

Juridical and accounting approach of insolvency at European and national level

- Resume of the doctoral thesis -

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OBJECTIVES AND STRUCTURE OF THE RESEARCH

The main objective of the thesis entitled "Legal and accounting approach of insolvency at European and national level" is to make a comparison of various aspects of insolvency regulations in European countries and of the financial and accounting information of insolvent companies from different countries.

Objective O₁: *study of the regulations of the EU member states, by reflecting the different features of insolvency the systems;*

Objective O₂: *statistical analysis of insolvency indicators (number of insolvent companies and insolvency rate) in Europe and their relationship with various macroeconomic factors;*

Objective O₃: *presentation and comparison of financial aspects for insolvent companies from different European countries;*

Objective O₄: *analysis of the risk of insolvency/bankruptcy based on the known models and establishing their accuracy based on the sample of insolvent companies;*

Objective O₅: *undertaken a study on the factors determining the level of indebtedness of insolvent companies in different European countries and depending on the area of activity.*

This thesis is separated into two parts, as its title suggests: the first part includes the legal approach of insolvency, and the thecond presents accounting issues related to the insolvency.

RESEARCH METHODOLOGY

Both parts of the thesis include both qualitative and quantitative studies. The legal approach is focused mainly on presenting different aspects of European legislation on insolvency, but also includes the study of the statistical data on insolvency and the analysys of the connection between the annual rate of insolvency and various macroeconomic factors. The accounting approach is focused on the analysis of economic and financial indicators of insolvent companies from five European countries and the study of the connection between some of them and the level of borrowing by applying deduction.

PART I. COMPARISON OF THE INSOLVENCY PROCEEDINGS IN EUROPEAN SPACE

INTRODUCTION

An unstable economic environment, such as the current one, causes many companies to be unable to pay their due debts, not having the amounts required for their payment. In such a case, the situation of the company can be decided after its entry into *insolvency proceedings*, which can be finished either by reorganization or by liquidation and payment of at least part of their debts.

This paper is separated into two parts, so at first we deal with the legal approach to insolvency, for then to present accounting issues related to the insolvency. Taking into account the matters referred, we consider as necessary a presentation of the legal aspects of insolvency proceedings in European countries, including Romania, starting with explaining the concept of insolvency and continuing with aspects of the European insolvency regulations. Of course, in this situation, the separation of the countries in Western European countries and countries in Central and Eastern Europe seems normal, given the major differences between the two categories. Legislation in Romania is presented separately and extensively.

The number of insolvent companies and insolvency rate varies, of course, from one country to another. However, which are the European countries with the most insolvent companies? Can be that a large number of insolvent companies is not alarming for a country's economy? Can we predict in which direction the two indicators will turn? To these questions we will respond by doing an analysis of the number of insolvent companies in each European Union member state and of the corresponding insolvency rate.

After a review of the literature we also considered that an empirical study on the impact of macroeconomic factors on insolvency cases can again show the differences between European and Romanian economic environment.

CHAPTER 1. THE REGULATORY FRAMEWORK OF INSOLVENCY IN THE EU COUNTRIES

In this chapter we propose, first, to define the concepts of failure, insolvency, bankruptcy, then we make an analysis of the legal and regulatory insolvency, both in Romania and in other countries in EU. In addition, some aspects about the efficiency of the insolvency systems and types of errors will help to expand knowledge of these terms. We also present the types of orientation of insolvency systems and the differences between them.

The term of "insolvent" was originally used in the period 1585-1595 and, etymologically speaking, comes from the words "in"="no" and "*solventem*"="payer" (Douglas Harper). *Insolvency* can be defined as: inability/lack of means to pay their due debts during normal activity; relative condition in which a person has available immediate/liquid its assets, but they are not enough to cover the debts (The Law Dictionary). The term "*imminent insolvency*" was introduced to define the situation in which a company is unable to pay their debts when they will be due.

During the last years there has been a tendency to change the law in terms of insolvency proceedings in many European countries. This trend has resulted in some cases in the adoption of new legislation. Although the 28 European Union member states form a community, they differ in many respects. Insolvency proceedings and their effectiveness vary significantly from country to country. Some countries have a complex insolvency proceeding while others have only a simple procedure of liquidation (Succurro, 2010).

Bankruptcy law in the UK is representative as a model system that protects the lender in all phases of insolvency. In fact, a classification of the main countries in Europe on the orientation of insolvency system has pointed out that the UK insolvency law and the old German law favors creditors, especially those who hold securities for their claims (Lopez Gutierrez et al., 2009). The peculiarity of insolvency regulations in France is given by the implication of the judiciary institution throughout the whole procedure. Consequently, they do not favor completely the debtor, but does not offer to the creditor any advanced protection. However, more than in other countries, insolvency law in

France presumes rescuing bankrupt companies to protect employees (Blazy et al., 2011). French origin legislations are in force in Italy, Spain, Portugal, Belgium and the Netherlands. Spain has opted for a debtor oriented insolvency system. However, secured creditors enjoy some protection. Ley concursal (Spanish insolvency law), adopted in 2004, brought a unification of the stipulations in insolvency, although it does not offer the necessary flexibility for liquidators to sell the assets of a company quick or to be able to save a company from bankruptcy.

Central and Eastern European countries are countries with a developing economy that is trying to take as model of the developed countries to adapt to economic changes. Therefore, regulations in these countries were formed by reference to the laws of other countries. As an example we give the Romanian legislation, which is based on the French model, or the Polish regulations which has as a base the insolvency legislation in Germany. However, there are still insolvency elements that regulations of emerging countries do not treat and the state was involved too much by introducing exceptions or special rules in the procedure.

Romanian insolvency regulations aimed have a number of peculiarities.

In 1887 the Romanian Commercial Code was adopted Commercial after the model of Italian Commercial Code. In the period 1947-1989, called the "social realism", state control over the accounting system of Romanian enterprises caused that the legislative framework referring to business failure was not uses, although the code has not been abolished (Onofrei, 2007). In this way the reforms that were carried out in post-revolutionary period were able to bring innovations to the field, through changes to old code, pending the Law no. 64/1995 of juridical reorganization and bankruptcy.

Romanian legal framework on bankruptcy procedure has undergone constant changes to be improved. This was the reason of the adoption of Law no. 85/2006 on insolvency proceedings, which entered into force on 21 July 2006. The law introduces new mechanisms intended to shorten the duration of judicial proceedings or by accelerating the reorganization of companies in financial difficulties through the

procedure called *juridical reorganization* or by closing of the business, in order to save as much as possible of the its wealth and respect the creditors' rights as much as possible through *bankruptcy*. In 2014 a new law was proposed for approval, so that at June 25, 2014 was published *Law no. 85/2014 on procedures to prevent insolvency and of insolvency* which introduces many changes.

Operations of the liquidator when liquidation is made out of court are distinct from the steps to take when the liquidation is made after bankruptcy. Liquidation steps are fixed by OMPF 1376/2004 for approving the methodological norms regarding the accounting registration of the major operations for merger, division, dissolution and liquidation of companies and for the withdrawal or exclusion of associates from a company and their tax treatment. However, since the adoption OMPF 1376/2004 quite some time has passed and an update of its stipulations would lead to facilitate the implementation of the specified steps to take.

The *efficiency of insolvency systems* can be determined at three levels of the process. There are three types of efficiency in insolvency (Laitinen, 2011): "ex-ante" efficiency; interim efficiency; "ex-post" efficiency. Another element which is closely related to the efficiency of insolvency laws is related to two *types of errors* that can occur with law enforcement. There are certainly cases where a company is facing financial difficulties, but instead of being liquidated, it is reorganized, causing a system failure known as a Type I error. Conversely, if a viable company is liquidated, this will cause type II error. The two types of errors are complementary and the aim insolvency system is to determine a way to minimize the total risk of developing one of them.

To determine the *orientation of insolvency law* in Romania the steps of the national insolvency procedure that can then be compared with the features of the procedures applied in other countries must be analyzed. For this purpose, you can create an index that reflects the degree in which the system is creditor orientated or the debtor orientated.

In Table 1 we present the values of each index for Romania, Spain, France, Portugal and Italy. Values for the UK and USA have been

included in order to compare the values obtained for the five countries against the representative insolvency systems. The minimum value is recorded for United States – 1. The maximum of the calculated index is registered for UK - 9.5. The resulting index has the value of 3.75 for Romania. This value indicates that the insolvency system in Romania is one that protects more than the debtor, but not entirely. In fact, the involvement of the courts in making decisions on the extent of the procedure shows an approximation of the laws from Romania and France. Romanian regulations were often inspired by the French ones. A proof of the strong connection between the two is the index value of 3.75 for Romania that is very close to the index for France of 3.5. Both regulations are geared more towards the debtor.

Table 1: Orientation of insolvency systems in several European countries and the USA

	<i>USA</i>	<i>Spain</i>	<i>Italy</i>	<i>France</i>	<i>Romania</i>	<i>Portugal</i>	<i>United Kingdom</i>
INDEX	1	2,75	3,25	3,5	3,75	5,75	9,5

Other countries with debtor orientated insolvency system are Spain and Italy, with indexes values of 2.75 or 3.25. Portugal has implemented a creditor orientated insolvency system. The index value obtained is 5.75.

In conclusion, the regulations of the countries in the European Union have, as expected, both differences and similarities. Another way to compare the EU member states is in terms of statistics on the number of insolvencies and insolvency rates, which we intend to do in the next chapter.

CHAPTER 2. INSOLVENCY AND RELATIONSHIP WITH MACROECONOMIC FACTORS

This chapter focuses primarily on statistical *analysis of the number of cases of insolvency and insolvency rate and the influence of macroeconomic factors on the latter.*

Insolvency statistics for the countries included in this study were collected for period 2003-2012. Total insolvencies in member states of the European Union (except Croatia, Malta and Cyprus) has slight

downward trend during 2005-2007, but after that the total number of insolvencies has increased considerably. If we compare 2012 to 2003, we see an overall increase in the number of insolvencies of 46.5%. However, the most drastic change of this number took place in 2008-2009 and since 2008 further increases in the total number of insolvencies in the EU is notated. This increase shows that the member states are still in economic crisis, but the most difficult period has passed. In 2012, France, Germany, Great Britain, Hungary and Romania are the countries with the most insolvent companies.

In our study we perform a **factorial analysis of correspondences** for *the number of cases of insolvency* and the *insolvency rate* giving the variables *country* and *year*.

In 2012 was recorded the highest ***number of insolvencies*** in the last decade. The number of insolvent companies in the European Union has increased every year since 2007, as a result of the global economic collapse in recent years. The period under review can be divided into two stages. First, the period up to 2007 inclusive, was characterized by a constant evolution in the number of insolvencies. Secondly, since 2008, the economy entered into crisis, as reflected by significant increased number of insolvencies from one year to another. Spain is a special case, given that nearly 80% of all cases of insolvency from 2003-2012 are in the last four years. The number of insolvencies in the country has doubled in 2009, and in subsequent years the changes were not significant compared to the previous year or there were significant increases.

The evolution in time and space of European insolvencies is explained in a proportion of 91.7% by the analyzed data. For Germany and Italy, changes in the number of insolvent companies from one year to another are not significant. Hungary, Romania and Spain recorded significant differences between the numbers of insolvency cases in 2011-2012 compared to 2003-2005, differences over the EU average.

Another indicator for the comparative analysis of insolvency is the ***annual rate of insolvency***. In 2012 there was the highest average rate on total insolvency in EU member states in the last decade. This average has increased since 2007. It can be seen that the highest

insolvency rates are recorded for Austria and Luxembourg until 2007, and Hungary and Romania, since 2008.

The evolution in time and space insolvency rate in Europe is explained in a proportion of 85.3% by the data included in the analysis. Insolvency rate was increasingly higher for countries like Romania and Hungary and more reduced for Austria, Slovenia and Sweden.

The present study reflects how the economic crisis from recent years has led to the insolvency and gives us information on the future evolution of the number of insolvencies and insolvency rate in European Union countries. France and Germany, although developed countries, have the highest values for the number of insolvent companies every year since 2003. However, given the major increases in Romania and Hungary, the top of the countries with the most cases of insolvent companies is changing, especially considering the fact that the two countries are developing one, with an unstable economic environment. The increases in Romania and Hungary, together with the information obtained through this study - the fact that the change in the number of insolvencies in Germany is not significant - indicates that the first place in the top of these countries will change over time.

Given the large number of insolvent companies in France and Germany compared to other EU countries, if we compare them only to the *countries of Western Europe*, the impact will be greater. In these two countries there are almost half of the companies under insolvency proceedings throughout the region. The third place among the countries with the most insolvent companies is held by United Kingdom. However, taking into account the rate of insolvency, we can say that for France and Germany the situation is not so bad. Insolvency rates in these countries have diminished. Italy, Netherlands, Spain and Portugal are the countries in Western Europe that have experienced, in fact, increases of the numbers of insolvent companies in 2012 compared to the previous year.

The situation in *Central and Eastern Europe* differs significantly from the one in Western Europe. The average number of insolvencies in these countries has increased much more. In 2012, more than two thirds of the states included in this category have positive growth rates in the

number of insolvencies and nearly half of them have growth rates of over 15%. Although of these countries Poland is the largest country, with a significantly higher number of companies compared to others, the rate of insolvency in the last two years is the lowest (about 0.04%, both in 2011 and in 2012). The highest rates of insolvency are in Romania and Hungary. This reflects the fact that, in trying to develop, these countries have failed to integrate in terms of the rate of insolvency, thereby increasing the average for Central and Eastern Europe and the EU.

The analysis of the influence of macroeconomic factors on insolvency cases will be achieved through multivariate regression at a European and national level (2003-2012). The main objective of the analysis is determining the connection and the percentage in which GDP growth rate, the degree of openness of the economy, the central bank's interest rate, inflation rate, unemployment rate and the rate of new firms affects European insolvency and Romania.

The most significant connection *at the European level* is between the insolvency rate and the rate of new firms. The study shows that 94.1% of the variation of the number of insolvencies can be explained by the influence of the independent variables. The equation of the regression model is:

$$\text{Insolvency rate} = 1.811 - 0.027 * \text{GDP growth rate} + 0.154 * \text{The opening of the economy} + 0.051 * \text{Inflation Rate} + 0.045 * \text{Unemployment rate} - 0.136 * \text{The rate of new firms}$$

In **Romania**, the most significant connection is, again, between the number of insolvencies and the rate of new firms. The study shows that 93.8% of the variation of the number of insolvencies can be explained by the influence of the independent variables. The equation of the regression model is:

$$\text{Insolvency rate} = -1.766 - 0.107 * \text{GDP growth rate} + 17,363 * \text{The opening of the economy} - 0,127 * \text{Inflation rate} - 0.836 * \text{Unemployment rate} - 0.163 * \text{The rate of new firms}$$

Depending on the period of analysis of the phenomenon of insolvency, results may vary due to the characteristics of the economic

environment that are always changing. Results of this study confirm the results of the authors: Richter (2009), Bergstrom et. al. (2005), Bhattacharjee et al. (2009), Wadhwami (1986), Gordon (1988), Alexopoulos and Domowitz (1998).

Table 2: Decision on the hypotheses

<i>Objectives</i>	<i>Hypotheses</i>	<i>Decision using multiple regression models</i>	
		<i>In EU</i>	<i>In Romania</i>
<i>A Analysis of the way in which macroeconomic factors influences the insolvency rate in Europe and in Romania.</i>	<i>Hypothesis 1.1: insolvency rates decreases during periods of economic growth;</i>	Validated	Validated
	<i>Hypothesis 1.2: insolvency rates increases at the same time as the increase of the degree of openness of the economy;</i>	Validated	Validated
	<i>Hypothesis 1.3: insolvency rates increases during periods of increasing inflation;</i>	Validated	NOT Validated
	<i>Hypothesis 1.4: insolvency rates increases during periods when unemployment is rising;</i>	Validated	NOT Validated
	<i>Hypothesis 1.5: insolvency rates reduce during periods when the number of newly established companies increases.</i>	Validated	Validated

Thus, in times of economic crisis, in Romania the insolvency rate and the number of insolvent companies increase due to the economic downturn. At European level, our study showed that the increase of the number of insolvent companies during the period under review was affected by higher unemployment. In fact, the two are interrelated. The economic crisis, coupled with rising unemployment and inflation led European companies to insolvency.

PART II. FINANCIAL ANALYSIS OF THE INSOLVENT COMPANIES

INTRODUCTION

The economic crisis has affected many companies, the number of company insolvencies increasing from one year to another. Any company should be cautious and should analyze their economic and financial situation before any difficulties cannot be corrected. The most affected areas of insolvency were: wholesale and distribution; retail; construction (statistics Coface Romania). Therefore, we intend to analyze more in depth the financial rates of insolvent companies for each sector of activity.

Insolvency and bankruptcy became common phenomena of modern economy. To predict these conditions, researchers have developed over time different statistical models in order to provide some hints to users of accounting information on the unfavorable evolution of a company. The ability to anticipate financial difficulties is a necessary requirement to the remaining on the market of a company. Failure to pay debt causes firms to fall for insolvency. According to Law 86/2014, provided that the insolvency is initiated by the debtor, the proceedings may begin if the cumulative total debt is over 40 thousand RON. So, the measure of debt is a representative element of insolvent companies and the factors affecting it are numerous.

The final goal of the study is to obtain information about the extent and capacity of indebtedness of insolvent companies. Early identification of difficulties is essential in taking decisions to make changes in the company's structure in order to improve the chances for the debtor to break the deadlock or to obtain new financing.

CHAPTER 3. DESCRIPTIVE STATISTICS OF INSOLVENT COMPANIES

In summary, this chapter includes an analysis of economic and financial characteristics of insolvent companies. The number of insolvent companies in the final sample is of 11,257 companies. These companies activate in different fields and have entered into insolvency proceedings in the period 2008-2014.

Non-financial information shows that insolvent companies in the sample differ in terms of non-financial characteristics as follows: they operate in different EU member states (Romania - 2027, Spain - 3449, France - 2996, Italy - 103, Portugal - 2682), they operate in different sectors of activity (trade - 23%, construction - 31%, industry - 22%, services - 14%, other areas - 10%), they differ in terms of number of employees and on the age on the market. In Romania only about 20% of insolvent companies included activate in construction. The number of companies that engaged in retail or wholesale is 26.64% of Romanian companies in the sample.

For the whole sample we determine that 87.41% of the sampled companies are micro or small enterprises, with less than 50 employees. Almost half of the large companies are in Romania.

Financial characteristics of insolvent companies

The mean profile of insolvent companies in the sample is: a company that holds assets of approximately 4,292 thousand € which is used to achieve an average turnover of over 2.5 million €, debt of about 4,085 thousand € and around 31 employees.

The sample included in the analysis is diverse. More than half of insolvent companies have assets not exceeding 2 million €. Over 90% of insolvent companies in the sample are either micro or small enterprises. Large businesses represent only 1% of the sample. For 7819 insolvent companies, turnover does not exceed 2 million €.

For companies in all activity fields, the unfavorable situation is obvious, having averages of debt much closer to the average value of assets, so very small positive average net situations. Companies that hold the less average are the active ones in construction in France. They also have, on average, fewer long-term debt compared to other

countries or other areas of activity. Also, the French companies, this time the ones in trade, have the lowest average values of short-term debt. In terms of turnover, Romanian companies in services achieve the lowest values for this indicator. Trade sector has the highest average turnover.

Economic and financial performance of companies

Spanish companies have on average the highest material expenses compared to other countries. Portuguese companies in services have on average the lowest level of material costs. Spanish companies have elevated average interest costs, unlike other countries. For other categories, the highest average values for expense are in Italy.

Firms in the service sector are characterized by intensive use of personnel. Financial expenses have a significant share of the total expenditure of insolvent companies in the construction industry. For all fields, the lowest personnel costs are in Romania. This is explained by differences between minimum and average wages for countries included in the study. With regard to interest expenses, the minimum values for all fields are recorded this time in France.

Positive averages of profitability rate are not recorded in any field of activity, because, on average, the results are negative. The difficulties encountered by companies in the sample are only temporary. The losses show that the company's assets are not used effectively. In all sectors the average rate of return on assets is negative.

Average cash flow is negative of -224.17 thousand €. Moreover, for all fields and for all countries, average values of cash flows are negative. The exception is the average of the cash flows for the company in trade in Italy. For these companies, average of the cash flows is positive but very small, of only 1,800 €.

Insolvent companies in Romania generate the lowest values for the value added. Moreover, companies in trade in Romania generate an average added value of only 53.69 thousand €. In fact, this area is the one with lowest average values for most countries.

The earnings before interest, taxes, depreciation and amortization (EBITDA) are negative for the entire sample, of -83.250 thousand €. Both averages on countries and on sectors of activity represent losses.

Earnings before interest and taxes (EBIT) have, as expected, a negative average of -162.57 thousand €. The average value obtained for the net result is negative. The fewest losses have the trade companies and the greatest losses are recorded by the construction companies. Normally, the lowest losses are the ones of French companies and the highest ones of Spanish (in trade and construction) and Italian (in industry and services) companies.

Asset turnover rate is above 1 for each sector and for the whole sample. On average, insolvent companies achieve a turnover of 1.83 times the value of assets held. The lowest assets turnover rate can be found for Italian companies and the largest for France. On fields of activity, the lowest rates are calculated for companies in the industrial and construction sector.

Based on those observations, we can conclude that the size of expenditure and incomes of the sampled companies did not allow them to obtain profit. The results of these companies motivate the entrance in insolvency proceedings in order to seek a solution (either reorganization or bankruptcy) to the financial difficulties.

The financial position of a company is reflected in accounting in the balance sheet items.

Insolvent companies in the sample have smaller shares of intangible or financial assets, but on average, 21.30% of their assets are represented by tangible assets. On average, insolvent companies invest 4% of total assets in intangible assets and 5% in financial ones. Insolvent companies in Romania invest the least in financial and intangible assets compared to other countries included in the analysis. On fields of activity, the companies that have the highest percentage for the fixed assets are in the services area.

The total sample has a rate of current assets greater the one of fixed assets, current assets exceeding 50% of total assets. The highest proportion in current assets is the one of claims. The average liquidities rate is 5.53%. An analysis of the liquidities rate for the sample of insolvent companies shows that less than half of them are within the limits set out by the literature. 50% of companies have liquidities rates

up to 1.45%, while 5% had high levels of liquidity, of more than 26.20%, indicating the lack of their use.

Many of the companies would be able to cover the debt by recovering their claims, since for more than half of them there represent over 40% of assets. Moreover, the claims rate comes to exceed 83% for 10% of the insolvent companies.

The liabilities of insolvent companies have an unbalanced structure. Current resources are, on average, almost 95% of their liabilities. In Romania and France, many companies have negative permanent equity, resulting in negative values for the rate of financial autonomy. Averages for this rate are negative both on the total sample and for each country, except Italy (with a positive average of only 0.48). ***For insolvent companies current liabilities have too high a proportion of total liabilities.*** On separate fields of activity, the means for the structural rates for liabilities show that the most difficult situation is the one of the companies in services.

The average value of equity is positive. But for Romania, France and Italy, the average equity is negative. These companies do not face losses just in the last year of activity before entering into insolvency, but major losses are accumulated from previous years. The average for the result in the last financial year is negative for the entire sample and separately for all five countries, which diminishes the equity. The biggest losses have the companies in Spain and Italy. The biggest losses are recorded by the construction companies.

Companies in almost all areas of activity have liquidity rates above 1 and in the current assets the largest proportions are the ones of the uncollected claims and stocks. Moreover, in the construction and services, liquidity rate is very high. This is due to the high levels of current assets held. On the other hand, companies in trade and industry have much lower liquidity ratios.

Average solvency ratio for each state included in the study and for the separate fields show that only in Italy in the construction field and in Spain in services the solvency rates are higher than the values recommended in the literature. For other sectors, this figure confirms the insolvency of the companies.

Many of the ratios presented in this chapter are used in the literature to determine the risk of bankruptcy or insolvency. Some of them we will even use for calculation of the bankruptcy risk in various models presented in the next chapter. Some of the indicators presented in this chapter will also be used to conduct a study on the factors that influence debt levels of insolvent companies, considering debt as the main factor that you need to control when it comes to insolvency.

CHAPTER 4. MODELS OF ANALYSIS OF INSOLVENCY AND BANKRUPTCY RISK

Over time there have been developed many models to help determine the risks of insolvency or bankruptcy, models that can be used by anyone interested in the economic and financial situation of a company. The most known and applied ones are the models for determining the risk of bankruptcy. Studies have shown that bankrupt firms have different ratios from firms with a good financial situation.

Bankruptcy prediction models have been developed over time. The type of analysis ranged from discriminated analysis to the multiple regression analysis, logit analysis, probit analysis and neural networks. However, discriminated analysis remains one of the best ways to predict the failure of a company (Bellovary et al., 2007). Liquidity ratio has been included in over 50 of the most important studies on bankruptcy prediction. It is most used rate after the return on asset.

In addition to presenting several international and national models for determining bankruptcy risk, we want to establish how companies within the sample companies according to criteria considered insolvent some of them. This time we will try to determine which of the models best reflect the situation of the insolvent companies included in the sample of 11,257 companies.

The *Altman model* or *Z-Model* was developed by the professor with the same name from USA in 1968. From the 8102 companies included in the sample for which we were able to calculate Z, the Altman-Z reflects a good situation for 1860. Most insolvent companies for which Z reflects a good situation are in France. The Altman-Z includes in the

categories of insolvency or difficult situation 77.04% of the companies for which we calculated Z.

Table 3: Classification of companies in groups according to Altman- Z

<i>Country</i>	<i>Altman Z (number of companies)</i>			<i>Total</i>	<i>Accuracy</i>
	<i>Group 1: Insolvency</i>	<i>Group 2: Difficult situation</i>	<i>Group 3: Good situation</i>		
<i>Romania</i>	878	117	290	1285	77,43%
<i>Spain</i>	2303	315	476	3094	84,62%
<i>France</i>	879	267	838	1984	57,76%
<i>Portugal</i>	1178	271	247	1696	85,44%
<i>Italy</i>	31	3	9	43	79,07%
<i>Total</i>	5269	973	1860	8102	77,04%

Conan and Holder model was built in 1978 by the authors with the same name. Z value for Conan and Holder model could be calculated for 9354 companies from the initial sample. The mean for the calculated Z for Conan and Holder model is -0.8. This reflects the failure of the companies. However, with a more detailed analysis on each country, we observe that the average risk of bankruptcy is more than 30% only for companies in Spain, France and Portugal. By activity fields, only the companies in industry have a lower risk of bankruptcy.

Table 4: Classification of companies in groups according Conan and Holder model (number of companies)

<i>Country</i>	<i>Conan and Holder model</i>					<i>Total</i>	<i>Accuracy (company in groups 1, 2 and 3)</i>
	<i>Group 1: Failure</i>	<i>Group 2: Risk</i>	<i>Group 3: Alert</i>	<i>Group 4: Good Situation</i>	<i>Group 5: Good Situation</i>		
<i>Romania</i>	439	138	116	131	520	1344	51,56%
<i>Spain</i>	943	383	340	324	847	2837	58,72%
<i>France</i>	711	500	445	348	625	2629	62,99%
<i>Portugal</i>	888	341	310	268	652	2459	62,59%
<i>Italy</i>	19	9	13	8	36	85	48,24%
<i>Total</i>	3000	1370	1224	1079	2680	9354	59,80%

For 59.80% of the sampled companies for which we were able to calculate the risk of bankruptcy with Conan and Holder model the risk is over 30%.

Determining the risk of bankruptcy for companies in Romania could not always be accurately performed using internationally recognized models. In this respect, the national literature has developed own models for determining bankruptcy risk for Romanian companies.

Robu-Mironiuc model was developed in 2012 based on a sample of 60 companies carrying out various activities and listed on the Bucharest Stock Exchange (Robu and Mironiuc, 2012). The number of companies included in the sample for which we could calculate the score RM is 9725. Mean scores of RM for the entire sample is negative, indicating the difficult situation of the companies. Moreover, the average score has negative values for each country end for each area of activity. The number of companies for which RM indicates bankruptcy risk is presented in Table 5.

Table 5: Classification of companies in groups according to RM score

Country	RM score (number of companies)						Total	Accuracy
	Group 1: High bankruptcy risk		Group 2: Average bankruptcy risk		Group 3: Low bankruptcy risk			
	No. co.	%	No. co.	%	No. co.	%		
Romania	1000	70,82%	297	21,03%	115	8,14%	1412	91,86%
Spain	2263	74,32%	643	21,12%	139	4,56%	3045	95,44%
France	1689	62,88%	819	30,49%	178	6,63%	2686	93,37%
Portugal	1779	71,47%	626	25,15%	84	3,37%	2489	96,63%
Italy	66	70,97%	21	22,58%	6	6,45%	93	93,55%
Total	6797	69,89%	2406	24,74%	522	5,37%	9725	94,63%

The model sees 94.63% of companies as companies with medium or high risk of bankruptcy. One aspect that deserves mentioned is that, although the model was developed based on a sample of Romanian companies, in this case, the lowest accuracy on countries is established for Romania, of 91.86%.

The model with the greatest accuracy based on the sampled companies is the Robu-Mironiuc model. The models for determining bankruptcy risk presented in this chapter are able to determine that between 59.80% and 94.63% (see Tables 3, 4 and 5) of the companies in the sample have medium or high risk of bankruptcy.

CHAPTER 5. STUDY ON DETERMINANTS OF DEBT LEVEL

In this chapter we analyze the link between some financial and non-financial indicators, on the one hand, and the indebtedness of insolvent companies, on the other hand. In fact, it aims to determine the influence of the assets turnover rate, fixed assets ratio, cash ratio, the ratio between cash flow and total assets, the ratio between the value added and total assets, the size of the company (as volume of total assets) and the number of employees on the structure and level of debt. Also, we intend to make the analysis and to determine the influences at the level of debt for the total sample and separately for the five countries included. The purpose of this study will be achieved by using linear multivariate regression analysis. The research objectives are:

- **Objective 1:** Identifying the existence and intensity of the link between the level of indebtedness and a number of financial indicators, such as turnover, size of current assets, cash ratio, the ratio between cash flows and total assets, the ratio between value added and total assets, total assets;
- **Objective 2:** Determining the link between the level of debt and the number of employees for insolvent companies.

Data were extracted from the ORBIS database. The sample includes a total of 11257 of companies in five European Union countries: Romania, Spain, France, Portugal and Italy.

At *the level of the whole sample*, the most significant link is between indebtedness rate and the ratio between cash flow and total assets. The correlation coefficient is equal to -0.680. This model explains 76.2% of the variation of the indebtedness rate. The equation of the regression model is as follows:

$$\begin{aligned} \text{Indebtedness rate} = & 0.531 - 0.173 * \text{Asset turnover rate} - 0.012 * \\ & \text{Current Assets Rate} - 0.068 * \text{Cash Rate} - 2.068 * \text{Cash flow to Total} \\ & \text{assets} + 0.798 * \text{Value Added to Total assets} + 0.039 * \text{Size of the} \\ & \text{company} - 0.001 * \text{Number of employees} \end{aligned}$$

The analysis can be used by insolvent companies from European countries, except Romania, Spain, France, Portugal and Italy, to

determine the evolution progress of indebtedness in certain given conditions. For the five countries we perform separate analyzes for the purpose of making comparisons between them.

A separate analysis on the countries would give us more detailed information on the differences between insolvent companies from the five countries. Thus, we use regression models for each country.

In **Romania**, the most significant connection is between indebtedness rate and the ratio between cash flow and total assets. The correlation coefficient is equal to -0.928. 91.4% of the variation of indebtedness rate can be explained by the influence of the independent variables included in the model. The equation of regression model is:

$$\begin{aligned} \text{Indebtedness rate} = & 0.212 + 0.034 * \text{Asset turnover rate} + 0.156 * \\ & \text{Current Assets Rate} + 0.256 * \text{Cash Rate} - 2.525 * \text{Cash flow to Total} \\ & \text{assets} + 0.594 * \text{Value Added to Total assets} + 0.076 * \text{Size of the} \\ & \text{company} - 0.001 * \text{Number of employees} \end{aligned}$$

Models for Romanian companies for each field explain the variation of indebtedness in different proportions. Furthermore, the general influence observed in the country may not be found in a model for a specific area of activity. For example, the positive link between asset turnover rate and indebtedness rate at the overall level of Romanian companies is not found between the two factors for the Romanian companies in trade, construction and industry. In this case, the positive connection for companies in the services and other fields is stronger and it influences the connection between variables at the level of the entire country.

For insolvent companies in **Spain**, the most significant link is between the indebtedness rate and the assets turnover rate. The correlation coefficient is equal to 0.704. 81.5% of the variation of the indebtedness rate of insolvent companies in Spain can be explained by the influence of the independent variables included in the model. The equation of the regression model is as follows:

$$\begin{aligned} \text{Indebtedness rate} = & 1.274 - 0.133 * \text{Asset turnover rate} - 0,195 * \\ & \text{Current Assets Rate} + 0,209 * \text{Cash Rate} - 1,234 * \text{Cash flow to Total} \\ & \text{assets} + 0.218 * \text{Value Added to Total assets} - 0,036 * \text{Size of the} \\ & \text{company} \end{aligned}$$

A separate model for industrial companies would be wise to use, given the difference between the sign of the coefficients obtained for the general model and the model obtained for Spanish companies in industry.

For **France**, the most significant connection is between the indebtedness rate and the ratio between cash flow and total assets. The correlation coefficient is equal to -0.740. The study shows that 79.0% of the variation of the indebtedness rate in France can be explained by the influence of the independent variables included in the model. The equation of the regression model is as follows:

$$\begin{aligned} \text{Indebtedness rate} = & -0.241 + 0.068 * \text{Asset turnover rate} + 0.011 * \\ & \text{Current Assets Rate} - 0.418 * \text{Cash Rate} - 1.322 * \text{Cash flow to Total} \\ & \text{assets} + 0.283 * \text{Value Added to Total assets} + 0.123 * \text{Size of the} \\ & \text{company} - 0.003 * \text{Number of employees} \end{aligned}$$

To use separate models for areas of activity for French insolvent companies, changes are needed.

For companies in **Portugal**, the most significant link is between the indebtedness rate and the ratio between cash flow and total assets. The correlation coefficient is equal to -0.749. The study shows that 58.8% of the variation of the indebtedness rate in Portugal can be explained by the influence of the independent variables included in the model. The equation of the regression model is:

$$\begin{aligned} \text{Indebtedness rate} = & 0.804 + 0.022 * \text{Asset turnover rate} + 0.114 * \\ & \text{Current Assets Rate} - 0.186 * \text{Cash Rate} - 1.690 * \text{Cash flow to Total} \\ & \text{assets} + 0.240 * \text{Value Added to Total assets} - 0.006 * \text{Size of the} \\ & \text{company} - 0.001 * \text{Number of employees} \end{aligned}$$

Separate models by fields of activity for insolvent companies in Portugal explain about the same extent of the variation of indebtedness as the country model. The exception is the services sector, where a separate model explains their situation better.

In **Italy** the most significant link is between indebtedness rate and the ratio between cash flow and total assets. The correlation coefficient is equal to -0.616. Only 39.0% of the variation of indebtedness rates in Italy can be explained by the influence of the independent variables

included in the model. The equation of the regression model is as follows:

$$\text{Indebtedness rate} = 0.700 + 0.066 * \text{Asset turnover rate} - 0.013 * \text{Current Assets Rate} + 0,018 * \text{Cash Rate} - 1,302 * \text{Cash flow to Total assets} - 0,079 * \text{Value Added to Total assets} + 0.001 * \text{Size of the company}$$

With increasing sample of Italian companies and the introduction of companies from all areas of activity, the results could significantly differ.

We conducted separate analyses to create separate models for each area of activity: trade, construction, industry, services and other fields. This way, there can be clearly seen the differences between the countries included in the analysis for each field. The only similar link for all countries and areas of activity is one between the indebtedness rate and the ratio between cash flow and total assets.

To determine which hypotheses are validated at each level of analysis we summarized in Table 6 information regarding the regression coefficients.

Table 6: Systematization of the regression coefficients

<i>Indebtedness rate</i>	<i>Regression coefficients</i>					
	<i>Romania</i>	<i>Spain</i>	<i>France</i>	<i>Portugal</i>	<i>Italy</i>	<i>Total</i>
<i>Assets turnover rate</i>	0,034	-0,133	0,068	0,022	0,066	-0,173
<i>Fixed assets rate</i>	0,156	-0,195	0,011	0,114	-0,013	-0,012
<i>Cash rate</i>	0,256	0,209	-0,418	-0,186	0,081	-0,068
<i>Cash flow to total assets</i>	-2,525	-1,234	-1,322	-1,69	-1,302	-2,068
<i>Value added to total assets</i>	0,594	0,218	0,283	0,24	-0,079	0,798
<i>Size / Ln(total actives)</i>	0,076	-0,036	0,123	-0,006	0,001	0,039
<i>Number of employees</i>	-0,001	0	-0,003	-0,001	0	-0,001

Table 7 summarizes the assumptions made at the beginning of the empirical research and the decisions regarding their validation or invalidation based on the econometric model used. Contrary to expectations, four of the hypotheses are not validated when we analyze the influence on the level of total debt.

Table 7: Decision on assumptions

Objectives	Hypotheses	Decision using multiple regression model					
		Romania	Spain	France	Portugal	Italy	Total
Analysis of how the level of indebtedness of insolvent companies is influenced by the structure of their assets, by sales, cash flows, value added or number of employees	<i>Hypothesis 1.1: GDP growth rate is directly related to the debt;</i>	Val.	x	Val.	Val.	Val.	x
	<i>Hypothesis 1.2: The increase in the volume of fixed assets (decreased in the volume of current assets) determines growth of debts;</i>	Val.	x	Val.	Val.	x	x
	<i>Hypothesis 1.3: Rising cash is correlated with increasing debt;</i>	Val.	Val.	x	x	Val.	x
	<i>Hypothesis 1.4: The increase in cash flow leads to reduction of debt;</i>	Val.	Val.	Val.	Val.	Val.	Val.
	<i>Hypothesis 1.5: Rising of the value added determines the increase in the volume of debt;</i>	Val.	Val.	Val.	Val.	x	Val.
	<i>Hypothesis 1.6: Companies that have more assets have in their structure a larger amount of debt;</i>	Val.	x	Val.	x	Val.	Val.
	<i>Hypothesis 1.7: Companies with more employees have higher debt.</i>	x	Val.	x	x	Val.	x

x - hypothesis not validated; V - hypothesis validated.

As noted earlier and giving the conclusions on validating or not validating the assumptions, we can say that there are differences between the proportion in which the financial and non-financial factors affect debt in the European countries considered.

CONCLUSIONS, LIMITATIONS AND FUTURE RESEARCH

National regulations relating to the establishment, operating and insolvency of companies present both aspects of regulations comparable to those of other European countries and peculiarities.

To better show the situation of the number of cases of insolvency of companies from European Union countries we have conducted a statistical analysis that has highlighted major differences between

member states in this regard. France, UK, Romania and Hungary are the countries with the biggest number of insolvent companies. Even in these circumstances, the regulations of these countries have different orientations, which means that the number of insolvent companies, although influenced by legislation, depends mostly on the stability of the economic environment of a country and the ability of managers to develop a profitable business.

By another study conducted in Chapter 2 "*Insolvency and relationship with macroeconomic factors*" we tried to establish the influence of macroeconomic factors (economic growth, the openness of the economy, inflation, unemployment, new firms rate) on the rate of insolvency. The links between these factors is different for the entire European Union, compared to the national level. At European level the strongest connection is between the rate of insolvencies and the rate of new firms. At national level, the strongest link is established between the same variables. However, the connection is stronger. In addition, for the other variables the types of connection are different at national level compared with the European Union. The differences between insolvency regulations in European Union countries, between the degree of development of there, between the actual number of companies that filed for insolvency proceedings, the insolvency rate and not only, makes that the comparison and analysis shown in this paper provides a broader view of the phenomenon of insolvency in Europe.

The second part of the paper, "*Financial analysis of the insolvent companies*", focuses on the presentation of items related to financial and economic issues of the companies under insolvency proceedings.

First, we tried to identify the rates that can best warn the existing of risks or that are more affected by the insolvency state. Thus, an analysis of the most important financial indicators and the most representative rates for the 11257 insolvent companies selected from Romania, Spain, France, Portugal and Italy was able to show the imbalances and the economic and financial situation of those. Regarding structure rates, the unusual values were those of the liability structure rates, given the negative values of equity of many insolvent companies.

We then continued with the presentation of models for assessing the insolvency and bankruptcy risk. For some of the models, if the necessary data to determine bankruptcy risk was available, we established the level of accuracy on the sample presented, knowing that all the companies are in insolvency procedure and have bankruptcy risk.

The goal of the final study is to determine the influence that the structure of the assets and other financial and economic factors have on the level of indebtedness of insolvent companies. The results were I separated by country and fields of activity. These are useful in determining what changes must be made to the structure of assets in order to improve economic and financial situation.

Of course, the level of indebtedness of the companies depends on a multitude of factors, both financial and non-financial. The results of the study show that the total indebtedness for the whole sample and separated for each country is influenced by financial factors such as the assets turnover rate, fixed asset ratio, cash ratio, the ratio between cash flows and total assets, the ratio between added value and total asset, the size of the company and by non-financial factors such as number of employees. In this study we also tried to show that the analyzed influences differ depending on the country in which the insolvent companies were registered and the type of activity they perform.

The link between the fixed assets and the indebtedness is indirect for the entire sample. The study does not confirm our hypothesis based on literature. However, for Romania, France and Portugal the hypothesis is confirmed. Cash ratio is also indirectly proportional with the level of indebtedness. However, as expected, in Romania, Spain and Italy rising levels of cash is correlated to the increase of total debt of companies. The strong correlation between indebtedness rate and the ratio between cash flows and total assets is manifested both for the whole sample and for each state. The closest connection between the two indicators is manifested in Romania. The negative link between the level of debt and firm size, significantly in Spain and Portugal, has been also found by Yuriy (2010). There are studies whose analysis led to different conclusions or even opposite (Pindado et al., 2006). This is the

case for the global connection and for the ones in Romania, France and Italy.

Limits and perspectives of the research

A premise from which we started is that all firms have the same restrictions on lending (Begley, 1990). Also, insolvent companies in the sample differ in terms of financial and non-financial characteristics, being, so that the sample is heterogeneous.

Of course, the conducted study included in the sample a number of only 11257 insolvent companies from five European countries. It would be ideal to increase the size of the sample by including more Italian companies and insolvent companies from other European countries, preferably emerging ones, so that the sample becomes more balanced in this regard. Thus, we could perform a comparison between countries with similar levels of economic development.

With access to data about insolvent companies from other emerging European countries, a relevant analysis would result from the comparison of insolvent companies from emerging countries of the European Union and those in developed countries. However, inclusion of the insolvent companies from other countries will be made as soon that other data is available.

Future research may target the introduction of more variables in the study to obtain a model that better represent indebtedness of insolvent companies.

REFERENCES

To achieve the thesis, there were consulted 195 bibliographic sources, represented by books, scientific articles, legislative rules, doctoral theses, reports of specialized organisms etc., from Romanian and international literature (36 books and 125 scientific articles).