



Determinants of nonperforming loans in the Southern Mediterranean countries

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Abstract

The main aim of this paper is to examine the determinants of financial soundness indicators (non-performing loans) of the banking system. There are several factors that lead to the growth or decline of non-performing loans, such as macroeconomic variables. This study uses a sample of six out of ten countries of the Southern Mediterranean (Tunisia, Morocco, Egypt, Lebanon, Jordan and Turkey) that were analyzed over the period of 2000 to 2012. Our result shows that the non-performing loans negatively depend on the nominal exchange rate, the consumer price index and the gross capital formation.

Keywords: Banking Sectors; Macroeconomic Determinants; Non-Performing Loans.

1. Introduction

The negative effects of the global financial crisis on the southern countries of the Mediterranean helped to demonstrate that the external funding sources can induce macroeconomic instability contexts to the difficulty of combining the autonomy of the monetary policy and the stability of the exchange rate, hence the risk of financial system vulnerability of these economies.

Therefore, whenever financial vulnerability is examined, the main emphasis is placed on the levels of non-performing loans. The NPL in the southern countries of the Mediterranean are increasing with an alarming rate each year (World Bank). Therefore, the main aim of the current study is to analyse the relationship between the ratio of non-performing loans (NPL) and the macroeconomic sector variables to assess the vulnerability of the banking sector.

The non-performing loan is an indicator of financial stability, as it reflects on the quality of the assets, credit risk and efficiency in the allocation of resources to productive sectors. The credit quality of the loan portfolio in most countries remained relatively stable until the financial crisis hit the global economy in 2007-2008. The average quality of the bank assets deteriorate sharply due to the global economic recession.

Common exposure to macroeconomic risk factors across banks is a source of systemic risk that influences the quality of a loan portfolio, which can be expressed as the ratio of non-performing loans to total gross loans. An increasing ratio may be a signal of deterioration in the banking sector results. In theory, we would expect the risk of credit expansion and the non-performing loans to a total loan (NPL) ratio to be procyclical within an economic cycle (Schinasi 2005).

The deterioration of the quality of the loan portfolio was the main cause of problems in the banking systems, and asset qualities are often associated with the presence of bankruptcy risk and financial crisis in both developed and developing countries. Non-perform

ing loans are among the main causes of economic stagnation problems (Nkusu, 2011). The presence of these loans causes a problem in the financial sector and increases the possibility of difficulty and unpredictability in the company.

The transition economies shared a common problem: their banking sectors in the early 1990s were characterized by a relatively small number of large state-owned institutions that had become burdened by large volumes of non-performing loans. We can point to two reasons for this: first, these countries had to deal with the issue of a large amount of inherited NPL from the past, and second new NPLs mounted up in the balance sheets of commercial banks due to a lack of experience, government intervention, inappropriate incentives for bank management and poorly designed privatization methods (Mejra Festic 2009).

2. The empirical literature overview

In recent years, the literature examining the non-performing loans (NPL) has attracted the attention of several researchers especially given the interest in understanding the factors responsible for the financial vulnerability.

There are many empirical literatures on macroeconomic factors that influence the non-performing loans (NPLs). These macroeconomic variables are the annual GDP growth, unemployment rates, real interest rate, money supply, inflation rate, per capita GDP, CPI, the index of stock prices, FDI, exports and the real exchange rate.

Table 1: The empirical literature Overview

Author(S)	Methodology and economies	Results
Faward A and Taqodus B (2013)	The authors used time series data to nine macroeconomic variables (annual growth in GDP, unemployment rates, real interest rates, inflation, the CPI, the real effective exchange rates, exports, industrial production and FDI) over the 1990-2011 period in the case of Pakistan.	The application of OLS for macroeconomic variables suggests that GDP growth, interest rates, inflation rates, the CPI, exports and industrial production are significant with non-performing loans, while three variables (unemployment rate, the real effective exchange rate and FDI) are insignificant associated with non-performing loans.
Peter Palogh (2012)	The author used Panel data to estimate the impact of the macroeconomic environment on two indicators (nonperforming loans to total gross loans and the ratio of assets of bank capital) of the banking system from 27 countries of the European Union.	The empirical analysis of banking systems in the EU reveals a strong correlation between economic trends and financial soundness indicators. This highlights the interdependence of the need for cooperation between financial supervision and economic policy that can lead to a reduction of systemic risk.
Nir Klein(2013)	The author examined the non-performing loans in Central Eastern and South Eastern Europe in the period 1998- 2011. The base includes four explanatory variables at the bank (ratio of equity to asset funds, equity returns, asset ratio of loans and loan growth rates); three specific variables for each country (inflation, changes in the exchange rate vis-à-vis the euro, and the unemployment rate changes) and two global variables (GDP growth and the S & P 500).	The results confirmed that the NPLs were found to respond to macroeconomic conditions such as GDP growth, unemployment and inflation. The analysis also indicated strong feedback effects of the banking system on the real economy.
Dimitrios P. Louzis, Angelos T. Vouldis, Vasilios L. Metaxas (2011).	The authors applied the methods of dynamic panel data to examine the determinants of non-performing loans in the Greek banking sector.	The authors concluded that macroeconomic variables, including GDP growth rates, unemployment rates, lending rates and public debt have a significant impact on NPLs.
Ali Shingjergji (2013)	The author studied the relationship between non-performing loans and GDP, inflation rate, unemployment rate and the interest rate using a simple regression model for the case of Albanian.	The regression analysis indicated a positive relationship between GDP growth, the exchange rate Euro / All and the ratio of nonperforming loans. This result shows that over 50% of loans in the Albanian banking system are in Euro.
Carlos Andres Olaya Bonilla (2012)	This research studies the macroeconomic determinants of non-performing loans in Spain and Italy for the period from January 2004 to March 2012. The macroeconomic variables are credit growth, wages, inflation, unemployment and GDP.	The author found that the five independent variables which used, only unemployment, wages and GDP, are statistically significant.
M, Farhan. A, Sattar. A, H, Chaudhry. F, Khalil (2012).	The regression analysis was performed to analyze the impact of the end of the independent variables (the interest rate, the energy crisis, unemployment, inflation, GDP growth and the exchange rate) on non-performing loans of the banking sector of Pakistan.	The authors showed that the interest rate, the energy crisis, unemployment, inflation and the exchange rate have significant positive relationships with non-performing loans in the banking sector of Pakistan, while GDP growth has a significant negative relationship.
Roland Beck, Peter Jakubic, et Anamaria Piloiu (2013).	The authors studied the macroeconomic determinants of non-performing loans of 75 countries over ten years on a panel data. In the econometric models used for this analysis, the real GDP (measure of macroeconomic performance), the nominal effective exchange rate, the interest rate loans, stock prices and credit of all stocks are considered determinants of nonperforming loans .	Econometric analysis suggests that real GDP growth was the main determinant of nonperforming loans. The authors showed that evaluation of the overall risk of asset quality and credit in the financial sector are important elements of macroprudential supervision.
Mejra Festic, Alenka Kaviller, Sebastijan (2011)	The authors studied the macroeconomic sources of systemic risk in the banking sectors of the five new members of the EU. The authors applied the Panel regression method using the export of goods and services, real GDP, fixed capital formation, FDI, disposable income and compensation of employees, net foreign assets, the ratio of deposit loans, the ratio of asset loans and the basic principles of Bale. They used a panel regression with fixed effect and random effect for the analysis.	The results indicate that FDI in financial intermediation contributes to worsening of non-performing loans. Gross capital formation contributed to the GDP growth and a reduction in bad debts, export growth and industrial production has a direct effect on the sustainability of the results of the banking sector in these countries.

3. Data and methodology

The data set, which consists of a group of six countries of the Southern Mediterranean, is based on the annual frequency for the 2000 -2012 period and collected from the World Bank.

To evaluate the non-performing loans to total loans based on a series of macroeconomic variables, the model is given as:

$$NPLit = \alpha_0 + \alpha_1 GDPit + \alpha_2 ICPit + \alpha_3 URit + \alpha_4 GCFit + \alpha_5 EXPit + \alpha_6 NERit + \alpha_7 FDIit + \alpha_8 DSit + \epsilon it$$

Where;

NPLit: is the rate of non-performing loans calculated as percent of the total volume, of loans granted in the respective country *i* at the moment *t*.

GDPit: is the annual growth rate of Gross Domestic Production the country *I* at the moment *t*.

ICPit: Indices of Consumer Prices in the country *i* at time *t*.

URit: is the annual average unemployment rate calculated as a percentage of the total labour force in the respective country *i* at time *t*.

GCFit: is the Gross Capital Formation (% of GDP) in the respective country *i* at time *t*.

EXPit: are the exports in the country *i* at time *t*.

NERit: is the Nominal Exchange Rate in the country *i* at time *t*.

FDIit: is the Foreign Direct Investment in country *i* at time *t*.

DSit: is the Deficit /Surplus in the respective country *i* at the moment *t*.

ϵit : stands for the estimation error.

$\alpha_0, \alpha_1, \alpha_2, \alpha_3, \alpha_4, \alpha_5, \alpha_6, \alpha_7, \alpha_8$ are the respective co-efficient terms.

The criteria of selecting these variables that empirically exist in the review found positive or negative influence of these variables on NPL and availability of data.

To explain the indicators of financial stability, we used the OLS regression in a general panel regression model. Thus, most of the existing studies have shown that OLS is an appropriate model to describe the determinants of non-performing loans (Faward A and B Taqodus (2013); Peter Palogh (2012); Shingjergji Ali (2013); Skarica Bruna (2013) Carlos Andres Olaya Bonilla (2012)).

The methods used in the various estimates that seek empirical evidence of a relationship between non-performing loans (source of systemic risk), and macroeconomic variables are: the analysis of co-integration, correlation and panel regression.

Before applying the OLS (Table 4), we begin our analysis with a complete description of all variables (Table 2). Then, we use the correlation matrix (Table 3) to check multicollinearity. The multicollinearity problem arises because of the high correlation between any explanatory variables. Two variables are positively correlated if their correlation coefficient is positive and vice versa.

4. Empirical results and discussion

Descriptive statistics is used to present quantitative description of different variables (dependent and independent), such as the mean and standard deviation presented in the following table;

Table 2: Descriptive Statistics

variable	Mean	Standard Deviation	Minimum	Maximum
NPL	12.51892	6.829041	2.5	29.3
ICP	6.816667	10.00276	-7	54.9
GDP	4.596154	2.894304	-5.7	9.4
UR	11.59067	2.686964	6.4	20
GCF	24.17949	5.497918	15	38
EXP	32.48718	11.91283	14	57
D/S	-4.355556	3.817118	-15	2.5
FDI	9.054806	1.561514	0	10.34335
NER	.8690435	1.403264	-.2006595	5.73

The descriptive statistics of the variables used in the empirical analysis is presented in Table 2. The Export and NPL variable present a very high disparity, since its minimum value stands at 2,5% and maximum at 29,3%. As far as GDP is concerned, there is a positive and negative value, indicating that, over the period 2000-2012, some countries showed a negative growth. Similarly ICP, nominal exchange rate and Deficit /Surplus, show a positive and negative value. Furthermore, FDI demonstrates a minimum of 0% and a maximum of 10, 34%. Finally, variable UR ranges from 6, 4% to 20 % and GCF from 15% to 38%.

In order to detect a possible relationship between the variables, we will present the various correlation coefficients in the following table to test the correlation between these variables.

Table 3: Correlation Matrix

VBs	NPL	ICP	GDP	UR	GCF	EXP	D/S	FDI	NE R
NP L	1.000								
ICP	0.04	1.0000							
GD P	-0.21	-0.08	1.0000						
UR	0.23* 38*	0.32 62*	0.29 25*	1.0000					
GC P	0.402 9*	0.34 63*	0.29 22*	0.18 20	1.0000				
Ex- port	0.075 7	0.19 25	0.10 27	0.41 67*	0.37 46*	1.0000			
D/S	0.059 6	0.14 94	0.17 98	0.01 89	0.23 22*	0.37 03*	1.0000		
FDI	0.092 4	0.07 66	0.20 32	0.33 60*	0.15 16	0.11 36	0.14 46	1.0000	
NE R	0.114 6	0.14 60	0.07 57	0.26 31*	0.10 93	0.48 68*	0.49 47*	0.05 57	1.0000

According to the correlation matrix table, we see that the unemployment rate is positively correlated with the non-performing loans; this is also consistent with the findings of Nir Klein (2013), Carlos Andres Olaya Bonilla (2012), M Farhan. A Sattar. A, H, Chaudhry. F, Khalil (2012).

Table 3 also shows that the gross capital formation is negatively correlated with the non-performing loans, while other macroeconomic variables (GDP, nominal exchange rate, and exports, FDI, Deficit/Surplus and IPC) are insignificant.

To identify the determinants of non-performing loans, we used the panel fixed effect model. The following table summarizes the results of the estimated regression model is estimated using Ordinary least Square.

The table below shows that three macroeconomic variables (the index of consumer prices, the exchange rate and gross capital

formation) are significant with non-performing loans, while the other variables in our model (GDP, FDI, exports, unemployment and Deficit/Surplus) are insignificant.

There are direct links between non-performing loans and macroeconomic variables, the coefficient of determination (R-squared =0, 3181) shows that 31, 81% of the variation in the dependent variable (non-performing loans) can be explained by the model regression.

Table 4: Results of OLS

Variables	Co-efficient	Standard error	t-Statistic	propability
ICP	-.2499703*	.1476782	-1.69	0.096
GDP	.2308064	.363631	0.63	0.528
UR	.1695135	.3564118	0.48	0.636
GCF	-.7092265***	.1409328	-5.03	0.000
EXP	.1300535	.0877098	1.48	0.143
D/S	.2067832	.2070385	1.00	0.322
FDI	-.8612075	1.01332	-0.85	0.399
NER	.794426*	.4615228	1.72	0.090
Cons	31.65706	11.61474	2.73	0.008

R-squared = 0.3181
F statistic = 7.42
Prob(F-Statistic) = 0.0000

***significant at 1%

**significant at 5%

*significant at 10%

This estimate indicates that inflation adversely affects non-performing loans. Inflation can have a negative impact on the quality of bank assets in the case of developed countries and positive in the emerging economies of Latin America (Peter Palogh 2012).

Table 4 shows that if the consumer prices index grows by 1percent, non-performing loan's decrease by 0,24%. The results of OLS for the growth of the consumer price index are consistent with the findings of the existing studies (Peter Palogh (2012) Gungör Turan and Arjeta Koskija (2014); Skarica Bruna (2014)) which justify the negative relationship between non-performing loans and the CPI.

Regarding the exchange rate, we found a significant positive relationship with non-performing loans, which suggests that whenever there is a deteriorating international competitiveness of the national economy, the level of non-performing loan's increases. This seems to be consistent with the results of MunibBadar and Atiy javid Yasmin (2013); Tarron Khemraj and Sukrishnalall Pasha (2012); Shingjergji Ali (2013); M Farhan. A Sattar. A, H, Chaudhry. F, Khalil (2012).

According to previous studies, there is a significant negative relationship between non-performing loans and gross capital formation (Mejra Festic, Alenka Kaviller, Sebastijan (2011); Mejra Fistic (2009)). Similar to these studies, our results mean that the increase in gross capital formation is susceptible to cause a reduction in non-performing loan portfolios.

5. Conclusion

After assessing systemic risk and refining the impact of macroprudential policies to ensure financial stability, it is essential to identify the variables that can affect the non-performing loans for countries of the southern Mediterranean.

The banking system of the southern Mediterranean countries faces many challenges, such as problems caused by the economic crisis, revolutions (Tunisia, Egypt) moreover; the fact that banks are not cautious about providing loans resulted in an increase in non-performing loans (NPLs). These are the most important source of systemic risk in the financial system and the spread of macroeconomic contagion.

In this situation, the empirical results show that the consumer prices index, the exchange rate and gross capital formation are significant with non-performing loans, while GDP, FDI, exports, the rate unemployment and surplus / deficit treasure are insignificant.

To conclude, we can say that the banking system of the southern Mediterranean countries reveals a correlation between economic

trends and the indicator of financial soundness (PNP). This highlights the interdependence of the need for cooperation between financial supervision and monetary policy as a new space for reflection, which can lead to a reduction of systemic risk and therefore to financial stability.

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