Author's Accepted Manuscript

More grip on inventory control through improved forecasting A comparative study at three companies

E. van Wingerden, R.J.I. Basten, R. Dekker, W.D. Rustenburg

Cite this article as: E. van Wingerden, R.J.I. Basten, R. Dekker, W.D. Rustenburg, More grip on inventory control through improved forecasting A comparative study at three companies, *Int. J. Production Economics,* http://dx.doi.org/10.1016/j.ijpe.2014.08.018

More grip on inventory control through improved forecasting
A comparative study at three companies

E. van Wingerden[a], R.J.I. Basten[b,*], R. Dekker[c], W.D. Rustenburg[d]

[a]*Eindhoven University of Technology, P.O. Box 513, 5600 MB, Eindhoven, The Netherlands*
[b]*University of Twente, P.O. Box 217, 7500 AE, Enschede, The Netherlands*
[c]*Erasmus University Rotterdam, P.O. Box 1738, 3000 DR, Rotterdam, The Netherlands*
[d]*Gordian Logistic Experts, Groenewoudsedijk 63, 3528 BG, Utrecht, The Netherlands*

Abstract

Inventory control for parts with infrequent demands is difficult since forecasting their demand is problematic. Traditional forecasting methods, such as moving average and single exponential smoothing, are known not to suffice since they do not cope well with periods with zero demands. Croston type methods and bootstrapping methods are more promising. We propose a new bootstrapping method, which we term empirical plus. The added value of this method lies in the fact that it explicitly takes into account that besides the demand, also the supply lead time is stochastic. We compare its performance with a number of methods from all three above-mentioned categories. Opposite to what is done in most comparative studies, we do not focus on performance metrics that are related directly to the forecasting results (e.g., mean squared error), but we focus on the resulting inventory control policy (achieved fill rate and holding costs). We use in our study large data sets from three companies, which we make publicly available. We find that our empirical plus method outperforms the other methods when the average inter-demand interval is large and the squared coefficient of variation of the demand size is small. This class of parts often consists of the expensive parts, for which forecasting is both difficult, because of the infrequent demands, and important, because of the price. The Syntetos Boylan approximation performs best on the other classes of parts. These findings may be used in practice to use the right forecasting method for each type of part, thus achieving more cost-effective spare parts inventory control.

Keywords: Inventory, spare parts, forecasting

*Corresponding author: T: +31 53 489 4007
Email addresses: `e.v.wingerden@tue.nl` (E. van Wingerden), `r.basten@utwente.nl` (R.J.I. Basten), `rdekker@ese.eur.nl` (R. Dekker), `jw.rustenburg@gordian.nl` (W.D. Rustenburg)