DIRECTIONS FOR THE EFFECTIVE USE OF DEBT FUNDS IN THE FINANCIAL ACTIVITIES OF ELECTRIC POWER NETWORK ENTERPRISES

O.U. Mavlonov
PhD, independent researcher Regional Electric Networks JSC
ORCID:0009-0009-7463-3795
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Abstract. *This article examines the effective use of debt in the financial activities of electric power grid enterprises using the example of JSC "Regional Electric Grids". The study evaluates the impact of debt burden, leverage, liquidity and profitability indicators on the financial stability of the enterprise using econometric methods. In particular, the relationship between EBIT, ROE and ROA indicators and debt was analyzed using regression and VAR models. The results showed that an increase in the debt share negatively affects profitability indicators, and maintaining debt at an optimal level is an important factor in ensuring financial stability. At the end of the study, conclusions were drawn on improving debt management in electric power grid enterprises, effective tariff policy, and the gradual introduction of market mechanisms.*
Keywords: *electric grid company, financial stability, debt, leverage, profitability, ROE, ROA*

Introduction. The financial stability of each enterprise is of great importance for its long-term and sustainable development. Although the financial and economic activities of state-owned enterprises differ from those of private sector enterprises, their main goal is to achieve sustainable growth. Ensuring the financial stability of state-owned enterprises directly affects the economic situation of the country. The financial crises of such state-owned enterprises can require significant budgetary funds from the state budget. It can also negatively affect the standard of living of the population and the activities of production enterprises through service and supply disruptions. Unsatisfied financial stability of power grid enterprises can lead to an increase in electricity prices and can cause non-monetary factors to increase prices in the economy. For this reason, the development of directions for ensuring the financial stability of power grid enterprises is becoming increasingly important in achieving the set goals of the country's economy.

Literature review. The OECD (2015) report highlights that the capital structure of state-owned enterprises is often formed in a manner that is constrained by market mechanisms. As a result, high debt burdens and low profitability negatively affect financial stability. The OECD justifies the need to form an optimal ratio between capital and debt in state-owned enterprises. According to the "soft budget constraint" theory developed by János Kornai (1986), state-owned enterprises often operate without the risk of bankruptcy, as they are supported by the government. This leads to excessive debt accumulation and a decrease in financial discipline.

The International Monetary Fund (2020) studies assess the debt of state-owned enterprises as a source of hidden fiscal risks. The report notes that debt under state guarantees can threaten the sustainability of the state budget.

According to the World Bank (2014) report, the efficiency of capital use in state-owned enterprises largely depends on the quality of corporate governance. SOEs with a high level of transparency and accountability have a high return on capital.

The classical capital structure theory of Modigliani Franco and Merton Miller (1958) discusses the impact of the ratio of debt to equity on the value of the enterprise. Although this theory is based on perfect market conditions, it also serves as an important theoretical framework for SOEs. According to the Asian Development Bank (2019) study, if leverage (debt level) is high in state-owned enterprises, financial stability decreases, but when properly managed, debt can stimulate investment growth.

The International Energy Agency (2021) report notes that debt instruments are widely used in state-owned energy enterprises due to the large capital requirements, but this increases financial risks.

Methodology. Econometric analysis was carried out on a number of financial indicators of the financial and economic activities of JSC "Regional Electric Networks". These analyses were carried out based on econometric models and hypotheses studied by scientists. The main focus was on studying the dependence of other relative indicators on the profitability indicators of the joint-stock company. The forecast value of the financial indicator of the joint-stock company was calculated. The VAR model was used to calculate this forecast indicator. Also, the MAPE (Mean Absolute Percentage Error) test was conducted on the reliability of the forecast indicators.

Econometric analysis was carried out on the basis of the relative indicators obtained from the financial and balance sheet reports of the JSC "Regional Electric Networks". In it, the leverage indicator as the main influencing factors and the profitability of capital and assets as a result of the financial activities of the enterprise were taken as the dependent variable for the analysis.

As a general overview of the model used, we can highlight the following:

$Y= \alpha_0 + \beta_t X_1 + \beta_t X_2 + \beta_t X_3+\mu$

$Y= \alpha_0 + \beta_t X_t + \beta_t X_{t-1} + \beta_t X_{t-3}+\ldots\ldots. \beta_t X_{t-n+} \mu$

$Y= \alpha_0+\beta_1*X_1+\beta_2X_2+ \mu$

each loan is an expense that reduces future profits for enterprises. For this reason, a linear regression analysis was carried out to determine the impact of the previous year's value of the loan on the profitability indicators of the current period. The calculations according to this regression model are carried out based on the formula in the books and can be calculated as the maximum limit value for the amount of profit to be obtained from model.

Analysis and results. According to the regression analysis, a 1% increase in the leverage ratio on short-term liabilities causes an 8% decrease in EBIT. A 1% increase in the leverage ratio on total liabilities causes an increase in EBIT by approximately 11%. In this case, the factor that causes a change in the real value of the amount of debt is inflation.

Table 1. Results of regression econometric analysis

LnEBIT	Coef.	St.Err.	t-value	p-value	[95% Conf	Interval]	Sig
LnLev1	-8.343	3.014	-2.77	.012	-14.65	-2.035	*
lnLev2	10.904	4.382	2.49	.022	1.733	20.075	*
Consta	-	3.	-	.	-	6.	

nt	1.562	949	0.40	697	9.827	704

Mean dependent var	2.698	SD dependent var	2.353
R-squared	0.341	Number of obs	22
F-test	4.920	Prob > F	0.019
Akaike crit. (AIC)	95.883	Bayesian crit. (BIC)	99.157

*** p<.01, ** p<.05, * p<.1

Also, through effective management of debt, enterprises can ensure their financial stability. This is also expressed in the presence of a limit on the amount of debt and clear goals.

Based on the results of the above regression model, it is aimed to make forecasts on the financial indicators of the "Regional Electric Networks Enterprise" JSC. Before that, we conducted several tests on the statistical significance of this regression model.

On the normal distribution of the residual part of the model, the Skewness & Kurtosis test and the Shapiro Wilk test were conducted, and we can see that the Prob>chi2 value is 0.16 and 0.14, and the residual is normally distributed. The Breusch-Pagan test was conducted for heteroscedasticity, and the result was determined to be Prob>chi2 value of 0.53.

In conclusion, there is no heteroscedasticity. Also, a test of the suitability of the variables for the model was performed using the Ramsey Reset test, and the result was determined to be Prob>F value of 0.59. As a conclusion, there are no omitted variables.

Also, in the next stage, the forecast value of the financial indicator of the joint-stock company was calculated. The VAR model was used to calculate this forecast indicator. The results of the VAR model for time series are presented in the following table.

Table 2. Forecast indicators of the Regional Electric Grids Enterprise JSC (billion sums)

Date	Pesimistik qarash	Optimistik qarash
2024q4	5,2	635,05
2025q1	8,55	878,84
2025q2	10,75	989,32
2025q3	11,8	1099,1
2025q4	12,28	1146,57
2026q1	12,48	1172
2026q2	12,56	1283,91
2026q3	12,6	1389,11

According to the forecast indicators, the EBIT amount of the joint-stock company for the next quarters shows growth trends. Forecasts are also presented for 2 options. Also, the MAPE (Mean Absolute Percentage Error) test was conducted on the reliability of the forecast indicators obtained and it was determined that the overall result is reliable with an error of 3 percent.

We can see from the table above that the relative indicators of leverage and liquidity are positively related to the reliability indicators of the joint-stock company.

Table-3. Results of linear regression analysis

ROE	Coef.	St.Err.	t-value	p-value	[95% Conf	Interval]	Sig
lev1	-.027	.009	-2.893	.009	-.046	-.008	**
Constant	3.016	1.233	3.563	0.0	0.445	5.588	**
Mean dependent var	100.062	SD dependent var				3.764	
R-squared	0.295	Number of obs				22	
F-test	8.369	Prob > F				0.009	
Akaike crit. (AIC)	116.046	Bayesian crit. (BIC)				118.228	

*** p<.01, ** p<.05, * p<.1

ROE	Coef.	St.Err.	t-value	p-value	[95% Conf	Interval]	Sig
lev2	-.098	.044	-2.261	.035	-.189	-.007	*
Constant	4.294	2.014	1.781	0.0	0.093	8.495	**
Mean dependent var	100.062	SD dependent var				3.764	
R-squared	0.203	Number of obs				22	
F-test	5.092	Prob > F				0.035	
Akaike crit. (AIC)	118.746	Bayesian crit. (BIC)				120.928	

*** p<.01, ** p<.05, * p<.1

We can obtain the following data on the analysis of the impact of leverage indicators on return on capital. In this case, we can see that a 1 percent change in debt funds relative to the company's own funds leads to a decrease in the profitability indicator by -0.027 percent.

We can also see from the regression model that a 1 percent change in debt funds relative to total assets causes a decrease in the profitability of the enterprise by 0.098 percent. Also, according to the study, it was found that there is no regression relationship between the liquidity of the joint-stock company and the profitability indicator. Also, the regression relationships with the profitability indicator of the assets taken for the study are analyzed.

Table 4. Linear regression analysis results

ROA	Coef.	St.Err.	t-value	p-value	[95% Conf	Interval]	Sig

	lev1	-.01	.004	-2.70	.014	-.018	-.002 *
	Constant	10	.508		0	10	10
		1.437		99.6		0.377	2.497 **

Mean dependent var	100.300	SD dependent var	1.522
R-squared	0.267	Number of obs	22
F-test	7.297	Prob > F	0.014
Akaike crit. (AIC)	77.037	Bayesian crit. (BIC)	79.219

*** p<.01, ** p<.05, * p<.1

ROA

	Coef.	St.Err.	t-value	p-value	[95% Conf	Interval]	Sig
lev2	-.038	.018	-2.15	.044	-.075	-.001	*
Constant	10	.822		0	10	10	
	1.948		24.1		0.234	3.662	**

Mean dependent var	100.300	SD dependent var	1.522
R-squared	0.188	Number of obs	22
F-test	4.640	Prob > F	0.044
Akaike crit. (AIC)	79.289	Bayesian crit. (BIC)	81.472

*** p<.01, ** p<.05, * p<.1

ROA

	Coef.	St.Err.	t-value	p-value	[95% Conf	Interval]	Sig
Liq	-.019	.009	-2.06	.053	-.038	0	
Constant	10	.862		0	10	10	
	1.961		18.2		0.162	3.76	**

Mean dependent var	100.300	SD dependent var	1.522
R-squared	0.175	Number of obs	22
F-test	4.229	Prob > F	0.053
Akaike crit.	79.659	Bayesian crit.	81.841

(AIC) (BIC)

*** p<.01, ** p<.05, * p<.1

The results of the regression analysis of these leverage indicators on the return on assets indicators show that a change in leverage indicators by 1 unit can lead to a decrease in the profitability indicator by -0.01 percent and a decrease in the profitability indicator by -0.038 percent. A change in the liquidity indicator by the same amount causes a decrease in the profitability indicator by -0.019 percent.

Based on the results of the research, we can conclude that short-term debt serves to form the working capital of the enterprise and it is emphasized that it is possible to increase profits through effective management of short-term debt.

That is, it can be more effective than long-term debt, but long-term debt is attracted to finance newly established enterprises and their strategic goals. Also

According to the regression result, the formed regression model looks like this:

$Y = 97.246 + 0.36\ lev2 - 0.006Lev2^2 + e$

Without the influence of the change in the leverage ratio, the profitability index due to the change in other factors is 97.246 percent. Also, by calculating the derivative value of this model, the share of debt funds in total assets is found.

That is, the leverage value is equal to the calculated value of 0.36-0.012lev2=0. Also, according to the result, it is shown that the share of total debt in total assets should not exceed 30 percent. In the analysis of the statistical significance of the model according to this indicator, we can see that the model residuals are correctly distributed according to the Shapiro-Wilk W test, the Shapiro-Wilk W test Prob>z is equal to 0.147, and we can conclude that the model residuals are correctly distributed and that the model is statistically significant.

Also, according to the model results, we find the forecast values of the profitability indicator using the VAR model (Vector Autoregressive model). This model allows us to predict the values of future variables in time series. That is, it forecasts taking into account the time factor and the number of lags. The forecast indicators of assets and profitability indicators are presented according to the results of the econometric model, the value of which is transferred.

Table 5. Forecast values (%) of ROE and ROA indicators of the Regional Electricity Networks Enterprise Aj according to the VAR model

T	ROA (p)	ROA (o)	ROE (p)	ROE(o)
2025q1	99,8	102,92	98,72	106,3
2025q2	99,98	103,15	99,13	106,9
2025q3	100,09	103,31	99,44	107,4
2025q4	100,14	103,35	99,6	107,6
2026q1	100,17	103,37	99,7	107,65
2026q2	100,19	103,38	99,7	107,7
2026q3	100,19	103,39	99,77	107,7
2026q4	100,19	103,39	99,79	107,7

Tests were conducted on these forecast indicators. The reliability of the test results was also positive with an error of 5%. It was also predicted that the profitability indicators of the enterprise for the next quarters would show positive results.

Conclusion. As a result of our research, we were able to develop the following scientific conclusions and proposals: we believe that it is necessary to carry out these influencing factors in connection with the financial and economic activities of the enterprise by dividing them into financial and non-financial factors. We can conclude that the financial relative indicators of the state-owned regional power grid enterprise are not stable.

According to current calculations, the Altman model predicts that the enterprise is in financial difficulty and may encounter financial problems. Also, the analysis of debt and equity relations in the financial activities of the joint-stock company shows an increase in the share of debt. At the same time, maintaining debts at effective and marginal levels, in turn, serves the stability of the enterprise.

The determination of electricity prices by the higher authorities of the Electric Network Enterprise JSC and the existence of prices classified by price, in turn, negatively affects the low level of income and profitability indicators presented as relative indicators.

Reference

1. OECD (2015). OECD Guidelines on Corporate Governance of State-Owned Enterprises. https://www.oecd.org/content/dam/oecd/en/publications/reports/2015/11/oecd-guidelines-on-corporate-governance-of-state-owned-enterprises-2015-edition_g1g5a749/9789264244160-en.pdf
2. KORNAI*, J. (1986), The Soft Budget Constraint. Kyklos, 39: 3-30. https://doi.org/10.1111/j.1467-6435.1986.tb01252.x
3. Asian Development Bank (2019). State-Owned Enterprises in Asia: National Practices and Reform Trends. https://www.adb.org/publications/state-owned-enterprises-asia
4. Modigliani, F., & Miller, M. (1958). The Cost of Capital, Corporation Finance and the Theory of Investment. https://www.jstor.org/stable/1809766
5. International Energy Agency (2021). Financing Clean Energy Transitions in Emerging and Developing Economies. https://www.iea.org/reports/financing-clean-energy-transitions-in-emerging-and-developing-economies
6. Inter-American Development Bank (2021). State-Owned Enterprises and Fiscal Risk. https://publications.iadb.org/publications/english/document/State-Owned-Enterprises-and-Fiscal-Risks.pdf
7. Megginson, W. L., & Netter, J. M. (2001). From State to Market: A Survey of Empirical Studies on Privatization. https://www.jstor.org/stable/2696368
8. Tirole, J. (2017). Economics for the Common Good. https://press.princeton.edu/books/hardcover/9780691175164/economics-for-the-common-good