

## Accepted Manuscript

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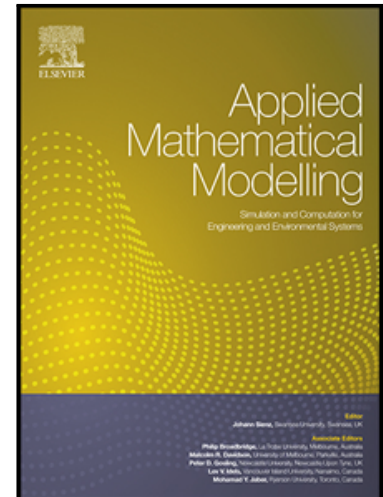
PII: S0307-904X(18)30074-X  
DOI: [10.1016/j.apm.2018.02.004](https://doi.org/10.1016/j.apm.2018.02.004)  
Reference: APM 12168

To appear in: *Applied Mathematical Modelling*

Received date: 8 February 2017  
Revised date: 7 February 2018  
Accepted date: 13 February 2018

Please cite this article as: Yongrui Duan, Yu Cao, Jiazhen Huo, Optimal pricing, production, and inventory for deteriorating items under demand uncertainty: The finite horizon case, *Applied Mathematical Modelling* (2018), doi: [10.1016/j.apm.2018.02.004](https://doi.org/10.1016/j.apm.2018.02.004)

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# Optimal pricing, production, and inventory for deteriorating items under demand uncertainty: The finite horizon case

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This paper aims to investigate the joint dynamic pricing and production decisions of deteriorating items with uncertain demand over a finite selling season, where the demand is price sensitive and the potential demand is characterized by a stochastic process. The stocks deteriorate physically at a constant fraction of the on-hand inventory. A joint dynamic pricing and production problem to maximize the total expected profit is modeled as a stochastic optimal control problem. We derive the closed-form solutions, which are in time-dependent linear feedback form of the inventory level when it is either positive or negative. It is shown that the manufacturer always benefits from a reduction in the volatility of potential market demand. In addition, to highlight the effectiveness of the joint dynamic strategy, we also consider the case of optimal production with a static price. A numerical example is presented to illustrate the validity of the optimal control policy, and sensitivity analysis on major parameters is performed to provide more managerial insights into deteriorating items.

**Keywords:** Deteriorating items, inventory control, dynamic production and pricing, stochastic process, closed-loop policy.

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