

Insurance Catastrophe Futures
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Summary

Insurance Catastrophe Futures Contracts began trading on December 11, 1992 on the Chicago Board of Trade (CBOT). As in all commodity futures contract trading, a key objective is to increase liquidity of a market by bringing in new participants. These new participants, who are not professional consumers or producers of a commodity, increase liquidity of a market with their shorter term investment time horizon. For Insurance Catastrophe Futures the attraction of capital from non-traditional sources for insurance risk can create increased catastrophe capacity that is sorely needed in today's insurance market.

In traditional insurance or reinsurance, the process of insuring against catastrophes is tedious requiring months of negotiations to conclude a sound agreement. In addition, the reversal of such agreements through commutation negotiations is equally tedious. Through the design of uniform insurance agreements, the CBOT attempts to develop a liquid market in which catastrophe risks can be easily assumed or transferred and in which non-traditional capital is attracted to insurance.

For a futures contract to be successful, commodity contracts must possess key characteristics. These characteristics are discussed in this paper. And in the author's opinion, CBOT insurance contracts in their current form do not possess characteristics necessary for success. Consequently, the insurance futures contracts have provided little additional capacity to the insurance catastrophe market and have not altered in a meaningful way negotiations prevalent in the catastrophe market. There may be some hope for success if certain structural changes take place in the reinsurance market.

The paper is broken into five sections:

1. Characteristics Of Successful Futures Contracts
2. The Structure Of The Contract And Its Options
3. Characteristics Of the Catastrophe Futures Contracts And Their Likely Failure
4. Structural Changes In the Reinsurance That May Provide Chance Of Success
5. Conclusion

As in all new contracts launched by the organized commodity exchanges in the United States, the contracts will evolve to resolve problems as perceived by professional hedgers and traders. As this paper is being written, the CBOT is shifting the contracts based on information from the Property Claim Service (PCS) Office. However, these changes from the indices published by ISO Data will unlikely change the outlook for the success or failure of insurance futures traded on the CBOT. It is only a possible shift in the way the reinsurance business operates that may provide a glimmer of hope for the mechanism created by the CBOT.

Characteristics of Successful Futures Contracts

Successful trading of futures contracts began in the United States in agricultural commodities in the middle of the last century. Livestock and soft commodities like frozen orange juice concentrate and cocoa were added in this century. In the decade of the 1970's contracts dealing specifically with currencies, stock market indices and U. S. Government credit securities also began.

The above contracts are successful. They have benefited producers and sellers of raw commodities by increasing the ability to freeze costs at current levels for both buyers and sellers and thus reducing business uncertainty. With the existence of liquid futures markets, professionals consuming or producing a commodity freeze future costs through the purchase or sale of a futures contract and can do so quickly through a liquid market. Hedge positions can be established, where professional traders assume the risk of future price fluctuations. Likewise futures in financial instruments provide portfolio managers an ability to hedge price changes by establishing positions in the futures market. There is no longer a need to liquidate huge amounts of stock in anticipation of a market decline. Reasonable protection can be obtained by selling index contracts. Guaranteed Investment Contract (GIC) managers and government security dealers can hedge interest rate changes with interest futures contracts.

Unfortunately, some futures contracts have failed. The contract on the CPI Index is one such contract. It was launched in the 1980's, and the anticipated volume and corresponding liquidity

that its creators hoped for never materialized. Why did the CPI contract fail and others succeed? Is there a clue to the fate of catastrophe futures contracts in the success of the T-Bond contract and the failure of the CPI contract?

In all sustainable and recurring economic transactions, parties involved in the recurring transactions must perceive that pricing in the market is fair and not manipulated. Admittedly, there are transactions where perceptions are erroneous and the price is not fair. But such transactions tend to die out quickly as the parties better understand real needs or appreciate that the price was wrong.

The T-Bond market and the corresponding futures markets are usually perceived as fair markets. The buyers and sellers of T-Bond contracts can hedge in the market, such as government bond dealers or managers of Guarantee Investment Contracts (GIC). Hedgers can offset changes in interest rates with T-Bond future positions. Hedgers can structure a transaction whose price change in the futures market which will closely mirror changes in the price of assets that they currently possess or wish to acquire.

On the other hand, traders typically seek a movement in the futures contract that are in their favor. Both the trader and the hedger dealing in the T-Bond futures market perceive a price reflective of current credit market conditions. Both the trader and hedger see high correlation between the futures market and cash markets. The ability to manipulate the spot market and the

corresponding futures market is perceived to be limited. In summary the T-Bond futures market along with other successful futures markets work because:

- 1.) Professional hedgers see a good correlation between the futures instruments and the assets in which they have direct interest.
- 2.) Traders can relate the futures prices to a relatively liquid spot market.
- 3.) Both the spot and futures market are big and not easily manipulated.

The trader, who ultimately provides the liquidity to the futures and spot markets, must be confident in the market and feel he is getting a fair deal. If the trader's confidence disappears, he ceases to participate in the market. Liquidity in the market then evaporates without the participation of traders. Outside capital that augmented the needs of the professional hedger disappears and the futures contract dies.

The CPI contract had no regular traded spot market. The government announces the CPI once a month and then occasionally revises the CPI. An obvious question then to both the trader and the hedger presents itself, "Is the CPI a reliable measure of inflation"? The trader has no regular dependable anchor on which to base his trading decisions in a futures market, since the CPI contract is tied to an infrequently published index. And the index is based on an opinion of a government office which can revise the index.

The Structure Of The Catastrophe Contract And Its Options

The catastrophe futures contracts are cash settlement index contracts. At settlement of the contract cash will change hands based on the value of an index that measures catastrophe losses in a given accident quarter. The contracts are based on loss activity in a given quarter. About two dozen participating insurers release premium and loss information to their statistical agent ISO Data, a division of the Insurance Services Office.

The premium is essentially premium collected on property policies. The premium includes fire premium which comprises the bulk of property premiums in the United States. The losses reported are essentially extended coverage (EC) losses primarily wind, sleet and hail losses but also earthquake losses. A ratio of these EC type losses to the total premium may be about .07. The contract can trade at .07 based on expected EC losses and the expected earned premium for a given quarter. The contract is finalized six months after the end of the experience period. If losses are unusually severe, the contract may end up at .30. The .23 difference accrues to the benefit of the long in the contract and the short or writer of the contract makes up the difference. Note that an index of 1.00 is a value of \$25,000; .01 is \$250.

It should be noted that the title of these contracts is a bit of a misnomer, since all EC type losses are included in the loss ratio-not just catastrophes. Taking a position in these contracts is really taking an interest in EC experience relative to property premium.

ISO Data, for the purposes of settling the futures contracts, adjusts the experience of the two dozen companies to produce a loss ratio of EC type losses to property premium that is more representative of industry experience. The final index is finalized six months after the end of the experience period so that the contracts can be settled.

As the CBOT catastrophe market has evolved, a few points are noteworthy:

- 1.) Trading in the actual futures is almost non-existent.
- 2.) Trading has been concentrated in spreads of call options on the index contract not on the index contract itself.
- 3.) Trades in the spreads are infrequent; but, when they occur, they are of blocks of 100 or so contracts.
- 4.) Total open interest on all contracts is about 5000 concentrating mainly on the eastern contract option spreads in the so-called hurricane quarter, July through September.
- 5.) Due to the infrequent trading, it is likely that the contracts once initiated are usually held to maturity. Liquidity in the market is minimal.

The tendency to establish option spreads may have surprised the creators of the CBOT catastrophe market, but in retrospect the shift to call spreads is quite understandable. The entire primary excess market and reinsurance market is structured similarly. On either a per occurrence or on an aggregate basis, excess insurance or reinsurance is written with a retention and a limit sitting above a retention. A call spread is a proxy for an aggregate excess arrangement. If the expected value of aggregate EC type experience is .10, someone might be interested in protecting their experience by buying a cover of .10 over the .10 retention. To do so one buys the .10 call and sells or writes the .20 call to provide the protection. In commodity parlance this is buying the

call spread. The insurer or reinsurer does the opposite by writing the spread by selling or writing the .10 option and buying the .20. Notice the limit of cover is .10 and the net cost to the buyer may be .03. That's about a three to one rate on line in reinsurance parlance. If aggregate experience is less than .10, the writer of the spread earns fully .03 and the buyer losses .03. If aggregate experience is exactly .13, both parties are even. Beyond .13, the writer of the spread is in a losing position up to the limit of writing of .07, if aggregate losses exceed .20.

**Characteristics of the CBOT Catastrophe Futures Contracts And
Their Likely Failure**

The movement of CBOT activity to call option spreads is understandable, but the low trading level and low open interest remain to be explained. The following factors seem to contribute to the low volume and open interest in the CBOT Catastrophe futures market.

- 1.) Infrequent publication of data on underlying experience that ultimately determines settlement prices for the futures and associated call spreads.
- 2.) Poor correlation between catastrophe index experience with actual experience. In commodity parlance, basis risks continues through the end of the contract.

When looking at the number of bids and asks on call spreads, there is a dearth of both; and there is often a wide spread between the two. The ultimate result is an open interest of 5000 contracts. Given a typical spread limit of .10, each spread is providing a limit of cover of \$2,500. Therefore, the CBOT market is providing a total capacity of \$12,500,000 in coverage. By comparison, the total value of physical property in California is approximately \$2,000,000,000,000. Both the traditional market and the CBOT market don't come anywhere near to providing that capacity, although the traditional market is likely on line for between \$50,000,000,000 and \$250,000,000,000 on earthquake exposure. CBOT has added almost no capacity, and what it has added is mainly in the hurricane prone areas of the country.

Insurers looking to reinsure are the intended buyers of the call spreads. But insurers realize that the experience of the index likely will not correlate well with their own experience, if a

catastrophe occurs. A basic reason for buying insurance is "insurable interest". To the extent that there is low correlation or "basis risk" in commodity parlance, insurable interest is diminished and reduced demand for call spreads results.

Sellers, on the other hand, may not sufficiently understand the contracts; and they, along with the buyers, may question the validity of the index and possible manipulation of the contracts. Manipulation can be exasperated by infrequent estimates of what the index is worth. Companies participating in determining what the index is worth can deliberately underplay their experience when a catastrophe occurs with optimistic public pronouncements. The company can then buy call spreads cheaply; and, as settlement of the contracts approaches, the real extent of the losses are revealed in the determination of the index and option spreads. The company makes a windfall in the futures contract, bagging the writers of the contract. One should note that there is no evidence that such manipulation by a data providing carrier has taken place, but the market hasn't been large enough to even make a manipulative effort worth while. However, if the market were larger the temptation cannot be ignored.

Structural Changes In the Reinsurance That May Provide Chance Of Success

Generally, as mentioned earlier, there is a dearth of both buyers and sellers of these contracts relative to needed catastrophe capacity. High excess property brokers and underwriters have also stated that the rates on line for these contracts, when they are traded, appear to be high relative to what can be obtained in the traditional reinsurance market.

The fact that there are buyers at all implies that certain insureds can't get coverage in the traditional market, and they attempt to obtain some hedge through the catastrophe index contracts. No rational buyer would pay a higher rate on line for a contract that has a basis risk, when a traditional product has both no basis risk and a lower price!

An obvious question arises as far as potential writers of the call spreads. They can make a higher underwriting profit with these contracts than they can in the traditional market. Why don't the reinsurers offer their capacity and drive the price of the index contracts down to rates on line characteristic of the traditional market? Some might be concerned about manipulation. Also accounting treatment for such writing is as a call spread and not as premium. Maybe that is a concern. But most are just not familiar with commodity markets and are uncomfortable participating in the unknown. Some may even fear obsolescence, if the index contracts were a success.

Reinsurers could set up internal divisions to deal in these contracts. It is clear that their insureds are generally not interested in assuming basis risk. The reinsurer could price its insurance contracts measuring the degree of basis risk it would assume by reinsuring and ceding a portion of its exposure to index writers rather than price the entire exposure.

It could be argued that the degree of variability associated with an index is less than the variability associated with more specific exposure. Therefore, the level of profitability associated with the index and the associated expectations of the traders consequently could be lower than current level of profitability in the catastrophe market. A functioning index market could provide the insurance industry with cheap reinsurance although with basis risk. The total cost of insurance could be reduced in a system, where insurers price basis risk and simply add costs associated with underlying secular catastrophe risk charged by a liquid index market.

A liquid index mechanism can drive the costs of insurance down. There is a catch 22, however, which the CBOT currently faces. The index market must exceed a certain critical size so that liquidity is perceived by thousands of traders, and prices in the market must fall to a level lower than prices existing in the traditional market.

Conclusion

The catastrophe futures contracts currently traded on the CBOT are an attempt to provide liquidity to an insurance market that is inherently illiquid. Through anticipated increased liquidity, capacity would be added to the insurance market by tapping financial resources of non-insurers. However the high specificity of insurance risk, whether the risk be an individual risk or a book of business of a an insurer seeking reinsurance, currently makes the purchase of a CBOT spread unattractive. In addition, the validity of the index and the possibility of manipulation adds concerns to potential buyers and sellers.

The CBOT is shifting to a new set of data published by PCS. This move will increase the frequency of publication of data and reduce anxiety about potential manipulation. But the problem of insurable interest resulting from basis risk or poor correlation remains. Until the insurable interest issue is clearly confronted and resolved, CBOT contracts will add little to catastrophe capacity. The development of specialty divisions within reinsurers may be a glimmer of hope in getting the index market going as the index mechanism may drive down insurance prices.