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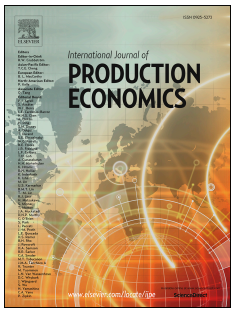

Machine replacement under evolving deterministic and stochastic costs

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Machine replacement under evolving deterministic and stochastic costs

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Abstract.

The infinite-horizon cost minimization and the real-option stopping problem are used to analyze serial replacement of a single asset under improving technology. It is shown that both techniques produce the same (equal life) replacement policy when exponential technological improvements affect the operating cost and new asset cost in the same way. Next, this result is extended to the stopping problem under evolving stochastic costs. Under general improving technology, the expected asset lifetimes appear to be different for sequential replacement cycles and depend on the future cost evolution. Numeric experiments are provided and managerial implications of the obtained outcomes are discussed.

Keywords: Stochastic replacement costs, improving technology, infinite-horizon optimization, real options, stopping problem

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