УДК 658.562

*Orlova V.*

# CERTIFICATION OF EXPERIENCE GOODS

*In the world of asymmetric information, goods can be classified by time frames of their quality determination. There are two basic types of goods — search goods and experience goods. Considering a certification as a minimisation of market failure costs, a special attention should be paid to the latter ones. Consumers cannot identify the quality of purchased experience goods ex ante making certification a possible indicator of good's quality.*

One of important fields of modern micro-economics is a study of market failures, including asymmetric information. The investigation of market with asymmetric information was first conducted by George Akerlof in his article "The Market for Lemons': Quality Uncertainty and the Market Mechanism". That analysis was based on the market for used cars [1], but the same idea can be applied to, e. g., insurance markets, investment projects, labour market, or the problems of natural monopoly regulation.

An area in which the presence of asymmetric information might be harmful is the quality of goods sold in the market. If quality cannot be determined immediately, the absence of information can at least distort consumers' demand leading to a non-optimal level of purchases and welfare losses.

There are several ways to cure the market failure. First, it can be done by distributing the information more evenly and universally and enabling the consumer to defend his right to obtain reliable information about goods in the court of law. Secondly, the examination of the quality of goods can be conducted prior to their consumption. The second way is the obligatory certification carried out by the state.

## Theoretical Background

The problem of asymmetric information exists if (a) information about goods' attributes is distributed unevenly ***ab initio;*** (b) the owners of information fail to re-distribute it properly, so that (c) the existing distribution of information results in over- or underconsumption of goods or services. The failure to distribute, the information through, e. g. advertising or warranties, can be explained by the high costs of such measures, difficulty to make a credible statement about goods [2], or disincentives to the provision of sincere information [3].

Asymmetric information markets can be classified by categories of supplied goods. The search good is a good the attributes of which can be determined by inspection before purchase [4]. The examples of such goods are furniture, sporting goods, cameras, china. The characteristics of an experience good can be determined only after purchase [5]. The category of experience goods includes, e. g., food, automobiles, and batteries.

The severity of market failure owing to asymmetric information depends negatively on both the frequency of purchases and the homogeneity of goods characteristics, and positively on the costs of revealing the true attributes of goods. For the search goods, the problem is less acute because consumers generally can rely on their inspection. In the case of the experience goods, buyers can be harmed by the consumption of the purchased good. In addition, if the quality of experience goods is highly heterogeneous or unstable, the learning is not effective and the negative effects can persist.

An additional effect of the asymmetric information market is a possible shift towards the consumption and production of low quality goods only due to adverse selection. The situation arises when consumers cannot distinguish between different qualities of goods. While both parties appreciate quality, the price is not determined by the best-informed party, and additional measures, such as warranties, do not help to eliminate uncertainty about the quality [6]. Thus, the share of the market of the low-quality goods starts increasing. Consequently, in the sequential periods

consumers adapt their expectation to the continuously increasing quantity of low-quality products in the market, and form the demand on the level of low-quality goods, which keeps the price low. The high-quality goods are forced off the market [7].

The presence of market failure generally leads to the attempt to remedy it. In the case of asymmetric information about quality, the possible remedy is to either provide the information directly to consumers or check the characteristics of goods or services prior to consumption. That is, the consumer would be assured that the quality is appropriate. The examples of the former method are publications in newspapers or special editions, mandatory labelling of products, existence of special free-access services for consumer protection. The latter is represented by the state certification of supplied goods and services. Different costs and resources of money are connected with those remedies.

## Certification of Experience Goods

The study of welfare costs of certification may be conducted in two dimensions. First, the certification costs in the perfect information environment, and, next, certification under asymmetric information — for the search goods and experience goods. In this paper, the focus is made on the certification of experience goods in asymmetric information environment. The choice is based on several ideas. Firstly, certification expenditures are actually irrelevant in perfect information environment that, by definition, includes no uncertainty about quality of goods. Secondly, in the case of the search goods, the consumer can distinguish between high and low quality goods, and, consequently, fix the position of the demand curve prior to purchase. The simple rule of the consumer behaviour, to "search until the marginal expected costs of search become greater that its marginal expected return", was derived by G. Stigler. In this case, it is reasonable to use certification procedures only if certification costs per consumer are not higher than the costs devoted to search by consumer. The problem is that it is difficult, even impossible, for the government to determine the level of marginal costs at which the consumer stops searching. In addition, the certification imposes additional costs of producers not justified by presence of negative externalities. Therefore, in the rest of the paper, we will consider the certification of experience goods.

The certification is presented in the partial equilibrium framework, with the help of such simple economic tools as supply and demand functions. For simplicity of the further exposition, the demand and supply are assumed to be linear. We consider two qualities of goods — high and low.

The demand function, or marginal benefit from consumption of the goods, is assumed to depend on the quality of products consumed, presented as a quality premium, and on the ability of the consumer to distinguish between different qualities. The latter is presented as the subjectively estimated probability that the good has a predetermined quality. A probability equal to one means that the quality is high. In this case the quality premium is the largest consumer agrees to pay. If the probability is zero, the quality is definitely low, and the quality premium is not paid. The middle cases [$0 < Prob < 1$] show the inability of the consumer to determine the quality of good with certainty. Assuming a risk-neutral consumer, the quality premium is paid in accordance with the expected value of the probability of appearance of high and low quality products in the market. Thus, the demand function is $D = f(P,J,pr)$, where $P$ is price, $J$ is the quality premium, and $pr$ is subjectively estimated expected appearance of high and low quality goods in the market.

The presence of uncertainty and the necessity of making subjective estimations of probability are assumed to exist only if goods are either non-certified (the institute of certification for this product does not exist) or certification is not always obeyed and it is difficult to distinguish between high and low quality products. If a good is certified, the demand is considered to be stable.

The supply curve is based on the marginal costs function. Assuming linearity of MC, we should use the quadratic total costs function. Total costs depend on production costs, which are assumed to be lower for low-quality products, and on either the costs of certification or the amount of penalty and the probability of detection, given the certification is non-voluntary. There are several possible certification payments: (a) varying with quantity: (b) fixed sum; (c) a mixture of (a) and (b). Let us assume for this study that certification costs are fixed, and, consequently, do not influence the marginal costs, although changing average costs. The penalty paid for non-certified sales is dependent on the amount sold, and changes the marginal costs.

The total costs function with certification is shown as $TC = AQ^2 + L$, where $AQ^2$ is the costs dependent on production different for low and high quality products — different values of $A$; $L$ is the sum paid for the certification. The total costs without certification when it is obligatory are $TC=AQ^2 + + fFQ$, where $f$ is the probability of detection and $F$ is the amount of penalty which depends on sales. An $f$ equal to one means that the penalty is unavoidable, and $f$ is equal to zero if penalty will never come. The middle cases [$0 < f < 1$] are more

usual. As mentioned before, the exact value of $f$ depends on either the past experience or expectations of entrepreneurs. The total costs, in case no certification is necessary, is ***TC=AQ.*** Therefore, if certification is obligatory, in case of the risk neutral entrepreneurs, for each quality level of production, mutually exclusive supply functions can be determined as:

$MC = 2AQ$ and $AC = AQ + \frac{L}{Q}$, if certification is applied;

$MC_1 = E(MC) = 2AQ + FE(f)$

and $AC_1 = E(AC) = AQ + FE(f)$,

if certification is not pursued.

Now we are ready to proceed with the certification. We will first consider the demand side. By definition, the quality experience goods cannot be defined by consumer *ex ante,* i. e. before purchase. Therefore, the presence of non-certified goods in the market due to either the absence of certification or the inefficiency of certification procedures introduces uncertainty. Hence, the demand is based not on the conscious choice of goods quality but on the subjectively derived expectations towards quality. The situation is represented by the $D_N$ curve in Figure 1.

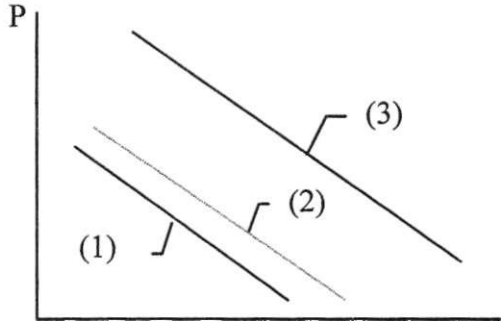


Figure **1.** Demand function:
1 — $D_L$ if the quality is low; 2 — $D_N$ if quality is uncertain given *pr* = {0; 1}; 3 — $D_H$ if quality is high

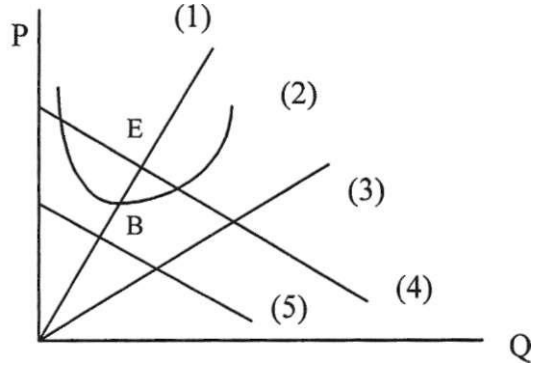


Figure 2. Experience high-quality goods: introduction of certification: 1 — marginal costs; 2 — average costs if certified; 3 — average costs without certification; 4 — high demand; 5 - uncertain demand

Compare first the absence of mandatory certification with the existing fully-complied-with certification in the market of high-quality goods (Figure 2). In this case, in the absence of the certification the equilibrium point is p. *B* (due to the lower demand $D_N$ under uncertainly). The introduction of certification enables to distinguish goods by the quality, and consumer pays the whole amount of quality premium, and demand moves to $D_H$. Consequently, the consumer surplus increases ex ante [1]. It is an ambiguous influence on producer profit due to increased average costs.

In the market of low-quality goods, the presence of uncertainty can be beneficial for producer (Figure 3). In this case, before certification the quantity sold and the price are higher than under certification. That is explained by the existing ex ante expectations of consumers as to these goods that can be either of high or low quality. The higher the quality is expected, the better for producer. In the subsequent iterations of exchange, the consumers expectations will change toward presence of low quality, and this gain will partly disappear. This partiality exists because average costs without obligatory certification are lower than average costs which include certification fees, and profit of producer of low-quality goods is higher if no certification is applied.

The problem of consumer surplus is a little bit tricky here. At the first glance, consumer surplus is a relatively larger in the case without certification.

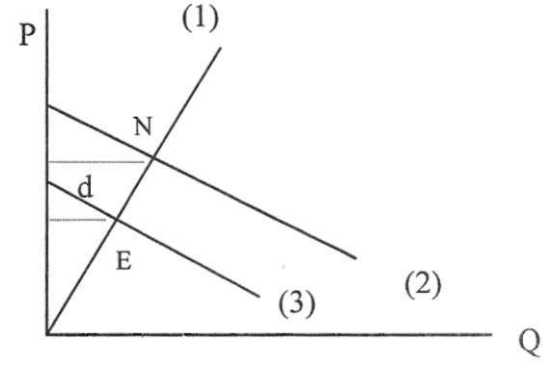


Figure **3.** Experience low-quality goods: introduction of certification: 1 — marginal costs; 2 — uncertain demand; 3 — low demand

[1] Although we can speak about ex post decrease in consumer surplus by analogy to consumer surplus behaviour in the low-quality goods market, it seems not to be very relevant issue. In the low-quality market, ex post consumer is definitely worse off. In the high-quality market, ex post consumer would like to pay the price under uncertainty but get high quality with certainty. It seems to be slightly unrealistic wish.

The problem is that the demand ex ante is based on expectations, and, after purchase, the true valuation is disclosed. That is, after the purchase of low quality goods in larger amounts and at higher price than it has to be if information is in place, the consumer actually loses the consumer surplus by amount *d* (Figure 3). Therefore, the introduction of certification is beneficial to consumer.

We can summarise that introduction of certification in the market of experience goods is beneficial for consumer, that is, welfare increases for consumer. From producer side, certification has ambiguous effect on high-quality goods producer's profit, and it makes the low-quality producer worse off. But it eliminates the adverse effect which develops if uncertainty persists.

The demonstrated investigation is non-complete without the analysis of penalty in the market under mandatory certification requirements. Let us consider the high-quality products market first (Figure 4). The possibility of non-certified sales leads to uncertainly in the demand. Hence, the equilibrium point in this case is p. *N,* which is definitely worse for both consumer and producer than point E which introduced certainty by certification procedures. It should be said that the certification would not be such a desirable thing if the shifts in both supply and demand would be tiny. Generally, due to adverse selection effect, the demand shifts closer to the low-quality level. Therefore, in the last resort, we return to the ambiguous situation of previous case without penalty. The support of certification by high-quality producers depends on the amount of penalty, probability of detection, and premium that consumers agree to pay for certainly high-quality goods.

In the market of low-quality goods, the introduction of penalty makes the choice of certification compliance more obvious and attractive (Figure 5). Consumer surplus is higher if certification is made, and producers consider the certification as attractive because of higher costs of non-compliance even given higher demand for low-quality goods under uncertainty. But, if probability of detection and/or amount of penalty are low, we return to the previously examined case where it is better for producers not to certify.

The welfare implications of certification in the experience goods market are rather ambiguous. Certification makes consumers definitely better off introducing certainty in the market. Producers are experienced different welfare consequences as a result of certification depending on their initial position. For high-quality producer, the certification is beneficial if its costs are lower comparing with gains from certainty. For low-quality producers, the certification is non-beneficial. The introduction of high penalty payment with high probability of detection leads to higher level of certification compliance, introducing certainty and making consumer better off. The producers choose to follow certification procedures if government can enforce then to do this. Therefore, we cannot speak about definite welfare losses from certification in this case. The certification appears to be beneficial if welfare gains of consumers do not overwhelm the losses experienced by producer.

Conclusion

According to the analysis conducted, certification may be important for experience goods in the asymmetric information environment. This statement is based on reduction of uncertainty and, thus, increase in consumers' welfare gains. However, even for experience goods, the certification is not an easy issue due to possibility of non-compliance. That is particularly important for low-quality goods; producer, but even high-quality goods' producer can be deterred by very high costs of certification.

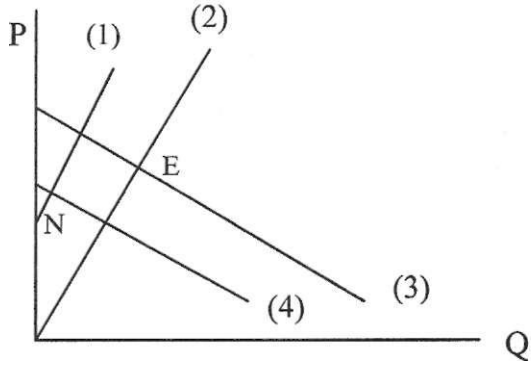


Figure 4. Experience high-quality goods:
pay or not to pay: 1 — marginal costs if uncertified;
2 — marginal costs if certified; 3 — high demand;
4 — uncertain demand

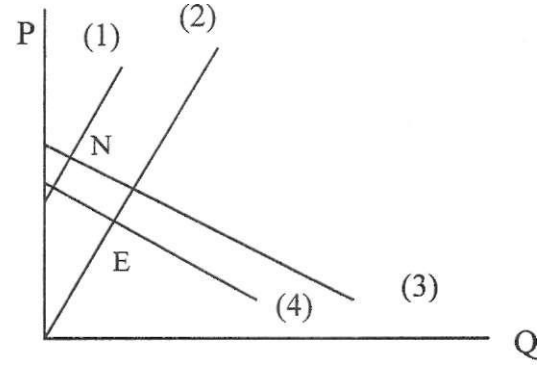


Figure 5. Experience low-quality goods:
pay or not to pay: 1 — marginal costs if uncertified;
2 — marginal costs if certified; 3 — uncertain demand;
4 — low demand

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*Орлова В. М.*

# СЕРТИФІКАЦІЯ ДОСВІДНИХ ТОВАРІВ

У світі асиметричної інформації товари можна класифікувати за часовими рамками, в яких споживачі визначають якість товару. Існує два базових типи товарів — товари дослідні, тобто ті, якість яких можна перевірити при обстеженні товару, та товари досвідні, тобто такі, якість яких перевіряється лише в процесі споживання. Якщо розглядати сертифікацію як засіб мінімізації витрат, пов'язаних з невиконанням ринком його функцій, особлива увага має приділятися саме досвідним товарам. Споживачі не можуть визначити їх якість до купівлі, і саме сертифікація може бути індикатором цієї якості.