

# **Nonperforming Loans in Albania**

**by**

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**Thesis submitted for the degree Master of  
Science**

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## **Abstract**

This thesis examines the continuous increase of nonperforming loans in Albania. The Albanian economy is facing many challenges since the collapse of the communism system. One of the main factors affecting nonperforming loans is global economic crisis of 2008. This uncertain macroeconomic environment in which this country currently is has directly affected the banking sector development. The other factor that has contributed in the increase of nonperforming loans is the decrease of incomes coming from emigrants. For this the variables taken in consideration as determinants of nonperforming loans are: real GDP; unemployment; inflation; loan interest rate and remittance. So this thesis is built on the hypothesis that the level of nonperforming loans depend on: real GDP; unemployment; inflation; loan interest rate; and remittance.

To show that there exists a long run relationship between nonperforming loans and all these variables is applied Johansen multivariate co-integration test. The data taken from Bank of Albania are calculated on quarterly basis from 2003 to 2013. From the Johansen co-integration test is concluded that nonperforming loans and the other five variables: GDP; unemployment; inflation; loan interest rate and remittance are co-integrated however, in the long run this is a weak co-integration.

**Keywords:** Nonperforming Loans, Real GDP, Unemployment, Inflation, Loans Interest Rate, Remittance, Co-integration Test.

## **Abstrakt**

Kjo tezë analizon rritjen e vazhdueshme të kredive të këqija në Shqipëri. Ekonomia e Shqipërisë është duke u perballuar me shumë sfida që pas rënies së sistemit komunist. Një nga faktorët kryesor që ka ndikuar në rritjen e kredive të këqija është kriza globale ekonomike që filloi në 2008. Ky ambient makroekonomik i paqëndrueshëm ka ndikuar drejt për së drejti në zhvillimin e sistemit bankar. Faktori tjetër që ka kontribuar në rritjen e kredive të këqija është rënia e të ardhurave nga emigrantet. Per keto arsye variablat që janë marr në konsideratë si percaktuese të kredive të këqija janë: PBB, papunësia, inflacioni, normat e interesit të kredive dhe remitancat. Pra kjo tezë ndertohet mbi hipotezën që niveli i kredive të këqija varet nga: PBB, papunësia, inflacioni, normat e interesit të kredive dhe remitancat.

Për të treguar që ekziston nje lidhje afatgjate ndërmjet kredive të këqija dhe të gjitha këtyre variablave është aplikuar Johansen multivariate co-integration test. Të dhënat janë marr nga Banka e Shqipërisë dhe janë llogaritur mbi baza tremujore. Nga Johansen multivariate co-integration test është arritur në përfundimin se kredit e këqija dhe pesë variablat e tjera: PBB, papunësia, inflacioni, normat e interesit të kredive dhe remitancat janë të ndërlidhura ndërmjet tyre, por në shtrirje kohore të gjatë kjo ndërlidhje është e dobët.

**Fjalët kyçe:** Kredit e Këqija, PBB, Papunësia, Inflacioni, Normat e Interesit të Kredive, Remitancat, Co-integration Test.

## **Acknowledgments**

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## **Declaration Statement**

1. The material included in this thesis has not been submitted wholly or in part for any academic award or qualification other than that for which it is now submitted.
2. The program of advanced study of which this thesis is part has consisted of
  - i) Research Methods course during the undergraduate study
  - ii) Examination of several thesis guides of particular universities both in Albania and abroad as well as a professional book on this subject.

Arjeta Koskija

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## **List of Abbreviations**

NPL: Nonperforming Loans

GDP: Gross Domestic Product

S.D: Standard Deviation

PROB: Probability

VAR: Variable

UN: Unemployment

INF: Inflation

INT: Loan Interest Rate

RE: Remittances

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## **Introduction**

A boom in lending activity has characterized Albania in these last 10 years. One of the main sources that promote economic growth for this country that has been in transition since 1900s are investments which are generally financed by crediting of banks. Financial institutions are playing an important role in the transformation of deposits into productive investments. Albanian banking system has made an extraordinary progress where now days there are operating sixteen private owned banks. In this situation it can be said that the banking system is one of the most developed sectors in the country but on the other hand even though there has been an increase in the level of banking intermediation this progress that has been made is not good enough compared with the other countries and compared with the standards that the country wants to achieve. The financial stability of Albania is being endangered by the increase of the overall level of the nonperforming loans. Nonperforming loans are the main causes of financial instability being in this way also the main cause of the start of crisis. A nonperforming loan can be defined as a loan which does not provide incomes anymore because the full payment of the principal and interest is not provided, the payment may be 90 or more days late and the maturity date has passed and the payment has not been completed. Nonperforming loans cause mismatches of maturities between assets and liabilities, they decrease profitability and increase liquidity problems so their continuous increase may bring banks to insolvency. Therefore, a low level of nonperforming loans means that there is a stable financial system while a high level of nonperforming loans means that the financial system of the country is not doing well. In Albania, all the three categories of nonperforming loans: substandard, doubtful and lost have been increasing. According to the latest survey of Bank of Albania on Lending activity in 2012 it can be seen that there has been a tightening of credit standards on all types of loans.

In the first period of transition the causes of nonperforming loans were mainly related with the inefficiency of state owned banks and enterprises but now the causes of the increase of level of nonperforming loans are related with the micro and macroeconomic environmental factors where banks operate. There are two main factors that have contributed in the increase of nonperforming loans in Albania: global economic crisis that directly affects GDP, unemployment and inflation of the country and the decrease of the incomes coming from emigrants. This increase of nonperforming loans shows that individuals and businesses have difficulties in making their payments and this increases the risk of the whole economic system of the country. Another factor that should be taken in consideration is that during the first years of transition the loans that were given were not well studied. A loan register did not exist just some years ago so banks gave more than one loan to the same individual or business even though they were unable to pay it back.

The study of nonperforming loans and the factors that has caused their increase is very important because in a situation where nonperforming loans are continuously increasing especially in a developing country like Albania they are the main obstacles of financial stability and economic growth so it is the main duty of regulators and policy makers to take immediate measures for the improvement of the situation.

After the introduction the rest of this thesis consists on: chapter 1 literature review; chapter 2 nonperforming loans in the region countries where there is explained and compared the situation of nonperforming loans in region countries with the situation of nonperforming loans in Albania; chapter 3 data and methodology where there is explained the variables and methodology used and also there is made an analysis on the results obtained and chapter 4 conclusions.

## **Chapter 1. Literature Review**

Recent studies especially Mwanza Nkusu (2011) has concluded that the linkages between nonperforming loans (NPL) and macroeconomic performance attributes to nonperforming loans a central role because a sharp increase of nonperforming loans cripples macroeconomic performance from several fronts. This sharp increase in NPL which weakens macroeconomic performance also activates a vicious spiral that exacerbates macro financial vulnerabilities. From another study carried out from Roland Beck, Petr Jakubik and Anamaria PiloIU (2013) was suggested that GDP growth is the main driver of nonperforming loans. Therefore a drop in global economic activity remains the most important risk for bank asset quality. At the same time, asset quality in countries with specific vulnerabilities may be negatively affected by additional factors. In particular, exchange rate depreciations might lead to an increase of nonperforming loans in countries with a high degree of lending in foreign currencies to unprotected borrowers. A drop in stock prices also negatively affects bank asset quality, for example, those countries with large stock markets relative to the economy.

Similarly another study made by Bruna Skarica (2013) concluded that GDP is the main driver of nonperforming loans and that the high levels of NPLs are the legacy of the crisis. The results of a study made by Nir Klein (2013) showed that the level of NPLs depends on macroeconomic conditions and banks` specific factors, particularly the results showed that the increase in the level of NPLs is caused by the increases in unemployment, depreciation of exchange rate and increase of inflation. The same result that the level of NPLs depends on macroeconomic variables and banks` specific factors was found also by another study carried out by Dimitrios Angelos and Vasilios (2011) which was a study made on Greek banking system. Abdelkader



Boundriga, Neila Boulila Taktak and Sana Jellouli (2014) also carried out a study to show the strong relationship that exists between nonperforming loans and bank specific variables and found out that higher capital adequacy and higher provisions are those bank specific variables that decrease the level of nonperforming loans. In Italy and Spain according to Carlos Andres and Olaya Bonilla (2012) it was concluded that macroeconomic variables are strong determinants of NPLs where the most statistically significant ones are unemployment and GDP.

Another study showed that the main contributors of the increase of the level of NPLs are some factors controllable by commercial banks and they are: the diversification of funds and weak credit analysis Evelyn Richard (2011). For developing countries it was specifically concluded that rapid growth of nonperforming loans causes: an increase of inflation, decline of economic growth, substantial depreciation of exchange rate, high budget and balance of payment deficit influencing the banking sector with increasing interest rate and money supply which reduces the repayment capacity of borrowers Munib Badar, Atiya Yasmin Javid and Shaheed Zulfiquar (2013). This malfunctioning of the banking sector which is directly related with its inefficiency of resource allocation destroys the real economic performance of a country. The level of NPLs in India according to Krishna Prasanna (2014) depends on macroeconomic variables and moreover from his results he showed that 52% of changes in NPLs is attributed to macroeconomic variables. In Romania was found that a strong correlation exists between NPLs and unemployment rate so when unemployment increased the level of NPLs increased too Iulia Iuga and Ruxandra Lazea (2012). In Kenya, Daniel Kwambai and Moses Wandera 2013 have concluded that credit information sharing and level of nonperforming loans are really related to each other. Credit information sharing plays a key role because it increases transparency among financial institutions, helps the banks lend prudently, decreases the risk level to the banks, acts as

a borrowers discipline against defaulting and it also reduces the borrowing cost. When the economic sectors grow, the level of lending to these sectors will also increase and in return the level of nonperforming loans tends to increase as the sector grows. The main factors that lead to bad loans in the bank are; lending to borrowers with questionable characters, serial loan defaulters, high interest rates that make it hard for some to pay back the loan, diversion of funds by borrowers. These causes make many borrowers not able to fulfill their obligations hence leading to many nonperforming loans and most of these factors are due to information asymmetry in the banking industry. Except information sharing as an important determinant of nonperforming loans in developing countries it was also concluded that corruption is an important factor that affects the level of nonperforming loans in these countries Fawad Ahmad (2013). This increase of nonperforming loans that is seen in many different countries is a very problematic issue because it leads to inefficiency of banking sector Linbo Fan, Sherill Shafer (2004) and Mohd Zain Abd Karim, Sok-Gee Chan, Sallahudin Hassan (2010).

## **Chapter 2. Nonperforming loans in other region countries: Italy and Greece**

### **2.1 Nonperforming loans in region countries**

The global economic crisis of the recent years is putting in danger the financial stability of many countries causing in this way an increase in the level of nonperforming loans also for other region countries. In Greece the economic crisis started in 2008 was concluded with the Greek government-debt crisis which was caused from:

- Government spending related with the financing of enormous military expenses.
- Public sector jobs and pension funds.
- Tax evasion and corruption related with misreported of the country's official economic statistics by paying Goldman Sachs and other banks to hide the actual level of borrowing of the country.
- Debt levels.
- The unsustainable and accelerating debt-to-GDP ratios causing high interest rate.

In Italy the economic crisis of 2008 came also as a result of some others economic policies implemented in this country in 2000s which consisted on:

- Deregulation process to reduce the state involvement in the economy with the aim of reducing corruption.
- The tripartite agreement to control power trade unions and the mechanism of wage collective bargaining as the main contributor of inflation.
- The start of a strong privatization process.

- The reduction of public expenditures and the introduction of labor flexibility.

All of these resulted in a negative economic performance with: income inequality, low wages, low consumption, low labor productivity, low competitiveness and low innovation.

The other factor affecting the levels of nonperforming loans in Greece and Italy is related with banks being not being careful when giving loans. In this case banks gave loans to individuals or business that could not pay back the loans.

In Greece nonperforming loans have affected more consumer and mortgage loans while in Italy nonperforming loans have affected more business loans.

## **2.2 Nonperforming loans in Albania**

In Albania the global economic crisis of 2008 was concluded with a weak economic growth of the country. This crisis that was spread through financial and current account channels hit harder those economic sectors that had the highest contribution in the economic growth of the country. Serious problems have been caused to the banking sector which is facing many risks because of this unstable macroeconomic environment. The main problem consists on the increase of nonperforming loans. According to majority of banks the level of nonperforming loans seems to be much higher than it is reported. Nonperforming loans have affected more business loans than consumer loans and business loans comprise more than 70% of the total lending activity in Albania. For the business loans the most problematic ones were those ones that were given to construction companies.

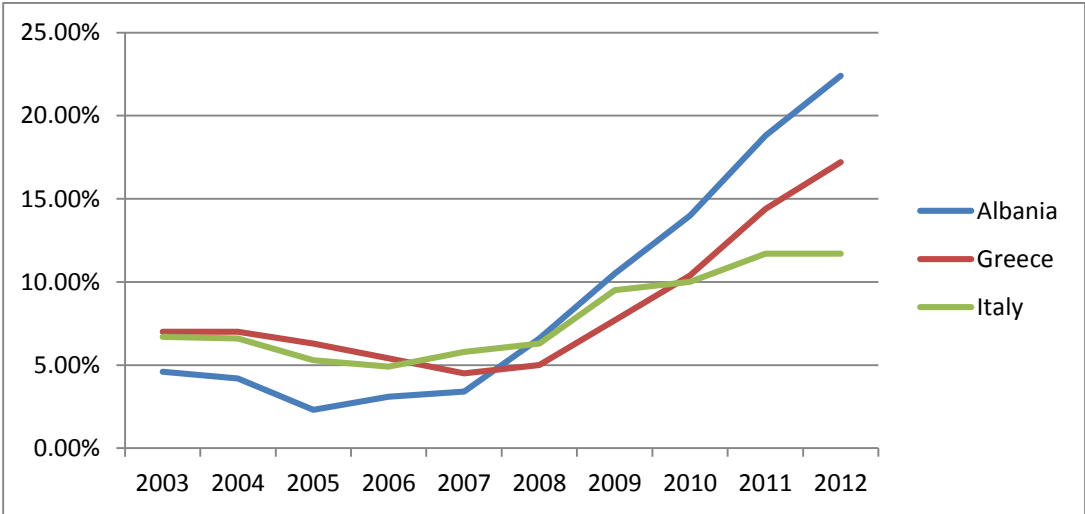
The second important factor that has contributed in the increase of nonperforming loans is the decrease of incomes coming from emigrants. This has caused problems to those people who pay

the loan in foreign currency because of depreciation on home currency. In the case of Albania it must not be forgotten also the fact of being a country in transition that have made it more difficult to deal with the situation of nonperforming loans in the first years of transition and which is having its consequences also now days.

What is worrying is that according to majority of banks the level of nonperforming loans seems to be much higher than it is reported and that according to them the situation will not get better in the short run.

### 2.3 Comparing nonperforming loans in Albania with those of region countries

**Graph 1.** Nonperforming loans in: Albania, Greece and Italy



It can be seen in the graph that in 2007-2008 nonperforming loans started to increase considerably for all these three countries: Albania, Greece and Italy. This period corresponds with the beginning of the economic crisis which is the main factors of the increase of nonperforming loans for all these three countries. After this the situation seems to be exact the

same for Albania, Greece and Italy. Nonperforming loans continued to increase reaching the highest values than they ever had in 2012:

1. In Albania nonperforming loans reached 22.4%.
2. In Greece nonperforming loans reached 17.2%.
3. In Italy nonperforming loans reached 11.7%.

## **Chapter 3. Data and Methodology**

### **3.1 Data**

In this thesis there are used five macroeconomic indicators to analyze the increase of nonperforming loans in Albania. These variables are: real GDP; unemployment; inflation; loan interest rate; and remittance. The data of these variables are calculated on quarterly basis from 2003 to 2013 and they are taken from quarterly reports of Bank of Albania.

Real GDP is negatively related with nonperforming loans. An overall increase of GDP brings economic development to a country so when it increases the level of NPL decreases.

Unemployment is positively related with nonperforming loans. An increase in the unemployment level means that there will be an increase in the level of people who cannot make the payments of the loans taken because of losing their jobs.

Inflation is positively related with nonperforming loans. An increase of inflation forces monetary regulators to increase interest rate to control inflation which means that there will be an increase in the cost of borrowing.

Loan interest rate is positively related with nonperforming loans because it means that the cost of borrowing will increase so people will have to pay more and they may not be able to make this payment if the loan interest rate increases.

Remittance is negatively related with nonperforming loans. A decrease in the incomes coming from emigrants causes a depreciation of home currency and those people who make the payments of their loans in dollars or euro so in foreign currency will have to pay more.

### 3.2 Methodology

The methodology used consists on applying Johansen Multivariate Co-integration Test and it is based on analysis of Hill (2008) that specifies the application of this test on a multiple regression to prove if there exists a long run relationship among variables.

So the model specification is:

$$Y = B_0 + B_1X_1 + B_2X_2 + B_3X_3 + B_4X_4 + B_5X_5 + U$$

Where: Y= Nonperforming Loans

B<sub>0</sub>= Intercept

X<sub>1</sub>= Real GDP

X<sub>2</sub>= Unemployment

X<sub>3</sub>= Inflation

X<sub>4</sub>= Loan Interest Rate

X<sub>5</sub>= Remittance

U= Random Error

$$\text{So NPL} = B_0 + B_1\text{Real GDP} + B_2\text{Unemployment} + B_3\text{Inflation} + B_4\text{Loan Interest Rate} + B_5\text{Remittance} + U$$

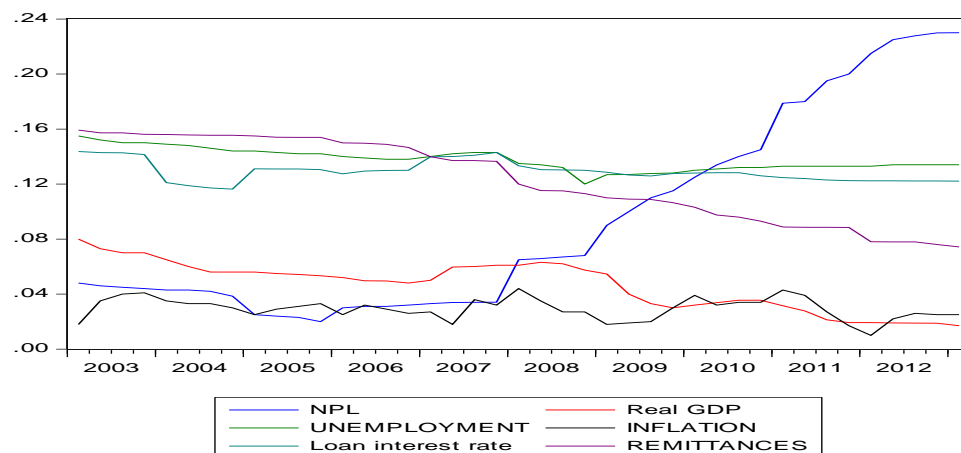
Firstly all the variables are tested if they have a normally distribution. A normal distribution means a symmetric distribution and it has a bell shape with a peakness leading to a Skewness of 0 and a tail-thickness leading to a Kurtosis of 3. If the Skewness is not near to 0 and Kurtosis is



not near to 3 the normality distribution is rejected. After doing this on all variables is applied Augmented Dickey Fuller unit root test meaning that all variables are examined if they have a unit root so if they are non stationary. Non stationary means that a series does not fluctuate around a mean value and does not have a tendency of coverage toward mean value. If for 1%, 5% and 10% level the probability is greater than 0.05 it means that the variable has a unit root (non stationary) so it is first differenced becoming stationary meaning that for 1%, 5% and 10% level the probability is lower than 0.05. The long run relationship that exists between nonperforming loans and all five other variables (real GDP, unemployment, inflation, loan interest rate, remittances) is shown by using Johansen co-integration test. If in the Johansen co-integration test the value of Trace statistic is greater than 5% critical value or if the Max-Eigen statistic is greater than 5% critical value it means that in the long run there exist a strong co-integration between nonperforming loans and: real GDP, unemployment, inflation, loan interest rate and remittances.

### 3.3 Estimated Results

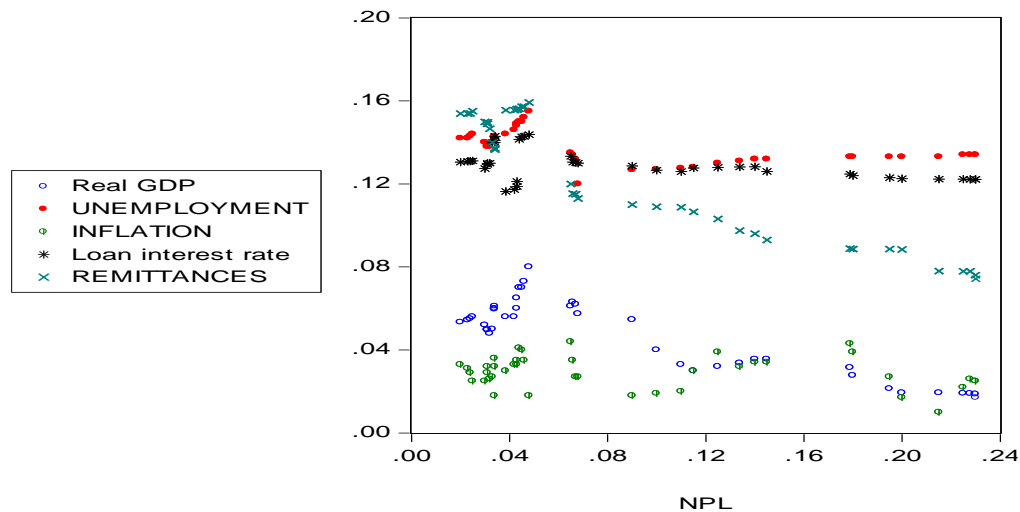
**Graph 2.** Nonperforming loans, real GDP, unemployment, inflation, loan interest rate and remittance series



The fluctuations of these variables show the economic situation which Albania is facing, where:

1. The problems caused from the economic crisis can be easily seen in the decrease of real GDP level, in the decrease of unemployment and in the continuous changes of inflation.
2. The incomes from emigrants coming mainly from Greece and Italy also have decreased because of the economic situation that also these countries have been facing.
3. And nonperforming loans are increasing over time because of the problems caused from economic crisis, from decrease of remittances and from banks not being careful on giving loans.

**Graph 3.** Real GDP, unemployment, inflation, loan interest rate and remittances in Albania, scatter diagram

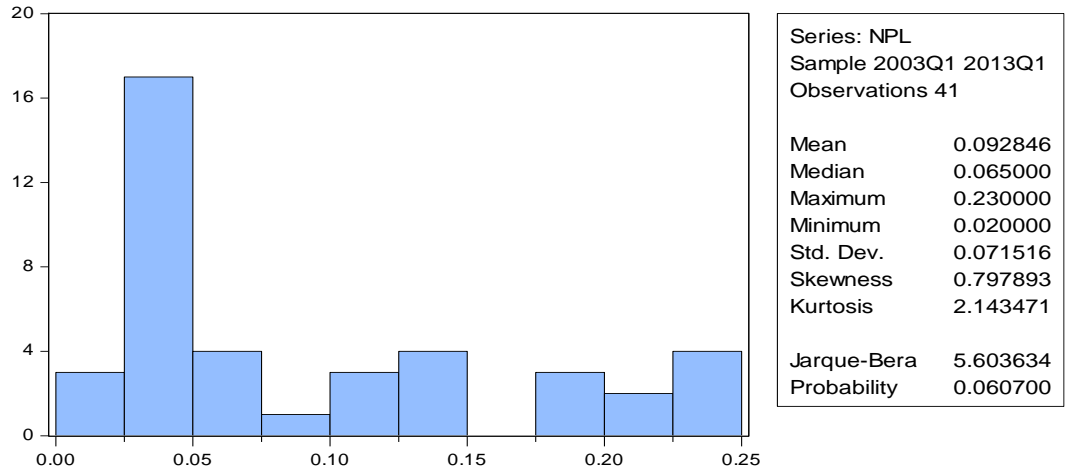


In Graph 3 when moving to the right is seen what kind of relationship nonperforming loans have with real GDP, unemployment, inflation, loan interest rate and remittances, specifically:

1. Real GDP tends to decrease nonperforming loans tend to increase.
2. Unemployment tends to increase and nonperforming loans tend to increase too.

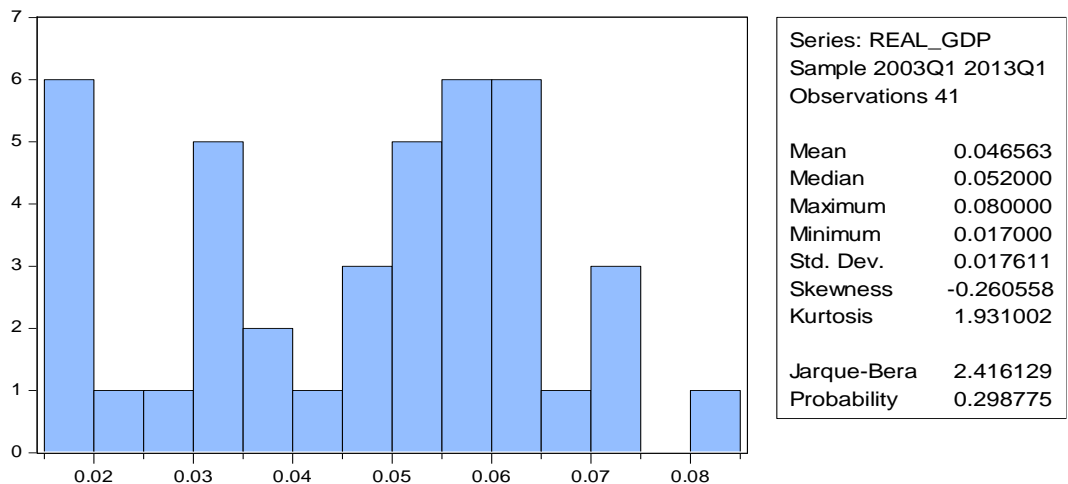
3. Inflation tends to decrease while nonperforming loans tend to increase
4. Loan interest rate tends to decrease while nonperforming loans tend to increase.
5. Remittances tend to decrease while non performing loans tend increase.

**Graph 4.** Histogram and statistics of nonperforming loans series



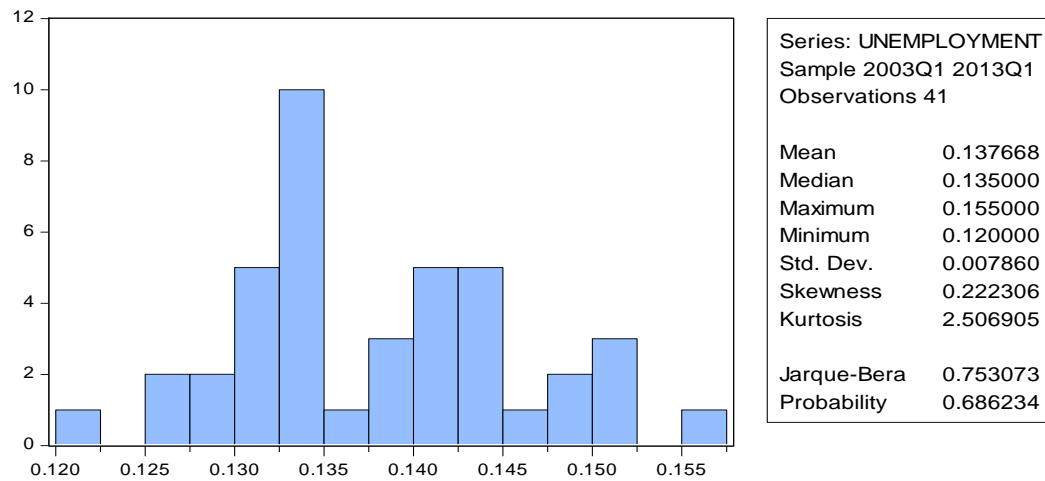
For nonperforming loans Skewness is equal to 0.797893 which is near to 0 and a Kurtosis is equal 2.143471 which is equal to 3 meaning that nonperforming loans have a normal distribution. (If the Skewness is not near to 0 and Kurtosis is not near to 3 the normality distribution is rejected.)

**Graph 5.** Histogram and statistics of real GDP series



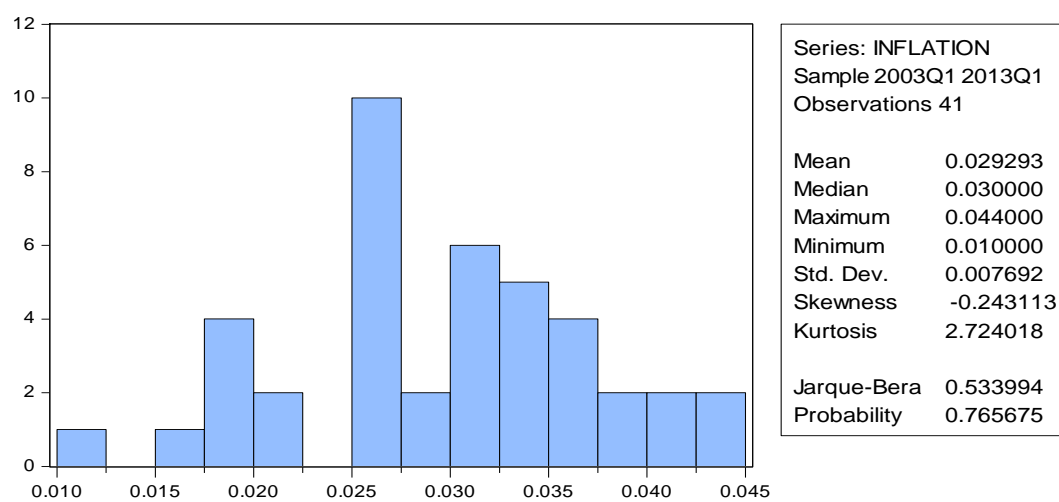
For real GDP Skewness is equal to  $-0.260558$  which is near to 0 and Kurtosis is equal to  $2.416129$  which is near to 3 meaning that real GDP has a normal distribution.

**Graph 6.** Histogram and statistics of unemployment series



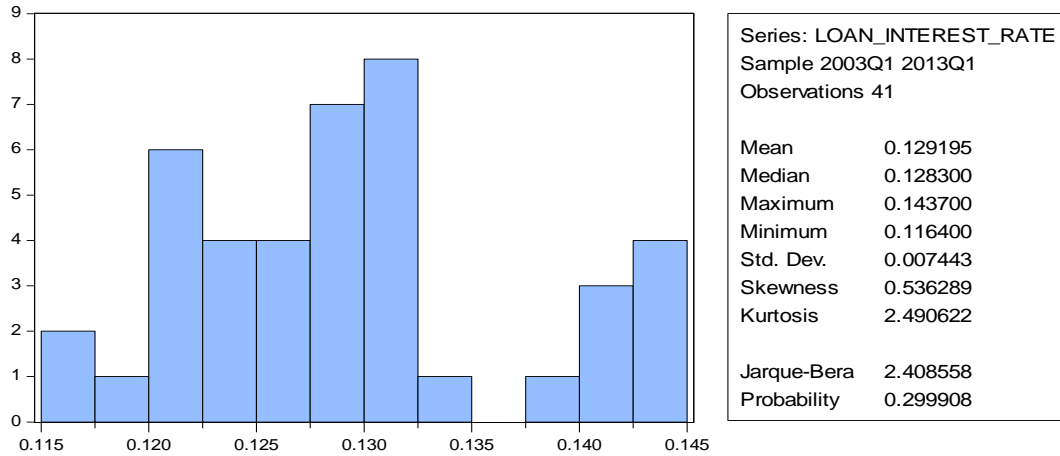
For unemployment Skewness is equal to  $0.222306$  which is near 0 and Kurtosis is equal to  $2.506905$  which is near 3 meaning that unemployment has a normal distribution.

**Graph 7.** Histogram and statistics of inflation series



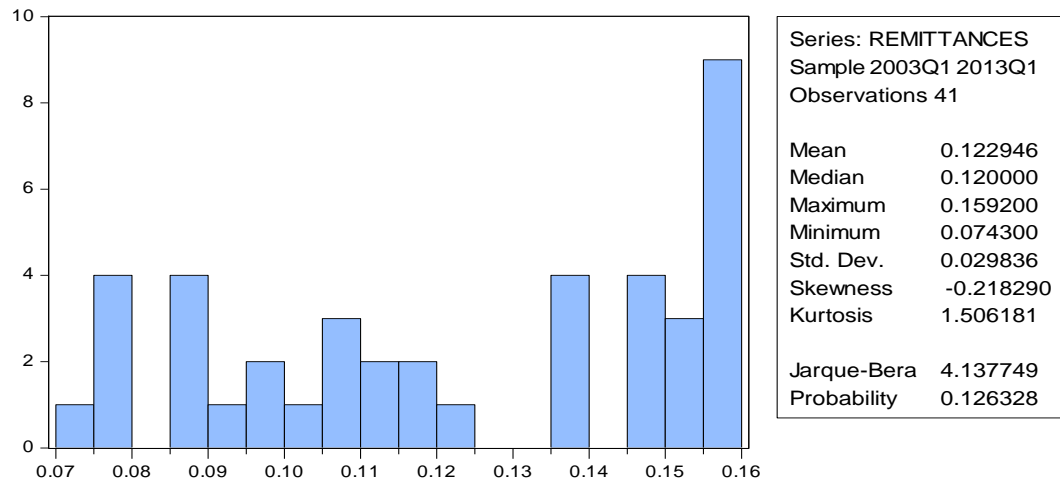
For inflation Skewness is equal to  $-0.243113$  which is near to 0 and Kurtosis is equal to  $2.724018$  which is near to 3 meaning that inflation has a normal distribution.

**Graph 8.** Histogram and statistics of loan interest rate series



For loan interest rate Skewness is 0.536289 which is equal to 0 and Kurtosis is equal to 2.490622 which is near to 3 meaning that loan interest rate has a normal distribution.

**Graph 9.** Histogram and statistics of remittances series



For remittance Skewness is equal to -0.218290 which is near to 0 and Kurtosis is equal to 1.506181 near 3 meaning that remittance has a normal distribution.

**Table 1.** Descriptive statistics of all variables

	NPL	REAL_GDP	UNEMPLOYMENT	INFLATION	LOAN_INTE REST_RATE	REMITTANCES
Mean	0.092846	0.046563	0.137668	0.029293	0.129195	0.122946
Median	0.065000	0.052000	0.135000	0.030000	0.128300	0.120000
Maximum	0.230000	0.080000	0.155000	0.044000	0.143700	0.159200
Minimum	0.020000	0.017000	0.120000	0.010000	0.116400	0.074300
Std. Dev.	0.071516	0.017611	0.007860	0.007692	0.007443	0.029836
Skewness	0.797893	-0.260558	0.222306	-0.243113	0.536289	-0.218290
Kurtosis	2.143471	1.931002	2.506905	2.724018	2.490622	1.506181
Jarque-Bera	5.603634	2.416129	0.753073	0.533994	2.408558	4.137749
Probability	0.060700	0.298775	0.686234	0.765675	0.299908	0.126328
Sum	3.806700	1.909100	5.644400	1.201000	5.297000	5.040800
Sum Sq. Dev.	0.204583	0.012406	0.002471	0.002366	0.002216	0.035607
Observations	41	41	41	41	41	41

Table.1 shows the group statistic where for each variable is made the same analysis as in the series statistics(mean, median, maximum, minimum, Std.Dev, Skewness, kurtosis, Jarqua-Bera, probability, sum, sum Sq. Dev) and again is seen that all variables are normally distributed.

**Table 2.** Estimated Equation Output

Sample: 2003Q1 2013Q1				
Included observations: 41				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.033834	0.055798	0.606370	0.5482
REAL_GDP	-0.772011	0.253977	-3.039689	0.0045
UNEMPLOYMENT	3.841085	0.383110	10.02607	0.0000
INFLATION	-0.246298	0.261159	-0.943094	0.3521
LOAN_INTEREST_RATE	-0.911462	0.339569	-2.684176	0.0110
REMITTANCES	-2.512194	0.154053	-16.30734	0.0000
R-squared	0.975041	Mean dependent var		0.092846
Adjusted R-squared	0.971475	S.D. dependent var		0.071516
S.E. of regression	0.012079	Akaike info criterion		-5.860315
Sum squared resid	0.005106	Schwarz criterion		-5.609548
Log likelihood	126.1365	Hannan-Quinn criter.		-5.769000
F-statistic	273.4605	Durbin-Watson stat		0.741452
Prob(F-statistic)	0.000000			

In the table 2 is noticed that when:

- Real GDP increases by 1 unit NPL decreases 0.77 unit.
- Unemployment increases by 1 unit NPL increases 3.84 unit.
- Inflation increases by 1 unit NPL decreases by 0.25 unit.
- Loan interest rate increases by 1 unit, NPL decreases 0.91 unit.
- Remittances increases by 1 unit, NPL decreases by 2.51 unit.

From these results is seen that there exist a negative relationship between non performing loans and inflation and also a negative relationship between nonperforming loans and loan interest rate. These results are against the international results from which is concluded that there exists a positive relationship between nonperforming loans and these other two variables (inflation, loan interest rate).

As the equation was  $NPL = B_0 + B_1GDP + B_2UN + B_3INF + B_4INT + B_5RE + U$

By substituting the values is achieved the final equation:

$$NPL = 0.033834 - 0.772011GDP + 3.841085UN - 0.246298INF - 0.911462INT - 2.512194RE$$

**Table 3.** ADF Unit Root Test on NPL, Real GDP, Unemployment, Inflation, Loan Interest Rate and Remittances

Variables	1% level	5% level	10% level	Probability
NPL	-3.610453	-2.938987	-2.607932	0.9992
Real GDP	-3.610453	-2.938987	-2.607932	0.8075
Unemployment	-3.610453	-2.938987	-2.607932	0.2763
Inflation	-3.610453	-2.938987	-2.607932	0.0219
Loan interest rate	-3.610453	-2.938987	-2.607932	0.0565
Remittances	-3.610453	-2.938987	-2.607932	0.985

In Table 3 is seen that:

- At 1%, 5% and 10 % level the probability is 0.9992 greater than 0.05 so the null hypothesis that NPL has a unit root is accepted.
- At 1%, 5% and 10% level probability is 0.8075 which is greater than 0.05 so the null hypothesis that GDP has a unit root is accepted.
- At 1%, 5% and 10% level probability is 0.2763 which is greater than 0.05 so the null hypothesis that unemployment has a unit root is accepted
- At 1%, 5% and 10% level probability is 0.0219 lower than 0.05 so inflation has not a unit root and the null hypothesis is rejected.
- At 1%, 5% and 10% level probability is 0.0565 which is greater than 0.05 so the null hypothesis that loan interest rate has a unit root is accepted.
- At 1%, 5% and 10% level probability is 0.9850 which is greater than 0.05 meaning that remittance has a unit root so the null hypothesis is accepted.

So all variables except inflation that doesn't have a unit root are first differenced and converted into stationary variables as it can be seen in Table 4.

**Table 4.** ADF Unit Root Test on D(NPL, Real GDP, Unemployment, Inflation, Loan Interest Rate and Remittances)

Variables	1% level	5% level	10% level	Probability
D(NPL)	-2.625606	-1.949609	-1.611593	0.0000
D(Real GDP)	-2.625606	-1.949609	-1.611593	0.0005
D(Unemployment)	2.625606	1.949609	-1.611593	0
D(Loan interest rate)	-2.625606	-1.949609	-1.611593	0.0000
D(Remittances)	-2.625606	-1.949609	1.611593	0.0001



- After taking first differences at 1%, 5% and 10% level probability is 0 which is lower than 0.05 so the null hypothesis that NPL has a unit root is rejected.
- After taking first differences at 1%, 5% and 10% level probability is 0.0005 which is lower than 0.05 so the null hypothesis that GDP has a unit root is rejected.
- After taking first differences, at 1%, 5% and 10% level probability is 0 which is lower than 0.05 the null hypothesis that unemployment has a unit root is rejected.
- After taking the first differences, at 1%, 5% and 10% level probability is 0 lower than 0.05 meaning that loan interest rate has not a unit root and the null hypothesis is rejected.
- At 1%, 5% and 10% level after taking the first differences probability is 0.0001 which is lower than 0.05 so the null hypothesis is rejected because remittance has not a unit root.

After converting non stationary variables into stationary ones it is applied Johansen co-integration test to see whether these variables are co-integrated in the long run.

**Table 5.** Johansen co-integration test

Series: NPL REAL_GDP UNEMPLOYMENT INFLATION LOAN_INTEREST_RATE REMITTANCES				
Lags interval (in first differences): 1 to 2				
Unrestricted Cointegration Rank Test (Trace)				
Hypothesized		Trace	0.05	
No. of CE(s)	Eigenvalue	Statistic	Critical Value	Prob.**
None *	0.591094	117.6240	95.75366	0.0007
At most 1 *	0.514157	83.64178	69.81889	0.0027
At most 2 *	0.450358	56.21076	47.85613	0.0068
At most 3 *	0.395210	33.46822	29.79707	0.0181
At most 4	0.240533	14.35898	15.49471	0.0736
At most 5 *	0.097629	3.903741	3.841466	0.0482
Trace test indicates 4 cointegrating eqn(s) at the 0.05 level				
* denotes rejection of the hypothesis at the 0.05 level				
**MacKinnon-Haug-Michelis (1999) p-values				

Unrestricted Cointegration Rank Test (Maximum Eigenvalue)				
Hypothesized		Max-Eigen	0.05	
No. of CE(s)	Eigenvalue	Statistic	Critical Value	Prob.**
None	0.591094	33.98226	40.07757	0.2068
At most 1	0.514157	27.43102	33.87687	0.2410
At most 2	0.450358	22.74254	27.58434	0.1847
At most 3	0.395210	19.10924	21.13162	0.0937
At most 4	0.240533	10.45523	14.26460	0.1837
At most 5 *	0.097629	3.903741	3.841466	0.0482
Max-eigenvalue test indicates no cointegration at the 0.05 level				
* denotes rejection of the hypothesis at the 0.05 level				
**MacKinnon-Haug-Michelis (1999) p-values				

In Table 5, Trace test indicates 4 co-integrating equations at the 0.05 level where the Trace statistic is greater than 5% critical value while Max-Eigen value test indicates that there is no co-integration at 0.05 level because Max-Eigen statistic is lower than 5% critical value. In other words nonperforming loans and the other five variables: real GDP, unemployment, inflation, loan interest rate, remittances are co-integrated to each other however, in the long run this co-integration is weak.(Hill, 2008)

## **Chapter 4. Conclusions**

Albanian banking system is facing many challenges. The problems caused by economic crisis, the decrease of incomes coming from emigrants and the fact that banks were not careful on giving loans in the first years of transition have caused a continuous increase of nonperforming loans. In this situation an analysis of the micro and macroeconomic environmental factors where banks operate must be done. There are five economic variables taken in consideration in this thesis as main economic variables affecting the level of nonperforming loans and they are: real GDP, unemployment, inflation, loan interest rate and remittances. From what it is concluded from the results of Johansen co-integration nonperforming loans and the other five variables: real GDP, unemployment, inflation, loan interest rate, remittances are co-integrated to each other however, in the long run this co-integration is weak.

Albania is not the only country dealing with the problem of nonperforming loans. The situation with nonperforming loans is the same also for the other region countries and this is not something unexpected because the global economic crisis of 2008 has affected also these countries. For example, in Greece and Italy nonperforming loans have reached the highest values that they have ever had in these last ten years. It is important to pay more attention to this situation because when nonperforming loans increase the whole economic stability of the country is being endangered so regulators must take some fiscal and monetary measures to improve it. Even though the banking system has made a progress compared to the first years of transition there are still some other things that need to be done.

For the improvement of the situation there are some measures that can be taken:

- Start to develop a tighter loan monitoring process. Banks must be more careful than they are now when giving new loans. In this way they can improve their loans portfolio step by step.
- Lending smaller loans than larger ones.
- For large clients accept financial statements that are audited form reputable companies.
- Offer training to loan officers continuously.

## References

1. Abdelkader Boundriga, Neila Boulila Taktak and Sana Jellouli (2014) ``*Does bank supervision impact nonperforming loans: cross-country determinants using aggregate data?*`,  
[http://www.researchgate.net/publication/38309279\\_Does\\_bank\\_supervision\\_impact\\_nonperforming\\_loans\\_cross-country\\_determinants\\_using\\_agregate\\_data](http://www.researchgate.net/publication/38309279_Does_bank_supervision_impact_nonperforming_loans_cross-country_determinants_using_agregate_data) ,Date 02/02/2014
2. Bank of Albania quarterly reports for 2003
3. Bank of Albania quarterly reports for 2004
4. Bank of Albania quarterly reports of 2005
5. Bank of Albania quarterly reports of 2006
6. Bank of Albania quarterly reports of 2007
7. Bank of Albania quarterly reports of 2008
8. Bank of Albania quarterly reports of 2009
9. Bank of Albania quarterly reports of 2010
10. Bank of Albania quarterly reports of 2011
11. Bank of Albania quarterly reports of 2012
12. Bank of Albania quarterly reports of 2013
13. Bruna Skarica (2013) ``*Determinants of nonperforming loans in Central and Eastern European countries*`, <http://fintp.ijf.hr/upload/files/ftp/2014/1/skarica.pdf>,  
Date 03/02/2014
14. Carlos Andres and Olaya Bonilla (2012), ``*Macroeconomic determinants of Nonperforming Loans in Spain and Italy*`,  
[http://www.banrepcultural.org/sites/default/files/tesis\\_olaya\\_carlos.pdf](http://www.banrepcultural.org/sites/default/files/tesis_olaya_carlos.pdf), Date 03/02/2014

15. Dimitrios Angelos and Vasilios (2011), *Macroeconomic and bank specific determinants of nonperforming loans in Greece: a comparative study of mortgage business and consumer loan portfolios*, <http://www.bankofgreece.gr/BogEkdoseis/Paper2010118.pdf>, Date 03/02/2014
16. Evelyn Richard (2011), *Factors that cause Nonperforming Loans in Commercial Banks in Tanzania and Strategies to Resolve Them*, [http://www.na-businesspress.com/JMPP/RichardE\\_Web12\\_7\\_.pdf](http://www.na-businesspress.com/JMPP/RichardE_Web12_7_.pdf), Date 03/02/2014
17. Fawad Ahmad (2013), *Corruption and Information Sharing as Determinants of Nonperforming Loans*, Business System Research, Vol.4, No.1, pp.87-98
18. Hill R.C, Griffiths R.C, Lim G.C (2008), *Using E-views for Principles of Econometrics*, Wiley
19. Iuga and Ruxandra Lazea (2012), *The influence of unemployment rate over nonperforming loans in Romania using the correlation indicator*, <http://oeconomica.uab.ro/upload/lucrari/1420122/18.pdf>, Date 07/02/2014
20. Iva Gjergji, (2013), *An analysis of nonperforming loans in the Albanian banking system*, <http://www.ijbcnet.com/2-6/IJBC-13-2602.pdf>, Date 07/02/2014
21. Kipyego Daniel Kwambai and Moses Wandera, ( 2013), *Effects of credit information sharing on nonperforming loans: case of Kenya*, <http://www.eujournal.org/index.php/esj/article/view/1048>, Date 10/02/2014
22. Krishna Prasanna (2014), *Determinants of Nonperforming Loans in Indian Banking System*, <http://psrcentre.org/images/extraimages/214306.pdf> Date 10/02/2014
23. Linbo Fan and Sherill Shafer (2004), *Efficiency versus risk in large domestic US banks*, Managerial Finance, Vol. 30 Iss: 9, pp.1 - 19

24. Mohd Zain Abd Karim, Sok-Gee Chan, Sallahudin Hassan (2010), `` *Bank Efficiency and Nonperforming Loans: Evidence from Malaysia and Singapore*`,  
[http://www.researchgate.net/publication/46560594\\_Bank\\_Efficiency\\_And\\_Non-Performing\\_Loans\\_Evidence\\_From\\_Malaysia\\_And\\_Singapore](http://www.researchgate.net/publication/46560594_Bank_Efficiency_And_Non-Performing_Loans_Evidence_From_Malaysia_And_Singapore) , Date 10/02/2014
25. Munib Badar and Atiya Yasmin Javid, (2013), ``*Impact of macroeconomic forces on nonperforming loans in Pakistan*`,  
<http://www.wseas.org/multimedia/journals/economics/2013/56-259.pdf>, Date 10/02/2014
26. Mwanza Nkusu, (2011), ``*Nonperforming loans and macrofinancial vulnerabilities in advanced economy*`, <http://www.imf.org/external/pubs/ft/wp/2011/wp11161.pdf>,  
Date 10/02/2014
27. Nir Klein, (2013), ``*Nonperforming loans in CESEE: Determinants and Impact of Macroeconomic Performance*`,  
[http://papers.ssrn.com/sol3/papers.cfm?abstract\\_id=2247224](http://papers.ssrn.com/sol3/papers.cfm?abstract_id=2247224), Date 15/02/2014
28. Roland Beck, Petr Jakubik and Anamaria PiloIU (2013), ``*Nonperforming loans: What matters in addition to the economic cycle?*`,  
[http://papers.ssrn.com/sol3/papers.cfm?abstract\\_id=2214971](http://papers.ssrn.com/sol3/papers.cfm?abstract_id=2214971), Date 15/02/2014

Appendix 1. NPL, Real GDP, Unemployment, Inflation, Loan Interest rate, Remittances

2003Q1-2013Q1

Years	NPL	Real GDP	Unemployment	Inflation	Loan interest rate	Remittance
2003Q1	4.80%	8%	15.50%	1.80%	14.37%	15.92%
2003Q2	4.60%	7.30%	15.20%	3.50%	14.29%	15.72%
2003Q3	4.50%	7%	15%	4.00%	14.27%	15.72%
2003Q4	4.40%	7%	15%	4.10%	14.15%	15.62%
2004Q1	4.30%	6.50%	14.90%	3.50%	12.11%	15.61%
2004Q2	4.30%	6%	14.80%	3.30%	11.88%	15.57%
2004Q3	4.20%	5.60%	14.60%	3.30%	11.72%	15.55%
2004Q4	3.85%	5.60%	14.40%	3.00%	11.64%	15.55%
2005Q1	2.50%	5.60%	14.40%	3%	13.11%	15.50%
2005Q2	2.40%	5.50%	14.30%	3%	13.10%	15.40%
2005Q3	2.30%	5.43%	14.20%	3%	13%	15.39%
2005Q4	2.00%	5.33%	14.20%	3%	13.05%	15.39%
2006Q1	3%	5.20%	14%	3%	13%	14.99%
2006Q2	3.10%	4.97%	13.90%	3%	12.94%	14.97%
2006Q3	3.10%	4.95%	13.80%	3%	13%	14.89%
2006Q4	3.20%	4.80%	13.80%	3%	13.00%	14.66%
2007Q1	3.30%	5%	14%	3%	13.98%	13.99%
2007Q2	3.39%	5.97%	14.20%	2%	14%	13.71%
2007Q3	3.40%	6%	14.30%	3.60%	14.10%	13.71%
2007Q4	3.41%	6.10%	14.30%	3%	14.30%	13.65%
2008Q1	6.50%	6.10%	13.50%	4.40%	13.33%	12%
2008Q2	6.58%	6.31%	13.40%	3.50%	13.05%	11.53%
2008Q3	6.70%	6.20%	13.20%	2.70%	13.03%	11.50%
2008Q4	6.80%	5.74%	12%	2.70%	13.00%	11.30%
2009Q1	9%	5.46%	12.68%	1.80%	12.86%	11.00%
2009Q2	10%	4%	12.70%	1.90%	12.66%	10.90%
2009Q3	11%	3.30%	12.76%	2.00%	12.59%	10.88%
2009Q4	11.50%	3%	12.80%	3.00%	12.77%	10.65%
2010Q1	12.50%	3.20%	13.00%	3.90%	12.80%	10.31%
2010Q2	13.39%	3.37%	13.10%	3.20%	12.82%	9.75%
2010Q3	14%	3.55%	13.20%	3.40%	12.83%	9.60%
2010Q4	14.50%	3.55%	13.20%	3.40%	12.60%	9.30%
2011Q1	17.88%	3.15%	13.30%	4.30%	12.47%	8.88%
2011Q2	18%	2.77%	13.30%	3.90%	12.40%	8.86%
2011Q3	19.50%	2.13%	13.30%	2.70%	12.30%	8.86%
2011Q4	20%	1.93%	13.31%	1.70%	12.25%	8.84%



2012Q1	21.50%	1.93%	13.32%	1.00%	12.23%	7.80%
2012Q2	23%	1.90%	13.35%	2.20%	12.23%	7.79%
2012Q3	22.78%	1.89%	13.39%	2.60%	12.22%	7.79%
2012Q4	22.99%	1.88%	13.40%	2.50%	12.22%	7.60%
2013Q1	23%	1.70%	13.40%	3%	12.21%	7.43%

Source: Bank of Albania, Date 2/02/2014)

## Appendix 2. Augmented Dickey Fuller test statistics on NPL

Null Hypothesis: NPL has a unit root

Exogenous: Constant

Lag Length: 1 (Fixed)

	t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic	1.582251	0.9992
Test critical values:		
1% level	-3.610453	
5% level	-2.938987	
10% level	-2.607932	

\*MacKinnon (1996) one-sided p-values.

Augmented Dickey-Fuller Test Equation

Dependent Variable: D(NPL)

Method: Least Squares

Date: 03/24/14 Time: 11:45

Sample (adjusted): 2003Q3 2013Q1

Included observations: 39 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
NPL(-1)	0.036742	0.023221	1.582251	0.1223
D(NPL(-1))	0.002198	0.178437	0.012319	0.9902
C	0.001383	0.002355	0.587415	0.5606
R-squared	0.080894	Mean dependent var		0.004718
Adjusted R-squared	0.029833	S.D. dependent var		0.009010
S.E. of regression	0.008874	Akaike info criterion		-6.537500
Sum squared resid	0.002835	Schwarz criterion		-6.409534
Log likelihood	130.4813	Hannan-Quinn criter.		-6.491587
F-statistic	1.584248	Durbin-Watson stat		1.976138
Prob(F-statistic)	0.219069			

### Appendix 3. Augmented Dickey-Fuller test statistic on D(NPL)

Null Hypothesis: D(NPL) has a unit root

Exogenous: None

Lag Length: 0 (Fixed)

	t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic	-4.432554	0.0000
Test critical values:		
1% level	-2.625606	
5% level	-1.949609	
10% level	-1.611593	

\*MacKinnon (1996) one-sided p-values.

Augmented Dickey-Fuller Test Equation

Dependent Variable: D(NPL,2)

Method: Least Squares

Date: 03/24/14 Time: 11:59

Sample (adjusted): 2003Q3 2013Q1

Included observations: 39 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(NPL(-1))	-0.681139	0.153667	-4.432554	0.0001
R-squared	0.340808	Mean dependent var		5.38E-05
Adjusted R-squared	0.340808	S.D. dependent var		0.011905
S.E. of regression	0.009666	Akaike info criterion		-6.415073
Sum squared resid	0.003550	Schwarz criterion		-6.372418
Log likelihood	126.0939	Hannan-Quinn criter.		-6.399769
Durbin-Watson stat	2.231135			

### Appendix 4. Augmented Dickey-Fuller test statistic on Real GDP

Null Hypothesis: REAL\_GDP has a unit root

Exogenous: Constant

Lag Length: 1 (Fixed)

	t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic	-0.801651	0.8075
Test critical values:		
1% level	-3.610453	
5% level	-2.938987	
10% level	-2.607932	

\*MacKinnon (1996) one-sided p-values.

Augmented Dickey-Fuller Test Equation

Dependent Variable: D(REAL\_GDP)

Method: Least Squares

Date: 03/24/14 Time: 12:13

Sample (adjusted): 2003Q3 2013Q1  
 Included observations: 39 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
REAL_GDP(-1)	-0.025813	0.032200	-0.801651	0.4280
D(REAL_GDP(-1))	0.453194	0.142689	3.176096	0.0031
C	0.000475	0.001613	0.294220	0.7703
R-squared	0.225386	Mean dependent var		-0.001436
Adjusted R-squared	0.182352	S.D. dependent var		0.003628
S.E. of regression	0.003281	Akaike info criterion		-8.527752
Sum squared resid	0.000387	Schwarz criterion		-8.399785
Log likelihood	169.2912	Hannan-Quinn criter.		-8.481838
F-statistic	5.237374	Durbin-Watson stat		1.932225
Prob(F-statistic)	0.010082			

### Appendix 5. Augmented Dickey-Fuller test statistic on D(real GDP)

Null Hypothesis: D(REAL\_GDP) has a unit root  
 Exogenous: None  
 Lag Length: 0 (Fixed)

	t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic	-3.658810	0.0005
Test critical values:		
1% level	-2.625606	
5% level	-1.949609	
10% level	-1.611593	

\*MacKinnon (1996) one-sided p-values.

Augmented Dickey-Fuller Test Equation  
 Dependent Variable: D(REAL\_GDP,2)  
 Method: Least Squares  
 Date: 03/24/14 Time: 12:15  
 Sample (adjusted): 2003Q3 2013Q1  
 Included observations: 39 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(REAL_GDP(-1))	-0.481496	0.131599	-3.658810	0.0008
R-squared	0.259591	Mean dependent var		0.000133
Adjusted R-squared	0.259591	S.D. dependent var		0.003828
S.E. of regression	0.003294	Akaike info criterion		-8.568391
Sum squared resid	0.000412	Schwarz criterion		-8.525736
Log likelihood	168.0836	Hannan-Quinn criter.		-8.553087
Durbin-Watson stat	1.988757			

## Appendix 6. Augmented Dickey-Fuller test statistic on unemployment

Null Hypothesis: UNEMPLOYMENT has a unit root

Exogenous: Constant

Lag Length: 1 (Fixed)

	t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic	-2.022635	0.2763
Test critical values:		
1% level	-3.610453	
5% level	-2.938987	
10% level	-2.607932	

\*MacKinnon (1996) one-sided p-values.

Augmented Dickey-Fuller Test Equation

Dependent Variable: D(UNEMPLOYMENT)

Method: Least Squares

Date: 03/24/14 Time: 22:11

Sample (adjusted): 2003Q3 2013Q1

Included observations: 39 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
UNEMPLOYMENT(-1)	-0.116788	0.057741	-2.022635	0.0506
D(UNEMPLOYMENT(-1))	-0.095830	0.155576	-0.615971	0.5418
C	0.015524	0.007941	1.954869	0.0584
R-squared	0.110675	Mean dependent var		-0.000462
Adjusted R-squared	0.061268	S.D. dependent var		0.002765
S.E. of regression	0.002679	Akaike info criterion		-8.933064
Sum squared resid	0.000258	Schwarz criterion		-8.805098
Log likelihood	177.1948	Hannan-Quinn criter.		-8.887151
F-statistic	2.240067	Durbin-Watson stat		1.992488
Prob(F-statistic)	0.121085			

## Appendix 7. Augmented Dickey-Fuller test statistic on D(unemployment)

Null Hypothesis: D(UNEMPLOYMENT) has a unit root

Exogenous: None

Lag Length: 0 (Fixed)

	t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic	-6.657586	0.0000
Test critical values:		
1% level	-2.625606	
5% level	-1.949609	
10% level	-1.611593	

\*MacKinnon (1996) one-sided p-values.

Augmented Dickey-Fuller Test Equation

Dependent Variable: D(UNEMPLOYMENT,2)  
 Method: Least Squares  
 Date: 03/24/14 Time: 22:12  
 Sample (adjusted): 2003Q3 2013Q1  
 Included observations: 39 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(UNEMPLOYMENT(-1))	-1.061988	0.159516	-6.657586	0.0000
R-squared	0.538241	Mean dependent var		7.69E-05
Adjusted R-squared	0.538241	S.D. dependent var		0.004118
S.E. of regression	0.002799	Akaike info criterion		-8.894105
Sum squared resid	0.000298	Schwarz criterion		-8.851449
Log likelihood	174.4350	Hannan-Quinn criter.		-8.878800
Durbin-Watson stat	2.018192			

### Appendix 8. Augmented Dickey-Fuller test statistic on inflation

Null Hypothesis: INFLATION has a unit root  
 Exogenous: Constant  
 Lag Length: 1 (Fixed)

	t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic	-3.296921	0.0219
Test critical values:		
1% level	-3.610453	
5% level	-2.938987	
10% level	-2.607932	

\*MacKinnon (1996) one-sided p-values.

Augmented Dickey-Fuller Test Equation  
 Dependent Variable: D(INFLATION)  
 Method: Least Squares  
 Date: 03/24/14 Time: 22:14  
 Sample (adjusted): 2003Q3 2013Q1  
 Included observations: 39 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
INFLATION(-1)	-0.493083	0.149559	-3.296921	0.0022
D(INFLATION(-1))	0.171051	0.152786	1.119544	0.2703
C	0.014354	0.004539	3.162066	0.0032
R-squared	0.235368	Mean dependent var		-0.000256
Adjusted R-squared	0.192888	S.D. dependent var		0.006942
S.E. of regression	0.006237	Akaike info criterion		-7.242854
Sum squared resid	0.001400	Schwarz criterion		-7.114887
Log likelihood	144.2356	Hannan-Quinn criter.		-7.196940
F-statistic	5.540727	Durbin-Watson stat		2.200681
Prob(F-statistic)	0.007983			

## Appendix 9. Augmented Dickey-Fuller test statistic on loan interest rate

Null Hypothesis: LOAN\_INTEREST\_RATE has a unit root  
 Exogenous: Constant  
 Lag Length: 1 (Fixed)

	t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic	-2.883451	0.0565
Test critical values:		
1% level	-3.610453	
5% level	-2.938987	
10% level	-2.607932	

\*MacKinnon (1996) one-sided p-values.

Augmented Dickey-Fuller Test Equation  
 Dependent Variable: D(LOAN\_INTEREST\_RATE)  
 Method: Least Squares  
 Date: 03/24/14 Time: 22:16  
 Sample (adjusted): 2003Q3 2013Q1  
 Included observations: 39 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
LOAN_INTEREST_RATE(-1)	-0.298872	0.103651	-2.883451	0.0066
D(LOAN_INTEREST_RATE(-1))	0.203769	0.155617	1.309430	0.1987
C	0.038135	0.013414	2.842992	0.0073
R-squared	0.193021	Mean dependent var		-0.000533
Adjusted R-squared	0.148188	S.D. dependent var		0.004776
S.E. of regression	0.004408	Akaike info criterion		-7.936852
Sum squared resid	0.000700	Schwarz criterion		-7.808886
Log likelihood	157.7686	Hannan-Quinn criter.		-7.890939
F-statistic	4.305404	Durbin-Watson stat		2.090797
Prob(F-statistic)	0.021063			

## Appendix 10. Augmented Dickey-Fuller test statistic on D(loan interest rate)

Null Hypothesis: D(LOAN\_INTEREST\_RATE) has a unit root  
 Exogenous: None  
 Lag Length: 0 (Fixed)

	t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic	-5.614748	0.0000
Test critical values:		
1% level	-2.625606	
5% level	-1.949609	
10% level	-1.611593	

\*MacKinnon (1996) one-sided p-values.

Augmented Dickey-Fuller Test Equation  
 Dependent Variable: D(LOAN\_INTEREST\_RATE,2)  
 Method: Least Squares  
 Date: 03/24/14 Time: 22:17  
 Sample (adjusted): 2003Q3 2013Q1  
 Included observations: 39 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(LOAN_INTEREST_RATE(-1))	-0.906516	0.161453	-5.614748	0.0000
R-squared	0.453433	Mean dependent var		1.79E-05
Adjusted R-squared	0.453433	S.D. dependent var		0.006473
S.E. of regression	0.004786	Akaike info criterion		-7.821028
Sum squared resid	0.000870	Schwarz criterion		-7.778372
Log likelihood	153.5100	Hannan-Quinn criter.		-7.805723
Durbin-Watson stat	2.002742			

## Appendix 11. Augmented Dickey-Fuller test statistic on remittances

Null Hypothesis: REMITTANCES has a unit root  
 Exogenous: Constant  
 Lag Length: 1 (Fixed)

	t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic	0.511489	0.9850
Test critical values:		
1% level	-3.610453	
5% level	-2.938987	
10% level	-2.607932	

\*MacKinnon (1996) one-sided p-values.

Augmented Dickey-Fuller Test Equation  
 Dependent Variable: D(REMITTANCES)  
 Method: Least Squares  
 Date: 03/24/14 Time: 22:21  
 Sample (adjusted): 2003Q3 2013Q1  
 Included observations: 39 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
REMITTANCES(-1)	0.009739	0.019040	0.511489	0.6121
D(REMITTANCES(-1))	0.030384	0.169778	0.178963	0.8590
C	-0.003261	0.002507	-1.300989	0.2015
R-squared	0.009582	Mean dependent var		-0.002126
Adjusted R-squared	-0.045441	S.D. dependent var		0.003251
S.E. of regression	0.003324	Akaike info criterion		-8.501435
Sum squared resid	0.000398	Schwarz criterion		-8.373469

Log likelihood	168.7780	Hannan-Quinn criter.	-8.455522
F-statistic	0.174140	Durbin-Watson stat	1.972703
Prob(F-statistic)	0.840883		

## Appendix 12. Augmented Dickey-Fuller test statistic on D(remittances)

Null Hypothesis: D(REMITTANCES) has a unit root  
 Exogenous: None  
 Lag Length: 0 (Fixed)

	t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic	-4.334211	0.0001
Test critical values:		
1% level	-2.625606	
5% level	-1.949609	
10% level	-1.611593	

\*MacKinnon (1996) one-sided p-values.

Augmented Dickey-Fuller Test Equation  
 Dependent Variable: D(REMITTANCES,2)  
 Method: Least Squares  
 Date: 03/24/14 Time: 22:22  
 Sample (adjusted): 2003Q3 2013Q1  
 Included observations: 39 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(REMITTANCES(-1))	-0.660667	0.152431	-4.334211	0.0001
R-squared	0.330812	Mean dependent var		7.69E-06
Adjusted R-squared	0.330812	S.D. dependent var		0.004484
S.E. of regression	0.003668	Akaike info criterion		-8.353182
Sum squared resid	0.000511	Schwarz criterion		-8.310527
Log likelihood	163.8871	Hannan-Quinn criter.		-8.337878
Durbin-Watson stat	2.018323			