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The extralegal development of securities trading in seventeenth-century Amsterdam

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Abstract

It is often argued that government rule enforcement is necessary for the development of a stock market (Glaeser, Johnson, & Shleifer, 2001). Work by Boot, Stuart, and Thakor (1993), Klein and Leffler (1981), and Telser (1980), however, suggests that repeated interaction and reputation can create incentives for contracts to be self-enforcing. This paper investigates these claims by examining the first stock market, the Amsterdam Bourse. At a time when many financial contracts were unenforceable in government courts the market developed surprisingly advanced trading instruments. Descriptions by seventeenth-century stockbroker, De la Vega [*Confusion de Confusiones*], indicate that a reputation mechanism enabled extralegal trading of relatively sophisticated contracts including short sales, forward contracts, and options.
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1. Introduction

From stock markets in former socialist countries to new electronic trading networks in the West, there is much debate over the proper amount of oversight of financial exchanges (Frye, 2000; Macey & O'Hara, 1999). A market without rules would hardly be conducive to trade (Brennan & Buchanan, 1985) so it is often concluded that government rules and regulations are necessary for a stock market to function (Glaeser, Johnson, & Shleifer, 2001). What happens

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when a legal system is not equipped to deal with complicated financial transactions? Boot, Stuart, and Thakor (1993), Klein and Leffler (1981), and Telser (1980), give us theories of how contracts can take place even without external enforcement. Among other things they illustrate that repeated interaction and reputation can align incentives such that it pays to abide by one's contracts. This paper uses evidence from the first stock market to investigate the degree to which financial markets are able to function without state enforced rules.

In the seventeenth century, the Amsterdam Bourse developed surprisingly advanced trading instruments at a time when government courts were unaccustomed and unable to deal with what today would be considered common financial transactions. Much of the dealings that took place were actually prohibited by law, although the law was ineffective and not strictly enforced. This relatively free atmosphere allowed the traders to experiment and devise new trading instruments, even though they were officially proscribed. The development of the instruments on the Amsterdam Bourse was not due to government directive but self-interest of traders who found it profitable to engage in new financial dealings. In contrast to the position that financial markets depend on government rules and regulations, the historical record lends credence to the theories that contracts can be self-enforcing and that market participants can police themselves.

The paper has the following structure: Section 2 discusses theories of exchange without external enforcement. Section 3 outlines the beginnings the Amsterdam Bourse, the companies traded, and the regulatory climate. Section 4 uses evidence from seventeenth-century stockbroker Joseph Penso de la Vega who gave a first hand account of the types of trading that occurred on the Bourse. Section 5 analyzes the reputation mechanism in use. Evidence shows that even though the law prohibited the trading of various derivatives the market was able to develop to a surprising degree of sophistication.

2. Exchange without external enforcement

In an article discussing emerging financial markets Glaeser et al. (2001, p. 853) ask "Who should enforce laws or contracts: judges or regulators?" They argue the theory that unregulated financial markets can be efficient "crucially relies, among other assumptions, on the possibility of effective judicial enforcement of complicated contracts" (2001, p. 854) and conclude that when the legal system is lacking, government regulation is needed. It is a common notion that without government enforcement parties have incentives to cheat and welfare-enhancing trades will not take place.

Tullock (1985, 1999), however, points out that the prisoners' dilemma is not as ubiquitous as we might believe; with continuous dealings parties will not want to jeopardize the benefits of long-term relationships and will choose to cooperate. Still it is questioned how far this can be extended. For example Tullock (1972) states:

> It is clear, however, that there are many situations in which we could not depend upon this very simple variant of the discipline of continuous dealings . . . Transactions in which large payments will be made in the future would be *impossible* if we depended solely on the discipline of continuous dealings. (1972, p. 69, emphasis added)

Likewise, Olson (1996) believes that some trades can take place without external enforcement but not complicated financial transactions. He declared:

> Though the low-income societies obtain most of the gains from self-enforcing trades, they do not realize many of the largest gains from specialization and trade. They do not have the institutions that enforce contracts impartially, and so they lose most of the gains from those transactions (like those in the capital market) that *require* impartial third-party enforcement. (1996, p. 22, emphasis added)

In recent years much work has been done on markets that can function without a legal system but if theorists such as Tullock, Olson, and Glaeser et al. correct the results cannot be generalized to financial markets. Cattle ranchers (Ellickson, 1991), Kwakiutl Indians (Johnsen, 1986), diamond dealers (Bernstein, 1992), and medieval merchants (Benson, 1989, 1990; Greif, 1989, 1993; Greif, Milgrom, & Weingast, 1994; Milgrom, Douglass, & Weingast, 1990) may be able to conduct business without legal recourse but is it the case that complicated financial transactions that involve large payments through time necessarily depend on external enforcement? Upon looking at the historical record it becomes evident that the answer is no. In seventeenth-century Amsterdam there were many complicated financial transactions involving large payments through time despite the fact that the legal system was not enforcing these contracts.[1]

This is akin to the findings of Quinn (1997) and Neal and Quinn (2001) who analyze seventeenth-century goldsmith-bankers in London. These bankers faced a comparable predicament: they had little redress if others failed to redeem their bills of exchange. But to allay this problem they used repeated dealings and an informal network to convey information about others' reliability. Even when there are complicated contracts that involve large payments over time reputation encourages contractual performance.

It is interesting to note that this dilemma was addressed by an economist at least as early as Smith's (1766) *Lectures on Jurisprudence.* Smith described how time bargains were unenforceable yet still took place. He stated:

> This practice of buying stocks by time is prohibited by government, and accordingly, tho' they should not deliver up the stocks they have engaged for, the law gives no redress. There is no natural reason why 1,000£ in the stocks should not be delivered or the delivery of it enforced, as well as 1,000£ worth of goods. But after the South Sea scheme this was thought upon as an expedient to prevent such practices, tho' it proved ineffectual. In the same manner all laws against gaming never hinder it, and tho' there is no redress for a sum above 5£, yet all the great sums that are lost are punctually paid. Persons who game must keep their credit, else no body will deal with them. It is quite the same for stockjobbing. They who do not keep their credit will be turned out, and in the language of Change Alley be called lame duck. (1766/1982, p. 538)

He went on to argue that:

> Of all the nations in Europe, the Dutch, the most commercial, are the most faithful to their word . . . This is not at all to be imputed to national character, as some pretend . . . It is far more reduceable to self interest, that general principle which regulates the actions of every

> man, and which leads men to act in a certain manner from views of advantage, and is as deeply implanted in an Englishman as a Dutchman. A dealer is afraid of losing his character, and is scrupulous in observing every engagement. When a person makes 20 contracts in a day, he cannot gain so much by endeavouring to impose on his neighbours, as the very appearance of a cheat would make him lose. (1766/1982, p. 538)

Smith described how people must be in good standing else others will not deal with them. Rather than relying on Glaeser et al. (2001, p. 855) preferred solution of "a highly motivated regulator to enforce the rules," we see the invisible hand guiding traders to abide by their contracts.

With external enforcement lacking, one of the most important mechanisms used is reputation (Klein, 1997). A known cheat will have difficulty finding business, so even when contracts are unenforceable, fear of having a bad reputation can create incentives to abide by one's word. By putting one's reputation on the line with each transaction, it is like posting a bond for each trade (Bernstein, 1996). Rather than taking a one time gain from cheating, traders are better off by cooperating, thereby developing a good reputation, which signals one's trustworthiness.

Good standing can be established through a number of means. One way is if traders are members of the same close-knit ethnic community (Landa, 1981, 1994). This mechanism, however, does not hold as one moves away from trade within close circles. Greif (1989, 1993) and Clay (1997a, 1997b) show how trade can be extended across long distances between merchants who seldom interact. As long as information about the reliability of prospective trading partners can be shared, much of the incentives for cheating are eliminated. If traders wish to deal with others in the future they will work to be known as a reliable partner. This multilateral reputation mechanism (Greif, 1993; Greif et al., 1994) facilitates trade between those who have no previous experience with each other and those who do not plan to interact with each other in the future. In both cases it is not in the interest of a trader to cheat since others will be informed. As will be discussed, this paper finds that in seventeenth-century Amsterdam a multilateral reputation mechanism enabled stockbrokers to engage in advanced contracts even though they were not backed by law. The Amsterdam stockbrokers, without a legal system to rely on, conducted trade on the discipline of continuous dealings and reputation alone.

3. The beginnings of the stock market

It was shortly after the establishment of the Dutch East India Company in 1602 when equities began trading on a regular basis.[2] Trading took place at the Amsterdam Bourse, an open aired venue, which was created as a commodity exchange in 1530 and rebuilt in 1608.[3] Commodity exchanges themselves were a relatively recent invention, existing in only a handful of cities.[4] Rather than being a bazaar where goods were traded intermittently, exchanges had the advantage of being a regularly meeting market, which enabled traders to become more specialized and engage in more complicated transactions (Braudel, 1979, p. 92). Kellenbenz reports:

> As early as the middle of the sixteenth century, people in Amsterdam speculated in grain and, somewhat later, in herring, spices, whale-oil, and even tulips. The Amsterdam Bourse in particular was the place where this kind of business was carried on. This institution as an

open-air market in Warmoestreet, later moved for a while to the 'New Bridge,' which crosses the Damrak, then flourished in the 'church square' near the Oude Kerk until the Amsterdam merchants built their own exchange building in 1611. (1957, p. 133)[5]

They created contracts for the future delivery of commodities that were "sometimes even years in advance" (Dehing and Hart, 1997, p. 53).[6] The Bourse was large enough to hold 500 people and was the site of trading of over 300 commodities (Bloom, 1937, p. 179; Dehing and Hart, 1997, p. 53).[7] Upon issuance of shares in the East India Company in 1602 it was only natural for equities to be traded there as well, with the stockbrokers occupying a section at the edge of the Bourse (Bloom, 1937, pp. 179–180). According to Bloom (1937, p. 181), "Marranos from the Spanish Netherlands brought with them a knowledge of exchange technique in the realm of produce which in Amsterdam they employed in money and securities."

Garber (2000, p. 23) remarks that by the 1630s "the Netherlands was a highly commercialized country with well-developed and innovative financial markets and a large population of sophisticated traders." Amsterdam did have a brokers guild, whose members swore not to trade on their own account, but large numbers of unlicensed brokers conducted business in their midst (De la Vega, 1688, pp. 184–186).[8] The count of all licensed brokers was 300–500 and the number of unlicensed ones was probably twice that (Dehing & Hart, 1997, p. 53; Bloom, 1937, p. 183).[9] In the mid-eighteenth century there were 100 stockbrokers (Bloom, 1937, p. 183), which likely is just over the amount in latter half of the seventeenth century.[10]

3.1. Equities traded

The primary company that was traded on the Amsterdam Bourse was the Dutch East India Company (VOC), which was the biggest joint stock venture to date (Dehing & Hart, 1997, p. 54).[11] This large scale and widely held endeavor was open to Dutchmen and foreigners alike and allowed numerous investors to reap the benefits of foreign trade without requiring them to risk their entire fortune. The company issued shares by region[12] with the Amsterdam Chamber raising over half of the funds from 1,130 investors[13] (Israel, 1989, p. 70; 1995, pp. 321–326) (Table 1).

The initial share price was 3,000 guilders,[14] a substantial sum of money for the average person, but it appears that it was possible to subscribe to less than one full share (De la Vega, 1688, p. 149). In all there would have been just over 2,100 shares, roughly half of

Table 1
Investors in the Amsterdam chamber of the East India Company in 1602

	All investors		Chief investors	
	Number	Guilders invested	Number	Guilders invested
North Netherlanders	785	2,023,715	40	635,100
South Netherlanders	302	1,418,700	38	871,160
Germans	38	137,900	3	60,000
English	3	6,900	0	0
Portuguese Jews	2	4,800	0	0

Source: Israel (1995, p.346).

which were for the Amsterdam Chamber. For its first 10 years the company paid no dividends and reinvested profits, until the 11th and 12th year where combined dividends amounted to 3,000 guilders (De la Vega, 1668, p. 149).

As Dehing and Hart (1997, p. 54) point out, “Initially, it was set up for a limited number of years, like most early modern trade enterprises,” but this was to change. Barbour explains:

> It was on the Amsterdam Bourse in this period that the share completed its evolution from subscription of money to any amount in a trading venture, recoverable only when the enterprise or company should be terminated and the joint stock wound up, to a unit of investment value in a permanent undertaking which implied no active participation in the business thus financed, and which the investor could sell or dispose of at will. (1950, p. 79)

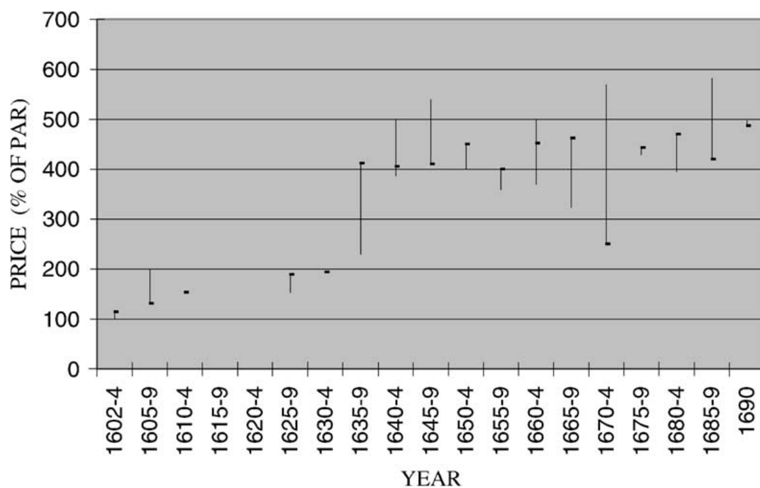
By 1609 the company made the shares enduring, requiring investors to sell their shares if they wished to cash out so they could not withdraw their capital from the company (Neal, 1990a, p. 195).[15] Neal reports how shares were transferred from person to person:

> Transfer and ledger books were maintained at each of the six chambers of the company . . . The transfer books were available 4 or 5 days a week and recorded the ledger entries for both the seller and the buyer, the amount of stock transferred, and the names of two witnesses and the clerk. A very small transfer fee was charged per share. Delays did occur due to the sloppiness of the clerks in recording entries and the necessity of checking to make sure the seller had at least the number of shares being sold to his or her credit in the main ledger. Dissatisfaction with the speed of transfers meant that most trading in VOC shares were done on the basis of forward, or *termijn*, contracts. These were settled at regular *rescontre* dates established every 3 months. (1997, p. 62)[16]

Shares that were repeatedly traded back and forth did not need to be officially transferred each time so stockbrokers figured out how to keep track of their dealings with each other. They created settlement days, “at which all bargains could be either adjusted or continued to the next settlement” (Dickson, 1967, p. 491).

Popularity of the stock market rose with the good fortune of the East India Company, which was significant (Fig. 1). Over the course of 120 years dividends on the original capital of the VOC ended up averaging 22.5% annually making it an attractive investment (Neal, 1990b, p. 17).[17] By 1688 the company had over 20,000 employees and over 300 ships traveling between the East Indies and Europe (Israel, 1989, p. 258; 1995, p. 942).[18]

The other principal company traded at the Amsterdam Bourse was the West India Company, founded in 1621 (Israel, 1995, pp. 326–327). Like its counterpart, the Company of the West raised over six million guilders, almost half in the Amsterdam Chamber (Israel, 1989, p. 159). In contrast, this company had difficulties earning profits, which was reflected in its market value (Fig. 2). In 1672 West India shares were almost worthless and the company had to be restructured (De la Vega, 1688, p. 174; Israel, 1989, p. 294). At the time De la Vega wrote *Confusion de Confusiones* the restructured shares were trading at 110 with the company’s dividends over a 14-year period amounting to only 26% (De la Vega, 1688, p. 174). While there were other companies in the Netherlands (Israel, 1989, pp. 109–112) none were as long lasting or large as the East and West India Companies, which constituted most of the stock market (Dehing & Hart, 1997, p. 54; De la Vega, 1688, p. 173).[19]

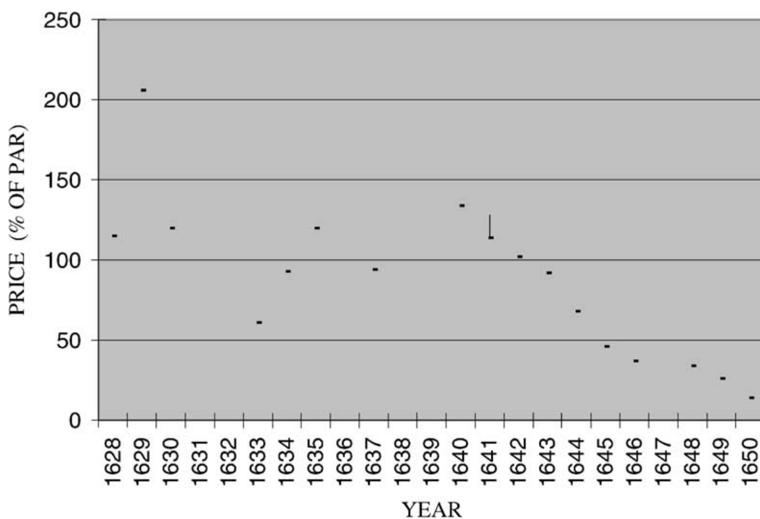


Source: Data are from Garber, 2000:77; Israel, 1989:86, 186; Israel, 1995: 848; Kellenbenz, 1957: 134.

Fig. 1. Share prices of the East India Company in Amsterdam, 1602–1690.

3.2. Regulatory climate

In some ways the stock market was not heavily regulated and left to its own devices (Neal, 1997, p. 63; Schama, 1987, p. 348)[20] officially, however, the government was not laissez faire. The state permitted the most straightforward sales but was not tolerant of everything that went



Source: Data are from Israel, 1989: 163.

Fig. 2. Share prices of West India Company in Amsterdam, 1628–1650.

on at the Bourse. Government viewed the market and its various forms of speculation with suspicion. Officials had long sought to limit speculation, as De Vries and Van Der Woude explain:

> Speculation in prices, with associated hoarding, was a constant source of concern to medieval municipal authorities, and it gave rise to mountains of legislation intended to guarantee supplies, prevent hoarding, and restrict the role of middlemen and nonmarket transactions. The Netherlands, under both Habsburg and Republican governments, had its share of ordinances. (1997, p. 150)

Within the first decade of equity trading brokers engaged in short sales and forward contracts, but these types of trades were frowned upon by officials. De Vries and Van Der Woude note:

> As early as 1609, futures trading emerged in the shares of the VOC . . . The following year the States General prohibited short-selling and other *windhandel*, a prohibition that would be repeated many times in later decades. But speculation in the prices of VOC and other joint-stock company shares continued. (1997, p. 151)

Modern economics has shown the benefits of short selling but at the time they thought that these sales were solely used to manipulate and suppress the stock prices, so the government attempted to prohibit these markets.[21] According to Garber (2000, p. 30) there were numerous pamphlets released in the Netherlands that were "motivated by a moralistic attach against speculation by the authorities."

It was believed that outlawing speculation would eliminate much of the price volatility and price declines. One event that caused a stir was when, in 1608, the price of the stock fell from 200 to 130, which they attributed to a large number of shorts (Kellenbenz, 1957, p. 134). The government claimed outlawing short selling would prevent further such episodes. Wilson (1941, p. 14) states, "In February 1610, selling '*in blanco*' was prohibited, and it was stipulated that shares which were sold must be transferred to the purchaser a month after the sale at the latest." The law pronounced that only those who owned the stock could engage in sales. Kellenbenz recounts:

> [O]n the 27th of February 1610, the first edict was published prohibiting activities of this sort, especially 'windhandel,' that is, the dealing in shares were not in possession of the seller. The sale of shares of the Company by *bona fide* owners for future delivery was allowed. In 1621, after the outbreak of war with Spain, a second edict against the 'wind trade' had to be issued, and further prohibitions followed; but apparently the abuses could not be eliminated. (1957, pp. 134–135)

In the following decades official prohibitions continued with additional ordinances passed in 1621, 1623, 1624, 1630, 1636, and 1677 (Dehing & Hart, 1997, p. 55; Garber, 1994, p. 78).[22] But despite these bans the speculative market still persisted.

Pronouncing something illegal and actually prohibiting it are separate matters. De Vries and Van Der Woude (1997, p. 150) point out, "the reality of the entrepôt repeatedly undermined the feasibility of traditional municipal market regulation, certainly in the major commercial centers." Decades after the first prohibition on selling stocks short the market still continued.

Wilson writes:

> By 1630, then, most of the elements of a speculative market in shares were already present on the Amsterdam Bourse. Speculators commonly sold shares which they did not possess at the time of sale, and surpluses were settled up on *rescontre* (settling day). This only became a regular feature in the second half of the seventeenth century. (1941, p. 14)

Speculation of various forms had become so widespread the government was nearly powerless in preventing such transactions. Schama (1987, p. 350) notes, "it was virtually impossible to stifle impromptu speculation. If it was driven from the Bourse, the chances were that it would develop spontaneously elsewhere." The historical accounts given by others such as Braudel (1979, p. 101) and Barbour (1950, p. 74) also point to the ineffectiveness of these regulations at eliminating these speculative markets;[23] they were "unenforceable prohibitions" (De Vries & Van Der Woude, 1997, p. 151). Barbour states:

> Repeated efforts of the States General to put a stop to the sale of actions by persons who owned none, to buyers who were not always able to pay for them, failed repeatedly. Only in 1689 was the policy of repression abandoned, when Amsterdam undertook to regulate and to tax the traffic in actions. By this date speculative trading had reached a strikingly modern stage of expertness. (1950, pp. 77–78)

Through the end of the seventeenth century it was evident that these prohibitions were ineffective.

For whatever reason the authorities did not stringently punish violators and hence they did not stamp out the speculative markets. Simply not enforcing contracts is less of an impediment than actually punishing those who engage in unsanctioned trading. In other societies there were restrictions placed on the market but the difference lies in whether the laws were actively enforced.[24] There are a few explanations why Dutch authorities were not ironhanded in their prohibitions. According to Hart, Jonker, and Zanden (1997, p. 3) the States General was not extremely powerful and operated in a "highly fragmented institutional structure." As Clay (1997a, p. 503), points out, "In economic models, the courts often operate costlessly; in reality, however, they involve real costs." Not only is it costly for the general public to use courts, the sense in which the quote refers, but it is also costly for officials. Governments have limited budgets and are not able to effortlessly put into effect every regulation they declare (Benson, 1990, pp. 96–101). In seventeenth-century Holland, rulers had many other things to worry about ranging from enforcing prohibitions against French brandy (Israel, 1989, p. 290) to the recurring wars against England (Israel, 1995, 713, 766, 785, 975). From the standpoint of the financial traders the key was that the government did not actively interfere; *de facto* it was pretty much hands off.

4. The account given by Stockbroker Joseph Penso de la Vega

To investigate the degree to which the market functioned let us examine a primary source. *Confusion de Confusiones* was published in 1688 by Joseph Penso de la Vega who was a stockbroker and writer.[25] The work was composed in Spanish in the form of a dialogue between three

characters, with one character, the shareholder, who "is usually the vehicle for the pronouncement of the author's judgments" (Kellenbenz, 1957, p. 133).[26] The narrative, although informal, provides an interesting account of a quite developed financial market.[27] English translator Hermann Kellenbenz (1957) has declared, "If one is able to look through or around the literary peculiarities of the volume, he will find in it a reasonably realistic description of the whole stock market."[28] De la Vega describes the trading that took place in shares in the East and the West India Companies; short sales, forward contracts, option contracts, and other transactions all existed despite the fact that much of them had been officially outlawed since they began appearing throughout that century.

4.1. Short sales

First let us look at De la Vega's account of short sales and their prohibition. In the text, he refers to the ordinances that prohibited short sales: "Frederick Henry, too, a shining star in the house of Orange-Nassau, promulgated (with wise motives) an ordinance for these provinces, according to which he who sold shares for future delivery without putting them on a time account should be exposed to a danger (because he sold something he does not own) that the buyer will not take the pieces at the time fixed upon." (152) Although the first laws prohibiting short sales had been passed before the time of Stadholder Frederick Henry, the chief executive of the Netherlands from 1625 to 1647, the traders referred to the ordinances of Frederick Henry since many were passed while he was in office.

Short sales were *de jure* illegal so one might assume that no such short sales took place, but based on *Confusion de Confusiones* it is clear that the ordinances did not stamp short sales out. De la Vega describes how people did engage in short sales but would be tempted to not follow through on their deal when the price took an unfavorable turn. De la Vega (153) wrote, "There are many persons who refer to the decree [which proclaims the unenforceability of short sales] only when compelled to do so, I mean only if unforeseen losses occur to them in their operations." When someone did not have the money to cover their position they might "appeal to Frederick" (De la Vega, p. 153)[29] and declare that their deal was not valid, but if everyone did this no one would agree to deal with short sellers. We can see that this was not the case as De la Vega (153) noted, "When a loss occurs, the losers are expected to pay at least what they have available at the moment, and it might be expected that, when the wound is fresh, there would be no new injury . . . Other people gradually fulfill their obligations after having sold their last valuables and thus meet with punctuality the reverses of misfortune." Despite the ability of short sellers to call upon the law to get out of their predicaments this was not prevalent and we see that short sellers did attempt to deliver or pay what they owed.[30]

4.2. Forward contracts

Beyond short sales other transactions with unclear legal status took place at the Amsterdam Bourse. We can see evidence of forward contracts, which were negotiated with settlement dates many months in advance. De la Vega described them:

> The third kind of transaction takes place *at later dates* still. Here the shares must be delivered and be paid for on the twentieth and twenty-fifth of the month which is specified in

> the contract, unless one makes use of the mysterious prolongations of which I disapprove because they damage the credit and endanger the reputation [of the party who asks for the prolongation]. For these time bargains the brokers use printed *contract forms* with the customary stipulations and conditions of the business. On these forms spaces are left only for the names, dates, and prices. When two copies have been filled out and signed, the contracts are exchanged by the two parties; [later], and after the establishment of the profit or loss in the business by the rescounters, they are re-exchanged by the signatories. (181–182)

Since they were for long periods of time, forward contracts required traders' counterparts to still be around with what the owed when the time came due.

One might assume that the law was the reason why traders followed through with contracts, but from *Confusion de Confusiones* we can see otherwise since time bargains were prohibited. De la Vega wrote:

> As to the unactionable feature of any speculative transaction to be settled by the payment of the differences, you are right in remarking that with *cash transactions* the regulation lacks pertinence. It is, however, valid in the case of *time bargains* unless the seller has the shares transferred to the time account of the purchaser within a fortnight. Then the buyer is obliged to take up the shares, or declare himself insolvent.
>
> Though the opinion prevails generally that this regulation does not apply in the case of the seller but only in that of the buyer, this is an error introduced by bad practice. The lawyers assert that the seller as well as the buyer is allowed to raise the objection [envisaged by Frederick Henry's edict].
>
> The public also presumes that, if the seller of stocks buys them back (from someone who had purchased them earlier), the law does not apply. That is undoubtedly an error also. (For instance), the edict does not apply when I buy shares at [540], sell it at [520], and declare before witnesses that the stock so sold will serve to settle the account of shares previously purchased. By this action I have declared myself debtor for the difference of 20% [of the face value] which I have lost. Therefore, I am not permitted to appeal to the regulation, since I have already assumed the debt; I must pay the difference or become insolvent. But if I have bought a share at [540] from one and without subsequent declaration I sell him another share at [520], [the seller in neither case really owning the stock,] I need neither declare myself bankrupt in order to free myself [from the obligation] nor disappear in order to shake loose; [I can merely appeal to the edict]. (182–183)

Shares needed to be settled or transferred within 2 weeks of the initial transaction, otherwise a contract would violate the law. Luckily for the traders, however, the regulations were not strictly enforced and they went on making forward contracts with each other despite their doubtful legal status.

4.3. Options

Equity trading had begun only earlier that century so it may be surprising to the modern reader that seventeenth-century traders developed an options market. De la Vega (182) described some

of the details options contracts, "For the *option business* there exists another sort of *contract form*, from which it is evident when and where the premium was paid and of what kind are the signatories obligations." In this area too options contracts had an uncertain legal standing. The regulations only added confusion since it was unsure how they applied. De la Vega wrote:

> As to whether the regulation is applicable to *option contracts*, the opinions of experts diverge widely. I have not found any decision that might serve as a precedent, though there are many cases at law from which one [should be able to] draw a correct picture. All legal experts hold that the regulation is applicable to both the seller and the buyer [of the contract]. In practice, however, the judges have often decided differently, always freeing the buyer from the liability while often holding the seller [to the contract] .... With regard to the put premium, however, there are also great differences of opinion, for, while the scholars assume that no [legally valid] claims can be made because of the regulation, there are contrary decisions by the courts, so that law and legal opinion, the regulation and the reasons for the decisions are contradictory. The theory remains uncertain, and one cannot tell which way the adjudication tends. (183)

It was unclear whether the law declared that buyers were not liable or if it said that both buyers and sellers were not liable to follow through with their contracts. Either way, with whole classes of contracts unenforceable, it seems that the options market had to develop without the aid of the law.

The regulation stated that one could not trade stock not owned, but some claimed that it did not apply as long as the stocks were purchased eventually. This interpretation essentially paid no heed to the regulation. De la Vega explained:

> However, if the payer of a put premium possesses the stocks on the day of the negotiation of the contract so that he could offer to make delivery to me and to have them transferred to my account [within] a fortnight after the offer, it is unlikely that in such a situation, embarrassing though it might be to me, the regulation can be appealed to. According to the opinion of some people, it is sufficient if the payer of the premium possesses the shares on the day when he declares [himself ready to make] the delivery and not already on the day when he entered into the premium contract, in order to make all objections on grounds of the regulation ineffective. (183–184)

Regardless of the how the officials intended the regulations to apply they were not strictly enforced and options trading persisted.

4.4. Hypothecation

Not only was there confusion over the legality of options, there was also confusion over the law concerning other practices, such as the hypothecation of shares as collateral for a loan. After buying shares there were three choices: the sale of shares, the transference of the shares into one's own name at the Bank, or hypothecation. The last option entailed pledging one's shares to obtain a loan at 80% of their value. This, in De la Vega's (152) words, "is done even by the wealthiest traders without harm to their credit." De la Vega (182) described the contract, "The *forms for hypothecating* are different also. Stamped paper is used for them, upon which

regulations concerning the *dividends* and other details are set down, so that there can be no doubt and no disagreement regarding the arrangements." Even though they signed clear contracts, in this area too it was unclear what was legal. De la Vega wrote:

> The same uncertainty of adjudication exists with respect to the hypothecation of stocks. While it is generally assumed that, if the shares fall below the value used as the basis of the loan, the mortgagee is obliged to pay in the difference or declare himself insolvent, a few very speculative minds have argued (uncertain doubtless because of the paucity of facts to sustain their position) that if the shares have not been transferred to the time account which I as money lender maintain, within a fortnight after the start of hypothecation arrangement, and if the shares remain in the account [of the borrower] until the date of payment [of the loan], I can raise objections [under the regulation] in order to garner a profit as well as to save myself from a possible loss. (184)

If the value of the shares fell enough, the party in possession of the shares would not be able to sell them for as much as the monetary value of the loan so as soon as this happened De la Vega said the consensus was that borrower must pay the difference. De la Vega pointed out that others maintained that such loans were in violation of the regulations unless the money borrower had transferred the equities into the moneylender's account. The latter position could not have been universally held, otherwise, there would not have been any of these loans.

4.5. Securitization

By the late 1600s the price of each share of the East India Company had reached quite a high value. Where, in modern times, we would see the company announcing a stock split or stock dividend at the time such practices had not yet been introduced. Traders began to offer derivatives of standard shares to allow those with less wealth to participate. De Vries and Van Der Woude explain:

> [S]hare speculation must have been encouraged by the difficulty of actually buying shares. Although the original subscription in 1602 allowed investors to place any amount of money, later trading usually took the form of single 'shares' . . . [which by 1650 cost] a small fortune. Much of the interest in futures trading came from persons whose modest means precluded the actual purchase of shares. A further encouragement to futures trading was the [East India Company's] practice of making legal transfer of share ownership only when the books were opened for the payment of dividends—twice per year at most. In time the *Beurs* established *rescounter* dates, quarterly deadlines for the settlement of mutually contingent financial contracts (monthly in the case of *ducat-actions*). (1997, p. 151)

With average daily wages around 0.9 guilders (Hart, 1997, p. 33) and the price of shares at over 15,000 guilders it would have taken a laborer's entire life earnings to purchase one full share.[31] Trader innovations opened the market to a whole new range of people who otherwise would have been precluded.

This was described by De la Vega:

> Some clerks have discovered that the speculation in ordinary shares (which are called *large* or *paid-up shares*) was too hazardous for their slight resources. They began, therefore, a less

> daring game in which they dealt in small shares. For while with whole shares one could win or lose 30 gulden of Bank money for every point that the price rose or fell, with the small shares one risked only a ducaton [3 gulden] for each point. The new speculation, called trading in *ducaton shares*, began in 1683. (185)

Ducaton shares, named for a coin in the Netherlands, were equivalent to one-tenth of a large share, and it appears that that people could trade in even smaller units as well (De la Vega, p. 188). De la Vega gave an analogy for the process of securitization:

> When a mirror is broken, each piece of crystal remains a mirror, the only difference being that the small mirrors reflect one's countenance in miniature and the large ones in larger size . . . Stocks shares are similar to mirrors . . . persons broke this mirror [the large 'East' shares] and cut the crystal into pieces by agreeing to regard each 500 pounds of the large shares as 5,000 small ones. (187)

Trading in these shares was more affordable than in large shares so they allowed more people to access the market (Dehing & Hart, 1997, p. 55). De la Vega (186) declared, "This branch of trade has been increasing during the last 5 years to such an extent (and mainly with a certain group which is as boisterous as it is quick-witted) that it is engaged in by both sexes, old men, women, and children." Apparently trading in ducaton shares became quite popular according to De la Vega (188) who wrote, "Even children who hardly know the world and at best own a little pocket money agree that each point by which the large shares rise or fall will mean a certain amount of their pocket money for their small shares . . . If one were to lead a stranger through the streets of Amsterdam and ask him where he was, he would answer, 'Among speculators,' for there is no corner [in the city] where one does not talk shares."

The trade of ducaton shares was an unofficial business, but they worked out a somewhat elaborate system of monthly or semimonthly settlements. Ducaton shares did not actually change hands (Kellenbenz, 1957, p. 141) but would be kept in the ledger of a cashier who was paid by the parties to keep the records and inform them on settlement date what they should pay or receive. The following passage from *Confusion de Confusiones* gives details:

> For a simple mode of clearing the transactions, the aid of a man who is called the General Cashier was secured. This man put down all contracts in a book, although previously only oral agreements had existed. For every contract that was put down, the General Cashier got a *placa* [the Spanish word for the small coin called a *stuiver* by the Dutch] from each party. Before the transactions were booked definitively, the cashier communicated with the two parties. One rarely agrees in this business to a transaction with a longer time to run than 1 month, because the resources of the people concerned are not sufficient. On the first day of each month when the clock of the Exchange shows one-thirty p.m., the cashier is told the price of the shares by two impartial stock-exchange men and, in accordance with these statements, he specifies the value of the small shares. This comedy is called 'raising the stick,' because formerly a stick was raised by the cashier, until this custom was given up because of the noise that was made each time. The fixing of the price is followed by the settlement of the transactions (in so far as they have not been settled in the middle of the month). Payment is made in cash, and is more punctual than with the large shares, so that even the most experienced businessmen take part in this trade in small shares, for, tempted

> by punctuality, they overlook the dubious reputation of the business and endorse it [by their actions]. (185–186)

It is often presumed that the third party necessary to enforce a contract must be the government but here we see the speculators hiring a private third party. The cashier would find out the price of the large share from two members of the Amsterdam Bourse and then declare the settlement price of the small shares.

In this area as well, ducaton contracts were not ultimately enforced by the courts of law. By the time the government courts addressed the trading in ducaton shares it was only to declare them illegal. De la Vega (208) described, "In the ducaton speculation the damage was still more disturbing. (Speculation was [in ducaton shares] was declared by court to be a game or a bet, and thus the transactions in them were denied the character of true business.) Therefore, it was not even necessary to appeal to Frederick Henry's decree to refuse payment." Again if the market in ducaton shares was to exist at all it clearly was not due to the support of government courts.

5. Analysis

From the examples given above we can see that official regulations were outlawing whole markets, not assisting them. For such extralegal markets to function there must have existed some other mechanism to ensure that traders followed their contracts. Rather than relying on law, there are various other ways of inducing contractual performance; sanctions against cheating can be physical, religious, social, or economic (Clay, 1997a, p. 513). There is no evidence that brokers used physical force, so it must be some combination of the other three. In passing Neal remarks:

> The number of stock traders in the Amsterdam Beurs in 1688 was sufficiently limited enough for them to prefer to deal only with other members of a close-knit group already dealing with them. In this way, any breach of contract in stock-trading could be compensated by an offsetting breach of contract in some other transaction unrelated to the stock market, but very much part of the group's activities. The group that emerged by the end of the seventeenth century in the Amsterdam Beurs was comprised of members of the Sephardic Jewish community. (1997, p. 63)

While this may be correct to a degree it seems likely that social and religious sanctions were not the only, or most important, factors. There were 300 licensed brokers in 1612, a number which increased to 500 over the next century, but of those only two were Jewish at century's beginning, 8 in 1612, 30 in 1645, and 50 through century's end (Bloom, 1937, pp. 182–183). It may be the case that a disproportionate amount of unlicensed brokers were Jewish and focused on the stock market (Israel, 1990), but it does not appear that the Bourse was an extremely homogenous group, socially or religiously.[32] In *Confusion de Confusiones* there are no apparent references to religious or social sanctions and the only reference to Judaism's influence is that on Saturdays less people attend the market (Bloom, 1937, pp. 179, 191). We can see that a substantial part, perhaps even most, of the exchange was not between the Sephardis so

it appears that religious and social sanctions were not the most important factor.[33] This is more in line with the findings of Neal and Quinn (2001, p. 10) who describe seventeenth-century bankers where, "Kinship or religious ties were often insufficient to cover the wide network of commerce that had then developed."

This leaves us with economic enforcement. Economic incentives for cooperation can be created if people wish to have enduring relationships. This can be at the individual level or within a group. With bilateral interaction consisting of repeated, one-on-one, long-term relationships, when someone cheats he risks that specific relationship. With interaction within a group, if someone cheats not only does he risk that specific relationship, he runs the risk of not finding any other trading partners (Clay, 1997a, p. 511). Though the Amsterdam brokers had no formal rules and could not exclude cheats, they could share information about trustworthiness and it would be in their interest to boycott those who were unreliable (Caplan & Stringham, in press).[34] Even when two brokers had no personal experience with each other or did not plan to trade with each other again, they would think twice about cheating because they knew that information about their behavior could be shared. This reputational network would create incentives for brokers to follow through with their contracts.

There are many passages from *Confusion de Confusiones* that illustrate the importance of reputation. De la Vega (172) wrote, "The Exchange business is comparable to a game. Some of the players behave like princes and combine strength with tenderness and amiability with intelligence, but there are some participants who lose their reputation and others who lack devotion to their business even before play begins." We would expect the untrustworthy brokers to not be very successful. Sure enough De la Vega (201) mentioned the disreputable, "Since the status, the insignificant capital, the low reputation, and the limited trustworthiness of such people are well known, they do not dare attempt to carry on any considerable business."

Though brokers with bad reputations were precluded from most dealing, the stock market was not a closed club. The text indicates the Bourse was composed of various sorts. De la Vega (185) remarked, "There exists an infinite number of these free brokers. This occupation is [in many cases] the only recourse for impoverished [businessmen], and the best place of refuge for many ruined careers." While many brokers live opulently, "Nevertheless there are numerous people in the business simply for the reason of providing decently for their families." (190) Although the Bourse was open to newcomers, participants did have to work to build their reputation before they could make substantial trades. For example, in one dialogue a novice believed his limited capital would preclude him and that "there would be nobody to give me credit," but he is told he can start with options until he "gains in reputation for his generosity as well as his foresight" (150–151).

At the Amsterdam Bourse each broker had to work to get business. Capitalists and merchants were able to make the trades themselves so they would only choose to go to the broker and pay his fee (De la Vega, p. 179) if they were getting value out such an arrangement. When confronted with this situation we would expect the brokers to act judiciously, which is confirmed by De la Vega (176) who wrote, "so great is the loyalty of some brokers to their principals, whom they usually call their masters, and so great is their industry, their activity, their zeal, and their vigilance that the customers get their money's worth."[35] The brokers would need to act in a virtuous manner if they were to expect patronage.

For this reason it was in the traders' interest to keep their promises and abide by their word. The following passage from *Confusion de Confusiones* illustrates this well:

> [To be sure, there is widespread honesty and expedition on the Exchange. For example,] the business in stocks and the bustle of the sales which are made when unforeseen news arrives is wonderful to behold. Nobody changes the decisions which he makes in his momentary passion, and his words are held sacred even in the case of a price difference of 50%; and, although tremendous business is done by the merchants without the mediation of brokers who could serve as witnesses, no confusion occurs and no quarrels take place . . . Such honesty, co-operation, and accuracy are admirable and surprising. (172)

Deals stuck at the spur of the moment were presumably without formal contracts, yet they did not break down.[36] In such an anarchic market it is not feasible for brokers' contracts to be continually reviewed and adjudicated in the courts, yet in absence of legal oversight we see that bargains are kept.[37] Because of the discipline of continuous dealings, 'such honesty, cooperation and accuracy' is not surprising.

In the 1600s, the first century when equities were traded, we can see that there was a considerable degree of financial innovation. We also see that most of the financial instruments were officially outlawed by the state. Brokers discovered new trading instruments and abided by their contracts not because of legal compulsion but because of market incentives. The regulations were not advancing the market, they were trammeling it, though the market developed in spite of the law. Contrary to the idea that the government is needed for financial innovation and contractual performance, the case of the Amsterdam Bourse provides evidence that securities markets can function successfully with little assistance from the state.

Notes

1. It seems that even if we go along with Tullock and Olson's distinction between regular transactions and complicated financial transactions, the results of the analysis do not greatly differ.
2. Although it is usually considered to be the first stock market, Braudel (1979, p. 100) argues that this is not precisely true: "It is not quite accurate to call [Amsterdam] the first stock market, as people often do. State loan stocks had been negotiable at a very early date in Venice, in Florence before 1328, and in Genoa, where there was an active market in the *luoghi* and *paghe* of Casa di San Giorgio, not to mention the *Kuxen* shares in the German mines which were quoted as early as the fifteenth century at the Leipzig fairs, the Spanish *juros*, the French *rentes sur l'Hotel de Ville* (municipal stocks) (1522) or the stock market in the Hanseatic towns from the fifteenth century. The statutes of Verona in 1318 confirm the existence of the settlement or forward market . . . In 1428, the jurist Bartolomeo de Bosco protested against the sale of forward *loca* in Genoa. All evidence points to the Mediterranean as the cradle of the stock market. But what was new in Amsterdam was the volume, the fluidity of the market and publicity it received, and the speculative freedom of transactions."
3. Trading also took place on the Dam, the square across from the Palace, before the Bourse would open its doors (De la Vega, 1688, p. 176).

4. Previously merchants had gathered in large numbers at fairs, which met only on occasion. Braudel (1979, p. 100) writes, "An Exchange was, relatively speaking, like the top section of a fair, but one in permanent session. Because the important businessmen as well as a host of intermediaries met here, business of every sort could be transacted: operations in commodities, currency exchange, shareholding, maritime insurance where the risk was spread among several guarantors; and it was a money market, a finance market and a stock market. It was natural that such activities should tend to become organized independently. In Amsterdam there was already by the beginning of the seventeenth century a separate Corn Exchange."
5. Schama (1987, p. 348) writes, "Even by the first years following the creation of the East India Company in 1602 (although of course the Bourse traded in all manner of stock), it had become plain that the old informal dealings in open-air markets on the Warmoesstraat and near the Oude Kerk would no longer suffice. The new Bourse was built on the Rokin in 1608." The building itself was modeled after the Bourse of Antwerp, which had been constructed in 1531. De Clerck (1998, p. 1) writes, "the Antwerp exchange, a large square with a courtyard surrounded by covered walkways, was the first building designed solely for the purpose of trade." Before the 1531 building the Bourse of Antwerp dates back to 1460 (Braudel, 1979, p. 99). Amsterdam had taken many of its cues from Antwerp, which it surpassed as the most popular area for trade in Europe in the late sixteenth century (Barbour, 1950, p. 20; De Vries & Van Der Woude, 1997, p. 366; Wilson, 1941, p. 13).
6. De Vries and Van Der Woude (1997, p. 150) explain, "Because of the *de facto* character of the new commercial practices, documentation is incomplete. But already in the 1550s, Amsterdam merchants practiced an early form of futures trading, when they wrote contracts for future delivery of Baltic grain and North Sea herring before the grain had been harvested or the herring had been caught. The enlargement of the range of goods traded in the Republic and the establishment of continuous markets at the Amsterdam Beurs created an environment in which speculative practices could spread and mature. In the seventeenth century, futures contracts came to be written for a large range of products, including pepper, coffee, cacao, saltpeter, brandywine, whale oil, and whale bone. Moreover, purchasers of these contracts increasingly had no intention of taking delivery, just as sellers did not possess and did not intend to acquire the promised goods."
7. For lists of commodities, and their prices, traded on the Bourse in 1585–1914 see Posthumus (1964).
8. Bloom (1937, p. 183) reports, "Sometimes, the brokers guild put obstacles in the way of the unsworn brokers. For instance, a certain Jew, Jacob Piemontel, citizen of Amsterdam, complains to the burgomasters that he is now (August 1675) hindered in his business by the authorities of the brokers guild, in spite of the fact that he only charges a commission of 5 cents on each 100 guilders .... He requested that he be left unimpended in his activity. His petition was supported by 38 Gentile signatures." De la Vega (1688, p. 186) stated, "If the free brokers were to be sued, they would have to pay a fine for impairing the income [of the sworn brokers]; but such action is taken only in cases of personal revenge, otherwise clemency and indulgence toward these brokers prevail, instead of the sworn brokers attending to their own interests."

9. The estimates are for the early 1720s and range from 700 to 1000.
10. Bloom (1937, p. 183) reports that in 1760, "Of the total number of brokers, sworn and unsworn, there were between 250 and 300 bill brokers, 80 wine and brandy brokers, 100 stock brokers and 100 insurance brokers." This fits with the allusions of De la Vega (1688, p. 164) who stated, "Formerly 20 speculators ruled the exchange ... Today there are as many speculators as merchants." De la Vega (1688, p. 150) classifies frequenters of the exchange into three categories: wealthy capitalists who buy and hold, merchants who invest in a share or two at a time, and speculators who seek to profit on price movements. Although he does not specify the number of merchants we can gather the number at the exchange was significantly greater than 40.
11. Joint-stock ventures with transferable shares date back to classical Rome but these were not long lasting endeavors so no stock market existed (Neal, 1997, p. 61). The first modern joint stock company was the Muscovy Company, which was chartered in England in 1553 (Kindleberger, 1984, p. 196).
12. There were six chambers which, "kept their capital, and commercial operations, separate from each other, while observing general guidelines, and policies, set by a federal board of directors" (Israel, 1995, p. 321). The board of directors consisted of 17 members who were appointed by chambers in proportion to their size; shareholders at this time had no voting power (Neal, 1997, p. 60).
13. For perspective the estimated population of Amsterdam in 1600 was 60,000 (Israel, 1995, p. 328).
14. A guilder, also referred to as a florin, contained about 10 g of fine silver (Dehing & Hart, 1997, p. 41).
15. Kellenbenz (1957, p. 134) explains the creation of East India Company shares: "Trade and speculation in shares first appeared there when in 1602, the six local 'chambers' for East Indian trade were united into a general Dutch East India Company. According to the official pronouncement, every inhabitant of the United Provinces had an opportunity to participate in the Company. At the beginning the rights deriving from the initial payments were called 'paerten,' 'partieen,' or 'partijen,' the word being taken over from the practice of 'participation' in the shipping business. It was not until 1606 that the word 'actie' (i.e., share) seems to have come into use. The possibility of trading these 'participations' was assured by the fact that each owner of shares could, by payment of a fee, transfer holdings, in whole or in part, to another person."
16. The development of regular settlement dates was later adopted by the English in the 1740s (Dickson, 1967, p. 491, 507–510).
17. Inflation in the century was negligible (Dehing & Hart, 1997, p. 41) and ordinary loans received interest of 2.5–3% (De la Vega, 1688, p. 164). For more on interest rates and banking in seventeenth-century Netherlands see Neal (2000), Dickson (1967, p. 474), and Dehing and Hart (1997, p. 53).
18. The trade included spices, tea, coffee, silk, and cotton (Israel, 1989, p. 336–8).
19. The shares traded at the Amsterdam Bourse were for the Amsterdam Chamber. Shares were nontransferable between chambers and though all received equal dividends "because speculation does not exist at the other places in these Provinces" shares for the other chambers traded at a discount of 5–30% (De la Vega, 1688, p. 165).

20. Schama (1987, p. 348) writes, “Confined within its handsome Flemish-mannerist colonnaded court, the Bourse was more or less left to its own regulation. Rules were not so much devised by the city for the exchange, as barriers set between it and the rest of the town’s commerce.”
21. Banner (1998) gives a history of Anglo attitudes towards the stock market and regulation from the seventeenth to the nineteenth century.
22. Garber, (2000, p. 34) states, “The authorities continually regarded futures trading as immoral gambling.”
23. In commodities markets there were these problems as well. Barbour (1950, p. 75), writes, “In 1698 the States General denounced by plakkaat a practice evidently not uncommon: the sale of large quantities of grain by persons who had none, or at least not the quantities of which they affected to dispose. Sales at time and transactions in options were forbidden, but continued notwithstanding.”
24. The fall of the Antwerp Bourse can be attributed to draconian political measures which included expelling the Jewish population (Bloom, 1937, p. 181) and banning ships traveling directly to the city (Israel, 1989, p. 30).
25. De la Vega, a Sephardi of Portuguese origin, was born around 1650 and grew up mostly in Amsterdam. He was a businessman and an author who wrote mainly in Spanish and occasionally in Hebrew and Portuguese (Amzalak, 1944, p. 33; Boer and Israel, 1991, pp. 443, 451; Penslar, 1997, pp. 33–34).
26. Even though the book was written in Amsterdam it was not translated into Dutch until the twentieth century (Kellenbenz, 1957, p. 146) which was also when it was translated into to German and English. The Spanish original (1688/1977), has parts that were not translated into English, but the translation does contain most of the material pertaining to the stock market. All quotes in this paper are from the 1996 English version.
27. Few if any descriptions of the Amsterdam stock exchange existed at the time, as the German translator for *Confusion de Confusiones* Otto Pringsheim noted, “a few pamphlets treating the speculation in shares were published in 1642 and 1687. The author does not know of them at all, or makes no mention of them because he thinks them too irrelevant.” (as quoted in Kellenbenz, 1957, p. 168). Bloom (1937, p. 191) remarked, “It is worthy to note that although de la Vega knew Dutch when he wrote the book his book [was] in Spanish, appealing to a circle of Jewish readers beyond the boundaries of Holland. De la Vega may have had the English Sephardim in mind. Many Amsterdam Jews had by this time established themselves in England. Two of De la Vega’s brothers lived in London.”
28. The book, however, is not without its shortcomings; since De la Vega did not have the good fortune of being trained in modern economics or finance it is no surprise that much of the inferences he draws are faulty. For example, some of his reasoning of why people participate in the market seems to posit a sort of irrationality on the part of participants. Also, he spends a lot of time describing various schemes where people attempt to trick others into thinking the price of the stock will fall or rise, which although possible, would require a large degree of gullibility. Due to an absence of a high degree of sophistication in economics and finance during that era, it is understandable there are flaws, but for its time it is a quite advanced book.

29. Such appeals were not literally appealing to Frederick Henry since he had died 40 years before *Confusion de Confusiones* was written.
30. As will be discussed next some contracts were for the delivery of shares while others simply required parties to pay the difference. With the latter one would "win or lose 30 gulden of Bank money for every point that the price rose or fell" (De la Vega, p. 185) but need not need actually transfer the share. I would like to thank an anonymous referee for this clarification.
31. Many contracts did not actually require the purchase of a share but even ones that involved paying the difference could require payment of 300 guilders, a year's salary for some, for each 10 points the stock moved in the wrong direction. I would like to thank an anonymous referee for pointing this out.
32. Although the Sephardis' native tongue was Portuguese or Spanish, Dutch was the language, "which most of the speculators or others concerned with the stock market must have used." (Kellenbenz, 1957, p. 146) De la Vega (1688, p. 166) mentioned that a mixture of languages was evident on the stock exchange, including words from Latin, Dutch and French.
33. After mentioning a handful of ethnic groups Neal (1997, p. 64) states, "It is likely that trading in the stock markets was done largely among individuals in these separate groups rather than between these groups." In the eighteenth century one-quarter of the shareholders were Jewish (Bloom, 1937, p. 190) so it may be the case that Jewish investors used Jewish stockbrokers but of the other three-quarters it seems unlikely that native Dutchmen had close religious or ethnic ties with their brokers. By 1688 the population of Amsterdam had grown to 200,000 which included residents of various religions originating from places such as Germany, Portugal, and Scandinavia (Israel, 1995, pp. 621–627). This seems too large to depend on close-knit ties or religious bonds for cooperation.
34. In Amsterdam, the brokers guild did not seem very important and it was not until the eighteenth century when printed rules appeared (Bloom, 1937, p. 188). The London stock market, which began in the late seventeenth century taking many cues from Amsterdam (Schubert, 1988, p. 300; Neal, 1987, p. 98) did not have an exclusive stock exchange until 1801 (Mirowski, 1981; Michie, 1999; Stringham, 2002). For a review of formal self-regulating organizations see Mahoney (1997) and Frye (2000).
35. Johnsen's (1994, p. 103) description of present stock market is similar, "On Wall Street, where news travels notoriously fast and a person's reputation is his stock in trade, a soft dollar broker who clearly cheats one client, say, by front-running, might well be terminated by a large number of his other clients."
36. In addition to the examples of people going along with their contracts, De la Vega described that of when people made legitimate errors the other party would not hold them liable. De la Vega (171) wrote, "It is an inviolable practice on the Exchange (which once was a mere usance) that that the party making a mistake is not obliged to suffer for it, if a transaction, not done at the price of the day, contains an error of 10% [of the par value]."
37. As Telser (1987, p. 187) wrote, "Since it is costly to rely on the intervention of third parties such as courts to enforce agreements and to assess damages of violations, the

parties to an agreement devise the terms to make it self-enforcing, if this can be done cheaply enough."

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