

Inventory Policy Above Country Level for Cooperating Countries for Vaccines

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Abstract : The countries are the units that procure the vaccines during the COVID-19 pandemic. The delivered quantities are huge. The countries must bear the inventory holding cost according to the variation of stock quantities. This cost depends on the speed of the vaccination in the country. This speed is time-dependent. The vaccinated portion of the population can be approximated by the cumulative distribution function of the Cauchy distribution. A model is provided for determining the minimal-cost inventory policy, and its optimality conditions are provided. The model is solved for 20 countries for different numbers of procurements. The results reveal the individual behavior of each country. We provide an inventory policy for the pandemic period for the countries. This paper presents a deterministic model for vaccines with a demand rate variable over time for the countries. It is aimed to provide an analytical model to deal with the minimization of holding cost and develop inventory policies regarding this aim to be used for a variety of perishable products such as vaccines. The saturation process is introduced, and an approximation of the vaccination curve of the countries has been discussed. According to this aspect, a deterministic model for inventory policy has been developed.

Keywords : covid-19, vaccination, inventory policy, bounded total demand, inventory holding cost, cauchy distribution, sigmoid function

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