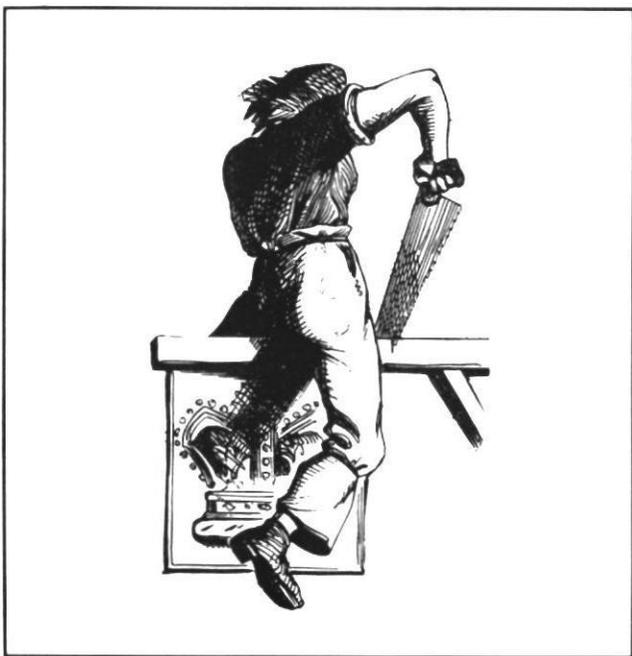


HOW TO CONSTRUCT REAL ESTATE PORTFOLIOS

by Jeff Madura



The concept of diversification has been a focal point of financial literature for more than two decades. Only recently, however, have researchers applied diversification to assets other than equities.

Jeff Madura is assistant professor of finance at the University of Central Florida in Orlando. He holds a master's degree in economics from Northern Illinois University in DeKalb and a doctorate degree in business with emphasis on finance from Florida State University in Tallahassee. His work has been published in various publications, including *Journal of Business Forecasting*, *Business Economics* and *Bankers Magazine*.

Aubey and Cramer (1977) attempted to compose a currency cocktail bond which would exhibit low variability in financing costs to the bond issuer. Johnson and Zuber (1979) developed multicurrency units of account which could reduce exchange rate risk. Levy (1981) applied the mean-variance model to international cash management decisions. Finally, Brewer (1982) and a host of other researchers have extended stock diversification from a national to an international perspective.

The diversification properties of portfolio building can be applied to real estate methods for constructing real estate portfolios. This study attempts to develop a method for constructing these portfolios.

Mean-Variance Model

A real estate investor with information about the expected yield, variability, and pairwise comovements of real estate ventures could use the mean-variance model developed by Markowitz (1952) to determine an efficient frontier of real estate portfolios. Each portfolio is efficient in the sense that it exhibits the lowest anticipated risk for a given expected return.

Mathematically, the mean-variance model minimizes portfolio variance (σ_p^2) for a given return subject to weight constraints:

$$\text{MIN } \sigma_p^2 = \sum_{i=1}^k w_i^2 \sigma_i^2 + \sum_{i=1}^k \sum_{j=1}^k w_i w_j \sigma_{ij} \quad (1)$$

(i ≠ j)

where w represents the weight allocated to an asset, i and j refer to individual assets, k is the total number of assets, and σ_{ij} is the covariance between the i th and j th assets. The maximization process satisfies the condition that the weights are non-negative and sum to 100 percent.

Equation (1) illustrates how the variability of portfolios can be reduced by selecting assets which exhibit low variability and low covariances with other component assets. A portfolio containing k assets has a variance determined by summing k variance and $k(k-1)/2$ covariances. This emphasizes the substantial influence of comovements on a portfolio's variability in returns. To construct a real estate portfolio with a low level of risk, the portfolio builder must assess which ventures have low or negative correlations with other ventures already undertaken. For this purpose, three risk-reducing strategies are given.

Reducing Risks In Portfolio Building

One method of reducing portfolio risk is to combine ventures within a given location, which have unrelated operations. In this manner, the impact of the economy on one venture will not automatically affect all other ventures in the same way. This can be referred to as business diversification. However, if the area of concern is supported by only a few major industries, the ability to sufficiently diversify within that one area is limited.

A second approach to real estate portfolio building is to diversify nationally. This approach is expected to utilize ventures which are less correlated with each other since they aren't all being influenced by the conditions of one local area. However, reducing risk may still be limited by

the systematic impact of the national economy on all real estate ventures.

A third approach for a real estate portfolio builder is international diversification. The extent to which international ventures would be similarly influenced depends upon the degree of international integration. Yet, even if the ventures do have some positive level of covariability, it is probably less than the correlations of ventures contained in local or national portfolios.

Summary

To operationalize the mean-variance model for real estate portfolio construction, the expected returns, variances and pairwise covariances of real estate ventures must be assessed. Three diversification methods have been reviewed. The international real estate portfolio is hypothesized to contain less correlated ventures and therefore less portfolio return variability than the local or national portfolios. This hypothesis deserves empirical examination in future research.

Of course, even if international diversification of real estate ventures is shown to be more effective in reducing risk, information barriers might limit a portfolio builder's desire to operationalize the idea. If information centers are established, however, these start-up costs might be easily covered through economies of scale by providing portfolio consulting services for other real estate investors.

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