FTS Real Time System Project: Using Stock Index Futures to Manage Market Wide Risk

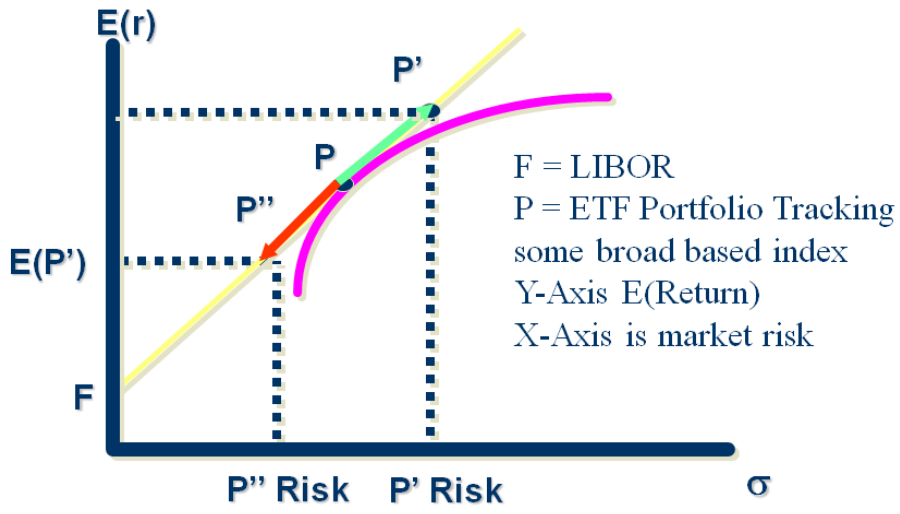
Question: How can you manage general market risk using stock index futures when guided by the insights obtained from the Capital Asset Pricing Model theory?

Remark: This assignment assumes that you have already completed the first futures assignment that covers how futures are traded using the RTFTS client.

Introduction

A classic figure in virtually all finance texts is some variation of the CAPM's Capital Market Line and it's implication for index fund investing.

If we recast this figure into an analogous real world counterpart it may look as follows:



The "risk free rate" for borrowing and lending in practice is usually taken to be LIBOR (London Interbank Offered Rate), the market index is some tradable broad based Exchange Traded Fund such as the SPY. A major prediction from the Capital Asset Pricing Model theory, sometimes referred to as the "two fund theorem" is that all risk averse investors will hold some combination of the approximately riskless security and the broad based ETF.

Now suppose an investor wants double the return from the SPY they could buy some risky stock. However, if they were applying CAPM theory they would instead leverage themselves up the capital market line from P to some position P'.

Similarly, suppose they want to carry less risk than what they are exposed to with the SPY?

Again CAPM predicts they are better off moving down the capital market line to say some position P''.

The question you are addressing in this exercise is how to implement the strategies suggested by CAPM?

Stock index futures allow you to implement these trades suggested by CAPM and the major objective of this assignment is to learn how.

Required questions:

First, form a view of the market over the next week or two and invest $800,000 equally in the two ETF's, SPY and QQQQ consistent with your view (i.e., approximately $400,000 in each ETF). Once you take this position you are no longer permitted to trade it.

A. Second, for time period 1 (e.g., 1 week) your task is to double the return from each position. That is, you should take a position in the futures markets for each ETF that is predicted to double the realized return from your position in the ETF. That is, you want to move up the CML. In practice this implies that if the market moves up you earn double the return. But if the market moves down then you are predicted to lose double the decline!
B. Third, at the end of the first time period now assume your task is to halve the expected return from your ETF position. Again you should construct a futures position that is designed to do this.

(1) Describe precisely the position you constructed to achieve A. What was the realized return and did this attain your trading objective? (Support your answer with why or why not).

(2) Describe precisely the position you constructed to achieve B. What was the realized return and did this attain your trading objective? (Support your answer with why or why not).

(3) What is your implied borrowing or lending rate in A. and B. above?

(4) Discuss the strengths and weaknesses of the trading strategies you have applied and discussed in 1-3 above.