Correlation and Partial Correlation REIT Portfolios

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We compare the performance of Markowitz's mean-variance analysis based on Pearson correlation coefficients (PCC) and Partial-correlation coefficients (PACC); using monthly return data on 11 REIT sectors and the EREIT index, over the period from January 1994 to December 2022. The results of the empirical analysis show a number of features of interest. First, we find that the off-diagonal elements of the PCC matrix are significantly positive. In contrast, the corresponding off-diagonal elements of the PACC matrix, conditioned on the EREIT index, are generally insignificantly different from zero and in a number of cases significantly negative. Second, we find that PACC-based minimum-risk portfolios (MRPs) are more diversified than PCC-based portfolios. In addition, while the PAC-based weights of the MRP change significantly from period to period, the MRP weights using PACC are very stable. The stability of the PACC portfolio weights means that the weights in one period can be used in the next period, with very little increase in portfolio risk. Therefore, the extent of rebalancing is limited in PACC portfolios, which will minimise transaction costs. In contrast, the instability of the PCC-based portfolio weights means that holding the optimum weights of the MRP in one sub-period leads to portfolio risks that are on average 27% greater than with an MRP optimum solution in the next sub-period. In other words, the MRPs estimated by the PACC method is substantially better than that by PCC-based methods. We conclude, therefore that portfolios constructed by PACC are more useful and meaningful for risk management and optimal portfolio selection than Pearson correlation-based methods.

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