USING FUTURES AND OPTIONS IN EQUITY PORTFOLIO MANAGEMENT

VESNA BOGOJEVIC ARSIC

Faculty of organizational sciences, University of Belgrade

Abstract
Equity portfolio return profiles can be modified by use of futures and options. It is possible to trade futures contracts on major indexes, as well as acquire options on stock market indexes, on selected industry groups, and on individual stocks. These derivative securities can assist portfolio manager in shifting a portfolio's exposure to systematic and unsystematic risk.

Keywords*: futures, options, portfolio, management*

1. GENERAL ASPECTS OF FUTURES AND OPTIONS

Futures and options can affect the risk and return distribution for a portfolio. Generally, between the changes in the price of the underlying security and the price of the corresponding futures contracts exist proportional relationship. In effect, being long (short) in futures is identical to substracting (adding) cash from (to) the portfolio. Long futures positions have the effect of increasing the exposure of the portfolio to the asset, while shorting futures decreases the portfolio's exposure. Figure 1 represents a portfolio's probability distribution of returns in case in which there are no futures (panel A), as well as in cases in which exists long (short) futures (panel B and panel C) [1].

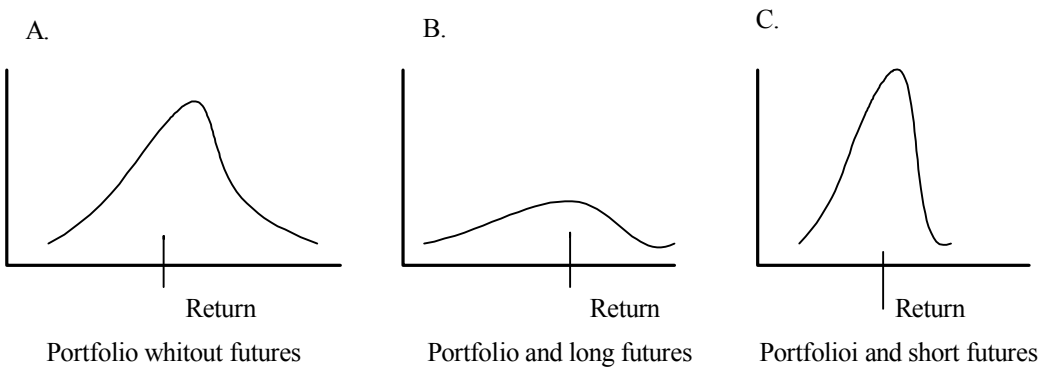

Figure 1.1. Return distributions and use of futures

Figure 1.1 illustrates that futures have a symmetrical impact on portfolio returns, since their impact on the portfolio's upside and downside return potential is the same. This is because of the close relationship between changes in the price of the futures contract and changes in the price of underlying.

In contrast, options give their owner the right (but not the obligation) to buy or sell the underlying asset, because the options do not have a symmetrical impact on returns. In other words, buying a call option limits losses, while buying a put option when the investor owns the underlying security has the effect of controlling downside risk. On the other hand, writing a covered call, limits upside returns while not appreciably affecting loss potential. Figure 2 illustrates the return distributions when options are used to modify portfolio risk [1].

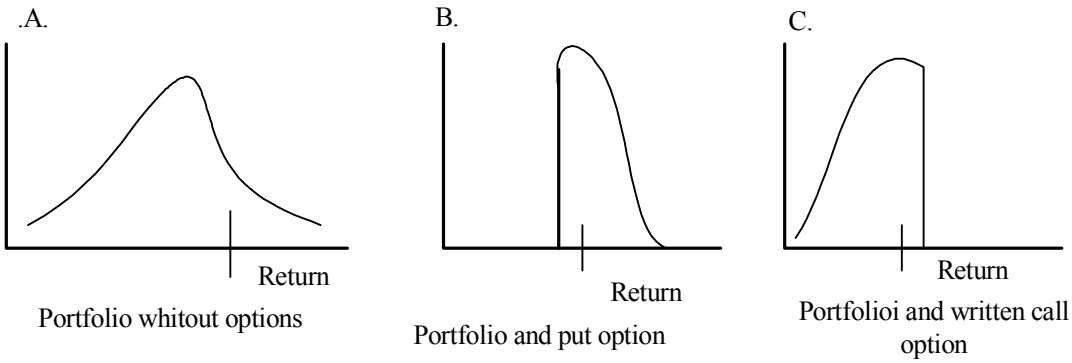

Figure 1.2. Return distributions and use of options

2. THE USE OF FUTURES IN ASSET ALLOCATION

In times of changing market conditions, shifting a portfolio's asset allocation must be done quickly to take advantage of the manager's forecast. Such changes are costly since securities must be identified and then sold and bought to facilitate the reallocation. Commissions and the market impact of large trades can harm the portfolio's return potential.

Rather than identifying specific securities for sale and purchase, and then issuing large buy-and-sell orders, the portfolio manager can use futures to accomplish the change in asset allocation. Long and short positions in the appropriate futures contracts can quickly and easily change the portfolio's asset mix at lower transaction costs than trading large quantities of securities. Experience of countries in which are stock index futures are used because of rebalancing the portfolio, shows that trading costs are lower for about seven times than the trading cost of equity trading.[2].

Futures also can be used to achieve a proper stock/bond mix in a multiple-manager environment. Many medium and large pension funds divide the portfolio among different individual managers to exploit their specialized expertise in managing different asset classes (e.g. small-cap growth, emerging stock market, high-yield debt). In such an environment, the overall pension fund manager can use futures to maintain the desired asset allocation; otherwise the manager would have to disrupt the specialized managers by adding or removing funds to or from them because of reallocation.

3. THE USE OF FUTURES AND OPTIONS IN HEDGING PORTFOLIO INFLOWS AND OUTFLOWS

Regardless of whether the equity portfolio is passively or actively managed, futures and options can be used to help control cash inflows and outflows from the portfolio. In reality, most options used to modify portfolio risk rate are options whose underlying security is another derivative security. These options are called futures options or options on futures.

When a large sum of money is deposited with a manager, the fund's asset composition changes. That means that a lump-sum cash inflow has the effect of reducing the portfolio's exposure to equities since a larger proportion of the portfolio's assets are currently in cash. A potential problem is that, if the portfolio manager wants to quickly invest the funds in the market, he or she may purchase inappropriate securities. Also, large purchases can lead to sizable commissions and a price-pressure impact on the stocks purchased.

A better strategy would be to use long positions in stock index futures contracts so the total contract value approximates the size of the inflow. Alternatively, portfolio manager could purchase index call options. As a result, the money is immediately invested in stocks with lower

commissions and a smaller price impact than if the stocks had been purchased outright. Once the futures positions are acquired, the manager has time to decide what assets to buy, and the specific stocks can be acquired in an orderly manner. The smaller purchases over time will reduce the price pressure. As these purchases are made, the futures contracts can be liquidated.

Similarly, a large planned withdrawal from a portfolio usually is done by selling securities over time so that when the withdrawal date occurs, the needed funds are available for transfer. The sale of securities causes an increase in cash holdings, which reduces the portfolio's equity exposure. A possible strategy to counterbalance of effect of a larger cash position is to take long positions in futures contracts as securities are sold. The net effect is to maintain the portfolio's overall exposure to stocks while accumulating cash. When the cash is withdrawn, the futures contracts can be unwound such that the portfolio's operations have not been disrupted.

4. THE USE OF FUTURES AND OPTIONS IN PASSIVE EQUITY PORTFOLIO MANAGEMENT

A passive investment strategy generally seeks to buy and hold a portfolio of equity securities. With a passive investment strategy, the manager is expected to manage cash inflows and outflows without harming the ability of the portfolio to track its target index. Instead of investing all cash inflows in the index or a subsample of the index, the manager can purchase an appropriate number of futures contracts to maintain the portfolio's structure and reduce the portfolio's tracking error relative to the index during the time period when the manager invests the funds in the index stocks. Similarly, anticipated cash outflows can be hedged when the portfolio manager is liquidating part of the portfolio over time. The hedge maintains the portfolio's exposure to the market through the use of futures contracts.

Options can be used to a limited extent in passive management. When cash rebalancing is imperfect and an index fund becomes overweighed in a sector or in individual stocks relative to its index, it is possible to sell call options on the individual stocks or on industry groups to correct the portfolio’s weights.

5. THE USE OF FUTURES AND OPTIONS IN ACTIVE EQUITY PORTFOLIO MANAGEMENT

Active management often attempts to adjust the portfolio’s systematic risk, unsystematic risk, or both [3].

Systematic risk is a portfolio's exposure to price fluctuations caused by changes in the overall stock market. In other words, an equity portfolio's systematic risk it the sensitivity of the portfolio's value to changes in the benchmark index measured by the portfolio's beta.

Having this in mind, if a rising market is expected, active portfolio managers will want to increase their portfolio's beta while expectations of a falling market will invite managers to reduce their portfolio's betas. Traditionally, when the market was expected to rise, active manager would sell stocks with low betas and buy stocks with high betas to raise the portfolio's weighted average beta. Alternatively, the use of futures provides quicker and cheaper way to change the portfolio's beta with less disruption to the traits of the portfolio. The long or short positions in futures allow the manager to increase or decrease a portfolio's beta.

Unsystematic risk includes the portfolio's exposure to industries, sectors, or firms that is different from the benchmark. The use of futures and options enables control of this risk. Futures and options on futures exist for a limited number of sectors, while there are options for numerous components of the equity market. There are option contracts on market indexes (such as S&P 100 and S&P 500), for stock groups (such as consumer goods and cyclicals) and for selected industries (such as banks, utilities, pharmaceuticals, and mining). Thus, even when industry options don’t exist, portfolio manager can buy or sell individual stock options for the industry to modify their exposure.

Options trading can be used to take advantage of the portfolio manager's forecasts for certain sectors and industries, by trading either sector options or options of firms in the industry.

Options on index futures also can be used to exploit anticipated market changes. Because of their truncation effect on return distributions, options on index futures can affect both a portfolio's systematic and unsystematic risk. For example, a manager can buy call options when anticipating a rise in the market, in a sector or industry, or in a group of individual stocks. The lower call premiums can provide more leverage than using futures, and options can allow greater precision in targeting sectors of the market rather than an entire index. The maximum loss for such strategies is limited to the call premium. On the other hand, investors can buy put options on an index future, a sector, or group of stocks in anticipation of a decline in value. Calls can be written on the market and subsets of the market when declining or stable values are forecast. Writing put options on the market and its subsectors can generate income when the portfolio managers expect the value of the market or subsectors to be stable or to rise.

6. THE USE OF FUTURES AND OPTIONS IN INTERNATIONAL EQUITY PORTFOLIO MANAGEMENT

Futures and options can be used to modify or hedge positions in international equity portfolios. International portfolios represent positions in both the securities and the currencies of the countries involved. Futures and options on major currencies allow the portfolio manager to manage the risks of each of these components separately. Currency futures and options on currency futures can be used to modify the currency exposure of an international stock portfolio without affecting the actual holdings of the portfolios. For example, a portfolio manager may be bullish on German stocks but also may believe that the euro is currently overvalued relative to the U.S. dollar. Manager can purchase the German securities and then adjust the overall currency exposure of the portfolio through the use of currency options and futures. The portfolio manager should have in mind current as well as desired portfolio allocation across countries and currencies. For example, portfolio manager could reduce exposure to euro currency by shorting appropriate number of euro futures and at the same time by taking long positions of an equal size in pound of sterling futures. The net effect of these positions taken together could be that the manager could exchange a portion of euro-denominated cash flows generated by his security portfolio for pound-denominated cash flows. The use of futures and options allows the portfolio manager to shift currency exposure in a quicker, less costly manner than reallocating stocks across countries, while allowing the manager to maintain the desired exposure to undervalued securities.

7. SUMMMARY

Futures and options can be used in efficient equity portfolio management. Futures can be used to hedge against portfolio cash inflows and outflows; to keep a passive portfolio fully invested and help minimize tracking error; and to change an actively managed portfolio's beta. Alternatively, options can be used to modify a portfolio's unsystematic risk. Finally, futures and options can be used in managing currency exposures in international equity portfolios.

BIBLIOGRAPHY

[1] Reilly, Frank K. and Brown, Keith.C. (2000): "Investment Analysis And Portfolio Management", The Dryden Press, New York,.pp.905-907;

[2] Hearth, Douglas and Zaima, Janis K. (1998): "Contemporary Investments – Security And Portfolio Analysis", The Dryden Press, New York, pp. 637-639;

[3] Rainer, Brosch (February 2001), "Portfolio-Aspects In Real Options Management", Working paper series: finance & accounting, No. 66.