MODELLING THE FINANCIAL PERFORMANCE OF THE INDUSTRIAL ENTERPRISES – CASE OF LIGHT, WINE AND MACHINERY INDUSTRIES

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The financial performance reflects the success in realization of financial objectives or in value creation. The evaluation of financial performance represents a stringent necessity for enterprise's development, thus the estimated level of financial performance allows establishing the directions of enterprise activity improvement. The researchers use different methods of financial performance evaluation depending on their research objects. This paper aims to adapt the econometric model of financial performance evaluation for industrial enterprises.

Keywords: *financial performance, evaluation, industrial enterprises, logistic regression.*

Performanţa financiară reflectă succesul întreprinderii în realizarea obiectivelor financiare propuse sau în crearea de valoare. Evaluarea performanţei financiare reprezintă o necesitate stringentă pentru dezvoltarea întreprinderii, deoarece nivelul estimat al performanţei financiare permite determinarea direcţiilor de perfecţionare a activităţii întreprinderii. Cercetătorii utilizează diverse metode de evaluare a performanţei financiare în dependenţă de scopul de cercetare propus. Această lucrare urmăreşte adaptarea unui model econometric de evaluare a performanţei financiare a întreprinderilor industriale, precum şi aplicarea practică a modelului obţinut.

Cuvinte-cheie: *performanţă financiară, evaluare, întreprinderi industriale, regresie logistică.*

Финансовая результативность отражает успех предприятия в достижении поставленных финансовых целей или в создании добавленной стоимости. Оценка финансовой результативности является крайне необходимой для развития предприятия, так как вычисленный уровень результативности позволяет определить направления совершенствования деятельности предприятия. Исследователи используют разные методы оценки финансовой результативности в зависимости от предполагаемой цели исследования. Цель данного исследования состоит в адаптации эконометрической модели оценки финансовой результативности промышленных предприятий на основе предыдущих эконометрических исследований, а также практическое применение полученной модели.

Ключевые слова: *финансовая результативность, оценка, промышленные предприятия, логистическая регрессия.*

JEL Classification: G39, L62, L66, L69.

Introduction. Financial performance is a complex, controversial and multidimensional economic concept that describes the past and future financial success of the enterprise, and reveals financial objectives proposed by the company in the context of satisfying the interests of stakeholders, respect for social values and sustainable development.

The evaluation of the company's financial performance holds a central place in the financial research. The ability to estimate the financial progress and assess the level of achievement of objectives is vital for enterprise strategic development.

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Financial performance is evaluated by various methods, the choice of which depends on the purpose of the research. Thus, the following types of methods for evaluating financial performance are used: the method of financial ratios, the scoring method, regression analysis methods and multi-criteria analysis methods.

Econometric techniques offer a number of advantages that convince researchers to use them in assessing financial performance, in predicting the risk of bankruptcy or developing credit rating. Among these advantages the objectivity is highlighted, because econometric methods are based on statistically significant relationships between variables, removing subjectivity, which is observed in the method of financial ratios or scoring, in which the researcher's opinion on the importance of predictors plays the basic role.

In developing the model of bankruptcy prediction, American researcher E. Altman (1968) argues that traditional analysis of financial ratios is no longer an important analytical technique in academic research (Altman, 1968), proposing a statistical method called discriminant analysis, which is used to classify an observation in a priori determined group. Discriminant analysis enables the prediction or classification of type of situation, where the dependent variable appears in qualitative form (performing or non-performing). In this respect classifying observations into two or more groups is the first step of the research. Each observation (enterprise) is determined by a set of characteristics (financial ratios). Discriminant analysis is to determine the best combination of features that will distinguish between groups [2].

Discriminant analysis has certain disadvantages, which have been described and criticized by another American scientist J. A. Ohlson, who proposes a logistic regression model to estimate the possibility of bankruptcy. In his work, it is argued that it is more advantageous to use a logistic model over the discriminant one, as the latter imposes certain statistical requirements on distributive properties of the predictors; also discriminant analysis results in a function score, which interpretation is largely subjective [8].

The researchers on estimating the bankruptcy risk drew our attention, because most of empirical research in assessing the financial performance of the company uses the simplest approach, that we do not support, identifying the financial performance with another financial concept (profitability, return, market value) as the dependent variable using a representative indicator of the selected concept (PN – net profit, ROA – return on assets, TSR – total return to shareholders). In this regard, we considered necessary to study the field of probability of bankruptcy to adapt its statistical techniques to assess the financial performance of the company.

Although some researchers confuse these concepts, using the terms "financial performance" and bankruptcy (failure, distress) to describe the two extremes of the same phenomenon [7], we believe that financial performance is a different concept than the bankruptcy. Despite the fact that these concepts have certain common points, they are seen as different areas, but interpendent. This is confirmed by empirical study conducted by a group of researchers who bound financial performance and bankruptcy, studying the connection between them, determining a statistically significant indirect relationship between financial performance and bankruptcy [1].

Content. By studying models of financial performance evaluation and of bankruptcy probability estimation, we considered the logistic regression as the most appropriate statistical technique of the determination of "the probability of failure" [9], to quantify the financial performance of industrial enterprises. Thus, in this paper, we propose a model of financial performance evaluation for industrial enterprises (beverage industry, light industry, machinery, equipment and apparatus industry), which are listed on the Stock Exchange of Moldova. The selection of this segment of industrial enterprises is primarily based on the fact that the these areas are strategically important for the national economy, both in terms of production volume, as well as a share of exports and secondly as long as the market value is considered as a dimension of financial performance, listed joint stock industrial enterprises are considered eligible.

The research purpose is to improve the current means of estimating financial performance at the enterprise level, using information available in local record system. The annual statistics for the period 2011-2014 of 43 companies (172 observations) of light industry, beverage industry and in machinery, equipment and appliances were used as the informational base for model development. Initial selection allowed the identification of 80 industrial enterprises, but imposed conditions (business continuity during the selected period, the presentation of full financial statements) have reduced the sample. Ten dimensions of financial performance were identified, based on financial literature, as the information descriptive basis:

(return, profitability, growth, capital turnover, stability, market value, added value, capacity payment, cash flow, financial equilibrium), detailed by descriptive indicators (table 1).

In this manner we identified potential variables for evaluation of financial performance of industrial enterprises. Overall 36 indicators were identified and determined. A dummy variable was defined by thoroughly analysing the results presented by enterprises according to the theoretical thresholds of performance, financial performance (PF), given the conditions: if the rate of operating cash flow (RFNO) > 0, also if the rate the own working capital (RFRP)> 1, overall borrowing rate (RIG) < 0,7 and long-term debt rate (RIT) <0.5, company is assigned to code 0 (performing company), otherwise been assigned code 1 (non-performing enterprise).

The estimation of financial performance evaluation model for industrial companies can be realized only after reducing the database to an optimal number of variables, starting from the premise that the number of predictors in a regression model may be approximately equal to the number of subjects. As Hosmer and Lemeshow said (2000) [6] the number of predictors in the logistic regressions is identified as well as in multiple regression based on the sample size (expected effect size and power of the test)[1].

The ANOVA – test was used as parametric technique of reducing the number of independent variables. This test verifies the differences between groups of subjects on variables of interest, taking into account the category to which the analysed enterprise belongs (performant or non-performant). The ANOVA test consists of identification of those financial variables for which the average levels for the two categories of analysis differ significantly. As a result, variables with improved ability to distinguish between groups that have been shown to be responsive to the enterprise category were identified.

In the next step of dimensions' analysis the initial identified variables based on ANOVA results were reviewed, also the expectations of their impact on the financial performance of the company were acknowledged. Only eight dimensions of financial performance from ten initiallly defined were shown to be sensitive to the category *performance* of the enterprise, namely:

1. The *Profitability* dimension, after preventive reviewing, was reduced to one significant indicator that differentiates businesses into performing and non-performing, which is: **gross profit (PB)**. A positive value of this indicator shows the ability of businesses to cover by the total revenue earned at least the cost of production. Expectations from this indicator are to be at least in positive area, as a low or negative level determine the diminution of the company's financial performance.

Table 1

The system of indicators for enterprinse's financial performance evalution

<table>
<tr><th>PROFITABILY</th><th>MARKET VALUE</th></tr>
<tr><td>1. Revenues from sales (VV)</td><td rowspan="2">20. Net profit per share (PNACT) = Net profit/number of shares</td></tr>
<tr><td>2.Gross profit (PB)= Revenues from sales – Cost of sales</td></tr>
<tr><td rowspan="2">3. The result from operational activity (RAO)= Gross profit + Other operational revenues – Distribution costs – administrative expenses – other operational costs</td><td>21. „Price/profit" ratio (PER)= Price of a share/ net profit per share</td></tr>
<tr><td rowspan="2">22. The market capitalization (CB)= Price of a share * number of shares</td></tr>
<tr><td rowspan="2">4. The result from other activities (RAA)= Result from investment activity + Financial result +Exceptional result</td></tr>
<tr><td rowspan="2">23. "Price to book value" ratio." (PBR) = Price of a share/ book value of a share</td></tr>
<tr><td rowspan="2">5. Net profit (PN)= Profit before taxes - Income tax expenses</td></tr>
<tr><td>PAYMENT CAPACITY</td></tr>
<tr><td>RETURN</td><td rowspan="2">24. Current liquidity (LC)= Current assets/ Current debts</td></tr>
<tr><td>6. Return over sales (ROS)= Gross profit/ Revenues from sales</td></tr>
</table>

[1] ***The online Statistics Calculators version 3.0 can be used (http://www.danielsoper.com/statcalc3/calc.aspx?id=1).***

PROFITABILY	MARKET VALUE
	25. intermediate liquidity (LI) = (Current assets - Inventory)/ Current debts
7. Return over cos (ROC)= Gross profit/ Cost of sales	26. Quick liquidity (LR)= Cash/ Current debts
8. Return over assets (ROA)= Profit before taxes / Total assets	27. The overall solvency ratio (RSG) = Total assets/ Total debts
9. Return over equity (ROE)= Net profit/ Equity	**CASH FLOW**
GROWTH	28. Operational cash flow ratio (RFNO) = net operational cash flow/ net cash flow
10. Growth of sales (CRVV)=($CRVV_1$-$CRVV_0$)/ $CRVV_0$*100%	29. The coverage ratio of debt to operating cash flow (RDFNO)= net operational cash flow/ total debts
11. Growth of assets (CRAT) =($CRAT_1$-$CRAT_0$)/ $CRAT_0$*100%	30. The coverage ratio of equity to operating cash flow (RCFNO)= net operational cash flow/ equity
12.Growth of net profit per share (CRPNACT) =($CRPNACT_1$-$CRPNACT_0$)/$CRPNACT_0$*100%	
CAPITAL TURNOVER	31. The coverage ratio of assets to operating cash flow (RAFNO)= net operational cash flow/ total assets
13. Turnover period of term assets (RAI) =Average value of term assets/ Revenues from sales * 365	**EQUILIBRIUM**
14. Turnover period of current assets (RAC) =Average value of current assets/ Revenues from sales * 365	32. Own working capital ratio (RFRP)= Own capital/ term assets
STABILITY	33. Working capital ratio (RFR)= Permanent capital/ term assets
15. Financial autonomy ratio (RAF) = Equity/ Total Assets	34. Current assets financing ratio (RFAC)= Working capital/ Current assets
16. Financial stability ratio (RSF)= Permanent capital/ Total Assets	35. Inventory financing ratio (RFS) = Working capital/ Inventory
17. Overall borrowing ratio (RIG)= Total debts/ Total Assets	**VALUE ADDED**
18. Long-term debt ratio (RIT)= Long-term debts/ Permanent capital	36. Value added (VA) = Value of sold production – Intermediate consumption
19. The leverage ratio (KLF) = Long-term debts/ equity	

Source: developed by authors.

2. The dimension *Return* is represented by the **return on equity (ROE)**, which quantifies the company's ability to efficiently use its own capital, in other words, the ability of equity to generate profits. The expectations of this indicator are at least positive, its growth will strengthen the financial performance.

3. The dimension *Stability* is represented by following variables: **financial autonomy ratio (RAF), financial stability ratio (RSF), overall borrowing ratio (RIG), and long-term debt ratio (RIT) and the leverage ratio (KLF)**. Stability indicators describe the company's financial structure. Quantitatively, these variables are proportion indicators (0-1) with optimal intervals and their assessment is made in concordance with optimal levels. Expectations from these indicators have a dual character as a level of financial autonomy rate close to the lower limit (eg. 0.4) can be appreciated as positive, if the attractions of major borrowed sources lead to expansion of production activity (optimal financial structure); or as negative if the debt is not justified by a pronounced increase in earnings, of profitability and, ultimately, of financial performance.

4. The financial performance's dimension *Equilibrium* will be presented by the following variables: **Rate of current assets financing (RFAC), rate of working capital (RFR), rate of own working capital (RFRP)**. The equilibrium's indicators show the margin of safety, revealing asset management strategy. Growth of these indicators points defensive intentions in assets financing, which, in addition to providing a safety margin, involves the increasing of funding costs. Thus, expectations regarding these indicators are dual, considering that their growth will strengthen financial performance only up to a level.

5. The dimension *Market value* will be presented through the prism of the indicators: **Net profit per share (PNACT), The "Price-to-Book-Ratio" (PBR)**. These indicators describe the company's stock performance. Expectations of net profit per share are its positive values. Also, an increased and supraunitar level for PBR is expected.

6. The dimension *Payment capacity* showed to be well played by variables: **current liquidity (LC), intermediate liquidity (LI), quick liquidity (LR) and the overall solvency ratio (RSG)**. Expectations from these indicators are that the current liquidity will record values greater than 1, and the overall solvency ratio will register values higher than the level of 1.5, while expectations of ability's to pay other indicators are not clearly defined. Overall, the enhancement of payment capacity's indicators strengthens the financial performance. However, an excessive amount of liquidity involves the increase of opportunity costs, it signifies that the growth of these indicators will enhance the financial performance only up to a certain level.

7. *Value added* dimension is described by the remaining variable: **Value added (VA)**. The positive value of this indicator reveals that the company has managed to create a surplus value in its work. The expectations to this indicator are the positive level and increasing dynamics, that will increase the financial performance.

8. The dimension *Growth* is reduced to be represented only by indicator: **Growth of total assets (CRAT)**. The positive value of this indicator highlights the quantitative aspect of the expansion strategy without disclosing qualitative aspect. Thus, expectations of this indicator are dual because growth of total assets does not guarantee an increase of financial result, nor of financial performance.

The ANOVA test significantly contributed to reduce the number of the financial performance predictors from 36 positions to 18, but not enough to get a quality simulation. An important moment in the modelling process, which should be taken into account, is the effect of correlation between independent variables. Thus based on estimated bivariate correlation matrix, we find that a statistically significant correlation is shown between some indicators of the same dimension. Based on the analysis of the correlation matrix, the matrix of possible predictors of financial performance may be reduced as a result of the relationships shown in Table 2.

The data set for this empirical research has been designed taking into account the modelling technique, which will be applied in probability modelling that represents the financial performance of enterprises and namely modelling with binary qualitative variables [6,10]. Logit and probit models were used as simulation techniques. Based on the empirical statistics and on the level of empirical prediction of the result, optimal simulation relationship of financial performance for domestic industrial enterprises was identified.

The logit model is described theoretically by:

$$F(x) = \Pr(y = 1|X) = \frac{1}{1+e^{-(\beta_0+\sum_{j=1}^{k}\beta_j x_{i,t})}} \quad (1)$$

If a logistic transformation is applied to equation (1), a linear relationship between the logit (F (x) and the explanatory variables is obtained:

$$\Pr(y = 1|X) = \log\left(\frac{F(x)}{1-F(X)}\right) = \log\left(\frac{pi}{1-pi}\right) = \beta_0 + \sum_{j=1}^{k}\beta_i x_{it} \quad (2)$$

The dependent variable in probit model is a transformation of observed probability according to distribution law. Mathematical form of this type of model is:

$$F(x) = \Pr(y = 1|X) = \int_{-\infty}^{z}\frac{1}{\sqrt{2\pi}}\exp\left(-\frac{1}{2}(x)^2\right)dx, \quad \text{where } z_i = \beta_0 + \sum_{j}^{k}\beta_j x_{ij} \quad (3)$$

Table 2

Interdimensional correlations

Dimension	Significant correlation (Sig.<0,01)	Final predictors
Profitabily	Gross profit (PB)	Gross profit (PB)
Return	Return over equity (ROE)	Return over equity (ROE)
Stability	Financial autonomy ratio (RAF)& Overall borrowing ratio (RIG) Financial autonomy ratio (RAF)& Long-term debt ratio (RIT) Financial autonomy ratio (RAF)& Financial stability ratio (RSF) Overall borrowing ratio (RIG))& Long-term debt ratio (RIT) Overall borrowing ratio (RIG) & Financial stability ratio (RSF)	Financial autonomy ratio (RAF) OR Overall borrowing ratio (RIG) OR Long-term debt ratio (RIT) OR Financial stability ratio (RSF), The leverage ratio (KLF)
Equilibrium	Working capital ratio (RFR) & Own working capital ratio (RFRP)	Working capital ratio (RFR) OR Own working capital ratio (RFRP), Current assets financing ratio (RFAC)
Market value	-	Profit net/acţiune (PNACT), Indicatorul PBR sau P/B- „Price-to-Book-Ratio" (PBR)
Paument capacity	Current liquidity (LC) & Intermediate liquidity (LI) Current liquidity (LC) & The overall solvency ratio (RSG) Intermediate liquidity (LI) & Quick liquidity (LR)	Current liquidity (LC) OR Intermediate liquidity (LI) OR The overall solvency ratio (RSG) OR Quick liquidity (LR)
Value added	Value added (VA)	Value added (VA)
Growth	Growth of total assets (CRAT)	Growth of total assets (CRAT)

Source: developed by authors.

A step by step method was used as a technique of introducing the variables in the model. Only variables that had significant influence on the result (<10%) were kept.

Both the logit and probit models present significant results for the following influence factors of the financial performance: financial autonomy ratio (RAF), own working capital ratio (RFRP), return on equity (ROE), Net profit /share (PNACT) ratio and the "Price-to-Book-Ratio" (PBR). But only one of these two models simulates the reality better – logit model.

The quality of binary models is verified by such estimated indicators as McFadden R2, Akaike criterion, Schwarz criterion, Hannan-Quinn criteria:

- McFadden R^2 is a statistical alternative of determination coefficient (typical linear regression model), which is calculated for models with binary qualitative variables. It is determined by maximum likelihood of estimated model correlating with empirical results. Choosing between two types of estimated model based on the same dependent variable, we argue to choose the model with maximum value of McFadden R^2, in the present case – logit model;
- comparing the quality of the models estimated by the Akaike, Schwarz and Hannan-Quinn criterias we point to the decision to accept the model that has the smaller value for these criterias. From Table 3 we find that this condition is satisfied by the logit model.

Table 3

The Results of modeling

Variabila dependentă: PF Metoda: ML - Binary Logit Perioada: 2011 2014 Număr observaţii: 172				
Variabile	Coeficienţi	Eroarea Standard (S.E.)	z-Statistic	Prob.
C	4.342582	0.826609	5.253489	0.0000***
RAF	-3.624646	0.948105	-3.823042	0.0001***
RFRP	-1.050723	0.350771	-2.995465	0.0027***
ROE	-3.099125	1.612851	-1.921519	0.0547*
PNACT	-0.110815	0.038410	-2.885057	0.0039***
PBR	-0.077785	0.038917	-1.998742	0.0456**
McFadden R^2	0.260187	Media var. dep.		0.540698
S.D. var. dep.	0.499796	S.E. a regresie		0.419770
Criteriul Akaike	1.090459	Suma pătr. resid.		29.25038
Criteriul Schwarz	1.200256	Funct. verosim		-87.77952
Criteriul Hannan-Quinn	1.135007	Restr. log likelihood		-118.6509
Restr. deviance	237.3018	Media funct. verosim		-0.510346
Statistica LR	61.74280			
Prob(statistica LR)	0.000000			
Obs cu Dep=0	79	Total obs		172
Obs cu Dep=1	93			

Variabila dependentă: PF Metoda: ML - Binary Probit Perioada: 2011 2014 Număr observaţii: 172				
Variabile	Coeficienţi	Eroarea Standard (S.E.)	z-Statistic	Prob.
C	2.511999	0.442232	5.680281	0.0000[888]
RAF	-2.134425	0.543318	-3.928497	0.0001[888]
RFRP	-0.592098	0.196793	-3.008741	0.0026[888]
ROE	-1.910783	0.962637	-1.984946	0.0472**
PNACT	-0.060854	0.021431	-2.839487	0.0045*
PBR	-0.045313	0.023146	-1.957658	0.0503*
McFadden R^2	0.258002	Media var. dep.		0.540698
S.D. var. dep.	0.499796	S.E. a regresie		0.420902
Criteriul Akaike	1.093474	Suma pătr. resid.		29.40824
Criteriul Schwarz	1.203270	Funct. verosim		-88.03878
Criteriul Hannan-Quinn	1.138021	Restr. log likelihood		-118.6509
Restr. deviance	237.3018	Media funct. verosim		-0.511853
Statistica LR	61.22428			
Prob(statistica LR)	0.000000			
	0.258002			
Obs cu Dep=0	79	Total obs		172
Obs cu Dep=1	93			

* p<0.1, ** p<0.05, *** p<0.01

Source: calculated by the authors with EViews 8.0

The application of logit model is reasonable only if it will prove/ argue the predictive power of this simulation and systematic justification of a relationship between forecasts and actual achievements. In this regard we have performed the following actions:

a) assessing the quality of prediction model (Table 4).

b) applying the Hosmer-Lemeshow and Andrews test (Table 5).

In assessing the quality of prediction model the division of businesses in performing and non-performing threshold level from 0.5 was realized (as mentioned previously, financial performance is expected in the range [0, 1]). Thus, if estimated financial performance registered a value less than 0.5, enterprise was attributed to the category of performing companies, and vice versa, a value higher than 0.5 awarded the company the nonperforming status.

Table 4

Assessing the quality of prediction model

Expectation-Prediction Evaluation for Binary Specification Equation: LOGIT nivelul de prag C = 0.5			
	Ecuaţia estimată		
	Dep=0	Dep=1	Total
P(Dep=1)<= C	63	28	91
P(Dep=1)>C	16	65	81
Total	79	93	172
Correct	63	65	128
% Correct	**79.75**	**69.89**	**74.42**
% Incorrect	20.25	30.11	25.58

Source: Calculated by the authors with EViews 8.0

As a result, identified logit model has a total prediction accuracy of 74%. Separately for simulation categories, the model projected performance correctly for 80 percent of cases and non-performance in 69 percent of cases. As the last step of the analysis the existence of a systematic relationship between forecast and actual achievements was verified. For this purpose Hosmer-Lemeshow & Andrews test was applied. Its premise verifies the existence of a systemic relation between forecasts and achievements. This test checks assumptions:

H0: there is no difference between the forecast results as a binary estimation and actual results;

H1: there is a difference between predictions and actual results.

Table 5

The χ^2 test

Goodness-of-Fit Evaluation for Binary Specification
Andrews and Hosmer-Lemeshow
Tests
Equation: LOGIT
Grouping based upon predicted risk (randomize ties)

	Quantile of Risk		Dep=0		Dep=1		Total	H-L
	Low	High	Actual	Expect	Actual	Expect	Obs	Value
1	2.E-05	0.1823	15	14.8069	2	2.19309	17	0.01952
2	0.1825	0.3033	13	12.7184	4	4.28155	17	0.02475
3	0.3101	0.3566	12	11.2514	5	5.74860	17	0.14729
4	0.3584	0.4051	10	10.6175	7	6.38250	17	0.09565
5	0.4073	0.4636	10	10.1282	8	7.87182	18	0.00371
6	0.4655	0.5750	9	8.18604	8	8.81396	17	0.15610
7	0.5796	0.7235	5	5.59798	12	11.4020	17	0.09524
8	0.7279	0.8471	2	3.94636	15	13.0536	17	1.25017
9	0.8483	0.9551	2	1.72355	15	15.2764	17	0.04934
10	0.9563	1.0000	1	0.27179	17	17.7282	18	1.98100
		Total	79	79.2482	93	92.7518	172	3.82277

H-L Statistic	3.8228	Prob. Chi-Sq(8)	**0.8727**
Andrews Statistic	3.7448	Prob. Chi-Sq(10)	**0.9581**

Source: Calculated by the authors with EViews 8.0

The results of Andrews and Hosmer&Lemeshow test, shown in Table 5, argue the correspondence of forecast to reality at a significance level of 1%. Thus, the estimated logit model is considered as a safe and quality tool for evaluation of company's financial performance.

Once the relevance of the logit model for estimation of financial performance of an enterprise was demonstrated, we find that the mathematical relationship which can be used as a tool for measuring is:

$$(x) = \Pr(y = 1|X) = \frac{1}{1 + e^{-(4{,}34 - 3{,}62RAF - 1{,}05RFRP - 3{,}1ROE - 0{,}11PNACT - 0{,}08PBR)}}$$

where:

RAF - financial autonomy ratio; RFRP – own working capital ratio;

ROE - return on equity; PNACT – Net profit per share;

PBR - "Price to book value" ratio.

The interpretation of regression estimators' parameters does not contain a direct elasticity that allows evaluating how much the change with a unity of a predictor will influence the change of dependent variable as it is possible in linear regression models. But it is possible to determine, instead of direct influence, the marginal effects of predictors using the following mathematical apparatus:

$$\frac{\partial p}{\partial X_i} = \frac{dp}{dZ}\frac{\partial Z}{\partial X_i} = f(Z)\beta_i = \frac{e^{-Z}}{(1+e^{-Z})^2}\beta_i \quad (4)$$

$$\text{where} f(Z) = \frac{dp}{dZ} = \frac{e^{-Z}}{(1+e^{-Z})^2}, \quad (5)$$

and $$Z = \beta_1 + \beta_2 X_2 + ...\beta_k X_k \quad (6)$$

The marginal effects of independent variables on financial performance of the logit model are calculated in the presented formulas (Table 6).

Based on the data of Table 6 we find that financial performance's dimensions identified at company level show the following marginal effects:

• The financial autonomy ratio (RAF) of an average enterprise increasing by 0.1 units determines the enhancement of financial performance by 8.43%;

• The own working capital ratio (RFRP) of an average enterprise contributes by 0.1 points, increasing the growth of financial performance by 2.44%;

• The return on equity (ROE) of an average enterprise increased by 0.1 point, determines the raise of financial performance by 7.21%;

• Net profit / share (PNACT) of medium enterprises, increasing by 0.1 points, determines the enhancement of the probability of success by 0.26%;

• "Price-to-Book-Ratio" (PBR) of an average enterprise determines, increasing by 0.1 points, the enhancement of financial performance by 0.18%.

The estimation of the financial performance of industrial enterprises through financial performance index (PF) determined by logistic regression permits the quantification of current financial success and of future financial potential of the company. The financial performance index is enframed in the [0, 1] interval, and if its level approaches the lower limit "0", the probability of financial problems is much lower, meaning that the financial performance is high and vice versa.

Table 6

The marginal effect of predictors on financial performance

Predictors	Marginal effect
The financial autonomy ratio (RAF)	-0.843030
The own working capital ratio (RFRP)	-0.244380
The return on equity (ROE)	-0.720803
Net profit / share (PNACT)	-0.025774
"Price-to-Book-Ratio" (PBR)	-0.018091

Source: Estimated by the author with EViews 8.0

Depending on the level of the index estimated according to the relation of the proposed model, the following types of financial performance of industrial enterprise are distinguished:

- $0 \leq \mathbf{PF} \leq 0{,}30$ – superior financial performance;
- $0{,}30 < \mathbf{PF} \leq 0{,}50$ – average financial performance;
- $0{,}50 < \mathbf{PF} \leq 0{,}70$ – low financial performance;
- $0{,}70 < \mathbf{PF} \leq 1$ – non-financial performance.

Conclusion. The identified dimensions of enterprise's financial performance at the level of beverage industry, light industry and the machinery, equipment, apparatus industries show the importance of obtaining positive net result, optimizing financial structure, appropriate management of assets and increasing of market value. Thus, the negative effect can be minimized by increasing debt leverage, ie by increasing the financial return, and net profit growth per share. Similarly if we consider the change in the assets, which can lead to lower own working capital, while investment in fixed assets can lead to increased net profit and return on equity.

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