

SpeedFactories: Global Dual Sourcing Under Correlated Demand

Presented by Stephen Disney. January 28th 2021, at 14.30pm on Zoom

Abstract

We study a global dual sourcing supply chain setting under correlated auto-regressive, AR(1), demand. We consider three cases: a) off-shoring all demand to a global supplier with a long lead time, b) near-shoring all demand to a local factory with unit lead times or c) dual sourcing where a proportion of demand is satisfied from the global supplier and the remainder is satisfied by the local supplier. We issue a dynamic order to both the global off-shore supplier and the local factory to cope with the demand correlation. We obtain closed-form expressions for the variances of the replenishment orders and the inventory levels maintained by the three scenarios which we use to obtain exact cost expressions under normally distributed error terms in the AR(1) demand process. Our analysis shows there exists an opportunity to near-shore a proportion of demand at a local factory despite unit purchasing costs being lower at the off-shore supplier. This intriguing benefit originates from the short lead time allowing one to maintain tighter control over inventory levels. The opportunity to near-shore a proportion of demand at a local factory increases as demand becomes more positively correlated and as the lead time increases.

References

This presentation based upon the following articles:

Boute, R.N., Disney, S.M. and Van Mieghem, J.A., (2020), Global dual sourcing under correlated demand. Pre-prints of the 21st International Working Seminar of Production Economics, 24th-28th February, Innsbruck, AUSTRIA, 14 pages.

Boute, R., Disney, S.M., Gijbrecchts, J. and Van Meighem, J., (2020), Dual Sourcing and Smoothing under Non-Stationary Demand Time Series: Re-shoring with SpeedFactories. Accepted for publication in *Management Science*, 14th December.

Supporting materials

A web-based shiny app, available at <https://bullwhip.shinyapps.io/shiny/>, was developed to support this work.

Zoom details

<https://Universityofexeter.zoom.us/j/97464875512?pwd=NnRESEQ3NmdLTkt3ZFBHQ3FNMnhnUT09>