

PRELIMINARY

**Mobilizing Investment in Lawless Environments:
Economic Depression and the Maritime Trade of Venetian Crete, 1303-1400**

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August 2005

Abstract

Historians have long debated whether or not the global economy experienced depression in the middle of the 14th century. The research presented here focuses on maritime activity emanating from Venetian Crete, one of the principal hubs of East-West trade in the Eastern Mediterranean. The research does two things. First, it exploits a dataset of 1,511 commercial documents from the State Archives of Venice to craft measures of the volume of economic activity being channeled through Crete in the years 1303-1400. The results accord with anecdotal evidence that economic activity had achieved the pit of depression in the early 1340's a few years *before* the Black Death invaded the Mediterranean. Second, the research exploits those measures of economic activity to test predictions of theories of the financial structure of contracts merchants used to finance overseas trade ventures. Established historical narratives point up the role of equity-like schemes between merchants and their agents in financing trade on the fringes of the trade economy. The theoretical and empirical results presented here point up the role of debt, not equity, in financing trade on the fringes of the trade economy. Implications for the governance of trade in "lawless" environments are presented.

0. Introduction

“The Industrial Revolution” has long occupied a secure place in the pantheon of historical constructs. Indeed, in his book titled *The Industrial Revolution* (1948), T.S. Ashton observed that “the phrase ... has been used by a long line of historians and has become so firmly embedded in common speech that it would be pedantic to offer a substitute.” (Ashton 1980, pg. 4) “The Commercial Revolution” has its own book, *The Commercial Revolution of the Middle Ages, 950-1350* (Lopez 1971), but it remains a construct without a critical mass of adherents. And perhaps for the better, for the adherents it has had invested it with hypotheses that they accorded the status of stylized facts – facts so stylized that they defy reconciliation with hard data.

One of the stylized facts is that equity-like schemes financed activity at the frontiers of the Mediterranean trade economy in the late Middle Ages.¹ One of the underlying theses is that equity-like schemes allowed the principal functionaries of trade, “merchants” and their agents, to share risk. Sharing risk allowed them to mobilize investment for trade ventures in and around the Mediterranean that risk-averse parties might otherwise have passed up. These investments allowed parties to secure gains that, altogether, amounted to an expansion of trade. But trade expansion alone did not characterize revolution. Rather, it was the innovation of equity-like schemes and other commercial practices in the first place that was revolutionary (Lopez 1971, pg. 76; Kedar 1976, pg. 25).

At first sight, the idea that risk-sharing helped mobilize investment seems plausible. Among other things, equity-like schemes seem to anticipate the emergence of joint stock companies (Lopez 1971, pg. 77). Less plausible, perhaps, is the idea that medieval merchants innovated modes of financing trade. Some earlier authors did not accept the innovation thesis, suggesting, instead, that existing modes of financing derived from types of financing the Romans and others had used and that exogenous factors (“external stimuli”) played a role in stimulating a “revival of trade” in the Mediterranean in the late Middle Ages (Pirenne 1925, pp. 82 and 110). In contrast, the innovation thesis lends itself to a grand, unifying theme of The Commercial Revolution that “for the first time in history, an underdeveloped society succeeded in developing itself, mostly by its own efforts” (Lopez 1971, pg. vii).

Grand narratives are all well and good, but the narrative of The Commercial Revolution is composed of a number of sometimes-implicit, sometimes-explicit theses, no one of which has been made to face up to more than a few bits of documentary evidence, and each one of which may yet wither under the focus of concentrated empirical analysis. The purpose here is to unbundle, disentangle and identify some of those theses, give them some structure, and do something no research on medieval commercial practices has done: stand them up to a large, representative data set of commercial contracts.

The first order of business is to generalize the risk-sharing thesis by posing the question that should have been asked in the first place. Equity-like schemes did not constitute the only means

¹ I explore this hypothesis and the corresponding literature at some length in a separate paper, “The Financial Structure of Commercial Revolution: Financing Long-distance Trade in Venice 1190-1220 and Venetian Crete 1303-1400” (2005).

by which medieval merchants financed trade. Indeed, there is abundant archival evidence that merchants and their agents *more often* financed their trade ventures with debt (D.V. Williamson 2005), and, yet, the narrative of The Commercial Revolution has little to say about debt. Even so, one should pose the obvious question about the financial structure of trade ventures: When and why did merchants sometimes use debt, and when and why did they use equity? From there one can unbundle questions about contract enforcement. Are there important interactions between contract enforcement and the financial structure of contracts? If so, can we use these interactions to inform our understanding of debt-versus-equity question?

I organize empirical results around two competing hypotheses. The Risk-sharing Hypothesis corresponds to the traditional narrative of The Commercial Revolution. It alone says nothing about the enforcement of commercial contracts. I match this hypothesis against an alternative Governance Hypothesis. The Governance Hypothesis suggests that contract enforcement does interact with financial structure and, indeed, suggests that debt and equity align with exogenous features of the enforcement of contracts. Contracting parties tended to choose equity over debt in environments in which they could detect (if not verify) cheating at low cost. Other environments were less conducive to monitoring and detection, in which case parties reverted to debt to finance their trade ventures.

The governance hypothesis is not entirely novel in that it corresponds to the *converse* of the hypothesis advanced in Williamson (1988) on the alignment of debt and equity with underlying governance structures – more on that to follow – but the data I use to test the competing hypotheses are novel. I work out of a data set of 1,511 commercial contracts I compiled at the State Archives of Venice in the summer of 1997 and spring of 2003. The context involves the financing of long-distance trade in and around the Eastern Mediterranean in the 14th century. The data pertain to trade emanating out of Venetian Crete, a major hub of East-West trade from the early 13th century through the late 17th century. Venetian merchants operating out of Crete mobilized investment for trade ventures in the face of physical hazards (shipwreck, piracy, war, plague) and commercial hazards (the volatility of commodities prices). The focus here is on agency hazards (the prospect of cheating). Merchants contracted with trading agents to conduct transactions in geographically dispersed markets.

Contracts featuring equity-like profit-sharing – contracts known generically in the literature as *commenda* contracts – may have allowed merchants and their agents to share risk, but a difficulty with equity-like compensation is that it depended on agents' reports of transactions that merchants could not observe. Agents might cheat. Anticipating this, one can imagine that parties might, at some cost, institute supports such as auditing schemes. Alternatively, they might organize trade ventures around debt financing, which they often did, or they might forego exchange altogether. One can imagine that debt neutralized cheating, because it made payoffs to merchants invariant to agents' reports. Debt would also have relieved parties of having to institute costly supports, but it may have come with costs of its own: it denied parties the advantages (if any) of risk-sharing. The relative costs of one remedy or another thus imposed an economic problem: parties might perceive tradeoffs between alternative modes of organizing trade. As it turns out, they appealed to different modes in different environments.

I use the data set to make inferences about what might constitute “different environments.” Part of the governance hypothesis I pose is that merchants could detect, if not verify, cheating in environments in which there was much public information about the prices of commodities agents commonly acquired for merchants in commonly attended markets. Detecting cheating alone might not have enabled merchants to appeal to formal enforcement processes – processes about which the historiography of The Commercial Revolution has nothing to say – but such information may have allowed merchants to appeal to informal mechanisms. I remain agnostic on how merchants might have enforced contracts, but, either way, I use the relative frequency of contracts to suggest that some environment featured more trade activity than others. These same environments would have featured more informal sources of payoff-relevant information and would thus have been more conducive to equity-like financing. In contrast, other environments would have featured less information, and it is in these information-poor environments that merchants would either have had to forego trade entirely or to resort to debt, the mode of financing of last resort.

The principal empirical result is that debt, not *commenda*, dominated in information-poor environments whereas contracting parties were more likely to appeal to the equity-like *commenda* contracts to finance trade in information-rich environments. Trade activity achieved the pit of economic depression before the wave of plague we know as the Black Death washed over the Aegean in 1347. One might have expected plague to depress trade activity even further, but, if anything, it surged. Even so, the plague induced parties to substitute out of *commenda* contracts into debt and into pooling arrangements by which merchants would outfit entire vessels and send their agents out together as teams.

The remainder of the paper proceeds in five parts. The first part describes the environment from which the contract data were generated. The next part details the Risk-sharing Hypothesis and the Governance Hypothesis. The next two parts describe the data and present empirical results. The final part concludes.

1. The Context

Strictly speaking, “The Commercial Revolution” is a label for an expansion of (largely) East-West Mediterranean trade that started in 10th century and extended into (not through) the 14th century (Pirenne 1925, pg. 110; de Roover 1963, pg. 43; Lopez 1971, pg. 73; Kedar 1976, pg. 25; and Hunt and Murray 1999, pg. 55). Indeed, historians have come to understand that Europe experienced sustained economic recession starting well before the middle of the 14th century (Campbell 1991, Kedar 1976, Miskimin 1964, Lopez and Miskimin 1962). This is all the more striking, because the conclusion is that the trade economy was already depressed before plague invaded the Aegean in 1347.

The data presented here span 1303-1400. This interval includes the purported decline of economic activity in the first half of the fourteenth century and includes a late-century revival of trade. Discrete patterns in the data are consistent with decline in, at least, the 1330’s and 1340’s before the emergence of the Black Death. Venice had sponsored regular commercial convoys that ran between Venice, Crete and other parts of the Eastern Mediterranean, but war and

political considerations frustrated much of this traffic from 1291 all the way to 1370. The interval also includes wars in the Aegean in the 1330's, 1340's and 1350's between shifting coalitions of Turkish factions, Genoese, Venetians, Greeks, Catalan interlopers, and the crusading order of the Knights of the Hospital of St. Thomas. It is only by 1370 that Venice managed to restore regular trade ties with major sites in Eastern Mediterranean and that trade began to takeoff again (Ashtor 1975, 1976).

Venetian merchants had been operating out of Crete since the early 13th century. Venice had annexed Crete in 1211, and Crete served as an important way station for commercial traffic extending between Venice and ports in the Black Sea, Egypt, the Levant, Turkish ports on the Anatolian peninsula, and Constantinople. Crete itself produced much agricultural produce that merchants exported to foreign ports.

Merchants largely organized around round-trip ventures by which an agent would travel to foreign ports to conduct transactions on the behalf of one or more merchants. Merchants would advance capital in kind or specie, and it was up to agents to decide how to dispose of this capital. Merchants and their agents might agree on specific itineraries the agents were to travel, but sometimes merchants granted agents complete discretion over when, where and in what commodities to trade.

One can easily imagine that "markets" for capital and agency services constituted a many-to-many matching problem. Using agents enabled merchants to assemble portfolios of trade ventures and, in turn, to achieve some degree of risk diversification. Agents themselves might assume the role of merchants in other trade ventures as well as contribute capital to some of their own trade activities. A big question remains about how merchants and their agents should share proceeds from their trade ventures. Agents might very well cheat their merchants and pad their own accounts, but, at the same time, merchants and agents might perceive advantages to sharing risk in some contexts.

2. Analytical Framework

2.1 The Traditional Risk-sharing Hypothesis

The traditional narrative joins concepts of trust and risk-sharing in explaining the role of *commenda* in enabling the revival of trade of the Commercial Revolution. Historians have been sensitive to the prospect that agents retained under the terms of a *commenda* contract might cheat their investors. The principal conclusion of the literature on this count is that investors could resort to *commenda* contracts if they could hire honest agents (Lane 1964, de Roover 1963, Lopez and Raymond 1955, Hunt and Murray 1999) or family members (North 1991, Byrne 1916). Investors could, of course, trust honest agents to report gains or losses honestly, and family bonds, presumably, would again encourage agents to render truthful reports. The next part of the thesis indicates how *commenda* enabled an expansion of trade. The idea is that contracts featuring risk-sharing enabled contracting parties to participate in ventures yielding the most uncertain returns. (See, for example, Lane 1973a, pg. 139, Kedar 1976, pg. 25.) For example, in characterizing contracting practices in the 13th and early 14th centuries, both

Frederic Lane and Benjamin Kedar distinguish between ventures conducted within a physically secure “inner-core zone” conforming to most of the Eastern Mediterranean and an “outer zone” conforming to the frontiers of the inner-core and beyond into India and Central Asia. Agents venturing beyond the inner-core would have faced both greater physical hazards and greater uncertainty over the availability of commercial prospects.

Taken together, trust and risk-sharing enabled the functionaries of trade to realize gains that risk-averse parties would have otherwise foregone. At least three difficulties with this thesis are (1) it does not explicitly address the trade-offs (if any) encountered in choosing *commenda* over debt contracts or vice-versa, (2) it neither recognizes nor rationalizes the role of yet other types of contracts that appear in the data, and (3) it is motivated by heavy interpretations assigned to no more than two anecdotes that have been heavily cited in the literature. The first anecdote relates to the experiences of the Venetian Giovanni Loredan in India. Lopez (1943) indicated that in 1338-1339 Giovanni Loredan ventured to India via the Black Sea with financing provided by family members by *commenda* contracts. This example of traveling to the “outer zone” under a *commenda* has been presented in Lopez (1943, 1951, 1955, 1971), Lopez and Raymond (1955), Lane (1973a), and Kedar (1976) as evidence of the role of the *commenda* in enabling long distance trade. Meanwhile, Kedar (1976) and Lopez (1951) indicate the venture of the Genoese Benedetto Vivaldi and his brother in 1315 to India under the terms of a *commenda* contract as further evidence. Kedar (1976, pg. 25) explicitly outlines the thesis with these two examples:

“In the outer zone, the prevalent form of partnership was the *commenda*, or as the Venetians usually called it, the *colleganza*... This form of partnership... was perfectly suited to the commercial trips to the distant, only partially known lands of Further Asia. Indeed, both of the commercial voyages to India about which the financial details are known – the voyages of the Genoese Benedetto Vivaldi in 1315 and of the Venetian Giovanni Loredan in 1339 – were undertaken by men who entered into *commenda* contracts.”

I submit that two anecdotes are not adequate for establishing a theory of contract selection. In contrast, this paper advances a simple governance hypothesis and then makes the hypothesis stand up to a sizable, representative data set of contracts.

2.2 The Governance Hypothesis

The hypothesis advanced here constitutes the converse of the transaction costs hypothesis advanced in Williamson (1988). Williamson (1988) provides a way of understanding the alignment of financial structures with modes of governing exchange. Williamson (1988) suggests that equity-like financing may be less resistant than debt to agency hazards and that, accordingly, parties might assemble, at some cost, mechanisms for neutralizing or mitigating hazards. The advantage of debt is that it does not require much in the way of costly supports, but that begs the question of why parties might choose equity over debt in the first place. The choice between one mode or another comes down to exogenous features of the underlying transactions parties hope to enable – features that dictate the extent to which underlying transactions depend on relationship-specific investments. Williamson goes on to suggest that exchange that depends on relationship-specific investments can be more susceptible to maladaptation. Equity-like financing gives parties inducements to hash out adaptations, but equity itself may be more

susceptible to agency hazards. Accordingly, parties might complement equity-like financing with costly supports. In contrast, parties would choose the combination of debt and the leaner mechanisms parties might institute support debt in order to enable exchange that involves transactions that are less susceptible to maladaptation. Such transactions tend to line up with investments that are highly redeployable outside of specific relationships.

An important distinction between the governance problems contemplated in Williamson (1988) and those explored here is that those here do not depend on an appeal to relationship specific investment or “asset-specificity.” Williamson (1988) appeals to asset-specificity, because asset-specificity is exogenous and can motivate the choice of financial structure and institutional supports. In the environment explored here, institutional supports are effectively exogenous in that parties choose between participating in environments that feature informal sources of information and participating in trade on the informational frontiers of the economy. The choice of one environment or another dictates the choice of institutional supports. Most of what remained for parties to choose was the financial structure of trade ventures.

In the context explored here, choosing which environment to trade in amounted to choosing between information-rich environments and information-poor environments. In information-rich environments, parties could use information to detect (if not verify) cheating at low cost. Detection alone could enable them to implement information enforcement mechanisms. In information-poor environments, parties had no means of detecting cheating and thus had to resort to debt, the mode of financing of last resort.

Remark 1

Dixit (2003) provides a way of linking the governance hypothesis to macroeconomic patterns one might observe in the trade economy. Dixit suggests that informal mechanisms could support pockets of trade but that parties may not be able to extend informal mechanisms to the governance of all trade within the trade economy. Dixit goes on, however, to suggest a second-order effect: As the entire economy expands, the pockets of trade to which parties could apply informal mechanisms diminish. There may be more information in the system, but that information gets dispersed across volumes of activity that increase even faster. The net effect is that information may get diluted, and contracting parties may have a harder time organizing exchange with risk-sharing schemes that require informational supports. The upshot is that the proportion of trade ventures organized around *commenda* contracts might not increase monotonically as the economy expands. It might increase up to a point before diminishing.

Remark 2

No researchers had taken up how the choice of financial structure could affect governance, but Grief (1989, 1993) explicitly takes up the problem of cheating with respect to long distance trade and suggests how informal processes – specifically, reputation mechanisms – could enable merchants to accommodate the problem of cheating.

Reputation mechanisms constitute one class of mechanisms parties might use to support exchange. They depend on repeated interactions between parties, on flows of information parties

use to detect cheating, and on sanctions parties use to redress or punish cheating (Bull 1987). Folk Theorem results derived from the theory of supergames (Sorin 1992) suggest that it can be easy to rationalize any number of practices and institutions as reputation mechanisms. Theory can motivate multiple equilibria, leaving theorists stuck with looking for criteria according to which parties might select one candidate equilibrium over another. The upshot is that theory alone may provide little descriptive, predictive or prescriptive content. Even so, empirical research suggests that people who were unencumbered with academic concerns about multiplicity of equilibria managed to institute and maintain reputation mechanisms. (See Greif 1989, 1993 for path-breaking economic analysis of the experiences of the Maghribi traders documented in Goitein 1967 and 1973.) Further research suggests that formal institutions such as the Law Merchant may have enabled parties to implement and maintain informal reputation mechanisms (Milgrom, North and Weingast 1990).

It is not obvious that reputation mechanisms served much of a role in ordering trade ventures that European merchants had organized – a topic that Greif (1994) takes up – but that raises the question of how European merchants accommodated the problem of cheating. Reputation effects would have depended on merchants being able to detect (if not verify) cheating. Indeed, as Bull (1987, pg. 148) observes, “[R]eputation effects are only as strong as the information flows that support them,” but it is not obvious what could have constituted accounting procedures that would have enabled merchants to detect distortions in agents’ reports of transactions.

There do exist indications that accounting procedures may have served a role in mitigating other types of cheating – specifically, cheating derived from claims agents might make that cargoes had been spoiled or otherwise compromised during transit. Italian merchant vessels often featured ship-board scribes whose maintained records of quantity and condition of cargoes that agents both loaded and unloaded. Other than that, it is not obvious that contracting parties could have depended on accounting procedures to neutralize cheating. Information remained susceptible to manipulation, limiting parties to nothing more than suasion to discourage cheating. In some Italian jurisdictions, for example, notaries could have faced the prospect of being burned at the stake for falsifying documents (Brătianu 1927, pg. 32).

3. The Data

The data derive from the logbooks (“cartularies”) of 25 notaries maintained at the State Archives of Venice. (See Table 1.) All of these data pertain to trade ventures that merchants operating out of Crete had organized. The records of only two of these 25 notaries, the records of Angelo de Cartura and Donato Fontanella, have been published. (See Stahl 2000.) One can find all of the records in the archival series *Notai in Candia* maintained at the State Archives.

The data indicate that in some years the records of particular notaries featured a high proportion of maritime contracts – sometimes more than 5% of all contracts – but in other years very few maritime contracts appear. From these data I indicate three types of contracts: *commenda*, debt, and contracts I have labeled “pooling contracts.” The one dimension that distinguishes these types from each other is the rule by which principals and agents share total surplus. Under the

terms of *commenda* contracts, parties split proceeds in fixed proportions such as half-and-half, two-thirds-and-one-third, and, less often, three-quarters-and-one-quarter. Debt contracts made agents the residual claimant; agents would guarantee fixed payoffs (principal plus interest) to their investors. Pooling contracts read just like *commenda* and debt contracts, except that they indicate payoffs as a function of the number of “shares” (*partes*) in a vessel that the parties have purchased.² Pooling contracts show up in the records of many notaries starting in 1339, a year of renewed fighting with Turks in the Aegean (Zachariadou 1983). The relative frequency of pooling contracts is greatest in 1347, the year in which the first wave of plague of the sequence of waves we know as the Black Death invaded the Aegean. Pooling contracts disappear in the succeeding few years.

Parties seem to have used pooling contracts in environments that were subject to extraordinary physical hazards. Investors may very well have been concerned that any one agent might not be able to return and to remit payments. More importantly, parties seem to have used pooling contracts in non-stationary environments in which negative shocks to the informational structure of the trade economy rendered commercial prospects difficult to ascertain.

All contracts feature the following types of information:

1. The identities and towns of residence of the investors.
2. The identities and towns of residence of the agents.
3. Investments on the part of investors in kind or in specie.
4. The rule by which parties share profits and losses.
5. The assignment of losses from spoilage or piracy to the investors or agents.
6. Date of enactment.
7. Contract duration: the time by which the agents must dispatch their obligations.
8. The identities of witnesses to the contract.
9. The identity of the notary assembling the contract.

Contracts often feature other terms:

10. An itinerary agents are supposed to follow.
11. An explicit indication that the agent surrenders the option to deviate from a stated itinerary.
12. The specific vessel by which an agent must travel.

The contracts number 582 *commenda* (39%), 126 pooling contracts (8%), and 803 debt contracts (53%). Important destinations included Palatia (formerly Miletus), the principal port of the Turkish Beylik of Mentеше on the Anatolian Peninsula (280 contracts), and Theologo (formerly Ephesus) the principal port of the Turkish Beylik of Aydin (48 contracts). Egypt (Alexandria or Damietta), Rhodes, and Cyprus show up in 108, 96, and 90 contracts respectively.

² How “shares” translate into profit-sharing rules is ambiguous. An important aspect of these shares, however, is that they indicate that agents were likely operating along side other agents representing the interests of other merchants. I have shared samples of these contracts with Alan Stahl and Francois Leduc. We agree that these contracts involve profit-sharing between investors and teams of agents operating together on particular vessels.

Most other contracts involve trade with islands in the Aegean. Often contracts would not indicate an itinerary or might even explicitly indicate that agents would reserve complete discretion over the selection of destinations.

4. Estimation

The point here is to identify salient patterns in the contract data that may allow us to distinguish between broad classes of theories and, further, to suggest a patchwork of theoretical results that may go some way toward understanding those patterns. I exploit three statistical exercises. First, I distinguish how parties organized trade with Egypt at a time when the Egyptian trade was routine and stationary and at a time when the Egyptian trade was situated on the frontiers of the trade economy. These data lend themselves to a simple natural experiment. Second, I distinguish how parties organized trade with Turkish beyliks. The authorities in Crete had been keen to organize trade relations with the various Turkish beyliks, but their efforts often ran counter to larger geo-political concerns. Among other things, various factions, including the Pope, had pressed the Venetians in Crete to participate in anti-Turkish “naval crusades” – the is, to fight against some of their most important trade partners. Finally, I apply a multinomial logit to the analysis of the discrete choices parties made between *commenda*, pooling contracts, and debt contracts.

4.1 The Trade with Egypt

Table 2 indicates how parties organized trade between Venice and Crete in the years 1190-1220 and between Crete and Egypt in the years 1303-1400. The earlier data derive from an effort in the 1930’s of historians to gather all of earliest extant commercial documents at the State Archives of Venice. (The contracts were transliterated and compiled in Morozzo della Rocca and Lombardo 1940.) In the interval 1190-1220, the Venetian Republic routinely sponsored convoys between Venice and Alexandria and other sites like Acre. In Alexandria, merchants would secure supplies of pepper for resale in annual trade fairs in Venice. In the interval 1303 – 1400, convoys between Venice and Egypt were not regular. The Venetians had secured permission from the Pope to sponsor a convoy in 1344 – the object of which was to secure supplies of grain at a time of widespread famine – but, the trade in pepper or other commodities was no longer routine.

The data in Table 2 are striking. In the interval 1190-1220, 15 of 18 available contracts involving trade between Venice and Alexandria (83%) were *commenda*. In the interval 1303-1400, 6 of 108 contracts involving trade between Crete and Alexandria (6%) were *commenda*. One hundred of the contracts (93%) were debt contracts.

The Egypt data suggest that the trade with Egypt had corresponded to activity that we could characterize as a pocket of trade to which merchants and their agents could extend informal mechanisms like reputation mechanisms to police cheating. Agents traveled together in the state sponsored convoy. The traded in the same commodities (principally pepper), and so were commonly informed about prices. The public information of prices may not have enabled formal

processes to police cheating, but they may have enabled parties to appeal to informal processes and, in turn, to contracts featuring risk-sharing. The data also suggest that the Egypt trade reverted to activity on the informational frontiers where parties would have been less well equipped to extend mechanisms, formal or informal, to the policing of contracts. In the interval 1303-1400 agents no longer operated in which information was commonly distributed among many agents. Information was more susceptible to manipulation, in which case parties appealed to debt contracts.

4.2 Trade and Crusade with the Turks of Mentеше and Aydin

The trade between Crete and the Turkish beyliks of Mentеше and Aydin reveals striking patterns that lend themselves to the argument that debt financed trade on the informational frontiers of the trade economy. War in the Aegean between shifting coalitions of Turkish beyliks and Catalan interlopers and shifting coalitions of other non-Muslim factions – Genoese factions, Venetian factions, the Knights of the Hospital of St. Thomas, and the Byzantine authorities – constituted the norm. Even so, the Venetian authorities in Crete had made attempts as early as 1318 to formalize trade relations with Mentеше (Zachariadou 1983). As Zachariadou (1983) suggests, it is not obvious that these efforts ultimately yielded anything, but we do know that Crete did establish formal trade relations with Mentеше in 1331. We also know that in 1332 the Pope and the Venetian authorities in Venice impressed the Venetians in Crete into service in the *Sancta Unio*, a “naval crusade” in the Aegean, against the various Turkish beyliks. The Cretans openly revolted in response to the efforts of the Venetian authorities to raise financing and build vessels to support the crusade, but the Santa Unio managed to launch naval activities in 1334. The authorities in Crete managed to re-establish trade relations with Mentеше in 1337, and they also concluded a treaty with the Turks of Aydin that same year. By 1339, however, the Turks renewed massive raids across the Aegean, and it is not obvious that trade between Crete and the various beyliks had recovered until the 1350’s.

The upshot of all of this is that merchants operating in Crete perceived and exploited at least two clear windows of opportunity in 1331 and 1337 to trade with Mentеше and Aydin. Debt contracts typically did not explicitly indicate rates of interest but rather indicated that agents would reimburse their lenders according to “customary” rates. In 1331 and 1337 - 1339, however, almost all debt contracts recorded by all notaries feature explicit interest rates. The lowest of these rates was 20% over a term of six months. (See Figure 1.) In 1338, for example, more than 60% of the contracts in the data set are debt contracts that explicitly indicate interest rates.

These data are consistent with agents and their investors participating in trade on the informational frontiers of the trade economy. They rushed in to participate in trade between Crete and Turkish beyliks. The data reveal that agents and their investors tended to organize trade through debt rather than commenda. Moreover, agents seemingly bid up interest rates beyond “customary” rates. Crusading activities in the mid-1330’s and renewed hostilities in 1339 disrupted the trade.

4.3 Multinomial Logit Estimation

I exploit measures of volumes of economic activity in a set of multinomial logits. The analysis of the discrete choice of contract type conforms to a reduced form in that it leaves in the background any explicit model of how merchants and their agents sort themselves between trade ventures on the informational frontiers of the economy or ventures within pockets of trade inside the frontiers.

The explanatory variables are:

1. Total Volume of Commerce: For each year represented in the dataset, I estimate the number of contracts notaries crafted, and I use this number as a proxy for overall economic activity.³
2. Total Volume of Maritime Commerce: For each year, I estimate the number of maritime contracts notaries crafted. I use this number as a proxy for the maritime activity.
3. Differences in Total Volume: I indicate differences, year-on-year, in Total Volume.
4. Differences in Maritime Volume: I indicate differences, year-on-year, in Maritime Volume.
5. Dummies for the years 1346-1350: I indicate dummy variables for the years immediately preceding and succeeding the first manifestation of plague in the Aegean in 1347.

One can interpret an expansion of the Total Volume of Commerce as either an expansion of trade at the informational frontiers of the economy or an expansion of pockets of trade within the frontiers. A larger economy may feature a larger frontier. At the same time, however, a larger economy may simply indicate a larger volume of the same types of activity. The suggestion is that an economic expansion of itself might not translate into an expansion of activity on the frontiers but rather may result in a deepening of the flows of information relevant to activities inside the frontiers. Appealing, again, to the bubble metaphor: the contents of a bubble may become denser. Finally, Dixit (2003) suggests a third possibility: as activity expands, information relevant to certain types of activity may become more diffuse.

The second variable, the Total Volume of Maritime Commerce, is amenable to the same three types of interpretations. In all that follows, I maintain that an expansion of the Total Volume of Commerce corresponds to an expansion of the frontiers of the trade economy, and an expansion of the Volume of Maritime Commerce corresponds to a deepening of the flows of information parties use to support exchange. My reasoning is that an overall expansion of activity could have been dispersed over a larger set of activities than maritime trade alone. Parties may have diverted resources to agricultural production (mostly vineyards) or local city commerce. Maritime trade, however, tended to be concentrated in the same types of activity, e.g., trade with Mentеше, trade with Egypt, or trade along Venetian convoy routes to Cyprus or Constantinople.

³ I estimate the average rate (contracts per unit interval of time) at which each notary crafted contracts in a given year. I use these rates to estimate the number of contracts notaries collectively crafted in any one year. I normalize those numbers by comparing them to the total number of contracts I estimate notaries crafted over the entire interval 1303 – 1400.

Trade with convoys may have been less susceptible to commercial hazards, but the trade with Egypt and Menteshé were more subject to conditions that changed year on year.

The second and third variables indicate differences in Total Volume and Maritime Volume from one year to the next. Differences provide an indirect way of identifying shocks to the informational structure of the economy. An increase in Maritime Volume, for example, may indicate an increase in the flows of information that parties could use to support their trade ventures. An increase in Total Volume is also consistent with an increase in flows of information that could support trade ventures, but it is also consistent with parties extending activity to informational frontiers of the economy.

The dummy variables corresponding to the years 1346-1350 provide a way of distinguishing the years surrounding the emergence of plague from other years. I maintain that plague induced a negative shock on the informational structure of the economy, shifting some volume of activity onto the informational frontiers. Even though plague invaded the Aegean in 1347, it had been migrating from east to west through Central Asia along overland trade routes that fed into the overseas routes in the Black Sea and Eastern Mediterranean. The effects of plague may very well have affected commercial prospect in the Aegean before it itself actually arrived.

What does the multinomial logit analysis suggest? I suggest that the results are consistent with the theoretical results of Dixit (2003). As pockets of trade expand, *commenda* assume a larger role, but debt constitutes the principal means of financing trade on the frontiers. Even so, the emergence of plague induces substitution not from *commenda* into debt but rather from *commenda* into pooling contracts.

Table 3 features three specifications. The second and third specifications are nested in the first, but likelihood ratio tests suggest that Specification 1 constitutes a better fit to the data. Specification 2 omits the quadratic term “Maritime Volume Squared,” and Specification 3 omits the dummies assigned to the years 1345-1350.

The trio of specifications yield some immediate results. First, the estimates of the coefficients corresponding to “Volume of Maritime Commerce” and the quadratic term “Maritime Volume Squared” have opposite signs. The suggestion is that the effects of larger volumes of maritime commerce diminish as maritime commerce grows. The result accords with a Dixit hypothesis that parties perceive limits to the extent to which they can extend the informal mechanisms supporting *commenda* contracts. Second, the dummies assigned to the years 1345-1350 pick up much action pertaining to the selection of pooling contracts over *commenda*. The suggestion is that most of the action relating to the emergence of plague pertains to pooling contracts rather than debt contracts.

Tables 4 and 5 indicate mean marginal effects (See Train 1986, pp. 41-44) corresponding to Specifications 1 and 3, respectively. I calculate standard errors for the mean marginal effects using the “delta method” (Greene 1993 pp. 108 and pp. 645-646). The marginal effects pertain to the probabilities by which parties chose one type of contract or another. Table 4 indicates, for example, that increasing the Total Volume of Commerce 100% would prompt an almost 20% increase in the likelihood of parties choosing a debt over *commenda* and pooling contracts.

Similarly, increasing the Total Volume of Commerce would lead to an almost 20% decrease in the likelihood of parties choosing *commenda*.

If we accept the hypothesis that an expansion of the Total Volume of Commerce represents an expansion of activity on the informational frontiers of the economy, then the marginal effects suggest that, other things equal, debt serves a larger role than *commenda* in financing activity on the frontiers. Meanwhile, we see that both *commenda* and debt are increasing as the Volume of Maritime Commerce increase. If we accept the hypothesis that an expansion of maritime activity corresponds to a deepening of the flows of information supporting trade on the inside of the frontiers, then we see that *commenda* had a larger role than debt in financing this activity.

The marginal effects corresponding to the differences in total volume and maritime volume are more striking. When new investment opportunities emerge, parties may pile in, but they pile in with debt financing in place of *commenda* financing. Yet, as the volume of maritime activity increases, parties gain access to information that is more relevant to their own maritime activities. Richer flows of relevant payoff-relevant information rather than larger flows of heterogenous information enables parties to support *commenda* financing.

The marginal effects corresponding to the year dummies indicate interesting results. Comparing Tables 4 and 5 suggest that almost all of the action that dummies pick up pertain to pooling contracts. The results suggest that in 1346, the year before plague invaded the Aegean, parties relied less on *commenda* and more heavily on pooling contracts. By 1350, parties' dependence on pooling contracts dissipated. Instead, regrouped and tended to venture forth – when and if they did – under the terms of debt financing.

5. Conclusion

One advantage of doing research on historical topics is that one can often get hold of data like commercial contracts. A disadvantage of historical research is that one might have a hard time getting a hold of covariates. It is not possible, for example, to merely visit something like the OECD website and download trade statistics from the 14th century. Even so, one might be able to exploit qualitative types of data as well as assemble proxies from extant sources.

In this paper I characterize the financial structure – a debt-versus-equity question – of medieval trade ventures. The results illuminate how enforcement processes and financial structure interact. The established historiography of medieval contracting practices did not even address questions of financial structure, and it had never indicated how formal enforcement processes could support exchange. The results presented here suggest that there may have been limited (if any) role for formal enforcement processes.

The research presented here provides clues to how parties enabled exchange in what Dixit (2004) might recognize as “lawless” environments. While it is uncontroversial to suggest that both formal and informal institutions can go some way toward enabling merchants to organize complex exchange, it is also reasonable to suggest that contracting parties could enable exchange in environments in which formal or informal enforcement processes may not have been feasible.

This is what makes the appeal to debt to finance trade ventures interesting: it required little institutional support, and, indeed, it constituted an important means of mobilizing investment for overseas trade ventures.

The natural experiments pertaining to the trade with Egypt and trade with Turkish beyliks tell most of the story. In environments in which parties could detect (if not verify) cheating, they could appeal to equity-like schemes (*commenda*) and share risk. The suggestion is that risk-sharing was, indeed, an important feature of contracting. Even so, risk-sharing did not dominate. The data also suggest that in environments in which parties could not detect cheating, debt financing prevailed.

In all of this we should keep in mind that formal institutions did exist. The Venetian Republic, for example, did maintain courts and other institutions for supporting economic activity. One might characterize governance in Venice as “Government of the Merchants, By the Merchants, and For the Merchants.” Even so, we do not know much about what formal Venetian institutions actually did. We do not know, for example, much about how merchants used courts to process claims relating to maritime commerce. While formal processes surely did serve some purposes, the evidence here suggests how merchants and their agents could have enabled exchange in environments situated well beyond the shadow of these formal processes.

Figure 1

Proportions of All Contracts Indicating Explicit Interest Rates

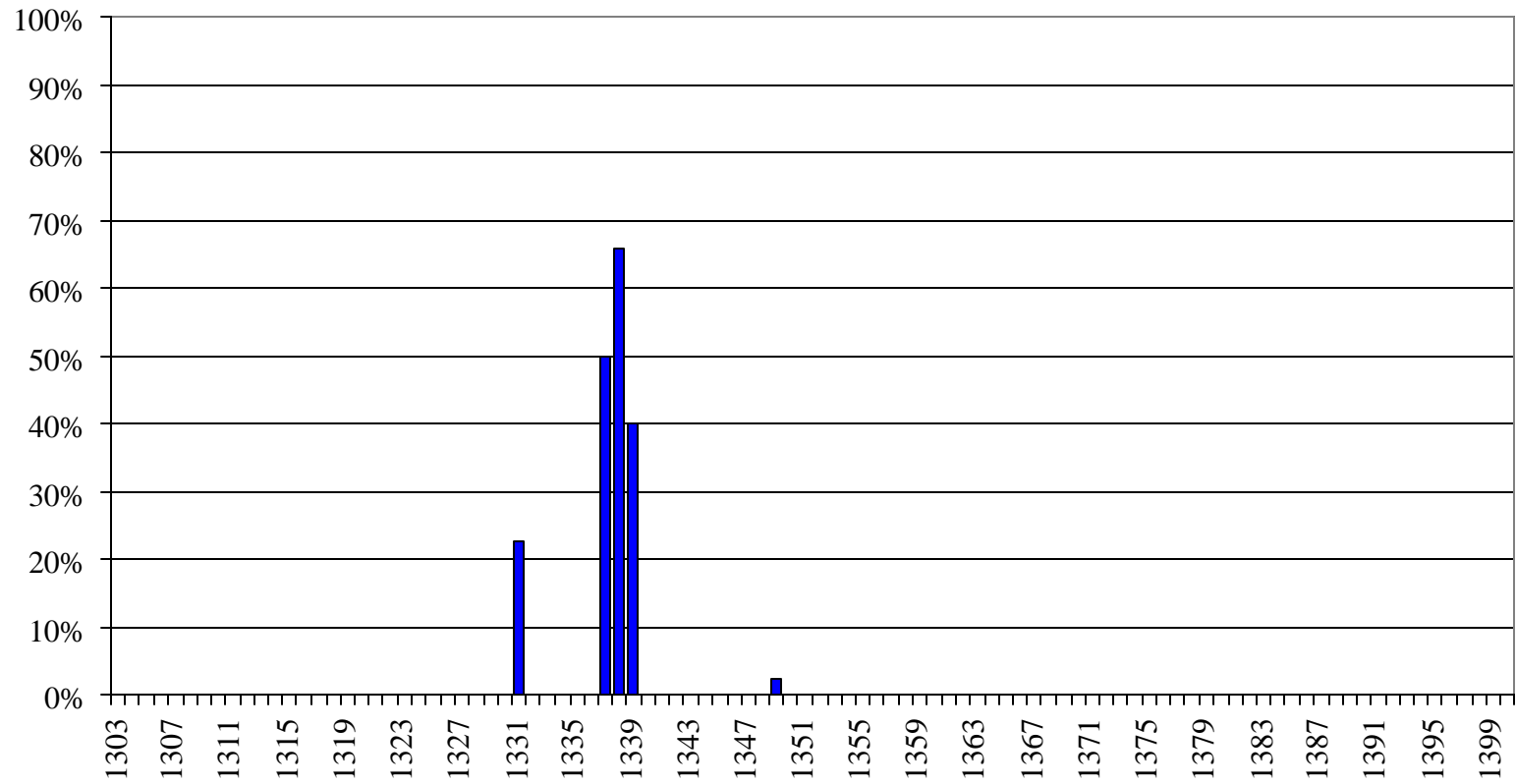


Table 1
Distribution of Contracts

Notary	1303 - 1305	1306 - 1310	1311 - 1315	1316 - 1320	1321 - 1325	1326 - 1330	1331 - 1335	1336 - 1340	1341 - 1345	1346 - 1350	1351 - 1355	1356 - 1360	1361 - 1365	1366 - 1370	1371 - 1375	1376 - 1380	1381 - 1385	1386 - 1390	1391 - 1395	1396 - 1400	Row Totals
Andrea de Bellamore						12															12
Andrea Nigro					34																34
Angelo Bocontolo									6	215											221
Angelo Cariola		5																			5
Angelo de Cartura	64	28																			92
Angelo Donno				6																	6
Antonio Brixiano											4										4
Bartholomeo Francisci								120													120
Donato Fontanella					3																3
Filippo Malpes										1											1
Francisco de Cruce								14													14
Giorgio Aymo														84							84
Giorgio Candachiti																				8	8
Giorgio da Milano I										10											10
Giorgio di Ligardo								2													2
Giovanni Catacalo																					47
Giovanni Gerardo						12	223	24	9	167	48	77	2								562
Giovanni Similiante						23	14														37
Iacobus de Firmo									2												2
Leonardo de Vegla										39											39
Leonardo Quirino				78	11																89
Marco da Piacenza								6	3	5											14
Nicolo Brixiano								2													2
Nicolo Tonisto																	5	16	8		29
Stefano Bono	58		16																		74
Column Totals	122	33	16	84	48	47	237	168	20	437	52	77	2	84	0	0	5	63	8	8	1511

Table 2

The Trade with Egypt

	1190-1220	1303-1400
<i>Commenda</i>	20	6
Pool	0	2
Debt	4	100
	24	108

Table 3
Multinomial Logit Estimation

	Specification 1		Specification 2		Specification 3	
	$\ln\left(\frac{\text{Pool}}{\text{Commenda}}\right)$	$\ln\left(\frac{\text{Debt}}{\text{Commenda}}\right)$	$\ln\left(\frac{\text{Pool}}{\text{Commenda}}\right)$	$\ln\left(\frac{\text{Debt}}{\text{Commenda}}\right)$	$\ln\left(\frac{\text{Pool}}{\text{Commenda}}\right)$	$\ln\left(\frac{\text{Debt}}{\text{Commenda}}\right)$
Total Volume of Commerce	0.692 ** 0.353	1.006 *** 0.145	0.787 ** 0.328	1.099 *** 0.145	0.024 0.358	1.049 *** 0.146
Volume of Maritime Commerce	11.228 ** 5.375	-0.541 ** 0.220	-0.659 ** 0.282	-0.090 0.062	19.304 *** 4.471	-0.451 ** 0.208
Maritime Volume Squared	-3.970 ** 1.867	0.091 ** 0.043			-6.010 *** 1.410	0.065 0.040
Difference Total Volume	2.366 1.559	2.369 *** 0.527	2.536 * 1.357	2.507 *** 0.528	6.771 *** 1.248	2.823 *** 0.469
Difference Maritime Volume	-0.889 0.810	-0.526 ** 0.229	-1.615 * 0.846	-0.627 *** 0.224	-0.745 * 0.448	-0.457 ** 0.213
1346	2.538 *** 0.654	0.890 *** 0.300	3.690 *** 0.568	0.877 *** 0.301		
1347	2.899 *** 0.543	0.617 *** 0.220	3.703 *** 0.524	0.524 ** 0.216		
1348	2.334 *** 0.622	-0.140 0.327	2.703 *** 0.523	-0.319 0.318		
1349	2.870 *** 0.652	0.349 0.364	3.095 *** 0.508	0.164 0.355		
1350	0.869 1.221	1.333 ** 0.638	1.489 1.199	1.183 * 0.634		
Constant	-10.996 *** 3.792	-0.583 ** 0.296	-3.138 *** 0.606	-1.101 *** 0.177	-16.730 *** 3.563	-0.581 ** 0.288
Log Likelihood	-1147.50		-1157.34		-1185.52	

The notations ***, ** and * respectively indicate 1%, 5% and 10% significance levels.

Table 4
Mean Marginal Effects
Specification 1

	Prob(Colleganza)	Prob(Debt)	Prob(Pool)
Total Volume of Commerce	-19.31% *** 2.78%	19.22% *** 2.86%	0.09% 2.10%
Volume of Maritime Commerce	7.20% *** 2.74%	5.44% 5.49%	-12.64% * 7.62%
Difference Total Volume	-47.03% *** 10.52%	42.08% *** 11.42%	4.95% 9.61%
Difference Maritime Volume	11.20% ** 4.65%	-7.76% 5.62%	-3.44% 5.14%
1346	-21.13% *** 5.76%	8.67% 6.19%	12.46% *** 3.93%
1347	-17.05% *** 4.12%	1.07% 4.68%	15.97% *** 3.36%
1348	-2.42% 6.30%	-13.20% ** 6.60%	15.62% *** 3.70%
1349	-12.23% * 7.04%	-4.72% 7.24%	16.95% *** 3.80%
1350	-25.50% ** 12.61%	25.69% ** 12.59%	-0.19% 7.05%

The notations ***, ** and * respectively indicate 1%, 5% and 10% significance levels.

Table 5
Mean Marginal Effects
Specification 3

	Prob(Colleganza)	Prob(Debt)	Prob(Pool)
Total Volume of Commerce	-18.83% *** 2.91%	23.14% *** 2.90%	-4.31% * 2.29%
Volume of Maritime Commerce	5.43% *** 1.72%	0.64% 2.26%	-6.07% ** 2.58%
Difference Total Volume	-68.08% *** 9.09%	33.66% *** 9.85%	34.42% *** 8.16%
Difference Maritime Volume	10.10% ** 4.28%	-6.94% 4.49%	-3.17% 2.92%

The notations ***, ** and * respectively indicate 1%, 5% and 10% significance levels.

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