

The Factors Affecting the Capital Value of Joint Stock Companies and their Econometric Modeling

Khurshid Kgudoykulov

DSc, professor, International School of Finance Technology and Science

Abstract: The article forms an econometric model of the impact of factors affecting the value of capital of joint-stock companies. It also analyzes the factors affecting the capital value of joint-stock companies based on data from 2015 to 2020. In particular, the forecasts of multiplier coefficients, which are factors affecting the capital value of JSC "Kyzylkumtsement", "Uzmetkombinat", "Kokand Mechanical Plant" and "Quartz" from the joint-stock companies of the country. The existing problems were identified, then the forecast of the factors that influence the assessment of the capital value of the joint-stock company. That scientific proposal and practical recommendations were developed to address them.

Keywords: joint stock company; capital value; cash flow; asset value; value of private capital; return on capital; operational benefits; forecast.

Introduction

In the evaluation of the private capital of joint-stock companies, traditional methods are mainly used to determine the fair value of their shares, in particular, traditional methods such as market value and income estimation approaches. Also, the value of private equity is estimated by determining financial indicators such as economic profit, economic value added (EVA), market value added (MVA) and shareholder value added (SVA). Today, most economists and analysts point out that the balance sheet values of financial statements do not always reflect the true financial performance. Therefore, the use of the present value of expected cash flows is widely used in the assessment of private and capital value in joint-stock companies in developing countries. In particular, the methodology of discounted cash flows is used in the evaluation of capital projects. It is appropriate to use the methodology of income assessment to estimate the fair value of the private capital of joint-stock companies. Also, discounted cash flow models serve to determine the internal value of the private capital of a joint-stock company and are based on the principle of calculation through the present value of future cash flows expected from private capital.

Assessment of the capital value of joint-stock companies is carried out primarily based on the theory of finance and accounting. According to the theory, most cost of capital estimations use discounted cash flow and residual income estimation models. Therefore, world practitioners use multiplier coefficients when determining the value of private capital of joint-stock companies, because this valuation method is used instead of complex valuation techniques. This multiplier is reflected in the reports of most joint-stock companies and investment banks in the assessment of capital value through coefficients. It is also used in evaluating corporate transactions through multiplier coefficients. Even practitioners using sophisticated valuation techniques use multiplier factors to estimate terminal value and verify its reliability.

Literature review

Today, in world practice, the use of the method of relative value estimation is a widely used method for evaluating the capital of joint-stock companies. In particular, researchers use this method to determine the market value of joint stock company shares and forecast them.

Industrial enterprises are analyzed by the P/E (price earnings ratio) ratio of market price to net profit. According to the conclusion of these researchers, when assessing the capital value of industrial enterprises, their income growth should be taken into account (Boatsman, J., and Bakin, E, 19981). They conducted studies on the effect of the method of discounted cash flows in the assessment of the capital of joint-stock companies and the multiplier coefficients of earnings before depreciation, interest and tax (Earning before depreciation, interest and tax) in the conditions of a high share of debt funds of these joint-stock companies. According to their conclusion, they stated that the method of estimating the cost of capital, taking into account the profit before taxes, interest and depreciation, is the method of valuation with discounted cash flows (Kaplan, S., and Ruback, R. 1995). By calculating the multiplier coefficients, in particular, the ratio of the market price to net profit and the ratio of the market price of the share to the book value, the market value of the capital of joint-stock companies and the weighted combination of these coefficients are suitable for forecasting the market and book value of the share (Penman, S. 1998).

In assessing the capital of joint-stock companies, using the relative value method, multiplier coefficients were used to determine the level of bankruptcy of joint-stock companies. In addition, the enterprise value EV (Enterprise Value), which is calculated as the coefficient of discounted cash flows, determined the level of bankruptcy of the enterprise through the ratio coefficient of the enterprise value EV (Enterprise Value) to the assets of the enterprise. In particular, according to the research conclusions, they state that the discounted cash flow coefficients determine the probability of bankruptcy of a joint-stock company by 40-70 percent (Hotchkiss, E. and Mooradian, R. 1998). the scientific conclusion is that society can determine the state of bankruptcy not 100 percent, but from 40 percent to 70 percent.

In determining the capital value of joint-stock companies and the market price of shares, the market used alternative methods of determining the multiplier coefficients representing the main efficiency. According to them, it is based on the need to use EV (Enterprise Value) coefficients in the assessment of capital. In turn, the use of enterprise value EV (Enterprise Value) coefficients is more accurate than the coefficient P/E (price earnings ratio) and the ratio P/B (price to book value ratio). (Liu, J., Nissim, D., and Thomas, J. 2007). They conducted research on the impact of the P/E ratio (price earnings ratio) on the investment opportunities in the stock market of the developed G-7 countries.

The ratio of share market price to net profit is considered a fundamental influencing factor on investment attractiveness in the stock market, and the increase in the P/E ratio is explained by the high liquidity of shares in the stock market (Rahman, ML, and Shamsuddin, A. 2019).

According to S. E. Elmirzaev, one of the local economists conducting scientific research on the development of modern corporate finance, it is appropriate to use several stock valuation models used in the assessment of the capital of joint-stock companies and to take into account their average. In addition, the P/E ratio, which is widely used in equity valuation, expresses the essence of the ratio as follows. In particular, the P/E ratio initially explains the assessment of the company's profit per share in the future period (S. Elmirzaev, 2019).

Local economists B. Toshmurodova and S. Elmirzaev in their research touched on several approaches to capital cost accounting that are widely used in practice. This, in turn, explains the different models of dividend discounting DDM (Dividend discount model), capital asset pricing model CAPM (Capital asset pricing model), Modigliani-Miller model (Modigliani–Miller theorem) and capital valuation with multiplier coefficients (B. Toshmurodova, S. Elmirzaev, N. Tursunova, 2017). In addition to this, in his research on ways to effectively organize the

financial management system in joint-stock companies, he noted that the capital structure is expressed through the ratio of private capital and debt capital. In particular, the minimization of the cost of debt capital is explained by the increase in the profitability of private capital (R. Karlibaeva, 2007).

In our opinion, the dividend payout ratio, dividend yield rate, enterprise value EV (Enterprise Value) before deduction of taxes, interest and depreciation EBITDA (Earnings Before Interest, Taxes, Depreciation and Amortization) coefficient, Gordon model, PEG (price/earnings to growth) coefficient, P/E (price earnings ratio) and P/B (price to book value ratio)) coefficients are appropriate to use. Also, these coefficients are widely used today to determine the market price of shares in the primary public placement of shares of these joint-stock companies in order to reduce the state share in large joint-stock companies in our country.

Research methodology.

The practical data we have collected are analyzed based on a special indicator, that is, panel data¹, and in particular, the factors affecting the capital value of JSCs "Kyzilkumtsement", "Ozmetkombinat", "Ko'kan Mechanical Plant" and "Kvarts" in our country as units of this panel, in particular, financial dependence (debt ratio), P/E (price-to-earnings ratio), P/B (price-to-book ratio), P/S (price-to-sales ratio) and EV/S (enterprise value-to-sales) the effect of coefficients on the section of joint-stock companies in the database of 2015-2020. Here, based on the data, regression and correlation analysis was performed based on the panel data. By performing an econometric analysis based on panel data, it is possible to accurately assess the impact of factors affecting the value of capital of "Kyzilkumtsement", "Uzmetkombinat", "Ko'kan Mechanical Plant" and "Kvarts" JSCs. Also, an econometric model was formed through factors affecting the value of joint-stock companies, and forecast indicators were systematized based on this model. We use the "Eviews 9" program, which is widely used in econometrics, to create these models. The value (EV) of the selected joint-stock companies as a result factor in the creation of a multi-factor regression and correlation econometric model and the factors affecting it were determined, and the research hypotheses were determined:

H₁ – the coefficient of financial dependence (debt ratio) depends on the growth of the capital value of joint-stock companies and has a high impact;

H₂ – the P/E ratio depends on the increase in the value of capital of joint-stock companies and has a high impact;

H₃ – the P/B ratio depends on the increase in the value of capital of joint-stock companies and has a high impact;

H₄ – the P/S ratio depends on the increase in the value of capital of joint-stock companies and has a high impact;

H₅ – the EV/S ratio depends on the increase in the value of capital of joint-stock companies and has a high impact.

Based on the above hypothesis, the following mathematical functions were formed:

$$E_{ev} = \alpha + \beta_1(\text{debt ratio})_1 + \beta_2 \left(\frac{P}{E}\right)_2 + \beta_3 \left(\frac{P}{B}\right)_3 + \beta_4 \left(\frac{P}{S}\right)_4 + \beta_5 \left(\frac{EV}{S}\right)_5 + \varepsilon_i \quad b > 0 \quad (4.1)$$

Here:

E_{ev} - the value of the capital of the joint-stock company;

debt ratio - coefficient of financial dependence;

P/E - market value of a share/((net profit-dividends paid on preferred shares)/number of common shares ratio);

¹ <http://www.classes.ru/dictionary-english-russian-scienceenru-term-78341.htm>. Multivariate time series data

P/B - the market value of the share (the market value of the company)/ the coefficient of the balance sheet value of the share;

P/S - market value of the share (market value of the company)/sales volume coefficient;

EV/S - the company's market value/tax and interest profit; the company's value=the company's market capitalization+the company's net debt ratio;

In the first step: We implement a correlation matrix based on panel data. Because, in forming a multifactorial function, there is some degree of correlation between random variables, which²causes the problem of multicollinearity.

In the second step: after solving the problem of multicollinearity between the selected variables, we form panel models.

In the third step: A test is conducted to choose which of the generated panel models is the best model.

In the fourth step: through the chosen better model, the capital value of the joint-stock company is forecasted for the period up to 2023.

Analysis and discussion of results.

As a result of the econometric analysis, we calculate the indicators of cumulative, fixed effect and random effect models (Table 1).

Table 1. R egression the indicators of models k ' results (2014-2020) years information based on³

Arbitrary variable (l n_ev)	(1)	(2)	(3)
	Assembled model	Fixed effects model	A random effects model
house_s	18.8907 *** (0.0008)	5.6346 *** (0.0678)	18.8907 *** (0.0000)
p_s	-17.8469 *** (0.0008)	-2.7743 *** (0.0554)	-17.8469 *** (0.0000)
debt_ratio	-5.612523 (0.0008)	1.234082 (0.2543)	-5.6125 (0.0000)
S (constant)	6.25170 ** (0.0000)	5.1804 ** (0.0000)	6.2517 ** (0.0000)
The number of observations	20	20	20
R- square	0.6008	0.9548	0.6008

Figures in parentheses are standard error of P- value, *** P<0.01, ** P<0.05, *** P<0.1

It can be observed that the P-value in the cumulative model of the selected independent variables in the three models in Table 1 is less than 0.001. However, it can be observed that the P-value of ev_s, p_s, and debt_ratio calculated as independent variables selected in the fixed effects model is less than 0.001. A random effects model indicates that all independent variables have a P-value of 0.001. If we conduct a hypothesis test on these independent variables, it is observed that the coefficient of the ln_ev variable is statistically significant at the 90 percent level in all three models. In addition, the random effects model ev_s, p_s, and debt_ratio independent variables are also affected at the 99 percent statistical significance level. This means that two volitional variables can represent the full effect of the nonvolitional variable. Looking at the R-squared, we

² <https://translate.academic.ru/multicollinearity/en/ru/>. In regression analysis, there is a high correlation between two or more independent (unrelated) variables.

³ was prepared by the author using the Eviews-9.0 program based on the data of "Kyzilkumtsement", "Uzmetkombinat", "Ko'kan Mechanical Plant" and "Kvarts" JSCs .

can see that the value is close to 1 in all three models. In particular, the R-squared index is almost close to 1 in the Fixed Effects model.

Looking at the estimated cumulative, fixed and random effects models, it can be observed that the difference is not very large. To determine which of these models is better, calculations were made using the test of foreign economist J. Hausman. When the test probability is less than 5 percent, the fixed effects model is the better model. If this probability indicator is greater than 5 percent, the random effects model is considered better. The analysis of this test is presented in the table below (Table 2).

Table 2. J. Hausman test results⁴

Variables	Fixed effect (a)	Random effect (b)	Difference of variables (ab)	Probability level
EV_S	5.634634	18.890747	5.086046	0.0000
P_S	-5.774357	-17.846915	4.908149	0.0000
DEBT_RATIO	1.234082	-5.612523	0.811982	0.0000
		<i>Chi</i> -square (χ^2) statistic	<i>Chi</i> -square distribution	Probability level
Cross -section random effects		101.988938	3	0.0000

2 show that the random effects model is better than the other models. The best random effects model was determined using the null hypothesis and the alternative hypothesis according to the P-value probability indicator. Accordingly, the random effect model was accepted as the null hypothesis, and its alternative, the fixed effect model, was rejected. In our study, the level of statistical significance of the Hausman test (χ^2) is less than 5 percent and the P-value equal to 0.0000 indicates that the fixed effects model is better than other models. After this test, we conduct a correlation test between the residuals . We can see the result of this test from the table below.

In conclusion, it can be said that the fixed effects model is the most suitable when analyzed through three models based on panel data. The robustness test of this model, i.e. the absence of correlation between the residuals, indicates that the model has a predictive capability. When studying the effect of *ev_s*, *p_s*, and *debt_ratio* coefficients on the value of capital of joint-stock companies, it was shown that *ev_s*, *p_s* coefficients have a direct effect. Without changing other factors in the fixed effects model, an increase in the *ev_s* coefficient by one point leads to a 5.6-fold increase in the value of the capital of the joint-stock company. A one-point increase in the *P_S* coefficient leads to a 2.7-fold decrease in the value of the capital of the joint-stock company. Based on this, it is appropriate to use the random effect model in the assessment of factors that directly affect the value of capital of joint-stock companies. This, in turn, serves to determine the changes in the value of joint-stock companies' capital in the medium and short term, as well as the investment potential in the capital of joint-stock companies in the near future.

The fixed effects model chosen in our study is the most appropriate. Therefore, the diagnostic test of the selected model showed that the fixed effects model has the ability to predict correctly. Therefore, in our scientific work , we make a forecast with coefficients calculated as factors affecting the value of capital of joint-stock companies through the model of fixed effects (Table 3).

⁴ The table was prepared by the author using the Eviews-9.0 program based on the data of "Kyzilkumtsement", "Uzmetkombinat", "Ko'kan Mechanical Plant" and "Kvarts" JSCs.

Table 3. in the value of the capital of joint-stock companies in 2020-2023, billion soums⁵

Years	Joint-stock company of capital value (billion soums)	EV/S ratio	P/S ratio	Debt ratio coefficient
2015	244.25	0.5415	0.5063	0.2061
2016	240.69	0.4205	0.3908	0.2445
2017	258.55	0.3526	0.2961	0.3713
2018	378.08	0.3718	0.3415	0.3064
2019	396.19	0.7115	0.6860	0.3809
2020	398.78	0.5670	0.5372	0.4253
2021	409.24	0.5961	0.5682	0.4664
2022	411.66	0.6252	0.5992	0.5076
2023	419.31	0.6544	0.6302	0.5487

From the data of Table 3, we can see that the capital value of joint-stock companies has increased almost 1.7 times by 2023. One of the main reasons for this is the increase in the income from the sale of products and the market value of shares of joint-stock companies. At the same time, the value of capital is expected to increase due to the increase in debt capital of joint-stock companies. Looking at the analysis, the debt ratio of joint-stock companies is expected to increase by 1.42 times in 2023 compared to 2019. In conclusion, it should be noted that the main indicators that ensure the increase in the value of the capital of joint-stock companies in our republic are the growth of the market value of the shares of joint-stock companies, the increase of debt capital and the change in income from the product. An increase in debt capital has a negative impact on the value of capital of joint-stock companies. Because, based on our research, we can say that the increase in debt capital leads to a decrease in the real value of the capital of the joint-stock company, liabilities leads to an increase and deterioration of the financial situation .

Conclusion and suggestions.

On the basis of the scientific work carried out above, the following conclusions and proposals were formed:

First, in Uzbekistan, the valuation of capital of joint-stock companies is carried out by calculating production costs and depreciation balances using the cost approach. In developed countries, using income and comparative approaches, equity valuation is done with cash flows and income from assets. In the comparative approach, the assessment is carried out taking into account the assets that are similar to the assets of the joint-stock company. Therefore, in our republic, it would be appropriate to implement the evaluation process using the income and comparison approach in the assessment of the value of capitals. As a result, it was possible to assess the real market value of capital of joint-stock companies .

Second, when analyzed through three models based on panel data, the fixed effects model is the most appropriate. The robustness test of this model, i.e. the absence of correlation between the residuals, indicates that the model has a predictive capability. When the effect of coefficients *ev_s*, *p_s*, and *debt_ratio* on the capital value of joint-stock companies was studied, it was shown that the coefficients of *ev_s*, *p_s* directly affect it. Without changing other factors in the fixed effects model, an increase in the *ev_s* coefficient by one point leads to a 5.6-fold increase in the value of the capital of the joint-stock company. A one-point increase in the *P_S* coefficient leads to a 2.7-fold decrease in the value of the capital of the joint-stock company. Based on this, it is appropriate to use the random effect model in the assessment of factors that directly affect the value of capital of joint-stock companies.

⁵The table was prepared by the author using the Eviews-9.0 program based on the data of "Kyzilkumtsement", "Uzmetkombinat", "Ko'kan Mechanical Plant" and "Kvarts" JSCs.

Thirdly, it is necessary to carry out prospective directions of assessment of the capital value of joint-stock companies through discounted cash flows. The implementation of these perspectives provides an opportunity to determine the income of shares and bonds in the capital of joint-stock companies, the expected income from these securities and the market risk. In addition, it serves to determine and diversify the capital structure of joint-stock companies and to determine how much income to get from this capital.

Reference:

1. Boatsman , J., and Bakin , E. 1981. Asset valuation with incomplete markets. *The Accounting Review*, Vol. 56, No. 1, pp. 38–53
2. Kaplan, S. , et al Ruback , R. 1995. The valuation of cash flow forecasts: An empirical analysis. *The Journal of Finance*, Vol. 56, No. 4, pp. 1059–1093.
3. Penman, S. 1998. Combining Earnings and Book Value in Equity Valuation. *Contemporary Accounting Research*, Vol. 15, No. 3, pp. 291-324
4. Hotchkiss, E. and Mooradian , R. (1998) Acquisitions as a Means of Restructuring Firms in Chapter 11. *Journal of Financial Intermediation*, vol. 7, issue 3, pp. 240-262
5. Liu, J., Nissim , D., and Thomas, J. (2007). Is Cash Flow King in Valuations? *Financial Analyst Journal*, Vol 63, Issue 2, pp.56–65.
6. Rahman, ML, and Shamsuddin , A. (2019). Investor sentiment and the price-earnings ratio in the G7 stock markets. *Pacific-Basin Finance Journal*, 55, 46-62
7. S. Elmirzayev and others *Finance market . Textbook . - T.: " Economy-finance "*, 2019. - 324 p.
8. B. Toshmurodova, S. Elmirzayev, N. Tursunova. *Financial management. Textbook. - T.: "Economy-finance"*, 2017. - 325 p.
9. R. Karlibaeva "Ways of effective organization of the financial management system in joint-stock companies" *Autoreferat*, Vol. 2007, pp. 1-30