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**Reconsidering anti-counterfeiting public policies efficiency:
How anti-counterfeiting consumption public policy could improve the quality of imitation**

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Abstract

The present paper reconsiders the efficiency of anti-counterfeiting public policies focusing on the criminalization of counterfeit consumption. Indeed, recent legislations try to deal with the counterfeiting phenomenon by addressing the demand of counterfeit goods. Such public policies might be efficient if it punishes deliberate consumption that is when consumers can at least partially observe attributes of goods they purchase. We thus introduce in the demand function for counterfeit goods the capacity to observe qualities of products and the quality of imitation. We develop a simple model in which producers of counterfeit products (counterfeiters) face this demand function and we investigate how anti-counterfeiting consumption public policies affect the optimal quantity and quality of imitation in the market for counterfeit products. The results suggest that the more consumers are able to observe attributes of goods and the more those consumers are willing to pay for high quality of imitation, the less the counterfeiter will produce counterfeit goods at optimal level. The results also suggest that the more consumers are able to observe attributes and the more the counterfeiter is able to bear the costs of anti-counterfeiting public policies the more the counterfeiter will increase the quality of imitation at optimal level. The quality of imitation approach aims at reconsidering public policies efficiency since the increase of quality imitation might reduce the alleged social harm of market for counterfeits.

Key Words: counterfeit, public policies efficiency, counterfeit consumption, quality of imitation.

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Introduction

Counterfeiting consists of the total or partial reproduction or use of a trademark, design, patent or copyright without the authorization of its holder. Therefore it constitutes a violation of intellectual property rights. Most developed countries protect intellectual property rights through a consistent body of law. Violations of intellectual property rights may be prosecuted under both civil and criminal law.

In recent decades, protection of intellectual property rights has either be enforced or reinforced in countries involved in globalization. Meanwhile, according to a number of reports, the production, distribution and consumption of counterfeit goods has increased drastically. The question is whether protection of property rights has reinforced because counterfeiting has spread or because the intellectual property rights core of law failed to deter counterfeiting.

The question that has no testable answer is whether counterfeiting production has itself increased. What we can say from data is that seized counterfeit products has increased and that product counterfeiting is widespread since, according to the World Customs Organization, counterfeit products get to 140 countries¹. Those empirical evidences may be the result of an increasing counterfeiting activity but also of a more effective customs control. Therefore, increasing seized counterfeit products might be the sign of a more efficient or more spendthrift anti-counterfeiting policy.

Nonetheless, the intellectual property law deterrence effect remains weak according to the counterfeiting widespread phenomenon². Some argues that legislations do not fit enough that illegal productive activity to deter it. First, counterfeiting is not only a matter of intangible property infringement. It is also a breach of tax regulations, employment law and competition law, consumer protection law. Second, counterfeiting is often considered as organized crime that turned into mass production distributed through networks. Legislation relative feebleness makes counterfeiting industry quite attractive on the supply side since the expected profit remains large enough³.

Legislations focus mainly on the supply side not that much on the demand side (consumers of counterfeit goods). The reasons are quite straightforward. First, the legal definition of counterfeiting gives one explanation. Total or partial reproduction of intellectual property is suspect purposing. The motivation behind “imitating” is to capture some benefits from the original producer’s intangible asset. This strategy can be profitable if potential consumers associate the imitation to the original good. Thus, counterfeiting is a way to cheat consumers. Often times, consumers are thus considered as victim rather than criminal buying voluntarily illegal goods. The second reason lies in the unlawfulness perception of consuming voluntarily counterfeit good compared to the unlawfulness perception of producing counterfeit good. Producing (and selling) counterfeit is clearly a criminal activity. Purchasing counterfeit is not properly a criminal activity even though counterfeit buyers might be punished under criminal law.

¹ 2008

² That weak deterrence effect is enhanced by the lack of consistent legislation between countries involved in trade relationships.

³ Reports on counterfeiting industry suggest that the high profitability of counterfeit production makes that industry a way of laundering money.

The present paper aims at introducing the demand side in the counterfeit market in order to reconsider the efficiency of anti counterfeiting public policy on counterfeiting trademark “market”.

Introducing the demand side steps from the simple idea according to which without demand there is no supply. Thus the demand is determinant to the counterfeiting activity level. Also, the recent public policies tend to sensitize counterfeit consumers either through informational campaigns or through legislation penalizing counterfeit consumption. In doing so, public anti-counterfeiting policies increase the expected price of counterfeit consumption that in turn would decrease the expected demand of the same goods. So just as the supply-side anti-counterfeiting legislation attends to decrease counterfeiting activity can't we imagine a demand-side anti-counterfeiting legislation that back anti-counterfeiting public policies efficiency.

Introducing the demand side for counterfeit goods can be considered as irrelevant in that counterfeit consumption is not always deliberate. In that case, consumption is not the result of the demand for counterfeit good but rather for the genuine one. It illustrates confusion in the consumer's mind between the fake product and the genuine one. That confusion rises from imitations of trademark that aim at cheating consumers on the quality level of the product. But in many “counterfeit” markets, buyers look for counterfeit goods making consumption deliberate. In those markets, trademarks serve an additional purpose above their traditional function. In many instances, trademarked goods are purchased for the purpose of demonstrating. So, when consumers purchase counterfeiting trademarks goods, they usually do not care if the good is counterfeit, they rather look for products that appear genuine to others consumers. Therefore the demand of counterfeit would be a demand for a high quality of imitation.

What makes the differences between non deliberate and deliberate counterfeit consumption is the consumer's capacity to observe the imitation. And the capacity to observe imitation relies on the characteristics of the goods for which trademark is imitated.

Trademark imitation aims at cheating either consumers that purchase counterfeits or external observer who not consume a specific counterfeit good. The capacity to cheat depends on the capacity to observe the intrinsic quality of the purchased good.

Intrinsic quality of the purchased counterfeit good should affect positively the demand for a given price. However, when intrinsic quality is not observable, the demand for counterfeit should not depend any more on the intrinsic quality.

Penalizing consumption of counterfeit makes the expected price of counterfeit increase and so should make the demand decrease for a given quality. But empirical evidences do not really support this mechanism. Rather, we can imagine another way through which penalizing counterfeit purchaser participates to anti-counterfeiting public policies efficiency.

Efficiency of anti-counterfeiting policy is most often assessed in terms of counterfeiting activity. But since quality aspects play a role in trademark counterfeiting, it is interesting to reconsider efficiency in terms of global quality of counterfeit goods. Whatever makes counterfeiters increase the quality of imitation reduces the harm caused by deceptive consumption (non-voluntary counterfeit consumption), increase the satisfaction associated to voluntary consumption for a given price, and eventually reduces the harm caused to original producers.

The first section stresses the idea that counterfeiting trademarks consist in imitating attributes or qualities of goods imitated. Therefore, the utility (or loss) associated to counterfeits consumption depends on the quality of imitation. The second section introduces the demand for counterfeit products with the idea that when consumers are able to observe attributes of good imitated, thus the demand function depends on the quality of imitation. The third section proposes a simple model that stresses the conditions under which anti-counterfeit consumption public policies would give incentives to counterfeiters to increase optimal quality of imitation and decrease the optimal quantity of counterfeit goods.

Counterfeiting and qualities

Trademarks counterfeiting consists of imitating a distinctive sign indicating the source of production⁴. Trademarks are used to distinguish a good or service produced by one firm and thus duplicating trademarks, as counterfeiting does, would destroy the identifying function of trademarks. Trademarks give information to consumers because they are a shorthand way of telling them what the attributes of branded goods are. Hence, consumers purchase branded goods because they associate specific attributes to specific branded products and those attributes match their preferences.

When trademarks are counterfeited, consumption choices rely on a sign that is disconnected to the attributes of the regular branded product. Counterfeit has itself specific attributes and thus trademarks imitation and attributes imitation are not independent aspects of counterfeiting since trademarks are a mean to inform consumers about those attributes⁵. When considering counterfeiting two components have to be mentioned:

- the imitation of the trademark itself: Is the mark perfectly imitated or partially imitated?
- the imitation of genuine good's attributes

Imitating trademark itself has low direct cost since copying a sign is an easy task. Still, trademark imitation is not systematically perfect for several reasons⁶. The costs of imitating genuine good attributes are the main costs in counterfeiting activity. Attributes are a set of characteristics such as vertical quality, location (horizontal differentiation). Imitation costs increase with vertical quality but also with differentiation because the more the product is differentiated the more the imitation will be complex. Moreover, differentiation is a dynamic process on legal markets that forces imitators to change production plans in order to maintain their status of imitators. For genuine goods, trademarks are associated with attributes of the same genuine goods. For counterfeits, a perfect imitation of the mark itself might cheat consumers concerning the expected attributes of counterfeits. The likelihood that consumers' confusion occurs depends on consumers' capacity to observe the attributes of counterfeits.

Consumers' capacity to observe counterfeits' attributes depends both on the process by which consumers purchase goods⁷ and on the kind of purchased goods. In the present paper we concentrate on the relationship between the capacity to observe the intrinsic quality and the nature of the good.

⁵ Trademarks reduce asymmetric information and thus participate to market efficiency.

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The capacity to detect counterfeiting varies with the nature of the counterfeit good. According to the standard economic categories of goods, products are classified into search goods, experience goods and credence goods⁸. Search goods are those whose qualities a consumer can determine by inspection before purchase. Experience goods are those goods whose qualities cannot be determined before purchase, but rather after purchase. Credence goods are those goods whose qualities average consumers hardly evaluate even after consumption. When attributes of a genuine good are by nature difficult to verify the attributes of the associated counterfeit good are also difficult to verify. The capacity to detect counterfeiting is given by a distribution over the classified counterfeits. Anti-counterfeiting public policies may affect this distribution but the present paper does not concentrate on the choice between goods that might be counterfeited but rather focuses on the efficiency of public policies in terms of quantity and quality of counterfeiting activities. When identifying counterfeits' attributes is costless, it makes sense to consider that consumers demand voluntarily counterfeit products because they can evaluate before purchase if attributes, from which the imitated marks, match their preferences. Conversely, when costs are prohibitive, consumption of counterfeiting goods might be non-voluntary. In order not to determine a priori whether counterfeit consumption is voluntary or not, we will introduce goods attributes together with prices in the demand function. The more identifying attributes is costly, the less qualities of goods influence the demand, up to situations where prices are the unique determinants.

Consumption of counterfeits

In the illegitimate market for counterfeit goods the demand might be either voluntary or non-voluntary. When the demand is voluntary, the consumption cannot be more deceptive than other legitimate goods consumption. When purchasing deliberately counterfeit goods rather than genuine goods, consumers gain satisfaction. The decision to purchase counterfeits rather genuine goods relies on the comparison between prices and qualities.

Equation 1

$$U = (p_{im} - p_i) - (\theta_i - \gamma\theta_i) \text{ with } \gamma \in [0, 1] \text{ and } \gamma\theta_i = \theta_{im}$$

θ_i represents the set of qualities (attributes) of the imitated good, γ represents the quality of imitation; P_i the price of the genuine good, and P_{im} the price of the counterfeit good.

When imitation is perfect, $\gamma\theta_i = \theta_i$ consumers gain from paying less for the same product. When the price of the counterfeit good is the same as the genuine one, utility turns into a loss as long as the imitation of the genuine good is not perfect. When prices are equal and attributes are the same, there is no positive gain since consumers are supposed to have incentives to avoid counterfeits.

The price P_{im} includes the cost of engaging in a criminal activity such as counterfeiting. In other word, the net expected social utility of counterfeiting activities is the difference between utility of counterfeiting consumption and the utility of the genuine good consumption:

Equation 2

$$U_t = U_{im} - U_i$$

The net social utility is positive as long as:

Equation 3

⁸ Nelson (1974), Klein (1998) and Darbi et Karni (1993).

$$U_{im} > U_i \leftrightarrow \gamma\theta_i - p_{im} > \theta_i - p_i \leftrightarrow (p_i - p_{im}) > (\theta_i - \gamma\theta_i)$$

Thus the willingness to consume counterfeit goods decreases with the price p_{im} increase and increases with the quality of imitation.

When the demand is non-voluntary, imitation is not detected at least before purchase and the consumption might be deceptive. Since consumers do not detect imitation, $\gamma\theta_i$ represents ex post qualities of the purchased good. When imitation is not perfect, the non-voluntary consumer will suffer a loss because what he consumed is different from what he expected. The net loss decreases with price p_{im} decreasing. Thus, the reasoning is the same as in the voluntary consumption case. The global utility decreases with the price p_{im} increasing and with the quality of imitation increasing for a given P_i and Q_i .

The demand function for counterfeit goods

The capacity to detect imitation is represented by the parameter $\beta \in [0,1]$. When $\beta = 0$ then imitation is non detectable and conversely when $\beta = 1$. Thus the parameter β measures the degree to which the imitative product consumption is intentional.

Equation 4

$$q_{im} = Dim(p_{im}, \beta, \gamma, \tilde{\theta}_i) = A - Bp_{im} + \beta C(\gamma\tilde{\theta}_i)$$

When consumers cannot observe goods' quality, then β tends to zero and quality of imitation does not affect any more the quantity demanded. Thus, when counterfeit goods consumption is non-voluntary, demand is only affected by the price. In that circumstance, the demand for counterfeit goods is actually a demand for genuine goods. Thus, consumers expect well-known quality $\tilde{\theta}_i$ when buying involuntarily counterfeit goods⁹. When $\beta > 0$, it means that consumers can observe even partially counterfeit good' set of qualities and thus it influences somewhat the demand.

The capacity to detect counterfeiting products is given by the distribution over $\beta \in [0, 1]$ which illustrates the consumer's ability to observe the goods quality. When $\beta = 1$, 100% of potential consumers are able to detect the quality and when $\beta = 0$, no single consumer is able to detect the quality. When $\beta = 1$, it means that the "average consumer" could detect the quality characteristics¹⁰. β does not affect the utility function since it is not a characteristic that could enter the utility function but it participates to the willingness to consume counterfeiting goods.

The value of β depends on the kind of good that is counterfeited. In cases of credence goods we consider that β tends to zero and in some cases of search goods β tends to 1. The distribution is given. β values are not equal in the same category of goods because counterfeiting covers a large range of different goods, but also because channels of purchases influence the capacity to observe attributes of goods, even though we decided not to consider it in the present paper.

⁹ We thus suppose that the price does not inform consumers about attributes of goods. Trademarks only convey information on qualities.

¹⁰ According to the European court of justice the "average consumer" is "reasonably well informed and reasonably observant and circumspect".

Reconsidering anti-counterfeiting policies efficiency.

Assessing the efficiency of anti-counterfeiting public policies leads to the same difficulties as in measuring counterfeiting activities and its influence on economics. It is almost impossible to assess precisely how anti-counterfeiting policies affect counterfeiting activities. For instance, if the probability of detection increases (because enforcement expenditures increased) the amount of counterfeit goods seized might increase but it does not necessarily mean that increasing expenditures has a social return in reducing counterfeits in illegal market. The increasing counterfeits seized might also be the result of an increasing counterfeiting activity.

The present paper does not concentrate on empirical analysis of anti-counterfeiting policies for the reasons we mentioned above. It rather focuses on how we can approach efficiency for a specific case of criminal activity that is counterfeiting. Anti-counterfeiting policies efficiency requires that marginal cost of anti-counterfeiting policy enforcement equals social marginal benefit in terms of reducing counterfeiting social harm. Most often, counterfeiting social costs are measured in terms of quantity of counterfeit goods or in terms counterfeiting activity. By definition crime is a negative externality (external diseconomy) and public law enforcement is a kind of non-exclusionary public good, so the objective of public policy is supposed to be maximization of social welfare. If individuals are risk-neutral thus social welfare can be expressed simply as the gains counterfeiters and consumers obtain from counterfeiting activities, less the harms caused by the same counterfeiting activities and less the cost of anti-counterfeiting policies¹¹. We consider that the enforcement objective is to maximize social welfare. If we look at social harm of counterfeiting we can perfectly identify who might suffer from counterfeiting:

- Consumers when consumption is non-voluntary and consumption is deceptive
- Legal producers of genuine products who might suffer a loss of reputation. The crime we are dealing with is productive imitation, and thus the imitated firm's behavior is at stakes. We take into consideration imitated firms because in counterfeiting issues those firms often invest private resources to reduce counterfeiting activities. The motivations behind such investments are manifold. Those resources devoted to anti-counterfeiting activities increase the probability of conviction and the chance to recover a part of counterfeiting profits. Legal producers suffer from risk of reputation losses when counterfeiting activities exist. But the amount of reputation losses depends on the risk of consumers' confusion. When the quality is observable, individuals voluntarily consume the counterfeit product and do not impute counterfeiting quality to the legal producer. When the quality is not observable, the legal producer loss depends on the consumers' deception. Imagine the extreme case where counterfeiting quality is the same as legal producer quality (the imitation is perfect), thus there is no space for consumers deception. Deception exists when imitation is not perfect. Consumers would mistakenly assume some connection between the counterfeiting product and genuine trademark product. The legal producer loss is proportional to that deception. Legal producers' losses are reputation losses since consumers' deception creates a negative perception of the

¹¹ We do not take into consideration the moral aspect of public policies. The idea that counterfeiting activities do not respect property rights are not discussed in the paper. So the single objective is welfare.

legal product¹². Consumers deception is illustrated by the ex post utility loss when consumption is deceptive such as: $L = (\theta_i - \theta_{im}) - (P_i - P_{im})$. So legal producers' reputation losses is given by: $R = f(L)$ with $\frac{\partial f}{\partial L} > 0$.

- Consumers of genuine products when they purchase for the purpose of demonstrating to others that they are consumers of a specific good.

First type of consumers and legal producers' losses both depend on the quality of imitation γ . The more perfect the imitation is the less harmful counterfeiting is. When the quality of imitation is relatively high non deliberate consumption is not highly deceptive and therefore consumers do not blame too much legal producers they mistakenly assume to be the producers of the counterfeit good they purchased. Therefore, reputation losses decrease with the quality of imitation. Consumers of genuine product behaving as snobbish consumers suffer higher losses when imitation is relatively good since their satisfaction decreases with the number of individuals affording the product. When the genuine product is well imitated no one notices the differences between genuine product and the counterfeit one while more consumers can afford the good.

The quality of imitation is a determinant of social harm in counterfeiting. We therefore propose an approach of anti-counterfeiting policy efficiency in terms of quality of the crime. We analyze the conditions under which legislation could contribute to improve the quality of counterfeiting and the results in terms of efficiency of such legislation. The starting point of analyze is twofold. First, the global quality of different kinds of counterfeit goods has obviously increased during the last ten years. Second, recent legislation aims at reducing counterfeiting activity by cutting the demand because a substantial demand is voluntary.

In Becker's crime and punishment (1968) it is the interactions between offenders and law enforcers that lead to equilibrium. But in our case, other parties are involved on the market for counterfeiting: the consumers and the original producers. They influence the equilibrium since they participate to the demand of both counterfeiting and anti-counterfeiting activities. Thus, the efficiency of public policies cannot be discussed without taking into account consumers and legal producers behaviors. Moreover, efficiency of such policy has to consider potential negative that exchanges on illegal markets of counterfeit might create such as snobbish consumers' losses and legal producers' losses of reputation.

Market for counterfeits

Recent legislation tends to reinforce anti-counterfeiting policies by penalizing counterfeiting willing consumption. Thus, not only supplying counterfeited goods is considered as a criminal activity but also buying counterfeiting product. Buyers of illegal goods and services are part of the market for offenses since they determine the direct or derived demand for illegal products. In doing so, the recent legislation increases the relative price of counterfeited good (relative to the price of the same legal product). Increasing prices of counterfeited goods should tend to reduce the willing consumption of counterfeited goods. When consumers are likely to be penalized, they take into

¹² Whether reputation losses turn into decreasing sales is not discussed in the present paper. Nevertheless, we may argue that consumers who experienced a deceptive consumption with counterfeiting products cannot afford legal product.

consideration expected costs of consuming counterfeited goods. Thus, the expected cost of consuming counterfeited goods combines the counterfeiting good price and the sanction per unit of product. When anti-counterfeiting consumption legislation exists, it increases the expected price of consumption, and this increasing price is entirely paid by consumers. So, when considering legislation and expected price paid by consumers we identify two prices: the price P_c paid for a counterfeit product, the one fixed by counterfeiters, and the expected cost of sanction if convicted $P(\beta)$.

Equation 5

$$P_{im} = P_c + P(\beta) \text{ with } P(\beta = 0) = 0 \text{ and } P(\beta = 1) = P^{max}$$

In that context, β measures the seriousness of crime and the $P(\beta)$ the corresponding severity of punishment. Let the crime punished by a fine F given by the function $g = g(\beta)$ and the probability of being punished for committing a crime of seriousness β given by the function $p = p(\beta)$. Thus, the expected price for buying illegal products or services equals:

Equation 6

$$P(\beta) = p(\beta) \times g(\beta)$$

So when consumers prefer consuming counterfeited goods rather than original goods for a given $\tilde{\theta}_i$ we should have:

Equation 7

$$\theta_i - P_i < \gamma\theta_i - P_{im} \leftrightarrow P_i - (\theta_i - \gamma\theta_i) > P_c + p(\beta) \times f(\beta)$$

The expected punishment increases because the seriousness of crime increases. And conversely, while the expected punishment increases, rational crime seriousness decreases. With a slight adjustment we can consider that an increase of the consumer's marginal expected cost of punishment decreases the number of offenses rather than the seriousness of crime. Thus, when β increases, the demand decreases unless the quality of imitation increases for a given $\tilde{\theta}_i$. The impact of consumers-legislation might be different from what we can expect on the counterfeiters side. When considering the supply of counterfeited goods, the anti-counterfeiting legislation aims at increasing the unit costs of production in order to give the incentive to diminish the quantity. The positive probability of being convicted increases the production costs with no compensation in terms of quality. The intensity of the decrease depends on the way producers perceive the risk of being convicted and his attitude towards risk. On consumers' side, we could imagine that the increase in the cost of purchasing counterfeit good could be compensated by an increase in the quality of imitation.

Since the present paper focuses on how consumers' side legislation could affect counterfeiting activities, the benchmark situation we refer to is one in which there is no anti-counterfeiting legislation. Therefore the starting point is a situation in which the expected price for counterfeit consumption is the price P_c .

We adopt a pure beckerian approach to crimes. Consumers of counterfeit maximize an expected utility function in which expected costs increase by: $p(B) \times Sanction$ if convicted. We consider that anti-counterfeiting policies may affect the quantity and quality of counterfeit goods, so

the counterfeit demand function could be elastic with respect to the variation of severity and probability of punishment¹³. We also consider that the distribution of goods between $\beta = 0$ et $\beta = 1$ is given.

The benchmark situation is such as no there is no anti-counterfeiting public policy such as:

$$P(\beta) = 0$$

$$\text{So } p_{im} = p_c + P(\beta) \text{ and } pim = p_c$$

When considering counterfeiting consumption we cannot ignore the quality determinant of the demand because counterfeiting aims at imitating trademarked goods and trademarks conveys information about quality. So both the differences in terms of price and in terms of quality explain counterfeiting consumption. The demand for the counterfeited product is $D_{im}(\tilde{\theta}_i, \gamma, p_{im})$ and the inverse demand is $Pim(\tilde{\theta}_i, \gamma, q_{im})$. When consumption of counterfeit products is not intentional, thus the demand should no more depend on imitation. The single argument is the price. So we consider a demand function such as:

Equation 8

$$Dim = q_{im} = A - Bp_{im} + \beta D(\gamma \tilde{\theta}_i)$$

With $p_{im} = p_c$

$$Dim = q_{im} = A - Bp_c + \beta D(\gamma \tilde{\theta}_i)$$

→

$$p_{im} = p_c = \frac{A + \beta D(\gamma \tilde{\theta}_i) - q_{im}}{B}$$

$$\text{with } \frac{\partial C(q_{im}; \gamma \tilde{\theta}_i)}{\partial q_{im}} > 0 \text{ et } \frac{\partial C(q_{im}; \gamma \tilde{\theta}_i)}{\partial \gamma} > 0$$

The profit maximization is a function of the seriousness of crime or the capacity to observe qualities of goods. On the consumer's side, when β increases, the expected punishment increases. The demand might also decrease for a given imitation quality and at a given price p_c .

Equation 9

$$\pi_{im} = q_{im} \times p_c - C(q_{im}; \gamma \tilde{\theta}_i) \text{ with } C(q_{im}; \gamma \tilde{\theta}_i) = q_{im} \times f(\gamma \tilde{\theta}_i)$$

The maximizing counterfeiter will thus produce :

Equation 10

$$q_{im}^* = \frac{A + \beta D(\gamma \tilde{\theta}_i) - Bf(\gamma \tilde{\theta}_i)}{2}$$

and

Equation 11

$$\gamma^* = \frac{2q_{im}^* + Bf(\gamma \tilde{\theta}_i) - A}{\beta D \tilde{\theta}_i}$$

¹³ We do not consider public policies as a mean to influence the choice between legitimate activities and illegitimate activities.

Now we introduce the anti-counterfeiting public policy on consumers' side such as:

$$P(\beta) \neq 0 \text{ when } \beta \neq 0 \rightarrow p_{im} = p_c + p(\beta)$$

The maximizing counterfeiter will thus produce:

Equation 12

$$q_{im}^* = \frac{A - BP(\beta) + \beta D(\gamma\tilde{\theta}_i) - Bf(\gamma\tilde{\theta}_i)}{2}$$

and,

Equation 13

$$\gamma^* = \frac{2q_{im}^* - A + BP(\beta) + Bf(\gamma\tilde{\theta}_i)}{\beta D\tilde{\theta}_i}$$

The influence of β on the quantity of counterfeit product at optimal level is given by:

Equation 14

$$\frac{\partial q_{im}^*}{\partial \beta} = \frac{D(\gamma\tilde{\theta}_i) - BP'(\beta)}{2}$$

According to equation 14, an increase in β reduces the quantity that maximizes counterfeit's profit function when:

Equation 15

$$\frac{\partial q_{im}^*}{\partial \beta} < 0 \leftrightarrow P'(\beta) > \frac{D}{B}\gamma\tilde{\theta}_i$$

When consumers' capacity to observe attributes of counterfeit goods increases, the consumption is more deliberate. Thus, the seriousness of crime increases and $P(\beta)$ goes up. The increase in $P(\beta)$ affects negatively the demand when the expected marginal price of sanction for purchasing counterfeits is stronger than the relative willingness to pay for quality of imitation $\gamma\tilde{\theta}_i$.

Now we try to figure out how β affects the optimal quality of imitation γ^* .

Equation 16

$$\frac{\partial \gamma^*}{\partial \beta} = \frac{1}{\beta^2 D\tilde{\theta}_i} [-2q_{im}^* + A + P'(\beta) \times \beta - BP(\beta) - Bf(\gamma\tilde{\theta}_i)]$$

$$\frac{\partial \gamma^*}{\partial \beta} > 0 \leftrightarrow f(\gamma\tilde{\theta}_i) < \frac{-2q_{im}^* + A}{B} + \frac{P'(\beta) \times \beta}{B} - P(\beta)$$

when $\beta = 0$

$$f(\gamma\tilde{\theta}_i) < \frac{-2q_{im}^* + A}{B}$$

when $\beta = 1$

$$f(\gamma\tilde{\theta}_i) < \frac{-2q_{im} + A}{B} - p^{max}$$

According to equation 16, when β increases the quality of imitation that maximizes counterfeiter's profit function increases if marginal of quality ($\Delta f(\gamma\tilde{\theta}_i)$) increases less than the increase of the cost sanction $P(\beta)$. It means that if the counterfeiter is able to absorb consumers sanction through an increase in quality of imitation, therefore the profit maximization leads to an increase in quality. In other words, we can expect an increase in quality of imitation when counterfeiters are best able to bear the risk (at lower cost) of sanction.

Conclusion

What is at stake in that paper is whether considering counterfeit good consumption as a crime is efficient in terms of social welfare. As we mentioned before, when attributes of counterfeit good is not detectable before purchase, the counterfeit consumption cannot be considered as voluntary consumption. In that perspective, punishing consumers if detected would make no sense since consumers is not aware that he engages in unlawful behavior. Punishing consumers in that circumstance would not have deterrence effect. However, when consumers are able to observe qualities of products, even partially, it could be efficient to criminalize counterfeit consumption since purchasing is deliberate. Thus, if anti-counterfeiting public policies sanction counterfeit consumption on the capacity to observe attributes grounds, it will increase the expected price of consumption and thus could affect the market equilibrium for counterfeit products.

As soon as we introduce the capacity to observe attributes of goods, we also introduce the capacity to observe the quality of imitation in the demand function. Thus, quality of imitation is an argument in the demand function for counterfeit products. When public policies interfere with the market for counterfeit product in modifying the expected price of counterfeit consumption it might affect the optimal quantity of counterfeit goods but also the optimal quality of those same goods.

The present paper concentrates on the potential effects of public policies that target counterfeit consumption on the optimal quality of counterfeit production. Indeed, most often public policies and reports on counterfeiting activities concentrate on the efficiency of anti-counterfeiting policies in terms of quantity of counterfeit goods. But, endeavors made to increase the quality of counterfeit goods could also be legitimized since it could reduce the social harm of counterfeiting. The simple model we developed in the paper gives the conditions under which anti-counterfeit consumption public policies would give incentives to counterfeiters to increase optimal quality of imitation and decrease the optimal quantity of counterfeit goods.

The results suggest further investigations such as how to design anti-counterfeiting public policies in order to reduce the quantity of counterfeit goods in non-observable attributes markets and increase the quality of counterfeit goods in observable attributes markets.

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