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# When should e-commerce platform facilitate green information disclosure?

## A game theoretical model

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### 1. INTRODUCTION AND RESEARCH QUESTIONS

To promote consumers to buy green products, some large e-commerce platforms such as Tmall and JD have taken measures to facilitate green information disclosure for products selling in their marketplaces. These measures include but are not limited to highlighting product green information and labeling green products on the search pages. With product green information disclosure facilitation, consumers can better receive and get green information, which pushes them to buy green products. This is the bright side. Regarding the dark side, one may list the cost of information disclosure facilitation. In this study, we normalize the cost of facilitating information disclosure to zero and aim to capture how the platform's facilitation of information disclosure affects the upstream manufacturer competition, which may make the platform not to facilitate green information disclosure. Besides, two online retail pricing models are mainly used by e-commerce platforms: wholesale model and agency model. In the agency model, manufacturers sell products directly to consumers on the platform, and the platform, such as Tmall, charges a commission; in the wholesale model, the platform, such as JD, buy products from competing manufacturers and resell them to consumers (Kwark et al., 2017, Sun and Ji, 2022).

In this paper, we aim to answer the following three research questions: 1) Under what conditions should the e-commerce platform choose to facilitate green information disclosure for products selling in its marketplace? 2) How does the disclosure facilitation of the platform affect manufacturers and consumers? 3) How do the answers to the above two questions differ between the wholesale model and the agency model?

### 2. THEORY AND RESEARCH FRAMEWORK

Three streams of research are closely related to our study: information disclosure in e-commerce platforms, green supply chain management and online pricing models. By reviewing related literature, we notice that more and more studies have begun to pay attention to the information disclosure of e-commerce platforms (such as, Hao and Tan 2018; Yu et al. 2022) and green supply chain management (such as, Cohen et al. 2016; Hong et al. 2018), but few studies look at the e-commerce platform's facilitation of green information disclosure in the competition situation. Therefore, we do this research and study the conditions for the platform to facilitate green information disclosure and reveal its impact on other stakeholders in both wholesale and agency pricing models.

We develop a game theoretical model by considering a green manufacturer and a non-green manufacturer selling two competing products to a continuous of consumers via the e-commerce platform. We use Hotelling model to capture the competition between manufactures. The timeline of game is as following. In the agency pricing model, the platform first determines whether to facilitate green information disclosure. Then, the manufacturers set the retail prices. Last, consumers decide whether to make a purchase. The timeline in the wholesale pricing model is similar to that of the agency pricing model except for the pricing setting stage, where the manufacturer sets the wholesale prices, then the platform decides the retail prices. We solve the game using backward induction and derive the equilibrium solutions in both the wholesale and agency models.

### 3. RESULTS AND MAJOR FINDINGS

Our analyses yield several interesting findings. In the wholesale pricing model, the platform should facilitate green information disclosure when the competition level between manufacturers is high. However, the competition level between manufacturers does not matter in the agency pricing model. Specifically, when the commission rate is small, the platform chooses to facilitate green information disclosure in the agency pricing model. Overall, our results suggest that facilitating green information disclosure has a subtle interplay with the pricing model adopted by the e-commerce platform. Besides, we also find that the e-commerce platform's disclosure facilitation of green information boosts the demand and the price of green product in both wholesale and agency pricing models.

### 4. CONTRIBUTIONS

This study investigates an e-commerce platform's incentives to facilitate green information disclosure and sheds light on revealing the interaction between green information disclosure facilitation decision and the pricing model adopted by the e-commerce platform. Our research has several managerial implications. First, we underscore the importance of e-commerce platform owners' tailoring their green information disclosure facilitation for products selling in their marketplace. The key factors should be considered include the adopted pricing model, the commission rate, and the competition level between upstream manufacturers. Second, our results indicate that the platform's green information disclosure facilitating can indeed help to increase the demand for green products, which means that this kind of strategies should be encouraged by social planners who aim to boost green consumption. Third, it is noted that non-green manufacturers are hurt by the platform's green information disclosure facilitation. This is two-fold. On the one hand, these non-green manufacturers may quit the existing platform and switch to another. On the other hand, the platform's green information disclosure facilitation can push non-green manufacturers to carry out green transformation and produce green products.

As one of the first studies on examining whether an e-commerce platform should facilitate green information disclosure in both the agency and the wholesale pricing models, we use a stylized model to capture the key trade-off in the paper. There are a few future directions, such as, 1) adding the hybrid model in which one manufacturer cooperates with the platform using the wholesale pricing model and the other uses the agency pricing model and 2) optimizing manufacturers' production decisions.

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