Models of evaluation of public joint-stock property management

N M Yakupova, S Levachkova, S G Absalyamova and G Kvon

1 Institute of Management, Economics and Finance, Kazan Federal University, Kazan, Russia;
2 Department of Economic Theory, Kazan National Research Technical University named after A.N.Tupolev, Kazan, Russia.

E-mail: yakupova.nm@mail.ru

Abstract. The paper deals with the models of evaluation of performance of both the management company and the individual subsidiaries on the basis of a combination of elements and multi-parameter and target approaches. The article shows that due to the power of multi-dimensional and multi-directional indicators of financial and economic activity it is necessary to assess the degree of achievement of the objectives with the use of multivariate ordinal model as a set of indicators, ordered by growth so that the maintenance of this order on a long interval of time will ensure the effective functioning of the enterprise in the long term. It is shown that these models can be regarded as the monitoring tools of implementation of strategies and guide the justification effectiveness of implementation of management decisions.

1. Introduction

A topical issue of the current stage of economy development is forming an efficient mechanism of public stock ownership management. By 01.01.2015, the register of federal property listed 2008 legal entities (Public Corporations, Ltd., Close Corporations), 1928 holdings of stocks and shares, 79 federal public enterprises, 1557 federal public unitary enterprises, 17288 federal public organizations. The imperfection of the management mechanism led to the situation, when the enterprises with a public share sometimes serve not the interests of the state-owner, but of the top management. The state has actually dissociated itself from the process of forming an efficient owner, by relying on the automatism of market relations, which has led to the low efficiency of the mechanisms of public stock portfolios management.

Many aspects of efficient property management were researched in the works by T. Keller, T. Copeland, M. Porter, M. Scott, N Antill, G Cokins et al.

Under the current conditions, the topical task is to form the efficient mechanism of public stock ownership management. One of the tools to solve this problem within the integrated structures – holdings, in the Russian and foreign practice [6, 7] is a system of the public stock trust managing. Management companies may serve as the basic element of such a system. Management companies are commercial organizations, which have the right to manage certain property (shares), and fulfill the managerial functions on behalf of the owners on the contract repayable basis.

1 To whom any correspondence should be addressed.
Another essential aspect of forming an efficient mechanism of public stock ownership management is elaboration of the efficiency assessment tools, of performance of both the management company as a whole and individual subsidiaries.

2. Methods
The research has been based on the normative-legal acts of the Russian Federation and Tatarstan Republic, which regulate the issues of public stock management procedures; academic works of the Russian and foreign authors on the issues of public stock ownership management; results of fundamental and applied research of the modern scholars who studied the specific issues of improving the institution of public stock ownership management; reviews of periodicals on the researched issue, as well as the actual data of the researched enterprises.

During the research, general scientific methods (systemic analysis, synthesis, induction, deduction) and special economic-mathematical methods (rank correlation) were used. Each method was used in conformance with its functionality and resolution to solve the appropriate research tasks at each stage.

To construct and identify the economic-mathematical model, we studied the example of one of the largest holdings of Tatarstan Republic, with the predominant share belonging to the state. To observe privacy, notation conventions were attributed to the enterprises.

In order to build a performance evaluation model, both for the management company and the managed companies of the holding, we proceeded from the fact that firstly, the main objective of the management company is to ensure the interests of the state in making and implementing decisions on the management of these companies.

Following the research results, we propose to use management companies in the system of public stock management, by transferring into their trust managing the public holdings stocks of the companies grouped on the territorial-sector basis. The main task of the management company should be securing the public interests when making and implementing the managerial decision [7].

In our opinion, a management company should function by employing independent directors. The independent directors, as representative of the state, must not be officials of any other entity, apart from the management company; must not own, personally or via affiliated persons, shares in the managed joint-stock companies; must not obtain remuneration for consultations and other services to the managed establishments, apart from the remuneration for the activities in the management company; must have good business reputation, etc. [5].

To assess the performance efficiency of both the management company as a whole and individual subsidiaries, we propose the approach, which combines elements of multivariate and target approaches. It implies that the performance efficiency of the management company should be assessed basing on the degree to which its targets are achieved.

Traditionally the performance efficiency of enterprises is assessed basing on individual indicators of financial-economic activity. However, they provide only indirect measurement of the results and costs, and each individual indicator cannot serve as an indicator of the performance efficiency of public stock companies in general. Besides, a large amount of diverse indicators, used in assessment and management of public stock ownership in the form of holdings, requires summarizing the initial data in the form of integral indicators before using them for decision making.

Due to the multivariate and diverse character of the indicators of financial-economic activity, we propose to use the multifactor model in the form of an ordinal compression of indicators. The proposed model is based on formulating certain strategic conceptions or requirements of the enterprises’ functioning and development, which are a complex of indicators, ordered by growth rates, so that this order maintenance during a lengthy period will provide efficient functioning of the enterprise long-term.

To construct the model, we have selected the most significant indicators of the productive-economic activity of enterprises: net profit (NP); income (I); prime cost (PC); monetary funds (MF);
short-term and long-term investments (ShLI); own current assets (OCA); current assets (CA); own capital (OC); total assets (TA); noncurrent assets (NCA); payroll fund (PRF); long-term liabilities (LL); short-term liabilities (ShL). In our research, basing on the coefficient analysis, we have found the normative ordering of indicators by the growth rates, which serves as the standard for integral assessment of the level of economic efficiency of the public stock ownership management and is a normative dynamic model of the enterprise management system (DMEM):

\[
NP > I > PC > MF > ShLI > OCA > CA > OC > TA > NCA > PRF > LL > ShL
\]

(1)

The degree of closeness of the two orderings – the actual and the normative – is determined by the indicator of the structural-dynamic assessment of the enterprise efficiency (ADAE). This indicator is calculated in compliance with the modified formula of the Kendall rank coefficient correlation for two rank series [3]

\[
ADAE = 1 - \frac{\sum m_i}{n(n-1)} \cdot \frac{M(A,N)}{n(n-1)}
\]

(2)

where \( n \) – number of indicators in the dynamic normative model of the enterprise management (DMEM);

\( M(A,N) \) – sum of inversions in the actual order of indicators (A) related to DMEM (N);

\( m_i \) – number of inversions in the actual order for the indicator having the i-th rank in DMEM:

\[
m_i = \sum_{j=1}^{n} a_{ij}
\]

(3)

where \( a_{ij} \) – variable reflecting the presence or absence in the actual order of indicators of the relation “faster” between the i-th and j-th indicators, set by DMEM of the management company (i = 1,…,n; j = 1,…,n):

\[
a = \begin{cases} 
1, & \text{if } r_i > r_j \text{ at } i < j \\
0, & \text{if } r_i < r_j \text{ at } i > j \\
0, & \text{otherwise,}
\end{cases}
\]

(4)

where \( r_i \) and \( r_j \) – ranks of the i-th and j-th indicators in the actual order;

We consider ADAE to be a tool for monitoring the enterprise’ strategies implementation and a basis to determine the integral indicator of the performance efficiency, of both the management company as a whole and individual subsidiaries.

We built a management company performance evaluation model (assuming state as an owner) on the basis of transformation of regulatory and dynamic model of enterprise management system (DMEM) and structural and dynamic performance evaluation of their activities (ADAE). The modification is based on the premise that it is important for management companies to comply with all the dynamic relationships between indicators of the norm (DMEM) for all companies that it controls, whereby each of the indicators DMEM dynamic management model can be represented as a vector:

\[
\begin{bmatrix}
NP_1 \\
NP_2 \\
\vdots \\
NP_k \\
\vdots \\
NP_d
\end{bmatrix} \gg \begin{bmatrix}
I_1 \\
I_2 \\
\vdots \\
I_k \\
\vdots \\
I_d
\end{bmatrix} \gg \cdots \gg \begin{bmatrix}
ShL_1 \\
ShL_2 \\
\vdots \\
ShL_k \\
\vdots \\
ShL_d
\end{bmatrix}
\]

(5)

where NP, – net profit of the k-th enterprise; 
\( I_k \) – income of the k-th enterprise; 
k \( \in \{1;d\} \).
However, the significance of carrying the same proportions between indicators for various companies may be different for management company. This can be explained by the difference of the significance of the contribution of enterprises to the final result of the activities of the management company, which eventually will be evaluated by the state. We have defined the main factors that determine the level of significance of the contribution of each enterprise: the value added of each enterprise and the share of state ownership in the authorized capital of these enterprises. The level of significance of the contribution of each enterprise in the total activities of the management company is proposed to be measured using the indicator "degree of significance" (DS). The algorithm of calculation of this indicator for each enterprise consists of the following steps:

1. Calculation of the added value of enterprise with a public share (statistical form 1-AV).
2. Determination of the public property share in the authorized capital of enterprises within the management company system.
3. Calculation of the size of added value, created by the enterprises, which is contributed by the public holdings stock (product of indicators calculated at stages 1 and 2).
4. Calculation of the degree of significance (DS) of each enterprise is determined as the size of contribution of each enterprise into the total size of the added value contributed by the public holdings stock (ratio of the indicator calculated at stage 3 to the sum of similar indicators or all managed enterprises).
5. Taking into account the introduced indicator of the degree of significance, the methodology of calculating the structural-dynamic assessment of the performance efficiency of the management company (ADAEmc) will take the following form:

\[
\text{ADAEmc} = 1 - \frac{\sum_{i=1}^{n} \sum_{k=1}^{d} DS_i \times \sum_{j=1}^{n} a_{ij} \times DS_k}{n(n-1) \times \sum_{k=1}^{d} DS_k}
\]  

(6)

where: \( n \) – number of indicators in the dynamic normative model;
\( d \) – number of enterprises, whose holding stocks belong to the management company;
\( DS_k \) – degree of significance of the \( k \)-th enterprise;
\( a_{ij} \) – variable reflecting the presence or absence in the actual order of indicators of the relation “faster” between the \( i \)-th and \( j \)-th indicators, set by the dynamic normative model (\( i = 1, \ldots, n; \ j = 1, \ldots, n \)) for the \( k \)-th enterprise.

3. Results

The practical realization of the offered model of estimation of efficiency of functioning of enterprises with state share was made by us on the example of one of the largest holdings of the Republic of Tatarstan, the prevailing blocks of shares in which belong to the state. In order to maintain the confidentiality of this holding has a designation of JSC "Alpha". The name of the other companies and the estimated values of ADAE are presented in table 1.

In compliance with ADAE calculation technique, we have calculated the rate of changing the indicators of the public stock ownership management efficiency of the researched enterprises (Table 1). As can be seen from the results of calculations, enterprises PJSC “Beta”, PJSC “Gamma”, Public Corporation “Epsilon”, PJSC “Zeta”, PJSC “Eta” and Joint-stock Company “Iota” tend to decrease the level of the performance efficiency in the analyzed period, which testifies to the negative influence on the development of the public holding in general. The slight change in the level of the performance and management efficiency can be seen in PJSC “Delta”. The trend to increase the level of the performance and management efficiency can be seen in PJSC “Theta” and Joint-stock Company “Kappa".
Table 1

Values of ADAE indicators of the JSC “Alfa” enterprises

| NN | Enterprises with the public share | ADAE indicator | Periods |
|----|----------------------------------|----------------|---------|
|    |                                  |                | 2006    | 2007    | 2008    | 2009    | 2010    |
| 1  | PJSC “Beta”                      | 0.6667         | 0.5128  | 0.6410  | 0.564103| 0.423077|
| 2  | PJSC “Gamma”                     | 0.3846         | 0.3718  | 0.4872  | 0.6410  | 0.2179  |
| 3  | PJSC “Delta”                     | 0.3974         | 0.4487  | 0.5897  | 0.4744  | 0.4872  |
| 4  | PC “Epsilon”                      | 0.5256         | 0.6923  | 0.5897  | 0.5769  | 0.3974  |
| 5  | PJSC “Zeta”                      | 0.5128         | 0.6154  | 0.6282  | 0.6026  | 0.3846  |
| 6  | PJSC “Eta”                       | 0.7308         | 0.5769  | 0.4359  | 0.6282  | 0.6026  |
| 7  | PJSC “Theta”                     | 0.4872         | 0.5256  | 0.4615  | 0.6410  | 0.7308  |
| 8  | JSC “Iota”                       | 0.5513         | 0.2821  | 0.2949  | 0.6410  | 0.5897  |
| 9  | JSC “Kappa”                      | 0.5128         | 0.6667  | 0.5513  | 0.4615  | 0.5128  |

Graphic illustration of ADAE indicators’ dynamics is shown in the figure 1.

![Graphic illustration of ADAE indicators’ dynamics](image)

Fig. 1. ADAE indicators dynamics for each enterprise

It should be noted that the values of ADAE integral indicators are an adequate informative base to determine the level of the management efficiency of each individual enterprise, but do not allow to make a full-fledged and unambiguous assessment of the management company performance in general.

An example of calculating the integral ADAEmc in 2013 by the above methodology is given in Table 2.
Table 2
Structural-dynamic assessment of the “Alfa” joint-stock management company’s efficiency in 2013

| Enterprises | Share of the management company in the authorized capital, % | Added value (AV), million rubles | degree of significance (DS) | \( \sum d_i^k \) | \( D_S \times \sum_{i=1}^{n} d_i^k \) |
|-------------|----------------------------------------------------------|---------------------------------|-----------------------------|----------------|----------------------------------|
| 1 PJSC “Beta” | 26.64 | 203 | 0.001 | 66 | 0.12 |
| 2 PJSC “Gamma” | 25.21 | 7897 | 0.07 | 34 | 2.32 |
| 3 PJSC “Eta” | 35.00 | 95 | 0.001 | 94 | 0.07 |
| 4 PJSC “Delta” | 36.00 | 59280 | 0.73 | 76 | 55.62 |
| 5 PJSC “Theta” | 33.60 | 7796 | 0.09 | 114 | 10.24 |
| 6 JSC “Kappa” | 48.98 | 34 | 0.001 | 80 | 0.05 |
| 7 PC “Epilllon” | 100.00 | 652 | 0.02 | 62 | 1.39 |
| 8 PJSC “Zeta” | 87.21 | 2730 | 0.08 | 60 | 4.91 |
| 9 JSC “Iota” | 100.00 | 17 | 0.001 | 92 | 0.04 |
| Total | | 78771 | 1 | 156 | |

The dynamics of structural-dynamic assessment of the “Alfa” joint-stock management company’s efficiency in the analyzed period is shown in Figure 2.

![Fig. 2. Structural-dynamic assessment of the “Alfa” joint-stock management company’s efficiency](image)

It should be noted that the ADAEmc level is in general very far from the maximally possible value – 1. To make adequate managerial decisions, the management company should timely reveal the existing and emerging negative trends in the individual enterprise’s functioning.

4. Conclusion

Thus, we consider it appropriate to carry out the public stock ownership management basing on the transfer of state holdings of stock for the trust managing by management companies. Using the normative-dynamic models of enterprise’s management and models of the performance efficiency assessment of both the individual enterprises and the management company. It is possible not only to
assess the efficiency of their functioning but serve as a monitoring tool of their strategies implementation, as well as the guidelines to ground the efficiency of managerial decisions.

We can list the advantages of the proposed methods of forming DMEM and calculation integral indicators of ADAE and ADAEmc:

First, the proposed method is based on systematic, comprehensive (multidimensional) approach to the assessment of such complex phenomena as the performance of activities of holding companies; DMEM, in contrast to the existing approaches to modeling regulatory ratios measures the movement of indices, gives not a piecemeal consideration of their relations, but linkages between many of the indicators of effectiveness of management of state joint-stock properties.

Second, the distinguishing feature of DMEM (normative dynamic model of enterprise management) is that it represents the "ideal" (normative) model of functioning of the object and answers the question "how it should be". The main purpose of its construction is not so much in the reflection of reality, but in the definition of rational behavior.

Third, integral ADAE gives you the opportunity to make comparisons in space with other businesses, and in time for a series of periods;

Fourth, using DMEM can be retrospective (if you are using actual values of indicators) and planning (plan, forecast, prior) if using the expected values of indicators, analysis of changes of efficiency of enterprise activity;

Fifth, to obtain an integral evaluation a fairly simple computational algorithm is implemented on a PC;

Sixth, this methodology takes into account the characteristics of enterprises, the overall economic situation, the interests of users, by modifying the composition and arrangement of the indicators in the DMEM;

Seventh, if necessary, the methodology allows to update the model with new strategic directions, or, conversely, to exclude from the model the least informative ratios to the growth rate, the change in the number and nomenclature used in the model indicators does not require changing the computational algorithm.

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