Contract Enforceability and Economic Institutions in Early Trade: The Maghribi Traders' Coalition

Avner Greif

Contract Enforceability and Economic Institutions in Early Trade: The Maghribi Traders' Coalition

By Avner Greif*

This paper presents an economic institution which enabled 11th-century traders to benefit from employing overseas agents despite the commitment problem inherent in these relations. Agency relations were governed by a coalition — an economic institution in which expectations, implicit contractual relations, and a specific information-transmission mechanism supported the operation of a reputation mechanism. Historical records and a simple game-theoretical model are used to examine this institution. The study highlights the interaction between social and economic institutions, the determinants of business practices, the nature of the merchants' law, and the interrelations between market and nonmarket institutions. (JEL N75, D23, J41)

Without the ability to exchange, the potential for growth is rather limited. Indeed, the historical process of European economic growth is marked by ever-expanding exchange relations. The contribution of an enhanced ability to exchange went beyond its direct economic impacts as, for example, the late-medieval European commercial revolution from the 11th to the 14th centuries led to fundamental social and political changes (see e.g., Robert S. Lopez, 1976; Henri Pirenne, 1939, 1956). Yet not much is known about the historical institutional developments that enabled exchange relations to expand, even though such knowledge can shed light on the nature and evolution of modern institutions and facilitate the understanding of the institutional transitions that developing economies still face.[1]

Few studies have attempted to examine analytically various aspects of the pre-modern institutional framework that supported exchange. Paul R. Milgrom et al. (1990) have argued that merchant courts at the Champagne fairs of the 12th and 13th centuries can be analyzed as an institution that supported impersonal exchange relations over time. It provided proper incentives for gathering information, honoring agreements, reporting disputes, and adhering to judgments. Moreover, by centralizing certain record-keeping functions and effectively permitting only merchants in good standing to remain at the fairs, this institution also achieved significant economies in transaction costs. The role of the European medieval *merchant guild* in enabling rulers to commit themselves to the security of alien

[1] In their pathbreaking works Douglass C. North and Robert Paul Thomas (1973) and North (1981) have pointed to the historical relations between institutions and growth.

merchants has been examined in Greif et al. (1992). In the absence of such a commitment, merchants were not likely to frequent trading centers abroad—a costly outcome for both the rulers and the merchants. Bilateral and uncoordinated multilateral reputation mechanisms failed to overcome this commitment problem at the efficient level of trade, since, without supporting organizations, the cost to the ruler of abusing the rights of "marginal traders" was not high enough to deter abuse. The merchant guild increased this cost and enabled trade to expand to its efficient level by coordinating the responses of the merchants to transgression and by ensuring solidarity of incentives among the merchants.

This paper is concerned with an institution that surmounted a commitment problem intrinsic in the relations between merchants and their overseas agents. In pre-Modern trade, a merchant had to organize the supply of the services required for the handling of his goods abroad. He could either travel along with his merchandise between trade centers or hire overseas agents to supply the service. Employing agents was efficient, since it enabled the merchant to save the time and risk of traveling, to diversify his sales across trade centers, and so forth. Without supporting institutions, agency relations are not likely to be established, since the agents can act opportunistically and embezzle the merchant's goods. Anticipating this behavior, a merchant will not hire agents, and efficient cooperation is not initiated. The importance of this organizational problem for pre-Modern trade efficiency is reflected in the fact that the merchant–agent relations are present in all the main forms of business association employed during that time.

This paper examines the institution that enabled 11th-century Mediterranean traders to overcome this commitment problem.[2] An historical source found in Fustat (Old Cairo) known as the *geniza* ("deposit place" in

Hebrew) contains about a thousand contracts, price lists, traders' letters, accounts, and so forth, that reflect 11th-century trade in the Muslim Mediterranean.[3] These documents were written by Jewish traders, known as the Maghribi traders (the Maghrib is the Muslim world's West), who operated mainly, but not exclusively, in the western basin of the Mediterranean. The Maghribi traders had the custom of depositing in the *geniza* of a Fustatian synagogue every document that was written in Hebrew characters (Goitein, 1967a p. 149). Since they conducted their commercial correspondence in Judeo-Arabic (an Arabic dialect written in Hebrew characters) it is reasonable to conjecture that the documents found in the *geniza* contain a representative sample of their commercial correspondence.[4]

The hypothesis advanced in this paper is that agency relations among the Maghribi traders were governed by an institution that might be called a coalition. Expectations, implicit contractual relations, and a specific information-transmission mechanism constituted the constraints that affected an individual trader's choice of action. In particular, these constraints supported the operation of a reputation mechanism that enabled the Maghribis to overcome the commitment problem. In turn, the reputation mechanism reinforced the expectations on which the coalition was based, motivated traders to adhere to the implicit contracts, and led to entry and exit barriers which ensured the sustainability of the coalition. An examination of this coalition casts light on several related issues in this historical episode such as the determinants of business practices, the interactions between social and economic institutions, the nature of the Merchants' Law, and the role of history in institutional evolution.

Historical documents rarely lend themselves to institutional analysis, and the *geniza* is no exception. Furthermore, due to

its nature, the type of institutional analysis conducted here is not likely to generate hypotheses that can be verified statistically. Accordingly, this study employs the historical documents to evaluate the importance and attributes of the agents' commitment problem and then uses this information to construct an explicit game-theoretical model that captures the essence of this problem. Explicit statements from the historical records are utilized to identify the strategies used by the Maghribi traders. Once the equilibrium strategies are recognized, the model is extended to generate predictions about facts other than those assumed in the model that are reflected in the historical records. Confronting these predictions with the historical evidence supports the accuracy of the conjectures about the nature of the coalition and provides additional insights.

The rest of this paper is organized as follows. The first section provides the general background concerning trade and business associations among the Maghribi traders. Section II discusses the commitment problem that curtailed agency relations and the role of the reputation mechanism in circumventing this problem. Section III models the commitment problem and examines the efficiency of the strategies used by the Maghribi traders and whether they constitute an equilibrium. Section IV presents the coalition and employs the model to generate predictions that substantiate the claim that agency relations were governed by the coalition. Various aspects of the coalition are highlighted. Section V discusses the role of the Merchants' Law, and conclusions follow.

I. Commerce, Overseas Agents, and Efficiency

The *geniza* indicates that 11th-century Mediterranean trade was free, private, and competitive, with no official restrictions fettering migration or the transfer of raw materials, finished goods, or money across the Mediterranean (see Archibald R. Lewis, 1951 pp. 189–91; Goitein, 1967a pp. 29–35, 266–72; Gil, 1983b [Vol. 1] pp. 205–30). Within each trade center, commercial transactions were conducted competitively. In

bazaars and storehouses, buyers and sellers negotiated and competed over prices using brokers, open-bid auctions, and direct negotiation (Goitein, 1967a pp. 157, 187, 192–5). However, trade was characterized by uncertainty. Prices, for example, were subject to large variations as a result of the production and communication technologies of the period (see e.g., Dropsie 389, a, ll. 4–5, b, ll, 27–8 [Gil, 1983a pp. 113–25]) (see also Goitein, 1967a pp. 217–29, 301–5; Greif, 1985 p. 92). Commercial relations between different regions also contributed to price fluctuations, since all the countries around the Mediterranean constituted one trade region connected by sea and land caravans. Thus, changes affecting business in one country were felt abroad. However, price fluctuations were not the only factor that contributed to commercial uncertainty. It resulted also from uncertainty with respect to the duration of a ship's voyage, whether the ship would reach its destination, the condition in which the goods would arrive, the cost of storage, and so forth (see Goitein, 1967a pp. 148–61, 200–1, 273–322; Norman A. Stillman, 1970 pp. 70–88; Greif, 1985 pp. 3, 69–78).

Eleventh-century trade is reflected in the *geniza* through documents written by the Maghribi traders. These were the descendants of Jewish traders who left the increasingly politically insecure surroundings of Baghdad and emigrated to North Africa during the 10th century. Each of the several dozen traders mentioned in the documents invested in merchandise worth between several hundred and several thousand dinars —substantial sums considering that the monthly expenses of a middle-class family in Fustat were between two and three dinars (Goitein, 1967a pp. 214–17; Gil, 1983b [Vol. 1] pp. 200–30; Greif, 1985 pp. 73–6).[5] To cope with the uncertainty and complexity of trade, the Maghribi traders operated through *overseas agents*. An overseas agent is anyone who supplies the services required for a commercial venture while the capital,

---

[5]For expenses, see Goitein (1967a p. 46) and Gil (1983a p. 91).

profit, or both are shared with a merchant located in a different trade center. (Henceforth the term "merchant" will be used to denote an individual who receives the residual revenue after the agent receives his compensation. The term "trader" will refer to both agents and merchants.)

Agents provided merchants with many trade-related services, including loading and unloading the ship; paying the customs, bribes, and transportation fees; storing the goods; transferring the goods to the market; and deciding when, how, and to whom to sell the goods and at what price and at which credit terms (Goitein, 1967a p. 166). Agency relations among the Maghribis were extremely flexible, as merchants operated through several agents at the same time and even at the same trade center and seem to have been at ease initiating and canceling agency relations following the needs of their complex and uncertain occupation (see e.g., Stillman, 1980; Greif, 1985).

Agency relations enabled the Maghribi traders to reduce the cost of trade by better allocating risk through diversification, by benefiting from agents' expertise, and by shifting trade activities across trade centers, goods, and time. Agency relations enabled merchants to operate as sedentary traders, thus saving the cost and risk of the sea journey, and enabled traveling merchants to gain from relying on agents to handle the merchants' affairs in their absence (Greif, 1985, 1989; Goitein, 1967a).

The efficiency gain from operating through agents is impossible to assess quantitatively. However, the superiority of pre-Modern trade systems in which cooperation through overseas agents prevailed over those in which it did not has been recognized by many scholars (see Lopez and Irving W. Raymond, 1955 p. 174; Raymond De Roover, 1965 pp. 43, 45–6, 70–4; M. M. Postan, 1973 pp. 66–71). Furthermore, the Maghribi traders themselves perceived that operating through agents was crucial for business success. This is reflected in the extent to which they established agency relations and by traders' statements. For example, one trader wrote to his business associate who served as his overseas agent that "all profit occurring to me comes from

your pocket" (TS 13 J 25, f. 18 [Goitein, 1967a p. 164]), while another mentioned that in trade "people cannot operate without people" (DK 22, b, l. 18 [Gil, 1983a pp. 97–106]).[6]

II. The Commitment Problem and Reputation-Based Community Enforcement Mechanism

Agency relations among the Maghribis were characterized by a commitment problem. Efficiency was enhanced by letting an overseas agent transact business with capital he did not own. When the capital was in his possession, however, he could embezzle it. Without a supporting institution, merchants anticipating opportunistic behavior would not operate through agents; thus mutually beneficial exchanges would not be carried out. To gain from cooperation, there was a need for an institution capable of surmounting this commitment problem, an institution through which an agent could commit himself *ex ante*, before receiving the merchant's capital, to be honest *ex post*.[7]

The historical records implicitly indicate the existence of such an institution among the Maghribis, as agency relations were the rule rather than the exception. Further, agency relations as reflected in the *geniza* were characterized by the prevalence of trust. Despite the many opportunities for agents to cheat, only a handful of documents contain allegations of misconduct (see Goitein, 1973 p. 7).[8] How was the merchant–agent commitment problem resolved?

---

[6] For the extent of agency relations through business associations, see Murad Michael (1965) and Stillman (1970).

[7] Were a merchant to sell the benefits from a particular trade venture, or the "business" as a whole to an overseas agent, he would have to become the agent. Selling it to a local agent meant losing the advantages of an overseas agency.

[8] Misconduct is mentioned in less than 5 percent of the approximately 250 documents examined for this study. This was not the case in Italy, where allegations of misconduct are well reflected in the historical records (e.g., De Roover, 1965 pp. 88–9).

There are situations in which a legal system surmounts a commitment problem. The historical evidence, however, suggests that this was not the case among the Maghribi traders. Many, if not most, of the agency relations in the *geniza* were not based on legal contracts. Only a few documents indicate that commercial disputes between merchants and agents were brought before the court, and the operation of the court in these cases seems to have been time-consuming and expensive (see Bodl. MS Heb., a3 f. 26 [Goitein, 1973 p. 97]). For example, sometime around the turn of the 11th century Hillel ben Isaac served as an agent for Nahum al-Hazan. About half a century later, in 1065, Nahum's two grandsons applied to the court, suing Hillel for what they claimed he still owed their late grandfather. In their letter they mentioned that they had "nominated Rabbi Maṣlī'ah some time ago" to represent them in court, a nomination that probably took place sometime before 1038 (TS 10 J 4, f. 3 [Greif, 1985 appendix, pp. 5–7]).[9] Furthermore, the court also faced difficulties in tracking down agents who emigrated (Moshe Maimonides, 1951 p. 210; Goitein, 1967a p. 439 [note 39]).

Most likely, the legal system was not used to mitigate the merchant–agent commitment problem, mainly due to the asymmetric information that characterized agency relations. Because of the complexity and uncertainty of long-distance commerce, the outcome of a commercial transaction depended on many realizations that could not be directly observed either by the merchant or by the legal system (Greif, 1989). Further, since the timing of ships' departures depended on weather conditions, a report concerning the results of commercial transaction sent by an agent reached the merchant a few months after the transaction

had taken place. Hence, a merchant who believed that he had been cheated could only sue the agent several months after the transaction had been completed. How could the court, several months later, verify the condition of the goods upon their arrival, the price received for the goods, the amount of the bribe given in the port, the cost of delivery, whether the goods were stolen from the agent's warehouse, and so forth?[10] Furthermore, the Jewish law restricts the ability to sue agents. For example, an agent entrusted to buy certain items cannot be sued for "bringing [to the merchant] an item worth 1 [dinar] for [which he charges the merchant] 100 [dinars]" (Maimonides, 1951 p. 208) (see additional discussion in Greif [1989]). Indeed, in 1095 an agent who received 70 dinars reported that he had lost all but 20 dinars. The furious merchant, although certain that he had been cheated, was unable to sue the agent since his claim did not have any legal base (TS 13 J 2, f. 5 [Goitein, 1967a p. 176]).

The conviction of the furious merchant that the agent had cheated him was, most likely, based on information which enabled him to monitor the agent imperfectly. A Maghribi merchant was associated with many Maghribi traders residing in different trade centers, and it was customary to reciprocate in the supply of trade-related information that was so crucial to business success.[11] Reciprocity, most likely, prevented "free-riding" on these information flows. (see e.g., TS 20.76; TS 13 J 15, f. 9 [Goitein, 1973 pp. 113–19, 320–2]; TS 10 J 11, f. 22, a, ll. 11–12 [Goitein, 1967a pp. 195, 201–9]; Greif, 1985 pp. 95 [note 60], 133). These information flows within the Maghribis traders group, as well as a merchant's experience, circumvented to some extent the

---

[9]For other examples, see Bodl. MS. Heb. f. 42 (S. Poznanski, 1904 pp. 171–2), TS 20.152 and Bodl. MS Heb. a3 f. 9 (Gil, 1983b [Vol. 2] pp. 724–32), and Bodl. MS Heb., a3 f. 26 (Goitein, 1973 p. 97). On Rabbi Maṣlī'ah and the timing of his nomination, see Greif (1985). For a similar situation in 15th-century Italy, see De Roover (1965 p. 88).

[10]For the dependency of a trade venture's outcome on these factors see, for example, TS 20.122, b. 1. 10; Dropsie 389, a, ll. 21–3 (Gil, 1983a pp. 113–25); TS 10 J 10, f. 30, ll. 11–12 (Gil, 1983b [Vol. 3] p. 193); Bodl. MS Heb. a3, f. 26 (Goitein, 1973 p. 98 [section B]); and note 62 in Greif (1985 p. 96).

[11]For the importance of information flow for commercial success see, for example, Dropsie 389, a, ll. 2–4 [Gil, 1983a pp. 113–25], Michael (1965) and Gil (1983b [Vol. 3] pp. 96–101).

asymmetric information between merchants and agents and enabled the former to monitor the latter (see e.g., DK 22, a, ll. 11, ff. [Gil, 1983 pp. 97–106]; ULC Or 1080 J 42 [Gil, 1983b (Vol. 3) p. 300]; TS Box Misc 28, f. 225 [Gil, 1983b (Vol. 3) pp. 96–101]). The ability to monitor, however, was most likely imperfect in the sense that a merchant could also be mistaken in concluding that his agent was dishonest. For example, around the middle of the century Maymun ben Khalpha of Palermo sent a letter to Naharay ben Nissim of Fustat. Discussing a conflict that Neharay had with one of his agents, Maymun makes clear that in contrast to Naharay he contends that the agent was honest and should not be accused of cheating (DK 22, b [Gil, 1983a]).

The theory of repeated games with imperfect monitoring illuminates how a commitment problem can be surmounted in the absence of an effective legal system. According to the theory of repeated games, by paying an agent a wage "high" enough during each period he is known to be honest, and by making future employment conditional on past conduct, a merchant can insure that the present value of the lifetime expected utility of an honest agent is larger than what the agent can obtain by cheating and facing the prospect of being unemployed. Hence, the best the agent can do, *ex post*, is to be honest. Since this is known, *ex ante*, to the merchant, he can trust his agent, and the agent acquires a reputation for honesty.[12] There are situations, however, in which the maximum punishment imposed by an individual merchant is not sufficient to enable the agent to commit himself, and a collective punishment may be necessary to

support cooperation.[13] When the actions taken by the agents can be only imperfectly monitored, however, there is a positive probability that an agent, although honest, will be considered a cheater. To sustain cooperation it may be optimal to punish the agent for a specific period of time during which he collaborates in his own punishment (see Edward Green and Robert Porter, 1984; Dilip Abreu et al., 1986, 1990; Drew Fudenberg et al., 1989; Abreu et al., 1991) (for an excellent recent survey, see David G. Pearce [1991]).

The *geniza* contains several documents that explicitly reflect the Maghribi traders' responses to suspicions that an agent had cheated a merchant. These documents suggest (i) that a reputation mechanism governed agency relations and, in particular, that merchants conditioned future employment on past conduct, practiced community punishment, and ostracized agents who were considered cheaters until they compensated the injured and (ii) that agents were ready to forgive current gain to sustain their good standing in the merchants' group. Since this evidence has been presented in detail somewhere else (Greif, 1989), a few examples will suffice here.

Around 1055 it became known in Fustat that Abun ben Zedaka, an agent who lived in Jerusalem, embezzled the money of a Maghribi trader. The response of the Maghribi traders was to cease any commercial relations with him. His bitter letter indicates that merchants as far away as Sicily had ostracized him. Only after a compromise was achieved and he had compensated the offended merchant were commercial relations with him resumed (TS 13 J 25, f. 12; TS 12.279; see also TS 8 J 19, f. 23 [Gil, 1983b (Vol. 3) pp. 218–33). About 50 years earlier, in the first decade of the 11th century, Samhun ben Da'ud, a prominent trader from Tunisia, sent a long letter to his business associate, Joseph ben 'Awkal of Fustat.

---

[12] Roughly speaking, a player's reputation is a function from past history to a probability distribution over his strategies. See discussion and applications in Philip Nelson (1974), Benjamin Klein and Keith B. Leffler (1981), Paul R. Milgrom and John Roberts (1982), Carl Shapiro (1983), Paul L. Joskow (1984 p. 14), Shapiro and Joseph E. Stiglitz (1984), Oliver E. Williamson (1985 pp. 121, 138), George Akerlof and Janet Yellen (1986), and David M. Kreps (1990a).

[13] For the theory of collective enforcement, see Jonathan Bendor and Dilip Mookherjee (1990), Masahiro Okuno-Fujiwara and Andrew Postlewaite (1990), and Michihiro Kandori (1992).

The letter says that Joseph made his future dealings with Samhun conditional upon his record: "If your handling of my business is correct, then I shall send you goods." It happened, however, that Samhum did not handle Joseph's business to his satisfaction —Joseph believed that Samhun had intentionally not remitted his revenues on time. Joseph's response was to impose economic sanctions against Samhum by ignoring Samhum's request to pay two of Samhun's creditors in Fustat. By the time Samhun found out about it "their letters filled with condemnation had reached everyone." The content of these letters caused Samhun to complain that "my reputation (or honor) is being ruined" (DK 13, a. ll. 26–9 [Stillman, 1970 pp. 267–75]; Goitein, 1973 pp. 26–34).

Around the middle of the century, Khalluf ben Musa described how he had handled the sale of two loads of pepper—one of his own and the other belonging to another merchant. The pepper price was very low, and therefore "[I] held it until the time when the sailing of the ships approached in the hope it would rise. However, the slump got worse. Then I was afraid that suspicion might arise against me and I sold your pepper to Spanish merchants for 133 [quarter dinars].... It was the night before the sailing of the ships—pepper became much in demand...[since] boats [with buyers] arrived...I...[sold] my pepper at 140–142. But brother, I would not like to take the profit for myself. Therefore, I transferred the entire sale to our partnership." To prevent suspicion, the agent preferred to sell the merchant's pepper early and hence received for it much less than he later received for his pepper. To compensate the merchant, he shared the gain and the loss with him. He did not behave this way, however, out of concern for his future relations with that specific merchant. His letter is explicit about his desire not to serve as an agent for this merchant in the future (Bodl. MS Heb., a3 f. 13 [Goitein, 1973 p. 123]).

Finally, the *geniza* indicates that, if an agent who had been accused of cheating were to receive agency services from other Maghribi traders, they could cheat him free from community retaliation. The words of a Tunisian merchant who was accused in 1041–1042 of cheating exemplify this. That merchant complains that when it became known that he had cheated, "people became agitated and hostile to [me] and whoever owed [me money] conspired to keep it from [me] (Bodl. MS Heb., a2 f. 17, section D [Goitein, 1973 p. 104]; see also Greif, 1989).

Agency relations among the Maghribi traders were characterized by a commitment problem in the presence of asymmetric information regarding agents' conduct. The evidence suggests that information flows among the Maghribis mitigated information asymmetry and enabled merchants to monitor their agents imperfectly. The theory of repeated games with imperfect monitoring indicates that cooperation in agency relations could have been sustained by conditioning future patterns of cooperation on the history of the relations. Indeed, the historical records indicate the operation of an informal community enforcement mechanism that was based on this principle.

Yet, many questions should be addressed: Why was the community punishment self-enforcing? Why was a boycott effective? Why was it not undermined by agents' ability to seek employment by non-Maghribis? Why was the merchants' commitment to future employment of honest agents credible despite the (potential) temptation to hire non-Maghribi agents? What was the mechanism that coordinated punishment? After all, for a collective punishment to be effective, there must be a consensus about which actions constitute "cheating." In short, what was the exact nature of the institution that governed agency relations? The formal model presented in the next section provides the foundation for addressing this issue.

III. Model: The Agent Commitment Problem and Multilateral Punishment Strategy

Constructing a model aimed at facilitating the examination of the actual functioning of a contract-enforcement institution in a specific historical episode presents a methodological problem. Should the as-

sumptions concerning the basics of the model be restricted only to those reflected in the historical records? Or is any assumption about the model which does not conflict with the evidence legitimate? The approach taken in this paper is that the model should be based, to the extent possible, on assumptions justifiable by the historical evidence, and the model that can account for the phenomena under consideration with the fewest additional assumptions should be used.

Thus, the model presented below does not impose the assumption that generates what is arguably the most intuitive explanation for collective punishment; that is, that merchants perceived an agent who cheated to be of a "bad type" who would keep on cheating in the future if hired.[14] There is nothing in the evidence that directly justifies such an assumption or indirectly justifies it by indicating that an agent who had proved himself honest in the past was considered to be more likely to be honest in the future. On the contrary, there is evidence suggesting that merchants were likely to participate in collective punishment even when they believed that the agent was honest. In Maymun's letter, mentioned above, he makes clear that he believes that Naharay's agent was honest and "should not be accused [of cheating].... " Yet, Maymun feared that if the agent would be openly accused it would affect his relations with the agent, presumably since Maymun would have to participate in a collective punishment: "You know that he is our [the Maghribi traders'] representative..., [so the conflict] bothers us all (DK 22, b, ll. 5–17 [Gil, 1983a pp. 97–106]).[15]

Further, a model based on agents' types seems unable to provide a satisfactory explanation for some historical phenomena. For example, as discussed below, the Maghribis did not hold agency relations with Jewish Italian merchants although, ignoring agency cost, these were perceived by the Maghribis to be very profitable. A model based on agents' types can account for this behavior, but this requires either imposing strategies contingent on social affiliations or else assuming that members of one group could not verify whether a specific member of the other group ever cheated (i.e., that a non-Maghribi could not "free-ride" on the information generated among the Maghribis by observing actions). Neither possibility is appealing. There is no reason to believe that these Jews "discriminated" against each other, and whether a specific individual was serving as an agent could easily be verified since merchants could examine a ship's cargo, its ownership, and its destination (see Goitein, 1967a pp. 336–7).

Whatever the importance of asymmetric information regarding agents' types in accounting for the collective punishment practiced by the Maghribis, an efficiency-wage complete-information model of the agent's commitment problem indicates that there is another mechanism which can support collective punishment and account for other historical phenomena.[16] In this model, the collective punishment is feasible due to the availability of information, and it is self-enforcing due to a link between expectations with respect to future hiring and the stream of rent required to keep an agent honest. To simplify the presentation of the insights generated by this model, it abstracts away from imperfect monitoring.[17]

---

[14]On this mechanism, see, for example, Kreps (1990a) and Milgrom and Roberts (1982).

[15]Similar considerations led to the rejection of a model in which costly participation in collective punishment is supported since nonparticipation provokes retaliation (e.g., David G. Pearce, 1991; Kandori, 1992).

[16]For efficiency wage models, see, for example, Shapiro and Stiglitz (1984) and Akerlof and Yellen (1986).

[17]To capture the asymmetry and imperfectness of information, as well as commercial uncertainty, the model presented here can be extended as follows. The revenue is observed only by the agent and is a random variable x with domain $[a,b]$. The agent reports a revenue realization $y \in [a,b]$. A wage is a contract which is a function of the agent's report, $w:[a,b] \rightarrow [a,b]$ $w(y) \leq y$ $\forall y$. The merchant observes the actual realization in probability $f(y,x)$ where $1 > f(\cdot) > 0$, $\forall y \neq x$ (information asymmetry), and $f(\cdot) > 0$ when $x = y$ (imperfect monitoring).

Consider a perfect and complete information economy in which there are M merchants and A agents, each of whom lives an infinite number of periods. Further, assume that $M > A$ and that agents have a time discount factor δ. In each period, a merchant can hire an agent from the pool of unemployed agents, and each agent can be hired by only one merchant. A merchant who does not hire an agent receives a payoff of $\kappa > 0$. A merchant who hires an agent offers him a wage W. An employed agent can decide whether to be honest or to cheat. If he is honest, the merchant's payoff is $\gamma - W$, and the agent's payoff is W. (Hence, the gross gain from cooperation is γ.) If the agent cheats, however, his payoff is α and the merchant's payoff is 0. After the allocation of the payoffs, the merchant can decide whether to terminate his relations with that agent or not. There is also the possibility that the merchant is forced to terminate the relation due to some exogenous reason, an event that can occur in each period with probability τ. An agent who is unemployed during some period receives the reservation utility, $\bar{w} \geq 0$. It is assumed that $\gamma > \kappa + \bar{w}$ (cooperation is efficient), $\gamma > \alpha > \bar{w}$ (cheating entails a loss, and an agent prefers cheating over receiving his reservation utility), and $\kappa > \gamma - \alpha$ (a merchant prefers operating by himself if the agent is to cheat him or to receive a wage α).

While the above formulation captures the essence of the agent's commitment problem, some elaboration on its details is in order. A merchant could initiate agency relations, and since an employed agent held the merchant's capital, he was assured of receiving his wage. The need to shift commercial operations over places and goods and the high uncertainty of commerce and life during the 11th century curtailed a merchant's ability to commit himself to future wages or employment. Hence, the model assumes a stationary wage scheme (which was indeed practiced among the Maghribis) and a limited ability to commit to future employment. Like any other economic agents, the Maghribi traders did not enjoy an infinite lifespan. The results obtained from this infinite-horizon model, however, are equivalent to those obtained from a finite-horizon model with a constant probability of termination. Furthermore, among the Maghribi traders, relatives were considered morally responsible for each other's business dealings, and traders' sons followed their fathers' occupation and were their old-age "insurance policies" (see Goitein, 1973 p. 60).[18] Hence, the value of one's reputation did not diminish with old age.

Consider a *multilateral punishment strategy* (MPS) according to which a merchant offers an agent a wage W^*, rehires the same agent if he has been honest (unless forced separation has occurred), fires the agent if he has cheated, never hires an agent who has ever cheated any merchant, and (randomly) chooses an agent from among the unemployed agents who never have cheated if forced separation has occurred. An agent's strategy calls for being honest if paid W^* and for cheating if paid less than W^*. Is MPS a subgame-perfect equilibrium (SGPE)? Will a merchant retaliate against an agent who has not cheated him?

To address these questions the wage, W^*, that will be offered by the merchants should be determined. For this aim, denote by h_h the probability that an unemployed honest agent (i.e., an agent who was honest when last employed) will be rehired and by h_c the probability that an unemployed cheater (i.e., an agent who cheated when last employed) will be rehired. Proposition 1 presents the relations between the lowest wage for which an agent's best response is to be honest and the above parameters.[19]

PROPOSITION 1: *Assume that* $\delta \in (0,1)$, $h_c < 1$, *and* $h_c \leq h_h$. *The optimal wage, the lowest wage for which it is an agent's best*

---

[18]Goitein (1978 pp. 33-4) noted that "both the government and public opinion were prone to hold a father, brother, or even more distant relative responsible for a man's commitments, although strict law, both Islamic and Judaic, did not recognize such a claim."

[19]This specification enables the examination of the optimal wage under both MPS and the bilateral punishment strategy discussed in Section IV.

response to play honest, is $W^* = w(\delta, h_h, h_c, \tau, \bar{w}, \alpha) > \bar{w}$, and w is monotonically decreasing in δ and h_h and monotonically increasing in h_c, τ, $\bar{w}$, and α.[20]

PROOF:

To show that an agent cannot gain from playing cheat one period if offered W^*, denote by V_h the present value of lifetime expected utility of an employed agent who, whenever hired, plays honest. Denote by V_h^u the present value of the lifetime expected utility of an unemployed honest agent. Denote by V_c^u the lifetime expected utility of an unemployed cheater (who will be playing honest in the future if hired). These lifetime expected utilities are

$$V_h = W^* + \delta(1-\tau)V_h + \tau V_h^u$$

$$V_i^u = \delta h_i V_h + \delta(1-h_i)(\bar{w} + V_i^u) \quad i = h,c.$$

Cheating once yields $\alpha + V_c^u$, and hence an agent will not cheat if $V_h \geq \alpha + V_c^u$. Substituting and rearranging yields that an agent's best response is playing honest if and only if

$$W \geq (T - \delta\tau H_h)\big[\alpha/(1-\delta H_c)$$

$$+ \delta\bar{w}\big(P_c/(1-\delta H_c) - \tau P_h\big)\big]$$

$$= W^*$$

where

$$T = 1 - \delta(1-\tau)$$

$$H_i = h_i/\big[1-\delta(1-h_i)\big] \qquad i = h,c$$

$$P_i = (1-h_i)/\big[1-\delta(1-h_i)\big] \qquad i = h,c.$$

The properties of w can be derived directly from this expression.

Under MPS, an agent is motivated to be honest by the carrot of a premium over his reservation utility and the stick of firing. If

the induced difference between the present values of the lifetime expected utility of an unemployed and employed agent is higher than the one-period gain from cheating, the best response of an agent is to be honest. Hence, the optimal wage decreases as an honest agent is more likely to receive future wage premiums (higher h_h), can gain less by cheating (lower α), is more likely to remain employed if he is honest (lower τ), has worse opportunities elsewhere (lower $\bar{w}$), and has a smaller chance of being hired if he is a cheater (lower h_c). Further, the optimal wage decreases as an agent values future income more (higher δ), since rewarding for honesty and punishing for cheating is done in the future.

For the MPS to constitute a symmetric SGPE, each merchant should find it optimal to hire agents. On the equilibrium path this condition amounts to a wage low "enough," that is,

$$W^* = w(\cdot, h_c, h_h) \leq \gamma - \kappa$$

where $h_c = 0$, and $h_h = \tau M/[A - (1-\tau)M]$. Assume that this condition holds. Will a merchant find it optimal to retaliate against an agent who did not cheat him? When switching agents does not impose any cost —as was assumed here—merchants may as well punish a cheater, and hence the MPS is an SGPE. Having the credibility of multilateral punishment rest on a knife-edge result, however, is unsatisfactory. Clearly, Maymun ben Khalpha considered punishing the Sicilian agent to be costly. Therefore, a more relevant question is whether the multilateral punishment strategy motivates a merchant to *strictly* prefer hiring an honest agent rather than a cheater.

As Proposition 2 demonstrates formally, a merchant strictly prefers to hire an honest agent under the MPS, merely since a cheater is not expected to be hired by other merchants. An honest agent is expected to be hired in the future, but an agent who has ever cheated is not. Since the optimal wage decreases in the probability of future hiring, a cheater's optimal wage is higher than an honest agent's wage, and hence each merchant strictly prefers to hire an honest agent.

[20]More exactly, this monotonicity is weak in some neighborhoods of the extreme values of the parameters.

It is the uncoordinated response of all the merchants and the interrelations between their expected future behavior and an agent's optimal wage as perceived by an individual merchant that insures solidarity of incentives. The possibility of forced separation links the optimal wage that a specific merchant has to pay his agent and the agent's expected future relations with other merchants, and it is this link that increases the optimal cheater's wage above an honest agent's wage, since punishments are independent from the agent's past conduct while rewards are not. Hence, merchants follow the multilateral punishment *despite* the fact that the agent's strategy does not call for cheating any merchant who violated the collective punishment, and *despite* the fact that cheating in the past does not indicate that the agent is a "lemon." Hence, it is reasonable that Maymun was concerned about Naharay's interpretation of his agent's actions because open accusation would have initiated an uncoordinated response that would have affected Maymun's business with that agent.

PROPOSITION 2: *Assume that* $\delta \in (0,1)$ *and* $h_c < 1$. *Under MPS a merchant strictly prefers to hire an honest agent.*

PROOF:
Under MPS the probability that an agent who has ever cheated would be rehired if he cheated or was honest this period and became unemployed is $h_c^c = h_c^h = 0$. The same probabilities for an agent who has never cheated before are $h_c^h = 0$ and $h_h^h = \tau M / [A - (1 - \tau)M] > 0$, respectively. The optimal wage for a cheater is $W_c^* = w(\cdot, h_h^c = 0, h_c^c = 0)$, and the optimal wage for a honest agent is $W_h^* = w(\cdot, h_h^c > 0, h_c^c = 0)$. Hence, since $h_c \le h_h$ for cheaters and honest agents, Proposition 1 implies that $W_c^* > W_h^*$.[21]

---

[21]For this proof it is sufficient that players can recognize cheaters and honest agents. On the role of "social labels" in random matching games see Okuno-Fujiwara and Postlewaite (1990) and Kandori (1992).

IV. The Maghribi Traders Coalition: Theory and History

The historical anecdotes presented above indicate that collective punishment of a specific nature facilitated by a network of information transmission was practiced among the Maghribis. Theory indicates the importance of expectations concerning future hiring in making the collective punishment credible. Hence, history and theory lend support to the main hypothesis of this paper, namely, that agency relations among the Maghribis were governed by a *coalition*, which is defined as a group of traders whose member merchants are expected to hire only member agents, and these agency relations are governed by MPS. Furthermore, if an agent who has been caught cheating operates as a merchant, coalition agents who cheat him are not subject to collective retaliation (i.e., they are not considered by other members to have cheated). Finally, an internal informal information-transmission mechanism enables merchants to monitor agents and makes cheating known to all.

The Maghribi traders' letters directly support the above hypothesis by indicating that the Maghribis practiced MPS, that an agent who cheated a cheater was not subject to MPS, and that the Maghribis shared the appropriate information-transmission mechanism. Yet, can the hypothesis be further substantiated? Can a coherent explanation of historical observations be advanced based on the assumption that a coalition governed agency relations? Can predictions based on this assumption be generated and confirmed by the historical records?

Indeed, the historical records are rich in facts that should be explained. The Maghribis were the descendants of merchants who lived in the Abbasid Caliphate centered in Baghdad until the first half of the 10th century, when they emigrated for political reasons mainly to Tunisia (Gil, 1983b [Vol. 1] pp. 215–16; Greif, 1985 pp. 124–7). This area prospered at the time, under the control of the Fatimid caliphate. As time passed, the Maghribi traders extended their trade from Spain to Constantinople. While the agency relations re-

quired for this expansion could have been established with non-Maghribi traders (Jewish or Muslim), evidence of such relations is rare. Instead, members of the Maghribi traders' group emigrated abroad and during the 11th century one finds Maghribi traders who emigrated from Tunisia to other trade centers in the Muslim world such as Spain, Sicily, Egypt, and Palestine. Members of these colonies kept agency relations for generations with the descendants of other Maghribi traders (Goitein, 1967a pp. 156–9, 186–92; Gil 1983b [Vol. 1] pp. 200–29; Greif, 1985 pp. 124–7).

Since the Maghribis adopted the customs and language of the Muslim world, emigration outside the Muslim sphere of influence was culturally and materially difficult. Indeed, the Maghribis did not emigrate to the emerging trade centers of Italy despite the Maghribis' perception that trade with the Christian world was most profitable. This perception is reflected, for example, in the words of a merchant from Palermo, Sicily, who complained around 1035 that even the Rums (i.e., in this case, Christians from the Latin world) were not ready to buy the inferior black ginger! (Dropsie 389, b, ll. 6–7 [Goitein, 1967a p. 45]) (see also Bodl. MS Heb. C 28 f. 11, ll. 11–13). Despite the perceived profitability of this trade, Maghribi traders did not establish agency relations with the Italian Jewish traders who were active during this period. The communities within which the Maghribi traders operated held communal ties with the Italian Jewish communities, and there were no political restrictions that could have hindered cooperation between the Maghribis and the Italian Jews. Yet the documents never reflect agency relations between the Maghribis and Jewish traders from the Christian world (e.g., TS 8 Ja I, f. 5 [Goitein, 1973 pp. 44–5]; see also Goitein, 1973 pp. 44, 211; Greif, 1989).

In the trade centers to which the Maghribi traders emigrated, a well-established Jewish community already existed, and Maghribi traders integrated into the existing communal structural. Yet they preserved their separate social identity as long as they were active in long-distance trade. Their separate social identity is reflected in the documents in which they are referred to as "our people, the Maghribis the travelers (traders)" (Goitein, 1967a pp. 30–4, 148–9, 157; Gil, 1971 pp. 12–15, 1983b [Vol. 1] pp. 215, 223; Greif, 1985 p. 153 [note 32]) (see e.g., DK 13, section G, F [Goitein, 1973 p. 32]; TS Box Misc. 25, f. 106, a, l. 9 [Gil, 1983b [Vol. 2] p. 734]; TS 13 J 26, f. 24, b, ll. 3–5; TS Box Misc. 25, f. 106, l. 9 [Gil, 1983b (Vol. 2) pp. 601, 734]). The Maghribis operated in the Mediterranean during the 11th century until the Italian naval and military supremacy drove the traders out from the Muslim world. Then they turned to the Indian Ocean trade until toward the end of the 12th century when they were forced by the Muslim rulers of Egypt to withdraw.[22] At that point they integrated within the Jewish communities and vanished from the stage of history.

The above historical observations raise intriguing questions. Why were seemingly profitable agency relations with non-Maghribis not established? How can the governance of agency relations by a coalition and the possibility of establishing an agency with nonmembers be reconciled? After all, this possibility seems to undermine the foundations of the coalition. It undermines the member merchants' commitment to hire honest member agents in the future, and it undermines the effectiveness of the collective punishment since agents can potentially enter agency relations with nonmember merchants. Why then was the coalition sustainable? To support the hypothesis that a coalition governed agency relations, the issue of relations with non-Maghribis should be explained by or reconciled with the hypothesis. Furthermore, can theoretical insights relate the Maghribis' immigration to Tunisia and the emergence of the coalition and also account for the fact that the Maghribis retained their social identity only as long as they were active in long-distance trade?

----

[22] For their trade in the Indian ocean, see Goitein (1958) and Walter J. Fischel (1958); Goitein's unpublished *India Book* contains further information.

To address these questions there is a need to examine the relations between coalition and efficiency. A coalition enhances efficiency relative to a situation in which agency relations are governed by the *bilateral punishment strategy* (BPS) usually considered in the efficiency-wage literature (e.g., Shapiro and Stiglitz, 1984). This strategy is identical to the MPS except that merchants do not condition their hiring on past conduct (because they do not have information regarding past actions, because they do not expect others to make hiring conditional on that information, or because they do not observe the wage paid to the agent and believe that cheating reflects underpayment). Under BPS, merchants would not hire agents in situations in which they would hire agents under MPS. Consider, for example, the case in which each merchant can commit himself to hire an agent for only one period ($\tau = 1$). Under BPS, for any finite wage, agents will cheat. Hence agents are never hired. Under MPS, however, an agent takes into account the consequences of cheating a particular merchant in terms of future employment with other merchants. Hence, the optimal wage will be finite and may be low enough to support cooperation. Proposition 3 indicates that, in general, MPS supports cooperation when BPS fails due to the limited ability of each merchant to commit himself to rehire an honest agent by decreasing the probability that a cheater will be rehired, h_c.

PROPOSITION 3: *For ease of presentation, suppose that the agents' time discount factor (δ) approaches 1. Define a to be the ratio of agents to merchants, that is, $a = A/M$. Recall that $\overline{w} < \alpha$ and $a > 1$. Given a, cooperation is feasible for all $\tau \in [0,1]$, if and only if $\gamma - \kappa \geq (a-1)\overline{w} + \alpha + \varepsilon$ $\forall \varepsilon > 0$ under BPS, but if and only if $\gamma - \kappa \geq a\overline{w} + \varepsilon$ $\forall \varepsilon > 0$ under MPS. Given τ, cooperation is feasible for all $a \geq 1$ if and only if $\gamma - \kappa \geq \alpha + \varepsilon$ $\forall \varepsilon > 0$ under BPS, but if and only if $\gamma - \kappa \geq \overline{w} + \varepsilon$ $\forall \varepsilon > 0$ under MPS.*

PROOF:

Take the limits of W^* as δ goes to 1 using the fact that $h_c = h_h = \tau M/[A - (1 - \tau)M]$ under BPS, and that $h_c = 0$ and $h_h = $ $\tau M/[A - (1 - \tau)M]$ under MPS. Finally, use the relations between W^* and the appropriate parameters as specified in Proposition 1 to take the appropriate limits.

MPS enhances efficiency, since it enables cooperation when each merchant's ability to commit to future hiring is rather limited. Furthermore, as long as the ability of a merchant to commit to future hiring is less than perfect, coalition decreases the optimal wage, W^*, relative to the situation in which BPS governs agency relations. This reduction reflects a decrease in the probability that a cheater will be hired, h_c, and an increase in the probability that an honest agent will be hired (h_h), which is due to the restriction of agency relations to a specific subset of the agents' group. This wage reduction further enhances efficiency by making agency relations profitable in situations in which the total gain from cooperation is relatively low (γ is small). While in such cases cooperation is efficient, it will be initiated only if it is profitable to a merchant, that is, only if $W^* \leq \gamma - \kappa$. Since the optimal wage under MPS is lower than under BPS, more cooperation will be initiated. The wage reduction and the enhanced efficiency imply that organizing agency relations in a coalition increases member merchants' profits and may, at the same time, increase the lifetime expected utility of a coalition-member honest agent relative to a situation in which agency relations were governed by BPS.

Efficiency gains generated by a coalition encourage its emergence, while the coalition rewards member merchants and agents in a manner which encourages agency relations among coalition members. Hence, by affecting efficiency and profitability, the sustainability of a coalition can be assured: member merchants are motivated to establish agency relations with member agents, while the latter are better off being employed by member merchants.

Additional factors also contribute to the sustainability of a coalition. Expectations with respect to future hiring, the nature of the networks for information transmission, and strategic considerations discourage members from initiating agency relations

with nonmembers and discourage nonmembers from initiating agency relations with members. To illustrate the impact of these factors, consider an economy in which two identical coalitions emerge. By definition, coalition members are not expected to establish intercoalition agency relations. Will these expectations be self-enforcing? A merchant will initiate intercoalition agency relations only if it is expected that the other coalition's merchants will use MPS against a member agent who cheated a nonmember merchant. Otherwise, the merchant strictly prefers to establish intracoalition agency relations, since the optimal wage in intercoalition agency relations is $w(\cdot, h_c = h_h > 0)$, which is, by Proposition 1, strictly higher than the optimal wage in intracoalition agency relations, $w(\cdot, h_c = 0, h_h > 0)$. For this wage differential to exist, it is sufficient that the merchant is uncertain whether MPS will be applied in intercoalition relations.[23]

A merchant is likely to be uncertain whether MPS will be applied in intercoalition relations due to information barriers between coalitions and strategic considerations. Within a coalition, each trader is known to others, and this enables informal information flows that the agent does not control to facilitate monitoring and to inform traders about cheating. In intercoalition agency relations, however, this mechanism does not function. Furthermore, coalition members are strategically motivated to ignore an outsider's accusations concerning the conduct of a coalition member agent. If the coalition members simply

"take the word" of an outsider, an agent is vulnerable to blackmail by nonmembers, which reduces his lifetime expected utility as an honest agent. This reduction comes at the expense of member merchants, since it increases the optimal wage. Hence, coalition members find it optimal to ignore an outsider's accusations. In contrast, insiders' accusations are not likely to be ignored since they can be assessed more accurately and since, when accusing an agent, an insider merchant puts his own reputation on the line. "Had I listened to what people say," wrote Khalluf ben Musa to his partner in response to the accusation that he had retained revenues received for the partner's goods, "I never would have entered into a partnership with you" (Bodl. MS Heb. a 3, f. 13, section B [Goitein, 1973 p. 121]) (see also DK 13, section G; ULC Or 1080 J 48; Bodl. MS Heb. a2 f. 17 [Goitein, 1973 pp. 32, 92–3, 103]; Goitein, 1967a pp. 168, 196; Greif, 1985 p. 143).

As MPS does not apply in intercoalition relations, the wage required to keep an agent honest in intercoalition agency relations is higher than the intracoalition wage. Hence, merchants are discouraged from establishing intercoalition agency relations, and the expectations that intercoalition agency relations will not be initiated are self-enforcing. Note that this result holds even in situations in which these intercoalition relations are more efficient. More precisely, intercoalition agency relations will not be established if the increase in the gains from cooperation does not compensate a merchant for the wage increase. Note that this result does not hold under BPS. When agency relations become possible across two identical traders' groups in which BPS prevails, efficient intergroup agency relations will be initiated.

Expectations with respect to future hiring, the nature of the networks for information transmission, and strategic considerations are the factors that ensure the sustainability of a coalition. These factors encourage member merchants to hire only member agents and discourage member merchants from hiring nonmember agents. Thus, these factors enable member mer-

---

[23]Formally, denote the coalitions by K and J, and denote by M_s and A_s a merchant and an agent from coalition s, respectively, $s \in \{K, J\}$. Denote by μ the expected probability that the merchants from coalition t will consider an A_t last employed by M_s as a cheater if he cheated M_s. All other things being equal, for any $\mu \in [0, 1)$, no individual merchant finds it optimal to establish intercoalition agency relations.

PROOF:

For any μ, the probability that A_t who cheated M_s will be rehired is $h_c^{s,t}(\mu) = \mu h_c^{t,t} + (1 - \mu) h_h^{t,t} > 0$. The probability that A_s who cheated M_s will be rehired is 0. By Proposition 1, this implies that the honesty-inducing wage is higher in intergroup agency relations than in intragroup agency relations.

chants to commit to hire only member agents even if efficient agency relations can be established with nonmembers. At the same time, these factors make the collective punishment effective since it discourages nonmember merchants from hiring member agents, thus enabling member agents to commit themselves not to enter agency relations outside the coalition. By discouraging intercoalition agency relations, these factors make the expectations on which the coalition rests self-enforcing. Hence, once a coalition is formed through some historical process, agency relations will be established only among the traders for whom expectations were initially crystallized.[24]

These theoretical observations suggest that the informal social networks for information transmission, which became available to the Maghribis in the process of their immigration to Tunisia, enabled them to support agency relations based on MPS. Further, this immigration process determined the social identity of the individuals with respect to whom expectations of collective punishment and future hiring were established. Once these expectations were crystallized (i.e., once the Maghribi traders' coalition was formed), only descendants of Maghribis were perceived by others as members, and hence only they could become members. Further, the factors that encouraged intracoalition agency relations and discouraged agency relations with nonmembers made membership a valuable asset. Hence the descendants of a Maghribi trader followed the trade of their fathers and continued to be active in long-distance commerce as members of the Maghribi traders' coalition.

As the Maghribis expanded the geographical scope of their trade, the profitability of intracoalition agency relations was high enough to encourage emigration and the establishment of colonies in other trade centers. Since Maghribi merchants were motivated to employ other coalition members, they were able to commit themselves to future employment of Maghribi agents. This assured the emigrants that they would be compensated for the cost of emigration. Emigration to Italy, however, was more difficult culturally and hence forgone. Nonmember Italian Jews were not employed as agents, despite the common religion and the potential gains from trade with Italy, since the additional gains from establishing agency relations outside the coalition did not compensate for the relatively high agency cost.

The Maghribi traders' social structure provided them with the initial information-transmission mechanism required for the emergence of an economic institution—the Maghribi traders' coalition. At the same time, the coalition provided the interactions required to sustain the social structure, while the Maghribis' social identity provided the means to coordinate expectations required for the functioning of the coalition.[25] When the Maghribis ceased to operate in long-distance trade and their coalition ceased to function, the motivation for social interactions diminished, their social structure lost its vitality, and the Maghribi traders assimilated into the existing Jewish communities.

As long as the Maghribi group survived, it retained social characteristics and trade practices which differed substantially from those of the Italian traders and can be consistently explained as reflecting the governance of agency relations by a coalition. The social structure of the Maghribi traders' group was "horizontal," as traders functioned as agents and merchants at the same time. Each trader served as an agent for several merchants while receiving agency services from them or other traders (see e.g., Stillman, 1970; Greif, 1985). In contrast, among the Italian traders of the late medieval period, merchants and agents constituted two distinct subgroups. Agency relations were organized "vertically," as wealthy merchants who did not function as

---

[24]On the relevant theory of path-dependence, see Paul A. David (1988a,b).

[25]For these types of relationships between economic activity and social structure, see George C. Homans (1950) and Herbert A. Simon (1987 pp. 100–14).

agents employed ambitious young traveling agents who did not function as merchants (Frederic C. Lane, 1944 pp. 178–96; Lopez and Raymond, 1955 pp. 174, 185–6; De Roover, 1965 pp. 51–3). For example, in the cartulary of John the Scribe, which reflects the Genoese trade of the mid-12th century, 180 merchants are mentioned, 12 of whom invested 40.4 percent of the total Genoese investment in trade. About 300 agents are known, but only 36 individuals functioned as both agents and merchants. Eugene H. Byrne (1916 p. 159) concluded that "as a rule" the Genoese agents during the late 12th century were "not men of great wealth or of high position in Genoa" (see also Byrne, 1920 pp. 210–11, 1928 pp. 160–1; Hilmar C. Kruegar, 1957, 1962).

The differences between the Maghribis and the Genoese were not confined to their social structure. These two groups also differed in the choice of forms of business association through which agency relations were established. The common denominator of the forms of business association employed by the Maghribis was that they required both parties (the merchant and the agent) to invest capital in the commercial venture. In sharp contrast, the Genoese traders established agency relations mainly through *commenda* contracts, which required only the merchant to invest.[26]

The Maghribi and the Genoese traders operated mainly in the western basin of the Mediterranean, and their merchandise consisted largely of textiles and luxury goods. Further, the two groups were familiar with similar forms of business association and employed, roughly speaking, the same technology.[27] Yet, despite these similarities the two groups differed in their social structures

and choice of forms of business associations. How does the choice of forms of business association and the social characters of a traders' group relate to the strategy employed in agency relations? Are the forms of business association and the social character of the Maghribi traders consistent with the claim that agency relations were governed by a coalition?

To address these questions, assume that a merchant can hire either an agent (who does not invest in trade) or another merchant (who is able to invest in trade) to provide agency services. Recall that within a coalition a capital premium is generated; that is, the return on the capital of a coalition member merchant is higher than that available to him outside the coalition or if he cheats another coalition merchant while serving as an agent to him. If a merchant has to establish agency relations outside the coalition (or within the coalition after he has cheated) he has to rely on BPS, which implies a lower profit for the reasons discussed above. Receiving this capital premium within a coalition is conditional on past conduct, and hence it provides a coalition member merchant with a commitment device not available to an agent. The value of the future capital premium constitutes a "bond" that insures honesty. Hence, ceteris paribus, it is profitable for each merchant to employ a merchant as his agent.

To demonstrate how the capital premium provides a bond within a coalition, consider the honesty condition for a merchant. This honesty condition should take into account the fact that if he cheats while employed as an agent, a merchant's subsequent relations with his member agents would be governed by BPS. A merchant will be honest if the present value of his lifetime utility obtained from being honest, V_h^a, is not smaller than the gains from one period of cheating, α, plus the present value of his lifetime expected utility as an unemployed cheater agent, $V_c^{u,a}$, minus the reduction in the present value of his lifetime expected utility as a merchant that results from cheating, $V_h^m - (R_c + \delta V_c^m)$. ($R_c$ is the merchant's net profit from employing an agent in the period in which he cheats.) Hence, the hon-

---

[26] For an elaboration on these forms of business associations and the differences between the Jewish and the Genoese, see Lopez and Raymond (1955), Krueger (1962), De Roover (1965), Goitein (1967a, 1973 pp. 11–15), Gil (1983b [Vol. 1] pp. 208–12), and Greif (1989, 1990).

[27] "Familiar" means that either they actually used these forms or that the forms were authorized as legal (see Greif, 1989).

esty condition is

$$V_h^a \geq \alpha + V_c^{u,a} - \left[V_h^m - (R_c + \delta V_c^m)\right].$$

Recall from the proof of Proposition 1 that the honesty condition for an agent (who does not invest in trade) is $V_h^a \geq \alpha + V_c^{u,a}$. Since BPS governs the relations between a merchant who had cheated and his agents, $V_h^m > R_c + \delta V_c^m$. Hence, ceteris paribus, a merchant strictly prefers hiring a merchant over hiring an agent. When the ceteris paribus assumption is relaxed, the analysis implies that hiring only or mostly merchants is an equilibrium within a coalition for a larger set of parameters than under BPS.

On the other hand, it should be noted that, according to Proposition 1 under MPS and BPS, the higher the reservation utility, the higher is the wage required to insure honesty. Hence, ceteris paribus, a merchant would prefer to hire an agent rather than another merchant if the reservation utility of the latter is higher. Furthermore, in reality it may be the case that a merchant's reservation utility is higher than that of an agent since a wealthy merchant is likely to allot some of his capital in non-trade-related investment. Hence, within a coalition the capital a merchant invests in trade enhances his ability to commit, while the capital he invests elsewhere hinders this ability. However, if agency relations are governed by BPS, capital invested in trade does not enhance the ability to commit, while, as before, capital invested elsewhere hinders the ability to commit.[28]

These theoretical considerations offer a coherent explanation of the differences between the Maghribis and the Genoese that is consistent with the hypothesis that agency relations among the Maghribis were governed by a coalition. Among the Maghribis, agency relations were governed by a coalition, and merchants stood to lose their capital premium if they ever cheated. At the same time, the Maghribis were professional traders who, as far as can be judged by their letters, invested most, if not all, their working capital in trade. Hence, their capital did not hinder their ability to commit. The resulting incentives shaped the nature of the Maghribi traders' social structure and choice over forms of business associations. By and large, each of them was a well-to-do merchant with the capital required to enhance his ability to commit.[29] Each Maghribi trader provided agency services to some Maghribi and received agency services from others. Establishing agency relations among merchants enabled the Maghribis to utilize forms of business associations in which both parties invested in trade and which, presumably, enabled them to benefit from diversification while retaining economies of scale and scope.

In Italy, one may conjecture, agency relations were governed by BPS, and thus the capital a merchant invested in trade did not enhance his ability to commit. Furthermore, the Genoese cartularies indicate that Genoese merchants, by and large, invested a significant portion of their capital in non-trade-related ventures. For example, they bought real estate, farmed taxes, and were active in agriculture. These investments, according to the theory, hindered their ability to commit. Hence, merchants were motivated to recruit agents with low reservation utilities. Vertical social structure and *commenda* relations were the result (see discussion in Greif [1990]).

Theoretical considerations also illuminate the rationale behind patterns of employment of agents and bookkeeping among the Maghribi traders. Among the Maghribi traders, agency relations resembled the relations between a modern firm and its workers, in that typically no explicit legal commitment governed the length of the relationship. Where a commitment was made, it was for a short period of time. The duration

---

[28]The above discussion ignores the possibility that a cheater invests the capital he embezzles in trade. Introducing this possibility only strengthens the results.

[29]Although some of the Maghribis were net givers of wage premium and some were net receivers of capital premium.

of agency relations *ex post* varied from a single season to several generations with sons replacing their fathers (Goitein, 1967a pp. 169–70, 178; Greif, 1985 p. 133).[30] Further, the Maghribi traders used a per-trade-venture rather than a multiventure accounting system, in which the income and expenses associated with each trade venture were detailed (Goitein, 1967a pp. 178, 204–9).

These trade practices are consistent with the operation of a reputation mechanism within a coalition. Intuitively, whenever a reputation mechanism is employed, a merchant may prefer short-term contracts, since the shorter the contract, the sooner the merchant can discover deviation, and thus the less he will have to pay to keep the agent honest.[31] In other words, a sequence of short-term contracts was more efficient than a single long-term contract. Further, a per-venture accounting system is more efficient than a multiventure accounting system whenever a reputation mechanism is employed, since it facilitates comparing agents' reports with any relevant information.

V. The Merchants' Law: Coordination and Comprehensive Contracts

The operation of a coalition is based on uncoordinated responses of merchants located at different trade centers. Hence, for the threat of collective punishment to be credible, "cheating" must be defined in a manner that ensures collective response. If some merchants consider specific actions to constitute "cheating" while others hold a different opinion, the effectiveness of the collective threat is undermined.[32] The re-

quired coordination can be achieved by specifying an agent's obligations in an explicit contract—ideally, a comprehensive contract. Given the 11th-century communication technology and the uncertainty and complexity of trade, detailed contracts entailed high negotiation costs. If a merchant and an agent had to agree upon a contract before any goods could be shipped to an agent, the negotiation costs would have made trade through agents impractical.[33]

Indeed, the *geniza* reflects the extensive use of incomplete contracts, usually in the form of letters with instructions that involve no negotiation: "Do whatever your propitious judgment suggests to you," wrote Musa ben Ya'qub from Tyre, Lebanon, to his partner in Fustat sometime in the second half of the 11th century (ULC Or. 1080 J 42 [Goitein, 1973 p. 94]).[34] Merchants often authorized their agents to do whatever they deemed best if none of the prespecified contingencies occurred. Incomplete contracts, however, undermine the operation of a coalition, since which actions should be considered cheating are not defined. Furthermore, when incomplete contracts are used, an agent can act strategically to reach circumstances in which he benefits from the incompleteness of the contract.[35]

Theoretically, hierarchy (authority relations) may be used as a substitute for an *ex ante* comprehensive contract by assigning the merchant with the right to all (*ex post*) decisions (Williamson, 1985). Similarly, culture may substitute for comprehensive contracts by specifying *ex ante* systematic rules

---

[30]In the Italian trade cities, *commenda* relations were also of short duration (see e.g., Lopez, 1952 p. 323).

[31]See Abreu et al. (1990) for differences on this point between models with perfect and imperfect monitoring.

[32]For relevant theory, see Jeffrey S. Banks and Randall L. Calvert (1989).

[33]The inappropriateness of comprehensive contracts in long-distance medieval trade is reflected in the difference between the Maliki and the Hanafi schools of law in Islam (see Abraham L. Udovitch (1970 pp. 208–9). For theoretical considerations of the inability to specify comprehensive contracts, see Williamson (1985), Sanford J. Grossman and Oliver D. Hart (1986), and Hart (1988).

[34]For a similar situation in Europe, see N. S. B. Gras (1939 p. 80).

[35]To some degree, such a situation is reflected in Dropsie 389 [Gil 1983a].

of behavior.[36] These cultural rules indicate what members of the organization should do after an unforeseen state of nature occurs. Hierarchy and culture, however, differ substantially. While culture requires *ex ante* learning of the rules but no *ex post* communication, hierarchy does not require *ex ante* learning but requires *ex post* information-transmission between the parties.

Given the communication and transportation technology of the 11th century, it is not surprising that hierarchy was not used among the Maghribi traders.[37] Instead, they employed a set of cultural rules of behavior —a Merchants' Law—that specified how an agent should act to be considered honest in circumstances not mentioned in the merchant's instructions. The Merchants' Law was shared by all the Maghribi traders and served as a default contract between agents and merchants. When it became known that an agent failed to follow the Merchants' Law, he was considered a cheater.

The importance of the Merchants' Law in determining the expectations and attitudes toward an agent's behavior is reflected, for example, in the letter, mentioned above, which was sent by Maymun ben Khalpha to Naharay ben Nissim. In discussing the conflict between Naharay and his agent, Maymun justified the agent's actions by arguing that he "did something which is imposed by the trade and the communication [system]; [what you asked him to do] contradicts the Merchants' Law" (or "the way of the trade"). In another letter, a "very angry" merchant accused his business associate of taking "actions [that] are not those of a merchant" (DK 22, b, ll. 5–9 [Gil, 1983a pp. 97–106]; TS 12.434, l. 7 [Goitein, 1967a p. 202 (note 50)]) (see also Goitein, 1967a p. 171).

Unfortunately, not much is known about the content of the Merchants' Law, and the most convincing evidence for its existence and the process of its formation is found outside the *geniza*. In the middle of the 12th century, Maimonides, a major Jewish spiritual leader who lived in Fustat, wrote in his legal code, "...if [an agent] enters a partnership with another without specifying any terms, he should not deviate from the custom current in the land in regard to the merchandise they deal with" (Maimonides, 1951 p. 223).[38] Similarly, the early-medieval Islamic legal literature contains numerous instances in which systematic legal reasoning is suspended because of the "custom of the merchants" (Udovitch, 1970 pp. 13, 250–9). Unfortunately, neither the legal literature nor the *geniza* reflects exactly how the Merchants' Law was formulated and changed (but see DK 22, a, margin right [Gil, 1983a pp. 97–106]; Goitein, 1973 pp. 111–12; Greif, 1985 p. 136).

Within the Maghribi traders' coalition, the Merchants' Law promoted efficiency by providing a coordination device necessary for the functioning of the coalition, economizing on negotiating cost and enabling flexibility in establishing agency relations. However, the Merchants' Law also imposed a rigidity on the system, as its process of adjustment was, most likely, impeded by agents' concerns regarding what others would be thinking about their actions rather than what the outcome of their actions would be. This is reflected in the words of Joseph ben Yeshua, who wrote to a merchant that without written instructions he could not do as he was instructed since he did not wish that "people will...say that I did something that I was not ordered" (Bodl. MS Heb. d 66, f. 60, a, margin, ll. 7–9 [Gil, 1983b (Vol. 3) p. 216]).

---

[36]See discussion in Colin Camerer and Ari Vespsalaninen (1987) and Janet T. Landa (1988) (cf. Kreps, 1990b).

[37]See DK 22, a, 9–11 [Gil, 1983a pp. 97–106] as an example of letters that explicitly indicate that it was impractical for an agent to await new instruction when an unspecified contingency occurred.

[38]Note that this may indicate that the Merchants' Law was not specific to the Maghribi traders coalition but was shared by a larger group. In the *geniza* see DK 13, b, 11.7–11 [Stillman, 1970 p. 272], Dropsie 389, b, 11.22–3 [Gil, 1983a pp. 113–25], and TS 20.26, section I [Goitein, 1973 p. 117].

VI. Conclusion

A specific economic institution, the coalition, governed agency relations among the Maghribi traders. The coalition was an institution in the sense that it determined the constraints a trader faced. The information flows, the other traders' strategies, and the Merchants' Law constituted the constraints that affected an individual trader's choice of action. The nature of the coalition and its importance are evident from direct quotations of Maghribi traders and the impact of the coalition on their behavior, social structure, and business practices. The evidence suggests that the coalition was a response to problems of contract enforceability and coordination that arose in complex trade characterized by asymmetric information, slow communication technology, inability to specify comprehensive contracts, and limited legal contract enforceability.

Within the coalition, information flows balanced the asymmetric information, enabled monitoring, and coordinated responses. The multilateral punishment, the value of the information flows for commercial success, and the importance of the Merchants' Law as a substitute for comprehensive contracts generated wage and capital premiums. Receiving these premiums was conditional on past conduct, while intergenerational transfers insured a horizon long enough to support the operation of a reputation mechanism. Since the premiums' present value was larger than what an agent could gain by cheating, agents could credibly commit themselves to be honest. While the Merchants' Law provided a unified interpretation of actions and thus coordinated responses, the operation of the coalition was based on information flows within a well-defined group of traders and expectations concerning future hiring and collective punishment. The credibility of the collective punishment was based on the links generated by the MPS between the optimal wage and expectations concerning future hiring by member merchants. Finally, expectations with respect to future hiring, the nature of the networks for information transmission, and strategic considerations ensured the sustainability of the coalition.

The emergence of the coalition and its size reflect an institutional path-dependent process. The coalition reflects the relationships between an historical process initiated by political events, the resulting social entity, and the positive reinforcement between economic and social institutions. In particular, networks for transmission of information within a social structure of an immigrants' group determined the coalition's initial size. In the coalition that emerged based on that initial social structure, the original social identity served as a signal that coordinated actions and expectations. The economic institution that governed agency relations, by promoting such relations and information transmission among a specific group of individuals, preserved the initial social structure, which in turn determined the boundaries of the economic institution.

By reducing agency costs and other transaction costs, the coalition promoted efficiency. It enabled operation through agents, even when the cost of establishing agency relations between a specific merchant and an agent in isolation was prohibitively high. In addition, the Merchants' Law economized on negotiation cost, governed the transmission of information and the provision of services, and substituted comprehensive contracts in the relations between a specific agent and merchant. On the other hand, the coalition seems not to have been an optimal institution. The same factors which ensured its sustainability prevented the coalition from expanding in response to welfare-enhancing opportunities. The Merchants' Law potentially introduced another distortion, as its adaptation was probably conducted in a manner that did not ensure optimal changes. Further, within a coalition, agents are more concerned about the interpretations of their actions by other members than about the outcomes of their actions. Hence, their actions, while aiming at maximizing their expected utility, do not necessarily maximize total profit. An introduction of some form of leadership might

have mitigated these distortions, perhaps at the cost of introducing others.

The study of nonmarket economic institutions employed in different historical periods is likely to enhance knowledge of the origins, nature, and implications of institutions. The study of the coalition indicates the importance of the interrelations between political, social, and economic factors in giving rise to a specific nonmarket institution (see Greif [1992b] for general discussion). Further, it suggests that, due to the nature of these interrelations, once a specific institution emerges, it may become a part of a self-enforcing stable system which is not prone to change in response to welfare-enhancing opportunities. Hence, economic growth in different economies may be diverse due to distinct institutional frameworks of historical origin. Indeed, the coalition resembles contemporary economic institutions like those described by J. S. Furnivall (1956), Stewart Macaulay (1963), and Janet T. Landa (1978).

Further, following Coase, it is customary in historical and theoretical research to distinguish between the operation of market and nonmarket institutions. The Maghribi traders' coalition was a nonmarket institution which, by governing agency relations, influenced the integration of interregional markets. Hence, the study of this coalition indicates the importance of a nonmarket institution in providing the institutional framework required for the operation of the market. The nature of nonmarket institutions influences the cost, if not the feasibility, of trade and thereby effects the process of market integration. As market integration is commonly believed to be a key to economic growth, historical institutional analysis of nonmarket institutions and their relations to market integration is likely to lead to better understanding of the processes of economic growth.

REFERENCES

Abreu, Dilip, Milgrom, Paul R. and Pearce, David G., "Information and Timing in Repeated Partnerships," *Econometrica*, November 1991, *59*, 1713–33.

_____, Pearce G., David and Stacchetti, Ennio, "Optimal Cartel Equilibria with Imperfect Monitoring," *Journal of Economic Theory*, June 1986, *39*, 251–69.

_____, _____ and _____, "Toward a Theory of Discounted Repeated Games with Imperfect Monitoring," *Econometrica*, September 1990, *58*, 1041–64.

Akerlof, George A. and Yellen, Janet L., *Efficiency Wage Models of the Labor Market*, Cambridge: Cambridge University Press, 1986.

Banks, Jeffrey S. and Calvert, Randall L., "Communication and Efficiency in Coordination Games," Working Paper No. 196, Department of Political Science, University of Rochester, 1989.

Bendor, Jonathan and Mookherjee, Dilip, "Norms, Third-Party Sanctions, and Cooperation," *Journal of Law, Economics, and Organization*, Spring 1990, *6*, 33–63.

Blau, Joshua, *A Grammar of Medieval Judaeo-Arabic*, Jerusalem: Magnes Press, 1961.

_____, *The Emergence and Linguistic Background of Judaeo-Arabic*, London: Oxford University Press, 1965.

Byrne, Eugene H., "Commercial Contracts of the Genoese in the Syrian Trade of the Twelfth Century," *Quarterly Journal of Economics*, November 1916, *31*, 128–70.

_____, "Genoese Trade with Syria in the Twelfth Century," *American Historical Review*, January 1920, *25*, 191–219.

_____, "The Genoese Colonies in Syria," in L. J. Paetow, ed., *The Crusade and Other Historical Essays*, New York: F. S. Crofts, 1928, pp. 139–82.

Camerer, Colin and Vespsalaninen, Ari, "The Efficiency of Corporate Culture," paper presented in the Colloquium on Strategy Content Research, Northwestern University, 1987.

David, A. Paul, (1988a) "The Future of Path-Dependent Equilibrium Economics," Center for Economic Policy Research Working Paper No. 155, Stanford University, 1988.

_____, (1988b) "Path-Dependence: Putting the Past into the Future of Economics,"

Technical Report No. 533, IMSSS, Stanford University, 1988.

De Roover, Raymond, *The Organization of Trade.* (The Cambridge Economic History of Europe, Vol. 3), Cambridge: Cambridge University Press, 1965.

Fischel, Walter J., "The Spice Trade in Mamluk Egypt," *Journal of Economic and Social History of the Orient,* April 1958, *1,* 157–74.

Fudenberg, Drew, Levine, David K. and Maskin, Eric, "The Folk Theorem with Imperfect Public Information," mimeo, Massachusetts Institute of Technology, 1989.

Furnivall, J. S., *Colonial Policy and Practice: A Comparative Study of Burma and Netherlands India,* New York: New York University Press, 1956.

Gil, Moshe, *The Tustars, The Family and the Sect,* Tel Aviv: Tel Aviv University Press, 1971.

_____, (1983a) "The Jews in Sicily Under the Muslim Rule in the Light of the *Geniza* Documents," unpublished manuscript, Tel Aviv University, 1983; appeared in Italian in *Italia Judaaica,* Rome: Instituto Poligrafico e Zecca dello Stato.

_____, (1983b) *Palestine During the First Muslim Period (634–1099)* (in Hebrew and Arabic), Tel Aviv: Ministry of Defence Press and Tel Aviv University Press, 1983.

Goitein, Shelomo Dov, "New Light on the Beginning of the Karim Merchants," *Journal of Economic and Social History of the Orient,* April 1958, *1,* 175–84.

_____, (1967a) *A Mediterranean Society: Economic Foundations,* Los Angeles: University of California Press, 1967.

_____, (1967b) "Jewish Trade in the Mediterranean in the Beginning of the Eleventh Century" [in Hebrew], *Tarbiz,* July 1967, *36,* 366–95.

_____, *Letters of Medieval Jewish Traders,* Princeton, NJ: Princeton University Press, 1973.

_____, *A Mediterranean Society: The Family,* Los Angeles: University of California Press, 1978.

Gras, N. S. B., *Business and Capitalism: An Introduction to Business History,* New York: F. S. Crofts, 1939.

Green, Edward and Porter, Robert, "Noncooperative Collusion Under Imperfect Price Information," *Econometrica,* January 1984, *52,* 87–100.

Greif, Avner, "Sicilian Jews During the Muslim Period (827–1061)" [in Hebrew and Arabic], Master's thesis, Tel Aviv University, 1985.

_____, "Reputation and Coalitions in Medieval Trade: Evidence on the Maghribi Traders," *Journal of Economic History,* December 1989, *49,* 857–82.

_____, "Reputation and Coalitions in Medieval Trade: Evidence on the Genoese Traders," mimeo, Stanford University, 1990.

_____, (1992a) "Cultural Beliefs and the Organization of Society: Historical and Theoretical Reflection on Collectivist and Individualist Societies," mimeo, Stanford University, 1992.

_____, (1992b) "Institutions and Commitment in International Trade: Lessons from the Commercial Revolution," *American Economic Review,* May 1992 (*Papers and Proceedings*), *82,* 128–33.

_____, Milgrom, Paul R. and Weingast, Barry R., "The Merchant Gild as a Nexus of Contracts," mimeo, Stanford University, 1992.

Grossman, Sanford J. and Hart, Oliver D., "The Cost and Benefits of Ownership: A Theory of Vertical and Lateral Integration," *Journal of Political Economy,* August 1986, *94,* 691–719.

Hart, Oliver, "An Economist's Perspective on the Theory of the Firm," mimeo, Massachusetts Institute of Technology, 1988.

Homans, George C., *The Human Group,* New York: Harcourt, 1950.

Joskow, Paul L., "Vertical Integration and Long-Term Contracts: The Case of Mine-Mouth Coal Plants," paper presented in the Economic and Legal Organization Workshop, Department of Economics, Massachusetts Institute of Technology, 1984.

Kandori, Michihiro, "Social Norms and Community Enforcement," *Review of Economic Studies,* January 1992, *59,* 63–80.

Klein, Benjamin and Leffler, Keith B., "The Role of Market Forces in Assuring Contractual Performance," *Journal of Political Economy*, August 1981, *89*, 615–41.

Kreps, David M., (1991a) *A Course in Microeconomic Theory*, Princeton, NJ: Princeton University Press, 1990.

_____, (1990b) "Corporate Culture and Economic Theory," in James E. Alt and Kenneth A. Shepsle, eds., *Perspectives on Positive Political Economy*, Cambridge: Cambridge University Press, 1990, pp. 90–143.

Krueger, Hilmar C., *Genoese Merchants, Their Partnerships and Investments, 1155 to 1164* (Studi in Onore di Armando Sapori), Milan: Institudo Editoriale Cisalpino, 1957.

_____, *Genoese Merchants, Their Partnerships and Investments, 1155 to 1230*, Studi in Onore di Amintore Fanfani), Milan: Multa Paucis, 1962.

Landa, Janet T., "The Economics of the Ethnically Homogeneous Chinese Middleman Group: A Property Rights–Public Choice Approach," Ph.D. dissertation, Virginia Polytechnic Institute and State University, 1978.

_____, "A Theory of the Ethnically Homogeneous Middleman Group: Beyond Markets and Hierarchies," working paper, Hoover Institution, Stanford University, 1988.

Lane, Frederic C., "Family Partnerships and Joint Ventures in the Venetian Republic," *Journal of Economic History*, November 1944, *4*, 178–96.

Lewis, Archibald R., *Naval Power and Trade in the Mediterranean, A.D. 500–1100*, Princeton, NJ: Princeton University Press, 1951.

Lopez, Robert S., "The Trade of Medieval Europe in the South," in M. M. Postan and E. Miller, eds. *The Cambridge Economic History of Europe, Vol. 2*, New York: Cambridge University Press, 1952, pp. 257–353.

_____, *The Commercial Revolution of the Middle Ages, 950–1350*, New York: Cambridge University Press, 1976.

_____ and Raymond, Irving W., *Medieval Trade in the Mediterranean World*, New York: Columbia University Press, 1955.

Macaulay, Stewart, "Noncontractual Relations in Business: A Preliminary Study," *American Sociological Review*, February 1963, *23*, 55–70.

Maimonides, Moshe, *Mishne Torah*, Vol. 12 [translated by I. Klein], Judaica series, New Haven, CT: Yale University Press, 1951.

Michael, Murad, *The Archives of Naharay ben Nissim, Businessman and Public Figure in Eleventh Century Egypt* (in Hebrew and Arabic), Ph.D. dissertation, Hebrew University, Jerusalem, 1965.

Milgrom, Paul and Roberts, John, "Predation, Reputation, and Entry Deterrence," *Journal of Economic Theory*, August 1982, *27*, 280–312.

_____, North, Douglass, C. and Weingast, Barry R., "The Role of Institutions in the Revival of Trade: The Medieval Law Merchant, Private Judges, and the Champagne Fairs," *Economics and Politics*, March 1990, *1*, 1–23.

Nelson, Philip, "Advertising as Information," *Journal of Political Economy*, July/August 1974, *78*, 729–54.

North, Douglass C., *Structure and Change in Economic History*, New York: Norton, 1981.

_____ and Thomas, Robert Paul, *The Rise of the Western World*, Cambridge: Cambridge University Press, 1973.

Okuno-Fujiwara, Masahiro and Postlewaite, Andrew, "Social Norms and Random Matching Games," CARESS Working Paper No. 90-18, University of Pennsylvania, 1990.

Pearce, David G., "Repeated Games: Cooperation and Rationality," Cowles Foundation Discussion Paper No. 983, 1991.

Pirenne, Henri, *Mohamed and Charlemagne*, New York: Norton, 1939.

_____, *A History of Europe*, New York: University Books, 1956.

Postan, M. M., *Medieval Trade and Finance*, Cambridge: Cambridge University Press, 1973.

Poznanski, S., "Ephraim ben Schemria de Fustat" [in French and Hebrew], *Revue des Etudes Juives*, 1904, *48*, 146–75.

Shapiro, Carl, "Premiums for High Quality Products as Return to Reputation," *Quarterly Journal of Economics*, November 1983, *98*, 659–79.

_____ and Stiglitz, Joseph E., "Equilibrium Unemployment as a Worker Discipline Device," *American Economic Review*, June 1984, *74*, 433–44.

Simon, Herbert A., *Models of Man, Social and Rational*, New York: Garland, 1987.

Stillman, Norman A., *East–West Relations ir the Islamic Mediterranean in the Earl) Eleventh Century*, Ph.D. dissertation, University of Pennsylvania, 1970.

Udovitch, Abraham L., *Partnership and Profi. in Medieval Islam*, Princeton, NJ: Prince- ton University Press, 1970.

Williamson, Oliver E., *The Economic Institu- tions of Capitalism*, New York: Free Press 1985.