

Multinational Companies do not Consider Basic Pricing Studies for the Existence of Parallel Imports

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Abstract

Aiming at the direct participation of consumers in parallel imports through the form of sea amoy, this paper uses game theory to consider the impact of exchange rates, tariffs and international freight rates on consumer behavior, constructs a basic pricing model that enterprises do not consider the threat of parallel imports, discusses the market conditions for parallel imports, and analyzes the impact of parallel imports on the supply and demand relationship and revenue of enterprises. The study found that: 1) parallel imports can add new market segments for enterprises, that is, consumer groups that can only be sea amoy in the high-willingness market; 2) when enterprises face the threat of parallel imports, they should comprehensively consider the proportion of consumers in the high-willingness market, the largest market size and the largest willingness to pay, and strategically respond to the threat of parallel imports. 3) The willingness to pay in both markets and the relative size of the market will affect the company's coping strategy.

Keywords

Parallel Import; Direct Speculation; Total Payment of Sea Amoy; Pricing Strategy.

1. Introduction

Parallel Import, the most common form of Grey Market activity, refers to an "informal" sales channel for selling a brand's products in a certain area without the authorization of the trademark owner [1], in common forms such as "sea amoy" and "Daigou" as we know it.

Parallel imports have become a common economic phenomenon in global economic activities. Its products are widely distributed in many countries, such as the United States, the European Union, Japan, the United Kingdom and New Zealand [2][3]. From consumer goods to industrial equipment, parallel imports involve a wide range of industries, such as luxury goods [4], electronics [5], cosmetics [6], clothing [7], books [8], automobiles [9], medicines [10] and infant formula.

KPMG and AGMAs estimate that parallel imports were worth as much as \$58 billion in 2007, with parallel imports accounting for about thirty percent of the overall IT market [11]. In Malaysia, mobile phone gray market sales account for 70% of total mobile phone sales, while in India, two-thirds of PCs are sold in the gray market. Internationally, retail giants Amazon and eBay have sold parallel imported products through their own e-commerce platforms, and mainstream e-commerce platforms led by Koala Haigou, JD.com and Tmall in China have also focused on the cross-border consumer market, but in addition to the M2C model authorized by manufacturers, the B2C platform's self-operated "Haitao" and C2C buyers' "Daigou" model adopted by the platform are essentially in the category of parallel imports.

At present, the relevant research on parallel imports mainly includes the participation of third parties in speculation and the authorization of parallel import speculation. Zhao [12] Zhao tracked the number of gray market sellers and transactions on Internet retail websites, discussed how brands should deal with product availability and pricing in the online gray

market, and showed that controlling the price of products is more effective than controlling the availability of products. Altug[13] considering the impact of domestic grey market issues on supply chains consisting of one manufacturer and several authorized retailers, noting that grey markets can provide retailers with opportunities to clear excess inventory, but create price competition between authorized retailers and non-retailers, leading to a decline in market prices. Malueg[14] et al. argue that in the case where the markets of various countries are continuous, if the market demand is very different, the unified pricing of monopolists will reduce global welfare, but it can completely prevent the occurrence of parallel imports. Shavandi [15] constructs a game model that examines manufacturers' pricing strategies and the impact of parallel imports on prices, market share, and profits. Taleizadeh[16] et al. studied assurance and price optimization in competitive double monopoly supply chains for parallel imports, showing that manufacturers can respond to parallel imports with assurance as a competitive strategy in a high-willingness to pay market. Altug[17] Explores the impact of grey markets on the product development and pricing strategies of drugmakers in different countries by constructing a tripartite game model between the government, drugmakers and consumers, and points out that distribution rebates can actually be used as a management method for responding to parallel imports after product release. Cao[18] et al. argue that when quality can be differentiated in different markets, manufacturers may increase quality differentiation to deal with the threat of parallel imports. Jiang [19] et al. studied the quality disclosure and pricing strategy of manufacturers under the situation that the product quality is asymmetric information under the conditions of parallel imports, indicating that enterprises can continuously narrow the price difference between the two markets and compete with parallel import speculators. Raff [20] constructs a newsboy model of parallel imports, explaining why some manufacturers of automobiles, clothing, toys, and consumer goods allow parallel imports to exist. Zhang [21] analyzes the use of consumer rebate strategies by manufacturers to deal with the problem of authorized retailers participating in parallel import speculation, and the study finds that consumer rebates are a deterrent to the grey market and beneficial to manufacturers and retailers. Yang [22] et al. pointed out that under the condition that the substitution coefficient and the elasticity of low-price market demand are suitable, retailers can obtain additional profits by participating in parallel import speculation. Second, the provision of services by manufacturers can reduce the space for retailers to participate in parallel import speculation and reduce the space for profit damage, and the more sensitive consumers are to products and services, the better the effect of service strategies on gray markets. Hong [23] et al. introduced the influence of consumers' recognition of the value of gray market products on the supply chain pricing strategy, and concluded that the profit of supply chain centralized decisions is higher. Hong [24] et al. When the demand elasticity of the market in which authorized distributors are located is large, distributors can profit from participating in the gray market speculation. Hong [25] et al. pointed out that authorizing distributors to make decisions first can reduce the sales volume of parallel import products and the speculative profits of parallel import speculators. Li[26] et al. examine the impact of different grey market structures on supply chain decisions and profits.

In general, the current parallel import scale is huge, involving many industries and many countries, and the development growth rate is fast and the potential is large. Therefore, for multinational enterprises and brand-conscious consumers, dealing with the threat of parallel imports is a huge challenge that cannot be ignored. Malueg[14] confirmed that parallel imports are affected by exchange rate fluctuations, that gray market products often flow from countries with weak currencies to countries with strong currencies, and that even expectations of exchange rate movements can affect parallel import behavior. In addition, high tariff rates will also encourage the development of parallel imports. In view of this realistic background, a pricing decision-making model for multinational enterprises to deal with the threat of parallel

imports is established, taking the direct participation of consumers in parallel import speculation as the starting point, considering the impact of cross-border transaction costs such as exchange rates, tariffs and international freight rates between the two countries, and strategically analyzing the pricing measures of enterprises to deal with the threat of parallel imports. In today's context of international liberalized trade, it provides guidance for multinational enterprises to deal with the threat of parallel imports.

2. Model Assumptions

Supply Market: There is only one multinational enterprise that produces a single product, and in order to simplify the model, it is assumed that the enterprise is located in an independent third-party country, regardless of the difference between the production costs and transportation costs of the enterprise in the two countries.

Demand market: There are two consumer markets located in different countries, different sizes, and different payment willingness, the high payment willingness market is market H, the low payment willingness market is market L, and market H consumers can enter the market L through Haitao to buy products.

Consider that consumers in both markets only buy products from local authorized channels in their home countries, as shown in Figure 1. That is, the consumers of market L only buy products through the authorized channels of market L, all for local consumers; in the same way, consumers of market H only buy products through the authorized channels of market H, and all are local consumers. It means that there is no parallel import between the two markets, and the superscript "0" indicates that there is no parallel import situation.

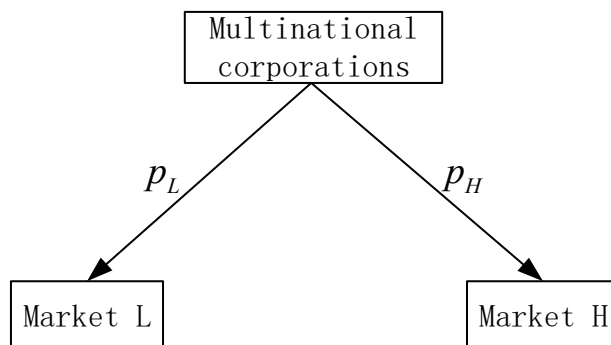


Figure 1. Parallel imports are not considered

Multinational enterprises: Due to the difference in geographical location and market purchasing power of the two consumer markets, the enterprise has independent authorized sales channels in the two markets, and sells the same products to the two consumer markets at different sales prices at different sales prices, that is $p_i (i = L, H)$, selling products on the market at the sales price.

Consumers: The maximum market size of the market is $A_i (i = L, H)$, the market consumer willingness to pay is $v_i (i = L, H)$, for the sake of simplification, assuming the consumer willingness to pay $v_i \sim U[0, V_i]$, wherein $V_i (i = L, H)$ is the maximum willingness to pay for the market, because the consumers of market H have a higher willingness to pay, so the consumer willingness to pay in the two markets is satisfied $ev_L \leq v_H$, wherein e is the exchange rate between the two currencies (the currency of the country where the market L is located is the base currency, and the currency of the country where the unit market L is located represents the currency of the country where the e unit market H is located). For consumers, only when

the consumer's willingness to pay, $v_i (i = L, H)$, is greater than the sales price of the product, p_i , the consumer will choose to buy the product, and when $v_i \in [p_i, V_i]$, the purchase will occur immediately.

Therefore, when an enterprise sells products at market L at the price of p_L , the local demand function of market L is expressed as:

$$q_L^0 = A_L \int_{p_L}^{V_L} \frac{1}{V_L} dv_L = A_L \left(1 - \frac{p_L}{V_L} \right) \tag{1}$$

Similarly, when the product sales price of market H is p_H , the local demand function of market H is expressed as:

$$q_H^0 = A_H \int_{p_H}^{V_H} \frac{1}{V_H} dv_H = A_H \left(1 - \frac{p_H}{V_H} \right) \tag{2}$$

Therefore, the profit function of the enterprise in market L is π_L^0 :

$$\pi_L^0 = q_L^0 \cdot p_L \tag{3}$$

Because the currency of the country where the market L is located is the benchmark currency, the currency of the country where the market H is located is used to represent the income of the enterprise, and the income function of the enterprise in the market H is π_H^0 :

$$\pi_H^0 = \frac{1}{e} \cdot q_H^0 \cdot p_H \tag{4}$$

If the income of a multinational enterprise is the sum of the sales revenue of the two markets, the enterprise income function is expressed as:

$$\pi^0 = q_L^0 \cdot p_L + \frac{1}{e} \cdot q_H^0 \cdot p_H \tag{5}$$

Game order: First of all, multinational companies first decide the sales price of the two markets based on the maximization of total revenue, and then consumers decide whether to buy the product according to their own market price. The optimization problem is expressed as:

$$\max_{p_L, p_H} \pi^0 = A_L \left(1 - \frac{p_L}{V_L} \right) \cdot p_L + \frac{1}{e} \cdot A_H \left(1 - \frac{p_H}{V_H} \right) \cdot p_H \tag{6}$$

3. Analysis of Decision-making Effects

Proposition 1 The equilibrium strategy of enterprises that do not consider parallel imports is shown in Table 1.

Table 1. Enterprises do not consider the equilibrium strategy of parallel imports

	Market L ($i = L$)	Market H ($i = H$)
p_i^*	$\frac{V_L}{2}$	$\frac{V_H}{2}$

Proof: According to the first-order conditions of maximum returns.

In the pricing strategy of parallel imports, according to the first-order conditions of profit maximization, the derivative of p_L is found on formula (6) and made it zero, and the station $p_L = \frac{V_L}{2}$ can be obtained, and the station is unique and within the scope of the definition field $[0, V_L]$, so the optimal pricing of the multinational enterprise in the market L is obtained:

$$p_L^* = \frac{V_L}{2} \tag{7}$$

In the same way, the optimal pricing of multinational enterprises in the market H:

$$p_H^* = \frac{V_H}{2} \tag{8}$$

The above equilibrium decisions are summarized and filled in table 1, and the propositions are confirmed.

Proposition 2 : The equilibrium result of enterprises not considering parallel imports is shown in Table 2

Table 2. Enterprises do not consider the equilibrium results of parallel imports

	Market L ($i = L$)	Market H ($i = H$)
q_i^{0*}	$\frac{A_L}{2}$	$\frac{A_H}{2}$
π_i^{0*}	$\frac{A_L V_L}{4}$	$\frac{A_H V_H}{4e}$

Proposition 2 shows that: 1) the local demand of the two markets is an increasing function of the market size, that is, the local demand q_i^0 increases with the increase of the market size A_i ; 2) the income of the two markets is directly proportional to the market size and the maximum willingness to pay, that is, the income of market i increases with the increase of market size A_i and the maximum willingness to pay V_i .

Proof: Bring the (7) formula back to the (1) formula to find the local demand of the market L:

$$q_L^{0*} = \frac{A_L}{2} \tag{9}$$

Substitute (7) and (9) into (3) to obtain the benefits of the enterprise in market L:

$$\pi_L^{0*} = \frac{A_L V_L}{4} \tag{10}$$

In the same way, the (8) formula is brought back to the (2) formula, and the demand for market H is obtained.

$$q_H^{0*} = \frac{A_H}{2} \tag{11}$$

Bring the (8) and (11) formula back to the (4) formula to seek the benefits of the enterprise in the market H

$$\pi_H^{0*} = \frac{A_H V_H}{4e} \tag{12}$$

Finally, the (10) and (12) equations are summed together to obtain the optimal return of the multinational enterprise at this time

$$\pi^{0*} = \frac{A_L V_L}{4} + \frac{A_H V_H}{4e} \tag{13}$$

Summarize and organize the above equilibrium results into Table 2 and complete the proof.

3.1. Occurrence of Parallel Imports

When multinational enterprises set the sales prices of the two markets according to their own maximum income, due to the transparency of international online shopping channels, consumers of market H can observe the lower sales price of market L and consider buying products from market L. In addition, due to the current accelerating integration of the world economy, the increasingly perfect international logistics services and cross-border electronic payment methods have also provided great convenience for cross-border transactions, and consumers of Market H can browse products and make purchases directly on the shopping website of Market L. As shown in Figure 2, the superscript "G" indicates the presence of parallel imports.

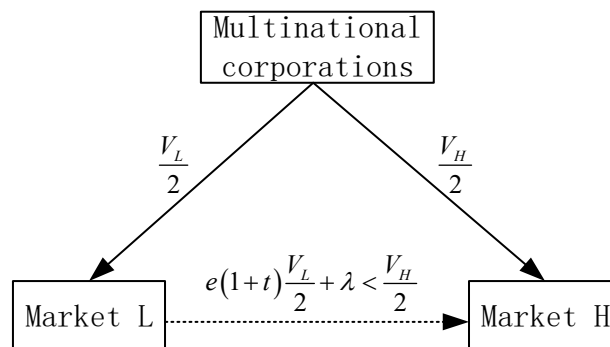


Figure 2. There are parallel imports

Multinational companies sell their products in both markets without considering optimal pricing and supply levels for parallel imports. That is, the sales price of market L is $\frac{V_L}{2}$, and the supply is $\frac{A_L}{2}$; the sales price of market H is $\frac{V_H}{2}$, and the supply is $\frac{A_H}{2}$.

Consumers need to note that only some consumers in Market H can observe the difference between the two markets, and Haitao needs to browse and purchase products directly on the authorized website of Market L, which has certain requirements for the buyer's foreign language ability. Therefore, the consumers in market H who have the ability to go from market

L Haitao are only a part of the consumers in market H, and $\theta(\theta \in [0,1])$ is used to indicate the proportion of consumers in market H who can participate in Haitao.

When consumers of Market H participate in Haitao, the price of the goods retrieved on the Market L shopping website is expressed in the currency of the country where Market L is located, so Haitao needs to consider the exchange rate e between the two currencies. In addition, since cross-border transactions involve issues such as customs clearance and cross-border transportation, it is also necessary to consider the impact of tariff rate t (tariffs are charged according to ad valorem) and international freight λ on transaction costs, so the actual total payment of market H Haitao consumers is $e(1+t)\frac{V_L}{2} + \lambda$.

(1) When the total payment of Haitao is greater than or equal to the market H price, that is, $e(1+t)\frac{V_L}{2} + \lambda \geq \frac{V_H}{2}$, for consumers of market H, it will be more economical to purchase products from local authorized channels, that is, consumers will not purchase products from market L through Haitao, so there is no parallel import situation.

(2) And when the total payment of Haitao is less than the market H sales price, that is, $e(1+t)\frac{V_L}{2} + \lambda < \frac{V_H}{2}$, parallel imports will occur. And when this market condition is met, for consumers who can participate in Haitao in market H, it is always a dominant strategy compared to local purchase of Haitao.

In addition, because the supply level of enterprises in the two markets is established, when some consumers in market H buy products from market L, it will cause a shortage of market L, and when there is a shortage of local demand and sea amoy demand that market L can meet, the largest is q_L^{0*} , while the products of market H have surplus.

The market L product adequacy ratio is calculated according to the total supply and total demand of market L α is:

Therefore, the market L's demand for sea amoy q_G^G is:

$$q_G^G = \theta A_H \int_{e(1+t)p_L^* + \lambda}^{V_H} \frac{1}{V_H} dv_H = \theta A_H \left[1 - \frac{eV_L(1+t) + 2\lambda}{2V_H} \right] \tag{14}$$

The market L product adequacy ratio is calculated according to the total supply and total demand of market L α is:

$$\alpha = \frac{q_L^{0*}}{q_L^{0*} + q_G^G} = \frac{\frac{A_L}{2}}{\frac{A_L}{2} + \theta A_H \left[1 - \frac{eV_L(1+t) + 2\lambda}{2V_H} \right]} \tag{15}$$

At the current supply level, since the local demand of market L and the demand for sea amoy cannot be fully met at the same time, for the sake of simplification, it is assumed that local consumers and sea amoy consumers are likely to be able to buy products at this supply level, which is the market adequacy ratio α .

Thus, in fact parallel imports exist when market L can be met for local demand:

$$q_L^{G\alpha} = \alpha A_L \int_{p_L^*}^{V_L} \frac{1}{V_L} dv_L = \alpha \frac{A_L}{2} \tag{16}$$

Market L can be met for the demand of sea amoy:

$$q_G^{G\alpha} = \alpha\theta A_H \int_{e(1+t)p_L^* + \lambda}^{V_H} \frac{1}{V_H} dv_H = \alpha\theta A_H \left[1 - \frac{eV_L(1+t) + 2\lambda}{2V_H} \right] \tag{17}$$

Market H local consumers are divided into two parts of the consumer group that can only buy in Market H and return to market H to buy because the demand for sea amoy is not met. Due to the shortage of stocks, some consumers who have not been able to get out of the market will consider returning to the market H to buy products locally, so the local demand for market H is expressed as:

$$q_H^G = [(1-\theta) + (1-\alpha)\theta] A_H \int_{p_H^*}^{V_H} \frac{1}{V_H} dv_H = \frac{(1-\alpha\theta) A_H}{2} \tag{18}$$

At this time, the income of multinational enterprises comes from the local demand of market L and the demand of Haitao, and the local demand of market H:

$$\pi^{G\alpha} = (q_L^{G\alpha} + q_G^{G\alpha}) p_L^* + \frac{1}{e} \cdot q_H^G \cdot p_H^* = \frac{A_L V_L}{4} + \frac{(1-\alpha\theta) A_H V_H}{4e} \tag{19}$$

3.2. Impact of Parallel Import Practices

Proposition 3: When the total payment of Haitao is less than the sales price of local authorized channels, that is $e(1+t)\frac{V_L}{2} + \lambda < \frac{V_H}{2}$, parallel import behavior will occur.

Proposition 4 : Parallel imports will lead to a shortage of goods in the low willingness to pay market, while the high willingness to pay market supply surplus, and the degree of impact is directly proportional to the market adequacy ratio α , the proportion of consumers in market H who can go to sea θ , the largest market size in market H A_H , and the maximum willingness to pay V_H ; inversely proportional to the exchange rates of the two countries e and international freight rates λ .

Proof: Analyze the impact of Haitao on multinational enterprises from the perspective of supply and demand balance.

The shortage of market L Q_L^G is the consumer demand in market H under the current pricing level:

$$Q_L^G = (1-\alpha)\theta A_H \int_{e(1+t)p_L^* + \lambda}^{p_H^*} \frac{1}{V_H} dv_H = (1-\alpha)\theta A_H \left[\frac{1}{2} - \frac{eV_L(1+t) + 2\lambda}{2V_H} \right] \tag{20}$$

The remaining amount of market H Q_H^G is equal to the total supply of market H minus the total demand:

$$Q_H^G = \frac{A_H}{2} - \frac{(1-\alpha\theta) A_H}{2} = \frac{\alpha\theta A_H}{2} \tag{21}$$

Proposition 5: Parallel imports will lead to a decrease in the overall income of enterprises, and the amount of revenue reduction is inversely proportional to the exchange rate e of the two countries; it is proportional to the market adequacy ratio α , the proportion of consumers in

market H who can dig for sea θ , the largest market size A_H in market H, and the maximum willingness to pay V_H .

Proof: From the perspective of returns, the (13) and (20) formulas are bad.

$$\Pi = \pi^{0*} - \pi^{G\alpha} = \frac{\alpha\theta A_H V_H}{4e} \quad (22)$$

Since the inequality $\frac{\alpha\theta A_H V_H}{4e} \geq 0$ is established, from the perspective of revenue, parallel imports will lead to damage to the overall income of the enterprise, and the loss of the company's income in the market H.

4. Summary and Outlook

In this paper, by constructing a pricing model for multinational enterprises without considering the existence of parallel imports, this paper analyzes and discusses the model description, model solution, and enterprise pricing decisions and effects in turn, focusing on the impact of parallel imports on the effect of decision-making. Studies have shown that: 1) when the market conditions make the total payment of Haitao transactions greater than the local authorized channel pricing of high payment willingness, there will be no parallel imports, and the basic pricing decision of parallel imports is not considered at this time to make the optimal decision of the enterprise; 2) the occurrence of parallel imports will affect the discriminatory pricing strategy of the enterprise in the two markets, resulting in a shortage of goods in the low payment willingness market, while the high willingness to pay inventory remains, which will damage the income of the enterprise; 3) parallel imports can add new market segmentation for the enterprise. That is, the consumer groups in the high-willingness market can only be sea-amoy; 4) When enterprises face the threat of parallel imports, they can strategically deal with the threat of parallel imports based on the comprehensive consideration of market adequacy ratio, the proportion of consumers in the high-willingness market that can be sea-amoy, the largest market size and the largest willingness to pay.

In view of the shortcomings of existing research, future research can start to fill the research gap from the following aspects. First of all, consider the existence of parallel imports, and construct a pricing decision-making model for multinational enterprises to deal with the threat of parallel imports.

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