USE OF FINANCIAL INDICATOR FOR ENTERPRISES’ SOLVENCY EVALUATION

Inta Kotane
Mg. oec., PhD student at Riga International School of Economics and Business Administration, Researcher at Rezekne Higher Education Institution, Latvia. Tel. +37129415644. E-mail inta@ru.lv

Received 22 06 2014; accepted 12 09 2014

One of the evaluation methods of the enterprises’ solvency is the calculation of the financial ratios and the establishment of the ratio mutual coherence. The research of the financial indicator use regarding the evaluation research of the solvency of the enterprises was carried out by the author, and the set of financial indicators was established including the groups of liquidity, solvency, activity and profitableness ratios and was used in the solvency evaluation of Latvian enterprises. The practical research was carried out according to the accounting data of the small enterprises of Latvia. The aim of the research is to appraise the use of the financial indicators in order to evaluate the solvency of the companies. The results of the research point out that there is no essential difference between the financial indicators of a liquidated enterprise and a reorganized enterprise and there is no possibility to foresee precisely the financial position of the enterprises by taking into account only the financial indicators of the enterprises.

Keywords: solvency, financial indicators, evaluation.

JEL codes: R11, G33.

1. Introduction

The analysis of the financial position of an enterprise by taking into account the financial ratios, gives an opportunity to estimate the strong and weak points of the enterprise’s economic activities, the improvement possibilities as well as the solvency of an enterprise.

Many authors have researched the issues of the evaluation of an enterprise’s solvency using different financial ratios regarding their nature and total number.

The types of the financial solvency of the small enterprises were researched (Pindado, 2004), using 42 financial ratios including activity, profitableness, productivity etc. ratios. The Australian researchers (Aripin, 2008) used 43 financial ratios in order to evaluate an enterprise’s activity including five groups of financial ratios: stock market ratios, profitableness indicators, capital structure indicators, liquidity indicators and other indicators taking into account cash flow indicators. 24 financial ratios were used in order to evaluate enterprises’ financial position (Bose, 2006), forecasting the financial difficulties of the enterprises 1, 2 and 3 years before their
beginning; 29 financial ratios (Lieu, 2008) were used researching the financial indicators of the bankrupt and non-bankrupt enterprises; 27 financial ratios (Min, 2009) – evaluating the financial health of the enterprises; 26 financial ratios (Kramin, 2003), 17 financial ratios (Halim, 2011), 16 financial ratios (Bhunia, 2011) and 12 financial ratios (Xidomas, 2009).

The given research carries on the author’s research of the enterprises’ solvency evaluation according to which the author concluded that different methods of the solvency establishment in 2009–2011 on particular cases present different solvency position on the enterprises (Kotane, 2013).

The objective of the research is to analyze the use of the financial indicators in the solvency evaluation process of the enterprises.

In order to reach the aim of the research the following research objectives were established:

• to carry out a theoretical research of the use of the financial indicators in the evaluation research of the solvency of the enterprises;
• to evaluate the possibilities of the financial indicators to foresee the solvency of the enterprises;
• to make the conclusions.

Research object: liquidated/reorganized small companies of Latvia.

Research subject: the level of solvency in the period of liquidation / reorganization.

The following scientific research methods were used in this research: information analysis and synthesis, logically constructive methods of data classification and graphic display.

2. Research methodology

In the quantity group of the economically active market sector total statistical units in Latvia – small enterprises; in the form of business activity – the enterprises by the type of activity, in the year 2011, like in the previous years, formed 3 sectors: wholesale trade and retail trade; car and motorcycle maintenance 82%, manufacturing industry 14.19% and construction 11.65% (Uzņēmumu skaits).

Lursoft Ltd. information has been used for the selection of the small enterprises of Latvia (Mazo…, 2013) and Lursoft Ltd. data base information has been used in order to estimate the enterprises’ solvency (Uzņēmumu …, 2013).

The selection of the analyzed enterprises was established according to the following selection criteria:

• in 2005–2011 Lursoft Ltd. has submitted annual reports;
• the enterprises correspond to the small companies criteria: the number of employed from 10 to 49 individuals, annual turnover LVL 7.028 millions or balance total LVL 7.028 millions (What is an SME?);
the enterprises of a certain economic sector (NACE): (C) Manufacturing Industry, (F) Construction and (G) Wholesale trade and Retail trade; car and motorcycle maintenance.

According to the selection criteria the set of the researched companies consists of 7 companies where 5 of them were liquidated in 2012 and 2 were reorganized (enterprises merged with other enterprises). 7 companies are all companies that met the study criteria set. The set of the liquidated enterprises consists of the manufacturing industry sector enterprises. The set of the reorganized enterprises consists of wholesale trade and retail trade; car and motorcycle maintenance sector enterprises.

Different grounds of liquidation describe the set of the researched companies: one or several insolvency processes (enterprise 1–3), judicial remedy processes (enterprise 1 and 3), two enterprises have begun the liquidation process by themselves (enterprise 4 and 5), two enterprises are reorganized (6 and 7).

The enterprise liquidation/reorganization process affects the financial accounting of an enterprise. If the enterprise management has an intention to liquidate the enterprise or the enterprise management knows the circumstances that doubt the enterprise’s capacity to carry on the activity in the following accounting year then it should be displayed in the enterprise balance. For example, if the fixed assets are intended for selling instead of a permanent use they shall be reclassified as goods. Savings, provisions, income and expenses of the following periods shall not be displayed in the enterprise balance. According to these signs under the balance data of the year 2011, the following enterprises shall not carry on the activity in the year 2012: enterprises 1, 2, 3 and 4. Such signs are not observed in the enterprise balances of enterprises 5, 6 and 7. Therefore, the evaluation of enterprise activity indicators has been carried out not only in the year 2011 but also in the year 2009 and 2010 – two months prior to liquidation/reorganization.

The financial ratios used in the practical research include 25 financial ratios: liquidity, solvency, activity and profitableness indicator groups and these are most often used financial ratios in the theoretical and practical researches of the evaluation of the enterprise financial position (Pindado, 2004; Aripin, 2008; Bose, 2006; Lieu, 2008; Min, 2009; Kramin, 2003; Halim, 2011; Bhunia, 2011; Xidomas, 2009).

The financial ratio codes used in the research: Current ratio (X1); Quick ratio (X2); Cash ratio (X3), Part of net working capital (NWC) within total current assets (X4); NWC manoeuvring coefficient (X5); Part of NWC within inventory (X6); Ratio of cash flow from operating activities (X7); Equity ratio (X8); Total debt ratio (X9); Debt to equity ratio (X10); Interest coverage ratio (X11); Short-term debt ratio (X12); Long-term financial independence ratio (X13); Equity manoeuvring coefficient (X14); Equity attribution coefficient (X15); Total assets turnover (X16); Current assets turnover (X17); Accounts receivables turnover (X18); Payables turnover (X19); Inventory turnover (X20); Return on assets (ROA) (X21); Return On Equity (ROE) (X22); Return on sales (ROS) (X23); Operating profit margin (X24) and Gross profitability (X25).
For the statistical analysis of the research data and the presentation of the results SPSS “Statistical Package for the Social Sciences” software package version 20.0 for Windows was used, Microsoft Excel and a statistical software PAST (method 6) was used for the forecasting calculation.

The set of enterprises was divided into two groups: liquidated enterprises and reorganized enterprises. Out of 7 enterprises 5 enterprises are liquidated and make the first group and 2 enterprises are reorganized and make the second group.

The analysis of enterprises’ financial indicators includes:

1. **The establishment of statistically important differences for financial indicators between liquidated and reorganized enterprises.**
   - The enterprise data is parametrical indicators because they reflect precisely calculated data. In order to establish the differences between the liquidated and reorganized enterprises’ financial indicators Student’s t-test was used. The statistical reliability p 0.05 was accepted as an important difference between the groups. Levene’s test (Levene’s test for Equality of Variance) was used before the t-test in order to verify whether the selection dispersions of the liquidated and reorganized enterprises fundamentally differ from each other or not differ fundamentally. If the selection dispersions of the liquidated and reorganized enterprises fundamentally differ from each other the standard Student’s t-test was used; if not – Welch's t-test was used. According to it the Student’s t-test results change.
   - If there is no statistically important difference found between the groups it indicates that the certain financial indicator is not important when forecasting the enterprise liquidity (bankruptcy). The assumption is based on the comparison of the liquidated and reorganized enterprises.

2. **Enterprises’ financial indicator forecasts for 2012 and their changes comparing to 2011.** The calculation of the financial indicator forecast was carried out using year 2006–2011 data. The average quantities of enterprises’ financial indicators in the specific year were used in the analysis. In order to establish forecasts two methods were used and adjusted according to the quantity time series data of a correlation coefficient (CC):
   - if the correlation coefficient exceeds |0.5| (there is a connection between data and years), then the analysis of regression for time series is used. Within analysis a presence of the signs of seasonality was verified in the analyzed time series. No such signs were found. Then a linear regression equation (y=a*x+b) was used in order to calculate forecasts or to receive a trend for all years. To verify the precision of the chosen equation the calculation shall be carried out and the total sum difference of the received data shall be close to 0;
   - if the correlation coefficient is less than |0.5|, then the moving average method (MAM) is used because there are no typical tendencies or trend observed in time series. Within this method all indicators are placed around an imaginary average quantity. The interval of a smoothing period shall be established that has the smallest average forecast error regarding certain time intervals.

The calculation formula of a simple moving average
\[ M_t = \frac{y_t + y_{t-1} + \cdots + y_{t-N+1}}{N} \]

where \( N \) is an interval of a smoothing period.

The calculation formula of a forecasting error

\[ \varepsilon_t = y_t - F_t, \quad \varepsilon_t = y_t - F_t, \]

To be sure that the certain financial indicators do not forecast the liquidation of an enterprise, the establishment of year 2012 forecast was carried out:

1. The forecast analysis of 2012 financial indicators for all 7 enterprises together using indicator average quantities per years and the evaluated changes of financial indicators in 2012 comparing to the year 2011.

2. In the forecast analysis of 2012 financial indicators the enterprises are divided according to the liquidation consequences – liquidated enterprises or reorganized enterprises. Using average quantities of the indicators by years and by groups the forecasted financial indicator changes in 2012 were evaluated comparing to the year 2011.

3. The forecast analysis of financial indicators of 2012 for each enterprise in order to establish the scale of an enterprise bankruptcy possibility that may be forecasted by the certain financial indicator. In order to establish the differences between the liquidated and reorganized enterprises the criterion method (\( \chi^2 \)) was used. Within this method the contingency table was used where one index was the type of a liquidated enterprise (liquidated or reorganized) and another index was forecast 2012 (positive or negative) in connection with the actual data of 2011. An important difference between the groups is a statistical reliability \( p<0.05 \).

**Research hypothesis:**

**H1.** There are no essential differences between the financial indicators of the liquidated and reorganized enterprises.

**H2.** The financial indicator forecasts of 2012 statistically reliably forecast a negative outcome – the liquidation of an enterprise.

**H3.** The financial indicator forecasts of 2012 statistically reliably forecast the liquidation or the reorganization of an enterprise.

1. **Research results**

1) The establishment of the statistically important differences in the financial indicators between the liquidated and reorganized enterprises.

If the result of the Levene’s test is \( p<0.05 \), then the particular financial indicator dispersions of the liquidated and reorganized enterprises differ. Evaluating the average quantities of the financial indicator selections of the liquidated and reorganized enterprises the author concludes that the total financial indicator \( p \) value of 2009-2011 exceeds 0.05 indicating that there are no essential differences between the fi-
financial indicators of the liquidated and reorganized enterprises. In 2011 (a year before bankruptcy) the data differences of equity profitability between the mentioned groups are of the edge of a statistical importance (p=0.05). A statistically reliable difference was not found between the 2009–2011 financial indicators of the liquidated and reorganized enterprises using t-test.

Hypothesis H1. There are no essential differences between the financial indicators of the liquidated and reorganized enterprises is confirmed.

2) The financial indicator forecasts of the enterprises in 2012 and their changes comparing to the year 2011.

The financial indicator forecast in 2012 for all 7 enterprises together taking into account both the numeral value and the economical nature (for example X9 (financial dependence coefficient) of 2012 comparing to 2011 decreased but it is a positive tendency) comparing to the year 2011 presents ambiguous results. Taking into account 2006-2011 data 8 indicators have a negative forecast in 2012 (X5, X6, X7, X11, X16, X17, X22 and X23) or only 32% of 25 selected financial indicators. The forecasts of the remaining financial indicators (X1, X2, X3, X4, X8, X9, X10, X12, X13, X14, X15, X18, X19, X20, X21, X24 and X25) present positive tendencies in 2012 comparing to 2011. The author concludes that the forecasts of the particular financial indicators of 2012 do not confirm that a well-grounded conclusion can be drawn on the basis of 2006–2011 data regarding the enterprises’ liquidation or reorganization in 2012.

The financial indicator forecasts of 2012 dividing enterprises into two groups (liquidated and reorganized) present similar results to the financial indicator forecasts of 2012 of all 7 enterprises together. Evaluating the results in the group of the liquidated and the reorganized enterprises the author concludes that there are financial indicators that forecast lower results in 2012 comparing to 2011 regarding only the liquidated enterprises or only reorganized enterprises.. Therefore, making forecasts to certain enterprises the deterioration of the financial indicators shall be observed.

Taking into account 2006–2011 data, there are negative observations or negative forecasts of the liquidated enterprises in 2012 regarding 10 indicators (X5, X6, X7, X10, X11, X14, X16, X17, X20 and X23) or 40% of 25 selected financial indicators. Taking into account 2006–2011 data, there are negative forecasts of the reorganized enterprises in 2012 regarding 14 indicators (X5, X7, X10, X11, X15, X16, X17, X18, X19, X20, X21, X22, X23 and X24) or 56% of 25 selected financial indicators. The author concludes that the forecasts of the particular financial indicators of the enterprise groups (liquidated and reorganized) in 2012 do not confirm that a well-grounded conclusion can be drawn on the basis of 2006–2011 data regarding the enterprises’ liquidation or reorganization in 2012.

Comparing particular financial indicator forecasts for all 7 enterprises together and the financial indicator forecasts according to enterprise group (liquidated and reorganized) (Table 1) there are negative financial indicator forecasts found in all three groups (X5, X7, X16, X17, X23), as well as the financial indicators that have nega-
tive forecasts only in the group of the liquidated enterprises or only in the group of the reorganized enterprises (highlighted in a table).

| Financial indicator code | Total enterprises | Enterprise group | Financial indicator code | Total enterprises | Liquidated | Reorganized |
|--------------------------|-------------------|------------------|--------------------------|-------------------|------------|-------------|
| X1                       | –                 | –                | X14                      | –                 | –          | –           |
| X2                       | –                 | –                | X15                      | –                 | –          | –           |
| –X3                      | –                 | –                | X16                      | –                 | –          | –           |
| X4                       | –                 | –                | X17                      | –                 | –          | –           |
| X5                       | –                 | –                | X18                      | –                 | –          | –           |
| X6                       | –                 | –                | X19                      | –                 | –          | –           |
| X7                       | –                 | –                | X20                      | –                 | –          | –           |
| X8                       | –                 | –                | X21                      | –                 | –          | –           |
| X9                       | –                 | –                | X22                      | –                 | –          | –           |
| X10                      | –                 | –                | X23                      | –                 | –          | –           |
| X11                      | –                 | –                | X24                      | –                 | –          | –           |
| X12                      | –                 | –                | X25                      | –                 | –          | –           |
| X13                      | –                 | –                | –                        | –                 | –          | –           |

There are situations in Table 1 where the negative forecasts appear in the separate enterprise groups (liquidated or reorganized enterprises, liquidated and reorganized enterprises) (X10, X14, X15, X18, X19, X20, X21, X24), but the negative financial indicator forecasts do not appear to all enterprises together. It motivates to carry on the further research of the financial indicator forecasts for each enterprise separately.

To make sure that the certain financial indicators do not forecast the liquidation of an enterprise the calculation of 2012 forecasts was carried out for each of the analyzed enterprises and the positive/negative forecast was calculated for the year 2012. The scale of reliability is established regarding the negative forecast (liquidation) of a certain financial indicator and the statistically reliable differences regarding the liquidation results of the enterprises (liquidation or reorganization) according to the forecast of 2012. Criterion method ($\chi^2$) was used within calculation.

The results of the given analysis and its summary (Table 2) present that, p value of all financial indicators exceeds 0.05, indicating that the financial indicators do not statistically reliably forecast the liquidation or reorganization of an enterprise. 3 financial indicators (X11, X21, X23) are on the edge of a statistical importance (p = 0.05), and the deterioration of certain financial indicators that may provoke the liquidation of an enterprise can be forecasted in 42.9% of occasions (highlighted in a table).

Hypothesis H2. The financial indicator forecasts of 2012 statistically reliably forecast a negative outcome – the liquidation of an enterprise is declined.

The deterioration of the financial indicators X9, X16 and X20 that may provoke the liquidation of an enterprise can be forecasted in 85.7% of occasions. Never-
theless, there are no statistically reliable differences between the possible liquidation and reorganization of an enterprise.

Table 2. Negative forecast of enterprises’ financial indicators for 2012

| Financial indicator code | p value | Negative forecast (%) |
|--------------------------|---------|-----------------------|
| X1                       | 0.43    | 28.6                  |
| X2                       | 0.09    | 14.3                  |
| X3                       | 0.29    | 28.6                  |
| X4                       | 0.43    | 28.6                  |
| X5                       | 0.15    | 57.1                  |
| X6                       | 0.81    | 57.1                  |
| X7                       | 0.43    | 71.4                  |
| X8                       | 0.09    | 14.3                  |
| X9                       | 0.09    | 85.7                  |
| X10                      | 0.81    | 57.1                  |
| X11                      | 0.05    | 42.9                  |
| X12                      | 0.09    | 14.3                  |
| X13                      | 0.09    | 14.3                  |
| X14                      | 0.43    | 28.6                  |
| X15                      | 0.71    | 60.0                  |
| X16                      | 0.50    | 85.7                  |
| X17                      | 0.29    | 71.4                  |
| X18                      | 0.14    | 57.1                  |
| X19                      | 0.14    | 57.1                  |
| X20                      | 0.50    | 85.7                  |
| X21                      | 0.05    | 42.9                  |
| X22                      | 0.29    | 71.4                  |
| X23                      | 0.05    | 42.9                  |
| X24                      | 0.43    | 28.6                  |
| X25                      | 0.50    | 14.3                  |

The deterioration of the financial indicators X7 and X17 that may provoke the liquidation of an enterprise can be forecasted in 71.4% of occasions. Nevertheless, there are no statistically reliable differences between the possible liquidation and reorganization of an enterprise.

Hypothesis H3. *The financial indicator forecasts of 2012 statistically reliably forecast the liquidation or the reorganization of an enterprise* is declined.

The author concludes that the establishment of the 2012 financial indicator forecasts of the liquidated or reorganized enterprises according to the previous financial accounting data of the enterprises does not give a chance to carry out statistically reliable forecasts regarding the possible liquidation or reorganization of already liquidated and reorganized enterprises.
4. Conclusions

1. There are no essential differences between the financial indicators of the liquidated and reorganized enterprises.

2. The financial indicator forecasts to the year 2012 of the liquidated/reorganized enterprises in 2011 only partially indicate the liquidation of the enterprises in 2012 and there are no statistically reliable differences between the possible liquidation and reorganization of an enterprise.

3. The establishment of the enterprises’ solvency using the method of financial ratios and the evaluation of the findings including the comparison to the actual situation of an enterprise in 2012 (liquidation/reorganization) indicates that the financial stability of the enterprises cannot be forecasted taking into account only financial indicators of the enterprises.

4. It is crucial to take into account both the financial and non-financial indicators in order to increase the precision of the evaluation of the financial position of an enterprise.

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FINANSINIŲ RODYKLŲ PANAUDOJIMAS ĮVERTINANT ĮMONĖS MOKUMĄ

Inta Kotane
Rezeknės aukštoji mokykla, Rygos tarptautinė ekonomikos ir verslo administravimo aukštoji mokykla, Latvija

Įteikta 2014 06 22; priimta 2014 09 12

Santrauka

Vienas iš įmonės mokumo įvertinimo metodų yra finansinių koeficientų apskaičiavimas bei rodiklių tarpusavio santykių nustatymas. Tyrimo tikslas – išanalizuoti finansinių rodiklių panaudojimą įmonių mokumo įvertinime. Autorė atliko teorinį finansinių rodiklių panaudojimo tyrimą įmonių mokumo įvertinimo tyrimuose, sudarė finansinių rodiklių visumą, kuri apima likvidumo, mokumo, aktyvumo ir rentabilumo rodiklių grupes, bei panaudojo tai Latvijos įmonių mokumo įvertinime. Praktinį tyrimą autorė atliko remiantis Latvijos mažųjų įmonių finansinių ataskaitų duomenimis. Tyrimo rezultatai liudija, jog nėra esminių skirtumų tarp likviduotų ir reorganizuotų įmonių finansinių rodiklių, taip pat negalima prognozuoti įmonių finansinės būklės remiantis tik įmonių finansiniai rodikliai.

Raktiniai žodžiai: mokumas, finansiniai rodikliai, įvertinimas.
JEL kodai: R11, G33.