

Instituto Superior de Ciências do Trabalho e da Empresa



HOW INFORMATIVE ARE CREDIT IMPAIRMENT DISCLOSURES?

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ABSTRACT

Credit impairment exists if there is objective and material evidence as a result of one or more events that impact negatively the fair value of a credit and occur after the initial recognition of the credit in the financial statements. Credit impairment can be defined as the difference between the assets carrying amount and the present value of estimated cash flows discounted at the credit's original effective interest rate. Quoted banks started to use this definition on their financial statements after the IFRS adoption on January 1, 2005. To provide evidence on the informativeness of this definition, I investigate the relation between credit impairment losses, return on assets and return on equity on the seven largest Portuguese banks (in total assets). The results suggest that credit impairment losses can predict return on assets and return on equity. The relation between these ratios and credit impairment is significant and negative. Thus, third parties like analysts or investors can use credit impairment losses to predict and compare the profitability of banks.

JEL Classification: G21, G28

Keywords: Credit risk, impairment, return on assets, return on equity, IASB, IAS 39.

Data availability: The data used in this Study can be obtained from public sources.

RESUMO

A imparidade do crédito verifica-se se existir uma evidência material e objectiva que resulte de um ou mais eventos, com impacto na redução do justo valor do crédito e que ocorram depois do seu reconhecimento inicial nas Demonstrações Financeiras. A imparidade do crédito pode ser definida como a diferença entre o valor de balanço e o valor actual dos *cash flows* futuros descontados à taxa de juro efectiva inicial. Os Bancos cotados começaram a utilizar este conceito depois da adopção das IFRS em 1 de Janeiro de 2005. De modo a evidenciar a utilidade desta informação, investiguei a relação entre imparidade do crédito, a rendibilidade dos activos e a rendibilidade do capital próprio nos sete maiores bancos portugueses (em activos totais). Os resultados empíricos sugerem que as perdas por imparidade do crédito podem prever a rendibilidade dos activos e a rendibilidade dos capitais próprios. A relação entre estes dois rácios e a imparidade do crédito, para além de ser significativa é negativa. Assim, entidades externas, como por exemplo analistas e investidores, podem utilizar as perdas por imparidade do crédito para prever e comparar a rendibilidade dos bancos.

Classificação do JEL: G21, G28

Palavras-chave: Risco de crédito, imparidade, rendibilidade dos activos, rendibilidade do capital próprio, IASB, IAS 39.

Disponibilidade de informação: A informação utilizada nesta dissertação pode ser obtida através de fontes públicas.

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1. Introduction

One of the biggest changes that the adoption of IFRS¹ implies to the banks is the credit impairment losses concept. Companies whose securities are admitted on the regulated markets within the European Union were demanded to prepare consolidated financial statements in accordance with international accounting standards starting in January 1, 2005². Banco de Portugal, as the Portuguese regulator and supervisor, transposed into local rules, the European Union regulation to have legal enforcement on the Portuguese banks. This rule was published on February 21, 2005 and it is called *Aviso nº1/2005*. Considering this legal environment, since then all quoted banks published their consolidated financial statements according to IFRS principles.

This study investigates the relation between credit impairment losses and the return on assets (ROA) and return on equity (ROE) indicators of the seven largest banks in Portugal. I collect four years of historical data from the consolidated financial statements reports. It is not possible to collect more historical information because IFRS have started to be applied in Portugal on 2005. Nevertheless, it is possible to consider 2004 data because in the financial statement reports of 2005, the comparative amount for the previous years is available in most cases. I use either annual or half year financial statement reports. The results suggest that credit impairment losses are informative measures of risk and they can be used to predict the return on assets and the return on equity of a bank.

A bank should identify and recognise impairment in a loan or a collectively assessed group of loans when it is probable that the bank will not be able to collect, or there is no longer reasonable assurance that the bank will collect, all amounts due according to the contractual terms of the loan agreement. The impairment should be recognised by reducing

¹ International Financial Reporting Standards (IFRS) were called IAS. International Accounting Standards Board (IASB) an independent body based in Europe changed their nomenclature on 2001, although, there are still some IAS in place.

² “For each financial year starting on or after 1 January 2005, companies governed by the law of a Member State shall prepare their consolidated accounts in conformity with the international accounting standards adopted in accordance with the procedure laid down in Article 6 if, at their balance sheet date, their securities are admitted to trading on a regulated market of any Member State within the meaning of Article 1 of Council Directive 93/22/EEC of 10 May 1993 on investment services in the securities field”, Article 4, Regulation No 1606/2002 of the European Parliament and of the Council of 19 July 2002 on the application of international accounting standards.

the carrying amount of the loan(s) through an allowance or charge-off and charging the income statement in the period in which the impairment occurs.³

Measuring credit impairment losses is a demanding task, mostly in terms of IT systems and data requirements. The methodology for capturing the impairment losses are driven to capture on the IT systems used for managing credit portfolios, information that allows the bank to calculate the credit impairment losses of their portfolios.

Although the size and the materiality of the credit portfolios must be considered, the methodology for calculating credit impairment losses is very similar across the banking industry. The general methodology can be defined as follows:

- To identify impairment triggers that will allow the classification of the credit portfolio in two groups: *credit with impairment indications* and *credit without impairment indications*. The impairment triggers must be based on available data⁴ derived from the banking IT systems that the bank believes can be the best to identify the credit with impairment indications⁵, for example, a client presents historical records of default on a specific bank or in the banking industry and the internal rating of the client is below a certain level⁶.

- To test the first group, *credit with impairment indications*. These tests must be made case by case. Each credit operation must be analyzed considering, for example, the type of loan, the collateralization level, the business sector where the client is operating and the specific market conditions. In the end of the individual tests, if the loan is considered *with impairment*, the bank must calculate the impairment losses for this loan. The credit impairment losses are the “difference between the asset’s carrying amount and the present value of estimated future cash flows (excluding future credit losses that have not been incurred) discounted at the financial asset’s original effective interest rate (i.e. the effective interest rate computed at initial recognition)”⁷. If the test presents that there is no evidence of credit impairment, this loan should be included on the second group, *credit without impairment indications*. This step allows the bank to determine, for this group, the credit impairment on an individual basis.

³ Sound practices for loan accounting, credit risk disclosure and related matters (October 1998), Consultative paper issued by Basle Committee on Banking Supervision.

⁴ If not available, the bank must adjust their business and IT processes in order to make it available.

⁵ Subject to the bank auditor’s opinion, as impairment is part of the financial statements report.

⁶ Assuming that the client is internal rated.

⁷ IAS 39, paragraph 63.

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- To test and determine the credit impairment losses of the second group. Although the individual credit impairment is already capture and measure, due to the diversity of the risks included on a credit portfolio, it is expected for this group that the bank will also incur on future losses. The main reason for that are the historical observed losses for this second group.

- To sum the amounts calculated for group one and for group two. This amount is the impairment losses of the credit portfolio of a bank.

The investments made by the banking industry to measure credit impairment losses are now decreasing since the first time adoption of IFRS. Although some improvements on the internal processes are being made to capture more effectively and accurately the credit impairment, the major investment was made on 2004 and 2005 (the year before and the year of the first calculation).

The return on assets (ROA) indicator is a measure of a company's profitability, equal to a fiscal year's Earnings Before Interests and Taxes (EBIT) divided by its total operating assets, expressed as a percentage. The ROA indicator represents how effectively a business has been using its operating assets. The ROA is a test of capital utilization - how much profit (before interest and income tax) a business earned on the total capital used to make that profit. The utilization of this indicator is often used jointly with the average interest rate of a company debt.

The Return on Equity (ROE) indicator is “a measure of how well a company used reinvested earnings to generate additional earnings, equal to a fiscal year's after-tax income (after preferred stock dividends but before common stock dividends) divided by equity/book value, expressed as a percentage. It is used as a general indication of the company's efficiency; in other words, how much profit it is able to generate given the resources provided by its stockholders. Investors usually look for companies with returns on equity that are high and growing.”⁸ ROE might also indicate if the profits of the company are growing without any additional capital from the shareholders. An increasing observed ROE can indicate that a company is being well managed in terms of investing shareholders capital and is able to distribute a higher percentage of dividends to the shareholders.⁹

⁸ ROE. InvestorWords.com. Retrieved July 13, 2008, from InvestorWords.com website: <http://www.investorwords.com/4315/ROE.html>.

⁹ The dividends paid to shareholders depends on the future investments of the company, also linked to the budget and capital projections for next years.

After the implementation of IFRS, ROA and ROE indicators have increased as observed from public information disclosures. This effect may result by the guidelines included in IFRS that in some cases allow the companies to recognise, measure and record some assets and liabilities at the fair value (with reflects on the Statement on Income¹⁰) against the local GAAP¹¹, that usually considers only the historical cost¹² to recognize, measure and record assets and liabilities. This difference between IFRS and local GAAP are mostly on non-US countries, because USGAAP¹³ already allows in some cases the fair value principle for recognising, measuring and recording assets and liabilities of a company.

Due to the specificities of the banking industry, the ROA indicator does not present very high values. Nevertheless, ROA is an important indicator to this industry as it measures how efficiently the operating assets are being used.

No previous work investigates the relation between credit impairment losses and ROA or ROE. There are not many work performed, regarding credit impairment losses or even impairment losses in a more general way. In fact, Peasnell (2005) explains the changes in the banking industry regarding the recognition and measurement of the financial assets and liabilities, from the historical cost to a fair value approach. He also explains in detail the recent evolutions of IAS 39¹⁴, referring the amendments that were made in order to converge to its equivalent in USGAAP, the SFAS n° 133¹⁵. Research by Cortavarria, Dziobek, Kanaya and Song (2002) indicate that “The notion of performing and non-performing loans is often used as a proxy for asset quality of a particular bank or banking system.” The objective of this study is similar. They also indicate that the non-performing loan definition can vary across country, so the comparison between countries with different GAAP’s should be made carefully. This study will avoid this issue as I only analyse Portuguese banks subject to the same GAAP.

The remainder of the paper proceeds as follows: Chapter 2 presents the testing framework, Chapter 3 describes the data and the descriptive statistics, Chapter 4 presents the results and Chapter 5 contains some concluding remarks.

¹⁰ Statement of Income is also called Profit and Loss Statement.

¹¹ Generally Accepted Accounting Principles.

¹² Historical cost is also called Acquisition cost.

¹³ United States Generally Accepted Accounting Principles.

¹⁴ IAS 39 – International Accounting Standard 39: Financial Instruments: Recognition and Measurement.

¹⁵ SFAS n° 133 – Statement of Financial Accounting Standards n°133: Accounting for Derivative Instruments and Hedging Activities.

2. Testing the Predictive Power of Credit Impairment

The impairment losses are usually calculated on a monthly basis. The provision for impaired loans must reflect the actual difference between the assets carrying amount and the present value of estimated cash flows discounted at the credit's original effective interest rate.

The main goal of the credit impairment utilizations is to reflect and to present accurately the actual value of loans and advances to costumers in order to present the financial statements for a reliable interpretation.

Each time a bank calculates the credit impairment losses, the actual value of the credit portfolio can be derived. If the actual value a loan¹⁶ is lower than the one calculated in the last period, a cost is incurred and must be recorded on the Statement of Income in a specific item "Loans impairment net of reversals recorded". If the actual value of a loan is higher¹⁷ than the one calculated in the last period, due to a reduction of the credit impairment, a profit is recorded on the same item referred above.

To investigate whether credit impairment losses are a reliable source to predict ROA or ROE, monthly data would be the best source of information¹⁸, as more data points could be considered on the study. Unfortunately, this information is not made available to the market, so I use only the information published on the financial statement reports (half year and year end).

To investigate the relation between ROA and ROE with credit impairment losses, I perform a linear regression analysis and so, the following equation is estimated:

$$Y = \alpha + \beta_i \times X_i + \varepsilon_i \quad (1)$$

The variable Y is the dependent variable (ROA or ROE). The independent variables used are represented by Xi. I estimate α and β parameters and test different models by

¹⁶ Although banks usually calculate credit impairment losses on a loan base, they are accounted as a group and presented in the Balance Sheet or in the Statement of Income in the same item.

¹⁷ An increase on the value of a loan can be observed mainly because of credit restructuring, the efficiency of the recovery process or even due to additional information not available or not considered on the previous analysis.

¹⁸ In case monthly information can be made available, it should also be considered the reliability of this information, as monthly information usually in not subject to external audit. In fact, external auditors in Portugal only issue an audit report / opinion to the half year and the year end financial statement reports.

inserting different variables in order to identify a meaningful model that is statistically significant.

I perform multicollinearity analysis to β parameters and I analyse the heteroscedasticity and autocorrelation of the errors.

If credit impairment losses are informative for ROA and ROE indicators β parameters should be different from 0. The R-square should present significant values, which means that the variation in Y (ROA or ROE) is explained by the independent variables X_i .

3. Data and Descriptive Statistics

3.1. The bank sample

This analysis is made for the Portuguese market and so, all of the banks on the scope of this study will be Portuguese or foreign banks with banking activity in Portugal. All data is at the consolidated level of the banks that are under the direct supervision of Bank of Portugal. That means, the information used for each bank selected will include the information of the branches and subsidiaries, even if they are foreign, that are under the consolidated level of the Portuguese group.

The criteria for including banks in the sample is the total assets, published on the financial statement reports of year ended on December 2007.

The source for selecting the bank sample for this study is the publication from ‘Associação Portuguesa de Bancos’¹⁹. This document is called ‘Boletim Informativo nº41’ and it is dated from July 2008. I consider the 7 biggest banks in total assets, which represent about 91% of the total assets of the banks operating in Portugal. Table 1 and Figure 1 describe the sample used.

The credit portfolio is the largest asset category on the Balance Sheet of the banks. In fact, in the sample used, credit portfolios represent 63.1% of total assets²⁰.

All bank data used in this study is published on the financial statement reports since January 1, 2005 until December 31, 2007. It is not possible to consider information previous to the one published on the financial statement reports of 2005, because the adoption of IFRS for banks in Portugal was in January 1, 2005²¹. Analyzing the financial statement reports of 2005, we can also obtain information for 2004 because the banks reported next to the data of 2005 the comparable data of 2004, according to IFRS principles²².

¹⁹ *Associação Portuguesa de Bancos*, was created on 1984 and its mission is basically to represent the associated banks that represents almost all national banks, as foreign ones, and that held banking activity in Portugal (the associated banks represents about 94% of the total assets of the Portuguese banking sector).

²⁰ Boletim Informativo nº41, Associação Portuguesa de Bancos, July 2008.

²¹ As it is defined on Aviso nº1/2005 issued by Bank of Portugal on February 21, 2005.

²² IAS 1 defines in paragraph 36, that comparative information shall be disclosed in respect of the previous period for all amounts reported in the financial statements.

3.2. Loans and advances to costumers and impairment losses

I consider two observation points in a year: June 30 and December 31. So, I collect all the data used on this study on the financial statement reports for half year (June 30) and the financial statement reports for the year end (December 31). The data is collected directly from the financial statements and from the notes to the financial statements.

For testing the predictive power of credit impairment losses for ROA and ROE, I use the following variables: loan and advances to costumers (LAC), coverage of loans and advances to costumers by provisions for impaired loans and advances to costumers recorded on the Balance Sheet (CLACP) and loans impairment net of reversals recorded on Statement of Income (LINR). Table 2, Figure 2, Figure 3 and Figure 4 show in detailed Loan and advances to costumers, provision for impaired loans and advances to costumers (Balance Sheet amounts) and loan impairment net of reversals and recoveries (Statement of Income amounts), for the seven largest banks operating in Portugal in December 2007.

Loans and advances to costumers are increasing across time. This fact is consistent to the increasing and development of the banking industry in Portugal. Figure 5 shows this evolution in detail.

As loans and advances to costumers (LAC) are presented in thousands of Eur, I use the logarithmic function to convert the amounts in Eur to a logarithmic scale.

The banks must present the appropriate level of coverage of the credit portfolio by provisions for impaired loans in order to present their financial statements without any distortions that can mislead the correct interpretation of the amounts disclosed.

Coverage of loans and advances to costumers by provisions for impaired loans and advances to costumers recorded on the Balance Sheet (CLACP) is an important variable that reflects the evaluation of the credit portfolio by the bank, in terms of credit recovering. The ratio can be calculated as follows:

$$CLACP = \frac{(\text{Provision_for_impaired_Loans_and_advances_to_costumers})}{LAC} \quad (2)$$

Figure 6 presents CLACP for the largest seven banks operating in Portugal on the observation period.

Loans impairment net of reversals recorded on Statement of Income (LINR) are presented in thousands of Eur. I use the logarithmic function to convert the amounts in Eur to a logarithmic scale.

Figure 7 presents LINR for the largest seven banks operating in Portugal on the observation period.

Table 3, Table 4 and Table 5 presents the descriptive statistics of the independent variables: LAC, CLACP and LINR by bank.

3.3. Return on assets

The return on assets is published on the financial statement reports for half year (June 30) and the financial statement reports for the year end (December 31). One issue that might be raised could be the fact of considering the return on assets of half of the year can mislead the interpretation of the results. That fact is not correct, because what return on asset measures is how many basis points the total assets of the bank generate, in a specific period. So, when I consider the return on assets for half of the year results, I am considering how many basis points, a bank with a certain amount of Loans to costumers and Impairment losses generate. Similar argument can be used for the year end results.

The ROA is the fiscal year's Earnings Before Interests and Taxes (EBIT) divided by its total operating assets:

$$ROA = \frac{EBIT}{TotalOperatingAssets} \quad (3)$$

Figure 8 presents ROA for the largest seven banks operating in Portugal on the observation period.

3.4. Return on equity

Return on equity considered is published on the financial statement reports for half year (June 30) and the financial statement reports for the year end (December 31). Considering the credit impairment losses recorded on the Statement of Income, I will be able to investigate the connection between these amounts and the profitability of shareholders equity, on the same period.

Regarding the usage of half year and year end values, the interpretation made on subsection 3.3 (Return on assets) can also be made.

The ROE is equal to a fiscal year's after-tax income (after preferred stock dividends but before common stock dividends) divided by book value or equity:

$$ROE = \frac{NetIncome}{BookValue} \quad (4)$$

Figure 9 presents ROE for the largest seven banks operating in Portugal on the observation period.

The descriptive statistics for the independent and dependent variables are presented on Table 6.

4. Results

I test the informativeness of credit impairment losses on return on assets (ROA) and on return on equity (ROE), by performing a linear regression with the following independent variables: coverage of loans and advances to costumers by provisions for impaired loans and advances to costumers recorded on the Balance Sheet (CLACP), loans and advances to costumers (LAC) and loans impairment net of reversals recorded on Statement of Income (LINR).

First, I estimate the regression on equation (1) for ROA and ROE only with one independent variable, CLACP; second, I include the other independent variable, LAC and I compare the results; third, I include the last independent variable, LINR and after analysing all the results, I choose the best regression model for the purpose of this study.

The results are presented in Table 7.

4.1. Model selection

Considering the coefficient of determination R-square and the results of the t-statistic for all regressions performed, I conclude that the best model for predicting return on assets and return on equity are in both cases the ones that includes the three independent variables: CLACP, LAC and LINR. So, the models selected for ROA and ROE are respectively model 3 model 6, as presented on Table 7.

The R-square observed is for ROA model is 33.7% and for ROE model is 51.9%. These results gives an intuition that these models have predictive power and are significant for predicting ROA and ROE indicators.

The most complete estimated regression equation for ROA is:

$$ROA = -0.005 - 0.136 \times CLACP + 0.002 \times LAC - 0.001 \times LINR + \varepsilon_i \quad (5)$$

The most complete estimated regression equation for ROE is:

$$ROE = -0.101 - 5.264 \times CLACP + 0.049 \times LAC - 0.024 \times LINR + \varepsilon_i \quad (6)$$

If credit impairment losses are informative for ROA and ROE indicators, β parameters will be statistically significant. The R-square should present high values, which means that the variations in Y (ROA or ROE) are mainly explained by the independent variables X_i . The linear regression will be meaningful, if β parameters for the independent variables (X_i) are statistically significant and the normality of the errors can be assumed.

4.2. Statistical tests for Return on assets model

I perform the F-test²³, which presents satisfactory results. All results for the variables entered into the model are significant for a confidence interval of 95%, except for CLACP variable that presents a t-test result of 0.056.

For the multicollinearity²⁴ analysis, I check the Variance Inflation Factor (VIF) and I conclude that all the independent variables do not present apparently any multicollinearity, as the VIF present results lower than 10²⁵. Table 8 presents the results of this analysis.

For a more detail analysis of multicollinearity, I check the Collinearity Diagnostics, i.e. Variance Proportions. So, I conclude that there is no evidence that the independent variables present multicollinearity. Table 9 presents these results.

To analyze the normality of the errors I check the histogram for the standardized residuals and a Normal P-P Plot of Regression Standardized Residual (Figure 10 and Figure 11). From their interpretation it can not be rejected the possibility of the errors distribution is normal.

4.3. Statistical tests for Return on equity model

I perform the F-test, which presents satisfactory results. All results are for the variables entered into the model are significant for a confidence interval of 95%.

²³ F-Test tests globally the model. The null hypothesis is that β_i coefficients are equal to 0.

²⁴ The multicollinearity on a linear regression model influences the ability of estimating the dependent variable by the independent variables.

²⁵ Neter, Wasserman, and Kutner recommend looking at the largest VIF value. A value greater than 10 is an indication of potential multicollinearity problems.

For the multicollinearity analysis, I check the Variance Inflation Factor (VIF) and I conclude that all the independent variables do not present apparently any multicollinearity, as the VIF present results lower than 10. Table 8 presents the results of this analysis.

For a more detail analysis of multicollinearity, I check the Collinearity Diagnostics, i.e. Variance Proportions. So, I conclude that there is no evidence that the independent variables present multicollinearity. Table 10 presents these results.

To analyze the normality of the errors I check the histogram for the standardized residuals and a Normal P-P Plot of Regression Standardized Residual (Figure 12 and Figure 13). From their interpretation it can not be rejected the possibility of the errors distribution is normal.

4.4. Results for Return on asset model

The estimated equation (5) indicates that return on assets is positive correlated with loan and advances to costumers (LAC) and negative correlated with coverage of loans and advances to costumers by provisions for impaired loans and advances to costumers recorded on the Balance Sheet (CLACP) and loans impairment net of reversals recorded on Statement of Income (LINR). It is observed that banks with higher amounts of loan and advances to costumers and less provisions associated to these loans, either recorded on Balance Sheet or in Statement of Income, have a higher return on assets ratio.

In fact, the contribution of each of the independent variables to return on assets is as follows:

- LAC: 1% of variation in LAC implies an increase in ROA of 0.002%;
- CLACP: 1% of variation in CLACP implies a decrease in ROA of 0.136%; and
- LINR: 1% of variation in LINT implies a decrease in ROA of 0.001%.

4.5. Results for Return on equity model

The estimated equation (6) indicates that return on equity is positive correlated with loan and advances to costumers (LAC) and negative correlated with coverage of loans and advances to costumers by provisions for impaired loans and advances to costumers recorded

on the Balance Sheet (CLACP) and loans impairment net of reversals recorded on Statement of Income (LINR). It is observed that banks with higher amounts of loan and advances to costumers and less provisions associated to these loans, either recorded on Balance Sheet or in Statement of Income, have a higher return on equity ratio.

In fact, the contribution of each of the independent variables to return on equity is as follows:

- LAC: 1% of variation in LAC implies an increase in ROE of 0.049%;
- CLACP: 1% of variation in CLACP implies a decrease in ROE of 5.264%; and
- LINR: 1% of variation in LINT implies a decrease in ROE of 0.024%.

4.6. Analysis on the results

Although, return on assets and return on equity are different measures that capture different effects and provide different conclusions in terms of profitability of a bank, I can conclude that the banks with larger credit portfolios and low level of provisions for impairment losses associated with those credit portfolios, tend to present higher values for these ratios and so, are more profitable.

On the other side, the correct valuation of the credit portfolios is a regulatory requirement arising from IAS/IFRS adoption. That means banks can not underestimate the level of provisions for impairment losses in order to improve their profitability, as they are subject to strict audit and supervisory processes, either conducted by external auditors of the bank or by supervisory and regulatory entities: Banco de Portugal and CMVM²⁶ (banks whose securities are admitted on the regulated markets).

²⁶ Comissão do Mercado de Valores Mobiliários (CMVM) is the Portuguese Securities Market Commission. It was established in April 1991 with the task of supervising and regulating securities and other financial instruments markets (traditionally known as “stock markets”), as well as the activity of all those who operate in these markets.

5. Conclusions

This study investigates the relation between credit impairment losses and return on assets and return on equity ratios for the seven largest banks operating in Portugal. The informativeness of credit impairment losses is of considerable interest, as Bank of Portugal requires banks to calculate and present credit portfolios value based on the impairment concept since January 1, 2005.

The objective of financial statements is to provide information about the financial position, performance and changes in financial position of an entity, that is useful to a wide range of users in making economic decisions²⁷. I perform this study because credit and advances to costumers represents the majority of the total assets of a bank, return on assets and return on equity are important measures of the performance of a bank and, until now, there is no evidence if credit impairment losses can predict future return on assets and return on equity.

I find that return on assets and return on equity ratios are significantly related to credit impairment losses. This indicates that analysts or investors can use credit impairment losses to compare and predict the profitability of banks.

The relation between return on assets / return on equity and credit impairment losses is negative and significant That means banks with higher loan and advances to costumers, but less covered by provisions for impaired loans and advances to costumers recorded on the Balance Sheet and with lower loans impairment net of reversals recorded on statement of income present high return on assets and return on equity ratios.

Although portuguese banks do not need to improve their impairment models in order to comply with the actual regulatory requirements applicable in Portugal, the evidence suggests that banks with robust impairment models that do not overestimate the level of provisions for credit impairment losses can benefit in terms of profitability.

The level of provisions for credit impairment losses is subject to the external auditor's opinion and to the supervision and regulation of Banco de Portugal and CMVM, so investors

²⁷ International Financial Reporting Standards (IFRSs®) including International Accounting Standards (IASs®) and Interpretations as at 1 January 2008, International Accounting Standards Board®, 2008, Framework for the Preparation and Presentation of Financial Statements, paragraph 12.

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and shareholders can be assured about the provisioning level of a bank. Since the IFRS adoption, more detail on the disclosure of loans and advances to costumers and the disclosure of provisions for credit impairment losses were requested.

The governance processes regarding credit policies in portuguese banks are also being enhanced since then.

However, nowadays the regulatory requirements are increasing to improve the level of information available for third parties and so, banks should continue the enhancement of their processes in order to calculate and to disclose more accurately loan and advances to costumers and provisions for credit impairment losses on their financial statement reports.

References

International Financial Reporting Standards (IFRSs®) including International Accounting Standards (IASs®) and Interpretations as at 1 January 2008, International Accounting Standards Board®, 2008

Regulation No 1606/2002 of the European Parliament and of the Council of 19 July 2002 on the application of international accounting standards

Aviso nº1/2005 (February 21, 2005), Banco de Portugal

Consultative paper issued by the Basle Committee on Banking Supervision, *Sound Practices for Loan Accounting, Credit Risk Disclosure and Related Matters*, (October 1998)

Peasnell, Ken (2005), *Institution-specific Value*, BIS Working Paper No 210, Bank for International Settlements

Cortavarria, Luis and Dziobek, Claudia and Kanaya, Akihiro and Song, Inwon, *Loan Review, Provisioning, and Macroeconomic Linkages*, IMF Working Paper, December 2000

Neter, Wasserman and Kunter, *Applied Linear Statistical Models*, 3rd ed., 1990, Irwin

Boletim Informativo nº36, Associação Portuguesa de Bancos, December 2005

Boletim Informativo nº37, Associação Portuguesa de Bancos, June 2006

Boletim Informativo nº38, Associação Portuguesa de Bancos, December 2006

Boletim Informativo nº39, Associação Portuguesa de Bancos, July 2007

Boletim Informativo nº40, Associação Portuguesa de Bancos, November 2007

Boletim Informativo nº41, Associação Portuguesa de Bancos, July 2008

Web sites

Associação Portuguesa de Bancos, www.apb.pt

International Accounting Standards Board®, www.iasb.org

Bank for International Settlements, www.bis.org

How Informative are Credit Impairment Disclosures?

Banco de Portugal, www.bportugal.pt

Comissão do Mercado de Valores Mobiliários, www.cmvm.pt

Investor words, <http://www.investorwords.com>

Table 1: Total assets of the largest seven banks operating in Portugal in amounts at December 2007

(amounts in thousands of Eur)

Bank	Abreviation	Total Assets on December 2007
Caixa Geral de Depósitos	CGD	103,553,764
Banco Comercial Português	BCP	88,166,161
Banco Espírito Santo	BES	68,354,713
Banco Santander Totta (1)	BST	42,002,504
Banco Português de Investimento	BPI	40,545,949
Caixa Económica Montepio Geral	CEMG	16,898,729
Banco Internacional do Funchal	BANIF	10,760,960
Total considered on this analysis		370,282,780
Total assets of banks with operating activity on Portugal		404,849,000
% under analysis		91%

Notes:

The total assets of banks with banking activity in Portugal according to Associação Portuguesa de Bancos (APE) on December 2007, Boletim informativo nº41, Associação Portuguesa de Bancos, July 2008.

(1) Total assets for Santander Totta SGPS.

Table 2: Loans and advances to costumers, provision for impaired loans and advances to costumers and loan impairment net of reversals and recoveries of the largest seven banks operating in Portugal in amounts at December 2007

(amounts in thousands of Eur)

Bank	Abreviation	Loans and advances to costumers (1)	Provision for impaired loans and advances to costumers (2)	Loan impairment net of reversals and recoveries (3)	ROA	ROE
Caixa Geral de Depósitos	CGD	68,573,149	1,728,849	249,439	0.91%	17.10%
Banco Comercial Português	BCP	66,872,781	1,222,332	260,249	0.60%	13.70%
Banco Espírito Santo	BES	43,160,658	990,395	213,184	0.98%	16.60%
Banco Santander Totta (4)	BST	28,359,271	441,995	64,843	1.00%	24.00%
Banco Português de Investimento	BPI	27,603,225	372,712	112,265	1.00%	22.40%
Caixa Económica Montepio Geral	CEMG	14,903,494	298,047	86,322	0.41%	7.78%
Banco Internacional do Funchal	BANIF	8,816,168	196,601	27,407	1.02%	19.30%
Total considered on this analysis		258,288,746	5,250,931	1,013,709		

Notes:

(1) Gross amount, before deduction of impairment losses.

(2) Balance Sheet amounts.

(3) Statement of Income amounts.

(4) Total assets for Santander Totta SGPS.

Table 3: Loans and advances to costumers (LAC) by bank in million of Euros

(amounts in millions of Eur)

Bank	N	Mean	Minimum	Maximum	Standard Deviation	Growth %
CGD	8	54,748	46,399	68,573	8,242	48%
BCP	7	57,362	51,677	66,873	16,951	29%
BES	8	33,773	28,100	43,161	17,742	54%
BST	7	27,780	24,697	30,769	10,788	25%
BPI	7	23,255	19,290	27,603	8,798	43%
CEMG	7	13,059	10,686	14,903	1,628	39%
BANIF	7	6,954	5,633	8,816	1,127	56%

Notes:

Minimum - The minimum values are observed on 2004 (half of year or year end amounts, according to data availability) for all banks.

Maximum - The maximum values are observed on December 2007 for all banks.

Growth - From first observation to the last.

Table 4: Coverage of loans and advances to costumers by provisions for impaired loans and advances to costumers recorded on the Balance Sheet (CLACP) by banks in percentage

Bank	N	Mean	Minimum	Maximum	Standard Deviation
CGD	8	2.67%	2.52%	2.88%	0.13%
BCP	7	2.27%	1.83%	2.59%	0.30%
BES	8	2.55%	2.29%	2.81%	0.19%
BST	5	1.68%	1.52%	1.80%	0.11%
BPI	7	1.38%	1.22%	1.54%	0.12%
CEMG	7	2.50%	1.96%	3.14%	0.48%
BANIF	7	2.24%	2.15%	2.33%	0.07%

Table 5: Loans impairment net of reversals recorded on Statement of Income (LINR) by banks in percentage in million of Euros

(amounts in millions of Eur)

Bank	N	Mean	Minimum	Maximum	Standard Deviation
CGD	8	186	92	252	76
BCP	8	128	71	260	57
BES	8	158	79	226	60
BST	7	48	2	109	38
BPI	8	58	27	112	27
CEMG	7	63	42	86	18
BANIF	5	25	10	34	10

Table 6: Variable descriptive statistics

Variable	Unit	N	Minimum	Maximum	Mean	Standard Deviation
LAC	millions of EUR	51	5,633	68,573	31,511	18,505
CLACP	percentage	50	1.00	3.00	2.22	0.50
LINR	millions of EUR	51	1.76	260.25	100.78	73.03
ROA	percentage	50	0.21	1.00	0.76	0.25
ROE	percentage	53	5.00	26.00	17.70	6.22
Valid N (listwise)		45				

Notes:

LAC - Loans and advances to costumers.

CLACP - Coverage of loans and advances to costumers by provisions for impaired loans and advances to costumers recorded on the Balance Sheet.

LINR - Loans impairment net of reversals recorded on Statement of Income.

ROA - Return on assets.

ROE - Return on equity.

Table 7: Model significance: return on assets and return on equity model results

	ROA Models			ROE Models		
	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6
Constant	0.012	0.001	-0.005	0.321	0.034	-0.101
CLACP	-0.182 (0.014)	-0.2 (0.005)	-0.136 (0.056)	-6.52 (0.000)	-6.959 (0.000)	-5.264 (0.000)
LAC		0.001 (0.017)	0.002 (0.001)		0.029 (0.003)	0.049 (0.000)
LINR			-0.001 (0.013)			-0.024 (0.003)
N	50	50	50	50	50	50
F-test	6.601	6.730	6.954	18.572	15.854	15.460
T-test	0.014	0.003	0.001	0.000	0.000	0.000
R-square	12.8%	23.4%	33.7%	28.3%	40.8%	51.9%

Notes:

Model 1 - Independent variables: CLACP.

Model 2 - Independent variables: CLACP, LAC.

Model 3 - Independent variables: CLACP, LAC, LINR.

Model 4 - Independent variables: CLACP.

Model 5 - Independent variables: CLACP, LAC.

Model 6 - Independent variables: CLACP, LAC, LINR.

Independent and dependent variables:

ROA - Return on assets.

ROE - Return on equity.

CLACP - Coverage of loans and advances to costumers by provisions for impaired loans and advances to costumers recorded on the Balance Sheet.

LAC - Loans and advances to costumers.

LINR - Loans impairment net of reversals recorded on Statement of Income.

Table 8: Collinearity statistics for return on assets and return on equity models

	Model 3		Model 6	
	Collinearity Statistics		Collinearity Statistics	
	Tolerance	VIF	Tolerance	VIF
CLACP	0.8610	1.1614	0.8413	1.1886
LAC	0.6141	1.6285	0.7232	1.3828
LINR	0.5458	1.8322	0.6238	1.6030

Notes:

Model 3 - Selected return on assets model.

Model 6 - Selected return on equity model.

Table 9: Collinearity diagnostics to ROA model

Collinearity Diagnostics^a

Model	Dimension	Eigenvalue	Condition Index	Variance Proportions			
				(Constant)	CLACP	LAC	LINR
1	1	3,941	1,000	,00	,00	,00	,00
	2	,032	11,088	,01	,94	,01	,07
	3	,025	12,493	,04	,00	,01	,60
	4	,002	50,037	,95	,05	,98	,32

a. Dependent Variable: ROA

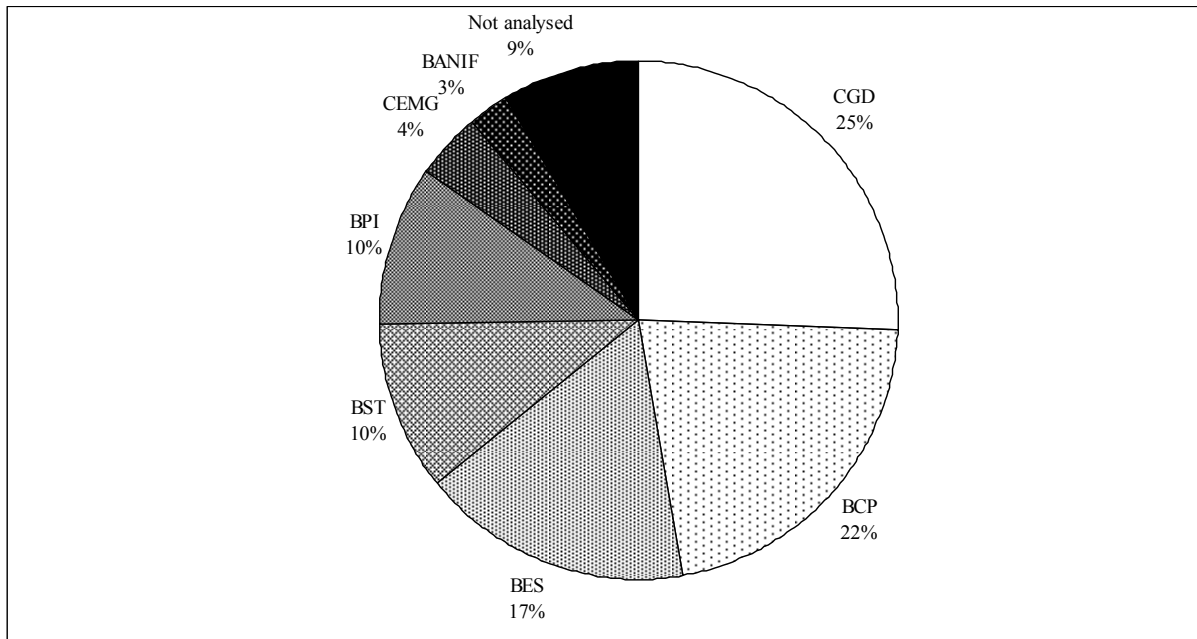
Table 10: Collinearity diagnostics to ROE model

Collinearity Diagnostics^a

Model	Dimension	Eigenvalue	Condition Index	Variance Proportions			
				(Constant)	CLACP	LAC	LINR
1	1	3.931	1.000	.00	.00	.00	.00
	2	.036	10.488	.02	.01	.01	.73
	3	.032	11.083	.01	.94	.01	.04
	4	.002	48.075	.97	.05	.98	.22

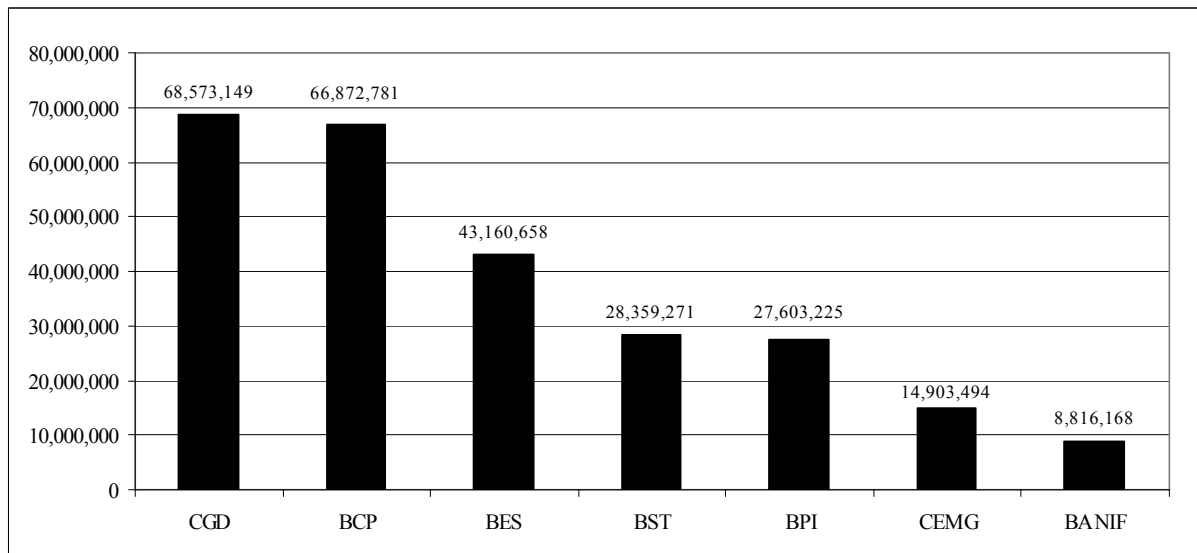
a. Dependent Variable: ROE

Figure 1: Largest seven banks operating in Portugal in percentage (total assets)



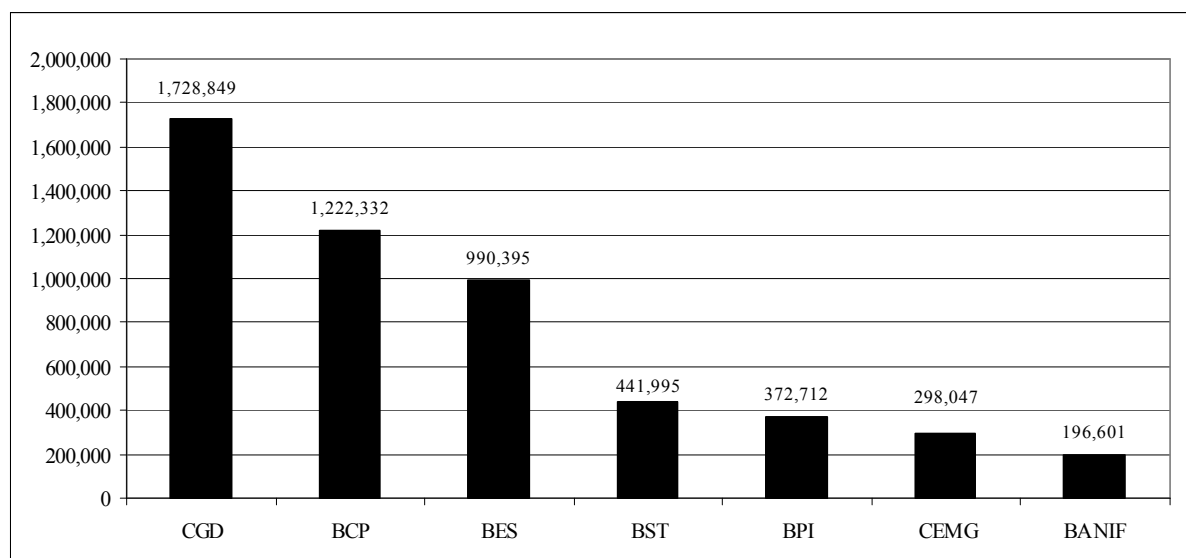
Notes: Total assets of the banks operating in Portugal at December 31, 2007.

Figure 2: Loans and advances to costumers of the largest seven banks operating in Portugal in amounts at December 2007



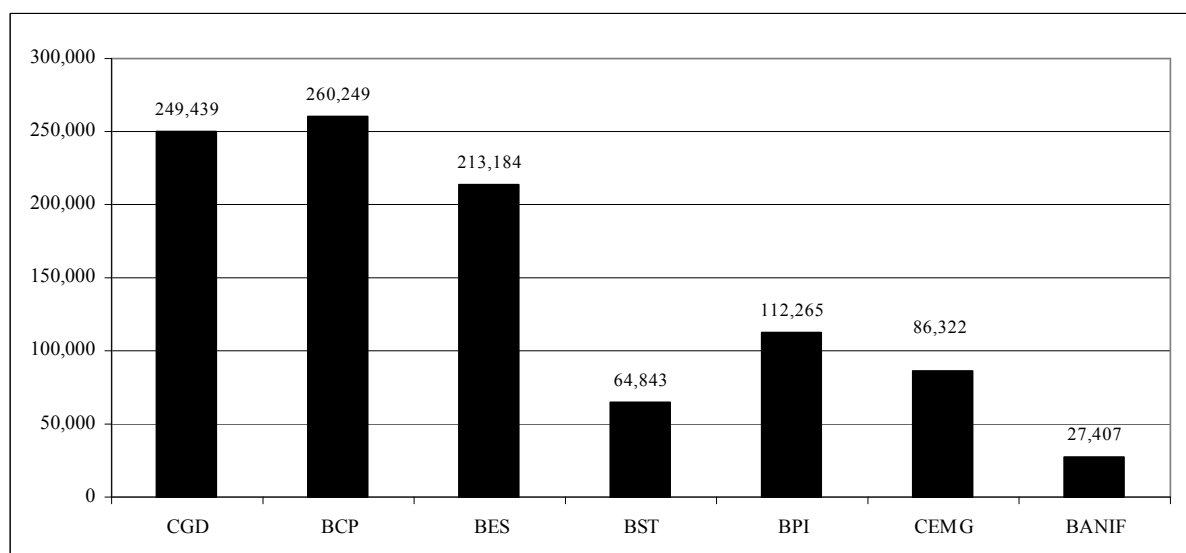
Notes: Loans and advances to costumers (Balance Sheet) in thousands of Euros at December 31, 2007.

Figure 3: Provision for impairment loans and advances to costumers of the largest seven banks operating in Portugal in amounts at December 2007



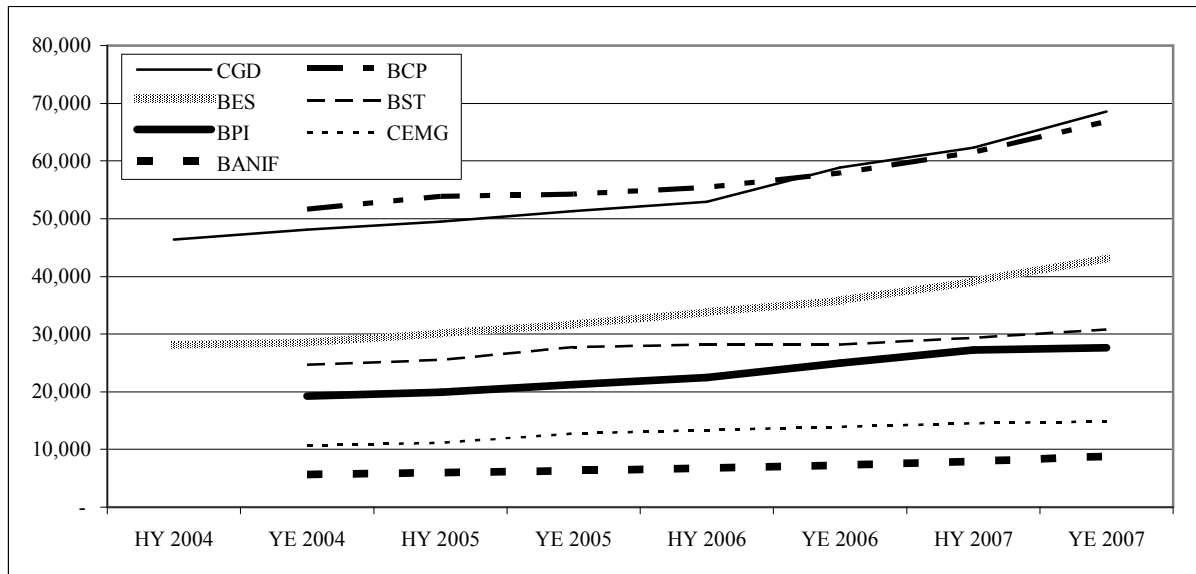
Notes: Provision for impaired loans and advances to costumers (recorded on the Balance Sheet) in thousands of Euros at December 31, 2007.

Figure 4: Provision for impairment loans and advances to costumers of the largest seven banks operating in Portugal in amounts at December 2007



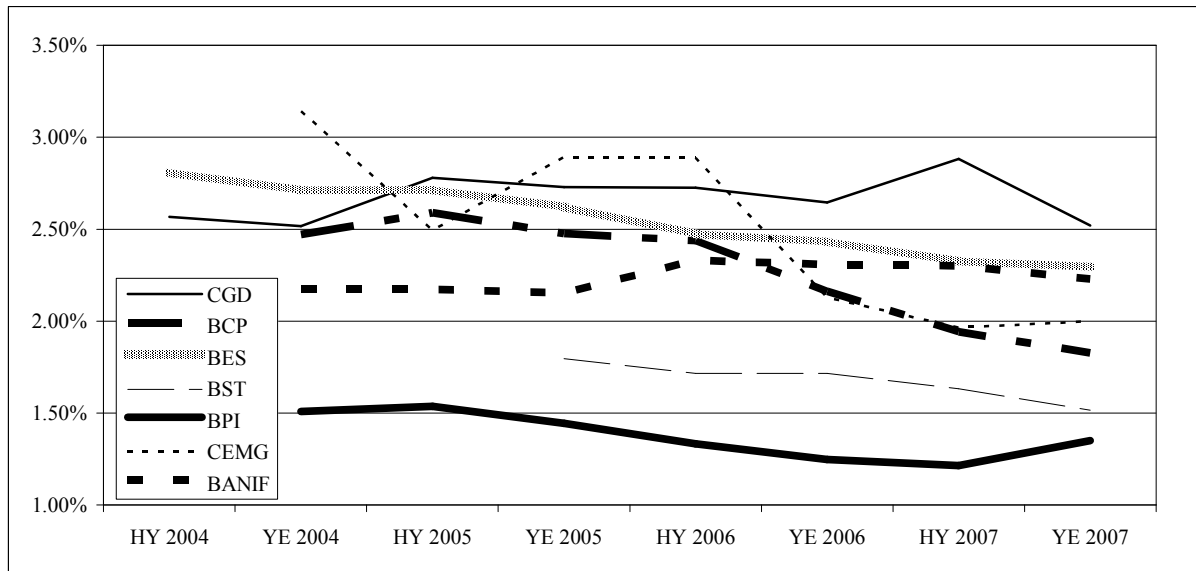
Notes: Loan impairment net of reversals and recoveries (recorded on the Statement of Income) in thousands of Euros at December 31, 2007.

Figure 5: Loans and advances to costumers in millions of Euros of the largest seven banks operating in Portugal



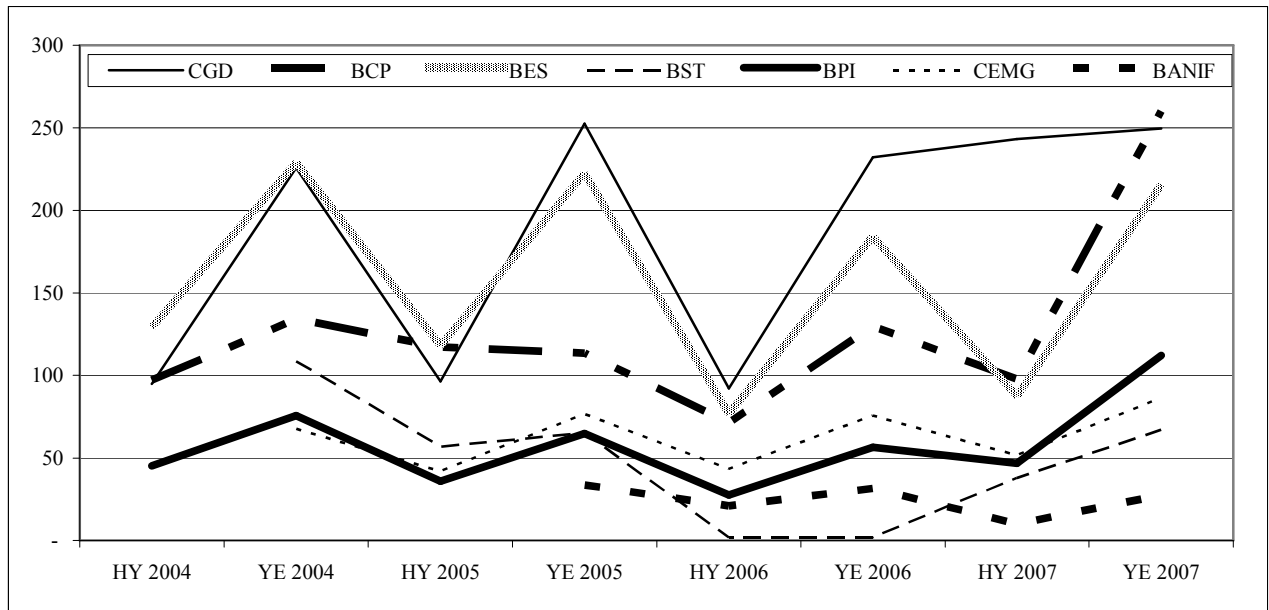
Notes: HY = Half Year
YE = Year End

Figure 6: Coverage of loans and advances to costumers by provisions for impaired loans and advances to costumers recorded on the Balance Sheet of the largest seven banks operating in Portugal



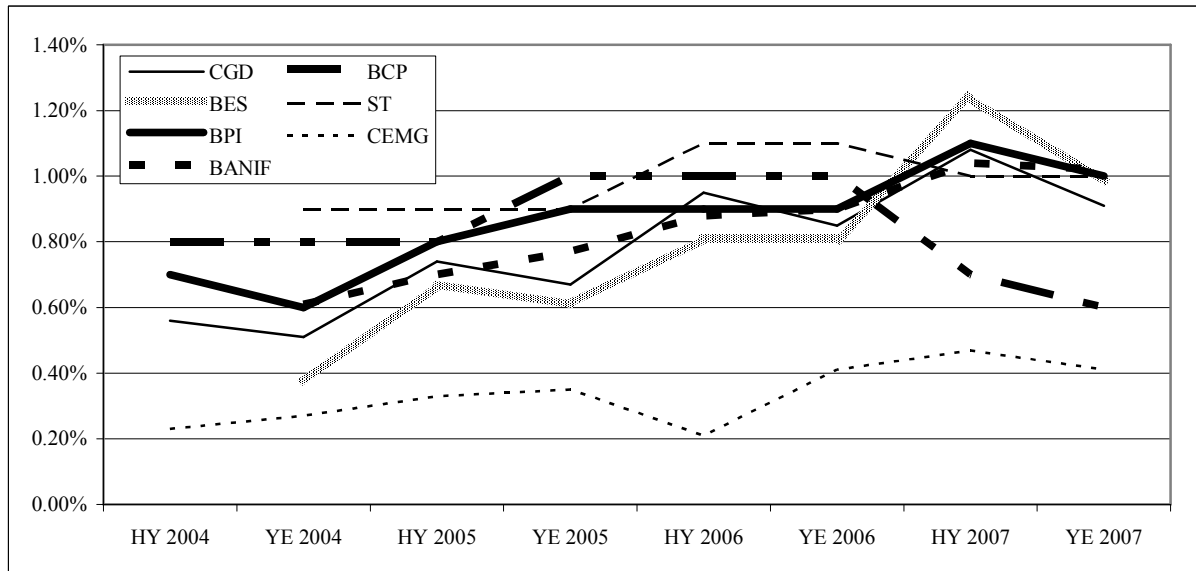
Notes: HY = Half Year
YE = Year End

Figure 7: Loans impairment net of reversals recorded on Statement of Income in millions of Euros of the largest seven banks operating in Portugal



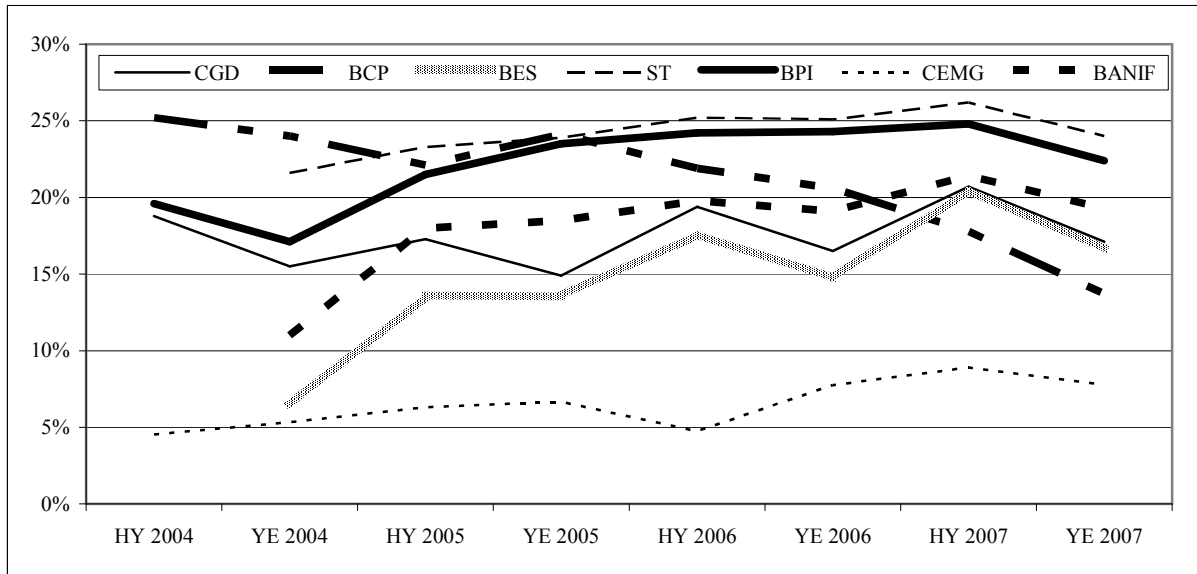
Notes: HY = Half Year
YE = Year End

Figure 8: Return on assets of the largest seven banks operating in Portugal



Notes: HY = Half Year
YE = Year End

Figure 9: Return on equity of the largest seven banks operating in Portugal



Notes: HY = Half Year
YE = Year End

Figure 10: Histogram of regression standardized residuals – Dependent variable: ROA

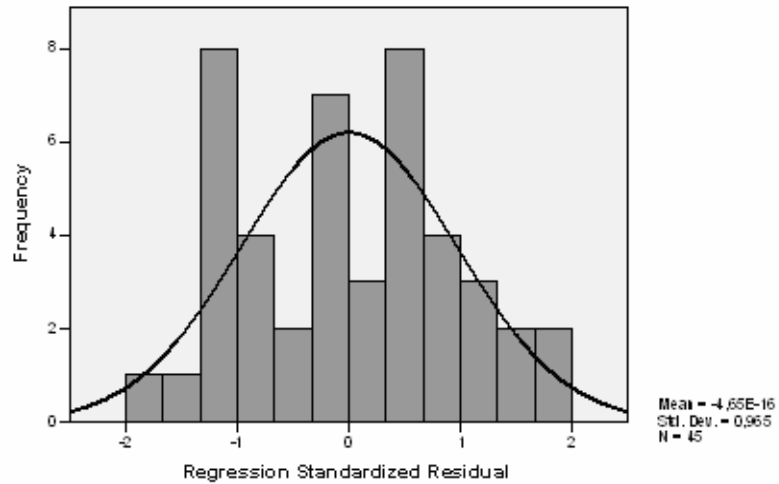


Figure 11: Normal P-P Plot of Regression Standardized Residual - Dependent variable: ROA

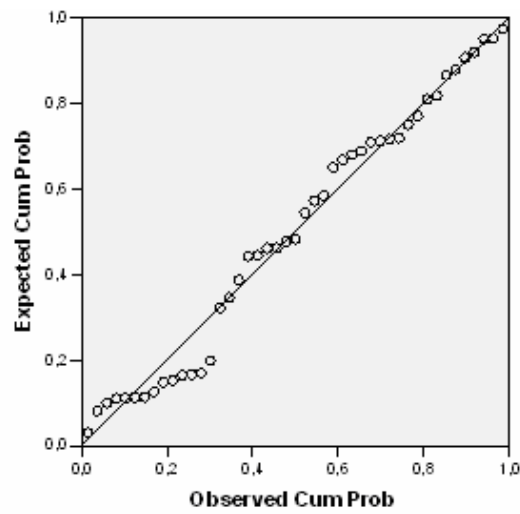


Figure 12: Histogram of regression standardized residuals – Dependent variable: ROE

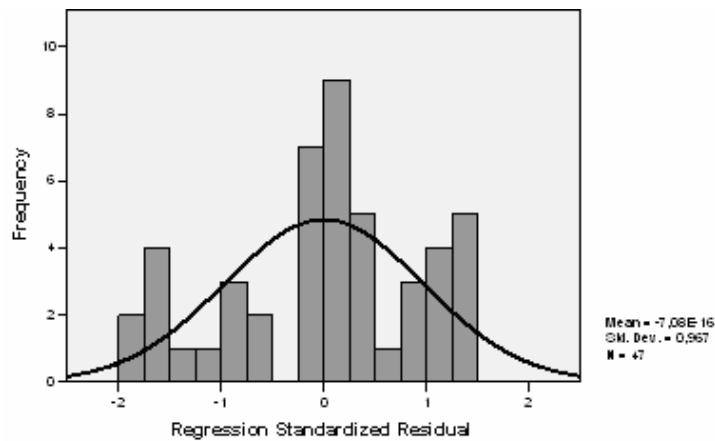


Figure 13: Normal P-P Plot of Regression Standardized Residual - Dependent variable: ROE

