Review of Futures

Volume 20 Special Edition

Research funding for this Special Edition was made possible by a generous donation from the Clearing Corporation Charitable Foundation to the Institute for Financial Markets.

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A HALF-CENTURY OF PRODUCT INNOVATION AND COMPETITION AT U.S. FUTURES EXCHANGES

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This paper explores the last 55 years of product innovation and competition at U.S. futures exchanges. We find that in general innovations perform better than imitations and product extensions. We find that one exchange has been a more aggressive innovator, imitator, and product extender than other exchanges and has grown to dominate the market. We find that interest rate contracts have generally outperformed others, that the 1980s was the golden decade of successful product innovation, and that there is evidence of a first mover advantage in product competition and of a liquidity driven monopoly effect.

In 1955, there were 61 futures contracts listed on U.S. futures exchanges. By the end of 2010, there were 916 contracts listed (not including futures on individual stocks).[1] This 11-fold growth in the number of listed futures products and the accompanying 668-fold increase in the volume of trading attests to the vigorous amount of product innovation and the dramatically increased importance of futures in the financial and commercial life of the country. U.S. futures exchanges have

1. There are approximately 2,000 futures contracts listed on individual stocks and exchange traded funds (ETFs) at OneChicago, the only surviving U.S. exchange that lists such products. These contracts are not included in the FIA database we will describe shortly, and this estimate was obtained from the OneChicago website on October 22, 2011. In addition, we do not include 632 OTC executed and NYMEX cleared products that are booked into NYMEX clearing via ClearPort. While these products are registered with the Commodity Futures Trading Commission as futures products and are included in the raw FIA database, they are not competing with other futures exchanges but rather with the Intercontinental OTC exchange. In addition, under regulations proposed under Dodd-Frank, most of the ClearPort products will likely not meet a test that requires that certain percentage of trading must occur on the floor or the exchange's electronic platform.

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Acknowledgements: The authors are very grateful for the grant from the Institute for Financial Markets, which made this paper possible. In addition we would like to thank Xuedong Tom Yang, Luis Horacio Valencia, Helen Li, Ankit Sisodia, and Rishabh Sharma for their research assistance. And we would like to thank the following people for their helpful conversations: Patrick Catania, formerly of the Chicago Board of Trade; John Labuszewski and John Nyhoff of the CME Group; and Robert Levin of NYMEX. And thanks to Mary Ann Burns and Toby Taylor for their help in obtaining the FIA data that forms the backbone of this study,

Keywords: derivatives, competition, innovation, exchanges
JEL Classification: G12, N21

been listing new products since they were first created in the 1860s. This process of product innovation has often been vitally important to growth of an exchange; for example, the 112-year-old Chicago Mercantile Exchange, would be 1% of its current size, had it ceased listing new products in the early 1970s. In other cases, new products provided the path for an exchange to rise from the ashes of disaster. In 1976, the New York Mercantile Exchange lost its most important product, Maine Potatoes, due to a major default caused by a reckless game of bluff by the parties on both sides of an expiring contract. The exchange shrunk to a sliver of its former self and could well have shut down if it had not listed No. 2 Heating Oil futures and reinvented itself as the world's biggest energy exchange (Gorham and Singh 2009).

While exchange turnarounds make for a good story, innovation plays a more fundamental role as a key to the ongoing growth and profitability of an exchange. The fortunes of futures exchanges depend largely upon the trading and clearing fees earned from trading volume.[2] CME Group, which now accounts for over 95% of U.S. futures volume, derived 82.7% of its revenues from trading and clearing fees in 2008 through 2010 (CME Group Annual Report 2010). Organic growth in trading volume[3] can come from two sources: increased trading in existing products and trading volume in new products. While exchanges may have some influence over the first source, via effective marketing, improvements in contract design or creating pricing incentives for both market makers and traders, trading in existing products is often driven by factors external to the exchange, such as the market dynamics of increased price volatility and significant price trends. Exchanges can have a much greater effect on their total trading volume by creating successful new futures contracts that fill some market need.

Launching successful new products involves significant uncertainty. Most fail, though really precise statistics on success and failure of futures contracts have not been readily available, a situation we intend to remedy in this paper. Few would have guessed that pork belly futures would be the Chicago Mercantile Exchange's (CME) leading contract for a decade. And the fact that the CME and the Chicago Board of Trade (CBOT) each spent about $1 million marketing their new over-the-counter (OTC) stock index contracts in the mid 1980s only to see both contracts fail miserably because the market was not yet ready for them illustrates the potential cost of failure.

There has long been both industry and academic curiosity regarding how to create successful products and how to measure that success. Most new contracts

2. In the new world of for-profit, stockholder-owned, publically-traded exchanges, the relevant performance metric is that profits and trading volumes directly drive the revenue side of profits through per-contract trading fees. In the old world of member-owned, not-for profit exchanges, which began to disappear with the Chicago Mercantile Exchange's demutualization in 2000, trading volumes drove exchange fortunes in a different way. More customer volume translated into more commissions for the floor members acting as brokers as well as more revenue for the members acting as market makers.

3. Mergers and acquisitions have been a major source of volume growth for both derivatives and stock exchanges over the past decade as the shift to electronic trading has significantly increased economies of scale in the industry, but this is outside the scope of this paper.

stop trading within a few years. And while there would be universal agreement that zero trading volume constitutes failure, there has been much less agreement on where to draw the line between success and failure. The definition of success has typically relied on the longevity (or lifespan) of contracts or on whether trading volume has reached some specified level within a specified period of time, generally three years. And the bar has generally risen over time. For example, the following definitions of success have been used in the literature:

- 1,000 contracts per year (Sandor 1973).
- 10,000 contracts per year (Silber 1981).
- 1,000 contracts per day (250,000 per year) plus open interest of 5,000, the *Wall Street Journal* requirement for including a contract in its market activity listing (Carlton 1984; Black 1986).
- 10,000 contracts per month (Holder, Tomas, and Webb 1999).

Both Black (1986) and Hung et al. (2011) argue that in studies of the effect of various factors (such as size of the underlying market and volatility of spot market prices), it is best to forgo these arbitrary measures and simply use actual volume levels achieved by new contracts. Black, for example uses average daily volume through the first three years as the dependent variable in her attempt to explain success. While this is correct, if we wish to make statements about the numbers or percentages of new contracts that are successful, we have no choice but to choose some standards of success.

Early articles were case studies focusing on why a particular contract succeeded or failed. These include Sandor (1973), who explored factors that contributed to the performance of plywood futures, and Johnston and McConnell (1989), who found bad design behind the failure of the GNMA CDR contract. Nothaft and Wang (2006) later studied the design of the GNMA CDP futures contract. Silber (1981) looked at the entire U.S. market and found that of the 130 new contracts listed between 1960 and 1977 only 24.6% had become successful, measured by trading at least 10,000 contracts in the third year after launch. He also found that both exchange size and being the first mover mattered. The five largest exchanges had success rates twice the level of the five smallest exchanges. And newly innovated contracts were 50% more successful than were similar contracts created by imitating contracts at other exchanges.

Carlton (1984) looked at contracts between 1921 and 1983 and measured contract success by average lifetimes and survival rates. Black (1986) measured success using the *Wall Street Journal's* criteria for listing a futures contract, specifically daily open interest above 5,000 contracts and daily trading volume above 1,000 contracts.

Corkish, Holland, and Vila (1997) focused on product innovation at the London International Financial Futures Exchange (LIFFE) from 1982 to 1994. They measured success using contract life spans and trading volume and found that most futures contract succeeded in the early years of the exchange. They found that contract success was highly correlated with the size and volatility of the underlying market

and confirmed the existence of a first mover advantage. The study draws the conclusion that the determinants of success are large and volatile spot market and competition.

Industry statements about success and failure in product innovation have often been seat-of-the-pants estimates. This paper makes use of a largely overlooked goldmine of data, converts it into a product innovation database and uses it to generate concrete, hard data answers to a number of questions regarding the innovation process. A careful analysis of this data will allow us to begin to answer such questions as:

1. What is the expected lifespan and lifetime volume of a new futures contract?
2. Whether a new future contract's success depends on the contract's
    a. underlying asset class.
    b. listing exchange.
    c. the decade in which the product was listed.
    d. degree of innovation, that is, whether the contract is
        i. a true innovation.
        ii. a product extension listed at the same exchange.
        iii. an imitation product listed at a competing exchange.
3. Do new listings in a particular asset class come in clusters as exchanges compete for market share?
4. To what extent do exchanges have monopoly positions in specific product listings?
5. When exchanges compete head-to-head with nearly identical products, how long does it take for one exchange to emerge as the dominant or exclusive market?
6. Are competitions between exchanges for nearly identical contracts always winner-take-all events? When are they not?
7. To what extent do these monopoly positions in individual products extend to asset classes?
8. With increased innovation and proliferation of products, has the share of trading volume concentrated in the highest volume products declined significantly over time?

The purpose of this paper is two-fold. First we will update some conventional metrics and present some previously uncalculated metrics on the process and performance of product innovation in U.S. futures markets over the past 55 years. Second, we will examine the extent to which a first mover (or innovator) advantage and liquidity-driven monopoly play a role in exchange competition over products. The paper is organized as follows. Section I describes the original FIA data source and how we have created a product innovation database that should be useful to other researchers. Section II lays out the descriptive statistics of a half century of product innovation in U.S. futures markets, something heretofore not readily available.

Section III examines the role of first mover advantage and liquidity-driven monopoly in product competition among exchanges. Section IV explores the paper's conclusions.

I. THE DATA: SOURCE AND ENHANCEMENTS

Since 1955 the Futures Industry Association (FIA) has been collecting monthly and annual volume data directly from exchanges. In its annual version, the data consists of all futures contracts that had some trading volume during the prior year. Contracts are organized by the listing exchange. So for each year, the FIA provides: the exchange name, the contract name, the contract size (e.g. 5,000 bushels for wheat), the contract category (five categories including agricultural, equity, interest rate, etc.) and volume of trade (i.e., the number of contracts traded that year). There are no other descriptors in the raw data.

Our objective was to use this data to build a database useful for describing and studying product innovation and competition in the U.S. futures industry. While this study focuses on the U.S. futures market, the FIA data also include the volume of options contracts traded at U.S. futures and options exchanges.

We have inferred from this data that a contract started life in the first year for which a volume number is displayed and ended its life in the last year in which a non-zero volume number was displayed. For example, Anhydrous Ammonia futures first show volume in 1992 and continue to do so through 1997 when 19 contracts were traded. In 1998 and subsequent years no volume is shown. We infer from this that this fertilizer contract started sometime in 1992, died sometime in 1997, and had a life of 6 years. Because the data are annual and do not tell us the date on which the contract started and stopped, the actual life could have been as little as four years or as much as six years.[4]

In cases where contract volume numbers appear for one or more years, then stop, then start showing volume again without a change in size, we calculate the contract's life span as the number of years for which the contract shows non zero volume. For example, French Franc futures started trading at the CME in 1974 and traded till 1990. There was no volume during 1991 and 1992. However, the years 1993 and 1994 show volume again. In such cases, we consider the life to be 19 years.

A. Innovations, Imitations, and Product Line Extensions

The major enhancement we have made to the FIA data is to tag every one of the 916 new contracts with one of three labels:

- An innovation.

4. The actual life would have been just over four years (if it started at the end of 1992 and died in the first days of 1997) or as much as six years (if it started on January 2 and died on December 30). Given a 1992 start and a 1997 end, we can thus infer that the life of this contract was four, five, or six years. Which is most reasonable? Assuming that contract births and deaths are uniformly distributed over the year, the inference that minimizes errors and gets closest on average would be the middle one.

- An imitation – an imitation of a contract previously traded at another exchange.
- A product extension – a variation on a contract previously listed at the same exchange.

Deciding the definition of "innovation" was the most difficult part of preparing the contracts for analysis. At one extreme, one could argue that there have only been a handful of true innovations in futures markets: the first agricultural product, the first currency, the first interest rate, the first equity index. While this might seem reasonable, it is not useful for analyzing the competition among exchanges to offer products that satisfy customer needs. While cattle, hog, corn, and wheat futures are all agricultural products, each offers price risk management tools for very different needs, and we considered the first futures contract in each one of these categories as an innovation.

Likewise, the first interest rate futures contract was the mortgage-backed security issued by Ginnie Mae, the GNMA collateralized depository receipt (GNMA CDR) in 1975 at the CBOT, clearly an innovation. The following year, U.S. Treasury bill futures were launched at the CME, which we also tagged as an innovation, because it was a different issuer. When the U.S. Treasury bond was launched a year after T-bills, we tagged it as a separate innovation, because though it was the same issuer, it was a short-term discount issue as opposed to the longer-term coupon instrument. Finally, when two-year Treasury note futures were launched at NYMEX in 1980, because this was another longer-term, coupon Treasury issue, it was tagged not as an innovation but as an imitation, because it was listed at an exchange different from the innovating exchange. NYMEX T-Note failed within a year, and when the CBOT started its own 6.5-10 year T-Note in 1982, it was tagged as a product extension of the T-bond innovation at the same exchange.

In order to ensure consistency of treatment, we had to establish detailed rules for categorizing the level of innovation of all the products we reviewed.

An **innovation** includes:

1. The first time a new product appears at any exchange.
2. A switch from physical delivery to cash settlement of any product. The CBOT introduced 10 versions of the GNMA contract with minor changes. All but the first were product extensions, except for a cash-settled version introduced in 1986, which we count as an innovation.
3. A movement up or down the processing chain. Gasoline and heating oil are produced from crude oil, but the first contract in each of these three distinct products was tagged an innovation.
4. A reduction in contract size to retail mini. Most futures contracts have been designed to appeal to a commercial hedging audience. Exchanges will make modest changes in contract size to better fit commercial needs. The creation of new, much smaller, retail-oriented versions of existing contracts was a trend, often highly successful, that began in the mid 1990s.

We have labeled these new contracts that are at least 50% smaller than the parent contract as innovations. (About 10% of all innovations were minis, and if the 46 minis were classified as product extensions rather than innovations, innovations would fall to 362 and extensions would rise to 365.)

5. A switch from U.S. to foreign delivery, thus reflecting price in a different market (e.g., CBOT's South American Soybeans were an innovation).

6. Switch from single par grade to index of multiple grades and locations (generally captured under the cash settlement change mentioned earlier).

7. For currencies: different currency pair. Same currency pair switching from American to European pricing is not an innovation.

8. For interest rates:

    a. Different issuer. The U.S. Treasury, U.S. government agencies, municipal entities, corporations, and each foreign entity are different issuers. So, the first German government bond and Argentine FRB bond are both innovations, but the Brazilian EI bond and Brazilian C bond would not both be innovations unless they were issued in the same year. (They were in fact both issued by the CME in 1996 and because we could not tell which came first, they were both tagged as innovations.) CBOT Commercial paper futures listed by the CBOT in 1997 was the first corporate issue of short-term paper and was tagged an innovation.

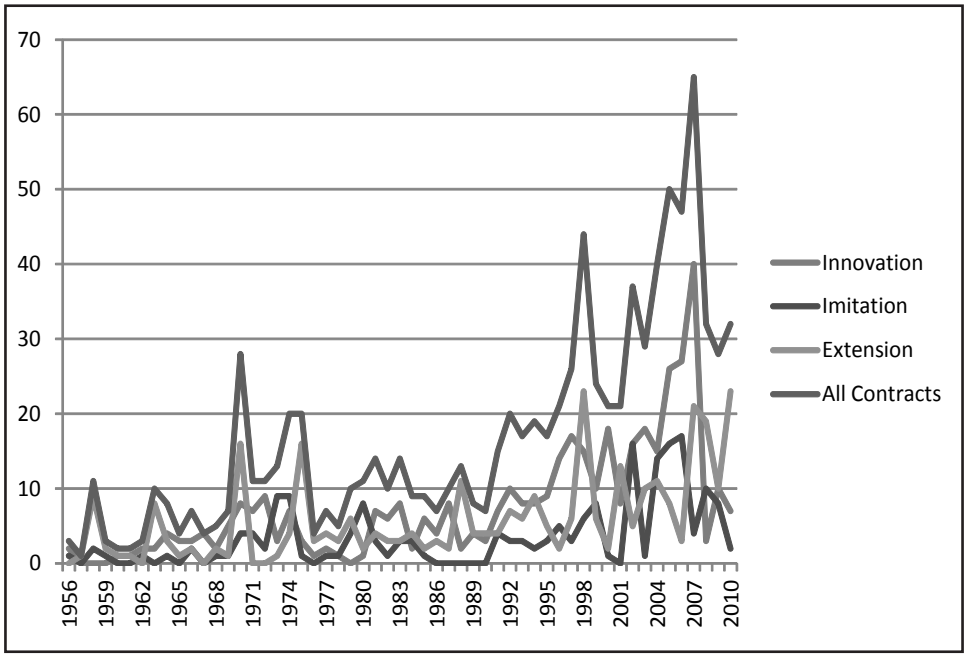
    b. Different currency of issue. Eurodollars, Euroyen, Euromark and EuroCanada were all tagged as innovations.

    c. Short-term, discounted instruments are different from longer-term, coupon instruments. (The maturity divide is typically at one year.) So Treasury notes and bonds of all maturities are all considered the same type instrument and only the first of all these, the 1977 listed T-bond is tagged an innovation.

9. For stock indexes: We explored criteria like market capitalization, style, sector, and publisher as ways to segment the 132 equity indexes into different homogenous groups, and it may be possible to do this in a reasonable way. However, unlike most assets underlying futures contracts, equity indexes are generally protected intellectual property and most indexes are licensed by publishers to exchanges on an exclusive basis (with exceptions like Russell, which for years granted only non-exclusive licenses). This makes head-to-head competition difficult. Two exchanges can list identical corn contracts, but only the CME can list the S&P 500. So we have taken the approach of treating most equity indexes as innovations. Exceptions include:

    a. When an exchange changes the dollar multiplier on its stock index, we tag that an extension. For example, the CME listed the S&P 500 in 1982 with a multiplier of $500. In 1994, it listed a new version with

Figure 1. New Contracts Launched Annually 1956-2010.



a multiplier of $250, because the index had increased so much that the contract value and associated margins had gotten quite large. We tagged the new contract as an extension of the first.

b. When an exchange lists an index that had already been listed at another exchange. The CBOT licensed and listed the Nasdaq 100 index in 1985 when there was not sufficient interest in the market and the product died the next year. Eleven years later in 1996, the CME licensed and listed the same index. We tagged this as an imitation.

A **product extension** is when an exchange makes a size, grade or location change in one of its previous innovations, other product extensions, or imitations. The only exceptions as noted above are when the size change is to a retail mini, or the delivery location is switched to a foreign country, either of which causes the product to be considered an innovation. Note also that there are only two sources of information regarding contract specifications: the contract size or index multiplier (which is generally given in the FIA reports) and the contract name (which might indicate a change in delivery location). For example, in 1964 the CME listed the first Live Cattle contract, clearly an innovation. The following year it listed a Live Cattle Western contract alongside the first. From the name, we knew this referred to a different delivery location and tagged it an extension. However, if a contract undergoes a significant change that is captured in neither the size nor the name, our system will not capture it as a product extension.

An **imitation** occurs when an exchange lists a product previously listed by another exchange, whether the new product is identical to or differs by size, grade,

or location from that of the other exchange. The only exceptions as noted above are when the size change is to a retail mini, or the delivery location is switched to a foreign country, either of which causes the product to be considered an innovation.

II. DESCRIPTIVE STATISTICS ON PRODUCT INNOVATION IN U.S. FUTURES MARKETS

Before we examine the metrics generated from the 1955–2010 data, we must first make a general point. During the first 110 years of organized futures trading in the United States, all futures contracts were based on physical commodities, mainly agricultural products. Then, in a concentrated period of a single decade (1972 to 1982), there were three key, and overlapping, waves of innovation that literally reshaped the industry. Foreign exchange futures began in 1972, interest rate futures in 1975, and stock index futures in 1982. While there has been a tremendous amount of innovation during the subsequent 28 years, today's blockbuster contracts, which have been the main drivers of growth, are those that were either created during this decade, or are product extensions of those earlier contracts.

A. Innovative Activity

1. Creation of New Contracts 1956–2010

During the 55-year period, U.S. exchanges listed 916 new contracts, about 17 per year on average. Most prevalent were actual innovations (44%), followed by product extensions (35%), with imitations by other exchanges as the least common type of new contract listed (21%).

Figure 1 makes clear that the frequency of new contract launches has changed markedly over the years. First, there has been a secular increase in annual new product launches during this half century period. The 1950s and 1960s were rather sleepy with new launches averaging about five per year. There was a burst of activity in the 1970s, when the number of new product launches tripled to about 15 per year. There was a bit of a lull in the 1980s, but beginning in the 1990s, there was another explosion in new product development that peaked at 65 new products in 2007. While there was a lot of year-to-year variation, almost every decade has had more new products listed than the decade prior.

Why did the growth in new product launches accelerate from 2001 to 2008? There were two major forces that made the process of product innovation easier, cheaper, and more enticing during the last decade of our study period. The first was the passage of the Commodity Futures Modernization Act in December of 2000, which allowed exchanges to list products much more quickly and easily and with less labor. In the old world, exchanges wishing to list new products were required to create a thick document that explained and justified every term and condition in the contract and explain the economic purpose of the new contract, specifically how it would be used to reduce commercial risk. It would take months, and sometimes over a year, to create this document, referred to as the Contract Justification. Once the CFTC received the proposed futures contract, it then had up to 12 months to approve it.

Exchanges argued to Congress that they were at a competitive disadvantage to European exchanges, which could get new products approved in a matter of weeks. So Congress inserted a provision in the new legislation that said only two things needed to be given to the CFTC: a copy of the proposed contract and a letter from the exchange certifying that the new product was consistent with all applicable laws and regulations. Having so certified the contract, they could list it the next day. It was now up to the CFTC to do the research required to see if the contract did actually comply with all laws and regulations.

The second force that made product innovation easier was the switch from floors to screens, which began more seriously at the two large Chicago exchanges in 2003–2004 when they were faced with serious competition from a new Chicago subsidiary of the giant, all-electronic, German exchange, Eurex. Electronic exchanges significantly reduce the cost of listing new products. In the earlier floor-based world, new products needed floor space and bodies on the floor to make markets in the new products. In the electronic world, all that is needed is a little space on a server. Economies of scale in an electronic world become huge, and exchanges try to race each other down the average cost curve.

2. New Contracts by Commodity Category

Even though they were not introduced until 1972, over half of all new contracts listed during the 55-year study period were financial (see Table 1) and the most frequently listed categories of product were foreign exchange (238), followed by agricultural products (200), equity products (132) and interest rates (129). Energy futures contracts, after excluding the OTC ClearPort products, which are cleared but not traded on NYMEX, were ranked sixth out of eight. Metals were last.

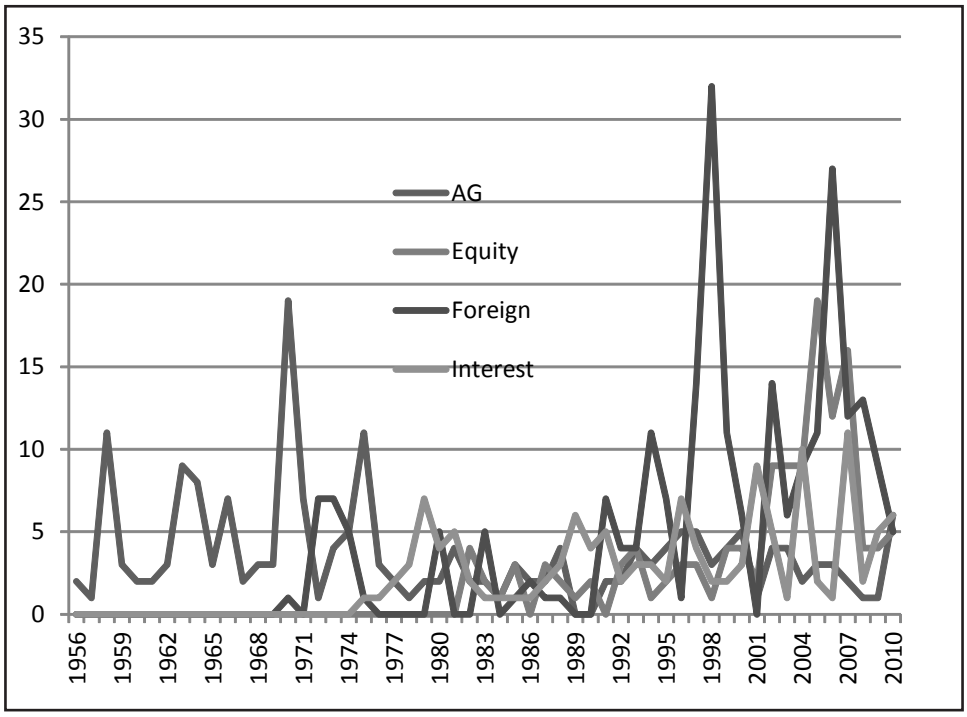
We noted earlier that overall new products were largely innovations (44%), then product extensions (35%) and finally imitations by other exchanges (21%). It is striking that none of the individual commodity groups followed that pattern. Agricultural products were mainly product extensions — not a surprise as cash market grades, weights, and delivery procedures evolve over time and futures contracts are redesigned to reflect these changes. Also, many of the agricultural innovations took place before 1955. Only foreign exchange and equities had more innovations than imitations and extensions. And the fact that 92% of all equities were innovations is a manifestation of our classification of each exclusively licensed stock index as an innovation. Russell stood out from other index publishers by granting non-exclusive licenses until just recently. There are just under 200 countries in the world and the fact that there were 98 FX innovations suggests that there are futures contracts on close to half those currencies.

Looking at the pattern of new contract launches over the 1956–2010 period (Figure 2), new products were almost exclusively agricultural until the 1972 launch of seven new currency futures contracts by the CME, and in 1970 U.S. exchanges listed an all time record 19 agricultural contracts. Financial products (currencies, then interest rates, and then equities) took over most of the new product momentum

Table 1. Number of New Contracts by Innovation Type and Commodity Category: 1956-2010.

	FX	Ag	Equity	Interest Rate	Other	Energy	Precious Metals	NP Metals
Innovations	98	60	121	49	37	28	11	3
Imitations	87	32	6	24	10	13	15	3
Extensions	53	108	5	56	42	33	17	5
All New Contracts	238	200	132	129	89	74	43	11

Figure 2. New Contracts by Commodity Category.



beginning in the mid 1970s, and after 1975 the number of new agricultural contracts never exceeded five in any year.

3. New Contracts by Exchange

Only six of today's futures exchanges existed at the beginning of our study: the two large Chicago (CBOT and CME) and two smaller New York exchanges (NYMEX and ICE, both the results of mergers and purchases along the way) and the two tiny regional exchanges (KCBT and MGE). The larger exchanges were much more aggressive at listing new contracts than were the tiny regional exchanges (Table 2). Could the regionals have become large exchanges had they worked harder at launching new contracts? It is doubtful. During the floor trading era, all important financial exchanges, both for securities and derivatives, were located only in the biggest financial and commercial centers. Only in the more recent electronic era did non-New York securities exchanges such as BATS start developing serious market shares. So no matter how many new contracts Kansas City and Minneapolis listed, it is doubtful they could have won serious market share. In addition, Minneapolis listed about twice as many new contracts as Kansas City but had less than one-third the volume of its Midwestern rival.

What is absolutely clear is that the CME, the exchange that eventually won the decades-long battle with the older and larger CBOT, trumped its larger opponent, and everyone else, in all measures of new products. Over the 55-year period, the

Table 2. New Contracts – by Exchange (1956-2010).

Exchange	Years Exchange in Business (1956-2010)	Total New Contracts	Innovations	Imitations	Extensions
CME	56	279	131	54	94
ICE	56	217	99	48	70
CBOT	56	161	70	17	74
NYMEX	56	101	38	17	46
Others*	54	74	22	37	15
CFE	7	24	23	1	
CCFE	5	20	10	1	9
MGE	56	17	6	3	8
KCBT	56	9	5	2	2
NYSE LIFE	3	8	4	4	
ELX	2	6		5	1
Total		**916**	**408**	**189**	**319**

Other* exchanges (orphaned exchanges) include ACE, BTEC, InCuEx, MBOTCA, MWGE, NFX/PBOT, SGE, SLM, US Futures Exchange/EUREX US and WCCE.

Table 2a. New Contracts – Orphaned Exchanges (1956-2010).

Exchange	Years Exchange in Business (1956-2010)	Total New Contracts	Innovations	Imitations	Extensions
USFE/EUREX US	5	40	15	17	8
PCE	5	10	3	3	4
WCCE	5	8	3	5	
NFX/PBOT	9	8		8	
ACE	3	3		3	
BTEC	3	3			3
InCuEx	4	1	1		
SLM	1	1		1	
SGE	5	0	0	0	0
MWGE	11	0	0	0	0
MBOTCA	10	0	0	0	0
Total		**74**	**22**	**37**	**15**

CME had 90% more innovations, 218% more imitations, and 27% more product extensions than its cross-town rival. In 2007, the CME bought the long-time world's largest derivatives exchange.

Note that Table 2 lists all exchanges that were active at the end of the study. The group of exchanges under the label "Others" are all the orphaned exchanges, exchanges that had active trading at some point during the 1955–2010 period, were not absorbed by another exchange, but just turned out their lights and went out of business. These exchanges are listed in Table 2a. Note that most were not in business long, at least during our study period, and did not list many new contracts. The three

Table 3. Average New Contracts Per Year by Exchange: 1956-2010.

Exchange	Years Exchange in Business	Total New Contracts	Innovations	Imitations	Extensions
CME	55	5.1	2.4	1.0	1.7
CBOT	55	2.9	1.3	0.3	1.3
NYBOT	55	2.4	1.0	0.4	1.0
NYMEX	55	1.8	0.7	0.3	0.8
ICE	51	1.7	0.8	0.6	0.3
USFE	5	8.0	3.0	3.4	1.6
CFE	7	3.4	3.3	0.1	0.0
CCFE	5	4.0	2.0	0.2	1.8
MGE	55	0.3	0.1	0.1	0.1
KCBT	55	0.2	0.1	0.0	0.0
NYSE LIFE	3	2.7	1.3	1.3	0.0
NFX	9	0.9	0.0	0.9	0.0
ELX	2	3.0	0.0	2.5	0.5
InCuEx	4	0.3	0.3	0.0	0.0
Others	42	0.6	0.1	0.3	0.2

orphaned exchanges that started before 1956 did not list a single contract during the 5 to 11 years they were in business during the study period. The exception was the very aggressive USFE, which listed more contracts per year of life than any other exchange. This was not good enough to keep the USFE from going out of business.

But given that the CME and other exchanges were in business during the entire 55-year study, while others have been around less than a decade, it is appropriate to take a look at the rate of innovation per year during the period each exchange conducted trading operations (Table 3). By this measure, several of the newer exchanges were more aggressive developers of new products. The CBOE Futures Exchange (CFE) listed the most innovations per year. New exchanges start out with no business, and it is risk reasonable that they would be fairly aggressive at listing new contracts, since they know that only a portion of new contracts succeed. But aggressive listing of new products is not sufficient to ensure an exchange's success. Of the four new exchanges that were most active, CCFE lost volume rapidly after it was clear that the U.S. Congress was not going to adopt cap and trade legislation, thus making its emissions contracts much less compelling. And the CFE, which listed 3.3 innovations each year during its seven years of life, hit on only one winner, the VIX, which in 2010 accounted for 99.8% of its trading. ELX,

Table 4. Number of New Contracts by Exchange and Commodity Category: 1956-2010

	FX	Ag	Equity	Interest Rate	Other	Energy	Precious Metals	NP Metals
CME	72	62	56	39	40	6	3	1
ICE	126	50	24	7	7	3	0	0
CBOT	9	42	16	55	15	7	15	2
NYMEX	8	17	2	3	2	49	13	7
Others	23	11	8	19	4	0	8	1
CFE	0	0	18	0	1	5	0	0
CCFE	0	0	0	0	20	0	0	0
MGE	0	15	0	0	0	2	0	0
KCBT	0	3	4	0	0	2	0	0
NYSE LIFE	0	0	4	0	0	0	4	0
ELX	0	0	0	6	0	0	0	0

which copied the strategy of Broker Tec and the USFE, by listing the major Treasury contracts of the CBOT, had an average record of launching new contracts, but had by far the highest volume of all the new entrants. A likely reason for this is because ELX is owned by some of the biggest financial trading institutions in the world, which have an interest in creating competitive pressure on CME Group to keep trading fees down and are thus likely to direct a portion of their orders to ELX.

It is also useful to take a look at which commodity categories each exchange has chosen to specialize in (Table 4). For example, while there were eight exchanges that listed 238 foreign exchange contracts, 83% of these contracts were at two exchanges: the CME and ICE/NYBOT. The CME was the innovator, listing the first successful currency contracts in 1972. The first currency futures was actually listed in 1970 at the International Currency Exchange (which called itself ICE, but which we have listed as InCuEx, to avoid confusion with the modern ICE Futures U.S. owned by the Intercontinental Exchange and listed simply as ICE in these tables). Because this was during the time that the Bretton Woods fixed exchange rate system was still in place, this first contract was premature and failed. Realizing that the CME had already created liquid markets in the major currency pairs, the FINEX subsidiary of the Cotton Exchange, which became absorbed into NYBOT and was later purchased and renamed ICE Futures US, decided to specialize in the dollar versus a trade weighted basket of currencies as well as in currency pairs that did not include the dollar, the latter referred to as cross rates.

There are similar stories in each commodity group. Take equity index futures. The innovator was the KCBT which listed the Value Line index a few months before the CME listed the S&P 500 in 1982. The original KCBT innovation is now dead and the CME's S&P 500, or more specifically the E-Mini S&P 500, a 1997 version with a multiplier one-tenth the size of the original contract's multiplier, is the largest in the world. While nine U.S. exchanges have listed 132 equity indexes since 1982, only five now have contracts. One contract, the E-Mini S&P 500, accounted for 75% of all U.S. equity index futures trading volume in 2010 and the CME's total market share of equity index futures was 89%.

In some instances a government action drives exchanges to list products all at one time. There is no better example than Congress' decision, effective December 31, 1974, to repeal the Gold Reserve Act of 1934, making it again legal for Americans to own gold. Five exchanges launched gold contracts on December 31.[5] By 2010, only one of the original five exchanges still listed gold (COMEX) as did one new competitor (NYSE LIFFE).

5. There was actually an earlier attempt. One exchange, the West Coast Commodity Exchange (WCCE), believing it had found a loophole in the Gold Reserve Act that allowed Americans to hold gold coins minted prior to 1934, launched a gold coin futures contract on July 20, 1971. Under very heavy pressure from the U.S. Treasury, the WCCE halted trading in less than a week. And two New York exchanges which were planning their own contracts on placer gold, the gold nuggets found in rivers and streams, decided not to move forward. (*The Gazette*, Emporia, Kansas, August 4, 1971, p. 4, reprinted from *Barron's*).

Table 5. Lifespan of New Contracts (in Years) 1956-2010.

	Min.	1st Qu.	Median	Mean	3rd Qu.	Max.
Innovation	1	2	3	5.8	6	54
Imitation	1	2	3	4.8	6	37
Extension	1	2	3	6.0	7	41
All New Contracts	1	2	3	5.7	7	54

B. Success of New Contracts

As mentioned, prior research measured success by product lifespan, by comparing the volume of trading in a specific year following launch to some specific benchmark like 1,000 contracts or 10,000 contracts or by volume over some specified period, like three years. We will show a variation on all these measures plus one additional measure, the discounted value of estimated trading fees earned by the exchange for a specific product.

1. Lifespan of Contract

Lifespan of contract is a measure that tells us how long a contract proved to be useful to the marketplace, but it says little about how broadly useful the contract is. For example, we cannot say that a low-volume contract that lasts 50 years is more successful than a very high volume contract that lasts 20 years. What may be most surprising about our 55-year sample is that the average contract lasts only 5.7 years (Table 5). And while product extensions have the longest lives and imitations the shortest, the differences are a little over a year. Note that the shortest life possible is one year, which could be anywhere from one day to 364 days because we are using annual data. Any contract showing volume in one year only is given a lifespan of one year. The longest life possible is 55 years for a product that was launched in 1956 and still trading in 2010. In fact, the longest lived innovation was 54 years, while the longest lasting product extensions and imitations were over a decade shorter.

2. Lifetime Volume of New Contracts

A much better measure of contract success is the total lifetime volume generated by that contract. This measure should be proportional to the value the market puts on the contract and to the revenues earned by intermediaries, by market makers and by exchanges. This is where the true innovations stand out, generating almost three times the volume of imitations and 50% more than product extensions (Table 6). These numbers suggest that on average the first mover (the exchange with the innovation) does much better than an imitation or extension of that same contract. Note that the means are as much as one to two thousand times the medians. This results from the fact that many contracts generate almost no volume. There were,

Table 6. Lifetime Volume of New Contracts 1956-2010.

	Min.	1st Qu.	Median	Mean	3rd Qu.	Max.
Innovation	1	1,236	15,730	31,330,000	306,300	4,977,000,000
Imitation	1	1,623	18,250	11,450,000	172,100	799,700,000
Extension	1	1,578	24,540	21,630,000	349,800	2,262,000,000
All New Contracts	1	1,430	18,868	23,830,000	288,800	4,977,000,000

Table 7. Lifetime Present Value of Trading Fees from New Contracts ($).

	Min	1st Qu	Median	Mean	3rd Qu	Max
Innovations	0	151	1,592	2,091,000	25,450	300,600,000
Imitations	0	170	1,762	832,700	15,550	62,879,000
Extensions	0	168	2,420	1,478,000	39,780	121,200,000
All New Contracts	0	163	1,743	1,617,000	25,940	300,600,000

for example, 104 new contracts that had lifetime volumes of less than 100 contracts. There were, on the other hand, five contracts that delivered lifetime volumes of over one billion contracts: Eurodollars, 5.0 billion; E-mini S&P 500, 3.1 billion; 10-year Treasury notes, 2.3 billion; Treasury bonds, 1.7 billion; and 5-year Treasury notes, 1.2 billion.

The shortcomings of both this and the following measure are that they biased in favor of contracts launched earlier, since earlier launches have more time to build up their lifetime volume. So new exchanges should often do worse by this measure, and any comparison across contracts risks false results due to this bias.

3. Present Value of Trading Fees Paid to Exchanges

The logic of this measure is consistent with mainstream financial decision making. A firm will engage in projects for which the net present value (PV) is positive. Ideally we would take the costs of creating, listing, and maintaining a new product and then calculate the revenues the new product brings in and subtract the present value of the revenues from the present value of the costs. Traditionally, the bulk of exchange revenues came from trading and clearing fees, followed by sales of market data, followed distantly by interest earned, fines levied on misbehaving members, membership fees, and other modest sources. While there is some anecdotal information available on costs, accurate information is not readily available, even in the annual reports of the publicly traded exchanges. But it would still be helpful to rank contracts by the present value of the revenues they generated to see if there were significant differences in revenues among types of contracts.

We should start by saying that we do not know the trading fees that were paid to each exchange for each contract over the past half century. We also do not know when fees were discounted for new contracts for market making and other reasons.These things might be knowable, but it would be difficult to find out. We have therefore made two simple assumptions. First we assume that the fee structure maintained by the CME for a decade or more through the 1980s was used by all U.S. exchanges from 1955 to 2010. This trading/clearing fee was 75 cents for customers and 25 cents for members. Second, we assume that the trading mix between members and non-members was 50-50, which gives us an average $1 fee collected per contract traded for both sides of the trade.

We would use the weighted average cost of capital to discount these fees, if exchanges were stockholder-owned firms that issued equity and bonds to raise cash to fund product development. But for about 80% of the 1955 to 2010 period, exchanges were not-for-profit, member-owned entities that paid for operations out of current revenues and avoided the stock and bond markets. So we approach this by asking what the opportunity cost for member-owners who bought seats was, and we argue that they would have invested in the stock market, allowing us to use the compound annual growth rate of the S&P 500 from 1955 to 2010, which was 6.13%. So we use a discount rate of 6% to discount future fees resulting from new contracts.

Based upon these assumptions, we calculate that the present value of lifetime

Table 8. Success Level – Volume in Fifth Year by Innovation Types 1956-2006.

	Innovation	Innovation (%)	Imitation	Imitation (%)	Extension	Extension (%)
Highly successful	79	19%	94	30%	32	17%
Successful	26	6%	38	12%	6	3%
Moderately	105	26%	68	21%	53	28%
Dead	197	48%	119	37%	99	52%
Total	407	100%	319	100%	190	100%

Table 9. Success Level in Fifth Year (% 1956-2006).

	Highly Successful	Successful	Moderately Successful	Dead	Total
CME	8%	8%	25%	59%	100%
ICE	1%	8%	34%	57%	100%
CBOT	6%	14%	23%	58%	100%
NYMEX	11%	7%	24%	58%	100%
Others	1%	1%	15%	84%	100%
All Exchanges	**5%**	**8%**	**25%**	**62%**	**100%**

Table 10. Success Level in Fifth Year by Category 1956-2006.

	Highly Successful	Successful	Moderately	Dead	Total
Ag	8%	13%	26%	54%	100%
Other	43%	9%	16%	33%	100%
Equity	33%	7%	17%	44%	100%
FX	18%	5%	39%	38%	100%
Interest	27%	4%	12%	57%	100%
NP Metal	9%	18%	27%	45%	100%
Energy	27%	4%	20%	49%	100%
Prec Metal	21%	14%	28%	37%	100%

revenue generated by the average new contract was $2.1 million (Table 7). Innovations did about 30% better than the average contract and imitations did only half as well. Similar to the case of lifetime volume, the first mover contract generated about 2.5 times the revenue as the imitation contracts. Note that the single best performing innovation, Eurodollars, generated a present value of $300 million in revenue on a lifetime volume of 5 billion contracts traded (Table 7).

In order to remove the bias involved in lifetime volume and present value of lifetime earnings, we also calculated the present value of revenues generated in the first five years and the first 10 years of a contract's life. While these numbers will be shared later in the paper (in Table 11) when we compare six different measures of contract success, we will say here that taking a shorter term view makes product extensions look almost as attractive over 10 years and 50% more attractive than innovations over a five-year period. In fact, over a five year period, both product extensions and imitations generate more revenue than do innovations.

4. Volume in the Fifth Year

Some of the earlier research judged success by how actively a new contract traded in the third year of life. Because of our larger time span, we are giving new contracts five years to show whether they have traction or not. So for every new contract we capture how much trading took place in its fifth year. For example, we would measure 1984 volume for a contract launched in 1980. Because we use annual data, we do not know whether the contract started in January or December of 1980, meaning by the end of 1984 it could have had either a full five years or only a bit over four years to develop. This variance becomes less important the further out we go and is another reason why the fifth year is a better choice than the third year.

Prior research looked at a single number that divided successful from unsuccessful contracts, with various authors using 1,000, 10,000, 120,000, and 250,000 contracts per year as the threshold for success. Rather than use a single threshold, we create four categories of success based on volume in the fifth year of trading:

Highly successful – greater than 1 million contracts.

Successful – between 100,000 and 1 million contracts.

Moderately successful – between 0 and 100,000 contracts.

Dead – zero contracts.

There is a bit of arbitrariness in choosing any specific definition, but multiple tiers allow us to recognize that there are levels of success in most endeavors, as manifested by gold, silver, and bronze in the Olympics.

We notice first that a bit more than half of all new contracts have zero volume in their fifth year (Table 8). We also notice that a visible share of new contracts is highly successful and that imitations (30% highly successful) do considerably better than innovations (19% highly successful).

Are some products noticeably more successful than others? We can see from Table 10 that about half of all new interest rate, agricultural, and energy contracts have gone to zero volume on or before the fifth year of trading. The fact that agricultural products die more frequently and are least likely to become highly successful is consistent with the low hanging fruit theory. Because agricultural futures contracts have been around since the 1860s, all of the most obvious agricultural products have already been converted into futures contracts, leaving only the least likely to succeed. One would generally expect the success rate in any product category to decline over time.

Not all products fit neatly into this theory, but the product categories with the smallest percentage of highly successful contracts are also the oldest — agricultural, metals, and foreign exchange.

5. Consistency of Product Success Measures

We have examined six measures of success in launching new futures contracts. Do we find that the six measures point in the same direction regarding the best performing innovation types, exchanges, commodity categories, and time periods? While we never find perfect uniformity across all these measures, we do find strong tendencies in the same direction.

Regarding levels of innovation (Table 11), the three most comprehensive measures of success, lifetime volume, the PV of lifetime revenue, and the PV of 10-year revenue all suggest that innovations are the most profitable new contracts to launch. Extensions last a few months longer and have the highest PV of five-year revenue than do innovations. Also, imitations have the highest fifth year volume.

When we examine success by exchange (Table 12), the CME wins by almost all measures. The NYMEX's contracts lasted one month longer on average. It is well known that from 1955 till 2000, the CBOT had substantially higher volumes than all other exchanges, so the fact that the CME gradually closed the gap and

then pulled ahead was due in part to the fact that its new contracts performed better than the CBOT's.

Is there consistency among the success measures when applied to commodity categories? By measures of lifetime volume and revenue, interest rates absolutely dominated (Table 13). However, by the shorter term benchmarks, equities did better. This is explained partly by the fact that the first interest rate futures contracts began in 1975 and had a seven-year lead on the 1982 launch of stock index contracts. Also, stock index contracts appear to build volume more rapidly on average than do interest rate contracts. While we have made clear that we do not put much stock in the lifespan as a measure of success, we note that precious metals last over twice as long as equity and interest rate contracts. This is due to these contract's early starts. Platinum was listed in 1956, silver in 1963, and palladium in 1968.

We finally apply these six success measures to see which time periods have generated the most successful contracts (Table 14). By almost every measure, the 1980s was the golden decade for successful launches. The average lifetime volume of contracts born in the 1980s was 76.3 million, more than twice any other decade. There is a natural bias here in that contracts launched in earlier decades have more time to build lifetime volume. Note however, that the average volume for 1980 new listings is over twice that of the 1970s and 65 times that of the 1960s. The 1960s saw launches exclusively in physical commodities and the 1970s mainly in physical commodities. The 1980s was the first decade to be dominated by financial launches, and financial contracts attracted much more trading than trading in physical commodities ever did. Note also that one of the few success measures that the 1980s did not win in was volume in the fifth year of trading. The average contract in the 1990s had built up a volume of one million in the fifth year, compared to 707,200 for 1980s contracts. Part of this was due to the spectacular performance of the 1997 E-mini S&P 500, which reached 39 million by the fifth year.

III. PRODUCT INNOVATION AND COMPETITION

In contrast to some other countries with a single futures exchange, the U.S. futures market has been long characterized by a number of exchanges aggressively competing for market share. The direct competition over products often involved the top two exchanges, the CBOT and CME, but there were many cases in which multiple exchanges would list identical or very similar products about the same time. Sometimes such multiple listings are driven by events. For example, when the law prohibiting Americans from owning gold was eliminated in 1974, there were seven gold futures contracts listed at five different exchanges within a very short period of time.

Given the tendency of product competition to be winner-take-all, and the belief that the winner will generally be the first exchange to build up significant market liquidity in a new product, a common exchange strategy is to attempt to be first in launching new markets. If one exchange learns that another exchange is developing a new product, it will attempt to come to market with the same or similar product as quickly as possible in order to minimize the time advantage of its competitor.

Table 11. Success Measure by Innovation Types.

SUCCESS MEASURE	Innovations	Imitations	Extensions	All contracts
Life Span (yrs.)	5.8	4.9	6.0	5.7
Lifetime Vol	31,330,000	11,450,000	21,630,000	23,830,000
PV lifetime revenue	2,091,000	832,700	1,478,000	1,617,000
PV 10-yr revenue	865,400	536,100	688,600	738,600
PV 5-yr Revenue	200,700	88,910	296,000	209,800
5th Year Volume	558,000	691,400	614,000	605,200

Table 12. Success Measure by Exchanges

SUCCESS MEASURE	CME	CBOT	NYMEX	All Other Current Exchanges	All contracts
Life Span (yrs.)	6.3	4.1	6.4	5.3	5.7
Lifetime Vol	45,190,000	997,800	24,840,000	1,441,000	23,830,000
PV Lifetime revenue	2,807,000	52,780	1,795,000	1,096,400	1,617,000
PV 10-Yr revenue	1,577,600	47,140	634,500	445,500	738,600
PV 5-Yr Revenue	377,600	29,110	262,800	128,300	209,800
5th Year Volume	1,261,000	60,910	1,033,000	243,400	605,200

Table 13. Success Measure by Categories.

SUCCESS MEASURE	Ag	Other	Equity	Foreign	Interest	NP Metals	Energy	Precious Metals	All contracts
Life Span Yrs	6.7	3.8	4.5	5.9	4.7	8. 1	4.9	10.6	5.7
Lifetime vol	4,729,000	1,627,000	39,920,000	6,137,000	87,320,000	9,183,000	26,330,000	16,050,000	23,830,000
PV Lifetime Revenue $	581,300	113,000	2,176,000	439,200	5,714,000	1,016,000	1,834,000	1,834,000	1,617,000
PV 10-yr revenue $	262,100	115,300	3,322,000	190,000	1,399,000	387,100	874,300	780,300	738,600
PV 5-yr revenue $	117,900	164,000	623,500	40,540	289,900	120,900	285,900	190,200	209,800
5th year volume	101,100	71,330	1,839,000	114,300	1,250,000	200,200	1,118,000	271,000	605,200

Table 14. Success by Decade Listed.

SUCCESS MEASURE	1950-1960	1960-1970	1970-1980	1980-1990	1990-2000	2000-2010	All Decades
Life Span (yrs.)	8.1	6.3	9.5	8.7	5.7	3.7	5.7
Lifetime vol	1,922,000	1,145,000	31,780,000	76,320,000	37,630,000	4,611,000	23,800,000
PV lifetime revenue ($)	497,700	291,300	3,399,000	4,997,000	1,961,000	220,100	1,243,000
PV 10-yr revenue ($)	228,500	228,400	830,400	955,700	836,700	273,100	403,900
PV 5_yr revenue ($)	160,500	87,880	218,500	355,800	225,800	146,400	150,200
5th year volume	36,000	71,570	304,300	707,200	1,010,000	606,400	604,600

Each exchange in the United States tends to hold a portfolio of monopoly products. On the day that the CME and the CBOT merged there was no overlap in their actively traded products. Futures markets tend to be liquidity-driven monopolies, a variant of the concept of network effects in economics. The reason is that the more buyers and sellers are present in a market, the more valuable that market is to all involved because bid-ask spreads narrow, market depth increases, and the market becomes both less costly and safer (in the sense of being able to easily find a counterparty) to trade in. Since this liquidity is extremely important to traders, they will always be attracted to markets with greater liquidity, other things being equal. If one exchange has developed substantial liquidity in a product, it is very difficult for another exchange to list that same product and attract traders to its market. Even when several exchanges start the same product at about the same time, at some point one market starts to move ahead in volume and gradually traders leave the less liquid market to trade in the more liquid market, typically leaving one exchange with all the business.

For example, in 1981 three exchanges listed negotiable certificates of deposit (CD) futures. The CME had an advantage over its two competitors, the CBOT and the New York Futures Exchange (NYFE), a subsidiary of the New York Stock Exchange, in that its market makers could hedge their CD risk in a liquid 90-day T-bill futures market on the CME floor. In the first year the CME had more than twice the volume of the other two contracts, and within two years volume in the other two markets had dropped to zero and the CME had 100% market share.

Anecdotes are helpful, but we would like to more rigorously explore this tendency toward liquidity-driven monopoly by utilizing our half century of new contract data to test a few propositions.

A. Clustering of New Products around Major Innovations

Is the liquidity driven monopoly principle and the first mover advantage sufficient to cause competing exchanges to react to major new innovations with their own related products in such a fashion that all activity clusters in a very short period of time? Figures 3–6 say no. Or more accurately, there is often an initial clustering, followed by a competitive battle that often continues over decades. Because the agricultural innovation occurred in the 1860s, long before our data begin, we focus on four major innovations: energy, interest rates, foreign exchange, and stock indexes.

1. Energy Clustering

The first energy contract, propane, was launched in 1967, followed by heating oil in 1974, gasoline in 1981, crude oil in 1983, and then by natural gas in 1990 (Figure 3). Most of the energy contracts during the first 23 years, except for crude oil and natural gas, died quickly or were lightly traded. NYMEX was pumping out most of the new products with no competition until 1982 to 1984 when the CBOT and CME launched a series of crude oil, gasoline, and heating oil products, all of which died within a year. So the energy innovation was a slowly evolving idea, and there was not a clustering of competing exchanges around the first energy contract.

2. Interest Rate Clustering

Interest rate contracts experienced a bit more initial clustering (Figure 4). In 1975, the CBOT listed the first of 12 unsuccessful mortgage-backed securities contracts. The CME followed the next year with a highly successful 90-day T-bill contract. The CBOT came back in 1977 with two contracts, an unsuccessful commercial paper contract and another that became the most actively traded contract in the world for many years — the U.S.Treasury bond contract. Then 1978 brought interest rate contracts from the CBOT, CME, and the now defunct American Commodity Exchange (ACE).[6] This cluster crested with seven contracts in 1979, with one from the CME and two each from the CBOT, COMEX and ACE. While the number of interest rate launches fell back, 1981 was notable because one of the five contracts was CME's three-month Eurodollar contract. This is the kind of competitive clustering we had in mind.

But the broad category of interest rate contracts continued to be fertile and competitive ground long after this initial cluster. In fact from 1975 through the end of this study in 2010, there was not a single year without a new interest rate futures contract. Not only did the exchanges already mentioned stay active, but a series of three exchanges were created for the express purpose of trying to capture interest rate market share from the CBOT and sometimes the CME. In 2001, Broker Tec (BTEC) launched three Treasury bond and note contracts. They were dead by 2003. In 2004 and 2005, a new Chicago subsidiary of Eurex (officially registered as USFE and doing business as Eurex US), listed six Treasury bond and note contracts. They also were dead within a couple of years. Finally, in 2009 and 2010, ELX listed four Treasury bond and note contracts and one Eurodollar contract. In 2010, all of these contracts traded over one million contracts, and three of them traded over three million contracts.

3. Foreign Exchange Clustering

Foreign exchange contracts also had a small initial bunching (Figure 5). It began with a currency index listed by the International Currency Exchanged in 1970. It was premature as the Bretton Woods fixed exchange rate system was still in place. The CME got things rolling with seven major currencies in 1972 (the German mark, British pound, Italian lira, Japanese yen, Swiss franc, Canadian dollar and Mexican peso). They started slow and took about seven years to really start taking off. All survived, except the lira. The following year there were another seven contracts: The CME listed the Dutch Guilder, and six imitations were launched by NYMEX and the New York Cotton Exchange, which later merged into NYBOT and then was purchased by ICE Futures US. In 1974, the CME listed the French franc and NYMEX added four more FX contracts. Activity then died down for a while, until the newly created NYSE subsidiary, the New York Futures Exchange (NYFE) decided to enter the fray with five CME imitations in 1980. These all died

6. The American Commodity Exchange (ACE) was a short-lived market (1978–1981) that listed only three products: GNMA mortgage-backed securities, T-bills, and T-bonds.

Figure 3. New Energy Contracts.

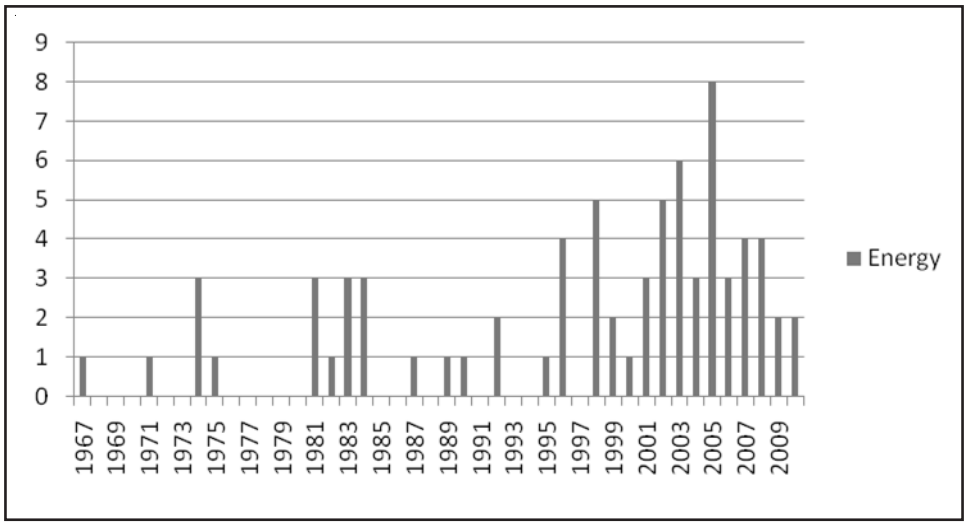


Figure 4. New Interest Rate Contracts.

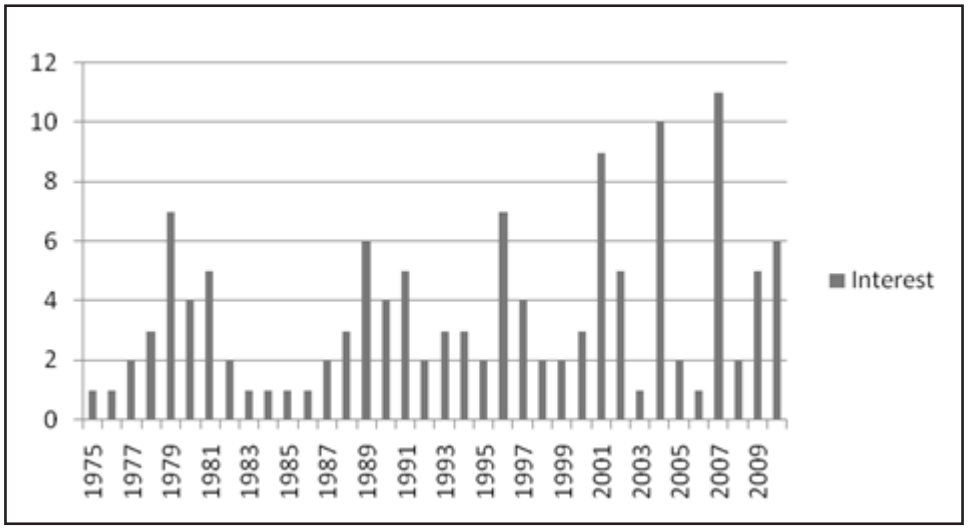


Figure 5. New Currency Contracts.

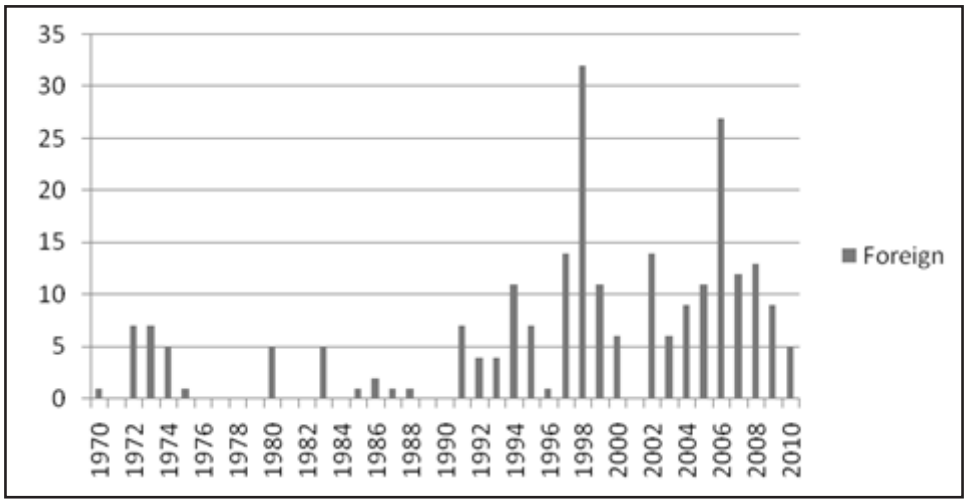
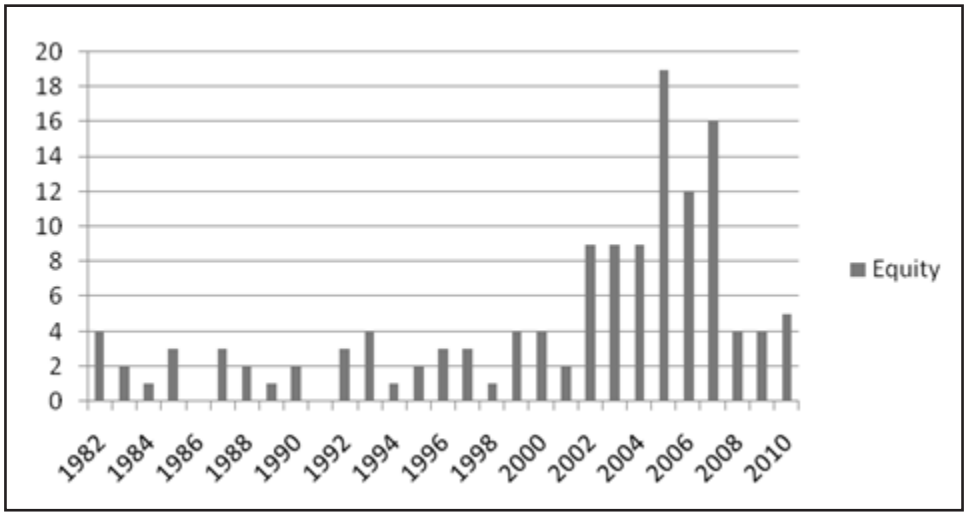


Figure 6. New Equity Contracts.



the next year. In 1983, the MIDAM came into the arena with five of its signature mini versions of full commercial-sized contracts successfully listed elsewhere. These contracts lasted for almost two decades, until the CME began listing its own mini versions.

In 1991, the Philadelphia Board of Trade (PBOT) began building up its own arsenal of CME look-alike currencies, which never captured any significant market share, but did last almost a decade. The period from 1991 to 2010 was characterized by much more listing activity than occurred around the CME's original 1972 launch. There were two significant peak listing years. In 1998, there were 32 FX contracts listed, 31 of them by NYBOT, which was trying to become a second anchor in the foreign exchange business, by focusing on cross rates (exchange rate pairs that do not include the dollar), which the market leader, the CME, had largely ignored. The other spike, 27 FX listings in 2006, was 100% ICE.

So foreign exchange listings also show some initial clustering, but most currency futures contracts were listed during a two-decade period beginning 20 years after the initial innovation was made.

4. Equity Clustering

The chart of new equity listings (Figure 6) looks remarkably like that of currencies — some initial competitive clustering, followed two decades later by much more innovation and competitive activity. In 1982, after an SEC-CFTC jurisdictional dispute was settled with the Shad-Johnson Accord, four stock index futures were listed by three exchanges. The KCBT was first with the Value Line, because it had submitted its application long before the others. It was not an institutionally important index and never traded very much, but it did last 22 years before it died in 2004. Two months later the CME listed its S&P 500, which went on to become the most actively traded stock index futures contract in the world. And the newly created NYFE listed the NYSE Composite along with a Financial Sector index. The Financial Sector died the next year, but the NYSE Composite hung on for 21 years. Remarkably, the CFTC approved nine stock indexes in that first year, though only four were listed. This was because both COMEX and the CBOT created what were essentially imitations of the S&P 500 and the DJIA, respectively, and both were blocked in court from listing.

Those first four years saw only 10 equity index contracts listed by four exchanges — the three 1982 pioneers plus the CBOT, which launched two contracts the next year, neither of which lasted very long. One of the constraints on listing more products was that, unlike corn, cattle, or crude oil, stock indexes were protected intellectual property and could only be traded by an exchange if a licensing agreement were put in place. In the early years, futures were viewed as borderline inappropriate by the securities industry and Dow Jones, for one, absolutely refused to license its index for such activity. Fifteen years later, Dow Jones saw how hugely successful and respectable stock index futures had become, and in need of money it leased its index to the highest bidder, which happened to be the CBOT and which finally got

the CBOT back into the stock index business. The thing responsible for creating a new much larger cluster of listings beginning in 2002 was the fact that index companies began creating a lot more indexes and new players, like the CBOE Futures Exchange (CFE), began listing index products. The CFE alone listed nine stock index contracts in 2005. They all died before the year was out.

B. Is the Principle of Liquidity Driven Monopoly Supported by the Data?

To what extent do exchanges have monopoly positions in specific product listings? To test this, we search for product prototypes, such as silver or corn or soybeans or Treasury bills, and then organize all contracts into groups around each of these prototypes. The contracts in a prototype group might be identical or may differ from one another by size, grade, delivery location, or maturity but are largely substitutable for one another in trading. If it differs sufficiently, it becomes a different prototype. So soybeans, soybean oil, and soybean meal are three different prototypes; they have different uses and values. For example, during our 55-year period there have been six silver contracts listed at five exchanges, each of them in the prototype group we call silver. In any given year, there were never more than three silver contracts actively traded, often only two and occasionally one. Silver coins were a separate prototype because coins can have a significant and varying numismatic value when compared to silver bars.

1. Is There Only One Active Contract for Each Group of Essentially Identical Contracts?

For each product prototype in each year, we calculate the number of actively traded contracts associated with that prototype and then take the average number of contracts per prototype group for that year. In its pure form, liquidity-driven monopoly would suggest that each group should have only one actively traded product in each prototype group and that the average for all groups for each year should be one, except for those cases where the battle for the winning contract has not yet resolved itself. In those unresolved cases where a number of contracts still have volume, the number could be two, three, four, or even five.

As can be seen from Figure 7, the number of directly competing contracts has on average ranged from 1.5 to 2.25 and shown a general decline, bottoming out in 2004 and then risen steadily to about 3.75 in 2010. While we expected this number to be closer to 1.0, the fact that we have had an average of almost 2.0 suggests that, despite the expected outcome, we continue to have vigorous competition in U.S. futures markets. This six-year increase in competition may have an explanation. It was beginning in late 2003 and early 2004 that competition from an electronic Chicago subsidiary of Eurex pushed the CBOT and CME to shift their members and customers away from the floor and onto the screen. It may be that as futures trading has become more completely electronic, exchanges have found that it is

Figure 7. Average Number of Essentially Identical Contracts per Competition.

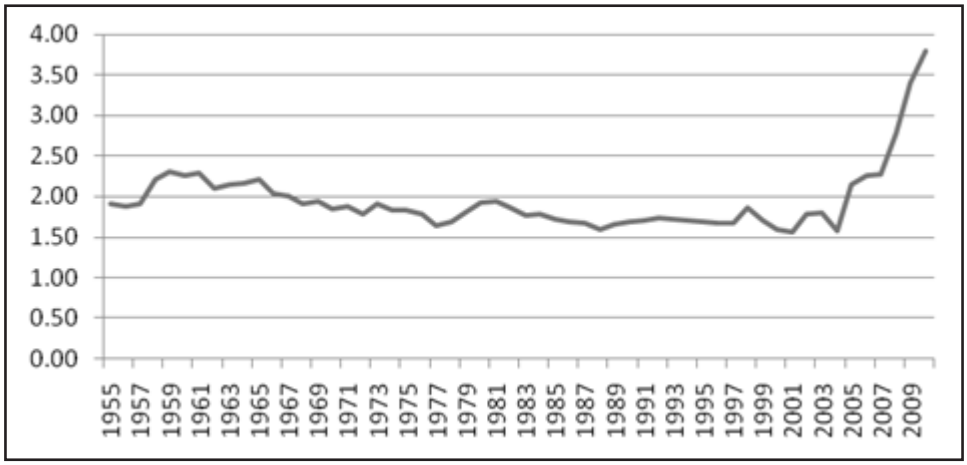


Figure 8. Dominant Contract's Average Share per Competition.

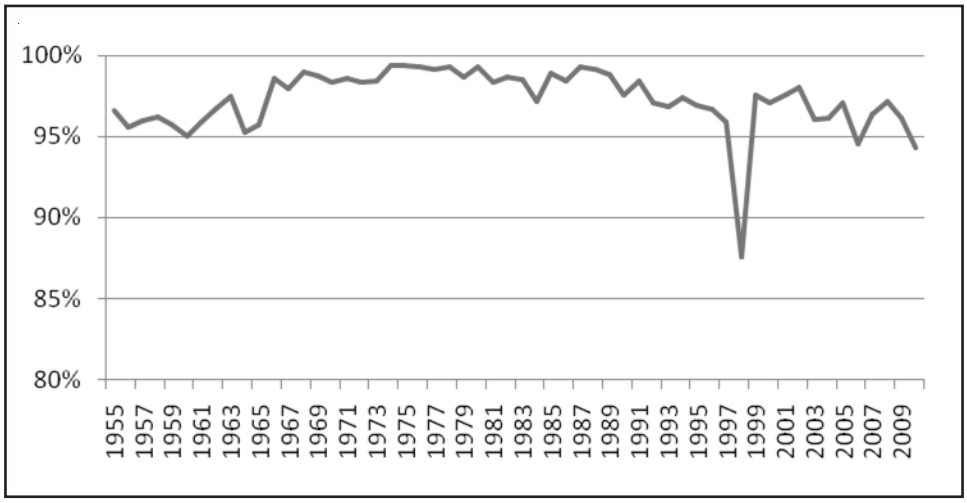


Figure 9. Percent of Cases Dominant Contract is an Innovation, Imitation, Extension, or pre-1956 Contract.

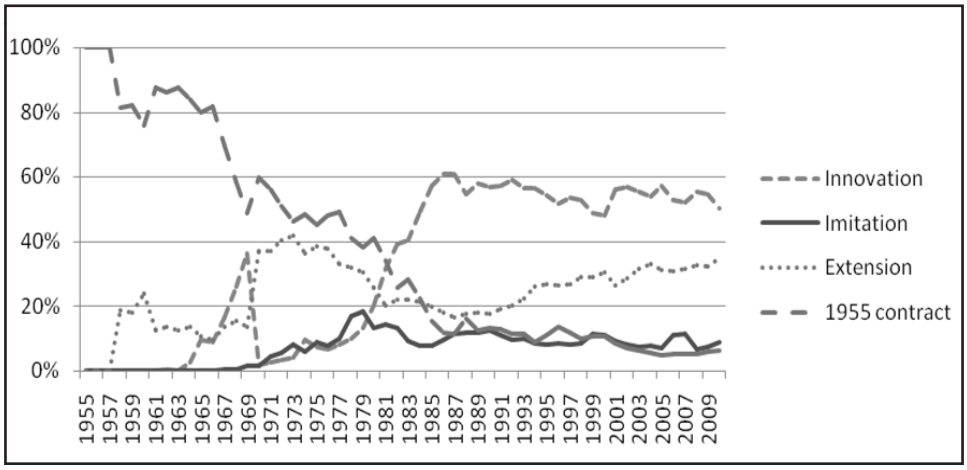
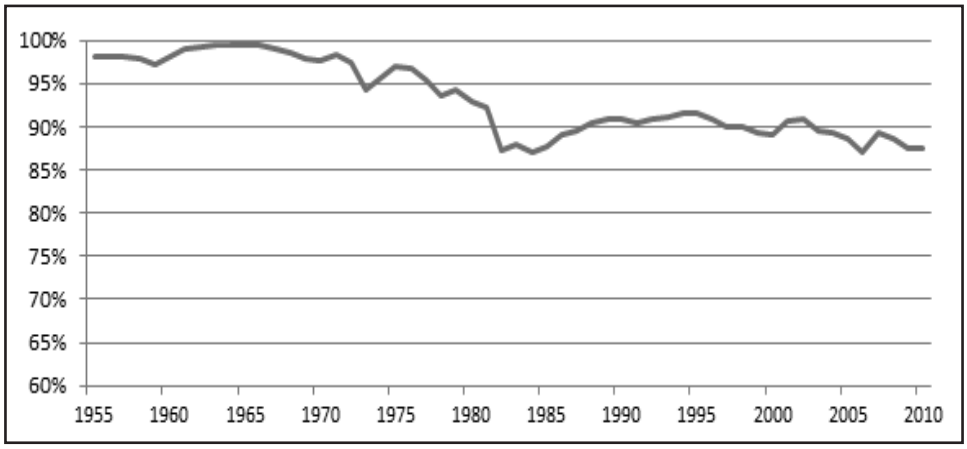


Figure 10. Market Share of Top 20 Contracts.



increasingly cheap and easy to list new competitive products, and therefore we have seen this increase in the number of competing contracts from 1.5 to almost 3.75.

2. Is the Market Share of the Dominant Contract in Each Prototype Group Almost 100%?

Even if there is still a competitive battle going on, the share of the dominant contract in each contested prototype group should be moving toward 100%. To test this, we calculate the market share of the dominant product in each prototype group and then take the average of these market shares across all groups for each year. As can be seen from Figure 8, the market share of the dominant contract has averaged between 95 and 100% in all but three years, 1998, 2006, and 2010. This may well be consistent with a world of liquidity-driven monopolies and the 1 to 5% share captured by competitors is the average share captured by contenders as the battles for monopoly are gradually resolved, The huge drop to an 88% share in 1998 is a mystery, and we cannot easily explain the rise in dominant product share from 1960 to 1974, nor the drop from 1974 to 2010.

3. Is There a First Mover Advantage?

By definition, the innovator is the first mover. And by definition an imitation or product extension is a contract that is listed no sooner than the year following the innovation. So if it is true that first movers are much more likely to win battles over contested contracts, then we should find that the innovation should always, or at least mostly, be the dominant contract when multiple similar contracts are contending for market share. Figure 9 tells us, for each year, the percentage of cases where the dominant contract is an innovation, an imitation, a product extension, or a contract that was listed before 1956 (in which case we do not know which of these types it is).

In 1956, virtually all competitions were among contracts that had been created before 1956, so the dominant contract would virtually always be a pre-1956 contract. In fact it was not until 1981 that the dominant contracts ceased being the old pre-1956 contracts. Ignoring the role of these legacy contracts and focusing on contracts listed in 1956 and later years, which means focusing on the contracts we know to be innovations, imitations, and product extensions, we find only weak support for the first mover theory. In fact, until 1981, the dominant contract in competitions was much more likely to be a product extension than an innovation. And even after 1981, while innovations were more likely than either extensions or imitations to be the dominant contract, they were the dominant contract in only 40 to 60% of the cases. The finding that would fully support the first mover theory would be if dominance by imitations and product extensions were always close to zero and innovations combined with the legacy contracts had close to 100% market share. That is not the case here.

4. Has Increased New Product Listings Reduced the Market Share of the Top Contracts?

If all the new products are solving problems for risk managers and traders, we might expect to see an increased diffusion of volume among more contracts. That would suggest a decline in the volume share of the top 20 contracts. We find that from 1981 to 2010, the market share of the top 20 products fell from 98% to 94%, not a huge diffusion but a visible one.

IV. CONCLUSIONS

In this paper we examined the 916 new futures contracts listed by 39 exchanges over the period 1956 to 2010. Of these, 44% were innovations, 35% were product extensions, and 21% were imitations. This analysis led to the following findings:

- The average lifespan of a new futures product is just under six years.
- Contract innovations tend to be more successful than extensions and imitations.
- The CME, which over the past 55 years has fought its way from being in the CBOT's shadow to being the top U.S. exchange, has more aggressively created new contracts (5.1 per year vs. 2.9 for the CBOT), and those contracts have on average been more successful.
- The 1980s was the golden decade of new contract success by almost every measure.
- Interest rate contracts generated the highest lifetime volumes and revenues, while agricultural and exotic contracts generated the least, on average.
- There is a strong tendency toward liquidity-driven monopoly (or winner take all) in U.S. futures markets. When there is product competition, there is an average of only two exchanges competing and the dominant contract tends to have over a 95% market share.
- However, the widely held view that the first mover always wins, is not supported by our findings. Even though innovations dominated product competition about 50% of the time, product extensions dominated over 30% of the time.

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