Measuring Systematic Risk with Neural Network Factor Model

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ABSTRACT

In this paper, we measure systematic risk with a new nonparametric factor model, the neural network factor model. The suitable factors for systematic risk can be naturally found by inserting daily returns on a wide range of assets into the bottleneck network. The network-based model does not stick to a probabilistic structure unlike parametric factor models, and it does not need feature engineering because it selects notable features by itself. In addition, we compare performance between our model and the existing models using 20-year data of S&P 100 components. Although the new model can not outperform the best ones among the parametric factor models due to limitations of the variational inference, the estimation method used for this study, it is still noteworthy in that it achieves the performance as best the comparable models could without any prior knowledge.