



Multi-Asset-Selling with Holding Costs and Discounting

Israel David¹ and Matan Shnaiderman²

¹ Department of Mathematics, HIT {Holon Institute of Technology}, Holon, Israel.

² Department of Management, Bar-Ilan University, Ramat-Gan, Israel

Abstract

In this work we examine the Operations Research problem of multi-asset-selling problem when holding costs are added. In this problem a seller has at hand n identical units to be sold one at a time to bidders. Bidders arrive sequentially in discrete time, each presenting a random bid amount, drawn from a known distribution function. The arrival process is an infinite horizon. Under these conditions an incentive to sell early stems from holding costs which are charged against unsold units. An incentive to sell late is the hope for a larger bid. Discounting of future revenues (as well as of future costs) also applies. The seller seeks optimal decision rules to maximize the total expected net profit from the sale of the n assets (items). We formulate these optimal accepting-rejecting rules (policies) and show how to compute their parameters. Monotonicity and concavity results are obtained. We then turn to optimal lot-sizing: the optimal number of items to purchase in the first place to sell to coming bidders. Explicit results for a number of bid distributions are presented that illustrate additional insights and quantify the impact of our results.

Keywords: dynamic programming, best choice, asset selling, optimal stopping