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Determinants of Bank Failures in a Deregulated Context: Evidence from the Portuguese Banking Sector in the 19th Century

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Dissertation written under the supervision of Dr. Diana Bonfim

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Abstract

This dissertation investigates the determinants of bank failures in the absence of comprehensive regulatory policies and of supervision in the banking sector. These features trigger the incorporation of new banks, contributing to an increasingly competitive environment. The fintech landscape still lacks regulation and it is increasingly composed by more players, which are gaining a foothold in the banking sector by offering more sophisticated and customized products and services than conventional banks. Since this new fintech era shares those peculiarities with the 19th century Portuguese banking sector, the latter was considered as an ideal and "clean" laboratory to study bank failures. This prevents the emergence of potential puzzling effects given that the banking sector in Portugal was relatively new and simple. In this sense, it was built a new dataset comprising the Portuguese banks' accounts between 1858 and 1887 to evaluate the bankruptcies and survivals of banks after the 1876 crisis. This thesis shows that the age of a bank is critical to survive a crisis following a period of deregulation which led to the increase of the number of banks operating. Further analysis indicates that having a low level of capital and providing unbalanced amounts of credit, significantly higher than deposits, are also determinant to bank failures.

JEL Classifications: E50; G21; G28; G33

Keywords: Bank failures; Banking deregulation; Bank runs; Banking crisis; Financial crisis

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Resumo

Esta dissertação investiga os factores responsáveis pela falência de instituições bancárias na ausência de políticas regulatórias e de supervisão no sector bancário. Estas características desencadeiam a criação de novos bancos, contribuindo para o aumento de competitividade neste sector. O panorama de fintech ainda não é suficientemente regulado e é constituído por cada vez mais empresas que estão a conquistar uma posição importante no sector bancário por oferecerem produtos e serviços mais sofisticados e personalizáveis que a banca convencional. Uma vez que esta nova era de fintech partilha as peculiaridades descritas previamente com a banca portuguesa na segunda metade do século XIX, esta foi considerada como o contexto ideal para estudar a falência de bancos. Isto previne o aparecimento de efeitos potencialmente confusos visto que o sector bancário português era relativamente recente e simples. Neste sentido, foi constituída uma nova base de dados composta pelas contas dos bancos em actividade em Portugal entre 1858 e 1887 para avaliar os bancos que faliram e sobreviveram após a crise de 1876. Esta tese evidencia que a idade de um banco é crítica para sobreviver a uma crise no seguimento de um período de desregulação que provoca o aumento do número de bancos em operação. Para além disso, uma análise mais profunda indica que apresentar um nível reduzido de capital e conceder valores desequilibrados de crédito, consideravelmente superiores ao valor de depósitos, são factores determinantes para a falência de bancos.

Classificações JEL: E50; G21; G28; G33

Palavras-chave: Falências bancárias; Desregulação bancária; Corridas bancárias; Crise bancária; Crise Financeira

Difficulties break some men but make others.

No axe is sharp enough to cut the soul of a sinner who keeps on trying, one armed with the hope that he will rise even in the end.

Nelson Mandela

Deus quer, o homem sonha, a obra nasce.

Fernando Pessoa

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Secondly, I would like to express my appreciation to Laura for putting a smile upon my face every day and to Diana for showing me the beauty of true friendship, along with their precious advices and constant stimuli. Also, I want to thank Teresa for her encouragement and optimism, Shaiza for the confidence as well as Miguel and Max for everything that I learned from them.

Lastly, and most importantly, I am deeply grateful to my parents, Mafalda and João, my brother, Tomás, my uncles, Maria João and Luís Frederico, and my grandparents, Maria da Conceição, Carlos, Maria Margarida and Laurentino, for inspiring and backing me every time as well as having laid the groundwork which allows me to be a better person and to grow every day.

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I. Introduction

This dissertation aims to study the main drivers of bank failures in a context with scarce supervision and a large number of new entrants. On the verge of a new deregulation wave, where fintech is increasingly taking a prominent role in the banking industry, it is relevant to study the bankruptcy determinants in a highly competitive environment. As a matter of fact, there is an increasing number of fintech start-ups, which are already offering some products and services more sophisticated than the ones offered by conventional banks, benefiting from growing in a disruptive sector whose regulation is scarce due to its novelty and high degree of technological complexity. One can thus try to learn from the failures of young and lightly regulated financial institutions in the second half of the 19th century and draw some parallels with the current situation.

In this context, the Portuguese banking sector in the second half of the 19th century may be considered the ideal laboratory to study the interconnection between deregulation, competition and bankruptcies. In fact, this century was characterized by the Liberalism rise in Portugal and, consequently, it was a period of less regulation which triggered more competition as new banks were established. Furthermore, since the Portuguese banking sector was relatively novel, it is plausible that there are no potential confounding effects given the simplicity of banks' operations. Indeed, the 19th century Portuguese banking activity can be summarized to a straightforward combination of deposits and loans, being exposed to the classical credit, liquidity and interest rate risks, which could ultimately lead to a bankruptcy situation. Lastly, the financial crisis and the associated bank runs comprised in this framework that occurred in 1876 allow us to analyze the above-mentioned bankruptcy side. This way, it is possible to draw a parallelism between the two contexts and potentially gain insights about the fintech banking sector and the need of regulatory policies.

I believe that this study and its results can be interesting for bank supervisors, as well as for bank investors, since they may be used as a starting point to impose new regulatory policies in line with the most important identified risks.

With the aim of studying bankruptcies on banks, especially among newly-created ones, the methodology used was essentially based on the logit binomial model to assess the probability of bankruptcy. In addition, it was performed a survival analysis, based on

the Kaplan-Meier estimates, to examine the relationship between the probability of survival and the age of banks.

The main findings are that the level of capital and the balance between credit and deposits are relevant to survive crises. Moreover, the banks' age, *id est* the years under activity, reveals to be critical on bankruptcies, especially when banks are incorporated during a deregulation period.

Finally, the present dissertation has the following structure: Section II exhibits the literature review where the main theories and concepts concerning bank runs, bankruptcies, regulation and the duality between financial stability and competition are revisited; Section III comprises the historical context where it is provided a detailed analysis of the economic, legal and political situation in the second half of the 19th century in Portugal; Section IV describes the data used as baseline for this study as well as the inherent sample selection and the applied methodology; Section V presents the main results derived from the applied models; Section VI displays the main conclusions and, in Section VII, the main limitations of this dissertation are exposed.

II. Literature Review

Bank runs are essentially liquidity shortage phenomena which are widely common during downturn periods. Briefly, they are consequence of having short-term liabilities, namely deposits, financing less liquid long-term assets, usually loans. When there is a confidence decline on banks by depositors, arises an environment of fear materialized by a high number of simultaneous withdrawals which grow as the probability of default and possible consequent bankruptcy increases. In this sense, it is fundamental to have regulatory policies which force banks to be prepared for these situations, given that it can ultimately lead to bank insolvency and, more importantly, create systemic aggregate liquidity risk (Panetti, 2016). One common approach to deal with these risks is to force banks to comply with minimum capital/reserve requirements defined by a supervisor, as well as the establishment of a sound and credible deposit insurance mechanism. As a matter of fact, following the financial crisis of 2007-2008, there was an increasing number of new regulations, as Basel III, addressing liquidity ratios with more detail and rigor.

Regarding the diminishing levels of confidence that feed bank runs, there are two traditional approaches which seek to justify them. According to Kindleberger (1978), banking panics result from "mass-hysteria" and, in line with this, Diamond & Dybvig (1983) postulated that they might be caused by self-fulfilling prophecies. On the other hand, this confidence decline can be purely a result of business cycles, *id est,* bank runs are seen as non-random events (Gorton, 1988).

When banks offer demand deposits, they gain foothold in the competitive market, benefiting from people's different preferences on the withdrawal timing, due to their distinct consumption patterns. Nonetheless, one of the equilibria is a bank run, where everyone decides to withdraw at the same time, even the agents that would prefer to do it later if they would not be pessimistic about a potential default. So, according to the self-fulfilling view, there is an incentives' distortion, the efficient risk sharing equilibrium is lost and withdrawing turns out to be optimal for every depositor.

Whereas in the business cycle view, it is considered that real economy fundamentals have an impact on the bank assets, potentially leading to their value decrease during recession periods. As a matter of fact, Gorton (1998) shows that during the U.S. National Banking Era, there was a bank run whenever a variable that could predict a business cycle downturn would indicate it.

Morris and Shin (1998) proposed the reconciliation of the two views composing the global game approach. In this sense, this model incorporates bank runs as potential derivations of both shifts in depositors' confidence (illiquidity outcome) and from real economy status (insolvency outcome), allowing to have a deeper understanding on Governments' intervention.

In this context, it is important to address the role of regulation policies in handling the duality between financial stability and competition. On one hand, there is one view present in the literature - "competition-fragility" - which believes that increasing bank competition allows lessening market power and profitability margins. Consequently, there is more risk-taking by banks to increase their profit margins (Keeley, 1990; Marcus, 1984). On the other hand, the "competition-stability" view considers the rise of moral hazard and adverse selection problems as it is harder for borrowers to bear high interest rates, due to a concentrated banking market, and thus increasing the bank risk (Boyd & De Nicolo, 2005). Nevertheless, it can also exist more risk-taking if there is the mindset of "too big to fail", also linked to the potential Government interventions (Berger, Klapper, & Turk-Ariss, 2009; Boyd, De Nicoló, & Jalal, 2006).

Although competition is positive in terms of a better allocation of resources, it is fundamental to ensure there are an appropriate supervision and policies which provide a balanced framework that can exist at the same time with financial stability (Allen & Gale, 2004). For instance, the existence of minimum capital requirements enables more equitable competition alongside the decrease on banks' risk taking. Furthermore, deposit-rate controls are other policy instruments that can be more efficient than capital controls on preventing moral hazard (Hellmann, Murdock, Stiglitz, Calomiris, & Schweikart, 1991).

According to Kaminsky & Reinhart (1999) there is a strong connection between banking and currency crises in a deregulated and liberal framework. In fact, their simultaneous appearance deepens and boosts the negative consequences of each other, contributing to harsh financial crises.

The 1876 Portuguese Financial Crisis is an ideal setting to study bank runs, since it constitutes an environment with no significant regulatory policies neither a Central Bank acting as supervisor. Additionally, unit banking was prevailing in this early period of the Portuguese banking system. This way, it is possible to waive probable confounding

effects of regulation and to settle a "clean" laboratory as in Braggion, Manconi, & Zhu (2017) and, more recently, in Bignon & Jobst (2017) and Carlson, Correia, & Luck (2018), which use data from the banking sector during the 19th century in France and in United States, respectively.

Furthermore, although there is an extensive literature on the main drivers of bankruptcies in banks, it was mainly focused on bank failures between 1980 and 1990 and, more recently, on the 2007-2008 financial crisis. In these periods, the banking sector was characterized by much more complex structures and sophisticated products and services than in the 19th century. Nonetheless, the first research stream, including Cole & Gunther (1995); DeYoung (2003); Thomson (1991); Whalen (1991) and Wheelock & Wilson (2000), has found that bankruptcies can be predicted by low asset quality (nonperforming loans), high concentrations of business or commercial real estate loans, illiquidity, fast asset growth, cost inefficiency and/or poor management, reliance on non-core deposit funding, low profitability and low equity capital. In a nutshell, banks characterized by low capital levels as well as illiquid and low-quality assets had more probability of failing (Wheelock & Wilson, 2000).

The more recent research stream on the financial crisis, for instance Altunbas, Manganelli, & Marques-Ibanez (2011); Cole & White (2012), has attained similar conclusions regarding these predictors when constructing early warning models for bank failures.

Lastly, according to DeYoung & Hasan (1998), new banks can be compared to business start-ups in other industries as both initially exhibit losses and, in the subsequent years, low earnings. Additionally, this study found that not only a bank with an activity of one year is much less profit efficient than an established bank, but also that the former is, in general, only able to attain the latter's profit efficiency levels after 9 years of activity.

III. Historical Context

One of the first financial crises in Portugal occurred in 1876. In order to understand the dynamics of this depression, including the main causes, it is crucial to do an analysis to the economic and political context during the second half of 19th century.

During 1846-1847, Portugal faced a monetary crisis which started with the establishment of the non-convertibility of Banco de Lisboa banknotes by the Decree of May 23rd, 1846. Afterwards, the Royal Charter on 19th November 1846 established the creation of Banco de Portugal (Bank of Portugal), resulting from the merger of Banco de Lisboa and Companhia Confiança Nacional. Then there was a recovery period with the Decree of December 9th, 1847[1] and, in 1850, the Decree of April 16th extended the right to issue banknotes to all the banking institutions which was until that time only allowed to Banco de Portugal[2]. On July 29th, 1854, it was published a law imposing the gold standard in Portugal, along with the possibility of converting banknotes without any limit in gold.

In this context, in 1858 (the first year in my sample), there were three commercial banks and three savings banks. In 1862, the commercial bank Banco União do Porto and the savings bank Caixa Económica Fayalense were incorporated and, in the subsequent year, the same happened to London and Brazilian Bank, with branches in Lisbon and Oporto. Additionally, it was established Nova Companhia Utilidade Pública, benefiting from the July 13th, 1863 Law[3] ("Lei das Sociedades Anónimas de Crédito Predial ou Agrícola") which allowed to create a property and/or farm credit (*Crédito Predial ou Agrícola*) public limited liability company exempt from taxes. The number of banks kept increasing with the creation of the Portuguese and Brazilian Bank, Banco Nacional Ultramarino, Banco Lusitano, Banco do Minho and Companhia Geral de Crédito Predial Portuguez in 1864.

In 1866, the June 22nd Law[3] authorized the establishment of district industrial and farm credit banks by social institutions (*Misericórdias, hospitais, irmandades* and *confrarias*) and the June 22nd, 1867 Law[3] ruled these banks' organization, governance and activity. With this policy, the Portuguese Government was aiming to foster growth

[1] https://www.museudodinheiro.pt/uploads/2017/04/crise-monetaria-de-1846-1847-hsb-valerio-pt.pdf
[2] https://www.bportugal.pt/page/historia
[3] legislacaoregia.parlamento.pt

across all the territory. This way the agriculture and industrial companies outside the main cities could benefit from having access to these banks, which had a *modus operandi* more similar to savings banks. Under this law, Banco Agrícola e Industrial Viziense (1868), Banco Agrícola e Industrial de Vianense (1873), Banco Agrícola e Industrial de Villa Real (1874), Banco Agrícola e Industrial Farense (1874), Banco Agrícola e Industrial de Ponte de Lima (1876) and Banco Agrícola e Industrial da Extremadura (1876) were created (Companhia Geral de Crédito Predial Português after the law being published operated in its terms).

The June 22nd, the 1867 Law[3] also regulated the public limited liability companies ("Lei das Sociedades Anónimas") by facilitating their incorporation. As a matter of fact, it enacted that there was no longer a previous mandatory Government authorization for a bank to start its operations. It would only be needed to register the bank in the Government Gazette (*Diário Oficial do Governo*) and to ensure its supervision by a Board of Auditors (*Conselho Fiscal*), which had the responsibility of analyzing and approving the balance sheet, the profit and loss statement and the annual report with the bank status. These would then have had to be published in the Government Gazette with a report from the Board of Auditors, if approved in the General Meeting of Shareholders.

After the enactment of this law, there was a period of strong growth in the number of banks incorporated. In fact, by 1867 there were 16 banking institutions (from which 4 were savings banks) and, by 1875, 56 (from which 5 were savings banks) reflecting the underlying stability and the peculiar liberal era's deregulation to increase competition, when there were not a real supervisor and regulatory policies. In this sense, it is possible to claim that the Portuguese banking sector remarkable growth during the second half of the 19th century benefited from the public investment promoted by Fontes Pereira de Melo's Governments and their liberal policies without an effective and reliable banks' supervision, aiming to diversify the public debt sources of financing[4].

In this context, Portugal entered in a financial crisis in 1876, which gradually spread out from the North region to all the country. In fact, the Oporto marketplace (*Praça do Porto*) was especially struggling. In the run up to the crisis, there was a speculative environment with a large number of investments in Spanish Government bonds. These

[4] https://www.cgd.pt/Institucional/Patrimonio-Historico-CGD/Estudos/Documents/Desenvolvimento-Banca-Portuguesa.pdf

securities suffered a significant depreciation, triggered by the 1864-1874 Spanish financial crisis, which led to liquidity shortage issues on banks as the distrustfulness atmosphere generated bank runs in May 1876[5], which are clearly visible in the data collected.

Alongside the increasing number of banks and the investments in Spanish funds which ultimately led to a generalized lack of confidence reflected on bank runs, the report from Banco de Portugal, prepared for the Board of Shareholders' General Meeting on 29th August 1876, indicated other causes of the crisis, namely the incorporation of several firms in a speculative environment, the scarcity of remittances from Brazil, the increase of cereals imports, Portuguese Government's large amount of payments due abroad and bonds' coupon payments to be done overseas by Companhia de Caminhos de Ferro do Norte e Leste. All of these drivers jointly induced a large currency devaluation and the consequent increase on gold exports.

At the end, this report made warnings on the urge to review the legislation, namely the "Lei das Sociedades Anónimas" and the April 14th, 1874 Law, which strengthened Banco de Portugal's tax exemption and its non-exclusive right of issuing banknotes. The Board believed these laws were incomplete and insufficient as it was visible in the events that led to the crisis.

In response to the crisis, the Portuguese Government decreed a moratorium on August 18th and distributed funds to the banks (bailouts) as London granted a loan to face the loss of liquidity.

This crisis led to the bankruptcy of 11 banks, namely Caixa Económica Penhorista, Banco Agrícola e Industrial de Ponte de Lima, Banco do Porto, Banco Nacional, Companhia Crédito Portuense, Companhia Commercial e Industrial Portuense, Banco Commercial de Vianna, Banco Nacional Insulano, Banco Commercial de Braga, Banco União de Portugal e Brazil, Caixa de Crédito Industrial[6].

[5] https://www.cgd.pt/Institucional/Patrimonio-Historico-CGD/Estudos/Pages/Grande-crise-bancaria-Portugal-BNU.aspx

[6] Valério, Nuno (coord.), Ana Bela Nunes, Carlos Bastien, Rita Martins de Sousa, Sandra Domingos Costa (2007), *História do Sistema Bancário Português - Da Formação do Primeiro Banco Português à Assunção pelo Banco de Portugal das Funções de Banco Central – 1822-1931*, Volume I. Lisboa: Banco de Portugal.

Lastly, it may be referred that, in this century, the Portuguese currency was *Real*, in plural *Réis.* The denomination *Conto de Réis*, in plural *Conto de* Réis, represents 1 million Réis (1:000$000) and it was widely used.

IV. Data and Methodology

The data for all Portuguese banks, including savings banks, during the second half of 19th century was obtained from the Bank of Portugal Archive. This is a completely new dataset collected from the document "Annaes de Estatística – Estatística Bancária", which comprehends the main banking accounts between 1858 and 1892, namely number of shares, realized capital, nominal capital, cash, bills of exchange, collateralized loans and deposits (annual and monthly examples in Appendices 1 and 2). The underlying timeframe allows considering 18 years before 1876 crisis and the subsequent 11 years, since it is the period where its effects are verifiable. Hence, the dataset used in this study comprises a timeframe between 1858 and 1887. In addition, the monthly accounts for each bank during 1876 were extracted.

Given that these data were only available on paper, this document was fully digitalized by Bank of Portugal Archive. I used the digitalized files to apply OCR (Optical Character Recognition) techniques, which allows to have the data in a format prepared to be manipulated and analyzed. In this sense, it was used OCR software with the required code to get all the data. Nevertheless, the high degree of deterioration of some figures associated with the underlying antiquity of the document led to defective and flawed outputs. So, the entirely data was manually uploaded, namely 82 pages of annual accounts between 1858 and 1892 and 10 pages of monthly accounts for 1876 (examples in Appendices 1 and 2, respectively). All the numbers were hand-checked one by one for three times to ensure the elimination of potential errors. In addition, I developed checks that include the basic rules of balance sheets reporting, namely in the capital, the number of shares and share price values available in the source document (Appendices 1 and 2).

This ambitious data collection effort allowed to create a database of the Portuguese banking system between 1858 and 1892, which can now be easily used by researchers.

After settling the dataset, it was initialized an EDA (Exploratory Data Analysis) to understand the figures and gather as many insights possible. In this context, I started by excluding the 2 banks that bankrupted before the 1876 crisis from the sample. Afterwards, the 2 banks that had their accounts in another currency were excluded alongside the 4 banks which were incorporated after the crisis. The observations excluded were ultimately considered the outliers of the sample, not existing the need for further

selection. Thereby, I started with a dataset comprised by 62 banks and 914 observations and, after the sample selection, I ended up with 54 banks and 835 observations to be analyzed (Figures 1 and 2). The entire dataset has 11 banks that went bankrupt after the crisis and 43 banks that remained active until the end of the period. During the years before crisis, especially the previous two years, there was a boom of new banks (startups) as it is displayed in Figures 3 and 4.

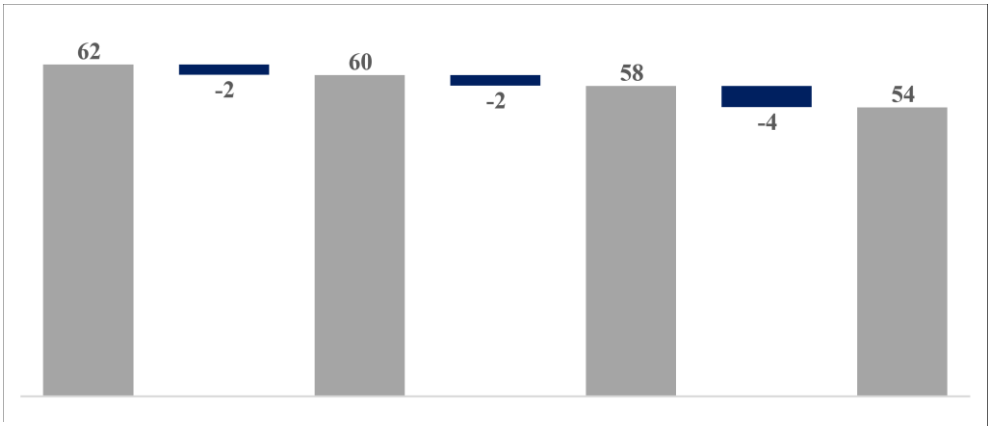

Figure 1 - Sample selection waterfall (number of banks). *Exclusion of the 2 banks that bankrupted before the 1876 crisis from the sample; the 2 banks that had their accounts in another currency; and the 4 banks which were incorporated after the crisis.*

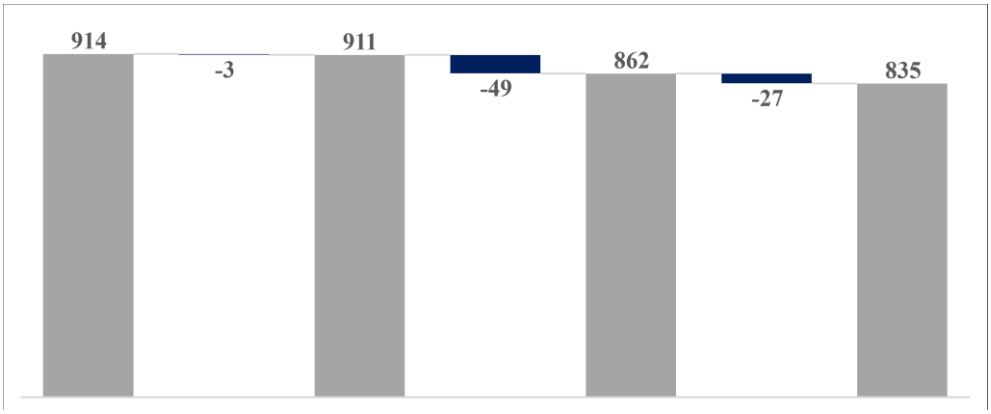

Figure 2 - Sample selection waterfall (number of observations). *Exclusion of the observations of the 2 banks that bankrupted before the 1876 crisis from the sample; the 2 banks that had their accounts in another currency; and the 4 banks which were incorporated after the crisis.*

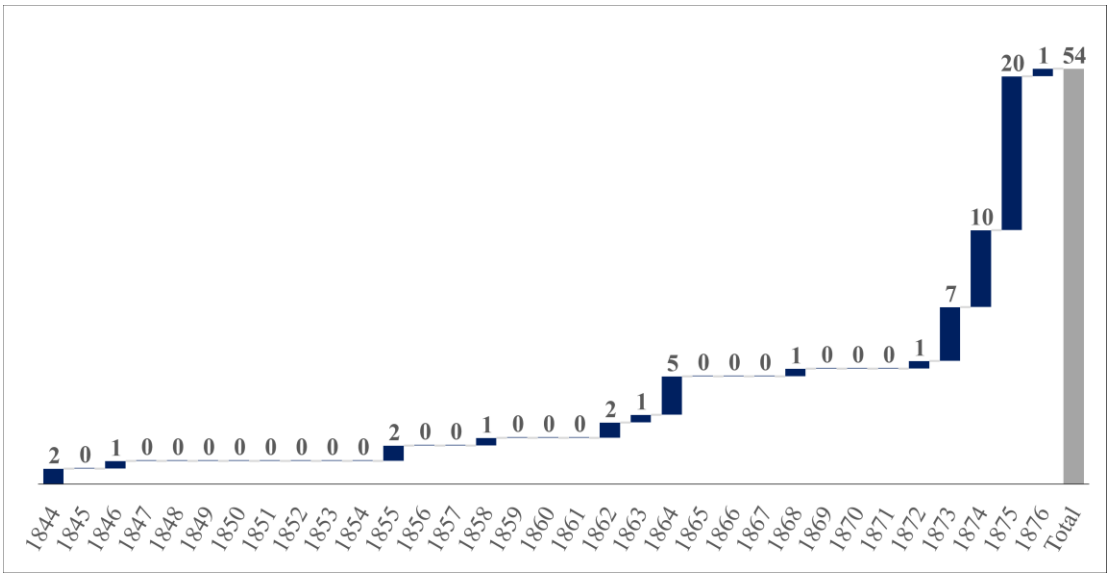

Figure 3 - Incorporation of new banks (number of banks). *Number of banks established in each year between 1844 and 1876 and total number of banks which were active in the advent of the crisis. There was a clear boom of new banks in the three years before 1876 crisis, where the total number of active banks increased from 16 to 54.*

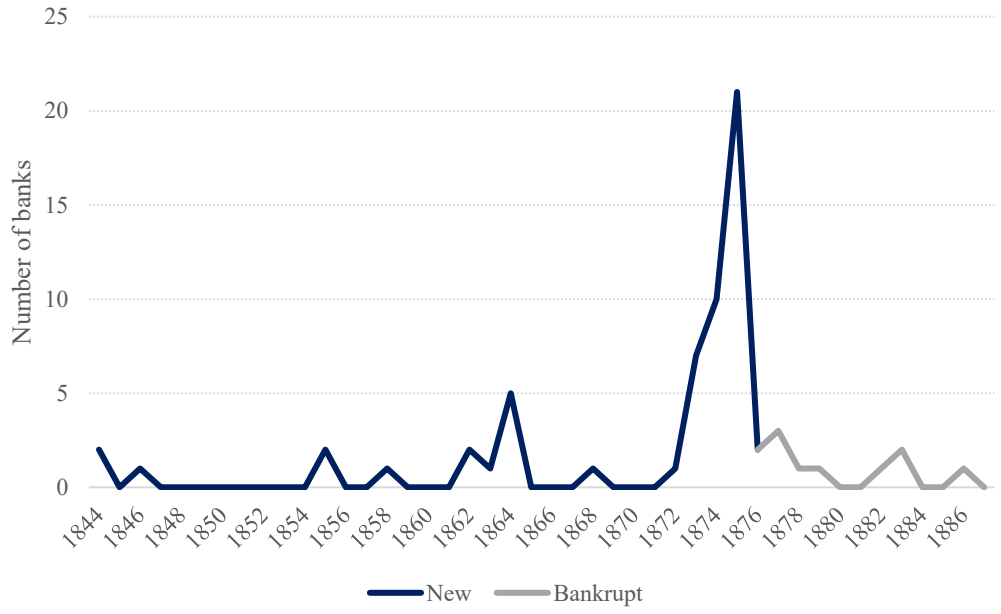

Figure 4 - Number of new banks created before the 1876 crisis and bankrupt banks after the 1876 crisis. *In 1876, there was an observable decrease in the number of established banks and, in the following years, no more new banks were incorporated. In fact, after 1876, there were solely bankruptcies, namely 11 bank failures.*

At this point, it was considered interesting to use a measure for bank competition, namely the Herfindahl-Hirschman Index (HHI), for each year to analyze its evolution. It was computed as the sum of squared market shares, defined as each bank's deposits to total deposits in the market ratio as in Berger & Hannan (2013). This market concentration index is plotted in Figure 5 and, in fact, there was a huge decrease of approximately 87.4% between 1858 and 1877, which is the year after crisis and where we can find the minimum value.

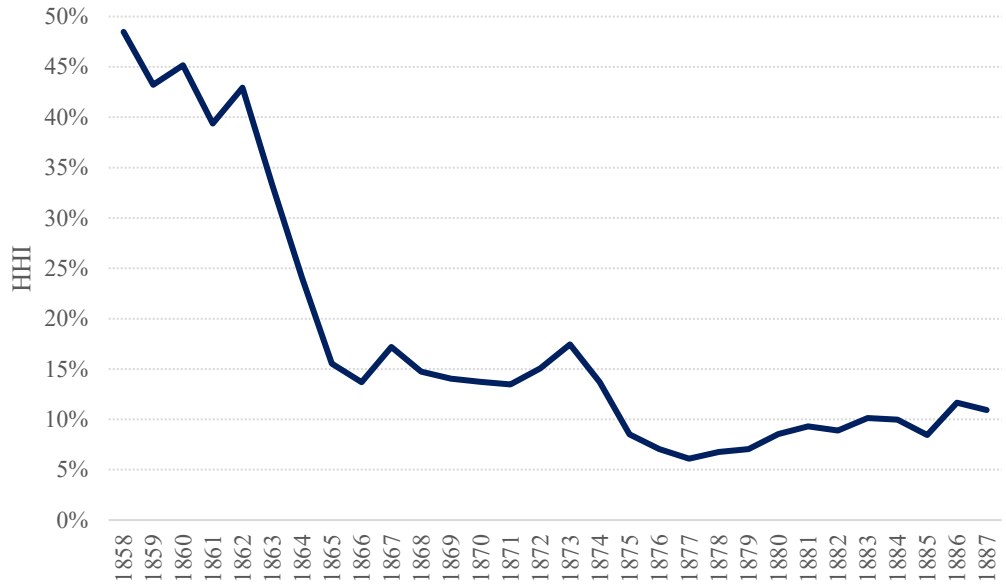

Figure 5 - Herfindahl-Hirschman Index (Market Concentration) Evolution between 1858 and 1887

Furthermore, in the EDA, it was identified a significant decrease on the levels of deposits of all banks after the 1876 crisis, reflecting the occurrence of bank runs described in the report from Bank of Portugal, prepared for the Board of Shareholders' General Meeting on 29th August 1876 (Figure 6). In this context, I also plotted the total deposits for all banks throughout the crisis year – 1876 – and, as it possible to see in Figure 7, the value decreases from 25042 to 14729 *Contos de Réis*, representing a 41.2% drop.

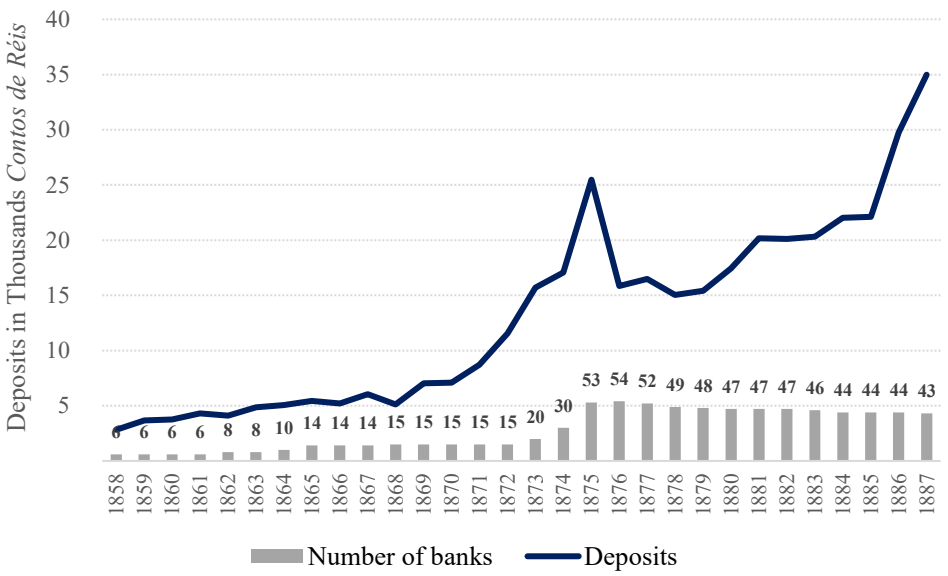

Figure 6 - Evolution of deposits of all active banks and number of active banks between 1858 and 1887

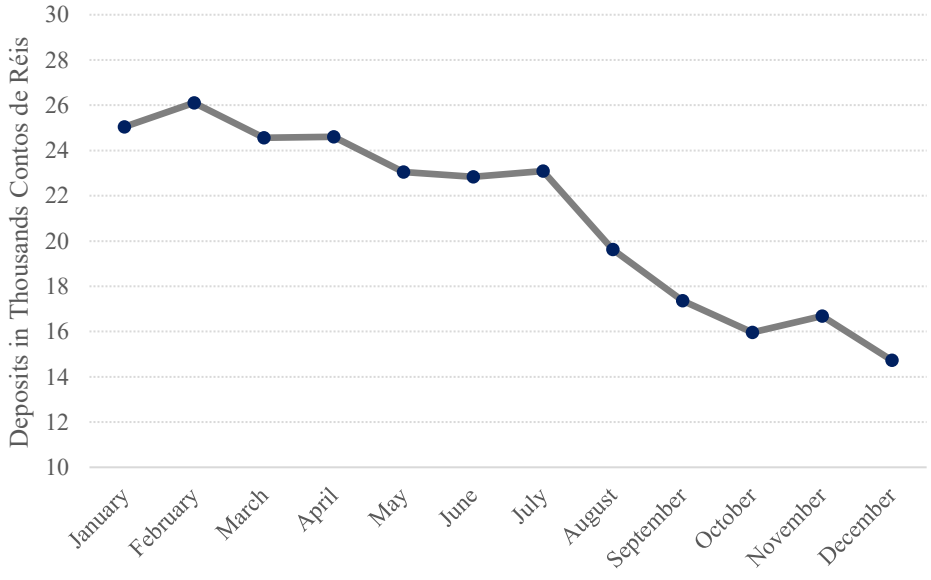

Figure 7 - Evolution of deposits of all active banks in 1876

Lastly, it was prepared a map with the bank locations (Figure 8) to look into the regional distribution, establishing a distinction between the North (banks north of river Mondego) and the South (banks south river Mondego, including Azores and Madeira archipelagos). It was used this distinction because it is present in the Bank of Portugal report mentioned above and, in fact, apart from Lisbon, there was more investment in

Spanish Government Bonds in the North. Besides, the banks which went bankrupt are flagged and it is observable there were 8 bankruptcies in the North versus 3 in the South, namely in Lisbon.

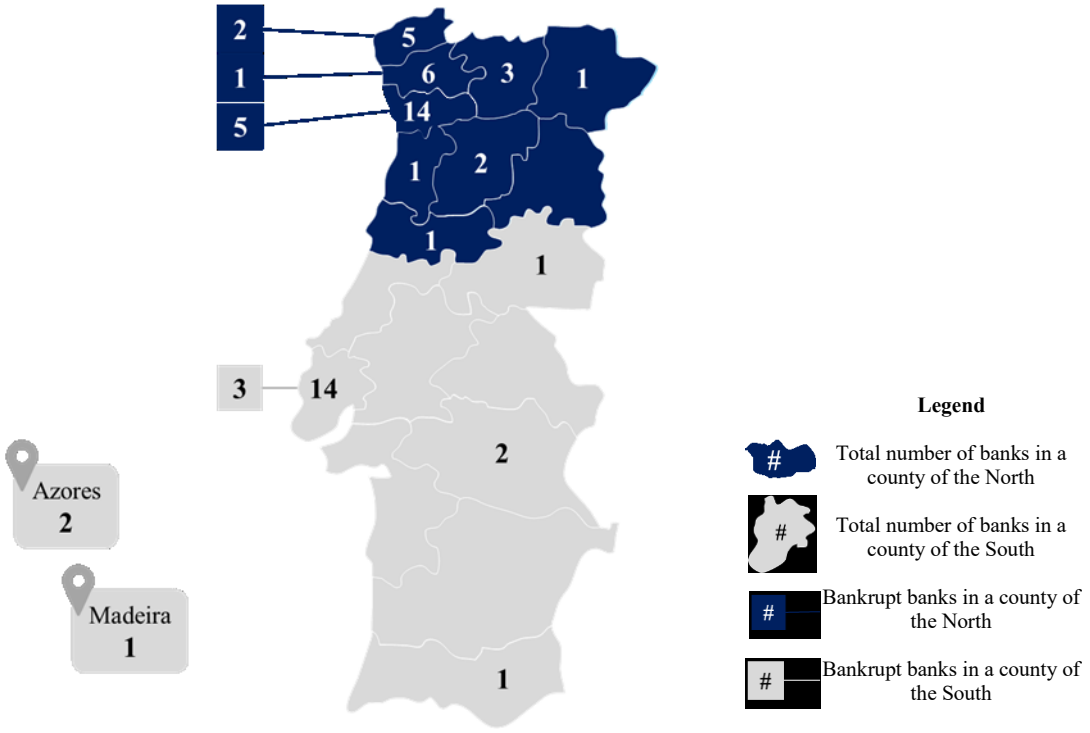

Figure 8 - Portugal map with number of banks by county and region (North and South)

Accordingly, I used all the entries available in the document "Annaes de Estatística – Estatística Bancária" in order to construct variables which reflect the main characteristics identified as critical to the occurrence of bankruptcies in the literature. Previous studies found that bankruptcies can be predicted by low equity capital, low asset quality and illiquidity. So, I decided to use the realized capital as well as the deposits, the total credit and the collateralized loans values available in the dataset to construct the variables collateralized loans to total credit ratio, total credit to deposits ratio and capital to total credit ratio. This way, total credit to deposits ratio is used as a proxy for liquidity and collateralized loans to total credit ratio as an indicator for asset quality. In fact, according to previous findings, a bank with a high value of total credit to deposits ratio is more prone to bankrupt since its liquidity may not be sufficient to address unexpected funding requirements. Moreover, a bank with a low weight of collateralized loans on total credit, displays lower asset quality, having higher likelihood of bankruptcy.

Regarding capital, including its logarithm in the models provides an approximation for banks' size. In general, smaller banks have more propensity to bankrupt during a crisis, according to the "too big to fail" view. Furthermore, the cash to capital ratio and the capital to total credit ratio give information on the banks' value. The smaller these ratios, the larger the probability of a bank failing because they mean the bank is less liquid and is less capitalized.

In addition, since in the literature there is evidence that new banks can be compared to start-ups in other industries and, in fact, they are more prone to bankruptcy than older firms, the age of a bank, *id est* the years on activity, is also studied in this thesis.

Finally, the annual change rate of deposits and the annual change rate of total credit may be also relevant to be investigated in this thesis in order to capture if the variations in those bank characteristics are determinant to bank failures.

Although there is evidence in the literature that low profitability, cost inefficiency and/or poor management are critical on bankruptcies of banks, the source document does not provide that information, so they are not considered.

In this sense, to examine whether the variables described above and displayed in Table 1 are determinant to increase or decrease the probability of bankruptcy, the following logit models were estimated.

Table 1 - Variables definition

Variable	Definition
Bankruptcy	Dummy variable that takes the value of 1 when the bank bankrupts between 1876 and 1887, and 0 otherwise
lncapital	Natural logarithm of realized capital
cash/capital	Cash to capital ratio
Δ *t.credit*	Annual change rate of total credit
coll.loans/t.credit	Collateralized loans to total credit ratio
t.credit/deposits	Total credit to deposits ratio
Δ *deposits*	Annual change rate of deposits
capital/t.credit	Capital to total credit ratio
age	Bank' years of activity
north	Dummy variable that takes the value of 1 if it the bank is located in the North of Portugal, and 0 otherwise

Firstly, since during the period 1873-1875 there was a boom of new banks, cross-sectional univariate Logit Models (1), (2) and (3) for those 3 years were estimated to complete the exploratory data analysis performed. This way, it is possible to assess the main bank characteristics that could have led to bankruptcies in that period, dealing with the shortage of degrees of freedom in a model which includes all of the variables described above, given the small size of the sample. In this context, it was considered as bankrupt, a bank that went bankrupt between 1876 and 1887 and, consequently, ceased its activity. For each year, 7 univariate models were estimated using each one of the variables logarithm of capital (*lncapital*), cash to capital ratio (*cash/capital*), annual change rate of total credit (Δ *t.credit*), collateralized loans to total credit ratio (*coll.loans/t.credit*), total credit to deposits ratio (*t.credit/deposits*), annual change rate of deposits (Δ *deposits*) and capital to total credit ratio (*capital/t.credit*) as the dependent variable to assess the significance of bank characteristics in the years before crisis to explain banks' failure:

(I) $Bankruptcy_i = \alpha + \beta_1 lncapital_i + \varepsilon_{i,t}$, *with i* = {1873; 1874; 1875}

(II) $Bankruptcy_i = \alpha + \beta_1 cash/capital_i + \varepsilon_{i,t}$, *with i* = {1873; 1874; 1875}

(III) $Bankruptcy_i = \alpha + \beta_1 \Delta\, t.credit_i + \varepsilon_{i,t}$, *with i* = {1873; 1874; 1875}

(IV) $Bankruptcy_i = \alpha + \beta_1 coll.loans/t.credit_i + \varepsilon_{i,t}$, *with i* = {1873; 1874; 1875}

(V) $Bankruptcy_i = \alpha + \beta_1 t.credit/deposits_i + \varepsilon_{i,t}$, *with i* = {1873; 1874; 1875}

(VI) $Bankruptcy_i = \alpha + \beta_1 \Delta\, deposits_i + \varepsilon_{i,t}$, *with i* = {1873; 1874; 1875}

(VII) $Bankruptcy_i = \alpha + \beta_1 capital/t.credit_i + \varepsilon_{i,t}$, *with i* = {1873; 1874; 1875}

Secondly, given that, in the exploratory data analysis performed, it was visible that the banks which failed were incorporated during the boom before crisis and, consequently, were substantially younger, it was decided to estimate an univariate logit model with panel data, using age as the dependent variable and including random-effects δ_i.

(4) $Bankruptcy_{i,t} = \alpha + \delta_i + \beta_1 age_{i,t} + \varepsilon_{i,t}$

Thirdly, following the previous model, it was made a survival analysis by plotting the Kaplan-Meyer non-parametric estimators forecasting the banks' survival time (Calomiris & Mason, 1997). This analysis intended to study the linkage between *age* and the dichotomy survival *vs* bankruptcy during this timeframe.

Lastly, it was estimated a logit model using panel data as Martin (1977), comprising the variables described above (Table 1). The annual change rates of total credit and of deposits were used to control for variations over time. Given that the bankruptcy probability may display regional effects, it was included a dummy for the region, drawing a distinction between banks in the North region and in the South region (includes archipelagoes Azores and Madeira) since there was a more intensively speculative environment in the North concerning the Spanish Government bonds. Furthermore, the model was estimated with random-effects δ_i because there is a time-invariant variable (north) in the model. Hence, the following logit model was estimated to assess the probability of the bank *i* bankrupt in time *t*:

$$(5)\quad Bankruptcy_{i,t} = \alpha + \delta_i + \beta_1\, lncapital_{i,t} + \beta_2\, cash/capital_{i,t} + \beta_3\, \Delta\, t.credit_{i,t} + \beta_4\, coll.loans/t.credit_{i,t} + \beta_5\, t.credit/deposits_{i,t} + \beta_6\, \Delta deposits_{i,t} + \beta_7\, \Delta capital/t.credit_{i,t} + \beta_8\, age_{i,t} + \beta_9\, north_t + \varepsilon_{i,t}$$

The descriptive statistics of these variables are explained in Table 2, where there is also a distinction between banks that went bankrupt and banks which did not (Panel A) as well as a division between banks in the North and banks in the South (Panel B). Table 2, in both panels, also reports the p-values of the parametric t-tests performed on the differences in the variables' means between the two groups.

Table 2 – Summary statistics. This table reports the mean, the median, the standard deviation, the minimum and the maximum values of the variables logarithm of capital (lncapital), cash to capital ratio (cash/capital), annual change rate of total credit ((Δ t.credit), collateralized loans to total credit ratio (coll.loans/t.credit), total credit to deposits ratio (t.credit/deposits), annual change rate of deposits (Δ deposits), capital to total credit ratio (capital/t.credit), age and the dummy north for the full sample and for a division between groups. Panel A reports those values for no bankrupt banks and for bankrupt banks and Panel B for banks in the South and banks in the North. Both Panels include the differences in the mean values between the two set of groups as well as the respective t-tests. The symbols ∗, ∗∗, and ∗∗∗ illustrate 10%, 5%, and 1% significance levels, respectively.

Panel A

Variable	All banks						No Bankrupt Banks						Bankrupt Banks						Difference
	Obs	Mean	Median	Std. Dev.	Min	Max	Obs	Mean	Median	Std. Dev.	Min	Max	Obs	Mean	Median	Std. Dev.	Min	Max	Mean
Bankruptcy	835	0.013	0.000	0.114	0.000	1.000													
lncapital	650	20.428	20.500	1.361	16.159	22.920	646	20.437	20.500	1.357	16.159	22.920	4	18.861	18.767	1.039	17.738	20.173	1.576**
cash/capital	650	0.149	0.095	0.189	0.000	2.057	646	0.150	0.096	0.190	0.000	2.057	4	0.038	0.022	0.047	0.001	0.105	0.112
Δ *t.credit*	768	0.292	-0.001	1.964	-1.000	29.628	758	0.302	0.001	1.975	-0.945	29.628	10	-0.051	-0.737	0.418	-1.000	0.076	0.353
coll.loans/t.credit	823	0.277	0.168	0.310	0.000	1.000	813	0.276	0.167	0.310	0.000	1.000	10	0.332	0.213	0.335	0.000	0.897	-0.057
t.credit/deposits	792	9.010	2.444	49.195	0.000	1144.036	783	8.685	2.422	48.388	0.000	1144.036	9	37.277	2.998	97.545	0.235	297.061	-28.593*
Δ *deposits*	739	0.383	0.060	4.159	-1.000	107.980	730	0.240	0.061	1.265	-1.000	14.431	9	11.961	-0.004	36.010	-1.000	107.980	-11.721***
capital/t.credit	639	2.125	1.500	2.275	0.052	24.255	635	2.072	1.490	2.054	0.052	24.255	4	10.642	9.539	10.535	0.406	23.086	-8.571***
age	835	12.007	10.000	9.160	1.000	44.000	824	12.086	10.000	9.186	1.000	44.000	11	6.091	5.000	3.833	1.000	13.000	5.995**
north	835	0.566	1.000	0.496	0.000	1.000	824	0.564	1.000	0.496	0.000	1.000	11	0.727	1.000	0.467	0.000	1.000	-0.163

Panel B

Variable	All banks						Banks in the South						Banks in the North						Difference
	Obs	Mean	Median	Std. Dev.	Min	Max	Obs	Mean	Median	Std. Dev.	Min	Max	Obs	Mean	Median	Std. Dev.	Min	Max	Mean
Bankruptcy	835	0.013	0.000	0.114	0.000	1.000	362	0.008	0.000	0.091	0.000	1.000	473	0.017	0.000	0.129	0.000	1.000	-0.009
lncapital	650	20.428	20.500	1.361	16.159	22.920	241	20.647	20.552	1.539	16.159	22.803	409	20.298	20.500	1.227	16.265	22.920	0.348***
cash/capital	650	0.149	0.095	0.189	0.000	2.057	241	0.181	0.983	0.234	0.000	2.057	409	0.131	0.095	0.154	0.000	1.520	0.050***
Δ *t.credit*	768	0.292	-0.001	1.964	-1.000	29.628	336	0.358	0.008	2.207	-0.945	29.628	432	0.240	-0.009	1.753	-1.000	24.620	0.117
coll.loans/t.credit	823	0.277	0.168	0.310	0.000	1.000	358	0.375	0.244	0.373	0.000	1.000	465	0.201	0.136	0.224	0.000	1.000	0.174***
t.credit/deposits	792	9.010	2.444	49.195	0.000	1144.036	332	14.146	1.695	74.864	0.000	1144.036	460	5.302	2.792	9.808	0.041	108.610	8.844
Δ *deposits*	739	0.383	0.060	4.159	-1.000	107.980	311	0.263	0.081	1.394	-1.000	14.431	428	0.469	0.046	5.335	-1.000	107.980	-0.206
capital/t.credit	639	2.125	1.500	2.275	0.052	24.255	237	2.227	1.545	2.123	0.052	15.492	402	2.065	1.478	2.360	0.149	24.255	0.162
age	835	12.007	10.000	9.160	1.000	44.000	362	14.122	11.000	10.798	1.000	44.000	473	10.389	9.000	7.282	1.000	33.000	3.733***
north	835	0.566	1.000	0.496	0.000	1.000													

In Table 2, the aggregate data display that 1.3% of the observations correspond to the last activity year of the banks which went bankrupt during the time under analysis. On average, banks are 12 years old. The mean capital (*lncapital*) is 745 *Contos de Réis* (exponential of 20.428), the mean cash to capital ratio (*cash/capital*) is 14.9% and the mean capital to total credit ratio (*capital/t.credit*) is 2.125. The mean collateralized loans (*coll.loans/t.credit*) are 27.7% of the total credit, reflecting a lower reliance on secured loans, which are less risky. The mean total credit to deposits (*t.credit/deposits*) ratio is 9.010, evidencing the significant liquidity risks these banks were facing. Regarding the annual change rates, for total credit (Δ *t.credit*) it is, on average, 29.2% with a median of -0.1% and for deposits (Δ *deposits*) it is, on average, 38.3% with a median of 6.0%, thus showing the expansionary period lived in the financial system before the crisis.

In Table 2, Panel A, one may acknowledge that the capital (*lncapital*) is, on average, lower for bankrupt banks (155 *Contos de Réis*, the exponential of 18.861) than for banks which did not go bankrupt (751 *Contos de Réis*, the exponential of 20.437). Furthermore, the difference in mean between the two groups is significant at a 5% level. Regarding the ratio of total credit to deposits (*t.credit/deposits*), the mean is substantially higher for bankrupt banks (37.277 *vs* 8.685) and the difference is statistically significant at a 10% level. Besides, the differences on the means of annual change rate of deposits (Δ *deposits*) and capital to total credit (*capital/t.credit*) between groups are significant at 1% level. The annual change rate of deposits (Δ *deposits*) among bankrupt banks is, on average, 11.961, which is substantially higher than 0.240 from no bankrupt banks. Concerning the capital to total credit ratio (*capital/t.credit*), bankrupt banks display a mean of 10.462 and the no bankrupt banks a mean of 1.490. Finally, the difference on the *age* means between the two groups reveals to be significant at a 5% level and it is lower for bankrupt banks (6.091) than for no bankrupt banks (12.086).

In Table 2, Panel B, it is possible to see that there are more bankrupt banks in the North (0.017) than in the South (0.008). In addition, banks in the South (929 *Contos de Réis*, exponential of 20.647) have, on average, significantly higher capital (*lncapital*) than banks in the North (655 *Contos de Réis*, exponential of 20.298) and this difference is significant at 1% level. Moreover, on average, the cash to capital ratio (*cash/capital*) is significantly different between South and North banks at a 1% level, being higher for the former (0.181) comparing to the latter (0.131). The mean collateralized loans are 37.5% of the total credit (*coll.loans/t.credit*) for South banks and 20.1% for North banks, being

the latter more exposed to risk. This difference also exhibits significance at a 1% level. Lastly, the difference on the *age* means between the two groups is also significant at 1% level, given that the mean of *age* for South banks is 14.122, being considerably higher than the mean value of 10.389 from North banks.

V. Empirical Findings

i. Univariate cross-section logit models

The first univariate cross-section models were estimated for the three years before crisis (1873, 1874 and 1875) using the variables logarithm of capital (*lncapital*), cash to capital ratio (*cash/capital*), annual change rate of total credit (Δ *t.credit*), collateralized loans to total credit ratio (*coll.loans/t.credit*), total credit to deposits ratio (*t.credit/deposits*), annual change rate of deposits (Δ *deposits*) and capital to total credit ratio (*capital/t.credit*) to assess if the bank characteristics in those years are significant to explain whether a bank goes bankrupt or not between 1876 and 1887. Table 3 comprises the results for those models, displaying the coefficients and the corresponding two-tailed p-values, which are obtained through White's method of correcting standard errors for heteroskedasticity; the Wald test and the Pseudo R^2. Since these models were constructed with the aim of observing the variables' significance and their coefficients' signs, it was decided for sake of brevity to not provide the marginal effects.

The univariate Logit Models (1) – I, II, IV, V and VII, each one using as independent variable logarithm of capital (*lncapital*), cash to capital ratio (*cash/capital*), collateralized loans to total credit ratio (*coll.loans/t.credit*), total credit to deposits ratio (*t.credit/deposits*) and capital to total credit ratio (*capital/t.credit*), respectively, were estimated for 1873. The univariate Logit Models (1) – III and VI which include the annual change rate of total credit (Δ *t.credit*) and the annual change rate of deposits (Δ *deposits*) respectively, were not estimated for 1873 because the two banks which went bankrupt in the crisis were created in this year, not being possible to compute annual change rates. Logit Models (1) – I, IV and V estimation reveals that capital (*lncapital)* and collateralized loans to total credit ratio (*coll.loans/t.credit*) are significant at a 10% level and total credit to deposits ratio (*t.credit/deposits*) is significant at a 5% level, respectively. In addition, their coefficients exhibit the expected signs as the probability of bankruptcy varies negatively with the capital, *lncapital*, (-0.674) and with the weight of collateralized loans on total credit, *coll.loans/t.credit*, (-11.294) and positively with the weight of total credit on deposits, *t.credit/deposits*, (0.608). Cash to capital ratio (*cash/capital*) and capital to total credit ratio (*capital/t.credit*) are not statistically significant in the Models (1) – II and VII, respectively.

For 1874, it is already possible to estimate Logit Models (2) – III and VI as there are data on the annual changes. However, both annual change rate of total credit (Δ *t.credit*) and annual change rate of deposits (Δ *deposits*) are not significant to explain bankruptcy. Moreover, Logit Models (2) - I, IV and V no longer exhibit significant capital (*lncapital)*, collateralized loans to total credit ratio (*coll.loans/t.credit*) and total credit to deposits ratio (*t.credit/deposits*), respectively. And the sign of the total credit to deposits ratio (*t.credit/deposits*) coefficient is, in this case, positive. Nonetheless, capital (*lncapital)* and collateralized loans to total credit ratio (*coll.loans/t.credit*) coefficients still display the awaited signs (-0.226 and -1.375). In their turn, Models (2) – II and VII reveal that cash to capital ratio (*cash/capital*) and capital to total credit ratio (*capital/t.credit*) in 1874 are significant to predict bankruptcy at 1% and 5% levels, respectively. The estimator sign for cash to capital ratio (*cash/capital*) is negative (-5.929) as expected, meaning that a more liquid bank is more likely to survive. The estimator sign for capital to total credit ratio (*capital/t.credit*) is positive (1.618) and it was expected to be negative since previous literature indicate that a more capitalized bank is less likely to bankrupt.

Using 1875 data, only the Model (3) – VII exhibits a significant predictor at 10% level, namely capital to total credit ratio (*capital/t.credit*), but with the sign contrary to what was expected (0.729). The annual change rates of total credit (Δ *t.credit*) and of deposits (Δ *deposits*) are not significant in the Logit Models (3) – III and VI as well as the logarithm of capital (*lncapital*), cash to capital ratio (*cash/capital*), collateralized loans to total credit ratio (*coll.loans/t.credit*), total credit to deposits ratio (*t.credit/deposits*) in the Models (3) - I, II, IV and V, respectively. The puzzling part is the fact that all the coefficients of the estimators cash to capital ratio (*cash/capital*), collateralized loans to total credit ratio (*coll.loans/t.credit*) and total credit to deposits ratio (*t.credit/deposits*) have a sign different from what was expected (0.392, 0.038, - 0.050). In fact, according to the literature, it would be expected to have negative coefficients in cash to capital ratio (*cash/capital*) and collateralized loans to total credit ratio (*coll.loans/t.credit*) since it is argued that a bank having more liquidity and assets with more quality is less likely to bankrupt. Also, it would be predicted to have a positive coefficient in the total credit to deposits ratio (*t.credit/deposits*) because, in general, a bank with a high value in this measure is more prone to bankrupt as it is less liquid.

Table 3 – Univariate cross-section logit models estimation. This table reports the results for the univariate logit models (1) – I, II, IV, V, VII; (2) – I, II, III, IV, V, VI, VII and (3) – I, II, III, IV, V, VI, VII of the probability of bankruptcy using the variables logarithm of capital (lncapital), cash to capital ratio (cash/capital), annual change rate of total credit (Δ t.credit), collateralized loans to total credit ratio (coll.loans/t.credit), total credit to deposits ratio (t.credit/deposits), annual change rate of deposits (Δ deposits) and capital to total credit ratio (capital/t.credit) in 1873, 1874 and 1875, displaying the coefficients and the corresponding two-tailed p-values, which are obtained through White's method of correcting standard errors for heteroskedasticity; the Wald test and the Pseudo R^2.

	Variable	Logit Model (1) 1873				Logit Model (2) 1874				Logit Model (3) 1875			
		Coef.	Obs.	Wald chi^2	Pseudo R^2	Coef.	Obs.	Wald chi^2	Pseudo R^2	Coef.	Obs.	Wald chi^2	Pseudo R^2
I	*Intercept*	11.666	16	*0.054*	0.117	1.385	24	*0.145*	0.017	0.761	40	*0.472*	0.009
		0.115				*0.682*				*0.868*			
	lncapital	-0.674				-0.226				-0.016			
		0.054				*0.145*				*0.472*			
II	*Intercept*	-1.818	16	*0.859*	0.002	-2.406	24	*0.008*	0.053	-2.566	40	*0.941*	0.000
		0.082				*0.031*				*0.007*			
	cash/capital	-0.058				-5.929				0.392			
		0.859				*0.008*				*0.941*			
III	*Intercept*	N.A.				-2.712	17	*0.166*	0.172	-1.834	27	*0.155*	0.047
						0.023				*0.005*			
	Δ *t.credit*					2.090				-0.591			
						0.166				*0.155*			
IV	*Intercept*	-0.037	17	*0.098*	0.212	-1.787	28	*0.119*	0.019	-1.421	51	*0.970*	0.000
		0.754				*0.008*				*0.001*			
	coll.loans/t.credit	-11.294				-1.375				0.038			
		0.098				*0.119*				*0.970*			
V	*Intercept*	-3.603	16	*0.025*	0.152	-2.072	28	*0.753*	0.001	-1.217	49	*0.565*	0.004
		0.000				*0.001*				*0.006*			
	t.credit/deposits	0.608				-0.010				-0.050			
		0.025				*0.753*				*0.565*			
VI	*Intercept*	N.A.				-1.908	16	*0.595*	0.003	-2.002	27	*0.599*	0.004
						0.016				*0.002*			
	Δ *deposits*					-0.081				-0.061			
						0.595				*0.599*			
VII	*Intercept*	0.080	13	*0.178*	0.118	-1.175	22	*0.038*	0.118	-3.942	38	*0.062*	0.161
		0.964				*0.434*				*0.003*			
	capital/t.credit	-1.783				-1.618				0.729			
		0.177				*0.038*				*0.062*			

ii. Univariate panel data logit model

In this subsection, it is tested if the age, defined as the years under activity of each bank, is significant to explain the probability of bankruptcy, using panel data. It was not estimated a cross-section model because all the banks which went bankrupt after 1876 and have information between 1873 and 1876, were established in the latter period. Therefore, the model ultimately predicts bankruptcy perfectly and, in this sense, it was only estimated a model using panel data. Table 4, which compiles this model's results, shows that the age is statistically significant to explain banks' bankruptcy at a 5% level. Furthermore, it was performed the Wald test which reveals that the model is significant at a 5% level. These results may illustrate that younger banks have higher default risks when comparing to older ones.

Table 4 - Univariate panel data logit model (4) estimation. This table reports the results for the univariate logit models of the probability of bankruptcy using the variable age, displaying the coefficients and the corresponding two-tailed p-values, which are obtained through White's method of correcting standard errors for heteroskedasticity; the log likelihood and the Wald test.

Variable	**Panel Data - Logit Model (4)**
	Coefficients
Intercept	-3.188
	0.000
age	-0.134
	0.036
Number of obs	835
Number of groups	54
Log likelihood	-55.150
Wald chi ^{2} (9)	4.39
Prob > chi ^{2}	*0.036*

iii. Survival Analysis | Kaplan-Meier Estimates

In this division, it is presented a non-parametric technique for survival analysis, namely Kaplan-Meier estimation, naturally following the study conducted in the previous subsection. In fact, at this point, this analysis turned out to be interesting given the statistically significance of *age* in Model (4). The use of this method allows to obtain the Kaplan-Meier estimator of the survival function of banks and to plot it into a graph. Additionally, it was prepared an analysis dividing the sample in two groups - banks from the North and banks from the South – to assess the survival time differences between them. It was performed the Log-rank test for equality of North and South survivor functions to test this proposition and it reveals that the difference between the two groups is insignificant.

Table 5 – Log-rank test for equality of survivor functions (p-value in italic)

Groups	**Log-rank test for equality of survivor functions**	
	Events observed	Events expected
South	3	4.610
North	8	6.390
Total	11	11
chi2(1)	0.980 *0.323*	

Figure 9 illustrates that banks with an *age* superior to 12 years survive during the crisis and this may evidence that the years under activity of a bank are potentially crucial to survive crises, especially when it is created under a deregulated context. Therefore, one may argue that when a bank becomes older, its default risk is likely to decrease, on average.

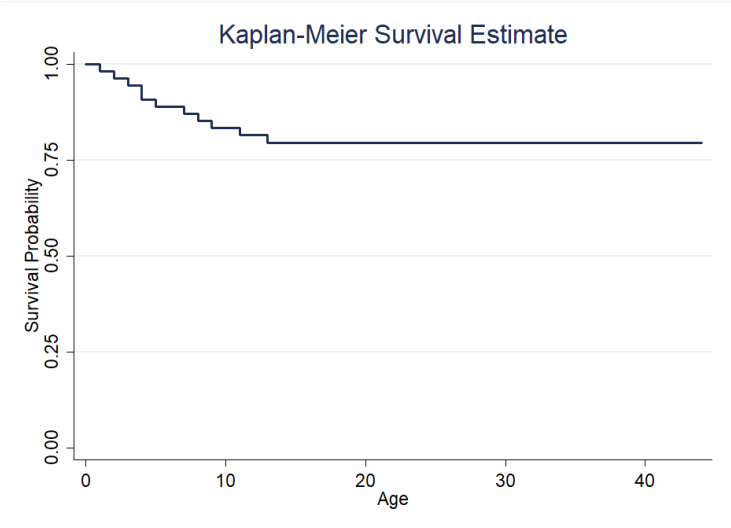

Figure 9 – Kaplan-Meier survival function estimates

Figure 10 indicates that, in the North, the banks which went bankrupt were under activity for 10 years or less. But, in the South, the banks which failed had an age between 7 and 12 years. This evidence may express that the incorporation of banks in the North during the years before crisis, which benefited from the deregulated setting, were created under a more speculative environment than South banks what is probably linked to faster bankruptcies in the North.

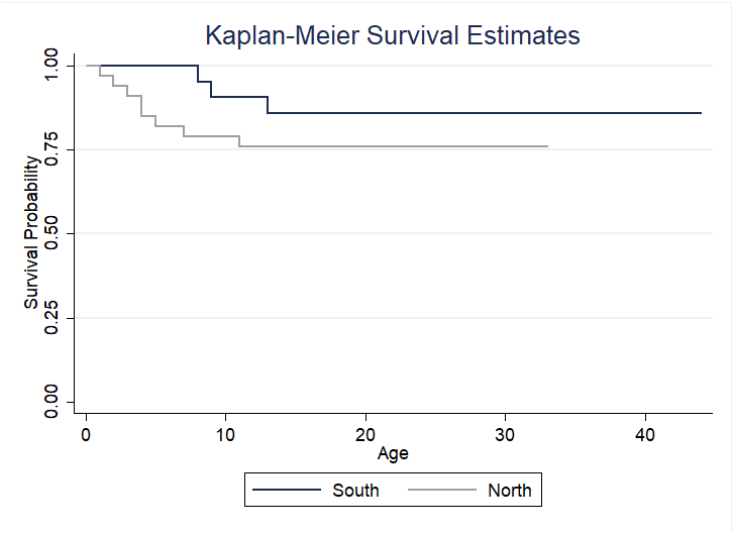

Figure 10 - Kaplan-Meier survival function estimates for banks in the South and North

iv. Panel data logit models

The next step was to estimate the Logit Model (5) comprising all the variables previously studied, using panel data. The estimation results are displayed in Table 6, including the coefficients, the marginal effects and their respective p-values, computed based on White's method to correct standard errors for heteroskedasticity. Besides, Table 6 contains the Wald test which indicates that this model, globally, is not significant. Further, all the predictors estimated reveal to be insignificant in this model.

Table 6 – Panel data logit model (5) estimation. This table reports the results for the logit model (5) of the probability of bankruptcy using the variables logarithm of capital (lncapital), cash to capital ratio (cash/capital), annual change rate of total credit (Δ t.credit), collateralized loans to total credit ratio (coll.loans/t.credit), total credit to deposits ratio (t.credit/deposits), annual change rate of deposits (Δ deposits), capital to total credit ratio (capital/t.credit), age and the dummy north without winsorization, displaying the coefficients and the marginal effects and the corresponding two-tailed p-values; the Wald test (p-value in italic) and the log likelihood.

Variable	**Panel Data - Logit Model (5)** *No Winsorization*	
	Coef.	Marginal effects
Intercept	114.105	
	0.211	
lncapital	-6.369	-0.020
	0.211	*0.352*
cash/capital	-35.031	-0.112
	0.194	*0.345*
Δ *t.credit*	-13.866	-0.045
	0.147	*0.316*
coll.loans/t.credit	4.831	0.016
	0.374	*0.448*
t.credit/deposits	0.010	0.000
	0.213	*0.364*
Δ *deposits*	1.055	0.003
	0.292	*0.360*
capital/t.credit	0.537	0.002
	0.187	*0.419*
age	-0.950	-0.003
	0.122	*0.242*
north	0.358	0.001
	0.858	*0.858*
Number of obs	564	
Number of groups	48	
Log likelihood	-6.152	
Wald chi ^{2} (9)	3.72	
Prob > chi ^{2}	*0.929*	

Following these results and considering that the sample used kept outliers, it was decided to perform an 80% winsorization. Although, it seems odd to winsorize in those terms a small sample as the present one, it has in fact extreme figures, possibly biasing the results, which are not treated when performing a 98% or even a 90% winsorization. Additionally, one should not discard that this dataset not only was collected initially by hand in the 19th century, but also it was manually uploaded to be manipulated in this study. Obviously, these facts could potentially have produced errors, despite the careful triple validation procedure.

Table 7 contains a summary of the descriptive statistics for the 80% winsorized sample, including the differences in the variables' means between groups and the corresponding t-tests in both panels. The aggregate data still displays that 1.3% of the observations correspond to the last activity year of the banks which went bankrupt during the time under analysis. The mean capital (*lncapital*) is, in this sample, 765 *Contos de Réis* (exponential of 20.456) comparing to 745 *Contos de Réis* (exponential of 20.428) from the initial sample; the mean cash to capital ratio (*cash/capital*) is 12.4% comparing to 14.9% and the mean capital to total credit ratio (*capital/t.credit*) is 1.851 comparing to 2.125. The mean collateralized loans (*coll.loans/t.credit*) are 27.7% of the total credit as in the initial sample and the mean total credit to deposits ratio (*t.credit/deposits*) is 3.943, significantly lower than 9.010 from the initial sample. Regarding the annual change rates, for total credit (Δ *t.credit*) it is, on average, 3.4% with a median of -0.1% and for deposits (Δ *deposits*) it is, on average, 8.5% with a median of 6.0%. These figures in the initial sample are substantially higher, namely 29.2% with a median of -0.1% for total credit (Δ *t.credit*) and 38.3% with a median of 6.0%, for deposits (Δ *deposits*).

In Table 7, Panel A, one may observe that the capital (*lncapital*) is still, on average, lower for bankrupt banks (772 *Contos de Réis*, the exponential of 20.465) than for banks which did not bankrupt (183 *Contos de Réis*, the exponential of 19.024). Furthermore, the difference in mean between the two groups is significant at a 5% level. The cash to capital ratio (*cash/capital*) means' difference is, in this sample, significant at 10% level, where the mean for no bankrupt banks is higher (0.125) than for bankrupt banks (0.044). The annual change rate of total credit (Δ *t.credit*) means' difference, in this sample, also turns out to be significant at a 1% level. On average, Δ *t.credit* is 3.8% for no bankrupt banks and -22.5% for bankrupt banks. Regarding the weight of total credit on deposits (*t.credit/deposits*), the difference is no longer statistically significant at a 10%

level as in the initial sample. Besides, the differences on the means of Δ *deposits* are not significant as well. Concerning the capital to total credit ratio (*capital/t.credit*), bankrupt banks display a mean of 3.109 and no bankrupt banks a mean of 1.843, being their difference significant at a 5% level. Finally, the *age* mean values and their difference remains equal to the initial sample.

In Table 7, Panel B, banks in the South (907 *Contos de Réis*, exponential of 20.625) have, on average, significantly higher capital (*lncapital*) than banks in the North (692 *Contos de Réis*, exponential of 20.356) and this difference is also significant at a 1% level in this sample. Also, on average, the cash to capital ratio (*cash/capital*) is significantly different between South and North banks at a 1% level, being higher for the former (0.138) comparing to the latter (0.116). The annual change rate of total credit (Δ *t.credit*) means' difference in this dataset is significant at a 5% level, being on average superior for South banks (0.057) than for North banks (0.017). The mean collateralized loans (*coll.loans/t.credit*) are 37.5% of the total credit for South banks and 20.1% for North banks as in the first sample and their difference also exhibits significance at a 1% level. Moreover, the difference in the means of capital to total credit ratio (*capital/t.credit*) between the two groups reveals to be significant at a 5% level. The mean capital to total credit ratio (*capital/t.credit*) is larger for South banks (1.959) than four North banks (1.787). Lastly, the statistics for the *age* remain equal to the ones from the initial sample.

Table 7 - Summary statistics. This table reports the mean, the median, the standard deviation, the minimum and the maximum values of the variables logarithm of capital (lncapital), cash to capital ratio (cash/capital), annual change rate of total credit (Δ t.credit), collateralized loans to total credit ratio (coll.loans/t.credit), total credit to deposits ratio (t.credit/deposits), annual change rate of deposits (Δ deposits), capital to total credit ratio (capital/t.credit), age and the dummy north for the 80% winsorized sample and for a division between groups. Panel A reports those values for no bankrupt banks and for bankrupt banks and Panel B for banks in the South and banks in the North. Both Panels include the differences in the mean values between the two set of groups as well as the respective t-tests. The symbols ∗, ∗∗, and ∗∗∗ illustrate 10%, 5%, and 1% significance levels, respectively.

Panel A ***80% Winsorization***

Variable	All banks						No Bankrupt Banks						Bankrupt Banks						Difference
	Obs	Mean	Median	Std. Dev.	Min	Max	Obs	Mean	Median	Std. Dev.	Min	Max	Obs	Mean	Median	Std. Dev.	Min	Max	Mean
Bankruptcy	835	0.013	0.000	0.114	0.000	1.000													
lncapital	650	20.456	20.500	1.146	18.389	22.004	646	20.465	20.500	1.142	18.389	22.004	4	19.024	18.767	0.836	18.389	20.173	1.440**
cash/capital	650	0.124	0.095	0.096	0.021	0.308	646	0.125	0.096	0.096	0.021	0.308	4	0.044	0.026	0.041	0.021	0.105	0.080*
Δ *t.credit*	768	0.034	-0.001	0.263	-0.347	0.558	758	0.038	0.001	0.262	-0.347	0.558	10	-0.225	-0.347	0.172	-0.347	0.076	0.262***
coll.loans/t.credit	823	0.277	0.168	0.310	0.003	1.000	813	0.276	0.167	0.310	0.003	1.000	10	0.333	0.213	0.334	0.003	0.897	-0.057
t.credit/deposits	792	3.943	2.444	4.028	0.483	13.709	783	3.924	2.422	4.010	0.483	13.709	9	5.620	2.998	5.399	0.483	13.709	-1.696
Δ *deposits*	739	0.085	0.060	0.320	-0.415	0.684	730	0.085	0.061	0.319	-0.415	0.684	9	0.091	-0.004	0.418	-0.415	0.684	-0.006
capital/t.credit	639	1.851	1.500	1.016	0.774	4.038	635	1.843	1.490	1.009	0.774	4.038	4	3.109	3.811	1.571	0.774	4.038	-1.266**
age	835	12.007	10.000	9.160	1.000	44.000	824	12.086	10.000	9.186	1.000	44.000	11	6.091	5.000	3.833	1.000	13.000	5.995**
north	835	0.566	1.000	0.496	0.000	1.000	824	0.564	1.000	0.496	0.000	1.000	11	0.727	0.000	0.467	0.000	1.000	-0.163

Panel B ***80% Winsorization***

Variable	All banks						Banks in the South						Banks in the North						Difference
	Obs	Mean	Median	Std. Dev.	Min	Max	Obs	Mean	Median	Std. Dev.	Min	Max	Obs	Mean	Median	Std. Dev.	Min	Max	Mean
Bankruptcy	835	0.013	0.000	0.114	0.000	1.000	362	0.008	0.000	0.091	0.000	1.000	473	0.017	0.000	0.129	0.000	1.000	-0.009
lncapital	650	20.456	20.500	1.146	18.389	22.004	241	20.625	20.552	1.210	18.389	22.004	409	20.356	20.500	1.095	18.389	22.004	0.270***
cash/capital	650	0.124	0.095	0.096	0.021	0.308	241	0.138	0.098	0.106	0.021	0.308	409	0.116	0.095	0.088	0.021	0.308	0.023***
Δ *t.credit*	768	0.034	-0.001	0.263	-0.347	0.558	336	0.057	0.008	0.278	-0.347	0.558	432	0.017	-0.009	0.249	-0.347	0.558	0.040**
coll.loans/t.credit	823	0.277	0.168	0.310	0.003	1.000	358	0.375	0.244	0.373	0.003	1.000	465	0.201	0.136	0.224	0.003	1.000	0.174***
t.credit/deposits	792	3.943	2.444	4.028	0.483	13.709	332	3.747	1.695	4.342	0.483	13.709	460	4.084	2.792	3.784	0.483	13.709	-0.337
Δ *deposits*	739	0.085	0.060	0.320	-0.415	0.684	311	0.103	0.081	0.325	-0.415	0.684	428	0.071	0.046	0.317	-0.415	0.684	0.032
capital/t.credit	639	1.851	1.500	1.016	0.774	4.038	237	1.959	1.545	1.116	0.774	4.038	402	1.787	1.478	0.948	0.774	4.038	0.172**
age	835	12.007	10.000	9.160	1.000	44.000	362	14.122	11.000	10.798	1.000	44.000	473	10.389	9.000	7.282	1.000	33.000	3.733***
north	835	0.566	1.000	0.496	0.000	1.000													

Therefore, I estimated the same model using the sample with the outliers identified in all the variables winsorized. The estimation results are displayed in Table 8, including the coefficients, the marginal effects and their respective p-values, computed based on White's method to correct standard errors for heteroskedasticity. Besides, Table 8 includes the Log likelihood and the Wald chi^2. Overall, the model is only significant at a 15% level based on Wald test. There is evidence that logarithm of capital (*lncapital*), total credit to deposits ratio (*t.credit/deposits*), capital to total credit ratio (*capital/t.credit*) and *age* are significant to explain bank failures at 1%, 5%, 10% and 5% levels, respectively. Additionally, these variables' coefficients feature the expected signs. Actually, the bankruptcy probability varies negatively with capital (*lncapital*) (-15.798), supporting the argument that more capitalized banks are healthier and they are more likely to survive in crises. One can also point out that capital levels reflect the banks' size and, consequently, bigger banks are less likely to bankrupt because of potentially receiving support in the case of a crisis, in line with a "too big to fail" view (Hovakimian & Kane, 2000). In reality, after the bank runs in 1876, the Portuguese Government bailed out some banks, through a 300,000 English Sovereigns loan granted by London, according to the report from the Board of Shareholders' General Meeting on 29th August 1876. The bankruptcy probability varies positively with the weight of total credit on deposits (*t.credit/deposits*) (1.617), which is consistent with the fact that, although banks may create additional supply through the deposit expansion multiplier, banks providing excessive amounts of credit without having an appropriate financial situation are more prone to fail during a crisis, especially when bank runs shorten the level of deposits. In its turn, the *age* coefficient estimate is negative (-2.658), indicating that the probability of banks failing varies oppositely with age. This finding suggests that newly-created banks are more susceptible of bankrupting in crises. As proposed earlier, this evidence may be related with the boom of new banks in the three years before the crisis, characterized by a deregulated environment with no comprehensive regulatory policies neither an established supervisor.

Regarding the marginal effects, they are only significant for the variables logarithm of capital (*lncapital*) and total credit to deposits ratio (*t.credit/deposits*) at a 5% level. When there is a one unit increase in the logarithm of capital (*lncapital*), the probability of bankruptcy decreases by 0.022. And when total credit to deposits ratio (*t.credit/deposits*) increases by one unit, the probability of bankruptcy increases by 0.002.

Capital to total credit ratio (*capital/t.credit*) and *age* are only significant at 15% and 20% levels, respectively.

Table 8 – Panel data logit model (6) estimation. This table reports the results for the logit model (6) of the probability of bankruptcy using the variables logarithm of capital (lncapital), cash to capital ratio (cash/capital), annual change rate of total credit (Δ t.credit), collateralized loans to total credit ratio (coll.loans/t.credit), total credit to deposits ratio (t.credit/deposits), annual change rate of deposits (Δ deposits), capital to total credit ratio (capital/t.credit), age and the dummy north with 80% winsorization, displaying the coefficients and the marginal effects and the corresponding two-tailed p-values; the Wald test (p-value in italic) and the log likelihood.

Variable	**Panel Data - Logit Model (6)** *80% Winsorization*	
	Coef.	Marginal effects
Intercept	275.755	
	0.004	
lncapital	-15.798	-0.022
	0.003	*0.027*
cash/capital	-22.065	-0.031
	0.580	*0.636*
Δ *t.credit*	-21.995	-0.031
	0.123	*0.200*
coll.loans/t.credit	-7.108	-0.010
	0.406	*0.454*
t.credit/deposits	1.697	0.002
	0.044	*0.015*
Δ *deposits*	11.316	0.016
	0.108	*0.173*
capital/t.credit	5.288	0.007
	0.057	*0.190*
age	-2.658	-0.004
	0.032	*0.111*
north	2.323	0.003
	0.642	*0.644*
Number of obs	564	
Number of groups	48	
Log likelihood	-8.916	
Wald chi ^{2} *(9)*	13.70	
Prob > chi ^{2}	*0.133*	

VI. Conclusions

This dissertation studies the determinants of bankruptcies of banks in a deregulated context. A close investigation to the political and economic situation in the 19th century is important to understand the context in which a boom of new banks (start-ups) emerged. This was a period where regulatory policies diminished, leading to successive incorporations of more and more banks. Although it can be argued that deregulation results in more competition, which in general is positive for the economy, it also reduces the financial stability, as it is observable in the 1876 crises and in the associated 11 bankruptcies. In fact, these banks were all incorporated during the boom, being younger than the other banks that survived the crisis. Following this, in the present thesis there is evidence that the age, defined as the years under activity of a bank, may indicate its propensity to survive crises, *id est* the older a bank, the higher its propensity to survive crises. Nowadays, in a deregulated and highly competitive environment, where fintech start-ups are striving to disrupt the banking sector, this finding may be critical to alert for the need of supervision.

In addition, it is fundamental to examine the bank characteristics not only during the crisis, but also in the years before. According to this thesis' findings, the financial status of a bank is decisive to survive during a crisis in a setting where the banks are created without demanding regulation. Based on the panel data composed by 835 observations between 1858 and 1887, besides age, the capital amount, the weight of total credit on deposits and the capital to total credit ratio are also determinant for banks to survive crises. In fact, in this study, there is evidence that banks with more capital are more likely to survive them. This follows the line of reasoning which argues that healthier banks are more capitalized and, further, this may be linked to a "too big to fail" view, which claims that larger banks are more likely to survive crises as it is more feasible that they receive support during those times than smaller banks. Besides, a bank providing large amounts of credit, significantly higher than deposits, is more prone to bankrupt. It is truth that banks have a crucial role in the economy through the deposit expansion multiplier, but if their credit offer is unreasonable and unbalanced considering their financial status, this may lead to an unstainable situation, especially when bank runs shorten the level of deposits. These findings are consistent with what has been the focus of banks' supervisors, namely regarding capital requirements.

The identification of these determinants strengthens the importance of regulation on mitigating the risk of entering in banking crises and, broadly, in depression periods. For banking supervisors, this evidence may be relevant because the boom of new fintech start-ups without proper regulation we are living may potentially lead to a situation of successive bank failures as in the 1876 crisis. Therefore, it is imperative to set regulatory policies and to establish an effective supervision for the unregulated and fast-growing parts of the financial system.

VII. Limitations

The estimated models include variables which assess the balance sheet composition and that are ultimately used as proxies for capital adequacy, asset quality and liquidity. These components alongside earnings and, more recently, management decision-making are part of the banks' supervision scope (CAMEL rating system). In this sense, it is important to mention that this study lacks data on banks' profitability and management quality, which are important drivers for the occurrence of bankruptcy (Cole & Gunther, 1995; Lane, Looney, & Wansley, 1986; Martin, 1977; Thomson, 1991; Whalen, 1991). Besides, efficiency and bank structure variables as well as quantitative information on the Portuguese economic conditions are relevant for bank failure analysis. Nevertheless, these figures were not available neither published in documents from Bank of Portugal Archive.

Moreover, although I analyzed monthly accounts from all the banking institutions in the year of the banking crisis, 1876, monthly data for all the years of the considered timeframe were not included in the study. In truth, this study only comprises annual banks' accounts data present in the document "Annaes de Estatística – Estatística Bancária" from Bank of Portugal Archive.

Additionally, there are some missing figures in the bank accounts due to a higher difficulty of collecting information in that century comparing to nowadays. There are also potential errors in the dataset because the figures present in the document referred above were manually collected in the 19th century and, in this dissertation, those figures were, in turn, manually introduced on a digital platform. Furthermore, while looking into the past is certainly helpful in shedding light into what might happen in the future, we should bear in mind the limitations of comparing banks 150 years ago to today's financial intuitions.

VIII. References

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IX. Appendices

i. Example of year accounts of a bank

QUADRO V. — Resumo das operações annuaes de cada um dos bancos, referido a 31 de dezembro

Nome do estabelecimento bancario	Annos	Numero de acções correspondente ao capital nominal	Importancia do capital: Nominal	Importancia do capital: Realisado	Valor nominal de uma acção	Dividendos distribuidos por acção (%)	Dinheiro em caixa: Papel moeda	Dinheiro em caixa: Notas do banco
	1858	80:000	8.000:000$000	(1) 8.000:000$000	100$000	5 %	268:861$200	1.018:161$600
	1859	80:000	8.000:000$000	8.000:000$000	100$000	5 %	297:118$800	653:602$000
	1860	80:000	8.000:000$000	8.000:000$000	100$000	6	291:590$100	500:228$000
	1861	80:000	8.000:000$000	8.000:000$000	100$000	6	357:860$000	803:780$000
	1862	80:000	8.000:000$000	8.000:000$000	100$000	6	312:559$200	623:014$000
	1863	80:000	8.000:000$000	8.000:000$000	100$000	5 %	319:780$800	768:016$000
	1864	80:000	8.000:000$000	8.000:000$000	100$000	6	318:019$000	1.028:910$000
	1865	80:000	8.000:000$000	8.000:000$000	100$000	6	315:010$000	119:135$600
	1866	80:000	8.000:000$000	8.000:000$000	100$000	6	306:829$200	1.201:130$000
	1867	80:000	8.000:000$000	8.000:000$000	100$000	6	303:603$100	1.310:331$000
	1868	80:000	8.000:000$000	8.000:000$000	100$000	6	301:567$100	1.882:522$000
	1869	80:000	8.000:000$000	8.000:000$000	100$000	6	307:861$200	2.331:268$000
	1870	80:000	8.000:000$000	8.000:000$000	100$000	6	308:531$800	2.601:510$000
	1871	80:000	8.000:000$000	8.000:000$000	100$000	6	300:511$000	2.407:006$000
	1872	80:000	8.000:000$000	8.000:000$000	100$000	7	286:581$100	1.250:232$000
	1873	80:000	8.000:000$000	8.000:000$000	100$000	7	309:036$200	848:572$000
	1874	80:000	8.000:000$000	8.000:000$000	100$000	7	295:402$800	761:990$000
Banco de Portugal ...... (Fundado em dezembro de 1846)	1875	80:000	8.000:000$000	8.000:000$000	100$000	7	289:126$000	372:531$000
	1876	80:000	8.000:000$000	8.000:000$000	100$000	7	259:119$100	912:240$000
	1877	80:000	8.000:000$000	8.000:000$000	100$000	7	269:328$000	1.148:782$000
	1878	80:000	8.000:000$000	8.000:000$000	100$000	6	266:518$000	3.115:740$000
	1879	80:000	8.000:000$000	8.000:000$000	100$000	7	262:161$600	3.289:936$000
	1880	80:000	8.000:000$000	8.000:000$000	100$000	7	253:182$600	4.107:180$000
	1881	80:000	8.000:000$000	8.000:000$000	100$000	7	252:839$800	4.590:003$000
	1882	80:000	8.000:000$000	8.000:000$000	100$000	7	252:267$100	3.920:278$000
	1883	80:000	8.000:000$000	8.000:050$000	100$000	6	251:076$600	4.176:011$000
	1884	80:000	8.000:000$000	8.000:000$000	100$000	6	218:595$100	4.255:206$000
	1885	80:000	8.000:000$000	8.000:000$000	100$000	6	218:951$800	3.013:761$000
	1886	80:000	8.000:000$000	8.000:000$000	100$000	7	218:071$000	5.480:004$000
	1887	80:000	8.000:000$000	8.000:000$000	100$000	7	176:917$000	4.500:780$000
	1888	135:000	13.500:000$000	(2) 13.500:000$000	100$000	6 ½	176:132$200	4.503:120$000
	1889	135:000	13.500:000$000	13.500:000$000	100$000	5 ¼	169:821$200	4.983:689$000
	1890	135:000	13.500:000$000	13.500:000$000	100$000	5	-$-	8.113:356$000
	1891	135:000	13.500:000$000	13.500:000$000	100$000	6	-$-	5.613:201$500
	1892	135:000	13.500:000$000	13.500:000$000	100$000	7	-$-	18.916:120$000

Annos	Dinheiro em caixa: Especies metallicas	Dinheiro em caixa: Total	Desconto de letras	Emprestimo sobre penhores	Depositos: Papel moeda	Depositos: Especies metallicas	Depositos: Total	Notas em circulação	Annos
1858	997:770$183	2.314:793$283	2.793:013$936	2.099:553$765	200:100$000	1.617:115$717	1.817:914$717	1.168:818$000	1858
1859	1.772:061$378	2.753:085$173	3.691:061$578	1.993:570$829	235:465$200	1.911:739$778	2.147:201$978	1.694:858$000	1859
1860	1.051:230$556	1.813:051$956	4.692:780$152	2.227:103$745	228:015$600	2.080:125$671	2.314:171$271	1.859:502$000	1860
1861	719:250$065	1.893:596$065	4.751:579$953	2.202:198$785	212:115$100	2.120:928$970	2.363:371$370	1.590:131$000	1861
1862	1.378:190$152	2.019:093$352	5.291:865$090	2.032:615$100	215:791$800	2.231:928$900	2.477:720$700	1.819:161$000	1862
1863	1.117:925$032	2.205:721$832	6.074:613$691	1.528:323$605	252:837$600	2.202:500$013	2.455:337$613	1.689:221$000	1863
1864	980:333$900	2.327:262$999	5.057:910$370	1.752:651$765	252:858$600	1.797:653$168	2.050:511$768	1.443:510$000	1864
1865	758:603$125	1.192:778$725	5.094:951$182	2.201:265$461	250:429$600	1.117:211$683	1.367:671$283	1.485:730$000	1865
1866	798:787$186	2.307:016$386	4.793:773$338	2.012:920$100	235:945$800	990:737$019	1.226:682$819	1.427:604$000	1866
1867	817:213$510	2.431:150$910	4.690:756$786	2.160:888$139	233:331$200	1.595:105$816	1.828:437$016	1.575:520$000	1867
1868	751:262$951	2.938:352$351	4.069:216$700	2.061:152$200	231:323$200	1.002:777$211	1.237:100$411	1.515:031$000	1868
1869	942:605$206	3.581:794$406	3.857:380$262	1.675:791$266	237:802$000	1.211:331$003	1.182:193$003	1.693:120$000	1869
1870	607:162$180	3.517:237$280	3.455:414$884	2.011:459$471	239:479$400	1.160:991$516	1.400:470$916	1.720:968$000	1870
1871	963:327$457	3.670:814$157	3.856:492$393	1.830:220$861	231:455$600	1.198:997$297	1.430:452$897	1.002:470$000	1871
1872	897:680$519	2.431:199$919	4.318:093$056	2.039:920$800	221:670$000	1.469:244$083	1.690:914$083	2.217:968$000	1872
1873	1.330:700$126	2.497:308$326	5.507:113$967	1.879:323$085	249:122$100	3.627:047$082	3.876:169$182	2.317:908$000	1873
1874	1.273:110$846	2.333:563$646	6.979:182$615	1.601:770$166	235:539$000	2.506:978$467	2.742:517$467	3.531:190$000	1874
1875	1.012:032$880	1.673:743$189	5.510:466$916	2.053:739$331	229:202$800	1.951:950$935	2.181:153$735	3.125:616$000	1875
1876	3.454:117$050	4.653:806$150	5.772:920$164	2.024:140$136	229:105$000	2.844:851$300	3.074:046$900	3.590:060$000	1876
1877	1.519:401$317	3.237:511$317	4.673:850$296	2.057:086$186	209:404$200	1.898:518$819	2.107:923$019	4.079:518$000	1877
1878	1.590:098$850	4.973:256$850	4.453:265$803	1.681:997$240	206:711$200	1.764:619$733	1.971:330$933	3.918:560$000	1878
1879	2.050:538$191	5.602:928$701	4.516:382$689	1.221:818$120	202:510$800	1.697:478$821	1.900:019$621	4.465:754$000	1879
1880	2.150:180$649	6.811:143$249	4.635:547$105	1.002:982$450	193:558$800	2.687:100$818	2.880:959$618	4.563:740$000	1880
1881	2.530:408$253	7.363:246$053	4.752:112$581	1.081:151$930	192:916$000	1.591:666$103	1.787:582$103	5.423:222$000	1881
1882	1.813:254$106	5.991:790$506	5.239:225$315	1.126:034$590	192:313$000	1.561:831$333	1.757:177$933	4.207:322$000	1882
1883	1.875:898$582	6.302:985$182	4.315:806$398	1.156:113$935	191:151$800	1.360:008$002	1.551:759$802	4.657:589$000	1883
1884	2.480:759$889	6.990:951$289	4.214:501$627	1.069:013$510	188:071$000	1.550:519$915	1.739:521$515	4.778:301$000	1884
1885	1.512:163$632	4.805:182$332	4.216:770$755	1.420:291$510	189:031$000	1.005:972$872	1.195:003$872	5.497:836$000	1885
1886	3.200:393$911	8.937:558$071	3.408:557$887	947:169$010	188:147$200	3.350:751$165	3.514:901$365	5.811:506$000	1886
1887	4.203:186$116	8.880:013$416	3.583:273$550	1.206:917$000	117:023$200	2.888:416$017	3.005:439$217	7.300:096$000	1887
1888	5.682:559$136	10.361:811$336	7.325:602$917	1.305:025$725	116:208$400	1.739:430$719	1.855:639$119	9.508:356$000	1888
1889	5.096:603$121	10.230:113$621	9.745:648$115	2.311:060$146	109:000$400	2.869:519$717	2.979:120$117	10.082:860$000	1889
1890	4.493:697$565	12.637:053$505	8.548:806$615	2.222:889$130	-$-	1.901:444$209	1.901:444$209	8.694:780$250	1890
1891	4.548:751$968	9.961:059$468	13.526:501$069	3.701:392$455	-$-	2.251:315$620	2.251:315$620	31.760:637$759	1891
1892	3.960:119$319	25.906:559$319	15.013:127$084	4.031:835$895	-$-	2.091:967$607	2.091:967$607	50.217:710$250	1892

(1) Capital em titulos de 1 e 5 acções.

(2) Capital em titulos de 1, 5 e 10 acções.

ii. *Example of monthly accounts for 1876*

QUADRO VII *(continuação)*. — Resumo das operações mensaes de cada um dos bancos

Anno de 1876

Estabelecimentos de credito		Janeiro	Fevereiro	Março	Abril	Maio	Junho	Julho	Agosto	Setembro	Outubro	Novembro	Dezembro	Media
Banco de Portugal	Dinheiro em caixa – Papel moeda	289:133$300	289:133$800	289:131$600	289:497$600	289:746$200	289:746$200	289:838$800	289:216$600	289:216$600	289:216$000	289:060$400	289:119$400	289:338$133
	Dinheiro em caixa – Notas do banco	312:972$000	602:500$000	888:560$000	720:550$000	418:370$000	939:330$000	1.193:110$000	1.145:160$000	1.060:020$000	1.103:550$000	1.153:710$000	912:240$000	878:339$333
	Dinheiro em caixa – Especies metallicas	1.550:258$332	1.750:092$720	1.388:947$260	1.075:679$032	2.034:162$137	1.455:453$505	1.310:503$522	3.427:338$058	2.918:228$352	3.026:515$440	3.318:018$907	3.451:447$050	2.227:939$033
	Desconto de letras	5.659:931$089	5.560:812$072	5.420:225$915	5.507:804$017	6.248:050$482	6.008:268$051	5.932:574$208	6.314:078$157	5.760:091$010	5.749:054$662	5.577:816$876	5.772:920$464	5.792:690$741
	Emprestimo sobre penhores	2.079:170$016	2.149:730$156	2.128:239$550	2.226:198$081	2.452:291$351	2.284:583$386	2.214:518$626	2.140:383$076	2.181:758$906	2.208:799$996	2.172:198$346	2.021:440$136	2.186:267$638
	Depositos – Papel moeda	229:210$000	229:210$000	229:207$800	229:573$800	229:622$400	229:622$400	229:315$000	229:292$800	229:292$800	229:292$800	229:136$000	229:195$600	229:414$333
	Depositos – Especies metallicas	2.845:033$501	3.240:012$903	3.057:987$604	2.675:131$256	3.136:632$218	2.607:118$253	2.571:169$141	3.300:652$206	2.721:873$930	2.877:789$138	2.508:805$337	2.844:851$300	2.898:417$241
	Notas em circulação	3.455:208$000	3.175:630$000	2.919:620$000	3.117:630$000	3.755:930$000	3.274:070$000	2.981:190$000	3.081:140$000	3.230:280$000	3.296:750$000	3.300:590$000	3.600:060$000	3.268:029$667
Banco Commercial do Porto	Dinheiro em caixa	231:732$251	208:605$380	156:739$462	178:519$176	224:081$531	231:159$784	230:207$952	267:707$534	300:746$103	303:675$507	300:352$131	383:400$773	251:193$183
	Desconto de letras	1.009:744$031	959:294$010	878:571$105	807:093$323	881:489$770	990:304$078	919:379$078	802:921$322	955:519$889	931:981$891	924:751$891	944:010$919	925:611$520
	Emprestimo sobre penhores	160:016$000	155:720$000	151:021$000	151:291$000	157:414$332	160:351$000	171:151$000	168:801$000	173:651$000	175:941$000	168:511$000	169:111$000	161:112$111
	Depositos	1.006:064$804	1.013:770$524	999:416$198	993:286$623	1.001:153$663	1.101:803$022	1.169:844$717	1.032:559$032	1.084:154$119	1.016:510$474	973:099$201	957:194$551	1.030:132$686
	Notas em circulação	191:000$000	128:890$000	91:100$000	103:510$000	53:310$000	70:140$000	75:210$000	7:820$000	4:700$000	3:470$000	3:170$000	3:060$000	61:594$167
Banco Mercantil Portuense	Dinheiro em caixa	332:116$119	362:376$795	143:688$514	297:161$712	310:502$350	358:522$827	315:005$630	119:912$904	232:140$030	180:791$655	214:729$554	312:091$696	257:005$732
	Desconto de letras	731:358$503	747:756$342	852:020$412	750:527$033	681:797$132	680:278$361	681:502$947	722:171$573	1.013:096$702	1.107:129$184	1.092:832$145	830:880$281	850:808$327
	Emprestimo sobre penhores	468:105$161	478:114$681	477:312$625	430:800$719	459:502$500	485:351$345	472:353$820	408:120$925	454:012$350	426:156$850	435:405$005	441:242$053	452:251$544
	Depositos	261:026$197	267:394$035	214:027$206	241:610$200	276:558$302	311:215$233	276:381$872	176:760$513	130:253$069	125:106$167	138:385$031	142:551$775	213:487$308
	Notas em circulação	123:800$000	181:456$000	172:809$000	142:301$000	197:033$000	145:321$000	129:354$000	12:593$600	10:225$000	7:489$000	21:257$000	59:952$000	93:057$417
Banco União do Porto	Dinheiro em caixa	726:584$341	578:670$845	513:008$016	498:591$012	405:733$030	566:003$994	485:897$231	194:463$960	391:955$507	412:916$162	531:016$373	410:468$890	476:525$781
	Desconto de letras	1.740:140$628	1.662:302$059	1.598:157$371	1.500:060$682	1.402:550$463	1.376:449$743	1.342:020$962	1.307:075$613	1.186:928$956	1.045:090$221	1.024:358$891	1.072:446$782	1.355:181$867
	Emprestimo sobre penhores	223:075$640	200:445$640	192:535$640	192:625$640	196:975$640	192:350$640	203:719$640	193:315$640	195:085$640	185:915$640	181:575$640	179:457$715	195:054$450
	Depositos	1.457:377$214	1.372:947$668	1.258:681$488	1.310:209$882	1.094:282$501	1.317:297$716	1.327:335$155	769:277$150	442:329$449	322:894$210	416:629$971	802:513$801	957:654$356
	Notas em circulação	219:990$000	250:900$000	187:990$000	179:930$000	110:990$000	114:990$000	69:990$000	12:503$000	11:500$000	6:810$000	4:900$000	4:190$000	92:917$750
Banco Alliança (Porto)	Dinheiro em caixa	287:780$494	401:297$015	299:932$172	317:195$886	219:308$625	339:903$435	241:158$816	191:885$006	216:209$534	192:610$866	270:580$715	309:797$646	279:478$308
	Desconto de letras	1.019:000$368	968:769$402	929:822$449	909:487$271	795:051$325	792:725$686	802:481$563	738:350$361	702:666$673	688:304$601	715:613$706	629:224$989	812:622$213
	Emprestimo sobre penhores	1.226:197$455	1.330:318$252	1.358:307$612	1.308:586$575	1.319:505$985	1.318:426$908	1.284:930$173	1.237:282$816	1.198:889$243	1.195:943$021	1.202:985$813	1.183:550$704	1.263:705$363
	Depositos	362:620$076	413:132$030	443:826$528	441:871$973	347:002$871	391:882$033	383:502$825	148:001$480	80:514$826	88:561$830	113:011$702	141:413$511	280:384$295
	Notas em circulação	309:190$000	332:470$000	321:960$000	256:270$000	215:670$000	205:540$000	324:220$000	34:700$000	127:070$000	93:100$000	188:710$000	273:890$000	231:001$167
Nova Companhia Utilidade Publica	Dinheiro em caixa	235:023$938	237:753$626	223:758$367	206:187$313	300:733$515	335:166$246	334:174$043	257:019$782	325:614$100	310:282$424	336:273$715	520:786$963	301:972$786
	Desconto de letras	893:292$386	923:595$916	908:370$103	937:550$981	913:511$040	937:925$785	961:905$762	1.008:308$000	965:786$216	935:828$694	1.005:229$289	936:828$312	919:013$131
	Emprestimo sobre penhores	373:962$185	399:618$135	392:552$315	397:335$678	391:419$011	418:152$344	415:995$354	420:075$685	412:275$791	413:295$024	381:830$460	466:680$815	400:095$281
	Depositos	1.140:292$788	1.199:057$823	1.135:120$366	1.061:519$085	1.148:168$223	1.179:008$737	1.190:631$131	1.075:010$610	991:292$687	967:647$133	1.012:692$182	1.274:005$201	1.117:194$939
	Notas em circulação	156:500$000	156:500$000	136:500$000	153:500$000	82:500$000	60:500$000	98:500$000	12:530$000	16:500$000	16:375$000	6:620$000	35:800$000	75:418$750
New London and Brazilian Bank	Dinheiro em caixa – Lisboa	280:077$244	302:804$840	117:321$351	260:367$537	310:657$086	190:083$662	146:082$075	428:165$881	142:017$815	161:612$680	192:841$505	202:289$284	222:297$846
	Dinheiro em caixa – Porto	116:561$858	92:886$652	60:933$788	91:967$510	151:601$459	81:466$500	127:512$849	153:427$148	41:041$074	59:509$007	104:731$330	161:996$130	103:889$317
	Desconto de letras – Lisboa	735:028$089	818:907$453	655:997$981	1.005:949$708	880:189$618	629:832$337	532:236$052	706:616$250	635:090$100	599:357$793	510:578$701	488:592$835	681:865$963
	Desconto de letras – Porto	888:284$637	425:215$831	381:963$532	410:994$980	459:604$156	384:993$189	380:517$723	300:621$460	328:333$117	356:929$209	300:306$415	240:702$689	363:456$103
	Depositos – Lisboa	409:172$529	451:318$078	437:624$912	449:552$000	417:236$697	417:429$621	440:106$768	395:110$308	445:524$162	436:728$781	513:622$710	562:801$400	418:306$108
	Depositos – Porto	210:078$401	215:913$690	186:610$273	176:552$207	178:777$172	208:509$524	220:929$865	157:709$100	177:371$085	171:483$774	167:302$574	222:451$959	191:146$058
Banco Nacional Ultramarino (Lisboa)	Dinheiro em caixa	582:511$358	623:685$458	249:097$239	221:506$737	201:268$783	361:409$197	243:036$823	168:631$370	226:922$724	150:146$111	143:359$856	210:914$600	287:355$876
	Desconto de letras	1.618:190$265	1.580:439$333	1.360:983$857	1.320:810$581	1.248:558$912	1.202:885$193	1.162:616$163	967:593$830	925:917$099	890:654$483	900:493$046	874:969$397	1.173:519$005
	Emprestimo sobre penhores	870:877$264	879:683$896	800:847$147	809:769$280	797:486$036	711:888$733	790:869$658	840:823$092	867:209$317	877:751$093	819:197$756	815:631$537	825:514$098
	Depositos	1.917:301$156	1.977:460$381	1.332:059$496	1.211:470$500	1.283:896$855	1.315:023$755	1.324:119$071	1.012:301$667	1.039:700$150	935:808$800	1.001:892$501	1.103:903$398	1.290:271$717

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