Study of Operational Efficiency of Large-Scale Publicly Owned Companies in Russia

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Abstract: A sustainable economic growth is partly a consequence of the best possible balance between public and private sectors. Reasons for changed government efforts in economy are highly diverse and lie in the area of strategic development goals. A review of evidence-based studies shows that public ownership in a capital of companies influences some characteristics of their operational activities. The specific components, elaborated in the paper, contribute to this. Based on data provided in financial statements of leading publicly owned companies in Russia, the research aims at identification of causal relationships in composition and ownership structure of companies, as well as their impact on economic ratios. Researchers verified the assumptions, put forward in this respect, using the correlation-regression analysis. The basis for the operational efficiency comparison included the return on equity (ROE), return on assets (ROA), return on sales (ROS), equity ratio and current liquidity ratio. Findings show that there are sufficient arguments in favour of the assumption that publicly owned companies are consistently less efficient against the private ones. Obtained data made it possible to conclude that a change in the state's share in the capital of large-scale companies in Russia influences the return on assets and return on equity only. Other ratios under consideration express poor correlations. The heterogenic impact on adjacent ratios of operational efficiency prevents from concluding in a rigorous manner that publicly owned companies are a priori less efficient. One needs to keep in mind sector affiliation and a capital concentration ratio.

Keywords: operational efficiency, publicly owned companies, private companies, capital concentration, economic growth, sustainable development.

1. INTRODUCTION

Efficiency of publicly owned and private companies has not become less of an issue in both the developed and developing countries. In this discussion, there is a main problem of a search for the best possible ratio between incorporation forms in economy [30]. Steady trends towards a growth of the public sector in Russian economy are a clear example saying that the issue is pressing. At the same time, this sector has historically concentrated production facilities and capital resources.

The transition to market economy in the 1990-ies had been marked by a declined government share (to 38%) in GDP by 2006 [51]. However, later, this trend did not develop and a balance between sectors started recovering. By 2016, the share of the public sector in Russia's GDP had reached 46% [39]. These data find their confirmation in ownership structure statistics. The national government is the largest shareholder in the Russian market. The share of publicly owned companies that disclose their ownership structure, in the

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Moscow Exchange index, is at least 45% [37]. 28 of 100 companies, ranking by RA Expert in 2017, are the publicly owned companies ones (percentage holding is 25%) [55]. 5.5% of all the employees in the Russian economy works for them in 2017. The share of proceeds of the top 100 public sector companies was 50% of their total revenue in 2017. According to RIA- rating in 2018, the publicly owned companies account for more than 48% of top 100 largest companies capitalization [56]. It indicates that the bunching of publicly owned companies companies is significantly high. We have recently observed further strengthening of a role of the national government, not only as a participant in economic affairs, but also as their regulator.

Efficiency of the public sector is a key issue in definition and justification of its required existence. The component analysis might help to make aspects of this issue clearer. There are convincing evidence-based data saying that overall efficiency of factors of production at Russian publicly owned companies is much lower than in the private sector [52]. Labour productivity at publicly owned companies is more than 30% below the national average rate due to the fact that crucial decisions often serve political purposes instead of commercial ones. Hence, efficiency criteria in state's ownership management are not formal ratios (such as profitability, scope of tax deductions to a budget), but a quality of provided public goods and other institutional ratios [44]. However, followers of this approach exclusively view publicly owned companies one-sidedly, as an element of infrastructure support to the social and economic life.

In the framework of the systematic view of the issue, researchers focus on an analysis of comparative efficiency of publicly owned companies as isolated agents. Unsatisfactory management of public assets and an excessive size of the public sector indeed pose a serious risk to the economic growth [44]. In the countries where the public sector's share is significant, they always serve for alignment of a business cycle and employment maintenance [1], often to the detriment of economic interests. The specifics available in the shift of interests manifests itself in the balance between the public and private capital in an ownership structure of companies. It makes sense in the discussion that this should cause a change in their performance, expressed in objective ratios. Therefore, our research aims at identification of causal correlations in a composition and ownership structure of companies, their impact on economic ratios. The conclusions that we hope to make would allow us being closer to a search for the best possible ratio between public and private sectors in economy, which make it possible to achieve sustainable development.

2. REVIEW OF LITERATURE

Boyett [6] believes that the process of *public entrepreneurship* appeared as a response to a transitional state in an economic system, as a new form of entrepreneurship in terms of an unstable external environment in response to uncertainty. There are various formal procedures, with which it is possible to calculate a share of the public sector in economy, its efficiency and various expert opinions, often contradictory.

In the research, publicly owned companies refer to those companies where for various reasons, a national government exercises control being also a dominating owner. An ownership structure and management models might differ [46]. In any case, controlled parameters of companies' activities measure their financial standing, main characteristics of which affect competitiveness of an enterprise in a sector and in a market as a whole [13, 26]. They also affect a potential and opportunities of business cooperation with other companies [11, 19] and involvement of stakeholders [8, 17]. Therefore, the analysis of corporate activities at runtime aims to show the extent, to which companies have *properly* consumed available resources [34].

The conventional view is that publicly owned companies are less efficient than private ones. Some researchers explain this by the fact that, under market conditions, publicly owned

companies are usually established as a compensation for market failures [43]. If market failures are treated by joint efforts as PPP projects, the return on investment is maximized when the private capital prevails [3]. Conceptual understanding of this phenomenon lies in the theory of public administration [54]. At the same time, in terms of institutional economy, a national government is unable to provide control over management in an efficient manner due to high information asymmetry (principal-agent theory). It is usual that for the companies with a high state's share, external mechanisms of management monitoring do not actually perform their disciplining function [41].

Borcherding, Pommerehne and Schneider [5] review findings from 50 evidence-based studies, in 40 of which authors concluded that private entrepreneurship had turned out to be much more efficient than public one. In 7 other cases, it was impossible to identify obvious advantages of one or another incorporation forms. In the similar comparison of functioning of private and publicly owned companies, Boardman and Vining [4] reviewed the results obtained earlier and compared them with own calculations. Their main conclusion is as follows: when considering a wide range of factors that influence transaction efficiency, large-scale production companies with joint ownership and similar companies that are 100%-owned by a national government are significantly less efficient against similar private companies. Muller [31] comes to similar conclusions, summarising findings from 71 studies. In 56 cases, publicly owned enterprises were less efficient.

Specifics of publicly owned companies makes specific a number of components that affect operational and strategic efficiency [45, 49, 50]. They include politics-driven resource allocation, weak managerial mechanisms and limited managerial autonomy, poor coordination of activities, risk-evasive behaviour of managers, poor market discipline, strong social control, poor employment motivation, bureaucrats, lack of flexibility, etc. In general, the terms, in which publicly owned enterprises operate, are *soft budget constraint* conditions with no active incentives for development.

At private companies with an insignificant state's share, which has not yet become controlling, mentioned components act to a lesser extent. Benefits from such cooperation come to the fore. There are reduction in a cost of investment attraction [9, 16, 29] and protectionism in commodity and resource markets [27]. Private companies consider the presence of the national government as a factor to increase competitiveness in terms of growing globalization in economy.

Note that even the presence of a prevailing state's share in a company's capital structure is not in itself a prerequisite of inefficiency. However, a circle of the papers that support this idea is narrow. It is noteworthy that such papers only cover a number of infrastructural sectors (4 out of the 5 cases, electric power production and distribution). There, for a number of reasons, competition is poor [39]. When analysing a wider market, there is lower efficiency of publicly owned enterprises against private enterprises operating in the same sector. In many cases, production costs at publicly owned enterprises are higher. A desire of managers at publicly owned enterprises to increase their budget/organizational size (Niskanen model [33]) and bureaucrats largely explain inefficiency at publicly owned enterprises.

Findings from evidence-based research on an impact of public ownership on efficiency of Russian companies are not categorical. Kuznetsov and Murav'yev think that the higher a proportion of outsiders is, the higher processing efficiency of companies is, measured as labour productivity. On the contrary, ownership of insiders and the national government causes lower productivity [25]. Kapelyushnikov [20] shows that enterprises with a dominating state's share in the authorized capital have the worst financial ratios. The Higher School of Economics' review [53] includes offbeat findings in terms of the state's influence on efficiency of Russian companies. Authors of the review focused on the selective influence of the state on individual enterprises in conjunction with their modernization.

Ruzhanskaya and Krutikov [40] believe that, as an owner, the state does not demonstrate efficient management of companies. They have nevertheless found a positive influence of the state's share in the capital on productivity, investment attractiveness and profitability ratios. At the same time, the state's share in ownership is not statistically related to the companies' growth. In absence of the obvious economic growth, the highly concentrated ownership of Russian companies has became at the same time a condition and consequence of the developed integration processes in the corporate segment [2, 35]. Findings from various evidence-based research of Russian production enterprises [24, 42] support such a conclusion [24, 42].

In the completed review, we emphasized that efficiency of publicly owned and private companies is a subject of an extensive discussion. There are sufficient arguments in favour of the assumption that publicly owned companies are comparatively less efficient than the private ones. The question has remained open, to what extent this influence is apparent, whether it is of a selective nature by sector affiliation and concentration level of state ownership in the capital. In the narration below, we will try to make these points clearer.

3. MATERIALS AND METHODS

One might approach company's efficiency in terms of various aspects [18, 32]. Experts usually distinguish operational and strategic efficiency [38]. This research focuses operational efficiency of companies exactly. Its important characteristics include return on equity (ROE), return on assets (ROA), return on sales (ROS), equity ratio and current liquidity ratio.

Research source data included data from financial statements of companies as reported by the *Interfax Centre for Corporate Information Disclosure* [10]. Recent 7 years was a period for the analysis (2012-2018).

All the publicly owned companies for the research were grouped by the *International Monetary Fund (IMF)* classification [14]: (1) 100%-publicly owned. The group includes the entities that are 100-percent ownership of the national government (e.g. *Russian Railways (RR)*, *United Shipbuilding Corporation (USC)*), (2) joint companies. The group includes the companies jointly established by governmental and non-governmental entities, as well as the companies established by governmental entities and non-resident entities, in which a share of a non-resident entity does not exceed 10%, (3) private companies with participation of the state. For the research, we selected 12 companies from various sectors of economy. See their general characteristics in Table 1. Companies represent different branches of economy, their gross output share is extremely large. According to SPARK-Interfax, over 2018, these 12 companies account for 16.5 trillion rubles of revenue, which is about more than 12% of the turnover of all the Russian companies. Undoubtedly, the limited sample has its disadvantages. Meanwhile we rely on the sample importance in terms of the scale and share of participation in economy.

Table 1. Description of the companies that have been selected for the research

Name	Sector	Public ownership, %
RR	Transportation	100.00
USC	Shipbuilding	100.00
Gazprom	Oil and gas production	50.23
Rosneft	Oil and gas production	50.00
UAC	Aircraft industry	96.95
Transneft	Transportation of oil and oil products	20.86
Inter RAO	Electric power sector	44.30
RusHydro	Electric power sector	75.40
Rosseti	Power sector	88.89
Rostelecom	Telecommunications	54.90
Tatneft	Oil and oil product production	34.00
Alrosa	Diamond mining	66.00

To study specifics of operational efficiency at publicly owned companies in Russia, we put forward a number of assumptions. Assumption testing followed methods of the correlation-regression analysis. Correlating makes it possible to estimate a strength of a component influence on the process under consideration. The linear correlation coefficient takes values from *-1* to *+1*. Correlations between attributes might be poor and strong (close). Their criteria are estimated with the *Cheddok* scale [21].

R^2 sample determination coefficient is a measure of an overall quality of the regression equation (correspondence of the made equation with statistical data). By definition, R^2 takes values in the range [0;1]. The closer R^2 is to *one*, the better the regression approximates empirical data. Statistical significance of individual regression ratios is checked with *Student's t*-test, and the equation as a whole – using *Fisher's F*-test.

4. RESULTS AND DISCUSSION

4.1. Overall analysis of economic standing of companies

Based on financial statements, we calculated operational efficiency ratios for each company under consideration (Annex A). See Table 2 for summarized estimates for 2018. The current state of publicly owned companies provides the first illustration of their operating performance at the moment that is regarded further over the preceding period. Cumulative data provides with comparing, first of all, the differences in branch specific nature; secondly, study their heterogeneity. The demonstrative example is labour productivity, which is significantly diversified. The explanation of this consists in performing a range of executive functions by publicly owned companies as United Shipbuilding Corporation (USC).

Table 2. Operational efficiency ratios for sample companies in 2018

Company/ Ratio	ROA	ROE	ROS	Equity ratio	Current liquidity ratio	Labour productivity, thousand RUB/ human	Conventional operational efficiency
RR	0.30	0.42	7.83	0.70	0.47	2391	Low
USC	0.04	0.12	-3.12	0.31	10.33	126265	Low
Gazprom	6.8	9.88	18.02	0.66	1.96	11113	High
Rosneft	3.94	24.83	5.08	0.16	1.43	22624	Low
UAC	-6.63	-9.81	-0.72	0.66	1.76	4375	Low
Transneft	0.98	5.46	5.75	0.18	0.79	8147	Low
Inter RAO	4.4	4.92	1.64	0.86	2.14	1113	High
RusHydro	3.64	4.38	40.52	0.82	7.63	2336	High
Rosseti	-2.93	-3.2	5.83	0.92	36.22	125	Low
Rostelecom	0.92	2.11	3.99	0.41	0.58	2372	Low
Tatneft	24.81	31.33	31.49	0.78	3.14	37551	High
Alrosa	5.29	8.15	20.13	0.63	1.58	6280	High

Let us consider in more detail a standing of each company at runtime in 2012-2018.

At *RR*, ROA and ROE were low in the period under consideration. Thus, in 2017, the sector-specific average return on assets at rail transport enterprises engaged in intercity and international passenger traffic was 1.1% [22], whereas at *RR*, it was 0.30%. At the same time, the return on sales was comparable to the sector-specific average of 8.3% (at *RR*, it was 8.25%). In 2012-2018, at *RR*, dynamics of profitability ratios was unstable. By 2014, there had been a clear decline in values. A recovery in values to values of 2012 had only been recorded by 2017-2018. In 2012-2018, at *RR*, the equity ratio was higher than the statutory value (0.5%), with an obvious decline of this ratio from 0.8% to 0.7%. The current liquidity ratio was significantly lower than the statutory value (1.5-2.5) and had the steady decreasing dynamics over the period under consideration. It is possible to conclude that *RR* has relatively low operational efficiency.

Operational efficiency ratios of another publicly owned company, *USC*, assume that its profitability ratios are also low in spite of the positive dynamics in 2012-2015. As reported by the *Federal Tax Service of Russia* (FTS), in 2017, the return on assets in production of other vehicles and equipment was 1.9% [22]. At *USC*, this ratio was at the level of 0.03%. The average sector-specific return on sales was 12.9%, while at *USC*, the value was negative (- 3.78%). At the same time, in 2018, the six-fold excess of the current liquidity ratio over the statutory value points out to an excess and inefficient use of funds.

In 2012-2018 at *Gazprom*, the return on assets and return on equity had a tendency towards an increase, while the return on sales significantly declined. According to the *Federal Tax Service*, in the sector of crude oil and gas production, in 2017, the average return on assets was 11.1% [22]. At *Gazprom*, this ratio was more than 2 times higher (25.2%). The company's equity ratio is relatively high (share of equity capital is at the level of 66%), but there is a tendency towards its decline. The current liquidity ratio fully complies with statutory values. Thus, at *Gazprom*, operational efficiency ratios are quite high with the clear positive dynamics.

Next, let us analyse *Rosneft* activities. The state's share in the company's capital was over 50%. Calculated data assume the negative changes available in profitability ratios that are significantly lower than sector-specific average values. There are also low levels of the equity ratio. In 2018, the share of equity was only 16% of total liabilities. The current liquidity ratio follows this tendency being below the statutory ratio. It is obvious that at *Rosneft*, operational efficiency is relatively low.

With the state's share of over 96%, *United Aircraft Corporation (UAC)* was not distinctive in operational efficiency. As dynamics for 2012-2018 assumes (Annex A), operational efficiency was low. Negative profitability values were observed almost over the entire period under consideration.

Transneft was another company in the sample. In 2018, the company's return on assets, as well as return on equity sharply dropped, ROA was 0.98%, and ROE was 5.46%. At the same time, as early as in 2017, values were 5.40% and 31.53%, respectively. Sector-specific average ROA in the pipeline transportation sector is about 5.5% [22], while ROS is 13.5% [22]. In 2018, the equity ratio was 18%. The current liquidity ratio also was below the normal level.

At *Inter RAO*, the effective state's share is 44.3%. Its operational efficiency ratios show the positive dynamics, while the capital structure is highly sustainable. The current liquidity ratio was also within the standard statutory range. In 2012-2013, over the short period of time, profitability ratios had been negative. However, by 2016, they had already increased. The average return on sales in generation, transmission and distribution of electric power is at the level of 11.1% [22], whereas at *Inter RAO*, in 2017, this type of profitability was negative (- 0.19%). The return on assets was slightly lower than the sector-specific average value, 3.95% versus 4.8% in 2017. In general, *Inter RAO* typically has relatively high operational efficiency.

RusHydro is another representative of the electric power sector. Minor fluctuations in ROE and ROS in 2012-2018 (Annex A) confirm sustainability and rigidity of a company's business model. At the same time, values of profitability ratios are close to sector-specific average values of ROA and much better in terms of ROS. In 2018, the equity share in the capital structure was 82% and the current liquidity ratio was 5 times higher than the standard statutory rate.

Rosseti stands out from this list to some extent, which also operates in the electric power sector. Its main activity includes the long distance electric power transmission and management of the energy system. In the structure of the shared capital at *Rosseti*, the state's share is 88.89%. The company has numerous subsidiaries, which, due to the high state's share in the parent company, also have high dependence on government entities. Operational efficiency of the company was low in terms of profitability ratios. At the same time, in 2018,

the equity share was 92%, the current liquidity ratio was more than 24 times more than the statutory value, which points out to excessive working assets.

Rostelecom is the largest telecoms provider in Russia. In 2012-2018, its return on assets and profitability ratio (Annex A) had negative dynamics being below the required threshold. Thus, in 2017, in the information and communication sector, sector-specific average ROA and ROS were 9.1% and 14.2%, respectively [22], whereas, in 2017, *Rostelecom's* ROA was at the level of 4.64%, ROS was at the level of 4.37%. The equity ratio was also lower than the recommended rate (41% of equity).

Tatneft is another representative of publicly owned business. The state's share at this company is 34%. The analysis completed showed that the company's operational efficiency is quite high as evidenced by the positive dynamics of profitability ratios (ROA, ROE and ROS) (all ratios increased over the period and their values were higher than sector-specific average values). The equity ratio was 0.78 (against the statutory ratio of 0.50). In the period under review, the current liquidity ratio was also higher than the statutory value.

Alrosa was a final company in the research sample. As one can see from calculated data (Annex A), all profitability ratios in 2012-2018 had tendencies towards a decline and their values were below average sector-specific values. In the mining industry, average ROA is about 11.0% [22]. However, in 2017, the company achieved the profitability of almost 2 times below than this value is (4.18%). At the same time, average sector-specific ROS is 25.9%. In 2012-2016, *Alrosa* exceeded the average sector-specific ROS, but in 2017-2018, it was significantly inferior in this aspect. The current liquidity ratio and equity ratio are in the statutory range. The analysis suggests that the company has relatively high operational efficiency.

For the research, the dynamics of industry average of the Russian companies operational efficiency is important to be noted. The Federal Tax Service of Russia regularly monitors average return on average assets (ROA) and return on sales (ROS). In 2018, ROA for HC and gas production totaled 35.3; for railway sector, it totaled 7.6; for pipeline industry, it totaled 12.2; for electrical power distribution and transmission, it totaled 12.5; for information and communication service, it totaled 14.6; for mining operations if totaled 33.6; for other transport and equipment production it totaled 12.0. The average of ROS for Russia in 2018 totaled: for HC and gas production totaled 20.4; for railway sector it totaled 20.2; for pipeline industry it totaled 4.0; for electrical power distribution and transmission it totaled 5.0; for information and communication service it totaled 7.4; for mining operations if totaled 17.3; for other transport and equipment production it totaled 2.0. Although, the industry average of operational efficiency resulted from both private and public companies. Therefore, the comparison of the obtained values of efficiency with average ones will be incorrect and inconsistent. The research goal is to determine of efficiency dependency based on changing of government share in company's assets.

Thus, observed heterogeneity in operational efficiency among publicly owned companies in the sample leads us to a need in a research of a component influence.

4.2. Component influence on operational efficiency

In order to study specifics of operational efficiency at publicly owned companies in Russia, we put forward a number of assumptions. We tested assumptions using methods of the correlation-regression analysis. The study conceptual framework involves identification of a relationship between a value of the state's share in the authorized capital and a value of each operational efficiency ratio (profitability ratio, return on assets, and return on sales, equity ratio, and current liquidity ratio).

Numerous evidence-based studies and the findings obtained by us from the analysis of a financial standing of a number of publicly owned Russian companies make it possible to put forward the idea that an ownership structure has an essential impact on operational efficiency of these companies. This assumption became the background of the research, which

presumes the correlation between operational efficiency values and the government share in company's assets. This idea found its expression in five independent assumptions as follows. Meanwhile, this correlation must be inexplicit, as operational efficiency is influenced by many other factors, which are not included in evaluation further. Besides, the dependency of operational efficiency on government share should be observed not on the whole sample, but on its part, since differential peculiarities of public administration are common for not all managers, mechanism of business operations takes place to be objectively, socio-economic conditions of work are heterogenic, etc.

Hypothesis 1: *ROA depends on the state's share in the company's capital. The higher the state's share is, the lower ROA is.*

The calculations completed show that the pair-correlation coefficient between the state's share in the company's ownership and return on assets was -0.57151. In this case, the correlation is inverse and significant against the parameters under consideration.

The linear regression equation looks like $y = -0.162 x + 14.038$. The regression coefficient ($b = -0.162$) shows that the change in the resulting ratio is elastic. In this case, with the 1-point growth, ROA has an average decline of -0.162. The free constant ($a = 14.038$) formally shows an expected initial rate of the resulting ratio with x (state's share) = 0. To check whether the linear regression equation is significant, determination coefficient R^2 is used and its value is 0.327.

Next, there is a calculation of the actual value of F-test (4.85). The tabular value of the criterion with degrees of freedom $k_1=1$ and $k_2=10$, $F_{table} = 4.96$. As far as the actual value of $F > F_{tabl}$, the determination coefficient is statistically significant (estimated value of regression equation is statistically reliable).

The assumption does not lack support, ROA declines with the growth in the state's share in the company's capital. Although, cause-effect relationship is not well-defined. The influence of other factors that are not taken into account in the framework of this regression model is not excluded.

Hypothesis 2: *ROE depends on the state's share in the company's capital. The higher the state's share is, the lower ROE is.*

The correlation coefficient between ROE and the state's share in the company's capital was -0.64310. This suggests a measurable correlation between attributes.

The linear regression equation looks like $y = -0.2715 x + 24.231$. The regression coefficient ($b = -0.271$) shows that the change in the resulting ratio is elastic. In this case, with the 1-point growth in the state's share, ROE declines on average by -0.271. With x (state's share) = 0, initial expected ROE is 24.231. Determination coefficient R^2 is 0.4136.

The actual value of F-test is 7.05. The tabular value of the criterion with degrees of freedom $k_1=1$ and $k_2=10$, $F_{tabl} = 4.96$. As far as the actual value of $F > F_{tabl}$, the determination coefficient is statistically significant (estimated value of regression equation is statistically reliable).

The assumption does not lack support, ROA declines with the growth in the state's share in the company's capital. As in case of Hypothesis 1, cause-effect relationship of observed values is questionable. The correlation can be confirmed with expanding of sample and the scopes of observations.

Hypothesis 3: *ROS depends on the state's share in the company's capital; the higher the state's share is, the lower ROS is.*

The pair correlation coefficient between the state's share in the company's capital and the return on sales was -0,23513. According to the typology, the correlation between attributes is poor.

The linear regression equation looks like $y = -0.117 x + 19.001$. The regression coefficient ($b = -0.117$) shows that the change in the resulting ratio is elastic. In this case, with the 1-point growth in the state's share in the capital, ROS declines on average by -0.117. The free constant $a = 19.001$ while x (state's share) is 0. Determination coefficient R^2 is 0.0553.

Next, there is a calculation of the actual value of F-test (0,59). A tabular value of the criterion with degrees of freedom $k_1=1$ and $k_2=10$, $F_{table} = 4.96$. As far as the actual value of $F > F_{tabl}$, the determination coefficient is not statistically significant (estimated value of regression equation is not statistically reliable).

The assumption lacks support. ROS does not decline with a growth of the state's share in the company's capital.

Hypothesis 4: *the equity ratio depends on the state's share in the company's capital. The higher the state's share is, the lower the ER is.*

The correlation between the equity ratio and the state's share was 0.26209 saying of the poor direct correlation.

The linear regression equation is $y = 0.00255 x + 0.425$. The regression coefficient ($b = 0.00255$) shows that the change in the resulting ratio is elastic. In this case, with the 1-point growth of the state's share in the capital, the equity ratio has an average increase of 0.00255. If x (state's share) = 0, an initial expected rate of the equity ratio is 0.425. Determination coefficient R^2 is 0.0687. The actual value of F-test is 0.704. As far as the actual value of $F < F_{tabl}$, the determination coefficient is not statistically significant (estimated value of regression equation is not statistically reliable).

The assumption lacks support. The equity ratio does not decline with an increase in the state's share in the company's capital.

Hypothesis 5: *the current liquidity ratio depends on the state's share in a company's capital. The higher the state's share is, the lower the current liquidity ratio is.*

The correlation between the equity ratio and the state's share in the company's equity was 0.38002. Its level is an evidence of a direct moderate correlation in place.

The linear regression equation is $y = 0.142 x - 3.565$. The regression coefficient ($b = 0.142$) shows that the change of the resulting ratio is elastic. In this case, with a 1-point growth of the state's share, the current liquidity ratio has an average increase of 0.142. At the same time, the free constant takes a negative value ($a = -3.565$) when x (state's share) is 0. Determination coefficient R^2 is 0.1444.

Next, there is a calculation of an actual value of F-criterion (1.688). As the actual value of $F < F_{tab}$, the determination coefficient is not statistically significant (found estimate of regression equation is not statistically reliable).

The assumption lacks support. The current liquidity ratio does not decline as the share of public ownership in a company's capital grows.

Thus, the component analysis of operational efficiency at publicly owned companies in Russia has showed that only return on assets and profitability ratio are dependent on the ownership structure. With the 1%-increase in public ownership, the ratios have a decline by 0.162% and 0.271% respectively. The other operational efficiency ratios that we have considered (return on sales, equity ratio and current liquidity ratio) do not depend on the share of public ownership.

5. CONCLUSION

The public sector is a key player in economy of Russia. Over the past few years, a number of publicly owned companies has had a steady growth, while a share of the public sector in Russia's GDP has increased up to 46%. The completed component analysis based on correlation-regression methods shows that the size of the publicly owned share has an overall

negative influence on operational efficiency ratios. This primarily refers to return on assets and return on equity. Dynamics of the other efficiency ratios considered (return on sales, equity ratio and current liquidity ratio) has poor interconnections with the share of national government in a capital of a company. Vague results of the research prevent us from concluding in a rigorous manner that publicly run companies are a priori less efficient. However, ceteris paribus, as compared to the private sector, it is more difficult for the national government to be an efficient owner.

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ANNEX A

Table. Operational efficiency ratios at runtime at sample publicly owned companies in 2012-2018

Ratio	Research period							$\bar{S}(x)$	$Var(x)$
	2012	2013	2014	2015	2016	2017	2018		
Russian Railways (RR)									
ROA	0.33	0.02	-0.93	0.01	0.12	0.30	0.30	0.02	0.17
ROE	0.41	0.02	-1.25	0.01	0.17	0.41	0.42	0.03	0.30
ROS	4.94	4.27	4.17	5.53	7.43	8.25	7.83	6.06	2.59
ER	0.80	0.77	0.73	0.70	0.74	0.72	0.70	0.74	0.00
CR	0.65	0.67	0.74	0.76	0.57	0.56	0.47	0.63	0.01
United Shipbuilding Corporation (USC)									
ROA	-0.37	-0.19	0.19	0.56	0.12	0.03	0.04	0.05	0.09
ROE	-0.46	-0.28	0.34	1.29	0.34	0.10	0.12	0.21	0.32
ROS	-275.72	0.12	-42.61	-6.49	-40.49	-3.78	-3.12	-53.16	9960.67
ER	0.76	0.59	0.52	0.38	0.35	0.36	0.31	0.47	0.03
CR	1.88	2.58	4.44	10.55	6.15	5.65	10.33	5.94	11.78
Gazprom									
ROA	5.69	6.01	1.64	3.20	3.07	2.66	6.80	4.15	3.91
ROE	7.21	7.73	2.16	4.38	4.04	3.51	9.88	5.56	7.59
ROS	27.14	24.45	23.09	18.73	8.46	2.33	18.02	17.46	81.02
ER	0.79	0.77	0.74	0.72	0.80	0.72	0.66	0.74	0.00
CR	2.21	2.41	2.28	2.35	2.02	1.63	1.96	2.12	0.07
Rossneft									
ROA	13.06	3.65	7.85	2.78	1.02	1.32	3.94	4.80	18.35
ROE	25.34	10.34	36.54	17.16	6.69	8.64	24.83	18.51	119.56
ROS	9.40	5.61	3.62	3.05	0.35	3.25	5.08	4.34	7.84
ER	0.50	0.28	0.17	0.15	0.15	0.15	0.16	0.22	0.02
CR	4.36	1.24	1.26	2.08	1.33	1.31	1.43	1.86	1.30
United Aircraft Corporation (UAC)									
ROA	-0.03	0.26	2.75	-2.49	-0.70	0.04	-6.63	-0.97	8.61
ROE	-0.04	0.36	4.11	-3.59	-0.96	0.06	-9.81	-1.41	18.86
ROS	-2.64	-7.37	-3.06	-3.32	-0.47	-0.62	-0.72	-2.60	5.91
ER	0.74	0.69	0.65	0.73	0.73	0.69	0.66	0.70	0.00
CR	6.97	11.84	2.80	3.42	2.82	2.52	1.76	4.59	13.04
Transneft									
ROA	1.17	1.22	1.14	1.07	2.58	5.40	0.98	1.94	2.64
ROE	7.56	7.61	7.68	7.98	17.55	31.53	5.46	12.20	88.09
ROS	2.68	1.71	1.71	2.76	4.40	5.78	5.75	3.54	3.11
ER	0.16	0.16	0.14	0.13	0.16	0.18	0.18	0.16	0.00
CR	0.97	0.26	0.19	1.28	0.83	0.87	0.79	0.74	0.15
Inter RAO									
ROA	-3.58	-13.58	0.12	1.05	24.60	3.95	4.40	2.42	132.90
ROE	-4.11	-15.03	0.13	1.12	25.51	4.10	4.92	2.38	149.38
ROS	-2.68	-4.70	-1.43	6.39	0.60	-0.19	1.64	-0.05	12.54
ER	0.86	0.95	0.94	0.94	0.98	0.94	0.86	0.92	0.00
CR	1.57	3.29	2.56	4.49	9.99	4.49	2.14	4.08	8.04
RusHydro									
ROA	2.08	4.50	3.68	3.43	4.65	3.82	3.64	3.69	0.71
ROE	4.44	5.80	4.58	4.11	5.54	4.53	4.38	4.77	0.41
ROS	40.57	43.49	37.17	40.27	37.85	42.08	40.52	40.28	4.88
ER	0.79	0.76	0.84	0.83	0.85	0.84	0.82	0.82	0.00
CR	3.04	3.67	6.11	5.49	7.40	3.80	7.63	5.31	3.42
Rosseti									
ROA	-2.11	-141.67	-30.77	-10.78	72.97	-3.24	-2.93	-16.93	4079.08
ROE	-2.36	-150.73	-31.01	-12.12	82.46	-3.53	-3.20	-17.21	4763.67
ROS	44.41	46.59	38.12	33.34	5.37	5.49	5.83	25.59	369.26
ER	0.87	1.00	0.99	0.82	0.92	0.92	0.92	0.92	0.00
CR	1.91	18.56	10.99	5.11	9.17	17.47	36.22	14.20	130.64
Rostelecom									
ROA	6.21	6.43	5.44	3.87	1.78	1.48	0.92	3.73	5.52
ROE	11.45	13.28	11.80	7.99	5.38	4.64	2.11	8.09	17.83

Ratio	Research period							$\overline{S}(x)$	$Var(x)$
	2012	2013	2014	2015	2016	2017	2018		
ROS	17.87	16.32	14.42	11.63	4.30	4.37	3.99	10.41	37.20
ER	0.52	0.44	0.48	0.49	0.19	0.46	0.41	0.43	0.01
CR	0.62	1.34	0.61	0.48	0.49	0.66	0.58	0.68	0.09
Tatneft									
ROA	13.80	12.30	14.78	13.98	15.34	13.52	24.81	15.50	17.76
ROE	18.86	15.96	18.10	16.50	17.92	16.26	31.33	19.28	29.42
ROS	29.61	26.89	23.37	25.80	18.76	21.48	31.49	25.34	20.12
ER	0.75	0.79	0.84	0.85	0.86	0.81	0.78	0.81	0.00
CR	5.63	4.50	4.02	3.51	3.31	3.75	3.14	3.98	0.74
Alrosa									
ROA	11.65	8.68	5.09	3.84	23.24	2.73	5.29	8.65	50.67
ROE	19.96	15.39	9.67	7.63	40.18	4.18	8.15	15.02	150.92
ROS	40.05	38.46	42.64	45.67	19.64	14.76	20.13	31.62	166.08
ER	0.56	0.56	0.49	0.51	0.64	0.67	0.63	0.58	0.00
CR	2.26	1.50	3.64	2.45	4.26	2.03	1.58	2.53	1.09

Note: *ER* is equity ratio, *CR* is current ratio, $\overline{S}(x)$ is time average value; $Var(x)$ is dispersion.