

An analysis of single-stock futures trading in the U.S.

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Abstract

This paper presents an overview of how single stock futures (SSF) have developed since their introduction in the United States. We present a number of reasons why individual investor interest in SSF may not have reached its potential. Individual investors should note SSF volumes are very low and implied interest rates indicate that SSF settlement prices often have little relation to their respective underlying stock's closing prices. We present evidence of a number of non-dividend paying companies with underlying stock prices that closed above the settlement prices of their respective SSF, contradicting the carry arbitrage model. © 2005 Academy of Financial Services. All rights reserved.

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1. Introduction

The current financial landscapes in the United States and abroad have been changed by a number of recent innovations. One such innovation was the introduction of single stock futures (SSF) in the United States. SSF began trading in the United States on November 8, 2002. The Commodity Futures Modernization Act of 2000 repealed the so-called Shad-Johnson Accord and, after a 20-year ban, made it legal for individual investors to trade futures on single stocks and narrow-based indices (sector-based indices with three to nine stocks). Two principal regulatory bodies for stocks and futures, the Securities and Exchange Commission (SEC) and the Commodity Futures Trading Commission (CFTC), respectively, came to an agreement on how to jointly regulate these new securities.¹

At present, three exchanges have been granted contract market designation to trade SSF:

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Nasdaq Liffe Market (NQLX), OneChicago, and Island Futures Exchange. However, only two of these exchanges, NQLX and OneChicago, currently have SSF trading. The NQLX was formed as a partnership between the NASDAQ Stock Market and the London International Financial Futures and Options Exchange (LIFFE). In June 2003, NASDAQ sold its ownership in the joint venture entirely to Euronext.Liffe, a subsidiary of LIFFE. OneChicago is a joint venture between the Chicago Board Options Exchange (CBOE), the Chicago Mercantile Exchange (CME), and the Chicago Board of Trade (CBOT) and has been the most active exchange thus far. On the launch date, OneChicago listed 21 SSF, while NQLX listed 10 contracts on stocks of individual companies as well as four contracts on exchange traded funds (ETFs). Since the initial launch date, the number of contracts listed on these two exchanges has increased. On each exchange's Website, as of September 2004, OneChicago lists SSF on stocks of 115 different companies, one ETF contract, and 15 narrow-based indices; while NQLX lists 56 contracts on individual stocks and two contracts on ETFs. Both of these exchanges continue to launch additional SSF contracts and contracts on narrow-based indices and to refine their product offerings.

This paper reviews the progression of the SSF market since its launch through November 2003. We will present an examination of the successes, failures, and general development of SSF since their inception in the United States. In addition, the paper reviews the volume and the implied interest rates inherent in SSF prices and exposes many abnormalities in these measures that the individual investor should be aware of.

The individual investor should note that volume of SSF contracts on many days is quite low and may often be zero. In addition, the implied interest rates in many SSF closing prices are lower than theory would indicate, and the implied interest rates of many contracts are negative. The implications of these findings for the individual investor considering the use of SSF for hedging or speculating are that the lack of market activity may lead to poor order execution and fulfillment. Investors trading in these contracts will need to closely monitor the activity of the contracts that they wish to trade, compute the theoretical price of a SSF contract before entering a trade, and possibly place limit orders so that their order does not get filled at a price that is far from the theoretical value of the contract.

At the present time, using SSF as a hedging tool may be too expensive or impractical for many investors, especially those desiring to hedge a large position of stock (even as low as one million shares). Given the low volumes of many SSF contracts, an investor may not be able to trade a sufficient number of contracts at one time to fully hedge his or her stock position. This problem will be solved as volume increases and as more speculative investors look to SSF as an investment alternative. However, until volumes increase, investors desiring to hedge large stock positions must look elsewhere or be patient with the current market to fill their order flow.

There is currently no known literature that addresses the progress of SSF in the United States. [Dutt and Wein \(2003\)](#) examine the margin requirements on SSF imposed by the SEC and CFTC and propose a risk-based margin requirement rather than the current strategy-based requirement. Baptiste, Gao, Wang, and Yau (2001, unpublished manuscript) investigate stock futures trading in Hong Kong and find low trading volume on stock futures contracts. Dennis and Sim (1999) and Lee and Tong (1998) analyze individual share futures

in Australia; both find that the introduction of SSF does not dramatically change the volatility of the stocks underlying the share futures.

2. Development of the single stock futures market

The development of the SSF market to date has not been very impressive, as evidenced by the volume and open interest of SSF contracts, especially when compared to volume in the respective underlying stocks. There are a number of reasons why SSF may not be meeting prior expectations. One reason may be the relative newness of the market, which has prompted some confusion among brokers and individual investors. Salcedo (2003b) notes that “a major reason retail stock traders aren’t trading single stock futures is their unfamiliarity with the new products.” On November 4, 2002, before the November 8 launch date, *Barron’s* (Gibson, 2002) reported that many futures executives did not expect an “error-free liftoff,” and that there would be a learning curve for many investors trading in SSF. Sisk (2003) reports that many financial institutions have waited to see how SSF have advanced and whether it will be worthwhile to direct investors to this market.

Additionally, there still seems to be confusion among market professionals and individual investors alike on many of the tax laws and their implications regarding SSF trading (Single Stock Futures, 2002). The majority of this confusion is related to portfolios that contain the underlying stock of the SSF being traded (for instance, trading SSF of 3M Co. in a portfolio that has 3M stock in it). Some brokers are even registered and willing to trade SSF for their clients but do not know the tax ramifications of trading SSF in the context of their clients’ particular portfolios. Many brokers are also unsure of the conditions under which selling an SSF against a client’s cash stock position will be considered a constructive sell, requiring the client to pay capital gains tax as if he sold the cash stock.

Current IRS rules state that a “gain or loss from (an SSF) contract will generally be treated in a manner similar to a gain or loss from transactions in the underlying security.” These rules also state that “any capital gain or loss on a sale, exchange, or termination of a (SSF) contract to sell property will be considered short-term, regardless of the holding period” (IRS Publication 550, 2003). Common interpretation of this rule is that a long position held in a SSF contract for more than a year by an investor is taxed as a long-term capital gain, but a short position held for any length of time is taxed as a short-term capital gain (Simmons, 2002). However, other futures contracts, as well as dealers in SSF, are not taxed in this manner; they are taxed as 40% short-term capital gains and 60% long-term capital gains (IRC Section 1256, 2003; IRS Publication 550, 2003). The difference between the tax treatment of SSF and other futures contracts may cause many investors to delay or totally avoid investing in SSF until the tax laws are clearer to them.

An additional reason that SSF may be slow to attract investor interest is the regulatory structure of these contracts. The SEC and CFTC agreed to initial and maintenance margin levels equal to 20% of the market value of the contract. As argued in [Dutt and Wein \(2003\)](#), the current 20% strategy-based margin rates are too high for many of the SSF contracts. In addition, Partnoy (2002) notes that the current margin requirements may restrict liquidity and that the method for setting these requirements is flawed. Baptiste et al. (2001, unpublished manuscript) report initial margin requirements as of August 15, 2000 for SSF traded in Hong Kong of between 6.3 and 12.4% of contract value.²

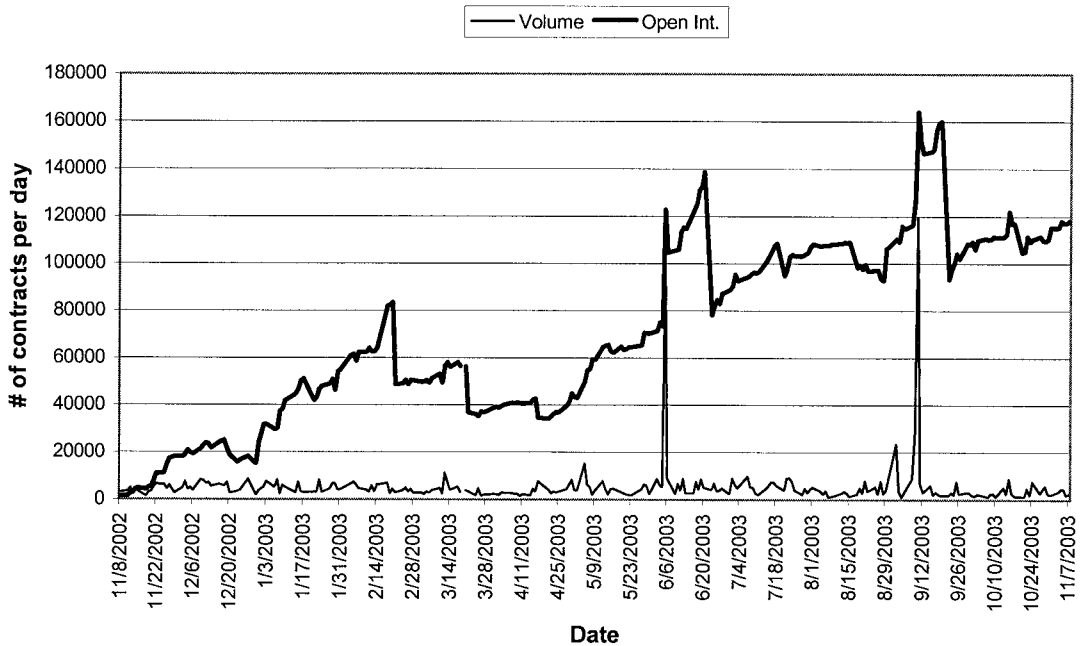


Fig. 1. Daily total volume and open interest (in number of contracts per day) on all SSF traded on OneChicago from its launch date to November 7, 2003.

Even with the apparent confusion and possible regulatory flaws, trading volume in SSF is increasing, and SSF exchanges continue to refine their product offerings. Since their launch, OneChicago has frequently reported record-setting daily volume and levels of open interest in its press releases. The total volume of all contracts on OneChicago has more than doubled since December 2002, the first full month of trading, to September 2003, and the exchange has added SSF on 94 additional companies over this period.

Fig. 1 shows total volume and open interest on all SSF traded on OneChicago from its launch date to November 7, 2003. Open interest has increased fairly steadily over this time, indicating growing investor interest. Total volume, however, has remained relatively low, with two large surges of 101,607, on June 5, 2003, and 119,675, on September 10, 2003. These large surges in volume were a result of investors' rollover into the next SSF contract.

Even with growing open interest, one might question whether there is adequate institutional and retail investor trading in the market. As noted in the following analysis of volume and implied interest rates, it seems that SSF still have a long way to go before reaching the potential that many foresaw at their launch. As Salcedo (2003a) put it, "many expected volumes for these unique instruments to skyrocket from day one"; this clearly has not happened.

3. Data and methodology

The data for this study consists of daily data from November 8, 2002, the first day of SSF trading in the United States, until November 7, 2003. SSF settlement price and volume data

were collected from Commodity Systems, Inc. (CSI) for OneChicago, the most active SSF exchange. Stock closing price and dividend data for the period, as well as other information on the underlying stocks, were collected from Yahoo! Finance. Daily one-month LIBOR data were collected from Bloomberg.

The paper first examines the general volume levels of the SSF on OneChicago. It presents how total volume has, in general, increased since the start of trading and examines total and average volume for a number of individual SSF. We also analyze days on which there was no volume in any of the SSF contracts of a company and compare the average daily volume in SSF contracts to the average daily volume in the underlying stock.

Our attention then turns to the interest rate implied in the settlement prices of SSF. The implied interest rate is obtained as a continuously compounded rate from the SSF settlement price and the closing price of the underlying stock. SSF and the underlying stocks both trade from 9:30 a.m. until 4:00 p.m. Eastern Time, so the settlement prices and closing prices are comparable. In addition, all SSF for a particular contract month mature on the same day, the third Friday of the contract month, and are physically settled with delivery of the underlying stock. After the implied interest rate is computed, it is compared to the continuously compounded one-month LIBOR rate for both non-dividend and dividend paying stocks.

Volume is examined primarily as the total volume on a particular day for all SSF contracts of a particular company. For analysis of volume and implied interest rates, SSF contracts are classified into nearby contracts. The nearby contract is defined as the nearest SSF contract month traded of a particular company. Since OneChicago trades two quarterly and two serial months, there is always a contract trading in the current month. One week before the expiration of the current month, the next contract month is rolled into and defined as the nearby contract because the volume of the current month declines during the week before expiration, and, hence, prices are more likely to be more representative of true implied interest rates in the next month's contract.

4. Analysis of volume

The total monthly volume of traded SSF contracts has increased since the November 2002 launch. The volume on OneChicago increased from 104,692 contracts in December 2002 to 234,576 in September 2003, but fell to 69,638 contracts in October 2003. The surge in volume from rollovers had a significant impact on the total September volume. Thus, overall volume in SSF has not been impressive and has not met the expectations that many in the industry expected before their launch. Since the launch of OneChicago, there has been no trading volume on nearby contracts 41% of the time and no trading volume on any contracts 39% of the time. That is, out of all nearby contract days examined (the number of nearby contracts times the number of trading days) 41% have had zero trading volume, and out of the total number of contracts available to be traded each day, only 61% had any volume at all. These statistics seem to show that either investors are not interested in SSF or the SSF market needs more time to develop.

Table 1 shows the total volume and average volume of all SSF contracts for each company, the average volume of the underlying stock, and days with zero volume for the

Table 1

Total volume, average volume of the SSF, average volume of the underlying stock, and days with zero volume of top-10 SSF contracts, by total volume

Stock	Total vol. of SSF (in # of shares)	Avg. daily vol. of SSF (in # of shares)	Avg. daily vol. (underlying)	Days with zero vol.
MSFT	13,066,900	52,478	54,361,672	8
AMGN	4,561,200	18,318	10,661,640	19
DELL	3,812,200	15,310	20,070,315	11
CSCO	3,482,400	13,986	60,722,104	28
EBAY	3,128,600	12,565	4,583,558	15
QCOM	3,048,500	12,243	12,983,704	7
YHOO	2,744,400	11,022	11,975,378	53
XLNX	2,586,200	10,386	9,388,307	38
MXIM	2,414,400	9,696	7,940,037	16
KLAC	2,313,500	9,291	11,012,944	24

Note: Each SSF contract represents 100 shares of the underlying stock. For comparison purposes, total volume and average daily volume levels of SSF are in number of shares. Total volume of SSF is the total volume of all contracts of the SSF for the respective company from November 8, 2002 until November 7, 2003. Average daily volume of SSF and average daily volume (underlying) is the average daily volume of all SSF contracts and underlying stock, respectively, for the period. Days with zero volume is the number of days, out of 249, when there was no volume in any SSF contract for the respective company.

top-10 SSF contracts, ranked by total SSF volume. Microsoft had the largest SSF total and average volume, with 130,669 and 524 contracts, respectively (100 shares per contract). Microsoft's total volume over the one-year period is equivalent to 13,066,900 shares, and compares with an average volume in the underlying stock of over 54 million shares per day. The average daily volume in Microsoft's SSF of 52,478 equivalent shares is dwarfed in comparison to the underlying stock's average daily volume. Qualcomm had the fewest days of zero SSF trading volume, with seven days. These seven days without trading should be noted, because the average daily volume of Qualcomm's underlying stock is almost 13 million shares.

The comparison of SSF volume with that of its underlying stock shows that many hedgers and even large speculators are not yet able to use SSF to meet their needs. Hedgers and large speculators cannot effectively trade in a market where the total yearly volume is so far below that of the average daily volume in the underlying security. Individual investors may want to consider trading SSF on a small scale initially, to help build up the volume. Once the SSF market has sufficient volume and liquidity, investors can then begin to place large hedging and speculative trades.

5. Analysis of implied interest rates

As described above, the continuously compounded implied interest rates of the nearby SSF contracts were computed for the period analyzed. There are many days when there is no volume on a particular SSF contract and the clearinghouse must determine a reasonable

settlement price. In the settlement procedures listed on their Website, OneChicago states that on days when there is enough trading such that there is a bid and offer at the close of trading in an SSF contract, the exchange determines the settlement price of that contract as the average of the bid/ask spread of the futures contract at the close of trading. On days when there is little trading activity or none at all, such that there is no bid or offer at the close of trading, the procedure is for the exchange to determine the day's settlement price by adjusting the average of the last bid and offer on the SSF, as reported to the exchange by an unnamed independent price reporting system. This adjustment is the difference between the price of the underlying stock at the time of the last quoted futures bid and ask and the price of the underlying stock at the close of regular trading hours for the day.

The implied interest rates computed from the SSF data have large variability over the time period examined. This is most likely a result of the thinly traded SSF market and the fact that trades cannot be matched on an intra-day basis. A trade in the SSF market may occur at one time in the day (if at all), while trades in the underlying stock are likely to occur continuously throughout the trading day. Thus, the settlement prices of SSF do not reflect very well the actual price movement in the underlying stock. The individual investor should take note of the fact that trading in many SSF contracts is somewhat thin, and that the quoted price may or may not reflect its true value at a given time.

These results imply that the individual investor may want to compute the theoretical price of a SSF contract before entering a trade. Because the underlying stock trades much more than the respective SSF throughout the day, the price quoted for an SSF contract may not be theoretically correct. Even though there is apparent mispricing in SSF, this does not give rise to any apparent speculative or arbitrage opportunities for investors, given that the majority of the mispricing is because of a lack of volume in many SSF contracts or to trades of SSF that do not coincide with trades in the underlying stock.

Out of the 86 total companies examined, there were 31 that did not pay dividends during the period. Nineteen of these 31 companies had an average nearby implied interest rate greater than the average LIBOR rate, indicating that the SSF settlement price was on average above its theoretical price under LIBOR. The remaining 12 companies had an average nearby implied rate less than LIBOR, indicating that the SSF settlement price, on average, was less than its theoretical price under LIBOR.

Table 2 presents the average nearby implied rate for a representative sample of fourteen companies with average nearby implied rates closest to LIBOR. The remaining seventeen companies had average nearby implied rates that were further above or further below the average LIBOR rate, indicating an even larger difference between the SSF settlement price and the theoretical settlement price under LIBOR. These average nearby implied rates range from 5.1412% for Krispy Kreme Doughnuts (KKD) to -0.0536% for Brocade Communications (BRCD). Table 2 also presents data on the minimum and maximum implied interest rates in addition to the standard deviation of these implied rates for the fourteen companies. These statistics show how volatile the implied interest rates were and the extent to which these rates varied over the period examined.

In the sample were 55 companies that paid a dividend during the period examined. In comparing the average implied interest rates of dividend and non-dividend paying compa-

Table 2
Nearby implied interest rate vs. LIBOR for non-dividend paying stocks

Stock	Average implied rate (in %)	Diff. in LIBOR & implied rate (in %)	Min/max (in %)	SD
LIBOR	0.806731			
MU	0.535197	-0.271534	-131.54/246.95	24.20
KLAC	0.595854	-0.210877	-77.38/15.30	6.29
IDPH	0.718904	-0.057699	-85.64/38.33	11.02
YHOO	0.749032	-0.044526	-11.28/25.37	3.83
SYMC	0.762205	-0.025549	-46.56/55.73	8.42
PSFT	0.781182	-0.014700	-43.97/20.04	6.30
AMGN	0.792031	-0.42476	-68.99/50.82	9.51
CSCO	0.879199	0.072468	-265.99/254.41	26.57
SEBL	0.910808	0.104078	-122.40/87.92	18.47
NXTL	1.038084	0.231353	-10.55/9.37	3.13
GENZ	1.155540	0.348809	-20.79/21.23	5.83
AMZN	1.158168	0.351437	-12.30/43.90	5.15
XLNX	1.235254	0.428523	-20.20/28.16	4.70
CEPH	1.278245	0.471514	-127.96/114.20	14.39

Note: Table 2 presents data from 14 companies that did not pay dividends during the period, with differences from LIBOR closest to zero. Average implied interest rate is the arithmetic average of the continuously compounded implied interest rate from the nearby SSF contract, expressed in percentage. Difference in LIBOR & imp. Rate is the difference in the arithmetic average of continuously compounded 1-month LIBOR and the average implied rate, in percentage. Min/max is the minimum and maximum values of the respective implied rates for each stock. SD is the standard deviation of the respective implied rates.

nies, we found little difference in the implied rates. The implied interest rates on the dividend-paying companies are also very volatile, with large end values.

6. Negative implied interest rates

There are 40 companies that during the period had negative average implied interest rates. These negative implied rates indicate that, on average, the settlement price of the nearby SSF contracts of these companies was lower than the underlying stock's closing price, contradicting the carry arbitrage model. There is no theoretical reason, however, for the SSF settlement price to be lower than the closing price of the underlying stock. The most likely reason for this to occur is that the volume in the SSF of these companies is so low that the trades in the SSF do not coincide with the closing price of the underlying stock.

Table 3 presents information on a representative sample of nearby contracts that over the period had the 10 largest and 10 smallest negative average implied interest rates. The average negative implied rate of all of these companies ranges from -0.0534, for Broadcom Corp. (BRCM), to -6.9043, for General Motors Corp. (GM). The number of days that the SSF settlement price was below the closing price of the respective underlying stock ranges from 21 days (8.43% of days), for Nextel Communications, Inc. (NXTL), to 137 days (55.02% of days), for Altria Group, Inc. (MO).

Table 3
Stocks with negative average implied rates

Stock	Average implied rate (in %)	Avg. daily vol. of SSF (in # of shares)	% days SSF below close
GM	-6.904298	1856	52.21%
MO	-6.813903	7894	55.02%
CVX	-5.590428	1684	48.19%
VZ	-4.246781	3399	46.18%
DD	-3.991168	2748	46.59%
HON	-3.842066	2742	53.01%
WFC	-3.823026	1745	18.47%
CAT	-3.746537	3476	47.39%
SBC	-3.104047	3422	49.80%
BA	-2.720262	1598	51.00%
DIS	-0.702718	4998	38.15%
HAL	-0.629040	8506	48.59%
MOT	-0.539588	637	42.97%
BRCD	-0.503622	3471	33.33%
C	-0.483121	7105	42.57%
DOW	-0.295617	3837	10.44%
MSFT	-0.079296	52478	33.33%
BBY	-0.076698	5356	40.56%
IBM	-0.062632	5538	39.36%
BRCM	-0.053446	6245	26.91%

Note: Table 3 presents data from the companies with the 10 largest and 10 smallest negative average implied interest rates. Average implied rate is the arithmetic average of the continuously compounded implied interest rate from the nearby SSF contract, in percentage. Avg. daily vol. of SSF is the average daily volume of the respective nearby SSF contract over the period, expressed in number of shares. % Days SSF below close is the number of days that the SSF settlement price was below the closing price of the underlying stock for the respective company divided by 249 days examined.

The average daily volume of the nearby contract is also included in Table 3. This volume number may be somewhat misleading. On most days when the SSF settled below the underlying stock's close, each company had zero or below average volume. The average daily volume number is slightly distorted by very large jumps in the volume of the nearby SSF on individual days, such as rollover days.

7. Conclusions

This paper presents an overview of how single stock futures have developed since their introduction in the United States. It presents a number of reasons why individual investor interest in SSF may have not reached the potential that many foresaw before their introduction, even though overall volume in the market has increased. The paper examines the general volume and implied interest rates of SSF. The individual investor should note that SSF volume is nowhere near that of their underlying stocks, and that implied interest rates indicate that SSF settlement prices often have little relation to their respective underlying stock's closing prices. In addition, the paper presents evidence of a number of companies

with underlying stock prices that closed above the settlement prices of their respective SSF. These findings imply that many hedging and even large speculative trades may be difficult to execute in the current SSF market. Investor interest must increase to provide sufficient volume for the market to efficiently support large trades and for SSF prices to reflect their true value at a given instance.

This analysis is a first step in examining the SSF market. This study shows that interest in SSF is growing, as evidenced by the growing open interest on OneChicago. However, volume has not been impressive, but many in the industry are still quite hopeful. Further research should be devoted to the specific uses of SSF and whether they may be used more for hedging or speculative purposes. Additional research should also be conducted on the numerous tax ramifications of investment strategies involving SSF and whether taxes play a large role in individual investor involvement with this market. Future research should also address what specific features of SSF attract or deter investors. SSF is a new market; investor involvement should increase in this market as both individual and institutional investors learn more about it and as the market develops. There are still many questions to be answered regarding SSF, and many more will emerge as this market matures.

Notes

1. For a brief history of regulatory debate between the SEC and CFTC, including information on the Shad-Johnson Accord, see Fischel (1986).
2. However, even if the margin requirements for SSF are theoretically higher than traditional risk-based margins (as noted by [Dutt and Wein, 2003](#)), SSF margins are still lower than the 50% Regulation-T margins required by the Federal Reserve for margin purchases of cash stock. This relatively lower margin requirement for SSF should actually lead more individual investors to invest in these contracts.

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