

# Differences in the SV decomposition of noise factors for indices and individual stocks

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The returns of stocks can be described by a volatility factor times an *iid* noise with zero mean in order to account for the absence of correlations in raw returns. Often the noise is assumed to be Gaussian. To test for the distributional form of the noise factor, we assume a slow dynamic of the volatility factor, as suggested by the correlation of absolute returns, and derive a moment ratio which depends only on the noise but not on the volatility factor. While indices turn out to be compatible with Gaussian noise, individual stocks exhibit significant deviations. We assume that index and individual values differ by the dependence on profits of the latter, motivated by recent evidence on the Laplace distribution of firm profit rates. Under the assumption of Gaussian noise, index returns are well described by a Student t-distribution of the volatility factor, which is generally not the case for individual stocks. We achieve a good description of individual stock returns by adding a Laplacian part to the noise, which presumably accounts for the profit dependence. In one example, this addition increases the  $\chi^2$  probability from an unacceptable value of  $10^{-23}$  to a reasonable value of 0.5.