

[Home](#) > [Risk Management](#) > Article

# Kappa ratios and (higher-order) stochastic dominance

| Original Article | Published: 21 June 2017

| Volume 19, pages 245–253, (2017) [Cite this article](#)

## Risk Management

[Aims and scope](#) →[Submit manuscript](#) →[Cuizhen Niu](#)<sup>1</sup>, [Wing-Keung Wong](#) <sup>2,3,4,6</sup> & [Qunfang Xu](#)<sup>5</sup> 237 Accesses  7 Altmetric  1 Mention [Explore all metrics](#) →

## Abstract

This paper first shows the sufficient relationship between the  $((n+1))$ -order SD and the  $n$ -order Kappa ratio. In fact, we clarify the restrictions on necessary beating of the target for the higher-order SD consistency of the Kappa ratios. Thereafter, we show that, in general, the necessary relationship between SD/RSD and the Kappa ratio cannot be established. We find that when the variables being compared belong to the same location-scale family or the same linear combination of location-scale families, we can get the necessary relationship between the  $((n+1))$ -order SD with the  $n$ -order Kappa ratio after imposing some conditions on the means. Our findings enable academics and practitioners to draw better decision in their analysis.



## Access this article

[Log in via an institution →](#)

## Subscribe and save

✓ Springer+ Basic

€32.70 /Month

- Get 10 units per month
- Download Article/Chapter or eBook
- 1 Unit = 1 Article or 1 Chapter
- Cancel anytime

[Subscribe now →](#)

## Buy Now

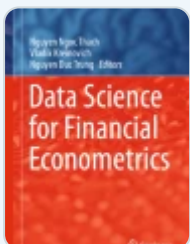
[Buy article PDF 39,95 €](#)

Price includes VAT (Poland)

Instant access to the full article PDF.

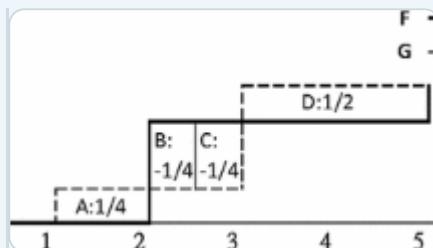
[Institutional subscriptions →](#)

## Similar content being viewed by others



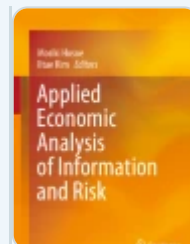
**Three Approaches to the Comparison of Random Variables**

Chapter | © 2021



**Revisiting generalized almost stochastic dominance**

Article | 20 April 2018



**The Subclasses of First-Degree Stochastic Dominance (FSD) Shifts and Their Comparative Statics**

Chapter | © 2020

## Notes

---

1. We note that there are other approaches to measure risk, see, for example, Bea ([2009](#)) and Kutan and Yaya ([2016](#)).
2. We denote risk-seeking SD for risk seekers as RSD while Levy ([2015](#)) denotes it as RSSD. Readers may refer to Li and Wong ([1999](#)), Wong and Li ([1999](#)), Wong ([2007](#)), Levy ([2015](#)), and Guo and Wong ([2016](#)) for more information.

## References

---

Bai, Z.D., Y.C. Hui, W.K. Wong, and R. Zitikis. 2012. Evaluating prospect performance: Making a case for a non-asymptotic UMPU test. *Journal of Financial Econometrics* 10 (4): 703–732.

[Article](#) [Google Scholar](#)

Bai, Z.D., H.X. Lui, and W.K. Wong. 2009. Enhancement of the applicability of markowitz's portfolio optimization by utilizing random matrix theory. *Mathematical Finance* 19 (4): 639–667.

[Article](#) [Google Scholar](#)

Bai, Z.D., K.F. Phoon, K.Y. Wang, and W.K. Wong. 2013. The performance of commodity trading advisors: A mean-variance-ratio test approach. *North American Journal of Economics and Finance* 25: 188–201.

[Article](#) [Google Scholar](#)

Balder, S., and N. Schweizer. 2017. Risk aversion vs. the omega ratio: Consistency results. *Finance Research Letters* 21: 78–84.

Bea, R., I. Mitroff, D. Farber, H. Foster, and K.H. Roberts. 2009. A new approach to risk: The implications of E3. *Risk Management* 11 (1): 30-43.

[Article](#) [Google Scholar](#)

Beedles, W.L. 1979. Return, dispersion and skewness: Synthesis and investment strategy. *Journal of Financial Research* 2: 71-80.

[Article](#) [Google Scholar](#)

Brockett, P.L., and J.R. Garven. 1998. A reexamination of the relationship between preferences and moment orderings by rational risk-averse investors. *GENEVA Papers on Risk and Insurance Theory* 23 (2): 127-137.

[Article](#) [Google Scholar](#)

Brockett, P.L., and Y. Kahane. 1992. Risk, return, skewness and preference. *Management Science* 38 (6): 851-866.

[Article](#) [Google Scholar](#)

Chan, C.Y., C. de Peretti, Z. Qiao, and W.K. Wong. 2012. Empirical test of the efficiency of the UK covered warrants market: Stochastic dominance and likelihood ratio test approach. *Journal of Empirical Finance* 19 (1): 162-174.

[Article](#) [Google Scholar](#)

Clark, E., Z. Qiao, and W.K. Wong. 2016. Theories of risk: Testing investor behavior on the taiwan stock and stock index futures markets. *Economic Inquiry* 54 (2): 907-924.

[Article](#) [Google Scholar](#)

Darsinos, T., and S. Satchell. 2004. Generalizing universal performance measures. *Risk* 17: 80-84.

[Google Scholar](#)

Fong, W.M., H.H. Lean, and W.K. Wong. 2008. Stochastic dominance and behavior towards risk: The market for internet stocks. *Journal of Economic Behavior and Organization* 68 (1): 194-208.

[Article](#) [Google Scholar](#)

Fong, W.M., W.K. Wong, and H.H. Lean. 2005. International momentum strategies: A stochastic dominance. *Journal of Financial Markets* 8: 89-109.

[Article](#) [Google Scholar](#)

Gasbarro, D., W.K. Wong, and J.K. Zumwalt. 2007. Stochastic dominance analysis of iShares. *European Journal of Finance* 13: 89-101.

[Article](#) [Google Scholar](#)

Guo, B., and Y.G. Xiao. 2016. A note on why doesn't the choice of performance measure matter. *Finance Research Letters* 16: 248-254.

[Article](#) [Google Scholar](#)

Guo, X., Jiang, X.J. and Wong, W.K. 2016. A note on stochastic dominance and the omega ratio. Social Science Research Network Working Paper Series 2827058.

Guo, X., and W.K. Wong. 2016. Multivariate stochastic dominance for risk averters and risk seekers. *RAIRO-Operations Research* 50 (3): 575-586.

[Article](#) [Google Scholar](#)

Guo, X., and Wong, W.K. 2017. The preferences of omega ratio for risk averters and risk seekers. Social Science Research Network Working Paper Series 2938547.

Hammond, J.S. 1974. Simplifying the choice between uncertain prospects where preference is nonlinear. *Management Science* 20 (7): 1047-1072.

[Article](#) [Google Scholar](#)

Hanoch, G., and H. Levy. 1969. The efficiency analysis of choices involving risk. *Review of Economic studies* 36: 335-346.

[Article](#) [Google Scholar](#)

Hoang, T.H.V., W.K. Wong, and Z.Z. Zhu. 2015. Is gold different for risk-averse and risk-seeking investors? An empirical analysis of the Shanghai gold exchange. *Economic Modelling* 50: 200-211.

[Article](#) [Google Scholar](#)

Kaplan, P.D., and J.A. Knowles. 2004. Kappa: A generalized downside risk-adjusted performance measure. *Journal of Performance Measurement* 8 (3): 42-54.

[Google Scholar](#)

Kutan, A.M., and M.E. Yaya. 2016. Armed conflict and financial and economic risk: Evidence from Colombia. *Risk Management* 18 (2): 159-187.

[Google Scholar](#)

Leitner, J. 2005. A short note on second-order stochastic dominance preserving coherent risk measures. *Mathematical Finance* 15 (4): 649-651.

[Article](#) [Google Scholar](#)

Leung, P.L., and W.K. Wong. 2008. On testing the equality of the multiple Sharpe Ratios, with application on the evaluation of iShares. *Journal of Risk* 10 (3): 1-16.

[Article](#) [Google Scholar](#)

Levy, H. 1969. A utility function depending on the first three moments. *Journal of Finance* 24 (4): 715-719.

[Article](#) [Google Scholar](#)

Levy, H. 2015. *Stochastic dominance: Investment decision making under uncertainty*, 3rd ed. New York: Springer.

[Google Scholar](#)

Li, C.K., and W.K. Wong. 1999. Extension of stochastic dominance theory to random variables. *RAIRO-Operations Research* 33 (4): 509-524.

[Article](#) [Google Scholar](#)

Ma, C., and W.K. Wong. 2010. Stochastic dominance and risk measure: A decision-theoretic foundation for VaR and C-VaR. *European Journal of Operational Research* 207 (2): 927-935.

[Article](#) [Google Scholar](#)

Markowitz, H.M. 1952a. Portfolio selection. *Journal of Finance* 7: 77-91.

[Google Scholar](#)

Markowitz, H.M. 1952b. The utility of wealth. *Journal of Political Economy* 60: 151-156.

[Article](#) [Google Scholar](#)

Niu, C.Z., W.K. Wong, and L.X. Zhu. 2016. *First stochastic dominance and risk measurement; MPRA Paper 75027*. Germany: University Library of Munich.

[Google Scholar](#)

Ogryczak, W., and R. Ruszczyński. 1999. From stochastic dominance to mean-risk models: Semideviations as risk measures. *European Journal of Operational Research* 116: 33–50.

[Article](#) [Google Scholar](#)

Ogryczak, W., and A. Ruszczyński. 2001. On consistency of stochastic dominance and mean-semideviation models. *Mathematical Programming* 89: 217–232.

[Article](#) [Google Scholar](#)

Ogryczak, W., and A. Ruszczyński. 2002. Dual stochastic dominance and related mean-risk models. *SIAM Journal of Optimization* 13: 60–78.

[Article](#) [Google Scholar](#)

Post, T., and Milos, K. 2016. Portfolio choice based on third-degree stochastic dominance. *Management Science*, forthcoming.

Schuhmacher, F., and M. Eling. 2012. A decision-theoretic foundation for reward-to-risk performance measures. *Journal of Banking Finance* 36 (7): 2077–2082.

[Article](#) [Google Scholar](#)

Shadwick, W.F., and C. Keating. 2002. A universal performance measure. *Journal of Performance Measurement* 6 (3): 59–84.

[Google Scholar](#)

Sharpe, W.F. 1966. Mutual funds performance. *Journal of Business* 39: 119–138.



Sortino, F.A., and R. van der Meer. 1991. Downside risk. *Journal of Portfolio Management* 17: 27-31.

Sriboonchitta, S., W.K. Wong, S. Dhompongsa, and H.T. Nguyen. 2009. *Stochastic dominance and applications to finance.*, Risk and economics Boca Raton: Chapman and Hall/CRC, Taylor and Francis Group.

Stoyan, D., and D.J. Daley. 1983. *Comparison methods for queues and other stochastic models.* New York: Wiley.

Vinod, H.D. 2004. Ranking mutual funds using unconventional utility theory and stochastic dominance. *Journal of Empirical Finance* 11 (3): 353-377.

Wong, W.K. 2007. Stochastic dominance and mean-variance measures of profit and loss for business planning and investment. *European Journal of Operational Research* 182: 829-843.

Wong, W.K., and C.K. Li. 1999. A note on convex stochastic dominance theory. *Economics Letters* 62: 293-300.

Wong, W.K., and C. Ma. 2008. Preferences over location-scale family. *Economic*

## Acknowledgements

---

The authors are grateful to Igor Lončarski, the Editor, and anonymous reviewers for substantive comments that have significantly improved this manuscript. The second author would like to thank Robert B. Miller and Howard E. Thompson for their continuous guidance and encouragement. This research has been partially supported by grants from the Fundamental Research Funds for the Central Universities, China Postdoctoral Science Foundation (2016M600951), Humanities and Social Sciences Planning Fund of Ministry of Education (15YJA910004), Natural Science Foundation of Zhejiang Province (LY15A010006), Asia University, Hang Seng Management College, Lingnan University, the Research Grants Council of Hong Kong, Ministry of Science and Technology (MOST), Taiwan, and World Track Investment Ltd.

## Author information

---

### Authors and Affiliations

**School of Statistics, Beijing Normal University, Beijing, China**

Cuizhen Niu

**Department of Finance and Big Data Research Center, Asia University,**

**Taichung, Taiwan**

Wing-Keung Wong

**Department of Economics and Finance, Hang Seng Management College,**

**Sha Tin, Hong Kong**

Wing-Keung Wong

**Department of Economics, Lingnan University, Tuen Mun, Hong Kong**

Wing-Keung Wong

**School of Business, Ningbo University, Ningbo, China**

Qunfang Xu

**Department of Finance, College of Management, Asia University, 500,  
Lioufeng Rd., Wufeng, Taichung, Taiwan**

Wing-Keung Wong

## Corresponding author

Correspondence to [Wing-Keung Wong](#).

## Rights and permissions

---

[Reprints and permissions](#)

## About this article

---

### Cite this article

Niu, C., Wong, WK. & Xu, Q. Kappa ratios and (higher-order) stochastic dominance. *Risk Manag* **19**, 245–253 (2017). <https://doi.org/10.1057/s41283-017-0020-1>

Published

Issue Date

21 June 2017

August 2017

DOI

<https://doi.org/10.1057/s41283-017-0020-1>

## Keywords

[Stochastic dominance](#)

[Kappa ratio](#)

[Omega ratio](#)

[Sortino ratio](#)

[Mean-risk analysis](#)

[Risk aversion](#)

**Search**

Search by keyword or author



## Navigation

Find a journal

---

Publish with us

---

Track your research

---

