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## **Portuguese Banks Capital Adjustment**

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Master in Finance

Supervisor:

Prof. Sebestyén Szabolcs, Assistant Professor,  
ISCTE Business School, Department of Finance

October, 2020



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## **Acknowledgements**

I would like to thank Professor Szabolcs Sebestyén for having accepted to be the supervisor of my master's thesis and for the guidance throughout this academic stage.

I am deeply grateful to my family for their enthusiasm, support and persistent encouragement.



## Resumo

A crise financeira de 2007-08, a crise da dívida soberana iniciada no final de 2009 e o programa de assistência financeira em 2011-2014 reforçaram a necessidade de um sistema bancário mais capitalizado. Para este efeito, as reformas de Basileia III foram adotadas na UE e começaram a vigorar em Portugal em 2014. Este pacote regulamentar impôs aos bancos requisitos de capital mais exigentes.

O estudo pretende investigar as estratégias e ajustamentos seguidos entre 2010 e 2018 pelos seis bancos portugueses mais significativos de forma a cumprir os novos requisitos regulamentares. Para alcançar rácios de capital mais elevados, as instituições ajustaram os seus modelos de negócios, carteiras e estrutura de balanço. Neste sentido, a análise incide sobre a evolução dos vários elementos que constituem o capital regulamentar e os ativos ponderados pelo risco e os seus impactos no rácio de fundos próprios totais dos bancos portugueses.

Os resultados do estudo apontam no sentido de que a maioria das instituições realizou um ajustamento nomeadamente através da redução dos ativos ponderados pelo risco. Por um lado, esta redução derivou do decréscimo global dos ativos, sendo o fator mais determinante no aumento do rácio de fundos próprios. Por outro lado, a redução progressiva no ponderador de risco médio teve uma contribuição significativa para melhorar a adequação de capital das instituições. A componente do capital contribuiu negativamente para a evolução do rácio de fundos próprios, sobretudo devido à baixa rentabilidade do setor bancário português. No entanto, as alterações no capital regulatório desempenharam um papel secundário.

**Palavras-Chave:** Basileia III, Adequação de capital, Rácios de capital, Requisitos de capital

**Classificação JEL:** G21, G28





## Abstract

The financial crisis in 2007-08, the European debt crisis, which started in late 2009 and the 2011-14 financial assistance program reinforced the need towards a more capitalized banking system. To this end, the Basel III reforms were adopted in the EU and started to take effect in Portugal in 2014. This regulatory package imposed on banks more demanding capital requirements.

The study intends to investigate the strategies and adjustments carried out between 2010 and 2018 for the six most significant Portuguese banks in order to meet the new regulatory requirements. In order to achieve higher capital ratios, institutions adjusted their business models, portfolios and balance sheet structure. In this sense, the analysis focuses on the evolution of the various elements that make up regulatory capital and risk-weighted assets and their impact on the capital adequacy ratio of Portuguese banks.

The results of the study point out that most institutions adjusted mainly through the reduction of RWAs. On the one hand, this reduction in RWAs derived from the global reduction in assets, being the most determining factor in CARs increase. On the other hand, the progressive reduction in the average risk-weight had a significant contribution to improve banks' capital adequacy. The capital component contributed negatively to the evolution of the CAR, mainly due to the low profitability of the Portuguese banking sector. However, the change in regulatory capital played a secondary role.

**Keywords:** Basel III, Capital adequacy, Capital ratios, Capital requirements

**JEL Classification:** G21, G28



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**List of Acronyms**

AT1	Additional Tier 1 Capital
BCBS	Basel Committee on Banking Supervision
CAR	Capital Adequacy Ratio
CET1	Common Equity Tier 1
CoCo	Contingent Convertible Bond
EBA	European Banking Authority
ECB	European Central Bank
EU	European Union
GDP	Gross Domestic Product
G-SII	Global Systemically Important Institutions
ICAAP	Internal Capital Adequacy Assessment Process
ILAAP	Internal Liquidity Adequacy Assessment Process
IRB	Internal Ratings-Based Approach
MAG	Macroeconomic Assessment Group
NPL	Non-Performing Loans
O-SIIs	Other Systemically Important Institutions
P2G	Pillar 2 Guidance
P2R	Pillar 2 Requirements
P&L	Profit and Loss Statement
ROA	Return on Assets
ROE	Return on Equity
RW	Risk-Weight
RWA	Risk-Weighted Assets
SA	Standard Approach
SREP	Supervisory Review and Evaluation Process
T1	Tier 1 Capital
T2	Tier 2 Capital



## Introduction

After the global financial crisis of 2007-08 and in response to the requests of the G20 the Basel Committee on Banking Supervision (BCBS or Committee) proposed in 2010 a set of measures to strengthen global capital and liquidity regulations aiming to address several shortcomings with the pre-crisis regulatory framework and promote a more resilient and sound banking sector that supports the real economy.

The rules outlined in the Basel III agreement of 2010 focused mainly on increasing the stability of the financial system covering both micro-prudential and macro-prudential elements. In this way, the new proposed regulatory framework addressed four key areas. The increase in the quantity and quality of regulatory capital, better risk coverage, the introduction of a leverage ratio as a backstop to the risk-based requirement and the introduction of two liquidity standards were the main elements that were subject to regulatory changes.

Much of the literature on Basel III has focused on long-term macroeconomic effects in order to quantify how capital adjustments affect lending rates and volume, financing costs and Gross Domestic Product (GDP) growth. The main objective was to assess the cost-benefit ratio of the new regulatory framework.

The size of the macroeconomic impact of a tightening of capital requirements varies substantially according to how banks respond to the regulatory changes. The quantification of the optimal capital level in the perspective of reducing the probability of bank crises and bank's default risk is also a topic addressed in some studies. Other authors sought to analyse the impact on profitability by incorporating the new rules, namely through the variation of return on equity (ROE). A stream of studies has studied hybrid securities such as contingent capital as they have been a tool used by banks to achieve the required ratios. Several other works seek to understand the impact of the new liquidity requirements, the liquidity coverage ratio and net stable funding ratio, in institutions profitability and funding costs.

To achieve more demanding capital ratios, and comply with the new capital buffers, institutions can focus on increasing the regulatory capital component, reducing risk-weighted assets (RWAs) or a combination of the two elements. As Elliott (2009) points out, "the adjustment would need to come from a set of actions, since the rebalancing appears tough to achieve with any single move" (p. 1).

Regulatory changes and the financial context have marked the past decade and have resulted in successive changes to the regulatory framework and requirements. Among these factors, the 2007-08 financial crisis, the Basel III regulatory package proposed in 2010, the creation of the Single Supervisory Mechanism (SSM) in 2013, the Single Resolution Mechanism (SRM) in 2014 and the European deposit insurance scheme (EDIS) proposed in 2015 as the three pillars of the European Union (EU) Banking Union, the Basel III – Finalising post-crisis reforms or Basel IV in 2017 and the implementation of

MiFID II, MiFIR and IFRS9 that came into effect in 2018.

Basel IV reforms will only take effect from January 2022 although the breadth of the proposed changes in the last decade emphasises this regulatory dynamic and reinforces the relevance of this study. The revisions announced in Basel IV to the capital framework focused on further improving capital framework aiming to reduce variability and standardise the calculation of RWAs, recalibrate risk sensitivities of the standard approach (SA), limit the use of internal models, introduce an output floor increasing the comparability and credibility of banks' capital ratios. Although this latest revision of Basel is outside this study, some issues and fears of regulators and industry remain relevant despite differences and additional elements introduced.

The banking system, regulators and several market players benefit from the various Basel III standards and amendments. Evidence from academic papers on previous regulatory changes may give some indication to the minimum period required for banks to adjust their business models, portfolio composition and to generate and accumulate additional capital. Also, these studies can also estimate the time required for the market to absorb new capital and subordinated debt emissions. Academic research can also give some indications about the implications to adapt systems, people and data in order to meet new regulatory requirements. At a macroeconomic level, academic knowledge can be useful in defining the phase-in period, anticipating impacts on banks' profitability and understanding the aggregate effect on credit volume and lending spreads.

The comprehension of how Portuguese banks adjusted to Basel III rules in terms of their balance sheets can be relevant in order to anticipate which are the most effective strategies to be used in order to prepare for future requirements.

It should also be stressed the importance of understanding how an increase in capital ratios affects profitability indicators. Realising this relationship allows managing profitability expectations, adjusting operating costs, redirecting the business towards more profitable lines that consume less capital, incorporating the new requirements in the pricing of loans and financial instruments. Analysing the strategies and adjustments made previously could serve as a guideline in the context of a bank capital shortfall.

There are few studies on capital requirements, the impact of Basel III and the relationship between capital and profitability concerning the Portuguese banking sector, giving greater relevance to the present study.

The capital adequacy component is a crucial element of the regulatory changes being the focus of this work. This thesis aims to study the actions and adjustments made by Portuguese banks to meet stricter capital requirements.

Our study intends to study and examine how the regulatory changes, mainly the introduction of Basel III reforms proposed in 2010, revised in 2011 and adopted in Portugal in 2014 together with the

market pressure for more capitalised banks after 2007-08 financial crisis impacted the capital structure and profitability of Portuguese banks during the period between December 2010 and December 2018.

The aim of this work does not intend to discuss the reasons that led individual banks to choose one approach over another. Instead, it analyses which approaches have been taken to comply with the new higher capital ratios. To this end, the research will focus on the impact of the evolution of the capital and RWAs components on the capital ratios of the most relevant Portuguese banking institutions in the period from 2010 to 2018.

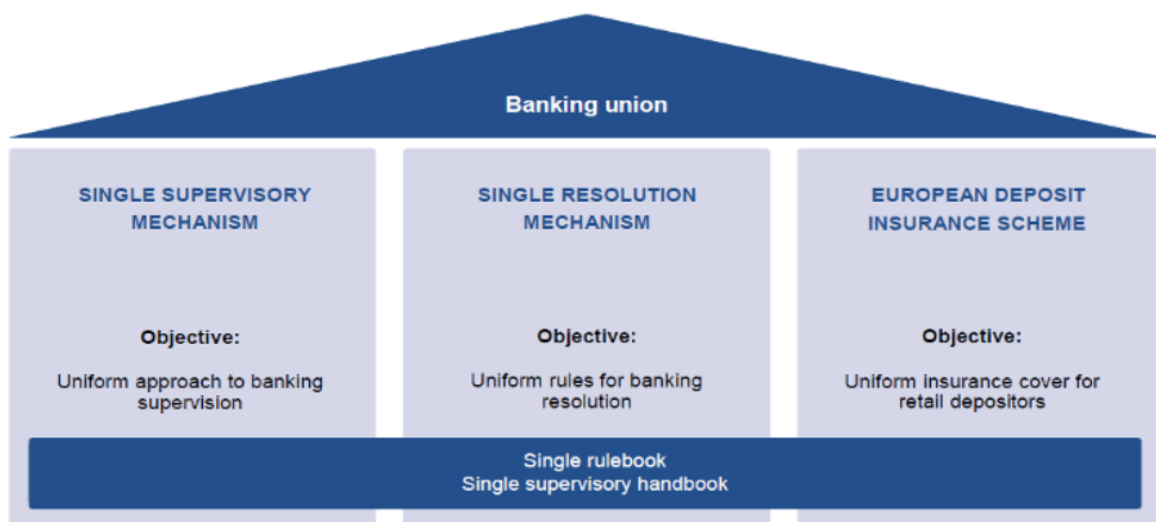
The paper is structured as follows. Section one presents the regulatory framework. Section two contains a review of the relevant literature. In section three, the hypotheses are elaborated. In section four, it is described the methodology used to carry out the research. Then, in section five, the results of the study are presented. In section six the results are discussed and finally the main conclusions are highlighted. Additionally, it is also identified both limitations to the study and future study perspectives.



## Chapter 1 Regulatory Environment

### EU Banking Union

The 2007-08 financial crisis and the subsequent sovereign debt crisis emphasised the need for a banking union in the EU. It has become clear that in the euro area monetary union, the problems caused by close links between public sector finance and the banking sector can easily cross-national borders and have a financial impact on other EU countries. The banking union was a milestone for the deepening and creation of a real Economic and Monetary Union, allowing for a consistent system of banking rules in the EU. The new procedures and tools allowed the creation of a more transparent, unified and secure market for banking institutions. The EU banking union is based on three pillars. The first pillar is the SSM created in 2013 and came into force in May 2014. The second pillar is the SRM created in 2014 and became operational in January 2016. Finally, the third pillar is the EDIS proposed in 2015. The SSM refers to the banking supervision system in Europe and all countries in the eurozone countries participate automatically in the SSM. The SSM is composed by the European Central Bank (ECB) and the national supervisory authorities of the participating countries, with the ECB having the direct supervision responsibility for banks classified as “significant”. As of August 2020, there were 115 banks classified as “significant”, holding approximately 82% of banking assets in the euro area. Banks identified as “less significant” are supervised by the respective national supervisors, in the case of Portugal by Banco de Portugal (BdP), in close cooperation with the ECB. Figure 1.1 presents the principal elements and objectives of the EU Banking Union.



**Figure 1.1 – EU Banking Union Pillars**

Source: Austrian National Bank. (n.d.)

## **Basel II and Basel III**

The BCBS is a committee of banking supervisory authorities that was established by the central bank governors of the Group of Ten countries in 1974. In 2019, the BCBS had 45 members from 28 jurisdictions, consisting of Central Banks and authorities with banking regulation responsibility. Its primary role is to strengthen the regulation, supervision and practices of banks worldwide to enhance financial stability. It should be noted that the BCBS is not an institution with legislative power. For Portugal, it is the European Parliament and the European Commission decision to follow the guidelines recommended by the BCBS and subsequent publication of prudential legislation.

Before the 2007-08 financial crisis, the capital adequacy standards were based on the Basel II capital framework developed by the Basel Committee and signed in June 2004. Basel II is based on three pillars: minimal capital requirements, regulatory supervision, and market discipline. The primary objectives were to ensure that capital allocation reflects the level of risk, increase alignment between economic and regulatory capital to reduce the scope for regulatory arbitrage and enhance the quality of risk management and supervision. Basel II rules were introduced into EU law and subsequently transposed into Portuguese national law, having entered into force in 2007. Since the adoption of the new regulatory framework was optional in 2007, its implementation by most Portuguese banks was only verified in 2008.

The European Banking Authority (EBA) defines Basel III agreement as comprehensive set of reforms in banking prudential regulation endorsed by the G20 in November 2010 and consists of several sequential updates: Basel III: A global regulatory framework for more resilient banks and banking systems (BCBS, 2011 [December 2010, revised in June 2011]); Liquidity Coverage Ratio (BCBS, 2013); Net Stable Funding Ratio (BCBS, 2014); Basel III: Finalizing post-crisis reforms (BCBS, 2017); Minimum capital requirements for market risk (BCBS, 2019a [January 2016, revised in January 2019]).

The implementation of the Basel III framework in the EU started with the entry into force of the EU Directive 2013/36/EU (CRD IV) and the EU Regulation 575/2013 (Capital Requirements Regulation) and applied from January 2014. Basel III reforms of 2010 aim to strengthen market discipline and to ensure that investors and depositors are well informed about institutions' capital and risk positions. Although outside the scope of the study, the proposed Basel III regulatory package in 2010 involved the creation of a liquidity framework, however, its deepening was reflected mainly in BCBS (2013, 2014). In these documents, the concepts related to liquidity instruments were developed, the objectives were outlined, and the rules were clarified.

The Basel III agreement was the most significant individual factor that forced banks to increase their capital ratios, so it is essential to understand how it is structured. Basel III consists in three pillars, stipulated previously in Basel II, and expanded in this recent version.

Pillar 1 covers the minimum capital requirements for credit, market, and operational risk. Also, a



non-risk-sensitive leverage ratio was introduced to prevent institutions from building up excessive on- and off-balance sheet leverage and to correct potential errors associated with risk-based capital requirements. Minimum liquidity rules supplement the minimum capital requirements. The minimum liquidity rules aim to ensure that institutions have sufficient liquidity at all times. The liquidity coverage ratio helps to ensure short-term liquidity, and the net stable funding ratio is designed to ensure bank's longer-term liquidity. The supervisory framework for large exposures complements the risk-based capital requirements in order to protect banks against high-volume losses as a result of customer default.

Pillar 2 refers to the Supervisory Review and Evaluation Process (SREP) and supplements the quantitative minimum capital and liquidity requirements by including both qualitative elements and other quantitative aspects for risks not considered in Pillar 1, such as interest-rate risk in the banking book or strategic risk. Pillar 2 Requirements (P2R) are directed at institutions, which must establish, based on an internal process, a level of capital and liquidity through the preparation of Internal Capital Adequacy Assessment Process (ICAAP) and Internal Liquidity Adequacy Assessment Process (ILAAP), in accordance with their risk appetite. ICAAP and ILAAP are vital inputs in the SREP, as clarified by the ECB (2020a):

The SREP assesses the way a bank deals with its risks and the elements that could adversely affect its capital or liquidity, now or in the future. This process determines where a bank stands in terms of capital and liquidity requirements as well as the adequacy of its internal arrangements and risk controls. (Executive summary section, para. 3)

Therefore, SREP intends to assess the institution's intrinsic risk and vulnerability to impacts arising from exogenous factors, as well as its position relative to a group of peers. SREP guidelines and methodologies, establish that the risk profile of supervised institutions is assessed in accordance to four elements: business model, internal governance and risk management, risks to capital, risks to liquidity and funding. P2R incorporate the capital needs that stem from the individual risk profile of a bank whose analysis and results are part of the SREP. SREP also includes the Pillar 2 Guidance (P2G), which indicates the adequate level of capital to be maintained by banks to provide a sufficient buffer to withstand stressed events. Contrary to P2R, the P2G is not legally binding.

Pillar 3 consists of disclosures obligations and enables market participants to obtain information regarding capital, liquidity, risk exposures, and risk assessment processes and evaluate whether capital and liquidity are adequate. These mandatory disclosures allow market discipline to be reinforced.

After the 2007-2008 financial crisis and before the effective implementation of Basel III in Portugal in 2014, the sovereign debt crisis and the 2011-2014 Financial Assistance Program (EFAP) agreed with the EU and the International Monetary Fund in May 2011, had a significant impact on the solvency and liquidity of the Portuguese banking sector.

The study period for our investigation starts in December 2010 and falls on a particularly troubled period for the Portuguese banking sector, as described by Augusto and Félix (2014):

The market capitalization of Portuguese banks was negatively affected by the sovereign debt crisis that affected several European countries, following the international financial crisis. The loss of access to medium and long-run international wholesale funding markets and the successive sovereign debt rating downgrades by several rating agencies contributed to the deterioration of Portuguese banks' liquidity conditions. On the other hand, the increasing impairments associated both with worse macroeconomic conditions and the extraordinary inspections of banks' credit portfolios promoted by the Banco de Portugal, and the deterioration of the net interest margin via volume and price effects, led to the announcement of negative profits which stressed the solvency position of Portuguese banks. (p. 1)

As of 2010, deteriorating conditions in the international financial markets and, in particular, the intensification of the sovereign debt crisis in the euro area, put the capital ratios of Portuguese institutions under pressure and consequently increased Portuguese institutions' capital needs between 2011 and 2012. Under the EFAP and defined by BdP Notice no. 3/2011, Portuguese banks had to reach the minimum Core Tier 1 ratio of 9% by the end of 2011 and 10% by the end of 2012. Under the financial stability pillar and intending to improve the solvency of the Portuguese banks, EFAP provided a support fund (Bank Solvency Support Facility) of EUR 12 billion to reinforce Portuguese banks capitalisation. This fund served as a resource for institutions that were unable to comply with the new capital requirements through private solutions. The recapitalisation of BPI, BCP, CGD in 2012 through the issuance of Contingent Convertibles (CoCos) instruments subscribed by the Portuguese State through this fund allowed the reinforcement of the capital ratios of the Portuguese banking sector.

In 2014, institutions began to be guided by the new regulation proposed in Basel III and transposed to national regulation.

The Table 1.1 shows the phase-in arrangements for the Basel III main changes, previously mentioned, for capital, liquidity and leverage indicators.

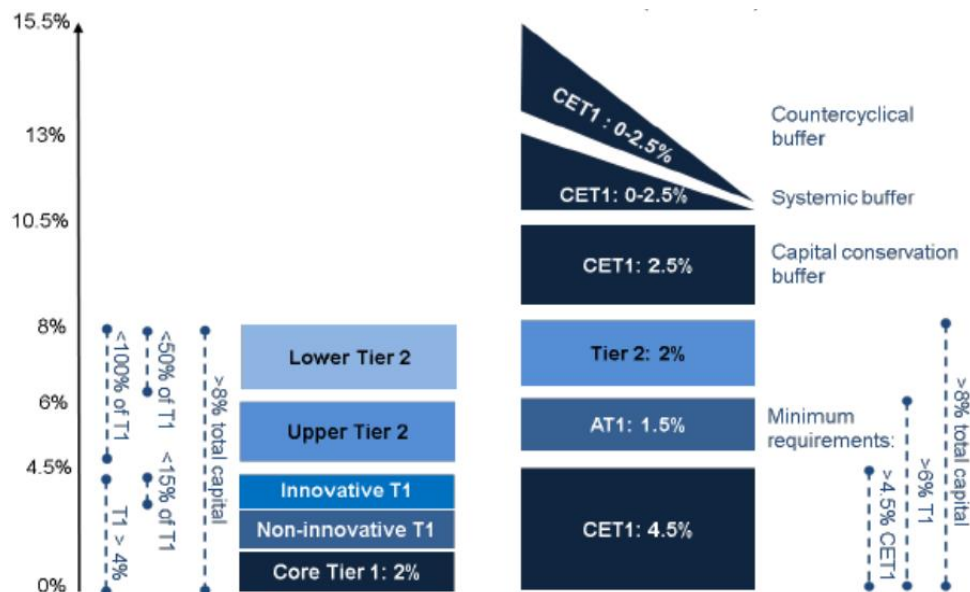
**Table 1.1 – Basel III phase-in arrangements**

(shading indicates transition periods - all dates are as of 1 January)

	2011	2012	2013	2014	2015	2016	2017	2018	As of 1 January 2019
Leverage Ratio	Supervisory monitoring		Parallel run 1 Jan 2013 – 1 Jan 2017 Disclosure starts 1 Jan 2015					Migration to Pillar 1	
Minimum Common Equity Capital Ratio			3.5%	4.0%	4.5%	4.5%	4.5%	4.5%	4.5%
Capital Conservation Buffer						0.625%	1.25%	1.875%	2.50%
Minimum common equity plus capital conservation buffer			3.5%	4.0%	4.5%	5.125%	5.75%	6.375%	7.0%
Phase-in of deductions from CET1 (including amounts exceeding the limit for DTAs, MSRs and financials )				20%	40%	60%	80%	100%	100%
Minimum Tier 1 Capital			4.5%	5.5%	6.0%	6.0%	6.0%	6.0%	6.0%
Minimum Total Capital			8.0%	8.0%	8.0%	8.0%	8.0%	8.0%	8.0%
Minimum Total Capital plus conservation buffer			8.0%	8.0%	8.0%	8.625%	9.25%	9.875%	10.5%
Capital instruments that no longer qualify as non-core Tier 1 capital or Tier 2 capital			Phased out over 10 year horizon beginning 2013						
Liquidity coverage ratio	Observation period begins					Introduce minimum standard			
Net stable funding ratio	Observation period begins							Introduce minimum standard	

Source: BCSB (2011)

It is relevant to verify the differences between Basel II and Basel III regarding the concept of capital and eligibility of the instruments. Figure 1.2 summarises the changes in capital requirements by capital tiers between Basel II and Basel III.



**Figure 1.2 – Capital minimum requirements – Basel II to Basel III**

Source: Citi Research (n.d., as cited in Knot, 2018)

The Committee at the capital base level proposed to increase Common Equity Tier 1 (CET1), the highest quality of regulatory capital, from 2% to 4.5%, Tier 1 from 4% to 6% as well as the gradual introduction of capital conservation buffer between 2016 and 2019. After the transition period for most instruments, as of 1 January 2019, and assuming Core Tier 1 (Basel II) and CET1 (Basel III) as equivalents, CET1 capital could increase from a minimum of 2% in Basel II to 9.5% of RWAs considering maximum requirements for the countercyclical buffer or 12% of RWAs considering also maximum requirements for systemic risk buffers. These minimum capital requirements refer only to Pillar 1 and are complemented by the P2R, requirements that are composed of at least 56% CET capital.

In Portugal, as of December 2018, there is no institution classified as Global Systemically Important Institutions (G-SIIs) and six banks classified as Other Systemically Important Institutions (O-SII).

Regarding Basel II capital tiers some flaws were pointed out by ECB (2010):

As revealed by the crisis, the existing definition of prudential own funds (capital) suffers from several fundamental flaws: (i) lack of a precise boundary between different capital components, (ii) inconsistent definition and application of regulatory adjustments and (iii) weak transparency of the regulatory capital bases. (p. 125)

Basel III addresses these issues and redefines the capital tiers as well as the eligible instruments in each capital tier, as shown in Table 1.2.

**Table 1.2 – Capital tiers and instruments – Basel II to Basel III**

	Basel II requirements	8%	Basel III requirements	8%
<b>Tier 3</b>			Abolished	
<b>Tier 2</b>	E.g. undisclosed reserves, subordinated debt - <b>Deductions</b>	4%	No substantial alterations	2%
<b>Additional Tier 1</b>	Some preference shares Hybrid capital - <b>Deductions</b>	2%	Some preference shares Portions of minority interests ----- Hybrids with innovative features no longer accepted	1.5%
<b>Core Tier 1</b>	Common equity Retained earnings Minority interests Some preference shares - <b>Deductions</b>	2%	Common equity Retained earnings Portions of minority interests ----- Preference shares generally excluded Silent partnerships generally excluded Portions of minority interests excluded - <b>All existing deductions</b> - <b>Additional deductions (e.g. deferred tax assets)</b>	4.5%

Source: ECB (2010)

Regarding Basel II, there are some changes in the definitions of the eligible prudential capital. In Basel III CET1 or “going concern” capital) comprises mainly common shares plus retained earnings.

The regulatory capital adjustments have been harmonised and taken generally from common equity. Some items as deferred tax assets arising from temporary differences will receive limited recognition in CET1 instead of full deduction. Capital instruments eligible for the Additional Tier 1 (AT1 or “additional going concern” capital) are loss absorbent on a going concern basis which requires that instruments are subordinated, have fully discretionary non-cumulative dividends or coupons and have neither a maturity date nor an encourage to redeem. According to ECB,

Hybrid instruments with a redemption incentive, such as “step-up clauses”, will no longer be eligible for inclusion in Tier 1 capital. This is because the eligibility criteria for both common equity Tier 1 and AT1 capital preclude capital instruments that contain any such incentive to redeem. Under the existing Basel II rules, hybrid instruments with a redemption incentive that are issued with the aim of generating cost-efficient Tier 1 capital are limited to a maximum of 15% of Tier 1 capital. (2010, p. 126)

Capital Tier 2 (T2 or “gone concern capital”) sub-categories, upper and lower T2, existing in Basel II, become just one category in Basel III. In order to be loss absorbent on a “gone concern” basis, eligible instruments will need to have an original maturity of at least five years and be subordinated to depositors and general creditors.

Capital Tier 3 in Basel II, which was intended to cover market risks and included only short-term subordinated debt that satisfied certain conditions, is completely abolished in Basel III.

The capital buffers included in Basel III are the capital conservation buffer, the systemic buffers and the countercyclical capital buffer.

### **Countercyclical Capital Buffer (CcyB)**

From 1 January 2016 BdP adopted the CcyB as an additional macro-prudential instrument. The CcyB aims to attenuate periods of excessive credit expansion. In periods where credit is growing at an excessive rate comparing to the fundamentals of the economy, institutions are required to build up a capital buffer. As a result, these periods are associated with an increase in the banking sector’s cyclical systemic risk.

“CcyB buffer ensures that institutions are better prepared to absorb losses and remain solvent. Additionally, during the downturn phase of the credit cycle, the buffer can be released, thus contributing to maintaining the flow of credit to the real economy.” (BdP, 2015)

The CcyB is defined quarterly, having been set at 0% since its first application date in January 2016.

## **Systematic Buffers**

The systematic buffers in Basel III include the G-SII buffer, the O-SII buffer and Systemic Risk Buffer (SRB).

In 2018 there are no Portuguese institutions classified as a G-SIIs, so the G-SIIs conservation buffer is not applicable in Portugal.

The SRB intends to limit direct and indirect exposure concentrations and when applied it has a minimum of 1% of the total risk exposure amount. The legislative framework is defined in CRD IV and as described by BdP (2018) “the purpose of the SRB is to mitigate long-term non-cyclical systemic or macroprudential risks. This buffer may be specific to a sub-group of institutions and applied to total exposures or domestic exposures only.” (p. 145). Institutions must comply with the higher of the G-SIIs / O-SIIs buffer and the systemic risk buffer, except when the latter only applies to risk exposures in the EU Member State which activated the measure, in which case it is additive. No Portuguese O-SII is subject to the SRB, in accordance to the notification template for Article 131 CRD – Other Systemically Important Institutions (O-SII) in 2019.

The methodology in EBA guidelines establishes a set of criteria and indicators allowing BdP, as the macro-prudential authority, to identify on an annual basis, which are the O-SIIs in Portugal. In addition to specific and significant factors of each financial system, the following four elements are prescriptive in quantitative analysis: Size, Importance, Complexity, Interconnectedness. Institutions classified as O-SII represent a greater risk to the Portuguese financial system due to their size, complexity or degree of interconnection with other financial institutions, relevance to the country’s economy, and in case of insolvency, the potential contagion of these institutions to other non-financial and financial sectors. The O-SIIs identification process started in 2015 and takes place on an annual basis.

BdP may impose additional capital requirements between 0% and 2% for O-SII in order to offset the greater risk that these institutions pose to the Portuguese financial system.

This capital buffer shall consist of CET1 on a consolidated basis, and it is revised each year or in the event of a significant restructuring process as a merger or acquisition. Concerning O-SII buffer phased-in period BdP defined a four-year phase-in period as follows: 1 January 2018: 25% of the fully-loaded O-SII buffer; 1 January 2019: 50% of the fully-loaded O-SII buffer; 1 January 2020: 75% of the fully-loaded O-SII buffer; 1 January 2021: 100% of the fully-loaded O-SII buffer.

However and due to the outbreak of COVID-19 the Board of Directors of BdP has decided to postpone the phase-in period for one year and the compliance with the O-SII buffer percentage that banking groups would have to hold on 1 January 2021 is postponed to 1 January 2022.

In the exercise of BdP powers as the national macro-prudential authority and within the scope of its annual revision of the identification of O-SIIs, BdP identified on 30 November 2017 the banks classified as O-SII in 2018 and the correspondent O-SII capital buffer as a percentage of the total risk exposure

amount to be applied to each banking group as of 1 January 2018, as reported in Table 1.3.

**Table 1.3 – O-SII capital buffer from 2018 to 2021**

O-SII	January 2018	January 2019	January 2020	January 2021
Caixa Geral de Depósitos, S.A.	0,250%	0,500%	0,750%	1,000%
Banco Comercial Português, S.A.	0,188%	0,375%	0,563%	0,750%
Santander Totta SGPS, S.A.	0,125%	0,250%	0,375%	0,500%
LSF Nani Investments S.à.r.l.	0,125%	0,250%	0,375%	0,500%
Banco BPI, S.A.	0,125%	0,250%	0,375%	0,500%
Caixa Económica Montepio Geral, Caixa Económica Bancária, S.A.	0,063%	0,125%	0,188%	0,250%

Source: BdP (2017)

### Capital Conservation Buffer (CcoB)

The CcoB is intended for banks to constitute an additional layer of capital in order to absorb losses. This capital buffer was introduced in 2016 and gradually increased until the fully-loaded version in 2019, set at 2.5% of the total risk exposure amount. This capital requirement is only made up of CET1 and is additional to the minimum capital requirement of 4.5% from the Pillar 1. When the buffer falls below the regulatory 2.5%, automatic restrictions are imposed on the distribution of capital such as dividends, share repurchases and discretionary bonus payments so that the capital buffer can be reinstated.

### Pillar 2

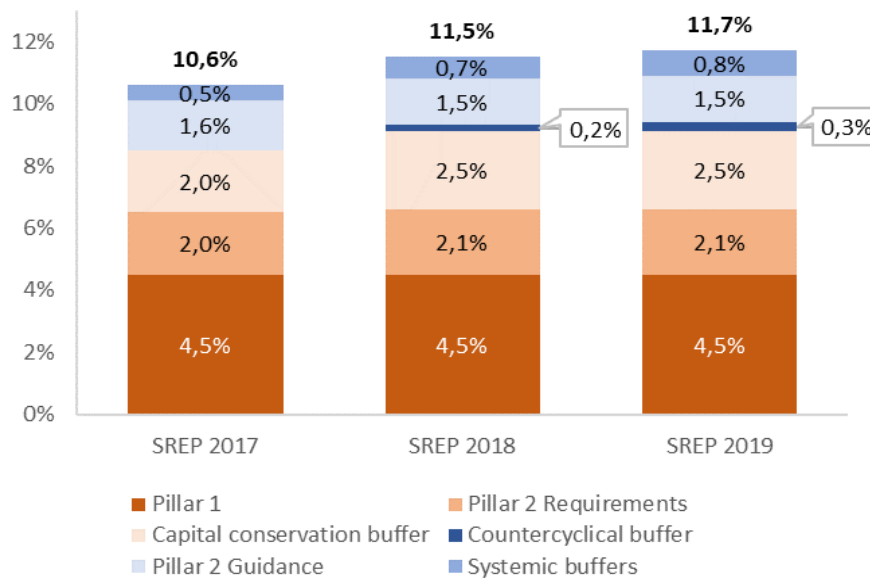
P2R is a capital requirement that covers risks which are underestimated or not covered by the minimum capital requirement and applied in addition to Pillar 1. P2Rs are binding, and breaches can have direct legal consequences for institutions. The P2R is determined via the SREP. ECB and national supervisory authorities carry out the SREP within the framework of the SSM, according to the criteria previously mentioned.

The capital demand resulting from the SREP also includes the P2G, which indicates to banks the adequate level of capital to be maintained beyond P2R in order to safeguard enough capital to withstand stressed situations. Unlike the P2R, the P2G is not legally binding. BCBS (2019b) clarifies how these requirements must be met:

Regarding the quality of capital, banks should meet binding Pillar 2 capital requirements following the Pillar 1 composition (56% CET1, 75% Tier 1, 100% total capital). However, the supervisory

authority may require banks, in particular cases, to have the binding Pillar 2 expectations comprise CET1 only. On the other hand, the non-binding Pillar 2 capital expectations should be made up entirely of CET1. (p. 22)

ECB published in 2019 for the first time individual SREP results (for 108 out of 109 EU significant institutions) and as usual aggregate average data concerning overall CET1 requirements and guidance (including Pillar 1, capital buffers, P2R and P2G) for 2019 and previous years, as presented in Figure 1.3.



**Figure 1.3 - Aggregate SREP results from 2017 to 2019 – Overall CET1 requirements**

Source: ECB (2020b)



## Chapter 2 – Literature Review

The global financial crisis has exposed the weaknesses of the existing regulatory framework and the financial system. It also demonstrated a strong systemic component and interdependence between banks and countries. The BCBS published in 2010 the Basel III which is a set of reforms focusing both in micro and macro-prudential regulation. At the individual bank level, prudential regulation aimed to promote the resilience of individual banking institutions to periods of stress. As highlighted by the Basel Committee on Banking Supervision (BCBS, 2010a) the reforms also have a macro-prudential purpose, addressing system-wide risks that can build up across the banking sector as well as the pro-cyclical amplification of these risks over time. These micro and macro-prudential approaches to supervision are interrelated, as greater resilience at the individual bank level reduces the risk of system-wide shocks.

The financial crisis has renewed attention to the role of bank capital because many highly leveraged financial institutions failed or had to be bailed out by governments.

The social cost of bank failures justifies the existence of regulatory capital requirements for financial institutions (Berger et al., 1995). In this sense, a central component of Basel III, which is underlined in the proposed regulation, is to strengthen the capital base of banks either by increasing capital ratios or by creating capital buffers.

A solid capital base must support bank exposures to mitigate the impact of credit losses and write-downs on retained earnings, which are part of the common equity base, as witnessed in the most recent crisis. Another issue that deserved attention in the new rules was the standardization in the concept and instruments that constitutes the regulatory capital.

Excessive on and off-balance sheet exposure, reduction of the quantity and quality of the capital base and the lack of proper liquidity buffers contributed to the severity of the crisis. These factors justify the focus of regulation on capital and liquidity enhancement.

Caruana (2012) points out that this increase in the required regulatory capital ratios is only part of the adjustment, and that is before considering the changes to definitions and risk weights (RW) that make the effective increase in the capital more significant.

### **Basel III macroeconomic effects**

The changes previously discussed in the Basel III agreement have raised concerns among observers and financial institutions in terms of short- and long-term impacts and costs.

Between 2010 and 2013 in reaction to some general apprehension concerning Basel III short and long-term effects, several authors and international organisations developed studies focusing on the macroeconomic impacts. BCBS (2010a, 2010b), King (2010), Institute of International Finance (2011), Angelini et al., (2011), Slovik and Cournède (2011), Elliott et al., (2012), Oxford Economics (2013)

developed models in order to estimate macroeconomic impacts, namely on GDP, annual growth rate, lending volume and spreads.

BCBS (2010b) conducted one of the first studies to assess the impact of implementing Basel III, the Quantitative Impact Study (QIS) in 2010. This study served as a reference and basis for comparison for other subsequent studies, such as Macroeconomic Assessment Group (MAG, 2010) or more country-focused studies as Locarno (2011). In the QIS exercise participated 263 banks from 23 out of the 27 BCBS member countries. This study showed that capital requirements calculated according to Basel III would have significant impacts on banks' capital ratios. The CET1 average ratio of Group 1 banks (banks with at least EUR 3 billion in Tier 1 capital) decreases from the current 11.1% to 5.7% at the end of 2009 considering fully implemented capital requirements, excluding the phase-in period. Adjustments related to the increase in deductions from regulatory capital represent the main factor that justifies the variation in CET1. In global terms and in order for banks to correspond to the minimum CET1 of 7% in 2009, if Basel III was in place, it is estimated that group 1 banks need 577 billion euros, which is 2.8 times the total net profit after taxes of banks participating in the QIS. In turn, Group 2 banks under Basel III rules reduce the average CET1 ratio from 10.7% to 7.8%, a relatively lower impact, meeting the minimum CET required of 7%. Overall, changes in RWAs have less impact on banks' capital positions than changes in the regulatory capital definition. The CET1 capital of Group 1 banks would fall by an average of 41.3% whereas in Group 2 banks would decrease by an average of 24.7%. The difference in the impact of Basel III between the two groups of banks is mainly related to the impact of deductions from CET1, which is greater in Group 1, namely in the items of Goodwill, Intangibles and DTAs (Differed Tax Assets). Besides, changes in RWAs would have a more significant impact on Group 1 banks, especially concerning counterparty credit risk and incremental risk charge and securitisations in the trading book.

BCBS (2010a) conducted one of the first in-depth reviews of the Basel Committee's proposed capital and liquidity reforms advocated in Basel III, the Long-term Economic Impact (LEI). The LEI working group sought to compare the economic benefits derived from the reduction of systemic banking crises, with the costs associated with its impact on output and possible increase in lending spreads. The study focuses on impacts after the projected transitional period and uses aggregate balance sheet data from 13 OECD countries. The conclusions point out that the macroeconomic benefits outweigh their costs contributing to a more robust financial system, even suggesting that there would be room for regulators to increase capital requirements. LEI report considers that the total adjustment resulting from higher capital requirements is reflected through the increase in lending rates, therefore based on the assumption of total pass-through to the bank's borrowers. The economic costs methodology does not consider the possible reduction in the cost of capital associated with greater capitalisation and reduction in the risk for the banking system. On the other hand, it also assumes the maintenance of ROE at the

level of the baseline scenario before regulatory changes.

The LEI working group found that a one percentage point increase in the capital ratio would cause a 0.09% permanent decline in the level of output relative to the baseline. Additionally, for the same increase of one percentage point and to maintain the baseline ROE, loan spreads would increase by 13 basis points, as shown in Table 2.2.

In the same line of study, the chairs of the Financial Stability Board and the BCBS created in 2010 the MAG whose objective is modelling the macroeconomic impacts of the changes in the capital and liquidity framework proposed in the reforms in Basel III. MAG (2010) long-term predictions are based on several models that employ a variety of assumptions. Estimates for a one percentage point increase in capital ratios implemented over eight years are presented in Table 2.1.

**Table 2.1** – *MAG estimates of the macroeconomic impact of higher capital requirements*

	Lending volume <sup>1</sup> (in percent)		Lending spreads <sup>2</sup> (in basis points)		GDP <sup>3</sup> (in percent)	
	Q35	Q48	Q35	Q48	Q35	Q48
Unweighted median	-1.38	-1.47	15.5	12.2	-0.15	-0.10
GDP weighted median	-1.11	-1.11	16.6	12.8	-0.21	-0.18
Unweighted mean	-1.29	-1.46	18.6	17.6	-0.20	-0.16
GDP weighted mean	-1.85	-1.89	17.9	16.7	-0.26	-0.22

<sup>1</sup> Results reported for 38 models. <sup>2</sup> Results reported for 53 models. <sup>3</sup> Results reported for 97 models. Not including international spillover effects.

*Note.* Macroeconomic impacts of a 1-point increase in capital ratios.

Source: MAG (2010)

There are several reasons why the real impact could be greater than that reported in Table 2.1. On the one hand, banks may try to comply with the stricter requirements ahead of the timetable established by the Basel Committee. If banks choose to implement the highest requirements in four years, the impact on the level of GDP would be slightly more substantial and, also, the impact on annual growth would be more significant. On the other hand, banks may choose to maintain a capital buffer above the established minimum values, which could increase some of the estimated effects.

Conversely, other factors can lead to a lower impact on GDP. First, in 2009, many of the banks studied strengthened their capital positions through new equity issues and retained earnings. These capital adjustments reduce the amount of additional capital that the banking system needs to accumulate in the future to meet requirements. Second, banks have several options and strategies to respond to the stricter requirements, including reducing structural costs or changing their portfolios to lower-risk assets, which in most cases were not explicitly modelled on MAG (2010) estimates. These strategies will reduce the need to increase loan spreads or reduce loan volumes, thereby reducing the impact on real activity.

This study focuses only on the transition costs of tighter capital requirements, however, the benefits of a well-capitalised banking system in terms of risk reduction, cost of financial crises and reduction of macroeconomic volatility lead to increased borrowers and creditors' confidence in banking system stability. These benefits are well recognised and analysed in studies such as BCBS (2010a), previously mentioned. According to authors, the capital requirements that are materially more demanding than those seen in the recent past are likely to exercise a beneficial impact on the macroeconomy that should more than offset the transition costs of the adjustments that banks need to make to meet the new Basel III requirements.

In Table 2.2 are the results of other studies, in addition to MAG (2010), for one percentage point increase in capital ratios.

**Table 2.2** – *Summary of estimates of the macroeconomic impact of higher capital requirements*

	Lending spread	Lending volume	Growth (annual rate)
MAG (2010)	+15–17 bp	–1–2%	–4 bp over 4 years
BCBS (2010a)	+13 bp	(not estimated)	–9 bp <sup>2</sup>
IIF (2011) <sup>1</sup>	+30–80 bp	–0.8–1.0%	–6–12 bp over 5–10 years
Slovik & Cournède, OECD (2011)	+8–20 bp	(not estimated)	–4 bp over 9 years
Elliott et al, IMF (2012) <sup>1</sup>	+5–15 bp	(not estimated)	(not estimated)
Miles et al (2013)	+5.5 bp	(not estimated)	–4.5 bp, permanent <sup>2</sup>
Oxford Economics (2013)	+15 bp	(not estimated)	–1.6 bp over 9 years

<sup>1</sup> Also includes the impact of other regulatory measures. <sup>2</sup> Long-term reduction in growth relative to the benchmark.

*Note.* Macroeconomic impacts of a 1-point increase in capital ratios.

Source: Caruana (2014)

Angelini et al. (2011) also researched the impact on the long-term economic performance of the new Basel III requirements being the results consistent with the Long-term Economic Impact report (BCBS, 2010a) and the Macroeconomic Assessment Group (MAG, 2010).

Locarno (2011) analysed for the Italian banking sector the costs in the transition period and the long-term effects of the new Basel III reform. The study results indicate that the economic impact of the new rules accounted for a GDP decline of 0.00-0.33% for a one percentage point increase in the capital ratio over eight years. According to this study, the economic costs of stricter capital requirements are small and become negligible if compared with the potential benefits that arise from reducing the frequency and impact of systemic banking crises.

Ramon et al. (2012) sought to study the benefits of the new regulation, including the relationship between capital and credit supply for banks operating in the UK over the period between 1997 to 2007. They adopted a different approach from the authors mentioned above, focusing on the bank's changes and actions in response to new requirements and then extracting the aggregate behaviour of the banking system. This model aims to describe and analyse how banks adjusted their capital ratios, taking into

account their current capital ratio and balance sheet structure. This model assumed that banks reacted and adopted different strategies depending on their current ratio and the desired capital ratio, adjusting their level of capital and RWAs over time, considering the minimum required capital ratios. From the individual analysis of the behaviour and strategies followed, it is possible to verify the sector-wide response from the UK banking sector to the new regulatory requirements. The results indicate that the regulatory capital ratios can rise by a further 22 percentage points until the economic benefits are outweighed by the costs, with room for increased requirements in line with the BCBS (2010) study. Ramon et al. (2012) summarizes the dynamics between adjustments to capital requirements and macroeconomic effects:

The level of GDP is subject to different influences that have impacts over different time horizons. In the short term, GDP is reduced quickly relative to the baseline as banks adjust their balance sheets. The reduction in consumer loans, while smaller than for corporate loans, has a larger impact as consumer spending (a major driver of GDP) reacts relatively quickly. Once banks have fully adjusted their balance sheets to the new requirements, lending is less constrained and consumer spending recovers. In contrast, reductions in corporate lending and business investment, which reduce production in the economy, take considerably longer to have an impact on GDP. These differences in the timing reduce the medium-term impact of Basel III on GDP. A long-term fall in GDP of around 0.4% relative to the baseline arises from all changes in bank capital requirements. (pp. 57-58)

### **Basel III and bank profitability**

Studies on the relationship between increased capital requirements and profitability have obtained mixed results.

Goddard et al. (2010) found a negative relationship between the capital ratio and profitability, suggesting that the opportunity cost of maintaining high levels of capital depresses shareholder returns, noting that the study in question for the capital adequacy measure used total assets and not RWAs.

The perspective that equity is expensive and has an adverse impact on the credit market, which increases funding costs and decreases ROE is discussed in the work of Admati et al. (2011).

Chun et al. (2012) researched the macroeconomic effects of Basel III in banks' profitability based on the assumption that equity is more expensive than debt and that banks would increase lending spreads in order to offset the expected reduction in ROE. The sample consists of banks from 16 countries of developed and emerging economies, and the study period covered the years from 2005 to 2010. Despite

the lending spread necessary to maintain the ROE at the pre-regulation level largely depends on the country analysed, three factors proved to be decisive, the ratio of RWA to total assets, the relative size of the loan to total assets or the long term interest rate on debt. In some banks, the return on assets (ROA) has practically halved, with the most considerable contribution being the reduction in non-interest income, generated by trading assets and trading liabilities, fees and commissions. Consequently, the authors infer that banks returned to the more traditional business model after the 2007-2008 global financial crisis.

### **Capital ratios adjustment strategies**

A line of investigation sought to examine the broad patterns of how banks have responded to achieve higher risk-weighted capital ratios required in Basel III reforms, the different strategies and adjustments that banks followed and the macroeconomic implications of these strategies if pursued on a large scale. In this line of research, there are three primary studies carried out by Roger and Vlcek (2011), Cohen and Scatigna (2014) and Andrieu et al. (2017). Other complementary studies focused on specific capital elements and their impacts such as Goes et al. (2016).

Roger and Vlcek (2011) contributed to the work of MAG (2010) and the BCBS (2010a) and reached similar conclusions to these previous studies concerning the modest macroeconomic impact of Basel III. However, the authors emphasise that macroeconomic costs differ according to the different strategies and adjustments followed by institutions. This study, along with most of others previously presented, evaluates only the costs and not the benefits of the increase in capital requirements.

Using a calibrated general-equilibrium model and assuming an increase in capital requirements over two years, Roger and Vlcek (2011) found that raising capital by retaining earnings through a lower dividend payout ratio using all retained profits to build up capital is the adjustment that has the lowest macroeconomic cost. Additionally, in this scenario, it is assumed that banks lower the long-run target ROE. Conversely, if banks choose to increase capital by increasing loan spreads, the estimated macroeconomic costs in the EU increase from -0.6% p.a. to -1% p.a. in cumulative output. The authors found that the strategy whose macroeconomic impact is highest is through adjustments in the volume of assets. The reduction in bank assets relative to the strategy of restrict dividend distribution more than doubles macroeconomic costs. The study conjectures that this form of adjustment is more likely to be followed by banks when there is a need for adjustment to be carried out in a brief period. Furthermore, the authors also found that the adjustment cost is considerably lower if the deleveraging is in loans to riskier customers (-1.5% p.a. vs -2.1% p.a. in EU). The strategies and respective impacts of Roger and Vlcek (2011) are presented in Table 2.3.

**Table 2.3** – *Macroeconomic costs of higher capital requirements by strategy*

		Scenario			
		Dividend policy and ROE	Lending spreads	Reducing banks assets	
				LTV ratio and Riskiness changed	LTV ratio changed by 1 p.p
Peak lending spread (basis points)	Euro Area	50	60	13	60
	US	40	70	15	62
Peak of output decline (%)	Euro Area	-0.3	-0.3	-0.5	-0.6
	US	-0.2	-0.3	-0.5	-0.6
Transition costs (% p.a.) computed as cumulative output loss over the simulation period	Euro Area	-0.6	-1.0	-1.3	-2.0
	US	-0.4	-1.0	-1.5	-2.1

*Note.* Percentage points increase in capital requirements over a two-year horizon. Transition costs computed as cumulative output loss. LTV refers to Loan-to-Value.

Source: Roger and Vlcek (2011 as cited in Andrieu et al., 2017)

Another work developed by Cohen and Scatigna (2014), based on Cohen (2013), points out the fears of some observers regarding the rapid capital increases that could eventually impact the ability of banks to finance economic activity. This work sought to answer the questions raised by BCBS (2010b), through the analysis of the adjustment channels used to meet highest prudential capital requirements. “This paper examines the broad patterns in how banks have gone about achieving higher risk-weighted capital ratios since the crisis” (Cohen & Scatigna, 2014, p.1). The authors first define a series of strategies used by banks to increase CAR between 2009 and 2012 for a cross-country sample. Among the stipulated strategies were considered the hypothesis that banks decrease dividend payout, issue new equity, sell assets, switch to lower-risk assets, decrease lending volume, or increase the lending spread.

The results of this study showed that most of the adjustment made by institutions was primarily in the capital component with an increase in retained earnings to be sustained by a reduction of the dividend payout and wider lending spreads. The reduction in RWAs played a minor role in increasing the bank’s CAR. The study concludes that, on average, lending volume continued to increase across developed and emerging markets. Conversely, and measuring assets in USD and not in the local currency, European banks reduced their assets, net loans and trading securities by 1.1%, 8.5% and 33.5%, respectively. In the aggregate of 94 banks studied, there was an increase in assets of 14.4% and net loans of 12.9% and a reduction of 17% in trading securities between 2009-2012. Contrary to what would be expected, the reduction of the level of risk does not occur at the level of the adjustment of the weighted assets (Cohen & Scatigna, 2014).

Andrieu et al. (2017) research sought to identify the strategies and adjustments of commercial banks between 2008 and 2014 in response to higher capital requirements of Basel III reform. The authors emphasise that the increase in capital ratios between 2008 and 2014 reflects not only the Basel III reforms but also other factors such as the financial crisis 2007-08, the interbank market uncertainty, and

the search for quality that may have contributed to the improvement of the capital ratios verified in this period. The sample consists of the five largest banks in each of the nine EU emerging market countries. Authors conclude that most of the banks in the EU emerging-market countries have used their retained earnings to increase their CARs. However, in countries that registered low profitability, banks have opted for two strategies to increase the CAR, more significantly through the issuance of new equity and additionally by maintaining or reducing the size of the balance sheet, primarily by shrinking the lending volume. Of the nine countries studied, six expanded their balance sheet, two kept their assets unchanged, and Slovakia's banks reduced their assets considerably. Hence, most countries increased the CAR simultaneously with the expansion of their balance sheets. In the six countries with asset growing banking sectors, the contribution of capital accumulation is twice as significant as the reduction in the riskiness of assets whereas in the banking sectors of the other three countries experienced declining total assets, the reduction in the riskiness of assets is the main element supporting the higher CARs.

Despite the different weight between countries, the riskiness of banks' assets declined on average in all countries analysed. Regarding net income and despite its positive contribution to the CAR in most emerging countries in the EU, the authors point towards the progressive average reduction of net income and ROA between the periods 2004-2007 and 2008-2014. However, countries that have accumulated losses over several years have increased capital, mainly through new capital issues. In all countries, the distribution of dividends had a negative contribution to capital, indicative of the reluctance to reduce dividends even in banking sectors experiencing average losses in the period studied. The reduction in operating costs in most countries improved ROA and contributes to the accumulation of results. The study reports that there are no significant differences in aggregate terms in the variation of lending spreads, the share of loans in total assets and net interest income.

The study of the alternatives and strategies of banks concerning the increase in the capital base also involves analysing the instruments that are eligible as capital. Goes et al. (2016) studied the impacts of one of these elements that constitute Tier 1 capital, the CoCos, analysing how they impact on the optimisation of the capital structure of Brazilian banks.



### Chapter 3 – Hypothesis

As BdP (2013) points out regarding Portuguese banks solvency, from 2010, BdP adopted several measures in order to preserve adequate capital ratios, including the recommendation to sell assets, impose capital increases, limit dividend distribution and set more demanding targets in terms of capital ratios. BdP set the Core Tier 1 ratio in 9% and 10% for the end of 2011 and 2012, thus anticipating the application of some of the main Basel III recommendations. These requirements were above the benchmark stipulated in European legislation, set at 8%. The objective was to promote the resilience of the Portuguese banking sector and forced banks to increase CAR in a short time.

In the Portuguese banking system, there was an average increase in the capital ratios of Portuguese banks between 2010 and 2018, which could derive from the increase in regulatory capital, the reduction of the risk of the assets or the reduction of the balance sheet, or a combination of these elements. The main elements that impacted capital ratios are the market pressure from policymakers and market participants after the 2007-08 financial crisis towards a more capitalised banking system, the impact of the sovereign debt crisis mainly between 2010 and 2012, impositions associated with the financial system stability pillar of the 2011-14 EFAP and Basel III introduction in 2014. Additionally, the low profitability, relatively high Non-Performing Loans (NPL) ratio in the Portuguese banks between 2010 and 2018 and IFRS 9 accounting standard introduction in 2018 impacted negatively capital ratios, promoting the need for additional adjustments in order to address these constraints at the capital level.

In order to achieve higher capital ratios, institutions use several strategies and adjustments to their business models and balance sheet structure in order to respond to the financial context and regulatory requirements. On the one hand, banks could focus on increasing the capital ratio numerator by increasing the loan spread of new contracts, investing in non-interest business lines, fee-related business areas such as Mergers and Acquisitions and consulting services or cutting operating expenses and staff costs. Another option to increase regulatory capital is to issue new equity, preferred stock, contingent convertible bonds or non-CoCos perpetual subordinated debt instruments. Another adjustment strategy in the capital component is to increase retained earnings by reducing dividends payout ratio or management bonus. On the other hand, institutions could reduce RWAs by reducing trading exposures, reducing loan volume, restrain credit lines and guarantees, changing the portfolio to lower or zero RWAs or selling non-core assets as buildings, branches or holdings in insurance companies. Despite the various alternatives, as Elliott (2009) points out, the adjustment should go through a combination of actions.

Based on the study by Cohen and Scatigna (2014) the results presented for 94 large banks from advanced and emerging economies indicate that most of the adjustment occurred mainly in the capital component with an increase in retained earnings to be sustained by a reduction of the dividend payout and wider lending spreads. Still regarding this study, the authors note that the reduction in assets, as well

as the risk weight of assets, played a secondary role in the increase in CAR.

Another study by Andrle et al. (2017) indicates that most banks in the nine EU emerging-market countries have used their retained earnings to increase their CARs. However, in countries where the banking sector had low profitability, banks have increase CAR mostly through the issuance of new equity and additionally by reducing or maintaining the size of the balance sheet.

In this line of research, our study aims to identify and analyse the strategies and adjustments followed by the six Portuguese banks classified as O-SII in 2019 in order to increase CAR during the period between 2010 and 2018.

In our study, we first identify bank strategies for achieving higher CARs and then judge the macroeconomic costs qualitatively by ranking the adjustment strategies. In this sense, we rely on findings of Roger and Vlcek (2011 as cited in Andrle et al., 2017), which are reported in Table 2.3. The ordering of strategies aims to reflect varying degrees of macroeconomic costs, going from the most benign strategy to the one considered to be the most costly.

We hypothesize that the six Portuguese banks classified as O-SIIs in 2019 (see table 4.1) followed one or a combination of the following strategies and adjustments in order to increase their capital ratios between December 2010 and December 2018. The empirical hypothesis is in line with Cohen and Scatigna (2014) and Andrle et al. (2017).

*1. Issue new equity or capital equivalents for Basel III purposes, including CoCos and non-CoCos subordinated debt.*

*2. Reducing dividend payments.*

*3. Increase in net income by:*

- a) Increase operating efficiency.*
- b) Increasing in lending spreads.*
- c) Increasing in non-interest revenue.*

*4. Reduce risk-weighted assets by:*

- a) Change the composition of the loan portfolio to assets considered to be less risky at the regulatory level and thus with lower risk-weights.*
- b) Decrease or slowing the growth of the loan portfolio and securities portfolio, decreasing the total assets.*

## Chapter 4 – Methodology

### 4.1. Data

In order to analyse the institutions that constitute the Portuguese banking sector, data from BdP were collected with reference to May 2020. There are in Portugal 32 entities authorised to operate in Portugal classified as Banks and Savings Banks, 32 branches of credit institutions with headquarters in EU and seven financial credit institutions.

Among the 32 institutions classified as Banks and Savings, the criterion for selecting the sample in our study was the classification of the institution as O-SII in the O-SII assessment of BdP in 2019. The six Portuguese institutions identified as O-SII in 2019 that represent the sample of our work and the corresponding scores of the parameters considered in the BdP assessment are reported in Table 4.1.

**Table 4.1** – Portuguese banking groups identified as O-SII in 2019

O-SII	Size	Importance	Complexity	Interconnectedness	Scores <sup>1</sup>
Caixa Geral de Depósitos, S.A.	576	540	812	489	2.416
Banco Comercial Português, S.A.	493	465	740	443	2.141
Santander Totta SGPS, S.A.	335	416	186	355	1.292
LSF Nani Investments S.à.r.l.	287	357	307	271	1.223
Banco BPI, S.A.	205	260	178	195	838
Caixa Económica Montepio Geral, Caixa Económica Bancária, S.A.	119	141	40	107	407

<sup>1</sup> According to the guidelines of the European Banking Authority, the threshold adopted for the identification process was 350 basics points  
Source: BdP (n.d.)

The choice of this sample is based on the institution's classification by BdP as an O-SII. As previously mentioned, these banks represent a greater risk to the Portuguese financial system due to their size, complexity or degree of interconnection with other financial institutions, relevance to the country's economy and, in case of insolvency, potential contagion to other non-financial and financial sectors. Moreover, the list of Portuguese banks identified annually by BdP as O-SII has not changed since 2015 until 2019, after the BANIF bank was excluded in December 2015, which indicates that these six identified banks have maintained a relevant position in the recent years in the Portuguese banking system.

According to BdP notification to EBA regarding Portuguese O-SII identification, under article 131 (3) of Directive 2013/36/EU, assets of the six Portuguese O-SIIs represent 80.6% of the total assets of the Portuguese banking sector and 153.9% of GDP, using financial data as of the end of 2018. Therefore, the relevance of these institutions in the domestic banking system and the magnitude of the systemic risk that they may pose to the Portuguese economy is evident. In this way, we assume the sample as

representative of the Portuguese banking system.

The sample contains an institution called LSF Nani Investments S.à.r.l., which ultimately belongs to Lone Star Funds (LSF). In October 2017 LSF acquired 75% of Novo Banco's capital through a shareholder structure that included headquartered entities that comply with the definition of a financial company, which is contained in European legislation and as such, these are considered supervised entities. In this sense, LSF Nani Investments S.à.r.l. is the entity at the highest level of prudential consolidation, so the list of entities directly supervised by the ECB has been amended accordingly. However, as Novo Banco is the only asset of LSF Nani Investments S.à.r.l., Novo Banco and consolidated entities integrated into the institution such as Novo Banco dos Açores or Banco Best, will be the focus of the ECB's supervision. Therefore, for the purpose of our work, consolidated financial data regarding Novo Banco and not LSF Nani Investments S.à.r.l. were used.

Regarding the data treatment of Novo Banco, the extinct Banco Espírito Santo (BES) underwent a resolution process in 2014, and Novo Banco was created with non-toxic assets. The recapitalisation process was carried out through the Resolution Fund impacting the variation in the Novo Banco's capital level and RWAs. Since there was a transition of part of BES assets to Novo Banco, it was considered as the same entity for the purpose of our study. The recapitalisation process by the Resolution Fund which initially involved an injection of EUR 4.9 billion, and the re-transfer of certain liabilities in 2015 (Five senior debt notes issued to qualified investors) from Novo Banco to BES of approximately EUR 2 billion in order to cover for BES's losses due to impairments on overvalued assets which were only detected after Novo Banco's opening balance sheet. The capital injections related to the recapitalisation of BES, after the resolution process and creation of the New Bank, are reflected the capital item *Newly Issued Capital*.

Regarding the period considered for the present study, the analysis covers eight years, between December 2010 and December 2018. This period was chosen for this study as it captures the pressure exerted by the market participants and regulators after the 2007- 08 financial crisis towards a more capitalised banking system and tighter banking regulation. Moreover, this period allows capturing the effect of Basel III before, as banks adjusted to the new rules proposed in 2010, and after the effective introduction in Portugal in 2014. In this sense, this work captures the Basel III capital adjustments during most of the phase-in period of new capital buffers and higher minimum requirements from 2014 onwards. December 2019 data was not considered as there were no audited annual reports for some banks during the period of data collection and processing, as well as the Market Discipline report regarding 2019.

Regarding data collection, several sources were used throughout the work. In order to identify the banking institutions operating in Portugal and to define the sample, BdP data were obtained including the list of authorised institutions in Portugal, the disclosures regarding capital buffers requirements and

the identification of institutions classified as O-SII.

The annual financial data of the six banks from December 2010 to December 2018 including dividends, equity, assets items and the disaggregation of annual results were collected directly from the balance sheet, income statement and statement of changes in equity disclosed by the banks. Regarding the collection of financial data, IFRS 9 came into force in 2018, replacing IAS 39, with changes in relation to accounting classifications. Despite some differences in treatment, for the purposes of this study the item AFS (available-for-sale securities) and FVOCI (fair value through other comprehensive income) were considered to be identical due to similar characteristics.

The institutions capital adequacy data were collected from the institutions market discipline reports. Based on this report, data were obtained regarding the components of prudential capital, the breakdown of RWAs by type of risk, details on capital increases and other risk management data. In the analysis of risk-weight (RW) by type of risk, there are cases in which the breakdown of RWAs by type of risk is not available. In these situations, the percentage presented was used as a proxy.

Regarding RWAs calculation, banks can use the SA or the Internal Ratings-Based Approach (IRB) upon regulator validation. SA and IRB models to compute RWAs are treated in the same way in our study, in line with equivalent studies. The increase in the capital ratio can occur through the change of assets from higher to lower RW however, it should be noted that this adjustment may arise only from the optimisation of risk models and should not be due to portfolio risk change as referred by Cohen and Scatigna (2014).

In order to harmonise the market discipline data for 2013, the restated ratios for December 2013 calculated by some banks following Basel III rules were not considered since some banks calculated these ratios only for comparative purposes and to ensure data harmonisation. In the remaining situations in which there are financial restatements, these were considered.

The capital ratios used throughout our study are phased-in and not fully loaded as they represent the effective minimum regulatory ratios for the year in question considering the phased-in period provided for in the legislation and an integral part of the new Basel III. Furthermore, most Portuguese bank in the sample does not disclose fully-loaded ratios. However, as of January 1, 2018, Banco BPI started calculating only fully loaded capital ratios, so for this year BPI fully loaded capital ratios were used.

Before the Basel III rules were transposed into the national context, pillar 3 data between 2010 and 2013 followed Basel II rules.

## **4.2. Statistical Treatment**

The statistical analysis presented was performed using Microsoft Excel and IBM SPSS Statistics 26 software.

Our study concerning the evolution of capital ratios follows the approach used by Cohen and Scatigna (2014) and Andrlé et al. (2017).

The analysis of the regulatory capital and RWAs is critical to understanding the strategies pursued by banks to achieve higher prudential ratios. In this way, Pillar 3 or Market Discipline report becomes crucial to provide additional risk management information relatively to banks annual reports. This information is a mandatory disclosure and aims to harmonise the information that is provided to stakeholders, fostering transparency.

In the first step, the institution's market discipline and annual reports will be used to investigate which components of the capital ratios mostly affected the Portuguese banks' capital structure.

The methodology consists in decomposing the change in bank's CAR, allowing to capture the three factors that impact CAR, the regulatory capital, the assets RW, and total assets.

The breakdown of the evolution of the CAR by its components for the various years considered is performed as follows.

$$\frac{K_t/RWA_t}{K_{t-1}/RWA_{t-1}} = \frac{\left(1 + \frac{K^{NE}_t}{K_{t-1}} + \frac{Inc_t}{K_{t-1}} - \frac{Div_t}{K_{t-1}} + \frac{Oth_t}{K_{t-1}}\right)}{\left(\frac{RWA_t/TA_t}{RWA_{t-1}/TA_{t-1}}\right) * \left(\frac{TA_t}{TA_{t-1}}\right)} \quad (1)$$

Where  $K$  is total regulatory capital (T1 and T2 capital),  $K^{NE}$  is newly issued capital or issuances of equity equivalents for Basel III purposes including CoCo and non-CoCos subordinated debt,  $RWA$  is risk-weighted assets,  $TA$  is total assets,  $Inc$  is net income attributable to shareholders after taxes,  $Div$  is paid dividends on common stock and preferred shares.  $Oth$  is calculated as a residual and represents other capital changes, which encompasses additional value adjustments, DTAs, CET1 deductions, other comprehensive income, IFRS9 adjustment and Basel III transitional adjustments. In short, regulatory capital component at time  $t$  is equal to the regulatory capital at time  $t-1$  adjusted by the newly issued capital, retained earnings and other adjustments and deductions. Retained earnings are the sum of net income adjusted for dividends.

In the study carried out by Andrlé et al. (2017) the capital component used was the book value of equity instead of the regulatory capital which, as specified in the study itself, differs and may be higher because it does not consider deductions to the regulatory capital as goodwill, securitisation positions, deferred tax assets and other items. Considering this distinction and the possible impacts, we will use regulatory capital instead of accounting capital throughout our study. In Cohen and Scatigna (2014) study for the capital element, it was considered the CET1 capital. However, CET1 capital excludes hybrid instruments as CoCos and subordinated securities included in AT1 and T2. Given the possible impact of these instruments in Portuguese banks, as identified in the literature review, the capital component on our study will consider total capital instead of CET1 capital. Therefore, allowing to verify

the weight of these supplementary capital instruments in Portuguese banks.

The changes in assets, RWAs and capital between 2010 and 2018 will be analysed in absolute terms for the six banks considered. Then, based on the breakdown of equation (1), the sources of change in the CAR are detailed in a non-additive manner. This first approach allows to analyse the percentage variation of the three elements that impact the CAR. It also allows to verify if the variation of the regulatory capital, the ratio of RWAs to total assets and the change to total assets at the individual level contributed to an increase or decrease in the capital ratio from 2010 to 2018.

In a second step and to better understand the impact of the different factors, it is useful to use transformation in equation (2) so that the different quantities can be expressed as additive components of the percentage point change in the CAR. To achieve this, we log-linearise both sides of equation (1) and then multiply both sides by a scaling factor as follows:

$$\frac{K_t}{RWA_t} - \frac{K_{t-1}}{RWA_{t-1}} = F \left[ \ln \left( 1 + \frac{K_t^{NE}}{K_{t-1}} + \frac{Inc_t}{K_{t-1}} - \frac{Div_t}{K_{t-1}} + \frac{Oth_t}{K_{t-1}} \right) - \ln \left( \frac{\frac{RWA_t}{TA_t}}{\frac{RWA_{t-1}}{TA_{t-1}}} \right) - \ln \left( \frac{TA_t}{TA_{t-1}} \right) \right] \quad (2)$$

(a) **Accumulated capital through newly issued capital, retained earnings and other adjustments**     
 (b) **Riskiness of assets**     
 (c) **Size of the balance sheet**

Where  $F$ , as a scaling factor, equals to:  $\left( \frac{K_t}{RWA_t} - \frac{K_{t-1}}{RWA_{t-1}} \right) / \ln \left( \frac{\frac{K_t}{RWA_t}}{\frac{K_{t-1}}{RWA_{t-1}}} \right)$

The first term (a) of the equation (2) captures newly issued capital, the effect of dividend-adjusted retained earnings, and other regulatory adjustments. The second term (b) measures changes in the riskiness of bank assets, and the third one (c) quantifies the effect of balance sheet expansion or contraction. The calculation of the elements of equation (2) allows a cumulative analysis of the various components that explain the increase in the CAR for the six banks considered.

In a third step, the objective is to examine in more detail the capital component. The capital variation can derive mainly from four factors: newly issued equity, dividend distributions, net income and other capital changes. To analyse the sources of changes in Portuguese banks' capital in an additive manner and in terms of a percentage point increase in the risk-weighted capital ratio, the following formula is used:

$$F \ln \left( \frac{K_t}{K_{t-1}} \right) = G \left( \frac{K_t^{NE}}{K_{t-1}} \right) + G \left( \frac{Inc_t}{K_{t-1}} \right) - G \left( \frac{Div_t}{K_{t-1}} \right) + G \left( \frac{Oth_t}{K_{t-1}} \right) \quad (3)$$

where the normalisation factor  $G$  is defined as:  $\frac{Fln\left(\frac{K_t}{K_{t-1}}\right)}{\frac{K_t}{K_{t-1}} - 1}$

In a fourth step, a further breakdown will be carried out regarding the Net Income subcomponent, as follows:

$$NI_t = NII_t + NOI_t - OE_t - LI_t + OI_t \quad (4)$$

$NII$  is net interest income,  $NOI$  is net non-interest income, which corresponds to net fees and commissions revenue,  $LI$  is loan impairments net of reversals,  $OE$  is Operating Expenses, and it is comprised of staff costs, general and administrative expenses and depreciation and amortisation,  $OI$  is calculated as residual and stands for Other changes in income.

The fifth step intends to address two questions that are regularly highlighted in the literature. The first question is whether the transition to higher capital ratios is reflected in lending spreads widening. The second is whether changes in prudential requirements would change the institutions' business models, fostering investment in non-interest business activities or forcing banks to reduce operating expenses.

To complement, support and compare the results obtained in our study, we will use the Portuguese banking sector and euro area data reported in financial stability reports and macro-economic data from BdP. Data from ECB regarding P2R and capital buffers will be used for comparison with Portuguese banks.

Concerning changes in assets a more in-depth study on lending growth, trading securities and NPLs is relevant as they are one of the regularly cited factors that retract the banking income of the Portuguese banks (Stalsberg, 2016).

Additionally, to analyse the variations in the riskiness of Portuguese bank's assets, the evolution of the global value of RWAs, the breakdown by type of risk and the average RW will be analysed.



## Chapter 5 – Results

### 5.1. Capital Ratios

The present work aims to research the adjustments and strategies pursued by institutions that impacted the evolution of the CAR, which consists of the total regulatory capital over the total RWAs, between 2010 and 2018.

In Table 5.1 it is reported Portuguese banks' CAR and its margin relative to the regulatory minimum required in 2010 and 2018.

**Table 5.1 – CAR and regulatory minimum in 2010 and 2018**

	Minimum Regulatory CAR	CAR	Delta	Minimum Regulatory CAR	CAR	Delta
	<i>Dec. 2010</i>			<i>Dec. 2018</i>		
Banco BPI	8,0	11,1	3,1	12,3	15,5	3,3
Banco Comercial Português	8,0	10,3	2,3	12,3	13,4	1,1
Santander Totta	8,0	11,1	3,1	11,5	17,3	5,8
Caixa Económica Montepio Geral	8,0	12,8	4,8	12,9	14,1	1,1
Caixa Geral de Depósitos	8,0	12,3	4,3	12,4	15,9	3,5
Novo Banco	8,0	11,3	3,3	13,3	14,5	1,2
Average	8,0	11,5	3,5	12,4	15,1	2,7

*Note.* In percentage points. The Santander P2R applicable in 2019 was assumed for 2018.

Regarding the data reported in Table 5.1, for 2010 capital ratios are based on the Basel II prudential rules and for 2018 on Basel III regulations. The minimum CAR required for 2010 relates only to Pillar 1 requirements, while for 2018 includes the Pillar 1 requirements, capital buffers (capital conservation buffer, countercyclical buffer and O-SII capital buffer) and P2R.

From the data in Table 5.1, we found an increase in the average regulatory minimum and CAR of 4.4 p.p. and 3.6 p.p., respectively. It is essential to highlight that despite the solid position in terms of capital adequacy in Montepio and Novo Banco in 2010, this situation was reversed over the period studied. In turn, BCP both in 2010 and 2018 recorded, compared to the other banks in the sample, the lowest margin relative to the regulatory minimum, having in 2018 together with Montepio a margin of only 1.1 pp over the regulatory minimum. By opposition, BPI and Santander in particular, improved their capital position relative to minimum regulatory requirements.

The differences in the minimum regulatory CAR between banks are related to pillar two requirements, which depends on the risk profile of each institution. Table 5.2 lists the six banks P2Rs,

which should be made at least by 56% of CET1 capital.

**Table 5.2 – P2R applicable from 2017 to 2019**

	Pillar 2 Requirement		
	Dec. 2017	Dec. 2018	Dec. 2019
Banco BPI	2,50%	2,25%	2,00%
Banco Comercial Português	2,40%	2,25%	2,25%
Santander Totta	N/A	N/A	1,50%
Caixa Económica Montepio Geral	3,00%	3,00%	3,00%
Caixa Geral de Depósitos	2,50%	2,25%	2,25%
Novo Banco	3,25%	3,25%	3,25%
Average	2,73%	2,60%	2,38%

*Note.* N/A – Data not available. The values stated derive from the disclosure of SREP results by the institutions concerned.

Comparing with the data reported in Figure 1.3 regarding the SREP results for the 108 EU significant institutions, we found for the three years analysed that the Portuguese banks' SREP is on average slightly higher. For 2018, Portuguese banks recorded an average P2R of 2.6% while the 108 significant institutions are subject to additional requirements of 2.1% on average.

CAR components for the sample are shown in Table 5.3 for 2010 and 2018, as well as their percentage changes.

**Table 5.3 – Capital adequacy ratio in 2010 and 2018**

	Regulatory Capital			RWA			Capital Adequacy Ratio		
	Dec. 2010	Dec. 2018	%	Dec. 2010	Dec. 2018	%	Dec. 2010	Dec. 2018	%
BPI	2.902	2.635	-9	26.036	16.977	-35	11,1	15,5	39
BCP	6.116	5.619	-8	59.564	41.855	-30	10,3	13,4	31
Santander Totta	2.710	3.469	28	24.355	20.052	-18	11,1	17,3	55
Montepio Geral	1.324	1.513	14	10.304	10.759	4	12,8	14,1	9
CGD	9.486	7.700	-19	76.989	48.418	-37	12,3	15,9	29
Novo Banco	7.798	4.328	-45	68.802	29.874	-57	11,3	14,5	28
Total	30.337	25.263	-17	266.051	167.934	-37	11,5	15,1	32

*Note.* In million Euros.

From the analysis of Table 5.3, we found that there was an average increase of 3.6 percentage points in CAR from 2010 to 2018.

Despite the increase in capital ratios, according to BdP (2018), the Portuguese banking sector in June 2018 had the second-lowest average CAR in the euro area, registering 15.2%, just ahead of Spain (15.1%) and away from the median euro area CAR, 18.5%.

The six banks decreased their capital by EUR 5 billion in aggregate terms. Novo Banco and CGD

reduced capital more sharply by EUR 3.5 billion and EUR 1.8 billion, respectively.

Concerning RWAs, there is a significant reduction of 37%, which in absolute terms corresponds to a reduction of 98 billion euros. Except for Santander and Montepio Geral, banks had a reduction of at least 30% in RWAs.

Table 5.3 data indicates that despite a decrease in the capital in 4 out of 6 the banks analysed, all of them increased the CAR because of the decrease in RWAs more than offset the reduction in capital.

In order to better understand the individual contribution of changes in capital and RWAs, the transformation of equation (2) was used in order to analyse the various factors additively as shown in Table 5.4.

**Table 5.4** – Sources of changes in CAR from 2010 to 2018

	Capital Adequacy Ratio			Capital	RWA	RWA			
	a	b	c			d	e	RWA to Total Assets	Total Assets
								f	g
	Dec. 2010	Dec.2018	Delta in p.p.	Change Contribution in p.p.					
Banco BPI	11,1	15,5	4,4	-1,3	5,7	0,8	4,9		
Banco Comercial Português	10,3	13,4	3,2	-1,0	4,2	1,1	3,1		
Santander Totta	11,1	17,3	6,2	3,5	2,7	4,6	-1,9		
Caixa Económica Montepio Geral	12,8	14,1	1,2	1,8	-0,6	-0,5	-0,1		
Caixa Geral de Depósitos	12,3	15,9	3,6	-2,9	6,5	1,7	4,8		
Novo Banco	11,3	14,5	3,2	-7,6	10,7	3,8	7,0		
Average	11,5	15,1	3,6	-1,3	4,9	1,9	3,0		

Note. Values presented in percentage points. The columns are related as follows:  $c = b - a$ ,  $d = e - c$ ,  $f = g - e$ .

The data in Table 5.4 disaggregates the CAR change between 2010 and 2018 by the contribution in percentage points of three elements, regulatory capital, assets and RW. Contributions represent ceteris paribus contributions.

The impact on the evolution of the CAR is positive when there is an increase in prudential capital and negative when there is an increase in average RW or total assets. Based on the results obtained, we observe that the most determining factor for the rise in capital ratios was the decrease in RWA, contributing ceteris paribus to an average increase of 4.9 percentage points for the six banks. The capital component was responsible for an overall reduction in capital ratios by 1.3 percentage points. Nonetheless, except for Montepio and Santander, it was not the most determining factor in CAR change.

For a more detailed analysis, we broke down RWAs into two components, total assets and the risk-weight of assets. Therefore, we found that the most determining factor, ceteris paribus, in capital ratios average increase is the reduction in institutions total assets, representing 61% of the total decline in RWAs. Montepio did not record significant changes in total assets during the period studied, ranging from EUR 18 billion in 2010 and 2018 to a maximum of EUR 23 billion in 2013.

The decrease in average RW for all banks, except Montepio, contributed 39% to RWAs reduction. In the period between December 2010 and December 2018 and in order to meet the progressively more demanding minimum capital ratios, Santander and Montepio, in contrast to the other banks, mainly adjusted the capital component. In the case of Santander, the consistently positive results during this period reduced the need to reduce assets or replace them with assets with lower RW. Montepio, given the accumulated losses over the study period, used other alternatives to increase prudential capital. Montepio benefited in 2010 from having the highest CAR, 12.8%, among the banks studied, and the highest margin on the regulatory minimum, 4.8%, as seen in Table 5.1. Furthermore, the CAR for 2010 almost complies with the regulatory CAR minimum of 2018, 12.9%. Consequently, these factors potentially removed the pressure to rapidly increase equity or decrease their assets over the period studied.

## 5.2. Regulatory Capital

To study the elements that constitute regulatory capital and its contribution to the change of capital, the transformation of equation (3) was used, as presented in Table 5.5.

**Table 5.5** – Sources of changes in Capital from 2010 to 2018

	Capital Ratio in p.p. (2010 RWA as denominator)			Net Income	Dividends	Newly Issued Capital	Other Changes to Capital
	a	b	c	d	e	f	g
	Dec. 2010	Dec.2018	Delta in p.p.	Change Contribution in p.p.			
Banco BPI	11,1	10,1	-1,0	6,3	-0,6	2,7	-9,4
Banco Comercial Português	10,3	9,4	-0,8	-3,8	-0,2	10,2	-7,0
Santander Totta	11,1	14,2	3,1	10,3	-5,7	2,5	-4,0
Caixa Económica Montepio Geral	12,8	14,7	1,8	-7,3	-0,4	15,6	-6,1
Caixa Geral de Depósitos	12,3	10,0	-2,3	-4,3	0,0	8,7	-6,7
Novo Banco	11,3	6,3	-5,0	-9,4	-0,3	8,7	-4,1
Average	11,5	10,8	-0,7	-1,4	-1,2	8,1	-6,2

Note. Values presented in percentage points. The columns are related as follows:  $c = b - a$  and  $c = d + e + f + g$ .

In order to study the capital component in isolation, the 2010 RWAs were used as a common denominator. In this way, we simulate the CAR for 2018, assuming the non-variation in the RWAs and analyse the regulatory capital component. The results obtained revealed an average decrease of -0.7 p.p. in CAR. Data in Table 5.5 corroborate the negative contribution of capital in CAR, as previously mentioned. Although the capital impact in CAR is limited in aggregate terms, the variation of the sub-components that make up the capital of Portuguese banks had significant variations between 2010 and 2018.

Institutions that had negative net income over the study period compensated mainly through capital increases and hybrid instruments issuances. Additionally, for the eight years of data, a statistically significant correlation was verified for a significance level of 0.01 between net income (year N-1) and newly issued capital (year N), as reported in Table 5.6.

**Table 5.6 – Correlation between Net and Newly Issued Capital**

		<b>Newly Issued Capital (Year N)</b>
<b>Net Income (Year N-1)</b>	Pearson Correlation	-,396**
	Sig. (2-tailed)	,005
	N	48

\*\*  $p < .01$ , two tailed.

This negative correlation is verified in BCP, Montepio, CGD and Novo Banco. In these banks, the reduction in net income was more accentuated and correspondingly were those that registered a greater contribution of capital issues and hybrid instruments, as reported in Table 5.5. The capital increases and the issuance of hybrid instruments carried out by banks made it possible to cover part of the negative results and other changes in capital.

### Dividends

The distribution of dividends is related, among other factors, to previous year results and the existence of margin regarding the minimum prudential requirements. Among the banks studied, those that accumulated negative results did not distribute dividends. Furthermore, from the analysis of data collected we found a significant negative correlation for a 0.01 significance level between net income (year N-1) and dividend distribution (year N), as reported in Table 5.7.

**Table 5.7 – Correlation between Net Income and Dividends**

		<b>Year Income (Year N-1)</b>
<b>Dividend (Year N)</b>	Pearson Correlation	-,380**
	Sig. (2-tailed)	,008
	N	48

\*\*  $p < .01$ , two tailed.

Concerning dividends distributed by Portuguese banks, Santander was the only one whose dividends had an impact on the capital component.

Santander distributed dividends over the entire period studied, unlike the other banks studied. As a result, dividends reduced by -5.7 p.p. the CAR (2010 RWAs). The payout ratio between 2011 and 2013 was 89% on average, whereas between 2016 and 2018 it was 65%, which represents a decrease in dividend distributions.

BPI had positive results in six out of the eight years analysed, however, the recapitalisation plan in which the Portuguese State subscribed in 2012 Core Tier 1 hybrid instruments restricted BPI, CGD and BCP to distribute dividends until full repayment. BPI fully repaid CoCos in advance, in 2014, BCP in 2017 and CGD CoCos were converted into equity in 2017. BPI distributed dividends concerning the financial year of 2009 and only returned to distribute ordinary dividends in 2018. The impact of the 140 million dividend distribution for 2018 is responsible for the impact of -0.6 p.p. on the CAR change, as reported in Table 5.5.

Novo Banco distributed ordinary dividends and dividends on preference shares in 2011 corresponding to EUR 173 million, which generates a marginal impact of -0.3 p.p. on the CAR variation.

Montepio distributed dividends in 2011, 2012 and 2013 in the amounts of EUR 23 million, EUR 17 million and EUR 2 million, respectively. The dividend payments represent an impact of -0.4 p.p. on capital change, therefore having a marginal effect.

BCP distributed ordinary dividends and dividends on preference shares in 2010 of EUR 138 million, and in subsequent years it only paid dividends related to preference shares.

Dividends represent a marginal impact on the Portuguese banking sector, being the component that least impacts the change in banks' capital. It represents an average effect of -1.2 p.p. on the evolution of the CAR (2010 denominator), as reported in Table 5.5.

Most banks did not distribute significant dividends at the beginning of the study period, in 2010, so the dividend reduction strategy to increase the CAR in this period was initially limited in this context. In the case of Santander, there was a decrease in the payout ratio however suggesting a relatively small impact on improving the CAR (2010 RWAs). Therefore, *strategy 2* does not appear to be supported by the data analysed.

### **Newly Issued Capital**

Bdp set the minimum Core Tier 1 at 9% for 2011 and 10% for the end of 2012, which generated the need to increase regulatory capital in the short term, considering the capital ratios of December 2010 as a reference point. These additional capital requirements contributed to the Portuguese bank's recapitalisations in June and December 2012. The recapitalisation was carried out through the issuance of CoCos subscribed by the Portuguese State totalling 3,000M, 1,300M and 900M in June 2012 for BCP, BPI, and CGD, respectively, and 400M in December 2012 for BANIF, allowed banks to comply with the minimum capital requirements defined by BdP and EBA.

BPI was one of the banks in the sample whose capital increases through new issues were lower. However, in addition to the issue of CoCos subscribed by the Portuguese State in 2012, the most significant transaction was in 2017 when BPI carried out a Tier II subordinated issue of EUR 300M.

Santander during the period under study made two capital issues in 2015 and 2016 in the amount of 300M of perpetual subordinated bonds that qualified as AT1 Capital with a reduced effect, 2.5 p.p., in the CAR variation (2010 RWAs).

Concerning CGD and in addition to the issue of CoCos in 2012 subscribed by the Portuguese State, there was also a capital increase through the issuance of new shares in the amount of EUR 750M.

Between 2017 and 2018, the Portuguese government, under the terms agreed with the European Commission, guaranteed the recapitalisation of CGD. The capitalisation operation had a total amount of EUR 4,944 million. In 2017 CGD carried out the issuance of ordinary shares solely subscribed by the Portuguese State (EUR 2,500M), the State also converted CoCos held in CGD into ordinary capital including accrued and unpaid interest (EUR 945M) and delivered CGD shares representing the capital share capital of Parcaixa, SGPS, SA (EUR 499M). Also, CGD issued, on the market, securities representing AT1 own funds (EUR 500M). In 2018 completed the last phase of the recapitalisation plan through the issuance of Tier 2 equity securities fully subscribed by institutional investors (EUR 500M).

Novo Banco new capital issuances had a positive impact of 8.7 p.p. on the CAR. In 2012, BES issued new shares, increasing its share capital by EUR 1,010M. Novo Banco was created in 2014, when BdP applied a resolution measure to BES, with a capital of 4.9 billion euros fully subscribed by the Resolution Fund. For the purpose of our study and assuming BES and Novo Banco as an entity, this capital injection is treated similarly to other capital increases. In 2017, the sale of Novo Banco to Nani Holdings, SGPS, SA, an entity 100% controlled by investment funds managed by the Lone Star group, was concluded, through a capital increase in the total amount of 750 million euros. Nani Holdings SGPS, SA has a 75% stake in Novo Banco and the Resolution Fund 25%. After the conclusion of the sale, a capital increase of 250 million euros was made in 2017. Finally, in 2018, a Tier 2 subordinated bond issue in the amount of EUR 400M was completed.

BCP has made extensive use of capital issues since 2010, contributing 10.2 p.p. to the CAR and mitigating the decrease in other capital items. In 2011, BCP carried out a public offer for the acquisition of subordinated perpetual securities with conditional interest in the amount of EUR 900M and an increase of share capital in cash with shareholders' preference reserve of EUR 260M. In 2012, in addition to the issue of CoCos subscribed by the State, it carried out a capital increase for shareholders in the amount of EUR 500M. In 2014, shareholders injected EUR 2,240M, the most substantial increase in share capital in the period studied. Part of this amount, EUR 1,850M, served to reimburse the State for hybrid CoCos instruments. In 2017, BCP concluded a new capital increase of EUR 1,300M, allowing the final repayment of EUR 700M to the State regarding the CoCos instruments, eliminating restrictions

on the distribution of dividends.

In turn, Montepio was the bank in which the weight of capital increases was more relevant, +15.6 p.p., more than offsetting the reduction in other capital items and allowing an increase of 1.8 pp in the CAR (2010 RWAs). Montepio had two increases in share capital in 2011 EUR 345M in March and EUR 100M in December, both fully paid up by Associação Mutualista. In 2013 Montepio increased its share capital through two successive issues totalling a capital increase of EUR 205M. Still in 2013 Montepio launched the initial public offer of 200,000,000 participation units, with a nominal value of 1 euro, representative of its Participation Fund, increasing its capital by EUR 200M. In 2015 Montepio issued representative units of CEMG Participation Fund, with a total nominative value of EUR 200M thousand, in cash, through a private offer, fully subscribed by Montepio Geral Associação Mutualista. In 2016 and 2017, Montepio performed capital increases subscribed by Montepio Geral Associação Mutualista subscribed by Montepio Geral Associação Mutualista in the amount of EUR 270M and EUR 250M, respectively.

As shown in Table 5.5, the average positive contribution of 8.1 p.p. in the CAR change for the six banks in the sample as well as the use by all banks of these regulatory capital instruments over the eight years, suggests that Portuguese banks widely used *strategy 1*.

### **Other Changes in Capital**

The other capital variations component is calculated as residual and had a significant negative impact. The Basel III transitional arrangements justify part of the negative impact on capital ratios. These transitional provisions include the progressive introduction of deductions from capital as well as the phasing out of some instruments previously eligible for own prudential funds. Other elements that help explain this variation include the revaluations of financial assets, minority interests, other comprehensive income, regulatory adjustments and deferred tax assets.

### **Net Income**

Net Income average contribution of -1.4 p.p. to CAR (2010 RWAs), as shown in Table 5.5, justifies a higher level of disaggregation, in order to understand whether there was a change in the capital management and business strategy and whether it translated into variations of the main Profit and Loss Statement (P&L) items. Table 5.8 shows the ROA for 2010 and 2018 and the breakdown by P&L item.



**Table 5.8** – Change in components of bank income by period

	Net Income (ROA)	Net Interest Income	Net Non- Interest Income	Operating Expenses	Loan Impairments	Other Net Income	Net Income (ROA)	Net Interest Income	Net Non- Interest Income	Operating Expenses	Loan Impairments	Other Net Income
	a	b	c	d	e	f	a	b	c	d	e	f
	2010 - 2013						2014 - 2018					
BPI	0,34	1,23	0,71	1,53	0,50	0,42	0,01	1,25	0,79	1,54	0,17	0,40
BCP	-0,68	1,37	0,81	1,63	1,25	0,03	0,14	1,71	0,90	1,33	1,12	-0,03
Santander Totta	0,49	1,36	0,77	1,14	0,53	0,04	0,86	1,39	0,63	1,11	0,13	0,08
Montepio Geral	-0,24	1,31	0,46	1,57	0,88	0,44	-0,48	1,26	0,53	1,43	1,14	0,31
CGD	-0,25	1,11	0,43	1,44	0,63	0,28	-0,38	1,17	0,51	1,25	0,84	0,03
Novo Banco	0,01	1,39	0,91	1,39	0,85	-0,06	-2,15	0,76	0,51	0,99	1,19	-1,24
Total	-0,15	1,28	0,68	1,46	0,80	0,15	-0,26	1,27	0,65	1,25	0,80	-0,13

Note. Values presented in percent of total assets. The columns are related as follows:  $a = b + c - d - e + f$ .

The European debt crisis that affected the Portuguese banking sector especially in the period between 2010 and 2012, as well as the regulatory changes of Basel III with effect from 2014 onwards, were the two factors used to define the two periods of profitability analysis of Portuguese banks. Thus, the evolution of net income was analysed between two periods, 2010-2013 and 2014-2018.

The banks' ability to increase their capital through the accumulation of retained earnings did not seem to result from improvements in profitability. The average ROA of the six institutions decreased from -0.15% in the period between 2010 and 2013 to -0.26% between 2014 and 2018.

### Net interest income

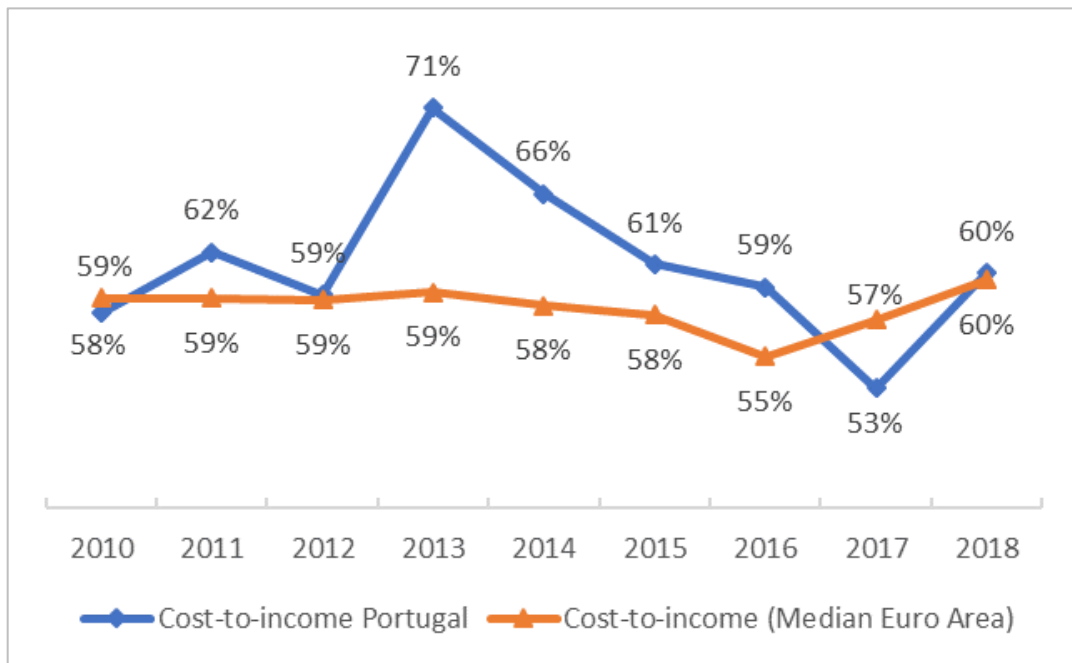
Replacing total assets, as shown in Table 5.8, by earning assets in order to calculate the net interest margin, there is a slight decrease from -0.23% in 2010-2013 to -0.41% between 2014-2018, suggesting that interest revenue had a negative contribution to the accumulation of capital in Portuguese banks. Thus, the *strategy 3b*, of widening lending spreads, does not seem to be proven for the period studied in the Portuguese case.

### Net non-interest income

In the context of low-interest rates that characterised the period studied, another strategy that banks could have followed would have been to invest in business lines that generate fees and commissions. The non-interest income item relative to total assets does not reveal any significant change for five of the six banks considered in the sample between the periods analysed. Novo Banco is the only one where there is a considerable reduction. The data suggest that *strategy 3c*, of strengthening investment in fee-related business areas or increasing its margins, does not seem to be proven.

**Operating Expenses**

Regarding operational efficiency, the operating expenses relative to total assets decreased slightly from 1.46% in 2010-2013 to 1.25% in 2014-2018. Operating expenses decreased from an average of EUR 5,827M in 2010-13 to an average of EUR 4,134M in 2014-18, a reduction of 29%. According to BdP (2019c) support data, operating costs as a percentage of average assets stood at 1.5% both in 2010 and 2018 for the Portuguese banking sector. Furthermore, for the 2010-2013 and 2014-2018 periods, the average operating costs relative to assets also remained at 1.5%. The greater reduction in operating costs in our study comparatively with BdP data for the Portuguese banking sector can be justified by the sample in our study being made up only of the six largest national institutions. In turn, these institutions were the ones with the most significant reduction in personnel expenses, which continued to reduce branches and employees, as mentioned in the same BdP report. Nevertheless, to analyse whether Portuguese banks followed *strategy 3a* regarding the improvement of operational efficiency in order to foster net income, it is relevant to consider the evolution of operating costs vis-à-vis the banking product generated, the cost-to-income ratio. We found that despite the 37% reduction in operating expenses in 2018 compared to 2010, the aggregate cost-to-income remains practically unchanged due to the proportional reduction in bank revenues, as shown in Figure 5.1.



**Figure 5.1 - Cost-to-Income of Portuguese banking sector and Euro Area**

Source: BdP (2019b)

Comparing the cost-to-income data between the Portuguese banking system, Figure 5.1, and the six banks considered in our sample, Table 5.9, it appears that the largest institutions have a slightly better operational efficiency compared to smaller banks for both 2010 and 2018.

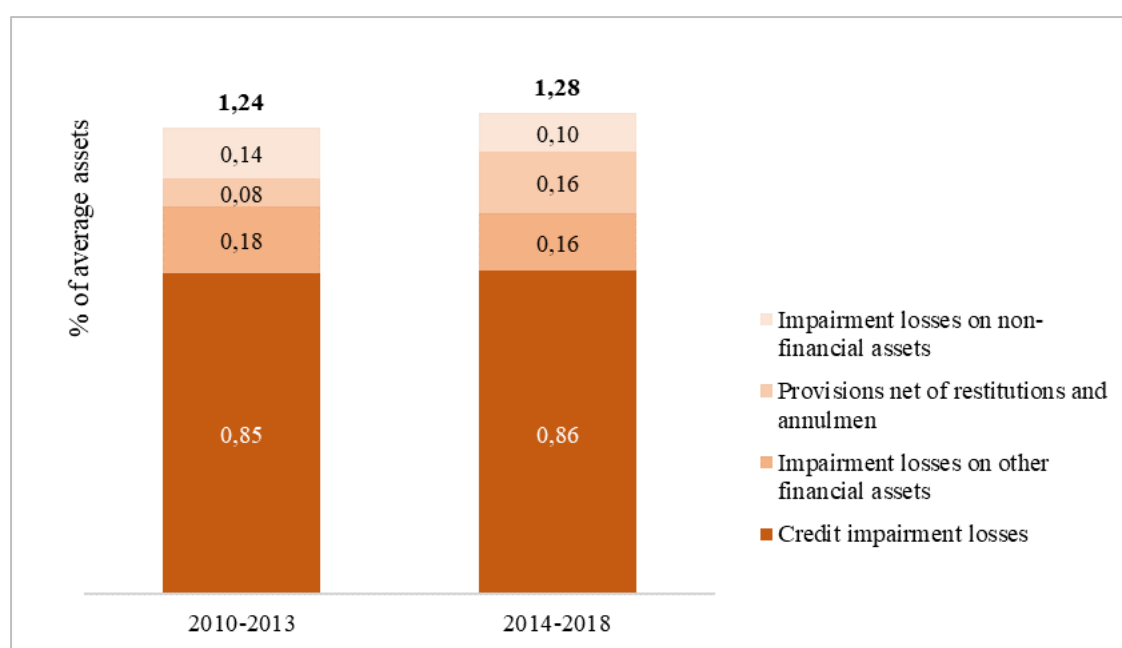
**Table 5.9** – *Cost-to-Income in 2010 and 2018*

	Cost-to-Income	
	2010	2018
BPI	0,61	0,60
BCP	0,56	0,46
Santander Totta	0,46	0,50
Montepio Geral	0,59	0,69
CGD	0,63	0,54
Novo Banco	0,49	0,65
Average	0,56	0,57

Evidence suggests that improvements in operational efficiency did not make a significant contribution to increase the profitability of Portuguese banks, so *strategy 3a* does not seem to be proven for the period studied.

### **Loan impairments**

Loan impairments, net of reversals and recoveries, decreased from an average of EUR 536M in 2010-2013 to EUR 441M in 2014-2018 for the six banks. BCP, Santander and BPI recorded a significant reduction in the average amount of loan impairments for the two analysed periods of 311 million euros, 166 million euros and 156 million euros, respectively. Despite the reduction in absolute terms, there was a proportional reduction in total assets. Therefore, the value as a share of assets remained unchanged at 0.8% between the two periods. Complementing the analysis with data from BdP (2020), we verified that for the Portuguese banking system, the component of impairments and provisions did not significantly impact ROA, as shown in Figure 5.2.



**Figure 5.2** – Provisions and impairments Portuguese banking sector by period

Note. Provisions and impairments as a percentage of average assets.

Source: BdP (2020)

Regarding the evolution of costs with provisions and impairments, the data obtained in our study as well as in BdP (2020) reveal that this component did not contribute to an improvement in Portuguese banks ROA. Table 5.10 shows the comparison of the average ROE for the two periods.

**Table 5.10** – Average ROE by period

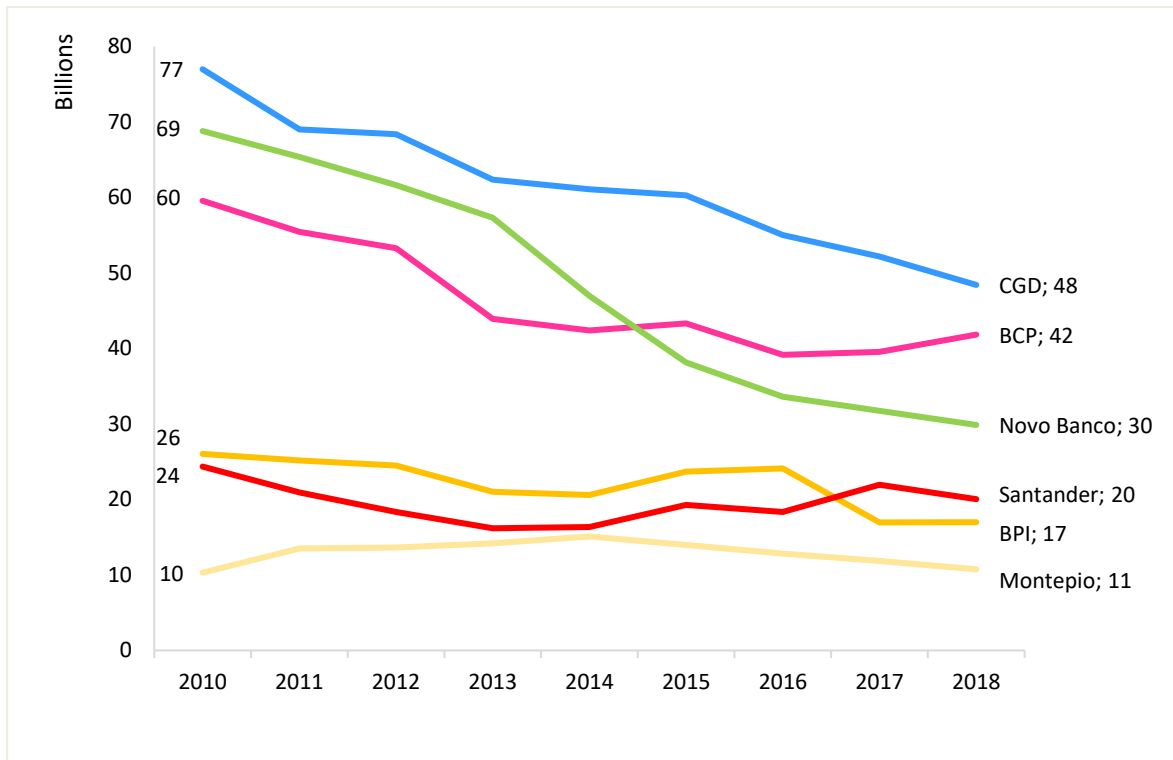
	Net Income	BV Equity	ROE	Net Income	BV Equity	ROE
	2010-2013			2014-2018		
Banco BPI	150	1.788	8,40	264	2.864	9,22
Banco Comercial Português	-616	4.315	-14,27	104	6.015	1,73
Santander Totta	213	2.785	7,64	420	3.811	11,02
Caixa Económica Montepio Geral	-50	1.384	-3,61	-100	1.503	-6,63
Caixa Geral de Depósitos	-303	6.783	-4,46	-366	6.624	-5,53
Novo Banco	7	6.956	0,10	-1.185	5.027	-23,58
Total	-599	24.012	-2,50	-863	25.844	-3,34

Note. In million Euros; ROE in percent.

ROE fell by 0.84 p.p. on average. However, excluding Novo Banco from the analysis, whose losses totalled EUR 5,926 million between 2014 and 2018, we observed a slight improvement in the average ROE from -3.55% between 2010-2014 to 1.55% in 2014-2018. Similarly, ROA would also increase from -0.19% to 0.12% between the two periods studied for the remaining five banks. The analysis of ROE reinforces the perspective of low profitability of Portuguese banks over the period 2010-2018.

### 5.3. RWAs

Figure 5.3 shows the evolution of RWAs for the six banks between 2010 and 2018.



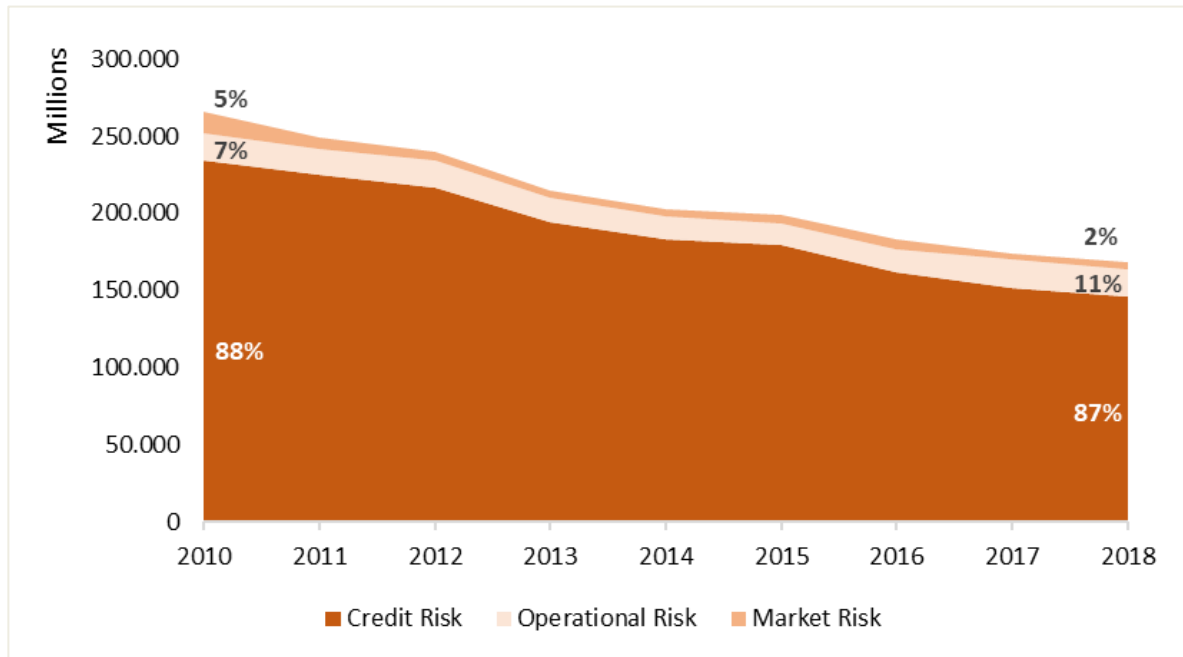
**Figure 5.3 – RWAs evolution by institution**

For the sum of the six banks, RWAs decreased in all the years studied, however, 2015 was the year in which RWAs least declined, 2%.

In 2013, there was an annual reduction of 10% in RWAs for the aggregate of the six institutions, the most considerable annual variation over the study period. Some factors may justify the sharp reduction in RWAs as the 2011-2014 EFAP economic adjustment program that involved the recapitalisation of the Portuguese banking sector. Also, one of the objectives of EFAP 2011-2014 was to stabilize the financial sector, which involved a balanced and orderly deleveraging of the financial sector. During this period there was combination of a challenging economic environment, the sovereign debt crisis, and a tightening of capital requirements for institutions.

Regarding capital requirements, the introduction of Basel III was in 2014, may also justify the sharp reduction in RWAs in 2013. Despite the progressive global reduction in RWAs, Novo Banco saw a sharp drop between 2013 and 2016, reducing RWAs by 41%. In turn, BPI saw a 30% reduction between 2016 and 2017, which was mainly due to a decrease in credit and counterparty risk.

Figure 5.4 indicates the evolution of RWAs for the six banks between 2010 and 2018.



**Figure 5.4 – RWAs by Risk Type between 2010 and 2018**

RWAs decreased from EUR 266,051 million in December 2010 to EUR 167,934 million in December 2018.

The proportion of credit risk in total RWAs has remained almost unchanged over the eight years. Market risk RWAs reduced their weight in total RWAs as opposed to operational risk, suggesting a reduction in trading activities over the eight years.

### 5.3.1. Total Assets

The decrease in total assets has a positive contribution to Portuguese banks' capital ratios. Table 5.11 highlights the reduction of assets in most banks between December 2010 and December 2018.

**Table 5.11** – Change in Total Assets from 2010 to 2018

Total Assets				
	2010	2018	Delta	
Banco BPI	45.660	31.568	-14.092	-31%
Banco Comercial Português	98.547	75.923	-22.624	-23%
Santander Totta	48.182	55.039	6.858	14%
Caixa Económica Montepio Geral	18.249	18.351	102	1%
Caixa Geral de Depósitos	125.862	89.091	-36.771	-29%
Novo Banco	83.028	48.274	-34.754	-42%
Total	419.528	318.247	-101.281	-24%

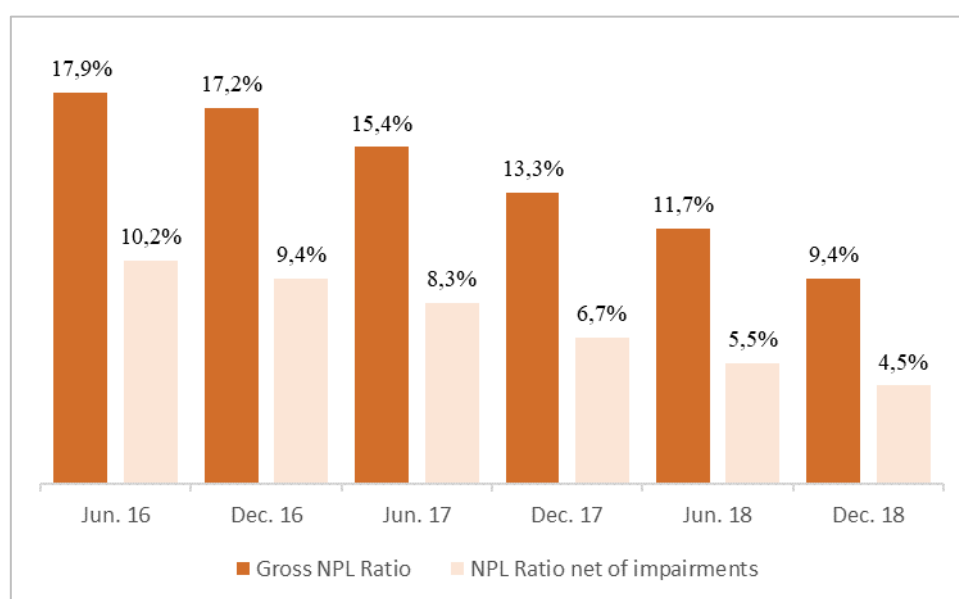
We found that most banks managed to increase CAR by significantly reducing total assets, as shown in Table 5.11. In contrast, Santander increased assets by 14%.

Table 5.12 shows the evolution of assets by the most relevant accounting items between the years 2010 and 2018.

**Table 5.12** – Change in Total Assets by asset type

	Loan to Customers	AFS / FVOCI Securities	Held for Trading Securities	Loan to Customers	AFS / FVOCI Securities	Held for Trading Securities
2010 -2018						
	Delta			Delta in percent		
Banco BPI	-8.691	-6.281	-1.015	-29%	-77%	-82%
Banco Comercial Português	-28.344	11.273	-4.233	-38%	438%	-82%
Santander Totta	6.783	-449	-356	21%	-7%	-8%
Caixa Económica Montepio Geral	-2.431	-1.986	-105	-17%	-82%	-82%
Caixa Geral de Depósitos	-30.318	-19.922	2.630	-37%	-80%	52%
Novo Banco	-26.075	-4.114	-1.602	-51%	-35%	-41%
Total	-89.075	-21.481	-4.681	-31%	-38%	-23%

In the three categories of assets analysed, there were steep declines over the eight years. The share of loans to total assets also reduced from 68% in 2010 to 61% in 2018. One of the main reasons that could explain the decrease in loans to customers was the sharp decline in the stock of NPLs. BdP (2019a) highlights the decrease in NPLs since the peak in December 2016, where they represented 17.9% of loans, to 9.4% in December 2018, as reported in Figure 5.5. Despite the convergence of both the gross NPL ratio and the net NPL ratio of the Portuguese banking system with the euro area, the gross NPL ratio is still 6.2 p.p. above the median of the euro area, which recorded 3.2% in December 2018. The net NPL ratio, net of impairment, follows the same convergence trend, standing 2.6 p.p. above the median of the euro area, which registered 1.9% in December 2018.



**Figure 5.5** – Gross and net NPL – Portuguese banking system

Source: BdP (2019a)

The most expressive part of banks assets reduction was in loans to customers, which reflects an impact on the real economy through the reduction of loans to households and corporations. The reduction of 31% and 38% in loans to customers and FVOCI securities represent the highest individual contributions to the increase in capital ratios for most banks in the sample and supports the adoption of *strategy 4b*.

### 5.3.2. Risk-weight

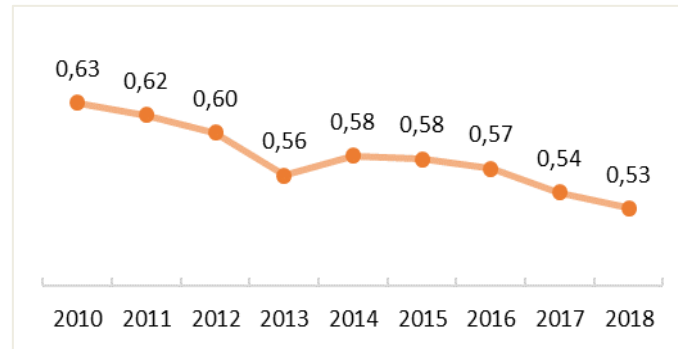
Table 5.13 shows the bank's average risk-weights in 2010 and 2018, considering total assets and RWAs.

**Table 5.13** – Risk-weight in 2010 and 2018

	Total risk-weight		
	Dec. 2010	Dec. 2018	Delta
Banco BPI	57,0%	53,8%	-3,2%
Banco Comercial Português	60,4%	55,1%	-5,3%
Santander Totta	50,5%	36,4%	-14,1%
Caixa Económica Montepio Geral	56,5%	58,6%	2,2%
Caixa Geral de Depósitos	61,2%	54,3%	-6,8%
Novo Banco	82,9%	61,9%	-21,0%
Total	63,4%	52,8%	-10,6%



There is a reduction of 11 p.p. in the average risk-weight. However, only 4 of the 19 countries in the euro area have an average RW higher than Portugal, with the median of the euro area standing at 46.2% for December 2018, according to BdP (2020). Figure 5.6 illustrates the evolution of the average RW for the six banks from 2010 to 2018.



**Figure 5.6** – Evolution of average risk-weight

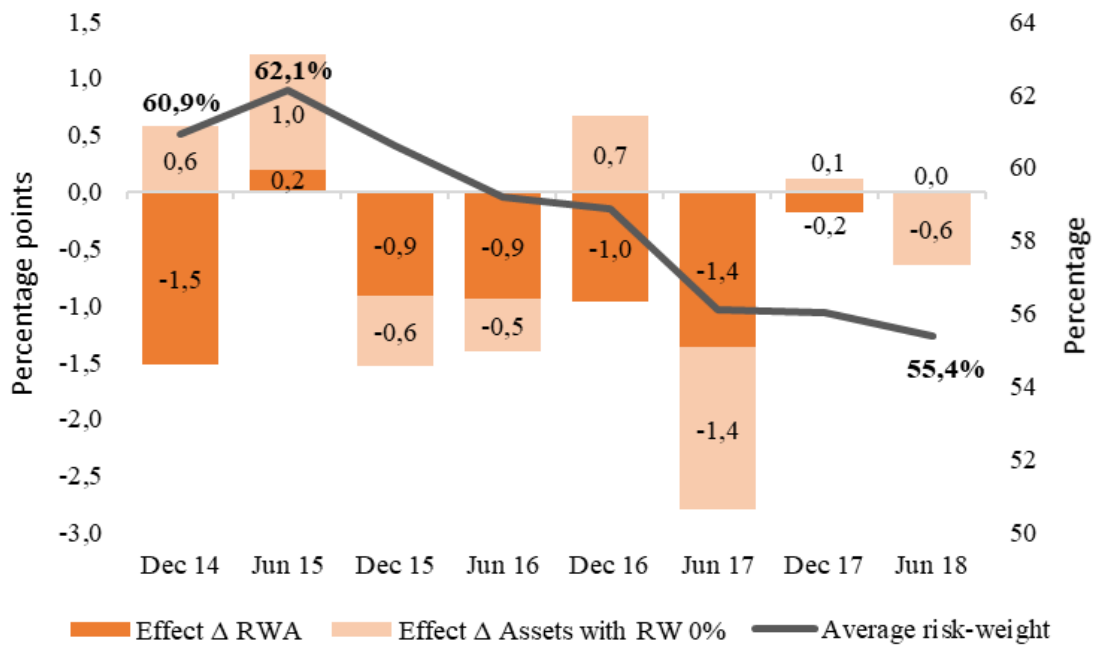
It is important to note that the progressive decrease in total RW, as shown in Figure 5.6, may be an indicator of reduction in the risk of bank assets. However, variations in the RW are not only derived from the reduction in the risk of the underlying assets but also from the internal models used and whose optimisation and assumptions can impact the RW. Some banks use internal models to calculate regulatory exposures, with some parameters modelled instead of being regularly prescribed, which can optimise capital requirements without changing the type of balance sheet assets.

In June 2018, the percentage of original exposures for which IRB models are used for the calculation of banking system risk exposures varied, at the euro area level, between 81% in the Netherlands and 0% in Malta, being that in Portugal this ratio was 29.1%, according to BdP (2018). As presented in Figure 5.4, in 2010 and 2018, RWAs related to credit and counterparty risk totalled 88% and 87% of total RWAs, of which 45% and 32% were calculated using internal models, respectively. Thus, most of the exposures related to credit and counterparty risk were calculated through the SA using prescribed parameters. Consequently, these data seem to indicate that the variation in average RW from 63% to 53% was not due only to the optimisation of internal models but to an effective change in the portfolio.

Credit and counterparty risk encompass assets registered in the trading and banking book and includes various types of assets such as loans, off-balance as guarantees and lines of credit as well as securities and derivatives. In this way and considering that the six banks have portfolios with different allocations, the reduction in the RW for credit and counterparty risk over the years as evidenced is due to a combination of factors that contributed to this progressive reduction. Some of these factors could include a larger share of deposits and repos with central banks as well as sovereign debt securities in the portfolio; derivatives and credit transactions carried out with counterparties with a better credit rating or

reduction of the NPL stock. Also, the decrease in off-balance sheet exposures with high credit conversion factors; reduction in high risk exposures such as venture capital and private equity investments or even demand for additional guarantees and collateral, prudently eligible, as risk mitigation factors could reduce the average RW for credit and counterparty risk.

According to the BdP (2018), the average RW for the Portuguese banking system from December 2014 to June 2018 decreased by 5.5 percentage points, of which 1.3 p.p. is related to change in the proportion of assets with RW 0%, such as sovereign debt or deposits in central banks. In turn, the remaining decrease of 4.2 p.p. in RW results from the average reduction in portfolio risk, as shown in Figure 5.7.



**Figure 5.7** – Contributions to risk-weight change for the Portuguese banking sector

Source: BdP (2018)

The decrease in NPLs favourably impacted the credit and counterparty RW, which is on average higher for exposures in default than for performing loans. Hence, the sharp reduction in NPLs contributed to the reduction in Portuguese banks total RW. The reduction in average RW for all banks, apart from Montepio, point out the widespread use of *strategy 4a* of reducing the risk of portfolio assets.

## Chapter 6 – Discussion

The results of our study point out that banks adopted the RWA reduction strategy between 2010 and 2018. This decrease in RWAs happened in two ways. On the one hand, the sharp decrease in the loan portfolio (-31%), available for sale securities (-38%) and securities held for trading (-23%), decreasing total assets (*strategy 4b*). However, it should be noted that this strategy of shrinking the balance sheet can potentially limit the ability to generate results and increase capital, either through the loss of interest revenue or the decrease in results from capital instruments.

On the other hand, the reduction in RW due to changes in the composition of institutions portfolios also justifies the reduction of RWAs (*strategy 4a*). Santander Totta represents the only exception whose explanation may be based on the consistently positive results and equity issuances in 2015 and 2016.

Regarding the capital component in aggregate terms, the sample average contribution to CAR change was negative (-1.3 p.p.). However, it had a comparatively lower weight than the variation of RWAs (+4.9 p.p.) in CAR change between 2010 and 2018. The assumptions regarding the increase in net income (*strategy 3a; 3b; 3c*) through the increase in lending spreads, non-interest income and increased operational efficiency seem to be unsupported by the data analysed, evidencing the maintenance of the level of profitability between 2010 and 2013 and 2014 to 2018 measured by ROA and ROE. Santander's profitability improved slightly due mainly to the decrease in loan impairments. Despite the weak improvement in bank profitability for the period under study, Santander and BPI had net income of EUR 2,516 million and EUR 1,630 million, respectively. The evidence points to the fact that, in Santander, the improvement in the CAR was mainly due to the increase in capital through the generation of net income over the period studied. Despite the positive global results, BPI had other changes in capital, which offset the gains obtained, not allowing the CAR to be increased through the capital component.

*Strategy 2* on reducing the distribution of dividends does not seem to have a significant impact since there were considerable losses in four of the six banks studied, the recapitalisation plans limited the ability to distribute dividends and most banks did not distribute significant dividends at the beginning of the study period restricting the ability to use the dividend reduction strategy to increase the CAR.

The results of our study point out that the initial CAR of the institutions in 2010 and the margin on the minimum requirements is not indicative of the evolution of this indicator until 2018. Furthermore, CAR in 2010 at any bank was sufficiently high for comfortably cover the progressive increase in minimum requirements advocated in Basel III. The starting point of the bank's capital ratios highlights the need that the banks had to follow one or more strategies placed as hypotheses for this study.

Cohen and Scatigna (2014) study use a sample of banks from developed and emerging countries for the period 2009-2012. Our work employs a similar methodology, although there are notable

differences in the results obtained. In this period in aggregate terms, the CAR increased from 11.4% to 13.9%, an increase of 2.5 p.p. on average for the 94 banks under consideration. Cohen and Scatigna (2014) concluded that for the period 2009-2012 the bulk of capital ratios adjustment was carried out through retained earnings. A reduction in dividends distributions alongside with the widening of lending spreads contributes to the increase in the CAR through the retention of the capital generated.

Narrowing the analysis to the 35 banks in Europe included in this study, CAR increases from 12.1% to 14.5%. Regarding the results for European banks our work converge with Cohen and Scatigna (2014) for the RWA component and diverge in the capital component. For European banks, total assets decreased by 2% from 2009 to 2012, even though significantly lower than that recorded for Portuguese banks, which registered a decrease of 24%. In our study, the contribution of asset reduction to CAR increase was 3 p.p. while in this study, it was 0.48 percentage points. The loan portfolio represented 61% to 68% of assets over the eight years, being the most significant component in Portuguese banks. In this item, our study reveals an average reduction of 31% instead whereas in Cohen and Scatigna (2014) the reduction in gross loans, quoted in USD, decreased only 9.5%, justifying the difference in the impact of the CAR. At the level of trading securities, this study indicates a sharp reduction of 33.5% in European banks, 10% higher than our results.

In Cohen and Scatigna (2014) research the decrease in RW was the most determining factor contributing 60%, 1.48 out of the 2.48 p.p., to the increase in CAR. Globally, Portuguese banks have reduced the risk of their portfolios, which is responsible for the increase of 1.9 percentage points in the CAR, in line with the study by Cohen and Scatigna (2014).

Concerning the capital component, this study shows for European banks a decrease in profitability, reflected in a decrease of ROA from 0.58% between 2005-2007 to 0.18% between 2010-2012. Contrary to the Portuguese banking sector, the European institutions in the study have low but positive profitability together with a reduction in dividends that may explain the positive contribution of capital in CAR of 0.52 percentage points. Conversely, in the Portuguese bank's capital component represents a decrease of 1.3 percentage points contribution in CAR. Another explanation is the weight of loan impairments in the Portuguese case, which represent -0.8 p.p. as a percentage of total assets and thus penalise profitability.

Nonetheless, the findings of this work are based on the use of accounting capital instead of regulatory capital, which can produce significant differences. Furthermore, the period analysed is prior to the adoption of the Basel III recommendations, with substantial differences in the eligible capital and an increase in risk-weights in many assets' classes, as mentioned by the authors. These factors may affect comparability with our study.

The Andrieu et al. (2017) study analysed the CAR evolution between 2008 and 2014 for 45 banks from 9 emerging EU countries. In contrast to our study, eight of the nine countries studied increased

their total assets, with seven in nine countries, increasing their share of loans to total assets. On average, the CAR increased from 12.3% in 2008 to 18.9% in 2014 for banks in the nine countries studied. From the 6.6 p.p. increase in CAR, the change in total assets contributed negatively by 1.6 p.p. in the Andrlé et al. (2017) study being the least significant factor in the aggregate CAR variation, in the opposite direction to our study.

In this study, the decrease in RW accounted for an increase of 4.1 p.p. and the accumulation of capital were responsible for another 4.1 p.p. rise in CAR. However, as mentioned by the authors, in countries where there was more significant growth in assets, the increase in retained earnings had a more significant impact on the CAR. In contrast, in countries where banks reduced their total assets or increased less significantly, the determining factor was the average decrease in risk-weights for the increase in CAR. In our study, and in a similar way, risk-weights decrease across all banks except for Montepio Geral.

This study points out that capital accumulation was mainly due to profitable banking sectors in the various countries despite the reduction in profitability and unchanged dividend distribution, even in countries with weak or negative results. In countries where net income was negative or had a marginal contribution to capital, capital issues more than offset this effect. The most profitable banking sectors also issued new equity, albeit on a considerably lower scale. Portuguese banks show less capacity to generate positive results, so the losses of many Portuguese banks were compensated through equity issuances, subordinated debt and hybrid capital instruments. Similar to the Andrlé et al. (2017) research, banks that presented positive average results such as BPI and Santander, also issued subordinated debt and hybrid instruments, accepted as regulatory capital, however on a smaller scale.

The reduction of operating costs in our study is in line with those achieved in emerging European banks considered in the Andrlé et al. (2017) study however, contrary to this study, the decrease in operating costs did not have the same impact on improving profitability. Our work converges with Andrlé et al. (2017) regarding some of the strategies followed by banks as the relevance of capital issuances, the RW reduction and the maintenance of lending spreads. However, most EU emerging market countries experienced profitable banking sectors, increased total assets as loans to customers, and maintained dividend distributions despite the decrease in profitability, which lead to different adjustment dynamics and results between Portugal and these nine countries.

Regarding the two studies with similar methodology and objectives presented, a substantial difference stands out, which is related to the difficulty in generating positive results from the banking activity itself by Portuguese banks and as a result the accumulation of capital. The weak or negative profitability of the six Portuguese banks resulted in an aggregate ROA of -0.15% for 2010-2013 and -0.26% for 2014-2018. One of the reasons underlying the low profitability may be related to the higher NPLs stock compared to the euro area during the period analysed. A larger NPL stock implies the

creation of provisions as well as the recording of impairments limiting the ability to generate profits. In June 2016, the gross NPL ratio in Portugal was 17.9% of loans against the median of 5.1% in the euro area. Despite the progress achieved since June 2016, the NPL ratio net of impairments was 9.4% in December 2018, continuing to be one of the highest in the European framework according to BdP (2019b). The reduction in NPLs justifies part of the reduction in assets, namely loans to customers. The sale of NPL portfolios has been an important factor in recent years in Portuguese banks and accounted for 34% of the reduction in gross NPL ratio, 2.9 out of 8.5 percentage points from June 16 to December 20, according to the BdP (2019b). The other factors were write-offs, new NPLs net of cures and other denominator effects whose weight was 36%, 21%, 9%, respectively. These factors indicate that the decrease in the NPL ratio was done through the numerator, through an effective clean-up of banks' balance sheet and not just a dilution effect, through the denominator increase.

## Conclusion

Our research aimed to identify the adjustments followed by the largest Portuguese banks to more demanding capital ratios. Based on a quantitative analysis of the evolution of the components that make up the CAR, it can be concluded that from 2010 to 2018 institutions have considerably reduced their balance sheets as well as the risk of the assets that make up their portfolios. In turn, the reduction related to these two elements was responsible for the increase in the CAR. In addition, the results indicate that the low profitability as well as other changes in capital were compensated mainly through the issuance of instruments eligible as regulatory capital. However, the change in regulatory capital played a secondary role.

This investigation contributes to a better understanding of the evolution of capital ratios, as well as allowing a more comprehensive perspective on the capital adequacy of the Portuguese banking sector.

Additionally, at the institution level the study details the main adjustments and strategies with an impact on the capital ratios, highlighting the differences between the context and actions followed by the largest Portuguese institutions.

Moreover, our study through a comparative analysis allows framing the capital position of the six largest Portuguese institutions in relation to the Portuguese banking sector and banks in the euro area.

Nonetheless, there were limitations to our study regarding data collection. Concerning the Pillar 3 report, the RWAs full disaggregation by risk type was not explicitly disclosed by some Portuguese banks, mainly from 2010 through 2013.

Also, our study uses data that refer to the application of Basel II and Basel III regarding capital and RWAs which could impact the results because Basel III have different RWs for several asset classes than Basel II. Conversions between Basel II and Basel III were not used despite methodological differences. Nevertheless, for our work, a significant impact or adulteration of results is not expected.

In line with similar studies, a further limitation was the fact that the analysis of total assets does not disregard intangible assets, goodwill, current tax assets and part of deferred tax assets, which are not subject to capital requirements. However, given their relatively small weight in total assets, no significant changes to results are expected. Off-balance sheet items are subject to capital requirements and therefore considered in the overall analysis of RWAs although a more detailed analysis on this item could be relevant.

Another constraint of this work was the fact that the contribution of some liability's elements such as repos, securities held for trading and derivatives was disregarded. These liabilities are considered in the calculation of requirements for credit and counterparty risk and market risk. Although the evolution of these passive elements and their contribution to the CAR has not been analysed, it is expected that they will have a relatively low impact on total RWAs.

The continuation of the study on banks' adjustments to the new regulatory requirements such as Basel IV or the Fundamental Review of the Trading Book and which strategies are adopted remains relevant for a better understanding of the Portuguese banking sector.

A study on the relationship between macroeconomic variables such as the level of reference interest rates or GDP growth in the adjustment of the balance sheet structure of Portuguese banks would be relevant. Along the same line of research, economic cycles and their impact on the choice of strategies followed to increase regulatory capital also deserve further study.

Complementary to our study, it would be interesting a more detailed approach on the analysis of the reasons, costs and specific context that led an individual bank to adopt a particular strategy to increase CAR.

Also worthy of further study would be to analyse how the Portuguese state interventions in the Portuguese banking system over the last decade, as well as the perception of the stakeholders regarding the solvency of banks, shape the behaviour and actions of banks in obtaining and maintaining capital buffers above minimum and possibly optimal levels.



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