Macroeconomics and Monetary Economics

Impact of Credit Restructuring on the Quality of Bank Asset Portfolio. A Cluster Analysis Approach

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Abstract: In this paper we proposed an analysis of the financial crisis impact on the procedures for management of loan portfolios in several banking systems. Despite ample liquidity injection programs implemented by major central banks and government actions, credit risk remains a key challenge of the current banking systems. On a medium term, the high percentage of bad loans has become a structural vulnerability. To maintain an acceptable quality of loan portfolios and not to damage the prudential and profitability indicators, credit institutions in EU member states have proceeded to apply various techniques for credit restructuring. The quantitative analysis carried out in the last part of the paper revealed a relatively moderate granularity of banking systems considered, in terms of capitalization, volume of bank reserves and net provisions, in response to the persistent trend of loan portfolio deterioration.

Keywords: financial crisis; credit portfolio; credit restructuring methods; cluster analysis

JEL Classification: E58; G01

1. Introduction

In the current economic conjuncture, to avoid enforcement of collateral, banks can resort to loan restructuring, for borrowers experiencing repayment problems. Restructuring is useful first, because enforcement involves additional costs, the legal process being always costly for both the bank and the debtor and, on the other hand, prices of assets brought as collateral are directly affected by housing market developments, which may lead to the inability to recover outstanding debts and interest payments by credit institutions which have granted the loan.

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In essence, the restructuring of loans involves altering the characteristics of the initial credit contract, in terms of interest rate, maturity or grace period relating to borrowers who have difficulties in reimbursing debt, in order to help them meet their timely payment obligations. As a result of the restructuring measures, the debtor must return to the normal parameters of repayment. Will be restructured only loans for which the debtor's financial analysis indicates that it has a present and future capacity of payment, enabling it to pay the rates according to the timetable of the restructured loan.

Application of credit restructuring schemes is made by each bank, in accordance with its internal rules and with the conditions and characteristics of the applicant client.

According to the Romanian Association of Banks (2009), through the process of loans restructuring banks assume a new risk, for which is required a rigorous analysis of the past customer’s conduct and business, until the moment it requires the loan to be restructured, the payment capacity features (analysis of current contracts and cash flow), an economic and financial analysis and an assessment of client ability to repay debts already accumulated.

2. Credit Restructuring Techniques

Economic literature differentiates between the types of events that trigger the restructuring of loans:

a) the restructuring of ongoing loans, which do not record arrears or have a few days of delay, defined as the process by which there is a modification of the terms and conditions of the original contract, when there is suspicion of credit default risk. Events that fall under this type of restructuring are: borrowers anticipate difficulties in repaying and call for rescheduling the loan; borrowers with good payment history require the maturity extension due to robust economic reasons; the customer records a dire financial situation because it is overly indebted or has a temporary default. For the credit institution any loan restructuring, by the renegotiation of the monthly payments, is a way to assist customers in various industries, so as monthly payment obligations become sustainable. The main ways for conducting this type of restructuring are the rescheduling and refinancing of loans.

Rescheduling is an operation which extends the initial credit maturity, by changing the date for repayment of loan installments, due to borrower’s inability to pay debt at the initial deadline. If the debtor has an outstanding debt at the date of rescheduling, it will be included in the loan balance. In addition, the grace period may be extended up to 12 months in which the borrower will pay interest only.

Through the refinancing option, the bank grants a new funding with the aim of taking over a loan granted by another bank, or closing an ongoing loan at the same bank, to benefit from another product's characteristics (cost, maturity, collateral) or closing an outstanding loan at the same bank and granting a new loan in order to amiable recover the arrear. This option allows the borrower to replace a currency-denominated debt with a loan expressed in domestic currency.

b) restructuring of nonperforming loans (troubled debt restructuring), consisting in the accumulation of loan payment arrears of over 90 days. This type of restructuring is applied in circumstances where there is macroeconomic environment deterioration or when there is a high degree of uncertainty in the debtor's activity, in terms of achieving the estimated cash flow. In such a situation it can become very difficult or even impossible for the bank to recover the amount lend, in accordance with the initial timetable, so that the bank should consider very carefully whether the amendment of the original terms of the contract could help the client in order to reimburse the contracted amount.

Restructuring of bad loans is a bank attempt to collect as much of the amount owed by the debtor, thereby reducing the losses from the lending activity. Restructuring arrangements include, mainly: the contract interest rate reduction or even elimination; carrying out over a given period only interest payments; principal reduction; extension of loan maturity; bringing new assets as collateral; change of the principal debtor or adding a co-debtor; change of the currency in the loan contract.

Green (2009) emphasizes the distinction between the two forms of restructuring: restructuring by simple modification of loan characteristics (loan modification) and restructuring of bad loans (troubled debt). In his opinion, the restructuring of bad loans is a concession made in favor of a debtor, which the bank would not normally appeal, if the debtor wouldn't be faced with financial or economic difficulties. The main feature of this type of restructuring consists in reducing interest rates or principal. Any other amendment to the original contractual terms, that do not involve changing the interest rate or principal level, enters in the category of the first type of restructuring.

In terms of the asset target group that is subject of restructuring measures, we distinguish three categories:

→ *corporate sector debt restructuring*, through two distinct approaches. The first approach is the voluntary negotiation of extrajudicial credit restructuring and consists in developing a restructuring plan accepted by the debtor and a consortium of lenders, such as to enable debtor's business continuity and the recovery of all or part of its debt. If restructuring fails, the alternative is the initiation of debtor's insolvency judicial procedure.

A second approach is specific to systemic crisis, characterized by a high level of corporate sector insolvency and difficult mediation between borrowers and lenders. In this case, the government has the central role in implementing the restructuring process. The main methods of intervention are:

• exercise of mediation by the government. An example is the London restructuring, which aims to identify a mediator, which may be a public or private institution, involved in judging the debtor-creditor relationship and states the possibility of state involvement in co financing the restructuring process.

• provision of guarantees or financial compensation by the government to creditors, in order to extend the maturity of corporate sector debt, grant grace periods, interest rates or exchange rate guarantees, capital injections.

• creation of special agencies (Asset Management Companies) to take over and manage the bad loans in a centralized manner (Global Financial Stability Report 2009, Laryea 2010). This solution is useful when a large number of companies are faced with problems of loan repayment, the loans characteristics are relatively homogenous or AMCs can provide expertise in the field of corporate sector debt restructuring, which is not available to banks. The advantages cover both companies, which receive assistance for business rehabilitation, avoiding the onset of insolvency proceedings, as well as banks. By transferring troubled assets to an AMC, banks may focus on banking activity, leaving to the agency the efforts to maximize the recovery of bad loans.

Laryea (2010) emphasizes that success, in the long term, of the corporate sector debt restructuring, can be ensured only if it is accompanied by operational restructuring, which is oriented on the structure and efficiency of corporate business, by closing non-viable business lines and restructuring of productive capacity.

→ *restructuring of household debt*. According to the Global Financial Stability Report (2009), restructuring of household debt is appropriate when the debt is denominated in foreign currencies, particularly loans secured by mortgages. If difficulties in the repayment obligations are severe and generalized, one option is the implementation of restructuring programs, which have two components: recapitalize viable financial institutions and restore the household repayment capacity, by renegotiating credit agreements.

Government intervention to facilitate the restructuring of household debt can be materialized into two broad approaches (Laeven, Laryea, 2009):

• establishing a predictable legal and institutional framework, in support of voluntary non-judicial restructurings;

• implement a household debt restructuring program sponsored by the government, which provides financial support (deleting debt, tax incentives, subsidized interest rates or exchange rate) for a particular credit type or debtor.

→ *restructuring of structured products*. If, for loans, banks can proceed with their restructuring, through negotiation with the debtors, in case of structured products legal rights to restructure the loans on behalf of which were issued are very low. Changing the credit contract is possible only if holders of securitized debt instruments issued will be paid based on the contractual provisions of the original loan.

In the process of restructuring the loans, special attention is granted to mortgage loans. For instance, in late 2008, the UK Treasury announced the launch of Homeowners Support Mortgage Scheme, whereby homeowners subject to a mortgage loan may defer the payment of a fraction of the loan rates, for a period not exceeding two years, by including those credit rates in the principal amount. Deferred payments were guaranteed by the Treasury. Eligible borrowers had to hold mortgages of no more than £ 400,000 and savings of up to 16,000 pounds and to record a decline in income.

In the U.S., in February 2009, the government launched a comprehensive program, called Making Home Affordable Program, consisting of two subprograms, one for refinancing (Home Affordable Refinance Program-HARP) and the other for restructuring, by changing the contractual characteristics (Home Affordable Modification Program - HAMP).

HAMP program is intended to reduce, to a tolerable level, the mortgage loans' monthly payments, for borrowers that: have obtained loans before 1 January 2009, are ownership - occupant of the purchased building, have an outstanding debt value of no more than $ 729,750 (for a one person family), the monthly payment rates are over 31% of gross monthly income and financial difficulties are due to growth in monthly rates, contraction of income or medical problems. Borrowers who have lost their jobs or prove a total inability for payment are not eligible for restructuring. The program will run until 31 December 2012.

HARP program was designed for borrowers who are up to date with monthly mortgage payments, but were unable to obtain a traditional refinance program because the value of the real estate collateral diminished. Eligible borrowers must hold a mortgage owned or guaranteed by Fannie Mae or Freddie Mac, have recorded no more than 30 days of late payment last year, have the ability to make new payments and the mortgage does not exceed 125% of the property current market value. The program will expire on June 30, 2012. Currently, the Department for Housing and Urban Development is working on a program designed to provide financial assistance to debtors who have taken out a mortgage loan, but face with a decrease in revenue of at least 15%, as a direct result of involuntary unemployment generated by unfavorable economic climate or serious illness. The program will be called the Emergency Homeowners' Loan Program - EHLP and will consist in granting of subordinated loans, without recourse, at a zero interest rate, in a maximum amount of $ 50,000 for a maximum of 24 months, to each eligible borrower. Thus, the monthly payment will be set at 31% of gross monthly income recorded at the date of application for this program, but not less than $ 25 per month. The remaining difference will be supported by EHLP program. Only those borrowers who register at least 3 months of late payments and have been notified by the lending bank on the intention to foreclosure the mortgage will be eligible.

3. International Trends Recorded in the Restructuring of Loans

In a study by the National Bank of Hungary (Gergely Homolya 2010) for monitoring the restructuring of households' loans, it was found that housing loans have been at a rate of only 0-2%, while restructured vehicle financing loans fall within the range of 5-10%. In terms of home equity loans, a third of banks surveyed have made restructurings in proportion of 5-10%, while another third has restructured 10-20% of them. As a means of restructuring, banks have opted for their own programs, which provide temporary extension of the maturity and relaxation of monthly payments, by adjusting interest rates or fees charged. In the case of vehicle financing loans, the reduction of fees charged is more pronounced, compared with the other two forms of financing. According to the study, the factors that prompted the loans restructuring in the Hungarian banking sector are low, decreasing revenue, exchange rate volatility, unemployment, improving the quality of loan portfolio and economic climate.

A study published by the European System of Central Banks (2010) note that, from the candidate countries for accession to the EU, Croatia and Macedonia have not yet implemented programs for loans restructuring, and Turkey has restructured loans granted through credit cards (until May 2009 had been restructured 36.5% of credit card bad loans).

In a study of the Federal Reserve Board of Governors (2010), 50% of banks surveyed said that, in the first half of 2010, requests for maturity extension of commercial real estate loans have not significantly changed, while 42.9% of banks registered a slight increase. 95% of mortgages refinanced by Freddie Mac in the fourth quarter of 2010 have a fixed interest rate. Another interesting borrowers' option was to reduce the maturity of the refinanced loan, the main reason being the lower interest rate. Thus, 70% of borrowers who refinanced an initial loan on 20 years have chosen a maturity of 15 years and 32% of borrowers with loans for 30 years chose a smaller maturity, of 15 or 20 years.

In Russia, according to the Regulation and Supervision Department of the central bank, at the end of first quarter of 2010 the share of restructured credits of the 30 largest banks increased to 35.7%.

A study of the ECB (2010) conducted on a sample of 120 banks in the euro area has revealed that one of the factors that positively influence corporate sector demand for loans is their debt restructuring (changing the terms and conditions of loans in progress). In the third and fourth quarters of 2009, 50% of respondent banks reported it as having an important influence. In the third quarter of 2010 was recorded by only 17% of banks surveyed.

National Bank of Poland (2010), National Bank of Slovakia (2009) and Bank of England (2009) conducted a similar study in which more than half of surveyed banks reported the significant impact of the restructuring requests from companies to the rising demand for corporate sector loans.

In Romania, according to the Romanian Association of Banks, at the end of 2010 nearly 20% of the ongoing loan portfolio, granted both to households and companies, has undergone a restructuring scheme. To facilitate negotiations between individuals in financial difficulty or the debtor companies and creditors, the Ministry of Finance in collaboration with the National Bank of Romania, Ministry of Justice and Consumer Protection Authority, with technical assistance from the World Bank published in September 2010 two guidelines for the out of court restructuring of companies obligations and households' mortgage loans.

The auditing and consultancy company KPMG has presented, at the end of 2010, the results of a study on more than 50 banks in Central and Eastern Europe, active in the real estate sector. The objective of this barometer had been to evaluate the quality of real estate loan portfolio and banks' opportunities to manage exposures that record delays in reimbursement.

It can be noted that the largest share of real estate loans with repayment difficulties, both for residential and commercial purposes, are recorded in the Baltic countries (72%, of which 19% is severe damage and 53% minor damage), followed by Romania with about 55%, a group of countries with values ranging between 30-35% (Hungary, Croatia, Bulgaria) and another group with similar values (Slovakia, Poland, Czech Republic).

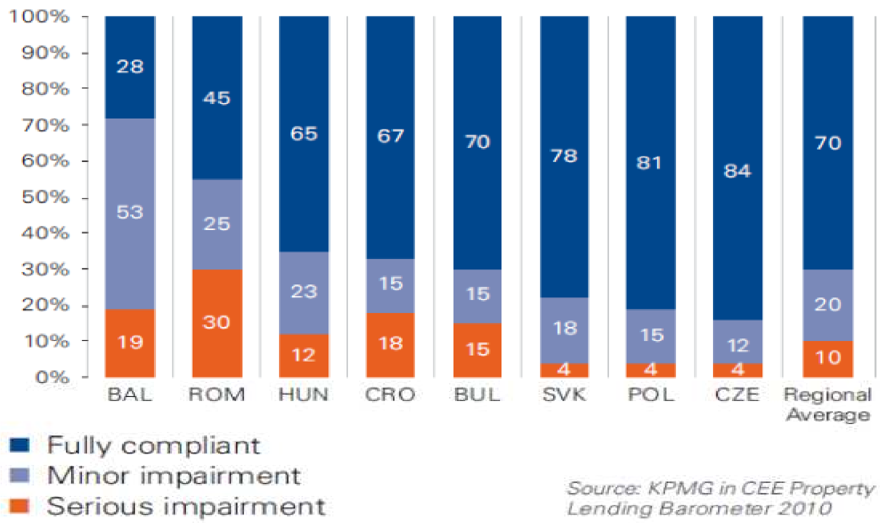

Figure 1. Impaired real estate loans

Another result of the study revealed that respondent banks believe that damaged exposures can be managed successfully by applying different restructuring techniques. On average, banks' positive responses on the use of restructuring techniques for real estate loans were of 60% for the countries considered, with a maximum recorded by Poland (over 80%).

4. Empirical Analysis of Credit Portfolio Heterogeneity in Selected EU Countries

In the following, we have analyzed a representative sample of EU countries, to highlight the extent to which the loan portfolio quality improvement, through the implementation of restructuring techniques, is homogeneous in the countries considered.

In their monthly reports, central banks do not publish distinctly the amount of loans that have undergone restructuring schemes, therefore there isn't a direct quantitative measure of this phenomenon in the banking systems. Hence, we included in the analysis several variables designed to provide an indirect overview on this issue. We considered net provisions' value, net interest income and capital and reserves amount, aggregated for the entire banking system, in the year 2009. To avoid that the final results should be distorted, we adjusted the value of each variable taking into account the country size effect, by reporting their gross values to the GDP level of each country. Data was taken from the OECD database, the bank profitability statistics section.

We have applied an exploratory type methodology, called Cluster Analysis, to gain an insight into those countries that meet similar characteristics, in terms of credit portfolio quality management. The core of Cluster Analysis is to identify similarities in the structure of variables, its purpose consisting in bringing together countries with similar characteristics into homogeneous groups called clusters. This method is not a typical statistical procedure, since it doesn't require the definition of an a priori hypothesis to be validated by calculation, but it identifies, on behalf of a series of algorithms, several homogeneous groups of countries, starting from the initial set of input variables.

The clustering algorithm is hierarchical, allowing the overcrowding, with priority, of countries that meet the highest degree of similarity (or smallest distance). The distance function between groups is calculated according to the Squared Euclidean distance, because it puts a greater emphasis on identifying countries that have extreme values for input variables. As a computational procedure, it represents the sum of squared geometric distances between countries in multidimensional space.

Squared Euclidean distance $(x,y) = \sum_i (x_i - y_i)^2$

A number of studies (Wolfson, Zagros, James 2004, Gutierrez, Sorensen 2006, Chung, Tijdens 2009) recommend this approach when it is intended to provide a greater weight to outliers. It should be noted that the squared Euclidean distance coefficient is a dissimilarity one. Therefore, the higher the value recorded, the more pronounced are the discrepancies among the countries considered.

The coefficients calculated will be the subject of another algorithm, called the Ward test, to facilitate mergers between groups with relatively similar characteristics. The result of this analysis is summarized in the form of a hierarchical tree (dendrogram), which illustrates the composition of each group and the distance between them.

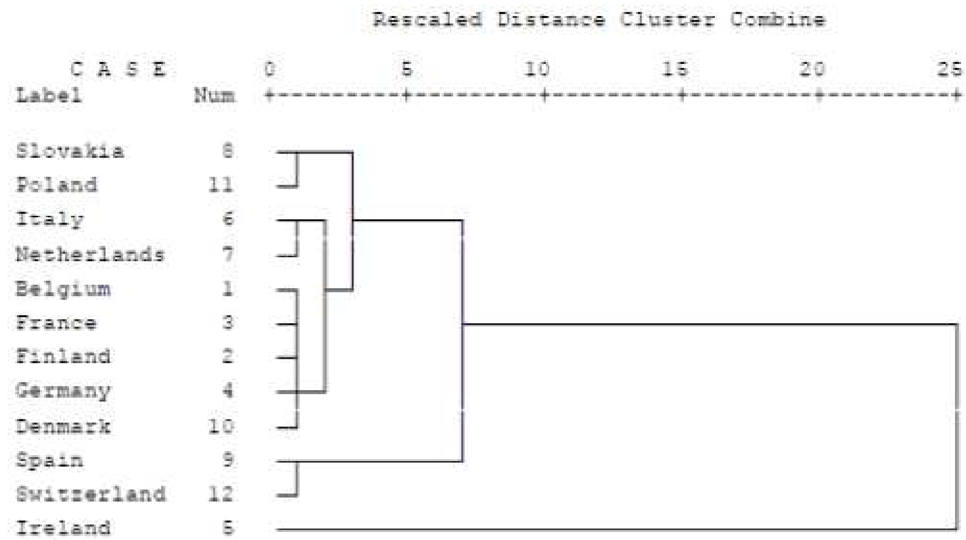

Figure 2. Dendrogram using Ward Method

It can be noticed the presence of three groups: one big group that gathers most of countries considered (Slovakia, Poland, Italy, Netherlands, Belgium, France, Finland, Germany and Denmark), which suggests, in the year 2009, a relative homogeneity in terms of capital adequacy for the purposes of managing credit risk; a group of two countries: Spain and Switzerland, and another one represented by a single country, namely Ireland, which records features substantially different from other EU countries.

This result is confirmed by reality. According to the Central Bank of Ireland, the Irish banking system was deeply affected by losses from the lending activity. In April 2011 has been launched the Financial Measures Programme, as part of the agreement with IMF, EC and the ECB, which aims to intensify efforts for banking system's stabilization, by asset sales measures, substantial increases in capital, reducing bank portfolio size to a sustainable level of the loan/deposit ratio.

5. Conclusions

In order that loan portfolios restructuring techniques be implemented and provide the desired result, monetary policy makers and government authorities must take steps to stabilize the economic and financial environment. It is, therefore, necessary to restore a certain predictability of interest rates, exchange rate, real asset prices, so that both debtors and creditors have a reference point when determining the terms of the new credit agreement.

Although, at present, the quality of loan portfolios in EU countries seems to have stabilized, it is not known the medium and long term impact of restructured loans. There is the risk that borrowers default again and restructured loans become nonperforming. Restructuring by modifying the original contract terms is seen as a way to save time, allowing the debtor to recover after his temporary financial difficulties. On the other hand, the restructuring of bad loans, represented by the impossibility of full repayment of the loan and interest on the original loan, is treated as a loss allocation process between the debtor and creditor.

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