

# Banking Relationship and Credit Risk: Another Type of Approach

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**Abstract:** A discussion on the banking relationship invites us to observe that any commercial bank plays the role of financial intermediation between depositors and borrowers. In interpreting this role, the bank must be concerned with obtaining information on the quality of depositors and borrowers. Obtaining information about depositors and borrowers is necessary to alleviate the imperfection of the credit market and the information asymmetry. In our approach we will refer to the impact of the banking relationship on the risk of non-repayment of loans. We will start from the findings of Ferri and Meseseori, 2000, respectively Jimenez and Saurina, 2004, who developed two hypotheses regarding the impact of the banking relationship on the risk of default on loans. The first hypothesis confirms the reduction of the credit risk due to the diminution of the information asymmetry. Obtaining this effect depends on the bank's orientation to develop over time a banking relationship that will allow a better knowledge of the borrowers. The second hypothesis is supported by the bank's tolerant behavior towards its former clients who, in certain periods, were in difficulty in repaying the loans on time.

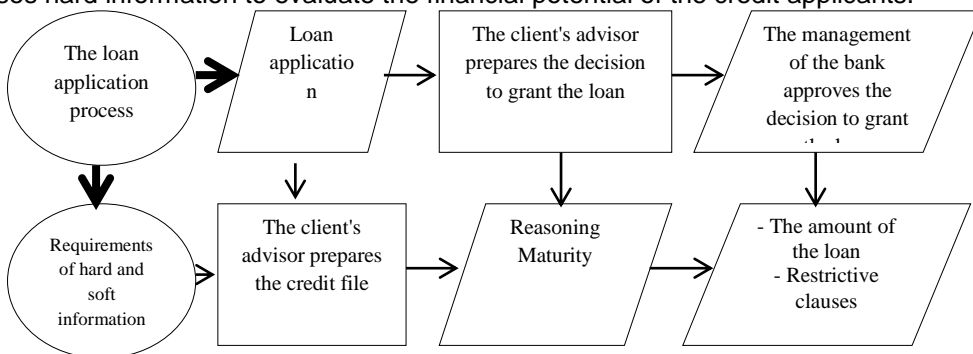
**Keywords:** high quality loans (honorable), medium quality loans (respectable), low quality loans (dangerous).

**JEL Classification:** G14, G21.

## 1. Methodological aspects

### 1.1 The field of study

The field of study serves the purpose of establishing the impact of the banking relationship on the ex-past credit risk, namely the risk of non-repayment of loans to Bank 01 and Bank 02. Our information at these banks with high market shares allows us to find that here we do not no empirical investigation of the credit risk has been carried out but, and we would like to point out, the two banks use an application that uses hard information to evaluate the financial potential of the credit applicants.



**Fig. 1. The structure of the loan application process**

The credit file, prepared by the client's advisor and approved by the bank's manager, contains the following hard information about the borrower: waist, liquidity (global and current), age, debt and guarantees (company and personal: of the manager or owner). This file lacks the software information and information needed to express the control variables.

To assess the impact of the banking relationship on the credit risk, 40 credit files were randomly selected, 15 were filed with Bank 01 and 25 were filed with Bank 02.

From the point of view of the requirements of the information bank we encountered several difficulties. The main difficulty derives from the failure to take into account when preparing credit files for procedures based on the use of hard and soft information. Opposed to this difficulty was the availability of the bank manager and the client advisor to respond to our proposal to investigate the banking relationship. Therefore, we will investigate the field through an econometric model based on the use of hard and soft information.

## **1.2. The econometric model. Definition of variables<sup>1</sup>**

### **1.2.1. Definition of variables**

Credit risk (RISC) is the dependent variable. Credit risk is considered to be the case when a borrower does not repay the entire loan or part of the loan at the maturities stipulated in the credit agreement. Credit risk management is considered the "heart of the banking field" (Godlewschi and Merli, 2010). This assessment takes into account the effect of the risk realization (most often a marked decrease in the profitability of the operations performed by the bank).

Credit risk is the oldest configuration of risk in financial markets. Credit risk differs from all other types of significant risks (market risk, liquidity risk, etc.). A more accurate assessment of credit risk requires a very good knowledge of the credit applicant, the financing project and its sector of activity. In practice, banks assess credit risk according to their experience and, possibly, using statistical instruments (score or expert systems). At the same time, banks protect themselves from the effects of credit risk by paying close attention to guarantees (of borrowed companies and / or managers / owners of borrowed companies).

For the assessment of credit risk, a process that can consider several methods, we will resort to the econometric model of processing hard and soft information. On the other hand, the cases of non-repayment of the loan, of late repayment were judged at the end of each year of the credit period (2013, 2014 and 2015). For example, on these dates we considered a situation of default or delay of repayment of the loan when the borrower did not repay or delayed by three months before maturity.

Menkhoff and Suwanaporn (2007) propose a credit risk assessment using a binary variable. Grants the value "1" in the case of non-repayment of the loan or the delay of the repayment of the loan and the value "0" in the case of repayment of the credit.

In the banking literature that emerged after 2004, banking risk management begins to be interested in both the use of hard information and soft information. Also, banks are becoming concerned to highlight the importance of taking credit granting decisions and practicing risk management under the conditions of using the two types of information (Godbillon-Camus and Godlewschi, 2007).

Regarding the use of both types of information, the researchers Godbillon-Camus and Godlewschi (2005) consider that "a combination of hard and soft information is more accurate than exclusively hard information". Hard information is

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<sup>1</sup> The architecture of the model was presented in detail in an article published in issue 20/2018, pp. 127-130.

characterized by high predictive power, while soft information has the advantage of strengthening the power of predicting hard information (Elsas, 2005).

The bank, using the combination of hard and soft information, manages to develop a long-term banking relationship that allows it to evaluate the quality of the borrower. The long-term banking relationship favors obtaining information advantage over its competitors. To the extent that the bank identifies and controls the behavior of the borrowers, it also obtains the advantage of reducing the reasoning of the loans. The long-term banking relationship is a guarantee for the borrower that it will be better supported by the bank. Of course, a sustainable banking relationship is capable of amortizing the conjunctural shocks inherent in the exercise of the loan contracting function.

The banking relationship and credit risk will be evaluated based on the following independent variables that use hard information:

- the size of the borrowed company;
- the age of the borrowed company;
- the liquidity of the borrowed enterprise;
- debt of the borrowed company;
- bank guarantees.

*The size of the borrowed enterprise (TAIN)* is considered by Lehman and Neuberger (2001) as an independent variable strongly influenced by the level of information asymmetry. The argument used to support this assertion is based both on the absence of regulations that cause the credit applicants to submit to the banks information regarding the waist, as well as the fixed costs of disclosing the information.

Regarding the impact of the variable, Jimenez and Saurina (2004) argue that "large firms are less risky than small firms". In support of the assessment, the two researchers relate to two arguments:

- big companies can diversify their investments;
- the activities of the big companies are not dependent on just one project.

Therefore, the size of the borrowed enterprise (TAIN) can be considered as an independent variable that has a negative impact on credit risk. From a quantitative point of view, large companies have a positive influence (they are less risky). Contrary to the previous situation, small businesses generate a negative influence (they are riskier).

For evaluating the size of the borrowed enterprise we will take into account the opinion of researchers Berger and Udell (2005). These researchers are concerned with respecting the confidentiality of information and propose that the total assets of the borrowed enterprise be expressed in the form of a nonperian logarithm. In Table 1 and Table 2, respectively, we present the data on the size of the companies that received loans. As we will study the evolution of the financial situation of the borrowed companies, we will refer to the years 2013, 2014 and 2015.

**Table 1. The size of the borrowed company (Credit files consulted at Bank 01)**

Company / File	CAEN code*	The size of the borrowed enterprise (TAIN)			
		2013	2014	2015	Average
I1/D1	172	0,61519	0,66783	0,76547	0,68283
I2/D2	252	1,16315	1,25276	1,38629	1,26740
I3/D3	155	1,69562	1,56862	1,61144	1,62523
I4/D4	452	1,63900	1,65866	1,67710	1,65825
I5/D5	013	1,69378	1,77326	1,60744	1,69149
I6/D6	266	2,08939	2,11263	2,15871	2,12024
I7/D7	452	1,73166	1,74920	1,77495	1,75194

I8/D8	262	2,16905	2,17475	2,17475	2,17285
I9/D9	294	1,48160	1,51273	1,53039	1,50824
I10/D10	361	1,93152	2,08815	1,84530	1,95499
I11/D11	505	1,76985	1,79176	1,80665	1,78942
I12/D12	505	0,52473	0,56531	0,59884	0,56296
I13/D13	202	0,27763	0,21511	0,11333	0,20202
I14/D14	551	0,43178	0,51879	0,66269	0,53775
I15/D15	012	1,37878	1,46787	1,34807	1,39824

<sup>)</sup> In Annex 1 the fields of activity corresponding to the CANE codes are indicated

**Table 2. The size of the borrowed enterprise (Credit files consulted Bank 02)**

Company / File	CAEN code	The size of the borrowed enterprise (TAIN)			
		2013	2014	2015	Average
I1/D1	011	0,96698	1,02604	0,97833	0,99045
I2/D2	158	1,56862	1,57070	1,37372	1,50435
I3/D3	602	1,36864	1,43508	1,49200	1,43191
I4/D4	361	0,85442	0,83291	0,69813	0,79515
I5/D5	204	0,90016	0,91228	0,94779	0,92008
I6/D6	551	1,16938	1,31909	1,15688	1,21512
I7/D7	361	1,72988	1,75786	1,74222	1,74332
I8/D8	013	0,81093	0,78846	0,81978	0,80639
I9/D9	505	1,61939	1,69562	1,72811	1,68104
I10/D10	281	-0,23314	-0,16252	-0,27444	-0,22337
I11/D11	505	1,74920	1,78339	1,80336	1,77865
I12/D12	602	1,04732	1,09192	0,75612	0,96512
I13/D13	294	1,62728	1,65823	1,64094	1,64215
I14/D14	452	1,29746	1,36354	1,40610	1,35570
I15/D15	505	1,22964	1,28093	1,29746	1,26934
I16/D16	551	1,43984	1,38879	1,34286	1,39050
I17/D17	551	1,32442	1,23547	1,11019	1,22336
I18/D18	505	1,72988	1,71380	1,69010	1,71126
I19/D19	505	1,32442	1,17557	1,09192	1,19730
I20/D20	505	1,25276	1,26413	1,28276	1,26655
I21/D21	505	1,04732	1,06471	1,01160	1,04121
I22/D22	252	1,65823	1,63900	1,16741	1,48821
I23/D23	266	1,76130	1,72455	1,63900	1,70828
I24/D24	551	1,64481	1,66013	1,66771	1,65755
I25/D25	551	1,81156	1,80500	1,77495	1,79717

<sup>)</sup> The activity fields corresponding to the CANE codes are indicated in Annex 1

The age of the borrowed enterprise (VAIM) is an independent variable that allows to signal the viability of the borrowed enterprise. Based on this variable, one can evaluate the magnitude of the reputation of the company applying for credit. In a bank-borrower relationship, the borrower is usually in a position to apply for financing for his project. Within the banking relationship, the borrower develops his reputation in the credit market and gradually reduces the information asymmetry. It is the bank that helps the borrower to "strengthen his reputation throughout the relationship with the bank" (Lehmann and Neuberger, 2001). From here, one can come up with the idea that new borrowers are more at risk than old borrowers.

The age of the lending company (VAIM) is a variable that, once taken into account, allows the bank to get to know the credit applicant better. The bank is interested in preferring a borrower whom he has known for many years because, undoubtedly, in all those years he managed to get to know better, more precisely the quality of the borrower. As a result, old borrowers are less risky, while new borrowers are more risky. Compared to the new borrowers, the bank must behave prudently, be concerned with better knowledge.

De Bodt et al. (2005) argue that it is necessary to distinguish between the age of the borrower and the duration of the banking relationship. The age of the borrowed company is public information, while the duration of the banking relationship provides information that is private and available only to a bank. The distinction between age and duration obliges the bank to respect the confidentiality of the relationship with any borrower.

For the age assessment of the borrowed enterprise we will consider the proposal of the researchers Menkhoff and Suwanaporn (2007, p. 1080): “The age of the borrowed enterprise indicates the number of years of operation at the date of submission of the loan application”. In Table 3 and Table 4 respectively, we indicate the age of the borrowed companies (number of operating years in 2013).

**Table 3. Age of the borrowed company (Credit files consulted at Bank 01)**

Comp any / File	CA EN code	The age of the borrowed enterprise (VAIM)																			
		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
I1/D1	011																	X			
I2/D2	158																X				
I3/D3	602												X								
I4/D4	361																		X		
I5/D5	204				X																
I6/D6	551										X										
I7/D7	361												X								
I8/D8	013												X								
I9/D9	505										X										
I10/D10	281																			X	
I11/D11	505											X									
I12/D12	602			X																	
I13/D13	294										X										
I14/D14	452												X								
I15/D15	505										X										

) The activity fields corresponding to the CANE codes are indicated in Annex 1

Table 4. The age of the borrowed company (Credit files consulted Bank 02)

Company / File	CAE N code	The age of the borrowed enterprise (VAIM)																			
		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
I1/D1	011										X										
I2/D2	158											X									
I3/D3	602																X				
I4/D4	361																	X			
I5/D5	204																	X			
I6/D6	551												X								
I7/D7	361														X						
I8/D8	013									X											
I9/D9	505											X									
I10/D10	281														X						
I11/D11	505														X						
I12/D12	602									X											
I13/D13	294									X											
I14/D14	452																			X	
I15/D15	505														X						
I16/D16	551						X														
I17/D17	551							X													
I18/D18	505												X								
I19/D19	505													X							
I20/D20	505													X							
I21/D21	505														X						
I22/D22	252											X									
I23/D23	266						X														
I24/D24	551													X							
I25/D25	551														X						

<sup>1)</sup> In Annex 1 the fields of activity corresponding to the CANE codes are indicated

The liquidity of the borrowed enterprise (LIM) is a variable that allows the bank to build on the borrower's ability to meet its financial commitments in the short term. The company is liquid when the resources generated by the current operations provide it with sufficient availability to meet the short-term maturities. A low liquidity of the borrower reveals to the bank that the company's stocks prove difficult to liquidate. In such a case, the borrowed company does not have sufficient liquidity to intervene in emergencies. Of course, low liquidity is a good signal for the bank regarding the risk of default on the loan. The opposite of low liquidity is the existence of liquidity. This time, the liquidity of the borrowed enterprise must be understood as the ability to honor its short-term commitments using operating resources.

Dumbravă (2010) and Bărbuță-Mișu (2010) propose that the liquidity of the borrowed enterprise (LIM) be evaluated by the ratio between current assets (Acr) and current liabilities (Dcr):

$$LIM = \frac{Acr}{Dcr}, \quad (1.1)$$

In conclusion, it can be considered that low-liquidity lending companies are more risky than lending companies that have sufficient liquidity to intervene in emergencies. The existence of liquidity ensures the security of short-term financing, it is a signal that the borrower can repay at the maturities provided in the credit agreement. In Table 5 and Table 6, respectively, we show the liquidity rates of the borrowed companies.

**Table 5. The overall liquidity rates of the borrowed companies  
(Credit files consulted at Bank 01)**

Company / File	CAEN code	Liquidity of the borrowed enterprise (LIM)			
		2013	2014	2015	Average
I1/D1	172	1,02	1,27	1,20	1,16
I2/D2	252	1,90	1,80	1,75	1,82
I3/D3	155	0,60	1,30	0,80	0,90
I4/D4	452	1,10	1,00	1,00	1,03
I5/D5	013	1,80	1,80	2,10	1,90
I6/D6	266	3,50	4,70	5,10	4,43
I7/D7	452	1,10	1,30	1,60	1,33
I8/D8	262	1,50	0,70	0,80	1,00
I9/D9	294	0,90	0,80	0,80	0,83
I10/D10	361	2,00	2,10	2,30	2,13
I11/D11	505	2,10	1,96	1,75	1,94
I12/D12	505	0,82	0,90	1,01	0,91
I13/D13	202	1,23	1,32	1,37	1,31
I14/D14	551	1,90	2,40	1,96	2,09
I15/D15	012	3,25	2,70	2,20	2,72

<sup>2)</sup> In Annex 1 the fields of activity corresponding to the CAEN codes are indicated

**Table 6. The overall liquidity rates of the borrowed companies  
(Credit files consulted at Bank 02)**

Company / File	CAEN code	Liquidity of the borrowed enterprise (LIM)			
		2013	2014	2015	Average
I1/D1	011	0,98	1,38	1,11	1,16
I2/D2	158	1,62	2,04	1,85	1,84
I3/D3	602	1,32	1,89	1,76	1,66
I4/D4	361	1,16	1,53	1,43	1,37
I5/D5	204	1,99	1,67	1,01	1,56

<b>I6/D6</b>	551	1,02	0,97	0,56	0,85
<b>I7/D7</b>	361	1,51	1,62	1,51	1,55
<b>I8/D8</b>	013	0,97	1,04	0,97	0,99
<b>I9/D9</b>	505	2,32	2,01	1,96	2,10
<b>I10/D10</b>	281	1,20	1,46	1,20	1,29
<b>I11/D11</b>	505	6,87	7,53	8,95	7,78
<b>I12/D12</b>	602	1,04	1,29	0,93	1,09
<b>I13/D13</b>	294	1,54	1,73	1,35	1,54
<b>I14/D14</b>	452	1,05	1,52	1,60	1,39
<b>I15/D15</b>	505	1,18	1,42	1,61	1,40
<b>I16/D16</b>	551	0,56	0,45	0,68	0,56
<b>I17/D17</b>	551	0,78	0,59	0,87	0,75
<b>I18/D18</b>	505	0,86	0,73	0,92	0,84
<b>I19/D19</b>	505	0,48	0,65	0,74	0,62
<b>I20/D20</b>	505	0,92	0,82	0,72	0,82
<b>I21/D21</b>	505	0,78	0,45	0,36	0,53
<b>I22/D22</b>	252	0,65	0,68	1,47	0,93
<b>I23/D23</b>	266	0,43	0,67	0,67	0,59
<b>I24/D24</b>	551	0,57	0,32	0,29	0,39
<b>I25/D25</b>	551	0,32	0,59	0,68	0,53

<sup>1)</sup> In Annex 1 the fields of activity corresponding to the CANE codes are indicated

The indebtedness of the borrowed enterprise (IND) is an indicator of the financial structure and an important signal for the bank. Debt is part of the life of any business and is considered both a positive and a negative element. It is a positive element because it can bring a consistent contribution to the development of the financing possibilities of the enterprise projects. However, indebtedness is, in fact, a danger to managers who do not know how to control and manage their debt levels.

Banks are interested in both positive and negative effects of debt. The impact of corporate debt invites economic analysts to research the "utility of corporate debt" (Menkhoff and Suwanaporn, 2007, p, 1085). Debt is useful when the company does not have sufficient equity or when the debt is in the form of a more economical means of financing the projects. On the other hand, indebtedness points to the weak point of the borrower. In this case, the bank anticipates that the credit risk is high when the debt rate is high. Highly indebted companies are considered conservative in their investment policies. In the case of enterprises, the basic principle in financial management no longer works<sup>2</sup>. These companies are the most risky due to the fact that the shareholders do not bear all the risks and losses in case of weakness. The banks will be the ones that will incur losses from the loan repayment. Therefore, if the debt of a company is high and the risk of default is high.

<sup>2</sup> The principle works when the rule is respected: a financing of the short-term asset with the short-term liability and a financing of the long-term asset with the long-term liability



Beca and Drăgan (2010) consider that the indebtedness of the borrowed enterprise (IND) can be evaluated by the indebtedness rate calculated on the basis of total debt (DT) and total net assets (ANT), as follows:

$$IND = \frac{DT}{ANT} \quad (1.2)$$

When the borrowing rate is high, the bank expects the risk of default on the loan to materialize. In Table 7 and 8 respectively, we present the borrowing rates of the borrowed companies.

**Table 7. Debt rates of borrowed companies (Credit files consulted at Bank 01)**

Company / File	CAEN code	Borrowing Company Debt (BCD)			
		2013	2014	2015	Average
I1/D1	172	0,83	1,78	2,41	1,67
I2/D2	252	0,79	1,67	0,54	1,00
I3/D3	155	0,43	0,66	0,50	0,53
I4/D4	452	0,62	0,55	0,45	0,54
I5/D5	013	0,47	0,46	0,55	0,49
I6/D6	266	0,92	0,93	0,93	0,93
I7/D7	452	0,53	0,49	0,55	0,52
I8/D8	262	0,62	0,41	0,29	0,44
I9/D9	294	0,44	0,42	0,33	0,40
I10/D10	361	0,56	0,61	0,53	0,57
I11/D11	505	0,46	0,60	0,51	0,52
I12/D12	505	1,98	2,22	1,95	2,05
I13/D13	202	1,21	0,98	0,85	1,01
I14/D14	551	1,04	0,72	1,28	1,01
I15/D15	012	0,34	0,39	0,39	0,37

*) The activity fields corresponding to the CANE codes are indicated in Annex 1*

**Table 8. Debt rates of borrowed companies  
(Credit files consulted at Bank 02)**

Company / File	CAEN code	Borrowing Company Debt (BCD)			
		2013	2014	2015	Average
I1/D1	011	1,41	1,29	1,00	1,23
I2/D2	158	1,92	0,93	0,70	1,18
I3/D3	602	0,96	1,87	1,10	1,31
I4/D4	361	1,69	1,09	1,01	1,26
I5/D5	204	2,68	2,09	1,95	2,24
I6/D6	551	1,84	1,58	2,42	1,95
I7/D7	361	2,65	3,51	4,33	3,50

<b>I8/D8</b>	013	3,33	2,58	3,33	3,08
<b>I9/D9</b>	505	3,45	2,91	1,08	2,48
<b>I10/D10</b>	281	3,71	2,69	3,71	3,37
<b>I11/D11</b>	505	1,04	0,97	0,63	0,88
<b>I12/D12</b>	602	2,47	4,12	4,20	3,60
<b>I13/D13</b>	294	5,54	4,15	6,75	5,48
<b>I14/D14</b>	452	2,56	1,96	2,78	2,43
<b>I15/D15</b>	505	0,68	0,76	0,88	0,77
<b>I16/D16</b>	551	4,57	6,57	7,84	6,33
<b>I17/D17</b>	551	7,29	6,21	5,95	6,48
<b>I18/D18</b>	505	6,87	7,63	7,63	7,38
<b>I19/D19</b>	505	12,74	11,46	8,67	10,96
<b>I20/D20</b>	505	9,34	12,58	12,58	11,50
<b>I21/D21</b>	505	7,81	9,15	16,47	11,14
<b>I22/D22</b>	252	11,16	10,07	9,12	10,12
<b>I23/D23</b>	266	21,64	19,82	17,85	19,77
<b>I24/D24</b>	551	11,09	9,96	8,87	9,97
<b>I25/D25</b>	551	18,87	14,56	16,14	16,52

<sup>3)</sup> In Annex 1 the fields of activity corresponding to the CANE codes are indicated

*Bank guarantees (GAR).* The bank requests, for the security of the repayment of the loan granted to the client, guarantees. In principle, bank guarantees have nothing in common with the specificities of covering civil and commercial claims provided for in the code of commercial and financial relations. The guarantees are considered necessary to prevent the risk of default on the loan and also for the bank to increase its chances of recovering the loan granted in case of weakness of the borrower.

Menkoff, et al. (2012) opts for two types of guarantees: the guarantees of the borrowed enterprise (GAIM) and the guarantees of the manager / owner of the borrowed enterprise (GAM / GAP). Both types of collateral constitute a means of motivating the borrowers, but also a signal for banks.

Based on the guarantees of the borrowed companies (GAIM), the bank ensures the cover of the losses due to the loan repayment. The higher the collateral, the easier it is for the bank to overcome the loan default situation. On the other hand, a borrowed company, when offering several guarantees, signals to the bank its good quality. The GAIM variable is deeply confidential. In order to respect confidentiality, it is necessary to consider GAIM as a binary variable. The assigned value is equal to "1" if the borrowed company provides the bank with more guarantees and "0" otherwise.

Regarding the guarantees of the manager (GAM) or those of the owner of the borrowed enterprises (GAP), these are considered as personal guarantees and credible signals for the bank. The personal guarantee undertakes the responsibility of the manager / owner for the repayment of the credit. Regarding this type of collateral, we found that it has no interest in the bank-borrower relationship.

For the econometric model, we will consider the guarantees of the borrowed enterprises (GAIM). These guarantees take the form of real estate guarantees and

movable mortgage on accounts. The values assigned to the GAIM variable are shown in table 9.

**Table 9. The values assigned for the guarantees of the borrowed companies  
(Credit files consulted at Bank 01 and Bank 02)**

Bank 01			Bank 02		
Company / File	CAEN code	Valoare atribuită GAR	Company / File	CAEN code	Valoare atribuită GAR
I1/D1	172	0	I1/D1	011	0
I2/D2	252	0	I2/D2	158	0
I3/D3	155	1	I3/D3	602	1
I4/D4	452	1	I4/D4	361	0
I5/D5	013	1	I5/D5	204	0
I6/D6	266	0	I6/D6	551	0
I7/D7	452	1	I7/D7	361	0
I8/D8	262	1	I8/D8	013	0
I9/D9	294	1	I9/D9	505	0
I10/D10	361	1	I10/D10	281	0
I11/D11	505	1	I11/D11	505	1
I12/D12	505	0	I12/D12	602	0
I13/D13	202	0	I13/D13	294	0
I14/D14	551	0	I14/D14	452	0
I15/D15	012	1	I15/D15	505	1
-	-	-	I16/D16	551	0
-	-	-	I17/D17	551	0
-	-	-	I18/D18	505	1
-	-	-	I19/D19	505	1
-	-	-	I20/D20	505	0
-	-	-	I21/D21	505	1
-	-	-	I22/D22	252	0
-	-	-	I23/D23	266	0
-	-	-	I24/D24	551	1
-	-	-	I25/D25	551	0

*) In Annex 1 the fields of activity corresponding to the CANE codes are indicated*

Between the bank and the credit applicants, the social interaction is important. Bharath, et al. (2007, pp. 368 - 419) considers that in addition to the financial information contained in the clients' financial statements (ie hard information) it appears in the banking relationship and the soft information (it is the information traded

between the managers / owners and the operational ones of the banks). As the banking relationship also uses soft information, the need to investigate social interaction emerges.

Uchida, et al. (2012), Kama, et al. (2011), Bellouma, et al. (2009) argue that the social dimension of the banking relationship is complex and cannot be understood solely on the basis of quantitative assessments (based on the use of hard information). The complexity of the social dimension of the banking relationship is amplified by the judgment and the contribution of the client advisors in the decision to grant the credit. Of course, this decision belongs to the bank manager, but the clients' advisors, through their judgment and input, are the major determinants of the decision to grant the credit. The clients' advisors come with an important contribution in the preparation of the decision.

Elsas (2005) thinks that the most important feature of the information is to be intimately related to the environment in which it was produced. Within the bank, more precisely during the banking relationship, the soft information offers access to a surplus of information compared to the publicly available information (ie hard information which is confidential). Soft information has the ability to strengthen the power of predicting hard information. This aptitude derives from the impact exerted by the qualitative factors on the significant banking risks, especially on the credit risk. Unlike hard information, information based on "numbers", soft information is generally presented in the form of texts which means it is information rendered by "words". The words are the ones that allow a better presentation of the dynamics of the banking relationship. The client advisors who know how to make sense of the words manage to bring to the surface "useful information" about the risk of repayment of the loan.

It follows from the aforementioned that, for a better understanding of the banking relationship, the independent variables that use soft information bring their contribution both to the accumulation of information and to a broader and more accurate description. It is also necessary to note that the integration of the soft information in the econometric environment brings an additional provision of the risk of the loan default.

Bellouma, et al. (2009) and Uchida, et al. (2012) propose for the overall evaluation of the social dimension of the banking relationship four variables, as follows: social contact; mutual trust; rotating the client advisor; communication.

*Social contact (CONS)* is a variable suggested by Bellouma, et al. (2009) and appreciated as a representative variable of soft information. The assessment is based on the argument that this information is obtained from a personal contact, a social interaction between the client's advisor and the manager or owner of the company applying for the credit. As far as we are concerned, we consider social contact an opportunity for the client's advisor to access additional information about the credit applicant's financing project. Through social contact, built over time, the client's advisor obtains new information that, in conjunction with hard information, can be used for a better credit risk assessment. At the same time, an important social contact allows to accumulate information about the borrower and, in this way, to reduce the information asymmetry. For the evaluation of social contact, Bellouma, et al. (2009) propose to use a binary variable to which the value "1" or "0" is assigned, depending on the rating made by the client advisor. The CONS variable is evaluated with "1" when the client counselor assigns the social contact with the borrower note 5 or note 4. Otherwise, that is, for note 3/2/1, the CONS variable is evaluated with "0". A social contact with 5/4 is a strong social contact. The social contact noted with 3/2/1 is weak.

To note the social contact, the advisers of the client in charge of drawing up the loan files were interviewed based on the question: "What note do you give to the social contact with the manager / owner of the borrowed company?".

*Mutual trust (IMUT)* is also a variable recommended by Bellouma, et al. (2009). Mutual trust has, in the context of information asymmetry, a key role in addressing the

uncertainty issues related to the forms of information asymmetry: adverse selection and moral risk. Under the conditions in which a long-term banking relationship develops, the chances of mutual trust develop as well. The bank, by developing mutual trust with the borrower, accumulates more information about the borrower and optimizes its decision to grant the loan. From this perspective, the variable IMUT can be considered as an indicator of the accumulation of soft information. Continuing the analysis we will appreciate that mutual trust must also be associated with the information production function. Based on mutual trust, the bank produces less expensive information, reduces information asymmetry and provides borrowers with funds when their financial situation is difficult to analyze. In conclusion, the bank, by developing mutual trust, achieves a better appreciation of the quality of the borrowers.

Mutual trust (IMUT), according to the work of Bellouma researchers, et al. (2009), is a binary variable that takes the value "1" or "0". The assignment of a value is made according to the note given to the mutual trust by the client advisor. This time, the client's advisor answers the question: "How do you rate the trust between you and the manager / owner of the borrowed company?". The IMUT variant is evaluated with "1" when the client's advisor gives a rating of 5 or 4. Otherwise, the IMUT variable is evaluated with "0".

*Client Counseling Rotation (ROCC)* is a variable that can be considered the central axis of independent variables that use soft information. The ROCC variable, in the situation of stability in carrying out the tasks of preparing the credit files, enhances the function of producing soft information of the other three variables.

The rotation of the client's advisor characterizes his contribution in the accumulation of soft information. Uchida, etc. (2012) states that "the value of the software information depends only on the agent collecting it". This statement allows us to consider the ROCC variable as a good indicator of software information production. Obviously, the client counselor becomes the main manufacturer of software information because it is the one that carries out exchanges and interactions with borrowers. The client's advisor has a direct contact with the manager or the owner of the borrowed company. Because soft information is difficult to collect, a frequent change of client advisor can affect the ability to produce information. The more frequent the rotation of the client's advisor, the lower the production of software information, and the shorter the life expectancy of a solid banking relationship.

Rotating the client advisor (ROCC), according to the Uchida approach, etc. (2012), is a binary variable that takes the value "1" or "0". The assignment of a value is made according to the note given to the continuity or discontinuity in the performance of the tasks of drawing up the credit files. To evaluate the rotation, the client's advisor answers the question: "In the activity performed by you in the bank did you perform, during the preparation of the credit file and other functions?". For the case of frequent rotation, the client counselor gives note 5 or 4, and for a rare rotation, note 3, 2 or 1. In the case of frequent rotation, the ROCC variable is evaluated with "1" and under rare rotation conditions with "0".

In a bank, client advisors are part of the sales staff category. In this capacity, the clients' advisors must play an essential role in the efficiency of the commercial relations and in the long-term orientation of the transactions with the depositors and the credit applicants (the clients of the bank). Banks are aware that it is very important to develop a trusting relationship between client advisors and their clients in order to transform the banking relationship into an essential customer loyalty tool. In order to keep its clients loyal, the bank must be interested in the clients' desire to attach themselves to the contact staff, that is to say, the client advisers. Therefore, the bank must be interested in building trust in the banking relationship. An important means of this construction is communication with depositors and credit applicants. In the communication process, the clients' advisors must first of all prove their expertise, have an ethical and

transparent behavior, take into account the clients' interests and promote an open communication style.

*Communication (COMU)* "is an independent variable that reflects the direct mode of trading" (Bellouma, et al., 2009, p. 236) between the client advisers and the representatives of the borrowed companies. Communication promotes the development of social contact and mutual trust. By developing these variables, the bank manages to better assess the financial situation of the borrowers and to curb their opportunism. The bank also produces more information about the borrowed companies and, in this way, limits the effect of pre-contractual and post-contractual information asymmetry.

In order to evaluate the communication variable (COMU), Bellouma, et al. (2009) propose to assign the value "1" when the client's advisor makes a direct interpersonal communication (face to face) with the manager / owner of the borrowed company and "0" in the case of indirect or point-to-point interpersonal communication (by telephone, fax or e -mail). The communication investigation is done by interrogating the client's advisor with the question: "What form of communication did you have in your relationship with the manager / owner of the borrowed company?"

On the empirical level, the dimensions of the soft information were investigated on the basis of the structured questionnaire presented below. Specifically, for the evaluation of the independent variables "social contact", "mutual trust", "rotation of the client's advisor" and "communication", we addressed with the client's two advisors (one from each bank) to answer four questions. The questions were repeated for each borrowed enterprise (ie for each loan file). This means that each client counselor received 15 respectively 25 questionnaires. For the first three questions, the client advisers were invited to evaluate the managers / owners of the borrowed companies with a rating grid from 1 to 5.

For the questions: "What grade do you give to the social contact with the manager / owner of the borrowed company?" And "How do you rate the trust between you and the manager / owner of the borrowed company?" The rating grid was recommended:

	Poor		Strong	
1	2	3	4	5

For the question: "In the activity performed by you in the bank did you perform, during the preparation of the credit file and other functions?" The rating grid was used:

	Rare		Frequent	
1	2	3	4	5

Finally, for the question: "What form of communication did you have in your relationship with the manager / owner of the borrowed company?" The following answers were investigated:

- direct communication
  - Face to face
- indirect communication
  - Phone
  - E-mail
  - Fax

To this question, the clients' advisers were invited to specify a single form of communication considering that this was the predominant form in its interaction with the manager / owner of the borrowed company.

In Table 10 and Table 11, respectively, we show the evaluations proposed by the two client advisors on the variables that characterize the social dimension of the banking relationship (of the relationship the client advisor - borrower).

**Table 10. The values attributed to the overall evaluation of the relationship of the client advisor with the manager / owner of the company loaned to Bank 01**

Company / File	CAEN* Code	Independent variables that use soft information			
		CONS	IMUT	ROCC	COMU
I1/D1	011	0	0	0	1
I2/D2	158	1	1	0	1
I3/D3	602	0	0	0	1
I4/D4	361	0	0	0	1
I5/D5	204	1	1	0	1
I6/D6	551	0	0	1	1
I7/D7	361	1	1	0	1
I8/D8	013	0	0	1	1
I9/D9	505	0	0	1	1
I10/D10	281	1	1	0	1
I11/D11	505	0	1	1	1
I12/D12	602	0	0	0	1
I13/D13	294	1	1	0	1
I14/D14	452	0	1	1	1
I15/D15	505	0	0	1	1

*) In Annex 1 the fields of activity corresponding to the CAEN codes are indicated*

**Table 11. Values attributed to the overall evaluation of the relationship of the client advisor with the manager / owner of the company borrowed from Bank 02**

Company / File	CAEN* Code	Independent variables that use soft information			
		CONS	IMUT	ROCC	COMU
I1/D1	011	0	1	0	1
I2/D2	158	1	1	0	1
I3/D3	602	1	1	0	1
I4/D4	361	1	1	0	1
I5/D5	204	1	1	0	1
I6/D6	551	1	1	0	1
I7/D7	361	1	1	0	1
I8/D8	013	1	1	0	1

I9/D9	505	0	0	0	1
I10/D10	281	0	1	0	1
I11/D11	505	1	1	1	1
I12/D12	602	0	0	0	1
I13/D13	294	1	1	0	1
I14/D14	452	0	1	0	1
I15/D15	505	0	0	0	1
I16/D16	551	0	0	0	1
I17/D17	551	0	0	1	1
I18/D18	505	1	0	1	1
I19/D19	505	0	1	0	1
I20/D20	505	0	0	0	1
I21/D21	505	1	1	0	1
I22/D22	252	0	0	1	1
I23/D23	266	0	0	1	1
I24/D24	551	0	0	1	1
I25/D25	551	0	0	1	1

<sup>\*)</sup> In Annex 1 the fields of activity corresponding to the CAEN codes are indicated

In order to present the control variables, we have retained the opinions of the researchers Neuberger, et al. (2008, pp. 101 - 126). These researchers relate to two variables:

- the activity of the borrower;
- the legal form of the enterprise.

*The sector of the loan activity (SEAC)* influences the risk of the loan defaulting by "its sensitivity to the economic situation" (Neuberger, et al., 2008, p. 103). From this point of view it is appreciated that the sectors of activity have different sensitivity to the economic situation and, consequently, some sectors of activity are more risky. For example, production companies hold more capital in assets than service companies. This characteristic causes the production companies to be more opaque than the service providers, that is to say, they are more risky. Therefore, the SEAC variable must be assigned the value "1" if the enterprise belongs to the services sector and "0" if the enterprise has a production activity.

*The legal form of the enterprise (FOJU)* refers to two legal forms: S.A. and S.R.L. From the point of view of the legal form, the joint stock companies (SA) are considered to have a low risk potential, while the limited liability companies (SRL) have a higher risk potential (Neuberger, et al., 2008). Therefore, we will assign the value "1" to the companies with legal form SA and the value "0" to the companies with legal form SRL.

In Table 12 and Table 13, respectively, we assign the values "1" and "0" to differentiate the companies borrowed according to the sector of activity and the legal form. Following the assignment of the values "1" and "0", the borrowed companies will be differentiated in relation to their risk potential.

**Table 12. Values attributed to control variables (Credit files consulted at Bank 01)**

Company / File	CAEN code*	Control variables			
		Sector of activity	SEAC Assigne d value	Legal form	FOJU Assign value



I1/D1	011	Produce	0	SRL	0
I2/D2	158	Produce	0	SRL	0
I3/D3	602	Produce	0	SRL	0
I4/D4	361	Produce	0	SA	1
I5/D5	204	Produce	0	SA	1
I6/D6	551	Produce	0	SA	1
I7/D7	361	Produce	0	SRL	0
I8/D8	013	Produce	0	SA	1
I9/D9	505	Produce	0	SRL	0
I10/D10	281	Produce	0	SA	1
I11/D11	505	Services	1	SA	1
I12/D12	602	Services	1	SRL	0
I13/D13	294	Produce	0	SRL	0
I14/D14	452	Services	1	SRL	0
I15/D15	505	Produce	0	SRL	0

*) In Annex 1 the fields of activity corresponding to the CANE codes are indicated*

**Table 13. The values assigned to the control variables  
(Credit files consulted at Bank 02)**

Company / File	CAEN Code *	Control variables			
		Sector of activity	SEAC Assigned value	Legal form	FOJU Assigned value
I1/D1	011	Produce	0	SRL	0
I2/D2	158	Produce	0	SRL	0
I3/D3	602	Services	1	SRL	0
I4/D4	361	Produce	0	SRL	0
I5/D5	204	Produce	0	SRL	0
I6/D6	551	Services	1	SRL	0
I7/D7	361	Produce	0	SA	1
I8/D8	013	Produce	0	SRL	0
I9/D9	505	Services	1	SA	1
I10/D10	281	Produce	0	SRL	0
I11/D11	505	Services	1	SA	1
I12/D12	602	Services	1	SRL	0
I13/D13	294	Produce	0	SA	1
I14/D14	452	Produce	0	SRL	0
I15/D15	505	Services	1	SRL	0
I16/D16	551	Services	1	SA	1
I17/D17	551	Services	1	SRL	0

I18/D18	505	Services	1	SA	1
I19/D19	505	Services	1	SRL	0
I20/D20	505	Services	1	SRL	0
I21/D21	505	Services	1	SRL	0
I22/D22	252	Produce	0	SRL	0
I23/D23	266	Produce	0	SA	1
I24/D24	551	Services	1	SA	1
I25/D25	551	Services	1	SA	1

<sup>o</sup>) In Annex 1 the fields of activity corresponding to the CANE codes are indicated

## 2. Analysis of the results

The results shown at the two banks are presented in tables 14a, 14b, 14c (for bank 01) and tables 15a, 15b, 15c (for bank 02). These results were obtained following the treatment of the econometric model according to the Statistical Package for the Social Sciences (SPSS) program. The data shown in the mentioned tables are treated based on the Pearson correlation coefficient and the Sig (2-tailed) coefficient.

**Table 14a. Results of correlation of variables at Bank 01 (2013)**

Variables		RISK	TAIN	VAIM	LIM	IND	GAR
RISK	A	1	-, 115	-, 368	-, 535*	, 246	, 068
	B		, 683	, 177	, 040	, 377	, 810
TAIN	A	-, 115	1	, 209	, 301	-, 660**	, 707**
	B	, 683		, 455	, 275	, 007	, 003
VAIM	A	-, 368	, 209	1	-, 042	-, 426	, 131
	B	, 177	, 455		, 882	, 113	, 641
LIM	A	-, 535*	, 301	-, 042	1	-, 197	-, 080
	B	, 040	, 275	, 882		, 483	, 776
IND	A	, 246	-, 660**	-, 426	-, 197	1	-, 759**
	B	, 377	, 113	, 113	, 483		, 001
GAR	A	, 068	, 707**	, 131	-, 080	-, 759**	1
	B	, 810	, 003	, 641	, 776	, 001	
CONS	A	-, 354	-, 016	, 043	-, 036	-, 065	, 000
	B	, 196	, 956	, 878	, 898	, 819	1,000
IMUT	A	-, 468	-, 135	0,039	, 081	-, 061	-, 055
	B	, 079	, 631	, 890	, 775	, 830	, 847
RCOC	A	-, 068	, 244	-, 100	, 543*	-, 226	, 111
	B	, 810	, 380	, 723	, 036	, 419	, 693
COMU	A	a	a	a	a	a	a
	B	-	-	-	-	-	-
SEAC	A	, 167	-, 385	-, 368	-, 025	, 504	-, 272
	B	-, 533	, 157	, 177	, 929	, 056	, 326
FOJU	A	-, 408	, 689**	, 088	, 352	-, 282	, 389
	B	, 131	, 004	, 756	, 198	, 308	, 152

A. Pearson Correlation.

B. Sig (2-tailed).

a. Cannot be computed because at least on of the variables is constant.

\*. Correlation is significant at the 0,05 level (2-tailed).

\*\* . Correlation is significant at the 0,01 level (2-tailed).

**Table 14b. Results of correlation of variables at Bank 01 (2014)**

Variables		RISK	TAIN	VAIM	LIM	IND	GAR
RISK	A	1	,008	-,368	-,480	,143	,068
	B		,977	,177	,070	,612	,810
TAIN	A	,008	1	,216	,242	-,595*	,697**
	B	,977		,439	,385	,019	,004
VAIM	A	-,368	,216	1	-,042	-,174	,131
	B	,177	,439		,882	,535	,641
LIM	A	-,480	,242	-,042	1	-,089	-,275
	B	,070	,385	,882		,752	,322
IND	A	,143	-,595	-,174	-,089	1	-,775**
	B	,612	,019	,535	,752		,001
GAR	A	,068	,697**	,131	-,275	-,775**	1
	B	,810	,004	,641	,322	,001	
CONS	A	-,354	,009	,043	-,053	-,022	,000
	B	,196	,878	,878	,852	,937	1,000
IMUT	A	-,468	,106	-,023	,113	-,197	,218
	B	,079	,706	,936	,689	,481	,435
RCOC	A	,272	,253	-,100	,396	-,416	,111
	B	,326	,362	,723	,144	,123	,693
COMU	A	a	a	a	a	a	a
	B	-	-	-	-	-	-
SEAC	A	,167	-,369	-,368	,009	,290	-,272
	B	,553	,177	,177	,976	,294	,326
FOJU	A	-,068	,706**	,088	,256	-,393	,389
	B	,810	,003	,756	,356	,147	,152

A. Pearson Correlation.

B. Sig (2-tailed).

a. Cannot be computed because at least on of the variables is constant.

\*. Correlation is significant at the 0,05 level (2-tailed).

\*\* . Correlation is significant at the 0,01 level (2-tailed).

**Table 14c. Results of correlation of variables at Bank 01 (2015)**

Variables		RISK	TAIN	VAIM	LIM	IND	GAR
RISK	A	1	,315	,039	-,441	-,360	,408
	B		,252	,891	,100	,188	,131
TAIN	A	,315	1	,217	,307	-,618*	,639*
	B	,252		,438	,266	,014	,010
VAIM	A	,039	,217	1	-,129	-,147	,126
	B	,891	,438		,646	,602	,654
LIM	A	-,441	,307	-,129	1	-,013	-,275
	B	,100	,266	,646		,963	,322
IND	A	-,360	-,618*	-,147	-,013	1	-,713**
	B	,188	,014	,602	,963		,003
GAR	A	,408	,639*	,126	-,275	-,713**	1
	B	,131	,010	,654	,322	,003	

<b>CONS</b>	A	-, 354	-, 071	, 044	, 074	-, 236	, 000
	B	, 194	, 801	, 877	, 794	, 397	1,000
<b>IMUT</b>	A	-, 468	-, 145	, 052	, 105	-, 183	-, 055
	B	, 079	, 607	, 855	, 709	, 515	, 847
<b>RCOC</b>	A	, 272	, 293	-, 126	, 303	-, 249	, 111
	B	, 326	, 289	, 654	, 272	, 371	, 693
<b>COMU</b>	A	a	a	a	a	a	a
	B	-	-	-	-	-	-
<b>SEAC</b>	A	, 250	-, 327	-, 348	-, 069	, 370	-, 272
	B	, 369	, 235	, 204	, 808	, 175	, 326
<b>FOJU</b>	A	-, 068	, 664**	, 063	, 361	-, 356	, 389
	B	, 810	, 007	, 823	, 186	, 193	, 152

- A. Pearson Correlation.  
 B. Sig (2-tailed).  
 a. Cannot be computed because at least on of the variables is constant.  
 \*. Correlation is significant at the 0,05 level (2-tailed).  
 \*\*. Correlation is significant at the 0,01 level (2-tailed).

**Tabelul 15a. Rezultatele corelației variabilelor la Banca 02 (2013)**

Variables		<b>RISK</b>	<b>TAIN</b>	<b>VAIM</b>	<b>LIM</b>	<b>IND</b>	<b>GAR</b>
<b>RISK</b>	A	1	, 196	-, 227	-, 462*	, 666**	, 114
	B		, 347	, 347	, 020	, 000	, 587
<b>TAIN</b>	A	, 196	1	-, 235	, 136	, 376	, 190
	B	, 347		, 258	, 516	, 064	, 362
<b>VAIM</b>	A	-, 227	-, 235	1	, 133	-, 149	, 331
	B	, 276	, 258		, 525	, 478	, 106
<b>LIM</b>	A	-, 462*	, 136	, 133	1	-, 411*	, 222
	B	, 020	, 516	, 525		, 041	, 287
<b>IND</b>	A	, 666**	, 376	-, 149	-, 411*	1	, 000
	B	, 000	, 064	, 478	, 041		, 996
<b>GAR</b>	A	, 114	, 190	, 331	, 222	, 000	1
	B	, 587	, 362	, 106	, 287	, 996	
<b>CONS</b>	A	-, 368	, 031	, 082	, 360	-, 421*	, 165
	B	, 071	, 884	, 698	, 077	, 036	, 430
<b>IMUT</b>	A	-, 439*	-, 391	, 238	, 294	-, 482*	, 014
	B	, 028	, 053	, 253	, 153	, 015	, 946
<b>RCOC</b>	A	, 471*	, 513**	-, 092	, 107	, 599**	, 206
	B	, 018	, 009	, 661	, 609	, 002	, 322
<b>COMU</b>	A	a	a	a	a	a	a
	B	-	-	-	-	-	-
<b>SEAC</b>	A	, 206	, 266	, 110	, 068	, 096	, 553*
	B	, 322	, 199	, 601	, 748	, 647	, 004
<b>FOJU</b>	A	, 113	, 635**	-, 133	, 231	, 347	, 089
	B	, 589	, 001	, 526	, 267	, 090	, 672

- A. Pearson Correlation.  
 B. Sig (2-tailed).  
 a. Cannot be computed because at least on of the variables is constant.  
 \*. Correlation is significant at the 0,05 level (2-tailed).  
 \*\*. Correlation is significant at the 0,01 level (2-tailed).

Table 15b. Results of correlation of variables at Bank 02 (2014)

Variables		RISK	TAIN	VAIM	LIM	IND	GAR
RISK	A	1	,273	-,273	-,506**	,775**	,165
	B		,137	,187	,010	0,000	,430
TAIN	A	,273	1	-,185	,157	,312	,179
	B	,187		,376	,452	,129	,391
VAIM	A	-,273	-,185	1	,227	-,291	,344
	B	,187	,376		,275	,158	,092
LIM	A	-,506**	,157	,227	1	-,446*	,209
	B	,010	,452	,275		,025	,316
IND	A	,775**	,312	-,291	-,446*	1	,044
	B	,000	,129	,158	,025		,834
GAR	A	,165	,179	,344	,209	,044	1
	B	,430	,391	,092	,316	,834	
CONS	A	-,299	,057	,239	,344	-,426*	,165
	B	,147	,786	,250	,093	,034	,430
IMUT	A	-,513**	-,368	,407*	,348	-,541**	,014
	B	,009	,070	,043	0,088	,005	,946
RCOC	A	,524**	,479*	-,192	,085	,536**	,206
	B	,007	,015	,359	,685	,006	,322
COMU	A	a	a	a	a	a	a
	B	-	-	-	-	-	-
SEAC	A	,461*	,266	,024	,005	,189	,553**
	B	,020	,199	,910	,982	,366	,004
FOJU	A	,175	,638	-,258	,187	,327	,089
	B	,404	,001	,212	,372	,111	,672

A. Pearson Correlation.

B. Sig (2-tailed).

a. Cannot be computed because at least on of the variables is constant.

\*. Correlation is significant at the 0,05 level (2-tailed).

\*\*. Correlation is significant at the 0,01 level (2-tailed).

Table 15c. Results of correlation of variables at Bank 02 (2015)

Variables		RISK	TAIN	VAIM	LIM	IND	GAR
RISK	A	1	,052	-,402*	-,424*	,642**	,114
	B		,803	,046	,035	,001	,587
TAIN	A	,052	1	-,092	,254	,202	,250
	B	,803		,663	,220	,334	,228
VAIM	A	-,402*	-,092	1	,196	-,231	,344
	B	,046	,663		,348	,267	,092
LIM	A	-,424*	,254	,196	1	-,382	,265
	B	,035	,220	,348		,060	,201
IND	A	,642**	,202	-,231	-,382	1	,053
	B	,001	,334	,267	,060		,800
GAR	A	,114	,250	,344	,265	,053	1
	B	,587	,228	,092	,201	,800	
CONS	A	-,206	,104	,239	,260	-,286	,165
	B	,322	,622	,250	,209	,165	,430

IMUT	A	-, 439*	-, 295	, 407*	, 235	-, 429*	, 014
	B	, 028	, 152	, 043	, 257	, 033	, 946
RCOC	A	, 292	, 407*	-, 192	, 222	, 432*	, 206
	B	, 156	, 044	, 359	, 287	, 031	, 322
COMU	A	a	a	a	a	a	a
	B	-	-	-	-	-	-
SEAC	A	, 529**	, 293	-, 024	, 066	, 190	, 553*
	B	, 007	, 156	, 910	, 753	, 364	, 004
FOJU	A	, 113	, 686**	-, 258	, 225	, 294	, 089
	B	, 589	, 000	, 212	, 279	, 154	, 672

- A. Pearson Correlation.  
 B. Sig (2-tailed).  
 a. Cannot be computed because at least on of the variables is constant.  
 \*. Correlation is significant at the 0,05 level (2-tailed).  
 \*\*. Correlation is significant at the 0,01 level (2-tailed).

The Pearson correlation coefficient  $r$  indicates the strength of the link between the dependent variable and the independent variables. A value +/- 1 of the coefficient "r" reveals a perfect correlation. In the literature, we also encountered a detail in the approximation of the correlation, as follows:

- $r \in [0 ; 0,2]$  – very poor correlation;
- $r \in [0,2 ; 0,4]$  – poor correlation;
- $r \in [0,4 ; 0,6]$  – reasonable correlation;
- $r \in [0,6 ; 0,8]$  – high correlation;
- $r \in [0,8 ; 1]$  – very high correlation;

As the coefficient "r" is closer to "0", the situation reveals a weak correlation between the variables. When the coefficient is close to the value -1, it shows an inverse correlation (as the variable x decreases the variable y decreases). When the coefficient approaches the value +1, the situation reveals a positive correlation (the variables x and y increase together).

Statistical Package for the Social Sciences alerts us, at the same time, if the correlation result is statistically negative, by the coefficient Sig (2-tailed). If this coefficient is below 0.05, the correlation is significant. When Sig (2-tailed) is in the relevant range, the Statistical Package for the Social Sciences helps us by signaling with the asterisk \* and \*\*. This signaling case can be seen in table 4.14a in the RISC - LIM relationship and, respectively, in the TAIN - IND and TAIN - GAR relationships, for example.

In Table 14a (Bank 01, Credit Records 2013) we report a reasonable correlation between the RISC dependent variable and the independent variable LIM ( $r = -0.535$  and  $\text{Sig} = 0.040$ ). It is a reasonable and significant correlation.

Between the independent variables both those that use hard information and those based on soft information at Banca 01, in 2013 the following correlations can be identified:

- TAIN – IND ( $r = -0,660$  and  $\text{Sig} = 0,007$ ) and TAIN – GAR ( $r = 0,707$  and  $\text{Sig} = 0,004$ ) are high and significant correlations;
- IND – GAR ( $r = -0,759$  and  $\text{Sig} = 0,001$ ) it is a high and significant correlation;
- RCOC – LIM ( $r = 0,543$  and  $\text{Sig} = 0,036$ ) it is a reasonable and significant correlation;

We also need to note the lack of correlation of the COMU variable with the other variables. The COMU variable is considered "a constant variable".

At Bank 01, in 2014, we did not identify any direct relationship between the dependent variable (RISC) and the other independent variables. Relationships between independent variables are developed:

- TAIN – IND, a relationship characterized by a reasonable correlation ( $r = -0,595$ ) and significant ( $\text{Sig} = 0,019$ );
- TAIN – GAR, a highly correlated relation ( $r = 0,697$ ) and significant ( $\text{Sig} = 0,004$ );
- IND – GAR, a highly correlated relation ( $r = -0,775$ ) and significant ( $\text{Sig} = 0,001$ ).

The variable COMU is appreciated, also in 2014, "a constant variable".

In 2015, at Bank 01, we identify the manifestation of the relationships from the previous year:

- TAIN – IND, a highly correlated relation ( $r = -0,618$ ) and significant ( $\text{Sig} = 0,014$ );
- TAIN – GAR, a highly correlated relation ( $r = -0,639$ ) and significant ( $\text{Sig} = 0,010$ );
- IND – GAR, a highly correlated relation ( $r = -0,713$ ) and significant ( $\text{Sig} = 0,003$ ).

Throughout the entire lending period (2013 - 2015), at Bank 01, the significance was for the independent variables: TAIN, LIM, IND, GAR și RCOC.

The significance of the TAIN variable makes this variable an important risk factor for non-repayment of loans. It is, however, a potential factor that has not materialized. The negative sign of the coefficient "r" for this variable, found in four of the five relationships, warns the bank to follow the fragility of the small borrowers. These borrowers are more opaque and highly dependent on bank credit for financing long-term investment and short-term operating cycles.

Regarding the LIM variable, the positive coefficient "r" is in line with the relatively high liquidity rates which, in turn, reveal a good credit repayment capacity. From a liquidity perspective, borrowers are considered to be solvent and very risky businesses. The situation provided by the bank is true as the C category borrowers also repaid the loans in full. An important liquidity denotes a good financial health of the borrower that allows him to repay the term loan.

According to our expectations, the IND variable did not affect the probability of loan repayment. Borrowing of borrowers investigated is not a determining factor of credit risk. Of course, the bank needs to be careful about borrowing debt because an increase in debt by a percentage can lead to an increase in the probability of repayment of the loan by 20%.

The GAR independent variable, highly correlated with the IND variable, was well managed by the bank. By demonstrating caution, the bank asked borrowers to provide solid collateral to limit their losses in the event of non-repayment of loans. On the other hand, the solid guarantees have caused the borrowers to repay the loans in due dates.

Finally, the RCOC variable, i.e. the rotation of the client advisor, reveals to us that it is a variable with a negative potential to affect the credit risk. In our case, the RCOC variable would have generated a negative influence through the LIM variable. This situation did not arise because the borrowers correctly managed their liquidities.

Any bank is very interested, in the process of granting loans, the variables IND and LIM. For these variables, banks recommend that credit applicants comply with the following limits in the credit contracting process:

- the debt ratio, calculated as a ratio between total debt and net assets, is less than 200%;
- the liquidity coefficient (rate), calculated as a ratio between current assets and current liabilities, is greater than 1.

During the lending period (2013 - 2015), at Bank 01, we identify the following situation for the 15 borrowers:

- 14 borrowers have a debt ratio below 200%. The average debt situation was:  
 IND > 205% = 1 borrower (6.5%);  
 Between 151% - 199% = 1 borrower (6.5%);  
 101% - 150% = 2 borrowers (13%);  
 51% - 100% = 7 borrowers (47%);  
 37% - 50% = 4 borrowers (27%);
- the average liquidity situation was:  
 Between 0.83 - 1.00 = 4 borrowers (27%);  
 1.01 - 1.50 = 4 borrowers (27%);  
 1.51 - 2.00 = 3 borrowers (19%);  
 > 2.00 = 4 borrowers (27%).

(4 borrowers did not meet the recommended level for liquidity)

From the point of view of the debt, 14 borrowers are not likely to be suspected of non-compliance with the commitments made to the bank. In fact, all 15 borrowers have honored their credit repayment commitments.

Regarding liquidity, for the four borrowers who were targeted, the probability of defaulting on the loan was not met. These borrowers, with low liquidity, have finally achieved a good liquidity management.

In order to analyze the correlations at Bank 02, we will refer to tables 15a, 15b and 15c. This time, the RISC dependent variable was strongly influenced by the independent variables LIM and IND (2013 and 2014). In 2015, these variables were added and the variable VAIM.

In 2013, two categories of correlations can be identified: high and significant, respectively, reasonable and significant.

From the first category are:

- RISC – IND ( $r = 0,666$  and  $\text{Sig} = 0,000$ );
- TAIN – FOJU ( $r = 0,635$  and  $\text{Sig} = 0,001$ ).

In the second category it can be included:

- RISC – LIM ( $r = -0,462$  and  $\text{Sig} = 0,020$ );
- RISC – IMUT ( $r = -0,439$  and  $\text{Sig} = 0,028$ );
- RISC – RCOC ( $r = 0,471$  and  $\text{Sig} = 0,018$ );
- IND – CONS ( $r = -0,421$  and  $\text{Sig} = 0,036$ );
- IND – IMUT ( $r = -0,482$  and  $\text{Sig} = 0,015$ );
- TAIN – RCOC ( $r = 0,513$  and  $\text{Sig} = 0,009$ );
- IND – RCOC ( $r = 0,599$  and  $\text{Sig} = 0,002$ );
- GAR – SEAC ( $r = 0,553$  and  $\text{Sig} = 0,004$ );

In 2014, 12 correlations were identified, of which a high and significant correlation:

- RISC – IND ( $r = 0,775$  and  $\text{Sig} = 0,010$ );
- and 11 reasonable and significant correlations:
- RISC – LIM ( $r = -0,506$  and  $\text{Sig} = 0,010$ );
  - RISC – IMUT ( $r = -0,513$  and  $\text{Sig} = 0,009$ );
  - RISC – RCOC ( $r = 0,524$  and  $\text{Sig} = 0,007$ );
  - RISC – SEAC ( $r = 0,461$  and  $\text{Sig} = 0,020$ );
  - LIM – IND ( $r = -0,446$  and  $\text{Sig} = 0,025$ );
  - IND – CONS ( $r = -0,426$  and  $\text{Sig} = 0,034$ );
  - IND – IMUT ( $r = -0,541$  and  $\text{Sig} = 0,005$ );
  - IND – RCOC ( $r = 0,536$  and  $\text{Sig} = 0,006$ );
  - TAIN – RCOC ( $r = 0,479$  and  $\text{Sig} = 0,015$ );



- VAIM – IMUT ( $r = 0,407$  and  $\text{Sig} = 0,043$ );
- GAR – SEAC ( $r = 0,553$  and  $\text{Sig} = 0,004$ ).

In 2015, at Bank 02, there were two high and significant correlations:

- RISC – IND ( $r = 0,642$  and  $\text{Sig} = 0,001$ );
- TAIN – FOJU ( $r = 0,686$  and  $\text{Sig} = 0,000$ );

and 9 reasonable and significant correlations:

- RISC – VAIM ( $r = -0,402$  and  $\text{Sig} = 0,046$ );
- RISC – LIM ( $r = -0,424$  and  $\text{Sig} = 0,035$ );
- RISC – IMUT ( $r = -0,439$  and  $\text{Sig} = 0,028$ );
- RISC – SEAC ( $r = 0,529$  and  $\text{Sig} = 0,007$ );
- VAIM – IMUT ( $r = 0,407$  and  $\text{Sig} = 0,033$ );
- IND – IMUT ( $r = 0,429$  and  $\text{Sig} = 0,033$ );
- IND – RCOC ( $r = 0,432$  and  $\text{Sig} = 0,031$ );
- TAIN – RCOC ( $r = 0,407$  and  $\text{Sig} = 0,044$ );
- GAR - SEAC ( $r = 0,443$  and  $\text{Sig} = 0,004$ ).

During the entire lending period, at Bank 02, 5 highly correlated and significant relationships and 28 reasonably correlated and significant relationships were manifested. This large number of relationships, three times more relationships than those identified at Bank 01 (33:11), is an important argument to consider that Bank 02 has faced multiple problems in the area of credit risk.

The analysis at Bank 02 allows us to find that credit risk is influenced by 6 variables: LIM (the only variable found at Bank 01), IND, VAIM, IMUT, RCOC and SEAC. For analysis, the variable FOJU is also interesting, highly correlated and significant with the variable TAIN. Next, starting from the previous specification, we will refer only to the interpretation of the results that characterize the variables: WE, CONS, IMUT, SEAC and FOJU.

Regarding the VAIM variable, the negative Pearson coefficient recorded in the three years of lending is in line with our expectation. Of course, as I mentioned in the theoretical presentation of the variable VAIM, young borrowers are more risky than the old ones. This is the case of the borrowers  $l_{16}$ ,  $l_{17}$  and  $l_{24}$  (they are 7-9 years old). Contrary to the tests for evaluating the credit risk potential at Bank 02, old borrowers, aged between 14 and 17 years, had the greatest negative effects on the risk of repayment of the loan. This is the case of the borrowers:  $l_{25}$ ,  $l_{23}$ ,  $l_{20}$ ,  $l_{21}$  and  $l_{22}$ . Compared to these borrowers, Bank 02 showed a great deal of understanding and continued to finance them, although the borrowers had less and less liquidity and became more and more indebted.

Relations between CONS - IND and IMUT - IND show the expected negative sign. From the point of view of the CONS variable, the client advisors should have developed an intense and sustainable banking relationship. The latter characteristics were to favor information flows and allow the bank to collect and accumulate more private, confidential and publicly unavailable information. Although this phenomenon probably happened, we did not have the opportunity to obtain such information, the social contact did not serve to inform a good credit risk management. Our results confirm the hypothesis of the positive influence of the CONS variable on credit risk.

The variable IMUT presents, for the three years of lending, a negative Pearson coefficient (-0.439; -0.513 and -0.439), which allows us to appreciate that the relationship between client and borrower advisors has developed in a confident climate that plays a role important in repayment of loans. At Bank 02, in the context of mutual trust, the results indicate that 60% (15/25) of the borrowers repaid the loan in due dates.

Regarding the variables SEAC and FOJU, we consider that they are important determinants of credit risk. As our sample was heterogeneous at Banca 02 (industrial

companies - few - and service companies - more -, SA and SRL) the results seem to indicate the same risk profile and we do not accurately observe the sectoral effect on the probability of loan repayment.

During the lending period (2013 - 2015), at Bank 02, we identify, from the point of view of IND and LIM variables, the following situations for the 25 borrowers:

- 18 borrowers (72%) have a debt ratio of > 200% of which:
  - 7 borrowers (28%) are between 250% - 500%;
  - 5 borrowers (20%) are between 510% - 1000%;
  - 6 borrowers (24%) have a debt ratio greater than 1000%;

The average liquidity situation was:

- 12 borrowers (48%) between 0.50 - 1.00;
  - 6 borrowers (24%) between 1.01 - 1.50;
  - 5 borrowers (20%) between 1.51 - 2.00;
  - 2 borrowers (8%) over 2.00.

In our discussions, the client advisors identified 10 borrowers who in 2015 presented inability to repay the loan.

### **3. Conclusions**

The main aim of the case study was to know if the development of a relationship between the bank and the borrower could have an impact on the credit risk. In pursuit of this target, we wanted to clarify the validity of two hypotheses circulating in the banking literature. The first is based on reducing the information asymmetry that allows to mitigate the credit risk by developing the banking relationship. The second hypothesis is based on the tolerant behavior of the bank towards its old clients, to finance them even when they are in difficulty.

The results obtained by using the econometric model are confirmations that Bank 01 presents a behavior specific to the first hypothesis. This bank is concerned with reducing information asymmetry, meaning having as much information as possible in order to know in detail the ability to repay the loan by borrowers. Bank 01 is concerned with favoring the accumulation of private information so that, obviously, it can differentiate the good borrowed from the bad ones. Bank 01 practices a scoring model that will ensure a better assessment of the quality of borrowers and a reduction in the cost of repayment of the loan.

The results of the correlation of the variables at Bank 01 show that only in 2013 is a highly correlated and significant RISC - LIM relationship. More precisely, the probability of credit risk and this very low one came from a single variable, the liquidity of the borrowers. Compared with Bank 02 where credit risk, throughout the credit period, can be affected by 3 independent variables that use hard information (VAIM, LIM and IND) and two other independent variables that use soft information (IMUT and RCOC).

Bank 01, in its scoring model, proceeds to a quantitative evaluation based on the variables TAIN, VAIN, LIM, IND and GAR. Bank 01 operates with a precise assessment that will allow it a deep differentiation of the borrowers. Then, according to scores, it distributes loans in 3 categories: A, B and C. In the investigated sample it turns out that the majority are category A and B loans, 12 out of 15 borrowers.

Finally, we note that Bank 01 is interested in both ex-ante and ex-past evaluation. In the presented case study, the econometric model based on hard and soft information offers the bank the possibility of a much broader assessment of borrowers.

The second hypothesis is based on the idea that a bank is interested in tolerant behavior towards old borrowers who are in difficulty. Before concluding on this type of

behavior, we believe that the bank assumes the risk of repayment of the loan based on the information gains accumulated in a long-term banking relationship. In light of the information gains, the bank is prepared to finance the old relationships even if they are risky. Ultimately, the bank hopes that the exclusivity of the banking relationship will not have any impact on the possibility of repayment of the loan. Bank 01 has such behavior only with borrowers I1 and I3. They are borrowers who are part of category C, but they are borrowers who ultimately repaid the loan in full. This is how the situation is presented at the second bank.

Bank 02, contrary to the assessments made on the credit repayment capacity, although it found that the borrowers I25, I23, I20, I21 and I22 are heavily indebted and have low liquidity, continued their financing. In such a framework, a process of understanding between the bank and its client means on the part of the bank that it allows to increase the credit risk. It seems that Bank 02 did not operate with rigorous assessments regarding the credit repayment capacity. The econometric model signals to this bank that credit risk can be affected by 6 variables, including VAIM.

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## Areas of activity corresponding to CAEN codes

<b>CAEN Code</b>	<b>DENOMINATION</b>
011	Cultivation of non-permanent plants
012	Cultivation of plants from permanent crops
013	Cultivation of plants for propagation
155	Manufacture of dairy products
158	Manufacture of other food products
172	Manufacture of paper and cardboard articles
202	Manufacture of pesticides and other agrochemicals
204	Manufacture of soaps, detergents and maintenance products, cosmetics and perfumery
252	Production of metal tanks, tanks and containers; production of radiators and boilers for central heating
262	Manufacture of computers and peripheral equipment
266	Manufacture of equipment for radiology, electro diagnosis and electrotherapy
281	Manufacture of general purpose machinery and equipment
294	Manufacture of other machine tools
361	Furniture production
452	Maintaining and repairing vehicles
505	Retail trade of motor fuels
551	Hotels and other similar accommodation facilities
602	Television broadcasting activities