Adverse Selection in a hostile environment:
Spanish traders and their partners in America, Seville 1500-1600

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Even nowadays, screening is a major problem for entrepreneurs. They have to hire the best workers, choose the best borrowers or contract with low-risk insurees even without complete information on them. Only after the contractual relationship is finished it becomes possible to realize about the efficiency of workers, the occurrence of accidents or the default on repayments.

This paper is aimed at analysing the screening process in a case of extreme asymmetric information: 16th century Atlantic Trade. This historical framework was featured by new maritime routes, an unexplored territory, long distances and difficulties in communications. Therefore, the extreme scenario of Atlantic Trade constitutes a suitable field of analysis for asymmetric information.

For the case of Spanish traders, all commercial transactions were carried out via Seville. Relevant merchants used to stay at the city while customers travelled with the merchandise.[1] In all cases payment was fulfilled in Seville after a certain period of time. In terms of asymmetric information, the problem faced by the merchant staying in Seville consisted of selecting the right customer among a pool of potential partners. The difficulty here lay in screening those individuals with lower probabilities of default.

Conventional wisdom in Economic History points at reputation and personal links as solutions of the adverse selection problem. By contrast, this paper argues that traders used written contracts to screen among low and high risk debtors. To test this major argument I mainly follow the Stiglitz-Weiss model where high risk individuals are attracted by more adverse contracts.[2] Stiglitz & Weiss (1981) formulated the model in terms of interest rates and debt-equity ratio; however, this information is not available

[1] For customers, the merchandise was sold on credit and prices were fixed at Seville, prior to the journey to the New World.
[2] I will refer to this model as S-W model hereafter.

in 16th century contracts.[3] Instead I will use collateral and the complexity of contracts in general as measured by the number of clauses. This paper tests whether increases in collateral requirements and in the contracts' provisions in general attracted high risk debtors. For the model, I assume that most conditions in the contract are exogenous since it is the principal who designs the contract and the customer simply decides about the acceptance or not.[4]

The econometric tests control by the existence of notaries' forms and the legal regulation on contracts in general. The interest at this point is to test if legal doctrine had an effect on the evolution of contracts' conditions from the empirical point of view. My interest with the variables *notaries' forms* and *regulation on contracts* is to check the degree of freedom on contracting in pre-industrial trade; in other words, did traders design contracts according to economic variables or did they simply accept documents pre-determined by notaries and legal norms?

Experts on historical official documents state that contracts simply legitimated the existence of the relationship and were used as credentials.[5] Indeed, history supports that contracts, at least for the case of Spain, were written according to the custom of every kingdom.[6] In the 16th century for instance, many forms were published and used by notaries to design contracts.[7] According to that, we can consider contracts as the documental support for an economic relationship where provisions did not express the rules of the game. This would explain the existence of external enforcement mechanisms which completed contracts but would not explain why contracts were so personal. In other words, if contracts were simple credentials, why were they not identical? Why can we observe differences in terms of rights and duties?

The paper is organized as follows. The first section offers an overview of theoretical debate on contracts as screening devices. Section 2 is devoted to the analysis of legal regulation of contracting during the 16th century including also a subsection on evolution of notaries' forms. Section 3 deals with data, and offers a description of the different clauses and their evolution throughout time. Section 4 explains the strategy for the regression and analyses the explanatory variables. Sections 5 and 6 present the econometric results. The last section contains the conclusions.

[3] The debt-equity ratio is calculated with total liabilities divided by shareholders' equity.
[4] Indeed, the only decision in the contract made by the debtor is destination of merchandise.
[5] See Bono Huertas (1982) and Rojas García (2009).
[6] The medieval history of Spain is quite complex. Until the Catholic Kings –Isabel and Ferdinand- the territory was divided into kingdoms. The major ones were Aragon (including Catalonia and Mallorca) and Castile. All of them coexisted with the territory dominated by the Moors.
[7] The forms consisted on a list of legal provisions applicable to every type of business, this issue will be explained in depth in section 3.

1. Adverse Selection and contracts

The design of contracts is a hot topic on Contract Theory. During the last decades scholars have produced a considerable number of theoretical models trying to figure out whether the optimal contract already exists. The key importance of this debate derives from asymmetric information models where the general equilibrium is defined as a set of contracts such that it does not pay anyone off to offer an alternative contract.[8]

Special attention has been paid to adverse selection models and more specifically to the screening process. Since the publication in 1981 of a paper by Joseph Stiglitz and Andrew Weiss, the screening process has been focused on the use of contracts as solutions for asymmetric information. The S-W model was formulated to explain credit rationing at the market but can be easily extrapolated to trade in general.

Models with similar results have been designed with wages for the job market [Greenwald (1979), Guash & Weiss (1980), Guash & Weiss (1982), Spence (1973)] rent for the land market [Braverman & Stiglitz (1982)] or prices in product markets [Stiglitz (1976), Wilson (1977)]. For an extreme case of asymmetric information, that of 16th century Atlantic trade, I cannot translate directly the model since information about prices or interest rates is not available. However, Stiglitz and Weiss state that "changes on other terms of the contract will also affect to the behaviour of economic agents".[9] Following that reasoning I use collateral and clauses instead.

Collateral has also been object of analysis. Experts even affirm that a convincing theory of debt must consider the role of collateral.[10] Specially important is the evidence about the existence of a positive correlation between project risk and collateral level shown by Orgler (1970), Leeth & Scott (1989), Booth (1992) or Berger & Udell (1990,1995). In this sense, collateral has also been viewed as a signal of a projects' quality [Besanko & Thakor (1987a, 1987b), Beaudry & Poitevin (1995)]. Models even deal with the role played by observable features of debtors such as initial wealth [Bester (1985, 1987)].

In this paper I use collateral in the sense of Wette (1983) where an increase of collateral requirement induces the exit from the market of customers with lower returns, who are the safest ones. This argument is explained by using the expected profit function from the customers:

$$\Pi i = p(Ri - (1+r)L) - (1-p)C$$

[8] See Stiglitz (2003) or Hart & Moore (2008).
[9] Stiglitz & Weiss (1980), p. 393.
[10] See Coco (2000), p. 191.

Where π_i is the expected profit of borrower i, p is the probability of success, R_i the returns of the project financed, L the total loan and C the collateral. An increase of C will decrease the expected profits and for a borrower with lower return projects it is worthless to ask for a loan.

The prior model can be extrapolated to explain credit in 16^{th} century Atlantic trade with customers instead of borrowers, and merchandise sold on credit instead of loans. In the model, I have information about the different markets selected in America by the customers as destinations instead of a project to be financed by the bank. Note that for every destination it is possible to assign a different degree of risk in the sense that more popular destinations have stronger demand potential and thus the probability of success is higher. However, returns in these destinations are lower since greater competition reduces expected profits. This works similarly to the S-W model, where it is assumed that an indirect correlation between return of projects and probability of success exists. Therefore, projects with higher probability of success, which are safer, present lower returns.

In the model, it is assumed that principals perceive certain degree of suspiciousness from every debtor but the probability of default is unknown. Besides, principals know information about destination selected. In this situation, an increase of the collateral requirement will produce two different effects:

1) Adverse selection effect, attracting a pool of people who has on average lower degree of risk aversion. In the model I proxy this effect through reputation assuming that low reputation people are less risk averse and relevant traders are more risk averse since their reputation depends on the repayment.

2) Incentive effect, encouraging people to select less popular markets where the number of competitors is lower and expected profits higher. This effect is proxied via destinations. We will expect an increment on the number of unpopular markets selected as destinations.

Apart from interest rate and collateral, other features of credit contracts turn out to be of crucial importance. I additionally test the differences on contract composition in terms of the number of clauses. In other words, why do contracts with the same aim present differences in terms of obligations or penalties? This issue will be analysed *ex ante* as an adverse selection problem. The major hypothesis is that higher requirements in the contracts are directly correlated to suspiciousness about the

debtor. Unfortunately, there are no relevant theoretical models for this issue. The major analysis on adverse selection and contracts has been focused on prices and collateral requirements.

Together with adverse selection hypothesis, the analysis also introduces legal regulation and notaries' literature as alternative explanations for the differential design of contracts in terms of clauses and collateral. My interest at that point is to check the degree of freedom of traders to design contracts according to economic criteria. The following section introduces information about this issue.

2. Regulation on contracts

Legal doctrine defines contracts as law among parties. In this sense, agents express their will in the different provisions. Parties, however, were not free to design contracts and documents had to fulfil some legal requirements. Throughout history, governments have restricted the will of the parties and affected the design of contracts. In this sense, rulers have promulgated norms regulating the capacity to sign contracts, the elements in the contract, the minimum guarantees or prescription periods. In a hostile environment such as 16th century Atlantic Trade, were parties free to decide what provisions include in the contract? Did the degree of risk affect written contracts?

2.1. Legal norms

According to the experts, Mercantile Law was developed during the Middle Ages. The previous Roman Law seemed to be insufficient to meet the needs of the commercial revolution initiated with the fair system. During fairs, traders created specific instruments which gave raise to the new commercial law. The new corpus of norms, called *Lex Mercatoria*, lived on practices from merchant gilds.

In the Spanish case the new legal system was born inside Consulates. That of Burgos was the most regulated, and indeed it served as a model for others such as Bilbao or Seville's. In its protocol, we find behaviour rules such as not to sell merchandise on cash if they received it on credit or the prohibition to deliver merchandise during holidays.[11] Rules to prevent potential conflicts can also be found, for instance the compulsory consent of all members in a company to receive a new partner.[12]

[11] García de Quevedo (1995), pp. 209-211.
[12] García de Quevedo (1995), p. 210.

Consulates had power to solve conflicts but they did not regulate contract design.[13] Theoretically, the design of contracts was a private issue. Only economic agents being part of the business had the power to include in the document all sort of provisions. In the Spanish case, however, the monarchy regulated several aspects of written contracts. The major regulation was the corpus of norms created by the Catholic Kings in 1503. The document collected the medieval tradition about the specification of every document and added new norms on the establishment of a fixed number of notary's offices for every city.[14] Besides, these norms affected to the notaries' verification in the obligation to register the full documents and not only an abstract.[15]

Along the 16th century this tendency to regulate formal aspects of contracts was intensified. The *Leyes de Toro*, the *Leyes Nuevas* or the *Leyes de Medina del Campo* serve as examples of this tendency.[16] Table 6.1 presents a summary on the regulation of contracts during the 16th century.

Table 1: Regulation on contracts

Period	Years with at least one norm
1500-1525	4
1525-1550	5
1550-1575	5
1575-1600	8

Source: http://www.mcu.es/archivos/lhe/

Most of the norms are concentrated in the final quarter of the century. The intensification of commercial exchange and with this the increase of the volume of contracts demanded a greater attention by rulers. Nevertheless, these norms were aimed to the regulation of formal requirements such as signature, denomination of every contract or capacity to contract. The contents of a contract in terms of clauses were determined for the will of the parties and the legal literature at the notary office.

2.2. Forms

Since the Roman Empire economic agents had written contracts. The obstacle imposed by the high degree of illiteracy was avoided with the creation of professionals

[13] See Gacto Fernández (1971). For the case of Seville, Rehme (1941) clarifies that the Consulate only offered the arbitrage process when both parties in the conflict were members of the institution, pp. 79-85.
[14] Bono & Ungueti (1986), p. 45.
[15] Bono & Ungueti (1986), pp. 38-40.
[16] All of them can be found at the National Library, Madrid.

who, for a pre-established price, wrote all sorts of documents. These professionals called *tabellio* or *notarius* not only designed the document but also had the power to convert a private document into public.[17] This power called *fides publica* was conferred by the rulers and transferred to the contract through the signature.

To write the different documents or *instrumentum* professionals had a pool of legal formulae which were introduced depending on the kind of document and the will of the parties.[18] Experts denominate forms to the pool of legal formulae used by notaries in the documents. These primitive forms consisted on a list of provisions in alphabetical order. During the Middle Ages some of these forms persisted inalterable while others evolved into more complex documents.

In the Spanish case we can observe two different traditions. On one hand, the forms in the kingdom of Catalonia-Aragon hardly evolved. Recently, scholars have published forms and even in the 16th century these were still written in Latin.[19] On the other hand, forms in the kingdom of Castile became real documents and were written in Spanish. The most complete form is included in the *Siete Partidas.*[20] The form was so highly developed that it is possible to find different models of documents, from wills, to purchase or company contracts. Even in the territories of the Iberian Peninsula that were dominated by the moors, notaries used forms to write contracts.[21]

In the Early Modern period notaries wrote many forms, following the medieval tradition but based on their experience.[22] With the introduction of the press in Spain the notarial forms became printed, thus contributing to their diffusion. The printers were professionals who had the access to this new technology. These enterprises used to be vertically integrated including among their activities, not only the edition and printing, but also the commercialization of books.[23] In Seville, for instance, most of the professional printers came from Germany like the famous Jacob Cronemberg or the partners Meinar Ungunt and Stanislan Polono.[24] Despite that, also locals became printers as Martín Montesdeoca.[25] By contrast with printers in other European cities, in Seville these professionals never were grouped in a guild.[26]

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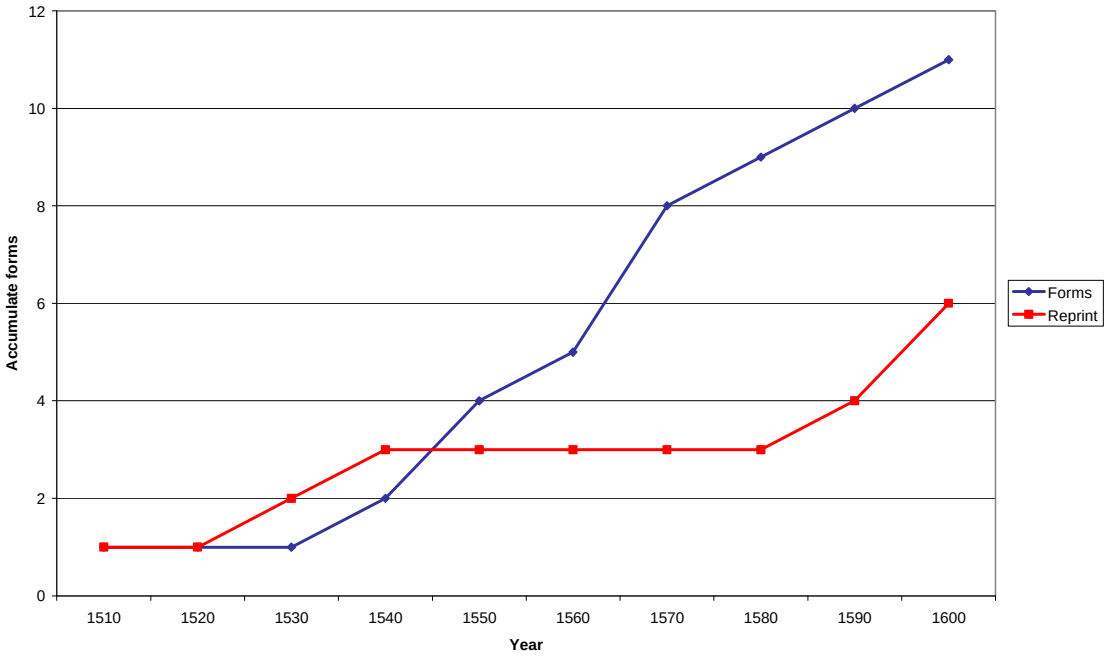
[17] See Bono Huertas (1982), Vol. 1.
[18] Regarding documents we can distinguish among contracts, testaments, inventories and even judicial documents as testimonies, see Bono Huertas (1982), Vol. 1, pp. 58-59.
[19] Carcel Ortí (1980), Gimeno Blay (1981) and Madurell i Marimón (1974).
[20] The book is a compilation of legal norms and was written by the king of Castile Alfonso the 10th between 1252 and 1284. See, *Las siete partidas del Rey don Alfonso el Sabio* (1972), 3 Vols.
[21] For the case of Cordoba see Al-Attar (2000) and Cano Ávila (1988) for Granada.
[22] For printed forms during the 16th century see Amezúa y Mayo (1950) and Bono Huertas (1982), Vol. 2.
[23] See Reyes Gomez (2000), Vol. II, pp. 1150-1159 and Marsá (1993), p. 90.
[24] Maillard Álvarez and Rueda Ramírez (2008), pp. 16-17.
[25] The relevance of Martín Montesdeoca is analysed in Wagner (1982).
[26] Álvarez Marquez (2007), pp. 112-115.

For the 16th century, Bono (1980) stresses the differential evolution of printed forms. While in the first half of the century forms only offer a compilation of medieval tradition in the second half included legal notes and explanations about notaries' practices.[27] It was during the second half of the century when the first treaties about Notarial Law were edited.

In quantitative terms the production of forms printed and circulated to be used by notaries was irregular. Figure 1 presents the evolution of printed forms throughout the century. The blue line represents the cumulative number of forms printed and the red line those which were reprinted.

Figure 1: Evolution of printed forms



Source: Bono (1980) and Amenzúa Mayo (1950)

The number of printed forms in the second half of the century nearly doubles. This fact obviously is a consequence of the rise in the activity of the notary's offices. Certainly, the trade intensified and notaries demanded simpler models to write contracts adapted to the Atlantic Trade.

The style in general of the literature in formal contracts did not change too much form one office to another. The notaries used to write documents based on the tradition of the city, and in Seville this tradition did not register alterations during the 16th century.

[27] Bono (1980), pp. 293-294.

3. Data

Contracts are very old. Since Ancient Times economic agents have written down the conditions of economic transactions in documents. The Atlantic Trade was not an exception and many traders registered contracts before going to America. The final result is a wide range of contracts available for economic analysis. Although these sources provide a complete explanation for trade, they have not yet been exploited by economic historians. The incredible number of documents without any logical organization and transcendence of sources from other archives in the city have discouraged researchers from incorporating contracts to their analysis.[28]

The sample used as a main source in this paper has been personally collected from the archive. The systematic sample was done by selecting a constant number of documents per every decade along the 16th century. With this sampling technique I avoid problems regarding to whether the sample represents or not the population.

Referring to contract theory in general, Chiappori and Salaniè (2000) state that personal characteristic should be also included in the economic analysis. In the contracts we can find information such as names, relationship between parts or residence, however some important information is still missing. To fill these gaps I have used historical literature as secondary sources, mainly descriptions of merchant families. From these sources we can infer data like institutions' membership, and in general the relevance of the individual as a trader.

Given the purpose of the paper, one of the most relevant pieces of information in contracts is the one about transfers between parts. In this set of contracts the transfers consist of the price of merchandise sold and the period for repayment. Unfortunately, in these contracts we found no information about prices or quantities. The only related data is the total value of the transaction. This value has been converted into one currency (*maravedí*) and adjusted by the general price index.[29]

One practical problem arises in contracts where instead of establishing a concrete period of time for repayment, the word *tornaviaje* appears as a replacement in the agreement. This expression implies a one-journey contract and means that the payment will be made when the merchant returns from America. In these cases, the

[28] More specifically, I refer to the Indies Archive (*Archivo General de Indias*). This archive contains all administrative and religious documentation from the West Indies. Moreover, in the Indies Archive there is an special section with all lawsuits since early 16th century to the 19th century.

[29] The Spanish monetary system during the 16th century is chaotic, multiple currencies whose values fluctuated everyday according to the fluctuations in the silver and gold's market. Merchants knowing this situation used to convert the values into an imaginary currency: the *maravedí*. This way it is easy to see in the contract the total value of the purchase expressed as for instance "25.000 ducados of 365 maravedís each".

duration had been estimated using average times for the journey, and adding one month as the time for the merchants to sell the goods.[30]

I also introduce external information to build variables reflecting the economic situation. Data about trade, mainly tons transported per year has been estimated from Chaunu (1955), the bankruptcy series from Sanz Eufemio (1986), and features of the credit market in general from Bernal (1992). Numbers could differ from those given by Acemoglu et al. (2005) given that they used only English printed sources.

The resulting data set is homogeneous. All contracts are purchased on credit with a principal staying at Seville and a debtor going to America with merchandise. The documents are non-exclusive contracts. In other words, the buyer was free to contract with more merchants. Prices were established at Seville and did not depend on American market conditions. The major uncertainty that the principal faced was whether the debtor would repay on time or not.

3.1. Content of contracts

The Spanish Civil Code states that a contract exists after two or more people consent in compelling themselves to give or to do something.[31] According to this legal corpus of norms, three elements should converge in a contract: consent, object, and cause.[32] In contracts from our data set the consent is given through the signature of the document, after both parties declared being legally of age. The data set is homogeneous and all documents analysed are purchase on credit and thus the object of the contract is the merchandise exchanged. Finally, the cause is the economic transaction that gave raise to the contract, in this case the sale of merchandise.

Contracts are very homogeneous in their structure. All of them start with the invocation which is the legal denomination of the contract, for the case of purchase contract the invocation was *compra*.[33] This initial classification is followed by a description of the parties.[34] Normally, the buyer is the first in the contract stressing that he is responsible for the execution of the written contract. Both parts have to fulfil all legal requirements to contract: being of age and mentally capable. In case of being a married woman she also needed the consent of the husband.

The object of the contract is the merchandise sold. Contracts reflected a description of such items, quantities, qualities and prices. On occasions, we even find a

[30] For average times in the journey to America see Garay Unibaso (1989) and García-Baquero (1992).
[31] Díez-Picazo & Gullón (1995), p. 399.
[32] Díez-Picazo & Gullón (1995), p. 408.
[33] Basas Fernández (1960), p. 381.
[34] In the description of the parties we find names, origin, professions and personal relationship among them.

full inventory of products. There are some cases, however, in which this description is missing and they simply add their economic value. The object of the contract is completed with the final destination of the merchandise in America.

At the end of the contract we can find the validation by the signatures of both parties and the notary. Through this simple act the contract passes from private agreement to public document. Occasionally, this procedure was supported also by the signatures of witness.

The will of both parties was expressed in the particular conditions of the business such as prices, merchandise or payment. The contract also comprised rights and duties for both parts reflected in the clauses. There were clauses that used to appear in all documents and some of them are variable.

3.2. Clauses

The Oxford Dictionary of Law defines contractual clauses as "any provision being part of a contract".[35] The contract itself is considered law among parts and thus all clauses must be fulfilled. From the economic point of view, clauses are conditions which regulate transactions between two parties. In the data set object of analysis we find 22 different clauses. However, some of them have been dropped since they were present in nearly all contracts and thus were not representative as variables.

Depending on their nature, clauses have been classified into four different categories: Guarantee, Penalty, Payment and Obligation.[36] Table 6.2 shows a list of the different clauses for every group. We have preserved the original denomination as they appear in the contract.

Table 2: Clauses

Name	**Group**	**Description**
Hipoteca bienes	Guarantee	Mortgage over present and future goods
Fiador	Guarantee	A third person acting as guarantor
Cuenta	Obligation	Settlement of account prior to payment
Paradas	Obligation	Stops of the journey must be regulated in the contract
Puestas en Indias	Obligation	The principal is responsible for the delivery
Tornaviaje	Payment	Payment established in Seville when the ship come back from America
Aplazamiento	Payment	Payment in instalments is allowed by the principal
Pago en Indias	Payment	Payment established in America

[35] Martin & Law (2006), p. 127.
[36] For this classification we follow the criteria used by notaries even nowadays, see Rojas García (2009).

Pena	Penalty	Monetary payment in case of non fulfilment
Costas	Penalty	Payment for all economic damages

Clauses in the guarantee group are mainly ex post procedures to ensure that the principal will receive the payment. Guarantee clauses constitute the collateral in these contracts. According to Chan & Kanatas (1985) this can be considered as *outside collateral*, because mortgages and endorsement are external elements to the purchase contract. In contrast, *inside collateral* is defined as a proportion of the sold items.

Obligation clauses consisted in compulsory duties. With these additional tasks, the principal will try to monitor the debtor's behaviour, and we should expect a positive correlation between regulation and opportunism. Regarding the debtor, two different obligations have been identified: *cuenta* and *paradas*. The first one alludes to obligation before the payment; in this case, the debtor in person must settle account with the principal.[37] The second obligation is related to the journey. As the purchase contract is bilateral, it generates an obligation to both parts and, as a consequence, we also detect duties for the principal. The only one included in this analysis is *puestas en Indias*. This clause represents the obligation for the principal to contract the insurance and the transport service, since the merchandise will be delivered in America.

From the legal point of view, payment is the most important group of clauses. Since the repayment for the merchandise constitutes the object of the contract, these clauses are essential; in fact they define the contract as purchase.[38] Clauses in this group established when and where the payment had to be done. *Tornaviaje* and *pago en Indias* refer to the place for repayment while *Aplazamiento* and *alungamiento* are related to time. *Tornaviaje* and *pago en Indias* are mutually exclusive; the first one alludes to a payment in Seville after the journey and the second establishes the destination in America as the place for repayment. The *aplazamiento* clause permits progressive payment on an instalment plan which is established at the contract in full detail. Finally, *alungamiento* refers to the termination of the contract.

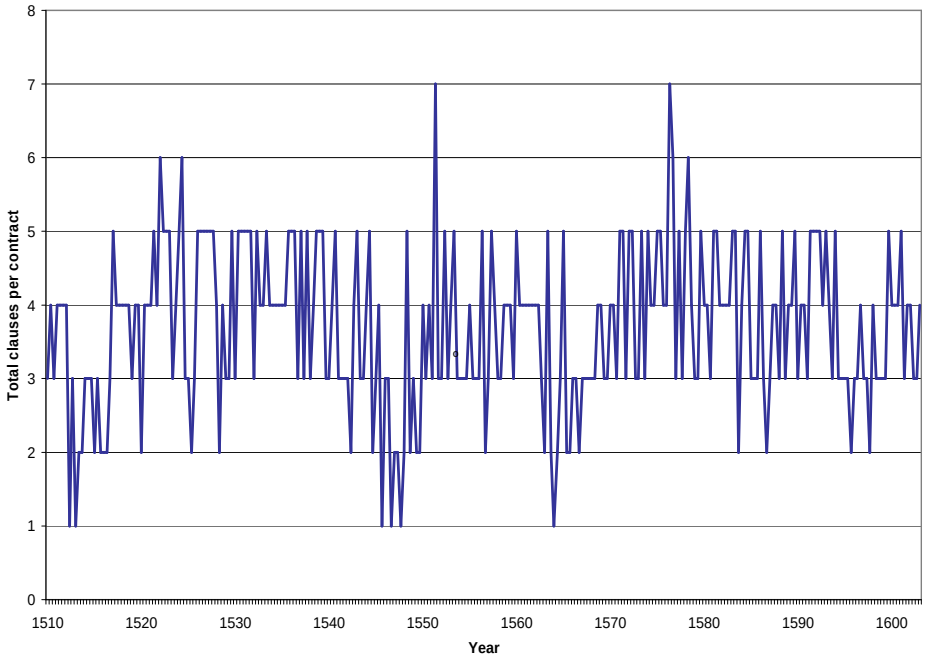
Penalties basically consist on economic compensations for damage suffered. Following Schäfer & Cooter (2007), an effective contract commits people to do what they say they will do, and the certainty and severity of sanctions will determine the strength of the commitment.[39] For the case of Atlantic Trade, sanctions used to be

[37] This clause came also from the Medieval Castilian legislation, see an example at Cuesta Rodríguez (1947), p. 109.
[38] Sánchez Calero & Sánchez-Calero Guirarte (2005), pp. 255-257.
[39] Schäfer & Law (2007), p. 3.

established in the contract. Contrary to the present legal system, monetary punishments were determined by the parties and not by the judges. Only two clauses are included in this group: *pena* and *costas*. The first one consisted on payments established in the local currency whilst the second is more generic.[40] In the clause *costas,* the debtor is punished with the payment of all expenses in which the principal incurred while trying to obtain the repayment.[41]

For the data set nearly all contracts have among 2 and 5 clauses as shown in figure 2.

Figure 2: Total number of clauses per contract



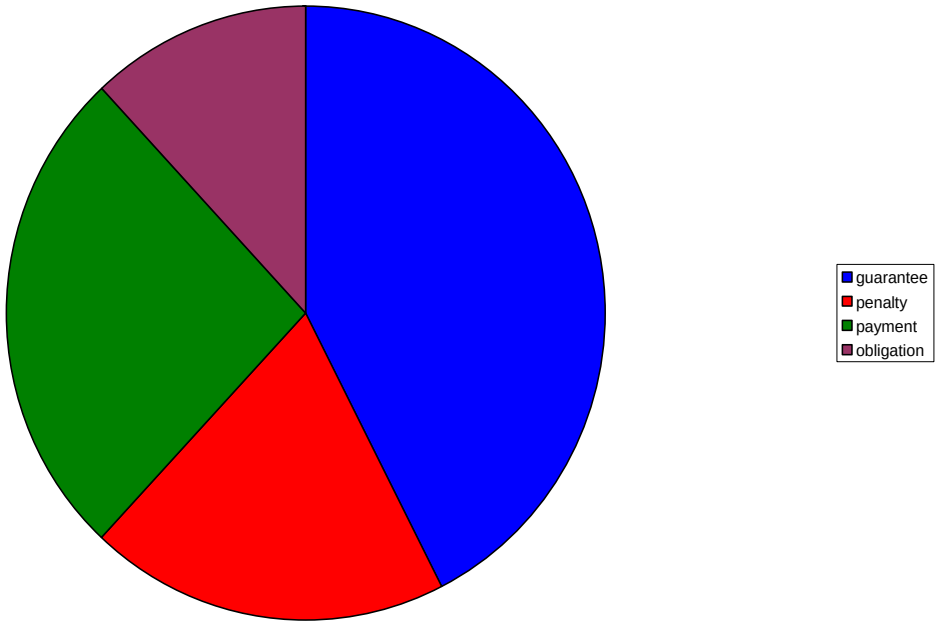
Source: Own elaboration

It is possible to distinguish three waves: a first one until 1550, a short second wave between 1550 and 1570 and a last wave from 1570 until the end of the period. In all of them, the distribution seems more or less homogeneous: an increase at the beginning which continues up to a maximum that is followed by a decline.

The next figure presents the results of clauses classified per group. The first one shows the participation of every group of contract provisions in the whole database and the second one illustrates the time dimension of clauses.

[40] The *pena del doblo* was very popular since the Middle Ages. This penalty consisted in a payment for the double quantity in case of breach of contract. Examples from this penalty can be found in Cuesta Gutiérrez (1947), pp. 38-39.
[41] Among the expenses were even included lawsuit costs.

Figure 3: Total number of clauses



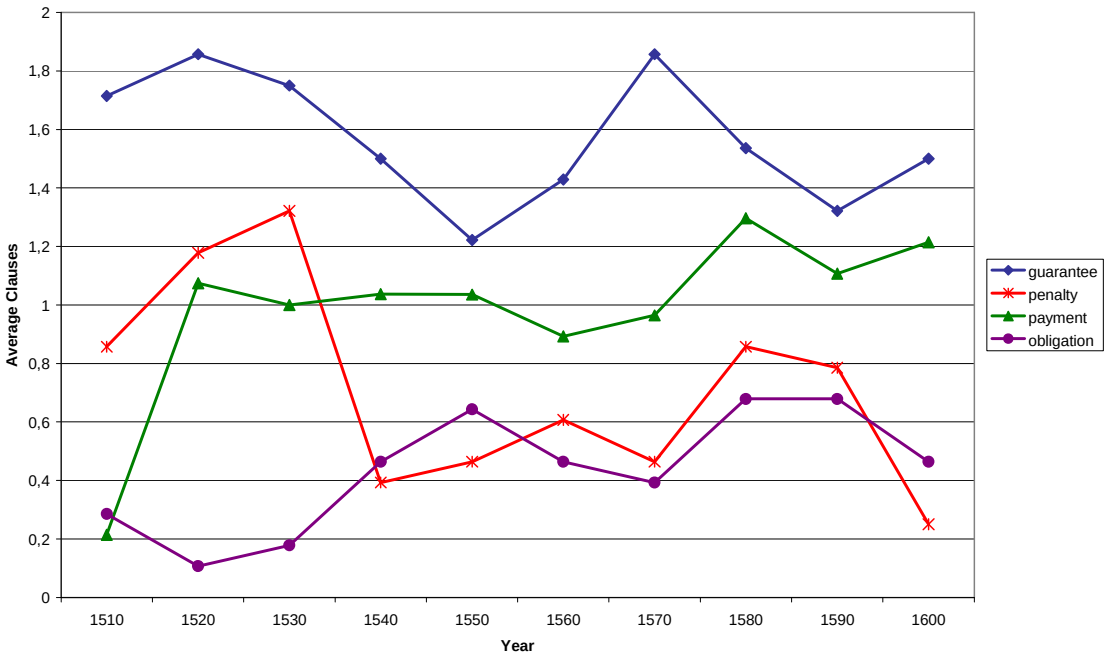
Source: Own elaboration

Comparing groups of clauses, collateral represents, in total terms, the greatest proportion. The guarantees offered in 16th century contracts in the form of goods and endorsement seemed to be very popular. This data perfectly supports the hypothesis of traders using collateral requirements to screen among debtors.

The second group in importance is payment, which is not surprising given the relevance of these clauses for contracts. Conditions of the repayment and finalization of the contract are well regulated in mostly all documents. Penalties are not so frequent and only represent a quarter of the total clauses. They are mainly specific economic penalties. With regard to this, *pena del doblo* became very popular. This penalty consisted on a repayment for the double value of the merchandise sold at the contract in case of delays. Finally, obligation seems to be the least important group. In fact, these clauses are more typical of agency and company contracts.

Given the historical nature of the data set, time plays an important role in the analysis. Taking into account time figure 4 shows the average number of clauses per group in every decade.

Figure 4: Average number of clauses per decade



Source: Own elaboration with data from sample B

There are some tendencies, even if very irregular. Guarantee and penalty clauses experiment a similar trend, a great rise during the first decades followed by a fall approximately in the mid-century and a slightly recovery until 1590. It is important to note that for all periods guarantee clauses represent the maximum in average terms. Payment clauses also followed the trend previously exposed, but in this case the fall and subsequent recovery were not so pronounced.

Regulation in general increased drastically in the first century of trade. After that peak, the demand of conditions in contracts became less tough. Nevertheless, the second half of the century came with a rise of economic exchanges and, with this, piracy. The protection from pirates' attacks and other eventualities produced progressive increases in contract provisions.

Obligation clauses presented an opposite trend. This category reached its minimum at the beginning of the century, at the moment when the other categories presented their peaks. Between 1520 and 1550, obligations in contracts grew. However, from the middle of the century onwards, the evolution of obligation clauses was very similar to the other categories. From this parallel evolution during the second half of the century, we can infer that the influence of trade, piracy and other factors presented the same impact.

4. Econometric strategy

As it was pointed out in the introduction of this chapter, the major hypothesis is that principals designed contract provisions simply to screen among debtors. I test this hypothesis in two different ways; using collateral requirements, and with provisions of the contract in general. The strategy for the regression will follow the next steps:

1) Test adverse selection with collateral requirements. To this aim, the dependent variable will be collateral in the contracts with y_i=0, 1, 2. The variable will take value 0 for contracts with no guarantee clauses, value 1 for contracts with only one guarantee clause which can be a mortgage on goods or simply endorsement, finally in contracts with y_i=2 we find both guarantees (endorsement and mortgages). As the variable Y is discrete and with finite values, I use a count data model assuming that this variable follows a normal distribution.[42]

2) Test adverse selection using clauses in general. Here, I will run a set of regressions. In the first one the dependent variable is discrete and measures the total number of clauses per contract with y_i=1, 2,…, n. In the regression I will use count data models, in this case the Akaike information criterion suggests a negative binomial distribution. For the rest of regressions I take into account every group of clauses. In other words, I run four different regressions for guarantee, penalty, payment and obligation clauses respectively. For all these regressions, the vector of dependent variables is $Y=y_{ki}$ with k=guarantee, penalty, payment and obligation and y_i=0, 1. Note that the variables are defined as dummies with y_k=1 for at least one clause of type k.

4.1. Explanatory variables

Among the explanatory variables, the first group is a proxy of the adverse selection hypothesis. More specifically, these variables measure the degree of suspiciousness for every debtor. The variables measure the reputation of the debtor and his experience as a trader. The reputation is approximated with institutions membership and news from every trader from historical analyses. To proxy the experience at trade I use the number of contracts signed and the official declaration of being a merchant.[43] Moreover, I add information about debtors' official declaration of bankruptcy prior to the signature of the contract.

[42] For this assumption I follow the Akaike information criterium (lowest value).
[43] See the Appendix.

Complementary to the major hypothesis the second group of explanatory variables proxies the principal's ability to control. The variables Pi, Pn and Pc proxy the relevance of the principal as a trader measuring the number of institutions, news and contracts signed by the principal, respectively.[44]

General characteristics of the business have also been introduced in the analysis. With these variables I control whether the relevance of the commercial transaction has any impact on the design of the contract. I include in the group features such as size, duration and destination. Note that the variable size is defined as the total amount of money contracted and does not allude to the composition of the contract in terms of clauses. I deliberately dropped the variable people from this group. Although the number of people in the contract could be accepted as a proxy of the relevance of the business, the variable is related to the existence of an endorsement which is included in guarantee clauses.

In the introduction, I already pointed out the need to take into account not only the economic but also the legal approach. I introduce in the analysis three different variables that proxy aspects related to legal theory. The first variable measures the efficiency of courts to test whether contracts were designed to be enforced at Courts.[45] The second variable measures the impact of legal regulation on the design of contracts using data from the different legal norms promulgated during the 16th century. This variable is calculated as the average number of norms for every period.[46] The last variable is taken into account the notaries' literature is built with information about forms printed during the 16th century.[47] With this variable we test the impact of notaries' literature on contract design.

I control for alternative factors from the economic environment in general such as trade, piracy or delays in the fleet system. Delays in the fleet system and piracy have been calculated in tons with data from Chaunu (1950). In both cases variables reflect the share of tons lost and stolen with respect to the total tons transported by the fleet in every period. The variable trade is measured here in economic value.[48] To build this variable we used data from scholars who analysed the taxes collected by the

[44] The variables Pi, Pn and Pc were defined similarly to the variables regarding reputation and experience of the debtor, see Appendix.
[45] Here the efficiency is basically related to the length of the legal procedures to solve conflicts.
[46] This information has been collected in a website from the Spanish Ministry of Culture, see http://www.mcu.es/archivos/lhe/.
[47] Information from Amenzúa Mayo (1950), Bono (1980) and Bono (1982), vol. 2.
[48] I am avoiding potential multicolinearity problems with the variables piracy and delays.

Spanish Crown.[49] More specifically, it is taken into account the two major taxes regarding the Atlantic Trade: the *almojarifazgo de Indias* and the *avería*.[50]

It should be necessary to introduce in the analysis information about the cost of written contracts. For the case of Seville, prices of contracts were regulated by the *Pragmática de los Reyes Católicos* and did not register changes along the century.[51] Prices were considered as taxes by the monarchy, and for this reason they were proportional to the quantities contracted. I deliberately drop prices from the analysis in order to avoid multicollinearity problems.

The next table summarizes all the hypotheses and the explanatory variables for the different tests.[52] A time trend will be added to these variables.

Table 3: Explanatory variables

Hypotheses	Variables
Adverse Selection	Di Dn Dc Profession Bankrupt
Ability to control	Pi Pn Pc
Business	Size Duration Destination
Law	Court Regulation Printed Forms
Economic Environment	Trade Value Delays Piracy

[49] Lorenzo Sanz (1982), vol. 2, pp. 101-106; Céspedes del Castillo (1945), pp. 155-156; García-Baquero (1992), pp. 120-128 and Chaunu (1950), vol. 6A. Unfortunately, the final series were not complete. To fill the gaps I used linear interpolation.

[50] The first one was a kind of tax for the circulation of merchandise and it was bi-directional, that is to say it was paid when merchandise was exported from Spain to America and when it was imported from America to Spain. In both cases, the payment was done at the port before the cargo was loaded. The second tax had a different nature; the *avería* was the contribution of private merchants to maintain the fleet system.

[51] For the case of Seville see Pardo Rodríguez (1998), and Ostos Salcedo (1998) for Cordoba.

[52] See the list of variables at the Appendix.

5. Collateral as a screening device

According to the economic literature previously reviewed, principals may use collateral requirements to screen among customers *ex ante*. Economic models suggest that a rise of collateral will attract high-risk individuals. In this section, I check if this hypothesis can be extrapolated to the case of 16th century Atlantic trade.

The variable to explain is the collateral requirements in the contract, this is a discrete variable with yi=0, 1, 2. I assume that Y is normally distributed with

$$f(y) = \frac{1}{\sigma\sqrt{2\pi}} e^{-\frac{1}{2}\left(\frac{y-\mu}{\sigma}\right)}$$

Where μ is the average of the dependent variable, and σ the standard deviation. Table 4 shows results from this regression, all of them presented after robustness (checks, controls???).

Table 4: Collateral regression

	Y=Collateral Requirements
Adverse Selection	
Di	0.030543
	(0.060738)
Dn	0.078802
	(0.062749)
Dc	-0.102798***
	(0.049412)
Profession	-0.038139
	(0.107728)
Bankrupt	-0.447176
	(0.449154)
Ability to control	
Pi	0.018777
	(0.045239)
Pn	-0.019263
	(0.019496)
Pc	0.002809
	(0.007688)
Business	
Size	8.08E-09
	(5.33E-08)
Duration	-0.000123
	(0.112449)

Destination	-0.222868**
	(0.000133)
Law	
Court	0.002790
	(0.002257)
Regulation	-0.053704
	(0.035391)
Printed Forms	0.078117
	(0.105502)
Economic Environment	
Trade Value	6.07E-06
	(6.96E-05)
Delays	-11.07861
	(16.35776)
Piracy	30.6820
	(33.21982)
Time trend	0.046091
	(0.129079)
R-Squared	0.139434
Log Likelihood	-324.9974
N	280

Standard Error in parenthesis
*p ≤ 0.10 **p ≤ 0.05 ***p ≤ 0.01

Results confirm the S-W model. Certainly, rises on collateral requirements are directly correlated to suspiciousness. The variable Dc is negative and significant, for every additional collateral requirement in the major contract the professionalism of individuals accepting such agreement is decreasing in 0.102798. Just recall that the variable Dc is approaching the degree of professionalism through the total number of contracts signed. This variable supports the argument of an attraction of low-reputation individuals when the guarantees rise. The result proves the existence of an adverse selection effect *a la* Stiglitz & Weiss.

Besides, the increase of collateral produced an effect on the degree of risk of the projects financed. According to the incentive effect form the S-W model, an increase of collateral will push customers to select riskier projects. In the regression, the variable destination is significant and negative, which means that an increase of collateral induced individuals to select less popular destination trying to obtain higher profits via monopoly.

The adverse selection and incentive effects altogether indicate that merchants used collateral to screen among debtors. They designed contracts with higher collateral requirements to attract high-risk debtors and used this information as a proxy for

personal monitoring. In this way, individuals suspicious of opportunism or those selecting riskier projects are willing to accept contracts with higher collateral levels. The acceptance of the contract would advice principals about suspicious behaviour producing an intensification of control through the debt-collector system.

Table 6.5 presents result from the regression with only significant variables; the dependent variable is collateral requirements as in the prior regression. It is possible to appreciate that the incentive effect becomes stronger since variable destination is now significant at 1%. The regression also evidences a small improvement in the R-squared.

Table 5: Significant variables

	Y= Collateral requirements
Dc	-0.072242*** (0.030634)
Destination	-0.264329*** (0.000131)
R-Squared	0.198581
Log Likelihood	-328.3419
N	280

Standard Error in parenthesis
*p ≤ 0.10 **p ≤ 0.05 ***p ≤ 0.01

6. Explaining contracts' complexity

The second step in the regression strategy consisted in checking the adverse selection hypothesis using data from clauses in the contract. To this aim, I run a set of regressions. Firstly, measuring the complexity of contracts in total terms, that is to say taking into account just the total number of clauses per contract. Secondly, introducing a differentiation according to the nature of clauses. Four regressions will be run for guarantee, payment, penalty and obligation clauses, respectively.

Table 5 depicts the results from the first regression. In this case I simply test the complexity of contracts in terms of clauses. The dependent variable is discrete and measures the total number of clauses per contract with y_i= 1, 2,…, n. The Akaike information criterion suggests a binomial distribution. Results are robust.

Table 6: All-clauses' regression

	Y=Total number of clauses
Adverse Selection	
Di	0.008549
	(0.042049)
Dn	0.007516
	(0.035729)
Dc	-0.021442
	(0.023284)
Profession	-0.025468
	(0.069375)
Bankrupt	0.181742
	(0.257007)
Ability to control	
Pi	0.031594
	(0.032355)
Pn	0.000630
	(0.012282)
Pc	-0.001871
	(0.004135)
Business	
Size	-1.37E-08
	(1.87E-08)
Duration	-0.000194**
	(8.46E-05)
Destination	0.064006
	(0.069116)
Law	
Court	0.000517
	(0.001443)
Regulation	-0.072517***
	(0.022148)
Printed Forms	-0.110638
	(0.072943)
Economic Environment	
Trade Value	-8.53E-05
	(4.05E-05)
Delays	2.247478
	(10.53552)
Piracy	-14.95746
	(22.07746)
Time trend	0.346575***
	(0.081807)
R-Squared	0.169370

N	280

Standard Error in parenthesis
*p ≤ 0.10 **p ≤ 0.05 ***p ≤ 0.01

Results from this regression show no evidence about adverse selection. The only variable regarding the business itself which really matters is duration. Nevertheless, the variable presents a different sign from what was expected. The variable duration is strongly significant with a negative value. This means that contracts regulating longer economic relationships contained a lower number of conditions. More specifically, the number of clauses decreases in 0.000194 for every single day in which the duration of the contract is increased. This is counterintuitive, since longer businesses should be expected to be more controlled. However, this fact is related to the strength of economic relationships. Normally, stronger relationships were extended on time and longer contracts mean more trustworthiness or high reputation individuals.[53]

What seems to be confirmed by the results are alternative explanations based on legal norms. Indeed, the variable regulation is significant and negative. Certainly, for every legal norm promulgated about contracts the number of clauses was reduced by 0.072517. It is possible to state that in total terms, legal requirements about contracts matter and economic agents were not totally free to design contracts.

Results also highlight the importance of time in the design of contracts. The variable time is strongly significant and positive. In every period, clauses per contract increase in 0.346575.

Except for an improvement in R-squared, results appear quite similar when running the prior regression with significant variables only as noted in table 7.

[53]Note that in this chapter the major hypothesis is related to using contracts as screening devices *ex ante* and not to controlling individuals *ex post* through the debt-collector system. In chapter five, the *ex post* control was tested and results indicated that longer contracts were later controlled.

Table 7: Significant variables

	Y= Total number of clauses
Duration	-0.000298***
	(0.000101)
Regulation	-0.042068***
	(0.008873)
Time	0.113262***
	(0.023748)
R-Squared	0.185716
N	280

Standard Error in parenthesis
*p ≤ 0.10 **p ≤ 0.05 ***p ≤ 0.01

6.1. Different clauses and different explanations

The next step will be to regress every group of clauses. In all cases, the dependent variable Y is always a dummy with value 1 in case of at least one clause of the group of interest and 0 otherwise. Being a binary variable, the OLS model seems inappropriate. Instead, I adopt the specification:

$$P[y_i=1 / x_i , \beta]= 1 - \Phi (-x_i' \beta)$$

Where Y is the dependent variable, X the vector of explanatory variables, β the different slope coefficients in the regression and Φ the cumulative distribution function for the variable Y. I assume two different specifications for Φ standard normal and logistic or PROBIT and LOGIT model. Consequently I will run two different regressions for every group of clauses although selecting a PROBIT or a LOGIT model has no impact on results. Results are presented after robustness tests.

Table 8: Guarantee regression

	$D_{GUARANTEE}$ PROBIT	$D_{GUARANTEE}$ LOGIT
Adverse Selection		
Di	0.169914	0.158755
	(0.250976)	(0.485742)
Dn	0.130477	0.223188
	(0.160695)	(0.290939)
Dc	-0.282954***	-0.459979***
	(0.120102)	(0.210030)
Profession	-0.117871	-0.147841
	(0.383906)	(0.723531)
Bankrupt	0.237054	0.576029
	(0.873371)	(1.771476)
Ability to control		
Pi	0.312664	0.383918
	(0.232244)	(0.480641)
Pn	-0.144718	-0.267271
	(0.092337)	(0.169116)
Pc	0.011592	-0.019333
	(0.045635)	(0.097136)
Business		
Size	8.75E-08	1.64E-07
	(8.39E-08)	(1.45E-07)
Duration	-0.000627	-0.001060
	(0.000422)	(0.000800)
Destination	-1.557510***	-3.434374***
	(0.558246)	(1.337134)
Law		
Court	0.029510**	0.052548**
	(0.014469)	(0.021644)
Regulation	-0.812047	-1.206895
	(0.530372)	(0.688763)
Printed Forms	-0.924844	-2.241009
	(0.508648)	(1.320196)
Economic Environment		
Trade Value	-0.000187	-0.000278
	(0.000282)	(0.000385)
Delays	-218.3097	-369.4410
	(123.9766)	(174.0017)
Piracy	550.6770**	939.6121**
	(310.8925)	(416.7200)
Time trend	0.797723	-0.109035
	(1.291886)	(2.702863)

Log likelihood	-86.32091	-83.86735
N	280	280

Standard Error in parenthesis
*p ≤ 0.10 **p ≤ 0.05 ***p ≤ 0.01

The previous table tells a very different story for the case of guarantee clauses. It seems that principals took into account the reputation of the debtor when a guarantee was demanded. Indeed, the variable Dc is strongly significant and negative, which means that principals demanded less guarantees for individuals who showed more experience in trade in terms of contracts signed. This result evidences that an adverse selection effect may not exist in general but just for the case of guarantee clauses.

Results also confirm the existence of an incentive effect. In the regression, destination is strongly significant and negative. In other words, contracts for debtors going to more popular destinations contained less guarantees. By contrast, more guarantees are required for unpopular and isolate destinations.

In addition, traders showed a lack of trust in legal enforcement. The variable *courts* is significant and positive, therefore increments on delays for conflicts' resolution were translated into more guarantees in contracts. Traders protected themselves with additional guarantees when the inefficiency of legal institutions increased. We should not forget that the variable *courts* is defined as the average time to solve a lawsuit weighted by the number of them.

Finally, the pirate threat also matters. Increases on pirates' attacks were registered in the contracts in the form of more guarantees.

Table 9: Penalty regression

	$D_{PENALTY}$ PROBIT	$D_{PENALTY}$ LOGIT
Adverse Selection		
Di	-0.367407**	-0.626555**
	(0.184422)	(0.304263)
Dn	-0.195498	-0.267632
	(0.180078)	(0.387464)
Dc	0.081576	0.131133
	(0.129194)	(0.234375)
Profession	0.145927	0.231376
	(0.278341)	(0.460427)
Bankrupt	-0.810469	-1.376464
	(0.508569)	(0.807913)
Ability to control		

Pi	-0.109924	-0.172041
	(0.169067)	(0.290466)
Pn	-0.031092	-0.062321
	(0.067653)	(0.120316)
Pc	-0.004791	-0.01209
	(0.021707)	(0.037042)
Business		
Size	-1.40E-07	-2.99E-07
	(1.51E-07)	(4.51E-07)
Duration	-0.000411	-0.000647
	(0.000364)	(0.000618)
Destination	0.320737	0.656696
	(0.344790)	(0.637220)
Law		
Court	-0.013325	-0.024355
	(0.007574)	(0.013664)
Regulation	-0.255685**	-0.405831**
	(0.123688)	(0.227652)
Printed Forms	-0.864280***	-1.540262***
	(0.361613)	(0.634831)
Economic Environment		
Trade Value	-0.000758	-0.001290
	(0.000196)	(0.000336)
Delays	112.6807**	201.4980**
	(57.64690)	(103.4598)
Piracy	-198.1532	-358.8144
	(121.8383)	(222.3928)
Time trend	1.449630	2.460667
	(0.372461)	(0.651192)
Log likelihood	-155.4091	-154.9823
N	280	280

Standard Error in parenthesis
*p ≤ 0.10 **p ≤ 0.05 ***p ≤ 0.01

Penalties also evidence an adverse selection problem. In this occasion the significant variable proxies reputation via institutions. To contract with members of relevant institutions meant fewer penalties. Relevant merchants were punished in a different way, probably not with economic penalties but with damages on their reputation. By contrast, economic penalties were the most popular punishment for people who did not care about reputation.

Despite the previous result, also legal regulation and printed forms affected penalties in some way. In general terms, the increase of norms and handbooks on legal formulas used by notaries decreased the number of penalties in the contract.

Penalties in the contract also changed due to delays in the fleet system. In the table, the variable *delays* is significant and positive. Just recall that the variable delays is calculated as the average from the previous period. Therefore, it can be stated that delays produced in previous fleets acted as a warning and thus increased penalties in future contracts.

Table 10: Payment regression

	$D_{PAYMENT}$ PROBIT	$D_{PAYMENT}$ LOGIT
Adverse Selection		
Di	0.497766	0.978829
	(0.286358)	(0.560301)
Dn	-0.241209	-0.437756
	(0.202519)	(0.414238)
Dc	0.213764	0.426991
	(0.182952)	(0.410135)
Profession	-0.511562	-1.155361
	(0.489723)	(0.993124)
Bankrupt	0.374731	0.738601
	(0.970926)	(2.153393)
Ability to control		
Pi	0.084022	0.084192
	(0.185607)	(0.348754)
Pn	-0.031911	-0.041799
	(0.089786)	(0.174431)
Pc	-0.008036	-0.017155
	(0.029493)	(0.057647)
Business		
Size	-3.84E-08	-9.61E-08
	(1.52E-07)	(3.50E-07)
Duration	-0.002023***	-0.003658***
	(0.000526)	(0.001153)
Destination	0.566612	0.844130
	(0.421415)	(0.809651)
Law		
Court	0.005437	0.013737
	(0.009093)	(0.019443)
Regulation	-0.548220***	-1.047474**
	(0.183253)	(0.451232)
Printed Forms	-0.222319	-0.166312
	(0.427341)	(0.836609)
Economic Environment		
Trade Value	5.38E-06	0.000117

	(0.000282)	(0.000650)
Delays	-113.4579	-246.8500
	(69.53715)	(141.5168)
Piracy	217.4777*	479.7106*
	(135.9152)	(273.5278)
Time trend	1.837958***	3.169087***
	(0.558649)	(1.341868)
Log likelihood	-76.59410	-77.18222
N	280	280

Standard Error in parenthesis
*p ≤ 0.10 **p ≤ 0.05 ***p ≤ 0.01

In purchase contracts payment clauses are essential; this is true in the 16th century and even nowadays. Indeed, the regulation of conditions for the repayment of the merchandise sold constitutes the object of the contract. Nevertheless, results show that for the Atlantic Trade this regulation was not an adverse selection problem. This does not mean that economic assessments did not matter. In fact, the variable duration is strongly significant and negative. Similarly to the regression with all clauses, this result indicates that repayment is less regulated in longer economic relationships what confirms the argument by Berger & Udell (1995). In the paper, the authors prove that the use of collateral decreases significantly with the length of the relationship between the borrower and the bank.

The legal regulation about contract design also had an impact in payment conditions. The increase of norms promulgated by the Crown simplified the conditions for repayment in contracts *ceteris paribus*.

As it happened with guarantee clauses, the pirate threat affected repayment conditions. The result was predictable since payment was done in silver and transported to Spain. Increases of piracy made the transport more insecure and insurances only covered a minimum part of the losses.

Also time exerted a positive influence on repayment conditions and the linear time trend is strongly significant.

Table 11: Obligation regression

	$D_{OBLIGATION}$ PROBIT	$D_{OBLIGATION}$ LOGIT
Adverse Selection		
Di	0.175839	0.347627
	(0.213198)	(0.360838)
Dn	-0.209093	-0.319119
	(0.157109)	(0.270958)
Dc	-0.238935**	-0.371265**
	(0.118336)	(0.197057)
Profession	-0.174032	-0.309647
	(0.320633)	(0.541633)
Bankrupt	9.021044***	37.11700***
	(0.428293)	(1.043719)
Ability to control		
Pi	-0.004985	-0.001401
	(0.172450)	(0.303508)
Pn	0.022336	0.058608
	(0.069213)	(0.122266)
Pc	0.012739	0.035239
	(0.025304)	(0.045918)
Business		
Size	3.53E-09	3.91E-09
	(1.03E-07)	(1.94E-07)
Duration	0.000193	0.000258
	(0.000390)	(0.000676)
Destination	-1.597982***	-2.973009***
	(0.384072)	(0.769487)
Law		
Court	0.002002	0.005286
	(0.008283)	(0.014312)
Regulation	0.028684	0.029712
	(0.131424)	(0.229709)
Printed Forms	0.222797	0.434937
	(0.405524)	(0.701405)
Economic Environment		
Trade Value	0.000168	0.000347
	(0.000207)	(0.000353)
Delays	-38.50082	-77.16169
	(64.04761)	(110.2581)
Piracy	45.73656	101.3666
	(135.5869)	(234.7013)
Time trend	-0.290015	-0.463498
	(0.397136)	(0.697621)

Log likelihood	-135.8357	-135.1788
N	280	280

Standard Error in parenthesis
*p ≤ 0.10 **p ≤ 0.05 ***p ≤ 0.01

In this last regression we can clearly appreciate the impact of adverse selection. The variables *Dc* and *bankrupt* are significant at 1%. Partners who have been officially declared bankrupt and with a limited experience on trade accepted more complex contracts in terms of duties. By contrast, contracts for more experimented traders contained fewer obligations. The result confirms the application of the Stiglitz-Weiss model for the case of obligations, since opportunistic individuals will be attracted by more complete contracts.

The result from variable destination confirms also the existence of an incentive effect; the increase in obligations in the contract forced debtors to select riskier projects. People who selected more popular destinations accepted contracts with fewer obligations, and debtors going to more distant markets preferred more complex contracts.

Table 12 presents results from the previous regressions altogether. In this occasion I use the LOGIT specification.[54]

Table 12: Guarantee, Penalty, Payment and Obligation

	$D_{GUARANTEE}$	$D_{PENALTY}$	$D_{PAYMENT}$	$D_{OBLIGATION}$
Adverse Selection				
Di	0.158755	-0.626555**	0.978829	0.347627
	(0.485742)	(0.304263)	(0.560301)	(0.360838)
Dn	0.223188	-0.267632	-0.437756	-0.319119
	(0.290939)	(0.387464)	(0.414238)	(0.270958)
Dc	-0.459979***	0.131133	0.426991	-0.371265**
	(0.210030)	(0.234375)	(0.410135)	(0.197057)
Profession	-0.147841	0.231376	-1.155361	-0.309647
	(0.723531)	(0.460427)	(0.993124)	(0.541633)
Bankrupt	0.576029	-1.376464	0.738601	37.11700***
	(1.771476)	(0.807913)	(2.153393)	(1.043719)
Ability to control				
Pi	0.383918	-0.172041	0.084192	-0.001401
	(0.480641)	(0.290466)	(0.348754)	(0.303508)
Pn	-0.267271	-0.062321	-0.041799	0.058608
	(0.169116)	(0.120316)	(0.174431)	(0.122266)

[54] Although results from LOGIT and PROBIT models are very similar the LOGIT regression presents a slightly lower value for the Akaike information criteria.

Pc	-0.019333	-0.012309	-0.017155	0.035239
	(0.097136)	(0.037042)	(0.057647)	(0.045918)
Business				
Size	1.64E-07	-2.99E-07	-9.61E-08	3.91E-09
	(1.45E-07)	(4.51E-07)	(3.50E-07)	(1.94E-07)
Duration	-0.001060	-0.000647	-0.003658***	0.000258
	(0.000800)	(0.000618)	(0.001153)	(0.000676)
Destination	-3.434374***	0.656696	0.844130	-2.973009***
	(1.337134)	(0.637220)	(0.809651)	(0.769487)
Law				
Court	0.052548**	-0.024355	0.013737	0.005286
	(0.021644)	(0.013664)	(0.019443)	(0.014312)
Regulation	-1.206895	-0.405831**	-1.047474**	0.029712
	(0.688763)	(0.227652)	(0.451232)	(0.229709)
Printed Forms	-2.241009	-1.540262***	-0.166312	0.434937
	(1.320196)	(0.634831)	(0.836609)	(0.701405)
Economic Environment				
Trade Value	-0.000278	-0.001290	0.000117	0.000347
	(0.000385)	(0.000336)	(0.000650)	(0.000353)
Delays	-369.4410	201.4980**	-246.8500	-77.16169
	(174.0017)	(103.4598)	(141.5168)	(110.2581)
Piracy	939.6121**	-358.8144	479.7106*	101.3666
	(416.7200)	(222.3928)	(273.5278)	(234.7013)
Time trend	-0.109035	2.460667	3.169087***	-0.463498
	(2.702863)	(0.651192)	(1.341868)	(0.697621)
Log likelihood	-83.86735	-154.9823	-77.18222	-135.1788
N	280	280	280	280

Standard Error in parenthesis
*p ≤ 0.10 **p ≤ 0.05 ***p ≤ 0.01

Conclusions

The implications of differences among contracts regarding design have been largely discussed among economists The multiplicity of theoretical debates about definition of terms, methodology or focus in the analysis offers an idea about the importance of such issue. Unfortunately, the proliferation of theoretical papers and the development of mathematic models contrast with the lack of interest about empirical analysis. This paper aimed at filling the gap between theory and reality.

In the paper, following the S-W model, I tested the hypothesis that 16th century merchants used contracts for the Atlantic trade as screening devices. The hypothesis was also controlled by factors such as legal regulation on contracts, the relevance of

the business or the economic environment. For the test, I use collateral requirements and the complexity of contracts, as measured by the number of clauses.

Regarding collateral, I detect an adverse selection effect since suspicious individuals are willing to accept higher collateral requirements. Results also show an incentive effect, so that the rise of collateral will, in general, drive individuals in general to select riskier destinations with higher expected profits.

Additionally, the complexity of contracts was also tested through clauses running a set of regressions: one for the total number of clauses in general and others for every type of clause. In total terms, and despite the influence exerted by legal norms, results highlighted that duration was a crucial element in the design of the contract. According to this, stronger economic relationships were less regulated while for business deals, principals introduced more provisions in the contract.

The whole story changes when distinguishing among clauses. For guarantee, penalties and obligations, principals had more authority to introduce specific provisions which were used to screen among debtors. In all these regressions, results reveal an adverse selection effect. The payment conditions however seem to be more legally regulated. The explanation lies in the importance of such conditions which are essential for the contract from the legal point of view.

Appendix: Variables in the regression

Dependent Variables

Collateral: The degree of collateral requirements per contract

All clauses: Total number of clauses per contract

Guarantee: Dummy variable which takes value 1 for at least one guarantee clause per contract and 0 otherwise.

Penalty: Dummy with value 1 for at least one penalty clause per contract

Payment: Dummy similar to penalty.

Obligation: Dummy variable defined as penalty.

Explanatory variables

Personal Reputation: The measures from reputation have followed triple criteria: institutions membership, news and contracts signed. I equally estimate reputation for debtors (Di, Dn, Dc), and principals (Pi, Pn, Pc).

Information from institutions has been proxy with Schäfer (2003) Mariluz Urquijo (1998), and Heredia (1983). All these books contain list of members from different institutions related to trade. While Ernesto Schäfer analyses members of the Indies' Council and the House of Trade, Mariluz Urquijo collects information from local institutions as the Town Council and Antonia Heredia includes list of merchants from the Consulate in Seville.

Among the wide historical literature to estimate the relevance of traders or news I distinguish between groups of merchants and trade in general. Regarding groups: merchants from Burgos in Palenzuela (2001), Pike (1972) or Caunedo (1983); Genoese merchants in Otte (1961), Otte (1963) or Pike (1966); merchants from the Basque Country in García Fuentes (1991). Regarding trade in general: Carande (1990), Otte (1996), Bernal (1992), Lorenzo Sanz (1986) or Dominguez Ortiz (1990).

Size and *Duration* are calculated with information from contracts. The first variable approaches the monetary value of the contract in maravedís and has been corrected by the Hamilton price index. The second variable is measured in days.

Destination: The popularity of different destinations throughout the century has been proxy with data about the fleet system. For every year it was compulsory for ships to register their final destination with the House of Trade, data which has been collected by Chaunu (1955). I compare for every year the total destinations of the fleet with the destinations in the contracts from the sample, with this information I have elaborate an index which measures the relative importance of every destination over the total. The variable destination will take values between 0 and 1, lower values will be interpreted as less popular markets while higher values means more popularity. For instance, if in 1540 55,69% of the ships in the fleet decided to go Mexico in the data base, contracts in 1540 with Mexico as destination have the value 0,5569.

Court Efficiency (*court*): The average duration for the previous decade waged by the number of lawsuits, extracted by the author from index of Section Consulado, Indies Archive, Seville.

Regulation: The average norms regulating contract per decade with information from the Spanish Ministry of Culture's website, http://www.mcu.es/archivos/lhe/.

Notarial Forms (*Forms*): Average number of printed forms per decade from Bono (1980) and Amenzúa y Mayo (1950).

Navigation: From Chaunu (1955) I have calculated the proportion of *delays* ship per decade. Also *piracy* is estimated with the rich information from the fleet system.

Trade Value: Information about taxes is fragmentary and has been collected from very different sources Sanz Eufemio (1982), Vol. 2, Céspedes del Castillo (1945), García-Baquero (1992), Chaunu (1955), Vol. 6A.