

U.S. Futures Exchanges as Nonprofit Entities

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I. INTRODUCTION

The question of why futures contracts trade in some commodities but not in others has been discussed for sometime in the literature with no clear consensus (see Working (1953), Gray (1959) and (1965), Sandor (1973), Telser and Higinbotham (1977), Behr and Ward (1983), and Black (1986)). Silber (1981) discussed the competitive structure of the futures exchange industry and argued that inter-exchange competition is a force in contract selection. However, little research has focused on the decision-making process of an exchange as it considers alternative new contracts.

Saloner (1986) presented the first formal model of futures exchange behavior. He hypothesized that exchanges maximize member profit by allowing only that number of memberships which will create an optimum bid/ask spread. Although an important first step in modeling exchange behavior, Saloner's model contains several simplifying assumptions. First, the model assumes that floor traders profit only from the bid/ask spread. However, members also profit from acting as commission brokers and by holding futures positions through time. Secondly, Saloner's model does not address the exchange's objective regarding contract volume. The model does not have the power to predict when an exchange will attempt to expand volume by introducing new contracts.

Black (1986) proposed that exchanges act to maximize aggregate trading volume to maximize their members' utility. If exchanges simply maximize aggregate contract volume, they should be observed offering several small contracts generating small volumes.

The operation of a futures exchange involves more than simply determining the optimal number of memberships or introducing any contract with an expected trading volume greater than zero. Yet no other model has been developed to more exactly describe futures exchange behavior.

Currently there are ten organized futures exchanges in the United States.¹ These exchanges are organized as nonprofit entities, formed for the benefit of their members and

¹The U.S. futures exchanges are: The Chicago Board of Trade (CBT), The Chicago Mercantile Exchange (CME), The Coffee, Sugar, & Cocoa Exchange (CSCE), The Commodity Exchange (COMEX), The Kansas City Board of Trade (KCBT), The Minneapolis Grain Exchange (MGE), The New York Cotton Exchange (NYCE), The New York Futures Exchange (NYFE), The New York Mercantile Exchange (NYME), and The Philadelphia Board of Trade (PBOT). In 1985, the MidAmerica Commodity Exchange merged with the Chicago Board of Trade. The authors acknowledge financial support from The Columbia Center for the Study of Futures Markets.

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the trading public. This article addresses how an exchange's governance structure affects operating decisions. The different types of exchange members are discussed to determine how each might influence the exchange. The article then centers on the fact that U.S. futures exchanges are legally organized as nonprofit firms. This nonprofit status results in an operating behavior which differs from profit maximizing behavior. Important implications become apparent which, in part, explain the high failure rate of newly instituted futures contracts, and explain why exchanges often offer contracts of similar commodity types.

II. ORGANIZATION AND GOVERNANCE OF U.S. FUTURES EXCHANGES

Futures exchanges are organized by their members to both provide a marketplace for trading predefined standardized contracts and to determine, monitor, and enforce agreed upon rules of trade. The governance of the futures exchanges rests with a member elected Board of Directors. Major policy decisions, including the final decision to initiate a new contract, are made by member standing committees and approved by the Board of Directors. Research efforts in identifying new contracts, promotion of the exchange, and direct oversight of trading activities are performed by nonmember managers and employees.

According to a classification system proposed by Hansmann (1980), a futures exchange is regarded as a "commercial mutual" nonprofit enterprise. Commercial refers to the fact that the entity's income derives primarily from providing services for a fee, in this case, providing a centralized marketplace. The exchanges are considered mutual organizations because the individuals who are the source of the organization's income, the members, also ultimately control the organization.

Given this structure, futures exchanges have inherent governance limitations due to agency costs (see Alchian and Demsetz (1972), Jensen and Meckling (1976), and Fama and Jensen (1983(a))). Briefly, these governance limitations are of two general types. First, due to the nondistribution constraint and free-rider problems, individual members of the exchange have less incentive to take a part in exchange management than they would if the exchange was a for-profit enterprise. Second, exchange management has little incentive to accept responsibilities because they are not entitled to generated residual cash flow. This problem is not unlike an open corporation in which general shareholders have little control over management (see Fama and Jensen (1983(b))). The theoretical solution to this problem is to devise a compensation scheme which will assure that management acts in the interest of the shareholder, or in this case, the members. Boards of Directors of many futures exchanges have tied management compensation to overall exchange volume.

III. TYPES OF EXCHANGE MEMBERS

Exchange members are generally classified into three different types of traders: brokers, floor traders, and hedgers.² It will be assumed that each of these member types will attempt to direct exchange policy with the objective of maximizing their individual utility or profit. However, if the objective of these traders differs, this might lead to conflicting objectives for the exchange. This issue is explored in this section.³

²These general classifications, as well as the subclassifications for the floor traders presented below, have been generally recognized as appropriate since first presented by Working (undated).

³Of course an exchange membership allows the holder to engage in all three types of trading activities. However, this analysis assumes that a member predominately engages in one activity, the situation most often observed on the trading floor.

Brokers receive incoming orders to the floor and act as agents to execute those orders. Many deal directly with the trading public and receive the designation of Futures Commission Merchant (FCM) by The Commodities Futures Trading Commission (CFTC). Brokers receive a commission for each order transacted. The amount of this commission is competitively determined in the market for brokerage services. Brokers' costs include a per transaction clearing fee as well as the cost of membership. Therefore, as long as the commission received is greater than the clearing fee, brokers will direct the exchange to encourage the largest possible trading volume.

Floor traders transact on their own accounts and can be classified into two distinct subgroups: position traders and scalpers. Generally, position traders profit from price movements in the market while scalpers profit from trading the bid/ask spread.

Position traders act as speculators taking positions based on their judgement as to the probable price movements in the market. Speculators are attracted by the prospect of price fluctuations which provide profits in return for taking price risks. Floor traders hold positions for varying lengths of time. Day traders usually hold their positions for less than a day, while other floor traders might hold the position for several weeks. Since position traders transact based on their expectations of price, they value the ability to reverse these positions as soon as their expectations change. That is, position traders value market liquidity, the ability to reverse positions on a timely basis without making price concessions. Therefore, the position traders would find it in their best interest for the exchange to encourage contract volume.

One exception to the above statement would be if a risk premium existed in a particular market and its size was inversely related to volume. The existence of a risk premium was first hypothesized by Keynes (1930) and later developed by Cootner (1960). This theory states that speculators will extract a risk premium from hedgers in exchange for the price risk. This risk premium takes the form of the expectation of futures price being a downward-biased estimator of the forthcoming spot price. Working (1953) discounted this theory, stating that speculators are attracted by price fluctuation and that the expectation of spot price should equal the futures price. Hirshleifer (1977) theoretically validates Working's hypothesis.

Empirical examination tends to discount the existence of a risk premium (see Telser (1958) and Gray (1961) except in thinly traded markets (Gray (1960) and Gordon (1984)). Thus, empirically it appears that a risk premium might exist when a contract has a low volume and as volume increases the risk premium disappears. As such, it is conceivable that floor traders might not encourage the exchange to increase volume. However, this situation is not likely because in the past, all the thinly traded contracts where a risk premium has been demonstrated (bran, sunflower seeds, milled rice) have traded for only a short time. Thus, it does not seem likely that a floor trader would encourage low volumes just to obtain a short term risk premium and thus endanger the long term viability of the contract.

Scalpers act as market makers by attempting to turn over their positions as quickly as possible. It has been shown that a price differential usually exists between the sale of a short position and the purchase of a long position.⁴ This spread is the difference between the lowest ask and the highest bid and is determined competitively by traders in the pit.

⁴Scalpers can trade also and profit by taking positions based on their expectation of price movement. However, this is not their primary objective. An analysis of the prevalence of scalping among floor traders is presented in Working (undated). Silber (1984) presents an analysis of the trading record of an individual scalper and shows that the representative scalper can profit from the bid/ask spread. The average time a trading position was held open was two minutes and positions held open longer than three minutes produced, on average, a loss.

The scalpers attempt to sell at their offer what they have bought at their bid. Scalpers do so by distinguishing themselves in the pit as individuals who continually quote bids and offers against which market orders can be executed. Of course, in a highly liquid futures market this might not always be possible, but it has been demonstrated that in even fairly active markets this activity persists.⁵ Scalper revenue is the product of the average bid/ask spread and the number of contracts traded. Therefore, scalpers will encourage the exchange to maximize volume as long as increases in volume do not decrease the bid/ask spread to such a point that overall revenue is decreased.

Large commercial hedgers who extensively utilize futures markets often find it advantageous to own seats on the exchange. A hedger is defined as a producer, processor, or holder of the physical commodity who enters the futures market subsequent to, or in anticipation of, a spot market transaction. Hedgers, like position traders, often place orders based on expectations of price. Also like position traders, they value the ability to reverse positions without making price concessions whenever their expectations change. In addition, as mentioned above, futures prices in low volume markets tend to be biased against hedgers and as volume grows this bias disappears. Thus hedgers, because of both the increased liquidity and reduced bias, will also encourage the exchange to maximize trading volume.

IV. COSTS AND REVENUES OF FUTURES EXCHANGES

The primary source of revenue for an exchange is the transaction fee earned for each contract traded. Many exchanges also assess an annual membership fee. In addition, exchanges earn revenue by selling price quotations to the public, but this revenue is secondary to the above mentioned sources.

General costs incurred by the exchange include salaries for exchange employees, payments for building and equipment, and expenditures for public relations and promotion. When considering the introduction of a new contract, three general types of costs are incurred: development, establishment, and maintenance. Development costs include researching the underlying commodity market and details of the contract terms. Establishment costs include costs of satisfying CFTC regulations, establishment of both a trading area on the floor of the exchange and an electronic quotation board, and informing potential traders of the uses and terms of the new contract. Maintenance costs include expenditures necessary for the day-to-day operation of trading. These include costs of recording and monitoring transactions. For the exchange, development and establishment costs are fixed costs while maintenance costs vary with contract volume.

Another long-term exchange constraint is that there are a finite number of members with a finite amount of capital. Introduction of several new contracts might spread traders and capital too thinly among the trading pits. The usual response to this constraint is to expand memberships. Specifically, several exchanges have added new membership categories to trade exclusively in the newly introduced contracts. For example, when the CME began currency trading in 1972 it created a new membership class, the International Monetary Market Members, to trade these new currency contracts.

Given this revenue and cost structure, profit maximizing behavior would prescribe that the futures exchange should institute any contract where the present value of revenue, less maintenance costs, exceeds development and establishment costs. By doing so, returns would be maximized to those entitled to a residual cash flow (i.e., residual

⁵Cohen et al. (1981) present a theoretical proof that a bid/ask spread is an equilibrium property of markets with many traders.

claimants). However, since futures exchanges are legally organized as nonprofit entities, this paradigm is in appropriate.

On the other hand, as was argued in the preceding section, members of the futures exchange will encourage the exchange to maximize trading volume. If the exchange simply heeded this directive, it would institute any futures contract which has a positive anticipated trading volume. This strategy, however, would bankrupt the exchange since many contracts would not generate sufficient revenue to cover costs. Thus, due to its nonprofit status and the system of governance, a futures exchange will follow neither of these paradigms.

V. THE EXCHANGE AS A NONPROFIT ENTITY

Economic analysis of the behavior of nonprofit entities is a relatively recent development. It was applied first to the study of hospitals and then expanded to the analysis of educational institutions. Only recently have more general economic theories been developed for nonprofit entities.⁶ A nonprofit entity is one in which the firm is restricted from distributing earnings to residual claimants. In other words, while a nonprofit entity is not restricted from earning profits, revenues in excess of expenditures must be retained within the enterprise. Hansmann (1980) refers to this unique characteristic of nonprofit firms as the "nondistribution constraint."

Given this constraint, nonprofit firms will, in general, expand whatever product or service they provide beyond the level given by the marginal conditions associated with the classical profit maximizing paradigm. That is, since profits cannot be distributed, the firm will react by expanding output. Thus, for a nonprofit firm, the operational constraint is that aggregate income for all products or services must cover the aggregate costs of the organization. In other words, instead of maximizing profits, the firm will attempt to break even. Given this less restrictive operating constraint, nonprofit enterprises are often observed cross-subsidizing products or services. In other words, a nonprofit entity will utilize income derived from one activity to subsidize other activities where expenditures exceed costs.

These general characteristics of nonprofit enterprises imply a certain behavior for futures exchange operating policy, particularly in regards to the futures contracts offered. As the exchange considers alternative contracts to offer it attempts to estimate expected contract volume.⁷ It will consider several commodities and arrive at differing expected contract volumes. For some contracts, estimated volume will be known with more certainty than for others. The exchange will then initiate any contract where it is clear that the present value of contract revenue exceeds the present value of contract costs. However, since the exchange operates on a break even basis, additional contracts might still be offered even if there is uncertainty as to whether anticipated volume will justify the contract's existence.⁸ That is, given the nonprofit status of the exchange, cross-subsidization might occur between those contracts that are clearly viable with those potentially less viable.

⁶See Newhouse (1970) and Feldstein (1971) for optimization models of hospitals and James and Neuberger (1981) for a model of a university. James (1983) develops a general optimization model for a nonprofit entity. Hansmann (1987) provides a review of economic theories of nonprofit organizations.

⁷A useful construct to derive expected contract volume is developed by Telser and Higinbotham (1977) and later empirically applied by Behr and Ward (1983).

⁸Alternatively, the exchange could choose to utilize additional revenue to support alternative activities such as enhancing management salaries or reducing contract transaction fees. See for example Wall Street Letter, "CSCE Reduces Member Contract Fees," April 25, 1988.

VI. EXCHANGE REVENUE FUNCTION

This section formally specifies a futures exchange revenue function and compares profit maximizing with not-for-profit behavior. In addition, the section shows a necessary condition for cross-subsidization between futures products.

Let the volume of trade of alternative futures contracts the exchange can offer be represented by:

$$(X_1, X_2, \dots, X_i, \dots, X_n). \quad (1)$$

In this expression, each X_i represents the estimated number of trades in the i th contract. While the exchange determines whether or not to institute a contract, the volume of trade is not a decision variable for the exchange. However, the exchange can certainly influence volume by deciding levels of promotion and advertising.

Let P_i represent per contract exchange income, M_i per contract maintenance costs, FR fixed exchange income (such as that derived through annual membership fees) and FC_i fixed development and establishment costs per contract. Therefore, the exchange revenue function can be represented by:

$$\Sigma(P_i - M_i)X_i + FR - FC_i. \quad (2)$$

If the exchange was motivated by profit it would evaluate (2) for each X_i represented in (1) and would institute only those contracts for which marginal revenue is greater than or equal to marginal costs. However, since the exchange is nonprofit, it will operate by setting (2) to zero. Therefore, it is not constrained to offering only those contracts dictated by marginal conditions and can offer any X_i as long as the exchange's overall operations do not incur a loss. Thus the preferences of the exchange membership will be incorporated into the selection of contracts from (1), and cross-subsidization might exist between contracts.

To derive the condition for cross subsidization, assume that the exchange is considering only two contracts X_1 and X_2 . Then, the exchange revenue function can be simplified to:

$$(P_1 - M_1)X_1 + (P_2 - M_2)X_2 + FR - FC_1 - FC_2 = 0 \quad (3)$$

If for X_2 marginal cost exceeds marginal revenue, for the exchange to be able to offer a contract in this commodity, it must be the case that:

$$|(P_1 - M_1)X_1 + FR - FC_1 - FC_2| = |(P_2 - M_2)X_2| \quad (4)$$

(4) states that revenues derived from the profitable contract and fixed revenue must be sufficient to cover the loss from the unprofitable contract.

VII. IMPLICATIONS OF ANALYSIS

The above discussion of the nonprofit status of the futures exchanges as well as their governance systems imply two significant results. First, the exchange's nonprofit status may explain the high failure rate of new contracts and secondly, the governance structure explains the predominance of exchanges offering similar contract types.

Since the exchanges operate on a nonprofit basis, they will offer more contracts than would be offered by profit maximizing enterprises. A thorough empirical test of this proposition would involve comparing the failure rate of contracts initiated by nonprofit exchanges to those initiated by profit maximizing exchanges. However, profit maximizing futures exchanges do not currently exist. As an alternative, an examination of the nonprofit exchanges record of contract initiation should be useful. Previous empirical studies have documented high contract failure rates.

Silber (1981) examined the contract success rate for U.S. futures exchanges for the period 1960–1977. Defining a contract successful if more than 10,000 contracts traded by its third year, Silber calculated that only approximately 25% of contracts obtained this level. By using 1,000 contracts traded a year as a measure of success, an earlier article by Sandor (1973) calculated an approximate 32% success rate for the period 1960–1970. Carlton (1984) examined the success rate of contracts introduced during the period 1921–1983. His study shows that approximately 50 to 55% of all contracts have lives of less than 9 years. Further, 20 to 30% of contracts fail within two years and 50–60% fail within ten years. Finally, a Wall Street Journal Article reported that of the 16 new contracts started during 1987, only one or two have shown a sustainable contract volume.⁹

It should be noted that any measures of success mentioned above are arbitrary. That is, there is no absolute standard as to whether or not a contract is successful unless it is terminated. For example, from its inception in 1972 until 1975, the Japanese Yen contract at the CME never traded more than 10,000 contracts in any year. As such, in early studies of contract success, the yen contract was labelled a failure. Since 1976 volumes in this contract have grown substantially, reaching over 4 million contracts traded in 1987. These recent volumes make this contract one of the most successful contracts. Notwithstanding these occasional misclassifications, studies measuring contract success by several different criteria have all demonstrated high contract failure rates.

When it comes to the decision to initiate new contracts, those members with the most to gain will influence the selection of contracts. That is, those members who will derive the greatest benefit from seeing a particular contract instituted will actively seek appointment on the committee deciding new contracts and actively promote their favored contract. Thus, the decision of which particular contracts will be cross-subsidized by more viable contracts depends on the preferences of individual members.

Seevers (1981) states that floor traders predominate member standing committees. If so, these are the members most likely to gain by a particular contract being instituted. Floor traders invest substantial time in developing detailed knowledge of the characteristics of the commodities they trade. Given this investment in human capital, it would be in the best interest of floor traders to support contracts in commodities similar to ones already traded by the exchange.

Also, introduction of new contracts has the potential of reducing liquidity in other trading pits. One strategy to avoid trading volume decreases in other pits is to offer contracts similar to existing contracts so that spreading opportunities are enhanced. Therefore, exchanges should be observed specializing in contracts for similar commodities.

An alternative explanation has been proposed to explain why exchanges specialize in offering similar contracts. It is hypothesized that the CFTC constrains exchanges from competing in particular commodity types and thus encourages exchanges to specialize. However, as pointed out by Anderson (1984), the commission's charter specifically directs the commission to use the least anti-competitive means to achieve its regulatory objectives. Also, the commission has never failed to designate a new contract once the exchange satisfied CFTC Guideline 1. This guideline does not specifically mention any prohibition against listing contracts similar to preexisting ones. In fact, as Anderson points out, once an exchange files an application with the CFTC and the application becomes public record, other exchanges often submit for closely related contracts.

Table I classifies new contracts introduced by exchanges for the period 1960 to 1986 into one of five categories. This table shows most exchanges have introduced contracts

⁹Wall Street Journal, "Many of 1987's New Trading Products are Failing Despite Spirited Marketing," January 4, 1988, p. 24.

Table I
NEW CONTRACTS BY CATEGORY BY EXCHANGE FOR THE PERIOD 1960–1986

	Grains/ Foodstuffs	Livestock	Currencies	Financial	Natural Resources
CBT		1		11	7
CME	1	7	8	9	8
CSCE				1	
COMEX				3	4
KCBT				2	
MGE	3				
NYCE		1		2	2
NYFE			5	9	
NYME		1	8	10	
PBOT			6	2	

Source: CFTC Annual Report, 1986.

predominately in one or two of the catagories. This is consistent with the theory discussed above.

The one exception to this phenomenon in Table I is the CME which introduced contracts in five of the five categories. However, this is not completely unexpected given this exchange has three different types of memberships: Full Members, International Monetary Market Members and Index and Option Market Members. Full members can trade any contract offered by the exchange, International Monetary Members can trade any financial contract and Index and Option Members can trade stock index contracts. It is not surprising, therefore, that the exchange offers contracts for differing commodity types.

VIII. SUMMARY

To better understand their behavior with regards to contract selection, this article considers the implications resulting from the nonprofit status of U.S. futures exchanges. Because U.S. futures exchanges are not constrained by profit maximizing conditions cross subsidizing new or less successful contracts becomes possible. It is shown that the decision regarding which contracts to subsidize rests with member committees which have a tendency to initiate similar contract types. This analysis also helps clarify the high contract failure rate of new futures contracts.

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