Heavy-tailed distributions can be specified by means of mathematical methods. However, there is no universally agreed upon theory for the technical classification of distributions by tail behavior, nor there is an academically accepted convention for the use of terms to describe it @Schuster. Some authors (@Asmussen) use precise nomenclature to differentiate among subsets of what they regard as the wider heavy tail distribution class. Nonetheless, in this paper the words “fat” and “heavy” are interchangeable. Dacorogna et al. (@Dacorogna) use a classification system of three categories of distribution behavior mainly based on how the tails of the cumulative distribution functions decline when $x \to \pm\infty$:

1. Thin-tailed: the tails decline in an exponential fashion, i.e. $O(e^{-\lambda|x|}), \lambda \in \mathbb{R}\_{>0}$

2. Fat-tailed: the tails decline like a power law, i.e. $O\left(|x|^{-\alpha}\right),\alpha \in \mathbb{R}\_{>0}$

3. Bounded distributions: absence of tails caused by domain finiteness

Under this classification system, the normal distribution falls into the thin-tailed category, whereas the distributions of daily asset returns plausibly fall into the fat-tailed category. The discrepancy between the normal distribution and financial data due to heavy tails is well documented (@Mandelbrot2), and although numerous authors agree on the need for models with heavy tails, the scientific literature does not converge on the type of distribution to use.