



**WILEY-
BLACKWELL**



How I Helped to Make Fischer Black Wealthier

Author(s): Jay R. Ritter

Reviewed work(s):

Source: *Financial Management*, Vol. 25, No. 4 (Winter, 1996), pp. 104-107

Published by: [Blackwell Publishing](#) on behalf of the [Financial Management Association International](#)

Stable URL: <http://www.jstor.org/stable/3665593>

Accessed: 15/01/2012 08:14

Your use of the JSTOR archive indicates your acceptance of the Terms & Conditions of Use, available at <http://www.jstor.org/page/info/about/policies/terms.jsp>

JSTOR is a not-for-profit service that helps scholars, researchers, and students discover, use, and build upon a wide range of content in a trusted digital archive. We use information technology and tools to increase productivity and facilitate new forms of scholarship. For more information about JSTOR, please contact support@jstor.org.



Blackwell Publishing and *Financial Management Association International* are collaborating with JSTOR to digitize, preserve and extend access to *Financial Management*.

<http://www.jstor.org>

Tribute to Fischer Black

How I Helped to Make Fischer Black Wealthier

Jay R. Ritter

Jay R. Ritter is Cordell Professor of Finance at the University of Florida.

■ Hillary Clinton wasn't the only person who made money speculating in the futures market during the late 1970s and early 1980s. A lot of finance professors did, including me. However, I used a different strategy than Hillary. Following the advent of stock index futures trading in 1982, many finance professors started playing the turn-of-the-year effect. The most popular approach was to buy the Value Line futures and short the S&P 500 futures. This is what I did. Of course, if there is easy money to be made, prices should adjust as the market learns, and a perpetual money machine will cease to exist. But I figured out a way to still make money.

Or so I thought. Unfortunately, there was an unexpected danger in my strategy. In 1986, Fischer Black of Goldman Sachs figured it out and took me to the cleaners.

But before explaining my rise and fall as a futures market speculator, a short digression on the pricing of stock index futures is required. For knowledge of the "cost of carry" model for the pricing of stock index futures was my downfall. A short history lesson about stock index futures is also necessary. A more extensive explanation of both the pricing and the rise and fall of the Value Line futures contract is contained in Thomas (1996).

I. The Pricing of Stock Index Futures Contracts

The no-arbitrage condition for pricing stock index futures takes into account the fact that the holder

Donald Keim, Jeremy Siegel, and Sam Thomas provided useful comments on an earlier draft.

doesn't have to put up the money that would be required if one was purchasing the stocks directly. Buying the futures, however, does not entitle the holder to receive dividends before the expiration date. Thus, the "cost of carry" model for pricing a stock index futures contract with maturity date T is

$$F_T = S_T(1 + r - \text{div})^{T-t}$$

where r is the risk-free rate of interest, div is the dividend yield on the index, and $T-t$ is the amount of time until maturity. For example, if the index is at 240, the interest rate is 7% per year, the dividend yield is 4%, and there are three months to maturity, the futures should be priced at

$$241.78 = 240(1 + 0.07 - 0.04)^{0.25}$$

The difference between the futures price and the index price is known as the basis. For the above example, the basis on this contract would be 1.78. Because of transaction costs and other factors, the basis on a futures contract can deviate from the theoretical value, exposing a speculator to "basis risk" as well as the risk associated with movements in the underlying indices.

II. History of Stock Index Futures and the Turn-of-the-Year Effect

In 1982, the Kansas City Board of Trade received regulatory approval to start trading the Value Line futures contract several months before the Chicago Mercantile Exchange received permission to start

trading the S&P 500 futures contract. Trading volume in both contracts grew rapidly.

In 1981, Rolf Banz published his article documenting the small firm effect, and shortly thereafter researchers led by Donald Keim (1983) documented that the small firm effect occurred entirely in January. The pattern, based upon research using AMEX and NYSE stocks, was dubbed the turn-of-the-year effect by Richard Roll (1983). In almost every year since 1926, small stocks had higher returns than large stocks during the month of January, with the pattern most pronounced during the first week of the year.¹

The Value Line index is a geometrically-averaged index of approximately 1,700 stocks covered by *Value Line*. It is an equally weighted index, and thus is relatively intensive in small stocks. The S&P 500 index, in contrast, is a value-weighted index. The equally weighted feature of the Value Line index made it an attractive vehicle for capitalizing on the turn-of-the-year effect. Both futures contracts had expiration dates every three months, in mid-March, June, September, and December. As there was no contract expiring in mid-to-late January, the March contract was the preferred contract to capitalize on the turn-of-the-year effect.

III. Early Successes

By December of 1983, Donald Keim, Jeremy Siegel, myself, and many other academics (and non-academics) took long positions in the March Value Line 1984 futures, with a short position in the March 1984 S&P 500 futures (to hedge against market movements) in order to capitalize on the turn-of-the-year effect. As usual, the Value Line index outperformed the S&P 500 in early January of 1984, and we made money.

Emboldened by the previous year's success, in December of 1984, I increased the size of my positions, and also organized a partnership for some friends and colleagues. We called it "The Ecstasy or Poverty Club." The first few weeks had their ups and downs. We received some margin calls. But in early January we made a lot of money. When we terminated the partnership in late January, however, an unexpected

problem arose. There was no bank account for The Ecstasy or Poverty Club, and a bank teller refused my attempt to deposit the check for over \$50,000 into my personal account. I was left in a quandary, until Jeremy Siegel gave me some advice: endorse it to yourself, and deposit it in an ATM.

The bank cashed it with no problem. I distributed the proceeds to the limited partners.

Unfortunately, the popularity of this turn-of-the-year strategy was having an effect on futures prices. Because so many people were taking long positions in the Value Line futures in December, the basis on the March Value Line futures was being forced up. As a result, the profitability of the Value Line-S&P 500 futures spread was being forced down.

In November of 1985, I formed a new partnership, "The Free Lunch Club," to play the turn-of-the-year again. This time, however, I had come up with a strategy to make money even if the market was going to incorporate the anticipated turn-of-the-year effect into futures prices before January rolled around. Anticipating that the basis on the March Value Line contract was going to be bid up in December, I decided to engage in a "calendar" spread. This spread involved going long the March 1986 Value Line futures and shorting the December 1985 Value Line futures. If the basis on the March contract widened relative to the basis on the December contract before the mid-December expiration date of the December contract, my partners and I would profit. When the December contract expired, the short position could be converted into a short position in the March S&P 500.

Everything worked exactly according to plan in December of 1985. My partners and I cleaned up. My futures markets profits for the year exceeded my assistant professor salary. My positions were big enough that the Commodity Futures Trading Commission classified me as a large trader, and started to monitor my positions on a daily basis. In early January 1986, the Value Line index rose relative to the S&P, and we continued to make money. The basis on the Value Line futures rose, too, making us even more.

IV. Bad Luck

Then, on the afternoon of January 8, 1986, I went off to the classroom to teach. After class, I returned to my office just as the futures markets closed. There was a message waiting for me. "Your futures broker called. URGENT." Some of The Free Lunch Club partners had left messages, too. I called the futures broker. The first thing he asked was, "Are you sitting down?"

While I was teaching, the Value Line index had dropped, and lots of futures market speculators had

¹Since 1983, the pattern has been much weaker, partially because the small-stock universe has been expanded to include NASDAQ-listed stocks, many of which are small glamour stocks. On the AMEX and NYSE, almost all small stocks are value stocks. In the academic literature, size is measured by market capitalization of equity, and value vs. glamour is based primarily upon book-to-market ratios of equity. Today, it is recognized that the turn-of-the-year effect is a seasonal return pattern in both size and book-to-market, with a strong interaction effect. (See Loughran, 1996.)

decided that it was time to take their profits and run. This selling pressure resulted in the basis on the March Value Line futures collapsing. We had lost all of our profits. My losses for the afternoon exceeded one-third of my annual salary.

In mid-January, I distributed the proceeds to the partners, after depositing a large check made out to The Free Lunch Club into an ATM. We had earned the risk-free rate of interest, but it was not a smooth ride.

I blamed the afternoon's losses on bad luck. The strategy was fundamentally sound. I was an informed trader, trading against uninformed traders. The calendar spread had worked beautifully.

V. A Little Knowledge Is a Dangerous Thing

In May, I received a phone call from my friend Jeremy Siegel at Wharton. He told me that someone was willing to offer a large position if we wanted to go long in the March 1987 Value Line futures and short the December 1986 contract. The spread being offered on this calendar spread was equal to the theoretical difference in the basis. Visions of large profits danced in my head. I would clean up when the spread widened as the basis on the March contract was bid up at the end of the year. Siegel was skeptical, for he wondered why an uninformed trader would be willing to offer such large positions. I called my futures broker, and bought several million dollars worth of the March contract at 243.80, while simultaneously selling several million dollars worth of the December contract at 242.00.² This gave a March-December calendar spread of 1.80. Siegel took a smaller position.

We checked the *Wall Street Journal* daily. The open interest in the March contract indicated that we held the entire long side of the March Value Line futures. Only in the autumn would it become more active.

But, in June of 1986, things started to go wrong. The basis on the March Value Line contract fell relative to its theoretical value, but the basis on the September and December contract did not. So the March-December calendar spread position lost money. On a Monday, the difference in the basis dropped by 0.20, and I lost \$5,000. On Tuesday, it dropped by 0.20, and I lost \$5,000. On Wednesday, it dropped by 0.20, and I lost \$5,000. I began to notice a pattern. Every morning, I would receive a margin call. I would go to the bank and pull out a credit card from my wallet. I would take a cash advance and wire the money to the futures broker. And the next morning I would receive another

margin call. Fortunately, almost every day I would receive a new credit card solicitation in the mail, telling me that I had been pre-approved for a new Gold MasterCard with a large credit limit. Isn't capitalism wonderful?

What was going on?

I talked with Jeremy Siegel. We reminded each other that the Value Line index was a geometric index. We remembered that the equation for the pricing of stock index futures contracts on a geometric index required an additional term to accommodate the peculiarities of the geometric computation. But what was this other term? We asked Krishna Ramaswamy of Wharton and Suresh Sundaresan of Columbia, both of whom had been partners in The Free Lunch Club. Sundaresan had coauthored an article on the pricing of stock index futures (Modest and Sundaresan, 1983). They pointed out that the appendix gave a formula for pricing a futures contract on a geometric index. We looked at the formula. The missing term was $\frac{1}{2}$ {average unique risk} of the stocks in the index. How much was this? A typical unique risk is about 10% per year. So one-half of this is 5% per year.

Holy Smoke!³ I had a multi-million dollar position in a futures contract that the market was pricing using the wrong formula, and now the market was moving towards pricing it using the correct formula that includes the extra term! Instead of $(1 + r - \text{div})$ being +3%, $(1 + r - \text{div} - \frac{1}{2}\{\text{average unique risk}\})$ is -2%. So instead of the theoretical basis being +1.78, it should be -1.21. By this time, five days had gone by, and I had already lost \$25,000. And the basis had moved only one-third of the way towards its new theoretical value, so I stood to lose another \$50,000 if I couldn't unwind my position.

There was only one problem with unwinding our position. The positions that Jeremy Siegel and I had were 100% of the long positions in the March contract. The only party on the other side had obviously figured out the correct formula, and this party wasn't about to let us out at the "market" price. We had discovered what an "illiquid" position meant.

There might be, however, a way to cut the losses. If we went long in the September 1986 contract, and shorted the December 1986 contract, as the relative basis changed, it would offset our losses on the March-December spread. So, instead of reducing my multi-million dollar position, I added another multi-million dollar position. In other words, I hedged my hedged position. I was short \$12 million of the December contract, and long \$6 million in each of the September and March contracts. A little wiggle in the term structure could wipe me out. Isn't leverage great?

²The Value Line and S&P 500 futures contracts multiply the index value by \$500, so a price of 242 involves \$121,000.

³I actually used a different expression.

VI. Denouement

The rest of the summer, I lost lots of money on the March-December spread as it fell from +1.80 to -1.60, but made up most of it on the September-December spread. In December, I made lots of money when the basis on the March contract was bid up by speculators anticipating the turn-of-the-year effect. But for the year as a whole, 1986 was a bad year. I lost more in the futures market than I made from my academic salary. And I decided that maybe I wasn't an informed trader after all, but instead was one of those traders who think that they are informed, when in reality they are providing the profits to the truly informed investors.

Years later, I found out who was on the other side of the trades in the summer of 1986. It was Goldman Sachs, with Fischer Black advising the traders, that took me to the cleaners as the market moved from one pricing regime to another.

In the first four years of the Value Line futures contract, the market priced the futures using the wrong formula.⁴ After the summer of 1986, the market priced the Value Line futures using the right formula. The September 1986 issue of the *Journal of Finance* published an article (Eytan and Harpaz, 1986) giving

the correct formula for the pricing of the Value Line futures. In the transition from one pricing regime to the other, I was nearly wiped out.

The calendar spread strategy might still work today, except for one problem. The problem is that in 1986 trading volume and open interest in the Value Line futures started to decline (Thomas, 1996). It has collapsed to less than 2% of the activity level of the mid-1980s. Partly, this death spiral occurred because as people began to understand that the Value Line index was a geometric index with strange properties, people didn't want to trade a contract that they didn't understand. In early 1988, the Kansas City Board of Trade switched to an arithmetic Value Line index, which doesn't underperform by $\frac{1}{2}\{\text{average unique risk}\}$, but by the time they did so, the death spiral had already occurred. In early 1988, the Value Line arithmetic and geometric indices had the same levels. At the end of 1996, the arithmetic index stood at 690, whereas the geometric index stood at 370 after almost nine years of underperformance by $\frac{1}{2}\{\text{average unique risk}\}$.

In the summer of 1986, I tried to warn the Kansas City Board of Trade about the problem with their contract, but they refused to pay my asking price for consulting services. That was a shame. I could have used the money to cover my margin calls. ■

References

- Banz, R., 1981, "The Relationship between Return and Market Value of Common Stocks," *Journal of Financial Economics* (March), 3-18.
- Eytan, T.H. and G. Harpaz, 1986, "The Pricing of Futures and Options Contracts on the Value Line Index," *Journal of Finance* (September), 843-855.
- Keim, D.B., 1983, "Size-Related Anomalies and Stock Return Seasonality: Further Empirical Evidence," *Journal of Financial Economics* (June), 13-32.
- Loughran, T., 1996, "Book-to-Market Across Firm Size, Exchange, and Seasonality: Is There an Effect?" University of Iowa Working Paper.
- Modest, D.M. and M. Sundaresan, 1983, "The Relationship between Spot and Futures Prices in Stock Index Futures Markets: Some Preliminary Evidence," *Journal of Futures Markets* (Fall), 15-41.
- Roll, R., 1983, "Vas Ist Das? The Turn-of-the-Year Effect and the Return Premia of Small Firms," *Journal of Portfolio Management* (Winter), 18-28.
- Thomas, S., 1996, "The Saga of the First Stock Index Futures Contract: Was It a Case of the Market Using the Wrong Model and Not Learning?" Weatherhead School of Management, Case Western Reserve University Working Paper.

⁴See Thomas (1996) for evidence on this.