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INFORMATION VALUE

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Summary

The paper intends to discuss the problem related to the knowledge transfer costs from the perspective of the economic actors as potential beneficiaries of this process. The approach uses the model for determining an optimal offer in uncertain circumstances related to the selling price and emphasizes the information value that a manger acquires in order to ease the decisional process regarding the offer level. In this context, the information value represents the total amount that the manager is willing to pay in order to get the perfect information regarding the output selling price, as a result of the difference between two levels of the average wealth utility (with and without knowledge transfer).

Key words: uncertainty, risk, information, knowledge, knowledge transfer, information value.

INTRODUCTION

In our times, the need for information and the process of acquiring it are overwhelming due to the multiple changes on various levels of society. Many authors [1, 5, 6, 7] consider the actual period as an" information era". Strict sense, the information value is related to the content, to the usable characteristics of the information. If we discuss the scientific information, we observe that the standardization, the formalization and the continuous shaping of the content transform the information into knowledge in order to ensure a better, more correct usage. As long as the information, the scientific culture is shaping itself, its content is shared (mostly free) among the members of the respective community. After the end of the shaping process, the content gets its specific form of expression it becomes transferable towards another domains and it is usable. Have the beneficiaries of this content (the users) to pay for the counter value of the work that made possible the receiving of the knowledge they received and used? This paper looks at the information value from this perspective, considering also the fact that the new

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concept of "knowledge based economy "[6, 7] essentially means the evolution from the mainly resource based economy towards the mainly knowledge based economy. Knowledge becomes more and more an economic good, it has its own market, with the respective actors and rules that have to be studied and observed.

OFFER MODEL IN UNCERTAIN CONDITIONS

Any production process encompasses a certain period of time between the startup moment when inputs are accepted and the final moment when outputs are issued. If the production process is well managed (the relation between inputs and outputs being well known) and if the inputs are bought and paid for before usage, the decision maker may estimate with a certain accuracy level not only the output level but also the costs related to obtaining it. Moreover, if the respective market is a concurrently one [4], the decision maker will know that the production counter value will be received at market level prices. If we admit the lack of technological uncertainty then the planned output level equals the sold output level. The technological uncertainty appears when the two levels are not equal anymore and the production becomes a random variable. Due to the technological lag the decision maker feels the uncertainty regarding the output. The risk sources are multiple, obviously. Some of them are to be found at the request level on the respective output market. Such a risk source is the price level that is to be obtained for the produced output. Not exactly knowing this price, the decision maker estimates based on experience, optimism inclination or even more rigorous methods the possible price levels and the achieving probability related to each level. The output price is a random variable and the decision maker is able to build the probability distribution for this specific random variable. In order to ease the presentation, we assume that the output price is a simple random variable, Bernoulli type – having only two possible values p_1, p_2 respectively having the probabilities $\rho, (1-\rho)$ respectively. Let us consider the case of a company whose manager (decision maker) is interested in establishing the offer optimal level (for the output) in uncertain price conditions. The decision maker sets the offer level so that the company's wealth, fortune is as big as possible. Shall we note by *B* the wealth, this is a random variable when the output price is random. We can consider the accounting net company assets (the assets value minus the debts towards third parties) as being the company's wealth. With the following notations:

- *y*, output level;
- B_0, initial company's wealth;
- *CV(y)*, variable production cost;
- *CF*, fixed costs;

at the end of the production process, the company's wealth will be either, $B_1 = B_0 + p_1 y - CV(y) - CF$ if the price is p_1, or $B_2 = B_0 + p_2 y - CV(y) - CF$, if the price is p_2. The company's wealth is a

random variable having the distribution: $B = \begin{pmatrix} B_1 & B_2 \\ \rho & 1-\rho \end{pmatrix}$.

If the decision criteria in uncertain conditions used by the manager are the maximization of the mathematical hope of the wealth utility then the decided offer level is y, so that the average utility of the company's wealth shall be at maximum level. The decision model will be:

$$\underset{y}{Max}\, E(U(B))$$

whereas $E(U(B)) = \rho U(B_1) + (1-\rho)U(B_2)$ is the mathematical hope of the wealth and $U(B)$ is the utility function of the wealth [2,8,9].

Under well-defined conditions [2] on the utility function the solution of the decision model involves solving the I level optimality condition - equation:

$$\rho[p_1 - c_m(y)]U'(B_1) + (1-\rho)[p_2 - c_m(y)]U'(B_2) = 0$$

whereas $c_m(y)$ is the marginal cost (the derivative of the total cost as proportion in the output). It is shown [2,3] that the riskofob decision maker confronted with the uncertainty regarding the output price chooses an offer level (y^*) so that:

- the marginal cost exceeds p_1 (unfavorable price level), but is inferior to p_2 (optimistic situation regarding the possible price level), meaning $p_1 < c_m(y^*) < p_2$;
- the marginal cost equals the average possible price plus a negative factor reflecting the risk aversion of the decision maker:

$c_m(y) = E(p) + \frac{\text{cov}(p, U')}{E(U')}$, where $E(p) = \rho p_1 + (1-\rho)p_2$ the average price and the second term are negative because the two random variables – the price and the marginal utility of the wealth vary in opposite directions: when price is up the marginal utility is down and their co-variance is negative.

INFORMATION VALUE

Due to the technological lag, the manager has to decide upon the offer level before knowing the realization of the random variable – price. One possible way out from this uncomfortable situation is to buy the services of an individual or institution able to inform him on the future price level. As a natural course of action we are now facing the problem related to the maximum amount that the manager is willing to spend in

order to get the information on price or, otherwise said what the budget is for the knowledge transfer. In our analysis further down we will limit ourselves to the "perfect information" situation and we will assume that the manager is fully confident in his information source.

Considering the previous context, when soliciting the information on price, the manager knows that he will receive either the answer p_1, or p_2. Even if he does not know which price will be announced until consulting the expert, the manager may anticipate the optimal reaction to each of the two values. He may as well associate to the two possible predictions, the respective probabilities ρ , $(1-\rho)$ respectively because in perfect information conditions we have an absolute correlation between prediction and realization.

Should the manager anticipate the announce to be p_1, then he will decide the output y_1 by solving the model: $\underset{y_1}{Max}U(B)=\underset{y_1}{Max}U\left[B_0+p_1y_1-CV(y_1)-CF\right]$.

The optimal solution y_1^*, will lead to a wealth level of $B_1^*=B_0+p_1y_1^*-CV(y_1^*)-CF$

Should the manager anticipate the announce to be p_2 then he will decide the output y_2 by solving the model:

$$\underset{y_2}{Max}U(B)=\underset{y_2}{Max}U\left[B_0+p_2y_2-CV(y_2)-CF\right]$$

The optimal solution y_2^*, will lead to a wealth level of $B_2^*=B_0+p_2y_2^*-CV(y_2^*)-CF$

The call for the "informant" allows the manager to make his decision upon the offer level as if he would act on certainly conditions. The possibility of being informed changed the decision making process. With no information, the offer would be uniquely determined (y^*) , whereas by acquiring information the decision on offer level is (y_1^*) or (y_2^*), as per the informant announcement. Still, before acquiring information, the manager finds himself in uncertain conditions and evaluates the economic status of the company in terms of mathematical hope of the wealth utility. By noting $E(U(B,I))$ the mathematical hope of the wealth under the knowledge transfer we have: $E(U(B,I))=\rho U(B_1^*)+(1-\rho)U(B_2^*)$.

If the knowledge transfer is missing, the optimal decision (y^*) leads to a wealth hope of:

$$E(U(B))=\rho U\left[B_0+p_1y^*-CV(y^*)-CF\right]+(1-\rho)U\left[B_0+p_2y^*-CV(y^*)-CF\right]$$

Since for the doubtless price p_1, the optimal decision is (y_1^*) and not (y^*), we have $B_1^*\rangle B_0+p_1y^*-CV(y^*)-CF$. Idem, when p_2 is certain, the optimal decision is

(y_2^*) and not (y^*), which leads to $B_2^* \rangle B_0 + p_2 y^* - CV(y^*) - CF$.

The immediate consequence is that: $E(U(B,I)) \rangle E(U(B))$, which means that the wealth mathematical hope is bigger in the situation of the knowledge transfer then in the situation lacking it. The difference between the two levels of the average wealth utility (with and without knowledge transfer) represents the information value. By noting V the information value we can determine it as a solution to the equation:

$$\rho U(B_1^* - V) + (1-\rho) U(B_2^* - V) = E(U(B))$$

The information value, V, represents the maximum amount that the manager is willing to pay in order to receive perfect information regarding the selling price for the produced output. If the "informant" sells his knowledge for a price inferior as compared to V, the manager will buy the information; otherwise he will not be using the informant services.

CONCLUSIONS

The notion of "information value" previously discussed connects itself to the notion of production flexibility. In certain conditions, the production flexibility means the possibility of perfect substitution between various possible production processes. In uncertain conditions, the flexibility relates to the possibility of immediate and perfect adjustment of the offer level to the realization of the random variable – price. A perfect flexible technology would bring the same service to the company as perfect information. In this circumstances, the amount V could be invested in the development of an instantaneous adjustment of the production process.

Although the notions of information value and flexibility are interesting as concepts, in real conditions is difficult to assert the information a priori or to have access to a perfect flexible technology. This is why the market mechanisms that help the decision makers in uncertain conditions developed. "At term" markets [2, 4] for different agricultural or industrial products are such institutions useful to the riscofob decision makers.

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