

Accepted Manuscript

Bootstrap consistency and bias correction in the nonparametric estimation of risk measures of collective risks

Alexandra Lauer, Henryk Zähle

PII: S0167-6687(16)30395-X

DOI: <http://dx.doi.org/10.1016/j.insmatheco.2017.03.001>

Reference: INSUMA 2333

To appear in: *Insurance Mathematics and Economics*

Received date: 20 September 2016

Revised date: 3 February 2017

Accepted date: 4 March 2017

Please cite this article as: Lauer, A., Zähle, H., Bootstrap consistency and bias correction in the nonparametric estimation of risk measures of collective risks. *Insurance Mathematics and Economics* (2017), <http://dx.doi.org/10.1016/j.insmatheco.2017.03.001>

This is a PDF file of an unedited manuscript that has been accepted for publication. As a service to our customers we are providing this early version of the manuscript. The manuscript will undergo copyediting, typesetting, and review of the resulting proof before it is published in its final form. Please note that during the production process errors may be discovered which could affect the content, and all legal disclaimers that apply to the journal pertain.



Bootstrap consistency and bias correction in the nonparametric estimation of risk measures of collective risks

Alexandra Lauer*

Henryk Zähle†

Abstract

We consider two nonparametric estimators for the risk measure of the sum of n i.i.d. individual insurance risks divided by n , where the number of historical single claims that are used for the statistical estimation is of order n . This framework matches the situation that nonlife insurance companies are faced with within the scope of premium calculation. Indeed, the risk measure of the collective risk divided by n can be seen as a suitable premium for each of the individual risks. For both estimators asymptotic normality has been obtained recently. Here we derive almost sure bootstrap consistency for both estimators, where we allow for the weighted exchangeable bootstrap and rather general law-invariant risk measures. Both estimators are subject to a relevant negative bias for small to moderate n . For one of them we investigate by means of numerical experiments the benefit of a bootstrap-based bias correction. The numerical experiments are performed for the Value at Risk and the Average Value at Risk, and the results are comparable to those of Kim and Hardy [18] who did analogous experiments for classical nonparametric plug-in estimators. For the other estimator the benefit of a bootstrap-based bias correction can be ruled out by theoretical arguments.

Keywords: Law-invariant risk measure, Collective risk, Nonparametric estimation, Bootstrap consistency, Weighted exchangeable bootstrap, Bootstrap-based bias correction, Value at Risk, Average Value at Risk

*Department of Mathematics, Saarland University, lauer@math.uni-sb.de

†Department of Mathematics, Saarland University, zaehle@math.uni-sb.de

متن کامل مقاله

دریافت فوری ←

ISIArticles

مرجع مقالات تخصصی ایران

- ✓ امکان دانلود نسخه تمام متن مقالات انگلیسی
- ✓ امکان دانلود نسخه ترجمه شده مقالات
- ✓ پذیرش سفارش ترجمه تخصصی
- ✓ امکان جستجو در آرشیو جامعی از صدها موضوع و هزاران مقاله
- ✓ امکان دانلود رایگان ۲ صفحه اول هر مقاله
- ✓ امکان پرداخت اینترنتی با کلیه کارت های عضو شتاب
- ✓ دانلود فوری مقاله پس از پرداخت آنلاین
- ✓ پشتیبانی کامل خرید با بهره مندی از سیستم هوشمند رهگیری سفارشات