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# Improved Bounds for Stochastic Extensible Bin Packing under Distributional Assumptions

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## Abstract

In the stochastic extensible bin packing problem,  $n$  items of random size must be packed into  $m$  bins of unit capacity. The number of bins is fixed, but their capacity can be extended at extra cost. This model plays an important role in surgery scheduling, where the extension of bin capacity represents overtime of operating rooms. It is known that this problem has a  $(1+e^{-1})$ -approximation algorithm for arbitrary probability distributions of the item sizes. Using the theory of second-order stochastic dominance, we obtain improved bounds when the sizes have a bounded Pietra or Gini index, and when they belong to specific parametric families, such as Gamma, Lognormal or Weibull distributions.

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