Pirates of the Mediterranean: An Empirical Investigation of Bargaining with Transaction Costs

Attila Ambrus* Eric Chaney†

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Abstract

This paper uses ransom prices and time to ransom for over 10,000 captives rescued from the Barbary Corsairs to investigate the empirical relevance of dynamic bargaining models with one-sided asymmetric information. Our dataset includes information that only the buyer knew. In addition, we observe multiple negotiations that were ex ante similar from the uninformed party's (seller's) point of view. Empirical results are consistent with many of the theoretical predictions of dynamic bargaining models. In particular, variation in bargaining costs helps explain the observed differences in negotiation outcomes between different locations.

*Harvard University and NBER.

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1 Introduction

In recent years, Somali-based pirates have captured headlines by staging prominent hijackings and exacting sizeable ransoms. The uptick in piracy off the coast of Somalia has brought such ransoms international attention but ransom payments have long provided a source of income for a variety of criminal organizations. Despite the economic importance of ransoms to these organizations, little empirical work has been done investigating the determinants of such ransoms.[1]

This paper begins to address this gap in the literature by investigating the empirical relevance of theoretical work related to many ransoming situations. To this end, we use a detailed historical data set on over 10,000 captives ransomed from the Barbary Corsairs by Spanish negotiating teams between 1575 and 1739. These predominantly Muslim Corsairs preyed on Christian European shipping in the Mediterranean and the Atlantic for centuries. Like Somali pirates today they derived important revenues from ransoms paid for captured crews and individuals.

Conceptually, we think about negotiations for the release of different captives as a dynamic bargaining game with asymmetric information. In particular, we assume that the relevant uncertainty is one-sided, regarding the exact value of each captive for the rescuers. This value contained a term that was impossible to observe for the pirates: the amount of earmarked money raised at home for the release of the given captive. For this reason, the captors could only know the probability distribution of the value for the buyer, conditional on observables.[2]

While the literature contains various models of dynamic bargaining with uncertainty regarding the buyer's valuation, most qualitative predictions are robust across bargaining

[1] A growing body of work by Peter Leeson does, however, investigate (mainly Carribean) piracy from an economic standpoint. Among other works, see Leeson (2007, 2009) and the references therein. See also Gathmann and Hillmann (2009) on the economic background of privateering in Britain around the 18^{th} century.

[2] These variables include gender, age, region of origin, profession and rank.

models in this class.[3] This paper focuses on these predictions while paying special attention to qualitative conclusions that distinguish this class of models from those in which the time preferences of the parties is uncertain.

Our dataset provides a unique opportunity to test the predictions of dynamic bargaining models with one-sided asymmetric information, for two reasons.

First –contrary to laboratory experiments examining dynamic bargaining– in our setting it is reasonable to assume that the participants only cared about their own physical payoffs. Several experimental papers, including Neelin et al. (1988) and Ochs and Roth (1989), show that the observed play of subjects in sequential bargaining situations is far from the perfect equilibrium prediction of corresponding models.[4] These papers compellingly argue that the main reason for this is that many subjects exhibit other-regarding preferences, and in particular reject offers that would give them less than what they regard as a fair share of the surplus. This can be clearly observed in ultimatum games, which are essentially one-period bargaining games, as first shown in Guth et al. (1982). In contrast, the negotiations we examine were conducted by professional bargaining teams on the Spanish side (with clearly laid out directives from the court), and experienced traders on the corsairs' side, for whom buying and selling captives was a regular business activity.[5]

Second, as opposed to field data previously used in empirical research on dynamic negotiations we observe multiple negotiations by the same parties for captives who for practical purposes were identical for both parties, with the exception of the earmarked money raised in Spain for some captives which was privately known by the rescuing team. We use this

[3] See Section 4 for a brief summary of the models proposed in the literature.

[4] For experiments on bargaining with asymmetric information, see Mitzkiewitz and Nagel (1993), Straub and Murnighan (1995), Croson (1996), Guth et al. (1996), Rapoport et al. (1996), and Schmitt (2004). The qualitative conclusion that play is far away from equilibrium predictions remains valid in the above experiments, although incomplete information (in particular on the responder side) tends to lower both average offers and the likelihood of acceptance of low offers.

[5] Another reason why observed behavior in the lab differs from theoretical predictions is that subjects in the lab might be risk-averse, while most of the theoretical literature assumes risk-neutral parties. Given that the parties in our setting were typically engaged in negotiating for the release of many similar captives, it is reasonable to assume risk-neutrality within any given negotiation (with the possible exception of a few high-ranked captives).

information as an instrumental variable to provide a plausible estimate of the causal effect of delay on equilibrium prices.

Our empirical use of information that only one of the parties (the negotiating team) possessed adds to a growing empirical literature on adverse selection that aims to collect and utilize such information (Finkelstein and McGarry (2006), Finkelstein and Poterba (2006), Abramitzky (2009)). To the best of our knowledge, ours is the first paper to empirically use such information in the context of bargaining under asymmetric information.

The instrumental variable estimates using this private information suggest a negative relationship between delay and equilibrium ransom prices, at least in settings in which the transaction costs of bargaining were high.[6] These estimates plausibly address endogeneity issues (in the context of the relationship between delay and equilibrium prices) that seem to have hampered many previous empirical investigations of asymmetric bargaining models (Kennan and Wilson (1989)).[7]

In settings with high transaction costs of bargaining for the rescuers, our nonparametric estimates of release price also appear to be monotonically decreasing over time. Hence, the data is consistent with theoretical predictions suggesting that the passage of time acted to separate out buyers with different evaluations through differential time costs.

We investigate various other correlations that are predicted by the theoretical models. One of these is that more uncertainty regarding the buyer's value leads to longer negotiations. Delay in agreement only occurs when there are buyer types with different evaluations and therefore different relative patience for getting to an agreement. The data lend some support to this prediction, in that individuals in professions that had a larger coefficient of variation of earmarked money sent from Spain were on average rescued after a longer delay.

[6] As we discuss in 3.3, there were significant differences in the time costs of bargaining for the rescuers between different Barbary strongholds.

[7] Card (1990), for example, found virtually no relationship between agreed upon wage and the length of negotiations analysing Canadian employment contract data for the period 1964-1985 despite the fact that all rational models of bargaining (when the relevant private information is on the firm side) predict a negative relationship between agreed upon wage and the length of negotiations. McConnell (1989), using US contract data for the period 1970-1981, finds a statistically significant negative relationship between average wage settlements and average strike duration, but this relationship is sensitive to the model specification.

We test predictions regarding differences in bargaining outcomes between settings with different transaction costs for the rescuers.[8] In line with the theoretical predictions, we find that where the transaction costs for the rescuers were high, negotiations were shorter, the probability of an unsuccessful negotiation was higher, and prices over the course of negotiations fell more steeply than where these costs were lower.

We also examine how settlement rates change over time. Bargaining models in which the relevant uncertainty is regarding the buyer's value do not provide clear predictions on this. However, we show that the empirical patterns are not consistent with an alternative class of models, in which the relevant uncertainty is about time preferences that predict that settlement rates should be ever decreasing.[9]

The remainder of the paper proceeds as follows. The second section provides a brief historical background of the Barbary Corsairs, the process leading to captivity and the organization of ransoming expeditions. Section 3 describes the bargaining process. Section 4 provides a theoretical overview. Section 5 uses the data to investigate the empirical relevance of the theoretical predictions. The final section concludes.

2 Historical Background

2.1 A Brief History of the Corsairs

Histories of the Barbary Corsairs traditionally begin with the "Red Beard" (*Barbarossa*) brothers.[10] These Muslim Greek-born brothers developed a reputation for military prowess, and eventually founded a corsairing state in Algiers (modern-day Algeria) in the early 16^{th} century. Soon after its foundation, this corsair state became part of the Ottoman Empire.

[8] Here we mainly use predictions from Cramton (1991), a model that considers both discounting and transaction costs for bargaining, but similar insights are obtained in other papers in the literature (see Section 4 for a summary).

[9] We can also reject another prediction of these models, namely that every negotiation leads to an extreme outcome in the division of the surplus.

[10] For a detailed treatment of the history of the Barbary Corsairs see among a large literature Julien (1970), Abun-Nasr (1977), Bono (1998), Davis (2003), Panzac (2005) and Weiss (2010).

Algiers and the other Ottoman-controlled North African provinces (which controlled the territories that roughly correspond to present day Tunisia and Libya) developed corsair fleets that targeted Christian European shipping and coastal populations in what was initially a form of low-intensity warfare between the Ottoman Empire and Christian European powers. As time progressed corsairing appears to have continued for mainly economic reasons.

In addition to these Ottoman centers, Muslim refugees from Spain developed corsairing fleets in Salé, Morocco (on the Atlantic coast) and Tetuan, Morocco (on the Mediterranean). Economic considerations also appear to have dominated in these corsairing centers.[11]

Corsairs and corsair states across North Africa derived revenues from the sale of captured merchandise and individuals. The sale of captured ships and individuals helped fill the state's coffers and led to the rapid growth of the population of the corsairing centers during Barbary's heyday.

At their height, the Barbary Corsairs significantly disrupted commercial routes in the Mediterranean (and to a lesser extent the Atlantic) striking as far afield as Iceland. In addition to their exploits at sea, the Corsairs made their mark on coastal settlement patterns in regions in close proximity to Corsair strongholds (like Spain's Mediterranean coast). Many areas in these regions became depopulated as the local populations fled continuous corsairing raids.[12] One scholar estimates that between 1530 and 1780 the Corsairs enslaved over one million European Christians (Davis 2001, 2003).

By the end of the 17^{th} century the Corsairs began a slow decline. In Algiers, contemporaries attributed the drop to more determined reprisals by European powers and a decreasing demand for slave labor (Davis 2001, p. 106). In Morocco, Mawlay Ismail (reigned 1672-1727) moved to curtail corsair activities in order to encourage legitimate commercial activity and to centralize political power (Friedman 1983, p. 29). By the start of European colonization in the 19^{th} century, corsairing activities had largely ceased.

[11] See Coindreau (1948, p. 27) and Maziane (2007, pp. 200-201).

[12] For the impact of piracy on Venetian commerce, see Tenneti (1967). For the impact of piracy on Spanish coastal settlement patterns, see Friedman (1983, pp. 48-49).

The remainder of this paper focuses on the corsairs that operated out of Algiers, Algeria and Tetuan, Morocco since the captives in the data set were ransomed from these centers.

2.2 Capture, Enslavement and the Christian Slave Population

2.2.1 Capture, Hiding One's Identity and Asymmetric Information

When captured at sea, soon-to-be captives often attempted to conceal their identity before the corsairs boarded their ships. Many wealthy captives changed clothes and threw them overboard in the minutes before capture in order to hide their true rank.

Although the corsairs (and subsequently the slave merchants and slave owners) did their best to obtain the rank and identity of their captives, some high-ranking captives were able to conceal their identities and obtain freedom for a fraction of their true value.

For example, in 1732 the Marqués de Valdecañas was captured and successfully concealed his identity (posing as a military officer) until he was finally discovered in 1736. After his discovery, the corsairs asked 800,000 reales for his release. The nobleman Don Pedro de Solís y Trujillo was ransomed in 1648 for 2,860 reales under the pseudonym of Pedro Alejandro (Friedman 1983, pp. 151-152).

These examples demonstrate that sometimes even the highest ranking nobles could pass as "normal" captives. Other times "normal" captives were mistaken for high ranking individuals. The Friar Jerónimo Gracián provides one example. Although he initially expected to be rescued quickly after his capture in 1592, his hopes were dashed when his captor became convinced that he was an archbishop on his way to Rome to become a cardinal (Friedman 1983, p. 56).

This uncertainty regarding a captive's worth will form an important part of the empirical analysis below. For now, it is sufficient to note that although slave owners had a general idea of each slave's worth (based on observables such as how long the slave had been left in captivity, the slave's occupation, age...), many slaves that appeared ex ante the same to the slave owners were worth varying amounts to the Spaniards.

2.2.2 Captivity in Algiers

After the corsairs had captured a ship (or made a land raid), they escorted their captives back to their home port.[13] Once the ship was in port, the corsair captain presented the ruler (known as the dey during much of the corsairing period) with a list of the captured booty.[14]

The dey's share of the capture varied widely although it usually fluctuated between 10% and 12% of a prize's total value. At times he took (what he thought were) the best captives, while other times the dey would wait until all the booty (captives and merchandise) had been sold in the market and take his share in cash. The remainder of the captives were usually sold in the Algerian slave-market, and the proceeds were divided between the crew and the outfitter of the corsair ship.

In the slave-market, captives were priced based on physical attributes and the potential for resale to the Spanish ransomers. Those who were thought to command high ransom prices were relatively well treated. Captives who were considered less important worked on public works and the galleys (Martínez 2004, pp. 63-64).

Algerian slave owners with sizeable slave ownings kept slaves in dungeons. Estimates of Algier's slave population range from 25,000 in the early 17th century to 500 in 1787 (Martínez 2004, p. 47).

2.2.3 Captivity in Tetuan

In addition to the captures made by Tetuan's local corsairing community, Tetuan elites bought slaves from corsairs in Salé and Algiers (Dan 1649, p. 270). Corsairing and slave trading led to Tetuan's emergence as one of Morocco's largest slave markets and corsairing centers (Gozalbes 1992, pp. 107, 291; Maziane 2007, p. 201).

Tetuan was governed by a local oligarchy headed by an official known as the *muqaddam* during much of 16^{th} and 17^{th} centuries. Members of this ruling elite and merchants owned

[13] This section draws on Bono (1998, pp. 193-196).

[14] See Shuval (2000) for a detailed overview of governing institutions in Algiers.

the majority of Tetuan's slave population. Although some slaves were kept in private houses, the vast majority appear to have spent their nights in underground caves. During the day the slaves left these dungeons to work in variety of capacities.

One estimate from the early 16^{th} century puts Tetuan's slave population at around 5,000. Although numbers from the 17^{th} century are not available, there never appears to have been a significant shortage of slaves for ransom in Tetuan during this period.

2.3 Spanish Rescue Missions to the Barbary States

After a captured individual had been sold to an owner, he could write a letter home (or have a fellow captive do so for him). Merchants carried these letters to Spain where they were delivered to a captive's family members. Slave owners often encouraged their slaves to write home, since they hoped the slave's family would send a ransom to secure their freedom.

Once a captured individual's family (or friends) learned of his fate, they would attempt to gather ransom money. When (and if) they gathered enough money, they had to find a way to negotiate and pay the slave owner. While a few individuals traveled to the corsair centers themselves or gave their money to merchants, the vast majority appear to have given their ransom money to one of Spain's redemption orders. These Catholic religious orders performed regular ransoming trips to the Barbary States, and would negotiate (and pay) the captured individual's ransom on behalf of the family.

From the reign of Phillip II (reigned 1556-1598) onwards, royal authorities appointed a notary to accompany these rescue missions (henceforth referred to as redemptions). This notary was required to record all financial transactions (apparently in an attempt to eliminate previous financial abuses (e.g. Friedman 1983 , p. 110)) and often provided anecdotes relevant to the bargaining procedures. These records were used to construct the data set used in the empirical section, and historians have generally stressed their quality and meticulous detail (Friedman 1983, p. 107). Summary statistics for these data are provided in table 1. A detailed overview of the data sources and an in depth discussion of the summary statistics

are provided in a separate data appendix.

2.3.1 Financing and Objectives

The ransoming trips were funded from alms[15], royal donations and "earmarked" donations (*adjutorios*) made by family members and friends of captives.

Miguel de Cervantes, the renowned Spanish author, was captive in Algiers from 1575 until his ransom in 1580. Cervantes –from a family of relatively modest means– was captured and ransomed long before his rise to fame. His *adjutorio* provides a good example of how the system of earmarked funds worked. In the notary's records from the ransoming expedition of 1580 to Algiers we read that:

> In the town of Madrid on the 31^{st} day of July of the said year [1579] [...] the redemptors received 300 *ducados* [a money of account in early modern Spain...] 250 of these came from the hand of Leonor de Cortinas, the widow of Rodrigo de Cervantes. The remaining 50 came from Andrea de Cervantes [... to aid] in the ransom of Miguel de Cervantes from the said town [Alcala de Henares] [...] who is captive in Algiers in power of Ali Mami, captain of the ships of the navy of the king of Algiers. [The said Miguel] is 33 years old and has lost use of his left arm. The redemptors then gave them 2 receipts [i.e. proofs of payment].[16]

In this trip, Miguel de Cervantes was rescued, although if he had not been rescued the negotiating team (henceforth referred to as redemptors) would have had to return the 300 *ducados* to his family. It is important to note that individuals were only allowed to send funds with the redemption if they had hard evidence (such as a letter) that the individual was being held captive in the redemption's destination.[17]

[15] The alms were collected throughout the year during church services and during special trips made by the redemptionist orders prior to a ransoming trip.

[16] AHN, códices, legajo 120, f. 32

[17] See Friedman (1983, p. 112) and BNM, MSS 3819, f. 3.

Summary statistics in table 1 show that in Algiers and Tetuan roughly 10% of all rescued captives were recorded as having been earmarked in this fashion. In addition to rescuing these earmarked individuals, the rescue missions were instructed to give preference to individuals who had been captured in the service of the king, priests, military captives, women and children.

2.3.2 The "Nuts and Bolts" of Redemption Trips

Spain Once the redemption order had decided to organize a trip to Barbary, they requested permission from the royal authorities to transport funds to the Barbary center of interest. In addition, they elected the redemptors to lead the ransoming expedition. These individuals appear to have been chosen according to their experience and ability.[18] Although we have not been able to find any direct reference to the incentive schemes used to motivate the redemptors, experienced redemptors were highly valued (BNM, MSS 3870, f. 10) and drawn from the highest level of the redemption orders.[19]

For trips to Algiers, the redemption order had to obtain a "passport" from the Algerian leadership in advance. The redemption order then publicized the redemption and individuals gave earmarked or general alms money. Armed guards escorted the money to the relevant port.

The Barbary States

Tetuan The redemption team hired a boat in Gibraltar to cross the straits to Ceuta, which was (and remains) a North African Spanish enclave. After arriving in North Africa, the commander of Spanish forces in Ceuta contacted the local leadership in Tetuan. This was usually done by dispatching a Muslim "runner."

[18] These negotiators were considered among the most skilled in Christian Europe (Davis 2001, p. 114).

[19] At least for the Mercederian order during the late medieval era. One historian speculates this might have been because "such senior brothers possess[ed] the prudence and experience necessary for the success of the mission" (Brodman 1986, p. 109).

This runner would return to Ceuta with a safe-conduct for the Spanish bargaining team. The safe-conduct contained the terms of the bargaining process (such as not forcing the bargaining team to buy slaves they didn't want) and guaranteed the safe passage of the bargaining team from Ceuta to Tetuan.[20]

At times the ruler of Tetuan would send a troop of cavalry to escort the team to Tetuan. Other times the Spanish would hire a ship to take them to Tetuan by sea. In either case, it was customary for the Muslim leadership in Tetuan to send hostages to stay in Ceuta for the length of the negotiations.[21]

Upon their arrival the redemption team stayed in a house in Tetuan's Jewish quarter. After the negotiations concluded, the owners and the redeemed slaves went to Ceuta where the slaves were freed and the owners paid.

Algiers When the Spanish bargaining team wanted to travel to Algiers, they first obtained a safe-conduct (passport) from local Algerian officials (Friedman 1983, p. 129). Trips to Algiers usually originated in Cartagena (which is located in south-eastern Spain), and the redemptors hired a boat and its captain for the duration of the trip.

Algerian officials met the bargaining team upon its arrival in Algiers. They then unloaded the money and merchandise to be used in the negotiations.[22] The Algerian ruler usually kept between 3% and 5% of the off-loaded funds as an "entrance tax." The remainder of the money was in theory kept by the redemption team, although in practice the dey could access the money at will.

In Algiers, the redemptors stayed in a house provided by government officials. After negotiations concluded, the redemptors paid an "exit tax" for each ransomed captive.

[20] For an example of such a safeconduct see AHN, códices, legajo 140, ff. 28-29.

[21] AHN, códices, legajo 143, f. 3; BNM, MSS 3819, f. 13

[22] It is important to note that while the Algerians could view the lion's share of the redemptions funds, they did not know who those funds were earmarked for.

Military and Bargaining Power We think of differences in the bargaining process between Algiers and Tetuan as driven primarily by differences in the military prowess of these two centers. The greater military strength of Algiers, in turn, probably was driven (at least in part) by its greater distance from the Spanish mainland.

Algier's military power led to both a larger slave population and a greater ability to impose bargaining institutions that worked to the corsairs' favor. Spanish negotiating teams appear to have agreed to these conditions because threats of military action to secure better terms were not credible. In Algiers, the Spanish seem to have relied heavily on the threat of not sending future ransoming trips to Algiers (repeated game) to secure their security.[23]

In Tetuan the proximity of a Spanish military garrison appears to have led to bargaining institutions that were more favorable to the Spanish. For much of the empirical analysis we will implicitly make assumption that the only way that differences in military power affected bargaining outcomes was through the supply of slaves and the shaping of bargaining institutions.

3 The Bargaining Process and Relative Bargaining Power

3.1 The Bargaining Process

Bargaining usually began with the slaves of the leading political figures in both cities (*forzosos*). The redemptors were expected to buy a fixed number of *forzosos* at an inflated price. One redemptor described these captives as "the worst possible" (Garí y Simuell 1873, p. 282). The identity, number and price of these captives were usually a subject of intense negotiations.

After a period of bargaining, the two parties would come to an agreement. If money was left over after the *forzosos* had been redeemed, private sellers could sell their slaves to the redemptors. In most trips the redemptors rescued a sizeable amount of captives from private

[23] For an example of such threats see Garí y Simuell (1873, p. 326).

owners.[24]

In general, negotiations for private slaves appear to have been carried out mainly around the redemptors' house, the houses of the individual slave owners or in a government-provided building.

The redemption team seems to have usually started negotiations (in a broad sense) with private owners at roughly the same time. This is important since in the empirical section we treat all private owners as having started negotiations at the same time. The start of negotiations was publicly announced[25] and the redemptors made lists of the identities and whereabouts of the captive population before starting negotiations.[26] Thus, even when the redemptors started physical negotiations with private owners at different times, a given owner knew how long the redemptors had waited to contact him. This delay seems to roughly convey the same information to the owner as direct delay in negotiations.

Once a ransom price had been agreed upon, the redemptors gave the owner a signed certificate with the agreed upon amount. These certificates were redeemed for the ransom price at the end of the negotiations.

3.2 Bargaining Tactics

3.2.1 Spanish

Many of the surviving record books contain detailed bargaining instructions given to the redemption team before each trip. These instructions stress the importance of hiding one's true valuation and using the passage of time to obtain lower prices. An informative extract from these instructions states that:

> the redemptors should feign indifference to the captives they most want to rescue,

[24] The sources suggest that if the political leaders did not allow private citizens to ransom their slaves they faced revolt (Garí y Simuell 1873, p. 332).

[25] See AHN, códices, legajo 143, f. 34.

[26] See BNM, MSS 3628, f. 101 ; AHN, códices, legajo 126, ff. 20-21 and BNM, MSS 3590 f. 39 for examples of compiling lists of the captive population prior to negotiations.

> and should pretend to only care about silver and not the captives. Since the Turks are greedy and love silver more than the good service of their slaves, they don't want to miss the chance to make money [...so that] every day the redemptors delay, they will save 20%.[27]

Qualitative evidence suggests that the redemption team largely followed these instructions, carefully guarding the identities of the earmarked captives[28] and delaying the rescue of many captives both within and between trips to obtain lower prices.[29]

Bundling In addition to these tactics, the historical evidence suggests that the redemptors sometimes attempted to bundle captives (that is negotiate for more than one captive for the same price) in order to conceal the identity of the captives they desired the most and to speed up negotiations.

An anecdote from one redemption trip relates how the redemptors used bundling:

> [in one trip the inhabitants of Tetuan] knew that the redemptor carried a large amount of money [...] but the redemptor feigned that he wanted to go elsewhere. The more that the inhabitants of Tetuan –moved by their greed– pleaded with him, the more the redemptor pretended he wanted to go somewhere else. Finally [...he agreed] as long as he could ransom all the captives at the same price [...and he] redeemed 325 captives, among them many priests, officials, children and women that would have otherwise cost him more.[30]

Another anecdote shows how the redemption teams used bundling to speed up negotiations. The redemptor states that:

[27] BNM, MSS 2974, ff. 5-6.

[28] For examples see Garí y Simuell (1873, p. 288) or BNM, MSS 647, f.6.

[29] See section 5.1 for a definition of within and between trip delay and Garí y Simuell (1873, p. 393) for an example of between trip delay.

[30] Garí y Simuell (1873, p. 316)

> had we negotiated separately captive by captive we would have lost much time and money [...] but we were able to rescue all the captives for one price and thus obtained greater clarity and less confusion.[31]

In sum, the redemption teams appear to have believed (at least in some situations) that bundling captives could lead to shorter negotiations and lower prices. There is also evidence that other times it was the slave holders who initiated bundled negotiations, such as for the release price of *forzosos*.

3.3 Geographic Variation

As noted in section 2.3.2 the redemptors had a stronger bargaining position in Tetuan than in Algiers. This subsection summarizes and provides greater details on the differences in bargaining conditions between the two centers.

The Storing of the Ransom Funds In Tetuan, the redemption team left their funds in the Spanish enclave of Ceuta for the length of the negotiations. Many examples (one is cited above) suggest this provided the redemption team an additional bargaining chip. In Algiers, however, funds were off-loaded by Algerian officials and kept in their care.

Muslim Hostages As previously noted, the inhabitants of Tetuan routinely sent Muslim hostages to Ceuta for the length of the negotiations. Similar arrangements did not occur in Algiers.

The Cost of Time The cost to the redemption of an additional day of negotiations appears to have been substantially higher in Algiers than in Tetuan.

First of all, the redemption team in Algiers incurred more direct costs on a daily basis than the redemption team did in Tetuan. In Algiers, the redemption team had to hire a ship

[31] Garcia (1946, p. 293)

that remained in port until the redemption was over and appears to have paid higher rent for their accommodations.

In addition to higher direct monetary costs, the redemption team in Algiers faced a higher probability of capture or bodily harm than it did in Tetuan. Thus an additional day of negotiations "increased the risk of capture of the entire bargaining team" (Martinez 2004, p. 99). In Tetuan the proximity of a Spanish enclave (and the possibility of rapid military intervention) seems to have greatly reduced this risk of capture.[32]

In sum, per-day negotiation costs appear to have been substantially lower in Tetuan than in Algiers. These differences in costs are reflected in the statement of one historian who suggests that "abuses were far less frequent [in Tetuan] than in Algiers" (Friedman 1983, p. 142) and among the opinions of contemporary redemptors. One redemptor summed up these differences by noting that:

> [negotiations in Tetuan are preferred] because amongst all Barbary, those in Tetuan are the most humane, and are more trustworthy. Moreover, it is much easier to perform the redemption in Tetuan [... in Algiers] the Corsairs have been accustomed to persecuting Christians once they have entered their country (Dan 1649, p. 270)

4 Theoretical background and predictions

We consider negotiations for ransom between the Spanish rescue team and the captive holders as a dynamic bargaining game with asymmetric information. In particular, the relevant private information is the exact value of a given captive for the rescuers. This is because the value of a particular captive for the Spaniards always had a component not known by the slave owners: the amount of earmarked money that was collected for the given captive. Over

[32] There are no documented examples (to the best of our knowledge) of the redemption team being held captive in Tetuan. In Algiers, however, the redemption team was held captive on at least one ocassion (Friedman 1983, pp. 136-138) and was threatened with death by fire on another (Garí y Simuell 1873, p. 326). See also the discussion in Friedman (1983, p. 142).

time, the captors could learn the distribution of this private value conditional on observables of a captive, but not the exact value for individual captives. In contrast, other important parameters for the bargaining process, such as the parties' time preferences and transaction costs, or reservation values of different types of captives for the holders, could either be observed by the parties through public information (such as interest rates charged by money lenders, or the price that a certain type of captive could be sold at slave markets) or learned over time.

In subsection 4.1 we provide a brief summary of models of bargaining with private value for the buyer, and in subsection 4.2 we describe some of the testable implications of such models. Since the predictions of different models within this class are qualitatively similar, we focus on general implications of these models. Subsection 4.3 discusses the aspects of the bargaining environment that are missing from existing models of dynamic bargaining. This subsection both calls attention to the fact that the bargaining models that we take to the data are only rough approximations of the bargaining situation we investigate, and point to useful directions for future theoretical work.

4.1 Models of dynamic bargaining with privately known valuation for the buyer

Dynamic bargaining models that assume one-sided private information regarding the value of the object for the buyer are incomplete information extensions of the models proposed by Stahl (1972) and Rubinstein (1982). In particular they assume that the seller and the buyer cannot commit their future actions, and require sequential rationality during the negotiations. They differ in whether time is modeled discretely or continuously, in the specification of time costs during negotiations, whether there is a deadline for negotiations, and in the specification of the rules of the game: who can make an offer and when. Below we briefly summarize the most standard models used in the literature, and their equilibrium implications. All the models reviewed here assume that there is one buyer and one seller,

bargaining for one indivisible object, and that all parameters besides the buyer's evaluation are commonly known by participants.

Screening models

The technically simplest models considered in the literature assume that only the uninformed party (the seller) can make offers, and there is a fixed amount of time that has to elapse between offers. They are referred to as screening models, as the seller's offers at different points of time are accepted by only certain buyer types, hence the seller screens different types of buyers throughout the bargaining process. Sobel and Takahashi (1983) introduced a finite version of the model, while Fudenberg at al. (1985) and Gul et al. (1986) extended the analysis to infinite-horizon. The equilibrium dynamics in these models are simple: the seller proposes a decreasing sequence of prices. In each round, there is a cutoff buyer type such that all remaining buyer types above this level accept the proposal, while buyers with evaluation below this level reject it. The main intuition is that buyer types with higher evaluation are more impatient and willing to pay higher prices to receive the object earlier. In the finite-horizon case, and in the infinite-horizon case if there is a gap between the outside option of the seller and the lowest possible evaluation of the buyer, there is an essentially unique perfect equilibrium, which can be obtained by backward induction techniques.[33]

Versions of the above models in which the buyer and the seller make offers alternatingly are screening models with an element of signaling. The latter is because proposals by the buyer can reveal private information about his valuation of the object. These models typically have a severe multiplicity of equilibria, as there is a lot of freedom in specifying the updated beliefs of the seller regarding the buyer's valuation after an out-of-equilibrium proposal by the buyer. Grossman and Perry (1986) propose a refinement of sequential equilibrium, called perfect sequential equilibrium, and show that under weak assumptions it is unique, and that

[33] Gul et al. (1986) shows that if there is no gap between the seller's outside option and the lowest possible evaluation of the buyer then there is a multiplicity of equilibria, although the different equilibria have similar qualitative features.

it can be computed by backward induction.[34] In this equilibrium at any stage when the seller makes an offer, buyers with valuations above a certain threshold accept the offer, buyers with valuation below a lower threshold decline the offer and make an unacceptable counter-offer (essentially giving back the proposal right to the seller), while buyers with valuation between the above two thresholds decline the seller's offer but then offer a lower price that the seller accepts. The resulting equilibrium is similar to equilibria of pure screening bargaining games.[35]

A common feature of the screening type models discussed above, as shown in Gul et al. (1986) and in Gul and Sonnenschein (1988), is that as the time between rounds goes to zero (alternatively, if the parties become more and more patient), expected negotiation times go to zero and the expected price converges to the lowest possible evaluation of the buyer. This phenomenon, referred to as the Coase conjecture, is intuitively because the seller has an incentive to speed up negotiations through decreasing price faster, to sell earlier to buyers planning to buy in the future, and this incentive is larger when the round length is smaller.[36] For this reason, for screening models to be able to explain lengthy delays in negotiations, it is necessary to assume that the time period between possible offers is substantial.[37]

Signalling models

A major alternative to the above models is a class of models in which a player whose turn it is to make an offer can wait before doing so, endogenizing the timing of the offer. These models are usually labeled as signalling, because in such a framework a low valuation buyer can credibly signal his type by waiting longer before making a (counter-)offer. The version of the model investigated in Admati and Perry (1987) assumes alternating-offer bargaining,

[34] See also Rubinstein (1985) and Bikhchandani (1992) for other refinements of sequential equilibrium in related models.

[35] Simulation results in Grossman and Perry (1986) show that the expected length of negotiations is longer and the expected price is higher in the equilibrium they focus on in the alternating offer model than in the equilibrium of the corresponding pure screening game.

[36] See Coase (1972) and Stokey (1981).

[37] For example in wage bargaining, using US data, the point estimate Fudenberg et al. (1985) obtain for the period length between offers is 5.2 weeks.

with the seller making the first offer. After a rejected offer, there is a minimal required time that has to lapse before the other player can make an offer, but the player can decide to wait any additional amount of time. Admati and Perry focus on an equilibrium in which the seller's initial offer is accepted by high valuation buyers, while the rest of the buyers reject the offer and wait an amount of time that credibly signals low valuation. In equilibrium these buyer types perfectly reveal themselves, hence the price they achieve is the same as in an alternating-offer bargaining game with no private information (Rubinstein (1982)).

Signalling models have the attractive feature that the Coase conjecture does not hold. That is, they can explain significant delays in negotiations even if the minimal required delay between offers is very small. This is because the amount of time necessary for a low valuation buyer to signal his type does not depend on the minimal waiting time. The important assumption in these models is that bargainers can commit to not revising an offer until a counteroffer is made.[38]

A version of the signalling model that is of particular interest to us is the one presented in Cramton (1991), as it introduces a transaction cost for bargaining (on top of discounting), that is a fixed cost per unit of time that all buyer types have to incur as long as negotiations last, and the possibility of terminating negotiations if a party foresees that he would have to incur too high transaction costs before reaching an agreement.[39] This is important in our context, as the Spanish rescue teams faced significant transaction costs when negotiating in corsair territory (particularly in Algiers).

Players in Cramton's model make offers alternately, with the initial offer made by the seller. As in other signalling models, a player whose turn it is to make an offer can choose to delay the offer endogenously. Each player is allowed to terminate negotiations at any time

[38] However, if one allows for nonstationary strategies, the signaling equilibrium outcome can be approximated as a perfect Bayesian Nash equilibrium in the alternating-offer bargaining game with a fixed time between offers when time between offers is small (see Ausubel and Deneckere (1994)).

[39] As Fudenberg et al. (1985) points out, introducing transaction costs and the possibility of exit to a pure screening model such as in Fudenberg and Tirole (1983) results in only trivial equilibria existing, in which every buyer type quits the negotiations immediately. As Perry (1986) shows, negotiations end immediately even if exit is not a possibility, and the party with the lower transaction cost gets all the surplus. Therefore screening models with transaction costs cannot explain delay in negotiations.

(in which case the object is not traded, but the parties cannot retrieve the transactions costs already incurred).

It is shown that if the transaction cost is higher than a certain threshold, sequential equilibrium implies negotiations with zero length, with all buyer types either immediately accepting the seller's initial offer or terminating negotiations. Intuitively, it is not worth delaying agreement in the hope of better terms of trade if the costs of waiting are too high.

In contrast, if the transaction cost is low enough, there exists a sequential equilibrium in which along the equilibrium path the players' actions are as follows: (i) buyer types with high enough evaluation accept the seller's initial offer; (ii) buyer types with a low enough valuation reject the seller's initial offer and terminate negotiations; and (iii) in-between buyer types reject the seller's initial offer, and strategically wait a certain amount of time before making a counter-offer that is accepted by the seller. The amount of time these latter types delay the counter-offer credibly signals their type to the seller.[40] In particular, high types do not find it worthwhile to imitate these in-between types through a delayed counter-offer. Types with low evaluation terminate the negotiations because the transaction costs from credibly demonstrating low valuation would outweigh the payoffs from acquiring the object.

To summarize, in Cramton's model there are three possible sources of inefficiency stemming from asymmetric information. If the difference between the buyer's and the seller's evaluations is small, the exchange does not happen (negotiations are terminated) even if there are gains to trade. If the difference in evaluations is from an in-between range, the transaction takes place, but with a delay that implies both type-dependent waiting costs (discounting) and type-independent transaction costs.

Alternative models

An important alternative to the models described above is provided by attrition models,

[40] In fact, in equilibrium these types perfectly separate themselves, and the resulting division of the surplus is the same as in a complete information bargaining game (Rubinstein, 1982). This also implies that in this range the amount of delay monotonically decreases and the ultimate price monotonically increases in the buyer's evaluation.

in which the uncertainty is about the transaction costs of the bargaining partners (Milgrom and Weber, 1985). Such models lead to a "war of attrition", in which eventually one of the bargaining partners gives in and concedes the surplus to be divided from bargaining completely. For various reasons we think that this model is not a fitting description of the negotiations in our setting. First, we think that the time costs of bargaining for the two parties could be learned over time. Second, such a model would imply that in each negotiation the rescuing team spent either none or the full amount of earmarked money for a given captive, which is not the case in the data we observe. Nevertheless, below we test one identifying feature of attrition models in our data, which is that settlement rates are perpetually declining.

For an informal discussion of other alternative models of dynamic negotiations, see Kennan and Wilson (1989).

4.2 Testable implications of the models

In this subsection we summarize some of the implications of the models described in the previous subsection, with particular attention to common predictions of signalling and screening models.

Relationship between length of negotiations and negotiated price

The main prediction, shared by all rational models of dynamic bargaining with one-sided private information on the buyer side is that there is a negative relationship between the buyer's value and the length of negotiations, otherwise high value buyers would find it worth to imitate low value ones.[41] A higher value of the buyer implies larger costs of time before reaching an agreement, thus willing to wait longer becomes a credible proof that a buyer's value is low. This prediction in our setting implies that given a fixed setting of negotiations

[41] If the seller is making all the offers and there is a gap between the seller's evaluation and the lowest possible evaluation of the buyer, then the sequence of offers in equilibrium has to be decreasing over time, too, as shown in Fudenberg et al. (1985).

and a homogenous set of captives (from the captors' point of view) both the amount of earmarked money and the release price of a captive should be negatively associated with the length of the negotiations for the captive. As a more basic prediction, there should be a negative relationship between negotiated price and the length of negotiations.

Effect of time preferences and transaction costs

In both screening and signalling models, it is difficult to derive general predictions analytically regarding the effect of an increase in one party's time cost (either increasing impatience or transaction costs). Nevertheless, there is a strong intuition arising from Rubinstein's complete information bargaining model, suggesting that such an increase decreases the surplus that the given party gets in equilibrium, by inducing him to accept less favorable offers to avoid costly delay. Indeed, in different types of models, Sobel and Takahashi (1983), Cramton (1991) and Cramton and Tracy (1992) report results confirming this intuition, either through numerical simulations or by analytically solving the model in special cases. Cramton (1991) also shows that as transaction costs increase, the duration of negotiations decreases, and the frequency of termination increases.

In our context, since the Spaniards faced higher transaction costs in Algiers than in Tetuan, the above results suggest that we should expect the Spaniards to be able to retain less information surplus in negotiations in Algiers. In particular, in successful negotiations, the captors are predicted to be able to extract a higher fraction of the ear marked money in Algiers. Furthermore, we expect a larger fraction of the ear marked money to be returned from Algiers (indicating more terminated negotiations), and shorter negotiations on average. These predictions are subject to the assumption that the distribution of evaluations is similar enough in the two locations, conditional on observables, that it does not overcome the effect of differences in transaction costs.

Effect of the amount of uncertainty

Another common feature of different bargaining models, although also one that proved to

be difficult to formalize analytically, is that more uncertainty leads to longer negotiations.[42] This is easy to see in the limit case of no uncertainty: the unique perfect equilibrium involves immediate agreement (see Rubinstein (1982)). Similar conclusions apply when the uncertainty about the buyer's value is small (see Rubinstein (1985)). For larger amounts of uncertainty, because of the relative complexity of bargaining models with asymmetric information, it is only possible to show that more uncertainty tends to lead to longer negotiations in restricted classes of games or through numerical computations, as in Grossman and Perry (1986) and Kennan and Wilson (1989). With the above caveats, the prediction in our setting is that given two otherwise comparable homogenous group of captives, and the same mean earmarked money, the group with higher variability of earmarked money should be associated with lower prices and longer negotiation times.

Settlement rates

The screening and signalling models described above give predictions about settlement rates only under special assumptions. On the other hand, attrition models yield the testable implication that settlement rates are monotonically decreasing (see Kennan and Wilson (1989)). This prediction can be confronted with our data.

4.3 Aspects of the ransom negotiations not incorporated in existing models of dynamic bargaining

There are some important aspects of the negotiations that as far as we know are not addressed in existing models of dynamic bargaining. We discuss a few of these below both to recognize potential shortcomings in our empirical analysis and in the hope of providing direction for future theoretical research.

[42] Tracy (86,87) conducts an empirical investigation along these lines, suggesting that the extent of the union's uncertainty about the firm's profits might be associated with variability of the firm's market value. He finds a significant positive empirical association between this measure of uncertainty and both strike incidence and duration, consistent with the theoretical prediction.

First, it is important to note that we treat every negotiation in isolation. In reality, the thousands of negotiations in our data set were part of a meta-game. Within the context of a given trip, the captive-holders competed to sell their slaves to the Spaniards. At the macro-level, the two corsair stronghold competed to attract redemption trips. Despite these facts, we generally abstract from important issues such as reputation-building, reputation-erosion, or inventory-building by the negotiating parties.[43]

Second –and on a related point– the models we consider do not incorporate either budget constraints (upper bound on the amount of money spent) or spending constraints (lower bound on the amount of money spent). In reality, the rescuers faced a soft form of both constraints, at least in Algiers, where they had to unload their money at the beginning of a trip. Spending more money than they had brought was costly, as it involved borrowing extra money at high interest rate. But spending less than the total amount involved costs as well, as any remaining money would have to be "wrestled back" from the dey.

Another aspect that played an important role in our context was the practice of bundling or negotiating for the release of a group of captives as opposed to negotiating for each of them separately. As seen in table 1 a large number of captives were ransomed in this manner. This aspect is not addressed in the existing literature in dynamic bargaining, despite a clear rationale for bargaining for bundled objects: it can cancel out idiosyncratic differences (more precisely, make the distribution of values more peaked), hence make negotiations shorter. This can potentially benefit both of the negotiating parties, by reducing the welfare losses from time costs and terminated negotiations.

Some intuition can be obtained about the effects of bundling in dynamic bargaining situations from a related literature on bundling and pricing decisions of a monopolist seller in a static context.[44] The latter can be viewed as a 1-period bargaining game in which the

[43] This can be partly justified by the fact that the identities of the Spanish negotiators and the set of sellers often changed from trip to trip.

[44] See for example Adams and Yellen (1976), McAfee et al. (1989), Armstrong and Rochet (1999) and Fang and Norman (2006). There is also a literature on bundling decisions in a mechanism design context. See Palfrey (1983), Chakraborty (1999), Avery and Hendershott (2000), Armstrong (2000) and Jehiel et al. (2007). Some of the qualitative conclusions of this literature are similar to those obtained in the nonlinear

seller makes the offer. The main takeaway from this literature is that some form of bundling is likely to be optimal for the seller. Our intuition is that similar results are likely to extend to dynamic bargaining situations, but this is an issue that clearly deserves to be investigated formally. In particular, it would be useful to characterize conditions under which bundling ex ante benefits both of the bargaining parties.

5 Empirical Results

This section uses the data on privately owned individuals to investigate the empirical relevance of the theoretical predictions outlined in the previous section.[45] For clarity we will test these predictions following the 4 general categories outlined in the previous section: i. predictions involving the relationship between length of negotiations and negotiated price ii. those regarding the effect of time preferences and transactions costs iii. those involving the effects of uncertainty and iv. those involving settlement rates.

5.1 Relationship between length of negotiations and price

As noted in the previous section, all else equal we expect the amount of earmarked money and the release price of a captive to be negatively related to the negotiation time (henceforth referred to as delay). We consider both between-trip and within-trip delay.

By between-trip delay we mean the effect on a captive's ransom price of delaying the captive's rescue an additional year. We use this metric (time in captivity when ransomed) as a proxy for the amount of redemption trips missed.[46]

Similarly, we define within-trip delay as delay that occurs within a ransoming trip. While

pricing context. See the paralells between the results in Amstrong and Rochet (1999) and Armstrong (2000).

[45] We limit the sample to privately-owned individuals because these individuals were not able to coerce the redemption team to the same extent as the government was able to. Results for government-owned captives, however, are qualitatively similar to those reported below although generally not statistically significant. Pooling all captives generally increases significance.

[46] Using the variable MissedTrips yields qualitatively similar point estimates, although these appear to be attenuated (probably due to measurement error in our measurement of trips elapsed).

we always report results using days elapsed since the start of negotiations for completeness, in practice this metric presents some problems. First of all, a few trips in both Algiers and Tetuan ransomed a few captives after an extremely long delay (over 100 days). The results are extremely sensitive to these outliers (even after including trip dummies). While dropping these outliers often produces results that are consistent with the theoretical predictions, we include those using the whole sample for transparency. In addition to this problem, the variable DaysElapsed is missing for a substantial number of captives (especially those rescued from Algiers).

For these reasons, we created an alternative metric for within trip delay. This metric uses the percentile position of a captive in the rescue order within a trip. For example, if a captive was the 70^{th} captive rescued out of a total of 140 captives rescued in that trip, his percentage elapsed variable is equal to 0.5. Results using this metric are quite robust and can be computed for almost all ransomed individuals.

Regardless of the metric we use to measure within-trip delay, recall that we expect there to be a negative relationship between the buyer's value and the length of negotiations.

We begin by investigating the time path of prices and our proxy for valuations (a dummy for whether or not a captive had earmarked money) over time. The nonparametric fit (lowess smoother with bandwidth 0.8) of both against our measurements of within and between delay are presented in figure one. The top two graphs detail the estimated path of price against delay. The bottom two graphs detail the fitted values of earmarked money against delay. The graphs on the left hand side examine within-trip delay, while those on the right examine between-trip delay.

In Algiers, the non-parametric fits appear to be consistent with the theory.[47] As time goes on prices fall as does the probability that a rescued captive was earmarked. In Tetuan, however, the theoretical predictions do not seem to hold as prices are roughly flat and the

[47]Prices appear to have been higher in Tetuan than in Algiers. This seems to have been because i. the government in Algiers imposed additional costs on captives (above the ransom prices) that were not recorded in many books and ii. the supply of captives in the Algerian slave markets was significantly higher than in Tetuan (BNM, MSS 4405, f. 18).

decrease in the probability of being earmarked is not as pronounced as in Algiers.

For a formal test of the relationship between delay and equilibrium prices, we begin by relating the delay in negotiations with the equilibrium price:

$$\ln(price_i) = \alpha + \beta Delay_i + \varepsilon_i \tag{1}$$

Results from (1) are presented in columns (1), (3) and (5) of panels one and three of table 2 for Algiers and Tetuan. Column (1) uses between trip delay, and columns (3) and (5) use within trip delay. Columns (2), (4) and (6) include trip and profession dummies in addition to a vector of controls.[48] The results in panel one suggest that in Algiers a 10 year increase in time in captivity is associated with between a 9% and 16% decrease in the equilibrium price. Similarly, being rescued at the end of the negotiation period (as opposed to the start) is associated with roughly a 40% decrease in the equilibrium price. In Tetuan (panel 3), however, the results are not statistically significant and suggest that –if anything– delay led to higher prices. Finally, results using days elapsed as a metric for within trip delay are not robustly significant in Algiers or in Tetuan.

Unfortunately, there is little reason to believe that $\hat{\beta}$ in a regression similar to (1) will provide the causal effect of delay on equilibrium prices. To understand why, recall that our sample consists only of captives actually ransomed from the corsairs. In each trip (when including trip dummies), we use the ransom prices of captives who were ransomed after varying delays to obtain an estimate of $\hat{\beta}$.

Although all ransomed captives were "desirable" to some extent, the historical evidence suggests that delay was more likely for captives the corsairs believed to be worth large amounts of money. This heterogeneity would act to create an upward bias in our estimate of $\hat{\beta}$ to the extent that we do not observe all the relevant characteristics of a captive. This is due to the fact that "normal" captives were more likely to be ransomed before those who

[48] This vector contains a dummy variable for female and a variable measuring the captive's age. We choose not to include some of the other covariates because including these covariates leads us to drop a large amount of observations (although results are generally qualitatively similar).

were worth more.

On the other hand, one would expect the redemption team to attempt to ransom captives who were worth more sooner than those who were worth less. In this case, unobserved heterogeneity would act to create a downward bias in $\hat{\beta}$. A priori, we do not know which bias dominates.

Fortunately, our theoretical framework suggests a way to identify the causal effect of delay on equilibrium prices under plausible assumptions. To understand this strategy, recall that the corsairs did not know with certainty which captives had earmarked money sent for them and the Spanish negotiating team did their best to hide this information. Moreover, among the captive population (at least those who were considered for ransom) earmarked funds appear to have been roughly randomly allocated (this randomness, in turn, seems to have been due to variability in a captive's family support and the time it took family members to gather funds).

The ransomed population (our sample) thus contained i. individuals who were ransomed in a trip because they had money sent for them and ii. individuals who were "desirable" yet did not have ransom money sent for them. The critical assumption we make is that within the ransomed group of captives, the only way that our dummy for earmarked money affected the final ransom price (conditional on the observable characteristics of a captive) was through a shorter elapsed negotiating time until rescue. In other words, we assume that the only way the corsairs knew they could charge a higher price for the earmarked captives than for the other rescued captives was due to the fact that the Spaniards wanted to rescue one captive after less time in captivity than another captive with the same observable characteristics.

This reasoning suggests that the only way earmarked money should affect equilibrium prices in the rescued sample (conditional on the corsairs' information set) is through a shorter period of delay. That is, the variable earmarked money should be a valid instrument

for $Delay_i$ in (1).[49][50]

Results in panels 2 and 4 of table 2 provide the estimates of $\hat{\beta}$ estimated in this manner for captives rescued in Algiers and in Tetuan. Results in columns (1) and (2) for Algiers suggest that a one year increase in between-trip delay resulted in between a 19% and a 31% decrease in prices. The first stage in Algiers is strong, suggesting that earmarked individuals were rescued between a year and a year and a half before individuals who had not been earmarked. The IV estimates are roughly 10 to 30 times the magnitude of those estimated using OLS. This result is consistent with the historical evidence that many valuable captives were left in captivity longer to obtain lower prices.

Unfortunately, in the remaining specifications the dummy variable earmarked is a weak instrument for $Delay_i$.[51] Much of this may be due to measurement error in our dummy for earmarked (see appendix for a discussion and the conditions under which IV remains consistent).

In sum, the theoretical predictions suggest that delay should be related to lower equilibrium prices. While we are able to plausibly establish a causal confirmation of this prediction for between-trip delay in Algiers, weak instrument issues do not allow us to reject or confirm this theoretical prediction in the remaining situations. Despite this fact, in Algiers the correlations appear generally consistent with the theory. Those in Tetuan, however, seem to support the theoretical predictions to a lesser extent.

The finding that the theoretical predictions hold to a greater extent in the Algerian sample than in sample from Tetuan is characteristic of much of the empirical section. These results suggest that the predictions of dynamic models of bargaining are more likely to be confirmed in settings where the time costs of bargaining are high.

[49] One might worry that the dummy variable for whether or not a captive was earmarked might be proxying for unobservable characteristics that are viewed by the corsairs but not by the econometrician. While possible, the distribution of earmarked money is quite wide, with low amounts of earmarked money constituting a substantial part of the sample.

[50] Using the variable amount of earmarked money as an instrument for delay, as opposed to the dummy variable indicating earmarked money, yields almost identical results.

[51] The first stage point estimates on the instrument (earmarked) are provided in the sections labeled "First Stage" stage in panels 2 and 4.

5.2 Time preferences and transaction costs

Theoretical considerations suggest that due to higher time costs of bargaining for the rescuers (i.) negotiations should have been more likely to be terminated in Algiers. In addition, we expect (ii.) prices to decrease more rapidly in Algiers than in Tetuan and (iii.) negotiations to be shorter in Algiers. Finally, we expect (iv.) the corsairs to be able to extract a higher fraction of earmarked money in Algiers than they were able to do in Tetuan.

5.2.1 Terminated Negotiations

Figure 2 provides evidence in support of prediction (i.).[52] The x-axis details the logarithm of the amount of money sent for a given captive. The y-axis provides the estimated probability a captive was successfully rescued. The solid black line gives the non-parametric estimate of the probability of rescue for earmarked captives in Algiers (estimated non-parametrically using a lowess smoother with bandwidth 0.8). The dashed line gives the same probability for captives with earmarked money in Tetuan. It is clear from the graph that for similar levels of earmarked money, the probability of successful rescue was generally higher in Tetuan than in Algiers. These differences are statistically significant when one removes the few outlying observations in the right tails of Tetuan and Algiers.

While this finding is consistent with a higher probability of termination of negotiations (failed negotiations) in Algiers, it is also consistent with other explanations. For example, individuals may have been more likely to die in Algiers or to be sold to owners in different areas.

In an attempt to get at this issue, we created a data set of captives for whom at least one previous negotiation failed. The main idea here is that if the same individual appears as earmarked in separate trips, then we know that he is alive and that negotiations failed in the previous trip. After using extremely conservative matching criteria that appear to have done a good job of minimizing type-II error (that is, only keeping individuals for whom

[52] For a few anecdotal examples of failed negotiations see Friedman (1983, pp. 149, 155-156).

there is a high certainty that (at least) one previous negotiation failed), we were left with 62 individuals.[53] Of these individuals (for whom at least one negotiation failed) 53 (85.48%) were captive in Algiers. Formal statistical tests comparing this proportion to the percentage of total rescued captives from Algiers (73%), the proportion of earmarked captives from Algiers (74%) or the proportion of rescued earmarked captives from Algiers (70%) all reject equality at the 1% significance level. This result, again, is consistent with a larger number of failed negotiations in Algiers.

5.2.2 Rate of Price Decrease

We test whether the rate of price decrease is greater in Algiers than in Tetuan by running a regression of the form

$$\ln(price_i) = \alpha + \beta_1 Algiers_i + \beta_2 Delay_i + \beta_3 Delay_i * Algiers_i + \varepsilon_i \tag{2}$$

where $Algiers_i$ is a dummy variable equal to one if the captive was rescued in Algiers. Results from regression (2) are presented in table 3. Results in columns (1) and (3) show that our estimate of β_3 is indeed negative for both within and between trip delay. Results in columns (2) and (4) confirm that these results are robust to the inclusion of covariates. Finally, results using DaysElapsed are not robustly significant and have the "wrong" sign.

While we recognize that $Delay_i$ is likely endogenous, weak instrument problems render IV estimates of (2) uninformative.

5.2.3 Length of Negotiations

Table 4 investigates prediction (iii.) by regressing within and between trip delay on an Algiers dummy variable. Columns (1) and (2) present the point estimates with DaysElasped as the dependent variable. Once quarter century year dummies are included in column (2),

[53] These criteria are detailed in the data appendix. Less stringent criteria mostly yield qualitatively similar results.

results are significant at conventional levels and suggest that negotiations in Algiers lasted roughly 23 days less than those in Tetuan.

Similarly, results presented in columns (3) and (4) suggest that captives in Algiers were rescued a little more than a year and half later than those in Tetuan.

5.2.4 Amount Extracted

The results in columns (1) and (2) of table 5 provide some support for prediction (iv.). The regression results presented in the first 2 columns of table 5 correspond to a regression of the form:

$$\ln(price_i) = \alpha + \beta_1 Algiers_i + \beta_2 \ln(moneysent_i) + \beta_3 \ln(moneysent_i) * Algiers_i + \varepsilon_i \quad (3)$$

where $\ln(moneysent_i)$ is the logarithm of the amount of money sent for a given captive. Recall that the theory predicts that $\beta_3 > 0$, that is, that slaveowners in Algiers are able to extract more money from the Spanish redemptors. Point estimates in columns (1) and (2) are consistent with this prediction although they are not significant at the 5% level.

5.3 Uncertainty and delay

Recall that theoretical considerations suggested that all else equal greater uncertainty should lead to longer negotiations. In order to measure uncertainty, we use the coefficient of variation (the standard deviation divided by the mean) of earmarked money by profession and by corsair center (that is we calculate the coefficient of variation of earmarked money by profession in both Tetuan and Algiers). Although this metric is imperfect at best, and point estimates are likely to be substantially attenuated due to measurement error, results in table 6 provide some support for the theoretical prediction.

Table 6 is divided into two panels, one for captives rescued in Algiers and another for captives rescued in Tetuan. Columns (1), (2), (4) and (5) present results examining the effect

of uncertainty on within-trip delay, whereas columns (3) and (6) present those investigating the effect of uncertainty on between-trip delay.

The first panel shows that –consistent with the theoretical predictions– greater uncertainty is correlated with longer between-trip delay. The estimated coefficients are not statistically significant for within-trip delay, although the point estimate is positive for delay as measured by the percentage of negotiations elapsed.

The second panel shows that results for Tetuan are more mixed. While the point estimates suggest that greater uncertainty is associated with greater between-trip delay, they are not significant at conventional levels. Point estimates suggest that more uncertainty reduced within-trip delay although these results are not significant at conventional levels.

5.4 Settlement rates

Recall that the theoretical predictions regarding settlement rates from models in which the uncertainty is regarding the value of the buyer are largely ambiguous. However, in an alternative class of models in which the uncertainty is regarding the time costs of bargaining parties, settlement rates are unambiguously predicted to be decreasing over time.

In order to investigate how settlement rates vary as time passes, we begin by limiting our analysis to the group of individuals who had "earmarked" money. Recall that the redemption team gave these individuals priority (that is, we know that they attempted to rescue all of these individuals). We can thus use this subset of individuals to observe how the rates at which these individuals were rescued varied over time.

The "stock" of individuals at time 0, then, is the sum of all individuals that appear as earmarked in the ransom books (we exclude trips that lasted more than 100 days since these were abnormal and obscure the graphical presentation). We denote "failure" as being ransomed and observe how this probability of being ransomed (failure) varies over time. If an individual was not ransomed we assume that she was right-censored at the maximum numbers of days elapsed in the trip in which her name appears (see the appendix for a

discussion of potential bias introduced by mortality or other factors that made a captive's rescue impossible). We estimate the hazard function at a given period by taking the steps of the Nelson-Aalen cumulative hazard and smoothing them with a kernel smoother.[54]

The plots of this non-parametric estimate of the hazard function are presented in the left hand of figure 3 for both Algiers and Tetuan. Settlement rates were higher in Algiers over the entire period in which the bargaining team was bargaining in both Algiers and Tetuan. Since negotiations in Tetuan lasted longer the bargaining team was able to rescue more of the desired captives than in Algiers. Over time, settlements rate appear to be roughly constant in Tetuan and parabolic (first increasing, then decreasing) in Algiers.

The right hand graph in figure 3 presents non-parametric estimates of the hazard function for all rescued individuals (that is the "stock" of individuals at time 0 is all captives who will eventually be rescued) as a robustness check. These estimates generally confirm the qualitative implications of the previous analysis.

To summarize, we do not find evidence for monotonically decreasing settlement rates over time, that would be predicted by models with uncertainty about time costs.

6 Conclusion

While the Barbary Corsairs have long ceased to roam the seas, the practice of ransoming captives continues today. The empirical results presented in this paper suggest that existing theoretical work on bargaining under asymmetric information can inform our understanding of such ransom negotiations, especially in high-cost situations.

Qualitative evidence provided from the ransom record books suggests the relevance of the theory by showing that the negotiating teams' behavior was consistent with many of the theoretical predictions. These teams worked to conceal the identities of the captives they wanted most, and delayed the ransom of many captives to obtain lower prices.

[54] We use an Epanechinikov kernel and the "optimal" kernel halfwidth using Stata's "sts graph, hazard" command.

Quantitative evidence using data on ransom prices and time to rescue for over 10,000 captives ransomed between 1575 and 1739 often bolster the qualitative evidence, especially in Algiers. In particular, instrumental variable estimates in Algiers suggest that between-trip delay led to a substantial decrease in prices. Furthermore, the data is largely consistent with theoretical predictions regarding differences in bargaining outcomes between Algiers and Tetuan.

In addition to providing empirical evidence for the relevance of a broad class of bargaining models, the observed negotiations suggest avenues for future research. Most prominently, the evidence suggests the importance of better understanding bundling (negotiating for the release of captives in a group as opposed to negotiating for each of them separately) in a dynamic framework.

Finally, the historical response of many European powers to the Corsairs may provide insights into negotiating with Somali pirates (and possibly other criminal groups). For example, the historical preference for centralized ransoming organizations suggests that such institutions might aid negotiations with pirates today by both enabling negotiations for multiple cargoes at once and by reducing transaction costs (which, besides saving costs directly, improves the bargaining power of the negotiating team).

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8 Appendix

8.1 Bias Introduced by Misclassification of Earmarked Individuals

In section 5.1 we used the variable earmarked as an instrument for delay. It seems likely, however, that many earmarked individuals are spuriously classified as not having earmarked money. In this subsection we consider the implications of this misclassification.[55]

Consider regression (1) in which we assume $Delay_i$ is measured without error. There is an instrumental variable $Earmarked_i^*$ that if observed without error would give a consistent estimate of β. The first stage is $Delay_i = \rho + \delta Earmarked_i^* + \nu_i$. Instead of $Earmarked_i^*$ we observe $Earmarked_i$ and calculate $\hat{\beta}^{IV} \underset{p}{\rightarrow} \frac{E[\ln(price_i)|Earmarked_i=1]-E[\ln(price_i)|Earmarked_i=0]}{E[Delay_i|Earmarked_i=1]-E[Delay_i|Earmarked_i=0]}$.

After some algebra it can be shown that $\hat{\beta}^{IV} \underset{p}{\rightarrow} \frac{\beta(\delta\gamma+\psi)+\theta}{\delta\gamma+\psi}$ where $\gamma \equiv E[Earmarked_i^*|Earmarked_i = 1] - E[Earmarked_i^*|Earmarked_i = 0]; \psi \equiv E[\nu_i|Earmarked_i = 1] - E[\nu_i|Earmarked_i = 0]$ and $\theta \equiv E[\varepsilon_i|Earmarked_i = 1] - E[\varepsilon_i|Earmarked_i = 0]$.

It is clear that $\hat{\beta}^{IV}$ is consistent if unobervable determinants of a captive's price are mean independent of the observed earmarked variable ($\theta = 0$).

Denote $Earmarked_i = Earmarked_i^* + \eta_i$, where $\eta_i \in \{-1, 0, 1\}$ is measurement error. If we assume that the true earmarked variable is exogenous, that is, if we assume that $E[\varepsilon_i|Earmarked_i^*] = E[\varepsilon_i] = 0$, then the assumption of conditional mean independence ($E[\varepsilon_i|Earmarked_i^*, \eta_i] = E[\varepsilon_i|Earmarked_i^*]$) is sufficient for $\theta = 0$.

8.2 Differential Mortality and the Hazard Function

This appendix briefly investigates the possible biases introduced by greater mortality on the hazard function estimated in section 5.5. The Nelson-Aalen estimator of the cumulative hazard at time t is given by: $\hat{H}(t) = \sum_{j|t_j \leq t} \frac{d_j}{n_j}$ where n_j is the overall number at risk at t and d_j is the number of failures at time t_j. The estimated hazard is just the smoothed cumulative hazard jumps $\frac{d_j}{n_j}$.

[55] Abstracting from covariates for simplicity.

Suppose, for example, that in Algiers a larger number of individuals are dead or missing (they can never be rescued), denote this number by i_j. Suppose for simplicity that all individuals in Tetuan can be rescued.[56]

In Algiers $n_j = r_j + i_j$. Where r_j are the number of captives for whom money has been sent who can actually be rescued. Ideally, we would compute the hazard using $\frac{d_j}{r_j}$. Instead, however, we calculate $\frac{d_j}{r_j+i_j} < \frac{d_j}{r_j}$.

This brief discussion suggests that if captives were more likely to die or go missing in Algiers, our estimates in the left-hand graph of figure 4 will be downward biased.[57] Our estimate of $\frac{d_j}{r_j}$ would be attenuated in each period by a factor of $\frac{r_j}{(r_j+i_j)}$. This quantity (weakly) decreases as time goes on and thus the attenuation bias will also (weakly) increase. Depending on the shape of the hazard and the number of missing individuals i_j, this could act to artificially create a decreasing hazard.

In practice, and given the estimated shapes of the hazard function, it seems unlikely that this bias (i.e. high mortality in Algiers) would significantly change the most important qualitative implications of the estimated hazard functions.

[56] More generally, as long as the attenuation factor $\frac{r_j}{r_j+i_j}$ in Tetuan is larger than that in Algiers the conclusions below hold.

[57] We abstract from the bias introduced by smoothing.

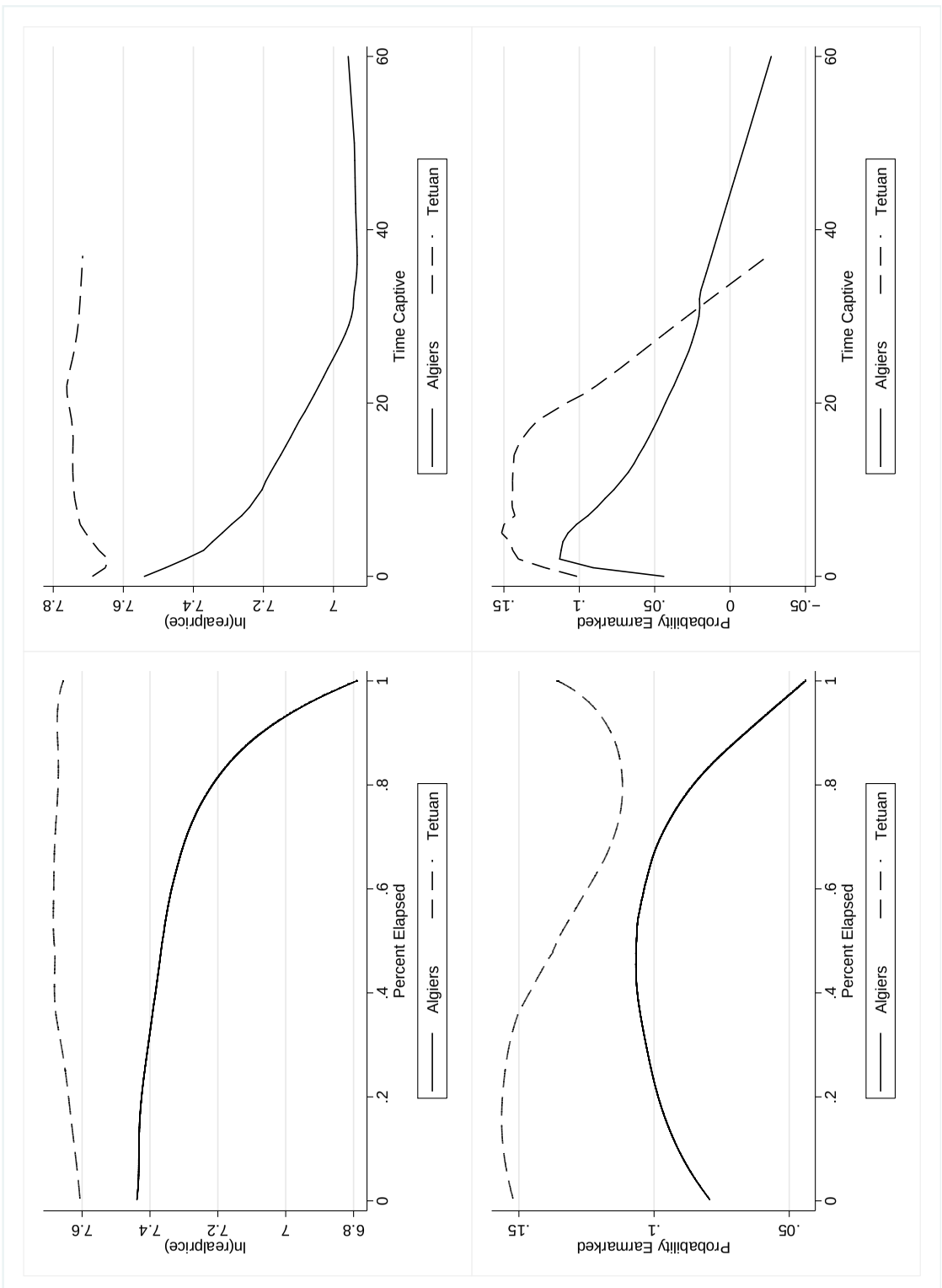

Figure 1: **Ransom Prices, Earmarked Money and Delay**
Graphs detail non-parametric relationship between delay, valuations and equilibrium ransom prices (see text for details).

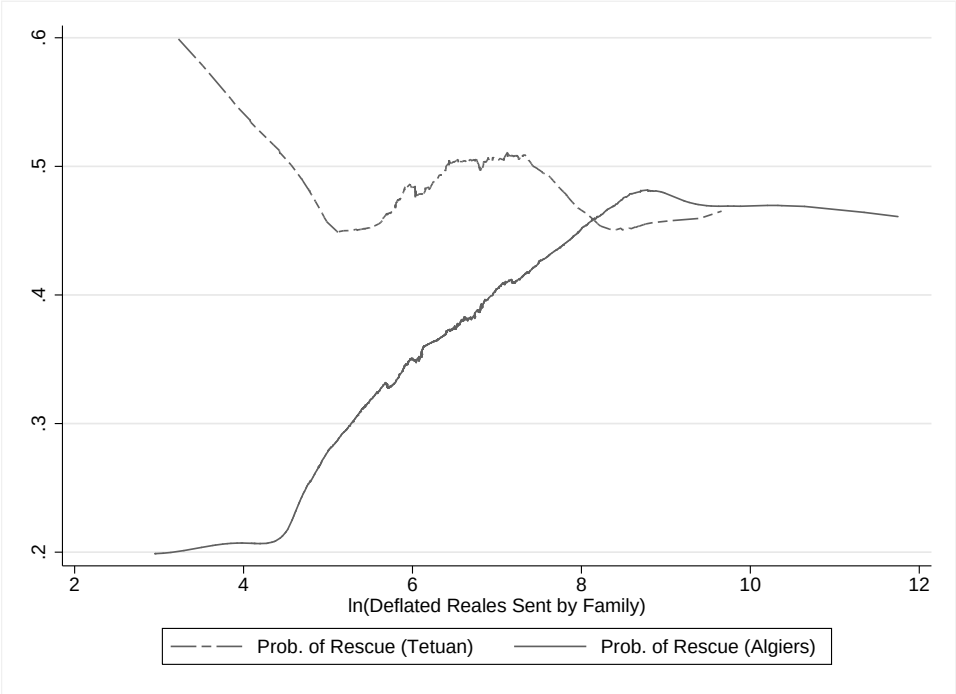

Figure 2: **Rescue Probability in Tetuan and Algiers**
Graph details non-parametric relationship between a dummy for successful rescue and the amount of money sent for a captive.

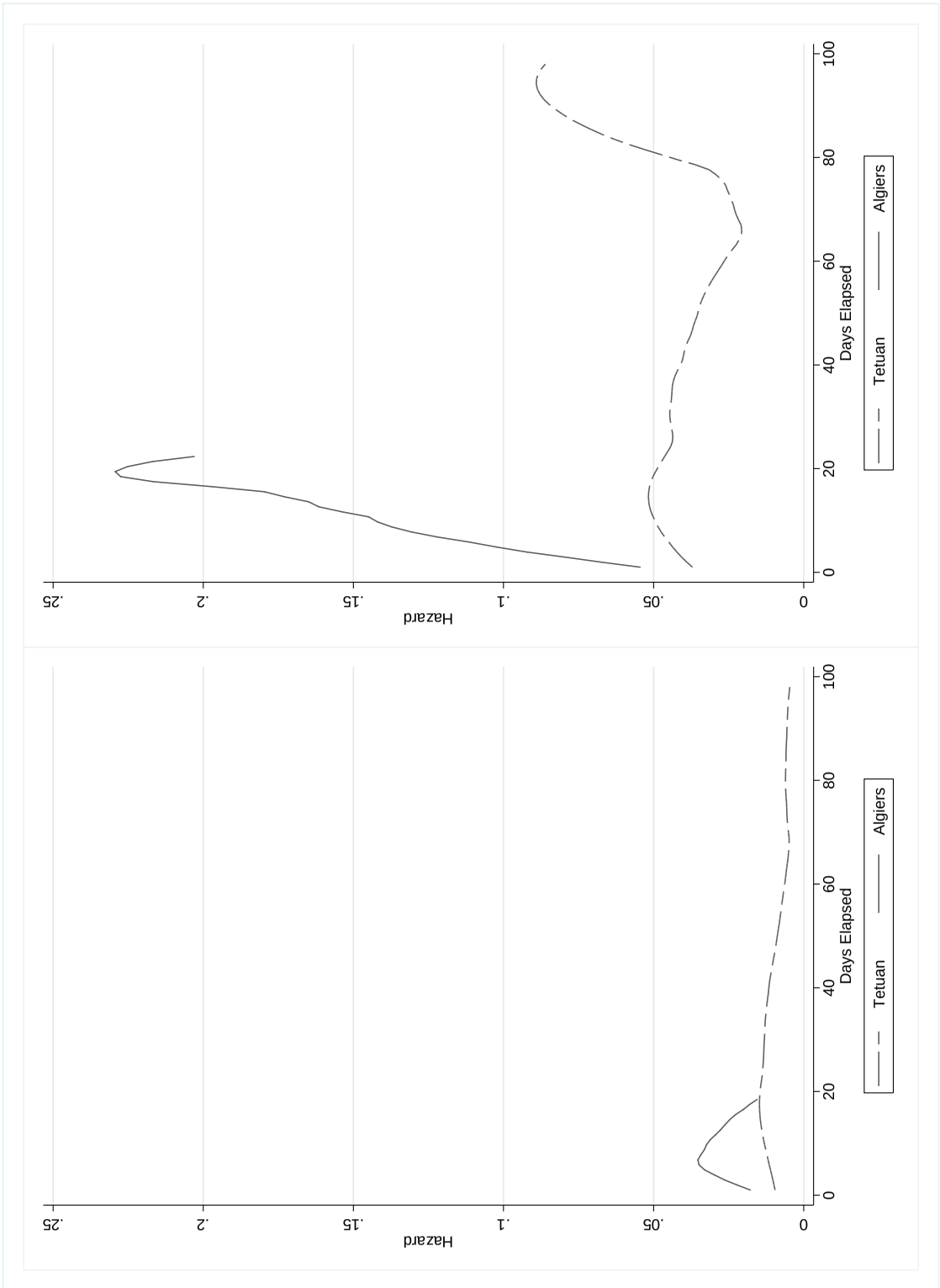

Figure 3: **Settlement Rates for Earmarked and All Rescued Captives**

Graph details non-parametric estimate of the hazard function for all earmarked individuals (left) and all rescued captives (right).

Table 1: **Summary Statistics (for Rescued Individuals unless otherwise noted)**

		Algiers					Tetuan				
Variable	*Description*	*Mean*	*St.dev.*	*Min*	*Max*	*N*	*Mean*	*St.dev.*	*Min*	*Max*	*N*
		(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
General											
YearsCaptive	Years Captive	6.10	6.45	0.02	60	7227	4.00	3.98	0	37	2335
Price	(Silver Reales)	1658	2257	0	81458	7317	1972	1400	125	21439	2703
Earmarked[1]	=1 if earmarked	0.09	0.29	0	1	7398	0.11	0.31	0	1	2716
$Moneysent(w/NotRescued)^2$	(Silver Reales)	1224	4298	19	126440	1676	1083	1372	25	15672	586
$Moneysent(OnlyRescued)^2$	(Silver Reales)	1400	5299	19	126440	677	1103	1474	34	15672	297
Bundled	=1 if bundled	0.43	0.50	0	1	7317	0.62	0.49	0	1	2703
Castile	=1 if from desired areas	0.49	0.50	0	1	3824	0.68	0.46	0	1	1524
DaysElapsed	Days to Agreement	8.31	20.08	0	272	4337	11.55	21.86	0	295	2044
MissedTrips	Trips before rescue	1.99	2.61	0	25	7227	0.93	1.39	0	11	2335
Govt	Captive owned by Govt	0.17	0.38	0	1	7398	0.25	0.43	0	1	2716
Female		0.05	0.22	0	1	7398	0.05	0.23	0	1	2716
Age		35.88	14.06	0.11	100	7253	33.68	14.21	0.83	94	2358
Occupation											
Fisherman		0.12	0.33	0	1	7398	0.11	0.31	0	1	2716
Soldier		0.18	0.38	0	1	7398	0.17	0.37	0	1	2716
Majesty	In King's Service	0.06	0.23	0	1	7398	0.06	0.23	0	1	2716
Shepherd		0.01	0.08	0	1	7398	0.01	0.12	0	1	2716
Sailor		0.06	0.23	0	1	7398	0.06	0.23	0	1	2716
Peasant		0.01	0.08	0	1	7398	0.02	0.14	0	1	2716
Indias	En route to Americas	0.01	0.09	0	1	7398	0.01	0.07	0	1	2716
Cleric		0.02	0.13	0	1	7398	0.01	0.12	0	1	2716
Other	Other Identified	0.01	0.09	0	1	7398	0.02	0.12	0	1	2716
NI	Not Identified	0.54	0.50	0	1	7398	0.54	0.50	0	1	2716
How Captured											
Land	On Land	0.07	0.26	0	1	7398	0.15	0.36	0	1	2716
Sea	At Sea	0.64	0.48	0	1	7398	0.49	0.50	0	1	2716
WarPrisoner	In Military Combat	0.24	0.42	0	1	7398	0.23	0.42	0	1	2716
Captivity	Born In Captivity	0.003	0.05	0	1	7398	0.004	0.06	0	1	2716
Unknown		0.05	0.23	0	1	7398	0.13	0.34	0	1	2716

Notes: 1: The variable Earmarked is defined equal to one if the captive was stated in the ransom books as having had money sent for them from Spain. The variable is defined as equal to 0 else.
2: The variable Moneysent is set to missing when a captive was not identified as having money sent for them. See the text and the data appendix for additional details.
The variable DaysElapsed is equal to 0 the first day an agreement is reached

Table 2: **Instrumental Variables and the Effect of Delay on Ransom Prices**

	ln(price) (1)	***ln(price)*** (2)	***ln(price)*** (3)	***ln(price)*** (4)	***ln(price)*** (5)	***ln(price)*** (6)
Panel 1: Algiers, OLS						
TimeCaptive/10	-0.16	-0.09				
	(0.02)	(0.02)				
%Elapsed			-0.37	-0.41		
			(0.10)	(0.10)		
DaysElapsed/100					0.17	-0.11
					(0.15)	(0.17)
Panel 2: Algiers, IV						
TimeCaptive/10	-1.86[1]	-3.09[1]				
	(0.56)	(0.71)				
%Elapsed			-13.27	-52.75		
			(11.04)	(109.47)		
DaysElapsed/100					16.20	26.74
					(26.52)	(34.33)
First Stage						
Earmarked	-0.15	-0.10	-0.02	-0.01	0.02	0.01
	(0.03)	(0.03)	(0.01)	(0.01)	(0.01)	(0.01)
Controls	No	Yes	No	Yes	No	Yes
Dummies	None	Trip, Profession	None	Trip, Profession	None	Trip, Profession
N	5857	5817	5993	5859	3225	3168
Panel 3: Tetuan, OLS						
TimeCaptive/10	0.12	0.06				
	(0.05)	(0.04)				
%Elapsed			0.06	0.03		
			(0.06)	(0.04)		
DaysElapsed/100					-0.60	-0.03
					(0.25)	(0.06)
Panel 4: Tetuan, IV						
TimeCaptive/10	-39.86	6.79				
	(305.36)	(4.08)				
%Elapsed			-3.73[1]	-11.30		
			(2.12)	(8.02)		
DaysElapsed/100					1.21	230.12
					(1.49)	(3039.98)
First Stage						
Earmarked	-0.005	0.04	-0.04	-0.03	0.11	0.001
	(0.03)	(0.03)	(0.02)	(0.02)	(0.02)	(0.01)
Controls	No	Yes	No	Yes	No	Yes
Dummies	None	Trip, Profession	None	Trip, Profession	None	Trip, Profession
N	1775	1733	2028	1785	1508	1328

Notes: [1]: Can reject values of 0 and higher at the 5% level using Moreira's conditional likelihood ratio test
Standard errors are clustered by trip
Controls include age and a gender dummy
See text for details

Table 3: **Differences in Rate of Decrease of Prices**

	ln(price)	***ln(price)***	***ln(price)***	***ln(price)***	***ln(price)***	***ln(price)***
	(1)	(2)	(3)	(4)	(5)	(6)
$Algiers$	-0.26	-0.20	-0.20	-0.15	-0.59	-0.25
	(0.10)	(0.09)	(0.11)	(0.11)	(0.12)	(0.19)
$TimeCaptive/10$	0.12	0.13				
	(0.05)	(0.05)				
$TimeCaptive/10 * Algiers$	-0.28	-0.24				
	(0.06)	(0.05)				
$\%Elapsed$			0.06	0.01		
			(0.06)	(0.05)		
$\%Elapsed * Algiers$			-0.42	-0.32		
			(0.12)	(0.11)		
$DaysElapsed/100$					-0.60	-0.26
					(0.25)	(0.21)
$DaysElapsed/100 * Algiers$					0.78	0.22
					(0.29)	(0.23)
N	7632	7550	8021	7644	4733	4496
$Controls?$	No	Yes	No	Yes	No	Yes

Notes: Standard errors are clustered by trip
Controls include age, profession dummies, a gender dummy and quarter-century dummies
See text for details

Table 4: **Differences in Length of Negotiations**

	DaysElapsed	***DaysElapsed***	***TimeCaptive***	***TimeCaptive***
	(1)	(2)	(3)	(4)
Algiers	-3.97	-23.06	1.72	1.56
	(4.96)	(9.13)	(0.36)	(0.47)
N	4804	4563	7750	7665
Controls?	No	Yes	No	Yes

Notes: Standard errors are clustered by trip
Controls include age, profession dummies, a gender dummy and quarter-century dummies
See text for details

Table 5: **Amount of Sent Money Extracted by Corsairs**

	ln(price)	***ln(price)***
	(1)	(2)
$Algiers$	-0.57	-0.80
	(0.31)	(0.32)
$ln(moneysent)$	0.42	0.33
	(0.03)	(0.04)
$ln(moneysent) * Algiers$	0.04	0.09
	(0.05)	(0.05)
N	852	815
$Controls?$	No	Yes

Notes: Standard errors are clustered by trip*profession dummies
Controls include age, a gender dummy and quarter century year dummies
See text for details

Table 6: **Uncertainty, Within and Between-Trip Delay**

	100*%Elapsed	***DaysElapsed***	***TimeCaptive***	***100*%Elapsed***	***DaysElapsed***	***TimeCaptive***
	(1)	(2)	(3)	(4)	(5)	(6)
Panel 1: Algiers						
$SD(moneysent)/(100 * E(moneysent))$	19.33	-19.67	19.43	11.10	-23.71	21.37
	(21.53)	(14.94)	(4.56)	(20.93)	(16.65)	(4.04)
$E(moneysent)/100$	-0.80	-0.09	-0.19	-0.59	-0.01	-0.23
	(0.47)	(0.30)	(0.09)	(0.46)	(0.37)	(0.08)
N	6123	3287	5967	5981	3228	5926
$Controls?$	No	No	No	Yes	Yes	Yes
Panel 2: Tetuan						
$SD(moneysent)/(100 * E(moneysent))$	-176.37	-55.22	21.28	-183.70	-59.47	22.44
	(103.16)	(66.48)	(13.92)	(106.68)	(68.30)	(13.35)
$E(moneysent)/100$	1.28	-0.09	0.21	1.22	-0.16	0.23
	(0.77)	(0.58)	(0.11)	(0.77)	(0.56)	(0.11)
N	2038	1517	1783	1793	1335	1739
$Controls?$	No	No	No	Yes	Yes	Yes

Notes: Standard errors are clustered by trip*profession dummies
All regressions include trip dummies
Controls include age and a gender dummy
See text for details