Single Stock Futures: An Alternative to Securities Lending

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Introduction

Securities Lending is primarily a back-office function that effectively is an over-the-counter derivative transaction. Mutual funds and Pension plans (Funds) lend (actually sell) assets today with an agreement that they will get the asset back at some point in the future. During the interim they will not lose economic exposure to the position and will receive additional compensation for participation. This transaction is substantially similar to an EFP (Exchange Future for Physical) transaction using Single Stock Futures (SSF) but with some very important differences:

- The SSF EFP is a trade on a regulated exchange.
- SSF trade in a competitive environment where multiple market participants establish finance rates.
- Transparency in pricing.
- No counterparty risk as all trades are cleared through the AAA rated Options Clearing Corporation (OCC).

Securities lending is currently an operations function. However it should be viewed as a trading strategy and therefore be included in the investment manager's responsibility. There are substantial profits being ceded to intermediaries that could accrue to the funds and their clients instead.

Securities Lending Overview

Securities lending markets has two sides. First is cash driven whereby institutions finance their operations by borrowing cash in return for collateral. The second part is the securities driven whereby hedge funds firms employing short delta strategies such as the 130/30 are required to borrow securities prior to shorting. This activity is increasing the demand for the available supply of stock to borrow. The hedge funds look to the brokerage firm to service the request. The brokerages can meet some of the demand from their own inventory but must look to the beneficial owners (the pension and mutual funds) to satisfy the total demand.

The beneficial owners make their supply of securities available by contracting with either a custodian or the brokerage firms for the wholesale distribution of all or a portion of their portfolio. For this they receive a guaranteed fee and/or a split of the reinvestment of the cash collateral the contracted party receives.

The disadvantages to this arrangement are the concentration of credit risk with a sole counterparty and the ceding of potential profits to these agents. The funds can achieve the same end of providing the market with the assets they need but not have to split the profits with a third party.

Funds will argue that the securities lending involves a variety of complex administrative, operational and accounting activities including credit evaluation and cash management which may be better handled by specialists in that field. Fair enough. However with SSFs they can participate in this process and earn higher returns on the assets under their management.
There are financial products that have the same economic effect, as securities lending that do not involve any securities being exchanged. These are off-balance sheet transactions such as equity swaps, total return swaps and Contracts for Difference. However, unlike SSF these products still entail some counterparty risk.

SSF Pricing

While SSF are a derivative product, they are the simplest derivative of them all. The value can be derived by using grade school mathematics. An SSFs price is the forward value of today's stock price which is derived by multiplying today's price by the risk free rate of interest out till expiration of the future and subtracting any dividend that is paid (if any) during that time period. The formulae are as follows:

For stocks that do not pay a dividend:

Equation 1. $SSF = Stock * e^{r*((t_x - t_0)/360)}$, where r is the effective federal funds rate, t_x is the expiration date of the future and t_0 is the date of evaluation.

For stocks that do pay a dividend:

Equation 2. $SSF = Stock * e^{r*((t_x - t_0)/360)} - Div * e^{r*((t_x - t_d)/360)}$, where r is the interest rate prevailing starting at the ex-dividend date, t_x is the futures expiration date and t_d is the ex-dividend date.

So for a $100 stock that pays no dividend in a 2% interest rate environment the six-month SSF will have a fair value of $101. If the stock paid a 20-cent dividend then the six-month future would have a fair value of approximately $100.80. (Approximate only because a higher resolution fair value could be obtained by taking the present value of the future dividend stream into consideration but for simplicity deducting the full value works.)

Now a trader should be ambivalent about buying the stock at $100 today or receiving the same stock at $101 (in the no dividend example) in six months in a 2% rate environment. The physical settlement of the SSF means that upon expiration the fund holding the long SSF will receive the CUSIP as the future expires and the party holding the short SSF will

be required to deliver. One of the most fascinating aspects of the SSF is that unlike all other futures products where the positions are offset prior to expiration more than 95% of the SSF positions traded on OneChicago actually make or take delivery upon expiration. So for funds who invest by buying and holding there is no difference in the two transactions of either buying today at one price or buying a SSF for delivery of the underlying at expiration except for the fact that they may be able to purchase the SSF at a lower net cost and therefore reduce the price they actually pay for the resulting position.

Pricing of the EFP

An Exchange Futures for Physical (EFP) trade allows for the substitution of a long or short stock position for a long or short SSF position. EFP's allow one to decrease finance charges for long stock positions or increase the interest received on short stock positions. That is because the interest rate built into the price of an SSF and hence its EFP is competitively determined by numerous market participants rather than by a single broker who can set less advantageous margin loan and stock borrow rates. Accordingly EFP's can be used as a synthetic stock loan transaction as funds can offer their long stock out in return for a SSF that will expire back into long stock at expiration but with returns that are greater than those currently being received for lending the stock to an intermediary.

An EFP is a combination order to sell (buy) an amount of stock and simultaneously buy (sell) a proportionate number of SSFs. Taking a long position in the EFP involves buying the SSF and selling the underlying stock. The stock position becomes flat due to the sale of the existing long stock position and the position now holds a SSF with the same economic exposure. The EFP is priced in interest rates as there is no underlying price risk since the stock and the SSF are equivalents but does involve interest rate risks as the two parties are simply engaging in a loan as they switch positions. Selling the EFP has the opposite positioning as the SSF is sold and the underlying is purchased. Hedge funds and other short sellers who are currently short and paying for the privilege would be able to lower their costs of financing this position by executing an EFP at a much more favorable rate without changing their economic position vis-à-vis the stock moves. Both parties will have the added benefit of removing their current positions from their balance sheets without changing their market position, as SSF are off-balance sheet items.

Cost of buying an EFP

The cost of buying an EFP in basis points is determined by solving the following equation for the interest rate (r) that reproduces the EFP ask price from the stock trade price given certain dates and dividend amounts.

$$F = S \exp\left\{\frac{r\, N_{exp}}{360}\right\} - \sum_{i=1}^{N_{div}} D_i \exp\left\{\frac{r\,(N_{exp} - N_i)}{360}\right\}$$

F	Price at which the SSF is bought. This price is determined by the price at which the stock is sold plus the EFP Ask Price.
S	Price at which the stock is sold.
r	The average bank year, exponential interest rate that reconstructs the EFP and stock trade prices.
N_{exp}	Number of calendar days to expiration of the SSF.
D_i	The i^{th} stock dividend payment that goes ex-dividend between now and the expiration of the SSF.
N_i	Number of calendar days to the ex-dividend date for the i^{th} stock dividend payment

and $\exp\{x\} = e^x$.

Note that F = S + EFP Ask Price.

Once the Interest Rate is know the Basis points Paid is calculated as follows-

$$\text{Basis Points Paid} = r \times 10{,}000$$

An approximation formula for Basis Points Paid is as follows.

$$\text{Basis Points Paid} = \left(\frac{\text{EFP Ask Price + Est. Dividends}}{\text{Stock Trade Price}} \right) \times \frac{360}{\text{Days to expiry}} \times 10{,}000$$

This formula is valid when ($r\ N_{exp}$) is small compared to 360.

Amount Received Selling an EFP

The amount received on selling an EFP also takes into account the estimated dividends in the period and is shown on an annualized basis. The cost of selling an EFP in basis points is calculated by solving the equation below for the Interest Rate that gives us the implied SSF Bid price from a known stock ask price and estimated dividends in the period.

$$\text{SSFiBid} = \text{StockAsk} \times \text{Exp}\left\{ \frac{r \times N_{\text{exp}}}{360} \right\} - \sum_{i=1}^{N_{\text{div}}} D_i \times \text{Exp}\left\{ \frac{r \times (N_{\text{exp}} - N_i)}{360} \right\}$$

Where,
SSFiBid = Implied SSF Bid Price, which is the sum of the EFP Bid Price and Stock Ask Price
Stock Ask = Stock Ask Price
r = Interest Rate
N_{exp} = Number of days from the day of trade to the expiry of the futures contract
N_{div} = Estimated number of Dividends from the time an EFP is entered into till expiry
D_i = Estimated Dividend in the current period

N_i = Number of days from the day on which the dividend is received till expiry

Once the Interest Rate is know the Basis points Received is calculated as follows:

$$\text{Basis Points Received} = r \times 10{,}000$$

An approximate calculation for Basis Points Received can be obtained by using the formula:

$$\text{Basis Points Received} = \left(\frac{\text{EFP Bid Price} + \text{Estimated Dividends}}{\text{Stock Ask Price}} \right) \times \frac{360}{\text{Days to expiry}} \times 10{,}000$$

Summary

Securities Lending is where buyers and sellers meet to exchange an asset for a short term in return for basis points of compensation. Lenders can deliver the asset to the borrowers through an SSF transaction by either purchasing outrights for future delivery or pricing the EFPs in such a way to increase the basis points received for the 'loan'. Funds have a fiduciary responsibility to their participants to maximize the returns without exposing the assets to unnecessary risk. SSFs competitive trading in a transparent process without counterparty risk exposure is a viable alternative.