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Credit Information, Guarantees and Non-Performing Loans

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Abstract. The aim of this paper is to study the effect of the credit quality information and the guarantees strength on the level of nonperforming loans in some MENA countries. To this end we apply a dynamic panel modelling and we use annual data which covers the period 2004-2011. The empirical results show that the information credit collected by the private or the public agencies affects negatively the level of nonperforming loans. The same result was found between the level of guarantees and the level of NPLs.

Key words: credit information quality, guarantees strength, nonperforming loans and MENA countries

I. Introduction

The banking activity is based on two main pillars: information and liquidity. The theory of financial intermediation earlier developed by Leland and Pyle (1977) and Diamond (1984) showed that if the information required by the financial institutions is not sufficient, several problems could occur. One of the major problems is the increase of the level of *bad* loans, also called the non-performing loans.

The literature on banking intermediation shows that the direct consequence of large amount of NPLs in the banking system generates bank failure. Given the severe impacts of NPLs on banks and the banking sector as a well, several studies have examined the determinants of the NPLs using either macroeconomic or microeconomic variables. For example, Cifter et al (2009) studied the impact of industrial production on the level of NPLs in the Turkish financial system over the period 2001-2007. Their results show that the level of economic activity, interest rates and total debt provide meaningful indicators for aggregate default. For a large panel of Italian banks over the period 1985–2002, Quagliariello (2007) finds that the business cycle affects NPLs. Regarding the microeconomic determinants of NPLs, Berger and DeYoung (1997) investigated the relationship between loans quality, cost efficiency and bank capital and found of a negative relationship between non-performing loans and cost efficiency. In another study, Salas and Saurina (2002) found a negative relationship between bank size and NPLs with more diversification opportunities for the bigger size. From a data set comprising 500 banks from 2005 to 2007, Shehzad *et al.* (2010) found that ownership proxied by three levels of shareholding (10%, 20% and 50%) has a positive impact on the NPLs ratio when the level of ownership concentration is defined at 10% but a negative impact when the level of level of ownership concentration is defined at 50%. There are also some studies that combined macroeconomic and microeconomic variables to explain the level NPLs

(Salas and Saurina (2002), Dimirios *et al* (2012)). In this paper, we will contribute to the NPLs literature by using the classical macroeconomic factors (GDP and INF) combined with the information depth index and the guarantees strength. To the best of our knowledge, the present study is the first contribution associating these indexes along with micro and macroeconomic factors to explain the determinants of NPLs. In general, the loans' quality depends on two dimensions: information collected and guarantees required. In this line of idea, sufficient information related to the borrower and sufficient guarantees could improve the quality of loans. To verify this idea we use data of 9 MENA countries observed during the period of 2004-2011 and we perform dynamic panel data estimation. Our main results show that the information collected by the private or public agencies affects negatively the level of nonperforming loans. Similar result was found between the level of guarantees and the level of NPLs.

The reminder of the paper is as follows. Section 2 presents statistics about information depth index and guarantees strength in MENA countries. Section 3 presents data and methodology; section 4 provides empirical results and finally section 4 concludes.

II. Empirical illustration

I. Data and Methodology

To test the relationship between credit information depth, guarantees strength index and the level of nonperforming loans, we use data for 9 MENA countries i.e. Tunisia, Saudi Arabia (KSA), Egypt, UAE, Morocco, Lebanon, Jordan, Kuwait and Oman. Time span is annually and it covers the period 2004-2011¹. For panel studies, academicians and researchers used to employ the basic fixed and/or random effects models. However, these techniques may provide inconsistent results especially when the regressors are correlated with the lagged

¹ Unfortunately data is not available for the other MENA countries and this is the longest available data.

dependent variable to some degree. To resolve this problem, Arellano and Bond (1991) introduced a new method which consists on differencing all regressors and employing Generalized Method of Moments (Hansen, 1982). This technique has generated a great attention by econometricians and it was further developed by Arellano and Bover (1995), Blundell and Bond (1998), and Hsiao, Pesaran, and Tahmiscioglu (2002). To sum up, we can classify these techniques into two approaches that differ in terms of the way that the individual effects are included in the model: the differencing GMM (DGMM) and the system GMM (SGMM). According to Bond, 2002; Roodman 2006 and Baum, 2006; the SGMM output is more consistent than DGMM in variables that are “random walk” or close to be random-walk variables. Therefore, as our model specification contains some macroeconomic variables which are known in economics for the presence of random walk statistical generating mechanisms, the SGMM approach seems to be the more appropriate choice (Efendic *et al.* 2006). The econometric model can be written as follows:

$$NPLS_{i,t} = \beta_1 NPLS_{i,t-1} + \beta_2 X_{i,t} + \beta_3 M_{i,t} + \varepsilon_{i,t} \quad (1)$$

X: is the matrix of bank specific variables, M is the matrix of macroeconomic variables. The extended form of equation 1 is:

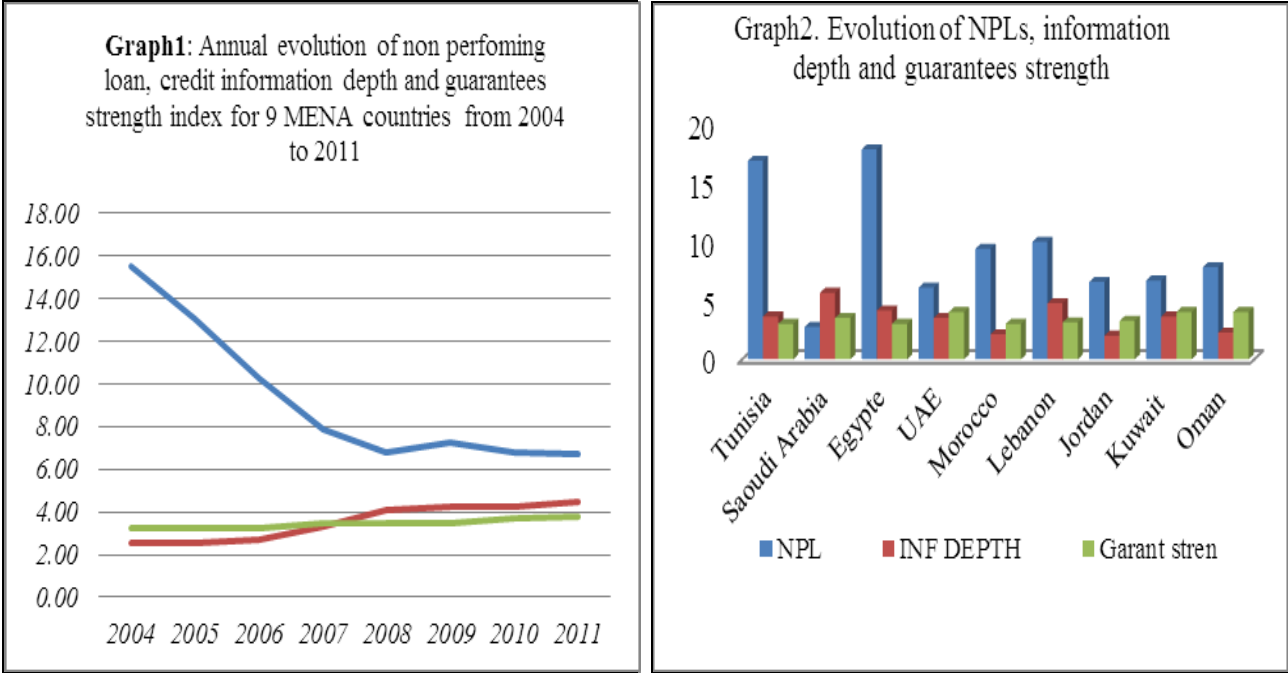
$$NPLS_{i,t} = \beta_1 NPLS_{i,t-1} + \beta_2 IPI_{i,t} + \beta_3 IGS_{i,t} + \beta_4 PRAG_{i,t} + \beta_5 PUAG_{i,t} + \beta_6 UNEMP_{i,t} + \beta_7 FLIB_{i,t} + \beta_8 GDP_{i,t} + \beta_9 INF_{i,t} + \varepsilon_{i,t} \quad (2)$$

Where:

NPLs, is the level of non-performing loans; NPLst-1 is the lagged non-performing loans to account for the accelerator effect IPI is the index of credit information depth which takes a value of 0 for a weak index and 6 for a high level. IGS is the index of guarantees strength; it takes the value of 0 for a weak index and 10 for a high level. PRAG is private credit agencies. PUAG refers the public credit agencies. UNEMP is the Unemployment rate while FLIB refers to the date of the financial liberalization which is a Dummy variable which

takes 0 before and 1 after the Liberalization; GDP is the Growth rate of real GDP per capita and finally INF is Inflation rate is the increasing rate of CPI. The data was collected from the World Bank world economic indicators (WDI 2013) except for liberalization².

The Figures below gives a look at the evolution of the non-performing loans and the indexes of information depth and Guarantees strength for the 9 countries.



Source : WDI 2013.

As we can see in Figure 1, the curves of the nonperforming loan and the information depth and guarantees strength have opposing trends (aggregated level). This may reflect the causality between the three indicators. In this sense, the more information depth and the guarantees strength indexes improve, the more the nonperforming loans decrease. From Figure 1, we can divide the evolution into two periods: 2004-2007 and 2007-2011. During the first period we can see a significant downward trend of the non-performing loan combined with an improvement of the indexes of credit information depth and the guarantees strength.

² This variable takes 0 before liberalization and 1 after liberalization

The value³ of nonperforming loans crossed shifted from 15.52% in 2004 to 6.71% in 2011. Furthermore, the values of credit information depth and guarantees strength have moved from 2.56% in 2004 to 4.44% in 2011 for the first indicator and from 3.22% in 2004 to 3.78% in 2011 for the second. During the second period, we can see that the level of non-performing loans continue to decrease but at a low pace compared to the first period. Similarly, the indexes of credit information depth and guarantees strength improved slightly. This slow pace is mainly caused by the global financial crisis and the European debt crisis which affected severely the economies of MENA countries.

The Figure 2 illustrates the evolution of the three indicators for each country. Egypt and Tunisia have the highest level of non-performing loans which is 17.75 and 16.775 respectively while Jordan and Oman have the weakest index of credit information depth; 2% and 2.25% respectively. In the other hand, Saudi Arabia appears to be the country with the weak level of nonperforming loans with an average 2,737% during 2004-2011. KSA has the also the most important index of information depth (5,625%).

Jordan and Kuwait are the two countries that require a high level of guarantees to cover the credit risk. The average level of guarantees strength index for those countries is 3.66% and 3.77% respectively. Tunisia, Saudi Arabia and Egypt did not require high level of guarantees as they have the same level (3.22%).

To sum-up, according to the three indicators (NPL, INF DEPTH and GUARANT STREN), we can classify Egypt and Tunisia as the countries having the worrying value and KSA with the most satisfactory value.

³ Values are calculated according to the mean of the 9 countries.

II. Results

We start this section by analyzing the descriptive statistics of the different variables. The results are displayed in Table 1.

Table 1: Descriptive statistics

| Variables | Obs. | Mean | Std. Dev. | Min. | Max. |
|-----------|------|----------|-----------|------|------|
| NPLs | 72 | 9.288889 | 6.421082 | 1.4 | 27.8 |
| IPI | 72 | 3.513889 | 1.556387 | 1 | 6 |
| IGS | 72 | 3.430556 | 0.624079 | 2 | 5 |
| PRAG | 72 | 5.984722 | 9.141419 | 0 | 31.2 |
| PUAG | 72 | 5.051389 | 6.935376 | 0 | 27.3 |
| UNEMP | 72 | 8.061111 | 4.294791 | 1.3 | 18 |
| FLIB | 72 | 0.666666 | 0.474712 | 0 | 1 |
| GDP | 72 | 4.852031 | 3.106023 | -5.2 | 12.8 |
| INF | 72 | 5.016667 | 3.743577 | -0.7 | 18.3 |

The descriptive statistics show that the mean of non-performing loans in MENA countries is about 9.28%. In 2009, Egypt had the maximum value of 27.8% while Saudi Arabia had the minimum level (1.4%).

The average value of the index of credit information depth is 3.51%. For the index of guarantees strength, the maximum value is 5% and the minimum is 2. We should note that all the 9 countries have not reached yet neither the maximum value of IGS which is 10 or the min value 1. For the macro variables, we have the mean value of GDP per capita is around 4.85% with a satisfactory level of 12.8% (Oman on 2008) and a min value of -5,2% (Kuwait on 2009). The mean level of inflation in MENA countries is 5.01% with a min value of -0,7% and max value of 18,3% (Egypt on 2009). Based on these statistics, we can say that the MENA countries are requested to improve more the credit quality information and to require

appropriate guarantees. Moreover, they need some effective policy responses to stabilize their macroeconomic sector. These actions combined with an efficient prudential regulation would decrease further the level of nonperforming loans.

As presented in Table2, the level of correlation between the different variables is very weak except for the relation between FLIB and UNEMP (49.99%). This reflects the absence of multicollinearity between the variables. Further, the correlation matrix shows that IPI, IGS, PRAG, PUAG and GDP act negatively on the NPLs. The UNEMP and FLIB variables are correlated positively with the dependent variable.

Table 2: Correlation Matrix

| Variables | NPL | IPI | IGS | PRAG | PUAG | UNEMP | FLIB | GDP | INF |
|-----------|---------|---------|---------|---------|---------|---------|---------|--------|--------|
| NPLs | 1.0000 | | | | | | | | |
| IPI | -0.2845 | 1.0000 | | | | | | | |
| IGS | -0.3422 | -0.0135 | 1.0000 | | | | | | |
| PRAG | -0.3402 | 0.4409 | 0.3288 | 1.0000 | | | | | |
| PUAG | -0.0294 | 0.0703 | 0.0342 | -0.3354 | 1.0000 | | | | |
| UNEMP | 0.4064 | -0.1358 | -0.6390 | -0.5038 | 0.1840 | 1.0000 | | | |
| FLIB | 0.1928 | -0.2033 | -0.3169 | -0.3475 | 0.1216 | 0.4999 | 1.0000 | | |
| GDP | -0.1198 | -0.2222 | -0.0170 | -0.1871 | -0.1043 | -0.0753 | -0.0439 | 1.0000 | |
| INF | 0.0419 | 0.1426 | -0.0755 | -0.0243 | -0.031 | 0.0472 | 0.1617 | 0.2088 | 1.0000 |

The results of the model are presented in Table 3. They show that the coefficient of the NPL_{t-1} is negatively and significantly correlated with the dependent variable (NPL). This means that the level of NPLs at the current year (t) is negatively associated with its level of the previous year (t-1).

Table 3: System GMM Model

| Variables | Coef. | Std. Err. | Z | P> z |
|--------------|----------|-----------|-------|----------|
| NPLs L1. | -0.6215 | 0.0910 | -5.86 | 0.000*** |
| IPI | -0.1418 | 0.9577 | -0.21 | 0.445 |
| IGS | -0.3222 | 3.2 120 | -0.28 | 0.315 |
| PRAG | -0.1465 | 0.1979 | -3.14 | 0.314 |
| PUAG | -0.0522 | 0.1351 | -0.58 | 0.563 |
| UNEMP | 0.1296 | 0.584 | 0.49 | 0.658 |
| FLIB | -1.8995 | 1.6891 | -3.22 | 0.052* |
| GDP | -0.5427 | 0.1875 | -5.55 | 0.002** |
| INF | 0.4257 | 0.9658 | 1.12 | 0.000** |
| CONS | 0.13661 | 2.2215 | 2.32 | 0.045* |
| F test (1) | 12.81*** | | | |
| Hansen test | 26.15 | | | |
| AR(1) test | -3.11** | | | |
| AR(2) test | -0.881 | | | |
| Observations | 72 | | | |

***, **, * significant respectively at 1%, 5% and 10%,

The main variables of our study (IPI, IGS, PRAG and PUAG) exert a negative effect on the level of NPLs. This finding is not surprising as it is rational that sufficient credit information help bankers to take the right decision of granting credits which in turn would reduce the level of non-performing loans. Further, the more the level of guarantees is high the more the probability of reimbursement increases. In the same line of idea, the diffusion of the credit information by private or public agencies allows banks to collect the maximum of information about the borrowers. If the information asymmetry (adverse selection) is reduced, banks can make a proper credit decision as they will be able to distinguish between *good* and *bad* borrower.

The results reveal that these variables (IPI, IGS, PRAG and PUAG) did not have significant effects on NPLs. Therefore, all the 9 MENA countries of our study are requested to improve the index of credit information depth and to require more sufficient guarantees and to establish more private or public credit agencies.

Our findings show a negative and significant relationship between FLIB and NPLs. Contrary to recent theoretical and empirical literature demonstrating the negative impact of financial liberalization (FLIB) on economic growth; financial liberalization reduced the non-performing loans in MENA countries. It is worth mentioning that the liberalization program (also called the Structural Adjustment Programs), was implemented gradually in these countries. The progressive reforms helped MENA countries escaping from banking and financial crises and allowed banks to improve their balance sheet by diversifying their activities. This diversification helped banks to improve the classification of loans and minimize the risks. Further, as liberalization intensified competition between banks, these institutions were forced to improve their risk management efficiency and adopt sophisticated technologies which in turn have reduced the level of non-performing loans.

Turning now to the macroeconomic factors, our results show that the per capita GDP is correlated negatively and significantly with the level of NPLs. This result is consistent as the NPLs are negatively affected when the economy is in recession. Our findings are similar to Salas and Saurina (2002), Bangia and *al.*, (2002); Carey, (2002). Regarding inflation rate, it exerts a positive and significant effect on the level of NPLs. Previous studies have demonstrated a positive relationship between inflation and the profitability of banks. A high rate of inflation is generally associated with a high interest rate and therefore an important income for banks. (Hamdi *et al* (2013)). Nevertheless, a high level and unanticipated inflation leads to increase the financial expensive of the borrower which became unable to refund his debt. Consequently the level of nonperforming loan increases. Finally, the result shows the

positive linkage between unemployment rate and the level of NPLs. This result is not surprising as (new) unemployed people are no longer capable to pay their debt.

III. Conclusion

The main purpose of this paper is to test for the possible relationship between credit information quality, guarantees and the level of nonperforming loan for a sample of nine MENA countries by the mean of a dynamic panel data modelling. The empirical results show that the information credit collected by the private or the public agencies affects negatively the level of nonperforming loans. The same result was found between the level of guarantees and the level of NPLs. This finding indicates that the MENA countries are requested to collect more credit information on their borrowers to reduce the level of nonperforming loans. Further, banks in MENA region should require more guarantees to minimize the risk of insolvency. We also found that financial liberalization acts negatively and significantly on the level of nonperforming loans. For the macroeconomic variables, we find that per capita GDP is correlated negatively and significantly with the level of nonperforming loans while inflation acts positively and significantly the level of NPLs.

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