# Article information:

Inventory management under price-based and stockout-based substitution - ScienceDirect  
<https://www.sciencedirect.com/science/article/pii/S0377221717303065>

# Article summary:

1. The article examines a stochastic inventory and pricing problem for a firm that sells two vertically differentiated products, considering both price-based and stockout-based substitution.

2. The demand function is not continuous in price, and the profit function is not necessarily unimodal under endogenous pricing.

3. Ignoring stockout-based substitution may lead to lower profit margins for high-quality products and severe supply-demand mismatches throughout the entire assortment. Two approximated pricing policies are presented for easy application.

# Article rating:

May be slightly imbalanced: The article presents the information in a generally reliable way, but there are minor points of consideration that could be explored further or claims that are not fully backed by appropriate evidence. Some perspectives may also be omitted, and you are encouraged to use the research topics section to explore the topic further.

# Article analysis:

The article "Inventory management under price-based and stockout-based substitution" presents a mathematical model for inventory and pricing optimization for a firm selling two vertically differentiated products. The study considers both price-based and stockout-based substitution, where customers may switch to a substitute product if their preferred product is out of stock. The authors provide closed-form expressions for the endogenous substitution rates expressed as functions of price, specifically distinguished between upward and downward substitution.

The article provides valuable insights into the impact of considering stockout-based substitution on inventory strategy and profitability. The authors show that ignoring stockout-based substitution leads to lower selling prices for high-quality products, which can harm overall profitability. Moreover, it may lead to severe supply-demand mismatches. By considering stockout-based substitution, firms would reconsider their inventory strategy.

However, the article has some limitations that need to be addressed. Firstly, the study only considers a stylized two-product choice mainly to keep the model tractable and derive structural results that can be used to solve more complex problems with more than two products. Therefore, the findings may not be generalizable to other industries or situations with more than two products.

Secondly, the study assumes that customers' quality valuation follows a normal distribution with known mean and variance. However, in reality, customers' quality valuation may follow different distributions or have unknown parameters. Therefore, the findings may not hold in all situations.

Thirdly, the study assumes that customers' net utility from buying the two products is determined by the products' quality attributes and selling prices only. However, in reality, there may be other factors affecting customers' net utility such as brand loyalty or social status.

Finally, while the article provides insights into how considering stockout-based substitution affects inventory strategy and profitability, it does not consider potential risks associated with overstocking or understocking certain products due to asymmetric substitution behavior.

In conclusion, while the article provides valuable insights into the impact of considering stockout-based substitution on inventory strategy and profitability, it has some limitations that need to be addressed. Future research should consider more complex situations with more than two products and different distributions of customer valuation. Additionally, potential risks associated with overstocking or understocking certain products due to asymmetric substitution behavior should be considered.

# Topics for further research:

* Inventory management for multiple products
* Customer valuation distribution in inventory optimization
* Factors affecting customer net utility in pricing strategy
* Risk management in inventory optimization
* Asymmetric substitution behavior in inventory strategy
* Impact of brand loyalty on pricing and inventory strategy

# Report location:

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