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STRATEGIC PRIORITIES FOR ENSURING THE RETURN ON EQUITY OF UKRAINIAN ENTERPRISES

Abstract. The article deals with the problem of realization of the financial interest of the business owner concerning the acceptable level of profitability of own financial assets. It is proved that the key criterion for the own funds efficiency is the profitability not lower than the marginal yield of the domestic government loan bonds (DGLP). The multi-factor economic and mathematical modeling of the return on equity was conducted taking into account the macroeconomic factors that may be regulated by the state, in particular the index of industrial producer prices, capital investment at the expense of state and local budgets, the level of the shadow economy and the PFTS index. The strategic guidelines for ensuring the expected return on equity of Ukrainian enterprises based on optimization methods and scenario approach are substantiated.

Keywords: equity, profitability, profit, modeling, optimization, financial management.

JEL Classification: C61, D24, G31

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СТРАТЕГІЧНІ ПРІОРИТЕТИ ЗАБЕЗПЕЧЕННЯ ПРИБУТКОВОСТІ ВЛАСНОГО КАПІТАЛУ ПІДПРИЄМСТВ УКРАЇНИ

Анотація. В статті розглянуто проблему реалізації фінансового інтересу власника бізнесу щодо прийняттого рівня прибутковості власних фінансових ресурсів. Доведено, що ключовим критерієм ефективності власних коштів є рентабельність, не нижча граничної дохідності облігації внутрішньої державної позики (ОВДП). Проведено багатофакторне економіко–математичне моделювання рентабельності власного капіталу з урахуванням макроекономічних факторів, що можуть бути регульовані державою, зокрема індексу цін виробників промислової продукції, капітальних інвестицій за рахунок коштів Державного та місцевих бюджетів, рівня тіньової економіки та індексу ПФТС. Обґрунтовано стратегічні орієнтири щодо забезпечення сподіваної прибутковості власного капіталу підприємств України на основі оптимізаційних методів та сценарного підходу.

Ключові слова: власний капітал, рентабельність, прибуток, моделювання, оптимізація, фінансовий менеджмент.

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СТРАТЕГИЧЕСКИЕ ПРИОРИТЕТЫ ОБЕСПЕЧЕНИЯ ПРИБЫЛЬНОСТИ СОБСТВЕННОГО КАПИТАЛА ПРЕДПРИЯТИЙ УКРАИНЫ

Аннотация. В статье рассмотрена проблема реализации финансового интереса владельца бизнеса относительно приемлемого уровня доходности собственных финансовых ресурсов. Доказано, что ключевым критерием эффективности собственных средств является рентабельность не ниже предельной доходности облигации внутреннего государственного займа (ОВГЗ). Проведено многофакторное экономико–математическое моделирование рентабельности собственного капитала с учетом макроэкономических факторов, которые могут быть регулируемыми государством, в частности индекса цен производителей промышленной продукции, капитальных инвестиций за счет средств государственного и местных бюджетов, уровня теневой экономики и индекса ПФТС. Обоснованы стратегические ориентиры по обеспечению ожидаемой доходности собственного капитала предприятий Украины на основе оптимизационных методов и сценарного подхода.

Ключевые слова: собственный капитал, рентабельность, прибыль, моделирование, оптимизация, финансовый менеджмент.

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Introduction. Under the conditions of macroeconomic instability the number of unprofitable and insolvent business entities increases, the efficiency of financial activity of enterprises worsens and as a result it is unprofitable to run a business and invest. For the owners (investors, shareholders) there is a problem to find tools, means and mechanisms of recovery and ensuring the profitability of the company, both internal and external. It is to some extent explained in the works of such scholars as: C. Botosan & M. Plumlee (2002) [1], R. Bushman & A. Smith (2001) [2], K. Chen, Z. Chen & K. C. John Wei (2009) [3], H. Daske (2006) [4], D. Dhaliwal, S. Heitzman & O. Li (2006) [5]. However the macroeconomic factors of the business functioning in providing and optimizing the expected level of return on equity, remain poorly researched.

Analysis of the research and problem definition. The main purpose of the article is to develop strategic priorities for maximizing the return on equity of Ukrainian enterprises on the basis of economic and mathematical modeling of macroeconomic factors impact, setting and solution of optimization tasks for the operational, tactical and strategic scenarios.

Results of the research. In financial management the key motive for the owner (an investor oriented to the capital growth in the long-term perspective) is to ensure the fastest return on equity¹ (investments) of his enterprise. Because of that there is a belief that the return on own funds (profit on 1 UAH of own capital) invested in a business that is objectively subject to the conditions of entrepreneurial risk should exceed the relatively risk-free alternative – the income obtained from investing in domestic government loan bonds (DGLB). Such an alternative to conducting business can be considered the least risky, as the return of money is guaranteed directly by the state. Another alternative in Ukraine from January 1, 2017 may also be the deposit of funds by a physical person (including sole proprietors) in a commercial bank in the amount of up to 200 thousand UAH, as the guarantor of their return in case of bankruptcy or withdrawal of a banking institution license is the Deposit Guarantee Fund [6].

In modern scientific research in financial management the main purpose of the corporation is to increase the welfare of shareholders, which is realized in maximizing the market value of ordinary shares [7, p. 9]. In conditions of underdevelopment of the domestic stock market this goal is extremely difficult to achieve. Therefore, it is reasonable to determine the maximization of return on equity (ROE) to be the sufficient criterion for the effectiveness of financial management of enterprises in Ukraine. Let us analyze the dynamics of the return on equity of Ukrainian enterprises, taking into account the methodology of its calculation for the national economy (Table 1).

Table 1

Formation and dynamics of the return on equity of Ukrainian enterprises
in the years 2007–2016

Years	Name of the index at the year-end					
	Net profit, bln, UAH	Net loss, bln, UAH	Net financial result (net balance), bln, UAH	Annual amount of own capital), bln, UAH	Return on equity, % (ROE)	Marginal level of DGLP profitability, %
2007	132.5	-48.1	84.4	934.3	9.04	6.4
2008	144.5	-185.5	-41.0	1081.7	-3.79	17.0
2009	108.9	-146.0	-37.1	1219.8	-3.04	25.0
2010	155.2	-141.3	13.9	1260.9	1.10	10.1
2011	208.9	-141.1	67.8	1339.5	5.06	13.5
2012	210.6	-175.5	35.1	1745.6	2.01	8.5
2013	179.3	-202.1	-22.8	1927.7	-1.19	8.0
2014	202.7	-792.8	-590.1	1715.5	-34.40	14.25
2015	353.0	-726.5	-373.5	2049.5	-18.23	8.85
2016	397.1	-368.6	28.6	2420.6	1.18	15.3

Source: formed and calculated according to the data, given in [8; 9].

¹Mathematically, the return on equity can be represented as the ratio of the annual average amount of own funds to the annual net profit of the enterprise, that is, the index turned to the return on equity (ROE).

It should be noted that the generalized index of return on equity was calculated on the basis of the consolidated annual financial statements of large and medium-sized enterprises that reported to the State Statistics Service of Ukraine. Besides, in table 1 the volumes of the financial results of profitable and unprofitable enterprises are summed up, and the net balance is taken for the ROE calculation. The average annual amount of equity is defined as the arithmetic mean at the beginning and at the end of the year. As a result, it can be seen that the maximum value of 9% of the return on equity of enterprises of Ukraine was at the end of 2007 and the minimum 34.4% by the end of 2014. At the same time, the loss in equity capital in 2008–2009 amounted from 3 to 4% (due to the global financial crisis), and during 2013–2015 – from 18 to 35% (due to the temporary occupation of the Autonomous Republic of Crimea and the military confrontation in the East of Ukraine). It is also important that only in 2007 the level of return on equity exceeded the marginal yield of the domestic government loan bonds (+ 2.6%), that is, the generalized profitability of the entrepreneurial sector ensured the realization of interests of business owners. In the next 9 years this principle has been violated, therefore, the principle of ensuring the interests of owners – the exceeding of the level of actual return on equity over the marginal level of yield domestic government loan bonds should be laid in the basis of strategic priorities for ensuring the return on equity of Ukrainian enterprises.

The influence of the main macroeconomic processes by means of correlation–regression analysis was studied for the development of strategic priorities for ensuring the profitability of equity capital of Ukrainian enterprises. Previously the key areas of influence on the return on equity of enterprises were identified, namely: inflation processes, investment climate, national economy shadowing and stock market development. Four factor characteristics were selected among them, between which there is no multicollinearity (close stochastic connection, where the coefficient of pair correlation exceeds the value of 0.7), and which had the greatest impact on the resulting sign (Table 2).

Table 2

Macroeconomical factors of the return on equity of the enterprises in the years 2007–2016

Years	Index name			
	Industrial Producer Price Index, % (<i>IPPI</i>)	Capital investment from the state budget, million UAH (<i>CISB</i>)	The level of the shadow economy, % to GDP (<i>LSE</i>)	PFTS Index (annual average) (PFTS)
2007	123.3	17782.0	28	1174.02
2008	123.0	21494.0	34	301.42
2009	114.3	10848.0	39	572.91
2010	118.7	15954.1	38	975.08
2011	114.2	25123.6	34	534.43
2012	100.3	24844.0	34	328.69
2013	101.7	12971.7	35	300.53
2014	131.8	8656.9	43	386.92
2015	125.4	21179.5	40	240.70
2016	135.7	36081.2	34	265.15

Source: formed and calculated according to the data, given in [10–13].

For the economic and mathematical modeling of the return on equity and the development of strategic priorities for the profitability of the business sector, the indices, given in the table 2, were taken as it is possible to directly influence them through the state regulatory policy in a following way:

– through the inflation targeting mechanism, it is possible to slow down the index of industrial producer prices, which will result in lower prices for resources and, consequently, the growth rate of production costs of enterprises will decrease;

– capital investments at the expense of budgetary funds – in such a case the investor is the state of Ukraine, and therefore the substantiated proposals to increase (or decrease) their volume can be considered in budget planning for the next year;

– the shadow economy is the greatest retarder of real economic growth, therefore, the unshadowing of economy is an important priority of state policy;

– PFTS index is an aggregate index of one of the largest stock exchanges in Ukraine, which reflects the state of the stock market conditions – the basis for the development of the financial sector, through the mechanisms of which the domestic corporations can achieve the maximization of the market value of common shares.

The proof of the absence of multicollinearity between the factor characteristics, given in Table 2, is the following correlation matrix, obtained using the statistical analysis capabilities in Excel (Table 3).

Table 3

Correlation matrix of factor characteristics of the return on equity of Ukrainian enterprises

	<i>IPPI</i>	<i>CISB</i>	<i>LSE</i>	<i>PFTS</i>	<i>ROE</i>
<i>IPPI</i>	1				
<i>CISB</i>	0.2091	1			
<i>LSE</i>	0.2024	–0.4597	1		
<i>PFTS</i>	0.0325	–0.2724	–0.3870	1	
<i>ROE</i>	–0.4095	0.4363	–0.8360	0.4289	1

Source: authors' calculations

Data given in table 3, confirm the absence of multicollinearity between the factor characteristics, since the highest value of the correlation coefficient is –0.46, the proves the existence of an inverse correlation (stochastic) connection of average tightness (density) between capital investments from state and local budgets and the level of the shadow economy. It should also be noted that the most significant impact on the return on equity of Ukrainian enterprises among the factors taken into account is the level of the shadow economy (the pair correlation coefficient is –0.84), the influence of the remaining factors is average.

So, in order to realize the economic and mathematical modeling of the return on equity of enterprises of Ukraine by means of multi-factor correlation–regression analysis, all the necessary preparations have been carried out. Using the standard Excel settings, we obtain the following multi-factor regression equation:

$$ROE = 69 - 0.506 IPPI + 0.001 CISB - 1.042 LSE + 0.018 PFTS. \quad (1)$$

The economic interpretation of the obtained equation (1) is that the growth of the index of industrial producer prices by 1% leads to the decrease in the level of return on equity of enterprises by 0.5%, increase in the volume of capital investment from the budget by 1 million UAH leads to the increase in profitability on 0.001%, the growth of the shadowing level of the national economy by 1% reduces profitability by 1.04%, and the increase of the PFTS index by 1 point ensures the return on equity growth of enterprises of Ukraine by 0.02%.

It is also possible to make a conclusion on the statistical significance of the obtained regression equation, since the coefficient of the multiple correlation is 0.94 (it is also statistically significant, since the *t*-criterion is 5.7, which in 2.2 times more than the normative value). The correlation connection is reliable, however the change in the return on equity of Ukrainian enterprises by 88.2% is determined by the change in the four factors introduced into the model. The determination coefficient is statistically significant, since the *F*-criterion is 9.3, which is 1.5 times more than the normative value. Autocorrelation, both negative and positive, is absent in the

obtained economic–mathematical model, since for the actual value of von Neumann's Q criterion the double inequality is correct: $1.18 < 1.996 < 3.61$.

The results of the statistical analysis give grounds to consider the obtained four–factor model of return on equity of Ukrainian enterprises to be statistically significant, adequate, consistent with economic logic, and therefore suitable for further use in developing strategic priorities based on the setting and solution of the optimization problem.

In order to set the optimization task of maximizing the return on equity of Ukrainian enterprises, taking into account the macroeconomic factors, it is necessary to determine the relevant criteria and limitations. As mentioned above, in relation to the efficiency criterion, the level of return on equity of the enterprise should not be lower than the level of yield of the domestic government loan bonds (as of August 15, 2017 the marginal level of yield of government bonds amounted to 14.54% [9]), in such case the average value of this index for the years 2007–2016 was 12.7%, while by the end of 2016 the average profitability in Ukraine was 1.2% (see Table 1).

On the basis of the conducted analysis we form 3 scenarios of ensuring the maximization of the return on equity of enterprises of Ukraine, subject to the variability of all 4 factor characteristics:

1) operational (or short–term) scenario (within 1 year) – ensuring the return on equity at the level of lowest meaning of marginal yield of government bonds for the years 2007–2016 6.4% – ROE → 6.4%;

2) Tactical (or medium–term) scenario (up to 3 years) – ensuring the return on equity at the level of average meaning of marginal yield of government bonds for the years 2007–2016 12.7% – ROE → 12.7%;

3) strategic (or long–term) scenario (over 5 years) – achievement of the return on equity at the level of maximum meaning of marginal yield of government bonds for the years 2007–2016 25% – ROE → 25%.

We solve the optimization tasks using the “Solver” setting in Excel, by optimizing target functions to the specified values of each of the three scenarios. Thus, for the operational scenario (up to 1 year) of ensuring the maximization of the return on equity of Ukrainian enterprises we have the following target function:

$$69 - 0.506IPPI + 0.001CISB - 1.042LSE + 0.018PFTS \xrightarrow{IPPI, CISB, LSE, PFTS} 6.4\%, \quad (2)$$

where $\overrightarrow{IPPI, CISB, LSE, PFTS}$ – means, that optimization is made by changing all the factor characteristics.

For the tactical scenario (up to 3 years) the target function is as follows:

$$69 - 0.506IPPI + 0.001CISB - 1.042LSE + 0.018PFTS \xrightarrow{IPPI, CISB, LSE, PFTS} 12.7\%. \quad (3)$$

For the strategic scenario (up to 5 years) the target function with limitations:

$$69 - 0.506IPPI + 0.001CISB - 1.042LSE + 0.018PFTS \xrightarrow{IPPI, CISB, LSE, PFTS} 25\%, \quad (4)$$

where $100 \leq IPPI \leq 110$;

$38000 \leq CISB \leq 40000$;

$28 \leq LSE \leq 30$.

The optimization results are given in Table 4.

Table 4

Forecasting of the return on equity of Ukrainian enterprises by optimization results

Index name	In fact at the end of 2016	Index meaning according to the scenarios at the end of:		
		2017	2019	2021
1. Industrial Producer Price Index, %	135.7	122.1	114.7	110.0
2. Capital investment from the state budget, million UAH	36081.2	36326.6	37935.8	40000.0
3. The level of the shadow economy, % to GDP	34.0	32.6	31.4	28.0
4. PFTS Index	265.2	265.9	267.6	533.1
5. Return on equity, %	1.2	6.4	12.7	25.0

Source: authors' calculations.

As can be seen from the data, given in Table 4, it is possible to ensure the increase in the return on equity by 5.2% during 2017, under the condition of 13.6% reduction in the industrial producer price index, an increase in the volume of capital investments from the budget by 245.4 million UAH and a decline of the shadow economy level by 1.4% of GDP volume. In order to ensure the level of return on equity 12.7% over the next 3 years, it is necessary to reduce the rate of growth of inflation of industrial products by 21%, compared to 2016, to increase the capital investment from budget funds by 5%, and reduce the level of shadowing of the national economy by 2.6% of GDP volume at a slight increment of growth (+0.9) in the market capitalization of the PFTS stock exchange. In the long-term perspective, the strategic priorities of the state economic policy of ensuring a return on equity of 25% over the next 5 years will be a reduction of the rate of growth of industrial production by 25.7%, an increase in capital investment from the budget by 10%, a decrease in the level of shadow economy by 6% GDP volume to the level of 2007, as well as the double increase of market capitalization of the PFTS stock exchange, to the level of 2011.

Conclusions. During the research, the authors have proved that the criterion of the effectiveness of financial management and the main objective of the owner or investor in Ukraine is to ensure maximization of the return on equity of the enterprise not lower than the current level of yield of domestic government loan bonds. On the basis of economic and mathematical modeling of the return on equity, taking into account the macroeconomic factors that could be influenced within the framework of the implementation of the state regulatory policy, three optimization tasks were set and solved. The results of the optimization are based on the strategic priorities of ensuring the maximization of the equity capital of enterprises of Ukraine at the level of 25%, under the condition of targeting the industrial products inflation to 110%, planning in the budget by 10% more than the capital investment volume, reducing the shadow economy to 28% of GDP and increasing capitalization of the stock PFTS exchanges twice during the years 2017–2021.

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