“BABEŞ-BOLYAI” UNIVERSITY CLUJ-NAPOCA

FACULTY OF ECONOMICS AND BUSINESS ADMINISTRATION

PHD THESIS

ANALYSIS SYSTEM AND FINANCIAL DIAGNOSTIC – A WAY OF PREVENTING COMPANY INSOLVENCY

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INTRODUCTION

The French philosopher Henri Bergson stated that “an absolute can only be given in an intuition, while all the rest has to do with analysis”. In other words, the complex analysis process can influence the majority of human activities. Considering that the majority of economic activities unfold on highly competitive markets, which are constantly expanding, financial analysis and financial diagnostic tend to become the central axis for managing business and the principal way of ensuring the longevity of economic activities.

Motivation for choosing the topic and relevance of research

The topic of this research was chosen in the context of the economic realities faced by national economies after the beginning of the 2007 world financial crisis, when phenomena such as insolvency and bankruptcy became realities for a huge number of companies around the world, including Romania. Hence, the necessity for implementing a system of financial analysis-diagnostic that could offer a clear and precise image of the company “health” becomes an imperative for every manager who is interested in revitalizing economic activity. Moreover, the process of correlating company sub-systems via quantitative and qualitative methods and investigation techniques, along with identifying strengths and weaknesses give rise to a global diagnostic based on which managers are able to take adequate decisions regarding the company future. The analysis-diagnostic turns into a *sine qua non* instrument for dedicated, responsible and proactive managers, an instrument which can make the difference between obtaining business performance and going bankrupt. As William Manchee, a commercial law professional, used to say, “many small businesses are doomed from day one, not from competition of the economy, but from the ignorance of their owners… their destiny is already decided because they have no idea how a business should be operated” (Manchee, 2011).

Structure of the PhD thesis

The PhD thesis “*Analysis system and financial diagnostic – A way of preventing company insolvency*” is structured into five chapters, including both theoretical aspects and practical approaches conducted on a numerous sample of companies from Romania with the help of econometric modeling.

The first chapter, entitled “Company analysis-diagnostic – A way of preventing bankruptcy”, introduces the key-concept of “analysis-diagnostic”, the content and characteristics of this process by means of an adequate comparison with the medical field realities. Based on solid arguments identified in the national and international literature, important aspects such as the role, instruments, typologies, stages in developing an analysis-diagnostic and the importance of financial diagnostic are presented. Moreover, the chapter drafts the limits of the legal framework that regulates these analyses, describing also the most popular diagnosis models. Last but not least, the components of the analysis-diagnostic system are briefly presented.

The second chapter, entitled “Insolvency – Integrated part of the current economic context”, tackles insolvency and bankruptcy, together with the history of Romanian legal framework from the 19th century until nowadays. Furthermore, the chapter presents in detail the most common insolvency causes, together with insolvency practices from Romania and at international level (Africa, Central and South America, North America, Asia, Europe, Oceania).

The third chapter, entitled “The role of liquidity and solvency in determining the financial diagnostic”, addresses concepts such as liquidity and solvency, determining these states with the help of a system of absolute and relative indicators, establishing the safety interval for each type of liquidity and solvency indicators. In addition, by means of econometric modeling with fixed effects applied on panel data, the significance of the relationships between liquidity, solvency and profitability indicators is tested.

The fourth chapter, named “Performance and financial diagnostic. The Romanian practice”, presents the taxonomy of factors influencing financial performance, performance indicators in absolute and relative size, the safety intervals for these indicators. Moreover, the degree in which performance influences the level of company liquidity and solvency was analyzed.

The fifth chapter, entitled “Risks and their impact on insolvent companies”, introduces the concept of “risk” in businesses, granting a special focus on bankruptcy risk and credit (banking) risk, and on the methods used for successfully identifying these types of risks. The essential contribution of this chapter and of the thesis is represented by the development of the global diagnostic based on the sample of insolvent companies, starting from the liquidity, solvency, performance, bankruptcy risk, and credit risk diagnostics. As expected, econometric analyses showed a strong statistical relationship between the global diagnostic and the aforementioned partial diagnostics.

Current knowledge status within the research field

Across its five chapters, the PhD thesis tackles numerous concepts, indicators, models of analysis and financial diagnostic by means of an extensive documentation process via books, articles from important journals, current legislation, internet pages of different economic entities. The results and conclusions of Romanian and international researchers are presented in a thorough approach meant to emphasize the strengths and weaknesses of the theoretical and practical research.

Defining the concept of "analysis-diagnostic" is accomplished with authors such as Moldoveanu (2000), Nicolescu, Verboncu and Hideguti (1998), Păvăloaia W. and Păvăloaia D. (2006), Petrescu (2008), Thibault (1989), and the characteristics of the financial diagnostic are highlighted by Bistriceanu, Adochiței and Negrea (2001), Dănescu (2003), Neagoe (1997), Toma and Alexandru (1998), Onofrei (2004) sau Vasile (2006), among others. The description of the main models of company analysis-diagnostic is achieved with the help of authors such as Bărbulescu (1999), Mereuţă *et al.* (1994), Miles (2000).

The issues of insolvency and bankruptcy were presented from the perspective of studies by: Bălescu (2012), Bufan (2009, 2014), Comşa (2011), Dinu (2004), Dumitru (2009), Ghiugan (2007), Godîncă Herlea (2018), Guda (2018), Miloș (2010), Miloş and Deli (2014), Miloș and Dinu (2002), Moţiu (2015), Nasz (2018), Stan and Turcu (2008), Țăndăreanu (2003).

The subsistems of global diagnostic were presented with the help of the following studies:

1. *Liquidity*: Bernard and Colli (1994), Bistriceanu, Adochiţei and Negrea (2001), Brezeanu, Boştinaru and Prăjişteanu (2003), Buşe (2005), Gaskin (1998), Gheorghiu (2004), Halpern, Weston and Brigham (1998), Higgins (1992), Marin and Chivulescu (1994), Petrescu (2006), Radu (1999), Robu and Georgescu (2004), Toma (1994), Toma and Alexandru (1998), Trenca (2005), Vintilă (2006);

2. *Solvency*: Antoniu *et al.* (1993), Backer, Elgers and Asebrook (1988), Dănescu (2003), Işfănescu and Ţuţu (1995), Mărgulescu and Mironiuc (2006), Niculescu and Robu (1994), Onofrei (2004), Stancu (2007), Toma and Chivulescu (1994), Vasile (2006);

3. *Performance*: Backer, Elgers and Asebrook (1988), Baltagi (2005), Işfănescu, Stănescu and Băicuşi (1999), Halpern, Weston and Brigham (1998), Niculescu (1997), Radu (1999);

4. *Risk*: Adochiţei M. and Adochiţei A. (1993), Anghel (2002), Băileşteanu (2005), Dumitrescu (2010), Fulmer *et al.* (1984), Giurgiu (1995), Koch (2001), Manolescu (1995), Mihai *et al.* (1997), Mihalciuc *et al.* (1995), Niculescu (1997), Petrescu and Mironiuc (2002), Stancu (1994), Vintilă (2002).

CHAPTER 1. COMPANY ANALYSIS-DIAGNOSTIC – A WAY OF PREVENTING BANKRUPTCY

In this chapter I have highlighted the importance of analysis-diagnostic based on the literature. Hence, according to various specialists, it is mandatory that an analysis-diagnostic generate an outcome, namely a diagnostic, similarly to what happens in the medical field. Moreover, I have ascertained that tackling a diagnostic from a system perspective is based on the "cause-effect" analysis. Therefore, I have shown that liquidity and solvency are highly influenced by the performance ratios.

Within the analysis-diagnostic, financial diagnostic is the principal component that can significantly influence the future of a company. In subchapter four, I have underlined issues such as the importance, necessity, role, objectives, instruments and stages that must be covered in order to develop a system of analysis and financial diagnosis for any company. In addition, I have described the system components: liquidity, solvency, performance, bankruptcy risk, and credit risk diagnostics.

I have presented the stages of an analysis-diagnostic, starting with the post-factum analysis, which establishes the prediagnostic of a company, continuing with the current analysis and ending with the forecasting analysis, which materializes into the postdiagnostic of the system. On top of that, I have discussed the role of economic and financial analysis in the process of developing the financial diagnostic.

The closing section of this chapter briefly describes different diagnosis methods that are built on the theory of cybernetic systems, where the input of a system is adjusted according to the output. The theory of cybernetic systems also stressed the impact of the environment on the company information energy.

CHAPTER 2. INSOLVENCY – INTEGRATED PART OF THE CURRENT ECONOMIC CONTEXT

In this chapter I have presented various theoretical aspects concerning the concepts of *insolvency* and *bankruptcy*, emphasizing the strong relationship between these concepts when starting insolvency proceedings.

Secondly, I have conducted a retrospective analysis of Romanian bankruptcy proceedings during the period 1817-nowadays and noticed that these aspects have always been of great importance. Taking into account the bankruptcy phenomenon, it is deemed that the competitive economy creates antibodies against companies that generate losses.

Based on the findings of an empirical study conducted by Coface Romania, I have described the trend for new insolvencies started in the period 2005-2017 and I have noticed that the insolvency phenomenon became more salient towards the ending of the analyzed period as a result of changes registered in the legal framework of this field. Moreover, with the help of the specialty literature, I have listed the causes and circumstances for starting the insolvency proceedings by different companies.

In the final section of this chapter I have described the characteristics of insolvency proceedings in countries from Africa, Central America and South America, North America, Asia, Europe, and Oceania.

CHAPTER 3. THE ROLE OF LIQUIDITY AND SOLVENCY IN DETERMINING THE FINANCIAL DIAGNOSTIC

In this chapter, I have firstly presented a multicriterial approach on the issues of liquidity and solvency, based on opinions reported in the specialty literature. In order to conduct the analysis-diagnostic regarding liquidity and solvency, I have selected three liquidity ratios (current liquidity ratio, quick liquidity ratio, cash liquidity ratio) and five solvency ratios (patrimonial solvency ratio, general solvency ratio, total indebtedness ratio, long-term indebtedness ratio, indebtedness capacity coefficient).

The descriptive analysis of the liquidity and solvency ratios has facilitated the establishment of safety intervals corresponding to insolvent companies, intervals that were later used to develop the liquidity diagnostic and the solvency diagnostic.

Secondly, I have conducted multiple econometric studies using panel data retrieved from 72 insolvent companies from Romania: 42 companies were analyzed on a six-year period (Group A), 16 companies on a five-year period (Group B), and 14 companies on a four-year period (Group C). According to the fixed-effect panel data analysis, I have found significant relationships between: liquidity ratios (dependent variables) and performance ratios (economic return ratio, Return On Equity ratio, general return ratio); solvency ratios (patrimonial solvency ratio, general solvency ratio, total indebtedness ratio) and the three abovementioned performance ratios.

The system of analysis and financial diagnosis established in this manner (contrary to the opinions reported in the specialty literature) is grounded on the liquidity, solvency, performance, bankruptcy risk, and credit risk diagnostics, as stated in the following chapters.

CHAPTER 4. PERFORMANCE AND FINANCIAL DIAGNOSTIC. THE ROMANIAN PRACTICE

In this chapter I have discussed the factors influencing the performance of insolvent companies based on a statistical analysis of income, expenses, and performance ratios.

Analyses have revealed adequate average and medium values for the six performance ratios corresponding to the sample including three categories of insolvent companies. After examining the main statistical indicators of central tendency and variance related to the performance ratios, I have concluded that 50% of the insolvent companies registered positive values of these ratios, while 50% of the companies experienced permanent financial difficulties, registering negative performance ratios. Starting from the analysis of financial ratios, I have identified the evolution ranges for each indicator, which will be used in establishing the performance diagnostic in the last chapter of this thesis.

Company performance depends largely on its financial structure, namely the extent to which its activity is financed with owner’s equity and loans. According to the economic theory, there is an optimum balance between the two financing sources, a balance that leads to maximizing company cost of capital and, implicitly, to maximizing company value. In this sense, I have deemed it is of great importance to find our whether there was a significant link between performance and solvency (as a measure of company exposure and, implicitly, as an indirect measure of company financial structure), and performance and liquidity among the insolvent Romanian companies.

The empirical research has revealed a series of connection among three performance ratios, namely the economic return ratio, Return On Assets ratio, operating activity return ratio (as dependent variables) and liquidity ratios (current liquidity ratio, quick liquidity ratio, cash liquidity ratio). At the same time, I have concluded that performance ratios were significantly influenced also by solvency ratios (patrimonial solvency, general solvency, indebtedness degree).

In addition, I have noticed that the signs of the explanatory variables were in accordance with the economic theory precepts. Therefore, current liquidity and cash liquidity had negative effects on the economic return ratio, while the impact of quick liquidity was positive. With respect to the current liquidity and cash liquidity, I have noticed that inventories and the lack of revenue negatively influenced this performance ratio, while account receivables and cash significantly influenced the economic return ratio (*RRE*), Return On Assets ratio (*ROA*) and operating activity return ratio (*RRExp*).

Analyses have also indicated that patrimonial solvency ratio, general solvency ratio and total indebtedness ratio were significant influence factors for the three performance ratios. At the same time, the coefficient signs of the explanatory variables were in accordance with economic theory. Therefore, general solvency and total indebtedness had negative effects on economic return ratio, while the impact of patrimonial solvency was positive. With respect to general solvency and total indebtedness, one could see that a significant increase in debts and a significant decrease in owner's equity generated a negative evolution for this performance ratio. The increasing total assets positively influenced the economic return ratio (*RRE*), Return On Assets ratio (*ROA*), and operating activity return ratio (*RRExp*).

The final component of the system of analysis and financial diagnosis (SAFD) is represented by risk analysis, with its two elements (bankruptcy risk, credit risk), which are tackled in the last chapter.

CHAPTER 5. RISKS AND THEIR IMPACT ON INSOLVENT COMPANIES

In this chapter, I have completed the scientific research by elaborating the global financial diagnostic of the 72 insolvent companies. For this purpose, I have determined the liquidity, solvency, performance, bankruptcy risk, and credit risk diagnostics, considering the results from the previous chapters.

Hence, I have taken into account the evolution ranges for liquidity, solvency, and performance, established by means of a descriptive analysis performed on data from insolvent companies. In order to establish the bankruptcy risk diagnostic, I have employed credit scoring methods such as “Anghel”, “Fulmer”, “Băileșteanu”, and “Credit-Man”.

In the process of establishing the credit risk diagnostic, I have considered the Patria Bank, BRD-GSG, Credit Europe Bank, and Intensa Sanpaolo Bank methods.

The results from these diagnostics have been included in the global financial diagnostic, which stresses the company financial state at a certain time. To ensure the analyses accuracy and to validate the working hypotheses, I have tested the links between the dependent variable general financial diagnostic and the five partial diagnostics. For all three subsamples of insolvent companies, I have then concluded that coefficients were significant, models were valid, and the global financial diagnostic was 80% influenced by the five partial diagnostics.

CONCLUSIONS

The PhD thesis entitled "*Analysis system and financial diagnostic – A way of preventing company insolvency*" tackles a current topic of great importance in the context of the economic turmoil of the last decade. The outburst and rapidly alarming dissemination of phenomena such as the global financial crisis on the ground of serious liquidity shortages and excessive indebtedness have emphasized the necessity of implementing a system of analysis and financial diagnosis with the purpose of preventing the beginning of insolvency proceedings among Romanian companies.

Across five chapters, relevant theoretical concepts presented according to the national and international literature, along with practical approaches conducted with the help of econometric modeling manage to draft the importance of developing the analysis-diagnostic in order to ground adequate managerial decisions. Without a detailed and realistic perspective on the company capacity to generate financial resources that are sufficient for meetings short-term and long-term debts, to obtain viable performance, to avoid unfavorable contexts such as insolvency and bankruptcy, and to attain a solid financial position according to the rules of credit institutions, I believe that managerial decisions regarding the company activity are rather guided by chance than by economic reality.

The importance of this scientific research stems from a series of aspects that I will present in the following paragraphs. First, the topic is of real interest for any company manager who is interested in the longevity of his business, considering the dynamics of national and international economy.

Second, the research is based on a large sample of companies operating on the Romanian market. Hence, I have generate the empirical results by using information retrived from the financial statements (balance sheet, income statement) of 72 insolvent micro-entities and small companies, which conducted commercial activities in various areas such as manufacturing, trade, services. Regarding the territorial spread of the analyzed companies, the majority come from the north-western part of the country and the city of Bucharest. The financial data of these companies have been provided by Insolvența SM SPRL, which manages a significant portfolio of companies undergoing different stages of this special proceeding.

Third, I have analyzed financial statements over a period of at least four years in order to observe the dynamics of liquidity, solvency, performance, bankruptcy risk, and credit risk indicators. Depending on the legth of the period, the 72 companies were grouped as follows: Group A includes 42 entities analyzed for the period 2012-2017; Group B includes 16 companies analyzed for the period 2011-2015; Group C comprises 14 companies analyzed for the period 2012-2015.

Fourth, the research methodology is complex and varied, following international academic standards. Theoretical concepts regarding analysis-diagnostic, liquidity, solvency, performance, bankruptcy risk (“Anghel”, “Credit-Man”, “Fulmer”, “Băileșteanu”), credit risk (Patria Bank, BRD-GSG, Credit Europe Bank, Intesa Sanpaolo Bank methods) and credit scoring methods are described in detail by means of documentation, starting from studies in the national and international literature. I have employed methods such as comparison, questioning, analysis, and synthesis.

The applicative part of this thesis contains numerous descriptive analyses and econometric models that are suitable to investigate panel data, in which fixed effects have been used to estimate parameters. In order to estimate econometric models, I have used the statistical software EViews version 9.0 and the Panel OLS (ordinary least squares) method.

Limitations and new research directions

The present research features certain limitations since any scientific endeavor of this kind can always be improved. In the first place, the analyzed company sample, although substantial, is not representative for the Romanian entities that face insolvency. Future research could aim at applying the analysis-diagnostic on a representative sample at national level. In the second place, the sample includes only companies pertaining to the category of micro-entities and small entities. Therefore, similar studies could conduct such analyses on samples comprising medium and large companies operating in Romania. In addition, similar empirical approaches could focus on landmark companies and multinationals operating on international markets because they shape the dynamics of world economy most of the time. In the third place, the company financial statements were analyzed for periods of 4-6 years, starting with 2011, without considering the year when the world financial crises started (i.e., 2007). Future research could extend the period of analysis to at least one decade in order to investigate the situation of companies that became insolvent before the crisis.

Martin Henry Fischer, an American physician known for his numerous epigrams on the medical field, used to say that “diagnosis is not the end, but the beginning of practice”. As shown throughout this thesis, analysis-diagnostic plays an essential role in grounding managerial decisions that aim at ensuring the improvement, development, and long-term survival of a company. In conclusion, this PhD thesis may represent a starting point in developing such diagnoses that can be applied to companies facing challenges related to liquidity, solvency, performance, crediting with the purpose of preventing unfavorable financial situations such as insolvency or even bankruptcy.

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