



MODEL OF THE DYNAMICS OF THE COMPANY'S VALUE TAKING INTO ACCOUNT THE OWNERSHIP STRUCTURE

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ABSTRACT

The article considers the main aspects of choosing a model of the dynamics of the value of the enterprise taking into account the ownership structure. In the course of financial and economic analysis of the enterprise the main indicators of activity were determined. DuPont's model was used, the method of real options - to assess the dynamics of the value of the enterprise. This allowed us to determine the degree of influence of the dynamics of a financial multiplier on the change in the ROE performance, the dynamics of profit growth, change in the structure of equity of the enterprise. This study revealed controlled parameters: the rate of accumulation of own funds and the structure of fixed capital. By influencing these parameters, you can slow down or accelerate the fall / rise, change the financial result.

Key words: company value, ownership structure, capital, profitability, dynamics model

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1. INTRODUCTION

1.1. Relevance of the Topic and Problem Statement

In conditions of uncertainty, it is important for the company to ensure the optimal capital structure. Over the last decade, the global trend has been a change in the ownership structure of enterprises, which significantly affects corporate behavior and finance (Shleifer & Vishny, 1997). The ownership structure of a company is a defining argument for its value (Chu, 2009). The subject of scientific research is the dynamics of ownership, modeling the value of the enterprise, forecasting development, taking into account the structure of equity (Chandler, 1977; Brav, 2009). This pattern in the dynamics of the ownership structure of the enterprise is called "life cycle theory". Researchers claim that the evolution of companies differs significantly in different countries (La Porta et al., 1998; Helwege, J., Pirinsky & Stulz, 2007). In addition, the form of ownership also has a significant impact on the value of the enterprise (Franks et al., 2011). The ownership structure of the company is a determining factor in the formation of dynamic interaction (Lintner, 1956), which is especially important in a market environment.

Therefore, in recent years, the development of methods necessary to solve a number of important dynamic problems has become especially relevant. We are currently making progress in creating methods for stochastic dynamic optimization, asset pricing analysis, game theory and dynamic investment modeling, and more.

However, the search for dynamic models and empirical methods for dynamic corporate finance remains relevant - to predict the future value of the enterprise and improve the management of property structures. After all, the assessment of dynamics helps to address issues that exist within static limits. It is necessary to adequately assess the financial constraints of the company - for timely management decisions to diversify the ownership structure, investment projects and more.

In the framework of this study, the following problematic issues are identified:

- determine on the basis of factor assessment of the dynamics of the company's profit, taking into account the ownership structure of the company;
- explore the dynamics of business value.

2. THEORETICAL SECTION

2.1. Dynamics of the company's Ownership Structure

Studies of dynamic models of company value, taking into account the ownership structure, are at the intersection of scientific issues of asset pricing and corporate finance (Danylyshyn et al., 2019). The level of return on equity is directly dependent on the level of financial leverage, return on invested capital, tax costs, as well as the current value of borrowed resources of the enterprise (Bondarenko et al., 2020).

The task of financial management of the enterprise is the optimization of corporate cash flows, which are derivatives of financial flows based on the base value of the firm. *The system of indicators that characterize the activities of enterprises within the concept of value management is constantly updated, with the introduction of modern information technology indicators become more objective and complex.* The economic literature offers various

methodological approaches to solving the problem of optimizing capital structure (Friedl & Kettenring, 2009; Knight, 1998).

Among the indicators and their methodologies: DuPont system (factor analysis), earnings per share EPS, return on invested capital ROI, return on equity ROE, return on net assets RONA, model of economic value added EVA, net operating profit after taxes (NOPAT), etc. . The formula of the EVA indicator has the form:

$$EVA = NOPAT - WACC \cdot CI = (ROA - WACC) \cdot CI \quad (1)$$

where - NOPAT – net operating profit after taxes, UAH;

ROA – return on total assets, UAH;

CI – invested capital, UAH;

WACC – weighted average cost of capital, UAH.

J.B. Stewart proposed the following formula for estimating EVA:

$$EVA = (\text{change in NOPAT}) - (\text{change in CI}) \cdot WACC \quad (2)$$

where - change in NOPAT – changes in (+/-) net operating profit after taxes;

change in CI – changes (+/-) of invested capital;

WACC – weighted average cost of capital, UAH.

The analysis of EVA and its changes according to the reporting of previous periods gives point estimates of management efficiency, which should be used in the system of incentives for management staff.

The integrated criterion - the market value of V_{EVA} is the sum of the economic balance sheet valuation of existing I_{aip} , assets, actual growth opportunities from current (aip - assets in place) and future (FP) assets:

$$V_{EVA} = I_{aip} = \sum_t \frac{EVA_{t,aip}}{(1+WACC)^t} + \sum_t \frac{EVA_{t/p}}{(1+WACC)^t} \quad (3)$$

where - V_{EVA} - market value of the enterprise;

I_{aip} - balance sheet valuation of existing assets;

t – number of years.

The last two indicators in V_{EVA} are based on item-by-item forecast of balance and on the admissible parameters of elements of a tree of factors of cost taking into account specificity of the concrete enterprise. Varying them for different scenarios, choose the option with the maximum value of V_{EVA} .

In view of this, more attractive, in our opinion, are the indicators that take into account future cash flows, in particular the method of added value of share capital - SVA (Shareholder Value Added). The main developer of the so-called Shareholder Value Scoreboard is A. Rappoport. His research has shown that there is a strong correlation between companies' market value and data based on the use of indicators such as economic value added (EVA) and shareholder value added (SVA). Method SVA evaluates magnification shareholder value capital. Itmagnification is the difference between the share capital value (MV) created future investments, and joint-stock cost of capital (BV) created by past investments - in a simplified form -book value of share capital:

$$SVA = MV - BV \quad (4)$$

where SVA - shareholder value added;

MV - share capital value created by future investments;

BV - book value of share capital.

$$EV = IC + EVA_{\text{дii}} + EVA_{\text{дmi}} \quad (5)$$

where EV – the cost of the enterprise, UAH;

IC - investment capital, UAH;

$EVA_{\text{дii}}$ - discounted EVA from existing projects, UAH;

$EVA_{\text{дmi}}$ - discounted EVA from future investments, UAH.

Thus, the system of indicators that characterizes the activities of the enterprise within the concept of value management, is constantly updated. Currently, the concept of value is accepted by the economic community as a basic paradigm of enterprise development. The concept of value advises to abandon ineffective accounting criteria for the success of the enterprise and to take into account only one criterion that is clear to shareholders and investors - value added. Thus, enterprise value management is a purposeful action on the factors of enterprise value formation in order to achieve its growth.

With the advent of options and similar instruments (warrants, convertible bonds) investors were given the right to make decisions that would allow them to take advantage of a successful coincidence or reduce losses. Real options theory is one of the methods of investment risk management, which takes into account both negative and positive consequences of risky events. To identify the investment attractiveness of the enterprise, the issues of selection of the main indicators of stable development become relevant. If you imagine the company, as an investor in real assets, the management can increase their value, adequately responding to changes in market conditions. In the late nineties of the twentieth century in the practice of valuation of the enterprises, to began to use the method of real options, which became widespread in foreign valuation practice.

F. Black and M. Scholes developed a formula for determining the value of the option:

$$\text{Call option} = P \cdot N(d_1) - EX \cdot \exp(-r \cdot t) \cdot N(d_2) \quad (6)$$

$$\text{where } d_1 = \left[\ln\left(\frac{P}{EX}\right) + \left(r + \frac{\sigma^2}{2}\right) \cdot t \right] \div (\sigma \cdot t^{0.5});$$

$$d_2 = d_1 - \sigma \cdot t^{0.5};$$

$N(d_1), N(d_2)$ – cumulative normal probability of the density function;

P – share price;

EX – execution price;

r – risk-free interest rate;

σ – standard deviation;

t – the period before the option is exercised.

In general, an option - it is a standard document that certifies the right to buy or sell funds on certain terms in the future, with the price fixed at the time of concluding such an option or at the time of such acquisition at the discretion of the parties to the contract. The above approach is used in estimating the value of enterprises in the Black-Scholes formula means:

P - current value of enterprise assets. The market value of assets P is calculated based on

data obtained in the valuation by the net assets method without any changes.

EX - the nominal value of the debt, which canon the balance sheet valuation, as the liabilities are discounted by bringing them to the present time at a risk-free rate.

r - is the interest rate in the absence of risks. Its size is defined as the sum of the percentage of yield on domestic government bonds and country risk premium.

t - maturity of debt (if there are several forms of liabilities - accounts payable, long-term and short-term loans - you should use the weighted average duration of these liabilities), presented in the form of coupon-free bonds with a maturity of equal . Debt duration is the most difficult indicator in the calculations, significantly influencing the determination of the total value of the enterprise.

There are three possible options for determining the duration:

- calculate as the turnover of debt in days;
- calculate as a weighted average depending on the terms of repayment of liabilities and their share in the total amount of liabilities;
- take the duration of an equal unit. It seems that the use of this option is possible only as a last resort (because at $t = 1$ all liabilities should be considered as short-term, while some of them may be long-term).

The standard deviation sigma (asset value variance) characterizes the risk of the considered business. In the Ukrainian practice of assessment it is recommended to use sigma in the range of 35-45%.

An optimization of the structure of working capital is one of the main levers to increase the value of enterprises. However, it is possible to state the weak account of this factor when calculating the main component of free cash flow - net income. Thus, the issue of analysis of the causes and identification of products that make a negative contribution to changing the structure of working capital, and, consequently, the value of the enterprise is relevant. This will help to make the best decisions to restructure, first of all, the production program of the enterprise.

In our opinion, it is expedient to estimate the contribution of products to the change in the value of current assets by determining the free cash flows for each of them according to the same scheme as for the entire enterprise. Discounting free cash flows will show the contribution of each of them to the total value of the enterprise. The analysis should take into account the prospects of changing market factors (market nature, changes in product positioning in the market), so it should be supplemented by forecast calculations for the next five years. In this case, the correct calculation of changes in working capital for each product must also be accompanied by the allocation of depreciation on the depreciation of those fixed assets that are engaged in the production of this product. The size of the flow determines the contribution of the product to the total capitalization of the company.

All this will take into account not only the efficiency of production of a product, but also the possible reaction of the working capital structure in the restructuring of the production program. Given the importance of this factor in the formation of the value of the enterprise, it will ensure the rapid development and implementation of rational management decisions to identify sources of increasing the value of the enterprise through restructuring.

The conditions for achieving an increase in the value of enterprises are:

1. Maximizing the mass of net income of the enterprise on the basis of:

- increasing profitability for each activity and product with a simultaneous increase in the share of the most profitable of them;
- reduction or elimination of low- and inefficient activities and production of certain products;

- business diversification to ensure its sustainability.
2. Minimization of costs that directly determine the cost of production.

The first condition is relatively innovative, because it requires updating technology, production apparatus, the use of more efficient materials. It is proposed to assess the value of the enterprise by setting priorities and setting goals for the enterprise and its owners. The next step is to analyze the stage of enterprise development. Significant performance components allow you to determine cash flows, discount rates, capitalization and the ratio of equity and debt capital.

3. METHODOLOGY

The methodological basis of this study were the main provisions of financial management, cash flow management and enterprise value, mathematical modeling; methods of financial analysis.

A systematic approach was used to validate the obtained results. The work used materials of the financial statements of the enterprise, open materials published in general, special literature, periodicals, online publications, as well as the authors' own materials obtained in the process of working on the article.

For analysis, this study uses the DuPont factor model, the method of real options - to assess the dynamics of the value of the enterprise.

The model includes a growth multiplier - return on equity (ROE). Under such conditions, the source of growth of the company's value is not only the amount of retained earnings, but also such indicators as the amount of reinvested capital, interest payments (financial costs), the capital structure of the enterprise (Morin & Jarell, 2001).

4. ANALYSIS OF RESULTS

4.1. Analysis of the Financial Condition of the Studied Enterprise

The object of the study was a Ukrainian industrial enterprise (hereinafter - Enterprise). For economic analysis of Enterprise activity, indicators of profitability of financial and economic activities, indicators of financial balance, indicators of commercial activity and competitiveness of products were analyzed, on the basis of which the economic potential of the enterprise was analyzed and the company's value was assessed taking into account ownership structure.

Sources of information support for the analysis of the financial condition of the enterprise are financial statements.

The main indicators of the enterprise are presented in table 1.

Table 1. Express analysis of the main indicators of financial condition
Enterprise for the period 2015 - 2017

Indicators	2015	2016	2017	Absolute deviation, +, -	
				2016to2015	2017to2016
The share of fixed assets in assets	0.24	0.18	0.24	-0.07	0.07
Depreciation rate of fixed assets	0.67	0.63	0.68	-0.04	0.05
Asset turnover (turnover), resource efficiency, transformation ratio	0.68	0.68	0.92	0	0.24
Return on assets	5.07	3.4	4.57	-1.67	1.18
Inventory turnover ratio (turnover)	2.61	1.62	3.65	-0.99	2.03
Receivables turnover ratio (turnover)	3.09	1.44	1.64	-1.65	0.2
Return on assets by net income,%	-9.23	-10.85	-10.74	-0.02	0
Payback period of equity	-4.84	-1.37	-1.23	3.47	0.14
Ratio of own working capital of stocks	-0.12	-0.32	-0.89	0.2	-0.58

Coefficient of financial independence (autonomy)	0.23	0.1	0.19	-0.13	0.09
Coefficient of financial stability	0.23	0.1	0.19	-0.13	0.09
Current ratio (coverage)	0.95	0.9	0.92	-0.05	0.02
Absolute liquidity ratio	0.02	0.01	0.05	-0.02	0.04
The ratio of short-term receivables and payables	1.38	1.62	1.7	0.24	0.08

Express analysis involves the calculation of several indicators that indicate different areas of financial activity of the enterprise - liquidity, stability, profitability, business activity and more. During 2015-2017, the efficiency of using all assets increases. This indicates a steady increase in the efficiency of the use of assets throughout the period.

The results of the analysis indicate a decrease in the efficiency of inventory management and may be a sign of reduced sales activity. In 2017, the trend is changing and there is an increase in the efficiency of inventory use. In 2017, they made 3.65 revolutions. The efficiency of receivables management decreases.

In 2017, the trend changed and at the end of the study period receivables amounted to 1.64 turnover. Return on assets is negative. The negative amount of working capital does not allow to finance stocks at their own expense. To do this, the company attracts borrowed resources. In 2016, the value of the indicator was -0.32. At the end of the study period, the value of the indicator was -0.89 against -0.32 in 2016, ie the amount of working capital is declining. The share of equity was lower than the normative value. The coefficient of financial stability is below the norm. The value of the liquidity ratio is also below the norm, ie the company is not able to repay all its obligations during the year. Accounts receivable management policy was ineffective. Indicators of equity use are presented in table 2.

Table 2. Dynamics of equity indicators

Indicators	2015	2016	2017
Equity protection ratio	0.12	0.17	0.14
Equity risk ratio	7.32	4.87	5.92
The coefficient of development of the enterprise due to self-financing of economic activity	2.84	0.87	-0.2
Return on equity,%	-20.66	-73.09	-81.15
Return on equity	1.53	4.56	6.91
Growth of own capital, thousand UAH	-46323	-9276	3953
Cost of equity according to the profitable approach	-0.21	-0.73	-0.81

The analysis shows that at the end of the study period 14.46% of assets were used to protect equity. The risk of loss of value of equity, as can be seen from the table, is low, because the value of the indicator in 2016 was 4.87, in 2017 the value of the indicator was 5.92.

In 2016, 87.06% of net profit was directed to increase the amount of reserve fund and retained earnings. In 2017, the value of the indicator is negative and is -20.18, ie net loss reduces the amount of equity.

This indicates a constant increase in the efficiency of the use of equity throughout the period.

In 2015, the amount of equity decreased by -46323 thousand UAH. The following year, the negative increase in equity amounted to -9276 thousand UAH. At the end of the study period, the increase was -9276 thousand UAH. According to the income approach, the cost of

equity is equal to the return on equity. That is, it is considered that the amount of net profit generated by the company is a fee for the use of these funds.

The property structure of the enterprise is presented in table 3.

Table 3. The structure of the property of the enterprise

Indicators	2015		2016		2017		Absolute deviation, +, -		Relative deviation,%	
	thousand UAH	%	thousand UAH	%	thousand UAH	%	2016/2015	2017/2016	2016/2015	2017/2016
Goods	8682	6.39	25798	11.45	3210	2.3	17116	-22588	197.14	-87.56
Settlement and cash	57179	42.06	118397	52.55	93398	66.99	61218	-24999	107.06	-21.11
Production	70092	51.56	81095	36	42809	30.71	11003	-38286	15.7	-47.21
Together	135953	100	225290	100	139417	100	89337	-85873	65.71	-38.12

At the end of 2017, the share of settlement and monetary assets was 66.99%, the share of production assets was 30.71%, and the share of commodity assets was 2.3%. This property structure indicates that the company is a production. The property structure is fairly balanced, as most are in highly liquid assets. Indicators of income and profitability of the enterprise are presented in table 4.

Table 4. Dynamics of indicators of return on equity of the enterprise

Indicators	2016	2017
Tax burden	0	16.42
The tax burden	-0.09	-11.18
operating profitability	-0.16	-4.51
Asset turnover	-0	-0.71
Financial leverage ratio or capital multiplier	-1.09	1.04
Return on equity, ROE	0	-609.33

Due to the tax burden in 2016, ROE changed to:

$$(1 * 1.8 * -0.08 * 0.68 * 15.34 - 1 * 1.8 * -0.08 * 0.68 * 15.34) = 0$$

Due to the tax burden in 2017, ROE changed by:

$$16.42 = (-4.96 * 1.92 * -0.08 * 0.68 * 25.42 - 1 * 1.92 * -0.08 * 0.68 * 25.42)$$

Due to the interest burden in 2016, ROE changed to:

$$(1 * 1.92 * -0.08 * 0.68 * 15.34 - 1 * 1.8 * -0.08 * 0.68 * 15.34) = -0.09$$

Due to the interest burden in 2017, ROE changed by:

$$-4.96 * 0.35 * -0.08 * 0.68 * 25.42 - 4.96 * 1.92 * -0.08 * 0.68 * 25.42 = -11.18$$

Due to operating margin in 2016, ROE changed to:

$$(1 * 1.92 * -0.08 * 0.68 * 15.34 - 1 * 1.92 * -0.08 * 0.68 * 15.34) = -0.16$$

Due to operating margin in 2017, ROE changed to:

$$(-4.96 * 0.35 * 0.07 * 0.68 * 25.42 - 4.96 * 0.35 * -0.08 * 0.68 * 25.42) = -4.51$$

Due to the turnover of assets in 2016, ROE changed to:

$$(1 * 1.92 * -0.08 * 0.68 * 15.34 - 1 * 1.92 * -0.08 * 0.68 * 15.34) = -0$$

Due to the turnover of assets in 2017, ROE changed to:

$$(-4.96 * 0.35 * 0.07 * 0.92 * 25.42 - 4.96 * 0.35 * 0.07 * 0.68 * 25.42) = -0.71$$

Due to financial leverage in 2016, ROE changed to:

$$(1 * 1.92 * -0.08 * 0.68 * 25.42 - 1 * 1.92 * -0.08 * 0.68 * 15.34) = -1.09$$

Due to financial leverage in 2017, ROE changed to:

$$(-4.96 * 0.35 * 0.07 * 0.92 * 15.73 - 4.96 * 0.35 * 0.07 * 0.92 * 25.42) = 1.04$$

The return on equity in 2016 changed to:

$$(0 * -0.09 * -0.16 * -0 * -1.09) = 0$$

The return on equity in 2017 changed to:

$$(16.42 * -11.18 * -4.51 * -0.71 * 1.04) = -609.33$$

The DuPont model is presented in table 5.

Table 5. DuPont model

Indicators	2015	2016	2017	Relative deviation,%	
				2016/2015	2017/2016
Profit from ordinary activities before taxation, thousand UAH	-11279	-19592	3953	73.7	-120.18
Total assets, thousand UAH	135953	225290	139417	65.71	-38.12
Revenue from sales of products, thousand UAH	83380	123263	167969	47.83	36.27
Turnover ratio of total assets	0.68	0.68	0.92	0.03	34.97
Profitability of sales	-0.14	-0.16	0.02	17.5	-114.81
ROA	-0.08	-0.09	0.03	deal at 0	-99.97

As a result of the influence of factors in 2015, ROA was -0.08, in 2016 -0.09, and at the end of 2017 the value of the indicator was 0.03. This value of the indicator indicates an ineffective policy of equity management of the enterprise.

Table 6 shows the initial data and calculation of the market value of the investigated enterprise by the method of real options.

The table 6 shows that the initial data differ in the value of the debt duration, as the company operates mainly on borrowed capital. From the calculations we can conclude that the cost decreases in 2016, and already in 2017, growth, which can serve to determine the investment attractiveness of the enterprise, depending on the goals set by the key investor at this stage.

Table 6. Determining the value of the enterprise by the method of real options

Indicators										Cost of enterprises, thousand UAH			Growth in the value of enterprises, %			
Assets of the enterprise (balance sheet), thousand UAH, P			Nominal (book) value of debt, thousand UAH, EX			Debt duration, years, T	Risk-free interest rate corresponding to duration, % per annum, R			The standard deviation of the value of the enterprise, %, <i>sigma</i>	2015	2016	2017	2015/2014	2016/2015	2017/2016
2015	2016	2017	2015	2016	2017		2015	2016	2017							
53541	44602	75004	48870	28517	63781	3	18.9	17.8	18	45	29007	28887	41776	4.81	-0.41	44.62

The fundamental difference between the method of real options from the standard methods - is that in this approach the enterprise is considered as a flexible managed system; the management's ability to make for decisions to the situation, are not ignored, but studied in detail and quantified. Many business processes can be represented as an options.

It is necessary to emphasize the scope of the real methodoptions that reveal the value of this approach: the main among them can be considered an assessment of the share capital of troubled companies. When valuing equity, it will have a value, even if the value of the enterprise is less than the nominal value of the debt. Although such companies are considered by investors, accountants and analysts as problematic, this does not mean that equity is worthless, although when using the net asset method, the result is a negative value of equity. The value is maintained due to the option nature of the share capital of the enterprise.

Thus, the DuPont model, the method of real options used in this study, are in financial management tools to justify decisions aimed at improving the financial and economic performance of the company. This approach helps to identify key factors that the company's management should prioritize in order to increase the company's value and overall business efficiency.

5. CONCLUSION

In this study the main aspects of the choice of the model of the dynamics of the value of the enterprise taking into account the ownership structure are considered. Transformational changes and combinations of dynamic relations of the enterprise necessitate the use of dynamic models to calculate the dynamics of the main indicators of the enterprise with different combinations of values of controlled and uncontrolled parameters. In the course of financial and economic analysis of the enterprise the main indicators of activity were determined. DuPont's model was used to determine the degree of influence of the dynamics of a financial multiplier on the change in ROE performance, the dynamics of profit growth, changes in the structure of equity. The value of the company was assessed using the real options method.

The study revealed controlled parameters: the rate of accumulation of own funds and the structure of fixed capital. By influencing these parameters, you can slow down or accelerate the fall / rise, change the financial result.

The analysis confirmed the mutual influence of the profitability of the operating sector and the magnitude of the risk of the working capital structure of the enterprise.

The adaptation of mathematical models during the financial and economic analysis allowed to evaluate their effectiveness in making appropriate management decisions and forecasting the future value of the company taking into account the ownership structure.

Cash flow management of the enterprise on the basis of static and dynamic models taking into account the capital structure - the direction of further research.

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