Frontiers in Business, Economics and Management
ISSN: 2766-824X | Vol. 25, No. 2, 2026

Refund Without Return: A Three-Stage Game of Platform Rules, Opportunism and Product Quality

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Abstract: A refund-without-return rule shifts the cost of a return from buyer to seller. Advocates expect quality to rise; critics point to sellers who lose both the money and the goods. We model the policy as a three-stage game of complete information: the platform sets rule strength, a seller sets price and quality, and buyers decide whether to purchase and then whether to claim. Because a claim succeeds only with probability equal to rule strength, the share of satisfied buyers for whom claiming pays rises with rule strength: a tougher rule manufactures the opportunism that defeats it. The threshold below which quality improves therefore falls as the rule is strengthened, and the quality-maximising rule is interior and declining in opportunism. The price response also changes sign: absent opportunism a tougher rule raises price; once claiming pays it lowers price, because a high list price is itself the inducement to claim. Welfare rises with rule strength, but the gain accrues almost entirely to consumers while seller profit falls by more than two-fifths; and since the platform pays to process claims, its privately optimal rule falls well short of the social one.

Keywords: Refund-without-return, platform governance, product quality, opportunistic claiming, three-stage game.

1. Introduction

A refund-without-return rule—"refund-only" on platforms—lets a buyer obtain a refund and keep the goods. Pinduoduo introduced it in 2021 for fresh produce; Douyin, Taobao, JD.com and Kuaishou followed in 2023–2024. The aim was to cut consumer redress costs. Under the conventional process the buyer pays return freight and carries the burden of proof, which for a cheap item is nearly the price paid. Shifting that cost to the seller was expected to force quality up. Instead it triggered disputes: sellers complained of losing both the money and the goods. By July 2024 Taobao had relaxed the rule for stores scoring 4.8 or above, and in January 2025 the State Administration for Market Regulation summoned the major platforms. By 22 April 2025 all five platforms had revised it, so sellers handle claims first and the platform no longer intervenes by default. Why did platforms impose a costly obligation on themselves, and why withdraw it within four years?

The question is not whether refund-only protects consumers, but how it alters the seller's price and quality choices, and when it defeats its own purpose. We model a three-stage game of complete information. The platform sets rule strength $r \in [0, 1]$, the probability a claim is approved. The seller then chooses price and quality. Buyers decide whether to purchase and, if so, whether to claim. Three modelling choices matter. Rule strength is a parameter, not a dummy, governing both approval probability and the loss a refund imposes. Non-conformity and opportunistic claiming enter as separate refund sources: a seller can invest to avoid the first but not the second. And the platform pays a handling cost per claim.

One result corrects a natural first guess. An unjustified claim is approved only with probability r, so rule strength belongs in the abuse decision. Raising r enlarges the pool of buyers for whom claiming pays; tolerance for opportunism shrinks as the rule is strengthened. A tougher rule manufactures the opportunism that defeats it. A closed-form threshold that ignores the feedback from price to quality overstates the true threshold by 30 to 64 percent, so Proposition 1 uses the exact comparative-static condition.

This paper joins two literatures. The first studies return options as insurance against misfit. Che (1996) examines how refund generosity and hassle costs shape demand; Su (2009) shows that full and partial return policies alter supply-chain incentives. That work concentrates on demand and the refund level; the seller's joint adjustment of price and quality remains largely unexamined. The second literature studies opportunistic returns. Altug et al. (2021) compare targeted refunds with a menu of refunds; Akturk et al. (2021) evaluate profiling and product-tracking. In both, the rule is the seller's own instrument. Here a platform sets it and pays to process claims, so the cost falls on a party with no direct stake in quality. Zhang et al. (2022) show return insurance can signal quality under private information; Liu & Zhang (2024) study store credit. Our quality is chosen under symmetric information, and the friction is opportunism, not adverse selection. Two-sided market theory (Rochet & Tirole, 2003) concentrates on price structure; Hagiu & Wright (2015) ask when a platform should act as marketplace rather than reseller. Non-price governance instruments that the platform must pay to enforce remain less studied. Refund-only is one.

2. The model

2.1. Timing

A platform, a representative seller, and a unit-mass continuum of buyers play a complete-information game in three stages. The platform sets rule strength $r \in [0,1]$, the probability that a refund claim is approved; the seller then chooses price p and quality q simultaneously; buyers then decide whether to purchase and, conditional on purchase, whether to claim. We solve by backward induction.

2.2. Non-conformity and Opportunistic Claiming

Goods fail to match expectations with probability

$$\mu(q) = \mu_0 - \beta q, \mu_0 \in (0,1), \beta > 0 \quad (1)$$

A linear form is a first-order approximation; a convex one strengthens every result below without changing signs. Opportunism enters through the private cost of claiming without cause, k: the time and effort of pressing a claim one knows to be unmerited, plus the risk of being flagged. We take k uniform on [0, 1/η], with η > 0 indexing opportunism. A satisfied buyer has value θq. Not claiming leaves her θq - p; claiming yields θq - (1-r)p in expectation, net of the hassle cost k. Claiming therefore pays when

$$k < rp, \quad (2)$$

And a fraction

$$A(p,r) = \eta r p \quad (3)$$

Of satisfied buyers claim. Both arguments of (3) matter: the abuse share rises with the list price, the refund being what is at stake, and with rule strength, which makes an unjustified claim more likely to succeed. Claims per buyer are $\lambda = \mu(q) + \eta r p$, and the realised refund rate is

$$R(q,p;r) = r\lambda = r[\mu_0 - \beta q + \eta r p] \quad (4)$$

The expected gain from holding the claim option, $\eta r^2 p^2/2$, rises in r and constitutes the rule's insurance value.

2.3. Demand, Costs and Payoffs

Market demand takes the reduced form

$$D(p,q;r) = a - bp + \gamma q + \kappa r, a, b, \gamma, \kappa > 0, \quad (5)$$

With κr capturing the insurance value and $D \geq 0$ maintained. The sign of κ follows from the model but its magnitude does not, so (5) is a local approximation; our results require only that demand decrease in price and not decrease in quality.

Quality costs $cq^2/2$ with c>0, and marginal production cost is zero, natural for the digital, service and thin-margin categories where refund-only rules are common. A refund costs the seller p+s: the refunded price plus $s \geq 0$, an exogenous burden covering ratings damage, traffic demotion and after-sales labour. The platform charges an ad valorem commission t, so the seller's unit receipt is (1-t)p and

$$\pi_S(p,q) = [(1-t)p - (p+s)r\lambda]D(p,q;r) - \frac{c}{2}q^2, \quad (6)$$

With $\pi_u \equiv (1-t)p - (p+s)r\lambda$ the net unit contribution. Writing the commission inside the seller's objective is not cosmetic: as a pure transfer it would remove precisely the incentives this paper is about.

The platform earns commission revenue and pays a convex enforcement cost $\varphi r^2/2$ plus ψ per claim:

$$\pi_P = t\, p\, D - \frac{\phi}{2}r^2 - \psi\, r\lambda D. \quad (7)$$

Welfare consists only of real resources, prices and transfers cancelling on aggregation:

$$W = \frac{1}{b}\left[aD + \gamma qD + \kappa rD - \frac{D^2}{2}\right] - \frac{c}{2}q^2 - \frac{\phi}{2}r^2 - (\psi + s)r\lambda D - \frac{(1-\mu)\eta r^2 p^2 D}{2}. \quad (8)$$

The first term is gross willingness to pay; the last is the hassle cost borne by claimants who would rather have kept the goods. The identity W = CS + πS + πP - DL holds and is verified in Section 5.

3. Equilibrium and Comparative Statics

3.1. The Seller's Conditions

A non-conforming buyer's good is worth nothing to her, and the friction k attaches only to claims made without cause, so she claims outright; a satisfied buyer claims when k<rp. This closes stage 3 and yields (4). Maximising (6) gives

$$F_1 = [(1-t) - r\lambda - (p+s)\eta r^2]D - b\,\pi_u = 0, \quad (9)$$

$$F_2 = (p+s)r\beta D + \gamma\,\pi_u - cq = 0. \quad (10)$$

In (10), the two returns to quality, fewer refund losses $(p+s)r\beta D$ and larger demand $\gamma\pi_u$, are set against cq. In (9) the bracket is the marginal net receipt from raising price: the commission-adjusted increment, less the refund cost of the average sale, less the extra refund cost a higher price itself induces through the abuse share, $(p+s)\eta r^2$. Differentiating again, with $\Delta \equiv \det H > 0$,

$$H_{11} = -2\eta r^2 D - 2b[(1-t) - r\lambda - (p+s)\eta r^2] \quad (11)$$

$$H_{12} = r\beta D + \gamma[(1-t) - r\lambda - (p+s)\eta r^2] - b(p+s)r\beta, H_{22} = 2\gamma(p+s)r\beta - c. \quad (12)$$

Two assumptions keep the equilibrium interior: (A1) $(1-t) - r\lambda - (p+s)\eta r^2 > 0$, so a marginal sale retains positive net value, and (A2) $c > 2\gamma(p+s)r\beta$, so quality cost is sufficiently convex. Then (9) and (10) determine a unique $(p*,q*)$ with H negative definite; all calibrations below satisfy both.

3.2. The Quality Threshold

Totally differentiating (9) and (10) gives

$$\frac{\partial q^*}{\partial r} = -(H^{-1}F_r)_2 = \frac{1}{detH}[H_{12}F_{1r} + |H_{11}|F_{2r}] \quad (13)$$

$$F_{1r} = (-\lambda - \eta r p - 2(p+s)\eta r)D + [(1-t) - r\lambda - (p+s)\eta r^2]\kappa + b(p+s)(\lambda + \eta r p), \quad (14)$$

$$F_{2r} = (p+s)[\beta(D + r\kappa) - \gamma(\lambda + \eta r p)] \quad (15)$$

Expression (13) separates two forces: the direct channel in F_{2r}, where a higher r raises the return to quality (the penalty effect) while eroding the contribution that finances it (the leakage effect); and the price feedback in F_{1r}, defined in (14), with $H_{12}>0$ making price and quality complements in the seller's problem.

Proposition 1. There exists an interior threshold $\bar{\eta}(r) \in (0,1)$ such that $\partial q*/\partial r > 0$ below it and < 0 above it, defined implicitly by $H_{12}F_{1r} + |H_{11}|F_{2r} = 0$.

The economics is a tug of war, settled by the composition of the leakage. The penalty effect pushes quality up; the leakage effect compresses π_u and, since quality is financed out of profit, pushes it down. Part of the leakage, ηrp, is quality-irrelevant: opportunists claim regardless of how much the seller invests and cannot be bought off by better quality. Once that component is large enough, further tightening erodes the margin that pays for quality.

Setting (15) to zero alone yields the closed form

$$\eta^P(r) = \frac{\beta(D + r\kappa) - \gamma(\mu_0 - \beta q)}{2\gamma r p} \quad (16)$$

It is not the true threshold: under our calibration $|H_{12}/H_{11}|$ runs from 0.51 to 0.58, so the neglected term is of the same order as the retained one, and (16) overstates the true threshold by a factor of 1.3 to 1.6 (Table 3); its factor 1/r nonetheless discloses Proposition 2.

3.3. Three Comparative-Static Results

Proposition 2. $\partial\bar{\eta}/\partial$ r < 0: a stronger rule reduces the tolerance for opportunism.

Raising r enters the abuse margin twice: it enlarges the market, raising the return to quality; and it raises the expected refund rp, drawing more buyers into claiming. The second effect dominates: the threshold falls from 0.082 at r=0.2 to 0.020 at r=1.0 (Table 3), so a rule introduced to discipline quality erodes the conditions under which it improves quality (Figure 1).

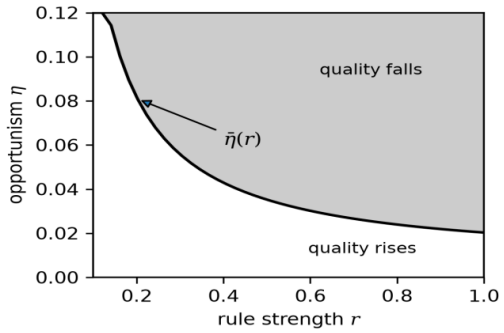


Figure 1. The opportunism threshold falls as the rule is strengthened.

Proposition 3. ∂ p∗/∂ r > 0 when η = 0; with η > 0 it is decreasing in r and turns negative above a threshold rule strength.

Without opportunism the rule imposes an expected refund cost of (p+s)rμ₀ on each sale, a standard cost shock the seller passes on. Once η>0 a second channel opens: since the abuse share is ηrp, a higher price invites more claims and the refund loss grows with the square of price; a high list price manufactures its own losses, and the seller cuts price to suppress the abuse. At r=0.8 the derivative is +1.07 at η=0 and -1.86 at η=0.034; with zero insurance value the figures are +0.69 and -1.95. The testable implication needs little data: the sign of the price response to a rule change reveals the strength of opportunism in the category.

Proposition 4. The rule strength maximising q∗ is decreasing in η; it is a corner at r=1 for small η and interior above roughly η=0.02.

The quality-maximising rule is a corner, r=1, while η ≤ 0.02; it falls to 0.52 at η=0.034, 0.34 at η=0.05 and 0.20 at η=0.08 (Table 3), matching the sequence of events.

4. Numerical Illustration

We solve (9) and (10) by Newton's method with a line search and compute comparative statics from the numerically differentiated Jacobian; the closed forms (11) to (15) match to within 2.4×10^{-4}, and welfare satisfies W = CS + πS + πP - DL to 10^{-14}. Baseline values: a=10, b=1, γ=1.2, c=4, μ₀=0.30, β=0.08, s=0.5, t=0.05, φ=0.10, κ=0.40, ψ=0.10, illustrative values displaying sign regions, not calibrated to any market.

Table 1. Equilibrium and comparative statics, η = 0.034

r	p∗	q∗	λ	abuse share	∂p∗/∂r	∂q∗/∂r
0.1	6.085	1.779	0.178	0.021	+0.436	+0.553
0.3	6.127	1.867	0.213	0.062	−0.036	+0.315
0.5	6.062	1.902	0.251	0.103	−0.635	+0.031
0.7	5.862	1.878	0.289	0.140	−1.399	−0.266
0.9	5.489	1.798	0.324	0.168	−2.361	−0.530
1.0	5.226	1.739	0.339	0.178	−2.900	−0.636

Quality rises from 1.78 to 1.90 as the rule strengthens from 0.1 to 0.5, then falls back to 1.74 at r=1; price peaks at r=0.3 and declines steeply thereafter; the abuse share climbs throughout, from 2.1 to 17.8 percent of satisfied buyers.

Table 2. Opportunism and the quality response, r = 0.8

η	0.000	0.010	0.020	0.024	0.030
q∗	2.491	2.275	2.082	2.010	1.909
∂q∗/∂r	+1.452	+0.747	+0.187	−0.003	−0.256
abuse share	0.000	0.051	0.098	0.115	0.140

At r=0.8 the threshold is $\bar{\eta}$=0.0239 (Table 3), so Table 2 brackets the sign change: raising opportunism from zero to 0.030 cuts quality by nearly a quarter. The rule turns harmful well before opportunism is large in absolute terms.

Table 3. The threshold, its closed-form approximation, and the quality-maximising rule

Panel A. Exact threshold against the closed form (16)

r	0.2	0.4	0.6	0.8	1.0
exact $\bar{\eta}$(r)	0.0817	0.0429	0.0302	0.0239	0.0203
closed form (16)	0.1073	0.0583	0.0427	0.0358	0.0333
ratio	1.31	1.36	1.41	1.50	1.64

Panel B. Quality-maximising rule strength

η	0.000	0.010	0.020	0.034	0.050	0.080
r∗	1.00	1.00	1.00	0.52	0.34	0.20

Note: $\bar{\eta}$ computed by bisection on the exact condition of Proposition 1.

Table 4. Welfare and its distribution, η = 0.034

r	W	consumer surplus	seller profit	platform profit	abuse deadweight
0.1	49.17	19.21	28.16	1.84	0.03
0.5	50.95	25.49	24.45	1.85	0.85
0.8	52.41	32.93	19.78	1.75	2.05
1.0	53.91	39.21	15.92	1.60	2.83

Raising the rule from 0.1 to 1.0 lifts welfare by 9.6 percent, but the distribution is lopsided (Table 4, Figures 2 and 3): consumer surplus rises 104 percent while seller profit falls 43 percent, the two crossing near r=0.47. Two qualifications. The deadweight loss grows almost ninety-fold: a rising share of the gross gain is dissipated rather than realised. And since η describes the buyer population, comparisons across different η compare different economies, not policy options.

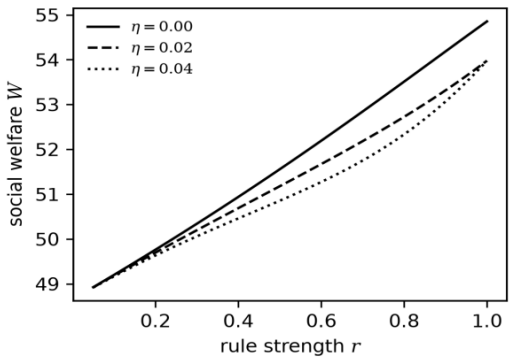


Figure 2. Welfare and its components against rule strength (η = 0.034).

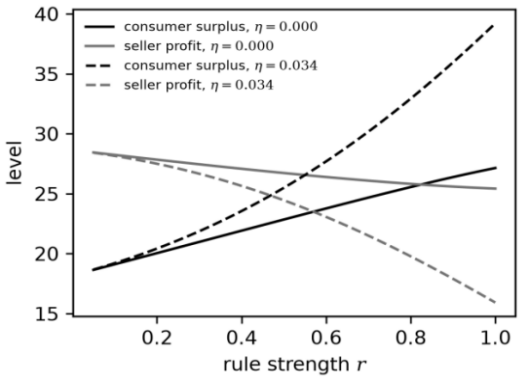


Figure 3. Distribution of the welfare gain (η = 0.034).

5. Platform Incentives and the Regulatory Gap

The platform maximises (7), internalising commission revenue and both rule-related costs but neither the seller's profit nor, except through demand, consumer surplus.

Proposition 5. With η=0 the private and social optima coincide at r=1; with η>0 the private optimum is strictly lower and the gap widens in ψ.

At ψ=0 the platform already chooses 0.590 against a social optimum of 1.000; at ψ=0.10 it chooses 0.340, the gap widening from 0.41 to 0.66 as the per-claim handling cost rises. Revenue tpD covers only part of the surplus the rule creates, most of which is consumer surplus, while the platform pays the entire enforcement and handling cost. That is the sequence the platforms followed: as claim volumes grew the private cost of the rule rose, and they eventually shifted the burden back onto sellers.

Rule strength and claim screening are therefore complements, not substitutes. Moving screening off the platform, to third-party credit systems or dispute-resolution bodies, narrows the gap, which exists precisely because the platform's private cost is not a social cost; tightening the rule without tightening screening enlarges the abuse pool and the platform's own costs.

6. Conclusion

Whether refund-without-return rules raise quality depends on the composition of the refund flow, in particular on how much of it comes from buyers who would claim at any level of quality. Because that share rises with rule strength, the rule's effectiveness declines as it is tightened. Quality peaks at an interior rule strength that falls as opportunism rises (0.52 at moderate opportunism in our calibration, 0.20 at high opportunism), so platforms and regulators seeking quality should not default to the strongest available rule. And the platform's own optimum sits systematically below the social one, because it pays to process claims while the rule's benefits accrue largely to buyers.

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