

THE COUNTERFEITING MAGNITUDE – A QUANTIFYING MODEL

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Abstract:

Economic impact, counterfeiting products, or "crime of the 21st century"¹ as it was called this phenomenon has serious consequences for holders of IPRs and the global economy, given the financial losses to be recorded, entered in connection with the crime of counterfeiting border. For this reason, the marketing of counterfeit goods, as otherwise we all goods infringing an intellectual property right, causing considerable damage to producers, retailers and rights holders to comply with the law, and also wrong and in some cases threatening health and safety of consumers.

Key words: counterfeiting, consumers, risks, competition

JEL classification: A13, C13, C51, E20

Just like any other types of goods, counterfeit products are the subject of international trade; therefore, they are reflected in many statistics regarding the economic field. Similarly, as many counterfeit products are sold through legal and official distribution chains, they are consequently reflected in retail statistics. Even in the case of forgeries which are mainly sold on street markets or by street merchandisers (and are not normally registered) we could talk about a weight rendered for those specific products in the consumer's total expenditures, especially when it comes to non-alimentary goods². In order to estimate this phenomenon, we normally would need to identify, for starters, those products that are considered to be counterfeit in the international trade and which are referred to as *sensitive goods*.

The risks associated to the consumption of counterfeit goods stand in the area of health, security and welfare threats. As counterfeiting affects both alimentary and non-alimentary products, on a long term and because mass proportion, Romania has been associated to a high rate of intellectual property rights losses, which could be translated in losses in IT&C and entertainment domains etc.

As a consequence, there are affected the welfare and the consumers' economic rights, as well as the business environment safety. Going beyond the surface, the counterfeiting phenomenon could be perceived as an exploitation of others' inventiveness and creativity and it is associated with organized crime.

The first ones to be affected by the consumption of counterfeit goods are the consumers and because of this there should be developed information and acknowledgement campaigns regarding the risks that they take by deliberately or accidentally consuming this type of products.

In order to support them, the following aspects should be made public: information regarding counterfeit products provenience or warranty should be gathered for avoiding buying this type of goods, avoiding buying products from unsafe sources

¹ Viefhues, M., Linklaters Oppenhoff & Rädler, *Counterfeiting and Organized Crime*, International Trademark Association, Special Report of Counterfeiting, September 2004

² This statistics distributes the consumer's expenses on three categories: food products, non-alimentary products and service market. (Romanian Statistical Yearbook)

(like street merchandisers or unauthorized merchandisers), the CDs and DVDs that are to be bought should have a hologram that identifies their authenticity, when paying them the consumer should request the fiscal receipt and the warranty documents. Moreover, the consumers need to be stimulated in order to announce the Police or The National Authority for Consumer Protection if they find counterfeit products or they are aware of infringing activities.

Before evaluating the counterfeiting effects, it should be noticed the extent to which the request for counterfeit products is affecting the offer.

Research Methodology

In what regards *the request*, we assume that i is a client of a given economy and that this client is more or less satisfied with the consumption of a given good k . The satisfaction degree obtained by agent i is directly proportional to the product's quality level (a higher quality determines a higher degree of satisfaction as a result of consuming that specific good). The value of the i customer's satisfaction is denoted $v_i(k)$ ³.

The products offered on the market differ according to the customer ease of appraising their quality. This quality appraisal is the equivalent of the consumer's estimation of the performances of a specific good in various domains that particularly interest him. The estimation must be anterior to the acquisition and the rapidity of the process determines the identification of the degree to which the needs of a specific consumer are satisfied due to the consumption of that precise product.

The quality of some product types cannot be rated in the moment of their acquisition. The effects of consuming goods from industry fields such as pharmaceuticals, alimentary products or cosmetics are visible only after the consumption of these goods. Moreover, the acquisition of a product could be influenced not only by the consumer's personal experience, but also by factors such as the notoriety of the trademark, various recommendations of that precise good (using flyers, prospects etc.). It should also be taken into account the fact that there cannot be established the prospected effects of that specific product prior to its consumption. Compared to the quality of pharmaceuticals or cosmetic products, the quality of other product types – like those belonging to the musical or clothing industry – can be easily tested. However, there are no cases in which the consumer could establish for sure and on an individual basis the quality of that specific product. Instead, the consumers are allowed to have certain expectations regarding the quality, and this expectation level is denoted:

$$(1.1.) \quad E[v_i(k)] \quad \text{where:}$$

E is the function of the perspective over the actual quality of a given product.

This function reflects the fact that a consumer acknowledges the possible performances of that product.

In order to optimize the acquisition of a good k , the client must make a minimum effort before buying the good, effort which could consist of searching and locating the product. This non-monetary cost is denoted $c_i(k)$.

Then, if the price of a product k is given by $p(k)$, the utility of consuming a specific good k anticipated by an agent i is given by the equation:

$$(1.2.) \quad u_i(k) = E([v_i(k)]) - c_i(k) - p(k)$$

The client will buy good k on the condition that the estimated utility is superior to any other alternative, including that of not buying it, denoted $A_i(k)$ ⁴.

³ According to OECD, *The Economic Impact of Counterfeiting and Piracy*, OECD Publishing, 2008

⁴ in most cases, it has the zero value; in some cases, for example when k is a remedy for incurable diseases, the value of the non-acquisition may tend to minus infinity, $E([v_i(0)]) = -\infty$.

Clients differ according to their expectations derived from consuming a good k , from evaluating the alternatives or the non-acquisition and also from the effort they are willing to make in order to obtain the good. These differentiations are realized from the perspective of each agent's individual features (taste, preferences, income⁵, value assessments, interest in health and security etc.). The classification of the agents according to the estimated satisfaction degree minus non-monetary costs, also taking into account the condition that to a hierarchically inferior i should correspond a higher satisfaction level, allows the determination of an expression for the demand of a good k . Therefore, the demand is determined by the sum of all clients for whom the estimated satisfaction minus non-monetary costs of acquisition is higher than the economical value of non-acquisition.

$$(1.3.) \quad D(p(k)) = \sum (E[v_i(k)] - c_i(k) - A_i(k) - p(k))d_i$$

In what regards the *OFFER*, assuming that j is a firm (investor) which operates in a specific field/domain, at a given time t , firm j invests a certain capital $I_{j,t}$ which has as a finality the creation of an intellectual property. Having established the rights of the intellectual property at the moment $t+1$, firm j is given the right to distribute good k in its field. Being a sole producer in its field, firm j sets the price $p_j^*(k)$ which maximizes the profits (see equation 5.4), either by excluding the constraints (by means of choosing the price that sets equality between marginal incomes and marginal costs) or by establishing a relation with the eventual constraints (for example, some competitors' threat from other fields, actions of undermining the authority).

As long as j is the sole right owner, the profits will come from:

$$(1.4.) \quad \pi_j = p_j^*(k)q_j(k) - c_j(q_j(k), k) \quad \text{where :}$$

- $p_j(k)$ is the price of k , $q_j(k)$ is the market supply
- $c_j(\bullet)$ represents the production and distribution costs.

We notice the fact that it can be established a balance between the demand $q_j(k)$ and the offer of a good k ; the $D(p(k))$ equation is established above, in the section which deals with the demand.

In order to determine if j decides to invest at moment t , we should underline the fact that this process is possible only if the estimated profits are higher than necessary investments⁶, according to equation 5.5 .

$$(1.5.) \quad f\{\pi_j, R\} > I_t \quad \text{where:}$$

- R is the interest rate and
- $f\{\bullet\}$ is the function which relates the estimated profits to the current value.

This function mainly depends on the interest rate R , but also on other variables such as the anticipation of the risk factor.

From the COUNTERFEITING as an INFRINGING ACTIVITY point of view, this together with piracy introduces a constraint for the right owner, in the sense of setting up a competition. In the case of patent counterfeiting, the competition is set from the direction of duplicating a protected item or that of an unauthorized exploitation of a protected technology. The second direction could restrict or limit the sales of the copyright owner or could underbid the advantages which, under different circumstances, the rightful copyright owner would win by producing specific goods.

In order to better understand the reasons for which agents tend to get involved in counterfeiting activities, we could take into consideration the following scenario. Let's

⁵ this reflects the budgetary restriction of an agent i .

⁶ it is assumed that all other markets are balanced. If not, including other potential alternatives should be taken into consideration.

assume that I is an agent who considers the possibility of contributing to an infringing activity of producing and distributing a counterfeit good k' (all variables which refer to counterfeit product will be denoted, from now on, ‘**(prime)**’). The noncompetitive nature of intellectual property highly facilitates the copying process and, in many cases, when this type of property takes the shape of a trademark, copyright or patent, it cannot be established a theft cost. In what regards the patents, their mechanism (for example, allowing the access to all details and technological aspects) significantly reduces the counterfeiting costs. Therefore, the focus shifts from the fix costs to other costs regarding the market offer of a counterfeit good k .

The relevant costs which could be taken into account by counterfeit goods potential suppliers are divided into the following categories: production costs, c_P ; distribution costs, c_D ; the estimated risk of being exposed and the corresponding penalty, $s_j(\bullet)$. Certainly, all these costs, as well as the calculation of their risks, depend on the quantity of the counterfeit products. The production cost depends on the quality of the product offered by the falsifiers. The distribution cost depends on the market type where illegal products are to be found⁸. The infiltration on the primary market is much more difficult than accessing the secondary market, as it is based on higher efforts and resources in order to come in touch with the legal distribution chains. Therefore, it is established the fact that falsifiers have to use a fix cost of $c_{\text{prim}} > 0$ in order to enter the primary market.

Before a counterfeit good, k' enters the market, the falsifiers j establish its quality and the market (primary or secondary) which they want to use as a main target.

A better quality of the counterfeit product implies a higher cost which needs to be paid by falsifier I . Hence, the production of high quality counterfeit goods should be motivated by the perspective of higher profits. These economical benefits earned as a result of counterfeiting and piracy necessarily depend on the price that I gives to such a product.

In what regards the primary market, the price paid for that specific good by cheated consumers is equal to the price imposed by $p_j^*(k)$, that is the rights owner. The situation gets complicated in the case of secondary market, where the consumers willingly buy counterfeit products. In order to establish the price that the falsifiers I gives to their products, it has to be established the demand in those goods.

Establishing the function of counterfeit products demand requires highlighting the fact that agent's i availability to pay is determined by the estimated satisfaction minus the non-monetary costs of buying the product (including ethics and the risk of being caught or exposed etc) and the non-acquisition option. Secondly, just like in the case of any other good, there are no economic agents who might request a falsified product if its cost is higher than the one they are willing to pay. Consequently, agent i will demand a counterfeit product k' under two conditions:

$$(1.6.) \quad E[v_i(k')] - c_i(k') - p(k') > E[v_i(k)] - c_i(k) - p(k)$$

$$(1.7.) \quad E[v_i(k')] - c_i(k') - p(k') > A_i(k)$$

The demand for the counterfeit product k' as a function of its price is then determined as the sum of all agents for whom function the two conditions above. In order to generalize, the demand for the counterfeit good k derives from equation 1.6 and it is represented as a function of both prices:

$$(1.8.) \quad D(p(k')) = \sum (E[v_i(k')] - c_i(k') - (E[v_i(k)] - c_i(k)))d_i - (p(k') - p(k))$$

⁸ It is assumed that all other markets are balanced. If not, including other potential alternatives should be taken into consideration

The demand function is strictly located under the demand for the original good⁹. This means that, for equal prices, the demand for the original good is higher than the one for counterfeit goods, and that for equal sold quantities, the market equilibrium price for counterfeit products is lower than that of the original goods. Moreover, the demand for infringing products depends on the price of the original good. A higher price of the latter implies a higher forgeries demand, while a significant rise in the availability to pay (caused by lower satisfaction/quality as the result of buying counterfeit products or steady efforts to obtain such products) determines a decrease in forgeries demand.

If l is the sole supplier of the counterfeit good k' (which is possible if, for example, the counterfeit goods production is under the control of organized crime networks), then l maximizes the profits the same way the producer of the original good does it. Under the auspices of this scenario, the profits are maximized according to the specific prices. When there are more suppliers involved in distributing products that break the intellectual property rights of a good k , the competitive pressure among the suppliers leads to a lower market price of k' simultaneously with a higher distribution of that product. In the extreme cases when there are more individual suppliers, the market for the counterfeit product k' is almost competitive and the competitors bring the falsifiers' profits near zero value. This means that the market price of k' equals the marginal cost of producing and distributing the forgeries. All the intermediate scenarios which take into account precarious competitors and high profits for counterfeiters also place the price between the two prices.

Defining the Main Infringement Market¹¹

The profits of falsifier l depend on the way he enters the market. In the case of a successful intrusion on the primary market (consequently, the quantity distributed in the market equals: (1.9.) $q'_l = \arg \max(\pi'_j)$ his profits are given by:

$$(1.10.) \quad \pi'_{prim,l} = p^*(k)q'_{prim,l} - c_{p,l}(q', k') - c_{prim} - c_{D,l}(q', k') - s_l(q', k')$$

If l enters the secondary market, the falsifier's profits are given by:

$$(1.11.) \quad \pi'_{s,l} = p_{s,l}(k')D_l(p(k')) - c_{p,l}(D_l(\bullet), k') - c_{D,l}(D_l(\bullet)k') - s_l(D_l(\bullet), k')$$

A comparative analysis of the two estimated profits indicates the market type towards which aims the falsifier party l . The factors that influence infringing intrusions in the primary market are presented below^{12*}:

↳ Profit Differentiation

$$(1.12.) \quad [p_j^*(k)q'_{prim,j} - p_{s,j}(k')D_j(p(k'))]$$

Significant profits in the primary market, compared to low profits in the secondary market, encourage the counterfeiter to cheat the customer. These high profits in the primary market are stimulated by a series of factors, such as:

- The price of rights owner A high monopolistic price explains the estimated profit of the counterfeiter.

- High expectations in what regards the supply of counterfeit goods $[q'_{prim,j}]$.

Important quantities of counterfeit products in the primary market determine an increase in the counterfeiter's profits.

⁹ this thing derives directly from the assumption that $E[v_i(k)] - c_i(k) > E[v_i(k')] - c_i(k')$ for all i

¹⁰ when needed, we will use "prime" and "s" to denote primary/secondary market variables

¹¹ the factors which encourage infringing intrusions in the secondary market are the opposites of those which encourage the same process in the primary market

- Low prices in the secondary market $[p_j(k')]$. A significant competition between falsifiers leads to a price decrease in the secondary market. Consequently, we register a decrease in the opportunity cost of the infringement.
- Low demand in the secondary market $[D_j(p(k'))]$. A low demand for counterfeit products means lower profits in the secondary market, therefore a lower opportunity cost.
- High estimation of the alternative $[A_i]$. An optimistic evaluation of the non-acquisition alternative reduces the estimated utility of deliberately buying a counterfeit product (see condition E5.3). However, this leads to a demand decrease in the secondary market and reduces the falsifier's motivation of entering this market.

↳ **Low Primary Market Access Costs** $[-C_{prim}]$. Such a cost leads to an increase in the estimated profits and an extramotivation for the counterfeiters to enter this market.

This methodology doesn't allow a direct estimation of the counterfeiting magnitude at an international trade scale but it can offer a description of the relative national trade intensity in what regards different counterfeit product types, approximating a ceiling for the trade in these products.

Estimating the counterfeiting magnitude based on internal trade doesn't offer a complete picture of this phenomenon; it doesn't include neither counterfeit products which are made and used at home nor the significant volume of counterfeit digital products which are traded via Internet.

Using the same scenario and real data, received in good time, it's possible to estimate the counterfeiting phenomenon on different product categories and their origin, in order to act upon these sensitive segments which are the result of the analysis made in order to diminish this scourge.

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