A Continuous-Review Inventory Model with Dual-Sourcing Strategy and Random Disruptions at the Primary Supplier

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We consider a continuous-review inventory problem for a retailer facing constant customer demand. This retailer can source from two suppliers who differ in the reliability and the costs they charge. Supplier 1, the primary supplier, is cheaper, but is subject to random disruptions; Supplier 2, the backup supplier, is more expensive, but is perfectly reliable. If Supplier 1 is available when the inventory level at the retailer reaches the reorder point, the retailer will order from Supplier 1. Otherwise, the retailer can either immediately reroute from Supplier 1 to Supplier 2, or wait for a while to see if Supplier 1 can recover from its disruption. We use $l$ ($l \geq 0$) to represent the cap of the retailer's waiting time before it reroutes to Supplier 2. We study the optimal inventory and sourcing strategy at the retailer, and show that under the continuous-review inventory policy, the retailer should use either safety stock or backup suppliers, but not both, to reduce the risks caused by random disruptions at the primary supplier.