THE NEED OF BANKRUPTCY PREDICTION IN THE COMPANY

Aurelija Mažintienė[1], Daiva Burkšaitienė[2]

Vilnius Gediminas Technical University, Faculty of Business Management,
Saulėtekio ave. 11, LT-10223 Vilnius, Lithuania
Email: [1]aurelija.mazintiene@gmail.com; [2]daiva.burksaitiene@vgtu.lt

Abstract. The obvious symptoms show up in a company's financial statements about a year or two before a company goes real bankruptcy. The aim of the article is to define the concept of bankruptcy and to provide the main aspects of bankruptcy prediction. The accurate financial failure predicting can provide time for corporate managers to take actions and save the business from financial insolvency. This article notes that managers have a natural tendency to underestimate risks and overestimate their ability to save an insolvent or near insolvent company. Therefore, the accurate prediction of bankruptcy has been an important and widely studied topic in the accounting and finance field for a long time. In terms of the successful identification of the relationship within data of company and industry, better business modeling and investment decisions can be found and implemented.

Keywords: bankruptcy, insolvency, prediction, bankruptcy proceedings, bankruptcy prediction strategy.

Jel classification: G33

1. Introduction

The financial failure or bankruptcy of a company is an event that can produce substantial losses to banks, suppliers, shareholders and a whole community. That is why managers of the company should be interested in predicting not only whether a company will fail, but also the first signs of potential failure. Despite the behavioral character of bankruptcy, it is possible to predict it properly using large amounts of information on the company and its industry. The idea of this article is in fact to show that most decisions are made without detailed analysis of information about future perspectives of company's performance. In such indeterminate conditions crisis appears in the company determining the stagnation of its performance and even its bankruptcy.

The analysis of the statistical data show that number of bankruptcies is increasing in year 2009 and the system of bankruptcy prevention and company's reinstatement is just being created in Lithuania. This lets us make the presumption that the features of failure of the company are diagnosed too late, they are not assessed properly and it determines danger in the company's performance.

Managers of the company are sure that profitable performance and creation of successful strategies make presumptions to avoid bankruptcy in the company. However, failure possibility persists even during the successful company's performance.

The scientific problem of the article – lack of managers'competence to integrate bankruptcy prediction strategy in companies overall strategy is widely explored in Lithuania, which is mostly dangerous in the company's performance. The reasons are assessed only after the bankruptcy has happened but prediction of crisis situation in the companies is absent.

The aim of the article is to define the concept of bankruptcy and to provide the main aspects of bankruptcy prediction.

Research methods are analysis of the scientific literature and statistical data.

2. The analysis of bankruptcy's prediction literature

Bankruptcy prediction is investigated by most researchers.

Valackienė and Virbickaitė (2011) on the basis of retrospective analysis of crisis situation, both crisis environment and bankruptcy features presented and principal keywords defined with reference to crisis in a company as a social phenomenon and related to its environment.

The study of Chia-Liang Lin and Kuan-Min Wang (2011) matched 23 Taiwanese OTC (Over-the-Counter) bankrupt corporations with 23 non-bankrupt corporations during the period 1999–2005. On the basis of the sample, a predictive and secondary research design was conducted to construct a rolling-prediction model and validate its

prediction in Taiwan on OTC corporation bankruptcy risks.

Rashid and Abbas (2011) identified the financial ratios that are most significant in bankruptcy prediction for the non-financial sector of Pakistan based on a sample of companies which became bankrupt over the time period 1996–2006. Their estimates provided evidence that the firms having Z-value below zero fall into the "bankrupt" whereas the firms with Z-value above zero fall into the "non-bankrupt" category.

Bivainis and Garškaitė (2010) presented the prepared system of diagnostics of bankruptcy threat to the enterprises. Bankruptcy, threatening the enterprises, was diagnosed as per three stages, i. e. the condition of the enterprise and the reasons, which have determined such condition, was gradually concretized.

Guščinskienė and Čiburienė (2010) studied the respondents' view on the situation of men and women in the labour market. Empirical study showed that 42 % of women and 26 % of men have never lost their jobs and the people who have, have mentioned several reasons for this. Respondents, both women and men, generally lose work because of inadequate working conditions and the company's bankruptcy.

After the analysis of bankruptcy prediction importance and bankruptcy dynamics in Lithuania, bankruptcy prediction models commonly used in scientific literature was given in a systematic way by Rugenytė *et al.* (2010).

Dakovic *et al.* (2010) developed statistical models for bankruptcy prediction of Norwegian firms in the limited liability sector using annual balance sheet information. It was demonstrated that careful examination of the functional relationship between the explanatory variables and the probability of bankruptcy enhances the models' forecasting performance.

Januševičiūtė and Jurevičienė (2009) systemized various opinions on internal and external reasons of bankruptcy origin. Analyzing the impact of bankruptcy for state's economy both negative and positive sides was pointed out. After analyzing the dynamics of bankruptcy of Lithuanian enterprises during recent years, the main factors which influenced the insolvency was stated.

Yung-Ho Chiu *et al.* (2009) adopted a two-stage approach, the Super-SBM and logistic regression, to investigate a bank efficiency index and the bank bankruptcy effect from incorporating capital adequacy regulations and a supervisory review process. This study used data on 36 Taiwanese commercial banks for the 3-year period from 2002 to 2004. The empirical results were summarized as follows: (1) The efficiency factor is proven to be influential in evaluating bank bankruptcy. (2) If certain prerequisites on capital adequacy are imposed on each bank, then it results in a lower risk to the bank and this reduces bank bankruptcy. (3) Corporate governance plays an important role in bank bankruptcy.

The main objective of Muller *et al.* (2009) research was to test whether some modeling techniques would in fact provide better prediction accuracies than other modeling techniques. The results showed that different analysis techniques definitely produce different predictive accuracies.

Garškaitė (2008) analyzed the Lithuanian enterprises, including the operating ones and the ones, which have gone bankrupt after the period under review, seeking to ascertain feasibility of application of the models, meant for forecasting of bankruptcy.

Agarwal and Taffler (2008) found the two approaches capture different aspects of bankruptcy risk, and while there is little difference in their predictive ability in the UK, the *z*-score approach leads to significantly greater bank profitability in conditions of differential decision error costs and competitive pricing regime.

Kageyama and Harada (2007) examined the trends in bankruptcies in Japan, with a particular focus on identifying the dynamic features of this series. Using quarterly data from 1975 to 2005, they first classified bankruptcies into three industrial sectors and two levels of firm size. Authors also constructed impulse response functions, which enable to assess the dynamic features of the system.

Hines (2006) concentrated on business bankruptcy sources useful to non-lawyers. Author explained basic types of bankruptcy and how to find information on a company in bankruptcy. He recommended general bankruptcy sources and those covering a specific bankruptcy area or topic.

Pompe and Bilderbeek (2005) using large amounts of data from small- and medium-sized industrial firms, examined several aspects of bankruptcy prediction. They tested a hypothesis on the predictive power of different ratio categories during the successive phases before bankruptcy, and one on the relationship between the age of a firm and the predictability of bankruptcy. It was found that virtually every ratio investigated had some predictive power, and that the univariate and multivariate importance of ratio stability were not very high.

Garškienė and Garškaitė (2004) concluded it is necessary to point out the positive role of the bankruptcy, which is related to a growing competition in the contemporary market economy and the acceleration of changes allowing the best compa-

nies alone to survive on the market. A positive improvement in the legal basis of bankruptcy and restructuring leaves the hope that the number of bankrupt companies will decrease. In order to reduce the bankruptcy risk, it is necessary to create a system of bankruptcy prevention.

Hillegeist *et al.* (2004) assessed whether two popular accounting-based measures, Altman's (1968) Z-Score and Olson's (1980) O-Score, effectively summarize publicly-available information about the probability of bankruptcy. They compared the relative information content of these Scores to a market-based measure of the probability of bankruptcy that they developed based on the Black–Scholes–Merton option-pricing model, BSM-Prob. Their tests showed that BSM-Prob provides significantly more information than either of the two accounting-based measures. This finding is robust to various modifications of Z-Score and O-Score, including updating the coefficients, making industry adjustments, and decomposing them into their lagged levels and changes. They recommended that researchers use BSM-Prob instead of Z-Score and O-Score in their studies and provide the SAS code to calculate BSM-Prob.

Gentry *et al.* (2002) presented of a sound theory and a comprehensive technique for learning the decision model for predicting bankruptcy. The theory is based on the information contained in cash flow components, which is the foundation of valuation theory, and an analytical system that measures the amount of uncertainty in the cash flow information.

Kennedy (2000) examined the operating performance of financially distressed firms and their rivals in the periods surrounding 51 bankruptcy filings. The analysis indicated that filings are associated with declines in rivals' revenues and profit margins. The declines occur prior to and coincident with bankruptcy filings, but dissipate quickly after a filing occurs. The adverse effect on rivals' profit margins appears to be caused by changes in firms' product market conduct, as it is robust to several methods used to screen out filings where a common shock has occurred. Author then examined whether market structure affects the link between filings and rivals' profit margins. The market structure effects appear to be small.

3. Concept of bankruptcy of the company

The various sources of the concept of bankruptcy are defined differently. The word "bankruptcy" (it. Banca rotta) is derived from custom of the medieval Italian cities, to break the benches of the Banker or Merchant who got into debt and ran away (Baird 1993) which figuratively refers to an inability to pay debts.

Van Horne (1983), Weston and Brigham (1992) embraced the concepts of insolvency and bankruptcy of financial difficulties and, depending on various factors presented the following classification:
– The economic downturn (failure);
– Business failure (failure);
– Technical insolvency;
– Insolvency;
– Legitimate bankruptcy.

C. Pass defined bankruptcy as a situation where a person or company's liabilities to creditors are higher than capital (Sakalas, Virbickaite 2003). Sneidere (2005) states that "bankruptcy" is the term which means the solution of insolvency, i.e. liquidation of the debtor and the creditor's claim payment.

Bankruptcy can be defined as inadequate management of the company, resulting in the absence of critical factors of the company's financial performance evaluation. Such an attitude in society is treated differently, because the analysis of scientific literature gives the impression that many of the authors' consider company's bankruptcy as a normal economic phenomenon. Charitanovas (2004) believes that the bankruptcy is the basis for market mechanism standing in one place with the competition and legalization of ownership in the capital.

Stoner *et al.* (2005) believes that thus, inefficient and non-performing companies leave the market, giving up the place to sufficient value-added businesses and transferring to them their own resources (staff, capital, assets). The largest gains in this area reached by Altman (1968) discovered the credit capacity index. Unfortunately, the author's created Z model still poses a massive object on its applicability for companies in Lithuania.

In each country, insolvency and bankruptcy proceedings are matter for the country's legal framework. The different legal systems define the bankruptcy as system that defense creditors and their debtors in favor of their rights, when borrowers are unable or unwilling to pay its debts Enterprise Bankruptcy Law of the Republic of Lithuania (2004) provides the following description of the bankruptcy: "Bankruptcy means the state of an insolvent enterprise where bankruptcy proceedings have been instituted in court or the creditors are performing extrajudicial bankruptcy procedures in the enterprise." This definition promotes the assumption that bankruptcy proceedings may be initiated only for insolvent company. A deeper analysis of Enterprise Bankruptcy Law of the Republic

of Lithuania suggests that the bankruptcy procedures for legal persons can be initiated if at least one of the following conditions exists:

– the enterprise does not pay wages on time and work-related benefits,

– the enterprise does not pay on time for goods/services received, work performed (services), do not repay loans and other transactions entered into by the property obligations,

– the enterprise does not pay on time taxes, other mandatory fees, and (or) awards amounts,

– the enterprise has publicly announced or otherwise communicated to the creditor (creditors), that cannot or do not intend to fulfill their obligations,

– the enterprise has no assets or income from which debts could be recovered, and for this reason, the bailiff returned execution to the creditor.

In accordance with the Enterprise Bankruptcy Law of the Republic of Lithuania an insolvent company means if it defaults and overdue liabilities exceed half of the net book value of assets. Such concept of insolvency more effectively protects the interests of creditors and gives them a legal opportunity to respond more quickly to the company defaults. On the other hand, the regulation allows the initiation of bankruptcy proceedings, even if the company is still able to pay its creditors, or in the future may actually significantly reduce or eliminate their debt burden (Andriulevičiūtė, Survilaitė 2009).

Summing up, company enters a failure process if there is a misalignment between what the company does and what its environment requires. This misalignment occurs when, due to environmental constraints and/or to management-related problems, the resources of the company and their deployment are not adequate to respond to internal and external pressures. Based on this company may enter a failure process as soon as it is created or after several years.

The Authors of this paper consider that causes of failure are the explanatory failure factors that fundamentally explain the misalignment between the company and its environment and, thus, its entry in a failure process. The consequences of failure are the subsequent events which occur as a result of the fundamental causes of the failure.

4. The need of prediction of bankruptcy for Lithuanian companies

While the bankruptcy have also a positive impact, but its negative impact on the country's economy is higher. Bankruptcy causes many economic and social problems not only for companies themselves, but also to the state. Based on the data pre-

sented by the Department of Enterprise Bankruptcy Management under the Ministry of Economy from 2008 the number of bankruptcies processes has increased significantly. Bankrupt in 2009 was launched in 1842 companies, or twice as many businesses as compared to the previous year.

Since 2008 the number of companies starting bankruptcy process grew, so in the past two and half years, bankruptcy has been initiated by an average of 1.461 per year (per month – 122 companies.). The context of bankruptcy proceedings by month, the number of serious corporate bankruptcies began to rise significantly in 2008 September. Then bankruptcies have been initiated to 123 companies. 2009 showed the highest number of bankruptcies in March (200 companies) and September (201 company). In the summer 2009, slightly decrease in the number of bankrupted companies was fixed (in July – 103 companies, in August – 104 companies). During I half 2011 the bankruptcies started for 672 companies or 20 % less than the same period 2010 and by 31.9 % less than the same period 2009. However, the number of bankruptcies of 672 started in I half 2011 is by 235 or 53.7 % higher than during I half 2008 (see figure 1).
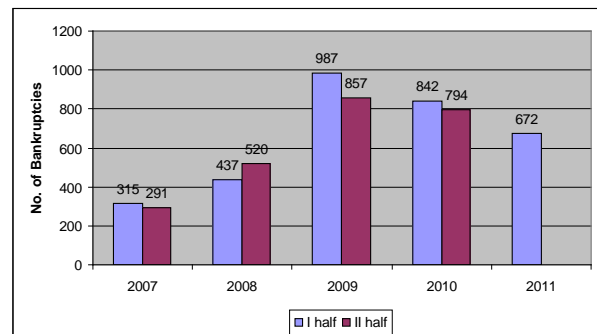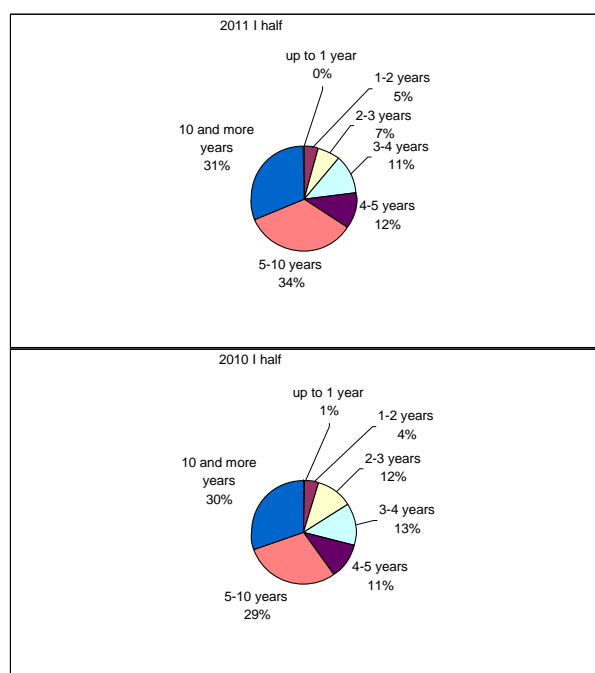

Fig.1. Started bankruptcy procedures of companies located in Lithuania. (Source: The overview of Bankruptcies and restructuring process of the companies during 2007−2011 I half. The Department of Enterprise Bankruptcy Management under the Ministry of Economy, announced on 2011−09−30 No. (8.4) −A2−798.)

Analysis of started bankruptcy processes by economic activities in I half year 2011 (Fig. 2) shows that the highest number of bankruptcies started in trade sector –25.3 % and construction sector – 21 %.

During I half 2011 the number of bankrupted companies decreased comparing with same period 2010. But slightly increase of bankruptcies is fixed in such industries as Accommodation and nutrition and other activities.
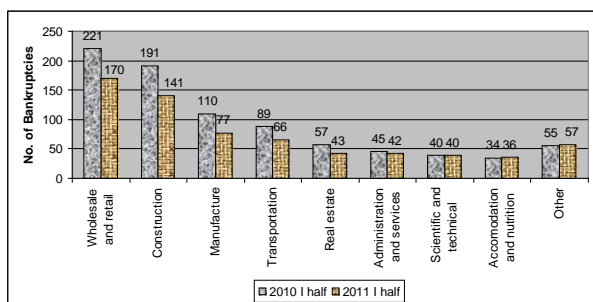
Fig.2. Started bankruptcy processes procedures of the companied located in Lithuania according to Economic activities, I half 2010–2011. (Source: Department of Enterprise Bankruptcy Management under the Ministry of Economy of the Republic of Lithuania.)
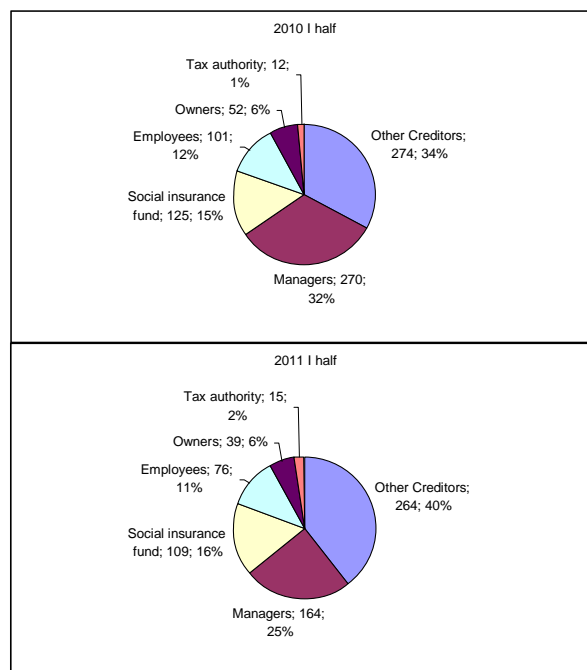

Fig.3. The average operating age of companies before the bankruptcy procedure (I half of 2010−2011). (Source: The overview of Bankruptcies and restructuring process of the companies. Department of Enterprise Bankruptcy Management under the Ministry of Economy announced on 2011−09−30 No. (8.4) −A2−798.)

During the economic crisis, bankrupting businesses in Lithuania grew by touching the other companies, which are considered effective, but may be tampered with so-called „domino effect" principle. The figure 3 presents the average age of insolvent companies.

In the context of 1993–2011 the first half bankruptcy and bankrupt companies operating age (from the date of incorporation until the date of filing for bankruptcy), it is noted that a bankrupt company into bankruptcy has been operating for an average of 7.7 years. During the I half 2011 the majority of bankrupt companies (about 66 %) and the bankruptcy have been operating for five years

or more opposite to the same period of 2010 (see Fig. 3).

The fact that bankrupcies are increasing, is impacted by initiative showed by company's creditors, and secondly by the managers of the companies. Analysis of the data of I half of 2010/2011 shows that the most active initiators of corporate bankrupcies were other creditors (33 % and 40 % accordingly in I half 2010 and 2011), 24 % bankruptcy proceedings initiated by managers of the companies, 16 % – State Social Insurance Fund (Fig. 4).

Fig.4. Initiators of bankrupcies, 2010 I half − 2011 I half. (Source: The overview of Bankrupcies and restructuring process of the companies. Department of Enterprise Bankruptcy Management under the Ministry of Economy announced on 2011−09−30 No. (8.4) −A2−798.)

Different reasons lead company to the bankruptcy but according to Sakalas and Savanevičienė (2003), the essential one which is very reluctant to recognize by the managers of the company – a lack of good corporate management. To avoid failure, companies' managers themselves must play an active role, not only continuous adaptation of Policy in accordance to changing circumstances. Practice shows that bankrupcies are more frequent in companies where there is no (or very weak) internal control system and some business leaders not perform financial analysis. It is therefore necessary to take early action measures to prevent the bankruptcy of a major – pre-bankruptcy prediction ensuring corporate governance.

5. The fundamental elements of bankruptcy prediction for the company

Bankruptcy prediction strategy is the proper interpretation of available data. The process normally involves the collection of large amounts of information related to the company and the industry where if functions in general. The usage of such information is valuable for the management of the companies in order to determine if a business has a good risk.

There are several types of information that provide the basics for any bankruptcy prediction. First, the current financial condition of the company is extremely important. A business that is not able to meet present obligations is likely to be seen as a greater risk for bankruptcy at some future point, while a business that is current in its obligations is likely to be viewed with more favor. Even if the profit margins are somewhat small, a business that is operating with low overhead, relatively little debt, and demonstrates of being sound from a financial and operational standpoint is likely to be considered a relatively low risk for bankruptcy.

Along with the circumstances of the business operation, managers of the companies must be interested to analyze closely developing trends within the industry associated with the company. If there are indications that the industry is likely to undergo some type of slump within the next several years, a manager may view this as an increased potential for bankruptcy to occur. This is true even if the business is currently financially sound. By projecting the most likely response to shifts in the industry by the company, it is possible to develop an informed bankruptcy prediction, and determine if the level of risk is within an acceptable range. Analyzing the data used to make the prediction can help the company develop new operational strategies that minimize the potential for bankruptcy, and ultimately allow the business to remain profitable over the long-term.

6. Conclusions

The Lithuanian economy has been experiencing severe challenges during the past few years, more and more companies in different industries, no matter large or small, are facing with painful bankruptcy. Hence bankruptcy predictions have drawn serious attention from both researchers and practitioners in order to provide on time signals for better investment and management decisions.

After we carefully analyze the statistics of bankrupt companies, several important conclusions can be observed.

Firstly, bankruptcy in Lithuania is determined as status of insolvency when the bankruptcy process starts according to the court decision or by creditors out of the court. As the practice shows for the most companies the bankruptcy process is very painful therefore the initial prediction of bankruptcy is essential.

Secondly, during the economic crisis the increase in number of bankruptcies is visible and the importance of bankruptcy prediction is evidence. In 2009 the bankruptcies were initiated for 1843 companies in Lithuania or it was 90 % more than in 2008. The major bankruptcies are fixed in construction, wholesale and retail sectors. The main reason for bankruptcies are lack of working capital, lost trade orders due to the increased completion and weak administration of business. According to the statistics the main initiators of bankruptcies remain the managers of the company. In practice the bankruptcies start in the companies where managers do not care about importance of internal control system and necessity of the data analysis. It is obvious that mangers in each company must have particular understanding about profitability, solvency, capital structure, cash flows and other financial indicators. Many bankrupt companies face problems in attaining financing in capital markets; but, it is the internal lack of managerial expertise in collecting and analyzing the necessary data that prevents company from bankruptcy.

Finally, managers of bankrupt companies do not have the experience, knowledge, or vision to run their businesses. Even as the company's age and management experience increases, knowledge and vision remain critical deficiencies that contribute to failure. Each company must find their own methodology of business stability and continuity and it might be constructed in manner that helps to identify the risk and to reduce or avoid the threat of bankruptcy.

In diagnosing the root causes of company's bankruptcy it should not be surprising that this turns out to be the management inefficiency of owner-managers. Younger companies are more likely to go bankrupt because of shortcomings in managerial knowledge and financial management abilities. In contrast, older firms are more likely to fail because of an inability to adapt to environmental change. These conclusions suggest a separate observation on different causal mechanisms between firms that fail early and those that fail at a later stage.

References

Agarwal, V.; Taffler, R. 2008. Comparing the performance of market-based and accounting-based bankruptcy prediction models, *Journal of Banking & Finance* 32(8): 1541–1551.
http://dx.doi.org/10.1016/j.jbankfin.2007.07.014

Altman, E. I. 1968. Financial Ratios, Discriminant Analysis and the Prediction of Corporate Bankruptcy, *The Journal of Finance* 23(4): 589–609.
http://dx.doi.org/10.2307/2978933

Andriulevičiūtė, R.; Survilaitė, R. 2009. Bankroto reglamentavimo dabartis ir ateitis Lietuvoje, *Apskaitos ir mokesčių apžvalga* [Accounting and Tax Review] (1): 74−79.

Baird, D. G. 1993. *The Elements of Bancruptcy*. New York: The Foundation Press.

Bivainis, J.; Garškaitė, K. 2010. Įmonių bankroto grėsmės diagnostikos sistema, *Verslas: teorija ir praktika* [Business: Theory and Practice] 11(3): 204–212. http://dx.doi.org/10.3846/btp.2010.23

Charitanovas, V. 2004. Įmonių bankroto prevencija: metodologinis aspektas, *Organizacijų vadyba: sisteminiai tyrimai* [Management of Organizations: Systematic Research] (30): 67.

Chia-Liang Lin; Kuan-Min Wang. 2011. Predicting the bankruptcy risk of Taiwanese OTC corporations, *Journal of Chinese Economic and Business Studies* 9(3): 301–316.
http://dx.doi.org/10.1080/14765284.2011.592359

Dakovic, R.; Czado, Cl.; Berg, D. 2010. Bankruptcy prediction in Norway: a comparison study, *Applied Economics Letters* 17(17): 1739–1746.
http://dx.doi.org/10.1080/13504850903299594

Enterprise Bankruptcy Law of the Republic of Lithuania. 2004 [online] [accessed 15 November 2011] Available from Internet: <http://www3.lrs.lt/pls/inter3/dokpaieska.showdoc_e?p_id=241851>.

Garškaitė, K. 2008. Įmonių bankroto prognozavimo modelių taikymas, *Verslas: teorija ir praktika* [Business: Theory and Practice] 9(4): 281–294.
http://dx.doi.org/10.3846/1648-0627.2008.9.281-294

Garškienė, A.; Garškaitė, K. 2004. Enterprise Bankruptcy in Lithuania, *Journal of Business Economics and Management* 5(1): 51–58.

Gentry, J. A.; Shaw, M. J.; Tessmer, A. C.; Whitford, D. T. 2002. Using Inductive Learning to Predict Bankruptcy, *Journal of Organizational Computing and Electronic Commerce* 12(1): 39–57.
http://dx.doi.org/10.1207/S15327744JOCE1201_04

Guščinskienė, J.; Čiburienė, J. 2010. Labour Market in Lithuania: Gender Situation, *Contemporary Issues in Business, Management and Education '2010* 8(1): 271–284.

Hillegeist, S. A.; Keating, E. K.; Cram, D. P.; Lundstedt, K. G. 2004. Assessing the Probability of Bankruptcy, *Review of Accounting Studies* 9(1): 5–34.
http://dx.doi.org/10.1023/B:RAST.0000013627.90884.b7

Hines, T. M. 2006. Sources for Researching Business Bankruptcies, *Journal of Business & Finance Librarianship* 11(3): 3–17.
http://dx.doi.org/10.1300/J109v11n03_02

Januševičiūtė, A.; Jurevičienė, D. 2009. Bankroto esmė: teorija ir praktika, *Mokslas – Lietuvos ateitis* [Science – Future of Lithuania] 1(3): 30–33.

Kageyama, N.; Harada, N. 2007. Bankruptcy Dynamics in Japan: A System Estimation Approach, in *Proceedings of the 51st Annual Meeting of the ISSS*. Tokyo, Japan 5, Tokyo Institute of Technology.

Kennedy, R. E. 2000. The Effect of Bankruptcy Filings on Rivals' Operating Performance: Evidence from 51 Large Bankruptcies, *International Journal of the Economics of Business* 7(1): 5–25.
http://dx.doi.org/10.1080/13571510084032

Muller, G. H.; Steyn-Bruwer, B. W.; Hamman, W. D. 2009. Predicting Financial Distress of Companies Listed on the JSE – A Comparison of Techniques, *South African Journal of Business Management* 40(1): 21–32.

Pompe, P. M.; Bilderbeek, J. 2005. The Prediction of Bankruptcy of Small- and Medium-Sized Industrial Firms, *Journal of Business Venturing* 20(6): 847–868.
http://dx.doi.org/10.1016/j.jbusvent.2004.07.003

Rashid, A.; Abbas, Q. 2011. Predicting Bankruptcy in Pakistan, *Theoretical and Applied Economics* 9(562): 103–128.

Rugenytė, D.; Menciūnienė, V.; Dagilienė, L. 2010. Bankroto prognozavimo svarba ir metodai, *Verslas: teorija ir praktika* [Business: Theory and Practice] 11(2): 143–150.
http://dx.doi.org/10.3846/btp.2010.16

Sakalas, A.; Savanevičienė, A. 2003. *Įmonės krizių vadyba* [Management of crisis in business]. Kaunas: Technologija.

Sakalas, A.; Virbickaitė, R. 2003. Bankroto teorija ir praktika, *Inžinerinė ekonomika* [Engineering Economics] 2(33):106–111.

Sneidere, R. 2005. Analysis of Bankruptcy Prediction Models, in *The Accounting and Auditing Systems Integration into the EU Area, New Challenges and Opportunities. International Conference on Communities*. 223 p.

Stoner, A. F. J.; Freeman, R. E.; Gilbert, R. D. 2005. *Management*. Kaunas: Printing and computer science.

Valackienė, A.; Virbickaitė, R. 2011. Conceptualization of Crisis Situation in a Company, *Journal of Business Economics and Management* 12(2): 317–331.
http://dx.doi.org/10.3846/16111699.2011.575192

Van Horne, J. C. 1983. *Financial Management and Policy*. NY: Prentice Hall.

Weston, J. F.; Brigham, E. 1992. *Managerial Finance*. Illinois: The Dryden Press.

Yung-Ho Chiu; Yu-Chuan Chen; Yu Han Hung. 2009. Basel II and bank bankruptcy analysis, *Applied Economics Letters* 16(18): 1843–1847.
http://dx.doi.org/10.1080/13504850701704241