Marketplace or Reseller? Optimal Platform Model under Disintermediation

Danhou Li* and Jinan Lin†

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Abstract. This paper examines how a platform facing disintermediation (marketplace leakage) optimally deploys a hybrid business model that combines marketplace and reseller functions. We develop a game-theoretic framework featuring a monopolistic platform and an integrated supplier acting as a wholesaler to the platform and a retailer to consumers. Consumers who discover the supplier on the marketplace can bypass the platform and purchase from the supplier's direct channel, creating a leakage problem for the platform. Additionally, demand uncertainty exposes the platform to inventory risk, which prevents it from adopting a pure reseller mode. In equilibrium, the supplier sets a wholesale price such that the platform optimally deploys the hybrid model, balancing the risk-free marketplace mode and the higher-margin reseller mode. Notably, the platform's reseller intensity exhibits an inverted-U relationship with consumers' leakage propensity: beyond a threshold, a worsening leakage problem shifts the platform back toward the marketplace mode. Extending the baseline analysis, we further examine scenarios in which the platform implements a non-hybrid business model. In particular, the platform deviates to a pure reseller mode if the supplier can costlessly implement a product return policy, but prefers a pure marketplace mode when it can invest in transaction benefits at a sufficiently low cost or when it faces fierce supplier competition.

Keywords: disintermediation, showrooming, hybrid platforms, two-sided markets.

*Department of Economics, National University of Singapore, E-mail: danhou@u.nus.edu
†Wisconsin School of Business, University of Wisconsin–Madison, E-mail: jinan.lin@wisc.edu

1 Introduction

Two-sided platforms or intermediaries typically generate profit through two primary models: operating as a pure marketplace that charges transaction fees, or operating as a reseller that procures and resells products. The choice between these two modes reflects trade-offs regarding whether a platform allocates decision rights to third-party sellers or retains them itself. In practice, rather than committing exclusively to either mode, many digital platforms adopt a hybrid business model that integrates both marketplace and reseller functions. Prominent examples include Amazon, JD.com, and Walmart,[1] which provide a marketplace for third-party sellers while also operating their own first-party stores. On the other side of the same coin, suppliers (manufacturers) routinely operate as a wholesaler that sells to platforms (B2B) and a retailer that sells to consumers (B2C). Moreover, in addition to running flagship stores on a platform's marketplace, suppliers may also retail through their own sites and apps. On JD.com, for instance, major electronics brands commonly appear in JD's first-party assortment and as marketplace flagship stores while also selling through their own channels.

Given that platforms charge transaction fees for products sold on their marketplaces, suppliers are motivated to bypass the intermediary and directly sell to consumers in their own channel once an initial match has been made. This disintermediation problem, commonly referred to as marketplace leakage or showrooming, arises when consumers discover suppliers through the platform's marketplace but complete transactions off-platform. Disintermediation is a common issue faced by platforms with the marketplace function (Hagiu and Wright, 2024).

The prior literature on platforms and intermediaries has explored the strategic choice between the marketplace and reseller modes as well as the adoption of the hybrid business model (Hagiu and Wright, 2015; Tian *et al.*, 2018; Gautier *et al.*, 2023; Hervas-Drane and Shelegia, 2025). Moreover, existing work has studied platforms' pricing strategies under marketplace leakage (Hagiu and Wright, 2024; Enache and Rhodes, 2025). Despite

[1] While Amazon started as a first-party retailer, 58% of physical gross merchandise sold on Amazon were from third-party sellers in 2018. Accessed from `https://www.aboutamazon.com/news/company-news/2018-letter-to-shareholders`; JD describes its e-commerce business as online retail and online marketplace. In the online retail business, they acquire products from suppliers and sell them directly to customers primarily through their mobile apps and websites. In the online marketplace business, third-party merchants sell products to customers primarily through our mobile apps and websites. Accessed from `https://www.sec.gov/Archives/edgar/data/1549802/000119312524143295/d800576dex992.htm`; Walmart is a direct retailer and also operates a third-party marketplace. Its 2025 10-K describes Walmart's own merchandise categories and separately states that some of the products customers buy from our website are sold by third parties, which Walmart calls marketplace transactions. Accessed from `https://www.sec.gov/Archives/edgar/data/104169/000010416925000021/wmt-20250131.htm`

the prevalence of hybrid platforms and the persistent threat of disintermediation, the economic mechanisms governing how platforms optimize their business models in the face of disintermediation remain largely underexplored. This paper bridges this gap by examining how the threat of leakage challenges the pure marketplace model and providing novel insights into the platform's adoption of a hybrid business model as an endogenously determined strategy. Specifically, we show that the hybrid business model arises not as an upfront design choice, but as the platform's inventory-choice response to the wholesale price of a supplier empowered by leakage.

In this paper, we develop a game-theoretic framework featuring a monopoly platform and a monopoly supplier to study how marketplace leakage affects the platform's optimal business model. The supplier functions as both a wholesaler and a retailer, selling its product through three distinct channels: wholesale to the platform, retail via the platform's marketplace, and its own direct channel. Importantly, the platform endogenously determines its business model, choosing among two pure operating modes and a hybrid configuration. As a marketplace, it charges a transaction fee to the supplier; as a reseller, it procures a specific quantity of the product from the supplier and resells it to consumers at a chosen resale price. In addition to marketplace leakage, we incorporate a second fundamental friction commonly faced by platforms: uncertainty of consumer demand.[2] Within our framework, the platform makes its procurement decision prior to the realization of actual market demand. Consequently, demand uncertainty affects the platform's optimal business model through two channels: directly, via the platform's own exposure to inventory risk, and indirectly, through the supplier's adjustment of the wholesale price. Furthermore, the platform acts as a gatekeeper with recommendation power: it can choose whether to make its own procured inventory or the supplier's marketplace listing visible to consumers through product recommendations. Specifically, consumers who receive a recommendation for the platform's product observe the resale price and are unaware of the supplier on the marketplace or in the direct channel, while those who receive a recommendation for the supplier's product observe the supplier's prices on the marketplace and in the direct channel. Therefore, in our framework, prioritizing its own inventory in recommendations defends the platform against disintermediation.

Our main finding shows that under the dual pressures of leakage and demand uncertainty, the platform optimally adopts the hybrid model in equilibrium. The distinct

[2]Inventory risk is a key distinction between the two modes. Under the reseller model, the platform obtains control over goods before they are transferred to customers, acts as the principal, and recognizes revenue on a gross basis. Under the marketplace model, the platform does not take ownership of inventory, acts as the agent, and records only the net commission as revenue. Accessed from https://www.sec.gov/Archives/edgar/data/1834584/000183458425000030/cpng-20241231.htm

economic forces underlying the two pure operating modes drive this result. On one hand, the pure reseller mode is highly profitable for both the platform and the supplier. Because it centralizes the retail transaction, the reseller mode eliminates the economic inefficiencies caused by consumers' switching costs and minimizes consumer surplus, thereby maximizing joint industry profits. However, the reseller mode forces the platform to bear inventory risk: since the platform makes its procurement decision prior to the realization of actual market demand, the platform incurs loss on unsold goods if demand falls below the procured quantity. On the other hand, the pure marketplace mode possesses a critical advantage: it shields the platform from the inventory risk, as the platform only facilitates transactions without taking ownership of inventory. In the baseline model, the supplier's equilibrium wholesale price provides the platform with a resale margin that exceeds the marketplace margin. Consequently, the platform procures a positive quantity while the inventory risk prevents it from adopting a pure reseller mode, implying a hybrid business model in equilibrium. This paper thus provides a novel insight for why platforms optimally adopt a hybrid business model combining both marketplace and reseller functions.

A key distinction of our framework lies in the specification of market power. While the extant literature predominantly treats the supplier as a price-taker vis-à-vis the platform, our model accounts for bilateral market power. Specifically, leakage provides the supplier market power to determine the wholesale price. Consequently, the platform's adoption of the hybrid model emerges endogenously as an equilibrium outcome of the strategic interplay between the two parties. Furthermore, our comparative statics reveal that as a consumer's leakage propensity increases (i.e., switching costs become lower) or as demand becomes less uncertain (i.e., inventory risk declines), the supplier's equilibrium wholesale price increases. Interestingly, as a consumer's leakage propensity increases, the platform's business model can shift toward the marketplace mode (i.e., procurement decreases), highlighting the nuanced interaction between the supplier's wholesale pricing and the platform's procurement decision.

To establish the robustness of our main finding and delineate its boundaries, we extend the baseline model along four dimensions. First, we show that when the platform transacts with independent suppliers comprising an pure wholesaler and a pure retailer, the hybrid model remains optimal under leakage and demand uncertainty. Second, we introduce a supplier-provided return policy for unsold inventory so that the platform's procurement cost is no longer fully sunk, partially mitigating its inventory risk. We find that if providing such a policy is not strictly costless for the supplier, full returns never arise in equilibrium. Consequently, the platform continues to bear inventory risk and the hybrid model remains optimal. Third, we endogenize the platform's investment in transaction benefits that consumers exclusively enjoy when purchasing on-platform. This reveals a critical boundary condition: when the cost of investing in these benefits is sufficiently low, the platform optimally reverts to a pure marketplace; otherwise, the hybrid model prevails. Finally, we incorporate supplier competition, i.e., the platform faces multiple suppliers that are heterogeneous in marginal costs and in their abilities to induce leakage. We find that the supplier with the lowest marginal cost consistently wins the market. Notably, a supplier's relative ability to induce leakage does not alter this competitive outcome.

Our analysis yields several managerial implications. The hybrid mode is frequently optimal, yet the relationship between disintermediation risk and the platform's reseller share can be non-monotone. Specifically, platforms facing intermediate leakage propensity can derive substantial profits from reselling, whereas those facing very low or very high leakage propensity may operate predominantly as marketplaces. From the supplier's perspective, maintaining a direct channel that induces leakage confers greater market power, while in competitive settings, entry and displacement depend solely on cost advantage rather than the ability to induce leakage.

The remainder of this paper is organized as follows. Section 2 summarizes the related literature on platform business models and platform leakage. Next, Section 3 presents the baseline model and derives the comparative statics with respect to leakage propensity and demand uncertainty. Subsequently, Section 4 extends the baseline model to incorporate non-integrated suppliers, return policies, investment in transaction benefits, and competing suppliers. Finally, Section 5 proceeds to the managerial implications, and Section 6 concludes.

2 Literature Review

This paper contributes to the extensive literature on platform business models, which traditionally examines the strategic trade-off between operating as a pure marketplace versus a traditional reseller (Hagiu and Wright, 2015; Abhishek *et al.*, 2016; Hu *et al.*, 2022). Increasingly, however, platforms are deviating from these pure modes (i.e., choosing between a marketplace and a reseller) to adopt a "hybrid" structure, concurrently hosting third-party suppliers and retailing their own products. Existing studies attribute this structural shift to various theoretical and operational drivers, including pessimistic expectations about supplier participation and the information disadvantage of platforms (Hagiu and Wright, 2015), upstream supplier competition and order-fulfillment costs (Tian *et al.*, 2018), consumer search dynamics across centralized and decentralized markets (Gautier *et al.*, 2023), and the need to manage internal capacity alongside third-party competition via storefront control (Hervas-Drane and Shelegia, 2025).

The chosen operational mode significantly alters the platform's strategic interactions with its ecosystem. For instance, the marketplace mode provides stronger incentives for information sharing (Zha *et al.*, 2023), while hybrid platforms demonstrate strategic flexibility by adjusting fees in response to third-party supplier cooperation (Bisceglia and Padilla, 2023). The literature also highlights the consumer welfare implications of these structural choices, demonstrating how first-party sales affect retail prices and product variety (Anderson and Bedre-Defolie, 2022, 2024). We expand upon this stream by introducing marketplace leakage and demand uncertainty as novel fundamental drivers that compel platforms to adopt a hybrid structure, even when facing a monopolistic supplier.

The early literature on disintermediation and leakage primarily focused on manufacturers mitigating retail free-riding across traditional channels (Telser, 1960; Mathewson and Winter, 1984), offline showrooming (Mehra *et al.*, 2017; Jing, 2018), and consumer search across multiple online and offline channels (Wu *et al.*, 2004; Loginova, 2009; Balakrishnan *et al.*, 2014; Bar-Isaac and Shelegia, 2023). Our setting is distinct in that leakage arises from consumers bypassing a platform to purchase from the exact same supplier via its direct channel. Consequently, this study connects to a growing body of theoretical work modeling online platform leakage. Seminal works have explored various platform countermeasures, including buyer heterogeneity and partial leakage (Hagiu and Wright, 2024), "front-loaded" pricing schemes for repeated transactions (Enache and Rhodes, 2025), and robust refund policies coupled with reduced supplier screening (Casner, 2024). A significant focus has also been placed on the welfare implications of price-parity clauses (PPCs) and cross-channel coherence as tools to combat disintermediation (Peitz and Sobolev, 2024; Boorsma, 2023; Wang and Wright, 2020). Although Hagiu *et al.* (2022) also examine a platform's optimal operational mode in the presence of a seller's direct channel, the platform commits to its chosen mode in their framework. In contrast, we allow the platform to endogenously determine its business mode contingent upon observing the wholesale price set by the supplier.

Complementing these theoretical models, empirical studies confirm the prevalence and consequences of leakage across diverse digital platforms (Cai *et al.*, 2023; Sullivan, 2025). Leakage has been widely documented in freelancing (Gu and Zhu, 2021), peer-to-peer healthcare (Zhou *et al.*, 2022), cargo delivery (Xie and Zhu, 2023), and pet care services (Farronato *et al.*, 2024). This literature identifies trust and technology as key enablers; as users build trust and technology facilitates direct communication, the platform's protective value proposition diminishes (Gu, 2024). Crucially, a platform's vulnerability depends heavily on transaction and user characteristics. While immediate, unpredictable services resist disintermediation (Edelman and Hu, 2016), services that are repeated, standardized, or require close coordination are highly susceptible (Gu and Zhu, 2021; Hagiu and Wright, 2024). Furthermore, experienced providers with loyal customer bases (Zhou *et al.*, 2022), as well as new suppliers experiencing a surge in sales (Chintagunta *et al.*, 2023), are disproportionately likely to bypass the platform.

Despite robust independent streams of literature on platform business models and disintermediation, their intersection remains under-explored. Most relevant to this study, Hagiu and Wright (2015) call for future research to relax the assumption that buyers must go through the intermediary to connect with suppliers so that leakage can challenge the profitability of the pure marketplace mode. Hagiu and Wright (2024) provoke a research direction in exploring how platform leakage may lead marketplaces to adopt a more radical change in business model–that is, to stop being marketplaces altogether and instead provide the product or service themselves. This work responds to the calls from Hagiu and Wright (2015) and Hagiu and Wright (2024) by endogenously embedding the choice of intermediary mode into a framework of platform leakage. We demonstrate how leakage reshapes the platform's optimal business model and provide novel insights into why a platform may optimally adopt a hybrid structure that integrates both marketplace and reseller functions. Importantly, a key distinction of our framework lies in the market power of the supplier. While prior literature predominantly models the supplier as a price-taker vis-à-vis the platform, our model endows both parties with bilateral market power. That is, the supplier can set its wholesale price strategically, enabled by its ability to induce leakage. Consequently, the platform's adoption of a hybrid model emerges endogenously as an equilibrium outcome of the strategic interplay between both parties.

3 Baseline model

3.1 Assumptions

Consider a monopoly platform M, a monopoly supplier (manufacturer) S and a continuum of consumers. S produces one product and each consumer seeks to purchase one unit of the product. The product is valued at v by all consumers and it incurs a marginal cost of c, where $v > c$.

We model S as an integrated supplier that functions as both a wholesaler and a retailer. Specifically, S can sell its product to M or consumers through three channels: (i) wholesale to M, (ii) retail to consumers via M's marketplace, and (iii) retail through its own direct channel. Thus, S sets three different prices: a wholesale price w, a retail price on the platform p_m, and a retail price in its direct channel p_d. The platform M can choose to operate as a marketplace, a reseller, or both. As a marketplace, M charges a per-unit transaction fee f to S for transactions completed on the marketplace.[3] As a reseller, M procures a quantity q_m of the product from S and resells the product to consumers at a resale price p_{resale}. Importantly, M can choose whether to make its own product (procured from S) or S's product available to consumers through product recommendations.

Upon joining M, consumers receive a product recommendation from M. If consumers receive a recommendation for M's product, they observe M's resale price p_{resale} but remain unaware of S's presence either on the marketplace or in the direct channel. Consequently, these consumers choose to buy M's product or exit the market, obtaining a utility of zero. If consumers receive a recommendation for S's product, they observe the supplier's marketplace price p_m and the direct price p_d. These consumers then decide whether to purchase on the marketplace, switch to the direct channel, or exit the market.[4] This recommendation-gated discovery structure is a deliberate abstraction of default prominence on digital platforms: buy-box assignment, algorithmic ranking, and featured placement determine which offer the marginal consumer actually evaluates. It is most apt where the first-party listing does not make the supplier's identity and direct channel salient, or where search costs for the brand's own channel are non-trivial. One implication is worth stating explicitly: leakage in our model arises only among the residual demand the platform itself routes to the supplier, so disintermediation is partly an outcome of the platform's own recommendation policy rather than involuntary showrooming.

Consumers have a preference for using M and face a switching cost (disutility) s when buying directly from S, which is drawn from a distribution $G(s)$ over the support $[0, \mu]$. Consumers thus have a heterogeneous net valuation $v - s$ when purchasing from the direct channel. Importantly, the total consumer demand q is uncertain and is drawn from a distribution $H(q)$ over the support $[\underline{q}, \bar{q}]$, where $0 \leq \underline{q} < \bar{q}$.[5] The consumer demand can be interpreted in multiple ways without changing our results. For expositional simplicity, we interpret demand as the mass of consumers in the market. The actual demand is realized after M and S set prices and before M makes product recommendations. Although both M and S face demand uncertainty, the associated inventory risk is borne by M, which must commit to a procurement quantity prior to the realization of market demand. This ex-ante

[3]Since consumers have a common valuation, assuming M charges a percentage transaction fee (commission) does not change our analysis. We discuss the details in the proof of Lemma 1.

[4]This assumption formalizes the platform's gatekeeping role, where recommendations serve as a prerequisite for supplier discovery. This setup follows the literature on platform steering and leakage (e.g., Hagiu *et al.*, 2022; Hagiu and Wright, 2024).

[5]We assume that $G(\cdot)$ and $H(\cdot)$ are continuously differentiable.

capital commitment typically arises from the contractual arrangement between the platform and the supplier. By contrast, we model S's production process as make-to-order. This specification reflects the operational reality of a manufacturer that controls production timing and benefits from demand pooling across the platform's wholesale orders, the marketplace, and its own direct channel.

The timeline is as follows: (i) M sets the per-unit transaction fee f and S sets the wholesale price w simultaneously; (ii) given w, M decides the quantity q_m of the product to procure from S; (iii) M sets its resale price p_{resale} and S decides whether to list its product on the marketplace, setting the marketplace and direct-channel retail prices, p_m and p_d respectively, if it chooses to enter; (iv) the actual demand q is realized, and upon observing q, p_m, and p_d, M makes product recommendations to consumers[6]; and (v) consumers draw their switching cost s, receive product recommendations, and observe the prices, after which they make purchase decisions.

Table 1 summarizes the key parameters and decision variables of the model.

3.2 Baseline analysis

Consumers' purchase decision. After joining the platform, consumers who receive the recommendation for M's product only observe the resale price p_{resale} and do not know of the existence of S on the platform or of the direct channel. As a result, they purchase M's product if and only if the resale price does not exceed their valuation, i.e.,

$$v \geq p_{resale}.$$

Buyers who receive the recommendation for S's product observe the product price on the platform p_m and the price in the direct channel p_d. Each buyer draws a switching cost (disutility) s from $G(s)$ and purchases one unit of S's product from the direct channel if and only if purchasing from the direct channel derives higher utility than staying on the platform:

$$v - p_d - s \geq max\{v - p_m, 0\}.$$

Retail prices. The platform M and the supplier S set retail prices simultaneously. Before solving for the optimal prices, we eliminate weakly dominated strategies and present the conditions that the optimal prices, transaction fee, S's entry decision and M's recommendation mechanism must satisfy in the following lemma (proof is in the appendix).

[6]The platform's (in)ability to observe the direct price when making recommendations does not change the baseline analysis because the platform always recommends its own product to consumers first, as we discuss later.

Table 1: Summary of parameters and decision variables

Notation	Definition and Role in the Model
Parameters	
$G(\cdot)$	CDF of consumers' switching cost
$H(\cdot)$	CDF of consumer demand
μ	Upper bound of consumers' switching cost
$\underline{q}, \bar{q}$	Lower and upper bounds of consumer demand
v	Consumers' valuation for the product
c	Supplier's marginal cost to produce the product
θ	Mean of consumer demand
δ	Half-width of the distribution of consumer demand
β	Recovery rate of cost for unsold product (in the extension of return policy)
k	Cost coefficient of transaction benefits (in the extension of investment in transaction benefits)
c_w, c_r	Marginal costs of the wholesaler and retailer (in the extension of non-integrated suppliers)
c_1, c_2	Marginal costs of the low-cost and high-cost suppliers (in the extension of competing suppliers)
Decision Variables	
f	Platform's transaction fee
w	Supplier's wholesale price
q_m	Platform's procurement quantity
p_{resale}	Platform's resale price
p_m	Supplier's retail price on the marketplace
p_d	Supplier's retail price in the direct channel
q_r	Maximal return quantity chosen by the supplier (in the extension of return policy)
b	Transaction benefits invested by the platform (in the extension of investment in transaction benefits)
f_1, f_2	Transaction fees charged to the low-cost and high-cost suppliers (in the extension of competing suppliers)
q_{m1}, q_{m2}	Quantities procured by the platform from the low-cost and high-cost suppliers (in the extension of competing suppliers)

Lemma 1. *S's optimal prices and M's optimal resale price and transaction fee satisfy $p_m = p_{resale} = v$, $v - \mu \le p_d \le v$, and $0 < f \le v - c$. Moreover, S always enters the marketplace and M always prioritizes its own product when making recommendations.*

Since the consumer demand can fall below M's procurement and the unsold inventory cannot generate any value for M, the procurement cost is sunk at the time when M makes product recommendations. Consequently, by charging $p_{resale} = v$ and recommending its own product to consumers, M's marginal profit is v. In contrast, the profit from recommending S's product is f multiplied by the probability of an on-platform transaction, which is less than v as $f \le v - c$. As a result, when realized demand falls below M's procurement quantity, M exclusively recommends its own product. Conversely, when demand exceeds the procurement quantity, M prioritizes its own product to meet demand up to the inventory limit and then recommends S's product to serve the residual demand. Thus, there is no price competition between M and S, and hence S charges $p_m = v$ to maximize its profit. Self-preferencing insulates the platform's reseller arm from retail competition with its own supplier, so the only cost of reselling is inventory risk. The platform's mode choice therefore trades off leakage against demand uncertainty rather than against head-to-head price competition — a feature specific to intermediaries that control discovery.

Given $p_m = p_{resale} = v$, S sets the direct price to maximize its total profit from selling the product to M and to consumers, including sales on the platform and in the direct channel:

$$\pi(p_d) = q_m(w - c) + \int_{q_m}^{\bar{q}} (q - q_m)((p_d - v + f)l(p_d) + v - c - f)dH(q),$$

where

$$l(p_d) = G(v - p_d),$$

is the probability of leakage conditional on a consumer receiving the recommendation for S's product.[7] Intuitively, when p_d is higher, consumers are more likely to stay on M and therefore the leakage proportion decreases. In particular, if S charges $p_d = v$, no consumer will switch to the direct channel.

Given S's profit function, the first-order condition (FOC) yields

$$p_d(f) = v - f + \frac{G(v - p_d(f))}{g(v - p_d(f))}.$$

[7] $G(\cdot)$ is the CDF of consumers' switching cost and $g(\cdot)$ is the corresponding PDF.

When $G(\cdot)$ is well behaved, the FOC yields a unique, interior profit-maximizing direct price ($p_d(f) < v$) for any $f > 0$. Consequently, M cannot eliminate leakage simply by charging a positive transaction fee. We say that M faces a marketplace leakage (disintermediation) problem in such cases; and a sufficient condition is that $G(\cdot)$ is log-concave.[8] In addition, given the transaction fee satisfying $f > 0$, $p_d(f)$ is decreasing in f. Since we show that S's optimal direct price is greater than $v - \mu$ in Lemma 1, S's profit-maximizing direct price is given by

$$p_d^*(f) = \max\{p_d(f), v - \mu\}. \tag{1}$$

The procurement quantity. Given the optimal direct price above and the optimal retail prices characterized in Lemma 1, M chooses the procurement quantity q_m to maximize its profit, which consists of two components: the profit made from reselling the product as a reseller and the profit from charging the transaction fee as a marketplace. Specifically,

$$\Pi(q_m) = \begin{cases} q_m\,(v-w) + \int_{\underline{q}}^{\bar{q}} (q - q_m)\varphi(f)dH(q) & \text{if} \quad q_m \le \underline{q} \\ \int_{\underline{q}}^{q_m} qvdH(q) + \int_{q_m}^{\bar{q}} q_m v + (q-q_m)\varphi(f)dH(q) - q_m w & \text{if} \quad \underline{q} \le q_m \le \bar{q} \end{cases},$$

where

$$\varphi(f) \equiv (1 - l(p_d^*(f)))f$$

is M's marketplace margin from recommending S, and $p_d^*(f)$ is as specified in equation (1).[9] For brevity, we suppress the argument f and write φ to denote $\varphi(f)$ in the subsequent analysis. If $q_m \le \underline{q}$, M's procurement quantity is lower than the minimal consumer demand and therefore M can sell its entire inventory. If $q_m > \underline{q}$, M faces the risk that it cannot sell out its inventory when the actual consumer demand is lower than the procurement quantity.

By solving M's profit maximization problem, we obtain the optimal procurement quantity

$$q_m^*(f, w) = \begin{cases} 0 & \text{if} \quad w > v - \varphi \\ H^{-1}\left(1 - \frac{w}{v-\varphi}\right) & \text{if} \quad w \le v - \varphi \end{cases}. \tag{2}$$

M procures a positive quantity when the resale margin $v - w$ exceeds the marketplace margin φ. Moreover, M faces no risk of consumer demand if $q_m \le \underline{q}$. Thus, M's optimal procurement quantity is at least $H^{-1}(0) = \underline{q}$ if $w \le v - \varphi$. However, if $q_m > \underline{q}$, M faces the

[8] If $G(\cdot)$ is log-concave, then $\frac{G(v-p_d)}{g(v-p_d)}$ is decreasing in p_d and $\lim\limits_{p_d \to v} \frac{G(v-p_d)}{g(v-p_d)} = 0$.

[9] Throughout this paper, M's marketplace margin refers to the expected profit M makes from recommending S's product to one consumer and charging the transaction fee with the consideration of potential leakage.

risk that the actual demand is lower than its procurement quantity. Consequently, when $w \leq v-\varphi$, M's optimal procurement quantity is the result of trade-off between the higher resale margin and the risk of redundant procurement, and $v-\varphi$ can be considered as the reservation wholesale price such that M is willing to procure the risk-free quantity ($\underline{q}$). Intuitively, M's optimal procurement quantity is decreasing in the wholesale price and its marketplace margin (φ). For brevity purpose, we suppress the arguments and write q_m^* to denote $q_m^*(f,w)$ in subsequent analysis.

The transaction fee. Given the expressions of optimal retail prices and procurement quantity, M sets a transaction fee f to maximize its total profit without observing the wholesale price

$$\Pi(f)=\begin{cases}\int_{\underline{q}}^{\bar{q}} q\varphi dH(q) & \text{if} \quad w>v-\varphi \\ \int_{\underline{q}}^{q_m^*} qvdH(q)+\int_{q_m^*}^{\bar{q}} q_m^*v+(q-q_m^*)\varphi dH(q)-q_m^*w & \text{if} \quad w\leq v-\varphi\end{cases}.$$

By solving M's profit maximization problem, we can show that M's optimal transaction fee maximizes its marketplace margin, that is,

$$f^*=\arg\max_f (1-l(p_d^*(f)))f.$$

Thus, we obtain the following preliminary result (proof is in the appendix).

Lemma 2. *M's profit-maximizing transaction fee maximizes its marketplace margin and induces partial leakage.*

Since M sets the transaction and S sets the wholesale price at the same stage, the transaction fee matters only when M recommends S to consumers. As a result, M's optimal transaction fee always maximizes the profit it makes from recommending S to one consumer. Notice that $l(p_d^*(f))=0$ only if $f=0$. Therefore, M's optimal transaction fee is strictly positive and induces partial leakage (i.e., $0<l(p_d^*(f^*))<1$). This result aligns with Hagiu and Wright (2024), whose analysis mainly focuses on the case of uniformly distributed switching costs.

The wholesale price. Given the expressions of optimal retail prices and procurement quantity, S sets a wholesale price w to maximize its total profit without observing the transaction fee

$$\pi(w)=\begin{cases}\int_{\underline{q}}^{\bar{q}} q\psi(f)dH(q) & \text{if} \quad w>v-\varphi \\ q_m^*(w-c)+\int_{q_m^*}^{\bar{q}}(q-q_m^*)\psi(f)dH(q) & \text{if} \quad w\leq v-\varphi\end{cases},$$

where

$$\psi(f) \equiv (v-c-f)(1-l(p_d^*(f))) + (p_d^*(f)-c)l(p_d^*(f))$$

is the expected profit that S makes from selling the product to a consumer and it is decreasing in f. Where no confusion arises, we will omit the argument f and refer to $\psi(f)$ as ψ. Since M's equilibrium transaction fee induces partial leakage, we have

$$v - \varphi > \psi + c.$$

Intuitively, since some consumers purchase in the direct channel and gain positive surplus, the total profit that M and S make from the marketplace sales ($\varphi + \psi$) is lower than the total surplus ($v-c$). As a result, if S charges $w = v-\varphi$, we obtain the following inequality

$$q_m^*(w-c) + \int_{q_m^*}^{\bar{q}} (q-q_m^*)\psi dH(q) \geq \int_{\underline{q}}^{\bar{q}} q\psi dH(q), \tag{3}$$

that is, S always makes more profit by charging $w = v-\varphi$ than charging $w > v-\varphi$. If consumer demand is uncertain and always strictly positive (i.e., $0 < \underline{q} < \bar{q}$), the above inequality holds with strict inequality. In this case, S's optimal wholesale price satisfies $w \leq v - \varphi$ and therefore incentivizes M to procure a strictly positive quantity for resale. Moreover, we can show that even if $\underline{q} = 0$, S's optimal wholesale price satisfies $w < v - \varphi$ and thus M also wants to procure a strictly positive quantity. In addition, M's procurement quantity is lower than $\bar{q}$ since $w > 0$. We state that M adopts the hybrid mode if $0 < q_m < \bar{q}$, implying that it operates as both a marketplace and a reseller ex-ante. Relegating the details of the proof to the appendix, we obtain the following proposition.

Proposition 1. *Under marketplace leakage and demand uncertainty, M adopts the hybrid mode in equilibrium. M's optimal transaction fee and procurement quantity satisfy*

$$f^* = \arg\max_f (1-l(p_d^*(f)))f,$$
$$q_m^*(f,w) = H^{-1}\left(1 - \frac{w}{v-\varphi(f)}\right).$$

In equilibrium, M procures when the resale margin $v - w^*$ exceeds the marketplace margin $\varphi(f^*)$. Throughout this paper, we show when this inequality holds and how it changes with consumers' leakage propensity, demand uncertainty, transaction benefits, and supplier competition. Conceptually, the hybrid mode is an ex-ante designation, defined by the existence of demand states in which M operates as both a marketplace and a reseller. Specifically, M procures a positive quantity and sells that inventory first, resorting to S's marketplace listing only when realized demand exceeds its inventory. Therefore, when $q \leq q_m^*$, M behaves as a reseller; when $q > q_m^*$, M clears its own inventory before deploying its recommendation to route residual consumers to S on the marketplace.

The optimality of the hybrid platform mode relies on two critical determinants: marketplace leakage and uncertainty of consumer demand. On the one hand, marketplace leakage undermines the viability of a pure marketplace strategy; M can mitigate leakage and earn more profits by adopting the reseller mode. On the other hand, demand uncertainty constrains M from operating as a pure reseller. The reseller mode facilitates full surplus extraction because it allows M to price the product at consumers' valuation. Consequently, M and S jointly capture the entire surplus, avoiding the welfare losses caused by switching costs. Thus, S can always find an appropriate wholesale price such that both M and S benefit from the reseller mode. However, demand uncertainty introduces inefficiency: the risk of inventory overstocking. When M procures more from S, acting more like a reseller, the probability of overstocking increases. Therefore, M's equilibrium procurement quantity must balance the benefit of surplus extraction from the reseller mode against the risk of excessive inventory, which ultimately induces M to adopt the hybrid mode. In the absence of leakage, M could simply set the transaction fee equal to $v - c$, thereby extracting the entire surplus as a pure marketplace; in the absence of uncertainty (deterministic demand), M would maximize profits as a pure reseller, exploiting the higher resale margin without the threat of excessive inventory. In particular, we show that if $H(\cdot)$ is convex, S's optimal wholesale price and the equilibrium outcome are unique. We relegate the details to the proof of Proposition 1.

3.3 Comparative statics

In this section, we characterize the closed-form solutions of the equilibrium outcomes and study the comparative statics based on uniformly distributed consumer demand and switching costs. Specifically, we assume $G(s) = \frac{s}{\mu}$ and $H(q) = \frac{q - \underline{q}}{\bar{q} - \underline{q}}$.

Given uniform distributions, S's optimal direct price is

$$p_d^*(f) = \max\left\{v - \frac{f}{2}, v - \mu\right\}.$$

If M charges a transaction fee greater than 2μ, S will set a direct price that induces full leakage and hence M will make zero profit as a marketplace. Thus, charging any $f > 2\mu$ is a weakly dominated strategy for M and hence we restrict our attention to the case where $f \leq 2\mu$ for subsequent analysis of this section.

Given the expression of $p_d^*(f)$, M's optimal procurement quantity is

$$q_m^* = \begin{cases} 0 & \text{if} \quad w > v - \varphi \\ \frac{w}{v-\varphi}\underline{q} + \left(1 - \frac{w}{v-\varphi}\right)\bar{q} & \text{if} \quad w \leq v - \varphi \end{cases}, \tag{4}$$

where $\varphi = f - \frac{f^2}{2\mu}$. Since M's optimal transaction fee maximizes φ and is capped by $v - c$, we obtain

$$f^*(\mu) = \min\{\mu, v - c\}. \tag{5}$$

Based on equation (3.2), we solve S's profit maximization problem and obtain the optimal wholesale price

$$w^* = \min\left\{\frac{\bar{q}(v-\varphi) + (\bar{q} - \underline{q})c}{(\bar{q} - \underline{q})\left(2 - \frac{\psi}{v-\varphi}\right)}, v - \varphi\right\}, \tag{6}$$

where $\psi = v - c - f + \frac{f^2}{4\mu}$.

Combining equations (5) and (6), we solve the equilibrium wholesale price. To facilitate the comparative statics analysis with respect to demand factors, we denote $\underline{q} = \theta - \delta$ and $\bar{q} = \theta + \delta$, where θ is the mean of consumer demand and δ measures the uncertainty of consumer demand, i.e., $H(q) = \frac{q-\theta+\delta}{2\delta}$. Moreover, we define consumers' leakage propensity as the reciprocal of the switching cost parameter (i.e., $\frac{1}{\mu}$). Relegating the details of the proof to the appendix, we obtain the following proposition.

Proposition 2. *Suppose $G(s) = \frac{s}{\mu}$ and $H(q) = \frac{q-\theta+\delta}{2\delta}$, M adopts the hybrid mode in equilibrium. Moreover, the equilibrium procurement quantity is*

$$q_m^* = \begin{cases} \max\left\{\frac{(\mu+4c)\theta+(\mu-4c)\delta}{4v+4c-\mu}, \theta - \delta\right\} & \textit{if} \quad \mu \leq v - c \\ \max\left\{\frac{\theta-\delta}{2} - \frac{(v-c)^2(\theta-5\delta)}{2(3(v-c)^2+8\mu c)}, \theta - \delta\right\} & \textit{if} \quad \mu \geq v - c \end{cases}.$$

If $\frac{v-c}{\mu} \leq 1$, M's procurement quantity is increasing in propensity of leakage ($\frac{1}{\mu}$), and may be increasing or decreasing in demand uncertainty (δ); if $\frac{v-c}{\mu} \geq 1$, M's procurement quantity is decreasing in propensity of leakage, and may be increasing or decreasing in demand uncertainty.

Notably, when consumers' leakage propensity is relatively strong such that $\frac{v-c}{\mu} \geq 1$, M's equilibrium procurement quantity q_m^* is *unambiguously decreasing* in consumers' leakage propensity. That is, the platform's business model shifts toward the marketplace mode in response to a worsening leakage problem. As shown in Figure 1, the equilibrium procurement q_m^* is first increasing then decreasing in leakage propensity $\frac{1}{\mu}$, and the kink point is $\mu = v - c$.

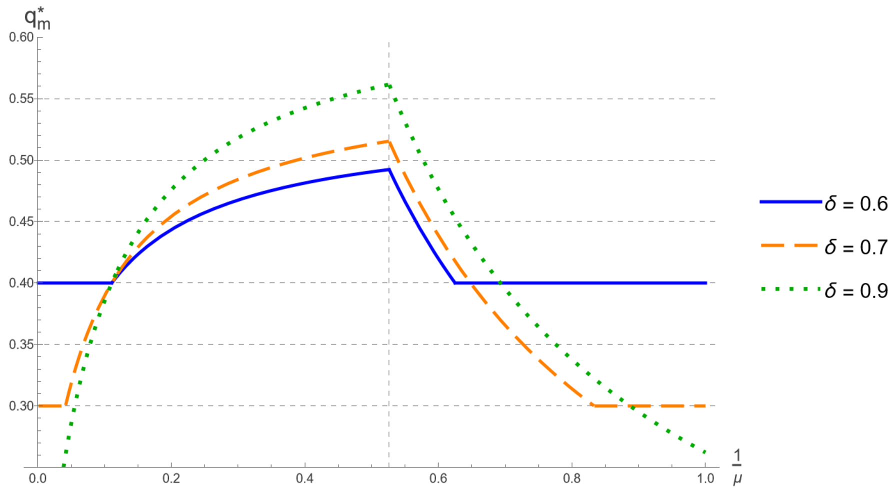


Figure 1: Procurement quantity versus leakage propensity under different demand uncertainty ($v = 2, \theta = 1, c = 0.1$)

To understand this non-monotonic pattern, recall that M's equilibrium procurement quantity is given by

$$q_m^*(\mu) = \bar{q} - \frac{w^*(\mu)}{v - \varphi(f^*(\mu))}(\bar{q} - \underline{q}),$$

where the equilibrium wholesale price $w^*(\mu)$ is decreasing in μ and M's equilibrium marketplace margin $\varphi(f^*(\mu))$ is increasing in μ. An increase in $\frac{1}{\mu}$ affects M's procurement quantity through two countervailing forces. On one hand, stronger leakage propensity reduces M's marketplace margin (i.e., $\varphi(f^*(\mu))$ in the denominator), which encourages procurement in favor of the reseller mode. On the other hand, greater leakage propensity allows S to increase the wholesale price ($w^*(\mu)$ in the numerator), which harms M's resale margin and drives M to operate as a marketplace. Thus, stronger leakage propensity can increase or decrease equilibrium procurement depending on whether S's wholesale price response dominates M's loss in marketplace margin. Table 2 shows the summary of platform's equilibrium transaction fee and comparative statics.

Condition	f^*	$\partial w^*/\partial\frac{1}{\mu}$	$\partial\varphi(f^*)/\partial\frac{1}{\mu}$	$\partial q_m^*/\partial\frac{1}{\mu}$
$\frac{v-c}{\mu} \leq 1$	$v - c$	$+$	$-$	$+$
$\frac{v-c}{\mu} \geq 1$	μ	$++$	$-$	$-$

Table 2: Summary of platform's equilibrium transaction fee and comparative statics

Importantly, S's market power to set the wholesale price plays a critical role in driving this result: the responses of S's wholesale price to consumers' leakage propensity differ in the two cases ($\frac{v-c}{\mu} \leq 1$ or $\frac{v-c}{\mu} \geq 1$), which results from the different pressures S faces. As $\frac{1}{\mu}$ increases, consumers are more willing to switch to the direct channel, so the leakage probability increases (when $\frac{v-c}{\mu} \leq 1$) or the wholesale price rises (when $\frac{v-c}{\mu} \geq 1$). As a result, S's profitability in the direct channel increases. Moreover, there exists one mechanism enhancing S's profit on the marketplace only for $\frac{v-c}{\mu} \geq 1$: as $\frac{1}{\mu}$ increases (μ decreases), the transaction fee also reduces as $f^* = \mu$, directly increasing S's profitability of marketplace sales. In contrast, when $\frac{v-c}{\mu} \leq 1$, M's transaction fee is capped at $v - c$ and hence the change of $\frac{1}{\mu}$ has no impact on S's profitability on the marketplace. Thus, when $\frac{v-c}{\mu} \geq 1$, S enjoys a "double benefit" by selling to consumers in the direct channel and on the marketplace as the leakage propensity $\frac{1}{\mu}$ increases. Consequently, S's incentive to raise the wholesale price as a response to a higher $\frac{1}{\mu}$ is stronger when $\frac{v-c}{\mu} \geq 1$.

Meanwhile, the change of M's marketplace margin $\varphi(f^*(\mu))$ are driven by two mutually exclusive forces that never operate simultaneously. In response to a higher $\frac{1}{\mu}$: when $\frac{v-c}{\mu} \leq 1$, M's transaction fee is capped at $v - c$, leaving the rising consumer switching probability as the active force that reduces the marketplace margin; when $\frac{v-c}{\mu} \geq 1$, the marketplace margin is shaped entirely by M strategically lowering the transaction fee because the consumer switching probability remain constant.

Taken together, these mechanisms reveal that when $\frac{v-c}{\mu} \geq 1$, the wholesale price $w^*(\mu)$ increases sharply due to the "double benefit", whereas M's marketplace margin $\varphi(f^*(\mu))$ decreases moderately. Consequently, M's lower resale margin derived from the higher wholesale price outweighs the reduced marketplace margin, resulting in a net decrease in procurement quantity. Thus, the platform's business model can shift toward the marketplace mode in response to greater leakage propensity.

4 Extensions

The four extensions map the boundaries of our mechanism. The first two establish robustness: the hybrid model survives when the wholesale and retail functions are separated across independent suppliers (Section 4.1) and when the supplier can partially insure the platform through a costly return policy (Section 4.2). The remaining results identify boundary conditions under which the platform abandons the hybrid mode. Specifically, the platform shifts to a pure marketplace mode when it can provide on-platform transaction benefits at a sufficiently low cost (Section 4.3) or when supplier competition is fierce (Section 4.4), and it reverts to a pure reseller mode when returns are costless for the supplier (Section 4.2).

4.1 Non-integrated suppliers

In this section, unlike the baseline model, we analyze a scenario where the platform faces a pure wholesaler and a pure retailer that are not integrated. The wholesaler S_1 only sells to the platform and the retailer S_2 only sells to consumers either through the platform's marketplace or its own channel. Thus, S_1 sets a wholesale price (w) and S_2 sets the retail prices on M's marketplace (p_m) and in the direct channel (p_d). As in the baseline, consumers prefer transacting on M and face a switching cost (disutility) s when buying directly from S_2, which is drawn from a distribution $G(s)$ over the interval $[0, \mu]$. We assume that the wholesaler's marginal cost is weakly lower than that of the retailer (i.e., $c_w \leq c_r$). Then the baseline model is otherwise unchanged, including the consumer demand and timeline. Importantly, we show that most results and insights from the baseline analysis are preserved when suppliers are not integrated, but the comparative statics under uniform distributions change.

Intuitively, M does not care whether the suppliers are integrated or not, so the optimal procurement quantity and transaction fee remain the same as in the baseline. Moreover, S_2's optimal price on the platform (p_m) is still equal to consumers' valuation and its optimal direct price maximizes its profit from selling the product to consumers given the transaction fee, which is also unchanged relative to the baseline. Following the same logic as in the proof of Lemma 1, we obtain the following lemma.

Lemma 3. *The suppliers' optimal prices and M's optimal resale price and transaction fee satisfy $p_m = p_{resale} = v$, $v - \mu \leq p_d \leq v$, and $0 < f \leq v - c_r$. Moreover, M prioritizes its own product when making recommendations.*

Given the expression of M's optimal procurement quantity, the wholesaler S_1's profit function is

$$\pi_1(w) = \begin{cases} 0 & \text{if} \quad w > v - \varphi \\ q_m^*(w - c_w) & \text{if} \quad w \leq v - \varphi \end{cases},$$

where $v - \varphi \geq v - f \geq c_r$. Since $c_w \leq c_r$, S_1 can set a wholesale price $w \in (c_w, v - \varphi)$ and make a strictly positive profit. Thus, we obtain the following result.

Proposition 3. *Under marketplace leakage and demand uncertainty, if the wholesaler has a lower marginal cost, M adopts the hybrid mode in equilibrium.*

Unlike the baseline results, the above proposition holds even if $G(\cdot)$ is not log-concave, meaning that the platform adopts the hybrid mode under weaker conditions when suppliers are non-integrated than when facing an integrated supplier. In the baseline model, the integrated supplier retains the option of selling only to consumers by setting $w > v - \varphi$

so that the platform procures nothing, whereas the independent wholesaler has no such outside option. However, when the suppliers are not integrated, the wholesaler does not have an outside option of selling to consumers and therefore must set a wholesale price such that the platform wants to procure a positive quantity.

Similar to the baseline analysis, we study the comparative statics by assuming that consumers' demand and switching costs are uniformly distributed. Specifically, $G(s) = \frac{s}{\mu}$ and $H(q) = \frac{q-\theta+\delta}{2\delta}$. Since the optimal retail prices and transaction fee remain the same as in the baseline, we only show the equilibrium wholesale price and procurement quantity in the following proposition.

Proposition 4. *Suppose $G(s) = \frac{s}{\mu}$, $H(q) = \frac{q-\theta+\delta}{2\delta}$, and $c_w \leq c_r$, in equilibrium, M adopts the hybrid mode, and the equilibrium wholesale price and procurement quantity are as follows:*

$$w^* = \begin{cases} \min\left\{\frac{(\theta+\delta)\left(v-\frac{\mu}{2}\right)}{4\delta} + \frac{c_w}{2}, \frac{2v-\mu}{2}\right\} & \text{if} \quad \mu \leq v - c_r \\ \min\left\{\frac{(\theta+\delta)\left((v-c_r)^2+2\mu c_r\right)}{8\mu\delta} + \frac{c_w}{2}, \frac{(v-c_r)^2+2\mu c_r}{2\mu}\right\} & \text{if} \quad \mu > v - c_r \end{cases},$$

$$q_m^* = \begin{cases} \max\left\{\frac{\theta+\delta}{2} - \frac{2\delta c_w}{2v-\mu}, \theta-\delta\right\} & \text{if} \quad \mu \leq v - c_r \\ \max\left\{\frac{\theta+\delta}{2} - \frac{2\mu\delta c_w}{2\mu c_r+(v-c_r)^2}, \theta-\delta\right\} & \text{if} \quad \mu > v - c_r \end{cases}.$$

In response to an increase in leakage propensity ($\frac{1}{\mu}$), the S_1's wholesale price and M's procurement quantity increase; in response to an increase in demand uncertainty (δ), the S_1's wholesale price decreases and M's procurement quantity may increase or decrease.

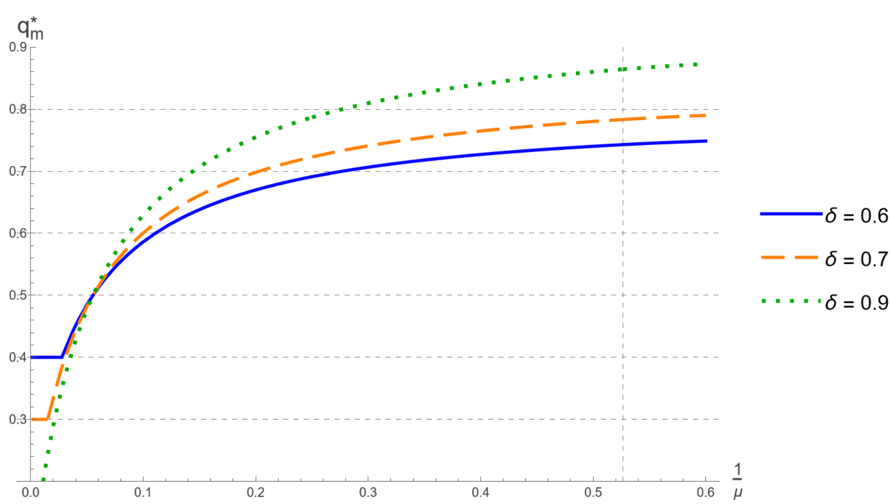


Figure 2: Non-integrated suppliers: procurement quantity versus leakage propensity under different demand uncertainty ($v = 2, \theta = 1, c_w = c_r = 0.1$)

As shown in Figure 2, M's equilibrium procurement quantity facing non-integrated suppliers is monotonically increasing in consumers' leakage propensity, even within the range $\frac{v-c_r}{\mu} \geq 1$, which deviates from the baseline results in Figure 1. This divergence arises because the wholesale price is endogenous and the independent wholesaler lacks the outside option of selling directly to consumers, which is available to the integrated supplier in the baseline. As leakage propensity increases, the diminishing marketplace margin lowers M's opportunity cost of procurement, thereby inducing a upward shift of M's demand for procurement. Consequently, the independent wholesaler raises the wholesale price solely as a demand-driven response. In contrast, in the baseline model, the integrated supplier raises the wholesale price sharply because stronger leakage propensity enhances its profitability both in the direct channel and on M's marketplace. Thus, the independent wholesaler's incentive to raise the wholesale price in response to increasing leakage propensity is weaker than that of the integrated supplier. This mitigated price response ultimately drives the monotonically-increasing pattern of the equilibrium procurement quantity.

In response to an increase in leakage propensity, M's procurement quantity is strictly higher when facing non-integrated suppliers than under the baseline. This is driven by the differences in market power: the independent wholesaler, who lacks the outside option of consumer sales, entirely relies on sales to M and is compelled to charge a lower wholesale price to stimulate M's demand for procurement. In contrast, the integrated supplier can sustain a higher wholesale price by leveraging its ability to sell the product to consumers. Consequently, M optimally procures a larger quantity when facing non-integrated suppliers.

4.2 Return policy

In this section, we assume the supplier can set a maximum return quantity along with the wholesale price. Thus, the platform chooses its procurement quantity after observing the wholesale price w and the return quantity q_r. If the actual consumer demand is lower than the platform's procurement quantity (i.e., $q < q_m$), then the platform can return at most q_r units of product to the supplier and receive a full refund of w for each unit of product. Moreover, S can sell the returned product in an outside channel and receive βc for each unit. We assume $0 \leq \beta \leq 1$ so that S cannot make positive profit from the outside channel. To obtain analytical results, we further assume that consumers' demand is uniformly distributed, specifically, $H(q) = \frac{q}{\bar{q}}$. Furthermore, we can still show that M first recommends its own product in equilibrium, and M's optimal resale price and S's optimal retail price on the marketplace is still equal to consumers' valuation. In addition,

S's optimal direct price is also the same as that solved in the baseline model.

By solving M's profit maximization problem, we obtain the optimal procurement quantity

$$q_m^*(f, w, q_r) = \begin{cases} 0 & \text{if} \quad w > v - \varphi \\ \frac{w}{v-\varphi} q_r + \left(1 - \frac{w}{v-\varphi}\right) \bar{q} & \text{if} \quad w \leq v - \varphi \end{cases},$$

where q_r is the maximal return quantity chosen by S. For brevity, we suppress the arguments and write q_m^* to denote $q_m^*(f, w, q_r)$ in this section. Notice that M will procure the highest consumer demand ($q_m^* = \bar{q}$) if $q_r = \bar{q}$, as the risk of excessive inventory is fully insured by S's return policy, so S has no incentive to offer a return quantity greater than $\bar{q}$. Moreover, M will procure nothing if $w > v - \varphi$, which follows the same logic as in the baseline. Thus, we eliminate the weakly dominated strategies and focus on the case in which $q_r \leq \bar{q}$ and $w \leq v - \varphi$ for subsequent analysis in this section. Given that $w \leq v - \varphi$, although M can return the unsold inventory for a full refund, M's profit from recommending its own product (v) is higher than that from recommending S's product ($w + \varphi$). Thus, M still prioritizes and first recommends its own product. In addition, M's optimal transaction fee is also the same as in the baseline model.

Given the expression of M's optimal procurement quantity, S sets $w \leq v - \varphi$ and $q_r \leq \bar{q}$ to maximize its total profit without observing the transaction fee

$$\begin{aligned} \pi(w, q_r) = & \int_0^{q_m^* - q_r} (q_m^* - q_r) w + \beta q_r c dH(q) + \int_{q_m^* - q_r}^{q_m^*} q w + \beta (q_m^* - q) c dH(q) \\ & + \int_{q_m^*}^{\bar{q}} q_m^* w + (q - q_m^*) \psi dH(q) - q_m^* c. \end{aligned}$$

By solving S's optimal wholesale price and return quantity, we obtain the following proposition (proof is in the appendix).

Proposition 5. *Under marketplace leakage and demand uncertainty, suppose $H(q) = \frac{q}{\bar{q}}$, in equilibrium,*
(i) if $\beta = 1$ or $c = 0$, S provides a full return policy ($q_r = \bar{q}$) and M is a pure reseller;
(ii) otherwise, S provides a partial return policy ($0 < q_r < \bar{q}$) and M adopts the hybrid mode.

By offering a full return policy, S eliminates M's inventory risk, which prevents the full procurement and M's adoption of the pure reseller mode in the baseline model. In contrast, a partial return policy remains a degree of inventory risk for M; hence, the rationale for the hybrid business model is preserved.

Consider the extreme case where $\beta = 1$ or $c = 0$, in which S can provide a return policy at no cost. In this scenario, S induces M to operate as a pure reseller by offering a full return policy and setting the wholesale price $w = v - \varphi$. Since the return policy fully mitigates the inventory risk, M remains indifferent between the reseller and marketplace modes as the marketplace and resale margins are equal. We assume that M adopts the pure reseller mode when it is indifferent; otherwise, S could set a wholesale price equal to $v - \varphi - \varepsilon$ (where ε is arbitrarily small) to ensure that M's resale margin exceeds its marketplace margin, thereby inducing M to choose the pure reseller mode. Consequently, M's profit is driven down to its minimum, which is exactly the profit level that can be ensured by operating as a pure marketplace. Furthermore, consumer surplus is also minimized, as the pure reseller mode yields zero surplus for consumers. Thus, S maximizes its own profit by setting $q_r = \bar{q}$ and $w = v - \varphi$. Conversely, when $\beta < 1$ and $c > 0$, providing a return policy is costly for S. Because the cost of a full return policy outweighs its benefits, S optimally offers a partial return policy.

4.3 Investment in transaction benefits

One strategy platforms can adopt to reduce leakage is to offer exclusive benefits that consumers cannot obtain when completing transactions in the direct channel.[10] These benefits can increase the perceived value of transacting on the platform and reduce consumers' incentives to switch to the direct channel. In this section, we explore how the platform's ability to invest in transaction benefits affects its choice of the business mode.

We model this by assuming that M can provide consumers with a benefit b for completing their transactions on M at a cost of $K(b)$, where $K(\cdot)$ is an increasing and convex function. The benefit b should be interpreted broadly, including loyalty credits, shipping and return privileges, and rebates or coupons conditional on completing the transaction on-platform. Buyers observe b after they join M and their valuation becomes $v + b$ if they purchase M's product or S's product on the marketplace, while their valuation remains at v if they switch to the direct channel. The timeline is as follows: (i) M sets the per-unit transaction fee f and the investment in consumer benefits b, and S sets the wholesale price w; (ii) given w, M decides the quantity q_m of the product to procure from S; (iii) M sets its resale price p_{resale} and S sets its retail prices through M's marketplace and in the direct channel: p_m and p_d respectively; (iv) the actual demand q is realized. Upon observing it, M makes product recommendations to consumers; (v) consumers draw their switching costs s, receive product recommendations, and observe the price(s) and benefits. Then they make purchase decisions based on all the information they have. The baseline model is otherwise unchanged.

[10] For instance, platforms like Amazon and JD.com provide faster shipping and more user-friendly return policies, while Airbnb offers payment protection, dispute mediation, and flexible cancellation policies.

To obtain closed-form solutions, we assume that consumers' switching cost and demand are uniformly distributed and the investment cost is quadratic: $G(s) = \frac{s}{\mu}$, $H(q) = \frac{q}{\bar{q}}$, and $K(b) = \frac{kb^2}{2}$. Additionally, we assume that consumers' switching costs are not too large, such that $\mu \leq v - c$. Following the same logic as in the baseline, we can eliminate weakly dominated strategies and present the conditions that the optimal product prices, transaction fee, and recommendation mechanism must satisfy in the following lemma (proof is in the appendix).

Lemma 4. *S's optimal prices and M's optimal resale price and transaction fee satisfy $p_m = p_{resale} = v + b$, $v - \mu \leq p_d \leq v$, and $b \leq f \leq v + b - c$. Moreover, M prioritizes its own product when making recommendations.*

Then we solve M's profit maximization problem and obtain the optimal procurement quantity

$$q_m^*(f, b, w) = \begin{cases} 0 & \text{if} \quad w > v + b - \varphi(f, b) \\ \left(1 - \frac{w}{v+b-\varphi(f,b)}\right) \bar{q} & \text{if} \quad w \leq v + b - \varphi(f, b) \end{cases},$$

where $\varphi(f, b) \equiv (1 - l(p_d^*(f, b)))f = f - \frac{f(f-b)}{2\mu}$. For a given transaction fee and wholesale price, when M invests more in consumer benefits, the change in the optimal procurement quantity is ambiguous. On one hand, M's marketplace margin from charging the transaction fee increases as S sets a higher direct price, leading to less leakage. On the other hand, M's resale margin also increases as M can charge a higher resale price. As a result, the overall effect of greater consumer benefits is unclear.

Given the expressions of S's optimal direct price and M's optimal procurement quantity, S's optimal wholesale price is

$$w^*(f, b) = \frac{v + b - \varphi(f, b) + c}{2 - \frac{\psi(f,b)}{v+b-\varphi(f,b)}},$$

where $\psi(f, b) \equiv (v+b-c-f)(1-l(p_d^*(f, b)))+(p_d^*(f, b)-c)l(p_d^*(f, b)) = v-c-(f-b)+\frac{(f-b)^2}{4\mu}$.

Moreover, similar to the baseline analysis, M's optimal transaction fee maximizes its marketplace margin from recommending S's product subject to $f \geq b$, which yields

$$f^*(b) = \begin{cases} b & \text{if} \quad b \geq 2\mu \\ \mu + \frac{b}{2} & \text{if} \quad b \leq 2\mu \end{cases}.$$

Thus, M's problem reduces to choosing the level of consumer benefits that maximizes its profit. Relegating the details of the equilibrium characterization to the appendix, we obtain the following proposition.

Proposition 6. *Suppose $G(s) = \frac{s}{\mu}$, $H(q) = \frac{q}{\bar{q}}$, $K(b) = \frac{kb^2}{2}$, and $\mu \leq v - c$:*
(i) if $k \leq \frac{\bar{q}}{4\mu}$, then M is a pure marketplace in equilibrium, and the equilibrium transaction fee and consumer benefit satisfy

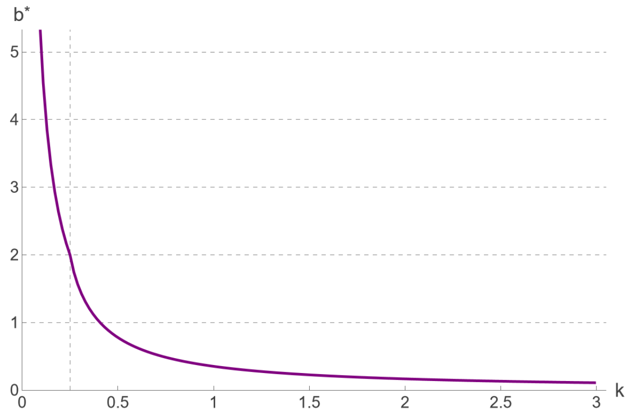
$$f^* = b^* = \frac{\bar{q}}{2k};$$

(ii) if $k > \frac{\bar{q}}{4\mu}$, then M adopts the hybrid mode in equilibrium, and the equilibrium transaction fee and consumer benefit satisfy

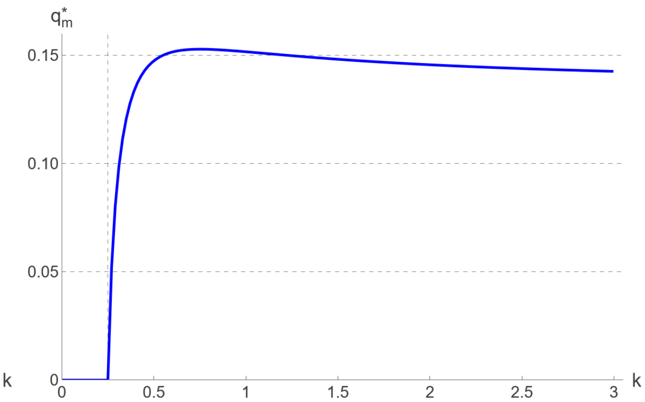
$$f^* = \mu + \frac{b^*}{2}, b^* \in (0, 2\mu).$$

Intuitively, when M's investment costs are sufficiently low, it can generate substantial consumer surplus and charge a high transaction fee. In this regime, M seeks to eliminate leakage entirely, as the marginal loss in profit resulting from leakage outweighs the gains from incremental increases in the transaction fee. Consequently, M optimally charges a transaction fee equal to the consumer benefits provided, which serves as an incentive-compatibility constraint ensuring S has no incentive to induce leakage. Since no leakage occurs and S's price on the marketplace fully captures consumer surplus, the marketplace mode achieves efficiency in inventory allocation, allowing M and S to share the entire welfare. Conversely, the reseller mode remains inefficient due to the uncertain demand, which may fall below M's procurement quantity and result in an excessive inventory problem. Given this inefficiency, either M or S must face a loss of profit if M shifts from the pure marketplace mode to the hybrid or pure reseller mode. In other words, S cannot offer a wholesale price that makes S and M mutually benefit from the reseller mode. Thus, in equilibrium, S only sells to consumers, and M functions exclusively as a pure marketplace. On the other hand, as investment costs become significant, M's optimal transaction fee exceeds the consumer benefits, thereby inducing partial leakage. As a result, the resale price can fully capture the transaction benefits while the transaction fee cannot, which makes the reseller mode more efficient. Thus, S responds by offering a wholesale price such that both parties can benefit from the reseller mode. Consequently, M adopts the hybrid mode in equilibrium, balancing the higher resale margin and the risk of excessive procurement.

Figure 3 illustrates how the platform's choices of transaction benefits and procurement quantity vary with respect to investment cost. Unsurprisingly, M's investment in transaction benefits is decreasing in cost (Figure 3a). Notably, M's procurement quantity exhibits a non-monotonic relationship with the investment cost. This pattern arises from the interplay of two countervailing forces. On the one hand, when the investment cost exceeds the threshold characterized in Proposition 6 (i.e., $k > \frac{\bar{q}}{4\mu}$), M's equilibrium transaction fee induces positive leakage, and the leakage proportion increases as transaction benefits diminish. Consequently, M increases its procurement quantity to mitigate the leakage



(a) Transaction benefits b^* versus k



(b) Procurement quantity q_m^* versus k

Figure 3: Platform's choices versus investment cost $(v = 2, \bar{q} = 1, \mu = 1, c = 0.1)$

problem. On the other hand, a decrease in transaction benefits narrows the margin premium of the reseller mode. This margin compression stems from the fact that the resale price fully internalizes the transaction benefits (i.e., $p_{resale} = v + b$), whereas the transaction fee does not (i.e., $f = \mu + \frac{b}{2}$). Thus, diminishing transaction benefits induce M to reduce procurement. Crucially, this second force is modest at lower procurement volumes but becomes increasingly salient as procurement expands; however, the first force works in the exact opposite direction. Specifically, when q_m is small, the marketplace constitutes the primary source of M's profit. Moreover, the leakage problem is particularly severe because a substantial share of consumers receive recommendations for S's product and a fraction of them subsequently switch to the direct channel. Consequently, M possesses a strong incentive to expand procurement to mitigate leakage. Concurrently, because resale contributes to a small share of M's total profit at low levels of q_m, the declining reseller margin premium has a minor impact on M's procurement strategy. Conversely, an entirely reversed logic applies when q_m is large. Thus, the leakage-mitigation effect dominates at lower procurement levels, whereas the margin-shrinking effect prevails at higher volumes, yielding the pattern illustrated in Figure 3b.

4.4 Competing suppliers

In this section, we study the case where the platform faces two integrated suppliers, S_1 and S_2, both of whom sell to the platform M and/or directly to consumers. To model the suppliers' competition in their direct channels, we assume that M can observe the prices in both direct channels before it makes product recommendations and can charge supplier-specific transaction fees. If consumers switch to S_i's direct channel, their switching costs are drawn from $G_i(s)$ over $[0, \mu_i]$, where $i \in \{1, 2\}$. We later show that our findings in this part generalize straightforwardly to a setting with N competing suppliers.

The timeline is as follows: (i) M sets the per-unit transaction fee f, and S_i sets the wholesale price w_i at the same time; (ii) given w_i, M decides the quantity q_{mi} of the product to procure from S_i; (iii) M sets its resale price p_{resale} and S_i sets its retail prices through M's marketplace and in the direct channel: p_{mi} and p_{di} respectively; (iv) the actual demand q is realized. Upon observing it, M makes product recommendations to consumers; (v) consumers draw their switching costs s, receive product recommendations, and observe the price(s). Then they make purchase decisions based on the recommendation they receive and prices they observe.

Similar to the baseline analysis, we assume that consumers' demand and switching costs are uniformly distributed such that $G_i(s) = \frac{s}{\mu_i}$ and $H(q) = \frac{q}{\bar{q}}$. Without loss of generality, we assume that S_1's marginal cost is weakly lower than that of S_2 (i.e., $c_1 \leq c_2$). Then we eliminate weakly dominated strategies and obtain the following lemma (proof is in the appendix).

Lemma 5. *In equilibrium, the retail prices satisfy $p_{m1} = p_{m2} = p_{resale} = v$. M recommends S_1 to consumers after its own inventory is sold out and the optimal transaction fees satisfy $f_1 \geq v - c_2$ and $f_2 = v - c_2$.*

Similar to the baseline model, M' optimal transaction fees maximize the profit it makes from recommending suppliers' product to one consumer. If M charges $f_1 = f_2 = v - c_2$, S_1 and S_2 compete in their direct prices for M's recommendation. Because in this case, M will then recommend the supplier with the lower leakage proportion after M's own inventory is sold out. As a result, the equilibrium direct prices will be $p_{d1} = p_{d2} = v$ and induce no leakage, which yields a marketplace margin of $v - c_2$ for M. Since M can ensure a marketplace margin of $v - c_2$ by charging $f_1 = f_2 = v - c_2$ and recommending S_1, and $v - c_2$ is already the highest marketplace margin M can possibly make from recommending S_2, M will only recommend S_1 in equilibrium.[11] Moreover, $v - c_2$ is also the highest marketplace margin M can possibly make from recommending S_1 if

$$v - c_2 \geq \left(1 - \frac{\min\{\mu_1, v - c_1\}}{2\mu_1}\right) \min\{\mu_1, v - c_1\}, \tag{7}$$

where the RHS is the equilibrium profit M can make from recommending S_1 to one consumer if S_2 does not exist (as in the baseline). Crucially, S_2's marginal cost determines

[11] We assume that M recommends the low-cost supplier S_1 when it is indifferent between the two suppliers.

whether M can effectively use S_2 to discipline S_1. When S_2's cost is sufficiently small such that inequality (7) holds, using S_2 to discipline S_1 yields higher profit for M. Therefore, M can charge $f_2 = v - c_2$ and a reasonable f_1 (which can be greater than $v - c_2$ and we will discuss it later) to ensure that it earns $v - c_2$ from recommending S_1 to one consumer. Otherwise, M cannot use S_2 to discipline S_1, given that charging the transaction fee characterized in the baseline model yields a marketplace margin greater than $v - c_2$ for M. In this case, M charges $f_1 = \min\{\mu_1, v - c_1\}$ and the level of f_2 is irrelevant.

In subsequent analysis and discussion, we restrict our attention to the case where inequality (7) holds; otherwise the analysis is exactly the same as the baseline. Moreover, given the existence of multiple equilibria, we focus on the equilibrium that is most favorable to the platform. Then we can solve the equilibrium transaction fee, wholesale price, procurement quantity, and direct price. Thus, we obtain the following proposition (proof is in the appendix).

Proposition 7. *Suppose $G_i(s) = \frac{s}{\mu_i}$, $H(q) = \frac{q}{\bar{q}}$, and $c_1 \leq c_2 \leq \min\{c_1 + \mu_1, v - \hat{\varphi}_1\}$. In equilibrium that maximizes M's profit, M adopts the pure marketplace mode if the two suppliers have the same marginal cost and adopts the hybrid mode otherwise. The equilibrium wholesale price, transaction fees, and procurement quantities are as follows:*

$$w_1^* = \frac{c_1 + c_2}{2},$$
$$(q_{m1}^*, q_{m2}^*) = \left(\frac{(c_2 - c_1)\bar{q}}{2c_2}, 0 \right),$$
$$(f_1^*, f_2^*) = \left(\frac{v - c_2}{1 - \sqrt{\frac{c_2 - c_1}{\mu_1}}}, v - c_2 \right),$$

where $\hat{\varphi}_1 \equiv \left(1 - \frac{\min\{\mu_1, v - c_1\}}{2\mu_1}\right) \min\{\mu_1, v - c_1\}$ and q_{mi}^* is the quantity procured from S_i.

An interesting result is that although the two suppliers are competing in their direct price–equivalently, in their leakage proportion–the outcome of this competition depends solely on their marginal costs and is independent of their ability to induce leakage (i.e., switching cost parameters μ_i). As a result, M never recommends S_2, the supplier with a higher marginal cost, even if consumers are very likely to switch to S_1's direct channel (μ_1 is small) and very unlikely to switch to S_2's direct channel ($\mu_2 \to \infty$). The intuition is as follows: when S_2's marginal cost is sufficiently high, M's profit from recommending S_2 is too low for S_2 to be a competitive threat to S_1; consequently, the equilibrium coincides with that in the baseline model. By contrast, when S_2's marginal cost is relatively low though still higher than that of S_1, M strategically includes S_2 as a competitive threat to discipline S_1. In this case, M can guarantee itself a marketplace margin of $v - c_2$ as a marketplace by charging transaction fees $f_1 \in [v - c_2, f_1^*]$ and $f_2 = v - c_2$. Since S_1 retains a cost advantage, it can always provide M a marketplace margin of $v - c_2$ and secures M's recommendation. Thus, M disciplines S_1 purely based on S_2's marginal cost and therefore does not care about S_2's ability to induce leakage.

Notably, the equilibrium transaction fee charged to S_1 is increasing in the corresponding leakage propensity ($\frac{1}{\mu_1}$), which is exactly the opposite of the baseline result. This is because in the equilibrium that maximizes M's profit, M always makes a profit of $v - c_2$ by recommending S_1 regardless of the transaction fee charged to S_1. Consequently, M charges a transaction fee such that S_1 makes zero profit by selling to consumers[12], which minimizes S_1's equilibrium wholesale price and therefore maximizes M's profit. Thus, when consumers' leakage propensity increases and hence S_1 makes more profit in the direct channel, M charges a higher transaction fee to reduce S_1's profit on the marketplace, thereby keeping S_1's profit from selling to consumers at zero.

Furthermore, the equilibrium wholesale price and procurement quantity only depend on the suppliers' marginal costs. This is also different from the baseline model with a monopoly supplier, where the equilibrium wholesale price and procurement quantity depend on not only the supplier's marginal cost but also consumers' valuation and switching costs. The intuition is as follows: in the equilibrium that maximizes the platform's profit, although M's marketplace margin is fixed at $v - c_2$, M can maximize its resale margin by minimizing S_1's profitability. To do so, M charges a high transaction fee to S_1 such that S_1 makes exactly zero profit from selling the product to consumers, which means S_1 can only make positive profit from selling to M. As a result, S_1 has the strongest incentive to sell to M and therefore charges the lowest wholesale price, which maximizes M's resale margin. Moreover, to deliver clear insights and intuition, we discuss the platform's strategies under perfect competition and imperfect competition respectively.

Under imperfect competition. Since S_1 is disciplined by the rival, S_1 must set its retail prices such that M's marketplace margin is $v - c_2$. Consequently, S_1's wholesale price and hence its profit are determined by its cost advantage compared with S_2. When S_1 has a cost advantage (i.e., $c_1 < c_2$), S_1 is able to offer a wholesale price lower than c_2 and make a positive profit from selling to M. Thus, M's resale margin $(v - w)$ is higher than that as a marketplace $(v - c_2)$. Importantly, M's procurement quantity is increasing in the difference in the suppliers' marginal costs (see Figure 4), that is, M's business model shifts toward the reseller mode when supplier competition is less intense. Moreover, since M

[12] Specifically, S_1 makes negative profit on M's marketplace and positive profit in the direct channel, and these two parts cancel out.

cannot perfectly discipline S_1 in this case, M optimally adopts the hybrid mode by trading off the risk-free marketplace mode and the higher-margin reseller mode.

Under perfect competition. In the extreme case where the two suppliers have identical costs (i.e., $c_1 = c_2 = c$), S_1 has no cost advantage and therefore M can perfectly discipline S_1 such that S_1 can only make zero profit. Specifically, M can extract all surplus by charging transaction fees $f_1 = f_2 = v - c$. As a result, M procures nothing from suppliers and operates as a pure marketplace in equilibrium.

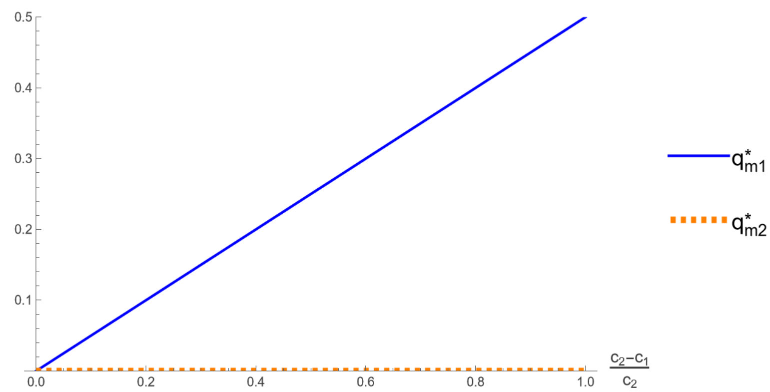


Figure 4: Procurement quantity versus cost difference ($\bar{q} = 1$)

Although S_1's wholesale price and total profit are minimized in the equilibrium that maximizes the platform's profit, consumer surplus is maximized because the high transaction fee maximizes the leakage proportion. Thus, the interests of the platform and consumers are aligned in the presence of competing suppliers. Notably, the results of this section can be easily extended to a setting with N competing suppliers, where the platform only cares about the two suppliers with the lowest marginal costs and ignores the remaining suppliers.

5 Managerial implications

Our model provides a number of implications for both platforms and suppliers, which we discuss in two separate sections below.

5.1 Implications for platforms

Hybrid mode is likely to be optimal, but not always: Under demand uncertainty and marketplace leakage, a hybrid business model frequently emerges as the profit-maximizing strategy. This dual-channel approach allows the platform to balance the operational flexibility inherent in the marketplace mode with the higher margin associated with the reseller mode. In addition, the hybrid model shields the platform from the disintermediation that is likely to arise in pure marketplaces. Nevertheless, certain contingencies may favor a specialized, or pure distribution regime. For instance, the platform should adopt an exclusive marketplace model leveraging a commission that eliminates leakage if it can invest in marketplace transaction benefits at a sufficiently low cost. Furthermore, a pure marketplace mode is optimal when upstream competition is sufficiently fierce, enabling the platform to exert perfect discipline on suppliers. Conversely, the platform should converge toward a pure reseller mode when the supplier offers a comprehensive return policy, thereby eliminating the risk associated with demand uncertainty.

More leakage can lead to less reseller intensity: As the risk of disintermediation intensifies, the platform's optimal strategy may shift toward the marketplace mode while retaining a hybrid structure. Figure 1 depicts an inverted U-shaped relationship between the platform's reseller intensity and disintermediation risk. Table 3 shows platform examples that are consistent with the baseline resale mechanism and assumptions. Specifically, platforms facing either very low or high disintermediation risk operate predominantly as pure marketplaces (e.g., DoorDash versus Upwork). Conversely, those facing intermediate risk levels derive a substantial share of their profits from reselling operations (e.g., Amazon, Booking.com, and Coupang). Our model demonstrates that this structural transition is driven by the supplier's strategic incentive to charge a higher wholesale price as consumers' leakage propensity increases. Consequently, platform profitability is decreasing in disintermediation risk across both operational modes. Our model reveals a nuanced relationship: the platform might favor the marketplace mode (lower procurement) when disintermediation risk is high, but prioritize the reseller mode (higher procurement) when disintermediation risk is low. Symmetrically, while a lower wholesale price typically incentivizes procurement, it does not universally imply an increase in the optimal volume. The platform must exercise strategic prudence in its procurement decisions, particularly when operating under imperfect information regarding shifts in consumers' leakage propensity.

Utilize competition among suppliers: A platform can enhance its profitability by introducing a competing supplier. Even in the absence of a competitive advantage for the entrant, the platform can utilize the entry as a disciplinary mechanism against the incumbent. In this case, consumers' propensity to switch to the entrant's direct channel becomes irrelevant, as the platform lacks the incentive to redirect consumers toward an inefficient supplier. Consequently, the platform's strategic focus is confined to the entrant's marginal

Table 3: Platforms classified by fit to the baseline resale mechanism

Platform	Platform-own Inventory	Seller Identity Visibility	Leakage Concerns	Procurable Products	Reseller Share
Panel A: Platforms matching the baseline resale mechanism					
Amazon[a]	✓	✓	✓[m]	✓	39%
Coupang[b]	✓	✓	✓[n]	✓	86%
JD.com[c]	✓	✓	✓[p]	✓	80%
Walmart[d]	✓	✓	✓[o]	✓	Not disclosed
Panel B: Platforms illustrating leakage or platform control, not resale					
DoorDash[e]	X*	✓	X	X*	n/a
Zillow[f]	X	X (via agent)	X	✓	n/a
Airbnb[g]	X	✓	✓[j]	X	n/a
Rover[h]	X	✓	✓[k]	X	n/a
Upwork[i]	X	✓	✓[l]	X	n/a

Notes. The baseline model assumes the platform (M) procures and owns inventory, resells a product whose provenance the consumer need not track, and controls recommendations so as to obscure the supplier's (S) direct channel. "Leakage concerns" record whether the platform maintains an official policy restricting off-platform transactions attached to a platform's marketplace side. "Reseller Share" is reported at the granularity each filing supports (see source notes). n/a: the platform does not resell. See Appendix B for full source citations.

* DoorDash is generally not the merchant of record; it owns inventory only in its DashMart, a chain of digital convenience and grocery stores owned and operated by DoorDash.

cost, which serves as the primary instrument for tempering the incumbent's wholesale pricing. Furthermore, the introduction of additional, non-advantaged suppliers yields no marginal benefit over a single-entrant framework. Conversely, when the entrant possesses a competitive advantage, the platform must account for both marginal costs and leakage risks. Specifically, the platform exhibits a preference for suppliers with low marginal costs and a minimal ability to induce leakage.

5.2 Implications for suppliers

B2B and also B2C: For an upstream supplier, a dual-channel distribution strategy that integrates wholesale procurement and direct-to-consumer marketplace sales dominates a single-channel approach. The wholesale channel is usually more profitable, as the platform leverages its downstream market power to optimize the retail price and maximize surplus extraction. Concurrently, maintaining a presence on the platform's third-party marketplace allows the supplier to capture residual demand in instances where the platform's procurement volume is insufficient to satisfy total market demand. Moreover, maintaining a direct channel that induces leakage provides the supplier with greater market power and enables the supplier to set a higher wholesale price.

Wholesale price: A monopoly supplier should set its wholesale price based on two factors: the uncertainty of consumer demand and consumers' switching propensity. The supplier should lower its wholesale price when consumer demand is more uncertain and consumers are less willing to switch to the direct channel. However, when facing a rival supplier without a cost advantage, the incumbent supplier's optimal wholesale price should take into account the rival's marginal cost. Specifically, the optimal wholesale price is increasing in the competitor's marginal cost.

When to enter the market: In the presence of an incumbent supplier, a potential entrant's strategy depends on the relative marginal costs of the two firms. The entrant successfully displaces the incumbent if and only if it possesses a cost advantage, rendering its capacity to induce leakage irrelevant to the entry condition. Upon entry, the efficient supplier (one with a lower marginal cost) maximizes its profit by setting its wholesale price relative to the rival's marginal cost. This limit-pricing strategy is designed to disincentivize the platform from procuring from or providing marketplace access to the displaced rival supplier. Notably, a supplier's competitive advantage arises from a lower marginal cost while shutting down the direct channel does not help the supplier win the platform's recommendation.

6 Conclusion

In conclusion, this paper investigates how digital platforms strategically optimize their business models when confronted with the dual frictions of marketplace leakage (disintermediation) and consumer demand uncertainty. Through a game-theoretic framework featuring a monopoly platform and an integrated supplier, we establish that adopting a hybrid model that combines both reseller and marketplace functions is the platform's optimal equilibrium strategy. This hybrid approach enables platforms to effectively balance the high-margin efficiency of the reseller mode, which maximizes joint profits but incurs sunk inventory risks, against the risk-free nature of the marketplace mode.

Furthermore, we study the persistence and variation of this equilibrium in several extensions. The hybrid model remains optimal across various structural conditions, including independent suppliers and the presence of costly return policies. However, we identify a critical boundary condition: if providing the return policy is costless, the supplier will offer a full return policy, and therefore the platform optimally adopts the pure reseller mode. In addition, if the platform can invest in exclusive on-platform transaction benefits at a sufficiently low cost to deter leakage, reverting to a pure marketplace becomes the optimal strategy. Moreover, in scenarios with supplier competition, we find that marginal cost efficiency ultimately dictates market dominance, superseding a supplier's relative ability to induce leakage. Ultimately, this research provides nuanced economic insights into why hybrid structures have become the prevailing and risk-mitigating standard for modern digital platforms.

References

Abhishek, V., K. Jerath, and Z. J. Zhang (2016): "Agency selling or reselling? Channel structures in electronic retailing," *Management Science*, 62(8), 2259–2280.

Anderson, S. and Ö. Bedre-Defolie (2022): "Online trade platforms: Hosting, selling, or both?" *International Journal of Industrial Organization*, 84, 102861.

——— (2024): "Hybrid platform model: Monopolistic competition and a dominant firm," *Rand Journal of Economics*, 55(4), 684–718.

Balakrishnan, A., S. Sundaresan, and B. Zhang (2014): "Browse-and-switch: Retail-online competition under value uncertainty," *Production and Operations Management*, 23(7), 1129–1145.

Bar-Isaac, H. and S. Shelegia (2023): "Search, showrooming, and retailer variety," *Marketing Science*, 42(2), 251–270.

Bisceglia, M. and J. Padilla (2023): "On sellers' cooperation in hybrid marketplaces," *Journal of Economics & Management Strategy*, 32(1), 207–222.

Boorsma, P. (2023): "Platform Coherence Policies with a Multiproduct Seller," *Working paper*.

Cai, G., X. Han, and G. Gu (2023): "Disintermediation Governance and Complementor Innovation: An Empirical Look at Amazon. com," in *Academy of Management Proceedings*, Academy of Management Briarcliff Manor, NY 10510, vol. 2023, 11435.

Casner, B. (2024): "Lowering the Garden Wall: Marketplace Leakage and Quality Curation," *Available at SSRN 4969728*.

Chintagunta, P. K., L. Huang, W. Miao, and W. Zhang (2023): "Measuring seller response to buyer-initiated disintermediation: Evidence from a field experiment on a service platform," *Available at SSRN 4423917*.

Edelman, B. and P. Hu (2016): *Disintermediation in two-sided marketplaces*, Harvard Business Review Press.

Enache, A. and A. Rhodes (2025): "Platform Disintermediation with Repeated Transactions," *Management Science*.

Farronato, C., J. Fong, and A. Fradkin (2024): "Dog eat dog: Balancing network effects and differentiation in a digital platform merger," *Management Science*, 70(1), 464–483.

Gautier, P., B. Hu, and M. Watanabe. (2023): "Marketmaking middlemen," *Rand Journal of Economics*, 54(1), 83–103.

Gu, G. and F. Zhu (2021): "Trust and disintermediation: Evidence from an online freelance marketplace," *Management Science*, 67(2), 794–807.

Gu, G. Y. (2024): "Technology and disintermediation in online marketplaces," *Management Science*, 70(11), 7868–7891.

Hagiu, A., T. Teh, and J. Wright (2022): "Should platforms be allowed to sell on their own marketplaces?" *Rand Journal of Economics*, 53(2), 297–327.

Hagiu, A. and J. Wright (2015): "Marketplace or reseller?" *Management Science*, 61(1), 184–203.

——— (2024): "Marketplace leakage," *Management Science*, 70(3), 1529–1553.

Hervas-Drane, A. and S. Shelegia (2025): "Retailer-led marketplaces," *Management Science*, 71(11), 9650–9669.

Hu, H., Q. Zheng, and X. A. Pan (2022): "Agency or wholesale? The role of retail passthrough," *Management Science*, 68(10), 7538–7554.

Jing, B. (2018): "Showrooming and webrooming: Information externalities between online and o ine Sellers," *Marketing Science*, 37(3), 469–483.

Loginova, O. (2009): "Real and virtual competition," *Journal of Industrial Economics*, 57(2), 319–342.

Mathewson, G. and R. Winter (1984): "An economic theory of vertical restraints," *RAND Journal of Economics*, 15(1), 27–38.

Mehra, A., S. Kumar, and J. S. Raju (2017): "Competitive strategies for brick-and-mortar stores to counter showrooming," *Management Science*, 64(7), 3076–3090.

Peitz, M. and A. Sobolev (2024): "Product Recommendations and Price Parity Clauses," *University of Bonn and University of Mannheim, Germany*.

Sullivan, M. (2025): "Fee Optimality in a Two-Sided Market," *Working Paper*.

Telser, L. G. (1960): "Why should manufacturers want fair trade?" *The Journal of Law & Economics*, 3, 86–105.

Tian, L., A. J. Vakharia, Y. Tan, and Y. Xu (2018): "Marketplace, reseller, or hybrid: Strategic analysis of an emerging e-commerce model," *Production and Operations Management*, 27(8), 1595–1610.

Wang, C. and J. Wright (2020): "Search platforms: Showrooming and price parity clauses," *RAND Journal of Economics*, 51(1), 32–58.

Wu, D., G. Ray, X. Geng, and A. Whinston (2004): "Implications of reduced search cost and free riding in e-commerce," *Marketing Science*, 23(2), 255–262.

Xie, Y. and H. Zhu (2023): "Platform leakage: Incentive conflicts in two-sided markets," *Working Paper*.

Zha, Y., Q. Li, T. Huang, and Y. Yu (2023): "Strategic information sharing of online platforms as resellers or marketplaces," *Marketing Science*, 42(4), 659–678.

Zhou, Q., B. Allen, R. T. Gretz, and M. B. Houston (2022): "Platform exploitation: When service agents defect with customers from online service platforms," *Journal of Marketing*, 86(2), 105–125.

A Appendix

A.1 Proof of Lemma 1

If M sets the transaction fee $f > v - c$, S will make negative profit selling on M's marketplace, and therefore S will set $p_m > v$ such that no buyer purchases on the marketplace.[13] Furthermore, $f = 0$ is obviously a weakly dominated strategy. Thus, we must have $0 < f \leq v - c$.

To maximize profit, M must set the resale price equal to the consumer's valuation v and prioritize its own product by recommendations. To see this, consumers who receive the recommendation for M's product remain unaware of S. Consequently, they will purchase the product provided the price does not exceed v. Given that procurement costs are sunk and unsold inventory holds no salvage value, M earns a revenue of v by reselling one unit of the product. In contrast, if M recommends S's product, the profit per consumer is capped at the fee f, where $f \leq v - c \leq v$. Therefore, pricing at v and prioritizing its own product constitutes the optimal strategy for M.

Since there is no entry cost, entering the marketplace is a weakly dominant strategy for S. If M does not make a full procurement (i.e., $q_m < \bar{q}$), entering the marketplace raises S's expected profit because M will recommend S's product to consumers if the actual demand exceeds its inventory; if M makes a full procurement (i.e., $q_m = \bar{q}$), S is indifferent between entering the marketplace or not. Thus, S always chooses to list its product on the marketplace.

In the stage where all retail prices are determined, S's problem is to setting p_m and p_d to maximize its profit. Given that $f \leq v - c$ and there is no price competition between M and S, S must set $v - \mu \leq p_d \leq p_m = v$. If $p_d = v$, no buyer will purchase from the direct channel, then S has no incentive to raise p_d. If $p_d = v - \mu$, all consumer will switch to the direct channel, then S has no incentive to reduce p_d. To see that p_m must be equal to v, suppose $p_m < v$, (i) if $p_d = v$, S can increase p_m by ε such that $p_m + \varepsilon < v$ and make higher profit; (ii) if $p_d < v$, S can increase p_m and p_d both by ε such that $p_m + \varepsilon < v$ and $p_d + \varepsilon < v$ and make higher profits without changing consumers' purchase decisions. Importantly, this logic also holds when M charges an ad-valorem transaction fee (commission), implying that S's optimal p_m is equal to v no matter M charges a per-unit fee or a percentage fee. Thus, the regime of transaction fee does not change our results.

[13] We assume the tie-breaking rule is that M recommends S if it is indifferent between recommending S or not.

A.2 Proof of Lemma 2

Given inequality (3), we focus on the case where S sets the wholesale price $w \le v - \varphi(f)$, where $\varphi(f) \equiv (1 - l(p_d^*(f)))f$. Consistent with main text, we suppress the argument f and write φ to denote $\varphi(f)$. Thus, $q_m^* = H^{-1}\left(1 - \frac{w}{v-\varphi}\right)$ as shown in equation (2) and we can rewrite M's profit as a function of φ as follows,

$$\begin{aligned}\Pi(\varphi) = &\int_{\underline{q}}^{H^{-1}\left(1-\frac{w}{v-\varphi}\right)} qv dH(q) - H^{-1}\left(1 - \frac{w}{v-\varphi}\right) w \\ &+ \int_{H^{-1}\left(1-\frac{w}{v-\varphi}\right)}^{\bar{q}} H^{-1}\left(1 - \frac{w}{v-\varphi}\right) v + \left(q - H^{-1}\left(1 - \frac{w}{v-\varphi}\right)\right) \varphi dH(q).\end{aligned}$$

Taking the derivative w.r.t φ yields

$$\begin{aligned}\Pi'(\varphi) &= \int_{H^{-1}\left(1-\frac{w}{v-\varphi}\right)}^{\bar{q}} q - \frac{\partial H^{-1}\left(1 - \frac{w}{v-\varphi}\right)}{\partial \varphi}\varphi - H^{-1}\left(1 - \frac{w}{v-\varphi}\right) dH(q) + \frac{\partial H^{-1}\left(1 - \frac{w}{v-\varphi}\right)}{\partial \varphi} w \\ &= \int_{H^{-1}\left(1-\frac{w}{v-\varphi}\right)}^{\bar{q}} q - H^{-1}\left(1 - \frac{w}{v-\varphi}\right) dH(q) > 0,\end{aligned}$$

which implies that M's profit is strictly increasing in φ when $w \le v - \varphi$.

When $w > v - \varphi$, M's profit is $\Pi(\varphi) = \int_{\underline{q}}^{\bar{q}} q\varphi dH(q)$, which is also increasing in φ. Thus, we can conclude that M's profit-maximizing transaction fee maximizes its marketplace margin from recommending S's product to consumers, that is,

$$f^* = \arg\max_f (1 - l(p_d^*(f)))f,$$

where

$$p_d^*(f) = \max\{p_d(f), v - \mu\} \tag{8}$$

and $p_d(f)$ is characterized by

$$p_d(f) = v - f + \frac{G(v - p_d(f))}{g(v - p_d(f))}.$$

Moreover, given that $G(\cdot)$ is log-concave, $p_d^*(f) < v$ for any $f > 0$. Thus, M's transaction fee induces partial leakage if its marketplace margin is strictly positive (i.e., $f > 0$ and $0 < l(p_d^*(f^*)) < 1$). In particular, if M charges $f = \mu$, then $p_d^*(\mu) > v - \mu$, leading to strictly positive marketplace margin of M and non-full leakage (i.e., $l(p_d^*(f^*)) < 1$). Since M's optimal transaction fee leads to a weakly higher margin than charging $f = \mu$, it must make strictly positive marketplace margin for M and induce partial leakage.

A.3 Proof of Proposition 1

Consistent with main text, we suppress the argument f, writing φ and ψ to denote $\varphi(f)$ and $\psi(f)$ respectively. Given inequality (3), we show that charging $w > v - \varphi$ is a weakly dominated strategy for S and therefore we only consider that S sets the wholesale price $w \leq v - \varphi$ in this proof. Since we have discussed the case where $\underline{q} > 0$ in the baseline analysis, we focus on $\underline{q} = 0$ in the following proof.

Suppose $\underline{q} = 0$, taking the derivative of $\pi(w)$ yields

$$\pi'(w) = \left(\left(1 - \frac{\psi}{v-\varphi}\right) w - c\right) \frac{\partial H^{-1}\left(1 - \frac{w}{v-\varphi}\right)}{\partial w} + H^{-1}\left(1 - \frac{w}{v-\varphi}\right).$$

Given that $H(\cdot)$ is continuously differentiable, $\pi'(w)$ is continuous. Moreover, $\frac{\partial H^{-1}\left(1-\frac{w}{v-\varphi}\right)}{\partial w} < 0$ and $H^{-1}(1) = \bar{q} > 0$ imply that $\pi'(0) > 0$. In addition, since $G(\cdot)$ is log-concave, the equilibrium transaction fee, direct price, and leakage probability satisfy $f^* > 0$, $p_d^*(f^*) < v$ and $l(p_d^*(f^*)) > 0$ as mentioned in the baseline analysis, which implies that

$$v - \varphi^* > \psi^* + c,$$

where $\varphi^* \equiv \varphi(f^*)$ and $\psi^* \equiv \psi(f^*)$. Therefore, given that $\varphi = \varphi^*$ and $\psi = \psi^*$, the derivative of $\pi(w)$ at $w = v - \varphi^*$ satisfies

$$\pi'(v - \varphi^*) = (v - \varphi^* - \psi^* - c) \frac{\partial H^{-1}\left(1 - \frac{w}{v-\varphi^*}\right)}{\partial w}\Big|_{w=v-\varphi^*} < 0.$$

Thus, we can conclude that S's optimal wholesale price is strictly less than $v - \varphi^*$. Consequently, M's procurement quantity is strictly positive in equilibrium, i.e., $q_m^* = H^{-1}\left(1 - \frac{w^*}{v-\varphi^*}\right) > 0$.

Moreover, we can show that S's optimal wholesale price and the equilibrium outcome is unique if $H(\cdot)$ is convex. Suppose $H(\cdot)$ is convex, $\frac{\partial H^{-1}\left(1-\frac{w}{v-\varphi^*}\right)}{\partial w}$ is negative and decreasing. Thus, $\pi'(w) > 0$ for $w \in \left[0, \frac{(v-\varphi^*)c}{v-\varphi^*-\psi^*}\right]$ and $\pi'(w)$ is decreasing for $w \in \left[\frac{(v-\varphi^*)c}{v-\varphi^*-\psi^*}, v - \varphi^*\right]$, which means that $\pi'(w)$ is single-crossing over the interval $(0, v - \varphi^*)$. Thus, there exists a unique $w^* \in \left(\frac{(v-\varphi^*)c}{v-\varphi^*-\psi^*}, v - \varphi^*\right)$ that maximizes S's profit.

A.4 Proof of Proposition 2

We assume that consumers' switching costs and aggregate demand are uniformly distributed such that $G(s) = \frac{s}{\mu}$ and $H(q) = \frac{q-\underline{q}}{\bar{q}-\underline{q}}$. Thus, M's equilibrium transaction fee is

$$f^*(\mu) = \min\{\mu, v-c\},$$

and the equilibrium price in the direct channel is

$$p_d^*(\mu) = v - \frac{\min\{\mu, v-c\}}{2}.$$

Then, we can calculate M's marketplace margin from recommending S's product ($\varphi(f^*(\mu))$) and S's per-consumer profit ($\psi(f^*(\mu))$) in equilibrium, which are as follows:

$$\varphi(f^*(\mu)) = \begin{cases} \frac{\mu}{2} & \text{if} \quad \mu \le v-c \\ v-c-\frac{(v-c)^2}{2\mu} & \text{if} \quad \mu > v-c \end{cases},$$

$$\psi(f^*(\mu)) = \begin{cases} v-c-\frac{3\mu}{4} & \text{if} \quad \mu \le v-c \\ \frac{(v-c)^2}{4\mu} & \text{if} \quad \mu > v-c \end{cases}.$$

Intuitively, when consumers' switching costs increase (i.e., μ increases), M's marketplace margin increases but S's per-consumer profit decreases.

To facilitate the discussion of the comparative statics with respect to the demand factors, we denote $\underline{q} = \theta - \delta$ and $\bar{q} = \theta + \delta$, where θ is the mean of consumer demand and δ measures the uncertainty of consumer demand. Based on equations (4) and (6), we solve the equilibrium wholesale price and procurement quantity as follows

$$w^* = \begin{cases} \min\left\{\frac{(2v-\mu)\left((\theta+\delta)(2v-\mu)+4\delta c\right)}{2\delta(4v+4c-\mu)}, \frac{2v-\mu}{2}\right\} & \text{if} \quad \mu \le v-c \\ \min\left\{\frac{(v-c)^2+2\mu c}{2\mu}\left(\frac{\theta+3\delta}{4\delta} + \frac{(v-c)^2(\theta-5\delta)}{4\delta(3(v-c)^2+8\mu c)}\right), \frac{(v-c)^2+2\mu c}{2\mu}\right\} & \text{if} \quad \mu > v-c \end{cases},$$

$$q_m^* = \begin{cases} \max\left\{\frac{(\mu+4c)\theta+(\mu-4c)\delta}{4v+4c-\mu}, \theta-\delta\right\} & \text{if} \quad \mu \le v-c \\ \max\left\{\frac{\theta-\delta}{2} - \frac{(v-c)^2(\theta-5\delta)}{2(3(v-c)^2+8\mu c)}, \theta-\delta\right\} & \text{if} \quad \mu > v-c \end{cases}.$$

When $\frac{v-c}{\mu} \le 1$, w^* is always increasing in $\frac{1}{\mu}$ and decreasing in δ; q_m^* is always increasing in $\frac{1}{\mu}$, and increasing in δ if and only if $(v-c)^2 > 4\mu c$. When $\frac{v-c}{\mu} \ge 1$, w^* is increasing in $\frac{1}{\mu}$ and decreasing in δ; q_m^* is always decreasing in $\frac{1}{\mu}$, and increasing in δ if and only if $\mu \ge 4c$.

A.5 Proof of Proposition 5

We first consider the case where $c > 0$. Given the maximal return quantity q_r, M chooses a procurement quantity to maximize the following profit function

$$\Pi(q_m) = \begin{cases} \int_0^{q_m} q\,(v-w)\,dH(q) + \int_{q_m}^{\bar{q}} q_m\,(v-w) + (q-q_m)\varphi dH(q) & \text{if} \quad q_m \leq q_r \\ \int_0^{q_m-q_r} qv + q_r w - q_m w dH(q) + \int_{q_m-q_r}^{q_m} q(v-w)dH(q) & \\ + \int_{q_m}^{\bar{q}} q_m v + (q-q_m)\varphi - q_m w dH(q) & \text{if} \quad q_r \leq q_m \leq \bar{q} \end{cases}.$$

Based on uniformly distributed consumer demand (i.e., $H(q) = \frac{q}{\bar{q}}$), solving M's profit maximization problem yields the following optimal procurement quantity

$$q_m^*(f, w, q_r) = \begin{cases} 0 & \text{if} \quad w > v - \varphi \\ \frac{w}{v-\varphi} q_r + \left(1 - \frac{w}{v-\varphi}\right)\bar{q} & \text{if} \quad w \leq v - \varphi \end{cases},$$

where φ is consistent with that in the baseline analysis. Given the expression of M's optimal procurement quantity, S sets $w \leq v - \varphi$ and $q_r \leq \bar{q}$ to maximize its expected total profit

$$\pi(w, q_r) = \int_0^{q_m^*-q_r} (q_m^* - q_r)w + \beta q_r c dH(q) + \int_{q_m^*-q_r}^{q_m^*} qw + \beta(q_m^* - q)cdH(q)$$
$$+ \int_{q_m^*}^{\bar{q}} q_m^* w + (q - q_m^*)\psi dH(q) - q_m^* c,$$

where ψ is consistent with that in the baseline analysis.

Then we analyze two scenarios based on the value of β. First suppose $0 \leq \beta < 1$, solving the FOC w.r.t w yields

$$w(q_r) = \frac{(m(q_r)^2 + 1)(v - \varphi) + 2c[(1-\beta)m(q_r) + \beta]}{2\left(2 - \frac{\psi}{v-\varphi}\right)},$$

where $m(q_r) = \frac{\bar{q}}{\bar{q}-q_r}$. Since S's optimal wholesale price does not exceed $v - \varphi$ and $w(q_r)$ is increasing in q_r, we define a critical value of the return quantity $\hat{q}_r$ by the following equation

$$w(\hat{q}_r) = v - \varphi.$$

In other words, S charges the wholesale price $w = v - \varphi$ if $q_r \geq \hat{q}_r$. Then, we take the total derivative w.r.t q_r by substituting in $w(q_r)$ and obtain

$$\frac{d\pi(w(q_r),q_r)}{dq_r}=\begin{cases}\frac{(\bar{q}-q_r)\beta c}{\bar{q}}\left(1-\frac{w(q_r)}{v-\varphi}\right)+\frac{(2\bar{q}-q_r)q_r w(q_r)}{2\bar{q}(\bar{q}-q_r)} & \text{if} \quad q_r\leq \hat{q}_r\\ \left(1-\frac{q_r}{\bar{q}}\right)(v-\varphi-\psi)-\left(1-\frac{\beta q_r}{\bar{q}}\right)c & \text{if} \quad q_r\geq \hat{q}_r\end{cases}.$$

Recall that in the baseline analysis, we have

$$v-\varphi>\psi+c.$$

Since the φ and ψ in this section are the same as those in the baseline, this inequality still holds. Consequently, $\frac{d\pi(w(q_r),q_r)}{dq_r}$ is positive for $q_r\leq\hat{q}_r$ and decreasing for $q_r\geq\hat{q}_r$. Furthermore, it is equal to $-(1-\beta)c<0$ when $q_r=\bar{q}$. Thus, there exists a unique and interior return quantity $(0<q_r<\bar{q})$ that maximizes S's profit. As equation (A.5) shows, M's optimal procurement quantity is a convex combination of q_r and $\bar{q}$. Therefore, M's equilibrium procurement quantity is less than $\bar{q}$, implying that M adopts the hybrid mode.

Next, suppose $\beta=1$. Taking the partial derivative w.r.t q_r yields

$$\frac{\partial\pi(w,q_r)}{\partial q_r}=\left(\frac{\bar{q}-q_r}{\bar{q}}\right)\left((w-c)\left(\frac{2w}{v-\varphi}-1\right)-\psi\left(\frac{w}{v-\varphi}\right)^2\right),$$

which is always positive or negative for a given w. Thus, S's optimal return quantity must be a corner solution, that is, $q_r^*=0$ or $\bar{q}$.[14] We show that S's optimal return quantity is $\bar{q}$ by contradiction. Suppose the return quantity is $q_r=0$, the corresponding optimal wholesale price is

$$w^*=\frac{v-\varphi+c}{2-\frac{\psi}{v-\varphi}}<v-\varphi,$$

where the inequality holds because $v-\varphi>\psi+c$. Moreover, given that $c>0$, we have

$$\left.\frac{\partial\pi(w,q_r)}{\partial q_r}\right|_{w=w^*,q_r=0}=\frac{c(v-\varphi-\psi-c)}{2(v-\varphi)-\psi}>0,$$

meaning that S can make more profit by increasing q_r, which contradicts with $q_r^*=0$. Thus, S's equilibrium return quantity is $q_r^*=\bar{q}$, implying that the risk of excessive inventory is fully covered by the return policy. Consequently, M will procure $\bar{q}$ and operate as a pure reseller in equilibrium.

We next examine the case where $c=0$. Since providing a return policy remains costless for S under this scenario, the underlying logic aligns with the previously discussed case

[14]We assume the tie-breaking rule is that S sets $q_r=0$ if S is indifferent between all return quantities.

where $c > 0$ and $\beta = 1$. Thus, S always provides a full return policy ($q_r = \bar{q}$) and charges $w = v - \varphi$ to maximize its profit. In this case, M is indifferent between the reseller and marketplace modes because the marketplace margin and resale margin are equal and the inventory risk is fully covered by the return policy. Consequently, M's profit is driven to its minimum, which is exactly the profit level that can be ensured by operating as a pure marketplace. Furthermore, consumer surplus is also minimized, as the pure reseller mode yields zero surplus for consumers. Thus, S maximizes its own profit by setting $q_r = \bar{q}$ and $w = v - \varphi$.

A.6 Proof of Lemma 4

We first show that M's optimal transaction fee satisfies $b \leq f \leq v + b - c$. If M sets $f \leq b$, S will have no incentive to induce any leakage since the profit from selling through M's marketplace $(v - c + b - f)$ is higher than that from selling through its own direct channel (at most $v - c$). Thus, M can make more profit by raising the transaction fee to b if it is strictly lower than b. On the other hand, if M sets $f > v+b-c$, S will make negative profit from selling on M, therefore S will set $p_m > v + b$ such that no buyer purchases on M. Thus, we must have $b \leq f \leq v + b - c$.

Given that consumers' valuation is $v+b$ when purchasing on M, M must set the resale price equal to $v + b$ and prioritize the recommendation of its own product. The logic follows that of Lemma 1: consumers receive the recommendation for M's product remain unaware of S and therefore they will purchase the product provided the price does not exceed $v+b$. Given that procurement costs are sunk and unsold inventory holds no salvage value, M earns a profit of $v + b$ per unit. In contrast, if M recommends S's product, the profit per consumer is capped at the fee f, where $f \leq v + b - c \leq v + b$. Therefore, pricing at $v + b$ and prioritizing its own product constitutes the optimal strategy for M.

Given $b \leq f \leq v + b - c$, we can show that S's optimal prices satisfy $v - \mu \leq p_d \leq v$ and $p_m = v + b$ following the same logic as in the proof of Lemma 1.

A.7 Proof of Proposition 6

Similar to the baseline analysis, we use backward induction to solve the subgame-perfect Nash equilibrium. Since Lemma 4 shows that $p_m = p_{resale} = v + b$, S sets the direct price to maximize its total expected profit from selling to the platform and consumers

$$\pi(p_d) = q_m(w - c) + \int_{q_m}^{\bar{q}} (q - q_m)((p_d - c)l(p_d) + (v + b - c - f)(1 - l(p_d)))dH(q),$$

where

$$l(p_d) = G(v - p_d).$$

Given Lemma 4, we focus on the case where $f \geq b$. Suppose $G(s) = \frac{s}{\mu}$ and $H(q) = \frac{q}{\bar{q}}$, S's optimal direct price is a function of the transaction fee and benefits, specifically,

$$p_d^*(f, b) = \max\{v - \frac{f - b}{2}, v - \mu\}.$$

Intuitively, S's optimal direct price is increasing in the consumer benefits since S can charge a higher price on M's marketplace and earn more profit from marketplace sales. Notice that if M charges a transaction fee greater than $2\mu + b$, S will set a direct price that induces full leakage and hence M will make zero profit as a marketplace. Thus, charging any $f > 2\mu + b$ is a weakly dominated strategy for M and thus we constrain our attention to the case where $f \leq 2\mu + b$ for subsequent analysis of this section.

With the investment cost $K(b) = \frac{kb^2}{2}$, M chooses the procurement quantity to maximize its total expected profit from operating as a marketplace and a reseller

$$\Pi(q_m) = \int_0^{q_m} q(v + b)dH(q) + \int_{q_m}^{\bar{q}} q_m(v + b) + (q - q_m)\varphi(f, b)dH(q) - q_m w - \frac{kb^2}{2}, \quad (9)$$

where $\varphi(f, b)$ is M's marketplace margin from recommending S's product to consumers and is defined by

$$\varphi(f, b) \equiv (1 - l(p_d^*(f, b)))f = f - \frac{f(f - b)}{2\mu}.$$

Therefore, we can solve M's optimal procurement quantity

$$q_m^*(f, b, w) = \begin{cases} 0 & \text{if} \quad w > v + b - \varphi(f, b) \\ \left(1 - \frac{w}{v + b - \varphi(f, b)}\right)\bar{q} & \text{if} \quad w \leq v + b - \varphi(f, b) \end{cases} \quad (10)$$

Since $q_m^* = 0$ if $w \geq v + b - \varphi(f, b)$, charging $w > v + b - \varphi(f, b)$ is a weakly dominated strategy for S. Thus, we restrict our attention to the case where $w \leq v + b - \varphi(f, b)$.

Similar to the baseline, M's optimal transaction fee maximizes its marketplace margin $\varphi(f, b)$, that is,

$$f^*(b) = \arg\max_f f - \frac{f(f - b)}{2\mu}.$$

Given that M's optimal transaction fee is bounded below by b, it satisfies

$$f^*(b) = \begin{cases} b & \text{if} \quad b \geq 2\mu \\ \mu + \frac{b}{2} & \text{if} \quad b \leq 2\mu \end{cases}. \quad (11)$$

Combining equations (9), (10) and (11), we can write M's profit as a function of b

$$\Pi(b)=\begin{cases}\frac{\bar{q}w^2}{2v}+\frac{\bar{q}(v+b)}{2}-\frac{kb^2}{2}-\bar{q}w & \text{if} \quad b\geq 2\mu \\ \frac{\bar{q}w^2}{2v-\mu+b-\frac{b^2}{4\mu}}+\frac{\bar{q}(v+b)}{2}-\frac{kb^2}{2}-\bar{q}w & \text{if} \quad b\leq 2\mu\end{cases}.$$

Taking the first derivative of $\Pi(b)$, we obtain

$$\Pi'(b)=\begin{cases}\frac{\bar{q}}{2}-kb & \text{if} \quad b\geq 2\mu \\ \frac{\bar{q}}{2}-kb-\frac{\bar{q}w^2\left(1-\frac{b}{2\mu}\right)}{\left(2v-\mu+b-\frac{b^2}{4\mu}\right)^2} & \text{if} \quad b\leq 2\mu\end{cases}.$$

Moreover, if $b\leq 2\mu$, the second derivative is

$$\Pi''(b)=-k+\frac{\bar{q}w^2}{\left(2v-\mu+b-\frac{b^2}{4\mu}\right)^3}\left(\frac{2v-\mu+b-\frac{b^2}{4\mu}}{2\mu}+2\left(1-\frac{b}{2\mu}\right)^2\right).$$

Notice that for $b\in[0,2\mu]$, $2v-\mu+b-\frac{b^2}{4\mu}$ is increasing and $1-\frac{b}{2\mu}$ is decreasing in b. Thus, $\Pi''(b)$ is strictly decreasing, implying that $\Pi'(b)$ is strictly concave for $b\in[0,2\mu]$.

Then we solve S's optimal wholesale price based on its profit function

$$\pi(w)=q_m^*(w-c)+\int_{q_m^*}^{\bar{q}}(q-q_m^*)\psi(f,b)dH(q)$$

and obtain

$$w^*(f,b)=\frac{v+b-\varphi(f,b)+c}{2-\frac{\psi(f,b)}{v+b-\varphi(f,b)}}, \tag{12}$$

where $\psi(f,b)$ is S's expected profit from selling its own product to one consumer and is defined by

$$\begin{aligned}\psi(f,b)&\equiv(v+b-c-f)(1-l(p_d^*(f,b)))+(p_d^*(f,b)-c)l(p_d^*(f,b))\\ &=v-c-(f-b)+\frac{(f-b)^2}{4\mu}.\end{aligned}$$

We are now ready to prove Proposition 6. We first consider the condition that $k\leq\frac{\bar{q}}{4\mu}$, under which we can demonstrate that M's investment in transaction benefits satisfies $b^*\geq 2\mu$ and M is a pure marketplace in equilibrium. Suppose instead, M chooses $b^*<2\mu$, therefore M's transaction fee is $f^* = \mu + \frac{b^*}{2}$ and S's wholesale price satisfies

$$w^* \leq v + b^* - \varphi(f^*, b^*) = v - \frac{\mu}{2} + \frac{b^*}{2} - \frac{b^{*2}}{8\mu} < v.$$

Moreover, $k \leq \frac{\bar{q}}{4\mu}$ implies

$$\Pi'(2\mu) = \frac{\bar{q}}{2} - 2\mu k \geq 0.$$

Since $\Pi'(2\mu) \geq 0$ and $\Pi'(b)$ is strictly concave over $[0, 2\mu]$, $\Pi(b)$ is strictly quasi-convex over $[0, 2\mu]$. Therefore, to show $\Pi(2\mu) > \Pi(b)$ for any $b \in [0, 2\mu)$, it is sufficient to show that

$$\Pi(2\mu) > \Pi(0) \Leftrightarrow \bar{q}\mu - 2k\mu^2 + \bar{q}\left(\frac{w^2}{2v} + \frac{v}{2} - w\right) > \bar{q}\left(\frac{w^2}{2v - \mu} + \frac{v}{2} - w\right).$$

Given that $w < v$ and $\mu \leq v - c$, we have $v(2v - \mu) > w^2$. Dividing by $v(2v - \mu)$ and multiplying by $\frac{\bar{q}}{2}$ gives

$$\frac{\bar{q}}{2} > \frac{\bar{q}w^2}{2v(2v - \mu)}.$$

Applying the given parameter condition $k \leq \frac{\bar{q}}{4\mu}$ ensures $\bar{q} - 2k\mu \geq \frac{\bar{q}}{2}$. By transitivity, this establishes

$$\bar{q} - 2k\mu > \frac{\bar{q}w^2}{2v(2v - \mu)}.$$

Multiplying the entire inequality by μ and applying the algebraic identity $\frac{\mu}{2v(2v-\mu)} = \frac{1}{2v-\mu} - \frac{1}{2v}$, we obtain

$$\bar{q}\mu - 2k\mu^2 + \frac{\bar{q}w^2}{2v} > \frac{\bar{q}w^2}{2v - \mu}.$$

Adding the common term $\bar{q}\left(\frac{v}{2} - w\right)$ to both sides directly yields the desired inequality

$$\bar{q}\mu - 2k\mu^2 + \bar{q}\left(\frac{w^2}{2v} + \frac{v}{2} - w\right) > \bar{q}\left(\frac{w^2}{2v - \mu} + \frac{v}{2} - w\right).$$

Thus, we have constructed a contradiction for $b^* < 2\mu$ in equilibrium.

As a consequence, M's optimal investment in transaction benefits must satisfy $b^* \geq 2\mu$. Based on equations (12) and (11), we have $f^* = b^*$ and the equilibrium wholesale price is $w^* = v$. Thus, we can show that $\Pi(0) \leq \Pi(2\mu)$ and hence $\Pi(2\mu) \geq \Pi(b)$ for any $b \in [0, 2\mu]$. Moreover, since $\Pi'(b)$ is decreasing for $b \geq 2\mu$, the unique profit-maximizing investment in transaction benefits is given by

$$b^* = \frac{\bar{q}}{2k} > 2\mu.$$

Importantly, since $w^* = v + b - \varphi(f^*, b^*) = v$, which means M's profitability from reselling is equal to that from charging the transaction fee, M procures nothing and chooses to be a pure marketplace considering the risk of consumer demand.

Then we consider another condition that $k > \frac{\bar{q}}{4\mu}$. Suppose the equilibrium exists,[15] we can demonstrate that M's investment in transaction benefits satisfies $0 < b^* < 2\mu$ and M adopts the hybrid mode in equilibrium. Since $k > \frac{\bar{q}}{4\mu}$, it follows that

$$\Pi'(2\mu) = \frac{\bar{q}}{2} - 2\mu k < 0,$$

implying that $\Pi(b)$ is decreasing for $b \geq 2\mu$ and M's profit-maximizing investment in transaction benefits satisfies $b^* < 2\mu$ given that $\Pi'(b)$ is continuous. Since $b^* < 2\mu$ in equilibrium, M's transaction fee is $f^* = \mu + \frac{b^*}{2}$ and S's wholesale price satisfies

$$w^* = \frac{v + b - \varphi(f^*, b^*) + c}{2 - \frac{\psi(f^*, b^*)}{v + b - \varphi(f^*, b^*)}} < v + b - \varphi(f^*, b^*).$$

As a result, $q_m^* > 0$ and M adopts the hybrid mode. Moreover, if $b = 0$, we have $w^* \leq v + b - \varphi = v - \frac{\mu}{2}$ and therefore $\Pi'(0) > 0$. Thus, we can conclude that M's optimal investment in transaction benefits satisfies $0 < b^* < 2\mu$ and M adopts the hybrid mode in equilibrium.

A.8 Proof of Lemma 5

Following the same logic as in the proof of Lemma 1, we can show that the suppliers' retail prices on the marketplace and M's resale prices must be equal to v, i.e., $p_{m1} = p_{m2} = p_{resale} = v$.

To see that M recommends S_1 to consumers after its own inventory is sold out, M always first recommends its own product because the profit made from reselling is higher than charging transaction fees given that the procurement cost is sunk. M needs to recommend the suppliers' product to consumers if the realized consumer demand is higher than M's procurement quantity. Suppose M charges $f_1 = f_2 = v - c_2$, S_1 and S_2 will compete in their direct price for M's recommendation because in this case M will recommend the supplier whose leakage proportion is lower after M's own inventory is sold out. As a result, the equilibrium direct prices will be $p_{d1} = p_{d2} = v$ and induce no leakage, then M can earn a marketplace margin of $v - c_2$ by recommending S_1. Since $v - c_2$ is already

[15] To ensure the existence of equilibrium, a sufficient condition is $\mu \leq (2 - \sqrt{2})v$, which guarantees that $\Pi(b)$ has a unique and interior maximizer. Thus, the equilibrium exists by Brouwer's fixed-point theorem.

the highest marketplace margin that M can possibly make from charging a transaction fee to S_2, M has no incentive to recommend S_2. Throughout our analysis, we assume the tie-breaking rule is that M recommends the low-cost supplier S_1 when it is indifferent between the two suppliers, which leads to more efficient equilibrium outcomes. Otherwise, S_1 could deviate by offering M an arbitrarily small increase in the marketplace margin to secure the recommendation.

Given that M always recommends S_1 and can ensure itself a marketplace margin of $v - c_2$ by charging $f_1 = f_2 = v - c_2$, M has no incentive to charge $f_1 < v - c_2$.

A.9 Proof of Proposition 7

First, we define two direct prices for S_1,

$$\hat{p}_{d1} = v - \frac{f_1}{2},$$
$$\tilde{p}_{d1} = v - \left(1 - \frac{v - c_2}{f_1}\right)\mu_1,$$

where $\hat{p}_{d1}$ is the profit-maximizing direct price conditional on M recommends S_1 and $\tilde{p}_{d1}$ is the direct price such that M makes a profit of $v - c_2$ by recommending S_1's product to one consumer. Since $v - c_2$ is the highest profit M can make from recommending S_2's product to one consumer, S_1 can ensure M's recommendation by charging $\tilde{p}_{d1}$. Since we assume condition (7) to differentiate the analysis from the baseline, we have

$$\tilde{p}_{d1} \geq \hat{p}_{d1},$$

thus, S_1's optimal direct price is $p^*_{d1} = \tilde{p}_{d1}$. Although M never recommends S_2, S_2's direct price helps M to discipline S_1 and it must satisfy $p_{d2} = v$ in equilibrium.

Similar to the baseline analysis, we can characterize M's optimal procurement quantity

$$q^*_{mi} = \begin{cases} \left(1 - \frac{w_i}{c_2}\right)\bar{q} & \text{if } \; w_i \leq \min\{w_j, c_2\} \\ 0 & \text{otherwise} \end{cases} . \tag{13}$$

M chooses the supplier with a lower wholesale price and procures a positive quantity only when such a price generates a profit margin exceeding the potential profit from charging the transaction fee (i.e., $v - w_i \geq v - c_2$). Thus, M never procures from S_2 because S_2's wholesale price never falls below its marginal cost.[16] Then, we can solve S_1's optimal

[16]We assume that M procures from the low-cost supplier S_1 when indifferent between the two suppliers.

wholesale price

$$w_1^* = \frac{c_1 + c_2}{2 - \frac{\psi}{c_2}}, \tag{14}$$

where $\psi(f_1) = c_2 - c_1 - \left(1 - \frac{v - c_2}{f_1}\right)^2 \mu_1$.

M's equilibrium transaction fees satisfy $f_1^* \geq v - c_2$ and $f_2^* = v - c_2$, where $f_1^* \geq v - c_2$ is shown in Lemma 4. To see $f_2^* = v - c_2$, we assume S_2's pricing strategy is $p_{m_2} = \max\{v, f_2 + c_2\}$ and $p_{d2} = v$ given that M never recommends S_2 in equilibrium.[17] If charging $f_2 \neq v - c_2$, M's marketplace margin from recommending S_2 would be strictly less than $v - c_2$. As a result, S_1 could set a direct price that yields the same marketplace margin and secure M's recommendation. Thus, M charges $f_2^* = v - c_2$ in equilibrium. The intuition is that S_1 can guarantee M's recommendation by making M indifferent between the two suppliers and M's marketplace margin from recommending S_2 cannot exceed $v - c_2$. Therefore, M's marketplace margin from recommending S_1 is also constrained by $v - c_2$.

Notice that M may charge S_1 a transaction fee that is higher than $v - c_1$, which means that S_1 will make negative profit by selling through M's marketplace. However, S_1 may accept such a transaction fee and set $p_{m1} = v$ to obtain M's recommendation. M's optimal transaction fee to S_1 is not unique because regardless of the transaction fee, S_1 will set its direct price to make sure M makes a profit of $v - c_2$ by recommending S_1 to one consumer. Thus, M is indifferent between the fees that yields non-negative profit for S_1. In particular, we denote by $\bar{f}_1$ the fee that yields exactly zero profit for S_1, that is,

$$\begin{aligned}
\psi(\bar{f}_1) &= (v - c_1 - \bar{f}_1)(1 - l(\tilde{p}_{d1}(\bar{f}_1))) + (\tilde{p}_{d1}(\bar{f}_1) - c_1)l(\tilde{p}_{d1}(\bar{f}_1)) \\
&= c_2 - c_1 - \left(1 - \frac{v - c_2}{\bar{f}_1}\right)^2 \mu_1 \\
&= 0.
\end{aligned}$$

Solving this equation yields

$$\bar{f}_1 = \frac{v - c_2}{1 - \sqrt{\frac{c_2 - c_1}{\mu_1}}}.$$

Notice that M's profit is decreasing in w_1 and w_1^* is decreasing in f_1. Thus, in the equilibrium that maximizes M's profit, M charges $f_1 = \bar{f}_1$. Then, we substituting $f_1 = \bar{f}_1$ into equations (13) and (14), solving the equilibrium wholesale price and procurement

[17] Assuming other pricing strategy of S_2 could change the equilibrium transaction fee to S_2, but it does not change other equilibrium outcomes including the transaction fee to S_1, wholesale price, and procurement quantity.

quantity

$$w_1^* = \frac{c_1 + c_2}{2},$$

$$q_{m1}^* = \frac{(c_2 - c_1)\bar{q}}{2c_2}.$$

B Source Notes for Table 3

[a] Amazon.com, Inc., Annual Report (Form 10-K) for FY ended Dec. 31, 2025, filed Feb. 6, 2026 (SEC accession no. 0001018724-26-000004). FY2025 net sales include "Online stores" (first-party, recorded gross) of $269B and "Third-party seller services" (recorded net) of $172B, of $716.9B total; Amazon reports third-party sellers as 61% of paid units (first-party 39%). https://www.sec.gov/Archives/edgar/data/1018724/000101872426000004/amzn-20251231.htm

[b] Coupang, Inc., Annual Report (Form 10-K) for FY ended Dec. 31, 2025, filed Feb. 2026 (SEC accession no. 0001834584-26-000024). FY2025 Product Commerce segment net revenues $29.6B of $34.5B total (86%), predominantly owned-inventory retail; the revenue note distinguishes "net retail sales" (owned inventory, gross/principal) from "net other revenue" (third-party merchant services, advertising, fulfillment fees, net/agent)—the exact first-party/third-party line split should be read from that note. https://www.sec.gov/Archives/edgar/data/1834584/000183458426000024/cpng-20251231.htm

[c] JD.com, Inc., Annual Report (Form 20-F) for FY ended Dec. 31, 2025, filed Apr. 16, 2026 (SEC accession no. 0001193125-26-157870). FY2025 total net revenues RMB1,309.1B (US$187.2B); "net product revenues" (first-party direct sales) are the large majority (80% in FY2024), with "net service revenues" (marketplace, logistics, advertising) the remainder—confirm the exact FY2025 split in the 20-F revenue note. https://www.sec.gov/Archives/edgar/data/1549802/000119312526157870/d53690d20f.htm

[d] Walmart Inc., Annual Report (Form 10-K) for FY ended Jan. 31, 2026, filed Mar. 13, 2026 (SEC accession no. 0000104169-26-000055). The filing states some products are sold by third parties in marketplace transactions and describes marketplace fulfillment/inventory arrangements, but does not disclose the first-party/third-party share of sales. https://www.sec.gov/Archives/edgar/data/104169/000010416926000055/wmt-20260131.htm

[e] DoorDash, Inc., Annual Report (Form 10-K) for FY ended Dec. 31, 2025, filed Feb. 18, 2026 (SEC accession no. 0001792789-26-000013). https://www.sec.gov/Archives/edgar/data/1792789/000179278926000013/dash-20251231.htm

[f] Zillow Group, Inc., Annual Report (Form 10-K) for FY ended Dec. 31, 2025, filed Feb. 2026 (SEC accession no. 0001617640-26-000015). https://www.sec.gov/Archives/edgar/data/1617640/000161764026000015/z-20251231.htm

[g] Airbnb, Inc., Annual Report (Form 10-K) for FY ended Dec. 31, 2025, filed Feb. 2026 (SEC accession no. 0001559720-26-000004). https://www.sec.gov/Archives/edgar/data/1559720/000155972026000004/abnb-20251231.htm

[h] Rover Group, Inc., Annual Report (Form 10-K) for FY ended Dec. 31, 2022, filed Mar. 9, 2023 (SEC accession no. 0001826018-23-000015). Risk factor: "Off-platform bookings and payments

have had and may continue to have a material adverse effect on our business." https://www.sec.gov/Archives/edgar/data/1826018/000182601823000015/rovr-20221231.htm

[i] Upwork Inc., Annual Report (Form 10-K) for FY ended Dec. 31, 2025, filed Feb. 12, 2026 (SEC accession no. 0001627475-26-000012). https://www.sec.gov/Archives/edgar/data/1627475/000162747526000012/upwk-20251231.htm

[j] Airbnb, "Off-Platform Policy" (Airbnb Help Center) and Terms of Service, which prohibit users from soliciting or facilitating any off-Airbnb transaction (e.g., redirecting communication or payments off-platform); enforcement was tightened effective 2025.

[k] Rover, Terms of Service and Help Center: "Initiating a booking through Rover and then completing the transaction off Rover violates our Terms of Service" and may result in account deactivation; booking and payment through Rover are required. https://www.rover.com/bookings-on-rover/

[l] Upwork, User Agreement §7 (Non-Circumvention) and Help Center: payments for Upwork relationships must remain on-platform; circumvention is a material breach that can result in account closure. https://support.upwork.com/hc/en-us/articles/360052511133-Circumvention-and-why

[m] Amazon, "Selling Policies and Seller Code of Conduct" and "Prohibited Seller Activities and Actions Policy" (Amazon Seller Central): sellers may not attempt to circumvent the Amazon sales process or divert Amazon customers to another website, including by placing hyperlinks or URLs in messages or listing fields that direct customers off Amazon. Governs the third-party (marketplace) side. https://sellercentral.amazon.in/help/hub/reference/external/G200386250

[n] Coupang, "Seller Code of Conduct" (Coupang Global Marketplace): prohibits sellers from attempting to circumvent the Coupang sales process or divert Coupang customers to another website, including by providing links or messages directing users to an external site. https://globalsellers.coupang.com/en/rules-and-policies/seller-code-of-conduct/

[o] Walmart, "Marketplace Seller Code of Conduct" and "Seller Suspension and Termination Principles" (Walmart Marketplace Learn): sellers must not divert customers or transactions from Walmart to another website, including via hyperlinks or URLs in listing content, description fields, or seller email messages. https://marketplacelearn.walmart.com/ca/guides/Policies%20&%20standards/Account/seller-suspension-and-termination-principles#Actions%20that%20Divert%20Walmart.ca%20Customers%20or%20Transactions

[p] JD.com, JD Open Platform merchant rules (https://learn-jdm.jd.com/knowledge/rule/detail?ruleId=923540006109319168; rule 21 published in Chinese), which prohibit merchants from directing transactions off-platform/offline and other conduct that violates the normal transaction process, with penalties up to store removal.