

Mathematical Statistics Stockholm University Bachelor Thesis **2022:12** http://www.math.su.se

A zero-truncated one-inflated model with application to population monitoring

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Abstract

When one-inflation in data arises due to samples from individuals being misidentified as samples from non-existent with probability p, a large bias arises in the population estimate if the inflation is not taken into account. This inflation causes a greater bias compared to previously analysed inflation where it arises due to individuals with some probability p_B succeed in deviating from being observed more than once (Böhning and Heijden (2019), Godwin (2017)). By using distributions that take into account that data contains one-inflation of the type miss identification, we can reduce the bias. With the same parameters in a base distribution and $p = p_B$, inflation that arises due to incorrect identification is always expected to give greater bias and variance on the population estimate than the corresponding behavior caused inflation population estimate. When we apply our models to brown bear data from the department of Environmental Research and Monitoring at the Swedish Museum of Natural History we see no evidence of one-inflation and note that further analysis regarding individual heterogeneity of the bears is required for a reliable population estimate.

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