Pricing and sales-effort analysis of dual-channel supply chain with channel preference, cross-channel return and free riding behavior based on revenue-sharing contract

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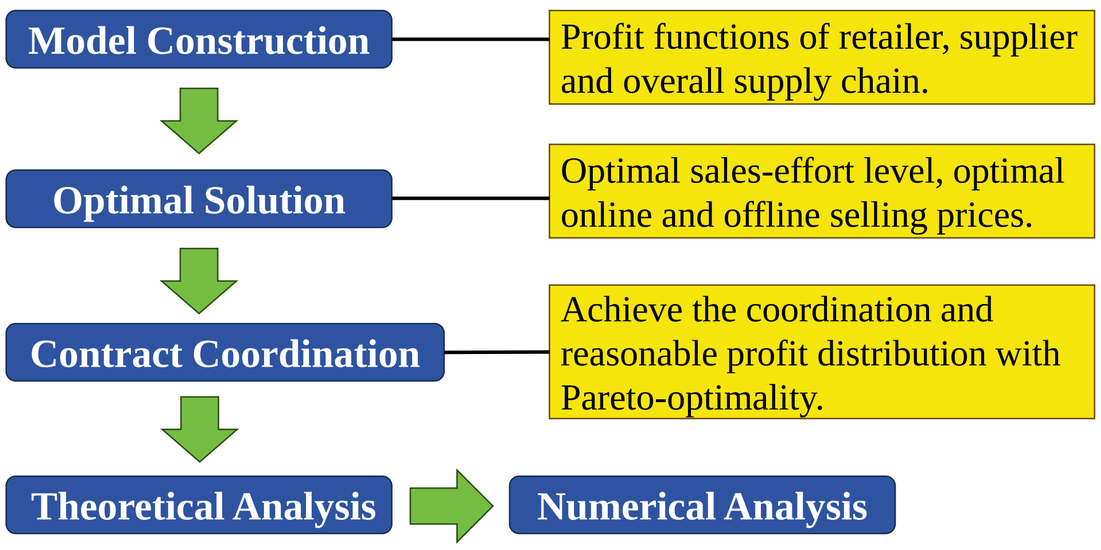
Introduction

- Offline stores can attract more customers through sales-effort, but some customers may purchase in online channels after enjoying the pre-sale service from offline stores, which results in the free-riding behavior (FRB)[1].
- Due to the long lead time of online returns, customers have potential demand for cross-channel return (CCR)[2].
- Financing difficulties of small and medium-sized enterprises (SMEs) have become the key barrier of their development, and even the whole supply chain[3].
- If the supply chain intends to achieve the optimal performance, it has to alleviate the conflict among the supply chain members[4].

Objectives

- Propose a trade credit financing (TCF) scheme to solve the capital constraint of the retailer, and discusses the effect of channel preference, sales-effort, FRB and CCR on the pricing decisions and the optimal performance of the dual-channel supply chain.
- Propose a revenue-sharing contract to coordinate the supply chain members, so as to reduce channel conflicts and improve the profits of both channels.

Methods



Results

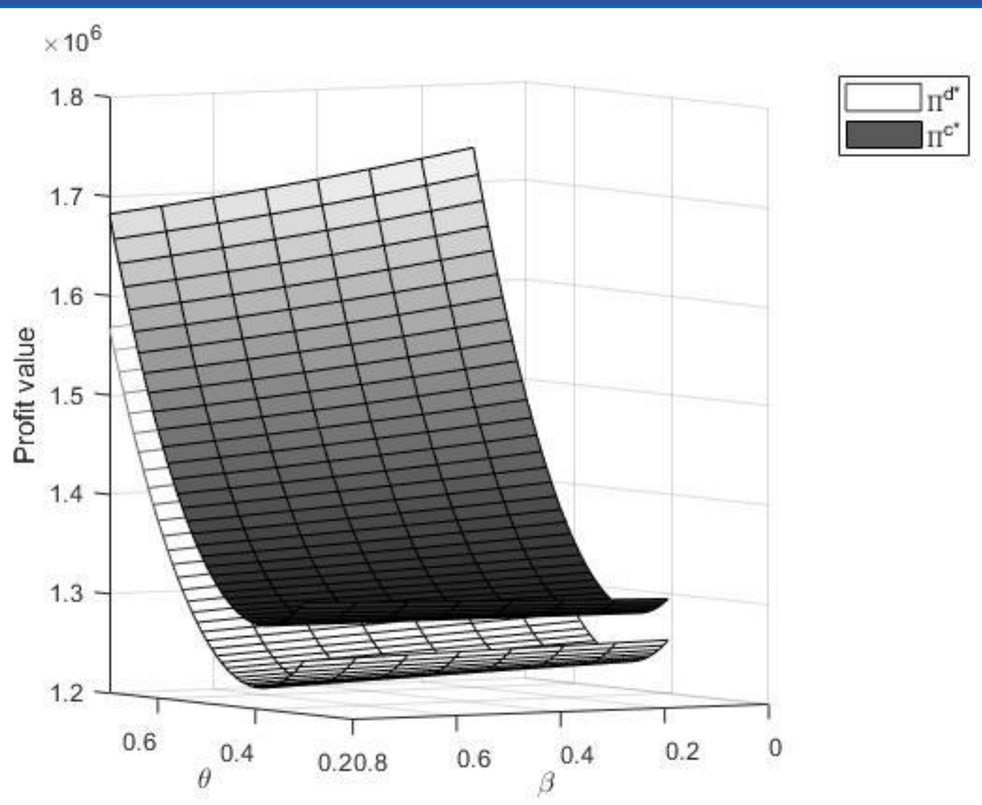


Figure 1. Π^{d*} and $\Pi^{c*}$with θ and β

Π^{d*} and Π^{c*} are the overall supply chain profits under the decentralized and centralized decisions, θ is offline channel preference proportion, and β is free riding coefficient of the supplier.

Results

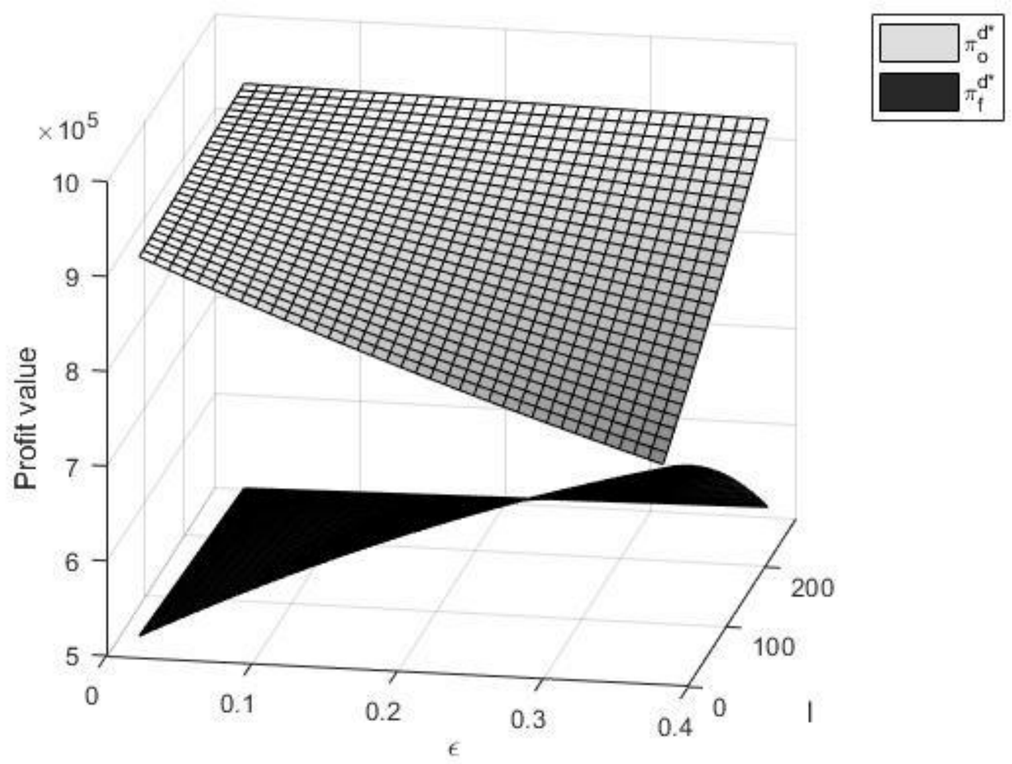


Figure 2. π_o^{d*} and π_f^{d*} with ε and l

π_o^{d*} and π_f^{d*} are the optimal profits of the supplier's online channel and the retailer's offline channel, ε is the proportion of CCR, and l is unit contribution to the supplier of the CCR products.

Table 1. Coordination analysis

u	π_f^u	π_o^u	Π^{c*}
0.05	435780	1097700	1533500
0.07	458890	1074600	1533500
0.09	482000	1051500	1533500
0.11	505110	1028400	1533500
0.13	528220	1005300	1533500
0.15	551330	982170	1533500

u is the supplier's revenue sharing ratio, and π_f^u and π_o^u are the profit functions of the retailer and the supplier with revenue sharing contract.

Conclusions

- It is vital for the dual-channel members to propose some rules so as to control or avoid FRB when consumers have a high offline channel preference in real business.
- The members need to negotiate with each other to set a lower unit contribution to the supplier of the CCR products if more consumers use CCR service.
- Revenue sharing contract can well coordinate the supply chain members with TCF.

References

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