(1 - \delta s(\cdot))^2}\frac{\partial s(\cdot)}{\partial \theta}g(\cdot) - \frac{(1 - \delta)}{(1 - \delta s(\cdot))}\frac{\partial \omega}{\partial \theta}c < 0$$

Q.E.D.

Discussion of the relations between parameters in the existence of MDE:

More formally, condition 1 implies that MDE(λ^k, T) does not exist if one clan finds it profitable to challenge when the other clan invests all its resources in enhancing its military strength. That is, if for k = i or k = j, $\exists$ $\psi^k \leq \lambda^k[I(T) + R(T)]/r$ s.t. for $\psi^{-k} = \lambda^{-k}[I(T) + R(T)]/r$, $\delta V^{k,u}(\lambda^k, T, \psi^{k,u}) < \delta s^{k,w}(\psi^k, \psi^{-k})V^{k,c}(T, \theta) - c + (\psi^k - \psi^{k,u})r)(1 - \delta)$. The left-hand side of this last inequality equals $\delta\{\lambda^k[I(T) + R(T)] - r\psi^{k,u}\}$ and hence it decreases with R(T) while the right hand side increases with θ, since $\partial V^{k,c}/\partial\theta < 0$ (as established in the proof to proposition 2). Hence as R(T) and θ decrease, this condition is more likely to be satisfied. At the limit, as R(T) → 0, θ → 0 (implying that s(.) → 1 and ω(.) → 0), and the time discount factor, δ → 1 an MDE(λ^k, T) does not exist iff $\lambda^k < s^{k,w}$(.) for some feasible ψ^k, k = i, j and for all feasible ψ^{-k}. That is, for the allocation λ^k, one clan can have enough supporters so that its probability of winning a challenge is higher than its share in the income, an MDE(λ^k, T) doesn't exist.

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