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"JUNK" PUBLICATIONS' MARKET

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Abstract

The article continues a series of the authors' publications about attempts to replace market control with conscious control. This time the object of the research is the market of periodical scientific publications. Two options of the existence of such a market are considered. The classic option involves competition between independent publishers. Decisive competitive position of the journal is provided by its scientific reputation. The second type of market arises when the quality of scientific articles is not evaluated by the market which is represented by the scientific community, but by a special bureaucratic body, named the Committee by the authors. Existence of non-compete clause in the market of periodical scientific publications leads to the creation of powerful incentives for opportunism. Publishers start pleading suit with members of the Committee, offering to monetize their consent to assign of a high scientific category to the journal. Meanwhile, the publisher earns money publishing untenable scientific papers on the pages of the magazine. In fact, apparently several scenarios exist that do not have such disastrous consequences for the scientific information market. As one of these options, the authors cite the policy of "thick" literary journals, observed in the 80-ies of XX century in the USSR. In those days the editors placed few outstanding works, fulling the remaining space of each issue of journal with kitschy but "ideologically sustained" stories..

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1. Introduction

By the end of the 20th century, the division of labour had gone so far that a new class of workers was born. It is the class of professional scientists. They are people "who specialize in different scientific fields and contribute to scientific research". The search for truth, which actually constitutes the essence of the profession, becomes much simpler if a great number of scientists simultaneously take part in this process, share and exchange opinions, evidence, results of experiments and, finally, hypotheses.

Relatively recently (since the invention of printing) the publication of ideas and research results in the open press has become the means of information exchange in the world science. At first, this exchange was carried out by means of books, for instance, "An Inquiry into the Nature and Causes of the Wealth of Nations" by Adam Smith, published in 1776. However, the scientific community needed a more rapid and more compact way of transmitting scientifically relevant information. Scientific journals addressed this need. The introduction of periodic scientific journals coincided in time with the dramatic changes in the occupation of science: from a hobby, it evolved into a profession. Thus, the first issue of the oldest economic journal "The Quarterly Journal of Economics", issued by Harvard University, was first published in 1886. The novelty of periodic journals publication has proved to be so effective that it immediately spread to all branches of science, and it remains the most popular way of research information exchange in the scientific community.

2. Problem Statement

The market of scientific information has a number of specific problems because science can be viewed as a part of public goods. To be more precise, when scientific information remains an utterly private good, the community is at a disadvantage.

The article discusses the relations established between the editorial body of scientific journals, the authors and the readers. Are they different from the corresponding relationships established for popular magazines?

3. Research Questions

Let us consider the difference between popular magazines and scientific journals. The publication of a popular magazine is a commercial enterprise. The editors bear the costs of acquiring resources in the market and converting them into the final product (magazine). The royalties paid to the authors of the articles are cost items. Then the editorial office would sell out the circulation of the magazine at market prices. If the price is higher than the publishing costs, the magazine gains profit. If the revenue is lower than the cost in a long period, the magazine is closed.

The reasons for the publication of scientific journal may differ from the considerations of pure commerce. For example, if a scientific institution has a large staff of scientific workers, the publication of a scientific journal here will be profitable only due to the scale economies (Chamberlin, 1996). In addition, there is a possibility that the funds of trustees or patrons will bear the costs of publishing the journal. Besides, the vanity of the publishers may bolster the existence of some scientific journals (Savitskaya, 2002).

However, is it possible for a scientific journal to become a commercially profitable enterprise? This requires nothing but journal subscription revenues to exceed publishing costs. That is, scientific journals, as well popular magazines, should become private goods. This means that the price must put severe restrictions on the access to the journal content. Moreover, that's only a half of the way. In order to make the publication of the scientific journal profitable, the value of scientific information contained in the journal should exceed the costs that are borne by the buyers of this journal. To cover the fixed costs, the number of buyers should be quite large.

4. Purpose of the Study

The reputation of a scientific journal is an effective tool for distributing and searching the scientific information among the researchers (Tyrol, 1996). The journal's reputation is usually the result of competition. Theoretically, it is possible to gain reputation in alternative ways. For example, a reputation can be bought, rented or borrowed from a special institution responsible for reputation. To denote this institution we use the term "Committee". The problem to be resolved is the following: will the alternative forms of reputation maintain their effectiveness as a tool to overcome the asymmetry of information when compared to reputation based on competition (Stigler, 1961).

5. Research Methods

The reputation of the scientific journal is valuable. The authors can win favour with the publishers only by their scientific achievements. It takes years or even decades to build up a reputation. During this long period, a number of editors, replacing each other one by one, have been selecting the publishing materials implementing rigorous guidelines of scientific approach. In other words, reputation serves as an assessment that publishers present to the scientific community. At the same time, any scientific journal competes with many other scientific journals, which also try to win favour with scientists. In the market of periodical scientific information, this reputation equals to any other product of competition. With the passing of time, when the journal becomes influential enough to attract, as a magnet, the works of the best scientists, editorial work is greatly simplified.

However, what happens to those scientific journals that failed to gain their commercial success? If the exchange of scientific information occurred in the same way as the exchange of private goods, many scientific journals would vanish. To confirm this idea it is enough to follow the evolution of literary journals. If they do not arouse the interest of the public, they are closed. For scientific journals, it would be unreasonable to rely only on the commercial grounds. The reason of it is the external effect that scientific ideas generate (Coase, 1974). Therefore, the community agrees to maintain scientific journals in the "zero profit" zone if they cannot sell scientific information at prices sufficient to cover the costs. It is also logical to make an assumption that the more "scientific" the journal is, the less likely it is to become a prosperous commercial project. The more specific problems the journal has on its pages, the fewer scientists read this journal regularly. It means that the publishers of highly specialized journals cannot rely on scale economies.

Another problem is that it is almost impossible to obtain scientific knowledge in a ready-made form. Scientific knowledge is always the result of the long-term competition between different hypotheses. However, frankly speaking, not all the hypotheses explaining certain phenomena are scientific ones.

Accordingly, the journals are not always equally scientific. This leads to the problem of conscious selection from numerous scientific journals the ones that will receive financial support from the community. Nevertheless, as soon as the problem of selection moves from the impersonal market into the sphere of personal choice, many difficulties immediately arise. Let us define the two problems. The first problem is the choice of "scientific" criteria. The second one is the problem of the choosers and their competence. They are the people who have to pass their judgement on the scientific validity of the publishing house.

As for the problem of "scientific" hypotheses and research, the work of Karl Popper, to a large extent, predetermines its resolution. Popper formulates the following demarcation criteria between "science" and "pseudoscience": "Science is a set of statements about the real world, which can, at least in principle, be refuted by empirical observations. We recognize science through its method of formulating and validating the statements, rather than through its subject or assurances of the truth of knowledge" (Blaug, 2004).

However, the problem of "competence" remains unsolved. Traditionally, the scientific reputation of the journal's editors address it. It appears to be an effective tool meant for control, especially in cases, when the net incomes of a scientist corresponds to his reputation. Of course, due to the heuristic character of science, this selection tool cannot be estimated as an ideal one, at least because new knowledge may not find its "buyer" in the midst of scientific authorities. Nevertheless, this tool of sorting out scientific ideas, which uses the reputation of a scientific editor as collateral, appears to be valuable, as it helps to preserve the elements of market competition when assessing the scientific status of a hypothesis. All in all, the editor is risking something and this "thing" is valuable.

Such system of selection and evaluation of the "quality" of scientific ideas is commonly accepted. Among other things, it helps scientists to reduce the cost of searching for information, because the reputation of the scientific journal plays the role of market signal for scientists (Spence, 1974). However, let us make a supposition that the publication market has an alternative structure. The differences from the considered "reputation" model are as follows. First, the reputation of the publishing house is no longer a result of competition. In the original period, it is assigned to the publishing house by a certain third party or a group of people, which can be called a Committee. Similarly, the reputation cannot be lost because of competition with other journals, and the decision to "lose" reputation is made by the same Committee. Secondly, the remuneration of scientists directly depends on the rank of the publishing house in which they published their scientific works. Third, the reward is guaranteed. The higher the rank of the publisher is the higher net income the scientist receives.

These changes have a devastating impact on the dissemination of scientific information. Let us prove it.

First of all, conscious control over the quality of the goods is never as ruthless as the market control. This rule is also applicable to such goods as scientific publications. When a scientific editor becomes less sensitive, in the first case, he risks all at once, and he can lose reputation, authors, readers and incomes. If the editorial board is under the Committee's control, consequently, the quality of publications will decline which will lead to ambiguous outcomes. It is safe to say that after some time the journal will lose its readers. As for other components, here various "options are possible".

Thus, the editors of the journal can try to convince the Committee members that the quality of publications remains high (Krueger, 1974). Such attempts will be more likely to succeed if the Committee members have poor scientific qualifications. This remark is essential. Of course, the members of the Committee can be true scientists, but it is not obligatory. Moreover, speaking on behalf of the Committee, its members will be less inclined to protect the scientific truths vigorously, as the reputation of the Committee for them does not have the same value as their own reputations. There is one more option, when the members of the Committee make prejudicial decisions, i.e. reject alternative scientific hypotheses or hypotheses suggested by other authors. Finally, the members of the Committee could be politically biased. The negotiations will result in keeping the previous rank of "reputation" of the journal. In this case, the journal need not to worry about the loss of its authors, as they do not have an incentive to transfer their manuscripts to another publishing house, on condition that the "rating" of the journal remains unchanged. However, will the journal necessarily retain its former readers and the previous level of income? The answer is negative. The proverbial moral risk is to blame (Farrell, 1986).

If the editors of the journal feel that its reputation is "guaranteed", they will weaken their efforts to control the quality of scientific publications. Moreover, the strong incentives to reduce the quality of publications will arise. This will happen if the authors start to put forward commercial proposals to the journal. They are the authors who will try to replace specific investments (scientific discoveries and hypotheses) with general investments (money). (These authors cannot boast of considerable "scientific contributions" and, according to the definition, are not true scientists). However, they seek to publish their works if the following conditions are satisfied $\Delta w > P_a$, where Δw is the wage increment resulted from the publication in an "influential" journal, and P_a is the price put by the journal for publishing the article. To denote this type of publications, churning out by some authors, it is appropriate to use the term "junk" publications (the word "junk" refers to rating scales describing high levels of credit risk).

The editorial office can replace the income received from the interested readers with income coming directly from the authors. In this case, the quality of publications decreases. Under certain conditions, "junk" publications can completely push out truly scientific work. It is possible to define these conditions. Indeed, the choice for the editorial of the journal lies between keeping the scientific control strict and weakening the requirements to the scientific content of the articles. The efforts to maintain the high quality of publications presents the symbol q . Toughened of requirements to the quality of the scientific article will lead to the following two consequences. First, the income (TR_1) coming from "junk" publications will decrease. Secondly, the income (TR_2) coming from the readers who buy the journal in search of scientific information will increase. If a journal wants to gain commercial success, it will look for such level of requirements (q) at which the sum of these two components will be maximal. It should be taken into account that the value of dTR_1/dq will be negative whatever the value of q . This condition is fulfilled as long as the rating of the journal assigned to it by the Committee remains unchanged. As soon as the Committee takes the rating away from the journal, the second component becomes equal to zero.

We face the standard task of getting the maximum profit by the seller, who is trading in two markets. The profit of this seller is calculated by the following formula:

$$\Pi = TR_1 + TR_2 - TC. \quad (1)$$

The maximum profit condition describes the following equation:

$$MR_1 = MR_2 = MC. \quad (2)$$

The key parameter of the model is the value of MS , which is treated as an additional effort to toughen the requirements for the "quality" of the scientific publication. The matter is that in general case this value is close to zero, because it is not difficult for a qualified scientist to distinguish between scientific and "pseudo-scientific" work. In the previous periods, the scientists have made specific investments necessary to perform truly scientific work. However, if MS is ~ 0 , then the values of MR_1 and MR_2 must be zero. Is this assumption true? Let us verify it for both models: for the traditional market of scientific publications and for the market where the Committee nominates reputation to scientific journals.

6. Findings

Let us assume that a classical scientific journal that values its reputation as it was hard to obtain it in the competitive market, decides to increase its profits. To do this, it begins an unusual price discrimination. It changes its publishing policy. Along with truly scientific articles attracting the scientific community, it publishes less scientifically important works and even "junk" materials. Here we observe the situation of price discrimination, as to have access to the journal author pay different prices: there is one price for the authors of "junk" publications in the first market, and there is another price for the interested readers of the journal in the second market (Robinson, 1986). It is possible to assume that, with some values, the elasticity of demand for the "authors" will be lower than the elasticity of demand for the readers, and therefore "authors" will agree to pay a higher price. It is most likely to happen in practice, if the number of influential journals is small, and the readers have access to alternative sources of scientific information.

At first glance, this policy of price discrimination may seem incompatible with the maximum profit rule (2). Indeed, if the journal weakens the "scientific" criteria for articles printed on its pages, it will not escape the attention of the readers. The demand for the journal from the scientific community will reduce, which will lead to a decrease in the price of the journal and, consequently, the reduction of the marginal income (MR_2). At the same time, weakening the requirements for the quality of scientific articles will lead to an increase in the revenue in the "junk" publications' market. In this market, the marginal income has a negative value. However, under such conditions, the scientific journal that allows less qualified authors to publish their works on its pages, will try to abandon this idea as soon as possible. Indeed, once the quality of publications has decreased, the revenue generated by the sale of the journal to the qualified readers declines. However, the authority of the journal will fall at the same time, and consequently, the demand of "junk" authors for the journal pages will decrease. That is, our assumption that $(dTR_1/dq < 0)$ turned out to be incorrect.

Therefore, a classical scientific journal has only one option, which is to protect its reputation and to publish only masterpieces of scientific thought. This will give the editors an opportunity to assign a high price for the journal to its regular qualified readers. However, as soon as the scientific journal embarks on the road of selling its reputation, it immediately loses the favour of its loyal readers who, in fact, provided it with this reputation. Soon after the scientific journal loses its reputation, the interest to it will be lost, and "junk" authors will turn away from it. Then, this scientific journal disappears.

In fact, the matter is not so dramatic. It seems that scientific journals can gradually reduce the quality of published materials for a long period, without fear of losing the goodwill of the scientific community or

its reputation. In other words, scientific journals, acting as a price discrimination tool, can fix the value of MR_2 in one market and increase the value of MR_1 in another market. This possibility results from several factors. The main of them is that scientific masterpieces cannot be "baked" like pancakes. However, the editors have to fill the pages of the periodical journals with scientific information, which is thus doomed to be unequal in quality. Secondly, scientific knowledge is not only heuristic by its nature, but also paradoxical. Therefore, the editors may be inclined to publish some extraordinary materials, fearing to miss an event that deserves the attention of the scientific world. They will apply the most unspecified criteria to estimate such works. Only the most odious scientific projects will be rejected. Finally, monetary inducements may influence the editors, so they will agree to publish some "junk" materials in the section called "Discussion Club" or something like that.

This pattern of behaviour was demonstrated by some Soviet literary and artistic journals in the 1960s. All the journals had to publish "ideologically approved" narratives and stories, but their artistic value was roughly equal to zero. However, some editors published outstanding works on the pages of their journals, which brought popularity to those publishing houses. At that time, the circulation of publishing products was strictly regulated, and the commercial component of the publishing activity was secondary. The 1980s saw the repetition of this pattern. In the race of commercial success, most literary journals began to publish previously forbidden works. Each issue of the journal hardly had two or three worthy works. The quality of other publications was very mediocre. It is clear that the "junk" literary publications simply filled the space of the "Consumer Award", formed by the publication of a literary masterpiece (Hicks, 1993). There is nothing to prevent scientific journals from pursuing a policy similar to that of the literary publications. However, a journal will pursue such a policy of "double standard science" only until it jeopardizes its scientific reputation. As soon as this possibility becomes real, the editors of the journal immediately toughen their scientific requirements. Otherwise, events will develop according to the cumulative scenario described above. For the scientific community, this is a very pleasant circumstance, because it makes it easier to find quality scientific information. The only thing the scientists need is to focus on the "authority" of the scientific journal, which thus continues to be a market signal.

Let us consider the differences in the behaviour pattern demonstrated by the scientific journal of the second model when its reputation is not deserved but nominated by the Committee. It is obvious that the sale of the journal occurs again in the two markets: in the first market the interested readers search for scientific information, in the second one the authors of "junk" articles acquire space on the pages of the journal. The journal has limitations in the form of following equations (1) and (2). This is where the similarity with the classical scientific journal ends. For the classical scientific journal, there is a limit of risking the quality of published articles. After exceeding this limit, further concessions making for scientific mediocrities put the very existence of the journal under threat. However, if the reputation is not conquered in the competition, but granted by the Committee, the competitive risks disappear. The editorial board of the journal can safely reduce the quality of published materials until the Committee revises the rating of the journal. In other words, now the editors can go much further to the first market with impunity, where they deal with the authors of "junk" publications. The editor's motives are understandable – now the increase of TR_1 has no influence on the value of TR_2 . After all, the authors of truly scientific works will not discourage from publishing the articles in this journal, because formally its "reputation" remained at the same level.

It seems that the only factor that can prevent the quality of published materials from falling is the monitoring of the Committee. However, the Committee's control is much softer than the market control influencing the reputation. The Committee is much more inclined to understand and to forgive. This softness of the Committee causes another danger.

To understand the origin of this threat, another difference between the two models of gaining scientific reputation will be considered. In the market model, the creation of reputation is impossible without the use of specialized resources, that is, it requires investment of a specific nature (Klein, 1981). These specific assets are creative and scientific abilities of the authors who are capable of writing outstanding articles, as well as scientific qualification of the editors of the scientific journals. In the model where the decision to assign "reputation" is taken by the Committee, it is enough for the journal to make only general investments (Williamson, 1996). Simply put, an individual may acquire a publishing license from the Committee without any specialized resources. The license, that is the "reputation" of the journal granted by the Committee, gives an opportunity, at least at the first time, to "make money out of nothing". Indeed, even if the publisher does not have the opportunity to sell the journal to the qualified readers, it still has the opportunity to sell its reputation among the authors of "junk" publications. That is, the publication of the scientific journal with reputation given by the officials becomes a special kind of business. It is clear that the Committee will be under pressure of many candidates for "scientific" creativity, among which it will not be easy to recognize the true scientists interested in the scientific advancement. The number of scientific publishing houses is likely to grow. They do not even need state budget funding. The only thing they need is "rating" given by the Committee.

Now we need to fix the algorithm of profit making by scientific journals, which received "reputation" from the Committee. The assumption that the editorial office is a monopolist in the market of "junk" publications will be incorrect. The Committee's responsiveness and kindness in the process of giving "ratings" will soon lead to the situation, when the market of "junk" publications becomes competitive. In the end, all sellers will receive normal (zero) profit. At this point, the market influx of new sellers (publishers) will stop. That is, the value of MR_I is proximity to zero again, as condition (2) requires, but now for another reason. There will be many publishers in the market, and they will offer the authors of "junk" articles to publish them at bargain prices.

Now it is time to consider the impact of the Committee's activities on the effectiveness of the scientific information market (Kolmakov & Bogatyreva, 2014). The basic model of the analysis includes several principal assumptions. First, the seller (publisher) may arbitrarily change the quality of the product at any time. Secondly, the information about this change in the quality of the product becomes available to readers in the next period. Thirdly, the publisher of the quality journal receives the award for high quality of the product (rent of reputation) (Shapiro, 1983)¹. Reputation rent means that the higher price assigned by the editorial board of a quality journal allows recouping the higher costs of its publication in the long term. That is, we represent the rent in the following way: $(p_I - c_I) / r$, where p_I – the price of the journal, c_I – the cost of producing a high quality journal, and r – the rate of interest.

¹ To be more precise, here is an attempt to use a model designed by J. Tirole to analyse a particular market filled with goods of different quality. The original model is designed to analyse reputation as a market signal.

Publishers can follow two strategies. The first strategy prescribed by the readers is to maintain constantly the quality of the product at a high level. Then the publishing house will profit in the amount $(p_1 - c_1) (1 + r)/r$, where factor $(1 + R)$ is the value, that is the reverse rate of the discount.

If, contrary to the buyers' expectations, the seller will reduce the quality of the product, its profit in the first period would be $p_1 - c_0$, where c_0 is the cost of producing a journal filled with "junk" publications. The formula does not include the rate of interest, since the seller will operate in the market only in the current period, and in the next period, he will lose all the readers. For this strategy to be disadvantageous for the journal, it should be less profitable than the strategy of maintaining high quality. That is, inequality (3) should be correct:

$$p_1 - c_1/r \geq (c_1 - c_0). \quad (3)$$

In other words, the reputation rent should exceed the cost savings achieved by lowering the quality.

In fact, this interpretation will be incorrect. Since the authors of the "junk" materials are paying for their publications, then the following condition is met by $c_1 > c_0$. The right part of the inequality will be more correctly read as $(c_1 - p_a)$, where p_a is the price that the journal assigns to the authors of "junk" articles for their publication. Then inequality (3) will take the following form (4):

$$(p_1 - c_1)/r \geq p_a. \quad (4)$$

This means that the publishing house still has the incentives to leave the group of highly ranked scientific journals and move to the category of low quality literature.

The power with which the publishing house will be "pushed out" from the first category to the second one is determined by three factors. First, it depends on the price level of p_1 , which can be assigned by the journal for publishing the works that have scientific value. Secondly, it is determined by the price level of p_a . Third, it is conditioned on the level of the rate of r . As noted above, the percentage rate applies to the entire period of the model's validity. This means that the more time it takes for the publishers to make sure that the quality of the published materials is unacceptably low, the less inclined the publishing house is to protect its reputation.

7. Conclusion

The main conclusion that can be drawn from a cursory look at traditional publishing activities in the field of scientific literature is the following. If the publishing house of scientific literature is a privately owned business, and scientific publication brings the author only indirect benefits, the market of "junk" publications cannot arise in principle. The publishing house has no incentive to sell the product of low quality to the readers, and the authors of the "junk" articles have no incentive (except moral) to pay for their publication.

Now let us estimate the efficiency of the Committee model. As soon as the value of p_a becomes positive, it puts the existence of truly scientific publishers at risk. Only a high value of p_1 and a low value of r can guarantee that the publishing house will maintain the conservative policy. High p_1 can be interpreted in different ways. In an elementary case, it is simply a high price for the subscribers of the publishing house. However, it can be also seen as the financial support of scientific or other informal communities, and even moral satisfaction, gained by the publishers, who protect "purity of science". In all cases, the traditions of science veneration typical of this community play a very important role. The stronger

they are, the higher the value of p_l is and, consequently, the publishing house is unlikely to move to the group of low quality journals. The second means of protection of the conservative publishing policy is the rather low value of r . Contrary to the basic concept J. Tirole, the publishing house retains some control over the value of this parameter. For example, the editorial board can combine publishing scientifically significant materials with "junk" publications for a long period, and thus it keeps the scientific community interested in the books and journals of the publishing house. In fact, this policy seems to be the most realistic for publishers seeking to reconcile its conservative policies with the desire to increase its income.

Let us return to the consideration of the role of p_a for the formation of the market of "junk" publications. It is obvious that publishing activity can become a business. The publishing house should "buy" the license giving the right to assign ratings to scientific articles from the Committee. Nothing prevents the majority of the claims that the Committee usually makes to the applicants for publication licences (reputation) from monetization. In this case, quite a lot of publishers (sellers) will get the right to enter the market of "junk" publication. The competition between them will inevitably lead to a decrease in p_a . As it follows from the content of the model under consideration (inequality (4)), the decline of p_a is to make publishers return to traditional conservative policies.

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