

The Analyze and Prognose of Risk Bankruptcy - Case Study, Arcelor Mittal Steel Galati

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Abstract

The discriminate analysis was resorted to, by means of which the financial characteristics of some companies that went bankrupt and some profitable companies. Socio - economic phenomena are influenced by numerous factors essential and accidental those are related to each other by many ties, intensities and meanings. In terms of economic phenomena there are lots of interdependence relationships requiring the identification and hierarchical ordering of influence factors. Regression models can be used to help understand and explain relationships among variables.

The best linear combination of rates leading to clearest differentiation of the two types of companies is then determined. This linear combination is also known as score function. The probability that the analyzed company may become bankrupt in the following years is estimated on the basis of the obtained score. A company is effective and therefore has a minimal bankruptcy risk if its score is high, and vice versa. The score function is a linear function of several variables, which are weighted by certain medium coefficients, established by the smallest squares method, based on the observations made on the companies analyzed and grouped into the two types. In my work, I achieved an analysis of the bankruptcy risk and I tried to adjust Altman and Conan & Holder score functions to the existing realities in Romania. I found this adjustment necessary as their application in the case of Romanian companies leads to paradoxical results, not the converging ones.

Keywords: discriminate analysis, bankruptcy risk, score function

JEL Classification: C 52

Introduction

The bankruptcy risk for companies from countries with economies in transition is of great importance both for the foreign investors, their own managers and for the banks. The majority of financial organizations are interested in determining a function meant to diagnose the bankruptcy risk of a company.

The bankruptcy risk shows the likelihood that a company will face significant losses and will not be able to respect the terms of payment towards its creditors, in other words, to be insolvent. The companies that meet such difficulties are characterized by an overinvolvement in debt, without being able to respect their payment terms and by becoming insolvent, a situation according to which the debts exceed the company's assets.

The assessment of the bankruptcy risk can be done through statistical methods of situation analysis, using the analysis of the financial balance, taking into account the balance sheet or through statistical methods of analyzing the dynamics using the cash payment, the solvency and also with the help of the changes shown by the financing planning.

The analyze of risk of bankruptcy

The patrimonial analysis

The analysis on the basis of patrimonial balance places a great importance on the value and solvency of the company. This type of analysis has long represented in the economics theory the only way of risk assessment.

The financial balance examines the company's risk of not respecting the financial obligations and shows its long-term or short-term solvency. The financial balance is created by horizontally comparing the assets and liabilities according to their cash payment and eligibility.

Therefore, according to this patrimonial theory, a company is solvent if there is a balance between the balance categories of equal duration. This is difficult to accomplish because while the exigibility of short-term obligations is certain, the transfer of the assets into liabilities is aleatory and can be affected by a series of economic and financial aspects and a combination of all these circumstances. This asymmetry implies the necessity of creating an overplus/ a stock/ a reserve meant to face the discrepancies at the term of payment, known as: circulating fund (Cosea , M; Nastovici, L., 1997:51)

There is no direct relationship between a company's circulating fund and the bankruptcy risk. Some companies can be described by a financial stability even if they have a negative circulating fund, while others are insolvent, despite a positive circulating fund.

Functional analysis

A company's function requires not only financing the secure operations but also covering some immediate needs. Books of specialty define the necessary circulating fund as a part of the circulating assets financed by lasting resources, respectively the part of the circulating assets which is not financed by the debts in operation.

The Treasury is the ensemble of monetary funds a company disposes at a given time and which ensures the short term financial stability of that company. As far as the Treasury is concerned, the aim is to perfect it by bringing it as close as zero. A negative treasury shows difficulties in covering the circulating fund out of the durable

resources and it needs to resort to bank credits, which makes the firm vulnerable, while a positive treasury shows that important amounts are not used.

Some methods of analysis of bankruptcy risk

Analyzing the dynamics of bankruptcy risk enables the diagnosis and explaining of the financial instability established by analyzing the situation. Therefore, the two types of analysis are complementary and should be simultaneously achieved. Analyzing the dynamics starts by determining the rates of solvency, liquidity and profitability and financing stages resulting from the capital investments and shown by the financing plan. This allows a dynamic analysis of financing the firm and of its financial stability. The financing plan/table/schedule is thought to be a table of the necessary resources as well as of the allocated ones and this explains the fluctuations of a company along a certain period of time.

An increased FR is the proof of an improvement in the financial situation of the company as well as in its ability to provide liquidities and to improve its own treasury. A low FR is the result of a financial instability which means that permanent needs are covered out of temporary resources. This instability, when related to the increase of the NFR, will lead to a permanent instability and, implicitly, to the increase of the company's bankruptcy risk.

Methods of prognosis for bankruptcy risk

The financial diagnosis enables pointing out the strong points and the weak points of the company which is being analyzed through a multitude of profitability and financial balance indicators. Moreover, taking into account the financial diagnosis the economic (functioning) risk can be assessed but the bankruptcy risk cannot be completely assessed/diagnosed. That is why, many specialists and financial institutions have tried to determine a function meant to be able to diagnose a company's bankruptcy risk. They have used the statistical method called discriminating analysis which analyses some bankrupt and profitable companies' financial characteristics. Another step is determining the best linear combination of rates leading to the clearest difference between the two types of companies under discussion.

This linear combination is also known as the score function as it leads to the so called value : score. It is a linear function of different variables modified by some average coefficients established through the method of the smallest squares as a result of the observations of the analyzed companies and grouped under the two types. This type of function is usually referred to as Z and is usually written:

$$Z = a_1R_1 + a_2R_2 + \dots + a_nR_n, \text{ where}$$

a_i = changing coefficients,

R_i = profitability rate.

The profitability rates used within a score function must be each independent because otherwise they would lead to the appearance within the score function of some repeated influences of the same phenomenon.

Taking into account the acquired score consequently the likelihood that the company will become bankrupt is estimated. A company is profitable and therefore presents a minimum bankruptcy risk when it has a high score and conversely it is not profitable and has a higher bankruptcy risk according to how low its score is. In other words, the higher the score, the lower the bankruptcy risk.

Traditional score functions have been improved by combining some reference scores. The tests taken have shown that a combination of the obtained scores allows a reduction of the own bias. To put it differently, a score function obtained through the combination of more functions will have a smaller bias than those of the score functions combined.

For a more efficient use of the score functions they make use of expert systems which contain some accountancy filters that allow the identification of the authenticity of the accounting data presented by the company at the bank which is supposed to offer the loan. As far as the Altman function is concerned the five accounting rates are multiplied by a positive coefficient while with the French function the accounting rates are multiplied by different coefficients both positive and negative. The positive accounting rates increase the Z score and therefore diminish the bankruptcy risk while the negative ones increase the bankruptcy risk of the company under analysis.

Among the most well known score functions we remind the Altman function, the Conan and Holder one and the function of the Central Balances within the Central French Bank which diagnoses the bankruptcy risk of French companies according to some 8 variables score function which are rates of economic and financial profitability.

In order to diagnose the bankruptcy risk of the Romanian companies we should create some score functions adapted to the reality of the companies in our country. Mereuta C, in his work "The diagnostic Analysis of the Commercial Units in Transition Economy" states that, "The Conan - Holder function is risky for almost all the companies while the Central Balances function of The Central Bank exposes the companies to minimal risk, There have been, though, convergent results when applied to some companies in France." (Mereuta, C (coord), 1994: 100).

The value of the score function must not be considered absolute, the evolution of the score must be followed along more financial exercises as well as by comparing it with the companies in the same field. The score function enables the prognosis of the bankruptcy risk but the analysis must be completed with classical methods of financial analysis.

Compared with the discriminating analysis the logistic regression mathematically presents more advantages because it allows appreciating the discriminating power of each accounting rate and it does not erase the correlated accounting rates.

At present the increasing rate of the turnover and the rate of net increase (a net result related to the turnover) are the most frequently used indicators in assessing the financial situation of a firm as well as in creating a hierarchy of the firms in the same field. These rates are taken into account by managers when they

estimate the results of their forms in the previous years as when they establish their objectives for the future financial exercises. A new direction of the financial analysts takes into account the current hegemony of the net increase which predicts that in the future the rate of the profitability of the invested capital will probably be used, which refers to the relation between the result of a certain activity and the capital which has been used.

In the past the banks were mainly interested in the solvency of the debtor and only after that in their liquidity which used to be measured by using two indicators, namely: the net active asset, as a first measure of the firm's value if it went into liquidation and then the circulating fund as an indicator of the relative liquidity. As a result of the increase of the loans granted by the banks, the creditory organisms have begun to be interested in the profitability of these firms along with their solvency and liquidity.

Originally it has been considered the rate of debt as being important, which meant the relation between the middle term and long term debts and their own capital or the gross increase of self-finance. It has also been analyzed the capacity of a firm to be in debt by taking into account the dynamic analysis of the treasury variations. The last opinion of the financial analysts which is not yet established is that according to which the payment of the loans contracted by a firm depends not so much on its solvency as on its present and future profitability of actions. In other words, a firm's financial situation is less important than its power to attract new actions as a result of its ability to create a value greater than the bank interest.

Also, Modigliani and Miller believe that the fiscal system together with the financing system are not decisive for the measure of an activity but it depends on the risk and the dimension of the monetary variations that could be generated in the future. In other words, it is only the investment policy that creates new value while the financial policy only represents a modality to distribute the risk involved by the profitability of investments among different categories of investors.

While in the past the financial analysts and the banks considered of great importance the firm's history, nowadays a great importance is given to the balance of active assets as they take into account a prospective approach for the identification of the sources which are supposed to create great value. In the view of these things the rate of net increase is certainly a more useful indicator than the concept of net active asset or circulating fund but less reliable than the rate of profitability of the invested capitals.

From the traditional point of view, centered on the debtors situation and on the analysis of its solvency, the financial dead end used to represent the first target to aim at and the net increase was considered to be a key indicator of the firm's financial situation, the dead end meaning the minimum turnover a firm needs to accomplish to be able to cover its expenses or the rate of minimum profitability a firm needs to achieve.

The modern point of view, centered on the situation of the shareholders of the analyzed firm, on the other hand, the stress is on the profitability of the invested capitals meant to be a reference point for the firm's position to the dead end.

To put it briefly, we can assume that the bankruptcy risk is of interest both for the investors and for the managers of the firms. The bankruptcy risk is the likelihood that a firm will confront with serious loss and not be able to pay its debts towards its creditors, which means to be solvent. '' The bankruptcy risk is about the state of difficulty of the firm considered as a permanent financial crisis. From the legal point of view a firm is considered to have difficulties when it no longer pays its debts without being able to face the exigible debts, case in which the law suggests the firm's restructuring or liquidation.'' (Dalotă, M.D; Dalotă, S, 2000, 250)

The majority of the financial organizations are interested in determining a function meant to diagnose the bankruptcy risk of a firm starting from a series of rates and from financial and accountancy indicators characteristic of the security state of a firm.

Case study - Arcelor Mittal Galatzi

The company's profile

Arcelor Mittal Galatzi is the greatest private company in Romania and the most important steel producer owning over 50% of the country's steel production. Beside the main headquarters in Galatzi, the company also has two regional branches, one in Turkey and the other one in Vienna and it is an associate member of EOROFER.

The company yields high quality plate, cold and hot rolled steel, iron steel, zinc -coated steel, tubes with high diametre longitudinally welded and billet. Two thirds of the production is exported in more than 40 countries. On the basis of a major modernization plan in full progress the company aims at becoming the greatest iron and steel works in Eastern and Central Europe. Arcelor Mittal Galatzi combines all the aspects of the modern process of producing steel, using both integrates facilities and flatting mills and is among one of the most advanced steel producers by using a variety of modern technology.

The company produces high quality steel for impressive customers, known for their exigency in this field, including the navy industry, the car industry constructions and excavating, the oil and gas industry. Currently, due to the introduction of the new program with the customers, Customer Dynamics, an improvement in the efficiency of honoring the orders and respecting the delivery deadlines has been recorded.

The company has got certifying standards as different as the industries it produces for. Arcelor Mittal Galatzi has direct access to the world marine routes and to some other transport understructure. It has its premises in Galatzi, a town which is also a Danube harbor, 80 miles from the Black Sea. Ships of over 30 000 tdw. Navigate on the Danube. Here lines of barges connect The Black Sea to countries such as Germany, Austria, Hungary, Serbia, Slovakia, Bulgaria and Ukraine. It also allows access to the greatest harbor in Romania, Constanta by navigating on The Danube or the canal connecting The Danube with The Black Sea.

Brief historical record

The iron and steel works in Galatzi was first set up in 1965 as a state company. They started building it in 1961 and in 1966 the first flatting mill called The Flatting Mill 1 has been inaugurated, followed by Furnace no. 1, The Steel Works no. 1 and the Slebing Flatting Mill in 1968. In 1970 it used to produce 2,5 mil tons of steel. The last department was inaugurated in 1986, the section for welded tubes. In 1991 the company was restructured in a stock company according to the Government decision 29/ 14.01. 1991 and recalled C. S. SIDEX S.A. As a result of the privatization process the company has been purchased in 1991 by LNM Holdings NV currently called Mittal Steel Group, the largest and the most global company in this field with sales in 2004 of 42,1 mil tons and a profit of USD 22 billion . When it came in the property of Mittal Steel Group the company was recalled Ispat Sidex and it represented 4 % out of the Romanian industrial production and its privatization was considered a critical aspect of the national economic reforming program.

When taken over the company was in a difficult situation. The equipment was old, there was an acute lack of cash and it would lose USD 1 mil. a day. LNM promised to invest USD 350 mil. Unconventional practice and barter disappeared. In 2003 its turnover was above USD 1 mil. and Ispat Sidex changed in a profitable company. Starting 2007 the name of the company is Arcelor Mittal Galați.

A brief description of the products and the technological production processes

The technological activity of the company comprises four technological departments: the chemical coke works, the furnaces, the refracting steel works and the flatting mills Being a completely siderurgical works Arcelor Mittal Galați uses all its stations in order to proceed the raw materials into finite products. The chemical coke works includes 6 sections which use imported coal as raw materials and they produce the coke used in furnaces to produce fluid metal and coke gas as a secondary product. After filtering the coke gas is used as fuel within its own sections covering 25 % of the total need of gas fuels the company needs. The furnaces are represented by a raw material yard of 5,5 mil. tons, an agglomeration section with 7 machines processing the powder ore to be used in furnaces and it also contains 6 furnaces (one of which is out of work in the present) that produces the crude iron for the roller mills. The retrieved furnace gas represents 34 % of the total need of gas fuel of the iron and steel works. The refractory steel works consists of three LD steel works, two outfits for the continuous flow of the fluid steel, an electrical steel works and a section for auxiliary products. The plant provides ingots and blooms to be laminated/rolled. The plant for flat rolles consists of a flatting mill, 2 flattinf mills for thick plate, 1 hot roller mill, 1 cold roller mill, a hot immersion zinc covering and a half-finishing mill. Besides the above 4 plants Arcelor Mittal Galati also has 3 auxiliary sections: the transport plant, the spare parts and siderurgical repair plant and the energy plant.

Products Arcelor Mittal Galatzi provides one of the greatest range of steel products in the world . Its main products are:

- Semi-finished steel products in the form of slabs is laminated into flat products. The steel in the form of slabs or billets is used for long products.
- Flat products. The hot rolled products are iced in the chemical industries and in the navy industry for structure and metallic

construction for steam boilers. The cold rolled products are used in the automobile field, for household items and metallic furniture and covering. The finishing includes aluminum covered products and zinc covered products through hot immersion or electrolytic immersion.

- Long products. Here a large variety of finite products is included, ranging from forged items for the automobile industry to draw bars used for precision design.
- Wire. Arcelor Mittal produces a wide range of wire starting from 0,4 mm type to resisting steel rollers which can be transformed either in paper clips or in cables for suspended bridges.
- Covered steel refers to the durable coverings applied to surfaces used in computers and heating or ventilation systems.
- Tubes and pipes are used for a wide variety of applications from transport main for natural gas, oil, water, to heating products as well as for general use. According to the destination of these products, the technological process has been designed in order to ensure maximum security in exploiting them as well as a general high quality, being safe to exploit them even at -60°C.

The profitability analysis

Table 1: The financial profitability analysis

The financial profitability analysis

Nr. crt.	Specificatio ns	UM	The analysed period			Formula
			n-2	n-1	n	
1	Net profit	lei	-1,133,089,129.6	-61,889,105.7	368,798,033.2	Pn
2	Own capital	lei	1,581,934,901.7	1,520,046,100.3	3,240,689,042.1	Cp
3	The financial profitability rate	%	-72%	-4%	11%	$Rrf=Pn/Cp$
4	The increase value	%		6%	-280%	$IcRrf=Rrfn/Rrfo$
5	Variation of indicator	%		-303%	-222%	$dvRrf=(Rrfn -Rrfo)/Rrfo$
6	Orientative value	%	25%	25%	25%	Std
7	Average interest rate	%	38.10%	57.20%	45.00%	rd

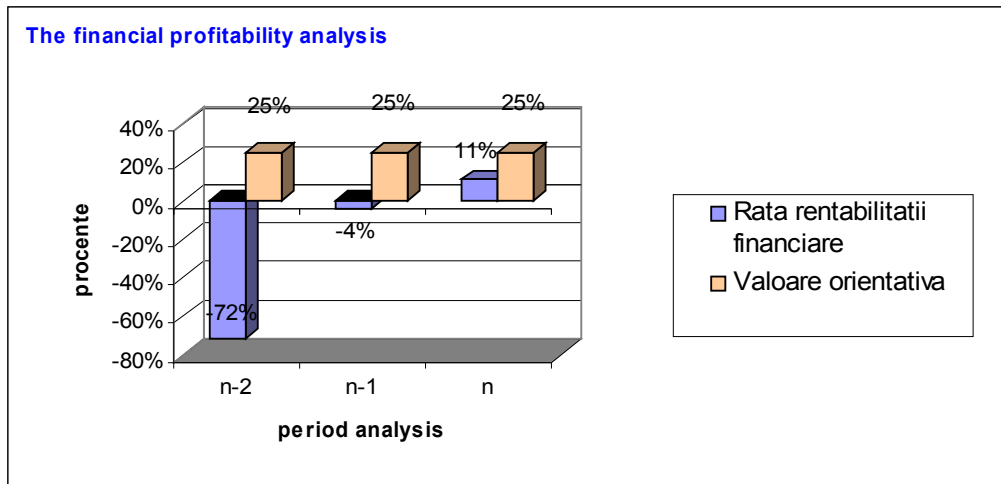


Fig. 1: The financial profitability analysis

Analysis of risks

The operating risk analysis

Table 2: Analysis of risk

Nr. crt.	SPECIFICATIONS	UM	The analyzed period		
			n-2	n-1	n
1	Exploitation income	lei	2,406,650,104.2	3,289,593,086.9	4,228,371,920.9
2	Exploitation expenses	lei	3,247,967,769.8	3,294,634,846.5	3,941,028,658.1
3	Exploitation result	lei	-841,317,665.6	-5,041,759.6	287,343,262.8
3	Variabile expenses	lei	2,760,772,604.3	2,800,439,619.5	3,349,874,359.4
4	Fix expenses	lei	487,195,165.5	494,195,227.0	591,154,298.7
6	Variable expenses increase	lei	-354,122,500.1	489,153,467.4	878,497,561.5
7	The rate of increase on variable expenses	%	-14.71%	14.87%	20.78%
8	Profitability level	lei	-3,311,024,561.6	3,323,499,291.5	2,845,335,430.7
9	Security increase	lei	5,717,674,665.8	-33,906,204.6	1,383,036,490.2
10	The position indicator	%	-173%	-1%	49%
11	The moment of achieving the target	days	-502.16	368.76	245.61
12	The flexibility coefficient		0.42	-97.02	3.06

The bankruptcy risk analysis

Table 3: Conan and Holder bankruptcy risk method

Nr. crt.	SPECIFIC ATIONS	U M	The analysed period			Formula
			n-2	n-1	n	
1	Circulating assets	lei	1,351,741,704.1	1,464,580,980.5	1,981,468,234.9	AC
2	Stocks	lei	456,884,790.6	790,151,862.9	1,077,041,701.6	Stocks
3	The gross exploitation result	lei	-841,317,665.6	-5,041,759.6	287,343,262.8	RBE
4	Total debts	lei	1,406,370,892.2	1,477,574,788.8	1,540,922,950.1	DT
5	Permanent capital	lei	1,661,427,191.3	2,141,463,077.1	3,778,529,500.2	CPERM
6	Total Assets	lei	3,332,433,268.8	3,373,315,099.5	5,202,046,713.6	TA
7	Financial expenses	lei	361,074,310.2	140,949,381.6	144,238,430.7	Financial expenses
8	Turnover	lei	2,157,202,658.8	3,004,998,587.0	4,058,877,729.6	CA
9	Staff expenses	lei	400,076,106.8	422,009,553.0	336,255,785.6	Staff expenses
10	R1-	-	-0.60	0.00	0.19	RBE/DT
11	R2-	-	0.50	0.63	0.73	CPERM/TA
12	R3-	-	0.27	0.20	0.17	(AC-Stocks)/TA
13	R4-	-	0.17	0.05	0.04	Fin. expenses/CA
14	R5-	-	0.19	0.14	0.08	Staff expenses / CA
15	Z =	-	0.16	-0.12	-0.19	Z=-0,24R1-0,22R2-0,16R3+0,87R4+0,1R5

The analysis of the company's solvency

Table 4: The analysis of the company's liquidity

Nr. crt.	SPECIFIC ATIONS	UM	The analyzed period			Formula
			n-2	n-1	n	
1	Circulating assets	Thous ands lei	1,351,741,704.1	1,464,580,980.5	1,981,468,234.9	AC
2	Short-term debts	Thous ands lei	1,326,878,602.6	856,157,812.0	1,003,082,492.0	DTS
3	General Liquidity	-	1.02	1.71	1.98	$L_{gen} = AC/Dt$
4	Indicator variation	%		68%	15%	$dvLg = (Lgn - Lgo)/Lgo$
5	Minimum accepted value	-	1.20	1.20	1.20	Min
6	Maximum accepted value	-	1.80	1.80	1.80	Max

Table 5: Fast liquidity

Nr. crt.	SPECIFIC ATIONS	UM	The analysed period			Form ula
			n-2	n-1	n	
1	Circulating assets	lei	1,351,741,704.1	1,464,580,980.5	1,981,468,234.9	AC
2	Stocks	lei	456,884,790.6	790,151,862.9	1,077,041,701.6	Stocks
3	Short-term debts	lei	1,326,878,602.6	856,157,812.0	1,003,082,492.0	Dts
4	Fast liquidity	-	0.67	0.79	0.90	$Lr = (AC - Stocuri)/DTS$
5	Indicator variation	%		17%	14%	$DvLr = (Lrn - Lro)/Lro$
6	Minimum accepted value	-	0.70	0.70	0.70	Min
7	Maximum accepted value	-	1.00	1.00	1.00	Max

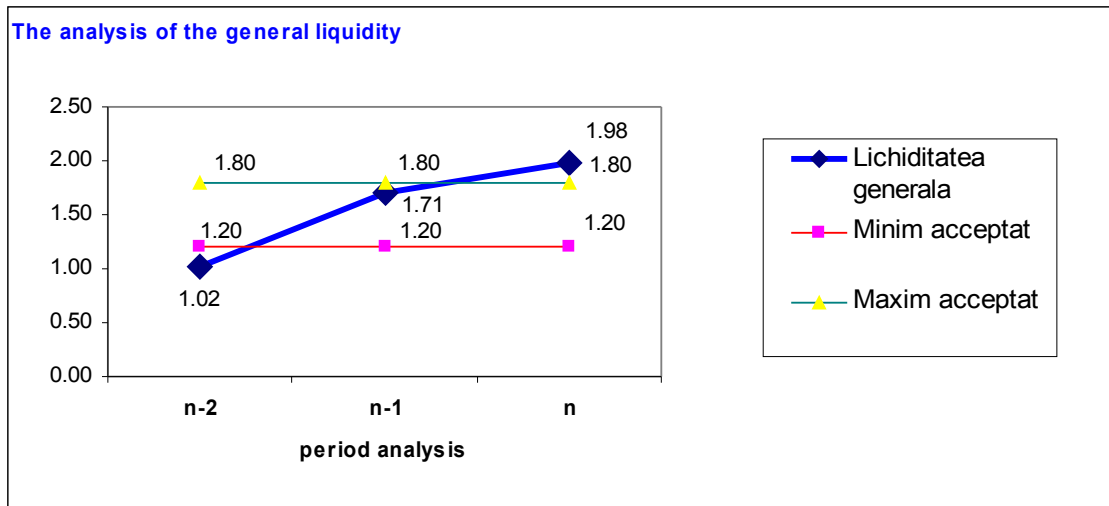


Fig. 2: The analysis of the general liquidity

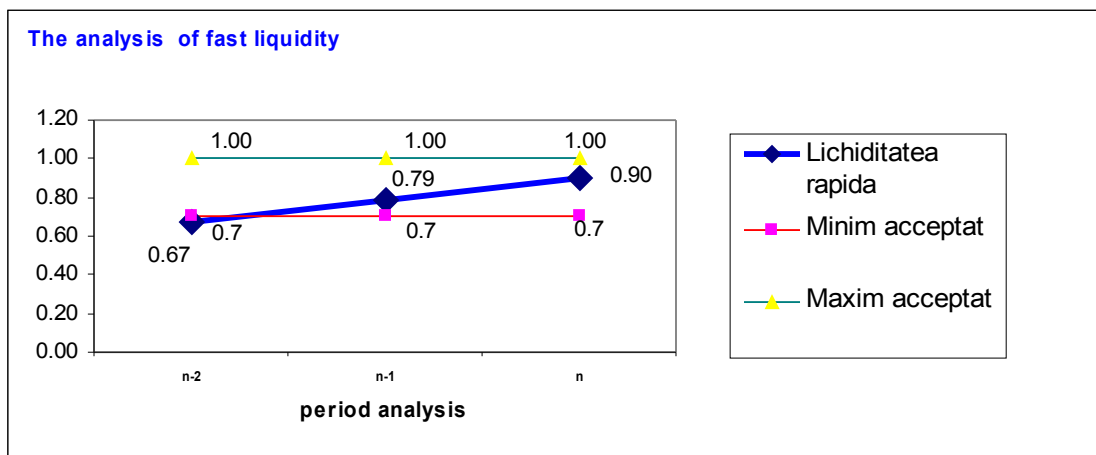


Fig. 3: The analysis of fast liquidity

Table 6: The analysis of immediate liquidity

Nr. crt.	SPECIFICATI IONS	UM	The analysed period			Formula
			n-2	n-1	n	
1	Reserves and placements	lei	138,508,964.8	52,377,450.9	77,342,768.9	Disp
2	Short – term debts	lei	1,326,878,602.6	856,157,812.0	1,003,082,492.0	DTS
3	Immediate liquidity	-	0.10	0.06	0.08	Li=Disp/ DTS
4	Indicator variation	%		-41%	26%	dvLi=(Li n- Lio)/Lio
5	Minimum accepted value	-	0.3	0.3	0.3	Min
6	Maximum accepted value	-	1.0	1.0	1.0	Max

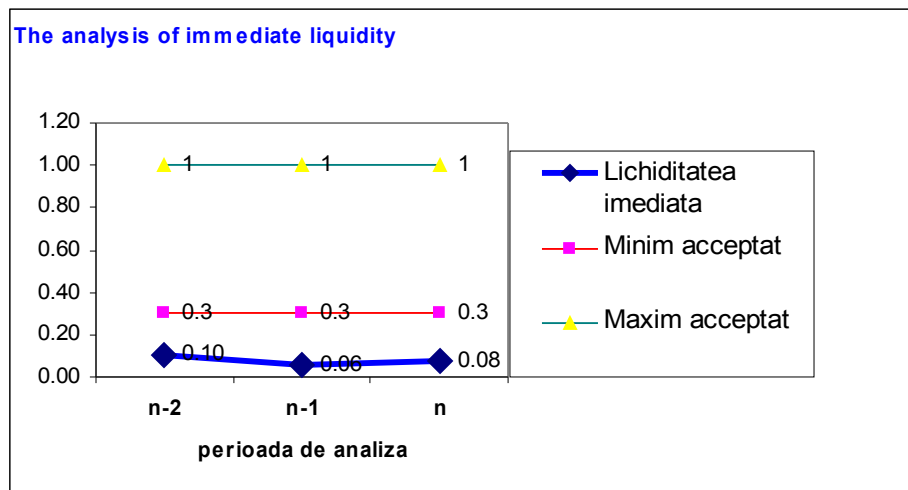


Fig. 4: The analysis of immediate liquidity

The economic contemporary companies as units of market economy are influenced both by exterior and interior factors. The exterior factors that mostly influence these types of companies are represented by the current economic environment. The law usually characterized by insufficiency and contradictory and restrictive changes, prohibitive financial and staff policies, high inflation, underdeveloped understructure and an underdeveloped informational market define the business conditions in countries with economies in transition. Out of the achieved results of the economic and financial analysis performed at S.C. ARCELOR MITTAL GALATI S.A the conclusion we have reached is that this company has known an increased activity. Therefore, in the first year of analysis its economic situation was dramatic, with very low achievements, followed by a gradual improvement each year. Thus, this company's bankruptcy risk has been considerably reduced during the three years of analysis and its solvency and liquidity have improved.

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