Optimal timing of price change with strategic customers under demand uncertainty: A real option approach

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A B S T R A C T

This paper proposes a model to determine the optimal markdown timing for a company with strategic customer purchasing behaviour. Since strategic customers are aware of potential markdown under the posted pricing scheme, they may choose to wait longer to maximise their utilisation instead of buying a product and fulfilling an instant surplus. On the other hand, the seller can delay the markdown decision until it is proved to be profitable and hence has an option to determine the timing. In estimating the value of the markdown decision, the seller's option needs to be estimated. However, the value of the option is hard to be captured by the conventional net present value analysis. Under market uncertainty where potential customer demand evolves over time, the seller's revenue function is in the form of a stochastic dynamic programming model. Applying a real option approach, we investigate the optimal price path and propose the optimal markdown threshold. Given the markdown costs incurred, we find that the optimal discount timing for the firm is determined by a threshold policy. Furthermore, our results show that if future market becomes more uncertain, the seller needs to wait longer or delay the markdown decision. In addition, the optimal threshold of the markdown decreases exponentially in a declining market, which explains the early markdown policy of some consumer product companies.

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Optimalen čas spremembe cene pri strateških kupcih v pogojih negotovega povpraševanja: Pristop resničnih možnosti

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POVZETEK

Ta članek predlaga model za določitev optimalnega znižanja cene za podjetje s strateškim nakupnim vedenjem kupcev. Ker se kupci zavedajo potencialnih znižanj v okviru sheme objavljenih cen, se lahko odločijo, da bodo čakali dlje in koristili svoje zaloge, namesto da bi kupili izdelek in dosegli takojšen presežek. Po drugi strani lahko prodajalec odloži odločitev o znižanju cene, dokler se ne izkaže, da je donosna, in ima torej možnost določiti čas. Pri ocenjevanju vrednosti znižanja cene je treba oceniti možnosti prodajalca. Vendar pa je vrednost znižanja cene težko določiti s konvencionalno analizo sedanje neto vrednosti. V tržni negotovosti, kjer se potencialno povpraševanje kupcev spreminja s časom, je prodajalčev prihodek lahko izražen kot funkcija v obliki stohastičnega modela dinamičnega programiranja. Z realističnim pristopom raziskujemo optimalno časovno spreminjanje cene in predlagamo optimalni prag znižanja cene. Glede na nastale stroške znižanja cene ugotavljamo, da je optimalni trenutek za znižanje cene za podjetje določen s pragovno politiko. Poleg tega naši rezultati kažejo, da bo moral prodajalec, če bo prihodnji trg bolj negotov, počakati dlje ali odložiti odločitev o znižanju cene. Poleg tega se optimalni prag znižanja cene na padajočem trgu eksponentno znižuje, kar pojasnjuje politiko zgodnjega znižanja cene nekaterih podjetij za potrošniške izdelke.