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### **Recommended** Citation

Blattberg, R. C., & Gonedes, N. J. (1977). A Comparison of the Stable and Student Distributions as Statistical Models for Stock Prices: Reply. *The Journal of Business*, 50 (1), 78-79. Retrieved from http://repository.upenn.edu/accounting\_papers/76

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# A Comparison of the Stable and Student Distributions as Statistical Models for Stock Prices: Reply

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### Comments

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### A Comparison of the Stable and Student Distributions as Statistical Models for Stock Prices: Reply

The most important part of Praetz's comment<sup>1</sup> on our paper<sup>2</sup> is the second paragraph, where he discusses our criticism of his data-standardization method. The key point of our discussion is that his using the sample standard deviation to standardize observed returns was inappropriate. Had he assumed that his data were drawn from a finite-variance Student model prior to conducting his tests, then his procedure would have been appropriate. The purpose of his work was to determine whether the Student model or the nonnormal stable model is the "better" model. If the test statistic corresponding to his standardization procedure is poorly behaved under one of the competing models, then his test will have less power than a test based upon a procedure more suitable under that model. As indicated in our paper on page 256, the sample standard deviation is a poorly behaved estimator of scale for the nonnormal stable model. This is supported by the extensive simulation results provided by Fama and Roll.<sup>3</sup> In this regard, note that Officer's results<sup>4</sup>-to which Praetz refers in his comment-do not contradict those simulation results. Hence, they provide no justification for Praetz's use of the sample standard deviation in his test.5

In his 1972 paper, on page 54 Praetz concludes that "the stable Paretian distribution always provides a better fit than the normal distribution..." This statement is based upon his observing lower values of  $\chi^2$  statistics for the stable model. In our paper, on page 256 we simply indicated that what he observed had nothing to do with the descriptive validity of the stable model. The lower values of the  $\chi^2$  statistics are "mathematical necessities." It seemed important to point this out because Praetz said nothing about it and because he seemed to offer the statement quoted above as an important conclusion.

\* University of Chicago.

1. Peter D. Praetz, "A Comparison of the Stable and Student Distributions as Statistical Models for Stock Prices: Comment," *Journal of Business* 50 (January 1977): 76-77.

2. Robert C. Blattberg and Nicholas J. Gonedes, "A Comparison of the Stable and Student Distributions as Statistical Models for Stock Prices," *Journal of Business* 47 (April 1974): 244-80.

3. Eugene F. Fama and R. R. Roll, "Parameter Estimates for Symmetric Stable Distributions," Journal of the American Statistical Association 66 (June 1971): 331-38.

4. R. R. Officer, "The Distribution of Stock Returns," Journal of the American Statistical Association 67 (December 1972): 807-12.

5. Peter D. Praetz, "The Distribution of Share Price Changes," Journal of Business 45 (January 1972): 49-55.

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Nor did Praetz say anything about the serial correlation problem in his 1972 paper. Evidently, he now has results that lead him to infer that this problem is not a serious one.

In conclusion, we still believe that Praetz reduced the power of his model-discrimination test by using the sample standard deviation to standardize returns. The important issue is not whether our results are consistent with his but, rather, whether our methods provide more reliable results.