CONTRIBUTION TO THE RESEARCH OF NATURAL MONOPOLY REGULATION ON THE BASIS OF INCREMENTAL COSTS

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Abstract: In the sense of determining monopoly prices that exploit customers according to economic point of view, a need for regulation of harmful behavior of the natural monopoly has been present for a long time and not only in practice but in economic theory as well. In both cases, there is a rescuer in the state i.e. one subject that is able to satisfy this need. On the one hand, protagonists of the practice require enactment of certain laws and that is already known under the name of antitrust laws. On the other hand, however, economic theoreticians, on the occasion of taxation or determination of administrative price of product of the natural monopoly, see possibility of customers’ protection from economic exploitation. All these efforts until today, however, did not produce adequate and satisfying solution. The first purpose of this article is to point out reasons why solutions failed to occur, and then to show how the best solution can be articulated by using the concept of incremental costs. The successful realization of these two purposes leads us directly to one another purpose, which is very important for Croatian circumstances, and that is that Republic of Croatia and Croatian enterprises will have to confront themselves very soon with the need of, as well as possible, regulation of the monopoly behavior with objective to protect domicile consumers from economic exploitation.

Key words: Monopoly Price, Administrative Price, Incremental Costs, Multiphase Allocation of Overhead and Common Costs, Harmonization of Regulation, Protection of domicile Customers.

1. INTRODUCTION

A need for regulation the harmful behavior of the natural monopoly, in the sense that it economically exploits consumers by determining the monopolistic price, is for a long time now present, not only in practice but also in economic theory. In both cases the government is seen as a savior, i.e. the entity that will satisfy this need. On the one hand, the protagonists of practice require the passing of certain laws, which is already well known as an anti-monopolistic legislation. On the other hand, the economic theoreticians see a possibility for the protection of the consumer from the economic exploitation in the taxation or administrative determining of the price of the natural monopoly’s product. All these efforts, however, have not resulted so far in an adequate or satisfactory solution. The primary purpose of this paper is to point out to the reasons as to why the solutions failed to take place, and then to show how the best possible solution could nevertheless be articulated through the concept of incremental costs. The successful achievement of both of these purposes directly leads us to yet another purpose, particularly significant for Croatian conditions, namely that the Croatian government and Croatian enterprises will be faced shortly with a need for the best possible regulation of the monopolistic behavior in order to protect the domicile consumers from the economic exploitation.
2. NEOCLASSICAL DETERMINING OF THE MONOPOLISTIC PRICE

The neoclassical microeconomic theory has inherited, among other things, the problem of monopolistic determining of prices\(^1\). Of course, it elaborated the problem itself in accordance with its tools and analytical methods, of which the diagrammatic technique is especially outstanding. We are presenting the monopolistic determining of the price in Figure 1. Let’s have a look at the graphic illustration!

In the case if the monopolistic effects are not subject to regulation, the observed monopolist would, as the Figure shows, make a decision on the basis of the marginal principle (i.e. the principle of equalizing the marginal income and marginal costs) to produce the quantity of products \(Q^*\). He would sell that quantity of production at the price \(P^{**}\). It is easy to conclude on the bases of the selected parameters \(Q^*\) and \(P^{**}\) that the observed monopolistic enterprise would earn the maximal level of the total profit in mass. But it should be concluded at the same time that the observed monopolist, although making a maximal profit, was in the position to insufficiently use the installed capacities, which leads to, ceteris paribus (all other things being equal), the reducing of the consumers’ welfare\(^2\).

In order to resist the exclusively marginalistic behavior of the natural monopolies resulting in significant negative effects\(^3\), the authorities are trying to design and implement certain forms of regulation of the monopolistic determining of prices. With the assumption that there is a desire to intervene directly, the authorities reach out to determine a precisely determined price frequently called, with regards to the manner in which it was determined, the administrative price. In the mentioned graphic illustration, the administrative price is designated by the symbol \(P^A\). With the price \(P^A\) the observed monopolist will produce the quantity of products \(Q^A\). It is important to note that with that quantity of products the administrative price cuts the curve of the average total costs. Since the

Figure 1: Direct regulation of a monopolistic enterprise

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\(^3\) The natural monopolies are generating per se the irrationalities. However, how big the problem is where the natural monopolies are owned by the government (state), where the authorities must take into account the welfare of consumers on the one hand, and of its own assets, on the other.
fair return to the invested capital is included within the average total costs, one may freely say that the observed monopolist will, with the price PA and quantity QA, earn a normal profit.

*Prima vista*, the solution just derived seems to be logical, and thus acceptable, for both agents of the subject business situation. However, is this really the case? Since the level of administrative price is less than the autonomously determined price $P^*$, and the quantity of products QA is greater than the quantity of products $Q^*$, it can be inferred that the government meets its obligation to protect the consumers. The relevant question is, however, whether the government, by imposing the administrative price directly correspondent to the level PA, acted correctly towards the observed monopolist as well? The subject question can be made much more concretely: how the government can prove that the price PA is also sufficient to cover the average total costs and for the earning of a normal profit?

As far as we know, the microeconomic theory does not answer to the questions made above. It simply appears that the answering to the above questions is not included in its tasks. We could possibly agree with that fact because we see the microeconomic theory primarily as the theory oriented to explanatory tasks, but one can by no means agree with the fact that by the protection of one market participant (consumer), a damage can be made possibly to other market participant (producer). The growing efforts, still without any abatement, in the direction of building an anti monopolistic legislation are clearly showing that the problems consisted in the above questions are far from being solved. Therefore, an attitude that that the intervention in the market processes must be fair and that it should not cause any harm to any of the agents present in these processes is incontestable.

### 3. THE CONCEPT OF INCREMENTAL COSTS

In addition to other things, the microeconomic theory of the managerial provenience offered one exceptionally important concept attributed with the syntagm “incremental costs”. Under the incremental costs a change in the total costs resulted from the implementation of new activities of the enterprise is understood. Based on the mentioned definition, one should first make a question: where the difference between the "total costs" used by the microeconomic theory and "total costs" that should denote the incremental costs lies?

#### 3.1. Limitations of the neoclassical syntagm “total costs”

If we become absorbed in the content of the syntagm "total costs", we will notice that it is made of two components: fixed costs on the one hand, and variable costs, on the other. Not each particular component represents simple elements. Already the first component of the total costs, the fixed costs, for which it is claimed that their level in mass does not change when the quantity of production changes, is made of greater number of fixed factors: equipment, buildings, operating inventory, etc. The other component of the total costs, the variable costs defined as the costs that are changing when the quantity of production changes, is also composed of a greater number of variable factors: different raw materials, materials, parts, energies, manpower, etc.\(^5\)

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\(^5\) A reader can find wider explanations on the internal content of the fixed and variable costs in: Santini, I. "Troškovi u poslovnom odlučivanju" Hibis, Zagreb, 1999.
With the introduction of the fixed and variable costs, the idea that each factor can be expressed in different ways is automatically created. Although this is an undisputable truth, these different possibilities can be reduced, through the accounting policies and accounting techniques, to one single possibility that will be recorded in an accounting manner. If this is taken into account, then the sum of the natural or elementary types of costs of the enterprise is understood under the total costs. This resultant of the total costs is qualitatively equal to total costs conceived as the sum of the fixed and variable costs, but possesses, nota bene, a different structure. Consequently, the total costs of the enterprise can have an equal numerical value but different structure, which cannot be noted by an exclusive reliance on the neoclassical syntagm of total costs, and this fact is extremely important for the incremental costs.

For the sake of simplicity of the paper and easiness of understanding, the neoclassical syntagm of total costs assumes that the enterprise produces only one single product, or a collection of products that can be homogenized. In reality, however, the enterprises are, by rule, producing several products, and the resulting assortment can be adequately described only by the use of the matrix: type of the product/quantity of products. This matrix becomes all the more complex if one also takes into account the possibility of engaging a subcontractor. The neoclassical understanding of total costs, thus, for the reason that it does not consider each particular product separately, becomes, indeed, not only just an idea that should be sharpened well and persistently, but also insufficient to be able to cover the actual production capacities that are, in reality, objectively at the disposal of the enterprise. Precisely the contrary thing can be said and elaborated for the incremental costs.

The neoclassical syntagm of total costs understood as a sum of fixed and variable costs relates to a short-term period, which means that the expansion of the enterprise is not discussed. However, the expanding of the enterprise is its generic need, requiring indeed numerous and different ways to satisfy that need. The closer list of these ways can be prepared and presented only with the help of the matrix: products/market; and this matrix is, nota bene, almost an ideal background for the application of incremental costs.

On the basis of the above elaborations it can be concluded that the neoclassical understanding of total costs can be assessed not only as a reductionist one, but also as static in the same manner. We are holding that these attributes of the neoclassical theory are sufficient enough for us to conclude that the syntagm total costs, as explicated by microeconomic theory, should be left where it belongs, i.e. in the area of understanding of simple situations of decision making by the enterprise on the price and quantity of its product. Therefore, a significantly more potential theoretical category attributed as incremental costs should be installed in its stead. Focusing on the exogenously desirable object, whatever might be understood by this, the incremental costs are not only neutralizing the static quality, i.e. they are covering the expansion of the enterprise, undoubtedly respecting and including thus the dynamics - this essential determinant of the modern business operation - but also allowing for the decrease of the excessive reduction to which the microeconomic theory necessarily, in accordance with its purposes and reasons, resorted and applied. This, however, does not mean that the neoclassical syntagm of total costs should be placed in a museum of antiquities, but only that it should be used only in the sense and meaning in which it has been articulated and explicaded; and within the incremental costs, nota bene, the numerous occasions for its application are provided.

### 3.2. Articulation of increments

A neoclassical enterprise is mainly considered as a passive reactor to the impulses induced from its economic environment. This approach to the enterprise ignores the essential determinant consisting of the fact that the enterprise has relevant organizational structure that allows for it, among other things, to assume an attitude that allows it to respond to the demands of the market.

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6 On natural or elementary types of costs see: Majcen, Ž. "Troškovi u teoriji i praksi", Informator, Zagreb, 1988.
7 The use of a subcontractor de facto means not only that the fixed costs can be replaced by variable costs, but also that an increased quantity of products can be produced. This is already well known "to do or to obtain" problem. See on this in: Santini, I.: "Troškovi u poslovnom odlučivanju", Hihis, Zagreb, 1999.
8 There is virtually no theory of firm that would not direct a similar or the same criticism to the neoclassical enterprise. A reader can find an interesting insight into the criticism of neoclassical enterprise in: Koutsoyinnis, A.: "Moderna mikroekonomika", Mate, Zagreb, 1996.
towards the economic environment in accordance with its objectives. We have mentioned earlier that the concept of incremental costs starts from the fact that one should focus on an exogenously desirable object. Now is the time to explain this determinant somewhat more clearly and elaborate it more closely. For this purpose we will use a chart that represents the organizational description of a complex, large and modern enterprise\(^9\), a chart in which, we are holding, even our natural monopolist can fit in very well. Let us have a look at the mentioned graphic illustration!

![Figure 2: Three-dimensional organizational chart of an enterprise](image)

In the above graphic illustration, the exogenously desirable object can be recognized in the determinant activity. Although this determinant is still undefined, it strongly suggests that this could be a question of a product and/or service, therefore of performance that could represent, within the enterprise, a profit center. On the basis of the mentioned concept, the profit center, the idea that any activity generates not only own revenues of a determinable level, but also own costs of determinable level. The hypothetical enterprise can earn the revenues from some activity, as it is visible from the mentioned graphic illustration, in different geographic areas. We are finding and reading a more concrete explanation at the depth ray of the presented area. At the same time, however, a particular activity also leads to arising of costs, not only of a certain structure, but also of a certain level. It is easy to read what these particular types of costs are in accordance with the functional principle of the organization of the enterprise on the horizontal axis (width dimension) of the graphic illustration mentioned above.

\(9\) There is a numerous literature on a variety of organization charts of the enterprise and the evolution of its organization. For the illustration see: Yuki G., Wexley K.: “Organizational Behavior”, Dow Jones, Irwin, Illinois, 1985.
Let us imagine now that the observed enterprise wants to expand itself in a manner that it launches some existing, already established product in a new market. In accordance with the graphic expressing, the depth axis, representing the geographic area, would have to be extended. This new market area, similarly to any other market area, would generate the revenues of a certain level for which it should be assumed, in consistence with our topic, that they are being realized under the monopolistic market conditions.

The monopolistic conditions in the new market de facto mean the presence of high elasticity of demand. If there are no additional restrictions to monopolistic conditions in the form of the government efforts to directly or indirectly regulate the monopolistic behavior, the observed monopolist can offer that quantity of products with which his costs, independently of how they are determined, are equalized with marginal revenues in this new market area. However, what will happen if the government wants to protect the domicile consumers from the monopolistic exploitation? With the intention to act justly, the government will, rather than to determine the price administratively, most likely look for the background on the basis of which the observed monopolist has determined and published the price of his product.

With the intention to meet the requirement of the state authorities, the observed monopolist will most likely avoid to apply the simple procedure consisting of simple deducting the usual profit rate from the published sale price, and will say that his actual total costs, which he has on the basis of production of the subject product, are corresponding directly to the residual calculated in this manner. Namely, the procedure of producing the costing background will surely have to be substantially different, far more transparent, within which a special attention should be paid to indirect production costs of the observed product, with a clear and unambiguous determination of the business increment, which is indeed de facto implied by the above simplified procedure.

3.3. Indirect costs of the product

In the continuation of this paper let us assume that the observed monopolistic enterprise already disposes of the survey of the total direct and indirect production costs for the subject product. Since direct costs can be directly determined by the unit of product, it is possible, for the simplicity of our paper, to simply leave them out and focus only on the collection of indirect costs. Figure 3. presents a simplified scheme of indirect costs of some hypothetical enterprise. Let us have a look at the mentioned graphic illustration!
Indirect costs of the enterprise are considered to be all those costs that cannot be determined unambiguously per each particular product of the enterprise. As the enterprise has the organizational structure elaborated in detail, which we presented in Figure 2, it is wise to classify indirect costs into two groups: (1) common costs, and (2) general costs. All particular costs arising in some division of the observed enterprise in which a greater number of products is produced by rule are understood under the common costs. Contrary to common costs, the general costs designate all those costs that are arising due to the operation and functioning of the enterprise (collection of division) as a whole.

If we stretch our view from the bottom to the top of the presented graphic illustration, then it can be seen clearly that each particular product carries with itself, first of all, its own indirect costs, and then the aliquot part of indirect costs of the division in which that product has been produced and finally the aliquot part of indirect costs of the enterprise. The presented structure of indirect costs is plausible indeed, so that it does not need, in our opinion, any additional explanation. However, it is wise here to pay the attention to the problems of the keys on the basis of which the concrete numerical values of indirect costs are determined.

However, when this problem is solved adequately, there should be no obstacles indeed to assess the structure of indirect costs as a clear, unambiguous and transparent one. With a remark that there are simply no problems with determining the unambiguity of indirect costs, it is easy to infer that total costs, therefore both direct and indirect, of the product of the observed enterprise presented in a form and structure leaving not much dilemma as to whether they are precise and reliable or not.

3.4. Long-term allocation of indirect costs

The previous considerations of the total costs of the product of the enterprise were based on the time horizon that could be called a short time period or operating time period. Thus it is wise to call the direct and indirect costs of the enterprise “the initial costing compositum”. Now is the time, however, to shift the time horizon to a longer time period, and to think through and understand what is going on with direct and indirect costs in a longer time period. Since the collection of costs like this is being projected into the

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Figure 2: Indirect costs caused by organizational structure of the enterprise
future, it is wise to call it the “projected costing compositum”. Once we have determined the relevant concepts, it is extremely important to answer the following question: wherein lies the specific difference between the initial and projected costing compositum?

To be able to answer the question just raised it is necessary to say something on the efficiency of the particular product’s production by the enterprise. We are aware of the fact that the efficiency of production is a technical question par excellence. Within the economic area, however, the technical efficiency is mediated by the economic efficiency, so that in the total costs of making some particular product one should simultaneously sense, and even see, not only the economic, but also the technical efficiency. It is not surprising then that by the act of articulation and presentation of the initial costing compositum the immanent economic/technical efficiency is de facto presented as well.

In the market system of earning, every enterprise is per definitionem permeated with a need to achieve an increased level of economic/technical efficiency. If one wishes to check whether the enterprise really achieves an increased level of efficiency, he will be able to do so by comparing the level of the projected costing compositum and the level of the initial costing compositum. If this ratio is, ceteris paribus (other things being equal), below 1 (one), it can be freely concluded that the enterprise, in respect of direct and indirect costs, really achieves an increased level of economic/technical efficiency. Consequently, the projected costing compositum has a rich information potential, not only because it speaks of the level and structure of some particular product’s costs, but also because it reflects the intended and realized production/technical implementations that lead to the realization of an increased level of efficiency.

We hold that on the basis of the above statements the conceptual difference between the initial and projected costing compositum is quite clear. This intuitive plausibility, however, should not screen from light the multitude of changes that could have happened objectively in the period whose starting point is the imposing of the initial costing compositum, and whose final point is reflected in the checking of the projected costing compositum’s realization. Namely, not only that the implementations could have happened in the production/technical sphere, but they could have happened in the sphere of the production program as well, so that the above conclusion, given with the clause ceteris paribus, does not have to be verified necessarily. Accordingly, the numerical comparison of the initial and projected costing compositum must be conceived only at the beginning of a comprehensive and complex analysis of a rich content reflecting all (intended, subsequent and unintended) changes in the time period between the imposing of the initial costing compositum and verifying of the realization of projected costing compositum.

Now that we adopted not only the content of what we call the initial costing compositum but what we call the projected costing compositum as well, and when we understood the great specific difference between these to concepts we can return to the allocation of indirect costs. First of all let us assume that the hypothetical monopolist has introduced in a new market a new product produced in this division in the same manner as the previous product. On the background of earlier discussions it would be reasonable to answer the following question: what will the structure of indirect costs of this product look like? With a help of (drawing on) the Figure 3., a beginning of the answer could be formulated in the following way: after all, this product, like the previous product, will carry with itself, in the first place, its own indirect costs. As for the division’s indirect costs it is much harder to give a clear and unambiguous answer. Why? The new product will most likely cause some division’s indirect costs but will, in the same manner, due to the increase of that division’s production for instance, cause a reduction of indirect costs by the unit of product. It is difficult to state accurately and in advance what concrete end result will occur. Not going any further into this problem, it is clear that the initial allocation of indirect costs must be reexamined, revised and explicated again. There are no doubts that this will be made. However, by time,  

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12 Although this is a right place, we do not want to start here the examination of the projected costing compositum on the background for distinguishing the operating and strategic level of management. Operating level is charged for what is called a care for the reduction of costs, which induces an impulse for the strategic level to achieve even more efficient implementation.
new, the same or similar, changes will occur, and the allocation will have to be made again, which all leads to conclusion that we are dealing with a long-term activity that should be called, with regards to the subject of the activity, a long-term allocation of indirect costs. The long-term allocation of indirect costs is, thus, an indispensable activity that the enterprises, primarily in order to meet their need for growth, must not only perform, but also implement in order to achieve the maximally possible clarity as to the indirect costs through the undefined long-term period.

4. ONCE AGAIN ON THE REGULATION OF THE NATURAL MONOPOLY

The need to return to the issue of the regulation of the monopoly is, first of all, manifested in our objection according to which any intervention by the state authorities, independently on the nature of their implicit or explicit intention, must aim at equity as much as possible. If the administrative price is explicated in a manner stated and explained earlier, then this act cannot be considered as fair. Namely, the state authorities should ask for a detailed explanation from the natural monopoly as to how it determines a price for its product. It is not difficult at all for any enterprise, including the natural monopolist as well, to satisfy this requirement and to do such task, since it already and ex ante disposes of, because of its pressing need to manage its own growth, necessary backgrounds within which there are, or should be, the elaborations on incremental costs as well.

In our opinion, the earlier presentation of more significant determinants of the incremental costs, although it is more proper to speak of the incremental analysis, offers a quite sufficient set of information on how the incremental analysis, if it is not able to eliminate the sense of injustice, which is of psychological provenience par excellence, it can help in its strong alleviation. Namely, by its structural approach, the incremental analysis strongly ilumines and explains the costing background for determining prices, which the neoclassical microeconomic theory objectively could not offer, because of its method of analysis, and was not, indeed, supposed to do so. Once the costing background is reliably and accurately determined, it can be verified and understood simply whether the natural monopolist, by its act of publishing the price of his own product, earns or not the extra profit, that imposition that undermines the consumers’ welfare.

In order to do even more work in the direction of ensuring the maximally possible equity, the state authorities, since they have a legislative power, would have to build in the legislative regulations a segment that would charge any natural monopolist with the obligation to report and document the price at which he intends to sell his own product. Namely, if such legal provision existed, which would clearly and unambiguously specify which costs could be charged to some product, especially those indirect costs, the need for administrative price would drop off at the same time, which would lead to the shift of the longitudinally existing cause of the sense of injustice into the psychological sphere where it de facto belongs.

Consequently, in the incremental analysis, which undoubtedly reflects more superior deliberation than the implicating one in the microeconomic theory, it is possible to build an adequate regulative system that would have to be acknowledged and respected by both observed parties – by the state authorities and by the natural monopolist. The fact that a certain regulative system is applied equally to both parties, has, per definitionem, correct and soothing effects, and strongly contributes to directing the efforts of the natural monopolist’s management towards discovering the true factors that are leading to an improvement of efficiency, which is also beneficial, admittedly indirectly, for the consumers of the natural monopolist’s product. Otherwise, if the state authorities failed to act in the direction of building an adequate regulative system, one would have to count on not only the fact that the number of court proceedings would continue to grow, but also that additional costs (sacrifices) would arise, of which the direct costs of the court proceedings are only the most visible ones.
5. CONCLUSION

A decision to treat the old theme, already present for a century in the microeconomic theory, is not accidental one at all. The first reason for this decision is reflected in the fact that the problem of harmful behavior of the natural monopolist is noticed much earlier than it has been adopted and treated in the economic theory. The then tools of the economic theory, but also those still present in the neoclassical microeconomic theory, have been only indicating to and explaining the subject issue, permanently arguing how the natural monopoly is harmful for the welfare of consumers and how its effects should be regulated.

The second reason for the selection of the topic determined by the title lies in the fact that the attempt to oppose to natural monopolies primarily came from the practice of the economic exploitation of consumers. By indictments and court proceedings, on the one hand, and lobbying for expanding and implementing the anti-monopolistic legislation on the other, an active and increasingly more powerful movement for the protection of consumers would be created. In this movement one should see an insufficient engagement of the state authorities in the realization of one of the important tasks that should be performed by them as good as possible. The resulting lagging behind of the state authorities not only leads to the further dissatisfaction of the consumers, but has also left for the natural monopolists a sufficiently wide room to earn their extra-profit.

The third reason for the treatment of this theme is in the fact that the microeconomic theory of the managerial provenience has built, adopting more superior theoretic/methodological approaches, relevant concepts, the concept of incremental costs for instance, that could serve for an adequate management of the growth and development of large and complex enterprises. We showed in this paper, and I hope proved, that the concept of incremental costs, this potent achievement of the managerial economics, implemented subsequently in the incremental analysis, could be used efficiently by the state authorities in their efforts to protect their citizens/consumers by regulative measures (system) from the historically obvious economic exploitation coming and permanently threatening from the natural monopolists’ side.

The fourth and most important reason for the treatment of the theme is reflected in the fact that Croatia must join the international economic integration. If it is felt in the domestic economy that there is an exceptionally complex situation of multi-criteria decision making, of which the criteria of the protection from the economic exploitation of consumers is not the sole nor, as it seems, the most significant one, this in no wise means that, in the process of approaching the desirable economic integration, one should not be familiar with, understand and apply, the efficient possibilities for the building of legislation oriented towards a correct behavior of all those enterprises, even if they were state owned enterprises with immanent characteristics of the natural monopolist. Consequently, in limiting the harmful effects of the natural monopoly Croatian government, if it wants to be just or fair on the one hand, and if it wants to be a component part of the desirable international integration on the other, must work intensively and with dedication on adoption of such concepts as the concept of incremental costs for instance, that will allow for it the efficient achievement of all its objectives and this, as we could see from our earlier discussions is not an easy, nor the simple task at all.
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