

## **Inverted Hockey Stick Effect In The European Industry: Inventory Reduction In The Last Fiscal Quarter**

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### **Abstract**

Inventory management decisions are critical to industrial companies' efficiency and performance. This paper aims to identify a pattern, coined by (Hoberg et al., 2017) as "Inverted hockey stick effect", of a systematic reduction of inventory (raw materials, work in progress, finished products and the sum of these) of European industrial companies in the last fiscal quarter. Such reduction would correspond to a conscient management decision, with an impact on the supply chain, something that may not be in line with strictly operational needs.

The theoretical basis of this paper is the study from (Hoberg et al., 2017), where a systematical inventory reduction in the last fiscal quarter was detected in a sample of 4877 North American industrial companies between 1990 - 2010.

The use of inventory days as a variable, integrates companies' economic activity by taking into consideration the COGS when analysing inventory behaviour.

Because a reduction of inventory can result from a peak of sales, the "inverted hockey stick effect" reduction of inventory must be noticeable in all three components (RM, WIP, FP).

The quarterly data concerning the period 2008 - 2017, were obtained from Compustat® using the S&P Capital IQ® interface, filtered by region (Europe) and classification (Industry).

In this preliminary study, we state the following propositions:

Proposition 1 – Companies promote inventory reduction in the last fiscal quarter

Proposition 2 – The inventory reduction in the last fiscal quarter is identified in all three components (RM, WIP, FP)

The consolidated data from the 54 companies (2008-2017) are used to calculate inventory days and checked for a reduction in the Q4 when compared with Q3 (Proposition 1). The same calculations are done for each inventory component, RM, WIP and FP (Proposition 2).

The sample (composed by 54 European industrial companies representing a global yearly average COGS of 394.584M€), presents a consolidated reduction of 8,4% in inventory days in Q4 when compared with Q3. The reduction is identified, not only for 2008-2017 but also for each year (Proposition 1).

The three inventory components present a reduction of 8.0% - RM, 7.9% - WIP and 8.7% - FP in inventory days in Q4 when compared with Q3 (Proposition 2). The reduction is also identified for each year with one exception – WIP in 2008, where there was an increase inferior to 0.2%.

This preliminary study is the first quantitative study of the inverted hockey stick effect in inventory for the European industry and points to a possible conscient management behaviour with impact on the industrial supply chain.

A reduction of inventory in the fiscal Q4, both in total inventory and in the three components (RM, WIP and FP) is identified. For the studied period, the found reduction in the fiscal Q4, is in average 8% (total inventory) representing an average reduction of 8.306M€ for each year from Q3 to Q4.

## **Keywords**

“Inverted Hockey Stick Effect”, “Inventory”, “European Industry”, “Inventory Management”

## **Biography / Biographies**

**Nuno Guedes Vieira** is a PhD Student in the Doctoral Program in Business and Management Studies of the Faculty of Economics, University of Porto, Portugal. He also has an Executive MBA degree from EGE – Catholic University Business School (Porto) / ESADE Business School (Barcelona). In parallel with his professional activity, he has concluded a post-graduation course in Quality Management and Quality Engineering as well as training course in 6 Sigma. He has developed his professional career in the automotive industry, more specifically in Quality, Operations and in the last years as Plant Manager in an international industrial group, TESCO. At the corporate level of this group, he is a member of the Expert Committee of Continuous Improvement, where he is representing Manufacturing. His research interests are in the areas of operations, continuous improvement, lean manufacturing and lean organizations.

**Catarina J. M. Delgado** is an assistant professor at the School of Economics and Management, University of Porto, and a researcher at LIAAD-INESCTEC, the Laboratory of Artificial Intelligence and Decision Support of the University of Porto. Her current research interests are sustainable operations and supply chain management, corporate social responsibility, and continuous improvement. After getting her undergraduate degree and her PhD in Engineering (both from University of Porto), she received an MBA, with a special focus on Strategic decision-making, from University of Coimbra. She teaches courses in the fields of Operations Research, Operations and Supply Chain Management, Quality Management and Continuous Improvement. Her academic work has been published in journals such as International Journal of Systems Science, Journal of Manufacturing Technology Management, Journal of Public Affairs, Sustainability and International Journal of Production Economics.

**José António C. Moreira** has a PhD in Accounting and Finance from the University of Lancaster, in the UK, and is an assistant professor at the Faculty of Economics of University of Porto, Portugal. He also collaborates with Porto Business School, as a teacher and coordinator of the post-graduate studies in Financial Analysis.

He is a member of CNC, the national accounting standards setter; of the Portuguese Association of Financial Analysts, and the European Financial Analysts Association; a research fellow at OBEGEF (Center for Research in Economics and Fraud Management) and CEF.UP (Center for Research in Economics and Finance).

His current research interests are Financial Reporting, Earnings Management and Financial Analysis. He has publications in international accounting journals, and is author and editor of books on real investments, financial analysis, accounting, and fraud.