PORTFOLIO MANAGEMENT

Time Diversification and Estimation Risk

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Abstract

The recommendation that investors with long investment horizons tilt their portfolios toward stocks is commonplace. We used a nonparametric bootstrap approach to investigate whether in a mean-variance-efficient portfolio, the weights for U.S. stocks and U.S. T-bills vary in a systemat the impact of estimatic results show that an i fficient portfolio rizon.

Practitio tilt their portfolios n important example that a systemat class and investme

We analy s vary signifi sis, we kept the r ment horizon from to 1997 for a well-dive

We presu historical estimates ns, variances ense that agents d the assets. We impli n-generating processe nal data through t ular, we used a nonpar h serial depende real bonus of the bootstrap approach is the possibility of generating empirical distributions of optimal weights. Thus, we could not only analyze the existence of time diversification but could also

test whether time diversification is significant in a statistical sense (i.e., if significant statistical differences exist between the optimal weights for different investment horizons).

With the bootstrap approach, we could also study the impact of estimation risk (meaning that the true parameters of the return distributions are unknown) on the optimal weights of stocks and bills. In a mean-variance context, estimation risk implies that the inputs to the mean-variance model are only sample estimates, not the true parameters.

The results show that estimation errors increase with the risk price and with the investment horizon. The first effect is a result of error maximization, which implies that the optimization framework chooses assets with overestimated expected returns and underestimated risks. The second effect is partly a result of fewer nonoverlapping observations existing at longer investment horizons than at shorter horizons.

We provide strong evidence that for all risk prices, the weights of stock in an efficient portfolio are significantly larger for the longer horizons. A tentative explanation is that for certain investment horizons, the return-generating process for stocks is mean reverting and/or the process for bills is positively autocorrelated. Because the return spread between stocks and bills is almost constant over the investment horizons, the change in portfolio weights might stem from the fact that with longer investment horizons, the standard deviation for stocks falls whereas the standard deviation for bills increases.

Our evidence supports the existence of time diversification: The weights for stock in efficient portfolios are significantly higher for long investment horizons than for a one-year horizon.

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