Liquidity and credit problems and the effect on the soundness of Tunisian groups (GDA)

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Liquidity and credit problems and the effect on the soundness of Tunisian groups (GDA[1])

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Abstract: Many failures in water distribution groups (GDA) have been induced. We will try through this research to explore the main sources of groups fragility. We will use as a sample, 10 commercial groups operating in The Tunisian territory. Our research covers a 10-year study period from 2011-2021. It discusses the relationship between liquidity risk and credit risk as well as the implications for the strength of GDA groups during the same period. Most academic research validates that credit risk and liquidity risk do not have a contemporary or temporally significant reciprocal relationship economically and the idea of the relationship between the two risk categories is positive and can amplify other risk categories.

***Keywords**:* GDA, drinking water distribution, liquidity and credit problems, solidity, Tunisian groups.

Introduction:

The success of any establishment, association or company becomes a major necessity structuring all the various internal and external systems. In the case of the GDA, the financial capital is 12m of debt in 2011, for this reason the credit risk is higher and that the natural and legal persons do not feel its obligations. According to Dangl and Al. (2004), high credit risk means that the leverage ratio is also higher. (Arnold and Al. (2017), then in this case the development group cannot cope with unforeseen problems with troubleshooting or hardware troubleshooting. The only solution taken by the government is to reappoint Mr. N. Mohammed under the general direction, who has the acquired and required qualities and the taste of initiative. Then , the group becomes more liquid and integrating the new technology for example, the installation of billing program in 2019 and photovoltaic panels in February 2021 but also, purification of water through a bleach pump. Curiously, we encourage the scientific sense of result in terms of studies of significance of liquidity risk and credit risk and these implications on the result or stability. Our sample consists of 10 agricultural development groups with the same field of commercial activity over a 10-year period (2011-2021). The information is rich and more varied in terms of the study of risk and credit risks and its implications for profitability. According to Saksonova and Al. (2012), Stability management began in the middle of XX century and at the end of the Bretton Woods system. Dalla Pellegrina and Al. (2011), Cevik and Teksov (2012), profitability is a performance term that is perceived in terms of stability or efficiency, Nguyen (2012), De Haas (2006), show that financial instability as a source of disruption to the financial system as a whole. Imbierowicz and Al. (2014), Bryant (1980), Diamond, (1997), show that borrower bankruptcies and massive withdrawals of funds are positively correlated. Battacharya and Al. (1987), Chari and Al. (2000), Morris (2000), CROCKETT, A. (2008), the increased need for capital implies a significant level of liquidity and credit risk. Pauzner (2005), Wagner (2009), Stuart and al. (2012), Gorton and Metrick (2011) RAPHAJL FRANCK, MIRIAM KRAUSZ (2007), liquidity has an impact on a credit problem. Ghenimi and Al. (2017), Deyong and Torna (2013), low equity and poor economic conditions capable of increasing risk. According to Brunnermeier and Al (2009), increasing capital funds can generate credit risks. Berger and Al. (2013), Vazquez and Federico (2015), explain that a higher level of liquidity and leverage ratio generates the bankruptcy of companies. According to Imbierowicz and Rauch (2014), ROA has a positive effect of 1%. According to Imbierowicz and Rauch (2014), Chari and Van Den End (2000), the joint presence of the two risks

[1] GDA: agricultural development group with the commercial mission of distribution of drinking water belonging to the Enweyl geographical area of the Tunisian delegation of Sidi Bouzid Bir Lhfay

threatens stability. So these two categories of risk play an important role for companies and banks as well as their stability. There are internal and external factors considered as basic variables. These variables are measured using the stabilization ratio, which measures the degree of insolvency. This ratio is defined as follows:

$$Z - \text{score} = \frac{(U + K)}{\sigma}$$

The degree of insolvency is influenced by liquidity and/or credit shock, According to Deg L'Innocenti (2018), the global crisis of 2007-2008 greatly influences the stability of banks. Walke and Al. (2018), confirm that financial crises have led to the revision of the quality of corporate governance. Some measures support board failures (Chari (2000)). Executive discipline can have the insertion of risk series and financial instability. To cope with the distress of private debt in times of crisis, debt has become a major political issue in many emerging market economies (Borio Ten (2010)), According to Cornett and Al. (2011), since the recent global crisis, policies have affected the outcome and stability of financial service providers (Acharya and Al. (2016). Inclusion contributes the stability of banks, the various empirical tests show the importance of ensuring financial inclusion since such a policy is well appreciated for the stability of environments (Andrea and Al. (2002). For this, we must clarify our research problem, which consists in having:

• What's the nature of the relationship between liquidity and credit problems, in the case of GDA?

• Does liquidity or credit problem have an effect on the result?

After finishing our research problems, we must proceed to evaluate the various hypothesis:

• H1: The relationship between liquidity and credit problems is a positive one, Ameni et Al. (2017).

• H2: Liquidity or credit problem with an effect on the stability of GDA, Ameni et Al. (2017).

1- Methodology:

a- Modeling of liquidity and credit problems:

We use the model of Love and Zicchino (2006), using the simultaneous equation, which consists in expressing the liquidity problem as a function of credit and vice versa by the method of generalized moments:

$$PC_{i,t} = C + \beta_1 PL_{i,t} + \sum_{j=1}^{J} \beta_j Groupe_{i,t}^{j} + \sum_{l=1}^{L} \beta_l Macro_t^l + \varepsilon_{i,t}$$

$$PL_{i,t} = C + \beta_1 PC_{i,t} + \sum_{p=1}^{P} \beta_p Groupe + \sum_{q=1}^{Q} \beta_q Macro_t^q \varepsilon_{i,t}$$

With i = 1, 2, 3,… N is the banking individuals and t = 1, 2, 3,... T is the period of time. PL and PC are respectively the problems of liquidity and credit. $\sum_{p=1}^{P} \beta_p Groups$, all internal variables, $\sum_{q=1}^{Q} \beta_q Macro_t^q$, the set of control variables. $\sum_{q=1}^{Q} \beta_q Macro_t^q$, $\varepsilon_{i,t}$, is the error term.

b- Modeling the stabilization function:

Our study consists in the expressing in the second place the function of stabilization according to liquidity and credit problems by the method of (GMM), the specificity of this model is that of Imbierowicz and Rauch (2014):

$$Z - score_{i,t} = \beta_0 + \beta_1 PL_{i,t} + \beta_2 PC + \beta_3 TE_{i,t} + \beta_4 FE_{i,t} + \beta_5 ROA_{i,t} + \beta_6 ROE_{i,t} + \beta_7 DS + \beta_8 Infl_t + \beta_9 PIB_t + \varepsilon_{i,t}$$

The Z-score function is expressed as a function of liquidity problem (PL) and credit problem (PC) and other control variables (TE, FE, ROA, ROE, DS) and finally by the external variables the rate of inflation, and the rate of real GDP growth.

2- Descriptive data and statistics:

The objective of our study is to determine the effect of liquidity and credit problems on the stability of GDA Enweyl to do this, we selected a sample of 10

business groups. Since the GDA has a more efficient and methodical result, on the contrary the other group has the opposite result, over a period of 10 years from 2013 to 2021 based on Panel data. Imbierowicz and Rauch (2014), show that, the joint presence of liquidity and credit problems harmful to the stability of.

So these two categories play an important role. There are internal and external factors considered as explanatory variables, these variables are measured using a ratio, which measures the degree of insolvency. This ratio is noted as follows:

$$\mathbf{Z-score} = \frac{(\mathbf{U}+\mathbf{K})}{\boldsymbol{\sigma}}$$

With: U: return on assets (ROA). K: the capital ratio. : The standard deviation of ROA which is defined, as an indicator of the volatility of returns. When Z-score then increases the probability of bankruptcy decreases. Table 1 presents the different variables and their measures:

Table 1: Independent variables, sources and method of calculation.

Independent variables	Calculation method
PC	$\frac{\text{doubtful currency}}{\text{gross currency}}$
FE	(Total water quantity – Quantity of water distributed)*600 *100%
ROA	$\frac{\text{Net income}}{\text{Total assets}}$
ROE	$\frac{\text{net income}}{\text{equity}}$
TE	Ln(total assets)
PL	$\frac{\text{liquid assets}}{\text{Total assets}}$
DS	Ln(Quantity of water distributed-Quantity of water to be collected*600)
TNF	Consumer Price Index
TCPIB	Real GDP growth rate

From this Table 2, we find that the distribution of the variables studied is significantly dissimilar to the normal distribution, being that the majority of Skewness coefficients are different from zero but also, the Kurtosis indicator is greater than 3. This confirms that, the distribution is non-symmetric with the exception of the variable, inflation rate which is less than 3 which indicates that most variables have a non-symmetric distribution and a spread to the right.

Table 2: Descriptive statistics for variables.

	Obs N	Av	E.T	Sk	Kurt	J-B	Prob J-B
ZS	98	1.77E	1.665E+15	8.776610 04	76.01299	183300.58	0.000000
TNF	99	0.033450 40	0.008919 5	0.072254 92	1.956755	3.702385 3	0.12356935
TCPIB	100	0.020306 00	0.032153 7	-0.833512 87	3.592191	10.83414 9	0.00334446
FE	100	0.089407 6	0.210929 2	2.644809 94	19.45545	985.9651 6	0.000000
TE	100	15.00242 5	1.116988 5	-1.911228 46	5.831693	76.02660 9	0.000000
ROE	100	0.105592 0	0.277030 2	-3.133709 40	32.98196	3130.457 7	0.000000
ROA	100	0.132182 5	1.165284 2	0.024475 30	20.29732	997.3934 8	0.000000
PL	100	0.045111 3	0.098995 9	6.422239 20	47.94061	7282.419 9	0.000000
PC	100	0.112136 2	0.521191 2	5.811214 38 71	36.32148	4156.41456	0.000000
DS	100	0.028766 9	0.021463 3	2.148400 0	9.666378	209.6761 29	0.000000

Source: Output EVIEWS 10. E.T: denotes the standard deviation. J.B: refers to the Jarque-Bera normality test.

The evaluation of the correlation matrix makes it possible to demonstrate the existence of a multi-collinearity problem. From this table, we note that the relationship between the result and the liquidity

problem is positive (Allen (2010)). So the GDA is more liquid and so is the other group. But, taking into account the credit problems, the relationship is negative. This makes sense because of the economic situation of the state, as well as COVID 19 and purchasing power. The correlation coefficient between these two problems is 0.1158, which encourages an increasing relationship between risks. All correlation coefficients, less than 0.6, this indicates that there is a presumption of absence of multi-colinearity problems.

Tableau 3. : La matrice de corrélation

	Zscore	pl	pc	te	roe	roa	tnf	tcpib	fe	ds
Zscore	1.0000									
pl	-0.02235	1.0000								
pc	0.16628	0.1158	1.0000							
te	0.1506	0.0266	-0.2101	1.0000						
Roe	-0.07420	0.1494	0.0041	0.0433	1.0000					
Roa	-0.02978	-0.0685	-0.0164	-0.0962	-0.0458	1.0000				
Tnf	-0.1457	-0.0288	-0.0306	-0.0748	0.1869	0.0603	1.0000			
Tcpib	0.0894	0.1211	0.0093	0.0326	-0.1244	0.0638	-0.1437	1.0000		
Fe	0.0893	-0.2040	-0.3851	-0.2705	-0.0591	0.0507	0.0620	-0.1089	1.0000	
ds	0.0862	0.1614	-0.0424	0.0187	0.0893	0.0075	-0.1965	0.0270	-0.2507	1.0000

3- Results and Discussions:

a- The relationship between credit and liquidity problems:

The estimation of the simultaneous equation, for expressing the relationship between credit and liquidity problems in the following two tables: Table 4 presents, the relationship between credit as a dependent variable and liquidity as an independent variable.

Table 4. : Estimation of the simultaneous model

pc	Coef.	Std. Err.	z	P>|z|	[95% Conf. Interval]	
pl	.992827	1.661465	0.57	0.569	-2.157989	3.933643
te	-10.22606	3.922725	-2.61	0.009	-17.9621	-2.5550019
Roe	-.1443221	.4133547	-0.36	0.721	-.9629903	.64663462
Roa	-.000000	.0002588	-0.02	0.983	-.0009505	.00019302
Tnf	-3.532187	6.11554	-0.58	0.563	-15.57769	8.4759314
Tcpib	-3.090329	3.8214	-0.80	0.423	-10.61066	124.450001
fe	-.2180104	.05324	-4.24	0.000	-.3173722	-.1166485
ds	-.520117	.3554554	-1.69	0.092	-1.146084	.0858496
_cons	3.980	.9057784	4.39	0.000	2.204795	5.756525

Source : STATA output

We conclude, a non-significant positive relationship between the two said problems. Group size and credit problem are the variables that better explain the variability of credit problems, P>|z| < 1% (as a confidence threshold). A positive relationship, implies that an increase in the credit problem is associated with an increase in the liquidity problem (Alfred. Norman, David Shiner. (1994)). The impact of the positive relationship on development groups capable of amplifying categories of bankruptcy problems and consequently, the instability of Tunisian agricultural development groups.

b- The relationship between liquidity and credit problems:

A positive relationship between credit and liquidity problems does not always indicate the same relationship between liquidity and credit. Thus, it's necessary to express the relationship between liquidity and credit problems.

Table 5. : Model estimate (2)

pl	Coef.	Std. Err.	z	P>|z|	[95% Conf. Interval]	
pc	.005	.009	0.57	0.56	-.0127	.0231795
te	.005	.316	0.02	0.98	-.6153	.6255272
Roe	.153	.026	5.85	0.000	.101	.2046337
Roa	-.000	.000	-0.44	0.663	-.000	.0000561
Tnf	-.431	.47	-0.92	0.359	-1.35	.4897285
Tcpib	.485	.29	1.67	0.095	-.084	1.055626
fe	-.003	.004	-0.90	0.369	-.012	.0046579
ds	.014	.024	0.61	0.542	-.033	.063151
_cons	.080	.078	1.03	0.303	-.072	.2334182

Source : STATA output

The estimate in Table 5 shows a positive relationship between liquidity and credit problems. All variables are not significant except yield, solvency and size, which better explain the variability of the liquidity problem. We proceed to note that the positive relationship (Frank Knight (1993)) indicates that an increase in liquidity is associated with an increase in credit. The impact of the positive relationship on development groups makes it possible to amplify the categories of risk of bankruptcy and consequently, instability. And finally, allows us to validate our hypothesis indicates that there is a positive relationship between liquidity and credit problems (Adam and al. (2018)).

c- The effect of liquidity and credit problems on the soundness of the groups:

The estimation of this model consists in having the effect of liquidity and credit problems on the soundness of development groups in the following table:

Table 6: Estimated Z-score function.

Zscore |	Coef.	Std. Err.	z	P>|z|	[95% Conf. Interval]	
Lr |	29.9	53.02	0.56	0.572	-73.9	133.8721
Cr	-2.77	4.176*	-0.66	0.506	-10.9	5.409006
Car |	156	181.9702	0.86	0.390	-200.27	513.0904
Roe |	-9.72	14.22522	-0.68	0.494	-37.6	18.15124
Roa |	-.012	.0163	-0.80	0.427	-.045	.0190389
Tnf |	-155.7	209.3	-0.74	0.457	-566	254.6345
Tcpib |	71.16	133.9	0.53	0.595	-191	333.721
Tb |	2.03	2.0403	1.00	0.318	-1.*	6.038298
Tcp |	8.0	10.91	0.74	0.462	-13.	29.42031
_cons |	-15.8	36.6	-0.43	0.664	-87.	55.89487

Source : STATA output

Based on Table 3.10. We can say that the majority of parameters are non-significant, P>|z| > at 0.5%,1% and 10% respectively and with a strong dispersion.

The total of internal parameters and external variables never explain the variability of the solidity function of agricultural development groups. Thus, these results of Tunisian model of solidity is not good in the context of the Tunisian example. Ghenimi and Al. (2017), explain that the relationship between stability and liquidity problem is positive and negative regarding credit risk. This reasoning applies even to the context of Tunisian development groups. Kiema and Al. (2014), - Dominici Quint, Oreste Tristani (2017), negative credit risk makes it possible to increase the categories of bankruptcy. Our results suggest that when credit problems increase, strength decreases due to higher debt ratios due to higher demand for credit by groups (Holmstrom, Tirole (1998)). On the other hand, liquidity problems have a positive impact but statistically is not significant on stability (Berger, and Al. (2013)). This confirms that the most liquid agricultural development groups are also the most stable due to unusable resources and able to cope with unforeseen changes (Walke and Al. (2018). Liquidity allows banks to overcome unexpected problems and rebuild overall stability through liquidity adequacy. Therefore, this insignificant result is dependent on the sound management of liquidity risk by banks (Angelo, Andrea (2010) D. Easley, M. O'hara (2010).

Rashid and al. (2016), insufficient liquidity does not allow these groups to maintain soundness. In addition, as the positive coefficient of the parameters in terms of interaction seems to increase stability.

It can also be indicated that a liquidity or credit problem is capable of changing the result obtained and consequently an immediate or unforeseen effect on the merit of these development groups (Iqbal (2012)), D.P. Louzis, A.T. Vouldis, V.L. Metexas (2012)). These results support our hypothesis that:

A liquidity or credit problem has an effect on the stability of GDA, Ameni et Al. (2017).

Also, it is necessary to point out that the existence of GDA in our sample is necessary to overcome problems of some kinds. For our case study the GDA is even able to cover the liquidity and credit shortfalls of the other 9 groups because of the incomparable successes in terms of liquidity level.

4- Hypothesis testing

- Presence test of individual effects:

This test needs to validate the two following hypotheses:

H0: Absence of individual effects

H1: Presence of individual effects

According to this table, it is observed that Prob of F = 0.0016 < to 5%. So we reject H0, which confirms the absence of individual effects. The results of this test show the presence of individual effects. The second step is to model the existence of individual effects, in other words allows the determination of the model with or with fixed or random effect. - Test of specification of individual effects: Hausman test the prob of chi-2 is equal to 0.9756 > 5%. Thus, H0 is rejected and the model is randomly effected.

- Error autocorrelation test: DW test

The DW statistic is equal to 1.9073001 near 2. We can see the absence of the problem of autocorrelation of errors.

- Heteroscedasticity test:

Referring to the Breush-Pagan test to test heteroscedasticity. The prob>chi(2) = 0.0936, which is greater than 5%, so there is not a problem of heteroscedasticity of errors.

There are other factors having the basis of success, these factors are largely addressed in the conclusion by expressing the success factors of GDA under the leadership of Mr. N. Mohammed.

Conclusion:

To study the concept of the stability of development groups through the assessment of liquidity problems and its influence on this concept, which revives a positive impact of the liquidity problem and a negative impact of the credit problem. Also, it's necessary to point out that the existence of GDA in our sample is necessary to overcome problems of some kinds. In this case, the GDA is even able to cover the liquidity and credit shortfalls of the other 9 groups due to the incomparable successes in terms of technological integration, personal development and good management. These qualities are necessary in the progress of all economic entities.

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