LISBOA SCHOOL OF ECONOMICS & MANAGEMENT

MESTRADO

FINANÇAS

TRABALHO FINAL DE MESTRADO

DISSERTAÇÃO

DETERMINANTS OF BANKS' PROFITABILITY – PORTUGUESE CASE

JOÃO PEDRO SILVA MARTINS GUERREIRO

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ORIENTAÇÃO:

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Abstract

This paper aims to determine the variables that have impact on Banks' profitability in Portugal, for the period between 2002 and 2011.

In what concerns to the database for this study, we have collected the necessary data for Portuguese banks in Bankscope, Central Bank of Portugal and Eurostat.

Scientifically, to obtain our results we used the method of use multiple Ordinary Least Squares (OLS) regressions with fixed effects, which are an extension of the multiple classical linear regression model, in *STATA 12*, which enabled us to check whether the chosen variables had an impact on the independent variable and, if so, whether this impact was in accordance with what was anticipated.

Additionally, given the financial instability in which we live these days, we tried to ascertain whether these variables, determinants of Banks' profitability, presented some abnormality when examined only for the "crisis period" that began in 2008, namely changes in the sign of the impact, or variables that are no longer, or have become, significant to our independent variable.

We concluded that the eleven independent variables selected, only the effective tax rate applied to banks had no effect on their profitability. The remaining variables, with few exceptions, behaved accordingly to what was expected. Despite that, for those disparities, we understood what the reasons that led to this event were.

Jel Classification: G21, J11, O16

Key words: Banks, Financial Crisis, Macroeconomic Effects, Corporate Finance and Governance.

Resumo

O âmbito deste trabalho consiste em determinar quais as variáveis que influenciam a rentabilidade dos Bancos em Portugal, para o período compreendido entre 2002 e 2011.

Ao nível da base de dados, para a realização deste estudo, foram recolhidos os dados necessários sobre os Bancos Portugueses no BankScope, Banco de Portugal e Eurostat.

Matematicamente, para a obtenção dos nossos resultados utilizámos o método dos mínimos quadrados com efeitos fixos no *STATA 12*, o que nos possibilitou verificar se as variáveis escolhidas apresentavam impacto na rendibilidade dos bancos portugueses e, em caso afirmativo, se este impacto estava de acordo com o previsto.

Adicionalmente, e atendendo ao período de instabilidade financeira em que vivemos, tentámos averiguar se as referidas variáveis, determinantes da rendibilidade bancária, apresentavam alguma alteração quando analisados apenas para o período da "crise" que se iniciou em 2008, nomeadamente alterações no sinal do impacto, ou variáveis que deixaram de ser, ou passaram a ser significativas para a nossa variável independente.

Concluímos que das onze variáveis independentes escolhidas, apenas a taxa real de imposto aplicada aos bancos não surtiu qualquer efeito na rendibilidade dos mesmos. As restantes variáveis, salvo raras exceções, apresentaram um comportamento de acordo com o que seria espectável, sendo que para as que apresentaram disparidades verificámos quais os motivos para o mesmo ter sucedido.

Jel Classification: G21, J11, O16

Key words: Banks, Financial Crisis, Macroeconomic Effects, Corporate Finance and Governance.

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All errors remain our own. Views expressed are those of the author and do not necessarily reflect those of any branch or agency of the Government of Portugal.

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1. Introduction

This paper analyzes the profitability of the Portuguese financial system as a whole, with particular emphasis on the financial crisis period, from 2008 to 2011. Using multiple Ordinary Least Squares (OLS) regressions with fixed effects, we try to identify empirically what are the key factors that determine Banks' profitability. To measure Banks' profitability we applied the Return on Average Assets (ROAA), Return on Average Equity (ROAE) and Net Interest Margin (NIM) as the key ratios of Banks' performance.

Portugal is a typical bank based economy where Banks are responsible for the majority of the funding of Portuguese companies. This is a key factor to consider when analyzing the Portuguese financial system given that the majority of banks operating in this market share similar characteristics (both Portuguese and International ones) namely, they all have commercial and investments departments so it is not possible to focus exclusively on Commercial or Investment banks.

This paper, only considered the main Banks excluding all holdings and possible investments subsidiaries. The data time range includes the period between 2002 and 2011, which means covering 10 years of financial information. Data pertaining to the year 2012 was purposely left out for it remained unavailable at the time our paper was written.

Since the beginning of the 2008 financial crisis, much has been said about the role of the banks, more precisely their responsibilities in the beginning of this event and ways through which they could be profitable again. We try to identify what are the key factors that influence banks profitability in order to get a better look of what is their role in the "post financial crisis" economy and in the world of business.

Based on our results we will hopefully be able to answer to the following questions: "what determines banks' profitability after all?" and "have those variables changed with the financial crisis?".

2. Literature Review

The profitability and valuation of a firm are subjects well studied along the last decades. But when studying a financial system especially banks, we have to bear in mind that banks are not ordinary firms. The traditional role of a bank is to collect funds from those who have savings and lend them to those who need it to fund their activities. A bank can be considered the connection between customers that have capital deficits and customers with capital surpluses.

Nowadays, modern banks have evolved from this old concept of being a simple cash intermediary to a role that surpasses the mere lending money and which includes a significant influence in financial markets.

2.1 Portuguese Financial System and Economy

According to Franklin Allen and Douglas Gale (2001) financial systems can be divided into two groups: the market based economies and the bank based economies.

Levine (2002) tried to identify what was the best financial system but the results of his study were inconclusive. It is safe to say that every type of financial system has its strengths and weaknesses. Banks, being an important part of the financial systems of any country, should take into account the type of financial system they operate in, in order to maximize their profitability and, with that, generating more value.

Portuguese economy has suffered great changes in the last decades, ever since the ending of the dictatorial regime known as *"Estado Novo"* that existed in Portugal until

1974. It changed from a colonial empire and closed economy to a peripheral non colonial country and an open economy.

Between 1974 and 1986, Portugal had two external interventions by the IMF (International Monetary Fund): one in 1977 and other in 1983. These interventions occurred due to the fact that Portugal was experiencing a period of social, politic and economic instability. The main reasons governing this disorder were the new and instable politic regime and the return of thousands of Portuguese citizens who lived in the former colonies. In this period there were several companies, including banks that were nationalized. Adding the fact of returnees' arrival, an enormous burden was put on national accounts to support high unemployment rates.

It was only when Portugal joined the European Economic Community (EEC) – the forerunner of the European Union – that the financial system growth in Portugal was remarkable, especially if compared with the scenario of the previous years. Banks were reprivatized and, with the access to European funds, Portugal was able to modernize its economy and achieve higher levels of economic growth until the end of the century. With the creation of a single currency for the European Union, Portugal began to experience lower levels of GDP growth mostly due to Portugal's inability to evolve to a competitive and modern productive system and economy, and also, due to the Globalization.

While the economy was getting colder and economic growth was slowing down, banks prospered and achieved record profits and explored new markets worldwide. This was also the time when there was a higher concentration of Portuguese banks due to several mergers and acquisitions that occurred in these two decades, leaving Portugal

with few banks operating in its economy. Nowadays there are six major Portuguese banks that survived to the increase of concentration on Portuguese banks market.

2.2 Previous Studies

Previous studies on Banks' profitability focused mainly on: net interest margins - José Costa (1996) and Carlos Costa (2008); and the return on banks' assets and banks' equity - Abreu M., Mendes (2002); A. Dietrich, G. Wanzenried (2011).

They all assumed that these three factors were the main variables representative of Banks' profitability and as such, in their studies, all these authors assume at least one of these variables as being the independent one.

Regarding the dependent variables that could affect Banks' profitability, previous studies have tried to identify what were the key factors that affect it. These authors have focused on analyzes on cross-country evidence - Demirguc-Kunt and Huizinga (1998,1999); Abreu and Mendes (2002); Staikouras and Wood (2004); Goddard et al. (2004); Athanasoglou et al. (2006); Micco et al. (2007) and Pasiouras and Kosmidou (2007) or in an individual country systems - Berger et al. (1987); Berger (1995); Neely and Wheelock (1997); Mamatzakis and Remoundos (2003); Naceur and Goaied (2008); Athanasoglou et al. (2008) and García-Herrero et al. (2009).

Their studies have showed different effects which can be explain by the differences that exist between financial systems as we can see in Franklin Allen and Douglas Gale (2001).

Regardless of what was stated above there are also cases where the conclusions from the previous studies are consistent with each others.

As A. Dietrich, G. Wanzenried (2011) pointed, banks' profitability is usually measured by the return on average assets (ROAA) and it could be affected by internal or external variables. For the internal ones authors usually use variables such as the Bank size, age, funding costs and ownership. For external factors they used variables such as inflation, GDP growth and taxation.

It was not until recently that the 2008 financial crisis was studied with the purpose of finding out if it was a determinant of Banks' profitability or if the normal behavior of the variables studied so far remained constant during this period. A. Dietrich, G. Wanzenried (2011) and Avramiotis Konstantinos (2012) have analyzed the behavior of some variables since 2008 and have concluded that some of the results were not altered by the financial crisis, but others like equity over total assets, real GDP growth or funding costs were.

2.3 2008 Crisis

In September of 2008, with the bankruptcy of the American Investment Bank Lehman Brothers began the world's last great financial crisis. Like many others before it, there were early signs that this "bubble" was about to burst.

Like the great depression, this crisis began with excess, in this particularly case, excess of credit. There was a belief that house prices would never drop but instead would always go up. However, in 2007, after these prices reached their peak in the mid 2006, houses prices fell to minimum values.

Adding to this situation, we have to take into account that several credits that were granted to purchase these houses were securitized in mortgages backed securities

(MBS) and collateralized debt obligations (CDO) that had AAA Rating attributed by the main Rating Agencies (Standard & Poor's, Fitch Ratings and Moody's).

With the increased of credit defaults, suddenly the major banks had a liquidity and impairment problem. This first one led to the Lehman Brothers bankruptcy and then to the USA Government intervention in the multinational insurance company AIG.

After these two major events, all financial transactions worldwide stopped and the financial system was at the verge of collapse. This chaos led the Governments of the major world economies (especially USA and European Union countries) to intervene in order to prevent a new great depression.

Banks received mass amounts of money to correct their financial situation and to finance the real economy. On the other hand, to finance economy and save banks, Governments had to substantially increase their volume of public debt in order to inject large amounts in the economy so that it did not stop. This action led to another phase of the financial crisis the Sovereign Debt Crisis.

At this stage of the financial crisis we were seeing countries like Greece, Ireland, Portugal and Cyprus being aided by financial assistance programs in order to solve their debt and economic structural problems. Other countries had not bailout programs like Spain and Italy. Instead of the traditional programs, that the other countries had to accept, these countries had a precautionary program which is a gentler one.

With all this happening, Portuguese banks suffered huge losses in their profits and some of them are actually presenting post-tax losses. In addition to this situation, some of the Portuguese major banks like *Caixa Geral de Depósitos*, *Millennium BCP*,

BPI and *Banif* had to be assisted by the Portuguese Government. This assistence came by the way of *CoCos* (convertible bonds) others, like *BPN* (*Banco Português de Negócios*) and *BPP* (*Banco Privado Português*) had a different end.

BPN was the first Portuguese Bank to be nationalized in several years due to the financial crisis and the systemic risk. Portuguese Government stated that there was no other choice but to nationalize this particular bank hoping this would contain the crisis. As of today, *BPN* has already been sold to *Banco BIC* for approximately 40 Million Euros. This led to massive losses and higher deficits on the Portuguese state budget.

Currently, there are still several Millions of Euros to be recovered from bad investments made in the past by BPN.

In the case of BPP, the Portuguese government chose not to intervene leading to its bankruptcy in 2010. After this event, in order to recover clients' investments, a fund to manage the BPP assets was created. Today, there are still clients that have not received their money back and there is a chance they never will.

The other banks in order to maintain their business and their core tier one ratios of capital at a minimum of 10 percent, notwithstanding the Portuguese government's help had to increase their capital. Despite of the Portuguese government help all private banks that were intervened had to increase their capital with private funds. The only major Portuguese bank that did not require the assistance of the Portuguese government was *Banco Espírito Santo (BES),* but like the other banks it too had to increase their capital in order comply with core tier one ratio requirement. Unlike the others major banks BES resorted only to private investors.

3 Variable selection

In this section we will present our choices for both Dependent and Independent Variables that were used on our empirical analysis. Since we are set to study the impact on banks' profitability, we choose only three dependent variables which justify the profitability of banks while the number of independent variables (eleven), which are the subject of our study, is higher[1].

3.1 Dependent variables

Several studies were made in the past to determine what the variables that affected banks' profitability were. However, it is still fair to ask "how can we measure banks' profitability?". In some firms, analysts look to the gross revenue while others, to the market share. In commercial banks, some analysts look to the volume of credit portfolios. However, and despite of the importance of the pool of credits to determine the value of a bank, is not relevant to determine its profitability.

In what concerns the independent variables we chose to use the Return on Average Assets (ROAA), Return on Average Equity (ROAE) and Net Interest Margin (NIM) as variables of banks' profitability. From what we analyzed these are also the three main variables that were used in several studies before this one.

ROAA is our main variable of bank profitability. It shows us how efficiently a bank is being run because it indicates how much profit is generated by each monetary unit (Euro) of assets. "According to Andreas Dietrich, Gabrielle Wanzenried (2011*)* «*The*

[1] See Figure 4: Descriptive statistics

ROAA has emerged as the key ratio for evaluation of banks profitability and has become the most common measure of bank profitability in the literature»".

ROAE is our second variable of banks' profitability. Bank owner's care more about what is the earning on their equity investment and this information is well provided by the ROAE. However, this ratio disregards the higher risk that is associated with a high leverage and the effect of regulation on leverage.

Our third and last variable, chosen to measure banks' profitability is the NIM, which is the ratio of the net interest income. This variable is essentially the net value between the interest income and the interest expenses divided by the total assets and it show us how much profit banks are making from interest activities which are their core business.

We could use several others variables to measure banks' profitability, such as the Net Income or the Net Operating Income but we preferred to follow the previous studies made to this date for the sake of consistency.

3.2 Independent variables

For the Independent Variables, our intention was to study and analyze the key factors that could influence Banks' profitability. In this sense, and like *Andreas Dietrich, Gabrielle Wanzenried (2011)* we divided our independent variables in two groups: Bank-specific characteristics (internal factors) and Macroeconomic and industry-specific characteristics.

3.2.1 Bank-specific characteristics (internal factors)

Equity over total assets (EOTA) - this ratio tells us if a certain bank is well capitalized or not. In studies on the impact of banks' profitability, the interpretation of this ratio can be tricky. For example, banks that are well capitalized are considered less riskier than banks that are not so well capitalized. On the other hand, while banks that have lower capital-to-asset ratios are more likely to have higher results, banks with higher capital-to-asset ratios are considered safer and can be more resistant to crisis periods. This is a variable that can have a positive or negative impact on banks' profitability.

Cost-income ratio (CIR) - is defined as the operating costs (staff costs, general and administrative expenses, depreciation and a amortization, provisions net of reversals and impairment on assets net of reversals) over total gross revenues. This ratio measures bank operating efficiency and being so we expect it to have a negative impact on Banks' profitability.

Loan loss provisions over total loans (LLPOTL) - is a ratio that can be considered as proxy for credit risk. The higher this ratio is, the lower the banks' credit quality will be, which then leads to a lower profitability. We expect that this variable has a negative impact on Banks' profitability.

Yearly growth of deposits (YGOD) - is a variable that can have a positive or negative impact on Banks' profitability. A higher rate of growth of deposits can mean increases on market share, increases on turnover and by extension an increase on profitability.

However, for banks, deposits are costs. A higher rate of deposits growth can also mean a higher increase on banks' operating costs. The management has to be very efficient in order to transform this increase in liquidity (cost to the banks) into future returns and therefore higher profitability.

Difference between bank and market growth of total loans (DBBAMGOTL) - is a variable of difficult assessment since positive differences between the growth of loans in a certain bank, when compared with the growth of the loan market, can be read as an increase on market share of that bank which leads to higher revenues values and therefore to higher profitability. This happens because loans are profitable to banks. However, we have to consider that in order to grant credit, banks must have liquidity to do it so, and a higher rate growth of total bank loans can also mean less capital which can lead banks to stressful situations if these loans are not performing.

Interest income share (IIS) - is defined as the total interest income over total income. This ratio shows the weight of interest income activities in all income activities of the banks. The greater this ratio is the more negative is the impact expected on Banks' profitability because a higher interest income ratio shows that a bank is not business diversified enough and is not collecting from other business opportunities such as fees and commissions income or trading operations.

Funding costs (FC) - are defined as interest expenses over average total deposits. This variable can be influenced by: competition between banks, market interest rates and

by some importance specific clients, especially the private ones. Theoretically the greater this variable is, higher is the negative impact on Banks' profitability.

3.2.2 Macroeconomic and industry-specific characteristics

Effective tax rate (ETR) - is the rate that banks pay to the Portuguese government. Despite the fact that our dependent variables are calculated before taxes on the banks' income statements, higher taxes could lead banks to increase their clients' commissions in order to deal with them, to a point where clients with some power could use other forms of funding such as, resort to international banks where taxation levels are not so high. We are expecting that this variable has and negative impact on Banks' profitability.

Real GDP growth (GDP) - is expected to have a positive impact on Banks' profitability because the demanding for lending increases with the increase of the GDP. Banks can benefit from this demand to expand their businesses and with that generate more revenues, which in turn can lead to higher profitability.

Term structure of interest rates (TSOIR) - is the difference between the interest rate of a 5 year and a 2 year Treasury Bill in Euros, issued by the Portuguese government. Its purpose is to serve has a proxy for the term structure of interest rates. "According to *Andreas Dietrich, Gabrielle Wanzenried (2011),* «commercial banks usually use short-term deposits to finance long-term loans. This maturity transformation is an important function of commercial banks and is influencing its profitability. Thus, we expect a steeper yield curve to affect the profitability positively»".

Yearly growth of Household disposable income (HDI) - is the yearly growth rate of household final consumption expenditure and savings minus the change in net equity of households in pension funds. It also corresponds to the sum of wages and salaries, mixed income, net property income, net current transfers and social benefits other than social transfers in kind, less taxes on income and wealth and social security contributions paid by employees, the self-employed and the unemployed. In this sense, we expect a positive impact on Banks' profitability.

4. Data and Descriptive Statistics

The majority of the data that is analyzed in this study comes from both Central Bank of Portugal and BankScope – Bureau Van Dijk. Minor data from Eurostat was also used.

Because BankScope is our main source of data[2], the time data set for our study was defined by it. We have collected data for Banks that have branches in Portugal between 2002 and 2011. This means our data period amounts to ten years. Also, some of our data was a combination of both BankScope and Central Bank of Portugal.

From the 78 banks registered in BankScope that operate in Portugal, we have considered only 27, both domestic and foreign. We did it so we had to exclude the holdings, subsidiaries, the Central Bank of Portugal, banks that had no business in Portugal in 2011 and any bank that had no commercial business.

Our data is composed of 4 public banks and 23 private ones. Approximately 67 percent are national banks, which mean that the majority of the banks in our data were

[2] See Figure 3: Data Resume and Figure 5: Descriptive statistics 2

founded in Portugal. Moreover, 67 percent is the weight of new banks in our data. In other words, the majority of banks in our data was founded or established their businesses in Portugal only after 1990.

Before implementing our model we report descriptive statistics of our variables for the period between 2002 and 2011. The analysis of the data through descriptive statistics shows us certain trends and evolutions of our variables. From this analysis we verify that both ROAA and ROAE reach their peak in 2005/2006 after a relatively stable period and then have a big drop between 2007 and 2009. On the other hand, NIM presents a different pattern, from ROAA and ROAE. It does not have any really significant peak and it drops less when compared with the ROAA and ROAE decreases.

5. Methodological Approach, Variables and Results

Our empirical study consists of comparing the relation between ROAA, ROAE and NIM with all the remaining dependent variables between 2002 and 2011. Alongside this study, we tried to determine if in the crisis period (2008 to 2011), the results from the first modeling remained constants. Our objective was to test both pre crisis and post crisis periods. However, the data collected from BankScope is not balanced for all years in the sense that we have only balance records between 2004 and 2011. Pre crisis period (2004 to 2007) results presented collinearity and our model was not able to compute solid results from it. So we have decided to study the period between 2002 and 2011 and then study the crisis impact (2008 to 2011) on the determinants of Banks' profitability.

To conduct our empirical study we chose to use multiple Ordinary Least Squares (OLS) regressions with fixed effects which are an extension of the multiple classical linear regression model.

$$Y_{it} = \beta_1 X_{it1} + \beta_2 X_{it2} + \varepsilon_{it} \quad For\ i = 1, 2, \dots, N\ and\ t = 1, 2, \dots, T$$

This econometric relationship involves Y, a dependent variable; X, observable explanatory variables; X1, X2, and one or more unobservable confounding variables. We have panel data for Y, X_1, and X_2. The panel data consists of *N*-units and *T*-time periods, and therefore we have *N* times *T* observations.

Since we are studying three main variables we had to make three models in order to run our main model[3]:

$$\boldsymbol{ROAA}_{it} = \sum_{i=2002}^{27} \beta_1 EOTA_{it} + \sum_{i=2002}^{27} \beta_2 CIR_{it} + \sum_{i=2002}^{27} \beta_3 LLPOTL_{it} + \sum_{i=2002}^{27} \beta_4 YGOD_{it} + \sum_{i=2002}^{27} \beta_5 DBBMGOTL_{it} + \sum_{i=2002}^{27} \beta_6 IIS_{it} + \sum_{i=2002}^{27} \beta_7 FC_{it} + \sum_{i=2002}^{27} \beta_8 ETR_{it} + \sum_{i=2002}^{27} \beta_9 GDP_{it} + \sum_{i=2002}^{27} \beta_{10} TSOIR_{it} + \sum_{i=2002}^{27} \beta_{11} HDI_{it} + \varepsilon_{it} \quad For\ i = 2002, 2003, \dots, 2011\ and\ t = 1, 2, \dots, 27$$

$$\boldsymbol{ROAE}_{it} = \sum_{i=2002}^{27} \beta_1 EOTA_{it} + \sum_{i=2002}^{27} \beta_2 CIR_{it} + \sum_{i=2002}^{27} \beta_3 LLPOTL_{it} + \sum_{i=2002}^{27} \beta_4 YGOD_{it} + \sum_{i=2002}^{27} \beta_5 DBBMGOTL_{it} + \sum_{i=2002}^{27} \beta_6 IIS_{it} + \sum_{i=2002}^{27} \beta_7 FC_{it} + \sum_{i=2002}^{27} \beta_8 ETR_{it} + \sum_{i=2002}^{27} \beta_9 GDP_{it} + \sum_{i=2002}^{27} \beta_{10} TSOIR_{it} + \sum_{i=2002}^{27} \beta_{11} HDI_{it} + \varepsilon_{it} \quad For\ i = 2002, 2003, \dots, 2011\ and\ t = 1, 2, \dots, 27$$

$$\boldsymbol{NIM}_{it} = \sum_{i=2002}^{27} \beta_1 EOTA_{it} + \sum_{i=2002}^{27} \beta_2 CIR_{it} + \sum_{i=2002}^{27} \beta_3 LLPOTL_{it} + \sum_{i=2002}^{27} \beta_4 YGOD_{it} + \sum_{i=2002}^{27} \beta_5 DBBMGOTL_{it} + \sum_{i=2002}^{27} \beta_6 IIS_{it} + \sum_{i=2002}^{27} \beta_7 FC_{it} + \sum_{i=2002}^{27} \beta_8 ETR_{it} + \sum_{i=2002}^{27} \beta_9 GDP_{it} + \sum_{i=2002}^{27} \beta_{10} TSOIR_{it} + \sum_{i=2002}^{27} \beta_{11} HDI_{it} + \varepsilon_{it} \quad For\ i = 2002, 2003, \dots, 2011\ and\ t = 1, 2, \dots, 27$$

[3] See Figure 8: Correlation matrix

The software chosen the perform this study was the *STATA 12* and, in that, we run the multiple Ordinary Least Squares (OLS) regressions with fixed effects which the results can be seen on Figures 6 to 8. From our initial fourteen independent variables we have the exclude banks' age, ownership and nationality for collinearity reasons. We used the function (Xtreg) applied with fixed effects (fe) in addition, we also used (vce cluster), this automatically filters our regressions from collinearity, heteroscedasticity and autocorrelation problems. The information about these variables can be seen on Figure 6.

After running our three models for the period between 2002 and 2011 and for the crisis period (2008 to 2011), we concluded that, some variables are statistically significant at 1, 5 and 10 percent level. Others, according to our results, are not.

For the Bank-specific characteristics (internal factors) our results were the following:

Equity over total assets:

For the period between 2002 and 2011 equity over total assets had a negative and statistically significant impact at 5 percent level on ROAA and a positive impact at 10 percent level on NIM. For the period from 2008 to 2011, equity over total assets had a positive impact at 10 percent level for both NIM and ROAE. For the ROAA variable, the negative impact was not statistically significant. These results confirmed that the more capitalized banks are, the more robust they become, and the better their results are in crisis periods. These results go against what has been said about Portuguese banks and

their need for recapitalization. According to our study, Portuguese banks showed that they are well capitalized especially in a period of great crisis, such as the current one.

Cost-income ratio:

This is our measure for operational efficiency. It is negative and highly significant for the period between 2002 and 2011. Given the negative impact on Banks' profitability we can conclude that efficiency do matter when talking about profitability. The results are in accordance with our expectations. For the crisis period our results show that this variable has only significant negative impact on ROAA.

Loan loss provisions over total loans:

This measures the credit quality of banks and, according to what was expected, had a statistically significant negative impact at 1 percent level on ROAA. This proves that the quality of credit is important to have higher profitability figures. However, for ROAE and NIM, our results showed that this variable had a positive impact in both periods. The findings for NIM showed an impact at 5 percent level for the total period studied and an impact at 1 percent level for the crisis period. For ROAE, the major significance was found between 2008 and 2011 at 5 percent level. When analyzing our data we concluded that these results were due to the relatively small and new banks (that started operating in Portugal in 2009/2010) given that, in all large banks, when the ROAE drops, the loan loss provisions over total loans rises, as it was expected.

Yearly growth of deposits:

Had a statistically positive significant impact at 5 percent level on ROAA between 2002 and 2011 and no significant impacts on the other variables. Therefore, we can conclude that banks were able to transform the liability that deposits are for them into higher incomes. In the crisis period however, for the ROAE, our results show that the yearly growth of deposits had a statistically negative impact significant at 10 percent level. This can be read as the failure that Portuguese banks had in make use of the increase on deposits that occur in the crisis period, to generate higher incomes.

Difference between bank and market growth of total loans:

This variable had a statistically significant positive impact on ROAA at 1 percent level, and for NIM it had a statistically significant positive impact at 5 percent level for the entire period of our study. We confirm that banks that lost market share became less profitable than before. In the crisis period, our findings for the ROAA showed a negative significant impact at a 1 percent level. However, the difference between bank and market growth of total loans had a statistically significant positive impact at 10 percent level on ROAE, and 1 percent positive significant impact for the NIM, which suggests that in the crisis period banks were able to transform equity into net profit despite losing market share.

Interest income share:

As it was expected it had a negative impact on Portuguese Banks' profitability. However, it is not statistically significant for the period between 2002 and 2011. In the

crisis period, our results showed that the ROAE was statistically significant at 1 percent level generating a negative impact on Portuguese Banks' profitability. This matched the portrait we have made of the Portuguese economy, when explaining that it is a bank based economy and, therefore the majority of banks business is concentrated in loan industry and not in the financial markets activities. Because of that, banks with higher share of interest income over total income are less profitable, and tend to suffer more with crisis periods than banks that are more diversified.

Funding costs:

This variable had a negative but not statistically significant impact on Portuguese Banks' profitability for the period between 2002 and 2011. However, in the crisis years we verified that funding costs had also a negative impact on Portuguese Banks' profitability but, in this period, this impact was statistically significant at 10 percent level for the ROAE and 1 percent for the NIM. We can affirm that banks that had less funding costs are more profitable in crisis periods. When looking into the data we verify that the largest banks increased their funding costs since the beginning of the crisis. This fact is related to the risk of Portugal (country risk), and the pressure that governmental and private debt put on Portuguese government funding, Portuguese firms and therefore Portuguese banks. However, and according to our results we cannot say that this fact is significant to the reduction on Banks' profitability.

For the Macroeconomic and industry-specific characteristics (external factors) our finds were the following:

Effective tax rate:

In both periods studied, tax rate had no significant impact on Banks' profitability. This may be due to Portuguese taxation that allows some tax deductions and, the major firms like banks, usually benefit from it. This fact is actually a major critic that some economic and politic commentators do when they affirm that banks should pay more taxes than those they effectively pay.

Real GDP growth[4]:

GDP growth had a statistically significant negative impact at 1 percent level on the NIM for both periods. For ROAE, real GDP growth had statistically negative impact at 10 percent level between 2002 and 2011 and 5 percent between 2008 and 2011. Contrary to what we expected, the growth impact of GDP had a negative impact on Portuguese Banks' profitability. This can be explained by the lower average rate (0,3 percent) of GDP growth that the Portuguese economy experienced in the last decade. Since banks already had good profitable indicators, those could have been even better if the GDP had higher growth rates.

Term structure of interest rates:

Being a proxy for the term structure of interest rates, we would expect a positive impact on Banks' profitability. Indeed in the crisis period, at a 1 percent level of significance that is what happened with ROAE. However, it also had a statistically negative impact at 5 percent level on NIM and, for all period of our study, we have

[4] See Figure 1: Portugal's GDP Growth Rate (2000-2011, %)

verified that the term structure of interest rates had a statistically negative significant impact on ROAE and NIM at 10 percent level. The explanation we have for this fact is that the Portuguese banks acted well in the crisis period amending previous period errors. In other words, a steeper yield curve during the financial crisis period affected positively Banks' profitability, as it was expected.

Yearly growth of Household disposable income[5]:

As it was expected, yearly growth of household disposable income had a significantly positive impact at 5 percent level on ROAE and 1 percent for NIM for the entire period between 2002 and 2011, and in the crisis period the results for the impact on NIM remain the same. For the ROAE, the level of significance was upgraded to 1 percent. Portuguese banks benefited from stable increases on Household disposable income of the Portuguese population to funding some of their activities. In the first period of this study this allowed the banks to increase their pool of credits, creating more revenues and, thus, increasing their profitability.

[5] See Figure 2: Portugal's household disposable income growth rate (2002-2011, %)

6. Conclusion

In this paper we aim to explain which and how bank-specific factors and macroeconomic and industry-specific factors affect Portuguese Banks' profitability.

From a total of 78 banks registered in BankScope as having branches in Portugal between 2002 and 2011, we chose 27 to move forward with this study. Comparing to other European and non European countries, here in Portugal, we have a relatively small sample to perform a study of this nature. Additionally, there is the fact that BankScope has strongly balance data for all Portuguese active banks but only since 2004, which made it difficult to study the pre crisis period. This led us just to study all period between 2002 and 2011, and in addition isolate the crisis period (2008 to 2011) so that we could verify if the impact of the variables we studied maintained their effects and if these ones did not change their signal.

From what we observed in our results, the key explanatory factors that influenced Portuguese Banks' profitability in the same way between 2002 and 2011 and in the crisis period were: the cost-income ratio that had a significant negative impact both in the total period and the crisis period on Portuguese Banks' profitability; the difference between bank and market growth of total loans also had a positive impact on Portuguese Banks' profitability despite that, in the crisis period for our variable ROAA, it presented a negative impact, nevertheless we concluded that losing market share led bigger banks in Portugal to be less profitable than before; again, with a negative impact on both periods we have real GDP growth, which goes against what was expected but, can be explained by the small GDP growth rates that Portugal had in the last decade; and finally, and as expected, yearly growth of Household disposable

income had a significant positive impact on the subject studied, proving that banks benefit from higher costumers disposable incomes.

Some of the variables studied had an impact on Portuguese Banks' profitability in only one of the periods studied. Interest income share had no significant impact on Portuguese Banks' profitability for all the years studied. However, it had a significant negative impact on Portuguese Banks' profitability in the crisis period, hence demonstrating that non diversified banks have more difficulties in crisis period that well diversified banks. The last of these cases was the funding costs. They had a negative, but not significant impact, on Portuguese Banks' profitability from 2002 to 2011. However, in the crisis period, the impact is still negative but it is a significant impact on Portuguese Banks' profitability, thus proving that higher funding costs led to lower profitability figures.

At last, there were some variable that changed the sign of their impact on Banks' profitability from the entire period to the crisis period. Equity over total assets had a significant negative impact for total period studied. However, in the crisis period, it had a significant positive impact on Portuguese Banks' profitability confirming that well capitalized Portuguese banks dealt better with the crisis than undercapitalized ones. Loan loss provisions over total loans had a significant negative impact on Portuguese Banks' profitability in all of the years studied but it had a positive significant impact in the crisis period. This contradiction is explained by the fact that smaller and new banks did not see their profitability affected by the increase of loan loss provisions. However, bigger banks saw their profitability affected by the higher volume of loan loss

provisions, because only the bigger banks had vast pool of credits that justified higher volumes of impairment in order to be protected against possible defaults. Yearly growth of deposits had positive significant impact for the total period studied. But for the crisis period, presented a negative significant impact on Portuguese Banks' profitability. This demonstrates that Portuguese banks failed to seize the opportunity to increase their profitability given the high growth rates of deposits occurred during the crisis period. To conclude, the term structure of interest rates had the most curious results. For the entire period studied they had a negative significant impact on Portuguese Banks'profitability which goes against what was expected and, in the crisis period, as expected, they had a significant positive impact, due to steeper yield curves verified in the crisis period. It appears that Portuguese banks corrected some of the errors that they made before the crisis period, proving they are handling it well and making the necessary adjustments to their business.

In what concerns to effective tax rate, our results were inconclusive on its effects on Banks' profitability for both periods studied.

For further analysis we think that it should be considered to wait for the end of the crisis to have accurate and a larger balanced database and include different independent variables that where included in this study such as nationality, size or ownership.

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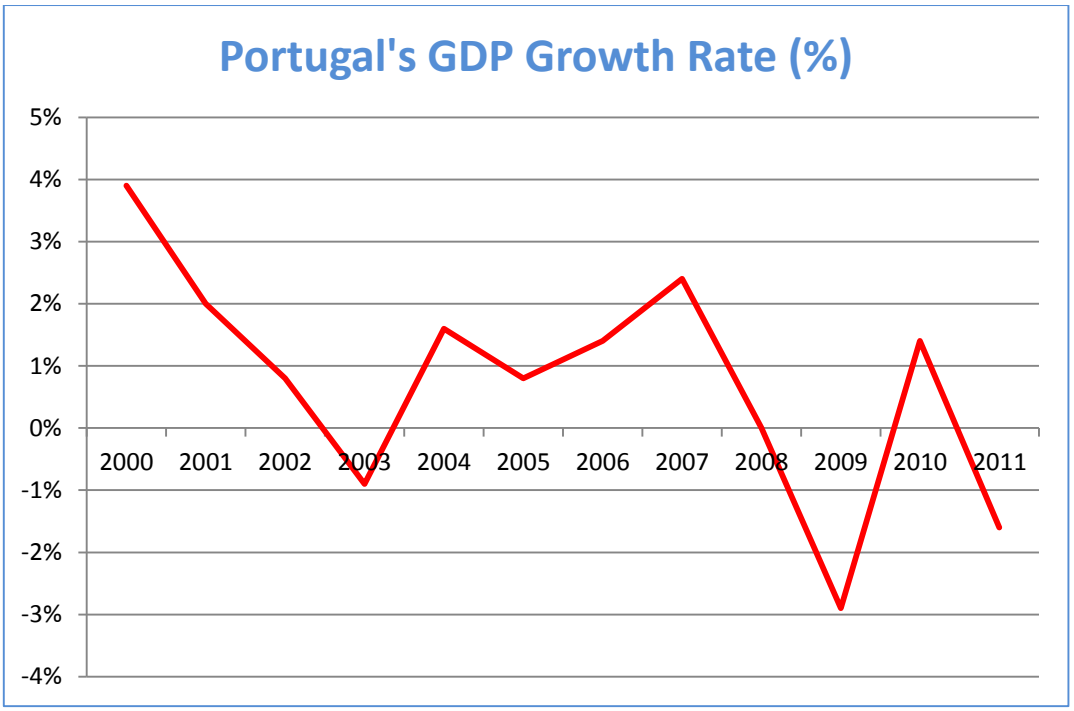
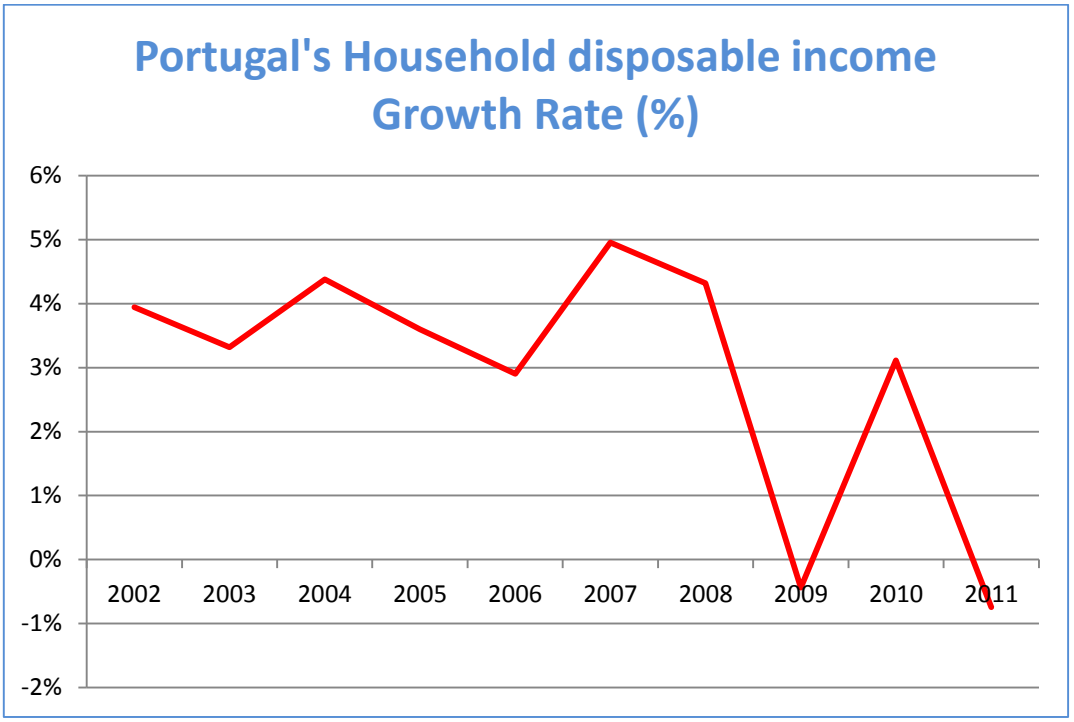
Figure 1: Portugal's GDP Growth Rate (2000-2011, %)



*Source: Eurostat

Figure 2: Portugal's Household disposable income Growth Rate (2002-2011, %)



*Source: Central bank of Portugal

Figure 3: Data Resume

Data Resume	
Number of banks	27
Bank Ownership	
Number of public banks	4
Number of private banks	23
Bank Nationality	
Number of national banks	18
Number of foreign banks	9
Bank Age	
Banks that start operating in Portugal before 1950	4
Banks that start operating in Portugal between 1950 and 1990	5
Banks that start operating in Portugal after 1990	18

*Source: BankScope

Figure 4: Descriptive statistics

Descriptive statistics		
Dependent variables: banks' profitability	Description	Expected effect
ROAA	Net profits over average total assets (%)	
ROAE	Net profits over average total equity (%)	
NIM	Net interest margin (in %), defined as net interest income divided by total assets	
Independent variables		
Bank-specific characteristics (internal factors)		
Equity over total assets	Equity over total assets (%). This is a measure of bank risk	+/-
Cost–income ratio	Total expenses over total generated revenues as a measure of operational efficiency (%)	-
Loan loss provisions over total loans	Loan loss provisions over total loans (%). This is a measure of credit quality	-
Yearly growth of deposits	Annual growth of deposits (%)	+/-
Difference between bank and market growth of total loans	Difference between the annual growth of a bank's lending volume relative to the average	-
Interest income share	Total interest income over total income (%)	-
Funding costs	Interest expenses over average total deposits (%)	-
Macroeconomic and industry-specific factors (external factors)		
Effective tax rate	Total taxes over pretax profit (%)	-
Real GDP growth	The yearly real GDP growth (%)	+
Term structure of interest rates	The difference between the interest rate of a 5-year and a 2-year Bonds in EUR issued by the Portuguese government (%)	+
Yearly growth of Household disposable income	Annual growth of Household disposable income (%)	+

Figure 5: Descriptive statistics 2

Dependent variables: bank profitability	Mean	Median	Std. Dev.
ROAA	0.32	0.45	1.34
ROAE	5.74	6.39	12.88
NIM	2.32	2.05	1.5
Independent variables	Mean	Median	Std. Dev.
Bank-specific characteristics (internal factors)			
Equity over total assets	11.45	6.81	16.29
Cost–income ratio	70.75	63.91	39.24
Loan loss provisions over total loans	3.8	2.46	4.71
Yearly growth of deposits	14.98	7.3	39.6
Difference between bank and market growth of total loans	6.27	0	47.58
Interest income share	65.92	65.09	23.97
Funding costs	0.07	0.03	0.28
Macroeconomic and industry-specific factors (external factors)			
Effective tax rate	20.07	19.91	34.33
Real GDP growth	0.3	0.8	1.56
Term structure of interest rates	0.66	0.6	0.47
Yearly growth of Household disposable income	2.94	3.46	1.86

The table reports the descriptive statistics of the variables used in the regression analyses. Data collected from BankScope, Central Bank of Portugal and Eurostat

Figure 6: Empirical Results from 2002 to 2011

VARIABLES	(1) ROAA	(2) ROAE	(3) NIM
EOTA	-0.0326**	-0.135	0.0474*
	(0.0155)	(0.422)	(0.0259)
CIR	-0.0163***	-0.132***	-0.00392***
	(0.00169)	(0.0395)	(0.00109)
LLPOTL	-0.166***	0.986	0.0406**
	(0.0169)	(0.721)	(0.0179)
YGOD	0.00530**	0.0797	-0.00167
	(0.00197)	(0.0650)	(0.00371)
DBBAMGOTL	0.00747***	-0.0122	0.00249**
	(0.00199)	(0.0308)	(0.00101)
IIS	-0.00203	-0.173	-0.00163
	(0.00698)	(0.110)	(0.00697)
FC	1.549	-14.96	-1.208
	(1.877)	(24.67)	(1.083)
ETR	-0.000290	-0.00764	-0.000695
	(0.00129)	(0.0171)	(0.000844)
GDP	0.0259	-3.657*	-0.178***
	(0.115)	(1.847)	(0.0475)
TSOIR	-0.0890	-6.833*	-0.282*
	(0.161)	(3.503)	(0.140)
HDI	-0.0113	3.717**	0.147***
	(0.0837)	(1.389)	(0.0486)
Constant	2.451***	21.71**	1.831***
	(0.336)	(8.747)	(0.423)
Observations	105	105	105
R-squared	0.720	0.387	0.301
Number of BANK	23	23	23

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

*The table above shows the results of our model for the period between 2002 and 2011 where, our dependent variables are the ROAA, ROAE and NIM.No dummy variables were used in the model. This table uses data from BankScope, central bank of Portugal and Eurostat.

Figure 7: Empirical Results from 2008 to 2011

VARIABLES	(1) ROAA	(2) ROAE	(3) NIM
EOTA	-0.0117	0.837*	0.0437*
	(0.0248)	(0.439)	(0.0215)
CIR	-0.0166**	0.0333	-0.00297
	(0.00750)	(0.0377)	(0.00184)
LLPOTL	-0.0629	0.693**	0.0413***
	(0.0374)	(0.290)	(0.0145)
YGOD	0.00255	-0.0662*	-0.00187
	(0.00346)	(0.0334)	(0.00180)
DBBAMGOTL	-0.00510***	0.0372*	0.00262***
	(0.00162)	(0.0201)	(0.000564)
IIS	0.00470	-0.327***	-0.00389
	(0.0153)	(0.0990)	(0.00683)
FC	-0.491	-30.97*	-3.695***
	(1.141)	(16.20)	(0.665)
ETR	0.00193	0.0310	-0.000233
	(0.00185)	(0.0270)	(0.000584)
GDP	0.0180	-3.116**	-0.225***
	(0.136)	(1.312)	(0.0611)
TSOIR	0.328	6.857***	-0.251**
	(0.237)	(2.400)	(0.109)
HDI	-0.0210	3.876***	0.194***
	(0.138)	(0.978)	(0.0497)
Constant	1.081	-4.013	1.808***
	(0.703)	(5.475)	(0.430)
Observations	74	74	74
R-squared	0.608	0.580	0.496
Number of BANK	22	22	22

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

*The table above shows the results of our model for the crisis period between 2008 and 2011 where, our dependent variables are the ROAA, ROAE and NIM. No dummy variables were used in the model. This table uses data from BankScope, central bank of Portugal and Eurostat.

Figure 8: Correlation matrix

	ROAA	ROAE	NIM	EOTA	CIR	LLPOTL	YGOD	DBBAMGOTL	IIS	FC	ETR	GDP	TSOIR	HDI
ROAA	1,0000													
ROAE	0,0782	1,0000												
NIM	0,1431	0,1142	1,0000											
EOTA	0,3533	-0,3254	0,3131	1,0000										
CIR	-0,7807	-0,1011	-0,1490	-0,1350	1,0000									
LLPOTL	-0,7234	0,2896	0,1196	-0,4619	0,5735	1,0000								
YGOD	0,1516	0,1842	-0,0218	0,0399	-0,1096	-0,1126	1,0000							
DBBAMGOTL	0,0202	-0,0066	-0,0690	-0,0076	-0,0619	-0,1398	0,3489	1,0000						
IIS	-0,2090	-0,0090	0,2100	0,0090	0,2706	0,2051	-0,1761	-0,2734	1,0000					
FC	0,0461	0,0361	0,4292	0,0453	-0,0238	0,1792	-0,1160	-0,0253	0,2088	1,0000				
ETR	0,0648	-0,0836	0,1536	0,0963	-0,0561	-0,1064	-0,0159	-0,0052	-0,0662	0,1736	1,0000			
GDP	0,1210	0,2564	0,0376	0,0063	-0,1001	-0,0064	0,2347	-0,0540	0,1716	0,1139	0,0439	1,0000		
TSOIR	-0,1017	-0,2247	-0,0739	-0,0086	0,0325	0,0419	-0,1398	-0,0049	-0,1890	-0,1827	0,0347	-0,6552	1,0000	
HDI	0,0779	0,3076	0,0709	-0,0013	-0,0557	0,0088	0,2607	-0,0434	0,2309	0,1908	0,1534	0,8722	-0,4559	1,0000

*The table above shows the correlation between all the variables used in this study.
This table uses data from BankScope, central bank of Portugal and Eurostat.