

UNIVERSITY OF ROCHESTER

William E. Simon Graduate School of Business Administration

Finance 411
Investments

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TRADING CASE ST1: May 5, 1997

Part of your grade for this course will depend on trading sessions using the Financial Trading System (FTS). For the purpose of these trading sessions, you should divide your study group into two separate subgroups - append an A or B to your group name for this purpose (e.g., "WildcatA" or "WildcatB"). Each subgroup will be considered a single "trader." Maintain the same subgroups throughout the course. The system will assign each trader a certain amount of "grade cash" based on their trading performance, but the amount assigned is never less than zero. At the end of the course, the grade cash for the two subgroups will be averaged to determine the grade for the study group. This provides diversification (risk reduction) in case one trader makes a big mistake in one of the cases.

The trading session for this case will be conducted after class on Monday May 5 from 4-5 PM.

FTS has an online help feature you may want to look at (it's not essential). You get to it by going through the sequence: SIMON_STUDENT, SYS, PUBLIC, . . ., FTS. Once you're in the FTS folder, click on the file FTS with the book icon. Similarly, clicking on Fast! gives a description of all the available trading cases.

Note: don't assume information for trading sessions will be the same as that given in the case descriptions. The information (interest rates, etc.) will be displayed by the system at the beginning of the session.

OVERVIEW

In this case, you will be trading for a firm that makes money from writing options for clients at a "premium" above its estimated competitive market price. Your trading problem is to hedge this source of profit from option writing activities.

In the FTS markets, stock prices will evolve in continuous time, but you can trade only at discrete points in time. Your trading performance is evaluated by the amount of money you make as well as ensuring that the market value of your position does not fall below a pre-specified floor. This guarantees that the profits from option writing activities do not fall below target levels.

In the FTS markets you will have access to a set of real-time analytical support tools that enable you to monitor the delta and gamma of your position at each point in time.

FTS TRADER SUPPORT WINDOWS

Your standard trading support windows allow you to monitor the history of prices in each market: IMB stock prices, the Treasury strip market (i.e., a zero-coupon bond with no default risk) with six months to maturity, two European call options on IMB and two European put options on IMB.

In ST1, you can access additional support windows by first clicking on the menu item Support in your Trading Screen. Once you have initialized this support system you will automatically see the market value, delta and gamma of your position in real time. By clicking on any Option label in this Option Support Window will popup and update an option calculator support window.

Each time you want to update the calculator be sure to click on the option label in the Option Support window first.

FTS markets are open for approximately six trading months, but time is condensed so that one week is equal to 15 seconds. Prices adjust every week and your position is marked to the realized market prices at the end of six months.

MARKET ENVIRONMENT

THE STOCK MARKET

The stock market trades the stock of IMB, a large computer manufacturer. Although this stock has suffered from major price corrections over its recent history, analysts expect that these corrections are finished. The following statistical process describes how prices are expected to evolve over the next six months:

Volatility of return (σ):	30% per annum
Spot Price:	347
Drift (μ):	5% per annum
Unit of Time:	1 week (15 seconds FTS time)

In addition, due to the recent weakness in the IMB stock, analysts forecast no dividend payments over the next six months.

Trading in this stock is permitted at the displayed bid/ask prices that are updated weekly. At the end of six months each share you own is marked to the realized market price.

THE TREASURY STRIP MARKET

The second security market trades a zero-coupon bond with zero default risk. This is known as a Treasury strip. This strip security pays \$900 at the close of the market regardless of which path the stock market takes.

THE EUROPEAN OPTIONS MARKETS

The third to sixth securities are European options (call/put/call/put for securities 3, 4, 5 and 6 respectively) defined on one IMB share. The strike or exercise price for these options are 320, 320, 360, 360 respectively. That is there is a put and call option for each strike price. Security 4, for example, is the put with a strike price equal to 320.

The time to maturity for each option is approximately six months and the terminal payoff for each option depends upon the realized value for IMB after the FTS markets are closed.

For example, options with a strike price equal to 320, have the following terminal values:

TERMINAL VALUE:

Call Option = Max[Marked value - \$320, 0]

Put Option = Max [\$320 - Marked value, 0]

At the end of their life, options are automatically exercised if they are "in the money."

TRADER ENDOWMENTS

As traders your task is to manage the exposure of your position to price risk. There are two types of initial trading endowments that you may start with. These are referred to as type A and type B. Each position type reflects the different option writing activities of a firm.

If you are type A then you have an initial non-tradable position in call options. If you are type B this non-tradable position is in put options.

<u>Type A</u>	<u>Endowments</u>
Treasury Strips	113 units
Call 320	-1,000 shares
Put 320	0
Call 360	0
Put 360	0

<u>Type B</u>	<u>Endowments</u>
Treasury Strips	45 units
Call 320	0
Put 320	+1,000
Call 360	0
Put 360	0

Implicit in each initial position is a "profit" from writing call options (put options) to clients at prices slightly higher than theoretical prices.

In both cases, this profit is approximately \$53,500 market cash, and your trading objective is to lock into a floor to this profit for the firm.

TRADING RESTRICTIONS

You can trade in the stock and the treasury strip markets. Up to 99 shares can be purchased or sold in these markets in any one transaction (i.e., one click of the mouse). You can trade a large number by repeating a transaction many times.

Option trading is not permitted. Therefore, you must manage your position's exposure to price risk by only trading in the stock and treasury markets.

Shortselling in the stock and treasury markets is permitted. This allows you to borrow (lend) at the risk-free rate by shortselling (buying) treasury strips.

Holding market cash pays zero interest and borrowing is not permitted in the cash market. If you want to buy securities but have insufficient cash you must first shortsell the required amount of treasury strips and then purchase the desired amount of stock.

The spot risk-free rate of interest for a Treasury strip is currently 3.25% per annum. This rate is not expected to change over the next 6 months.

TRADING OBJECTIVE

Your trading objective is to earn as much grade cash as possible.

EARNING GRADE CASH

You can make money by buying and selling securities for market cash over approximately six months of calendar time. This period is referred to as one trading trial.

At the start of a trial, your initial endowment is either type A or type B, and an independent path for the stock prices is generated (starting from the spot price of 347).

If at the end of any trial you have a closing balance of \$45,000 market cash then you will earn \$6 of grade cash. If you have a closing balance of market cash that is lower than \$45,000 then you will earn \$0 of grade cash. Any amount of market cash that is greater than \$45,000 and less than or equal to \$200,000 earns grade cash as follows:

$$\text{Grade Cash} = \$6 + [(\text{Ending Balance of market cash} - \$45,000) / 155,000] \times \$4$$

Above \$200,000, market cash earns the maximum grade cash for one trial, which is \$10.

Trading is conducted over a number of independent trials and a record of your cumulative grade cash is maintained.