

Factor analysis of owners equity effectiveness

Faktorová analýza rentability vlastného imania

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Abstract: The paper shows methodical procedure and results of factor analysis of owners equity effectiveness in form of quantification and determination of analytical indicators of their pyramidal system. The analysis is realised through comparison of aggregated values of two groups of enterprises (per 30 each group) for the period 1998–2000. First group of enterprises is in the first third of soil price groups in Slovakia (cheapest soil) and the second group in the third of price group of the most expensive soil.

Key words: owners equity effectiveness, factor analysis, pyramidal decomposition, revenues, costs, capital

Abstrakt: Príspevok prináša metodický postup a výsledky faktorovej analýzy rentability vlastného imania formou kvantifikácie determinácie analytických ukazovateľov ich pyramídovej sústavy. Analýza sa opiera o porovnávanie agregovaných hodnôt dvoch skupín podnikov (v každej skupine po 30) za obdobie rokov 1998 až 2000. Prvá skupina podnikov pôsobí v prvom terciu cenových skupín pôdy v rámci Slovenska (najlacnejšie pôdy) a skupina druhá v terciu cenových skupín najdrahších pôd.

Kľúčové slová: rentabilita vlastného imania, faktorová analýza, pyramídový rozklad, výnosy, náklady, kapitál

INTRODUCTION

Financial control nowadays is becoming one of the key factors of the enterprise existence including agricultural and food complex. Requirements on enterprise managers are constantly increasing for managing the trusted enterprises. This requires a perfect cognition of the reproduction process in its whole depth and complexity. The more knowledge we have about its state and development, the more objectively we can determine aims, tools and ways of its fulfilment.

At qualifying, financial status of an enterprise is undoubtedly of great importance regarding the owners equity cost effectiveness, and its value is especially important for shareholders (owners) of the enterprise. It is the most representative indicator of labour effectiveness from the enterprise owners point of view. It is recommended to keep its value higher than the current interest rate and, at the same time, proportional to the taken business risks. In practice, most agricultural enterprises are unable to ensure their own capital effectiveness at the annual inflation level. That is one of the main reasons why this paper is dealing with internal capital effectiveness analysis and the factors that determine it.

MATERIAL AND METHODS

Construction and identification of certain factors informing about different aspects of economical processes is deficient for effective enterprise managing. The

reason for this deficiency is, that there are running many different and differentiated (production, financial, stocking or sale) processes in enterprises. The complex character of these processes very often causes a non-transparency of the indicators that refer to them. When searching for optimal methods of measuring enterprise effectiveness, we can come out from the experience, that economy has a certain coherence (determinants) of indicators in the given enterprise. This coherence can be expressed by indicators, among which there are simple and understandable relations and causal connections. A typical sample of this method is the pyramidal system of indicators, which is a logical-deductive indicator system. This system is being observed and it is created by decomposition of one relatively very synthetic indicator – logical and deduction method – to other indicators that are in the position of causal factors. This means that an artificial hierarchy is created, while we can choose a different number of decomposition levels. The pyramidal system of indicators is utilised mainly by internal enterprise analysis and it is one of the managers tools for comparing planned and real values of indicators. By using pyramidal decomposition of indicators, it is possible to:

- find a certain coherence between indicators to find out which factors (analytical indicators) have influence on the decomposed (synthetic) indicators. That means, we are able to analyse reasons of the synthetic indicator values changes – that is the static form of the pyramidal model
- determine influence of the analytic indicators changes on the changes of the analysed synthetic indicators –

this means, we are able to evaluate, if the direction of analytical indicators effect is positive or negative – this is the dynamic form of pyramidal model.

The static form of pyramidal decomposition does not enable us to determine the intensity of analytic indicators influence on the synthetic indicator. This means that is not possible to quantify the influence of the analytical indicator on the synthetic indicator or on its change. If we want to express the influence of the analytical indicator on the increase or index of the synthetic indicator, we have to use special methods. An increase of a synthetic indicator (ΔX) or index of a synthetic indicator (Ix) we express as the function of increase or index of analytic indicator.

$$\Delta X = f(\Delta a, \Delta b, \dots \Delta s)$$

$$\text{Index } X = f(\text{index } a, \text{index } b, \dots \text{index } s)$$

$$\text{Condition: } X = f(a, b, \dots s)$$

where: X = synthetic indicator
 a, b, \dots, s = analytical indicator

According to the mentioned method, we built up a pyramidal system of indicators – determinants of owners equity effectiveness.

The steps of pyramidal decomposition of the owners equity effectiveness as a mathematical equation are in Figure 1.

Basic data for this paper are taken from the gross balance sheets and profit and loss accounts of sixty enterprises, from the years 1998–2000. Half of the mentioned enterprises are farming on land, that is shown in the price group 1 to 7 (signed in the paper as enterprises of first group) and the second half of enterprises are farming on land, that is shown in price group 14 to 20 (enterprises of second group). For better comprehension, we added that there are 20 price groups of land in evidence, where the qualitatively worst land is classified in first price group and the best quality land in twentieth. The valid legislation does not allow us to publicise the indicators of enterprises, therefore in the paper we operate with aggregated quantities for certain, already specified workgroups. Compared quantities are indicators calculated from the year 2000 data and comparing quantities are the

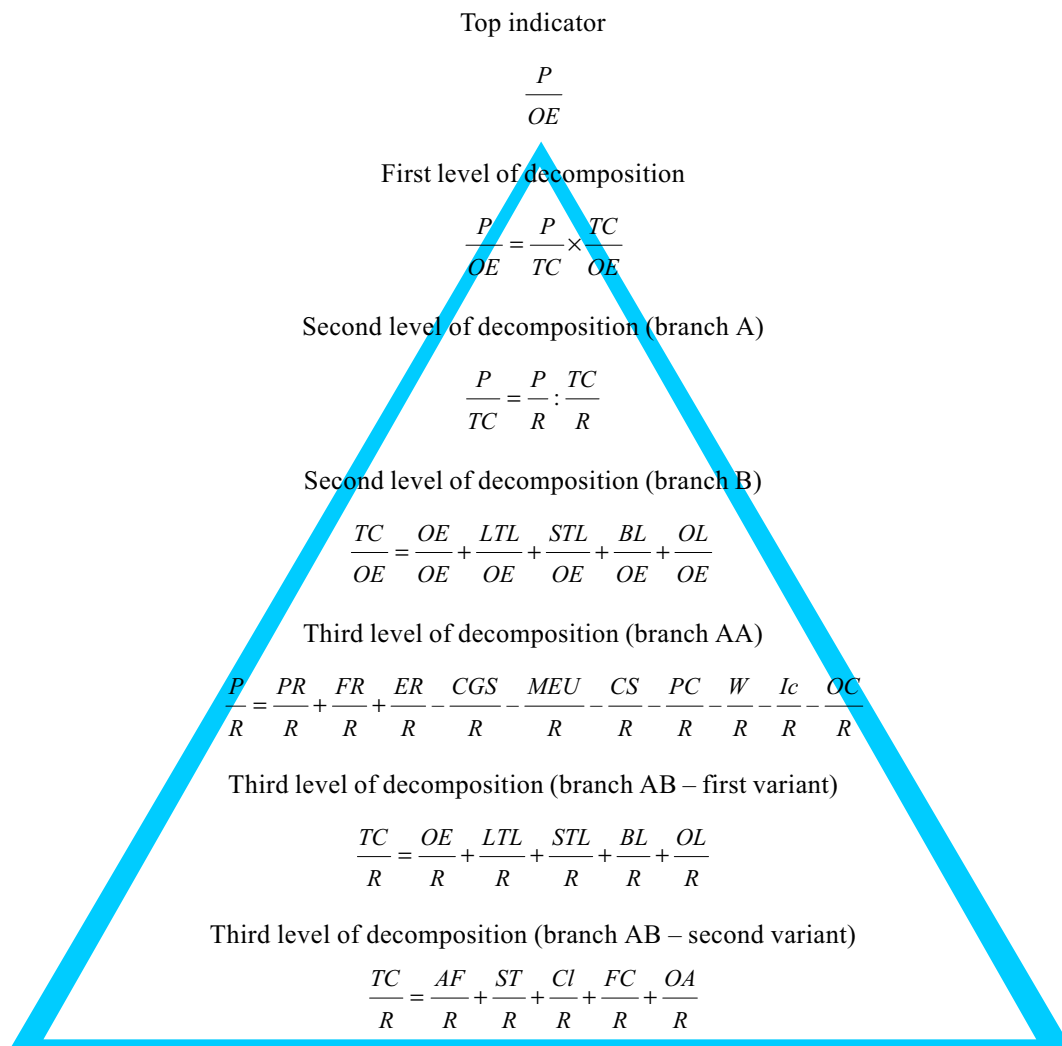


Figure 1. The steps of pyramidal decomposition of the owners equity effectiveness as a mathematical equation

indicators of year 1998. The legend of used abbreviations is supplied at the end of the paper.

At quantification, determination of analytical indicators changes on changes of internal equity effectiveness at multiplicative relations. We used methods of gradual changes. Of this mathematical procedure, we will show as an example the quantification effect of total capital

effectiveness change on internal equity effectiveness change (first level of decomposition).

$$\frac{P}{OE} \frac{P}{TC} = \frac{P_{2000}}{TC_{2000}} \times \frac{TC_{1998}}{OE_{1998}} - \frac{P_{1998}}{TC_{1998}} \times \frac{TC_{1998}}{OE_{1998}}$$

Table 1. Quantified effects of analytical indicators on changes of total capital effectiveness

Indicators	1. group of enterprises			2. group of enterprises			Note
	effect in absolute value	effect in relative value (%)	effect if Δ profit/VI = 100%	effect in absolute value	effect in relative value (%)	effect if Δ profit/VI = 100%	
$\Delta P/OE$	0.0228	1 101.03	100.00	-0.0252	-139.82	100.00	Top indicator
$\Delta P/TC$	0.0248	1 198.34	108.84	-0.0259	-143.74	102.80	First level of decomposition
$\Delta TC/OE$	-0.0020	-97.31	-8.84	0.0007	3.92	-2.80	
$\Delta P/R$	0.0246	1 189.66	108.05	-0.0261	-144.71	103.50	
$\Delta TC/R$	0.0002	8.67	0.79	0.0002	0.97	-0.69	Third level of decomposition branch AA
$\Delta PR/R$	0.0152	733.08	66.58	-0.0086	-47.61	34.05	
$\Delta FR/R$	-0.0094	-452.51	-41.10	0.0126	69.83	-49.94	
$\Delta ER/R$	-0.0058	-280.56	-25.48	-0.0040	-22.22	15.89	
$\Delta CSG/R$	-0.0179	-867.75	-78.81	0.0038	20.83	-14.90	
$\Delta MEU/R$	0.0057	275.80	25.05	-0.0088	-48.81	34.91	
$\Delta CS/R$	-0.0020	-97.37	-8.84	-0.0015	-8.22	5.88	
$\Delta PC/R$	0.0099	477.73	43.39	-0.0069	-38.40	27.47	
$\Delta W/R$	-0.0014	-69.83	-6.34	-0.0073	-40.41	28.90	
$\Delta Ic/R$	-0.0001	-4.44	-0.40	-0.0020	-11.12	7.95	
$\Delta OC/R$	0.0305	1 475.52	134.01	-0.0033	-18.59	13.29	Third level of decomposition branch AB
$\Delta OE/R$	-0.0013	-61.67	-5.60	0.0006	3.28	-2.35	
$\Delta LTL/R$	0.0004	21.19	1.92	-0.0003	-1.59	1.13	
$\Delta STL/R$	0.0008	37.75	3.43	0.0000	0.27	-0.19	
$\Delta BL/R$	0.0002	11.06	1.00	-0.0002	-0.98	0.70	
$\Delta OL/R$	0.0000	0.34	0.03	0.0000	-0.01	0.00	Third level of decomposition branch AB
$\Delta AF/R$	0.0003	15.33	1.39	0.0001	0.43	-0.31	
$\Delta ST/R$	0.0002	8.23	0.75	0.0001	0.41	-0.29	
$\Delta CI/R$	0.0001	3.65	0.33	0.0000	-0.25	0.18	
$\Delta FC/R$	-0.0003	-15.31	-1.39	0.0000	0.18	-0.13	
$\Delta OA/R$	-0.0001	-3.22	-0.29	0.0000	0.21	-0.15	Second level of decomposition branch B
$\Delta LTL/OE$	-0.0007	-32.83	-2.98	0.0004	2.00	-1.43	
$\Delta STL/OE$	-0.0010	-46.31	-4.21	0.0001	0.35	-0.25	
$\Delta BL/OE$	-0.0003	-16.72	-1.52	0.0003	1.44	-1.03	
$\Delta OL/R$	0.0000	-1.45	-0.13	0.0000	0.13	-0.09	

Used abbreviations:

P = profit (loss)
OE = owners equity
TC = total capital
R = revenues
PR = process revenues
FR = financial revenues
ER = extra revenues
CSG = costs on sold goods
MEU = material and energy usage
CS = costs of services
PC = personal costs
W = write-offs

Ic = interests (cost)
OC = other costs
LTL = long term liabilities
STL = short term liabilities
BL = bank loans
OL = other liabilities
AF = assets fixed
ST = stocks
CI = claims
FC = financial capital
OA = other assets

Proportion process revenues on total revenues is a quantity that is connected with indicator one level of decomposition lower by additive relation. Procedure of quantification of its change in the analysed period on change of the top indicator will be:

$$\frac{P}{OC \frac{PR}{R}} = \frac{\Delta \frac{PR}{R}}{\Delta \frac{P}{R}} \times \frac{P}{OE \frac{P}{R}}$$

RESULTS OF FACTOR ANALYSIS OF OWN EQUITY EFFECTIVENESS

The boundary of endangerment – minimal value of owners equity effectiveness – can be regarded as the value that is equal to the average inflation rate, that means they will be keeping at least the real value of their own capital. If under the given conditions we determine this value as 8%, we undoubtedly have to maintain that agricultural enterprises in our analysis absolutely do not fulfil this requirement. Paradoxically, enterprises farming under worse soil and climatic conditions (first group) have a higher proportion of profit per one crown of owners equity than enterprises of the second group. Although the trend of profit is unstable, we can observe a growing trend in general. Its value of 2.5% does not fulfil the criteria of the boundary of endangerment and we ignore business risk, what is significant in agriculture. We cannot allow also opinions ignoring the real view on the financial strength and financial behaviour of enterprises saying that it is a provisional period – period of transformation. Such state is also reflection of the macroeconomic instruments that are characteristic for agricultural enterprises. To be objective we have to mention, that in first group in year 2000, there were sixteen enterprises with positive owner equity effectiveness, nine of them with effectiveness higher than 8%. In second group, nineteen enterprises have the positive owners equity effectiveness although only one of them is able to keep the real value of own capital. This observation can mean

an inadequate reaction of the enterprise management on external or/and internal input information.

Quantified influence of certain analytical indicators changes on the change of owners equity effectiveness we show in Table 1. While in the first group we can observe an increase of about 0.0228 (compared with year 1998, it is rise of about 1 101%), in the second group, the profit per crown of owners equity has decreased by 0.0252, what means relative change value of 139.8%. Between the decisive indicators increasing owners equity effectiveness in the first group of enterprises, there are effectiveness of total capital, revenues effectiveness, share of process revenues on total revenues, personal costs per crown of total revenues, and also other not specified costs per revenue. Negative effect on value of top indicator had the changes of costs per sold product, extra and financial revenues per crown of total revenues.

In the second group of enterprises, we can observe mainly negative effects. Determining, top indicator decreasing influence in second level of decomposition was the change of total capital effectiveness, what was determined by the negative trend of revenues effectiveness. In the third level of decomposition, mainly in branch AA, negative influence is distributed evenly. Changes of owners equity effectiveness are positively determined by the proportion of financial and total revenues.

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