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Supply chain game analysis based on mean-variance and price risk aversion under different power structures

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ABSTRACT

In view of the random retail price and retailer's preference for retail price risk aversion, we used mean-variance to describe the uncertainty risk of retail price. To study the impacts of both the retail price uncertainty risk and retail price risk aversion preference on supply chain (SC) decision-making, we constructed a SC game model based on three different power structures, including Manufacturer Stackelberg (MS) game, Retailer Stackelberg (RS) game, and Vertical Nash (VN) game. The results showed that the retail price uncertainty risk and the retailer's retail price risk aversion preference weakened the manufacturer's production effort input, decreased the retailer's enthusiasm for ordering, and damaged the interests of manufacturer and retailer. Under the three different power structures, the production effort input of the manufacturer depended on the production effort affecting wholesale price efficiency and retail price efficiency. The retailer's expected utility was largest under the MS game model and smallest under the VN game model. The manufacturer's profits were closely related to each parameter under the three respective power structures. This study provides theoretical guidance for the decision-making of SC enterprises with retail price risk and retailer with retail price risk aversion preference under different power structure situations.

ARTICLE INFO

Keywords:
Supply chain game;
Mean-variance;
Retail price risk aversion;
Different power structures;
Game theory;
Vertical Nash game;
Retailer Stackelberg game;
Manufacturer Stackelberg game

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Analiza igre dobavne verige na podlagi povprečne variance in nenaklonjenost cenovnemu tveganju pod različnimi strukturami moči

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POVZETEK

Glede na spremenljivo maloprodajno ceno in prednost, ki jo imajo trgovci pri zmanjševanju tveganja za spremembo maloprodajne cene, smo za opis tveganja za spremembo maloprodajne cene, uporabili povprečno varianco. Da bi preučili vplive tveganja za spremembo maloprodajne cene in nenaklonjenost tveganju za spremembo maloprodajne cene na odločanje v dobavni verigi, smo izdelali model igre dobavne verige, ki temelji na treh različnih strukturah moči, vključno s Stackelbergovo igro proizvajalca (MS), Stackelbergovo igro trgovca (RS) in vertikalno Nashevo igro (VN). Rezultati so pokazali, da tveganje za spremembo maloprodajnih cen in trgovčeva nenaklonjenost tveganju za spremembo maloprodajnih cen oslabita proizvajalčev vložek v proizvodni proces, zmanjšata trgovčevo pripravljenost za naročanje ter škodita interesom proizvajalca in trgovca. Pri vseh treh različnih strukturah moči je bil proizvajalčev vložek v proizvodni proces odvisen od proizvodnega napora, ki je vplival na učinkovitost veleprodajne cene in učinkovitost maloprodajne cene. Pričakovan dobiček trgovca je bil največji pri modelu igre MS in najmanjši pri modelu igre VN. Dobiček proizvajalca je bil tesno povezan z vsakim parametrom v vseh treh strukturah moči. Ta študija zagotavlja teoretične smernice za podjetja o upravljanju dobavnih verig s tveganjem za spremembo maloprodajne cene in s trgovčevo nenaklonjenostjo tveganju za spremembo maloprodajne cene pod različnimi strukturami moči.

PODATKI O ČLANKU

Ključne besede:
Igra dobavne verige;
Povprečna varianca;
Nenaklonjenost tveganju za spremembo maloprodajne cene;
Različne strukture moči;
Teorija iger;
Vertikalna Nasheva igra;
Stackelbergova igra trgovca;
Stackelbergova igra proizvajalca

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