JANINA JĘDRZEJCZAK-GAS
PAWEŁ KUŹDOWICZ

Evaluation of the financial condition of the companies of transport and storage section in times of economic crisis - taxonomic analysis

1. Introduction

The global economic crisis of 2007/08-2012/13 affected the sector of Polish companies, including the companies, of which the core business activity is associated with logistics services i.e. storage together with stock handling as well as transportation processes and handling of products (Skowron-Grabowska 2010). It was in the years 2008-2013 that the companies of the transport and storage section recorded deterioration of many financial indicators, including decline in the net profit per 1 company, decline in profitability (ROS, ROA, ROE) and increase in debt. The analysis of the statistical data indicates that other indicators such as indicators of financial liquidity (current ratio, quick ratio), were improved during that period (table 1).

So arises the question: How did the financial situation of the companies of the transport and storage section evolve during the worldwide crisis?

Janina Jędrzejczak-Gas, Ph. D.
University of Zielona Góra,
Faculty of Economics
and Management
Paweł Kuźdowicz, Ph. D. Eng.
University of Zielona Góra,
Faculty of Economics
and Management

Table 1. The selected data characterizing the financial situation of the companies of the transport and storage section in the years 2006-2013[1]

Description	2006	2007	2008	2009	2010	2011	2012	2013
Revenues from total activity per 1 company (mln zl)	53,4	54,7	51,7	35,0	39,6	41,5	39,6	40,6
Net financial result per 1 company (mln zl)	3,2	3,3	1,6	0,5	1,0	1,1	1,0	1,1
Current ratio[2]	1,06	1,04	1,22	1,24	1,30	1,33	1,31	1,39
Quick ratio[3]	0,95	0,93	1,10	1,11	1,17	1,20	1,20	1,29
Return on sales – ROS[4] (%)	6,27	6,35	3,31	1,50	2,58	2,78	2,61	2,91
Return on assets – ROA[5] (%)	5,06	5,11	2,76	1,27	2,30	2,41	2,32	2,47
Return on equity – ROE[6] (%)	10,43	10,50	5,56	2,79	5,06	5,11	5,56	6,12
Debt ratio[7]	0,51	0,51	0,50	0,55	0,55	0,57	0,59	0,60

[1] 2006-2008 the section - transport, storage and communication
[2] Current ratio = current assets / current liabilities
[3] Quick ratio = (current assets – stocks – short-term inter-period settlements) / current liabilities
[4] ROS = (net profit (loss) / net revenues from sales) x 100
[5] ROA = (net profit (loss) / total assets) x 100%
[6] ROE = (net profit (loss) / equity capital) x 100%
[7] Debt ratio = total liabilities/ total assets

Source: own study based on: GUS 2009, 2010, 2011, 2012, 2013, 2014

The evaluation of the financial situation of companies is a complex and multi-dimensional process. First of all, the following aspects of business activity should be considered: 1) Profitability, 2) Financial liquidity, 3) Operational efficiency, 4) Debt and 5) Market value. Certainly there are many financial ratios which are used to measure those five aspects. However, it should be noted that various ratios may give conflicting signals, which could be observed during the recent economic crises in the case of the companies of the transport and storage section (table 1). This situation may cause a problem in a clear assessment of the financial situation of the companies investigated. Therefore, it is helpful to use methods of the multidimensional statistics in studies on the financial condition of the companies, which allow to determine a synthetic measure which replaces a numerous set of features of the investigated subject (e.g. industry) with one

JANINA JĘDRZEJCZAK-GAS
PAWEŁ KUŻDOWICZ

aggregate variable. Thus, the synthetic measure (ratio) enables measurement of the multidimensional phenomenon, which is the financial condition of the companies.

The aim of this article is to assess the financial condition of the companies of the transport and storage section on the basis of a synthetic ratio during the recent economic crisis. This evaluation will be carried out in relation to other selected industries.

The time horizon adopted in the analysis and evaluation of the financial condition of the companies investigated covers the years 2010-2013. This period is due to the availability of the GUS *(Central Statistical Office)* data. This study used the data on financial results of the companies, which were derived from the source „Financial results of economic entities in 2008 (balance sheet)". Until 2008, these data were presented according to the PKD 2004 classification, while since 2009 - according to the PKD 2007 classification. Due to this situation it is not possible to calculate financial ratios for some industries, on which the data is provided according to the PKD 2007 classification, for the year 2009 and prior years.

The study consists of two parts. The first one covers theoretical issues concerning the construction of synthetic measures and shows the procedure of the construction of the measure which was applied in this study. It is in the second part of this study that the synthetic measures for the financial situation of the H sector companies were calculated and the assessment of the financial situation of the companies was carried out.

2. Construction of the synthetic financial condition ratio

There are many different methods for construction of synthetic measures (Cieślak 1974; Hellwig 1968; Strahl 1990, Zeliaś 2000; Malina 2004; Młoda 2006). Generally, they can be divided into two major groups: model and non-model ones. The first group of the methods assumes that there is a hypothetical pattern (a model), with respect to which the distance for all interesting objects is determined by calculating taxonomic distances. The methods included in the second group are based on determination of a synthetic variable by averaging the values of diagnostic variables standardized in an appropriate way (Panek 2009).

This paper used the model method in order to construct a synthetic ratio for the evaluation of the financial condition of the companies of the transport and storage section and other selected industries.

354

Evaluation of the financial condition
of the companies of transport and storage
section in times of economic crisis -
taxonomic analysis

The first step to construct a synthetic measure of the financial condition is to determine partial financial ratios (diagnostic variables), which can be used for its creation. The main criterion for the selection of these ratios should be the fulfillment of the requirement of significance and the scope of the available statistical data.

The next step is to examine whether the diagnostic variables characterize and diversify objects (e.g. industries) in terms of the studied phenomenon in reality. While selecting variables (partial financial ratios), it is required that they show adequate variability, since a poorly diversified variable represents a small analytical value. It is for measurement of the diversification of a variable that the coefficient of variation is most commonly used. It is assumed that the variables should be eliminated from the set of the potential variables, for which the value of the coefficient of variation is less than the one determined in an arbitrary way, of the critical threshold of this factor of 10%.

In addition to the variability, it is their correlation, which is an important criterion (of the partial financial ratios). It is assumed that the two highly correlated variables give similar information (in this case, the correlation is tantamount to providing the same information about the examined objects). Therefore, it is recommended to eliminate one of them. Due to it the analysis of the Pearson correlation coefficient matrix can be carried out[1]. It is assumed that variables exceeding the correlation threshold of R=0.7 should be removed from the set.

Then, the nature of the variables should be determined, i.e. the partial financial ratios due to the way of their impact on the phenomenon; they shall be divided into (Młoda 2006):

- stimulants - an increase in their value means a positive change for the financial condition of the company,
- destimulants - an increase in their value means a negative change for the financial condition of the company,

---

1 Pearson correlation coefficient assumes the values within the range of <-1, +1>. The sign informs on the correlation direction and its value on the strength of the relation. It is assumed that if the ratio is (Zeliaś 2000):
- less than 0,2 - there is no linear relation between the variables,
- from 0,2 to 0,4 - there is a distinct but small linear relation,
- from 0,4 to 0,7 - a relation is moderate,
- from 0,7 to 0,9 - a relation is significant,
above 0,9 - a relation is very strong.

JANINA JĘDRZEJCZAK-GAS
PAWEŁ KUŻDOWICZ

- nominants are characterized by a certain optimum level, from which any deviation - increase or decrease - is a negative situation.

If there are destimulants and nominants in a set of the partial financial ratios, they have to be converted into stimulants. It is from the many transformations proposed in the literature (Kolenda 2006; Walesiak 2006) that the following ones will be applied in this study:

- for destimulants:

$$x_{ij}^S = -x_j$$

(1)

where:

x_{ij}^S - the value of the j-financial ratio in the i-sector converted into a stimulant,

x_{ij} - the value of the j-financial ratio in the i-sector,
j = 1,2,3,….,m – number of ratios,
i = 1,2,3,…, n – number of the ratio observations (number of sectors).

- for nominants:

$$x_{ij}^S = 0 \qquad \text{when } x_{j,nom,D} \leq x_j \leq x_{j,nom,G}$$

$$x_{ij}^S = x_{j,nom,G} - x_j \qquad \text{when } x_{ij} > x_{j,nom,G}$$

(2)

$$x_{ij}^S = x_j - x_{j,nom,D} \qquad \text{when } x_{ij} < x_{j,nom,D}$$

where:

$x_{j,nom,D}$ - lower value of the nominal range of the j-financial ratio,

$x_{j,nom,G}$ - upper value of the nominal range of the j-financial ratio.

The partial ratios, which are aggregated to a synthetic ratio must be mutually comparable. The financial ratios are generally expressed in different units (e.g. PLN, %, days), which prevents from their direct aggregation. Therefore, the next step is the process of standardization.

356

Evaluation of the financial condition
of the companies of transport and storage
section in times of economic crisis -
taxonomic analysis

In the literature, there are described different standardization procedures (e.g. standardization, quotient mapping). In order to bring the analyzed financial ratios to comparability, they were subjected to standardization based on the following formula:

$$z_{ij} = \frac{x_j - \overline{x}_j}{S_j}$$

(3)

where:

z_{ij} - standardized values of the j-financial ratio in the i-sector,

x_{ij} - empirical values of the j-financial ratio in the i-sector,

$\overline{x}_j$ - arithmetic mean of the j-financial ratio,

S_j - standard deviation of the j-financial ratio.

After standardization the arithmetic mean of each transformed financial ratio z_{ij} is 0 and its standard deviation is 1.

The next step in the model methods is to define the coordinates of the model objects, the so-called model/or anti-model. The most commonly used approach is the determination of these coordinates on the basis of statistical data[2]. When all the financial ratios have been converted into stimulants, the model is most commonly an abstract point (z_0^+) with coordinates being the maximum realizations of the individual standardized financial ratios in the analyzed set of objects (e.g. industries).

$$z_0^+ = [z_{01}, z_{02}, z_{03}, \ldots, z_{0m}]$$

where:
$z_{0j} = \max z_{ij}$, i = 1, 2, 3, …, n, j = 1, 2, 3, …, m.

---

2   There are also other solutions possible (Grabiński 1992; Pociecha, Podolec, Sokołowski, Zając 1988).

JANINA JĘDRZEJCZAK-GAS
PAWEŁ KUŻDOWICZ

On the other hand, an anti-model is usually an abstract point (z_0^-) with coordinates being the minimum realizations of the individual standardized financial ratios in the analyzed set of objects.

Then, the distance from the model (or less commonly anti-model) is determined for each of the objects (e.g. industry). The Euclidean distance is used most commonly[3].

$$d_{i0} = \sqrt{\sum_{j=1}^{n}(z_j - z_{0j}^+)^2}$$, (i = 1,2,3, …, m) (j = 1,2,3, …,n)   (4)

where:

n – number of variables (e.g. financial ratios),
m – number of objects (e.g. industries),

z_{ij} – standardized values of the j - variable (e.g. financial ratios) for the i-object (e.g. industries),

z_{0j}^+ – standardized value of the model for the j – variable (e.g. financial ratios).

The greater the distance of the point from the model, the lower is the position in the ranking of objects (e.g. industries).

The values of a ratio d_{i0} are not standardized, therefore the relative measure of development is determined for ease of interpretation (d_i), whose value ranges between 0 and 1:

$$d_i = 1 - \frac{d_{i0}}{d_0}$$

(5)

where:

$$d_0 = \sqrt{\sum_{j=1}^{n}(z_{0j}^+ - z_{0j}^-)^2}$$

(6)

▼

3 Other measures can be also used, e.g. Jeffreysa-Matusita, Clarka, Mahalanobisa (Grabiński 1992).

Evaluation of the financial condition
of the companies of transport and storage
section in times of economic crisis -
taxonomic analysis

The measure d_i takes the value of 0 for the anti-model and 1 for the model. The higher the value of development measure, the closer is the object (e.g. industry) to the model. Using the criterion of the decreasing value of this measure, a ranking of the objects (e.g. industries) subjected to the study according to the level of the examined phenomena can be created (e.g. the financial condition of the companies).

3. The synthetic measure of the financial condition of the companies of the surveyed sections

The procedure for calculating synthetic ratios for the companies of the transport and storage section and other selected industries was carried out according to the steps described above.

In order to construct a synthetic ratio, 15 partial ratios from four areas describing the financial standing of a company were selected[4]:

The area of the financial liquidity
   Current ratio = current assets/current liabilities (CR = CA/CL)
   Quick ratio = (current assets – stocks – short-term inter-period settlements)/ current liabilities (QR= (CA-S-SIS)/CL)

The area of profitability
   Return on sales = (net profit (loss)/sales revenue) x 100% (ROS = NP/SR x 100%)
   Return on assets = (net profit (loss)/average total assets) x 100% (ROA = NP/ TA x 100%)
   Return on equity = (net profit (loss)/average equity capital) x 100% (ROE = NP/EC x 100%)

The area of efficiency
   Total cost ratio = total costs/total revenue (TCR = TC/TR)
   Total assets turnover ratio = total revenue/average total assets (TATR = TR/TA)
   Current assets turnover ratio = total revenue/average current assets (CATR = TR/CA)
   Inventory turnover ratio = sales revenue/average stocks (ITR = SR/S)
   Trade receivables turnover ratio = sales revenue/average receivables from deliveries and services (TRTR = SR/RFDS)

---

4   The selection criteria were the significance of the ratios and the scope of the available statistical data.

Trade payables turnover ratio = sales revenue/average liabilities from deliveries and services (TPTR = SR/LFDS)

Cash conversion cycle = ((average receivables from deliveries and services + average stocks – average liabilities from deliveries and services) x 365)/sales revenue (CCC = ((RFDS+S-LFDS) x 365)/SR)

The area of debt

Debt ratio = total liabilities/total assets (DR = TL/TA)

Debt structure ratio = long-term liabilities/total liabilities (DSR = LL/TL)

Long-term debt ratio = long-term liabilities/equity capitals (LDR = LL/EC)

It is in the table 2 that the partial financial ratios (possible variables) were presented, which were used to construct a synthetic ratio for the financial condition of the companies of the transport and storage section (section H) as well as selected descriptive statistics of these ratios for the analyzed fourteen industries in the years 2010 and 2013.

Table 2. The financial ratios for the companies of the transport and storage section and the selected descriptive statistics of these ratios for the analyzed industries in the years 2010 and 2013

	Section H	Min. value	Max. value	Average value	Section H	Min. value	Max. value	Average value
			2010				2013	
CR	1,30	1,19 (Section Q)	1,84 (Section J)	1,51	1,39	0,98 (Section I)	1,75 (Section L)	1,41
QR	1,17	0,82 (Section G)	1,62 (Section J)	1,26	1,29	0,79 (Section G)	1,40 (Section T)	1,16
ROS	2,58%	-0,33% (Section R)	12,51% (Section T)	4,92%	2,91%	0,62% (Section R)	7,13% (Section J)	3,94%
ROA	2,30%	-1,01% (Section R)	7,64% (Section J)	3,73%	2,47%	1,28% (Section R)	5,35% (Section B+C+D+E)	3,21%
ROE	5,06%	-2,60% (Section R)	14,62% (Section J)	8,03%	6,12%	2,27% (Section L)	12,64% (Section G)	7,29%
TCR	0,97	0,88 (Section J)	0,9978 (Section R)	0,94	0,97	0,92 (Section L)	0,99 (Section R)	0,96
TATR	0,93	0,24 (Section L)	3,11 (Section R)	1,18	0,89	0,26 (Section L)	2,55 (Section G)	1,11

Evaluation of the financial condition
of the companies of transport and storage
section in times of economic crisis -
taxonomic analysis

CATR	3,41	1,01 (Section T)	9,13 (Section R)	3,28	3,26	1,02 (Section T)	6,68 (Section R)	3,16
ITR	48,10	6,83 (Section F)	183,33 (Section R)	46,60	60,66	6,86 (Section F)	194,25 (Section R)	47,92
TRTR	8,12	2,28 (Section T)	59,24 (Section R)	11,75	8,00	3,07 (Section T)	48,99 (Section R)	11,28
TPTR	9,66	5,78 (Section F)	29,12 (Section R)	11,49	10,16	4,67 (Section F)	29,96 (Section R)	11,55
CCC	14,55	-4,32 (Section R)	145,00 (Section T)	31,90	15,50	-3,87 (Section I)	103,05 (Section T)	28,62
DR	0,55	0,27 (Section L)	0,66 (Section N)	0,52	0,60	0,28 (Section L)	0,67 (Section F)	0,55
DSR	0,38	0,14 (Section G)	0,63 (Section I)	0,37	0,38	0,15 (Section G)	0,64 (Section I)	0,37
LDR	0,46	0,18 (Section P)	0,87 (Section N)	0,43	0,57	0,19 (Section B+C+D+E)	0,78 (Section T)	0,47

Section B+C+D+E - Industry, Section F - Construction, Section G - Trade and repair of motor vehicles, Section H - Transportation and storage, Section I - Accommodation and food service activities, Section J - Information and communication, Section L - Real estate activities, Section M - Professional, scientific and technical activities, Section N - Administrative and support service activities, Section P - Education, Section Q - Human health and social work activities, Section R - Arts and recreation, Section S - Other service activities, Section T - Financial and insurance activities

Source: own study based on: GUS 2009, 2010, 2011, 2012, 2013, 2014

From the data presented in the table 2, it results that both in H section companies as well as in other analyzed industries, the financial liquidity remained at the optimum level during the analyzed period. However, it should be noted that the H section noted increase in both the current ratio as well as quick ratio while comparing 2010 to 2013, while their average value in the analyzed 14 industries decreased (their min. and max. value decreased also). A similar situation can be observed in the case of profitability - the H section reported an increase in profitability ratios (ROS, ROA, ROE), while their average value in the analyzed industries decreased. While analyzing the efficiency area, it can be noted that there were similar changes as in other industries, except for inventories and cash conversion cycle, in the companies of the transport and storage section.

JANINA JĘDRZEJCZAK-GAS
PAWEŁ KUŹDOWICZ

The inventory turnover ratio in the H section increased from about 48 times to almost 61 times (an increase of 27%), whereas the average value of this ratio (also min. and max. value) in the analyzed industries increased only by about 2,8%. On the one hand, the cash conversion cycle in the companies of the transport and storage section got longer by approximately 1 day, while its average value in all industries decreased by about 3 days. The debt analysis indicates that both in the companies of the transport and storage section and in average ratios of the analyzed industries, there was an increase in the participation of the external capital in financing of companies.

In conclusion, the analysis of the data presented in the table 2 indicates that the financial condition of the companies of the transport and storage section in 2013 in comparison to 2010 improved to a greater extent than the average for the companies of all analyzed sections.

The partial financial ratios (for the H section in 2010 and 2013 are shown in the table 2) were then subjected to statistical verification. Due to too low volatility, the total cost ratio (TCR) was eliminated from the set of the analyzed partial ratios. The next step was the analysis of the correlation matrix. It showed the high correlation between the following pairs of ratios: CR and QR, ROA and ROE, TATR and CATR, CATR and TRTR, CATR and TPTR, ITR and TRTR, ITR and TPTR, TPTR and TRTR, DR and DSR, DR and CDR, DSR and LDR. So X3, X5 were removed from the set of variables. So QR, ROA, TATR, TRTR, TPTR, DR, LDR were removed from the set of variables.

Then, the character of the variables qualified for further study was defined (CR, ROS, ROE, CATR, ITR, CCC, DSR). The cash conversion cycle was included in the destimulant set (CCC). The current ratio was included in the nominant set (CR). Other ratios (variables) were included in the stimulant set. The destimulant and nominant were converted into stimulants using the formula (1) and (2). For the nominant, the current ratio (CR), the value recommended in the literature as optimal one within the range of 1,2-2,0 was adopted (Sierpińska, Jachna 2011).

The next step was bringing the investigated features to mutual comparability, therefore they were subjected to standardization in accordance with the formula (3).

The last step of the construction of the synthetic measure was the calculation of the Euclidean distances and determination of the d_i measures in accordance with the formula (4), (5) and (6).

In the table 3, the values of the calculated synthetic ratio for all sectors investigated were presented and their positions in the ranking of the industries in terms of this ratio.

362

Evaluation of the financial condition
of the companies of transport and storage
section in times of economic crisis -
taxonomic analysis

The data presented in table 3 show that the companies of the transport and storage section were characterized by a good financial situation in comparison to other industries in 2010 (the fifth position within fourteen analyzed sections). It was in 2011 that the value of the synthetic ratio for the companies of the transport and storage section increased to a level of 0,45468, i.e. by 4,2%, but the increase in the ratio was reported by majority of the analyzed sections (twelve sections), which eventually resulted in that the H section companies took the sixth position in the ranking of the industries. In 2012, the companies of the eleven sections (out of fourteen) reported a deterioration in its financial situation, including the transportation and storage section. The value of the synthetic ratio for the companies of this section decreased by more than 12% and reached the lowest in level in the entire period analyzed. Despite this, the H section companies occupied the sixth position in the ranking of industries, which resulted from the fact that companies of other 8 sections noted even greater deterioration of its financial situation. In 2013, the majority of the analyzed sections (ten sections), including the H section, noticed a significant improvement of their financial condition. In the companies of the H section, the synthetic ratio rose by 19% (average in the analyzed industries was 15%) and reached its peak in the entire analysis period, which enabled businesses in this industry to take high fourth position in the ranking of the analyzed industries.

**Table 3. The values of the synthetic measures and the position
of industries in the ranking in the years 2010-2013**

Section	2010		2011		2012		2013	
	d_i	Position in the ranking	d_i	Position in the ranking	d_i	Position in the ranking	d_i	Position in the ranking
Section B+C+D+E	0,39195	9	0,43437	8	0,36068	11	0,40680	7
Section F	0,34485	13	0,40358	11	0,21091	14	0,29096	14
Section G	0,36478	12	0,44255	7	0,33222	12	0,37156	8
Section H	0,43618	5	0,45468	6	0,39909	6	0,47656	4
Section I	0,45583	3	0,23463	13	0,36841	9	0,36984	9
Section J	0,49775	1	0,50503	4	0,47590	3	0,52054	3

JANINA JĘDRZEJCZAK-GAS
PAWEŁ KUŻDOWICZ

Section K	0,34238	14	0,43147	9	0,36489	10	0,32858	13
Section L	0,40408	7	0,42721	10	0,28763	13	0,34205	12
Section M	0,38447	10	0,17579	14	0,40581	5	0,35392	11
Section N	0,40089	8	0,49845	5	0,39002	7	0,42982	6
Section P	0,38292	11	0,39163	12	0,46263	4	0,44456	5
Section Q	0,44577	4	0,51381	3	0,50077	2	0,60289	1
Section R	0,47840	2	0,69450	1	0,54511	1	0,52347	2
Section S	0,41026	6	0,51391	2	0,37286	8	0,35704	10

Section B+C+D+E - Industry, Section F - Construction, Section G - Trade and repair of motor vehicles, Section H - Transportation and storage, Section I - Accommodation and food service activities, Section J - Information and communication, Section L - Real estate activities, Section M - Professional, scientific and technical activities, Section N - Administrative and support service activities, Section P - Education, Section Q - Human health and social work activities, Section R - Arts and recreation, Section S - Other service activities, Section T - Financial and insurance activities

Source: own study based on: GUS 2009, 2010, 2011, 2012, 2013, 2014

In summary, during the economic crisis[5] the companies of the transport and storage section occupied the fourth or sixth position in the ranking of the analyzed fourteen sections, which proves a quite good financial condition of these companies. Moreover, during the period under consideration, the position of the H section companies in the ranking of the industries changed by a maximum of one or two places, so the financial condition of the companies was pretty stable while compared to other industries.

4. Conclusion

The global economic crisis affected Polish companies, including the companies of the transport and storage section. In comparison to other industries, the companies of H section noted both deterioration and improvement in various

---

5   The analyzed period covers the years 2010-2013.

364

Evaluation of the financial condition
of the companies of transport and storage
section in times of economic crisis -
taxonomic analysis

financial indicators[6]. The evaluation of the selected partial ratios shows that the financial condition of these companies in comparison to other industries was rather improved in the years 2010-2013 (table 2). These preliminary conclusions were confirmed by the synthetic ratios calculated for the companies of the transport and storage section and other 13 sections.

It can be concluded that the financial condition of the companies of the transport and storage section was changing positively and negatively in the in subsequent years of the study but it was quite good and fairly stable while compared to other industries. Moreover, a significant improvement in the financial condition of the H section companies was noted while comparing 2013 to 2010, which proves that the economic crisis did not cause substantial distortions in the functioning of the companies.

Summary

Evaluation of the financial condition of the companies of transport and storage section in times of economic crisis - taxonomic analysis

The aim of the article is an evaluation of the financial condition of the companies of transport and storage section (section H) based on synthetic indicator in times of economic crisis. The first part of the paper discusses theoretical issues relating to the construction of synthetic measures. In the second part of the paper, a comparative study of the financial condition of the companies of transport and storage section in comparison with the financial condition of the companies in other sections was presented. This study was carried out on the basis of a synthetic financial condition indicator constructed with use of the model method.

Keywords: *transport and storage section, financial condition, synthetic measure.*

6   It was in times of economic crisis that the companies of the transport and storage section recorded, among others, improvement of indicators of financial liquidity. There are many factors affecting maintaining or losing the financial liquidity of an enterprise. It is in the literature that there are mentioned macroeconomic, sectoral and microeconomic factors (Skoczylas, Bogacka 2009; Wojciechowska 2001, pp. 21-24) as well as factors dependent and independent of the operation way of an enterprise (Wędzki 2003, p. 72). Therefore, there is a need for more detailed and in-depth studies that will assist to receive full information about, among others, the determinants of the financial liquidity in times of crisis.

365

JANINA JĘDRZEJCZAK-GAS
PAWEŁ KUŹDOWICZ

Streszczenie

Ocena kondycji finansowej przedsiębiorstw sekcji transport i gospodarka magazynowa w czasie kryzysu gospodarczego – analiza taksonomiczna

Celem artykułu jest ocena kondycji finansowej przedsiębiorstw sekcji transport i gospodarka magazynowa (sekcja H) na podstawie wskaźnika syntetycznego w czasie kryzysu gospodarczego. W pierwszej części artykułu omówiono zagadnienia teoretyczne dotyczące konstrukcji miar syntetycznych. W drugiej części, przedstawiono badanie porównawcze kondycji finansowej przedsiębiorstw sekcji transport i gospodarka magazynowa w odniesieniu do kondycji finansowej przedsiębiorstw w pozostałych sekcjach. Badanie to przeprowadzono w oparciu o syntetyczny wskaźnik kondycji finansowej skonstruowany za pomocą metody wzorcowej.

Słowa kluczowe: *sekcja transport i gospodarka magazynowa, kondycja finansowa, miara syntetyczna.*

References

1. Cieślak M. (1974), *Modele zapotrzebowania na kadry kwalifikowane*, PWN, Warszawa.
2. GUS (2009), *Financial results of economic entities in 2008 (balance sheet)*, Warsaw.
3. GUS (2010), *Financial results of economic entities in 2009 (balance sheet)*, Warsaw.
4. GUS (2011), *Financial results of economic entities in 2010 (balance sheet)*, Warsaw.
5. GUS (2012), *Financial results of economic entities in 2011 (balance sheet)*, Warsaw.
6. GUS (2013), *Financial results of economic entities in 2012 (balance sheet)*, Warsaw.
7. GUS (2014), *Financial results of economic entities in 2013 (balance sheet)*, Warsaw.
8. Grabiński T. (1992), *Metody taksonometrii*, Wydawnictwo Akademii Ekonomicznej w Krakowie, Kraków.
9. Hellwig Z. (1968), *Zastosowanie metody taksonomicznej do typologicznego podziału krajów ze względu na poziom ich rozwoju oraz zasoby i strukturę kwalifikowanych kadr*, „Przegląd Statystyczny", No. 4.

366

Evaluation of the financial condition
of the companies of transport and storage
section in times of economic crisis -
taxonomic analysis

10. Kolenda M. (2006), *Taksonomia numeryczna. Klasyfikacja, porządkowanie i analiza obiektów wielocechowych*, Wydawnictwo Akademii Ekonomicznej we Wrocławiu, Wrocław.

11. Malina A. (2004), *Wielowymiarowa analiza przestrzennego zróżnicowania struktury gospodarki Polski według województw*, Seria Monografie, No. 162, Wydawnictwo Akademii Ekonomicznej w Krakowie, Kraków.

12. Młoda A. (2006), *Analiza taksonomiczna w statystyce regionalnej*, Difin, Warszawa.

13. Panek T. (2009), *Statystyczne metody wielowymiarowej analizy porównawczej*, SGH, Warszawa.

14. Pociecha J., Podolec B., Sokołowski A., Zając K. (1988), *Metody taksonomiczne w badaniach społeczno-ekonomicznych*, PWN, Warszawa.

15. Sierpińska M., Jachna T. (2011), *Ocena przedsiębiorstwa według standardów światowych*, PWN, Warszawa.

16. Skoczylas W., Bogacka D. (2009), *Czynniki kształtujące płynność finansową przedsiębiorstwa sektora motoryzacyjnego w warunkach kryzysu*, Zeszyty Naukowe Uniwersytetu Szczecińskiego No. 534, Szczecin.

17. Skowron-Grabowska B. (2010), *Centra logistyczne w łańcuchach dostaw*, PWE, Warszawa.

18. Strahl D. (1990), *Metody programowania rozwoju gospodarczego*, PWE, Warszawa.

19. Walesiak M. (2006), *Uogólniona miara odległości w statystycznej analizie wielowymiarowej*, Wydawnictwo Akademii Ekonomicznej we Wrocławiu, Wrocław.

20. Wędzki D. (2003), *Strategie płynności finansowej przedsiębiorstwa*, Oficyna Ekonomiczna, Kraków.

21. Wojciechowska U. (2001), *Płynność finansowa polskich przedsiębiorstw w okresie transformacji gospodarki. Aspekty makroekonomiczne i mikroekonomiczne*, SGH, Warszawa.

22. Zeliaś A. (2000), *Metody statystyczne*, PWE, Warszawa.

JANINA JĘDRZEJCZAK-GAS
PAWEŁ KUŻDOWICZ