



NEW COLLEGE
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Contingent Capital:

A Theoretical and Empirical Analysis

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Abstract

This thesis is about the design of contingent capital (CoCos) to induce monitoring and to therefore reduce the expected size of taxpayer funded bailouts. CoCos are debt instruments that either convert into debt or are written down when a bank approaches distress—based on a reduction in the bank’s capital.

The thesis begins with a moral hazard model that provides a stylised illustration of the circumstances where either shareholders or CoCo investors can be induced to monitor. It predicts that shareholders will monitor if conversion reduces their claim to zero and CoCo investors will monitor if conversion reduces the value of their claim below what they paid when the CoCo was issued. It then assess different elements of the model—including the social cost that gives rise to the need for bailouts, the usual mechanisms to reduce the need for bailouts, and the bank specific insolvency regime adopted in the European Union.

The focus then turns to monitoring incentives induced by CoCos. It discusses triggers and advocates higher minimum trigger levels. It then defines monitoring in the context of CoCos, assesses the extent to which monitoring is undertaken in CoCo markets, and makes recommendations about how incentives to monitor might be strengthened.

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Wandus

“As already mentioned, the exit option is widely held to be uniquely powerful: by inflicting revenue losses on delinquent management, exit is expected to induce that ‘wonderful concentration of the mind’ akin to the one Samuel Johnson attributed to the prospect of being hanged.”

Albert O Hirschman

Contents

Abstract	2
Acknowledgments	3
List of Legal Materials	11
1 Introduction	16
1 Overview	19
2 Methodology	24
3 Contributions to the Literature	31
4 Structure of the Thesis	32
2 Model	34
1 Function of CoCos	36
2 Base Case of the Model	38
2.1 Players	38
2.2 Payoffs	38
2.3 Timeline	40
2.4 Solution	40
3 Bank Recapitalisation	43
3.1 Payoffs	43
3.2 Incentive Compatibility Constraints	45
3.3 Solution	47

4	Extensions	51
4.1	Shareholders and CoCo Investors Monitoring	51
4.2	Neither Shareholders or CoCo Investors Monitoring	52
4.3	The Amount of CoCos Issued	52
3	Bank Insolvency	53
1	The Social Cost of Bank Failure	55
1.1	General Problems with Standard Insolvency Procedures	58
1.2	Bank Specific Problems: Contagion	61
1.3	Bank Specific Problems: Credit-Rationing	65
2	Avoiding Standard Insolvency Procedures	67
2.1	Lender of Last Resort	68
2.2	Bailouts	71
3	Conclusion	77
4	Capital and Resolution	78
1	Equity Capital Requirements	80
2	CoCo Capital Requirements	84
2.1	The Tax Treatment of CoCos	88
2.2	Value Changes in CRD IV	91
2.3	Restrictions on Coupons	93
3	Specialised Bank Insolvency	96
3.1	Recovery Planning	97
3.2	Resolution Planning	100
4	The Benefits of the New Framework	107
5	Conclusion	111
5	Triggers	113
1	Triggers Theoretically	116
1.1	Model Assumptions	117

2	Triggers in Reality	118
2.1	Trigger Types	122
2.2	Trigger Levels	128
2.3	Implications for Model	132
3	Conclusions and Policy Prescriptions	133
6	Monitoring	137
1	Passive Monitoring	145
2	Active Monitoring	149
2.1	Active Monitoring by CoCo Investors	151
2.2	Active Monitoring by Shareholders	159
2.3	Active Monitoring Facilitated by Regulators	161
3	Investor Sophistication	166
3.1	Limited Ownership Information	168
3.2	Investor Types	171
3.3	Incentivising Sophisticated Investors: Credible Bailout Commitments	174
3.4	Prohibiting CoCo Ownership by Unsophisticated Investors	177
4	Legal Framework	179
5	Description of CoCo Formats	181
6	Payoffs of CoCo Formats	182
7	Empirical Evidence: Formats of CoCos	187
7.1	Overview of Convertibles and Write-Downs	187
7.2	Convertible CoCos	188
7.3	Write-Down CoCos	198
8	Model Assumption and Interpretation	203
8.1	Assumption	203
8.2	Limitations	204
8.3	Analysis - Issuance	205
8.4	Analysis - Political Economy	206

9	Conclusion	208
7	Conclusion	215
1	Incentives to Monitor	216
2	Impediments to Monitoring	218
3	Strengthening Monitoring Incentives	219
4	Future Research	222
	Appendix A: Summary of CoCos	224
	Appendix B: Summary of Ownership of CoCos	232
	Bibliography	234

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1

Introduction To The Thesis

1	Overview	19
2	Methodology	24
3	Contributions to the Literature	31
4	Structure of the Thesis	32

CHAPTER 1. INTRODUCTION

This thesis is about monitoring using contingent capital ('CoCos').¹ The original proposal for banks to issue CoCos was made by Professor Flannery in the corporate finance literature, who called them Reverse Convertible Debentures and advocated that they be used to recapitalise banks outside of insolvency.² In 2011, following the financial crisis, Professor Coffee advocated the use of CoCos as regulatory capital instruments.³ Regulatory interest in the use of CoCos as a capital instrument began following the Squam Lake Report in 2010 which advocated the use of CoCos as a regulatory capital tool.⁴ CoCos are debt instruments that either convert into equity or are written-down when a bank approaches insolvency.

The Modigliani Miller theorem sets out circumstances where capital structure might affect the value of a firm.⁵ This thesis and its focus on monitoring is an analysis of the potential role of agency costs to reduce the size of taxpayer funded bailouts.⁶ To a lesser extent, this thesis also briefly discusses the role of taxes in the issuance of CoCos.⁷

The literature on CoCos is varied. Broadly, there are two strands in the literature.⁸ The first strand attempts to price the instruments.⁹ Pennacchi presents a partially theoretical and partially asset pricing model of CoCos that explores how yields vary with different CoCo

¹Contingent capital securities are also sometimes called 'contingent convertibles'. However, the contingent convertible label does not capture the write-down format of the securities, which do not convert into shares, and so contingent capital is preferred in this thesis. See, John C Coffee, Jr, 'Systemic Risk After Dodd-Frank: Contingent Capital and the Need for Regulatory Strategies Beyond Oversight' (2011) 111 Colum L Rev 795. Monitoring in the context of the thesis is discussed in more detail below and formally defined in Chapter 2.

²Mark J Flannery, 'No Pain, No Gain? Effecting Market Discipline via "Reverse Convertible Debentures"' in Hal S. Scott (ed), *Capital Adequacy Beyond Basel: Banking, Securities, and Insurance* (OUP 2005).

³Coffee (n 1).

⁴Kenneth R French *et al.*, *The Squam Lake Report: Fixing the Financial System* (OUP 2010) 54-6.

⁵Franco Modigliani and Merton H Miller, 'The Cost of Capital, Corporation Finance, and the Theory of Investment' (1958) 48 Am Econ Rev 261.

⁶Mathias Dewatripont and Jean Tirole, *The Prudential Regulation of Banks* (MIT 1994).

⁷Franco Modigliani and Merton H Miller, 'Corporate Income Taxes and the Cost of Capital: A Correction' (1963) 53 Am Econ Rev 433.

⁸For an overview of the CoCo market see: Stefan Avdjiev *et al.*, 'CoCos: A Primer' (Sep 2013) BIS Quart Rev 43. For literature review see: Mark J Flannery, 'Contingent Capital Instruments For Large Financial Institutions: A Review of the Literature' (2014) 6 Annual Rev of Fin Econ 225. For an overview of the economic rationale of CoCos see: Ceyla Pazarbasioglu *et al.*, 'Contingent Capital: Economic Rationale and Design Features' (25 Jan 2011) Int'l Monetary Fund SDN/11/01, 7-8.

⁹See, Zhaojun Yang and Zhiming Zhao, 'Valuation and Analysis of Contingent Convertible Securities With Jump Risk' (2015) 41 Int Rev of Fin Analysis 124. See also, A Meltzler and R M Reesor, 'Valuation and Analysis of Zero-Coupon Contingent Capital Bonds' (2015) 9 Mathematics and Fin Econ 85. See for an industry example, Alberto Gallo, Lee Tyrrell-Hendry, Tao Pan, and RBS Research India, *The Revolver—Coconomics: Pricing Contingent Capital Risks* (RBS 3 Jul 2014).

CHAPTER 1. INTRODUCTION

formats as well as the incentives of managers to increase asset risk when CoCos are issued.¹⁰ This thesis is not concerned with presenting a pricing model for CoCos.

The second strand has analysed the different ways of designing CoCos to facilitate monitoring and to therefore reduce the incidence of bank insolvency.¹¹ This literature owes much to the early work of Mark Flannery who proposed a version of CoCos that are not too dissimilar from those that have been issued by European banks.¹² Flannery set out the broad structure of CoCos and how they could be used to effect market discipline. The same issue has been explored in the legal literature.¹³ In a recent paper, Sundaresan and Wang argue that market based triggers reduce market discipline and therefore the ability of investors to penalise bank managers for taking excessive risk.¹⁴

A number of questions have been addressed in the second strand of the literature. First, a sub-strand of the literature proposes that CoCos should have sequential triggers in order to have a staged process of bank recapitalisation.¹⁵ This strand includes analyses that highlight the problem of forbearance with regulatory triggers and manipulation with market based triggers.¹⁶

Second, in a different sub-strand of the literature some authors have reframed the benefit of CoCos as a form of emergency capital. For instance, Bolton and Samama argue that CoCos are a method of providing emergency regulatory capital to banks in emergency

¹⁰George Pennacchi, Theor Vermaelen, and Christian CP Wolff ‘Contingent Capital: The Case for CO-ERCs’ (unpublished manuscript, 5 Mar 2011).

¹¹See, Mark J Flannery ‘Stabilizing Large Financial Institutions With Contingent Capital Certificates’ (unpublished manuscript, 6 Oct 2009). See also, Paul Glasserman and Behzad Nouri, ‘Contingent Capital With a Capital-Ratio Trigger’ (2012) 58 Management Science 1816. See further, Wulf A Kaal and Christoph K Henkel, ‘Contingent Capital With Sequential Triggers’ (2012) 49 San Diego L Rev 221.

¹²Flannery (n 2).

¹³See Jens Hilscher and Alon Raviv ‘Bank Stability and Market Discipline: The Effect of Contingent Capital on Risk Taking and Default Probability’ (unpublished manuscript, Sep 2012) <http://www.brandeis.edu/departments/economics/RePEc/brd/doc/Brandeis_WP53.pdf>. See also, Wulf A Kaal, ‘Initial Reflections On The Possible Application of Contingent Capital in Corporate Governance’ (2012) 26 Notre Dame J of L, Ethics & Public Policy 281. See further, Coffee (n 1).

¹⁴Suresh M Sundaresan and Zhenyu Wang, ‘On the Design of Contingent Capital With A Market Trigger’ (2015) 70 J Fin 881.

¹⁵See, Kaal and Henkel (n 11). See also, Robert L McDonald, ‘Contingent Capital With a Dual Price Trigger’ (2013) 9 J Fin Stability 230. See further, Jan De Spiegeleer & Wim Schoutens, ‘Multiple Trigger CoCos: Contingent Debt Without Death Spiral Risk’ (2013) 22 Fin Markets, Institutions & Instruments 129.

¹⁶See, Pennacchi *et al.* (n 10). See also, McDonald (n 15).

situations when banks need it the most.¹⁷

This thesis falls into the second strand of the CoCo literature which is about reducing the incidence of bank insolvency. The specific focus of this thesis is on monitoring, broadly defined to include market discipline as well as exerting influence through exit, voice, and loyalty so as to reduce the probability of bank insolvency and expected bailout costs.¹⁸ This thesis considers the ability of CoCo investors, shareholders, or indeed regulators to monitor banks. Consequently, this thesis brings together elements of the legal literature, political science literature, and the finance literature.

This introduction has four sections. In the first section, it provides an overview of the thesis and the main points that are discussed. In the second section, it discusses the mixed methodology of the thesis and the extent to which it borrows from financial economics, political science, and a functional law and finance approach. In the third section, it sets out four contributions of the thesis. In the fourth section, it sets out the structure of the remainder of the thesis.

1. Overview

This thesis analyses and suggests reforms to a framework designed to reduce the expected size of bailouts. It looks at resolution as a means of reducing the size of expected bailouts and focuses on the role of CoCos in creating incentives for bank stakeholders to reduce the expected cost of bailouts. The thesis answers a question that arose as a consequence of the financial crisis that began in September 2008 with the failure of Lehman Brothers, namely, how do we reduce the expected size of bailouts when a bank becomes distressed.

¹⁷Patrick Bolton and Frederic Samama ‘Capital Access Bonds: Contingent Capital with an Option to Convert’ (unpublished manuscript, Sep 2011). ‘Our main proposal is thus to deal with this counterparty risk by *collateralizing* the put with cash. This can be done straightforwardly by letting the bank issue a “reverse” convertible bond, whereby the issuer rather than the investor gets to decide whether to convert the bond into equity. By issuing such a bond the bank effectively gets the investors in contingent capital to “assign” upfront the cash necessary to purchase the equity. We underscore the nature of this instrument as an equity capital commitment for the issuer by referring to it as a *Capital Access Bond* or *CAB*.’ (emphasis in original)

¹⁸The thesis draws on Hirschman’s work to assess whether these contractual and extra-legal mechanisms of reducing bank risk-taking exist. See, Albert O Hirschman, *Exit, Voice, and Loyalty: Responses to Decline in Firms, Organizations, and States* (Harvard UP 1970).

CHAPTER 1. INTRODUCTION

CoCos have been issued in a number of jurisdictions. However, this thesis focuses on the law and empirical evidence about CoCo issuance in the European Union ('EU').¹⁹ There are at least two reasons for this focus. First, the EU jurisdictions have seen the largest amount of CoCos issued.²⁰ The United States ('US'), for instance, was not included in the analysis because no CoCos have been issued there. Second, the EU and specifically the United Kingdom ('UK') contain large financial markets that tend to set trends with respect to regulatory and financial innovation.²¹ Indeed, there are significant innovations with respect to CoCos that have been developed by regulators and banks in the EU.

The conventional account of bank failure is that when a bank becomes insolvent the cost of bank failure to a government is greater than the cost of a bailout. The primary cost to governments is credit rationing, which arises when banks are unwilling or unable to provide loans to SMEs or household for profitable projects.²² There are two theories about how credit rationing arises: first, credit rationing arises when interest rates for borrowing rise to a level where good borrowers avoid borrowing from banks while bad borrowers continue to borrow,²³ and second, depositors and other bank creditors might become unwilling to lend to banks because the prevailing spreads are higher than the interest that the bank can pay.²⁴

Credit rationing is a significant cost of bank failure and it is exacerbated by contagion in the financial system and often accompanied by disruptions of the payment system. Contagion

¹⁹For an overview of proposals leading to the introduction of CoCos in Europe see: Wulf A Kaal and Christoph K Henkel, 'Contingent Capital in European Union Bank Restructuring' (2012) 32(2) *Northwestern Journal of Int L Bus* 191, 240-51.

²⁰The EU is the largest region with CoCo issuance because there are regulatory requirements for banks to issue CoCos in CRD IV and its regulations. See, Directive 2013/36/EU of the European Parliament and of the Council of 26 June 2013 on Access to the Activity of Credit Institutions and the Prudential Supervision of Credit Institutions and Investment Firms amending Directive 2002/87/EC and repealing Directives 2006/48/EC and 2006/49/EC [2013] OJ L176/338 (Capital Requirements Directive - 2013/36/EU). See also, Regulation (EU) No 575/2013 of the European Parliament and of the Council of 26 June 2013 on Prudential Requirements for Credit Institutions and Investment Firms and Amending Regulation (EU) No 648/2012 [2013] OJ L176/1 (Capital Requirements Regulation - 2013/575).

²¹Katharina Pistor, 'Towards a Legal Theory of Finance' (18 Nov 2012) Columbia Law and Economics Working Paper No 434.

²²See, Joseph E Stiglitz and Andrew Weiss, 'Credit Rationing in Markets with Imperfect Information' (1981) 71 *Am Econ Rev* 393, 398. See also, Bengt Holmström and Jean Tirole, 'Financial Intermediation, Loanable Funds, and the Real Sector' (1997) 112 *Q J Econ* 663, 679.

²³Stiglitz and Weiss (n 22) 398.

²⁴Jean Tirole, *The Theory of Corporate Finance* (Princeton University Press 2006) 114.

CHAPTER 1. INTRODUCTION

is the propagation of distress amongst banks or indeed to non-bank firms.²⁵ Contagion can arise from interconnections on the asset side or the liability side of the distressed bank's balance sheet. On the asset side, during normal times banks may have uncorrelated assets that become correlated during a crisis.²⁶ This change in correlation can be explained in at least two ways: first, distressed banks might become forced sellers of assets and sell those assets below their fundamental value because they need liquidity,²⁷ and, second, investors may assess bank credit risk based on the reputation of a regulator so that if the regulator's reputation is damaged, for instance because of a regulated bank failing, then investors may charge a higher premium to all other regulated banks.²⁸ On the liability side, cross-holding by banks of liabilities might mean that the failure of bank A leads to a loss on the asset side of the balance sheet of bank B.²⁹ Banks provide means for households and SMEs to make payments using, for instance, debit cards, credit cards, and chequing accounts. When a bank becomes distressed, in addition to credit rationing there is a risk of a disruption to the payment system because of an inability for households to make payments using their bank cards.³⁰

The amount of credit that is rationed when a bank becomes distressed is greater than the cost of a bailout.³¹ Consequently, a government is faced with a decision to allow a bank to fail without intervening and incurring a significant cost in terms of GDP growth or to step

²⁵For contagion amongst banks see generally, Dewatripont (n 6). For non-bank firms see, Chitru S Fernando *et al.*, 'The Value of Investment Banking Relationships: Evidence from the Collapse of Lehman Brothers' (2012) 67 J Fin 235, 237.

²⁶Kathy Yuan, 'Asymmetric Price Movements and Borrowing Constraints: A Rational Expectations Equilibrium Model of Crises, Contagion, and Confusion' (2005) 60 J Fin 379, 397-403.

²⁷Franklin Allen and Douglas Gale, 'Limited Market Participation and Volatility of Asset Prices' (1994) 84 Am Econ Rev 933.

²⁸Alan D Morrison and Lucy White, 'Reputational Contagion and Optimal Regulatory Forbearance' (2013) 110 J Fin Econ 642.

²⁹Franklin Allen and Douglas Gale, *Understanding Financial Crises* (OUP 2007) 263.

³⁰Parliamentary Commission on Banking Standards, *Changing Banking for Good - Volume II: Chapters 1 to 11 and Annexes, Together with Formal Minutes* (UKHL Jun 2013) 111.

³¹*ibid* 111. 'Banks provide essential services such as ... the payment system in general on which the rest of the economy relies. Any interruption in these services, no matter how brief, would risk causing widespread damage. Insolvency destroys value. Unlike other corporate insolvencies, when the operating business can often be maintained or sold to maximise value, in the case of a bank, all that can often be done is to liquidate the assets. ... Disorderly failure can cause contagion because banks in general are reliant on the confidence of depositors and other creditors to keep operating. Allowing one bank to fail in a disorderly way could spread panic among creditors of other similar institutions and cause a wider financial crisis.'

CHAPTER 1. INTRODUCTION

in and bailout the bank in order to avoid some of those costs. Unsurprisingly, governments tend to bailout distressed banks that are placed into an insolvency process. The exception to the rule of bailing out distressed banks is the failure of Lehman Brothers in 2008 which precipitated the great recession.³² The failure of Lehman Brothers can be thought of as the exception that confirms the rule: when a bank becomes distressed it is a cheaper option to bail it out than to place it into an insolvency process without taxpayer support.

In response to the *fait accompli* that follows from bank failure, the focus of policy makers turned to reducing the cost of bank failure and therefore the expected cost of bank bailouts. There are two mechanisms that policy makers have used to reduce the cost of bank failure. First, policy makers have attempted to reduce the costs of bank insolvency by designing a unique insolvency process for banks known as the Bank Recovery and Resolution Directive (**BRRD**).³³ Second, policy makers have attempted to reduce the probability of bank insolvency by increasing the amount and quality of capital held by banks of capital in the Fourth Capital Requirements Directive (**CRD IV**),³⁴ and the Regulations for the Fourth Capital Requirements Directive (**CRR**)³⁵.³⁶ This thesis analyses the BRRD and sets out a number of ways in which it reduces the cost of bank insolvency. This thesis also analyses CoCos and their role as part of the BRRD. Finally, much of this thesis analyses CoCos as a distinct mechanism for reducing the probability of bank failure by providing additional capital and creating incentives for either CoCo investors or shareholders to monitor banks.³⁷

The BRRD aims to reduce the costs of bank insolvency by giving resolution authorities

³²Alan D Morrison, ‘Systemic Risks and the “Too Big to Fail” Problem’ (2012) 27 Oxford Rev Econ Pol 498, 501-2. ‘In short, there are economic reasons for believing that the costs of allowing certain financial institutions to fail are too high to bear. Moreover, the political calculus points towards bailouts. It is probably inevitable that some institutions will remain [too big to fail]. If this is the case, it is important that we understand the implications of an implicit or explicit [too big to fail] policy.’

³³Directive 2014/59/EU of the European Parliament and of the Council of 15 May 2014 Establishing a Framework for the Recovery and Resolution of Credit Institutions and Investment Firms and Amending Council Directive 82/891/EC, and Directives 2001/24/EC, 2002/47/EC, 2004/25/EC, 2005/56/EC, 2007/36/EC and 2011/35/EU, 2012/30/EU and 2013/36/EU, and Regulations (EU) No 1093/2010 and (EU) No 648/2012, of the European Parliament and of the Council [2014] OJ L173/190 (Recovery and Resolution Directive - 2014/59/EU). This is discussed in Chapter 4.

³⁴Capital Requirements Directive - 2013/36/EU.

³⁵Capital Requirements Regulation - 2013/575.

³⁶This is also set out in Chapter 4.

³⁷This discussion takes place in Chapters 5 and 6.

CHAPTER 1. INTRODUCTION

powers that do two things: first, allow for losses to be imposed on *only a pre-specified group of creditors*,³⁸ and, second, to put a bank through an insolvency like process over a period as short as a weekend. The resolution framework, broadly speaking, has at least two parts. First, recovery plans which are likely to be implemented when a bank is solvent but distressed. Member states are required to make banks draw up recovery plans that aim to ensure the restoration of the bank's financial situation following a significant deterioration.³⁹ Second, a regulator might place a bank into resolution and use its resolution powers to recapitalise the bank. In resolution, there are two types of resolution powers: powers to sell a bank's assets to a purchaser and powers to impose losses on the bank's shareholders and certain creditors.⁴⁰ These powers are designed to be substitutes for standard insolvency, its social cost, and ultimately aim to reduce the taxpayer bailout bill.

Around the same time as a recovery plan is implemented, a CoCo might be triggered to recapitalise a bank. CoCos are capital instruments that can be converted into shares or written-down whilst a bank is solvent and not in resolution.⁴¹ As capital instruments, CoCos are intended to operate outside of the resolution framework.⁴² Potentially, CoCos can reduce the expected costs of bailouts prior to being triggered and after being triggered. Once triggered, CoCos reduce the coupons payable by the issuing bank which reduces the prospect of cash flow insolvency. In addition, they reduce the outstanding debt, leverage, and consequently help stave off balance sheet insolvency. The expectation is that CoCos can change the behaviour of stakeholders and create an incentive for them to monitor banks, reduce the probability of bank insolvency, and therefore the expected cost of taxpayer funded

³⁸Traditional insolvency procedures impose losses on all creditors in accordance with their priority. See, Roy Goode, *Principles of Corporate Insolvency Law* (Sweet & Maxwell 2011) 65-6.

³⁹Recovery and Resolution Directive - 2014/59/EU, art 5.

⁴⁰*ibid.*

⁴¹Capital Requirements Regulation - 2013/575, art 92(1). See also, David Skeel, 'The New Synthesis of Bank Regulation and Bankruptcy in the Dodd-Frank Era' (Mar 2016) University of Pennsylvania Law School & ECGI Law Working Paper No 306/2016, 17. 'More recently, banking scholars have advocated that bank holding companies issue a very similar form of security that has become known as convertible contingent capital, or a CoCo. Like chameleon equity, CoCos would convert to equity as the bank holding company's condition deteriorated. With CoCos, the conversion would come prior to a default. If effective, CoCos would quickly recapitalise a company, making formal resolution proceedings unnecessary.' See further, Anna Gardella, 'Bail-in and the two Dimensions of Burden-Sharing' (1-2 Sep 2015) ECB Legal Conference Paper.

⁴²Skeel (n 41) 17.

bailouts.

A significant focus of this thesis is the monitoring benefit of CoCos. If CoCos do not incentivise monitoring then it is arguable that regulators should not require banks to issue them because the loss absorbing function of CoCos after trigger can also be performed by equity. On the other hand, if CoCos incentivise monitoring, then they offer a benefit over and above equity capital. The question of monitoring by CoCo investors, shareholders, and / or regulators is central. The thesis discusses, using a stylised model, the conditions where shareholders and CoCo investors are incentivised to monitor. It reconciles this with empirical data about CoCos issued by banks and analyses this data to determine which CoCo stakeholders might have an incentive to monitor and how these incentives might be strengthened.

2. Methodology

This is a mixed methods thesis: it begins with a formal game theory model, draws on empirical data, and analyses this material using a functional law and finance approach. The thesis begins with a game theory model that sets out conditions under which shareholders or CoCo investors might monitor banks and reduce the probability of their insolvency. In the next two chapters it uses a functional law and finance approach to analyse the reasons for bank bailouts—focusing on, amongst other things, the role played by standard insolvency, contagion, and credit rationing. The final two chapters continue to make use of the functional approach but also draw on empirical data to discuss the extent to which CoCos might incentivise monitoring in the real world.

The formal game theory model motivates the thesis. It sets out circumstances where a government will bail out a bank. It then discusses the role of CoCos, as a form of capital, in reducing the incidence of bank insolvency. Specifically, the model defines conditions where either shareholders or CoCo investors will monitor. It then discusses a number of potential limitations and extensions which are addressed in the final two chapters of the thesis.

The remainder of the thesis uses a functional law and finance framework to analyse

CHAPTER 1. INTRODUCTION

aspects of the model. The term ‘functional’ has been described as being ‘justifiably suspect’⁴³ because it means different things to different people.⁴⁴ The approach taken by La Porta et al in their seminal paper was to identify empirical differences in the law and to explain whether those differences had consequences for corporate finance.⁴⁵ The ‘functional’ aspect of this thesis is identifying an economic problem, i.e. the moral hazard problem of bank bailouts, and to analyse legal responses to that problem and the effectiveness of those responses. The finance analysis is undertaken throughout the thesis but is most formally evident in the model that follows. The more traditional law and finance analysis is contained in subsequent chapters.

This thesis assumes that the purpose of CoCos is to reduce the probability of bank insolvency. It highlights two points: first, the design of CoCos can induce shareholders or CoCo investors to monitor. When triggered, CoCos can facilitate value transfers between different stakeholder groups in order to create incentives for those stakeholder groups to reduce the likelihood that the bank becomes insolvent.⁴⁶ The relevant stakeholder groups include: bank managers, shareholders, and CoCo investors of the bank. Bank managers have control of the bank and can be directly incentivised to reduce risk-taking by for instance requiring them to issue CoCos which, when triggered, transfer their wealth to other stakeholder groups i.e. shareholders. Indirectly, bank managers can be incentivised to reduce risk-taking if shareholders, or CoCo investors have their wealth transferred upon the CoCo being triggered and consequently have an incentive to reduce the likelihood that the CoCo is triggered.

On the other hand, two types of incentives can be created for shareholders and CoCo investors. First, they can be incentivised to seek the trigger because they are the beneficiary of a wealth transfer from a different stakeholder group. Second, they can be incentivised to

⁴³Reinier Kraakman *et al.*, *The Anatomy of Corporate Law: A Comparative and Functional Approach* (OUP 2009) 4.

⁴⁴*ibid* 4. ‘We realise that the term ‘functional’, which we have used here and in our title means different things to different people, and that some of the uses to which that term has been put in the past—particularly in the field of sociology—have made the term justifiably suspect.’

⁴⁵Rafael La Porta, Florencio Lopez-de-Silanes, Andrei Shleifer, and Robert W Vishny, ‘Law and Finance’ (1998) 106 J Pol Econ 1113, 1121. ‘Our goal is to establish whether laws pertaining to investor protection differ across countries and whether these differences have consequences for corporate finance.’

⁴⁶These transfers might be priced but their effect is to also change the behavior of the CoCo investors or shareholders. Hilscher (n 13). See also, Glasserman and Nouri (n 11).

CHAPTER 1. INTRODUCTION

avoid the trigger because their wealth will be transferred to other stakeholders.

The second point highlighted by this thesis is that in order to induce banks, i.e. their shareholders to issue CoCos, regulators can impose a rule that makes CoCos a form of regulatory capital. This rule might involve an incentive, such as deductible interest, to issue CoCos.⁴⁷ The compromise is that regulators can require banks to issue CoCos that absorb losses outside of insolvency. At the same time, bank managers can reduce the cost of CoCos by treating the distributions paid to investors as tax deductible interest. The benefit of the deductibility of interest payments on CoCos might then be shared amongst various stakeholder groups associated with the bank i.e. shareholders, CoCo investors, and other investors in terms of the price of their respective securities.

The functional approach is also used to analyse the social cost of bank failure and how this results in taxpayer funded bailouts of banks or lender of last resort ('LOLR') funding from central banks when banks become distressed and face difficulties in obtaining short-term financing. This framework is further used to analyse bank capital regulation and resolution. Bank capital regulation is framed as providing a buffer before a bank becomes distressed. On the other hand, resolution and insolvency are framed as methods for imposing losses on stakeholders. Bank capital regulation and resolution can provide incentives *ex-ante* for stakeholders to monitor. In particular, CoCos which give stakeholders the opportunity to reduce to writing how losses are imposed provide an opportunity for stakeholders to participate in the the creation of these monitoring incentives. The two chapters immediately after the model provide the broader context of bank capital regulation and resolution.

The last two chapters of this thesis draw upon empirical data in addition to the functional law and finance framework. The data have been gathered from Bloomberg and supplemented by gathering prospectuses from bank and exchange websites. The data were downloaded from the Bloomberg Application Programming Interface for all of the CoCos issued by entities incorporated within the EU. The data included basic facts such as the amount raised (in US\$),⁴⁸ the issue date, maturity date, as well as data related to the trigger and

⁴⁷Dewatripont (n 6) 49-52.

⁴⁸These were converted into US\$ using the exchange rate from the original currency at the date of issue.

CHAPTER 1. INTRODUCTION

conversion price. In addition, more sophisticated information such as the ranking, capital position, ratings, and various covenants were downloaded.

The full range of data and the sources are set out in Table 1.1. Not all of the data was available on Bloomberg, so the Bloomberg data was supplemented with manual reviews of prospectuses to expand the dataset. Some data is not available because Bloomberg does not contain the data and the prospectus is written in a foreign language. These data points are marked N/A.

Table 1.1: Summary of Empirical Data. This table shows the data and sources for the empirical analysis in this and subsequent chapters.

Data Description	Source
International Securities Identification Number	Bloomberg
Issuer Name	Bloomberg
US\$ Total Issuer Assets	Bloomberg
Issuer or Listed Entity Tier 1 Ratio	Bloomberg
Date of Tier 1 Ratio	Bloomberg
US\$ Book Value of Equity	Bloomberg
Leverage Ratio	Author's Calculations
CoCo / Total Assets	Author's Calculations
CoCo / Total Leverage	Author's Calculations
Country of Incorporation	Bloomberg
Issue Date	Bloomberg
Maturity Date	Bloomberg
Time to Maturity	Author's Calculations
Issuing Currency	Bloomberg
Amount Issued	Bloomberg
Cumulative Amount Issued	Author's Calculations
Amount Outstanding	Bloomberg

CHAPTER 1. INTRODUCTION

Summary of Empirical Data

CoCo / Book Value of Equity	Author's Calculations
Amount Redeemed or Exchanged	Bloomberg
Proportion Redeemed (%)	Author's Calculations
Denominations	Prospectuses
Issue Price	Bloomberg
Market of Issuer	Bloomberg
Sales Restrictions	Bloomberg
Coupons or Distributions	Bloomberg
Frequency of Interest Payments	Bloomberg
Interest Reset	Bloomberg
Fixed Component of Reset Interest	Bloomberg
Spread on Reset Interest	Bloomberg
Ranking in Insolvency	Bloomberg & Prospectuses
Regulatory Capital Position	Bloomberg & Prospectuses
DBRS Rating at Issue	Bloomberg
Fitch Rating at Issue	Bloomberg
Moody's Rating at Issue	Bloomberg
S&P Rating at Issue	Bloomberg
Regulatory Call Option	Prospectuses
Tax Call Option	Bloomberg
Loss Type	Bloomberg
Conversion Price	Prospectuses
Trigger Reference	Bloomberg
Trigger Level	Bloomberg
Distance to Trigger	Author's Calculations
Supplementary Triggers	Prospectuses

CHAPTER 1. INTRODUCTION

Summary of Empirical Data	
Restrictions on Asset Sales	Prospectuses & Bloomberg
Restrictions on Mergers and Business Changes	Prospectuses & Bloomberg
Restrictions on Debt	Prospectuses & Bloomberg
Restrictions on Dividends	Prospectuses & Bloomberg
Collective Action Clause	Bloomberg
Anti-Dilution Clause - Buy-Backs	Prospectuses
Anti-Dilution Clause - Modifying Shareholder / Debtholder Rights	Prospectuses
Governing Law	Prospectuses & Bloomberg
Lawyers	Prospectuses
Ownership	Bloomberg

There are 131 CoCos in the sample, issued by 51 distinct entities between 11 May 2009 and 18 July 2014, incorporated in 14 countries. The average size of each CoCo is US\$1.076bn. The median amount issued is US\$1bn. Figure 1.1 shows the cumulative amount of CoCos issued from 2009 to 2014.

The four jurisdictions that have issued the most CoCos in the sample are United Kingdom US\$29.312bn, Switzerland US\$29.066bn, France US\$16.840bn, and Spain US\$11.554bn. Prior to the publication of CRD IV on 27 June 2013, roughly \$60bn of CoCos had been issued. Since then and until 18 July 2014, that number has more than doubled to \$140bn. A more complete summary of the data is set out in Table 7.1 and Table 7.2.

CHAPTER 1. INTRODUCTION

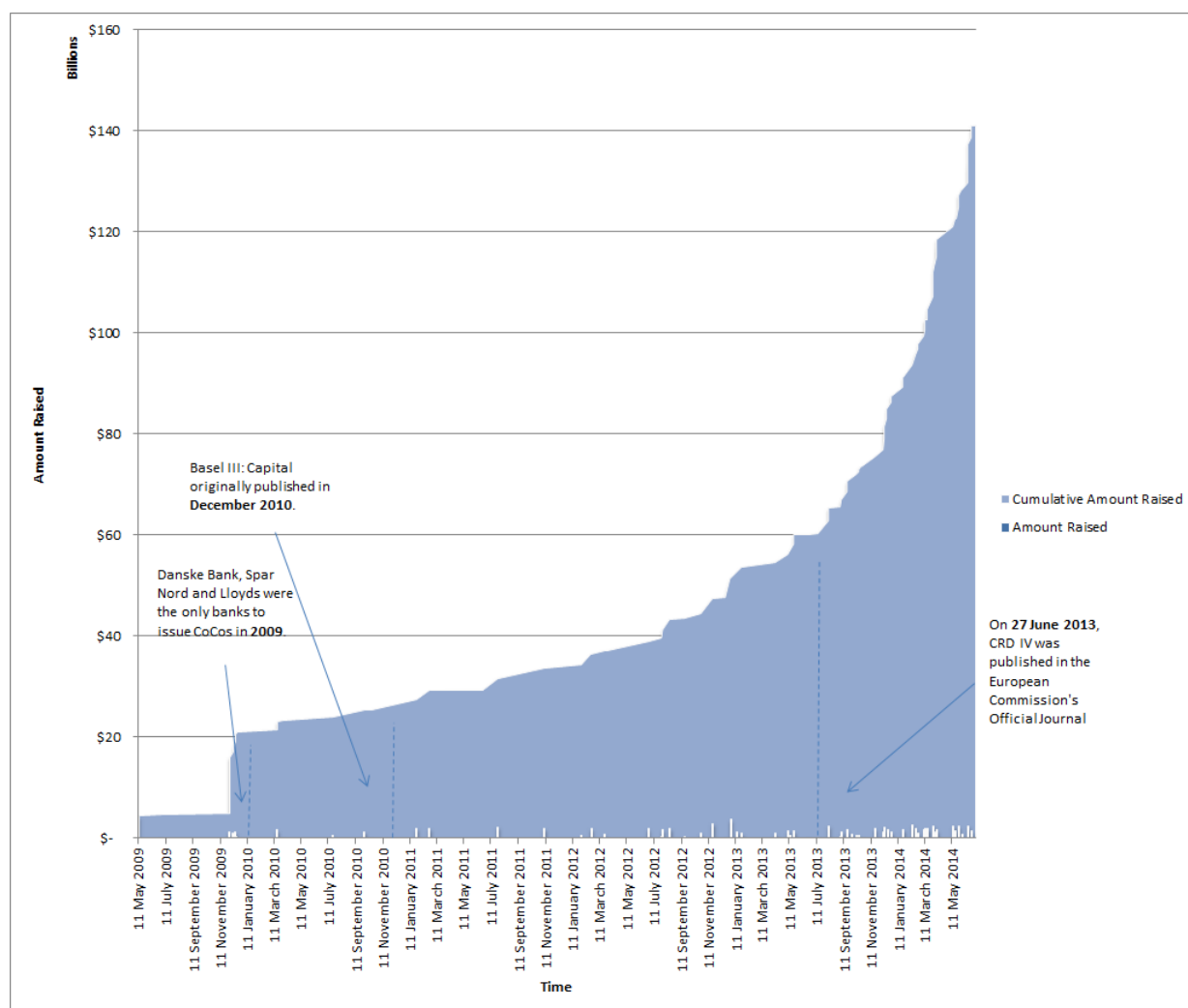


Figure 1.1: **Cumulative Amount of CoCos Raised Over Time (USD)**. Sources: Bloomberg, bank prospectuses, annual reports, and Author's calculations.

3. Contributions to the Literature

This thesis makes several contributions to the law and finance literature, in short: it provides a formal framework for discussing monitoring in the CoCo market, it draws on empirical data about CoCos, it provides a rigorous analysis of triggers including a discussion of trigger *levels* which has been rarely discussed in the literature, and it also provides a rigorous analysis of monitoring.

First, the thesis uses a game theory model to frame the issues in the thesis and to identify design characteristics of CoCos that could incentivise monitoring. This method is, as far as the author is aware, relatively novel for law and finance theses. The model owes much to corporate finance theorists and particularly to the work of Holström and Tirole.⁴⁹

Second, this thesis draws on empirical data. The dataset allows the analysis to move beyond the theoretical and to consider the extent to which real world observations conform to the predictions of the model. This allows the analysis to make claims about which stakeholders are incentivised to monitor and to question the strength of those incentives. Most importantly, these data raise a number of further questions which are discussed in the thesis.

Third, this thesis includes a rigorous analysis of triggers. It discusses trigger types, which have received regulatory and academic scrutiny.⁵⁰ On the other hand, trigger levels have received much less scrutiny but may have a much more significant impact on incentives. The thesis draws on empirical evidence to analyse trigger levels and their impact on the incentive for CoCo stakeholders to monitor.

Fourth, this thesis analyses monitoring by shareholders and CoCo investors. It builds a framework for thinking about monitoring drawing on market discipline in the corporate finance literature and the literature on exit, voice, and loyalty.⁵¹ It links the two strands of the literature and uses this fused understanding to discuss the methods available to CoCo

⁴⁹Holmström and Tirole (n 22).

⁵⁰See, Financial Stability Board, *Update of Group of Global Systemically Important Banks (G-SIBs)* (1 Nov 2012) 8-9; Flannery (n 2) 178; McDonald (n 15) 237; Natlya Martynova and Enrico Perotti ‘Convertible Bonds and Bank Risk-Taking’ (unpublished manuscript, Sep 2012).

⁵¹See, Mark J Flannery, ‘The Faces of “Market Discipline”’ (2001) 20 J of Fin Services Research 107, 110. See also, Hirschman (n 18) 30.

CHAPTER 1. INTRODUCTION

investors, shareholders, and regulators to monitor. It draws on the contractual mechanisms employed in CoCos to develop this analysis, and concludes that there are limited mechanisms available to both stakeholder groups to monitor. This means that monitoring might be undertaken by either shareholders or regulators. It also argues that CoCo investors, through contractual mechanisms, have an unused mechanism to monitor than shareholders.

It then discusses how losses are imposed on shareholders and CoCo investors and how this incentivises monitoring. It contributes to the literature on dilution by distinguishing between financial dilution and governance dilution. It defines financial dilution as financial losses that depend on conversion terms. It contrasts this with governance dilution which occurs when CoCos are converted into shares and therefore new shares are issued diluting the governance rights of existing shareholders.

4. Structure of the Thesis

Throughout this introduction there has been a discussion of the structure of the thesis. The thesis has a further five chapters. The next chapter is a model that sets out, in a simplified setting, the circumstances when CoCo investors or shareholders will have an incentive to monitor banks and reduce expected taxpayer bailouts. The model has two cases. In the first case, a bank has debt (deposits) and equity. In the second case, CoCos are introduced and in this model, I define the circumstances where CoCo investors and shareholders will monitor. A number of potential extensions which are analysed more rigorously in subsequent chapters are set out.

The third chapter discusses the conditions that drive the solutions in the model. Namely, in order for governments to bail out banks the cost of bank failure has to be greater than the cost of bailouts. In economic terms, this chapter is an analysis of the conditions that give rise to bailouts. The chapter focuses on insolvency law and how this can result in contagion and credit rationing. It then discusses lender of last resort and bailouts as the usual solutions to the problems caused by standard insolvency.

The fourth chapter discusses the suite of options that have been developed to overcome

CHAPTER 1. INTRODUCTION

the problems caused by standard insolvency. It begins with an analysis of equity capital requirements as a means of reducing the likelihood of bank insolvency. It discusses the cost of capital implications of increasing equity capital requirements and frames this cost with respect to reducing the need for bank bailouts. It then discusses CoCos as a regulatory tool and the role of the tax treatment of CoCo for their issuance. It shows, empirically, that where CoCo coupons are tax deductible, there appears to be a greater issuance of CoCos. It then discusses value transfers when CoCos are triggered, how these affect incentives to monitor, and the incentives created by allowing regulators or bank managers to cancel CoCo coupons. It then discusses the role of recovery planning, resolution planning, and resolution powers for reducing taxpayer bailouts. It concludes with an analysis of how the capital and resolution frameworks reduce expected taxpayer bailouts.

The fifth chapter discusses CoCo triggers. It discusses potential trigger types: market and regulatory triggers. It discusses the benefits and the costs of each. It then turns to trigger levels and how these affect stakeholder incentives to monitor banks. Underlying this discussion of trigger types and levels, and linking it to the model, is a concern about whether banks issue enough CoCos to successfully recapitalise themselves when they become distressed.

The sixth chapter defines and discusses monitoring by different CoCo stakeholders. It reconciles the literature about exit, voice, and loyalty with the literature on market discipline to define monitoring in the context of CoCos. It then analyses the available empirical evidence to determine which CoCo stakeholders might have an incentive to monitor. It reconciles the conditions derived in the model for either CoCo investors or shareholders to monitor with empirical observations.

The seventh chapter concludes and suggests areas for future research. It discusses whether there are incentives for CoCo stakeholders to monitor. It also discusses how those incentives might be strengthened. It discusses the impediments to changes that lead to stronger monitoring incentives. It then sets out areas for further research.

2

Game Theory Model

1	Function of CoCos	36
2	Base Case of the Model	38
2.1	Players	38
2.2	Payoffs	38
2.3	Timeline	40
2.4	Solution	40
3	Bank Recapitalisation	43
3.1	Payoffs	43
3.2	Incentive Compatibility Constraints	45
3.3	Solution	47
4	Extensions	51
4.1	Shareholders and CoCo Investors Monitoring	51
4.2	Neither Shareholders or CoCo Investors Monitoring	52
4.3	The Amount of CoCos Issued	52

CHAPTER 2. MODEL

This chapter presents a basic model of moral hazard related to bank effort.¹ This model does not aim to capture all of the subtleties of the real world. Instead, the objective is to provide an organising framework for the functional analysis in this thesis. The predictions in this model will be compared to the empirical data in subsequent chapters.

The chapter begins by setting out the possible functions of CoCos.² In particular, it discusses how CoCos can be designed to incentivise monitoring by either shareholders or CoCo investors.³ It then sets out a base scenario where a bank is funded by deposits and shares. It identifies the conditions in this base case where shareholders might be incentivised to monitor. It sets out in these circumstances why a government bails out a distressed bank. It argues that a bailout is cheaper than the social cost of bank failure.

This chapter then extends the model to a situation where a regulator requires a bank to issue CoCos. It sets out how the design of CoCos changes the condition for shareholders to monitor. It also highlights that CoCos can create incentives for CoCo investors to monitor banks. It sets out conditions under which the design of CoCos create incentives for either shareholders or CoCo investors to monitor.

In the final section, this chapter sets out a number of potential extensions that would allow the model to comport to reality. These potential extensions are set out briefly but their implications are more formally addressed in Chapter 5 and 6.

In summary, the model predicts that shareholders will monitor if they are completely diluted by the conversion of CoCos into equity. It predicts that CoCo investors will monitor if the value of their converted shares is lower than what they paid for the CoCo. These predictions are important for the discussion in Chapter 5 and 6.

This chapter has four sections. In the first section, it sets out the function of CoCos—specifically, to create incentives for monitoring. In the second section, it presents the base case of the model—where a bank is funded by equity and deposits. In the third section, it presents

¹Bengt Holmström and Jean Tirole, ‘Financial Intermediation, Loanable Funds, and the Real Sector’ (1997) 112 Q J Econ 663.

²Reinier Kraakman *et al.*, *The Anatomy of Corporate Law: A Comparative and Functional Approach* (OUP 2009) 4.

³Mark J Flannery ‘Stabilizing Large Financial Institutions With Contingent Capital Certificates’ (unpublished manuscript, 6 Oct 2009).

a recapitalisation case where CoCos are used to recapitalise a bank and the circumstances where they create incentives for either shareholders or CoCo investors to monitor. In the final section, it sets out potential extensions which are explored at the end of the thesis.

1. Function of CoCos

This section introduces CoCos and discusses the contribution of this model to the broader thesis. CoCos are debt instruments that change priority in accordance with terms stipulated *ex-ante* in a contract. Usually, they convert into equity or are written-down. The change in priority occurs when a CoCo is triggered and the trigger is usually a pre-specified value of the issuing bank's capital. If the ratio of equity to total assets falls below this pre-specified level then the CoCo is triggered and its priority is changed.

In the European Union, the regulations for the Fourth Capital Requirements Directive (**CRD IV**) allows banks to issue CoCos as part of Additional Tier 1 (**AT1**) and Tier 2 capital for regulatory purposes.⁴ The regulations create a series of strict requirements for CoCos to be counted as AT1 capital and these requirements do not apply to Tier 2 capital.⁵ With respect to the AT1 requirements, the regulations say:⁶

1. Capital instruments shall qualify as Additional Tier 1 instruments only if the following conditions are met: ... (n) the provisions governing the instruments require that, upon the occurrence of a trigger event, the principal amount of the instruments to be written down on a permanent or temporary basis or the instruments be converted to Common Equity Tier 1 instruments.

In the United States a cautious approach has been adopted about requiring banks to issue CoCos. Section 115(c) of *Dodd-Frank*⁷ requires the Financial Stability Oversight

⁴See Regulation (EU) No 575/2013 of the European Parliament and of the Council of 26 June 2013 on Prudential Requirements for Credit Institutions and Investment Firms and Amending Regulation (EU) No 648/2012 [2013] OJ L176/1 (Capital Requirements Regulation - 2013/575), arts 52 and 92; and *ibid* arts 63 and 92.

⁵*ibid* art 52(n). More specific rules concerning write down and convertible CoCos are set out in Article 54 of the regulations.

⁶*ibid* art 52(n).

⁷Wall Street Reform and Consumer Protection (Dodd-Frank) Act of 2010, Pub L No 111-203, 124

Council (‘FSOC’)⁸ in the United States to study the feasibility, benefits, costs, and structure of a CoCo requirement for banks. There has been little development of a CoCo requirement in the U.S. implementation of Basel III.

In this thesis, the ‘function’ of CoCos, and their intended regulatory purpose, is to reduce the probability of bank insolvency.⁹ The exact mechanism of reducing the probability of bank insolvency is explored in this chapter. The major contribution of this chapter is to formally outline the two ways that CoCos can reduce the probability of bank insolvency.

First, a CoCo can be designed to create an incentive for CoCo investors to monitor bank managers. Intuitively, if a CoCo investor expects that the value of their claim on bank assets will decrease as a bank approaches insolvency then they will have an incentive to monitor bank managers to reduce the probability of insolvency. This might involve: first, simply selling CoCos to reveal adverse information to the market, second, including terms in the contract that give control rights to investors when the bank becomes distressed, and third, threatening to sell CoCos if a bank invests in a risky project.¹⁰

Second, the CoCo can be designed to create an incentive for shareholders to monitor bank managers. CoCos can be designed to impose losses through the governance and financial dilution¹¹ of shareholders when triggered.¹² The threat of these losses creates an incentive for shareholders to monitor so that the CoCo is less likely to be triggered.

In addition, the model explores a number of parameters that are relevant to understanding whether shareholders will issue CoCos. First, it suggests that the tax treatment of CoCos is relevant to the decision of shareholders about the design of CoCos. Second, it explains that as debt is retired and replaced with capital (either shares or CoCos), as a way to increase the amount of capital issued by a bank, shareholders are more likely to monitor.

Stat 1376 , sec115(c).

⁸ibid sec111.

⁹Kraakman *et al.* (n 2) 4.

¹⁰See Mark J Flannery, ‘The Faces of “Market Discipline”’ (2001) 20 J of Fin Services Research 107, 110. See also, Albert O Hirschman, *Exit, Voice, and Loyalty: Responses to Decline in Firms, Organizations, and States* (Harvard UP 1970) 30.

¹¹Governance and financial dilution are discussed in Chapter 6.

¹²This may occur if a shareholder holds a block of shares. For a discussion of monitoring using exit, voice, and loyalty in these circumstances see: Alex Edmans, ‘Blockholders and Corporate Governance’ (2014) 6 Annu Rev Financ Econ 23.

Third, it highlights that the benefits of CoCos can be motivated by the existence of a social cost of bank failure.

2. Base Case of the Model

This section considers a basic model in which there is moral hazard surrounding bank effort.¹³ This is a very simplified model to pick out key ideas that feature prominently in this thesis and to explain their relevance for the subsequent analysis. In this section, I outline the structure of the model without CoCos and in the next section, I extend the model to include CoCos.

2.1 *Players*

There are two central risk-neutral agents, a shareholder and a debt investor / depositor, who have claims on a firm whose payoffs are dependent on the state of nature. The two agents have two decisions: (1) they can choose to monitor or (2) they can choose not to monitor.

In addition, there is a regulator. The only role that the regulator has is to require banks to retire debt and replace it with CoCos. It does so in the recapitalisation case.

The government exists to either collect taxes or to bail out banks if they become insolvent.

The debt investor / depositor deposits its money in the bank and because the government will bail out the bank, for reasons described later, does not have an incentive to monitor.

2.2 *Payoffs*

There are two states of nature which we will call: success or failure. The total payoff from the firm's assets in the success state is v^u and the payoff in the failure state is v^d where

¹³Holmström and Tirole (n 1). Holmström and Tirole develop a model of moral hazard involving entrepreneurs and outside investors. The model in this paper follows theirs but instead the effort here is about monitoring.

CHAPTER 2. MODEL

$v^u > \delta > v^d$.¹⁴ Shareholders will have incentives to finance themselves almost entirely with debt. However, capital adequacy rules essentially set a minimum amount of equity i.e. a ceiling on the size of δ . The payoffs for each stakeholder in the success and failure states as well as the tax payable are set out in Table 2.1.

Table 2.1: Payoffs in the base case at $t = 2$ for different stakeholders.

State	Payoff	Shareholders	Debt holders	Tax
Success	v^u	$(1 - \tau)(v^u - \delta)$	δ	$(v^u - \delta)\tau$
Failure	v^d	0	δ	0

Debt

In Table 2.1, δ is the face value of debt and is fully tax deductible;¹⁵ τ is the tax rate and a social cost k is incurred if the firm becomes insolvent. In order to avoid k , regulators can bail out debt investors.¹⁶ We assume that $k > \delta - v^d$, which ensures that a bailout is always less costly than incurring the social cost k .¹⁷

τ denotes the tax rate. The tax payable in the success state is:

$$(v^u - \delta)\tau$$

Hence, as the amount of debt increases, less tax is payable. I assume that $\delta > v^d$ (this assumption is discussed below) and hence the tax in the failure state is 0 because there are no profits to tax.

¹⁴I use the superscripts “u” and “d” to denote up and down to describe the success and the failure states respectively.

¹⁵While this is unrealistic it simplifies the analysis below without fundamentally altering the insights from the model.

¹⁶A cost of bank failures is credit rationing. This concept and its relationship to bank insolvency is discussed in Chapter 3.

¹⁷A number of strategies are designed to reduce k so that $k > \delta - v^d$ does not always hold and consequently banks can sometimes be allowed to become insolvent without the need for a bailout. These are specialised bank insolvency regimes and the six ways which they reduce k are discussed in Chapter 3.

CHAPTER 2. MODEL

Payoffs

In the success state, shareholders receive:

$$(1 - \tau)(v^u - \delta)$$

Hence, as the tax rate increases, the shareholder return decreases, because more of the profit is taxed. In the failure state, the shareholder receives 0 because $\delta > v^d$ and the firm is insolvent.

2.3 Timeline

The model has three time periods as set out in Figure 2.1. At $t = 0$ the regulator can require the bank to retire debt, which in the base case they do not. If regulators decide that banks should retire debt then shareholders decide whether the debt will be replaced with either shares or CoCos and also decide the structure of any CoCos that are issued.

At $t = 1$ the shareholder (or CoCo investor) decides whether to exert effort, which changes the probability of success from p^l to p^h where $p^h > p^l$. I assume that the shareholder has a technology which allows her to change the probability that different states materialise. For example, in reality, a shareholder could exert effort to hire better managers of the firm. We call their exerting effort, monitoring.

However, there is a cost related to using the monitoring technology. If the shareholder does not monitor then she will receive a private benefit, which we define B^E . Contrastingly, if she monitors then she will not enjoy B^E .

At $t = 2$ the state of nature is revealed.

2.4 Solution

In this section I determine the equilibrium actions of the debt investor and the shareholder. This is useful because the solution will explain patterns of behaviour that exist in the real

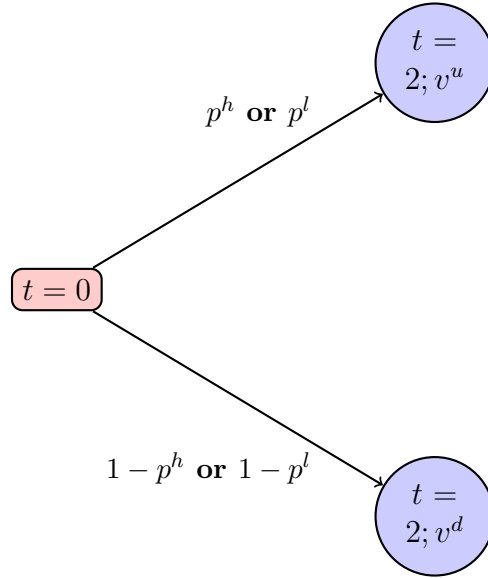


Figure 2.1: This figure sets out the the two states of nature, and broadly the probabilities of different states of nature arising in time period 2.

world and provide reasons for that behaviour.

Debt

As in Table 2.1 the debt investor receives δ in both states of nature. The debt investor therefore has no incentive to monitor because he receives a state independent payment.

Shareholders

Like the debt investor, the shareholder enjoys a private benefit B^E if she does not monitor. If the shareholder monitors then she receives:

$$p^h(1 - \tau)(v^u - \delta)$$

which is the expected payoff to the risk neutral shareholder when the probability of success is p^h .

CHAPTER 2. MODEL

If the shareholder does not monitor then she receives:

$$p^l(1 - \tau)(v^u - \delta) + B^E$$

which is the expected payoff to the risk-neutral shareholders when the probability of success is p^l plus the private benefit from not monitoring. Hence, the risk-neutral shareholders maximises her payoff by electing to monitor if what she receives from monitoring is greater than what she receives from not monitoring:

$$p^h(1 - \tau)(v^u - \delta) \geq p^l(1 - \tau)(v^u - \delta) + B^E$$

This requirements reduces to the following **Shareholder Incentive Compatibility Constraint**:

$$(1 - \tau)(v^u - \delta) \geq \frac{B^E}{(p^h - p^l)} \quad (2.1)$$

This condition is more likely to be satisfied when private benefit B^E from shirking is small or when p^h is large relative to p^l .

Choosing to Monitor

If we introduce the indicator variable i to be 1 if the shareholder chooses to monitor and 0 otherwise, then shareholder wealth at $t = 0$ is given by the following formula:

$$V^\Theta(i) = p^h(1 - \tau)(v^u - \delta) + B^E(1 - i) \quad (2.2)$$

Shareholders have no choice to make in this base case so $i = 1$ if and only if Equation (2.1) is satisfied.

3. Bank Recapitalisation

In this section, I consider the way that the shareholder responds to a requirement to replace retired debt with either additional shares or CoCos so as to prevent the failure state. Specifically, I assume the regulator requires debt of $\delta + \Delta - v^d$ to be retired. In practice, it is more common for a bank to improve its capital ratio by selling assets and using the proceeds to pay down debt. However, a similar affect can be achieved by requiring banks to retire debt and to replace it with CoCos or equity. Debt could be retired via the issuance of equity or a new instrument, the CoCo. The CoCo investor is risk-neutral. Δ can be either shares or CoCos and the decision about whether it is CoCos or shares is made by shareholders. The amount of Δ is set by the regulator.

Like the shareholder, the CoCo investor can either monitor, in which case they increase the probability of success from p^l to p^h , or shirk, in which case they receive private benefit B^C .

In general, “CoCos” in this model are characterised by the fact that: (1) in the success state they are more senior than equity but less senior than debt (2) in the failure state they convert into shares that either completely dilute the shareholder or only partially dilute the shareholder and (3) are tax deductible in both states of nature.

3.1 Payoffs

All of the payoffs to different stakeholders, and the tax payable, are set out in Table 2.2. I write c^s to denote the payoff to CoCo investors in the success state and c^f as the payoff to CoCo investors in the failure state. I assume that $c^s \leq v^u - v^d + \Delta$ and $c^f \leq \Delta$ so that payments to the CoCo investor cannot cause the bank to become insolvent. I make no assumptions about the relationship between c^s and c^f . However, from the assumptions about insolvency $c^s > c^f$. What will become relevant is the extent to which $c^s > c^f$.

CHAPTER 2. MODEL

Table 2.2: Payoffs in the case including capital at $t = 1$ for different stakeholders.

State	Shareholders	CoCo Investors	Debt Investors	Tax
Success	$(1 - \tau)(v^u - v^d + \Delta - c^s)$	c^s	$v^d - \Delta$	$\tau[v^u - (v^d - \Delta) - c^s]$
Failure	$(1 - \tau)(\Delta - c^f)$	c^f	$v^d - \Delta$	$\tau(\Delta - c^f)$

Debt

In the success and the failure state, the debt investor receives $v^d - \Delta$, which is the original debt δ less the amount retired, $\delta + \Delta - v^d$.

CoCo

I assume that, like debt, payments to the CoCo investor is tax deductible. In the success state, the tax that would be payable is $\tau[v^u - (v^d - \Delta) - c^s]$. In the failure state, the tax payable is:

$$\tau[v^d - (c^f + v^d - \Delta)] = \tau(\Delta - c^f)$$

The dominant strategy for shareholders is to replace their retired debt with CoCos because payments to the CoCo investor are tax deductible while the payments to the shareholder are not tax deductible. However, the bank has to be solvent in the failure state in order for taxes to be payable on CoCos.

Shareholders

Shareholder payoffs are complicated by the existence of CoCos. In the success state, the shareholder receives $(1 - \tau)(v^u - v^d + \Delta - c^s)$ while in the failure state she receives $(1 - \tau)(\Delta - c^f)$, both of which are non-negative and hence respect limited liability.

3.2 Incentive Compatibility Constraints

Debt

As before, there is no incentive for the debt investor to monitor.

CoCo

In order for the CoCo investor to monitor, the returns from monitoring must be greater than from shirking i.e. The CoCo investor's return from monitoring is:

$$p^h c^s + (1 - p^h) c^f$$

The CoCo investor return from shirking is:

$$p^l c^s + (1 - p^l) c^f + B^C$$

When the return from monitoring is greater than the return from shirking, the CoCo investor will choose to monitor. This condition is set out below:

$$p^h c^s + (1 - p^h) c^f \geq p^l c^s + (1 - p^l) c^f + B^C$$

In reduced form, **the incentive compatibility constraint for the CoCo investors is**

$$c^s - c^f \geq \frac{B^C}{(p^h - p^l)} \quad (2.3)$$

which again is more likely to be satisfied when the benefits of shirking are small or c^s is large relative to c^f .

The constraint suggests that the CoCo investor is more likely to exert effort to monitor bank managers when c^s is large and when c^f is low. However, increasing c^s reduces the residual value of the claim of the shareholder. This tension becomes important in the next

section.

Shareholders

Shareholders only monitor when their return from monitoring is greater than the private benefit they derive from shirking. A result of shareholders receiving a payoff in the failure state is that the condition for them to monitor is slightly more complex than in Section 2.

The shareholder return from monitoring is:

$$p^h(1 - \tau)(v^u - v^d + \Delta - c^s) + (1 - p^h)(1 - \tau)(\Delta - c^f)$$

The shareholder return from not monitoring is:

$$p^l(1 - \tau)(v^u - v^d + \Delta - c^s) + (1 - p^l)(1 - \tau)(\Delta - c^f) + B^E$$

In order for shareholders to monitor, their return from monitoring has to be greater than not monitoring. In expanded form, the condition is

$$\begin{aligned} p^h(1 - \tau)(v^u - v^d + \Delta - c^s) + (1 - p^h)(1 - \tau)(\Delta - c^f) \geq \\ p^l(1 - \tau)(v^u - v^d + \Delta - c^s) + (1 - p^l)(1 - \tau)(\Delta - c^f) + B^E \end{aligned}$$

The new **Incentive Compatibility Constraint** for shareholders is:

$$(1 - \tau)(v^u - v^d + \Delta + c^f - c^s) \geq \frac{B^E}{(p^h - p^l)} \quad (2.4)$$

The shareholder constraint is slackened when $\tau = 0$, Δ is large, and c^s is small. A large Δ implies that a large amount of debt is retired at $t = 0$ which means that the return from shareholder monitoring is not shared with the debt investor. At the same time, a small c^s suggests that the payoffs to the CoCo investors at $t = 2$ should be small which similarly

means that the return from shareholder monitoring in the success state is not shared with the CoCo investor.

3.3 Solution

I assume that the shareholder writes a CoCo contract that requires either herself, the shareholder, or the CoCo investor to monitor. In general, the payoff to shareholders when they issue CoCos is comprised of two parts. First, the combined shareholder return to the old and converted shareholder, after payments to debt and the CoCo investor is:

$$p^h(1 - \tau)(v^u - v^d + \Delta - c^s) + (1 - p^h)(1 - \tau)(\Delta - c^f) \quad (2.5)$$

At $t = 1$, a total of $\delta + \Delta - v^d$ is invested by the CoCo investor or the new shareholder. I assume capital markets to be competitive, so that all investors pay their expected $t = 2$ income. Hence, the CoCo investor pays $p^h c^s + (1 - p^h) c^f$ and therefore the shareholder is expected to receive:

$$\delta + \Delta - v^d - p^h c^s - (1 - p^h) c^f \quad (2.6)$$

Hence, the payoff to the old shareholder after refinancing is obtained by subtracting Equation (2.6) from Equation (2.5). Overall, the shareholder payoff from issuing CoCos is given by $V^*(i)$:

$$V^*(i) = \tau[p^h(c^s - c^f) + c^f] + p^h(1 - \tau)(v^u - v^d) + v^d - \tau\Delta - \delta + B^E(1 - i) \quad (2.7)$$

Where i is an index variable in the open interval $(0, 1)$ is 1 if the shareholder monitors and 0 if the CoCo investor monitors. The shareholder has to select i , c^s , and c^f while ensuring that monitoring by the appropriate party is incentive compatible and, subject to this requirement, maximise $V^*(i)$.

I note that $\frac{\partial V^*(i)}{\partial c^s} = p^h \tau$ and $\frac{\partial V^*(i)}{\partial c^f} = \tau(1 - p^h)$ which shows that when $\tau > 0$ the

CHAPTER 2. MODEL

shareholder raises as much as possible from the CoCo investor. This is because of the tax deductibility of CoCos which makes them more attractive than issuing new shares. The link between tax deductibility of interest and the issuance of CoCos is strong and explored in Chapter 4. There, I highlight that CoCos tend to be issued in jurisdictions where CoCo interest payments are likely to be tax deductible.

CoCo Investor Monitors ($i = 0$)

I start by considering the case where $i = 0$ and the CoCo investor monitors. The shareholder problem is therefore to maximise $V^*(0)$ subject to the CoCo investor incentive compatibility constraint in Equation 2.3. $V^*(0)$ is:

$$V^*(0) = \tau[p^h(c^s - c^f) + c^f] + p^h(1 - \tau)(v^u - v^d) + v^d - \tau\Delta - \delta + B^E$$

As noted above, $V^*(0)$ is increasing in c^s and c^f so the shareholder sets both as high as possible subject to the incentive compatibility constraint in Equation (2.3). The incentive compatibility constraint for the CoCo investor will bind because the left hand side of Equation (2.3) is decreasing in c^f . Hence, the maximum value for $c^f = v^u - v^d + \Delta - \frac{B^C}{p^h - p^l}$ because a greater payment would lead to insolvency in the failure state. By re-arranging Equation (2.3) we can set c^s to the maximum value which does not result in insolvency which is $c^s = v^u - v^d + \Delta$. Consequently, in Equation (2.8),

$$\begin{cases} c^f = v^u - v^d + \Delta - \frac{B^C}{p^h - p^l} \\ c^s = v^u - v^d + \Delta \end{cases}$$

Hence, the maximum shareholder value is:

$$V^*(0) = \frac{B^C \tau(p^h - 1)}{p^h - p^l} + v^d(1 - \tau) + p^h(1 - \tau)(v^u - v^d) + v^u \tau - \delta + B^E \quad (2.8)$$

Shareholder Monitors ($i = 1$)

I now consider the case where the shareholder monitors so that $i = 1$. The shareholder problem is then to maximise $V^*(1)$ subject to the incentive compatibility constraint in Equation 2.4. Note that $V^*(1)$ is:

$$V^*(1) = \tau[p^h(c^s - c^f) + c^f] + p^h(1 - \tau)(v^u - v^d) + v^d - \tau\Delta - \delta$$

Once again $V^*(1)$ is increasing c^s and c^f . Hence, as before, the shareholder sets c^s , c^f as large as possible, subject to the incentive compatibility constraint in Equation (2.4). The incentive compatibility constraint for the shareholder will bind because the left hand side of Equation (2.9) is decreasing in c^f .¹⁸

$$c^s - c^f = v^u - v^d + \Delta - \frac{B^E}{(1 - \tau)(p^h - p^l)} \quad (2.9)$$

The maximum value for $c^f \leq \Delta$ because a payment more than Δ would lead to insolvency in the failure state. Re-arranging Equation (2.9) and substituting $c^f \leq \Delta$ we set $c^s = v^u - v^d + 2\Delta - \frac{B^E}{(1 - \tau)(p^h - p^l)}$. Hence, in Equation (2.11),

$$\begin{cases} c^f \leq \Delta \\ c^s = v^u - v^d + 2\Delta - \frac{B^E}{(1 - \tau)(p^h - p^l)} \end{cases}$$

Hence, the maximum shareholder wealth is:

$$V^*(1) = \frac{-p^h B^E \tau}{(1 - \tau)(p^h - p^l)} + p^h(v^u - v^d) - \delta + v^d \quad (2.10)$$

Where $V^*(0) - V^*(1) \geq 0$ the shareholder will prefer that the CoCo investor monitors and will design the CoCo contract in Equation (2.8) in order to maximise her returns. $V^*(0) - V^*(1) \geq 0$ is equivalent to the following condition:

¹⁸Please note that Equation (2.9) is obtained by simply rearranging Equation (2.3).

$$\begin{aligned}
 & V^*(0) - V^*(1) \geq 0 \\
 \Leftrightarrow & B^E[p^h\tau + (1-\tau)(p^h - p^l)] - \tau(v^u - v^d)(1 - p^h) \geq B^C\tau(1 - p^h)(1 - \tau) + p^h\Delta\tau(1 - \tau)(p^h - p^l)
 \end{aligned} \tag{2.11}$$

I have therefore proved the following proposition.

Proposition 1 *If the condition in Equation 2.11 is satisfied then the shareholder writes the following CoCo contract:*

$$\begin{cases} c^f = v^u - v^d + \Delta - \frac{B^C}{p^h - p^l} \\ c^s = v^u - v^d + \Delta \end{cases}$$

Consequently, the CoCo investor will opt to monitor.

If, on the other hand, the condition in Equation 2.11 is not satisfied then the shareholder will write the following contract:

$$\begin{cases} c^f \leq \Delta \\ c^s = v^u - v^d + 2\Delta - \frac{B^E}{(1-\tau)(p^h - p^l)} \end{cases}$$

Consequently, the shareholder will monitor herself.

I make seven observations about Proposition 1.

First, the shareholder is more likely to write a contract that incentivises the CoCo investor to monitor when B^E is large and B^C is small.

Second, the shareholder is more likely to write a CoCo contract that incentivises her (the shareholder) to monitor when B^E is small and B^C is large.

Third, when Δ is large, i.e. as debt is retired and replaced with either CoCos or shares, it is more likely that the shareholder will monitor.

Fourth, the tax deductibility of CoCos in the model creates the incentive for the shareholder to maximise c^s and c^f in the shareholder objective function.

CHAPTER 2. MODEL

Fifth, consistent with assumptions about avoiding insolvency $c^s > c^f$ when CoCo investors monitor.

In the failure state, if $c^f > \Delta$ then the amount paid to the CoCo investor is greater than the cash available after paying the debt investor which is $v^d - (v^d - \Delta) = \Delta$.

Sixth, the model suggests that the expected payoff to the CoCo investor in the failure state is $v^u - v^d + \Delta - \frac{B^C}{p^h - p^l}$. The maximum value of $c^f = \Delta$. Consequently, the CoCo is converted so that the investor should expect to receive shares worth what they initially paid for their CoCos. However, after paying depositors, the residual value of the firm is Δ . Consequently, paying the CoCo investor Δ means that the shareholder receives nothing when the CoCo is converted and therefore has an incentive to monitor.

Seventh, if the shareholder wants the CoCo investor to monitor then $c^f \leq \Delta$. If $c^f \leq \Delta$ then the residual value to the shareholder when a CoCo is triggered is greater than zero. Consequently, the shareholder receives something when the CoCo is triggered and the CoCo investor receives, in shares, less than what they initially paid for their CoCos. Intuitively, the CoCo investor loss when $c^f \leq \Delta$ creates an incentive for the CoCo investor to monitor.

4. Extensions

The model can be extended in three ways. First, we could consider a situation where both the shareholder and the CoCo investor monitor. Second, we could consider a situation where neither the shareholder or CoCo investor monitors. Third, we could extend the recapitalisation case so that the retired debt is not enough for the bank to avoid insolvency. The extensions would move the model closer to the real world. In the analysis that follows in subsequent chapters these extensions are considered.

4.1 *Shareholders and CoCo Investors Monitoring*

In the recapitalisation case, the shareholder and CoCo investor monitoring is conditional on their incentive compatibility constraint being satisfied. In Section 3.3 we assumed that

CHAPTER 2. MODEL

someone monitors. There are three possibilities when someone monitors: first, the CoCo investor monitors, second, the shareholder monitors, and third, both the shareholder and CoCo investor monitor. In deriving our solution we considered situations where either the CoCo investor or the shareholders monitor. We did not consider a situation where both the CoCo investor and the shareholder monitor. It might be useful extending the model to a situation where both the shareholder and the CoCo investor monitors.

4.2 *Neither Shareholders or CoCo Investors Monitoring*

In the recapitalisation case, we assumed that either the shareholder or CoCo investor incentive compatibility constraint was satisfied. Of course, it is possible that neither incentive compatibility constraint is satisfied. In other words, if neither Equation (2.4) and Equation (2.3) are satisfied then the CoCo investor and the shareholder will not monitor. It might be useful extending the model to determine the circumstances where neither stakeholder monitors. If neither constraint is satisfied, then the introduction of CoCos may not necessarily mean monitoring takes place.

4.3 *The Amount of CoCos Issued*

In the recapitalisation case, we assumed that the regulator retired enough debt to ensure that the bank's value in the failure state was greater than the value of debt. In other words, we assumed that enough debt was retired to avoid insolvency. This assumption simplified and focused the analysis on monitoring. In reality, this assumption might not be reasonable. Increasing capital requirements by either increasing equity or CoCos does not necessarily ensure that banks avoid insolvency. It would therefore be useful to extend the model to consider situations where banks could become insolvent despite retiring debt and replacing it with either CoCos or shares.

3

Bank Insolvency: Social Cost, Lender of Last Resort, and Bailouts

1	The Social Cost of Bank Failure	55
1.1	General Problems with Standard Insolvency Procedures	58
1.2	Bank Specific Problems: Contagion	61
1.3	Bank Specific Problems: Credit-Rationing	65
2	Avoiding Standard Insolvency Procedures	67
2.1	Lender of Last Resort	68
2.2	Bailouts	71
3	Conclusion	77

CHAPTER 3. BANK INSOLVENCY

This chapter explores credit rationing and uses it as a proxy to the parameter k in the model.¹ It then explains bailouts and lender of last resort as methods of avoiding standard insolvency procedures. In the next chapter, the thesis analyses the new regulatory framework for reducing the probability of bank failure including capital requirements and the bank recovery and resolution framework. These responses can do two things: first, they can reduce the expected size of bailouts and second, properly designed, they can reduce the social cost of bank failure by reducing the probability of bank failure. The next chapter explores the first objective of recovery and resolution and CoCos. Subsequent chapters explore empirically, whether the design of CoCos is consistent with the predictions of the model and consequently reduce the social cost of bank bailouts.

This chapter argues that a major social cost of bank insolvency is credit rationing. It argues that the cost of credit rationing due to the insolvency of one bank and the transmission of insolvency to other banks is unacceptably large for systemically important banks. Consequently, central banks and governments have acted as lender of last resort (**‘LOLR’**) and provided bailouts to avoid bank insolvency. In theory, LOLR is when a central bank provides a secured loan with punitive interest rates to a distressed bank.² In reality, LOLR might be provided without punitive interest rates and the priority of the loan may be *parri passu* with existing creditors. Contrastingly, a bailout is when a government or central bank purchase shares or provides an unsecured loan to a distressed bank or provides guarantees to third parties about the value of bank liabilities or to the bank about the size of the losses the bank may incur on certain assets. There are a number of differences between LOLR and bailouts, a critical difference being that LOLR ought to be provided to solvent banks facing a liquidity crisis. However, the distinction between liquidity and solvency crises can be difficult to determine in reality and therefore LOLR and bailouts can be difficult to distinguish on the criteria of liquidity / solvency. Another distinction is that LOLR involves the regulator

¹Another significant cost of bank failure is the disruption of payment systems. It is not explored in detail here because the impact of bank failure through credit rationing and on depositors is considered more serious. ‘[P]articipation in the payments system is certainly not a prerequisite for regulation . . . Our point is simply that the concern for depositor protection figures prominently in the design of the regulatory system.’ Mathias Dewatripont and Jean Tirole, *The Prudential Regulation of Banks* (MIT 1994) 29-30.

²Walter Bagehot, *Lombard Street: A Description of the Money Market* (Greenbook Publications 1872).

CHAPTER 3. BANK INSOLVENCY

or government giving a bank high quality assets in exchange for low quality assets without changing the overall face value of assets of the bank. On the other hand, bailouts involve a decrease in the risk-weighted assets of the bank based on a potentially unsecured injection of cash by the regulator or government.

The role of banks as repositories of savings and purveyors of credit exacerbates these costs causing contagion and credit rationing. Contagion is the transmission of distress from one bank to another bank. This might be because the market value of a solvent bank's assets decreases because of a firesale by a distressed bank. There are of course more complex channels of contagion and these are discussed in Section 1.2. Credit rationing occurs when distressed banks do not finance positive net present value projects.³ This chapter explores the parameter k which motivates the discussion in the model. The existence of k and the assumption that it is greater than bailouts explains why there is a need to restructure distressed banks.

The rest of the chapter is structured in the following way. In the first section the social cost of bank failure is discussed from the perspective of insolvency law. It is argued that standard insolvency procedures generate problems which are exacerbated in the case of banks and can cause contagion and credit rationing. In the second section, it explains LOLR and bailouts as the usual methods used by central banks to avoid standard insolvency and the social cost k of bank failure.

1. The Social Cost of Bank Failure

Placing a bank, particularly a systemically important bank, into a standard insolvency procedure may cause credit rationing.⁴ Standard insolvency procedures are generally designed to protect the interests of creditors through a process that transfers control of the distressed

³Joseph E Stiglitz and Andrew Weiss, 'Credit Rationing in Markets with Imperfect Information' (1981) 71 Am Econ Rev 393.

⁴See, *ibid* 398. See also, Bengt Holmström and Jean Tirole, 'Financial Intermediation, Loanable Funds, and the Real Sector' (1997) 112 Q J Econ 663, 679. Contagion and credit rationing are discussed in Section 1.2 and Section 1.3.

CHAPTER 3. BANK INSOLVENCY

firm's assets to courts and insolvency practitioners.⁵ When applied to non-bank firms, standard insolvency procedures can destroy value because judges and insolvency practitioners may be unable to realise the maximum value of the distressed firm's assets.⁶ Put another way, judges and insolvency practitioners may not be able to manage the assets of a distressed firm as well as the original managers.⁷

Applied to banks, standard insolvency procedures are more destructive of value than when applied to non-banks for two reasons. First, short-term creditors that are exempted from the automatic stay in insolvency strip the bank of its cash and its most liquid and easy to sell assets.⁸ Second, the remaining assets in a bank insolvency are difficult for judges and insolvency practitioners to value and realise at book value. Therefore, the assets are subject to fire-sale discounts relative to their book value and cash-in-the-market pricing.⁹ Consequently, creditors subject to a stay in insolvency are likely to recover only a portion of their debt. The ensuing contest amongst remaining creditors to recover their debt can prolong the insolvency and this coordination problem can ultimately increase the fire-sale discount applied to the hard-to-value-and-liquidate assets. An example of these difficulties is Lehman Brothers' insolvency which spawned a mass of litigation between competing creditors trying

⁵Roy Goode, *Principles of Corporate Insolvency Law* (Sweet & Maxwell 2011) 63-4. 'English corporate insolvency law is firmly attached to the notion that if a company fails it is necessary to bring in outside management in the form of an individual who is now required to be a qualified insolvency practitioner.' Harry Rajak, *Company Rescue and Liquidation* (3rd edn, Sweet & Maxwell 2013) 180. 'The full process of liquidation—getting in the company's outstanding assets, investigation into what went wrong, soliciting the creditors' claims and so on—will begin after the appointment of the liquidator. . . . The liquidator, whether appointed by the court in a compulsory winding-up or by the creditors or members in a voluntary winding-up, has, in theory, control over all the company's assets.'

⁶Reinier Kraakman *et al.*, *The Anatomy of Corporate Law: A Comparative and Functional Approach* (OUP 2009) 143-7.

⁷*ibid* 143-7.

⁸See, Directive 2002/47/EC of the European Parliament and of the Council of 6 June 2002 on Financial Collateral Arrangements [2002] OJ L168/43 (Financial Collateral Directive 2002/47/EC). See also, The Financial Collateral Arrangements (No. 2) Regulations 2003 2003/3226 (U.K.) and The Financial Markets and Insolvency (Settlement Finality and Financial Collateral Arrangements) (Amendment) Regulations 2010 2010/2993 (U.K.). For academic analysis of exemptions to the usual stay on insolvency: Mark J Roe, 'The Derivatives Market's Payment Priorities as Financial Crisis Accelerator' (2011) 63 Stanford L Rev 539 and Franklin Edwards and Edward Morrison, 'Derivatives and the Bankruptcy Code: Why the Special Treatment' (2005) 22 Yale J on Reg 91.

⁹See, John Armour, 'The Law and Economics of Corporate Insolvency: A Review' (2001) ESRC Centre for Business Research University of Cambridge Working Paper No 197, 22-3 and Franklin Allen and Douglas Gale, 'Limited Market Participation and Volatility of Asset Prices' (1994) 84 Am Econ Rev 933, 949.

CHAPTER 3. BANK INSOLVENCY

to recover their debt.¹⁰

The core problem with standard insolvency procedures is the transmission of financial distress to otherwise healthy banks and the credit rationing that follows.¹¹ Credit-rationing arises because banks refuse to lend to positive net present value projects—specifically those pursued by small to medium sized enterprises (**SMEs**) and households. A common element of loans to SMEs and households is that they are typically recouped over a long time through periodic repayments by the borrower. A home loan may be repaid over 30 years and a loan to an SME might be recouped over 5 years. The importance of these loans in stimulating enterprise and economic growth is clear in banking policy discourse.

The Independent Commission on Banking’s (**ICB**) final report emphasised the importance of protecting loans to SMEs.¹² Consistent with this focus, empirical evidence suggests that SMEs are funded by bank loans.¹³ The evidence shows that firms that obtain bank loans (and private placements) are on average smaller than firms using public offerings of straight debt.¹⁴ It also shows that the equity value of an SME that obtains a bank loan is higher than an SME funded by bonds or private placements.¹⁵ Accordingly, if a bank reduces the level of its lending it is likely to affect SMEs more than larger borrowers.¹⁶

¹⁰The number and complexity of questions raised was briefly discussed in *Lehman Brothers International (Europe)* (2009) EWHC 2545 (HC) at [1] (Mr Justice Briggs). ‘This is an application by the Administrators of Lehman Brothers International (Europe) (“LBIE”) for directions pursuant to paragraph 63 of Schedule B1 to the Insolvency Act 1986. By it, the Administrators seek the court’s guidance on one of the many difficult and complex issues arising in the Administration of LBIE. There are pending a number of similar applications but, since the Administrators have taken the view that the subject matter of this application is both important, in terms of its effect on their ability to make early distribution, and self-contained, in the sense that its determination does not depend upon the determination of other issues, the Administrators have brought it forward for separate and early determination.’ There are of course a multitude of cases involving entities in the Lehman Brothers group of companies that took place in other jurisdictions.

¹¹Credit rationing is discussed in Section 1.3.

¹²Independent Commission on Banking, *Final Report: Recommendations* (Sep 2011). Indeed, the protection of SMEs is an objective of the United Kingdom government in the *Financial Services (Banking Reform) Bill* (2013).

¹³Christopher James, ‘Some Evidence on the Uniqueness of Bank Loans’ (1987) 19 J Fin Econ 217, 223; Eur C Bank, *Survey on the Access to Financial of Small and Medium-Sized Enterprises in the Euro Area* (Sep 2009) 12.

¹⁴James (n 13) 223; Survey on the Access to Finance (n 13) 12.

¹⁵James (n 13) 223; Survey on the Access to Finance (n 13) 12.

¹⁶Rohan Churm, Amar Radia, Jeremy Leake, Sylaja Srinivasan and Richard Whisker, ‘The Funding for Lending Scheme’ (2012) Q4 Bank of England Quarterly Bulletin 306, 308. ‘[T]he FLS boosts banks’ incentives to lend by making both the amount and price of funding available to banks conditional on their lending to the UK real economy.’ See also, James (n 13) 226.

CHAPTER 3. BANK INSOLVENCY

1.1 *General Problems with Standard Insolvency Procedures*

The application of standard insolvency procedures¹⁷ to banks,¹⁸ causes credit rationing and therefore insolvency law needs to be redesigned.¹⁹ Governments and regulators are predisposed to avoiding the insolvency of systemically important banks because of the costs associated with standard insolvency.²⁰ The mechanics of standard insolvency are set out here. Irrespective of jurisdiction, functionally equivalent problems arise in the insolvency system of most advanced economies. Indeed, the need for a process that eliminates agency and coordination problems is the common motivation for insolvency law in a number of jurisdictions.²¹

Professor Goode outlines two objectives for insolvency procedures:²² either rescuing companies or facilitating their legal death. This distinction is evident in the UK when one compares the winding up process and the administration process.²³ The purpose of winding up is to facilitate ‘a sale of the firm’s assets by auction’.²⁴ A winding up effects ‘legal death through statutory dissolution’.²⁵ The objectives of administration, on the other hand, are to (1) rescue the company as a going concern (2) achieve a better result than an immediate winding up and (3) realise property in order to make distributions to secured and preferential creditors.²⁶ A by-product of both functions of insolvency law is the requirement that a process is followed which respects the economic rights of the insolvent’s creditors. The anticipation of

¹⁷Rosa M Lastra (ed), *Cross-Border Bank Insolvency* (OUP 2011) [2.10]-[2.26]. Described as *lex specialis*.

¹⁸More troublingly, to systemically important banks.

¹⁹Credit rationing is discussed in Section 1.3.

²⁰Mark J Flannery, ‘Contingent Capital Instruments For Large Financial Institutions: A Review of the Literature’ (2014) 6 Annual Rev of Fin Econ 225, 226. ‘Government support for undercapitalized banks could be avoided simply by forcing financial firms into bankruptcy when they fail. Private claimants (shareholders and uninsured liability holders) would then bear losses. This has not generally occurred because the usual bankruptcy procedures are unsuited to resolving failed financial institutions. Delays and uncertainties over how claims will be resolved disrupt the ability of financial firms to operate.’

²¹Kraakman *et al.* (n 6) 122-3.

²²Goode (n 5) 29-31. See also Kraakman *et al.* (n 6) 122. ‘Reflecting the importance of the decision to continue or close down the business, jurisdictions often provide a choice of more than one bankruptcy procedure, with different associated authority and control structures. *Liquidation* procedures are geared towards a sale of the firm’s assets by auction, whereas, *reorganisation*, or “rescue”, procedures seek to facilitate a renegotiation of the firm’s obligations to its creditors.’ Payne distinguishes between three options: liquidation, trading out of difficulty, or an asset sale. Jennifer Payne, ‘Debt Restructuring in English Law: Lessons from the US and the Need for Reform’ (2014) 130 LQR 282, 282.

²³See e.g., Rajak (n 5) 91 and 177.

²⁴Kraakman *et al.* (n 6) 122.

²⁵Goode (n 5) 36 and 38.

²⁶Insolvency Act 1986, Sch B1 (3)(1) (U.K.).

CHAPTER 3. BANK INSOLVENCY

and progression through this process is *costly* and leads to a significant erosion of enterprise value in five respects.²⁷

First, individual creditors are able to start a reorganisation or a winding up which may entail coordination costs.²⁸ There is a risk that creditors may initiate proceedings that destroy asset value, but protect their individual interests. For instance, an oversecured creditor might initiate a winding up to recover the full value of their loan. However, the value of the assets from a sale process in a winding up might be lower than the going-concern value. Accordingly, unsecured creditors may receive less if insolvency proceedings are initiated than they would from a contractual restructuring. In the context of a bank insolvency, long-term secured creditors might initiate proceedings to recover their debts which may lead to an erosion in the value of the bank's assets.

Second, insolvency proceedings usually involve a delegation of control rights from directors to an insolvency practitioner and/or a court.²⁹ This delegation avoids the strategic negotiations involving shareholders when a bank becomes distressed, but is likely to be accompanied by diminished effectiveness in the management of the business.³⁰ Oversecured creditors prefer the least risky alternative to recover their loan because they do not benefit from an increase in enterprise value. Conversely, undersecured and unsecured creditors are incentivised to take additional risk because their proportionate return is dependent on an increase in enterprise value and they have limited liability. An independent insolvency practitioner with duties to creditors as a whole, who relies on its reputation to attract future

²⁷Kraakman *et al.* (n 6) 143-7.

²⁸*ibid* 143-4.

²⁹A key exception to this tendency is Ch 11 in the United States. Published initially as part of the Bankruptcy Reform Act of 1978, Pub L No 95-598, 92 Stat 2549. A different explanation for the delegation is that courts overcome the under innovation caused by freedom of contract because of (1) the resources involved in drafting a new contract and (2) the costs of enforcement, including uncertainty about being able to enforce. See Julian Franks and Oren Sussman, 'Financial Innovations and Corporate Bankruptcy' (2005) 14 *Journal of Financial Intermediation* 283.

³⁰In the context of systemically important institutions it has been argued that delegation to judges is problematic because they lack the expertise to execute rapid resolutions. '[T]he bankruptcy process is managed by a judge. Though federal regulators are subject to political pressure, they possess expertise that is generally beyond the ken of judges. When a systemically important institution suffers distress, rapid decision making is necessary. Federal law permits this kind of speed when the FDIC seizes a bank.' See Edward R Morrison, 'Is The Bankruptcy Code An Adequate Mechanism For Resolving The Distress Of Systemically Important Institutions' (2009) 82 *Temple L Rev* 449, 461.

CHAPTER 3. BANK INSOLVENCY

appointments is not aligned with a particular group of creditors. Similarly, a court is not inherently aligned with the incentives of a particular group. However, the appointment of these independent parties to determine the outcome of proceedings also results in incurring the cost of their relative inefficiency in the management of the distressed firm.

Third, despite the delegation of control rights, creditors with security over a significant proportion of a bank's assets retain a right to veto a plan to wind up or restructure a firm. This reintroduces the strategic bargaining of over, under and unsecured creditors. Accordingly, 'most jurisdictions do not allow voting by either creditors who will recover in full or by junior creditors who are "out of the money"'.³¹

Fourth, there is a depression in the value of the distressed firm's assets when it is forced into a 'fire sale' of assets.³² A fire sale can arise when there is not a thick and liquid market for the distressed firm's assets.³³ One view is that when firms are suffering from financial distress, other firms in the same industry capable of buying the distressed assets are likely also to be suffering liquidity problems.³⁴ Consequently, the assets of the distressed firm will be sold at a severe undervalue.³⁵ More generally, this fire sale effect is explained in the language of cash-in-the-market pricing which occurs when the price of an asset is not based on discounted future cashflows but instead on the amount of cash that potential purchasers have available to finance the acquisition.³⁶

Fifth, there is a loss of goodwill associated with the public announcement of the distress of a firm.³⁷ For the purpose of this paper goodwill refers to the likelihood that consumers

³¹Kraakman *et al.* (n 6) 143-7. In the United Kingdom this restriction is set out in Insolvency Act (n 26) Sch B1 (52). Being "out of the money" refers to the claim of the junior creditor having no economic value.

³²One view is that '[i]f there is not a thick and liquid market for assets of the relevant type then markets will not prove an effective means of reallocating resources. Shleifer and Vishny (1992) argue that at times when firms are suffering from financial distress, other firms in the same industry - who would be natural buyers of its assets - are likely to be suffering liquidity problems, because financial distress is often linked to industry-wide downturns. Hence assets will be sold at a severe undervalue.' Armour (n 9) 22-3.

³³*ibid* 22.

³⁴*ibid* 22.

³⁵*ibid* 22-3.

³⁶Allen and Gale (n 9) 949. 'When liquidity is scarce, asset prices are not determined by discounted cash flows, but rather by the amount of cash in the market. It is the relative variation in the amount of the long asset and cash supplied to the market that is important for price volatility.' See also Franklin Allen and Douglas Gale 'Cash-in-the-Market Pricing to Financial Fragility' (unpublished manuscript, 2004) <<http://www.econ.nyu.edu/user/galed/papers/paper04-09-03.pdf>>.

³⁷Armour (n 9) 25.

will purchase goods and services from the distressed firm. An explanation for the loss of goodwill as a firm approaches distress is its loss of reputation.³⁸ To the extent that a firm can no longer trade on its reputation it is likely to lose reputational business.

In sum, insolvency proceedings can lead to a significant erosion of enterprise value and there is a rich literature which quantifies the erosion of value caused by insolvency. The evidence suggests that the distress costs for non-financial firms range from 10-20% of the total enterprise value of the distressed firm.³⁹ For banks this figure is significantly larger.⁴⁰ In the next sub-section we consider the specific social cost of bank failure. In addition to the general costs of failure in this section, the interconnectedness of banks can precipitate disruptions to the payment system, contagion in the financial system and cause credit-rationing in the real economy.⁴¹ These costs are far greater than the 30% of enterprise value identified in the empirical literature because of credit-rationing.⁴²

1.2 *Bank Specific Problems: Contagion*

While most of this chapter focuses on the insolvency of an individual bank, this sub-section and the next describe the effect of the failure of several banks in what can be described as a systemic crisis. A systemic crisis can arise because a number of banks follow correlated strategies which increases the likelihood that they become insolvent at the same time. Alter-

³⁸See Avner Greif, 'Contract Enforceability and Economic Institutions in Early Trade: The Maghribi Traders' Coalition' (1993) 83 Am Econ Rev 525.

³⁹Gregor Andrade and Stephen Kaplan, 'How Costly is Financial (Not Economic) Distress? Evidence from Highly Leveraged Transactions that Became Distressed' (1998) 53 J Fin 1443, 1446-7.

⁴⁰Christopher James, 'The Losses Realised in Bank Failures' (1991) 46 J Fin 1223, 1228. For instance because of the significant amount of business undertaken by banks as reputational intermediaries. See generally, Alan D Morrison and William J Wilhelm, Jr, *Investment Banking: Institutions, Politics, and Law* (OUP 2007).

⁴¹Parliamentary Commission on Banking Standards, *Changing Banking for Good - Volume II: Chapters 1 to 11 and Annexes, Together with Formal Minutes* (UKHL Jun 2013) 111. 'Banks provide essential services such as ... the payment system in general on which the rest of the economy relies. Any interruption in these services, no matter how brief, would risk causing widespread damage. Insolvency destroys value. Unlike other corporate insolvencies, when the operating business can often be maintained or sold to maximise value, in the case of a bank, all that can often be done is to liquidate the assets. ... Disorderly failure can cause contagion because banks in general are reliant on the confidence of depositors and other creditors to keep operating. Allowing one bank to fail in a disorderly way could spread panic among creditors of other similar institutions and cause a wider financial crisis.'

⁴²Stiglitz and Weiss (n 3). See also Stephen D Williamson, 'Costly Monitoring, Loan Contracts, and Equilibrium Credit Rationing' (1987) 102 Quarterly J Econ 135.

CHAPTER 3. BANK INSOLVENCY

natively, a systemic crisis can arise if the failure of one bank is transmitted to other banks in a process known as contagion. This sub-section explores the concept of contagion. The next sub-section explains a potential effect of contagion, credit rationing.

Together, contagion and credit-rationing are important because the failure of a systemically important bank can significantly reduce the capacity of other affected banks to provide loans to SMEs and households. The risk of contagion and credit-rationing looms large in the Financial Stability Board's (**FSB**) Key Attributes paper, which begins:

“The objective of an effective resolution regime is to make feasible the resolution of financial institutions without severe systemic disruption and without exposing taxpayers to loss, while protecting vital economic functions through mechanisms which make it possible for shareholders and unsecured and uninsured creditors to absorb losses in a manner that respects the hierarchy of claims in liquidation”⁴³

This concern about contagion is echoed in the preamble of the Recovery and Resolution Directive that says ‘[r]apid and coordinated action is necessary to sustain market confidence and minimise contagion.’⁴⁴ Contagion, in this thesis, refers to the transmission of liquidity or solvency problems from one bank to non-bank institutions and other banks in the financial system. The International Monetary Fund calculated that the historical average cumulative loss in output growth caused by contagion in the financial system and into the real economy from 1975 to 1997 was 11.5% of GDP on average during banking crises in different countries.⁴⁵ The greater the contagion caused by the failure of a bank, the more likely that a government will bail it out to avoid the calamity associated with its failure.

⁴³Financial Stability Board, *Key Attributes of Effective Resolution Regimes for Financial Institutions* (Oct 2011) 3.

⁴⁴Directive 2014/59/EU of the European Parliament and of the Council of 15 May 2014 Establishing a Framework for the Recovery and Resolution of Credit Institutions and Investment Firms and Amending Council Directive 82/891/EC, and Directives 2001/24/EC, 2002/47/EC, 2004/25/EC, 2005/56/EC, 2007/36/EC and 2011/35/EU, 2012/30/EU and 2013/36/EU, and Regulations (EU) No 1093/2010 and (EU) No 648/2012, of the European Parliament and of the Council [2014] OJ L173/190 (Recovery and Resolution Directive - 2014/59/EU), 199.

⁴⁵Int'l Monetary Fund, *IV World Economic Outlook - Financial Crises: Characteristics and Indicators of Vulnerability* (1998) 74, 79.

CHAPTER 3. BANK INSOLVENCY

A contagion channel⁴⁶ to non-bank firms is for the failure of a bank to adversely impact non-bank firms that have a business relationship with the distressed bank. Banks use their reputation and comparative advantage in information exchange to develop business relationships with non-bank firms.⁴⁷ Specifically, banks assist non-bank firms to sell securities to investors.⁴⁸ Accordingly, when a bank becomes insolvent its clients lose the benefit of its reputation. Consistent with this expectation, Fernando et al estimated the loss of value to firms that employed Lehman Brothers to assist in the issue of equity and debt securities. They found that those firms lost 5% of their equity market value or \$23bn of market capitalisation following the failure of Lehman Brothers.⁴⁹ This statistic shows that the failure of financial institutions can have detrimental effects on the financial sector. While significant, this form of contagion is not the usual justification for bailing out G-SIBs and other banks. The justification for avoiding insolvency law is credit-rationing by a number of banks because of contagion.

A channel of contagion to other banks arises out of interconnections on the asset side or the liability side of the distressed bank's balance sheet. On the asset side, in situations of distress uncorrelated assets held by banks appear to become correlated during a crisis.⁵⁰ A number of explanations have been proffered to explain this type of contagion.

First, prices can be temporarily dislocated because distressed banks sell assets below their fundamental value due to their need for liquidity. This suggests that markets become inefficient because of a lack of liquidity.⁵¹ Banks can hold significant positions in securities

⁴⁶A contagion channel refers to the way in which the distress of one bank is transmitted to bank and non-bank institutions.

⁴⁷Morrison and Wilhelm (n 40) Ch 3.

⁴⁸*ibid* Ch 3.

⁴⁹Chitru S Fernando *et al.*, 'The Value of Investment Banking Relationships: Evidence from the Collapse of Lehman Brothers' (2012) 67 J Fin 235, 237.

⁵⁰Kathy Yuan, 'Asymmetric Price Movements and Borrowing Constraints: A Rational Expectations Equilibrium Model of Crises, Contagion, and Confusion' (2005) 60 J Fin 379, 397-403. See also Francis A Longstaff, 'The Subprime Credit Crisis and Contagion in Financial Markets' (2010) 97 J Fin Econ 436. The author finds empirical results consistent with liquidity driving contagion in the financial markets during the subprime crisis. Graciela L Kaminsky and Carmen M Reinhart, 'On Crises, Contagion, and Confusion' (2000) 51 J of Int Econ 145. The paper discusses contagion at the national level as well as through financial systems.

⁵¹Zoshar Goshen and Gideon Parchomovsky, 'The Essential Role of Securities Regulation' (2006) 55 Duke L Rev 711, 720. 'Efficient markets are characterized by accurate pricing and high liquidity. Accurate pricing is essential for achieving efficient allocation of resources in the economy . . . Liquid markets benefit the economy

CHAPTER 3. BANK INSOLVENCY

so that any distressed selling can move prices. Indeed, other market participants are likely to seek a liquidity discount if a bank becomes a forced seller, or the assets might become subject to cash-in-the-market pricing.⁵² This explains contagion between banks holding securities that are uncorrelated in normal market conditions. This liquidity effect can ultimately affect the solvency of affected banks if the liquidity available from selling assets is less than their liabilities.

Second, investors may assess credit risk based on the reputation of a regulator so that a regulator's reputation affects all regulated banks.⁵³ If that reputation is damaged, through for instance a regulated bank failing, then investors may charge a higher premium to all other regulated banks. Therefore, banks with uncorrelated securities may be adversely affected by a perceived failure on the part of their common regulator to ensure the stability of a regulated bank.

On the liability side, banks can become interconnected through wholesale markets. Wholesale markets can (1) assist banks lacking liquidity to obtain funds from other banks with surplus liquidity⁵⁴ or (2) can be used as a substitute for retail funding.⁵⁵ However, transactions in the wholesale market can expose lending banks to the credit risk of the borrowing banks. If the borrower becomes distressed, an asset on the balance sheet of a lending bank has to be impaired. This is known as cross-holding contagion.⁵⁶ Indeed, the

by reducing the cost of transacting and the risk associated with investments. Markets are liquid when traders can buy or sell large quantities, immediately, without causing a substantial price effect. This liquidity is a function of time, price and quantity.'

⁵²For a discussion of cash-in-the-market pricing: Allen and Gale (n 9) 949. 'When liquidity is scarce, asset prices are not determined by discounted cash flows, but rather by the amount of cash in the market. It is the relative variation in the amount of the long asset and cash supplied to the market that is important for price volatility.' See also Allen and Gale (n 36).

⁵³Alan D Morrison and Lucy White, 'Reputational Contagion and Optimal Regulatory Forbearance' (2013) 110 J Fin Econ 642.

⁵⁴Franklin Allen and Douglas Gale, *Understanding Financial Crises* (OUP 2007) 269-274; Dewatripont (n 1) 104; Antoine Martin *et al.* 'The Fragility of Short-Term Secured Funding Markets' (unpublished manuscript, Oct 2012). See also Gary Gorton, *Slapped by the Invisible Hand* (OUP 2010) and Gary Gorton and Andrew Metrick, 'Securitized Banking and the Run on Repo' (2012) 104 J Fin Econ 425.

⁵⁵Simon Gleeson, *International Regulation of Banking: Capital and Risk Requirements* (2nd edn, OUP 2012) 369-70.

⁵⁶A stylised version of this argument was described by Allen and Gale: Franklin Allen and Douglas Gale, 'Financial Contagion' (2001) 108 J Pol Econ 1 and Allen and Gale (n 54) 263. 'The only solution to a global shortage of liquidity (withdrawals exceed short assets), is to liquidate long assets ... each bank has a limited buffer that it can access by liquidating the long asset. If this buffer is exceeded, the bank must fail.'

fear of cross-holding contagion of this type may explain why wholesale funding to banks like Northern Rock, Bear Stearns and Lehman Brothers dried up leading to their insolvency.⁵⁷

1.3 *Bank Specific Problems: Credit-Rationing*

Credit-rationing occurs when banks are unwilling or unable to provide loans to SMEs or households for positive net present value projects.⁵⁸ It is a significant social cost associated with bank insolvency and a consequence of credit rationing is that banks have (i) less cash available to lend to households and SMEs in the real economy or (ii) would prefer to keep cash rather than lending it because of uncertainty about their own short-term liquidity needs. There are two theories about how credit-rationing arises.

First, credit-rationing arises when interest rates reach a level where good borrowers avoid borrowing from banks while bad borrowers continue to borrow.⁵⁹ In a market with perfect information an increase in interest rates leads to an increase in a bank's expected return. However, when there is adverse selection, an increase in interest rates leads good borrowers to exit the market while bad borrowers continue to borrow. Accordingly, at a certain point, increases in interest rates actually lead to a *reduction* in a bank's expected return. Credit-rationing occurs when there is more demand for loans for positive net present value projects than supply because a bank is unwilling to increase interest rates such that the demand and supply of loans are equal.⁶⁰ When a bank is adversely affected by a shock, and its borrowing costs increase, it must in turn increase the returns from loans by increasing interest rates. However, owing to the adverse selection effect, it may drive out good borrowers

⁵⁷Hyun S Shin, *Risk and Liquidity* (OUP 2010) 161. Arguably other banks began hoarding liquidity rather than extending wholesale funds because they feared cross-holding contagion or that other banks would stop lending to the bank in question.

⁵⁸Fundamentally, credit-rationing is a problem that is based on information. In the context of firms, this information perspective was well summarised by Holmstrom and Tirole. Holmström and Tirole (n 4) 679. 'In a credit crunch, banks will have to sort out the good risks from the bad, and small firms will not be worth the fixed cost of getting informed.'

⁵⁹Stiglitz and Weiss (n 3) 398. 'A credit rationing equilibrium exists given ... the demand for loanable funds ... exceeds the supply of loanable funds ... and any individual bank increasing its interest rate ... would lower its return per dollar loaned.'

⁶⁰ibid 398. See also Williamson (n 42) 141. '[A]gents who do not receive loans are "rationed" in this case, in the sense that they would be willing to pay interest rates higher than market rates to receive loans, but no one would be willing to lend to them at any interest rate.'

CHAPTER 3. BANK INSOLVENCY

by increasing interest rates. Accordingly, the bank may stop lending, rather than increasing the interest rates it charges and lowering its expected returns.⁶¹

The second explanation of credit-rationing is based on moral hazard and is exacerbated during a crisis when spreads widen.⁶² In essence, lenders might be unwilling to lend to a borrower bank with positive NPV projects because the prevailing spreads in the market are higher than the interest that the borrower can pay. In order to induce a borrower to put in effort, the borrower must receive sufficient profit. At the same time, the interest that is paid must compensate the lender for the risk of lending. A project might be profitable but the lender might require a spread that absorbs all of the profits and does not leave enough on the table for the borrower to put in high effort. In this situation, banks refuse to lend because they expect that borrowers will not put in high effort.⁶³

Once credit is rationed to the lending bank, it can then be rationed to households and SMEs for one of two reasons. First, the lending bank has less cash available to lend to households and SMEs. Second, for the adverse selection or moral hazard reasons outlined above, the lending bank is unwilling to lend to households or SMEs.⁶⁴ The cost of lending banks failing to invest in long-term assets is a reduction in the growth of the real economy.⁶⁵

The threat of credit-rationing looms large in the minds of legislators and regulators. Consistent with the model, the social cost of bank failure is greater than bailouts. Consequently, one might expect that the response to the threat of credit rationing is to bail out

⁶¹Stiglitz and Weiss (n 3) 406-7.

⁶²Jean Tirole, *The Theory of Corporate Finance* (Princeton University Press 2006) 114. ‘A key feature of this model is that lenders face an agency problem as the manager borrower bank may mismanage the project. She may take a private benefit and thereby reduce the probability that the project succeeds. The private benefit is inefficient in that its value to the borrower is smaller than the foregone profit; yet the borrower, who receives the entire private benefit and only part of the profit, may choose to enjoy the private benefit. The borrower must then keep a sufficient stake in the outcome of the project in order to have an incentive not to waste the money. Consequently, the project’s income cannot be fully pledged to outside investors, which in turn implies that the project may not receive financing even if the expected income when the manager behaves exceeds the investment cost, that is, even if the project has positive net present value (NPV). That is, there may be credit rationing.’

⁶³*ibid* 114.

⁶⁴This is not directly related to a bank becoming financially distressed. However, when there is a banking crisis lenders may act more opportunistically.

⁶⁵Mathias Dewatripont and Xavier Freixas, ‘Bank Resolution: Lessons from the Crisis’ in Mathias Dewatripont and Xavier Freixas eds. (ed), *The Crisis Aftermath: New Regulatory Paradigms* (Centre for Economic Policy Research 2012) 109.

or provide LOLR funding to systemically important banks. This was the action taken by governments and regulators in advanced economies in the period following the insolvency of Lehman Brothers.

2. Avoiding Standard Insolvency Procedures

When a systemically important bank becomes distressed, they either receive LOLR support from a central bank or are bailed out.⁶⁶ Both mechanisms are designed to avoid, in general the social cost k of bank failure, and more specifically, the insolvency, contagion, and the credit rationing that follow. In order to avoid insolvency bailout funds must be used to satisfy all bank debt, including uninsured depositors and unsecured creditors. Under the *Insolvency Act 1986* (UK) a company is considered insolvent if it is “unable to pay its debts”. Insolvency can be established by applying the cash flow test which is satisfied if a bank is unable to pay even a *single* debt.⁶⁷ Accordingly, in order to avoid insolvency, a bank must pay all the debts owing to all of its creditors. This desire to avoid insolvency is a significant link between LOLR and bailouts.

Theoretically, LOLR is provided to economically sound but liquidity constrained banks.⁶⁸ In other words, banks that have a book value of assets greater than the value of their liabilities. During a crisis, banks might find that the market value of their short term assets is lower than their short term liabilities. This mismatch could result in insolvency, if say, the bank fails to pay its liabilities as and when they become due and payable. In this situation, LOLR funding is provided so that the bank can continue to operate during the crisis. On the other hand, a bailout is provided to banks that are systemically important irrespective

⁶⁶Bagehot (n 2); Dewatripont (n 1).

⁶⁷Goode (n 5) 128. ‘Where a company defaults in payment of an undisputed debt after demand has been made, that is sufficient evidence that it is unable to pay its debts as they fall due, and if it persists in its failure to pay it will be taken to be unable to pay its debts even if in fact it appears to be solvent. This salutary rule, which applies on the failure to pay even a single debt, reflects the view that a company which is able to pay an undisputed debt and chooses not to do so has only itself to blame if the inference is drawn that it is unable to pay.’ See also John Armour, Henry Hansmann and Reiner Kraakman, ‘The Essentials of Corporate Law: What is Corporate Law?’ (2009) Harvard John M Olin Discussion Paper No 632 , 3 <http://lsr.nellco.org/harvard_olin/632/>.

⁶⁸Henceforth, reference to LOLR will implicitly assume that liquidity is provided to economically sound banks.

CHAPTER 3. BANK INSOLVENCY

of whether they are economically sound. A bailout is provided if the cost of credit rationing is greater than the cost of the bailout—essentially, the bailout is the cheapest option for the government.

In principle, the objectives of LOLR and bailouts are different. In reality there are overlaps between LOLR and bailouts and often there is not a clear distinction between liquidity provided because of a temporary dislocation of market prices and liquidity provided to avoid credit rationing. The distinction between LOLR and a bailout can, in some circumstances, boil down to a view about the future value of bank assets.

Limiting state support to LOLR creates a disincentive for managers to buy correlated assets. This section describes LOLR and bailouts as ways of avoiding standard insolvency procedures. It explains when LOLR and bailout policies are likely to be used by central banks and governments. Finally, it highlights the costs of LOLR and bailouts.

2.1 *Lender of Last Resort*

LOLR is the provision of liquidity by a central bank to a financially distressed bank⁶⁹ with high interest rates on quality assets provided as collateral by the distressed bank.⁷⁰ During the recent crisis, the range of assets, the term of the loan, and the institutions that received LOLR assistance was broadened.⁷¹ LOLR can provide liquidity to banks to ensure that they pay their creditors in two types of crisis, both of which would constitute failure state in the model in Chapter 2.⁷² First, when a general and wide-spread drying up of liquidity causing concern about the liquidity held by various types of financial institutions.⁷³ This type of crisis requires open market operations.⁷⁴ Second, in a crisis situation when one or more financial institution gets into trouble due to problems in the payment system - such as a depositor

⁶⁹Payne (n 22) 282 '[The distressed bank] is cash-flow insolvent but is nevertheless economically viable.'

⁷⁰Bagehot (n 2) Ch VII.

⁷¹See generally, Lastra (ed) (n 17) 3-13.

⁷²Douglas W Diamond and Philip H Dybvig, 'Bank Runs, Deposit Insurance, and Liquidity' (1983) 91 J Pol Econ 401; Martin *et al.* (n 54) 32. Lastra (ed) (n 17).

⁷³*ibid* 3.

⁷⁴*ibid* 3.

CHAPTER 3. BANK INSOLVENCY

run.⁷⁵ The central bank provides this liquidity to ensure that financially distressed firms do not become economically distressed. Thus LOLR allows liquidity constrained but otherwise profitable banks avoid insolvency.⁷⁶

In Europe, LOLR cannot be directly provided by the ECB. Instead, LOLR is provided by national Central Banks. The Treaty on the Functioning of the European Union prohibits monetary financing by the ECB.⁷⁷ Monetary financing extends to the provision by the ECB of overdraft or any other type of credit facility in favour of EU banks.⁷⁸ The prohibition

⁷⁵ibid 3.

⁷⁶Bagehot (n 2) Ch VII.

‘And with the Bank of England, as with other Banks in the same case, these advances, if they are to be made at all, should be made so as if possible to obtain the object for which they are made. The end is to stay the panic; and the advances should, if possible, stay the panic. And for this purpose there are two rules: First, that these loans should only be made at a very high rate of interest. This will operate as a heavy fine on unreasonable timidity, and will prevent the greatest number of applications by persons who do not require it. The rate should be raised early in the panic, so that the fine may be paid early; that no one may borrow out of idle precaution without paying well for it; that the Banking reserve may be protected as far as possible.

Secondly. That at this rate these advances should be made on all good banking securities, and as largely as the public ask for them. The reason is plain. The object is to stay alarm, and nothing therefore should be done to cause alarm. But the way to cause alarm is to refuse someone who has good security to offer. The news of this will spread in an instant through all the money market at a moment of terror; no one can say exactly who carries it, but in half an hour it will be carried on all sides, and will intensify the terror everywhere. No advances indeed need be made by which the Bank will ultimately lose. The amount of bad business in commercial countries is an infinitesimally small fraction of the whole business. That in a panic the bank, or banks, holding the ultimate reserve should refuse bad bills or bad securities will not make the panic really worse; the ‘unsound’ people are a feeble minority, and they are afraid even to look frightened for fear their unsoundness may be detected. The great majority, the majority to be protected, are the ‘sound’ people, the people who have good security to offer. If it is known that the Bank of England is freely advancing on what in ordinary times is reckoned a good security on what is then commonly pledged and easily convertible the alarm of the solvent merchants and bankers will be stayed. But if securities, really good and usually convertible, are refused by the Bank, the alarm will not abate, the other loans made will fail in obtaining their end, and the panic will become worse and worse.

It may be said that the reserve in the Banking Department will not be enough for all such loans. If that be so, the Banking Department must fail. But lending is, nevertheless, its best expedient. This is the method of making its money go the farthest, and of enabling it to get through the panic if anything will so enable it. Making no loans as we have seen will ruin it; making large loans and stopping, as we have also seen, will ruin it. The only safe plan for the Bank is the brave plan, to lend in a panic on every kind of current security, or every sort on which money is ordinarily and usually lent. This policy may not save the Bank; but if it do not, nothing will save it.’

⁷⁷Consolidated Versions of the Treaty on European Union and the Treaty on the Functioning of the European Union 2012/C 326/01 [2012] OJ C326/1 (Treaty on European Union and the Treaty on the Functioning of the European Union 2012/C 326/01), art 123.

⁷⁸ibid art 123. ‘1. Overdraft facilities or any other type of credit facility with the European Central Bank or with the central banks of the Member States (hereinafter referred to as ‘national central banks’) in favour of Union institutions, bodies, offices or agencies, central governments, regional, local or other public authorities, other bodies governed by public law, or public undertakings of Member States shall be prohibited, as shall the purchase directly from them by the European Central Bank or national central banks of debt instruments. 2. Paragraph 1 shall not apply to publicly owned credit institutions which, in the context of the supply of reserves by central banks, shall be given the same treatment by national central banks and the European

CHAPTER 3. BANK INSOLVENCY

in Article 123 prevents the ECB from purchasing government bonds in the primary market and therefore providing liquidity including LOLR to banks.⁷⁹ Article 123 also constrains the ECB's intervention in the secondary market to serving specific monetary policy purposes consistent with its primary objective of price stability.⁸⁰ Consequently, the ECB can only incidentally provide liquidity to banks. The ECB provides liquidity through two types of 'Monetary Policy Operations'.⁸¹ First, 'open market operations' which include a range of four operations that either provide liquidity for a specified period or facilitate outright purchases of assets.⁸² Second, the marginal lending facility which is a 'standing facility' that provides overnight liquidity to banks.⁸³

LOLR promotes financial stability in two ways. First, it allows banks to avoid insolvency procedures by ensuring they have enough money to pay their debts when they become due and payable. The technical requirement for insolvency is an inability to repay debt.⁸⁴ With LOLR funding a bank becomes capable of repaying its debt. Consequently, it is unlikely to become insolvent and enter a costly insolvency procedure.

Second, LOLR creates incentives for banks to hold uncorrelated assets in order to buy their competitors' assets at distressed prices. Bank managers can benefit from acquiring assets from distressed competitors if they hold uncorrelated assets.⁸⁵

Central Bank as private credit institutions.'

⁷⁹Philippine Cour-Thimann & Bernhard Winkler, 'The ECB's Non-Standard Monetary Policy Measures: The Role of Institutional Factors and Financial Structure' (2013) 28 Oxford Rev of Econ Policy 765, 767.

⁸⁰*ibid* 767.

⁸¹Eur C Bank, 'Introduction to Eurosystem's Instruments' (*ecb.europa.eu*, 17 Dec 2014) <<https://www.ecb.europa.eu/mopo/implementation/intro/html/index.en.html>>.

⁸²See, Eur C Bank, 'The ECB's Response to the Financial Crisis' (2010) Oct ECB Monthly Bulletin 59, 66. See also, ECB Introduction to Eurosystem's Instruments (n 81).

⁸³*ibid*.

⁸⁴Goode (n 5) 110-1. 'Inability to pay debts is the fundamental concept on which all insolvency law is based.' See, Insolvency Act (n 26) ss 123, 222-4, and Sch.B1 para 11(a).

⁸⁵Viral V Archarya and Tanju Yorulmazer, 'Cash-in-the-Market Pricing and Optimal Resolution of Bank Failures' (2008) 26 Rev Fin Studies 2705, 2708. '[W]e compare these two policies (bailouts and lender of last resort) from an *ex-ante* standpoint in a setting where banks choose to differentiate or herd. Each bank invests either in a common industry or in a bank-specific industry. This decision affects the correlation of bank returns and the likelihood that banks fail together. *Ex-ante*, the regulator wishes to implement a low correlation between banks' investments to minimize the likelihood that many banks fail, and simultaneously implement resolution policies that are *ex-post* optimal. The regulator can achieve this by employing the bailout policy, only if it can commit to sufficiently diluting the share of bank owners when they are bailed out. By doing so, the bailout subsidy becomes small enough that banks prefer to differentiate and capture the surplus from buying assets at cash-in-the-market prices.'

CHAPTER 3. BANK INSOLVENCY

The LOLR mechanism suffers from a moral hazard problem because central bankers may suffer from a time inconsistency problem. While they may be able to credibly commit *ex-ante* to provide LOLR to a financially distressed bank, *ex-post* a central banker who wants to avoid bad press may provide LOLR to an economically distressed bank.⁸⁶ In addition, there was a concern that LOLR would cause inflation and expose the central bank to the market risk associated with the assets provided by the distressed bank.⁸⁷ In the period following the crisis there has been a growing body of evidence that supports the proposition that LOLR has not created a risk of inflation.⁸⁸ Overall, this suggests that LOLR is an effective mechanism for ensuring that a financially distressed bank avoids insolvency and that banks hold uncorrelated assets.⁸⁹

2.2 Bailouts

A bailout occurs when taxpayer funds are used to stop a bank from entering insolvency. Specifically, a bailout can involve the purchase or guarantee of the debt or equity of the recipient bank by an emanation of the State. Bailouts are a method of side-stepping insolvency and therefore avoiding the social cost k . This sub-section explains the justification for bailouts. It also discusses the moral hazard cost. It argues that the expectation of a bailout creates an incentive for bank creditors to refrain from disciplining bank managers and shareholders and leads to more risk-taking behaviour.

Bailouts allow distressed banks to avoid insolvency because the government provides

⁸⁶Payne (n 22) 282. ‘Where a company is economically distressed, so that the net present worth of the business as a going concern is less than the total value of its assets were they to be broken up and sold separately [or indeed sold as a whole], then liquidation may be the only sensible option.’ Edward J Kane, ‘Changing Incentives Facing Financial-Services Regulators’ (1989) J Fin Services Research 265, 270. See also, Morrison and White (n 53).

⁸⁷Dougale Gale and Tanju Yorulmazer, ‘Liquidity Hoarding’ (2011) Federal Reserve Bank of New York Staff Report No 488, 35.

⁸⁸See, Marco Del Negro and Christopher A Sims, ‘When Does A Central Bank’s Balance Sheet Require Fiscal Support?’ (2015) 73 J Monetary Econ 1. See also, Robert E Hall and Ricardo Reis ‘Maintaining Central-Bank Solvency Under New-Style Central Banking’ (unpublished manuscript, Mar 2015). See further, Brois Hofman and Feng Zhu, ‘Central Bank Purchases and Inflation Expectations’ (2013) March BIS Q Rev 23.

⁸⁹There are some concerns associated with LOLR but they are beyond the scope of this thesis. See, John Armour *et al.*, *Principles of Financial Regulation* (OUP 2016) 328-31.

CHAPTER 3. BANK INSOLVENCY

cash to the distressed bank. The funding can be provided as an equity injection. Alternatively, it could be provided on an unsecured basis. Theoretically, a bailout could be secured and it is at this point that it may become difficult to distinguish bailouts and LOLR. From one perspective, the only difference between LOLR and bailouts is the level of subordination⁹⁰ and the lack of collateral provided by the recipient bank. A bailout might be construed as arising when the government takes greater risk to avoid insolvency of the distressed bank.

Prior to the financial crisis there was limited legislation that defined and prescribed circumstances where a bank would be bailed out. The constraint limiting the use of bailouts was the potential political backlash of taxpayers. Following the crisis, legislation and policy have emerged that provide guidance about different forms of bailouts and circumstances where they might be used. In the United States, the *Dodd-Frank Act*⁹¹ prohibits the bailout of systemically important banks and other financial institutions.⁹² More specifically, the Federal Reserve's emergency authority, which was used bailout Bear Stearns was removed and the FDIC's issuance of loans outside of the Orderly Liquidation Authority provisions was made subject to Congressional approval.⁹³ In Europe, the BRRD sets out the restrictions on the provision of bailouts. The preamble sets out the principle that recovery and resolution plans⁹⁴ should not assume access to bailout funds.⁹⁵ Similarly, it was noted that an effective resolution scheme should minimise taxpayer exposure to bailouts.⁹⁶ Overall, a key objective of the BRRD is to ensure that the need for taxpayer bailouts in the future is reduced.⁹⁷

⁹⁰'Subordination' here refers to the seniority of the liquidity provided to the bank. The most 'subordinated' type of liquidity is an equity investment i.e. buying shares. The least 'subordinated' type of liquidity is a loan secured by assets of the bank.

⁹¹Wall Street Reform and Consumer Protection (Dodd-Frank) Act of 2010, Pub L No 111-203, 124 Stat 1376 .

⁹²For instance, the bailout of swaps entities is prohibited. *ibid* s 716. 'Notwithstanding any other provision of law (including regulations), no Federal assistance may be provided to any swaps entity with respect to any swap, security-based swap, or other activity of the swaps entity.' It is uncertain whether in a situation of systemic distress this law would be complied with.

⁹³*Armour et al.* (n 89) 348-9.

⁹⁴Discussed in Chapter 4.

⁹⁵Recovery and Resolution Directive - 2014/59/EU, pp31.

⁹⁶*ibid* pp67. 'An effective resolution regime should minimise the costs of the resolution of a failing institution borne by the taxpayers. It should ensure that systemic institutions can be resolved without jeopardising financial stability.'

⁹⁷*ibid* pp1. 'During the crisis, those challenges were a major factor that forced Member States to save institutions using taxpayers' money. The objective of a credible recovery and resolution framework is to obviate the need for such action to the greatest extent possible.' See also, *ibid* art 44(7) and Regulation

CHAPTER 3. BANK INSOLVENCY

In addition, at least theoretically, state aid rules govern the circumstances when a bailout can be provided.⁹⁸ Article 107 of the Treaty on the Functioning of the European Union lays down the test for state aid in the European Union.⁹⁹ Article 107 has three paragraphs. Paragraph 1 establishes that state aid that affects trade between member states is incompatible with the internal market.¹⁰⁰ The state aid framework provided a common basis for member states to provide bailouts to distressed banks. To that end, it facilitated and highlighted the difficulties in coordinating responses to bank failure.¹⁰¹ The state aid or ‘bailouts’ that were provided after the crisis were a way to avoid standard insolvency procedures and credit rationing.¹⁰² Brierley, head of policy for financial stability at the Bank of England, said:¹⁰³

“The failure of banks can generate large negative externalities to the stability of the financial system, in a manner unlikely to apply to non-financial companies.

Application of the corporate insolvency law could aggravate rather than reduce

(EU) No 806/2014 of the European Parliament and of the Council of 15 July 2014 Establishing Uniform Rules and a Uniform Procedure for the Resolution of Credit Institutions and Certain Investment Firms in the Framework of a Single Resolution Mechanism and a Single Resolution Fund and Amending Regulation (EU) No 1093/2010 [2014] OJ L225/1 (EC Single Resolution Mechanism Regulation), art 27(9).

⁹⁸See, Paul Craig and Gráinne De Búrca, *EU Law: Text, Cases, and Materials* (4th edn, OUP 2007) 1086. See also, Eva Hüpkens, *The Legal Aspects of Bank Insolvency: A Comparative Analysis of Western Europe, the United States, and Canada* (Kluwer 2000) 96-104.

⁹⁹Treaty on European Union and the Treaty on the Functioning of the European Union 2012/C 326/01, art 107.

¹⁰⁰ibid art 107(1) ‘Save as otherwise provided in the Treaties, any aid granted by a Member State or through State resources in any form whatsoever which distorts or threatens to distort competition by favouring certain undertakings or the production of certain goods shall, in so far as it affects trade between Member States, be incompatible with the internal market.’

¹⁰¹For example, the state aid granted to Dexia. See Commission Decision on State Aid for Dexia SA [2010] OJ L274/54 (State Aid for Dexia SA).

¹⁰²The resolution context described in the next section facilitates the imposition of losses on bank creditors so that regulators do not fall foul of state aid requirements if a bailout is also needed. See Anna Gardella, ‘Bail-in and the two Dimensions of Burden-Sharing’ (1-2 Sep 2015) ECB Legal Conference Paper , 209-10. ‘According to Regulation (EU) No 806/2014, establishing the framework of the Single Resolution Mechanism and of the Single Resolution Fund (“SRM Regulation”), resort to the single resolution fund (“SRF”) is conditional upon the prior exhaustion of the institution’s internal loss-absorbing capacity and State-aid clearance. The BRRD / SRM Regulation framework in particular provides that the following two conditions must be met: (i) the internal loss-absorbing capacity must have reached an amount of not less than 8% of the institution’s total liabilities – based on the valuation carried out pursuant to Article 20 SRM Regulation - via the write-down or conversion of capital instruments and eligible liabilities; and (ii) the contribution of the SRF must not exceed 5% of total liabilities including own funds of the institution under resolution.’ The 5% cap may be exceeded in exceptional circumstances. See EC Single Resolution Mechanism Regulation.

¹⁰³Peter Brierley, ‘The UK Special Resolution Regime for Failing Banks in an International Context’ (July 2009) Bank of England Financial Stability Paper No 5 , 4.

CHAPTER 3. BANK INSOLVENCY

these system-wide losses". (emphasis added)

Of course, the 2008 financial crisis was not the first time governments had bailed out banks. There is a rich history of bank bailouts—modern experiences include the Continental Illinois bailout in the United States.¹⁰⁴ Consistent with historical experience, markets are able to predict the likelihood of bank bailouts. Indeed, credit rating agencies identify banks that are expected to receive bailout funds if they become distressed. Fitch Ratings provides 'Support Ratings' which are its opinion as to whether a bank will receive a bailout or institutional support.¹⁰⁵ The ratings are assigned to all banks and to some non-bank financial institutions.¹⁰⁶ The ratings are provided on a scale of 1 to 5 using the following definitions:¹⁰⁷

1. A bank for which there is an extremely high probability of external support. The potential provider of support is very highly rated in its own right and has a very high propensity to support the bank in question. This probability of support indicates a minimum Long-Term Rating floor of 'A-'.
2. A bank for which there is a high probability of external support. The potential provider of support is highly rated in its own right and has a high propensity to provide support

¹⁰⁴Dewatripont (n 1) 16. Continental Illinois is often cited as an illustration of the policy of providing bailouts to banks to avoid the deleterious consequences of their insolvency. See also Dewatripont and Tirole (n 65) 111. For an analysis of the Herstatt bank failure and case studies of other bank failures see: Basel Committee on Banking Supervision, 'Bank Failures in Mature Economies' (Apr 2004) Working Paper 13.

¹⁰⁵Fitch Ratings, 'Other International Credit Ratings: Bank Support, Viability, and Individual Ratings' (*Other International Credit Ratings*, 14 Apr 2014) <https://www.fitchratings.com/jsp/general/RatingsDefinitions.faces?context=5&detail=505&context_ln=5&detail_ln=500>. 'Fitch's Support Ratings (SRs) reflect the agency's view on the likelihood that a financial institution (FI) will receive extraordinary support, in case of need, to prevent it defaulting on its senior obligations. Extraordinary support typically comes from one of two sources: the rated entity's shareholders (institutional support) or the national authorities of the country where it is domiciled (sovereign support). However, in some circumstances SRs may also reflect potential support from other sources, e.g. international financial institutions, regional governments or expected acquirers of the rated entity. In some cases Fitch may judge that the likelihood of a FI receiving external support is materially different regarding its foreign- and local-currency obligations. This may happen, for example, when the sovereign that is the potential support provider itself has Foreign- and Local-Currency IDRs assigned at different levels. In such cases, the FI's SR (and Support Rating Floor) will be assigned based on the obligations less likely to be supported (usually, those in foreign currency), while the FI's Foreign- and Local-Currency IDRs may be assigned different levels to reflect the difference in risk.'

¹⁰⁶ibid. 'Support Ratings are assigned to all banks, whether commercial or policy institutions, and are usually assigned to bank holding companies. SRs may also be assigned to non-bank FIs, including securities companies, leasing and finance companies and asset-management companies, where those entities' IDRs are support driven, and the agency believes the assignment of an SR would enhance transparency.'

¹⁰⁷ibid.

CHAPTER 3. BANK INSOLVENCY

to the bank in question. This probability of support indicates a minimum Long-Term Rating floor of ‘BBB-’.

3. A bank for which there is a moderate probability of support because of uncertainties about the ability or propensity of the potential provider of support to do so. This probability of support indicates a minimum Long-Term Rating floor of ‘BB-’.
4. A bank for which there is a limited probability of support because of significant uncertainties about the ability or propensity of any possible provider of support to do so. This probability of support indicates a minimum Long-Term Rating floor of ‘B’.
5. A bank for which there is a possibility of external support, but it cannot be relied upon. This may be due to a lack of propensity to provide support or to very weak financial ability to do so. This probability of support indicates a Long-Term Rating floor no higher than ‘B-’ and in many cases, no floor at all.

The ratings are determined based on sovereign and institutional support.¹⁰⁸ Sovereign support rating factors include the sovereign’s ability to support, the sovereign’s propensity to support the banking sector, and the sovereign’s propensity to support the specific institution.¹⁰⁹ The institutional support rating factors include the parent’s ability to support; parent’s propensity to support, and the resultant subsidiary classification as ‘core’, ‘strategically important’ or of ‘limited importance’ and, the legal and regulatory obligations or constraints.¹¹⁰ Evidence suggests that the yield on subordinated debt with a support rating of 1 or 2 does not reflect the asset risk of the issuing bank.¹¹¹ This means that there is a relationship between the Fitch Support Ratings and the market perception of an implicit bank guarantee.¹¹² The specifications in Gropp et al suggests that a support rating of 1 or

¹⁰⁸ibid.

¹⁰⁹ibid.

¹¹⁰ibid.

¹¹¹Reint Gropp, Jukka Vesala, and Giuseppe Vulpes, ‘Equity and Bond Market Signals as Leading Indicators of Bank Fragility’ (2006) 38 J Money, Credit and Banking 399, 413. ‘[A] joint hypothesis test reveals that the coefficient on the spread is zero for the banks with a high expectation of public support. This is in contrast to the results for -DD and suggests that subordinated debt holders assign a probability of one to being bailed out for some banks and, hence, bond prices do not adjust in line with risks for these banks.’

¹¹²ibid 413.

CHAPTER 3. BANK INSOLVENCY

2 *causes* the market to decouple the yield on subordinated debt from the asset risk of the issuer.¹¹³

In addition to the political backlash that follows from providing a bailout, there are at least three interrelated problems with bailouts that follow from the expectation of market participants that they will be bailed out.¹¹⁴ First, bailout funds are often used to bail out creditors that are capable of bearing losses. Second, all creditors anticipate that they will receive bailout funds and therefore lack the *ex-ante* incentive to discipline banks. Third, without that discipline, banks can take excessive risks to maximise shareholder return.¹¹⁵

Together, these interrelated problems with bailouts create moral hazard. Creditors do not have an incentive to reduce bank risk-taking because they expect to be bailed out. Consequently, in the model in Chapter 2 there was an assumption that debt investors would not monitor banks and consequently there was no incentive compatibility constraint for debt investors. The expectation of a bailout weakens the incentives of creditors to monitor risk-taking by bank managers. One way that bank managers have increased the riskiness of bank assets is to cross-subsidise risky business lines with funds raised from their commercial banking arms. Another way that banks have increased the riskiness of their assets is by increasing the size of their balance sheet, which increases competition for assets, which in turn decreases margins and creates instability. Essentially, as bank balance sheets have increased instability has also increased.

¹¹³ibid 413.

¹¹⁴Erlend Nier and Ursel Baumann, ‘Market Discipline, Disclosure and Moral Hazard in Banking’ (2006) 15 J Fin Intermediation 332, 345. ‘The expectation of government support, as measured using Fitch support ratings, is found to have a negative effect on bank capital buffers, . . . , reflecting the moral hazard incentives arising from implicit government insurance.’

¹¹⁵The last two points together highlight a time inconsistency problem. William W Lang & Douglas D Robertson, ‘Analysis of Proposals for A Minimum Subordinated Debt Requirement’ (2002) 54 Journal of Economics and Business 115, 119. ‘The time inconsistency problem arises because it may be socially desirable in the near-term to act to prevent a systemic crisis when faced with a failure of one or more very large banks. However, the likelihood that the government may choose to bail out failing institutions may itself be a causal factor generating high-risk banks. For these types of time inconsistency problems, the optimal policy often requires the establishment of *ex ante* rules that credibly eliminate or reduce the ability of policy makers to influence decisions to close banks.’

3. Conclusion

This chapter has explored the social cost of bank failure. It has argued that the major social cost of bank failure is credit rationing. It has highlighted a link between standard insolvency processes, credit rationing and contagion. Specifically, it has argued that standard insolvency processes can lead to credit rationing and contagion. It has then considered the two standard methods of avoiding bank insolvency and credit rationing. First, the provision of LOLR by a central bank, which often involves the provision of collateral and an exchange of illiquid for liquid assets by a financially distressed bank.

Second, the provision of a bailout by a central bank or government, which involves the injection of new cash or a guarantee on existing debt which has the effect of increasing explicitly or implicitly the asset-side of bank balance sheets.

Bailouts are problematic because they eliminate any incentive for guaranteed investors to monitor. Often, they extend beyond depositors to other debt investors who could potential bear losses. In fact, in some circumstances they can even benefit equity holders. However, in the model in Chapter 2, bailouts are only used to support debt investors and not shareholders.

The next chapter sets out in broad terms the new suite of tools designed to reduce the expected cost of bank bailouts. It discusses the going-concern elements of the bank capital framework and also discusses the recovery and resolution framework.

4

Capital and Resolution: Reducing Bailouts

1	Equity Capital Requirements	80
2	CoCo Capital Requirements	84
2.1	The Tax Treatment of CoCos	88
2.2	Value Changes in CRD IV	91
2.3	Restrictions on Coupons	93
3	Specialised Bank Insolvency	96
3.1	Recovery Planning	97
3.2	Resolution Planning	100
4	The Benefits of the New Framework	107
5	Conclusion	111

CHAPTER 4. CAPITAL AND RESOLUTION

This chapter discusses mechanisms that have been designed to reduce the expected cost of bank bailouts. In particular, it introduces CoCos and places CoCos in the broader suite of regulatory tools designed to reduce the expected cost of bank bailouts.

This chapter argues that increasing capital requirements and creating a new framework for recapitalising or winding down distressed banks is directed at reducing the expected cost of bank bailouts. Increasing equity capital requirements and issuing CoCos has two intended effects: first, banks are more resilient to shocks in asset value because shares and CoCos can absorb losses outside of insolvency. This reduces the expected cost of bailouts. The second effect of increasing equity capital requires is increasing the aggregate skin in the game of equity investors to monitor banks. In addition, properly designed CoCo contracts can strengthen this shareholder monitoring incentive. The second effect, the incentive to monitor, is the subject of much of this thesis. This chapter sets out broadly the suite of tools that have been introduced to reduce the expected cost of bailouts.

Imposing losses on shareholders and debt investors, to preserve their entitlements to the maximum extent possible, is something that traditionally happens in insolvency.¹ CoCos as part of the the bank capital framework, the recovery plan requirement, and the resolution tools, attempt to impose losses on bank stakeholders without the usual insolvency machinery. As a consequence, the capital, recovery, and resolution framework can be conceptualised as alternatives to traditional insolvency because their objective is to impose losses on bank stakeholders—but the aim is to reduce the taxpayer’s bailout bill. Standard insolvency procedures entail a number of costs; first, there is a coordination cost amongst individual creditors. The second cost of standard insolvency is that the delegation of control rights to a court or insolvency practitioners includes agency costs. The third cost of standard insolvency is that despite a delegation of control rights, creditors retain a veto right which can create hold-up and further coordination problems. The fourth cost of standard insolvency is that assets are likely to be sold at fire sale prices as part of standard insolvency. The fifth cost of

¹Roy Goode, *Principles of Corporate Insolvency Law* (Sweet & Maxwell 2011) 72-3. ‘Thus, bankruptcy law is essentially procedural in character; its role is not to affect pre-bankruptcy the substance of entitlements, but rather to organise a collective regime designed to ensure the preservation of those entitlements to the maximum extent possible.’

CHAPTER 4. CAPITAL AND RESOLUTION

standard insolvency is that goodwill with counterparties is likely to be lost because of any public announcement of insolvency. These problems were discussed in Chapter 3. This chapter discusses how equity capital, CoCos, recovery and resolution planning, resolution with a sale, and resolution without a sale can reduce the expected cost of bailouts. The monitoring incentives of CoCo investors and / or shareholders are discussed in subsequent chapters.

The rest of this chapter is structured in the following way. In the first section, it explores how increases in equity capital requirements reduce the probability of bank insolvency and consequently the expected cost of bank bailouts. In the second section, it discusses CoCos. In the third section, it discusses the recovery and resolution framework and how the resolution tools can reduce the expected cost of bank bailouts. In the fourth section, it discusses the benefits of the new capital and resolution framework. In the fifth section, it concludes.

1. Equity Capital Requirements

Like a normal firm, when a bank issues shares (or equity)² it can absorb larger shocks to its asset value without becoming insolvent.³ Insolvency arises when a firm is unable to repay its creditors. In this distressed state, a firm will also be unable to pay dividends and the value of its shares will highly likely to be close to zero. In addition, the expectation of losses creates an incentive for shareholders to monitor in order to avoid insolvency and consequently they are likely to use their control rights and their ability to buy and sell shares to discipline bank managers.⁴ Requiring banks to issue equity is a tool that regulators can use to reduce the likelihood of insolvency, the expected cost of bailouts, and the social cost k of bank failure. The original Basel Accord⁵ introduced a requirement for banks to issue Tier 1 (equity,

²Or indeed increasing reserves.

³Franco Modigliani and Merton H Miller, ‘The Cost of Capital, Corporation Finance, and the Theory of Investment’ (1958) 48 Am Econ Rev 261.

⁴See Michael C Jensen and William H Meckling, ‘Theory of the Firm: Managerial Behavior, Agency Costs, and Ownership Structure’ (1976) 3 J Fin Econ 305. See also, Reinier Kraakman *et al.*, *The Anatomy of Corporate Law: A Comparative and Functional Approach* (OUP 2009) 56. For an overview of the use of exit to sharpen the minds of managers see: Albert O Hirschman, *Exit, Voice, and Loyalty: Responses to Decline in Firms, Organizations, and States* (Harvard UP 1970). See also Alex Edmans, ‘Blockholders and Corporate Governance’ (2014) 6 Annu Rev Financ Econ 23.

⁵Basel Comm on Banking Supervision, *International Convergence of Capital Measurement and Capital Standards* (Jul 1988).

CHAPTER 4. CAPITAL AND RESOLUTION

retained earnings, and certain perpetual preferred stock) and Tier 2 (undisclosed reserves, revaluation reserves, general loan loss reserves, debt/equity hybrids, and subordinated debt) as a way of reducing insolvency risk.⁶ Under the Accord, a bank was required to issue capital equal to 8% of its total assets on a risk-weighted basis.⁷ There have been three further iterations of the Basel Accord—the most recent is Basel III.⁸

Like the original accord, Basel III requires banks hold capital commensurate to the riskiness of their assets.⁹ The requirements were adopted in the European Union in the Capital Requirements Directive¹⁰ and the Capital Requirements Regulation.¹¹ Under the European framework, on a risk-weighted basis, banks are required to issue:

- at least 4.5% of common equity tier 1 (**CET1**) capital.¹²
- a capital conservation buffer of 2.5% of CET1 capital.¹³
- an institution specific countercyclical capital buffer.¹⁴
- a global systemically important institution surcharge of up to 3.5% of CET1 capital.¹⁵
- at least 1.5% of additional tier 1 (**AT1**) capital.¹⁶

⁶In Europe, the first set of rules requiring banks to issue equity and debt as capital were passed in 1989. For a discussion see: Larisa Dragomir, *European Prudential Banking Regulation and Supervision* (Routledge 2010) 65-70.

⁷See discussion: Christos Hadjemmiuil, *Banking Regulation and the Bank of England* (LLP 1996) 65-6.

⁸Basel Comm on Banking Supervision, *Basel II: International Convergence of Capital Measurement and Capital Standards: A Revised Framework – Comprehensive Version* (Jun 2006); Basel Comm on Banking Supervision, *Enhancements to the Basel II Framework* (Jul 2009); and Basel Comm on Banking Supervision, *Basel III: A Global Regulatory Framework for More Resilient Banks and Banking Systems* (Jun 2011).

⁹*ibid.* For an analysis of the historical development of capital standards see, William Blair *et al.*, *Banking and Finance Services Regulation* (3rd edn, Butterworths 2002) 423-6. See also, Hadjemmiuil (n 7) 196-212.

¹⁰Directive 2013/36/EU of the European Parliament and of the Council of 26 June 2013 on Access to the Activity of Credit Institutions and the Prudential Supervision of Credit Institutions and Investment Firms amending Directive 2002/87/EC and repealing Directives 2006/48/EC and 2006/49/EC [2013] OJ L176/338 (Capital Requirements Directive - 2013/36/EU).

¹¹Regulation (EU) No 575/2013 of the European Parliament and of the Council of 26 June 2013 on Prudential Requirements for Credit Institutions and Investment Firms and Amending Regulation (EU) No 648/2012 [2013] OJ L176/1 (Capital Requirements Regulation - 2013/575).

¹²*ibid* art 92.

¹³Capital Requirements Directive - 2013/36/EU, art 129.

¹⁴*ibid* art 130.

¹⁵*ibid* art 131.

¹⁶Capital Requirements Regulation - 2013/575, arts 52 and 92.

CHAPTER 4. CAPITAL AND RESOLUTION

- at least 2% of tier 2 capital.¹⁷

CET1 capital is predominantly comprised of shares and retained earnings.¹⁸ The common equity tier 1 capital requirements represent an increase in the minimum equity capital requirements of banks.¹⁹

Equity capital requirements reduce the likelihood of insolvency by increasing the shock on asset value required to lead to insolvency.²⁰ While increasing equity capital requirements can reduce the need for bailouts it does not eliminate the incentive of equity holders to gamble for resurrection when banks become distressed.²¹ The incentive to gamble for resurrection can never be completely removed from a firm that issues debt. However, it can be reduced when equity capital requirements are increased. The incentive to gamble for resurrection is important when creditors lack the incentive to discipline bank managers because it can substantially increase even of distress losses and the expected size of bailouts.

Broadly speaking, increasing the equity capital requirement for banks is privately but not socially costly.²² If a bank defaults the government bails out creditors in order to avoid the contagion and credit-rationing that follows from the bank being placed into insolvency.²³ On the other hand, shareholder losses are capped by limited liability when a bank fails.²⁴ Therefore neither creditors or shareholders have sufficient incentives to reduce risk-taking by bank managers when a bailout is expected.²⁵ The cost of bank failure, in excess of the

¹⁷ibid arts 63 and 92.

¹⁸Basel Comm, *Basel III* (n 8) 13. 'Common Equity Tier 1 capital consists of the sum of the following elements: common shares issued by the bank ... [and] retained earnings ...' See also, Capital Requirements Regulation - 2013/575, art 26.

¹⁹Basel Comm (n 5). Basel Comm, *Basel II* (n 8). Basel Comm, *Enhancements* (n 8).

²⁰The objective of equity capital is to raise cash that can be used to repay creditors if a bank has insufficient current assets. Blair *et al.* (n 9) 421-2.

²¹'By increasing the participation of owners in the financing of risky activities, the regulatory capital standards maximise their exposure to potential losses and dissipate the abnormal returns on equity from highly leveraged risk-taking.' Hadjemmniul (n 7) 196.

²²Anat R Admati *et al.*, 'Fallacies, Irrelevant Facts, and Myths in the Discussion of Capital Regulation: Why Bank Equity is not Expensive' (2011) Rock Ctr Corp Governance at Stan Univ Working Paper No 86 .

²³For reasons that are explained later this may be the case even if the stabilisation tools under the *Banking Act 2009* (UK) are used.

²⁴Kraakman *et al.* (n 4) 9-11; Paul Davies, *Gower and Davies Principles of Modern Company Law* (8th edn, Sweet & Maxwell 2008) 193-8.

²⁵Shareholder incentives to monitor are dependent on the assumption that bailout funds are not used to support shareholders. However, in reality, bailouts might include injections of equity which reduce the incentives of shareholders to avoid bank insolvency. Mathias Dewatripont, Jean-Charles Rochet, and Jean Tirole,

CHAPTER 4. CAPITAL AND RESOLUTION

equity value, are borne socially either in the form of bailouts or through credit rationing. The benefits of manager risk-taking are privately captured by shareholders and creditors. On the other hand, the cost of manager risk-taking is socialised and borne by taxpayers.

Increasing the amount of equity that banks must hold adversely affects shareholders because the residual value of the firm is shared amongst more shareholders. Creditors are indifferent to the change because they are still the beneficiaries of an implicit guarantee because social cost k is greater than the cost of a bailout. Importantly, increasing equity does not harm the interests of taxpayers. Admati et al have argued that increasing the amount of equity held by banks is not socially costly. They argue that:

“Because the social benefits of significantly reducing bank leverage are significant, and because there are no significant social costs of increasing equity requirements for banks, politicians and regulators should not be overly concerned with threats that credit markets will be adversely affected by increasing equity requirements. High equity requirements need not interfere with any of the valuable intermediation activities undertaken by banks. Regulators should therefore take steps to impose significantly higher equity requirements as quickly as possible.”²⁶

In essence, they argue that there are no significant social costs associated with making a bank raise funding in the form of equity instead of debt. Consistent with the arguments set out by Admati et al, the model in Chapter 2 shows that retiring debt and replacing it with either CoCos or shares (denoted by Δ) makes it more likely that shareholders will monitor. The social benefits, in their view, outweigh the social costs. Increasing equity is certainly a mechanism that aligns the goal of reducing taxpayer funded bailouts with the financial interests of shareholders to monitor bank managers. Indeed, Basel III increases equity capital requirements.²⁷

Balancing the Banks (Princeton UP 2010) 39. ‘Participation by taking up preferred (nonvoting) stocks and warrants. This approach has the benefit of leaving management in private hands, which presumably are more familiar with techniques and risks and less susceptible to political pressure. By contrast, there is a real danger that private shareholders might gamble if the capitalisation is inadequate, since this strategy allows them to benefit from the upside.’

²⁶Admati et al. (n 22) 57. See also Modgiliani and Miller (n 3).

²⁷Basel III establishes a additional capital requirements including a requirement for additional tier 1

CHAPTER 4. CAPITAL AND RESOLUTION

A problem associated with relying solely on equity capital requirements to eliminate the need for bailouts is that it does nothing to eliminate the gambling for resurrection incentives of shareholders and managers on the eve of distress. In general, increasing equity capital requirements reduces the risk taking incentives of shareholders and decreases the probability that the bank becomes distressed. However, if equity capital is eroded then shareholders will have an incentive to gamble. At this point, shareholders and managers have an incentive to take risks. If the risk pays off, the share value increases, otherwise, losses are borne by creditors.²⁸ Normally, creditors are incentivised to stop eve of distress gambling because they bear losses, but when they expect a bailout they do not benefit from stopping gambling. Therefore, by increasing equity without establishing a credible and effective insolvency mechanism, eve of distress gambling is not curbed. The consequence is that a bank which becomes distressed, without credible insolvency procedures in place, will have eroded a greater proportion of its asset value than a bank subject to a credible and effective insolvency procedure. This increases the expected cost of a bailout. Accordingly, simply increasing equity does not overcome the problems that arise when a systemically important bank becomes distressed.

Increasing equity capital requirements does not eliminate the incentive for managers to gamble at the eve of insolvency. Market discipline by creditors can reduce this incentive. Resolution tools used by regulators or properly designed CoCos can potentially overcome the incentive of shareholders to gamble for resurrection on the eve of insolvency.

2. CoCo Capital Requirements

Theoretically, there ought to be a period between implementing a recovery plan and entry into resolution.²⁹ During this period, as a bank's capital position deteriorates, CoCos ought

capital, a capital conservation buffer and a countercyclical buffer. Basel Comm, *Basel III* (n 8). The FSB has published a report that requires G-SIBs to hold additional capital because of their systemic risk. Financial Stability Board, *Update of Group of Global Systemically Important Banks (G-SIBs)* (1 Nov 2012).

²⁸Anat R Admati *et al.*, 'Debt Overhang and Capital Regulation' (Mar 2012) Rock Ctr Corp Governanceat Stan Univ Working Paper No 114 .

²⁹See, Mark J Flannery, 'Contingent Capital Instruments For Large Financial Institutions: A Review of the Literature' (2014) 6 Annual Rev of Fin Econ 225, 227. 'Contingent capital instruments provide an

CHAPTER 4. CAPITAL AND RESOLUTION

to be triggered.³⁰ CoCos are debt instruments that convert into equity or are written-down. Indeed, the premise that underlies the requirement for CoCos to have a minimum trigger level of 5.125% of CET1 capital is that the bank has equity value when the CoCo is triggered.³¹

Like equity capital, CoCos are a form of capital that absorbs losses prior to formal insolvency.³² However, they differ from equity because losses are imposed based on a trigger rather than arising as a consequence of being a residual claim on the firm's assets. They reduce the expected size of bailouts in two ways. First, the trigger is set at a point before the bank enters resolution.³³ Second, they can create incentives for either shareholders or CoCo investors to monitor and discipline bank managers which reduces the probability of bank insolvency and consequently expected bailout costs.³⁴

This section highlights two aspects of CoCos: tax considerations and value transfers. It doesn't purport to provide a comprehensive overview of all of the issues central to CoCos. It begins by considering laws as they relate to the tax treatment of CoCos.³⁵ It then discusses the types of value transfers permitted by the CRR for CoCos that count as regulatory capi-

alternative (not mutually exclusive) solution to the challenge of recapitalizing large financial firms. Unlike the bail-in process, coco bonds would convert into equity before failure. Going-concern coco bonds contrast with the gone-concern bail-in bonds that provide recapitalization only after the institution has become nonviable (Calello & Ervin 2010). Because cocos soften the hard constraint on firm operations usually provided by debt, their effects bear on questions of corporate governance, much as a traditional bankruptcy does. Although managerial or shareholder discipline can be incorporated into coco bonds, their main purpose is to provide rapid delevering of financial firms that might impose social costs if they were to fail.' Both of recovery plans and resolution are discussed in the next Section.

³⁰David Skeel, 'The New Synthesis of Bank Regulation and Bankruptcy in the Dodd-Frank Era' (Mar 2016) University of Pennsylvania Law School & ECGI Law Working Paper No 306/2016, 17. 'Like chameleon equity, CoCos would convert to equity as the bank holding company's condition deteriorated. With CoCos, the conversion would come prior to a default. If effective, CoCos would quickly recapitalize a company, making formal resolution proceedings unnecessary.'

³¹Capital Requirements Regulation - 2013/575, art 92(1). See also, Kenneth R French *et al.*, *The Squam Lake Report: Fixing the Financial System* (OUP 2010) 55. 'These regulatory hybrid securities will not prevent failure altogether, because banks also make other commitments such as accepting deposits and issuing short-term debt. After the new hybrid instrument converts to equity, if the value of a bank's other commitments exceeds the value of its assets, the bank may require additional complementary resolution mechanisms, such as an FDIC takeover.' Indeed, this premise also exists in the work of the Squam Lake Report.

³²Capital Requirements Regulation - 2013/575, art 92(1).

³³Ansgar Walther & Lucy White 'Rules versus Discretion in Bank Resolution' (unpublished manuscript, 12 Jun 2015).

³⁴Mark J Flannery, 'No Pain, No Gain? Effecting Market Discipline via "Reverse Convertible Debentures"' in Hal S. Scott (ed), *Capital Adequacy Beyond Basel: Banking, Securities, and Insurance* (OUP 2005).

³⁵Allen & Overy – Global Tax Practice, *Tax Treatment of Additional Tier 1 Capital Under Basel III* (Allen & Overy 2013).

CHAPTER 4. CAPITAL AND RESOLUTION

tal.³⁶ It argues that, in general, there is a pattern of CoCos being issued in countries where coupons are tax deductible. It then considers value transfers that are legally permitted in CoCos. It argues that the majority of theoretical possibilities for designing losses in CoCos involve a value transfer to or from CoCo investors to shareholders. This suggests that discipline by either CoCo investors or shareholders might be an objective sought by regulators. It concludes by analysing a new CoCo known as a temporary write-down CoCo. It argues that there is a chance that temporary write-down CoCos might facilitate value transfers from taxpayers to CoCo investors.

If shareholders have a choice between issuing shares or CoCos as regulatory capital, then if they issue CoCos it means that the tax benefit of CoCos outweighs the cost of monitoring by either shareholders or CoCo investors. Dividends paid on shares are not tax deductible. On the other hand, interest on CoCos are often tax deductible. Shareholders will choose to issue CoCos if the benefit of deductible interest payments outweighs the cost of shareholder monitoring or CoCo investor monitoring. In the model in Chapter 2, shareholders are more likely to monitor when taxes are lower; this is evident in the shareholder incentive compatibility constraint. On the other hand, the tax rate does not affect the incentive of CoCo investors to monitor in the model. This is consistent with the intuitive point that the benefit of tax deductible interest accrues only to shareholders.

In Europe, banks can either issue CoCos or CET1 as 1.5% of the Tier 1 capital requirement of 6% of risk-weighted assets.³⁷ There are two main differences between CET1 and CoCos. First, distributions on CET1 are unlikely to be tax deductible while distributions on CoCos may be tax deductible. Second, losses on CET1 are linear while they may not be linear in CoCos. The benefits of deductible interest and the freedom to increase asset risk can be shared amongst bank stakeholders. Consequently, the decision to issue CoCos reveals whether (1) the size of the tax savings or (2) the increased oversight of asset risk is greater for bank stakeholders. If a bank issues CoCos, then this suggests that the tax savings outweigh the reduction of asset risk caused by the incentive effects created by CoCos.

³⁶Capital Requirements Regulation - 2013/575, art 52(1)(n).

³⁷ibid art 92(1).

CHAPTER 4. CAPITAL AND RESOLUTION

In addition, banks can either issue CoCos or subordinated debt as 2% of their total capital ratio of 8% of risk-weighted assets.³⁸ There are similarly two main differences between subordinated debt and CoCos. First, subordinated debt only absorbs losses that are part of resolution or in insolvency while CoCos absorb losses upon a contractual trigger. Second, losses on subordinated debt are subject to normal insolvency priorities while losses on CoCos are subject to the conversion or write-down formula. To the extent that governments and regulators place a bank into resolution without a CoCo being triggered, CoCos and subordinated debt can both bear losses so *ceteris paribus* any difference in CoCo and subordinated debt pricing is likely related to investor perceptions of the credibility of a regulator imposing losses on either CoCo investors or subordinated debt investors.

In the US, banks can issue preference shares (not CoCos) as 1.5% of their Tier 1 capital requirement of 6% of risk-weighted assets³⁹ and subordinated debt (not CoCos) as 2% of their total capital ratio.⁴⁰ CoCos are not treated as regulatory Tier 1 capital in the US until they have been converted from debt into equity.⁴¹ If CoCos internalise the cost of bank failure and increase a bank's overall cost of capital then we would expect US banks to not issue CoCos. Consistent with this hypothesis as far as we are aware of no US banks have issued CoCos.

In Switzerland, banks are divided into five categories depending on their size and complexity.⁴² The smallest and least complex banks (category 5) are only required to fulfill

³⁸ibid art 92(1).

³⁹Federal Reserve Board - Capital Adequacy Rules, 12 C.F.R. (30 Aug 2012). 'Consistent with Basel III ... the follow minimum capital ratios: (1) A common equity tier 1 capital ratio of 4.5 percent; (2) *a tier 1 capital ratio of 6 percent*; (3) a total capital ratio of 8 percent ...' (emphasis added)

⁴⁰ibid. 'Consistent with Basel III ... the follow minimum capital ratios: (1) A common equity tier 1 capital ratio of 4.5 percent; (2) a tier 1 capital ratio of 6 percent; (3) *a total capital ratio of 8 percent* ...' (emphasis added)

⁴¹United States Federal Register Vol 78, 198 C.F.R. (11 Oct 2013). 'The agencies continue to believe that restricting tier 1 capital instruments to those classified as equity under GAAP will help to ensure those instruments' capacity to absorb losses and further increase the quality of U.S. banking organizations' regulatory capital. The agencies therefore have decided to retain this aspect of the proposal. To the extent that a contingent capital instrument is considered a liability under GAAP, a banking organization may not include the instrument in its tier 1 capital under the final rule. At such time as an instrument converts from debt to equity under GAAP, the instrument would then satisfy this criterion.'

⁴²Jean C Rochet, *The Extra Cost of Swiss Banking Regulation: White Paper* (Swiss Finance Institute Feb 2014) 8. 'The requirements of the Basel III framework are supplemented by additional capital requirements introduced as a so-called Swiss Finish by the Swiss Financial Market Supervisory Authority (FINMA) Circular 2011/2. Under this regulation, banks are divided into five categories depending on their

the Basel III requirements.⁴³ On the other hand, the systemically important category 1 banks, i.e. UBS and Credit Suisse, have additional capital requirements including 3% of RWA in high-trigger CoCos and a variable component of 6% of RWA in low-trigger CoCos.⁴⁴ Unlike the CRD IV requirements and the US capital requirements, Swiss regulations do not give issuers the option of CoCos or another form of capital. Instead, there is a mandatory requirement for banks to issue CoCos. Consequently, the issuance of CoCos does not reveal whether issuers consider that tax savings outweigh the incentives to discipline created by CoCos.

2.1 *The Tax Treatment of CoCos*

This sub-section discusses the tax treatment of CoCos in different jurisdictions. It shows that consistent with the assumption in the model in Chapter 2, in general CoCo interest payments are tax deductible. It also shows that CoCos tend to be issued in countries where interest on CoCos is tax deductible.⁴⁵

In the model in Chapter 2 the tax rate and deductibility of interest on CoCos are relevant to understanding how CoCos might lead to a reduction in the probability of bank insolvency. Shareholders are less likely to monitor, according to the model, as tax rates increase. Higher tax rates are thus consistent with higher expected bailout costs. The share-

size and complexity.’

⁴³ibid 8.

⁴⁴ibid 8. ‘[T]he conservation buffer must be complemented with 3% of RWA in the form of high-triggering Contingent Convertible Bonds (CoCos) or bonds with a write-down feature. Finally, a variable progressive component of up to 6% of RWA may be required from TBTF Swiss banks depending of [SIC] the systemic importance of the respective banks. This requirement may be satisfied in the form of low-triggering CoCos (i.e. CoCos that are converted in equity capital if the CET1 ratio of 5% is undershot).’ The high-triggering CoCos are triggered when the CET1 ratio falls below 7%.

⁴⁵Stefan Avdjiev *et al.*, ‘CoCos: A Primer’ (Sep 2013) BIS Quart Rev 43, 49. ‘The issuance of CoCos is also affected by their tax treatment in different jurisdictions. If fiscal authorities treat CoCos as debt, then the interest expense associated with them is typically tax-deductible for the issuing bank. As a result, the tax classification of CoCos can have a significant impact on the after-tax interest expenses of issuing banks. While there is still considerable uncertainty in many jurisdictions, it appears that CoCos would not be tax-deductible in some countries. Preliminary estimates suggest that roughly 64% of CoCos have tax-deductible coupons, while approximately 20% do not. The tax treatment of the remaining 16% of CoCos is currently under review.’

CHAPTER 4. CAPITAL AND RESOLUTION

holder incentive compatibility constraint is of course:

$$(1 - \tau)(v^u - v^d + \Delta + c^f - c^s) \geq \frac{B^E}{(p^h - p^l)}$$

On the other hand, CoCo investor incentives to monitor are independent of taxes. Therefore, if CoCo investors are monitoring, interest on CoCos are tax deductible, and tax rates are increasing, the expected cost of bailouts remains the same. We recall that the CoCo investor incentive compatibility constraint is:

$$c^s - c^f \geq \frac{B^C}{(p^h - p^l)}$$

Consequently, we might expect that *ceteris paribus* regulators prefer CoCo investors to monitor because their incentive to monitor is independent of taxes. This pattern is consistent with Posner's characterisation of regulatory capture, which relevantly posits that regulation is a product which can confer benefits to individuals or groups⁴⁶ and regulation is likely to be designed to benefit the interest group that values it the most.⁴⁷ In the case of CoCos, shareholders may value the deductibility of interest on CoCos more highly than taxpayers due to the coordination costs of taxpayers and the agency costs between taxpayers, legislators, and regulators.⁴⁸ Therefore, a product—in this case, the deductibility of interest on CoCos—is provided to shareholders because subject to coordination and agency costs, they value it more highly than other stakeholders and particularly taxpayers.

Consistent with this argument, in the CRR, CoCo coupons are described as distribu-

⁴⁶Richard A Posner, 'Theories of Economic Regulation' (1974) 5 Bell Journal of Economics and Management Science 335, 344. 'The theory is based on two simple but important insights. The first is that since the coercive power of government can be used to give valuable benefits to particular individuals or groups, economic regulation—the expression of that power in the economic sphere—can be viewed as a product whose allocation is governed by laws of supply and demand.' For a discussion of capture being based on 'coalitional aspects of politics' see, Sam Peltzman, Michael E Levine, and Roger G Noll, 'The Economic Theory of Regulation After a Decade of Deregulation' (1989) 1989 Brookings Papers on Economic Activity 1, 38.

⁴⁷Posner (n 46) 344. 'Viewing regulation as a product allocated in accordance with basic principles of supply and demand directs attention to factors bearing on the value of regulation to particular individuals or groups, since, other things being equal, we can expect a product to be supplied to those who value it the most most.'

⁴⁸ibid 344.

CHAPTER 4. CAPITAL AND RESOLUTION

tions.⁴⁹ The characterisation of coupons on CoCos as distributions suggests that EU regulators sought to leave the legal treatment of CoCos, for *inter alia* tax purposes, ambiguous. Consequently, the question of tax is left to the discretion of the parliament of each jurisdiction. If CoCos represent a compromise between regulators and other stakeholders then the pattern of CoCo issuance will likely be related to the tax treatment of CoCos in different jurisdictions. For instance, if CoCos are issued in countries where they are tax deductible this would support the conjecture that CoCos are issued as a compromise form of capital. On the other hand, if CoCos are issued randomly in countries which treat CoCo coupons as deductible or non-deductible then this would militate against the view that CoCos are issued as a compromise between regulators and other stakeholders.

The tax treatment of CoCos varies across Europe. Allen & Overy have prepared a report summarising their views on tax treatment of CoCos in various countries including three of the largest four in Europe: Great Britain, France, and Spain.⁵⁰ Their report is couched in non-specific terms as the deductibility of interest is dependent on the interpretation of the law. Their views are summarised in Table 4.1 below; because they are not expressed in absolutes, they are set out here as either unlikely, maybe, or likely. In GB, HMRC has determined that CoCo coupons are tax deductible.⁵¹ In Switzerland, it has been argued that banking groups have an incentive to issue bail-in-able debt including CoCos to take advantage of reductions in their capital requirements.⁵²

⁴⁹Capital Requirements Regulation - 2013/575, art 4(110). The CRR defines a distribution as the ‘payment of dividends or interest in any form.’

⁵⁰Tax Treatment of AT1 Capital Under Basel III (n 35).

⁵¹See HMRC, *Measure Explaining Tax Treatment of Regulatory Capital Securities* (1 Jan 2014) 2. ‘This measure provides that for the new type of AT1 and T2 securities to which the regulations apply (“regulatory capital securities”) to be taxed as debt and so provide credit institutions or investment firms with certainty of tax treatment to ensure that tax uncertainty does not discourage these entities from issuing more loss absorbent forms of capital.’ See also, Supervisory Statement SS3/13: Capital and Leverage Ratios for Major UK Banks and Building Societies Nov 2013 SS3/13 , 3 (U.K.). See further, Prudential Regulation Authority, ‘CRD IV and Capital’ (Dec 2013) PRA Supervisory Statement - SS7/13 , 3.

⁵²Jeffrey N Gordon and Wolf-Georg Ringe, ‘Bank Resolution in the European Banking Union: A Transatlantic Perspective on What It Would Take’ (Aug 2014) University of Oxford Legal Research Paper Series Paper No 18/2014 , 37-8. ‘But regulation can change the relevant incentives. Stimulated by regulatory incentives, Swiss banks are reported to be among the first European banks to currently change their organizational structure. Under Swiss rules, banks can lower their core capital by changing their legal structure to make the banking group more resolvable. This has led both major banks, Credit Suisse and UBS, to adjust their organizational structure to something akin to the U.S. bank holding company structure.’

CHAPTER 4. CAPITAL AND RESOLUTION

Table 4.1: Deductibility of Interest of CoCos in Different Jurisdictions (USD)

Source: Bloomberg, author’s calculations. The amount of outstanding CoCos is empirical data gathered from the Bloomberg API. It shows there are more outstanding CoCos in countries where interest is likely to be deductible. The tax treatment of CoCos is subject to interpretation so in their analysis Allen & Overy refrained from asserting with certainty whether coupons paid on CoCos in any country are tax deductible. The only exception is Great Britain where a measure published by HMRC makes it clear that coupons on AT1 and Tier 2 CoCo are tax deductible. The tax treatment of CoCos issued in Switzerland is not included for two reasons. First, the data was unavailable to the author. Second, Swiss issuers have no choice in issuing CoCos therefore if interest is deductible this might be simply be characterised as a taxpayer wealth transfer to Swiss bank stakeholders. The size of the banking system was calculated by gathering data from the ECB’s Statistical Data Warehouse for 2014 and the IMF’s Financial Sector Stability Assessment for Switzerland published in 2014. The amounts were converted to \$US using the 31 December 2014 exchange rate.

Country	Interest Deductible	US\$ Amount of Outstanding CoCos	Size of Banking System
Belgium	Unlikely	US\$2.95bn	US\$494.9bn
France	Likely	US\$16.84bn	US\$8,184.7bn
Germany	Unlikely	US\$4.72bn	US\$8,172.1bn
Italy	Likely	US\$2.34bn	US\$2,997.6bn
Luxembourg	Likely	US\$5.80bn	US\$113.6bn
Netherlands	Unlikely	US\$5.69bn	US\$2,856.4bn
Spain	Likely	US\$11.55bn	US\$4,049.8bn
Great Britain	Deductible	US\$29.31bn	US\$9,273.4bn

Table 4.1 compares the amount of outstanding CoCos in different countries to whether interest is likely to be deductible in those countries. It reveals a general pattern. There are more outstanding CoCos in countries where interest is likely to be deductible.

In summary, where CoCo coupons are tax deductible, there appears to be a greater issuance of CoCos. This is consistent with the view that with respect to tax the political pressure from bank shareholders and managers is greater than the pressure exerted by taxpayers.

2.2 Value Changes in CRD IV

This sub-section sets out how CRD IV frames its CoCo write-down and conversion provisions in order to assess whether regulators limit the types of value changes that can be engineered

CHAPTER 4. CAPITAL AND RESOLUTION

in CoCos that satisfy regulatory capital requirements. It shows two objectives are possible under current regulations. First, there is no possibility for CoCos to become unsecured debt in order to facilitate wealth transfers between CoCo investors and unsecured debt investors.⁵³ Second, there are two types of remaining CoCos: first, conversions that reduce the value of shares and increase the value of CoCos and second, the value of CoCos is decreased and the value of shares are increased. These value changes occur in at least four ways: through a conversion of CoCos into shares, a permanent write-down of CoCos, a staged write-down of CoCos, and a temporary write-down of CoCos.

The CRR requires AT1 CoCos to either ‘be written-down on a permanent or temporary basis or the instruments be converted to [CET1].’⁵⁴ There are four types of value transfers that can be created based on the requirements for AT1 CoCos. First, a permanent write-down requirement involves a value transfer from CoCo investors to shareholders. In a permanent write-down, when the CoCo is triggered⁵⁵ all or a part of the future coupon payments are permanently canceled. Second, a conversion into shares above the market price transfers investor value to shareholders. Third, a conversion into shares below the market price transfers shareholder value to investors. In all convertible CoCos, the trigger results in an exchange of CoCos for newly issued shares in the bank. The amount of shares for each CoCo is required to be specified *ex-ante* in the prospectus.⁵⁶ Fourth, a temporary write-down has the potential to transfer shareholder and non-CoCo debt investor value to CoCo investors.⁵⁷ In a temporary write-down, once the trigger is breached, coupon payments are canceled.⁵⁸ However, if the bank recovers and the CET1 ratio rises above the trigger level then the CoCo is written back up.⁵⁹ Therefore, the investor only loses the interest payments that were missed during the period where the bank’s capital is below the trigger level.

⁵³This might be contemplated in order to create incentives to reward sophisticated investors to price CoCos accurately as they approach the trigger point.

⁵⁴Capital Requirements Regulation - 2013/575, art 52(1)(n).

⁵⁵ibid art 54(1)(a). The trigger event is required to be a CET1 ratio of 5.125% or higher.

⁵⁶ibid art 54(1)(c).

⁵⁷ibid art 52(1)(n).

⁵⁸ibid art 54(1)(a).

⁵⁹ibid art 54(1)(a).

2.3 Restrictions on Coupons

This sub-section discusses an alternative to value transfers based on conversion or write-downs. It focuses on the cancellation of coupons and argues that this mechanism creates incentives for CoCo investors to discipline bank managers. It makes two arguments. First, from the perspective of regulators, a regulatory coupon cancellation power and director liability for failure to cancel coupons when a bank approaches distress is a credible substitute to write-down and convertibles with a transfer to shareholders. Second, from the perspective of non-regulator stakeholders, there is little additional risk involved in issuing write-downs and convertibles with a wealth transfer to shareholders.

Coupon cancellation is a requirement for AT1 but is not for Tier 2 CoCos. AT1 CoCos are subject to discretionary coupon cancellation by regulators or issuers of CoCos—this makes them either a substitute or a complement to triggered losses. First, CRD IV gives regulators the power to restrict or prohibit interest payments on AT1 CoCo investors.⁶⁰ Article 104(1) says:⁶¹

For the purposes of Article 97, Article 98(4), Article 101(4) and Articles 102 and 103 and the application of Regulation (EU) No 575/2013, competent authorities shall have at least the following powers:

- (i) to restrict or prohibit distributions or interest payments by an institution to shareholders, members or holders of Additional Tier 1 instruments where the prohibition does not constitute an events of default of the institution.

Second, coupons paid on AT1 CoCos can only be made if the issuer has distributable items.⁶² Article 52 of the CRR allows issuers to restrict the payment of interest on AT1 CoCos by requiring distributions to be discretionary and based on profits from the current

⁶⁰Capital Requirements Directive - 2013/36/EU, art 104. At least in the UK, the Prudential Regulatory Authority has not waived its right to exercise those powers in its rule book. See PRA Rulebook CRR Firms Instrument 2013 2013/6 (U.K.).

⁶¹Capital Requirements Directive - 2013/36/EU, art 104.

⁶²See Capital Requirements Regulation - 2013/575, pp 128 and *ibid* art 52.

year.⁶³ Specifically Article 52(1)(l) provides:⁶⁴

Capital instruments shall qualify as Additional Tier 1 instruments only if the following conditions are met:

- (l) distributions under the instruments meet the following conditions:
 - (i) they are paid out of distributable items;
 - (ii) the level of distributions made on the instruments will not be amended on the basis of the credit standing of the institution or its parent undertaking;
 - (iii) the provisions governing the instruments give the institution full discretion at all times to cancel the distributions on the instruments for an unlimited period and on a non-cumulative basis, and the institution may use such canceled payments without restriction to meet its obligations as they fall due;
 - (iv) cancellation of distributions does not constitute an event of default of the institution;
 - (v) the cancellation of distributions imposes no restrictions on the institution;

Managers of an issuer of AT1 CoCos are required to cancel coupon payments if they do not have distributable items. Failure to cancel coupon payments can give rise to personal liability beyond their creditor regarding duties as the bank approaches insolvency.⁶⁵ The

⁶³Distributable items are set out in the preamble of the CRR: *ibid* pp 128. ‘ ‘distributable items’ means the amount of the profits at the end of the last financial year plus any profits brought forward and reserves available for that purpose before distributions to holders of own funds instruments less any losses brought forward, profits which are non-distributable pursuant to provisions in legislation or the institutions’ bye-laws and sums placed to non-distributable reserves in accordance with applicable national law or the statutes of the institution, those losses and reserves being determined on the basis of the individual accounts of the institution and not on the basis of the consolidated accounts.’ The discretion on the payment of interest is set out in *ibid* art52(1)(l).

⁶⁴*ibid* art 52(1)(l).

⁶⁵Eva Hüpkens, *The Legal Aspects of Bank Insolvency: A Comparative Analysis of Western Europe, the United States, and Canada* (Kluwer 2000) 43-4. ‘Directors of a bank owe fiduciary duties to the bank and must act for the proper purposes of the bank. If the bank is insolvent or on the verge of insolvency, the

CHAPTER 4. CAPITAL AND RESOLUTION

personal liability that attaches to directors with respect to CoCos is similar to the liability that arises when dividends are not paid out of profits.⁶⁶ This risk of personal liability if coupons are not paid out of profits creates is a powerful incentive for bank managers to cancel coupon payments when they consider that the bank is approaching insolvency. Coupon cancellation in turn be construed as advanced warning to a regulator that all is not well at the regulated bank.

Coupon cancellation has two benefits relative to write-down and convertibles with a wealth transfer to shareholders. First, director liability creates a more direct discipline mechanism than reliance on the cost of funding and secondary market pricing of CoCos. Cost of funding i.e. direct market discipline is limited by the requirement for AT1 CoCos to be perpetual.⁶⁷ Secondary market pricing may be ineffective because informed CoCo investors are unlikely to hold CoCos just prior to coupon cancellation. The relative presence of uninformed investors might lead to mispricing as coupon cancellation becomes likely and secondary market pricing becomes important. Consequently, coupon cancellation is a credible way to create incentives for CoCo investors to discipline bank managers because they are open to *ex-post* personal liability if the bank becomes distressed without them canceling CoCo coupons.

Second, coupon cancellation is not dependent on the CET1 ratio falling below a minimum of 5.125%.⁶⁸ Instead, coupon cancellation is dependent on either regulatory discretion⁶⁹ or the existence of distributable items.⁷⁰ Regulatory discretion creates an opportunity for

directors must have regard to the interests of its creditors. When the problems are severe they must notify the supervisory authority or the competent judicial authority to initiate insolvency proceedings. . . . Liability provisions are largely found in non-banking statutes, e.g., in general insolvency law, or in the company law.' See generally, Paul L Davies, 'Directors' Creditor-Regarding Duties in Respect of Trading Decisions Taken in the Vicinity of Insolvency' (2006) 1 European Business Organisation Review 301.

⁶⁶Davies (n 24) 287. '[The relevant legal rule] seems focused on the company's profit and loss account, rather than its balance sheet. The thrust of the rule is on two points. First, the company needs to assess its accumulated profits and losses over the years to determine whether, at the point a dividend is under consideration, there are profits to support it. . . . The second feature . . . is that it applies only to "realised" profits and "realised" losses. "Unrealised" profits and losses are left out of account in the calculation required by section 830.'

⁶⁷Capital Requirements Regulation - 2013/575, art 52(1)(g).

⁶⁸ibid art 54(1)(a).

⁶⁹Capital Requirements Directive - 2013/36/EU, art 104.

⁷⁰Capital Requirements Regulation - 2013/575, art 52(1)(l).

regulatory forbearance. However, personal liability for directors arising from making coupon payments when there are no distributable items creates an additional mechanism for reducing risk-taking and the probability of bank distress.⁷¹

From the perspective of non-regulator stakeholders; there is little difference between write-down and convertible CoCos, given the existence of a regulatory coupon cancellation power and director liability for failing to cancel coupons. The threat of coupon cancellation exists for both types of CoCos. Indeed, write-down and convertible CoCos become the same if coupons are canceled before the CoCo is triggered. Indeed, an industry report has highlighted that ‘coupon cancellation is a key risk for AT1 holders.’⁷² The existence of a coupon cancellation requirement is consistent with the wealth transfers created by most CoCos. What this suggests is that regulators, like market participants, consider that CoCo investors should have an incentive to discipline bank managers.

3. Specialised Bank Insolvency

This section and the next section discuss a suite of options that are substitutes for bailouts or try to reduce the social cost of bank failure by expediting the insolvency process. It has two sub-sections. First, it discusses recovery planning in the EU. Planning is likely to reduce the time it takes to stabilise a bank in distress by reducing coordination⁷³ and agency⁷⁴ problems by credibly committing to a recovery plan *ex-ante*.⁷⁵

⁷¹Davies (n 24) 293. ‘The main thing which the distribution rules have to achieve on this point is the identification of the accounts (the “relevant” accounts) which are to be used for assessing the legality of the distribution. . . . When that is so, the distribution is lawful so long as it is justified by reference to those accounts and the accounts have been properly prepared in accordance with the Act, or have been properly prepared subject only to matters not material for determining whether the distribution would be lawful.’

⁷²Alberto Gallo, Lee Tyrrell-Hendry, Tao Pan, and RBS Research India, *The Revolver—Coconomics: Pricing Contingent Capital Risks* (RBS 3 Jul 2014) 2 and 7. ‘In this report, we analyse and model coupon cancellation and conversion risk. We believe coupon cancellation is a key risk for AT1 holders . . . On average, investors expect a 9% price drop in cocos across the whole market on the first cancellation of coupons, and a 15% drop upon a conversion.’

⁷³Kraakman *et al.* (n 4) 143-4.

⁷⁴Edward R Morrison, ‘Is The Bankruptcy Code An Adequate Mechanism For Resolving The Distress Of Systemically Important Institutions’ (2009) 82 Temple L Rev 449, 461 If the plan requires losses to be borne by creditors, we expect their incentive to discipline bank managers to increase.

⁷⁵See Mathias Dewatripont and Xavier Freixas, ‘Bank Resolution: Lessons from the Crisis’ in Mathias Dewatripont and Xavier Freixas eds. (ed), *The Crisis Aftermath: New Regulatory Paradigms* (Centre for Economic Policy Research 2012) 117. ‘The bank-specific bankruptcy procedure has to be set not only to

CHAPTER 4. CAPITAL AND RESOLUTION

Second, it discusses resolution planning and the powers available to regulators as part of resolution. It begins by discussing resolution with a sale which involves a transfer of the commercial banking assets, and matching deposits, to a private sector purchaser with the remaining assets and liabilities being wound up. This process is designed to avoid the social cost of bank failure such as credit rationing by ensuring the continuing operation of systemically important parts of banks. It then discusses resolution without a sale which is designed to impose losses on bank stakeholders including debt investors so as to expedite the resolution process and overcome the costs associated with a prolonged bank insolvency process.⁷⁶

Resolution without a sale or ‘bail-in’ can be thought of as the regulatory complement to CoCos. CoCos are required as part of a bank’s capital requirements and absorb losses whilst a bank is solvent. On the other hand, a bail-in is effected when a regulator places a bank into resolution, which is an insolvency like process. We therefore expect, as set out above, that CoCos will be triggered before a bail-in is effected.⁷⁷

3.1 *Recovery Planning*

Recovery plans are likely to be implemented as the first step in attempting to save a distressed bank. Article 5 of the BRRD sets out that banks⁷⁸ must draw up, maintain, and update

maximise value to creditors and provide a fair treatment of claim-holders, but also to minimise the social cost of banks’ bankruptcies and preserve the safety and soundness of the banking system. This implies the procedure has to be speedy in order to avoid speculation and bank runs, and it has to be orderly, characterised by legal certainty and no renegotiation.’

⁷⁶Skeel (n 30) 17. ‘The observation that the hiving off of bank insolvency regulation from bankruptcy does not appear to have been inevitable deepens the question of whether it is desirable. Is it? The conventional answer is yes—that banks need a special, administrative insolvency framework because bank resolution needs to take place extremely quickly to preserve the value of bank assets, to assure that depositors have continuous access to their deposits, and to prevent disruptions to the payment system.’

⁷⁷ibid 19. ‘In the words of another advocate of CoCo’s [SIC], contingent capital “is not presented as a panacea or as an adequate remedy by itself, but more as a failsafe, supplementary protection.” A bankruptcy or resolution framework still is a necessary backstop.’

⁷⁸More specifically, credit institutions and investment firms inside the EU, (mixed) financial holding companies in the EU, parent financial holding companies in the EU, financial institutions in the EU that are subsidiaries of one of the three types of entities and certain branches of institutions outside the EU. Directive 2014/59/EU of the European Parliament and of the Council of 15 May 2014 Establishing a Framework for the Recovery and Resolution of Credit Institutions and Investment Firms and Amending Council Directive 82/891/EC, and Directives 2001/24/EC, 2002/47/EC, 2004/25/EC, 2005/56/EC, 2007/36/EC and 2011/35/EU, 2012/30/EU and 2013/36/EU, and Regulations (EU) No 1093/2010 and (EU) No 648/2012,

CHAPTER 4. CAPITAL AND RESOLUTION

a recovery plan for the restoration of a bank's financial situation following a significant deterioration.⁷⁹

In the United States, the *Dodd-Frank Act* allows the Financial Stability Oversight Council⁸⁰ to recommend to the Board of Governors that banks prepare resolution plans and credit exposure reports.⁸¹ Specifically, section 115(d) allows the FSOC to recommend that banks periodically provide a 'resolution plan' to be implemented 'in the event of material financial distress or failure.'⁸² The *Dodd-Frank* definition of 'resolution plan' loosely maps onto the BRRD definition of a recovery plan because the bank draws up the plan rather than a regulator drawing up a plan. In the US, there does not appear to be a separate legislative requirement for resolution authorities to draw up their own plans independent of that drawn up by banks such as the requirement in Article 10 of the BRRD.⁸³

Recovery plans can reduce the size of bailouts and the social cost of bank failure k in the model in Chapter 2.⁸⁴ There are three aspects of recovery plans that reduce the size

of the European Parliament and of the Council [2014] OJ L173/190 (Recovery and Resolution Directive - 2014/59/EU), art 1. See also, Renè Smits, 'Is My Money Safe at European Banks? Reflections On The 'Bail-in' Provisions in Recent EU Legal Texts' (2014) 9 Capital Markets L J 137, 142.

⁷⁹Recovery and Resolution Directive - 2014/59/EU, art 5. 'Member States shall ensure that each institution draws up and maintains a recovery plan providing, through measures taken by the management of the institution or by a group entity, for the restoration of its financial situation following significant deterioration. Recovery plans shall be considered as a governance arrangement within the meaning of Article 22 of Directive 2006/48/EC.

'Member States shall ensure that the institutions update their recovery plans at least annually or after change to the legal or organisational structure of the institution, its business or its financial situation, which could have a material effect on, or necessitates a change to the recovery plan. Competent authorities may require institutions to update their recovery plans more frequently.'

⁸⁰The Financial Stability Oversight Council members are listed in sec111: Wall Street Reform and Consumer Protection (Dodd-Frank) Act of 2010, Pub L No 111-203, 124 Stat 1376, sec111. The members comprise voting and non-voting members. Voting members include the Secretary of the Treasury, the Chairman of the Board of Governors, the Comptroller of the Currency, the Director of the Bureau of Consumer Financial Protection, the Chairman of the SEC, the Chairperson of the FDIC, the Chairperson of the CFTC, the Director of the Federal Housing Finance Agency, the Chairman of the National Credit Union Administration Board, and an independent member with insurance expertise appointed by the President. Non voting members include the Director of the office of Financial Research, the Director of the Federal Insurance Office, a State insurance commissioner, and a State securities commissioner.

⁸¹ibid sec115(d).

⁸²ibid sec115(d).

⁸³Recovery and Resolution Directive - 2014/59/EU, art 10(1).

⁸⁴It is only recently that bank insolvency measures have been directed at avoiding bailouts whilst attempting to rescue or transfer the assets of the bank. 'Bank insolvency measures have two objectives: First, they are meant to provide the bank with "some breathing space" in an attempt to rescue the bank and avoid its liquidation; and second, they protect both the assets of the bank while avoiding their dissipation, and the rights of the bank's creditors in order to ensure the equal treatment of all creditors.' Hüpkes (n 65) 49.

CHAPTER 4. CAPITAL AND RESOLUTION

of bailouts and the social cost k of bank failure. First, recovery plans reduce the time it takes to stabilise a bank in distress by reducing coordination and agency costs by credibly committing to a process for quickly saving a bank.⁸⁵

Second, recovery plans provide a definition of the priority of creditors; specifically which creditors will bear losses and which are immune from losses, which in turn leads to efficient markets (accurate pricing and high liquidity). Accordingly, accurate pricing and liquid markets are likely to increase the information content of security prices so that market participants and regulators can gauge when a bank is approaching distress.⁸⁶ Defining creditor priority assists with price accuracy and provides legal certainty about expected losses.

Third, recovery plans are a mechanism of credibly pre-committing to action when a bank is distressed. However, the credibility of this commitment is linked to giving regulators the powers necessary to rapidly and effectively save a distressed bank. Recovery plans involve a distressed bank setting out a plan that might involve the exercise of powers by a supervisor or resolution authority.⁸⁷ For instance, a recovery plan might involve selling parts of the distressed bank. On the other hand, a recovery plan might involve imposing losses on certain classes of creditors in order to recapitalise the bank on an expedited basis. Both examples can be facilitated by a regulator and therefore empowering a regulator to assist in the sale of bank assets or in the imposition of losses on creditors makes recovery plans more credible. The next sub-section discusses resolution planning and the powers given to resolution authorities.

⁸⁵Recovery and Resolution Directive - 2014/59/EU, arts 5 and 9. See also, Capital Requirements Directive - 2013/36/EU, art 74. See further, Dodd-Frank Act 2010 (n 80) sec115(d).

⁸⁶Zoshar Goshen and Gideon Parchomovsky, 'The Essential Role of Securities Regulation' (2006) 55 Duke L Rev 711, 720. 'Efficient markets are characterized by accurate pricing and high liquidity. Accurate pricing is essential for achieving efficient allocation of resources in the economy . . . Liquid markets benefit the economy by reducing the cost of transacting and the risk associated with investments. Markets are liquid when traders can buy or sell large quantities, immediately, without causing a substantial price effect. This liquidity is a function of time, price and quantity.'

⁸⁷On the other hand, resolution is the exercise of resolution powers by a resolution authority using its own discretion. The BRRD defines resolution as 'provid[ing] authorities with a credible set of tools to intervene sufficiently early and quickly in an unsound or failing institution so as to ensure the continuity of the institution's critical financial and economic functions, while minimising the impact of an institution's failure on the economy and financial system. The regime should ensure that shareholders bear losses first and that creditors bear losses after shareholders, provided that no creditor incurs greater losses than it would have incurred if the institution had been wound up under normal insolvency proceedings in accordance with the no creditor worse off principle as specified in this Directive. Recovery and Resolution Directive - 2014/59/EU, pp 5.

3.2 Resolution Planning

If a bank is distressed, implementing a recovery plan might require a regulator to exercise powers given to it under regulation. It might therefore be necessary for a regulator to draw up a plan either independent of or taking into account the recovery plan created by the distressed bank. In the EU, a resolution authority must draw up a bank specific resolution plan.⁸⁸ There is no equivalent requirement in the US. Article 10 of the BRRD requires resolution authorities to draw up plans for the resolution of banks as a consequence of idiosyncratic and systematic shocks.⁸⁹ Resolution planning in the BRRD sense is advantageous in that it can make recovery plans credible and a regulator is free to promote financial stability in a way that a bank is not. First, planning forces regulators to acquire more bank-specific information to manage the distress of a specific bank.⁹⁰ Regulators can make use of recovery plans while focusing on their financial stability objective.⁹¹ The information acquired from recovery plans and in the process of drawing up a resolution plan ought to regulators to resolve a bank over a very short time period.⁹² Second, a resolution plan ought to include mechanisms that mitigate the fire sale of bank assets, contagion, and credit rationing.⁹³

Of course, it should be noted that resolution planning, by itself, is not directed at overcoming creditor coordination problems⁹⁴ and the loss of goodwill associated with insolvency.⁹⁵ In addition, there is some uncertainty about whether *ex-ante* plans are likely to be credible when a bank becomes distressed and regulators may be forced to act in an ad-hoc

⁸⁸ibid art 10(1).

⁸⁹ibid art 10(1). ‘The resolution authority, after consulting the competent authority and after consulting the resolution authorities of the jurisdictions in which any significant branches are located insofar as is relevant to the significant branch shall draw up a resolution plan for each institution that is not part of a group subject to consolidated supervision pursuant to Articles 111 and 112 of Directive 2013/36/EU. The resolution plan shall provide for the resolution actions which the resolution authority may take where the institution meets the conditions for resolution. Information referred to paragraph 7(a) shall be disclosed to the institution concerned.’

⁹⁰Morrison (n 74) 461.

⁹¹ibid 461.

⁹²Of course, a bank’s business might change between the time that the plan is drawn up and when the bank enters resolution.

⁹³John Armour, ‘The Law and Economics of Corporate Insolvency: A Review’ (2001) ESRC Centre for Business Research University of Cambridge Working Paper No 197 , 22-3; Franklin Allen and Douglas Gale, ‘Limited Market Participation and Volatility of Asset Prices’ (1994) 84 Am Econ Rev 933, 949.

⁹⁴Kraakman *et al.* (n 4) 143-4.

⁹⁵Armour (n 93) 25.

CHAPTER 4. CAPITAL AND RESOLUTION

way. The credibility of resolution plans is essential to their effectiveness. The credibility of resolution plans is related to the powers assigned to a resolution authority.⁹⁶ Broadly speaking, resolution authorities have two types of powers. First, resolution with a sale which involves the sale of the core parts of the bank to a new purchaser with a view to a continuation of the business without a bailout and without contagion and credit rationing. Second, resolution without a sale which involves the imposition of losses on creditors as part of resolution with a view to avoiding insolvency and therefore avoiding the need for a bailout. Each is discussed in turn in this sub-section.

Resolution With A Sale

Resolution with a sale involves the sale of the core parts of a bank to a new purchaser with a view to a continuation of business without the need for a bailout.⁹⁷ The technique has been historically used in the United States. There, the transfer of bank assets and liabilities to a new purchaser were accompanied by the transfer of insured and uninsured deposits, which is in effect a bailout of uninsured depositors, often on the ground that the cost to the FDIC would be reduced by a transaction that may protect the franchise value of the transferee bank.⁹⁸ However, recent legislative developments allow the Bank of England to use the tool in the United Kingdom. More recently, at the European level, the BRRD sets out a framework for resolution with a sale.⁹⁹ The BRRD resolution with a sale framework has three parts. First, the sale of business tool which allows the transfer of the shares,

⁹⁶Indeed, in the US context where the alternative to resolution is bankruptcy rather than standard insolvency law, Skeel provides limited context specific support for resolution. Skeel (n 30) 9. ‘Notice how context-specific this endorsement of the bank insolvency framework is. When banks’ liabilities are nearly all deposits, and the government has guaranteed the deposits, the case for an administrative resolution framework is strong.’

⁹⁷The transfer can be completed by selling either assets or assets and liabilities. In the latter case, the cash paid by the purchaser and their inclination to buy the assets and liabilities is driven by their view of asset risk and their ability to monitor the asset. For instance, the United States Federal Reserve brokered a deal for the sale of Bear Stearns to JP Morgan. Board of Governors of the Federal Reserve System, *Bear Stearns, JP Morgan Chase, and Maiden Lane LLC*, REGULATORY REFORM (2 Aug 2013), <<http://www.federalreserve.gov/newsevents/reform.bearstearns.htm>> accessed 18 Sep 2014.

⁹⁸John Armour *et al.*, *Principles of Financial Regulation* (OUP 2016) 355. ‘In traditional FDIC resolution of small banks, there is only one significant creditor class—the depositors—which the FDIC in practice acted to protect, whether insured or not.’

⁹⁹Recovery and Resolution Directive - 2014/59/EU, art 37(3)(1)-(3).

CHAPTER 4. CAPITAL AND RESOLUTION

assets, and liabilities of the distressed bank to a purchaser.¹⁰⁰ Second, the bridge institution tool which allows the transfer of shares, assets, and liabilities of the distressed bank to a state owned entity¹⁰¹ with a view to a transfer back to the original owners or to a new purchaser.¹⁰² When the sale of business tool or the bridge institution tools are used the remainder of the distressed bank must be wound up under normal insolvency proceedings.¹⁰³ Third, the asset separation tool which transfers the assets or liabilities of a bank or bridge institution to an asset management vehicle which manages the assets¹⁰⁴ to maximise their value through eventual sale or orderly wind down.¹⁰⁵ The asset separation tool can only be used in conjunction with another resolution tool.¹⁰⁶

In the United Kingdom, resolution with a sale can be done in one of three ways. First, by a sale of the commercial banking assets to a private sector purchaser.¹⁰⁷ Second, by transferring some or all of the assets of the distressed bank to a wholly owned subsidiary of the BoE to be managed and ultimately sold to a private sector purchaser.¹⁰⁸ Third, by taking the distressed bank into temporary public ownership by acquiring all of its shares with a view to selling them to a private sector purchaser.¹⁰⁹

In the United States, the Federal Deposit Insurance Corporation (**FDIC**) has historically used resolution with a sale.¹¹⁰ FDIC receivership as it is known has historically been used on commercial banks. Title II of the Dodd-Frank Act extended the FDIC powers to

¹⁰⁰ibid art 38.

¹⁰¹ibid art 40.

¹⁰²ibid art 40(6).

¹⁰³ibid art 37(6).

¹⁰⁴ibid art 42.

¹⁰⁵ibid art 43(3).

¹⁰⁶ibid art 37(5).

¹⁰⁷Banking Act 2009, s 11 (U.K.). ‘The first stabilisation option is to sell all or part of the business of the bank to a commercial purchaser.’

¹⁰⁸ibid s 12. This is known as a bridge bank. ‘The second stabilisation option is to transfer all or part of the business of the bank to a company which is wholly owned by the Bank of England (a “bridge bank”).’

¹⁰⁹ibid s 13. **This is known as temporary public ownership and is the functional equivalent of a bail out.** ‘The third stabilisation option is to take the bank into temporary public ownership.’

¹¹⁰Federal Deposit Insurance Corporation Act of 1991, Pub L No 102-242, 105 Stat 2236 . The FDIC approach is less costly than standard insolvency procedures but may be more costly than the new resolution procedures. There are five broad strategies available to the FDIC. (1) Purchase and Assumption (2) Bridge Banks and New Banks (3) Receivership and Liquidation (4) Conservatorship and Government Assistance and (5) Open Bank Assistance: Morrison (n 74) 455-7.

CHAPTER 4. CAPITAL AND RESOLUTION

non-deposit taking but systemically important banks in the United States.¹¹¹ In the United Kingdom, the *Banking Act 2009* (UK), provides the Bank of England with the authority to exercise powers similar to FDIC receivership on banks.¹¹²

Once the commercial banking assets are sold, the rump must be resolved. FDIC receivership is the process for winding up the non-commercial assets of a bank in the United States. Evidence suggests that FDIC receivership leads to a lower diminution of bank asset value than standard insolvency.¹¹³ The most striking illustration is that a loss of 34.25% is realised when the FDIC uses its receivership powers which is likely to be significantly less than the costs of standard insolvency procedures which include contagion and credit rationing.¹¹⁴ Because the liquidation mechanism in the *Banking Act 2009* (UK) is modeled on FDIC receivership, the evidence is supportive of the use of FDIC style receivership to liquidate the non-viable / non-systemically important banking assets of a distressed bank.

There are at least two reasons why FDIC receivership is less destructive of asset value than normal insolvency. First, from a transaction cost perspective, the FDIC is a specialised receiver that is likely to be a better manager of banking assets than a court appointed insolvency practitioner because of its knowledge and expertise as a regulator.¹¹⁵ Second, from an agency cost perspective, the FDIC is a significant creditor of the distressed bank because it guarantees retail deposits and is subrogated to the position of those depositors. This creates an incentive for the FDIC to minimise the destruction of asset value from receivership in order to increase the value of its claim as a creditor.

In terms of the sale of the commercial banking assets of the distressed bank to a private sector purchaser there are at least three problems which are set out in more detail below. First, the size and complexity of systemically important banks may make them difficult to

¹¹¹Dodd-Frank Act 2010 (n 80) s 201-17. It has been argued that the extension of FDIC receivership powers to systemically important banks is problematic because it creates inconsistency with the resolution of non-deposit taking banks that are not systemically important. It was argued that the FDIC receivership powers should be extended to all non-deposit taking banks. David A Skeel, Jr & Thomas H Jackson, 'Transaction Consistency And The New Finance In Bankruptcy' (2012) 112 Columbia L Rev 152.

¹¹²Banking Act (n 107) s 2.

¹¹³Christopher James, 'The Losses Realised in Bank Failures' (1991) 46 J Fin 1223, 1228.

¹¹⁴*ibid* 1228.

¹¹⁵'[W]ithout a regulatory framework, the relevant federal agency might have insufficient information to make timely rescue decisions.': Morrison (n 74) 459.

resolve; second, potential purchasers may not have enough cash to purchase the commercial banking assets; and third, there may be difficulty coordinating the sale of assets in different jurisdictions.

Resolution Without A Sale

Resolution without a sale is designed to impose losses on shareholders and creditors in an expedited way so that the bank can continue without requiring a bank bailout or at least reducing the size of the bailout.¹¹⁶ Standard insolvency procedures are costly because of coordination problems between creditors that lead to an unnecessary destruction of asset value as well as the agency costs associated with an insolvency practitioner or a court managing the assets of the distressed firm.¹¹⁷ These problems also exist in resolution with a sale but are attenuated by having a specialised resolution authority for a bank with cross-border operations.¹¹⁸ Resolution without a sale has similar problems but steps are taken to reduce those costs relative to both standard insolvency and resolution with a sale.

First, not all creditors are affected by resolution without a sale. In fact, only creditors that are unable to run, i.e. those with long-term debt, are likely to face losses.¹¹⁹ This reduces

¹¹⁶Resolution without a sale is not a new idea. Indeed, the Aghion-Hart-Moore (AHM) procedure has an uncanny resemblance to resolution without a sale. See, Hüpkes (n 65) 94-5. ‘There are several variations of the AHM procedure. They differ with respect to the role played by the authority administering the procedure. The basic concept, however, remains the same. That is, it is a debt equity swap, where debt claims are converted into equity and the company’s senior creditors become shareholders. That way, the decision about whether to liquidate or reorganize is put to a vote by the new equity holders, those who have an incentive to maximise value. Even though the bank’s reorganization value is not known, equity rights are distributed to the failed bank’s creditors. The value of these equity rights is expressed in terms of a function based upon the priority of the creditors’ entitlement in a liquidation.’

¹¹⁷Kraakman *et al.* (n 4) 143-7.

¹¹⁸Regulation (EU) No 806/2014 of the European Parliament and of the Council of 15 July 2014 Establishing Uniform Rules and a Uniform Procedure for the Resolution of Credit Institutions and Certain Investment Firms in the Framework of a Single Resolution Mechanism and a Single Resolution Fund and Amending Regulation (EU) No 1093/2010 [2014] OJ L225/1 (EC Single Resolution Mechanism Regulation), pp 12.

¹¹⁹Avgouleas and Goodhart have argued that capital flight might increase because of the expectation of a bail-ins causing credit rationing. Emiliios Avgouleas and Charles A Goodhart, ‘A Critical Evaluation of Bail-in As A Bank Recapitalisation Mechanism’ (Jul 2014) Centre for Economic Policy Research CEPR Discussion Paper series No 10065 , 17-8 <<http://www.cepr.org/pubs/dps/DP10065.php>>. ‘A desideratum for a revenue raising mechanism is that the taxed cannot easily flee. It is difficult to avoid taxation, except by migration, which has many severe transitional costs. In contrast it is easy to avoid being hit with the costs of creditor bail-in; you just withdraw or sell your claim. Consequently, triggering the bail-in process is likely to generate a capital flight and a sharp rise in funding costs whenever the need for large-scale recapitalisations becomes apparent. ... In such circumstances, bank credit extension would stop, amplifying the downturn,

CHAPTER 4. CAPITAL AND RESOLUTION

coordination costs and the antecedent risk of value destroying runs. However, if the long-term debt matures during a period of distress lenders are more likely to run.

Second, as with resolution with a sale, agency costs are reduced by either appointing a specialised manager - a regulator to manage the process of allocating losses to creditors, or allowing parties to determine *ex-ante* how losses are to be imposed. A regulator is likely to be able to assess the financial position of the distressed bank quicker and more accurately than a judge or insolvency practitioner. Accordingly, an appropriate amount of losses can be imposed much more quickly. This in turn means that resolution of distressed banks can be concluded on a more expedited and less costly basis.

Third, resolution without a sale may require less international coordination depending on the structure of the distressed bank. This sub-section explains the method by which regulators are able to impose losses on shareholders and creditors.

Resolution without a sale is effected through a bail-in. Bail-in is a power that allows a regulator to impose losses on shareholders and creditors outside of standard insolvency.¹²⁰ However, the imposition of losses on shareholders in distressed banks is not the novel element of the tool. The novel element is imposing losses on creditors that would normally benefit from a bailout which creates an *ex-ante* incentive for those creditors to monitor bank managers. The objective that underlies the bail-in tool is the need to ensure financial stability.¹²¹ This objective differs from that of standard insolvency procedures which have the objective of protecting the property rights of creditors. Formally, bail-in has empowers a resolution authority to:

1. write-off and dilute common equity or debt; and
2. write-off and convert debt into equity.

lowering asset values yet further and putting the solvency of other banks at risk. Excluding depositors of all brands from bail-in might reduce the danger of contagion but would not remove it.’

¹²⁰Losses are likely to be imposed on unsecured creditors and particularly the investors in subordinated bank of the distressed issuer. Depositors, particularly guaranteed depositors, are unlikely to be subject to bail-in. Recovery and Resolution Directive - 2014/59/EU, art 44(2) See also, Smits (n 78) 146-9. See further, Samantha Bewick and Richard Heis, ‘Bail-in: The New Tool In The Resolution Box?’ (2014) 11 International Corporate Rescue 67, 103.

¹²¹The objectives of resolution under the BRRD include avoiding adverse effects on financial stability. Recovery and Resolution Directive - 2014/59/EU, art 37.

CHAPTER 4. CAPITAL AND RESOLUTION

Bail-in powers can be used in resolution with a sale as well as resolution without a sale.¹²² In the resolution with a sale context, the purpose of the bail-in power is to convert to equity or write-down debt instruments transferred to a bridge institution, under the sale of business tool or the asset separation tool.¹²³ In the resolution without a sale context, the purpose of the bail-in power is to impose losses on creditors in order to recapitalise a distressed bank.¹²⁴ Importantly, the conversion of debt into equity facilitates a transfer of going-concern ownership to former creditors.

Bail-in has been criticised for having three requirements in order to be effective. First, the timing of the bail-in has to occur when losses have been fully incurred so future rounds of bail-in are not required and, subject to delay because of legal suits by creditors (which would not occur in the context of a bailout), prior to a run by non-bail-in-able creditors who may lose confidence in the credibility of the tool to recapitalise the bank.¹²⁵ Second, market confidence is required to protect the franchise value of the distressed bank and to ensure that official liquidity support is repaid.¹²⁶ Third, the loss on the asset side of the distressed bank's balance sheet must be fully captured so that subsequent bail-ins or the use of other resolution tools are not required.¹²⁷ In the case of an idiosyncratic shock this is likely to be easily identified but during a systemic crisis, historic and traditional valuation methods for an asset are unlikely to reveal the full decline in bank asset values.¹²⁸

¹²²ibid art 43(2).

¹²³ibid art 42(2)(b). 'Member States shall ensure that resolution authorities may apply the bail-in tool ... for any of the following purposes ... to convert to equity or reduce the principal amount of claims or debt instruments that are transferred: (i) to a bridge institution with a view to providing capital for that bridge institution; or (ii) under the sale of business tool or the asset separation tool.'

¹²⁴ibid art 42(2)(a). 'Member States shall ensure that resolution authorities may apply the bail-in tool ... for any of the following purposes ... to recapitalise an institution or an entity referred to in point (b), (c) or (d) of Article 1(1) of this Directive that meets the conditions for resolution to the extent sufficient to restore its ability to comply with the conditions for authorisation (to the extent that those conditions apply to the entity) and to continue to carry out the activities for which it is authorised under Directive 2013/36/EU or Directive 2014/65/EU, where the entity is authorised under those Directives, and to sustain sufficient market confidence in the institution or entity.'

¹²⁵Avgouleas and Goodhart (n 119) 11.

¹²⁶ibid 11.

¹²⁷ibid 11-2.

¹²⁸ibid 12.

4. The Benefits of the New Framework

The purpose of increasing capital requirements and resolution is to reduce the need for bank bailouts which can be achieved in at least two ways: first, bank insolvency is avoided because of monitoring and second, the costs associated with resolution are cheaper than a bailout and so resolution is pursued in place of a bailout. With respect to the latter, the resolution framework reduces insolvency costs in a number of ways. First, resolution reduces direct insolvency costs by reducing the need to pay court fees associated with standard insolvency.¹²⁹ Second, increasing capital requirements (including CoCos) reduces insolvency costs in two ways: to begin with, stakeholders may be incentivised to monitor banks and to therefore reduce the probability of bank insolvency, and, second, CoCos are an additional form of capital that should absorb losses prior to bank insolvency.

More specifically, there are six distinct insolvency cost savings associated with the new bank capital and resolution framework. First, the decision to enter resolution is at the discretion of a regulator or contractually specified. If resolution is triggered by a regulator then, subject to forbearance incentives, this will be done in the interest of financial stability. On the other hand, in standard insolvency law in the UK, creditors can place a firm into an insolvency process in order to protect their own financial interests. That being said, the interest of creditors are protected by the no creditor worse-off principle.¹³⁰ The principle operates to protect creditors from losses in resolution that would be greater than losses from standard insolvency procedures. This creates certainty and might facilitate efficient markets. However, it is subject to a valuation by a party tasked to promote financial stability rather than maximising returns to creditors which reintroduces a potential agency cost.¹³¹

Second, resolution involves the delegation of authority to the regulator or an appointee of the regulator. The BRRD specifies that a special manager is appointed to operate the

¹²⁹It is questionable whether indirect costs in the lead up to resolution would differ significantly from standard insolvency due to special management: Recovery and Resolution Directive - 2014/59/EU, art 35.

¹³⁰ibid art 74. However, the no creditor worse off principle requires the valuation of a bank's assets to determine the outcome in insolvency. This process might allow resolution authorities to functionally impose losses on creditors.

¹³¹Harry Huizinga and Luc Laeven 'Bank Valuation and Regulatory Forbearance During a Financial Crisis' (unpublished manuscript, Nov 2010).

CHAPTER 4. CAPITAL AND RESOLUTION

distressed bank.¹³² The special manager must have ‘the qualifications, ability and knowledge required’ to, amongst other things, protect public funds.¹³³ The knowledge required by a special manager is likely to result in a lower diminution in the value of the distressed bank’s assets than the appointment of an insolvency practitioner by a court.

Third, the special manager is appointed with ‘all the powers of the shareholders and the management body of the [bank].’¹³⁴ Being able to exercise the power of both shareholders and managers reduces the coordination costs that arise in standard insolvency procedures. A decision taken by a special manager is likely to be made more quickly than a decision agreed upon by the entire body of creditors or by different classes of shareholders and creditors. This is likely to streamline the resolution process and facilitate an expedited recapitalisation and / or winding down of a distressed bank.

Fourth, resolution without a sale and CoCos avoid cash-in-the-market pricing, which is analogous to a firesale effect. More specifically, cash-in-the-market pricing occurs where the price of an asset is not based on discounted future cashflows but instead on the amount of cash that potential purchasers have available to finance the acquisition.¹³⁵ When a systemically important bank fails and a regulator becomes a forced seller of its assets, it is uncertain whether assets can be sold at a fair price. This is because of cash-in-the-market pricing.

Normally, banks would be hard-pressed to liquidate their assets to finance an acquisition. In particular, a large discount is likely to be applied to a bank selling its loan book in order to finance an acquisition.¹³⁶ When a systemically important bank is distressed other banks may have difficulty obtaining the liquidity to buy its assets. This might be a function of the liquidity hoarding that arises during a systemic crisis. The distressed assets are

¹³²Recovery and Resolution Directive - 2014/59/EU, art 35.

¹³³ibid art 31(2)(c) and 35(1). Together the two sections provide that the special manager shall have the statutory duty to take all the measures necessary to promote the resolution objectives referred to in Article 31 which include minimising reliance on extraordinary public financial support.

¹³⁴ibid art 35(2).

¹³⁵Allen and Gale (n 93) 949. ‘When liquidity is scarce, asset prices are not determined by discounted cash flows, but rather by the amount of cash-in-the-market. It is the relative variation in the amount of the long asset and cash supplied to the market that is important for price volatility.’ See also, Franklin Allen and Douglas Gale ‘Cash-in-the-Market Pricing to Financial Fragility’ (unpublished manuscript, 2004) <<http://www.econ.nyu.edu/user/galed/papers/paper04-09-03.pdf>>.

¹³⁶The bank could securitise its loan book but there may be problems associated with this course of action.

CHAPTER 4. CAPITAL AND RESOLUTION

consequently bought at firesale prices by investors with liquidity. It has been suggested that this cash-in-the-market pricing explains why bailouts have been used in place of resolution with a sale when there is a systemic shock to the banking system.¹³⁷ By providing a bailout the government ensures that banking assets are not bought by liquidity endowed investors outside the banking industry who may not be the most efficient users of the assets.

Fifth, a pan-European resolution framework reduces coordination problems associated with supervision and resolution authorities protecting national interests by externalising the cost of bank failure.¹³⁸ Resolution also allows regulators to resolve cross-border bank grounds—by assigning conditional authority to one regulator.¹³⁹ CRD IV requires a single consolidating supervisor to make joint decisions with other regulators for a banking group in the European Union.¹⁴⁰ More recently, the single supervisory mechanism (SSM)¹⁴¹ confers on the European Central Bank the power to supervise banks across national borders.¹⁴² Com-

¹³⁷Viral V Archarya and Tanju Yorulmazer, ‘Cash-in-the-Market Pricing and Optimal Resolution of Bank Failures’ (2008) 26 Rev Fin Studies 2705, 2706. ‘When only a few banks fail, these banks can be acquired by surviving banks. However, for a large number of failures, the liquidity of surviving banks enables them to acquire all failed banks only at fire-sale prices, an affect akin to the industry-equilibrium hypothesis . . . The resulting “cash-in-the-market” pricing . . . makes it more likely that investors outside the banking sector, who are liquidity-endowed by potentially not the most efficient users of these assets, end up purchasing some failed banks’ assets.’

¹³⁸Dewatripont and Tirole (n 75) 111. ‘There are clear potential incentive problems faced by the home supervisor in terms of consolidated supervision, with the risk of being pressured to “limit damage” and leaving part of the mess to foreign countries, with potential dangers in terms of contagion.’

¹³⁹See Capital Requirements Directive - 2013/36/EU, arts 111-118. CRD IV sets out in some detail (1) how a consolidating supervisor is to be determined (2) requires a consolidating supervisor to facilitate coordination amongst supervisors (3) mandates joint decisions (4) requires information sharing (5) requires coordination and cooperation agreements amongst supervisors (6) requires the consolidating supervisor to establish colleges of supervisors, (7) establishes cooperation obligations amongst authorities, and (8) requires authorities to ask foreign authorities to provide information about entities incorporated in their jurisdiction. See also Rosa M Lastra (ed), *Cross-Border Bank Insolvency* (OUP 2011) 166-7.

¹⁴⁰Capital Requirements Directive - 2013/36/EU, arts 111 and 113 However, there is an exception based on common agreement for a group to not be supervised by a consolidating supervisor. *ibid* art 111(5). Technical standards have recently been developed for decisions on institution-specific prudential requirements. Com-missions Implementing Regulation (EU) No 710/2014 of 23 June 2014 Laying Down Implementing Technical Standards With Regard to Conditions of Application of the Joint Decision Process for Institution-Specific Prudential Requirements According to Directive 2013/36/EU of the European Parliament and of the Council [2014] OJ L188/19 (Implementing Regulation Regarding Decision Process for Institution-Specific Prudential Requirements).

¹⁴¹Council Regulation (EU) No 1024/2013 of 15 October 2013 Conferring Specific Tasks on the European Central Bank Concerning Policies Relating to the Prudential the Prudential Supervision of Credit Institutions [2013] OJ L287/63 (EC Single Supervisory Mechanism Regulation).

¹⁴²See, *ibid* art 1. See also, *ibid* pp 5. ‘Competence for supervision of individual credit institutions in the Union remains mostly at national level. Coordination between supervisors is vital but the crisis has shown that mere coordination is not enough, in particular in the context of a single currency. In order to preserve financial stability in the Union and increase the positive effects of market integration on growth and welfare,

plementing CRD IV and SSM, the BRRD requires group level resolution authorities (consolidating supervisors) to establish resolution colleges¹⁴³ within the European Union,¹⁴⁴ and with resolution authorities in third countries.¹⁴⁵ The single resolution mechanism (SRM)¹⁴⁶ goes further than the BRRD. It empowers the Board,¹⁴⁷ as a single resolution authority, to resolve banks within the EU. A purpose of the SRM is to overcome coordination problems when multiple resolution authorities in different jurisdictions are required to resolve a bank. The preamble to the SRM says:

‘The establishment of the SRM will ensure a neutral approach in dealing with failing banks and therefore increase stability of the banks of the participating Member States and prevent the spill-over of crises into non-participating Member States and will thus facilitate the functioning of the internal market as a whole. *The mechanisms for cooperation regarding institutions established in both participating and non-participating Member States should be clear, and no Member State or group of Member States should be discriminated against, directly or indirectly, as a venue for financial services.*’¹⁴⁸ (emphasis added)

The joint effect of CRD IV, the SSM, the BRRD, and the SRM from an insolvency cost perspective is two-fold. First, it creates a framework for pan-European entities to supervise and resolve banks with cross-border operations. Second, it establishes the means for national supervisors and resolution authorities to coordinate their actions when supervising and re-

integration of supervisory responsibilities should therefore be enhanced. This is particularly important to ensure a smooth and sound overview over an entire banking group and its overall health and would reduce the risk of different interpretations and contradictory decisions on the individual entity level.’

¹⁴³Recovery and Resolution Directive - 2014/59/EU, art 88.

¹⁴⁴*ibid* art 89.

¹⁴⁵The BoE and the FDIC have issued a joint statement indicating that they are exploring coordination of banks with cross border operations in both of their jurisdictions. See, Bank of England & Federal Deposit Insurance Corporation, *Resolving Globally Active, Systemically Important, Financial Institutions* (10 Dec 2012) 12: ‘A key part of the work undertaken by the U.S. and the U.K. has been to identify the regulatory obligations of foreign authorities in response to a resolution originated by a home authority. Where any impediments to effective whole group resolution have been identified, authorities are in the process of exploring methods to overcome them.’ See also, Recovery and Resolution Directive - 2014/59/EU, arts 93-8.

¹⁴⁶EC Single Resolution Mechanism Regulation.

¹⁴⁷*ibid* arts 42-3.

¹⁴⁸*ibid* pp 12.

solving a cross-border group. These mechanisms are not without their problems¹⁴⁹ but are a step forward in reducing the coordination problems between regulators serving national interests.

Sixth, CoCos reduce the expected size of future bank bailouts in two ways. First, CoCos provide capital to distressed banks at a time when access to equity markets might be constrained.¹⁵⁰ Second, CoCos can create incentives for either shareholders or CoCo investors to monitor banks and to therefore reduce the probability that they become distressed and require a bailout.¹⁵¹ The remainder of this thesis will explore the extent to which CoCos create marginal incentives for monitoring and how those incentives might be strengthened.

5. Conclusion

This chapter has analysed the methods directed at reducing the expected size of taxpayer funded bailouts. It has set out the new tools that are used to stabilise a distressed bank.

First, in order to reduce the likelihood of insolvency and the expected cost to taxpayers, banks are required a minimum amount of equity capital. This absorbs losses on a going concern basis as asset values fluctuate.

Second, banks are required to issue a new type of going concern capital known as CoCos. CoCos are triggered and reduce the interest liability of banks, and if they are convertible, increase the amount of capital that a bank has on a going concern basis because they are triggered whilst equity still has value.

Third, banks are required to prepare recovery plans. These plans are submitted to regulators and set out a process for recapitalising or winding down a distressed bank.

Fourth, regulators are required to maintain a resolution plan that is separate from recovery plans. These resolution plans might then be implemented if the other tools have

¹⁴⁹See e.g., CRD IV allows for the breakdown of the consolidated supervision system if all competent authorities agree to waive the requirement. Capital Requirements Directive - 2013/36/EU, art 111(5).

¹⁵⁰Patrick Bolton and Frederic Samama 'Capital Access Bonds: Contingent Capital with an Option to Convert' (unpublished manuscript, Sep 2011).

¹⁵¹Jens Hilscher and Alon Raviv 'Bank Stability and Market Discipline: The Effect of Contingent Capital on Risk Taking and Default Probability' (unpublished manuscript, Sep 2012) <<http://www.brandeis.edu/departments/economics/RePEc/brd/doc/Brandeis.WP53.pdf>>.

CHAPTER 4. CAPITAL AND RESOLUTION

been exhausted. The BRRD gives regulators a series of powers to stabilise a distressed bank by either selling the assets of the bank to a new entity or by directly imposing losses on shareholders and creditors using the bail-in tool.

This suite of tools to stabilise a distressed bank have a number of benefits above and beyond standard insolvency. Consequently, it is possible that they can reduce the probability of bank insolvency and therefore the expected size bailouts. Indeed, if the social costs associated with increased capital and resolution are lower than the cost of a bailout then this new framework might eliminate the need for taxpayer funded bailouts.

The next two chapters of this thesis focus specifically on CoCos. Chapter 5 analyses CoCo triggers. It focuses on the credibility of triggering CoCos without delay or forbearance. It argues, amongst other things, that CoCo trigger levels need to be increased. Chapter 6 discusses monitoring. It defines the monitoring technologies available to CoCo investors and shareholders, it analyses the different types of CoCos that have been issued, and analyses the extent to which they are likely to create incentives for either CoCo investors or shareholders to monitor.

5

CoCo Triggers and Monitoring

1	Triggers Theoretically	116
1.1	Model Assumptions	117
2	Triggers in Reality	118
2.1	Trigger Types	122
2.2	Trigger Levels	128
2.3	Implications for Model	132
3	Conclusions and Policy Prescriptions	133

CHAPTER 5. TRIGGERS

The remaining chapters of this thesis focus on CoCos. In particular, this chapter will focus on CoCo triggers. CoCo triggers are contractual mechanisms that set out the circumstances when a CoCo is either converted into equity or written-down.

This chapter examines CoCo triggers in two dimensions: first, the type of trigger, which is either market or regulatory, and, second, the level of trigger which represents how close to resolution a bank is before the CoCo is triggered.¹ Each dimension of analysis has implications for the incentives of stakeholders to monitor. For instance, a market based trigger can be viewed by market participants but it can also be manipulated by those participants.² On the other hand, a regulatory trigger gives managers and regulators some discretion about when a CoCo ought to be triggered, this can avoid unnecessary triggers but can also facilitate forbearance.³ In addition, a higher trigger level means that CoCos could be triggered even if a bank is solvent. This means that a CoCo being triggered doesn't necessarily mean that a bank is distressed. This is problematic because triggers are a noisy signal of bank health from a market efficiency perspective. On the other hand, for distressed banks earlier recapitalisation might stave off entry into resolution or indeed the need for a bailout. Therefore, from a financial stability perspective, higher trigger levels may help recapitalise distressed banks. This chapter highlights that triggers for most CoCos are relatively low trigger meaning that the CoCos will ordinarily be trigger just prior to or indeed as part of the resolution of the

¹Financial Stability Board, *Update of Group of Global Systemically Important Banks (G-SIBs)* (1 Nov 2012) 8-9. The FSB market-based triggers include: ratings downgrades, revenue reports or P&L, credit risk limits, equity ratios, per cent renewal of wholesale financing, withdrawal of deposits and other funding, increased collateral requirements, rise in public debt, GDP forecasts, three-month LIBOR, senior debt spreads, and counterparty risk events.

²Robert L McDonald, 'Contingent Capital With a Dual Price Trigger' (2013) 9 J Fin Stability 230, 237. 'Market-based triggers seem prone to type I errors, and regulatory and accounting-based triggers seem prone to type II errors. It seems unlikely that there would be a systemic crisis without financial firms having low stock prices. This would reduce the likelihood of a type II error for market-based triggers. Accounting and regulation, however, are not automatic, and both are subject to political winds and whims. Basing conversion on regulatory judgment would reduce the likelihood of a type I error, in which bonds converted into stock without any crisis.' See also Natlya Martynova and Enrico Perotti 'Convertible Bonds and Bank Risk-Taking' (unpublished manuscript, Sep 2012). 'The result is that market triggers cause more unnecessary conversions, but help avoid regulatory forbearance, which fails to trigger necessary conversions.'

³Wulf A Kaal, 'Initial Reflections On The Possible Application of Contingent Capital in Corporate Governance' (2012) 26 Notre Dame J of L, Ethics & Public Policy 281, 301. 'Converting CCS into equity prematurely at a time when the financial institutions can still operate without an equity capital injection could mean that the CCS capital injection would no longer be available when the financial institution will be unable to obtain other funding.'

CHAPTER 5. TRIGGERS

bank. The exception to this pattern are staged write-down CoCos, where coupon amounts are reduced as a bank's capital position deteriorates.

This chapter is linked to the extensions in Chapter 2. It shows how two assumptions in that chapter ensure that enough debt is retired and replaced with either shares or CoCos that the bank can avoid insolvency. It argues that in reality it is uncertain whether banks hold enough equity and CoCos to avoid insolvency, it also highlights how resolution might change the incentives of stakeholders relative to insolvency. Specifically, it addresses two assumptions in Chapter 2: first, that regulators retire debt⁴ and allow shareholders to either issue new shares or CoCos, second, the model assumed a payment to CoCo investors in the success and failure⁵ state that was less than the cash after paying debt investors,⁶ which ensured that there was residual value to shareholders in order to avoid insolvency. Overall, these assumptions ensure that enough debt is retired and replaced with either shares or CoCos so that banks avoid insolvency and the resultant social cost.⁷

In the real world, there are two situations that are outside of the scope of the model in Chapter 2, which are explored in this chapter. First, it is uncertain whether enough debt is replaced with either CoCos or shares for a bank to avoid insolvency. Second, entry into resolution is likely to take place before a bank enters into insolvency and the payoffs in resolution are likely to be different from the contractual payoffs set out in a CoCo. Consequently, the prospect of resolution is likely to change the incentives of CoCo investors and shareholders.

This chapter highlights the differences between the model in Chapter 2 and the real world with respect to triggers. In the analysis it shows that the incentives of stakeholders to monitor banks may not be as sharp as implied by the model and indeed may be contrary to the incentives suggested by the model. It highlights how trigger types and trigger levels affect those incentives. Therefore, it argues for changes to CoCo triggers that create incentives for stakeholders to monitor banks.

Ultimately, this chapter creates a link between a game theoretic approach

⁴the specific proportion of the retired debt was denoted Δ .

⁵This assumption was denoted $c^f \leq \Delta$

⁶This assumption was denoted as $c^s \leq v^u - v^d + \Delta$.

⁷Which was denoted k in the model.

to monitoring with an analysis of the law and finance of CoCo triggers. It highlights how deviations in the law impact the incentives of shareholders and CoCo investors to monitor banks. It also highlights changes to the law that facilitate outcomes that arise in the game theoretic model.

This chapter has three sections. The first section discusses CoCos theoretically. It begins with a description of the legal requirements for CoCos and then discusses how the legal requirements interact with the assumptions of the model in Chapter 2. The second section shows contrary to the model that a bank enter insolvency despite issuing CoCos because: first, there may not be enough CoCos to stave off insolvency, and second, the trigger types gives rise to a risk of regulatory forbearance. The second section also discusses minimum trigger levels and whether these are set high enough to recapitalise a bank when a CoCo is triggered. It argues for higher trigger levels to increase the likelihood that CoCo triggers lead to a recapitalisation of a bank that avoids the need for implementing recovery and resolution plans. The third section concludes.

1. Triggers Theoretically

This section sets out the two assumptions that relate to insolvency in the model in Chapter 2. It shows that these assumptions ensure that enough debt is retired and replaced with either shares or CoCo that the bank can avoid insolvency. It argues that in reality it is uncertain whether the amount of AT1 CoCos that banks issue is enough for a bank to avoid resolution or indeed insolvency. It also argues that a bank is likely to be placed into resolution rather than insolvency when its position deteriorates. It then argues that the incentives created by entry into resolution may undermine the incentives of CoCo investors to monitor that are otherwise created by the design of CoCos.

This section is about AT1 CoCos which require banks to first, inform competent authorities, second, inform investors of the trigger, and third, write-down or convert CoCos in

CHAPTER 5. TRIGGERS

accordance with the contractual terms.⁸ Specifically, art 54(5) of the CRR provides:⁹

When a trigger event occurs institutions shall do the following:

- (a) immediately inform the competent authorities;
- (b) inform the holders of the Additional Tier 1 instruments;
- (c) write down the principal amount of the instruments, or convert the instruments into Common Equity Tier 1 instruments without delay, but no later than in one month, in accordance with the requirement laid down in this Article.

A regulatory trigger requirement means that the bank and investors cannot exercise their contractual right to waive the trigger.¹⁰ This requirement only applies to AT1 CoCos. On the other hand, there is no regulatory requirement for Tier 2 capital to be triggered which means banks and investors can waive the trigger. The existence in the CRR of a requirement that AT1 triggers cannot be waived reduces the capacity for forbearance by banks and regulators. The lack of a similar provision for Tier 2 CoCos increases the risk of forbearance by both regulators and banks.

1.1 *Model Assumptions*

This sub-section discusses the assumptions in Chapter 2 and argues that their effect is to ensure that enough debt is retired and replaced with CoCos and shares that a bank can be recapitalised without entering insolvency. There are two assumptions.

First, we assumed that regulators retired debt and allowed shareholders to either issue new shares or CoCos. The retired debt¹¹ that is replaced with either CoCos or shares is a

⁸Regulation (EU) No 575/2013 of the European Parliament and of the Council of 26 June 2013 on Prudential Requirements for Credit Institutions and Investment Firms and Amending Regulation (EU) No 648/2012 [2013] OJ L176/1 (Capital Requirements Regulation - 2013/575), art 54(5).

⁹ibid art 54(5).

¹⁰Jack Beatson, Andrew Burrows, John Cartwright, *Anson's Law of Contract* (29th edn, OUP 2010) 466. 'A party who voluntarily agrees to forbear from insisting on the mode of performance or time of performance fixed by the contract, or forbears from so insisting, will be held to have waived the right to require that the contract be performed by the other party in accordance with its terms.'

¹¹Which we denoted Δ .

proportion of the total debt retired by the regulator in the recapitalisation case.

Second, we assumed that there was sufficient surplus in the success and failure state to avoid insolvency and the required quantity of retired debt to be large enough in the success and failure states to avoid insolvency.¹²

Overall, these assumptions ensure that enough debt is retired and replaced with either shares or CoCos that the bank can avoid insolvency. In particular, that the payments to CoCo investors in the success or failure states have to be lower than the cash available after paying ordinary debt investors ensures that the retired debt allows the bank to avoid insolvency. These assumptions relate to the financial claims of CoCo investors and, consequently, the extent to which they might be financially diluted.¹³

Therefore, the model is most useful for understanding the real world when its assumptions are satisfied. Consequently, this chapter examines the real world evidence to get a handle on deviations from the assumptions and the applicability of the model. If reality comports to the assumptions in the model then the predictions of the model are useful for understanding real-world empirical observations. On the other hand, if reality does not comport with the assumptions of the model then the predictions of the model may be less useful in understanding real world observations. Of course, the model may still be helpful for interpreting observations even if the assumptions are violated slightly because: first, the deviations are minor, and, second, the deviations can be rectified by changes in regulation.

2. Triggers in Reality

This section shows that, contrary to the design of the model, in reality a bank can enter insolvency despite issuing CoCos. However, consistent with the model, regulators require banks to issue capital which can either be equity or CoCos. Article 92(1) of the CRR requires

¹²We recall that c^s is the payment to CoCo investors in the success state, v^u is the value of the bank in the success state, v^d is the value of the bank in the failure state, and of course Δ is a proportion of the debt retired by the regulator in the recapitalisation case that shareholders can choose to replace with either shares or CoCos. Consequently, $c^s \leq v^u - v^d + \Delta$. The assumption is therefore that the payment to CoCo investors in the success state has to be less than the sum of (1) the difference in the value of the bank between the success and failure states plus (2) the amount of retired debt Δ .

¹³The term financial dilution is discussed in Chapter 6.

CHAPTER 5. TRIGGERS

banks to issue either CoCos or CET1 as 1.5% of the Tier 1 capital requirement of 6% of risk-weighted assets.¹⁴ It is uncertain whether this amount of 1.5% of risk-weighted assets is enough for banks to avoid insolvency. The Independent Commission on Banking in the UK noted that 95% of banks that have failed in recent crises would have survived if their total capital was 24% of risk-weighted assets.¹⁵ Given that the Tier 1 capital requirement for banks is 6% and can rise to a potential maximum of about 13% it is unlikely that a bank that satisfied the AT1 requirement in the CRR would survive a financial crisis. Therefore, the 1.5% AT1 requirement is highly unlikely to ensure that banks avoid insolvency. Given the insufficiency of the AT1 requirement, there are two outcomes that can arise for a bank in distress. First, the bank is recapitalised because the AT1 shares or CoCos absorb losses which increase its CET1 position. Second, the bank enters insolvency despite imposing losses on AT1 capital.

A bank can enter insolvency despite having CoCos for two reasons. First, under the *Insolvency Act 1986* (UK) a bank is considered insolvent if it is “unable to pay its debts”. Insolvency can be established by applying the cash flow test which is satisfied if a bank is unable to pay even a *single* debt.¹⁶ Second, banking licenses can be revoked if a bank cannot satisfy its prudential requirements. Retaining a banking license requires a bank to satisfy requirements set out in CRD IV. A bank can impose losses on AT1 capital and still breach the requirements in CRD IV. It follows that banks can enter insolvency despite satisfying or indeed triggering their AT1 capital instruments.

Article 18(d) of CRD IV sets out three distinct reasons that allow a regulator to revoke a banking license and only the first is relevant to the analysis that follows.¹⁷ Banking

¹⁴Capital Requirements Regulation - 2013/575, art 92(1).

¹⁵Independent Commission on Banking, *Final Report: Recommendations* (Sep 2011) 112.

¹⁶Roy Goode, *Principles of Corporate Insolvency Law* (Sweet & Maxwell 2011) 128. ‘Where a company defaults in payment of an undisputed debt after demand has been made, that is sufficient evidence that it is unable to pay its debts as they fall due, and if it persists in its failure to pay it will be taken to be unable to pay its debts even if in fact it appears to be solvent. This salutary rule, which applies on the failure to pay even a single debt, reflects the view that a company which is able to pay an undisputed debt and chooses not to do so has only itself to blame if the inference is drawn that it is unable to pay.’ See also John Armour, Henry Hansmann and Reiner Kraakman, ‘The Essentials of Corporate Law: What is Corporate Law?’ (2009) Harvard John M Olin Discussion Paper No 632 , 3 <<http://lsr.nellco.org/harvard-olin/632/>>.

¹⁷The second is similar to the test for insolvency i.e. an inability to satisfy its debts. The third, is dependent on a bank having sufficient collateral as security for deposits—a regulator that provides LOLR funding can

CHAPTER 5. TRIGGERS

regulators can revoke a banking license if a bank does not satisfy prudential requirements, cannot fulfill its obligation to creditors, and no longer provide security for assets provided by depositors.¹⁸ The absolute minimum CET1 capital ratio for a bank is 4.5% and, unless there is a systemic crisis, below this level it would be difficult for a regulator to justify the decision to not revoke a banking license.¹⁹ In addition, above this level, regulators have the discretion to revoke a banking license.

It does not necessarily follow that when a banking license is revoked a bank will become insolvent. Nor does it follow that having a CET1 level below 4.5% means that a bank will become insolvent. However, it is likely in both situations that a bank will become insolvent because there is likely to be a wholesale and retail run due to a crisis of confidence. To the extent that wholesale and retail depositors are informed of the deterioration of the bank's capital position they will withdraw their funding causing a liquidity crisis that will quickly become a solvency crisis.²⁰

Giving regulators discretion about revoking a banking license raises the issue of forbearance. There are two relevant types of forbearance: forbearance by bank managers through fraud or waiver and forbearance by a regulator changing regulations.²¹ These forms of forbearance are more likely to apply to Tier 2 CoCos than AT1 CoCos because of article 54(5) of the CRR.²² Article 54(5) requires banks to notify regulators and investors as well as converting or writing down a triggered AT1 CoCo. This removes the ability of the bank and investors to agree to waive their contractual rights. However, it does not stop the regulator from changing the CRR. It binds banks and investors and therefore limits forbearance by

help a bank avoid this situation. Directive 2013/36/EU of the European Parliament and of the Council of 26 June 2013 on Access to the Activity of Credit Institutions and the Prudential Supervision of Credit Institutions and Investment Firms amending Directive 2002/87/EC and repealing Directives 2006/48/EC and 2006/49/EC [2013] OJ L176/338 (Capital Requirements Directive - 2013/36/EU), art 18(d).

¹⁸ibid art 18(d) allows a regulator to revoke a banking license for failure to comply with capital requirements. Article 104(1)(a) says those capital requirements are found in Chapter 4 of CRD IV and the CRR. Chapter 4 of CRD IV refers to the various forms of capital that banks are required to issue including the 4.5% minimum own funds requirement.

¹⁹Capital Requirements Regulation - 2013/575, art 92(1)(a).

²⁰The situation might develop similarly to the wholesale and then retail run that occurred in Northern Rock. See Hyun Song Shin, 'Reflections on Northern Rock: The Bank Run that Heralded the Global Financial Crisis' (2009) 23 J Econ Persp 101.

²¹Both of which are discussed in the next subsection about different trigger types.

²²Capital Requirements Regulation - 2013/575, art 54(5).

CHAPTER 5. TRIGGERS

bank managers. Therefore it creates an additional hurdle for regulators because it requires a rule change in the CRR for the regulator to facilitate bank manager forbearance. Similar constraints do not apply to Tier 2 CoCos.

There is an expansive literature on regulatory forbearance in the context of banking crises which is beyond the scope of this thesis.²³ Relevantly, that literature supports the conjecture that bank regulators might forbear and revoke a banking license too late in a gamble to avoid either the reputational damage²⁴ or financial damage²⁵ that would follow revoking a banking license. A regulator that revokes a banking license is likely to receive a reputational sanction because market participants might infer that the license was revoked because of lax supervision.²⁶ This sanction is likely to adversely affect other banks supervised by the same regulator. In addition, revoking a banking license sends a negative signal to market participants about the prospects of the bank and might precipitate a liquidity and / or a solvency crisis at the bank.

Forbearance by regulators, to avoid reputational and financial sanctions is likely to give banks enough time to trigger CoCos and to recapitalise themselves without entering insolvency. However, there is an additional layer of forbearance by managers and regulators that might arise with respect to triggering CoCos. These are addressed in the first subsection. There are three outcomes that can materialise when there is forbearance. First, the CoCo is triggered leading to a successful recapitalisation of a distressed bank. Second, the

²³It has been argued that the Savings & Loans Crisis in the US was exacerbated by regulatory forbearance. See Eva Hüpkens, *The Legal Aspects of Bank Insolvency: A Comparative Analysis of Western Europe, the United States, and Canada* (Kluwer 2000) 37. ‘In the United States, forbearance and the failure of the regulators to close the banks before they became hopelessly insolvent were identified as factors aggravating the Savings & Loans Crisis. Earlier and more vigorous enforcement action was prescribed as a cure. Particularly in times when the number of troubled banks begins to rise, bank regulators have a political disincentive to intervene promptly and resort to formal remedial measures.’

²⁴Reputational damage to the regulator. See, *ibid* 37.

²⁵Financial damage to the bank if market participants assume that regulators have access to private information. See, Ansgar Walther & Lucy White ‘Rules versus Discretion in Bank Resolution’ (unpublished manuscript, 12 Jun 2015). ‘If the regulator ‘bails in’ a large portion of the bank’s debt, market participants rationally infer that the bank must be under-capitalized. This revelation can trigger costly disruptions such as runs by short-term creditors. Therefore, regulators with bad news and discretion have incentives to act as if they had better news. In equilibrium, they conduct excessively weak bail-in policies, leaving banks under-capitalized compared to the first best.’

²⁶Alan D Morrison and Lucy White, ‘Reputational Contagion and Optimal Regulatory Forbearance’ (2013) 110 J Fin Econ 642.

CoCo is triggered but the bank needs to be placed into resolution because it is distressed. Third, the CoCo is triggered as part of resolution and not prior to resolution. The next two sub-sections highlight that the forbearance incentives that exist within the legal framework governing CoCos make the third outcome most likely.

2.1 *Trigger Types*

The type of trigger used in CoCos can create incentives for shareholders and regulators to forbear and CoCo investors to want a CoCo triggered. Forbearance in triggering a CoCo makes it more likely that when the CoCo is finally triggered the bank has deteriorated to the level where the recapitalisation using a CoCo comes in one of two circumstances: first, just prior to placing the bank into resolution, and second, as part of the resolution process.

There are two possible types of CoCo triggers.²⁷ First, a trigger based on accounting measures such as a regulatory capital requirements.²⁸ These triggers have some element of regulatory discretion. In the context of a regulatory capital trigger, the regulator sets out what types of instruments count as regulatory capital and therefore has control over the capital position of a bank. Accounting triggers are subject to manipulation by bank managers and regulators. For instance, managers may prematurely trigger a CoCo and consequently reduce the amount of capital available when the bank becomes truly distressed.²⁹ Effectively designed accounting triggers avoid forbearance by having strict trigger conditions that are imposed with certainty.

²⁷FSB: G-SIB Update (n 1) 8-9. The FSB market-based triggers include: ratings downgrades, revenue reports or P&L, credit risk limits, equity ratios, per cent renewal of wholesale financing, withdrawal of deposits and other funding, increased collateral requirements, rise in public debt, GDP forecasts, three-month LIBOR, senior debt spreads, and counterparty risk events.

²⁸McDonald (n 2) 237. ‘Market-based triggers seem prone to type I errors, and regulatory and accounting-based triggers seem prone to type II errors. It seems unlikely that there would be a systemic crisis without financial firms having low stock prices. This would reduce the likelihood of a type II error for market-based triggers. Accounting and regulation, however, are not automatic, and both are subject to political winds and whims. Basing conversion on regulatory judgment would reduce the likelihood of a type I error, in which bonds converted into stock without any crisis.’ See also, Jeremy Bulow and Paul Klemperer ‘Equity Recourse Notes: Creating Counter-cyclical Bank Capital’ (unpublished manuscript, May 2015) <<http://www.nuff.ox.ac.uk/users/klemperer/ERNS.pdf>>.

²⁹Kaal (n 3) 301. ‘Converting CCS into equity prematurely at a time when the financial institutions can still operate without an equity capital injection could mean that the CCS capital injection would no longer be available when the financial institution will be unable to obtain other funding.’

CHAPTER 5. TRIGGERS

Second, a trigger based on a market metric such as the share price has the advantage of being able to be checked frequently by market participants.³⁰ Unlike an accounting based trigger, a market trigger is prone to being manipulated by market participants.³¹ In addition, shareholders or CoCo investors might manipulate market based triggers to expropriate value from each other.

The CRR requires that AT1 CoCos use accounting triggers.³² Banks are allowed to set CoCo triggers at 5.125% or above.³³ Article 54(5)(c) states that when the CET1 falls below the pre-specified trigger level a CoCo must be converted or written-down.³⁴

Article 54(1)(a) says:³⁵

1. For the purposes of point (n) of Article 52(1), the following provisions shall apply to Additional Tier 1 instruments:
 - (a) a trigger event occurs when the Common Equity Tier 1 capital ratio of the institution referred to in point (a) of Article 92(1) falls below either of the following:
 - (i) 5.125%;
 - (ii) a level higher than 5.125%, where determined by the institution and specified in the provision governing the instrument;

Article 54(1)(b) allows banks to specify, in addition to regulatory triggers, market based triggers.³⁶ This means that regulatory triggers provide a minimum standard for when a CoCo should be triggered. This minimum standard can be supplemented by the inclusion of another trigger such as a market based trigger. The transparency afforded by market

³⁰Mark J Flannery, 'No Pain, No Gain? Effecting Market Discipline via "Reverse Convertible Debentures"' in Hal S. Scott (ed), *Capital Adequacy Beyond Basel: Banking, Securities, and Insurance* (OUP 2005) 178.

³¹McDonald (n 2) 237. It may make sense for managers, subject to market manipulation laws, to trigger CoCos to engender wealth transfers to shareholders at the expense of CoCo investors. Martynova and Perotti (n 2) 21. 'The result is that market triggers cause more unnecessary conversions, but help avoid regulatory forbearance, which fails to trigger necessary conversions.' See Fischer Black, 'Noise' (1986) 41 J Fin 529.

³²Capital Requirements Regulation - 2013/575, art 54(1)(a).

³³ibid art 54(1)(a).

³⁴ibid art 54(5)(c).

³⁵ibid art 54(1)(a).

³⁶ibid art 54(1)(b).

CHAPTER 5. TRIGGERS

based triggers might mitigate forbearance by bank managers or regulators. However, market manipulation issues arise as a consequence of CoCo prospectuses containing a market based trigger. Alternatively, the regulatory CET1 trigger might be supplemented by a different regulatory trigger such as the provision of a bailout. If the situation where a bailout is provided is the same as the situation where a regulator is likely to forbear then the two regulatory triggers are complementary. In other words, a second regulatory trigger can eliminate regulatory forbearance incentives. Similarly, there are circumstances where a regulatory trigger can eliminate managerial forbearance incentives. Article 54(1)(b) says:³⁷

1. For the purposes of point (n) of Article 52(1), the following provisions shall apply to Additional Tier 1 instruments: ...

(b) institutions may specify in the provisions governing the instrument one or more trigger events in addition to that referred to in point (a);

There are no equivalent requirements for Tier 2 CoCos. In practice, as shown in Table 5.1, CoCos, including Tier 2 CoCos, almost exclusively use a regulatory trigger based on the issuer's regulatory capital position—the issuer's CET1 level.

Table 5.1: Trigger Type of CoCos (USD)

Source: Bloomberg, author's calculations. This table shows the types of CoCo triggers used in outstanding CoCos. It highlights the prevalence of CoCos based on the CET1 ratio of issuers. It also shows that a number of CoCos are based on the total Tier 1 ratio and Basel II capital ratios.

Trigger Reference	Amount Outstanding	Percentage of Outstanding CoCos
Common Equity Tier 1 (CET1) Ratio	\$90,703,231,010	70.12%
Tier 1 Ratio	\$18,595,926,000	14.38%
Core Tier 1 Ratio (Basel II terminology)	\$14,751,327,160	11.40%
Unknown	\$4,220,230,000	3.26%
Total Risk-Based Capital Ratio	\$1,091,847,000	0.84%

Accounting triggers based on the CET1 position of the issuer create two forbearance problems. Table 5.2 summarises the incentives of different stakeholders to forbear. First,

³⁷ibid art 54(1)(a).

a regulator might allow a bank to manipulate its accounting numbers in order to avoid reputational damage from a regulated bank needing recapitalisation through a CoCo.³⁸ In the medium to long term this is likely to damage the regulators reputation and act as a channel of contagion to other regulated banks.³⁹ Therefore, it might be optimal for an individual working within a regulator, who has a short-term incentive to maximise individual utility, to allow bank managers to gamble and to move on from the regulator before the bank is either saved or in a worse situation.⁴⁰

Second, bank managers might elect to gamble for resurrection by either relying on periodic disclosure requirements or misstating their accounting numbers in the hope of an improvement in the book value of equity.⁴¹ Period disclosure allows gambling for resurrection because the deterioration in a bank's book value of equity might occur extremely rapidly. At the same time, quarterly disclosure requirements of book equity values give managers enough time to gamble before there is a requirement to disclose the book value to the market. These periodic disclosure requirements can facilitate gambling by giving time for a recovery in book values.⁴² Misstatements have occurred in the past and are a second way to gamble. During

³⁸See, Morrison and White (n 26). See also, Hüpkens (n 23) 37.

³⁹Morrison and White (n 26).

⁴⁰See Edward J Kane, 'How Incentive-Incompatible Deposit-Insurance Funds Fail' (Feb 1989) Nat'l Bureau of Econ Research Working Paper 2836 . See also, Edward J Kane, 'Changing Incentives Facing Financial-Services Regulators' (1989) J Fin Services Research 265.

⁴¹Mark J Flannery, 'Contingent Capital Instruments For Large Financial Institutions: A Review of the Literature' (2014) 6 Annual Rev of Fin Econ 225, 229. 'Book (accounting) capital measures reflect substantial managerial discretion in valuing loan losses, Level 3 mark-to-market values, etc. Accounting measures inevitably track deterioration less rapidly than (forward-looking) market valuations do. (The overstatement of market value by regulatory capital can be exacerbated by a bank's decision to understate the risk weights associated with its assets.) A bank asked to issue new shares can reasonably respond that its regulatory capital is sufficient. So trying to force equity issuance requires challenging the firms' audited financial statements.'

⁴²Darrell Duffie, 'A Contractual Approach to Restructuring Financial Institutions' in Kenneth E. Scott *et al.* (ed), *Ending Government Bailouts As We Know Them* (Hoover Institution Press Publication 2009) 114-5. 'If the trigger for automatic conversion is an accounting capital ratio, such as the Tier 1 capital trigger used in the design of the Lloyds Bank issuance, there should be some concern over the failure of accounting measures to capture the true financial condition of the bank. For example, Citibank, a SIFI that did receive a significant government bailout during the recent financial crisis, had a Tier 1 capital ratio that never fell below 7 percent during the course of the financial crisis and was measured at 11.8 percent at roughly its weakest moment in December 2008, when the stock market capitalization of Citibank's holding company fell to around \$20 billion, or about 1 percent of its total accounting assets. Because of the limited-liability treatment of equity and because of significant prevailing uncertainty over the true valuation of Citibank's assets, this stock market valuation suggests that Citibank's assets probably had a market value well below its debt principal in late 2008. Nevertheless, any reasonable Tier 1 capital-based tripwire for distress-contingent convertible debt would probably not have been tripped.' See also, Andrew Kuritzkes and Hal Scott, 'Markets

CHAPTER 5. TRIGGERS

the recent financial crisis banks systematically understated the impact of the impairment of their assets.⁴³ In addition, the largest 100 U.S. bank holding companies overstated their book equity ratios.⁴⁴

Table 5.2: Trigger Type, Forbearance, and Manipulation Incentives. This table shows how the types of CoCo the types of CoCo triggers affect the incentives for different stakeholders to manipulate or forbear.

Trigger Type	Shareholder	CoCo Investors	Regulator	Manager
Accounting	Forbear	Forbear	Forbear	Forbear
Market	Manipulate	Manipulate	N/A	N/A

Shareholders and regulators have incentives to forbear. One might expect that CoCo investors might want to minimise forbearance in order to avoid gambling and an increased likelihood of insolvency. However, this is not the case. Permanent write-down CoCo investors also have an incentive for forbearance and for banks to be placed into resolution because they might receive a higher payoff in resolution than under the terms of their CoCo. There are two reasons for this.

First, in resolution CoCo investors have higher priority than CET1 capital.⁴⁵ Article 48(1) of the BRRD sets out that when applying the bail-in tool CET1 items must first be written-down.⁴⁶ It then says that if the reduction of CET1 is less than what is necessary to recapitalise a bank CET1 capital can be written-down to the extent of their capacity.⁴⁷ In other words, in resolution CoCos have priority over CET1 capital. Outside of resolution,

Are The Best Judge of Bank Capital' (2009) Fin Times .

⁴³Harry Huizinga and Luc Laeven 'Bank Valuation and Regulatory Forbearance During a Financial Crisis' (unpublished manuscript, Nov 2010).

⁴⁴Flannery (n 30) 182. 'The data in table 5.2 suggest that book equity ratios are overstated for the most highly levered U.S. bank holding companies (BHC). These data describe the 100 largest U.S.large bank holding companies with traded common equity over the period 1986-2000 (Flannery and Rangan 2003).' See also, Mark J Flannery and Kasturi P Rangan, 'Partial Adjustment Toward Target Capital Structures' (2006) 79 J Fin Econ 469.

⁴⁵Directive 2014/59/EU of the European Parliament and of the Council of 15 May 2014 Establishing a Framework for the Recovery and Resolution of Credit Institutions and Investment Firms and Amending Council Directive 82/891/EC, and Directives 2001/24/EC, 2002/47/EC, 2004/25/EC, 2005/56/EC, 2007/36/EC and 2011/35/EU, 2012/30/EU and 2013/36/EU, and Regulations (EU) No 1093/2010 and (EU) No 648/2012, of the European Parliament and of the Council [2014] OJ L173/190 (Recovery and Resolution Directive - 2014/59/EU), art 48(1).

⁴⁶ibid art 48(1)(a).

⁴⁷ibid art 48(1)(b).

CoCos absorb losses whilst CET1 still has value—functionally therefore, CoCos are subordinated to CET1 capital outside of resolution. Accordingly, CoCo investors holding write-down CoCos prefer resolution to relying on their contractual rights. In effect, they have an incentive to promote forbearance by regulators and managers and increase the likelihood of resolution.

Second, a write-down in resolution is to the maximum extent necessary to recapitalise the bank whereas a contractual write-down might be permanent. Consequently, there is the possibility outside resolution of receiving a return greater than in resolution. Article 60(1)(b) of the BRRD requires AT1 instruments to be written-down ‘to the extent required to achieve the resolution objectives ... or to the extent of the capacity of the relevant capital instruments, *whichever is lower*.’⁴⁸

There are two aspects of the resolution framework that benefit CoCo investors relative to their contractual entitlements. First, losses can be partial in resolution whereas outside of resolution losses may be complete. Indeed, subject to a final valuation of assets, a regulator that writes down a capital instrument is required to permanently write-down that instrument.⁴⁹ Second, in resolution there can be a write-up of CoCos whereas only temporary write-down CoCos contain a similar feature. There is a write-up power in Article 46(3) which allows a regulator to write-up CoCos if a permanent write-down is found to exceed the requirements of recapitalising a distressed bank.⁵⁰

Outside of resolution, a CoCo is triggered based (usually) on the CET1 level of the bank. A positive CET1 level suggests that bank shares have value. Within resolution, losses have to be imposed on shareholders before they are imposed on CoCo investors. Consequently, there are three relevant outcomes. First, a write-down of shares is enough to recapitalise the bank. Second, a write-down of shares and conversion or staged write-down of CoCos is enough to

⁴⁸Emphasis added. *ibid* art 60(1)(b).

⁴⁹See *ibid* art 60(2)(a). ‘Where the principal amount of a relevant capital instrument is written down: (a) the reduction of that principal amount shall be permanent, subject to any write up in accordance with the reimbursement mechanism in Article 46(3).’

⁵⁰*ibid* art 46(3). ‘Where capital has been written down in accordance with Articles 59 to 62 and bail-in has been applied pursuant to Article 43(2) and the level of write-down based on the preliminary valuation according to Article 36 is found to exceed requirements when assessed against the definitive valuation according to Article 36(10), a write-up mechanism may be applied to reimburse creditors and then shareholders to the extent necessary.’

recapitalise the bank. Third, a complete write-down of shares and complete write-down of CoCos is enough to recapitalise the bank. In either of the first two outcomes, CoCo investor payoff is higher within resolution than outside of resolution. This creates an incentive for, at least, permanent write-down CoCo investors to want banks placed into resolution.

This sub-section shows that all central stakeholders from the model in Chapter 2 may have an incentive for regulatory forbearance. First, regulators have an incentive to forbear in order to protect their institutional or individual reputation. Second, bank managers have an incentive to forbear in order to gamble for resurrection. Third, CoCo investors have an incentive to promote forbearance because their payoff in resolution might be higher than their payoff outside of resolution.

The two primary mechanisms for AT1 CoCos that counteracts these forbearance incentives are first, minimum trigger levels, and, second, the art 54(5) requirement to write-down or convert triggered CoCos. In addition, relative to reliance on the bail-in power, a contractual trigger for Tier 2 CoCos militates against regulator forbearance.⁵¹ Trigger levels are will be presently examined.

2.2 Trigger Levels

Trigger levels set above the minimum level that a bank can retain its banking license, 4.5%, may possibly mean that CoCos are triggered before insolvency or resolution.⁵² A trigger level above 4.5% makes it possible that a bank is recapitalised outside of insolvency. However, a trigger level above 4.5% can also counteract the forbearance incentive of regulators, shareholders, and at least some CoCo investors. This sub-section explores triggers levels.

The EU regulations set a floor trigger level of 5.125% of CET1 for AT1 CoCos.⁵³ This level is above 4.5% i.e. the minimum CET1 level, in normal circumstances, for a bank to retain its license.⁵⁴ In the UK, the Prudential Regulation Authority has suggested that ‘an

⁵¹Walther & White (n 25).

⁵²Capital Requirements Directive - 2013/36/EU, art 18(d).

⁵³Capital Requirements Regulation - 2013/575, art 54.

⁵⁴Capital Requirements Directive - 2013/36/EU, art 18(d).

CHAPTER 5. TRIGGERS

instrument with a trigger of 5.125% CET1 may not convert in time to prevent the failure of a firm.⁵⁵ Indeed, the PRA has stated that the eight major UK banks and building societies are expected to meet a 7% CET1 ratio.⁵⁶ Tier 2 CoCos do not have a minimum trigger level and the PRA has not commented on the trigger level of Tier 2 CoCos.

Consistent with the statements of the PRA, CoCos issued by banks incorporated in United Kingdom tend to have trigger levels above the 5.125% minimum. Table 5.3 shows the trigger levels of CoCos issued by banks incorporated in the United Kingdom. It includes the amount of CoCos outstanding and the proportion of the total amount of CoCos issued by banks in the United Kingdom. All of the outstanding CoCos issued by Barclays PLC and Barclays Bank PLC have a trigger level of at least 7%.⁵⁷ At the same time, the majority of CoCos issued by Lloyds Banking Group PLC have a trigger level of 7%. The only Lloyds CoCos with a trigger lower than the 7% are the ECNs issued by LBG Capital No.1 and No.2 in 2009. They have trigger levels of 5%. However, the ECN's were exchanged for the Lloyds Banking Group PLC 7% CoCos issued in 2014. Amongst the credit unions, Yorkshire Building Society's 5% trigger CoCo was issued on 1 April 2010 before the CRR minimum was published and the PRA position was established. From this evidence, it is clear that the PRA has indeed ensured that banks and credit unions incorporated in GB issue CoCos with triggers above the 5.125% minimum set out in CRD IV. A minimum trigger level above the point where banks lose their banking license militates against forbearance by regulators and shareholders by removing their discretion.⁵⁸

⁵⁵Prudential Regulation Authority, 'CRD IV and Capital' (Dec 2013) PRA Supervisory Statement - SS7/13 , 3.

⁵⁶The eight banks are: Barclays, Co-operative Bank, HSBC, Lloyds Banking Group, Nationwide, Royal Bank of Scotland, Santander UK, and Standard Chartered. The PRA said 'Firms will be expected to meet 7% Capital Requirements Regulation (CRR) end-point definition of common equity Tier 1 (CET1) capital ratio, after taking into account any adjustments set by the PRA (see below).' Supervisory Statement SS3/13: Capital and Leverage Ratios for Major UK Banks and Building Societies Nov 2013 SS3/13 , 3 (U.K.).

⁵⁷Recently, the FPC set the UK's countercyclical buffer at 0.5% which means at a CET1 level of 5% UK banks may lose their banking license. Financial Policy Committee, *Record of the Financial Policy Committee Meeting* (Bank of England 5 Apr 2016) 13. 'A majority of FPC members initially preferred to increase the CCyB rate from 0% to 0.5% of risk-weighted assets. . . . Those members who had initially favoured moving to 0.75% were content to join a consensus that made clear that the setting of 0.5% was on a path to a setting of 1%, consistent with the FPC's overall strategy for the prevailing risk environment.'

⁵⁸Walther & White (n 25) 27. '[C]ontingent capital hardwires the conversion of debt upon bad public news. This ties the regulator's hands in a helpful way. When public news is bad, commitment to tough bail-in actions is valuable, since the threat of runs and the excessive weakness associated with discretion

CHAPTER 5. TRIGGERS

Table 5.3: Trigger Levels of UK CoCos (USD)

Source: Bloomberg, author's calculations. This table shows the trigger levels for CoCos issued in the UK. It highlights that most outstanding CoCos have been issued with a 7% trigger level which comports with the requirements set down by the PRA.

Issuer Name	Trigger Level	Amount of Outstanding CoCos	Percentage of UK Outstanding
Lloyds Banking Group PLC	7%	\$8,909,630,000	30.39%
Barclays PLC	7%	\$4,588,400,000	15.65%
Barclays PLC	8%	\$1,458,390,000	4.98%
Barclays PLC	9%	\$1,183,480,000	4.04%
Barclays Bank PLC	7%	\$4,000,000,000	13.65%
LBG Capital No.2 PLC	5%	\$3,828,874,360	13.06%
LBG Capital No.1 PLC	5%	\$2,962,397,820	10.11%
Nationwide Building Society	7%	\$1,661,800,000	5.67%
Coventry Building Society	7%	\$680,800,000	2.32%
Yorkshire Building Society	5%	\$39,107,300	0.13%

Switzerland is a special case within the sample respect to trigger levels. Swiss law requires banks to issue CoCos with different trigger levels. Systemically important Swiss banks such as Credit Suisse, UBS, and Zürcher Kantonalbank are either required to or otherwise have incentives to issue at least two types of CoCos:⁵⁹ first, they have a requirement that 3% of RWA be in the form of 'high-triggering' CoCos,⁶⁰ second, they have a variable progressive component of up to 6% of RWA *may* be satisfied with 'low-triggering CoCos'.⁶¹ Inconsistent with this framework, Table 5.4 shows that 60% of Swiss CoCos are issued with a 5% trigger level, 37% are issued with the EU minimum of 5.125% trigger level, and 2% are issued at a 7% trigger level. Despite Swiss regulations establishing a distinct framework, this pattern of issuance suggests that Swiss banks have a preference for low trigger level CoCos and the EU minimum.

All bank stakeholders have an incentive for forbearance and lower trigger levels make forbearance more likely. One reason for this, is that triggering a low trigger level CoCo is likely

are imminent. In these states, the conversion of contingent debt provides quasi-commitment by mandating a tough bail-in policy beyond the regulator's control. When public news is good, discretion is preferable. Since contingent capital does not convert in these states, discretion is preserved exactly when it is most valuable.'

⁵⁹Jean C Rochet, *The Extra Cost of Swiss Banking Regulation: White Paper* (Swiss Finance Institute Feb 2014).

⁶⁰ibid 8. 'High triggering CoCos are converted in equity capital if the CET1 ratio of 7% is undershot.'

⁶¹See, ibid 9. 'CoCos that are converted in equity capital if the CET1 ratio of 5% is undershot.'

CHAPTER 5. TRIGGERS

to reveal adverse private information to the market while triggering a high trigger level CoCo is less likely to reveal adverse private information.⁶² Consequently, the incentives to forbear are likely to be stronger with lower trigger level CoCos. As set out above, all stakeholders prefer forbearance and therefore it is unsurprising that given a choice the pattern of issuance of Swiss CoCos increases the probability of forbearance.

Table 5.4: Trigger Levels of Swiss CoCos (USD)

Source: Bloomberg, author's calculations. This table shows the trigger levels for CoCos issued in Switzerland. It highlights that most outstanding CoCos have been issued with a 5% and 5.125% trigger level which comports with the minimum Swiss and EU-wide requirements. The sample only includes CoCos issued in a European country where a trigger level is available within the sample period.

Issuer Name	Trigger Level	Amount of Outstanding	Percentage of Swiss Outstanding
UBS	5%	\$6,733,940,000	23.45%
Credit Suisse AG	5%	\$6,669,760,000	23.23%
UBS AG/Stamford CT	5%	\$2,000,000,000	6.97%
UBS AG/Jersey	5%	\$2,000,000,000	6.97%
Credit Suisse Group AG	5.125%	\$9,809,895,000	34.16%
Julius Baer Group Ltd	5.125%	\$661,118,000	2.30%
Banque Cantonale de Geneve	5.125%	\$123,001,000	0.43%
Glarner Kantonalbank	5.125%	\$76,729,100	0.27%
Zuercher Kantonalbank	7%	\$640,469,000	2.23%

Table 5.5 shows that across Europe, there appears to be some divergence in the trigger levels for CoCos. The general pattern is that banks in the UK and Nordic countries issue CoCos with relatively high trigger levels. On the other hand, banks in Southern Europe tend to issue CoCos around the regulatory minimum of 5.125%. Both are above the point where a bank might be expected to lose its banking license.⁶³ However, all other things being equal, higher trigger levels reduce the likelihood that the recapitalisation comes too late. In other words, a high trigger level makes it more likely that a CoCo is triggered and a bank does

⁶²The book value of equity is calculated by employees of the bank and is private information. If that information is adverse and is revealed to the market it will provide information to the market. A higher trigger level, all other things being equal, increases the likelihood of a false positive, and the market impact of a CoCo trigger. A lower trigger level, is unlikely to have the same likelihood of being false positive and therefore the market and reputational impact to managers and regulators might be higher.

⁶³See eg PRA: Capital and Leverage Ratios (n 56) 3. We recall that issuers in the UK have a minimum CET1 ratio of 7% and therefore the point of resolution might also be earlier for these banks.

not need to enter resolution or insolvency (which is consistent with the assumptions in the model in Chapter 2).

Empirically, there is support for the conjecture that minimum trigger levels could be set higher in Table 5.6. Table 5.6 shows the range, from least to most, of the distance of the reported CET1 of a bank and the trigger level of its CoCos. In the Luxembourg figures, Russian banks that issued CoCos out of Luxembourg were excluded as they are not bound by the requirements of the BRRD. In addition, there are only two CoCos where the issuing bank was within 300 basis points of trigger its CoCos. The vast majority were between 500 and 700 basis points. If we consider that June 2014 was a relatively stable period for banks in EU countries then a 62.5 basis point difference seems small and indeed it might be useful to require a higher minimum trigger level that is at least 200-250 basis points above the 4.5% of CET1; in essence a minimum trigger level of 6.5-7% of CET1 which is consistent with the PRAs requirements in the UK.⁶⁴

There are two qualifications to the proposition that the minimum trigger level should be set higher. First, the deterioration in bank book equity values may be rapid and differences in trigger levels may materialise in a short time frames such that they have no material effect on the probability of a successful recapitalisation. Second, at higher trigger levels it is more likely that a CoCo might be triggered despite the bank being healthy i.e. not needing to be recapitalised.

2.3 Implications for Model

The previous sub-section argued that a bank can enter into insolvency (or more likely resolution) despite issuing CoCos. It argued that accounting based triggers create incentives for regulators and bank managers to forbear. It also argued that CoCo investors (particularly write-down CoCo investors) benefit from their priority in resolution relative to their contractual rights and may consequently prefer resolution. To the extent that forbearance increases the likelihood of bank insolvency, CoCo investors also have an incentive for managers and

⁶⁴ibid 3.

regulators to forbear. Consequently, these stakeholder groups may have incentives consistent with CoCos being triggered as part of insolvency or resolution.

Triggering a CoCo as part of resolution (insolvency) is inconsistent with the assumptions in Chapter 2. Those assumptions had the effect of ensuring that CoCos recapitalised a bank outside of insolvency. Recapitalising a bank outside of insolvency ensured that the social cost of bank insolvency did not materialise in a world with CoCos. In reality, contagion and credit rationing might exist despite the existence of CoCos. Put another way, CoCos do not completely prevent the externalities associated with bank failures. However, CoCos might reduce the probability of bank insolvency in two ways. First, they provide a capital buffer in resolution, insolvency, and outside of insolvency. Second, they may also create incentives for shareholders or CoCo investors to monitor banks.

3. Conclusions and Policy Prescriptions

This chapter has analysed the assumption in Chapter 2 that CoCos are triggered outside of insolvency. It has argued that CoCos can be triggered as part of resolution or insolvency. In addition, it has argued that shareholders, bank managers, CoCo investors and regulators may all have incentives to trigger CoCos as part of resolution or insolvency. This means that the social cost of bank failure is not avoided by issuing CoCos.

This chapter makes two policy prescriptions directed at creating incentives for at least CoCo investors to want CoCos triggered outside of insolvency / resolution. First, requiring that all CoCos are written-down as part of any resolution i.e. that CoCos are written down ahead of equity. Second, requiring that CoCos are convertible which means that contractual payoffs to CoCo investors are higher than payoffs in resolution. This creates an incentive for CoCos to be triggered prior to resolution where the recapitalisation may save the bank.

This chapter also makes one policy prescription directed at ensuring that a bank is recapitalised by CoCos outside of insolvency. It seeks trigger levels higher than 5.125%. Triggering a CoCo reveals negative private information, about the bank's book value of equity to the market. A higher trigger level increases the likelihood of a false positive and

CHAPTER 5. TRIGGERS

consequently the market impact of the negative private information. To the extent that negative information causes contagion and potentially credit rationing, the uncertainty associated with a higher trigger level might reduce the magnitude of the social cost of bank failure.⁶⁵

This chapter finally makes a policy prescription directed at mitigating the incentives for forbearance by bank managers and regulators. It argues that CoCo triggers using a market trigger ought to be implemented. Bulow and Klemperer argue for a trigger that is ‘based on whether the share price is below a trigger that is a fixed fraction of the issue-date share price.’⁶⁶ Of course, market based triggers suffer from potential manipulation by investors. Indeed, if shareholders expect a wealth transfer from a conversion they are likely to manipulate share prices as a bank approaches distress. The problem of manipulation is exacerbated as the trigger level is set further away from insolvency. A regulatory trigger with a high trigger level is subject to forbearance by a regulator, manipulation by bank employees, and contagion caused by false positive triggers. On the other hand, a market based trigger with a high trigger level is subject to manipulation by shareholders and CoCo investors and potentially contagion through the regulator reputation channel. However, it is less likely with a market trigger with a high trigger level that contagion would occur because of damage to the regulators reputation for two reasons. First, a market trigger is subject to manipulation by market participants. Second, a high trigger level increases the chances of false positive triggers. For these reasons, a market based trigger with a high trigger level ought to be preferred to a regulatory trigger with a low trigger level.

⁶⁵A different view is taken by Avogouleas and Goodhart. They argue in the context of bail-in that an early trigger may risk further rounds of bail-in and a late trigger might risk a flight of creditors that do not hold bail-in-able debt. See, Emiliios Avgouleas and Charles A Goodhart, ‘A Critical Evaluation of Bail-in As A Bank Recapitalisation Mechanism’ (Jul 2014) Centre for Economic Policy Research CEPR Discussion Paper series No 10065 , 11 <<http://www.cepr.org/pubs/dps/DP10065.php>>.

⁶⁶Bulow and Klemperer (n 28) 3.

CHAPTER 5. TRIGGERS

Table 5.5: Trigger Levels by Country (USD)

Source: Bloomberg, author's calculations. This table shows trigger levels by countries to show that there are differences in the CoCo trigger levels depending on the country of incorporation of the issuer. It highlights a pattern of issuing CoCos with higher trigger levels in Nordic countries and UK relative to banks incorporated elsewhere in Europe. The sample only includes CoCos issued in a European country where a trigger level was available. It represents about 85% of the total outstanding amount of CoCos in the sample.

Country	Trigger Level	Amount Outstanding	Percentage of Total Outstanding
United Kingdom	5%	\$6,830,379,480	5.61%
United Kingdom	7%	\$19,480,630,000	16.29%
United Kingdom	8%	\$1,458,390,000	1.20%
United Kingdom	9%	\$1,183,480,000	0.97%
Switzerland	5%	\$17,403,700,000	14.29%
Switzerland	5.125%	\$10,670,743,100	8.76%
Switzerland	7%	\$640,469,000	0.53%
France	5.125%	\$14,840,370,000	12.19%
France	7%	\$2,000,000,000	1.64%
Spain	5.125%	\$7,824,387,000	6.43%
Denmark	3.5%	\$238,666,000	0.20%
Denmark	5%	\$16,462,780	0.01%
Denmark	5.125%	\$8,778,710	0.01%
Denmark	7%	\$1,872,942,200	1.54%
Denmark	12%	\$4,380,170,000	3.60%
Ireland	2%	\$2,350,000,000	1.93%
Ireland	8.25%	\$4,122,050,000	3.39%
Luxembourg	2%	\$5,800,000,000	4.76%
Netherlands	7%	\$1,692,880,000	1.39%
Netherlands	8%	\$4,000,000,000	3.28%
Germany	5.125%	\$4,723,830,000	3.88%
Guernsey	5%	\$1,725,000,000	1.42%
Guernsey	7%	\$2,820,031,000	2.32%
Belgium	5.125%	\$1,948,280,000	1.60%
Belgium	7%	\$1,000,000,000	0.82%
Italy	5.125%	\$1,250,000,000	1.03%
Italy	6%	\$1,091,847,000	0.90%
Faroe Islands	5%	\$34,204,900	0.03%

Table 5.6: Range of Distance to Trigger in Different Countries

Source: Bloomberg, author's calculations. This table shows the range from least to most of the distance to trigger of CoCos issued in different jurisdiction.

Country	Range of Distance to Trigger
Belgium	6.56% - 6.59%
Switzerland	2.23% - 13.25%
Germany	6.52%
Denmark	2.67% - 11.30%
Spain	3.93% - 5.91%
France	5.90 - 7.78%
United Kingdom	3.86% - 12.65%
Greece	5.40% - 7.40%
Ireland	5.05% - 9.72%
Italy	3.78% - 7.41%
Luxembourg	8.57% - 8.57%
Netherlands	9.55% - 10.55%

6

Monitoring Using CoCos: Mechanisms, Incentives, and Limitations

1	Passive Monitoring	145
2	Active Monitoring	149
2.1	Active Monitoring by CoCo Investors	151
2.2	Active Monitoring by Shareholders	159
2.3	Active Monitoring Facilitated by Regulators	161
3	Investor Sophistication	166
3.1	Limited Ownership Information	168
3.2	Investor Types	171
3.3	Incentivising Sophisticated Investors: Credible Bailout Commitments	174
3.4	Prohibiting CoCo Ownership by Unsophisticated Investors	177
4	Legal Framework	179
5	Description of CoCo Formats	181
6	Payoffs of CoCo Formats	182
7	Empirical Evidence: Formats of CoCos	187
7.1	Overview of Convertibles and Write-Downs	187
7.2	Convertible CoCos	188
7.3	Write-Down CoCos	198
8	Model Assumption and Interpretation	203
8.1	Assumption	203
8.2	Limitations	204

CHAPTER 6. MONITORING

8.3	Analysis - Issuance	205
8.4	Analysis - Political Economy	206
9	Conclusion	208

CHAPTER 6. MONITORING

There are two different types of CoCos:¹ first, convertible CoCos and second, write-down CoCos. In this chapter we are concerned with monitoring and consequently, the question of dilution is salient. The two types of CoCos can be explained in terms of dilution: first, financial dilution, and, second, governance dilution. Financial dilution arises when the claim of either shareholders or investors are reduced because of conversion. Governance dilution arises when new shares are issued which dilute the voting rights of the original shareholders. Governance dilution matters only if there is either a difference in the sophistication or risk preferences of shareholders and converted CoCo investors. For instance, if CoCo investors are more sophisticated users of governance rights than shareholders then we would expect better governance decisions when their debt interest is converted into shares. Convertible CoCos always cause governance dilution and can therefore create an incentive for shareholders to monitor. On the other hand, convertible CoCos may or may not necessarily cause financial dilution of either CoCo investors or shareholders at conversion. Financial dilution of CoCo investors arises if the value of the triggered claim is less than the amount paid at issue. Financial dilution of shareholders arises if the value of converted CoCos is greater than the amount paid at issue. Contrastingly, write-down CoCos do not create financial or governance dilution to shareholders. A write-down financially dilutes CoCo investors and because no new shares are issued there is also no shareholder governance dilution. Instead, the threat of a write-down may create incentives for CoCo investors to monitor.

This chapter explores the question of monitoring in two parts: in the first part it sets out how stakeholders monitor and how regulators facilitate monitoring and then in the second part it empirically analyses different CoCos to determine the incentives of different stakeholders to monitor. The first part of this chapter begins by outlining a theoretical framework for analysing monitoring. Indeed, an outstanding question raised by the extensions in Chapter 2 is how exactly shareholders and CoCo investors monitor banks. The first part of this chapter

¹A similar analysis to this was conducted by the Basel Committee who distinguished between write-down CoCos as a way to ensure investors received zero shares and convertible CoCos as a method for receiving a high number of shares. Their analysis focused on shares whilst the analysis here also considers the effect of conversion rates. See, Basel Comm on Banking Supervision, *Proposal to Ensure the Loss Absorbency of Regulatory Capital at the Point of Non-Viability* (Aug 2010) 8-9.

CHAPTER 6. MONITORING

answers that question. It provides a framework for conceptualising monitoring for the purposes of this thesis. This framework borrows from and also builds on the Pillar III framework of Basel III which facilitates market discipline through disclosure regulation.² Monitoring is the use of information by stakeholders to change behaviour or the investment decisions of a firm. This framework also allows us to consider a situation where both shareholders and CoCo investors monitor and why neither may monitor.

There are two types of monitoring discussed in the first part of this chapter: first, passive monitoring which involves observing data and influencing bank employee behaviour by buying or selling securities, and active monitoring, which involves influencing decision making within a bank by revealing information through the buying and selling of CoCos, including information revelation terms in CoCo contracts, and exerting pressure on bank employees.³ Passive monitoring is linked to market discipline. It involves the use, for instance, of prices to instill market discipline, or the use of covenants to reveal information about the bank. On the other hand, active monitoring uses governance techniques to influence bank employee's actions.⁴ For instance, some contractual terms can provide contingent control rights if they are breached.⁵ The threat of this transfer of control influences the behaviour of bank managers and shareholders.⁶

If, as is argued in Chapter 4, the purpose of CoCos is to allow banks to issue a tax deductible form of capital then we may observe little evidence of monitoring from CoCos.

²Basel Comm on Banking Supervision, *Basel III: A Global Regulatory Framework for More Resilient Banks and Banking Systems* (Jun 2011).

³Mark J Flannery, 'The Faces of "Market Discipline"' (2001) 20 J of Fin Services Research 107, 110. 'Investors accurately evaluate changes in a firm's condition and incorporate those assessments promptly into the firm's security prices ... Monitoring generates market signals that may convey useful information to supervisors.'

⁴ibid 110. '[T]he process by which outside claimants influence a firm's actions.'

⁵Roy Goode, *Principles of Corporate Insolvency Law* (Sweet & Maxwell 2011) 59. 'When a debtor, whether a private individual, a sole trader, a partnership firm or a company, fails to pay a debt on its due date, the creditor is entitled to avail himself of all the rights and remedies given to him by his contract and by law.'

⁶Reinier Kraakman *et al.*, *The Anatomy of Corporate Law: A Comparative and Functional Approach* (OUP 2009) 119-20. 'All our jurisdictions specifically deal with shareholder-creditor agency problems in relation to corporations that are financially distressed-that is, "in the vicinity of insolvency". The incentives for shareholders or managers of such firms to engage in value-decreasing transactions, such as asset substitution, become particularly intense when the firm's future is in doubt. Correspondingly, legal restrictions targeting corporations in financial distress are likely to have benefits.'

CHAPTER 6. MONITORING

Broadly, this Chapter finds little evidence in support of CoCos creating significant monitoring incentives. However, it identifies certain marginal incentives to monitor and discusses the limits of these incentives. In general, monitoring can be implemented or facilitated by several stakeholder groups, including wholesale depositors and bondholders. However, for our purposes there are three distinct stakeholder groups: CoCo investors, shareholders, and regulators. Although CoCo investors and shareholders can monitor, it is also possible for regulators to monitor. Indeed, supervision and resolution imply monitoring.⁷ There is an uneasy tension that arises when regulators attempt to influence passive and active monitoring. The new governance literature broadly posits that private actors can assist in the development of regulation.⁸ It requires that ‘rulemakers and operating-world actors work literally side by side—but to repeat, in plain view of the public—and thus largely overcome the distinction between the detached staff of honest but imperfectly informed experts and the knowledgeable but devious insiders they regulate.’⁹ Ideally, and in the context of CoCos, bank regulators and investors operate side-by-side to regulate ‘devious insiders’ (bank managers).¹⁰ However, there is a tension that arises when regulators, first, use private sector agents to gather information and, second, delegate to private sector agents the role of rule-maker.

When regulators design a system that relies on contractual bargaining between market participants to achieve regulatory objectives it creates two potential problems. First, if the incentives of investors are inconsistent with the intentions of regulators, then the contractual terms that develop might be inconsistent with the objectives of regulators. Second, contract terms bargained for by bank managers are likely to reflect the incentives of managers, not

⁷For instance, the financial stability objective in the BRRD. Directive 2014/59/EU of the European Parliament and of the Council of 15 May 2014 Establishing a Framework for the Recovery and Resolution of Credit Institutions and Investment Firms and Amending Council Directive 82/891/EC, and Directives 2001/24/EC, 2002/47/EC, 2004/25/EC, 2005/56/EC, 2007/36/EC and 2011/35/EU, 2012/30/EU and 2013/36/EU, and Regulations (EU) No 1093/2010 and (EU) No 648/2012, of the European Parliament and of the Council [2014] OJ L173/190 (Recovery and Resolution Directive - 2014/59/EU). In addition, the London Approach implies that regulators exert informal pressure on regulated entities. See, John Armour & Simon Deakin, ‘Norms in Private Insolvency: the “London Approach” to the Resolution of Financial Distress’ (2009) 6(4) J Empirical L Stud 687. It is possible that similar channels are used to influence banks as they approach distress.

⁸Michael C Dorf and Charles F Sabel, ‘A Constitution of Democratic Experimentalism’ (1998) 98 Columbia L Rev 267, 355.

⁹ibid 355.

¹⁰ibid 355.

CHAPTER 6. MONITORING

the regulator. The involvement of managers in the creation of contract mechanisms is likely to produce innovations that are inconsistent with the objectives of regulators. To overcome these problems, regulation might prescribe terms to be included or not to be included in CoCo prospectuses. In fact, this Chapter will argue that regulatory rules are the key mechanism of incentivising monitoring.

Returning now to the role played by CoCo investors and shareholders in monitoring. Both shareholders and CoCo investors can passively monitor. Passive monitoring can involve direct or indirect market discipline. Indirect market discipline is effective when banks are required to issue debt with a short or medium term maturity because secondary market prices affect the future cost of funding. However, AT1 CoCos are perpetual and therefore CoCo investors cannot always rely on secondary market prices to instill indirect market discipline on banks.¹¹ On the other hand, allowing incredibly short maturities for AT1 CoCos, i.e. overnight, would give investors opportunities to withdraw funding when a bank approaches distress.¹² Consequently, a balance must be struck between extremely short-term instruments, which may facilitate runs, and perpetual instruments with call options, in order to allow the direct form of market discipline to diminish bank asset risk. The requirements for AT1 CoCos strike a balance that may facilitate some indirect discipline but this is subject to banks including and exercising five year call options. Consequently, with the exception of allowing call options for the issuing bank,¹³ these requirements limit the scope for indirect market discipline using prices.

Shareholders and CoCo investors can both monitor using market discipline. Shareholder

¹¹Indirect market discipline is effective when secondary market prices affect the cost of raising capital in the future. Banks tend to have call options that arise every five years which facilitates indirect discipline but this may be strengthened by a requirement for AT1 CoCos to have a maturity of two years. Under current rules AT1 CoCos must be perpetual instruments but banks can have five year call options. Regulation (EU) No 575/2013 of the European Parliament and of the Council of 26 June 2013 on Prudential Requirements for Credit Institutions and Investment Firms and Amending Regulation (EU) No 648/2012 [2013] OJ L176/1 (Capital Requirements Regulation - 2013/575), art 52(1)(g).

¹²For an example in the interbank market see: Hyun Song Shin, 'Reflections on Northern Rock: The Bank Run that Heralded the Global Financial Crisis' (2009) 23 J Econ Persp 101.

¹³Capital Requirements Regulation - 2013/575, art 52(1)(i). 'Capital instruments shall qualify as Additional Tier 1 instruments only if the following conditions are met: the instruments may be called, redeemed or repurchased only where the conditions laid down in Article 77 are met, and not before five years after the date of issuance except where the conditions laid down in Article 78(4) are met.'

CHAPTER 6. MONITORING

market discipline will exist when share prices reflect the issuance of CoCos. Shareholders also have the opportunity to impound market discipline by buying or selling shares at the issue date of shares, the issue date of CoCos, and when banks are required to raise additional shares or CoCos.¹⁴ In addition, unique shareholder control rights include the ability to nominate, elect, and remove bank directors.¹⁵ Although coordination is a cost, the allocation of these rights to shareholders influences the behaviour of directors who in turn can make decisions about the hiring and firing of other bank employees.¹⁶

Regulators can facilitate monitoring by either CoCo investors or shareholders by prohibiting or requiring particular terms in CoCo prospectuses or indeed requiring bank employees to behave in a particular way. For instance, the CRR requires banks to reveal when a CoCo has been triggered and to act in accordance with the terms of the prospectus.¹⁷ This term has two effects, first, it ensures that price sensitive information is revealed, and, second, it influences bank employee behaviour i.e. by requiring them to write-down or convert CoCos when they are triggered. In addition, mandatory disclosure requirements facilitate the revelation of information which is incorporated into prices.¹⁸ Like Article 54(5), mandatory disclosure rules ensure that price sensitive information is revealed and because of this, influence bank employee behaviour.¹⁹

The first part of this chapter has three sections. In the first section, it defines and analyses passive monitoring by shareholders and CoCo investors. In the second section, it

¹⁴Federal Reserve System: Staff Study, ‘Using Subordinated Debt as an Instrument of Market Discipline’ (Dec 1999) Board of Governors of the Federal Reserve System Staff Study No 172 , 2.

¹⁵Kraakman *et al.* (n 6) 56. ‘The law addresses the shareholder-manager agency problem in the first instance by establishing and reinforcing the right of shareholders to appoint the members of the board. The effectiveness of this strategy depends, in turn, on the board’s powers and resources, and on the capacity of shareholders to engage in collective action.’

¹⁶*ibid* 56. ‘In single-tier jurisdictions such as the U.S., UK, and Japan, one board exercises the legal power to supervise *and* manage a corporation, either directly or through its committees.’

¹⁷Capital Requirements Regulation - 2013/575, art 54(5).

¹⁸Kraakman *et al.* (n 6) 278. ‘[T]here are familiar agency problems within corporations. Corporate insiders often prefer to suppress bad news for reasons that range from managements’ desire for additional compensation, to shareholders’ desire to sell high or raise additional capital at ‘low’ prices. Of course, such biased disclosure need not harm *diversified* investors if prices anticipate it across the market. But not all public investors are diversified. Moreover, biased disclosure raises the cost of capital and distorts the allocation of capital when real-world market conditions prevent companies from signaling their true value.’

¹⁹Louise Gullifer & Jennifer Payne, *Corporate Finance Law: Principles and Policy* (2nd edn, Hart Publishing 2015) 527-8.

CHAPTER 6. MONITORING

discusses active monitoring by shareholders, CoCo investors, and active monitoring facilitated by regulators. In the third section, it discusses investor sophistication and location and how this affects the capacity and incentive for CoCo investors to monitor.

The second part of this chapter describes empirical data that relates to whether CoCo investors and / or shareholders monitor banks. The analysis is framed in terms of different types of CoCos. As set out above, there are two broad types of CoCos: convertibles and write-downs. Amongst write-down CoCos there are three distinct types: permanent write-down, temporary write-down, and staged write-down.

The second part provides an overview of the empirical data relating to each type of CoCo. It shows that convertible CoCos are issued in Great Britain, Spain, Guernsey, Ireland, Portugal, and Denmark, while permanent write-down CoCos are issued in Switzerland, Denmark, Great Britain, and the Netherlands, temporary write-down CoCos are mostly issued in France, Luxembourg, Germany, and Italy, and staged write-downs are issued in the Netherlands, Ireland, and Switzerland.

It then discusses the ownership of the different types of CoCos. With the exception of staged write-down CoCos, it shows that sophisticated investors such as investment advisors tend to hold low trigger level CoCos (5% or 5.125% trigger level). This is consistent with the analysis in the previous chapter that low level triggers have less risk than higher trigger level CoCos.

The second part then analyses this data in light of the model in Chapter 2. It sets out the assumption that either shareholders or CoCo investors monitor. It sets out the limitations of this assumption. It then discusses the implications of the data for the interpretation of the conditions derived in the model. It shows that the pattern of CoCo issuance across countries is reflective of the size of bailouts relative to the GDP of different countries. It shows, for instance, that French bailouts were relatively smaller than, for instance bailouts in Great Britain, Switzerland, and the Netherlands.

The second part of this chapter has three sections. Section four sets out the legal framework governing convertible and write-down CoCos. Section five describes the different CoCo

formats that are empirically observed. Section six describes the theoretical payoffs of each CoCo format and discusses the incentives generated by each. Section seven provides empirical evidence about the payoffs, country of issuance, trigger levels, and the incentives this creates for monitoring. Section eight assesses the assumptions about monitoring in Chapter 2, discusses the limitations of the assumption, and the potential implications.

1. Passive Monitoring

This section is the first of two sections that discusses the mechanisms available to shareholders and CoCo investors to monitor.²⁰ This section defines passive monitoring, explains, and then discusses how shareholders and CoCo investors (using data about CoCo prospectuses) can passively monitor bank employees.

In general, passive monitoring occurs when investors incorporate information into prices. Information revelation through prices is known as market discipline in the finance literature and there are two types of market discipline: direct and indirect.²¹ Direct market discipline is the threat of a higher cost of funding, *at the time of issue* if the market expects a stakeholder to act opportunistically.²² A staff study by the Board of Governors of the Federal Reserve system defined direct market discipline in the following way:²³

“*Direct market discipline* is exerted through a risk-sensitive debt instrument when a banking organization’s expected cost of *issuing* that instrument increases substantially with an increase in the organization’s risk profile. For such discipline to occur, investors must gather and collect information about the banking

²⁰The standard view about monitoring assumes it will be undertaken by banks as debt investors. With CoCos, this is not necessarily the case. For instance George G Triantis and Ronald J Daniels, ‘The Role of Debt in Interactive Corporate Governance’ (1995) 83 California L Rev 1073, 1080. ‘In an effort to broaden the focus of American corporate governance away from equityholders, we begin by demonstrating the role of debt in interactive governance. In particular, we examine the role of debt through the activities of a familiar institution: the commercial bank. . . . A bank may respond by scaling down or terminating its relations with the borrower (exit). Alternatively, the bank may use its threat of exit to intervene in the decisions of the firm (voice).’ In general, see Albert O Hirschman, *Exit, Voice, and Loyalty: Responses to Decline in Firms, Organizations, and States* (Harvard UP 1970).

²¹Federal Reserve System (n 14) 2.

²²*ibid* 2. See also Adrian Pop, ‘Market Discipline in International Banking Regulation: Keeping the Playing Field Level’ (2006) 2 J Fin Stability 286, 287.

²³Federal Reserve System (n 14) 2.

CHAPTER 6. MONITORING

organization's risks and prospects and then incorporate that information into the decisions to buy and sell the organizations debt. The anticipation of higher funding costs provides and incentive *ex-ante* for the banking organization to refrain from augmenting its risk." (emphasis added)

Indirect market discipline is exerted by observing *the secondary market prices* of a bank's securities and using those prices to increase the cost of funding by trading other securities (market participants) or increase supervision and regulatory burdens (supervisors and regulators).²⁴ The Federal Reserve Board defined indirect market discipline in the following way:²⁵

"*Indirect market discipline* is exerted through a risk-sensitive debt instrument when private parties and possibly government supervisors monitor secondary market prices of that instrument to assist in determining the risk exposure (or default probability) of the banking organization. In response to a perceived increase in bank risk, such parties could then take various actions that increase the cost of the bank's operations. ."

The Federal Reserve's definition of direct and indirect market discipline can lead to active monitoring by stakeholders including regulators. They note:²⁶

"The anticipation of these types of penalties, from either private parties or government supervisors, provides banking organizations with additional incentives to refrain from augmenting their risk."

In general, we would expect that indirect market discipline to be instilled by either shareholders or CoCo investors. Both stakeholder groups can observe publicly available information and incorporate that information into security prices.²⁷ If information is incorporated into prices at the time of issue of a CoCo then there is direct market discipline. On the

²⁴ibid 2. See also Pop (n 22) 287.

²⁵Federal Reserve System (n 14) 2.

²⁶ibid 2.

²⁷Flannery (n 3) 110.

other hand, if information is incorporated into prices in the secondary market then this is indirect market discipline. Unfortunately, AT1 CoCos are perpetual and therefore, indirect market discipline²⁸ is unlikely to occur with three exceptions: first, if AT1 requirements are increased over time, and, second, after CoCos are triggered and there is a need to replace them, and third, supervisory responses to indirect discipline.²⁹

Incorporating information into prices requires stakeholders either to buy or sell securities. Buying securities increases price and reveals positive information. On the other hand, selling securities reduces price and reveals negative information. The role of CoCo investors is arguably more important when they reveal negative information by selling. Such selling can induce a “wonderful concentration of the mind” of managers to halt the deterioration of a bank’s CET1 level.³⁰

Passive monitoring may also be induced by CoCo terms or regulation requiring banks to reveal information.³¹ Mandatory disclosure is a central information revelation tool.³² It occurs at the initial offering stage of shares or CoCos and as a continuing requirement.³³ Legally, ongoing disclosure requirements exist to provide information to shareholders to exercise their governance rights and to provide information to investors to protect those investors.³⁴ In the

²⁸Through secondary market prices affecting the issue price of subsequently issued CoCos.

²⁹Capital Requirements Regulation - 2013/575, art 52(1)(g).

³⁰Hirschman (n 20) 21 ‘As already mentioned, the exit option is widely held to be uniquely powerful: by inflicting revenue losses on delinquent management, exit is expected to induce that “wonderful concentration of the mind” akin to the one Samuel Johnson attributed to the prospect of being hanged.’

³¹It is argued that the most efficient type of monitoring would be undertaken by a single lender rather than a group of investors. See Gullifer & Payne (n 19) 92. ‘[T]he most effective and economically efficient monitoring and influence is exercised by a single bank lender, as compared to the situation where finance is provided to a company by many creditors, such as where a number of creditors lend, each on the security of separate assets, or where a loan is syndicated or where finance is provided by a bond issue (or a combination of these).’

³²Paul Davies, *Gower and Davies Principles of Modern Company Law* (8th edn, Sweet & Maxwell 2008) 709. Part Five of Gower & Davies begins ‘[i]t has been accepted since the early days of modern company law that mandatory publicity about the company’s affairs was an important regulatory tool.’

³³Louise Gullifer & Jennifer Payne, *Corporate Finance Law: Principles and Policy* (Hart Publishing 2011) 475. ‘A number of important distinctions arise between mandatory disclosure at the IPO stage and continuing disclosure obligations.’

³⁴ibid 476. ‘In *Caparo Industries plc v Dickman* [1990] 2 AC 605 ... [t]he House of Lords ... held that the purpose of the statutory accounts provisions was ... to provide information to the shareholders and that the purpose of this information provision was to enable them to exercise their governance rights over the board effectively. ... Since *Caparo* new investor-focused disclosure obligations have been added and even some of the obligations which have traditionally been regarded as shareholder focused are now understood as having, additionally, an investor protection element. Since *Caparo* there has also been the introduction of a new statutory remedy for investors regarding misstatements in ongoing disclosures and there has been the

UK, shareholders or CoCo investors can bring contractual claims for damages to put them in the position that they would have been had there been no false representation net of any benefits received.³⁵

Permanent write-down CoCos, staged write-down CoCos, and to a lesser extent temporary write-down CoCos should include information revelation terms because investors face a risk of loss greater than other types of debt. Amongst convertible CoCos, those with a conversion value lower than the issue value should have more information revelation terms than other convertible CoCos but to a lesser extent than write-down CoCos, the risk of investor loss is greater than with other forms of debt. These predictions are not borne out. There is no difference in the amount of information revelation terms in convertible CoCos with a decrease and increase in value. Similarly, there is no difference amongst different types of write-down CoCos and indeed between write-down and convertible CoCos.

Instead, there are information revelation requirements when a CoCo is triggered for AT1 CoCos in the CRR and in AT1 CoCo prospectuses. Article 54(5) of the CRR requires banks to first, inform competent authorities, second, inform investors of the trigger, and third, write-down or convert CoCos in accordance with the contractual terms.³⁶ In addition, CoCo prospectuses tend to include a term that requires the bank to inform investors when the CoCo is triggered. For instance, the prospectus might include a term requiring the bank to inform the regulator and investors that the CoCos has been triggered.

This regulatory requirement is included in all CoCo contracts and consequently there is no distinction in the information revelation terms in different types of CoCos. This regulatory and the associated contractual requirement supplements mandatory requirements, which apply to all publicly traded entities, because information is likely to be revealed in a more timely manner than public disclosure based on mandatory disclosure.³⁷ The prospectuses of

introduction of new administrative remedies for market abuse.’

³⁵Gullifer & Payne (n 19) 564-5. It is also possible for the FCA, in the UK, to bring a claim for negligent misstatements and the Corporate Reporting Review can review directors’ reports and accounts and take enforcement actions against large companies. *ibid* 569-70.

³⁶Capital Requirements Regulation - 2013/575, art 54(5).

³⁷Triantis & Daniels (n 20) 1084. ‘Moreover, a borrower usually undertakes to advise the bank of any violation of its covenants. This communication is likely to be more timely than public disclosure required under securities laws, largely because banks are bound to adhere to the legal duty of confidentiality.’

permanent write-down CoCos, staged write-down CoCos, temporary write-down CoCos, and the various types of convertible CoCos all contain information revelation terms.³⁸ In general, passive monitoring occurs when prices reveal information. More specifically, regulatory requirements facilitate information revelation to assist shareholders with their governance rights and to protect CoCo investors.

Article 54(5)(c) is different from the other aspects of Article 54(5) because rather than requiring banks to reveal information, it requires them to write-down or convert CoCos in accordance with the prospectus.³⁹ This requirement clearly influences the behaviour of bank employees because it ties their hands about what action to take when a CoCo reaches its trigger level. When a requirement influences the behaviour of bank employees then active monitoring is taking place. The next section discusses active monitoring in more detail.

In summary, this section has set out three related mechanisms that allow shareholders and CoCo investors to passively monitor banks: first, market discipline i.e. incorporating information into the price of securities, second, mandatory disclosure which is a regulatory requirement that facilitates the disclosure of information to shareholders and CoCo investors, third, there are information revelation terms in Article 54(5)(a)-(b). The next section discusses mechanisms of active monitoring by shareholders, CoCo investors, and facilitated by regulators.

2. Active Monitoring

This section defines active monitoring, it explains and then discusses how shareholders and CoCo investors can actively monitor bank employees. In general, active monitoring arises

³⁸See, Directive 2003/71/EC of the European Parliament and of the Council of 4 November 2003 on the Prospectus to be Published When Securities are Offered to the Public or Admitted to Trading and Amending Directive 2001/34/EC [2003] OJ L345/64 (Prospectus Directive 2003/71/EC). See also, Commission Regulation 809/2004/EC of 29 April 2004 Implementing Directive 2003/71/EC of the European Parliament and of the Council as Regards Information Contained in Prospectuses as well as the Format, Incorporation by Reference and Publication of Such Prospectuses and Dissemination of Advertisements [2004] OJ L149/1 (Prospectus Regulation 809/2004).

³⁹Capital Requirements Regulation - 2013/575, art 54(5)(c).

CHAPTER 6. MONITORING

when stakeholders change the behaviour of bank employees.⁴⁰ Shareholders can influence the behaviour of bank employees using their control rights.⁴¹ CoCo investors can influence the behaviour of bank employees by including contractual mechanisms that restrict their actions.⁴² Regulators (or courts) can facilitate active monitoring by requiring or restricting certain contractual terms in CoCo contracts or by creating obligations between bank employees and other stakeholder groups.⁴³ Both CoCo investors and shareholders can also write private letters to bank managers to influence their behaviour. On their face, such letters may not compel bank managers to change the risk-taking profile of the bank.⁴⁴ However, the threat of exit that might be explicit or implicit in such letters might change risk-taking at a bank.⁴⁵ The threat of exit might then give greater voice to these investors or shareholders.⁴⁶

This section shows that most CoCos, convertible and permanent write-down, do not contain terms that influence the behaviour of bank employees. However, when restrictive terms are included in CoCo contracts, they are more likely to be included in permanent write-down CoCos than other CoCo formats. This section has three sub-sections. First, a sub-section about monitoring by CoCo investors - specifically through the use of contractual terms. Second, a sub-section about monitoring by shareholders using their control rights. Third, a sub-section describing how regulators influence on monitoring by CoCo investors and shareholders. Each sub-section discusses active monitoring. This section highlights a number of general and specific mechanisms available to stakeholders to actively monitor

⁴⁰Although Flannery characterises the distinction between direct and indirect discipline put forth by the Federal Reserve (see Federal Reserve System (n 14) 2) as market influence. Flannery (n 3) 110. ‘Kwast et al. (1999) categorize influence as either “direct” or “indirect.” Investors and counterparties can directly induce a bank to avoid risky situations if they will raise a riskier bank’s cost of funds or reduce the volume of business they are willing to undertake with riskier banks.’ Market influence in Flannery’s view is distinct from market monitoring.

⁴¹For a discussion of blockholder monitoring using the voice, exit, and loyalty framework see: Alex Edmans, ‘Blockholder Trading, Market Efficiency, and Managerial Myopia’ (2009) 64 J Fin 2481, 2496. ‘Although loyalty and exit are indeed mutually exclusive, this leads to complementarities between them. The power of loyalty relies on the threat of exit. By making exit more feasible, increased liquidity renders loyalty more meaningful.’ For a survey of the finance literature see: Alex Edmans, ‘Blockholders and Corporate Governance’ (2014) 6 Annu Rev Financ Econ 23. See also Gullifer & Payne (n 33) 476

⁴²Hirschman (n 20).

⁴³Dorf and Sabel (n 8).

⁴⁴Edmans (n 41) 26.

⁴⁵ibid 26. ‘[T]he blockholder can implement a strategy by “jawboning”: informal negotiations with firm management such as writing letters.’

⁴⁶Edmans (n 41) 2496.

bank managers.

2.1 *Active Monitoring by CoCo Investors*

CoCo investors do not have the usual toolkit available to debt investors, particularly bank investors, to monitor bank employees.⁴⁷ Instead, CoCo investors can influence bank employees using a limited set of contractual mechanisms that do not include acceleration terms. This sub-section focuses on one mechanism available to CoCo investors to actively monitor bank employees: contractual terms in convertible and write-down CoCos.⁴⁸ As with passive monitoring, in the absence of regulatory requirements, we would expect more influence in permanent write-down CoCos than convertible CoCos because investors face a greater threat of loss with a permanent write-down. If permanent write-down CoCos do not contain more restrictive terms than convertible CoCos then this might be interpreted as evidence that CoCo investors are not sophisticated enough to require banks to incorporate terms that facilitate monitoring.⁴⁹ We discuss this conjecture in the next section. This section focuses on whether there is a difference in contractual terms between convertible and permanent write-down CoCos.

The seminal paper about the incentives created by different types of contractual terms was written by Smith and Warner.⁵⁰ They argue that there are three broad types of restrictive

⁴⁷In general, bank investors can actively monitor by exiting or renegotiating ('voice') using their contractual rights. However, with the exception of selling their CoCos, as a limited version of the exit option, investors do not have the full suite of monitoring mechanisms usually available to bond investors. Triantis and Daniels (n 20) 1084-8. 'To be an effective player in corporate governance, a bank must not only monitor the corporation, but it must also be able to act on the information it acquires ... It can also accelerate the maturity of the outstanding debt, refuse to renew existing debt, and, if necessary, enforce its matured claim against the borrower's assets. ... In sum, bank monitoring and reaction may correct managerial slack either directly, by precipitating a crisis in the boardroom and exercising voice, or indirectly, by exiting and providing a signal for the intervention of others.'

⁴⁸Klaus M Schmidt, 'The Economics of Covenants as a Means of Efficient Creditor Protection' *The Law and Economics of Creditor Protection* (2008) 89. 'A covenant restricts the actions that the borrower can take. The desired effect is that it prevents opportunistic actions on the part of the borrower that destroy firm value at the expense of the creditor but to the benefit of the debtor.'

⁴⁹Another interpretation is that the lack of contractual terms reflects the fact that when the influence is most necessary, during a period of crisis, managers might have competing incentives to gamble and CoCo investor influence is unlikely to change this incentive. Yet another interpretation, is that the gains from exerting influence need to be shared amongst all investors and implemented by the trustee and these costs may not be worth it for a small investor.

⁵⁰Clifford W Smith Jr and Jerold B Warner, 'On Financial Contracting: An Analysis of Bond Covenants'

CHAPTER 6. MONITORING

terms.⁵¹ First, restrictions on investment policies, which, in the context of CoCos, are directed at constraining managers from drastically increasing asset risk prior to the trigger. There are at least three types of restrictions on investment policies.

1. Restrictions on mergers;
2. Restrictions on asset sales; and
3. Restrictions on the sale of shares of a subsidiary.

Second, restrictions on debt, which, in the context of CoCos, might be directed at ensuring managers do not finance risky investments with a high chance of triggering a CoCo by issuing higher priority debt. There are two types of restrictions on debt:⁵²

1. Restrictions on liens; and
2. Restrictions on debt issuance.

Third, restrictions on the payment of dividends, which are directed at ensuring that managers do not withdraw funds from the bank to the detriment of CoCo investors.⁵³ This sub-section focuses on contractual mechanisms that should appear in CoCos to facilitate active monitoring. It analyses restrictions on dividends, asset sales, and asset substitution.

CoCo investors can sell their CoCos, use the threat of selling their CoCos to specialist litigators to renegotiate with banks, or enforce their contractual rights.⁵⁴ The sale of CoCos is an aspect of passive monitoring because it causes a decrease in the price of CoCos.

(1979) 7 J Fin Econ 117.

⁵¹See, *ibid.* See also, Vidhan K Goyal, 'Market Discipline of Bank Risk: Evidence from Subordinated Debt Contracts' (2005) 14 J Fin Intermediation 318, 325. The purpose of these terms is explained in: Douglas G Baird and Robert K Rasmussen, 'Private Debt and the Missing Lever of Corporate Governance' (2006) 154 University of Pennsylvania L Rev 1209, 1228. 'The purpose of these tripwires is not to force repayment of the loan, but rather to ensure that lenders have control over major decisions and the ability of insist on changes in management when the business encounter reverses.' These tripwires are more effective when there is security. However, they are limited by the unsecured and low priority nature of CoCos.

⁵²Smith and Warner (n 50) 136.

⁵³Goyal (n 51) 325.

⁵⁴Triantis and Daniels (n 20) 1096. 'A lender may choose to defer exit and instead use its threat of exit to induce management to renegotiate the terms of the debt. This strategy is successful only to the extent that the lender's threat is credible, which in turn depends on the cost of exit to the lender.'

CHAPTER 6. MONITORING

Using the threat of a sale to a specialist litigator in order to renegotiate with a bank is an aspect of active monitoring.⁵⁵ In addition, if a restrictive term is breached it might give rise to damages and the option to enforce the term might give investors the opportunity to renegotiate.⁵⁶ The threat of a sale and the opportunity to sue for damages are the drivers for the discussion of restrictive terms in this sub-section.

Using the threat of a sale to induce renegotiation is dependent on the credibility of the investor's threat to sell, which, in turn depends on the cost of selling to the investor.⁵⁷ The costs of selling will likely vary depending on the identity of the investors. For instance, a sophisticated investor will face lower costs because it will be cheaper to acquire information about where to redeploy its cash after selling. On the other hand, an unsophisticated investor is likely to face higher costs if it sells. Investor sophistication is discussed in Section 3.

The ability to sue for breach of contract can also facilitate renegotiation.⁵⁸ For instance, the inclusion of an asset sale clause might allow CoCo investors to threaten to sue if the proceeds of a sale are to be used to invest in high risk projects.⁵⁹ Restrictive terms that are breached in advance of a trigger give investors an opportunity to renegotiate with banks.

In this sub-section we make two empirical observations. First, restrictive terms are included in a very small proportion of CoCos. Second, when there are restrictive terms, they tend to be included in permanent write-down CoCos instead of other formats.

The first observation, that there are few restrictive terms in CoCos, is inconsistent with what we would expect for at least three reasons.⁶⁰ First, we would expect restrictive terms

⁵⁵There appears to be a parallel between active monitoring and 'voice' as described by Hirschman. Hirschman (n 20) 30. 'Voice is here defined as any attempt at all to change, rather than to escape from, an objectionable state of affairs, whether through individual or collective petition to the management directly in charge, through appeal to a higher authority with the intention of forcing a change in management, or through various types of actions and protests, including those that are meant to mobilize public opinion.'

⁵⁶Baird and Rasmussen (n 51) 1228.

⁵⁷See generally, Triantis and Daniels (n 20) 1096. The value that can be extracted by the investor is limited by provisions that govern preferences. Goode (n 5) 569-96.

⁵⁸Jack Beatson, Andrew Burrows, John Cartwright, *Anson's Law of Contract* (29th edn, OUP 2010) 533. 'Where a party performing a contract does not do so to the standard required by the contract or within the timeframe set, that party will breach the contract.'

⁵⁹There are two broad types of remedies for breach of contract as well as restitution for a claim under unjust enrichment. *ibid* 533.

⁶⁰Clifford W Smith Jr and Jerold B Warner, 'Bankruptcy, Secured Debt, and Optimal Capital Structure: Comment' (1979) 34 J Fin 247, 250; Oliver Williamson, 'Credible Commitments: Using Hostages to Support Exchange' (1983) 73 Am Econ Rev 519, 525; John Armour, 'The Law and Economics Debate About Secured

CHAPTER 6. MONITORING

in CoCos because of the priority of CoCos namely that the priority of a CoCo is either the same as or below shareholders. Second, we would expect restrictive terms in CoCos because the value of a CoCo might be above or below its price at issue when it is triggered. Third, we would expect restrictive terms in CoCos because there are explicit and implicit guarantees for much of the debt issued by banks which reduces the incentive of many of the other bank creditors to monitor.

An unanswered question is why there are so few restrictive terms in CoCo contracts. One potential solution that is explored below is that monitoring by CoCo investors is facilitated by regulatory requirements. A benefit of this approach is that the parties cannot discharge regulatory requirements in the same way as they can discharge contractual requirements.⁶¹ Therefore, CoCo investors can be made to credibly commit to behaviour consistent with regulatory objectives and their own initial interests. There are two potential costs to monitoring being facilitated by regulatory requirements. First, regulatory terms incentivising monitoring may be inconsistent with the interests of CoCo investors and therefore deferral to regulators will impose a cost on CoCo investors. Second, a regulatory requirement that cannot be waived by the parties reduces the ability of CoCo investors to use the threat of enforcement to change the behaviour of bank management.

Another reason why there may be so few restrictive terms in CoCo contracts is that the CoCo market is still young and investors have not yet developed contractual technologies to protect their interests. Indeed, technologies might instead be developed to protect shareholders instead of CoCo investors. The original CoCos in our sample were issued in 2009 and when the terms of these agreements are compared to CoCos issued by the same bank in 2014 the terms have been slightly modified. For instance, shareholder call options appear in

Credit: Lessons for European Law-Making' (2008) 5 European Company and Financial Law Review 3, 9. The standard account is that issuing secured debt allows firms to issue more unsecured debt because unsecured creditors can rely on secured creditors to monitor. However, this doesn't strictly apply to banks because of the explicit guarantee of deposits, the short-term nature of wholesale debt, and the implicit guarantee of subordinated debt in order to avoid the credit rationing that follows from bank failure.

⁶¹Beatson *et al.* (n 58) 459. 'Contract rests on the agreement of the parties: as it is their agreement which binds them, so by their agreement they may be discharged. And this mode of discharge may occur in one of four ways: by release under seal; by accord and satisfaction; by rescission of a contract which is still executory; or by the operation of some provision contained in the contract itself.'

more recent CoCos issued by Lloyds Bank.⁶²

Restrictions on Dividends

We expect write-down CoCos to include restrictions on dividends because the value of CoCo investor claims is reduced when dividends are paid.⁶³ Dividends reduce the assets available to investors in two ways.⁶⁴ First, reducing planned investments and instead using the proceeds to pay a dividend.⁶⁵ Second, using the proceeds of a debt issue to pay a dividend to shareholders.⁶⁶ Both financing methods reduce the assets available to CoCo investors if the borrower defaults. Contractual terms can be used to prevent this behaviour.⁶⁷ However, Figure 6.1 shows that the majority of CoCos do not contain terms restricting dividend payments. One reason for this is that investors may rely on regulatory action to motivate banks to maintain their CET1 ratio at a high level. Amongst those that do, the majority are permanent write-down CoCos. This suggests that write-down CoCos have more protective terms than convertible CoCos. More directly, restrictions on dividends maintain the CET1 ratio at a higher level by stopping the payment of the bank's cash to shareholders. Permanent write-down investors face a higher expected loss than other types of CoCo investors when a CoCo is triggered and therefore have a greater incentive to monitor and to include restrictive terms.

Restrictions on Asset Sales

If bank employees choose to sell assets then dividend covenants protections do not offer CoCo investors much protection. One way that CoCo investors might influence the behaviour of

⁶²These terms are discussed in sub-section 7.2.

⁶³Smith and Warner (n 50) 118. 'If a firm issues bonds and the bonds are priced assuming the firm will maintain its dividend policy, the value of the bonds is reduced by raising the dividend rate and financing the increase by reducing investment. At the limit, if the firm sells all its assets and pays a liquidating dividend to the stockholders, the bondholders are left with worthless claims.'

⁶⁴Avner Kalay, 'Stockholder-Bondholder Conflict and Dividend Constraints' (1982) 10 J Fin Econ 211.

⁶⁵*ibid* 212.

⁶⁶*ibid* 212.

⁶⁷Smith and Warner (n 50) 133.

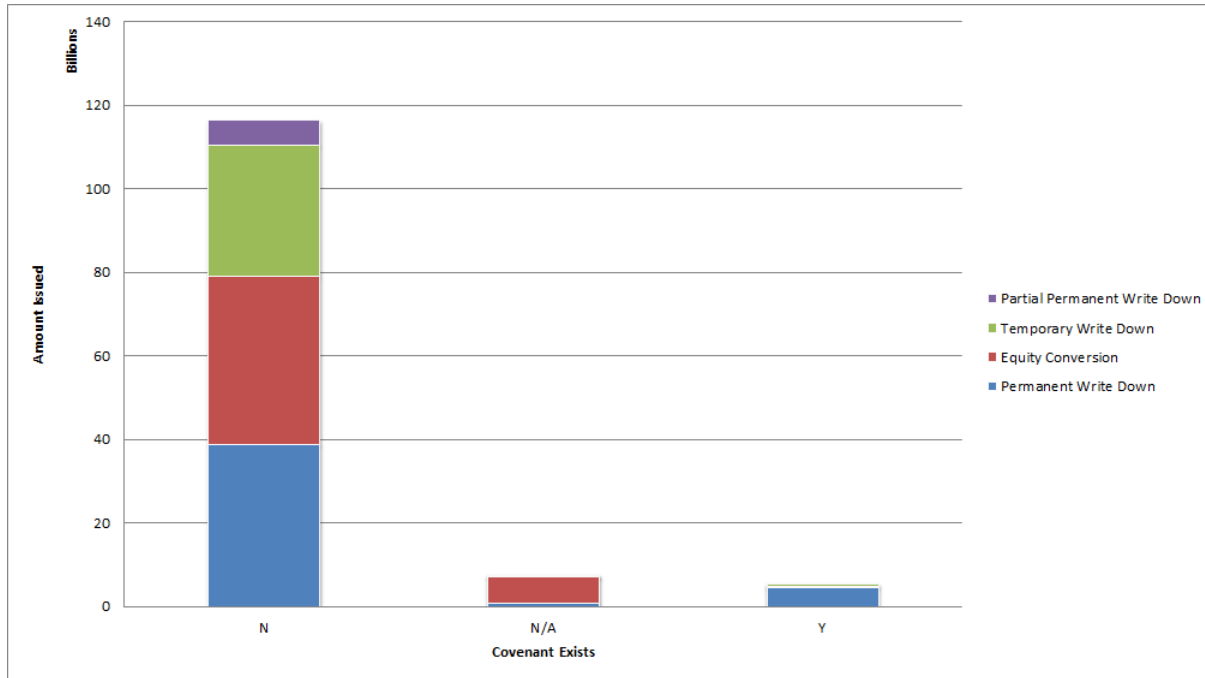


Figure 6.1: **Dividend Covenant Protections by Amount Outstanding (USD)** Sources: Bloomberg, bank prospectuses, annual reports, and Author’s calculations. This figure shows that dividend covenant protections are incorporated predominantly in permanent write-down CoCos. However, it also shows that the majority of CoCos, including the majority of permanent write-down CoCos do not include dividend covenant protections.

bank employees is to include a contractual mechanism that restricts their ability to sell assets.⁶⁸ It is beneficial for investors in permanent write-down and convertible CoCos alike to have contractual mechanisms that restrict the ability of bank employees to sell assets.⁶⁹ However, investors in permanent write-down CoCos will likely suffer a greater loss if a CoCo is triggered than those investors in convertible CoCos. Consequently, investors in permanent write-down CoCos might have a greater incentive to include terms that restrict asset sales.

Figure 6.2 shows that a relatively small proportion of CoCos include restrictions on asset sales. Figure 6.2 also shows that restrictions on asset sale are included in three types of CoCos: equity conversion, permanent write-down, and staged write-down. Interestingly, the majority of CoCos with restrictions on asset sales are convertibles rather than permanent write-down CoCos. There is no clear reason why a there are more asset sale restrictions in

⁶⁸ibid 127.

⁶⁹ibid 127. ‘The Costly Contracting Hypothesis suggests that restrictions on the sale of substantial units of the firm’s assets are observed because, in general, the proceeds if assets are sold piecemeal will be less than if sold as a going concern.’

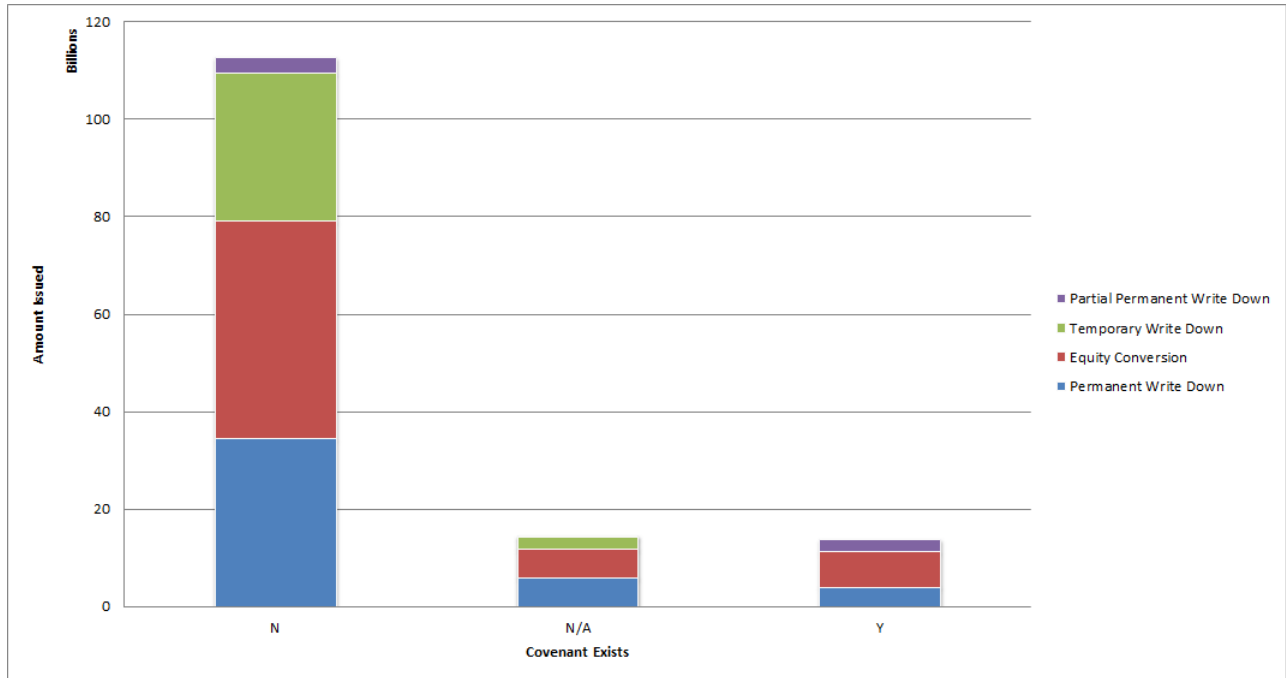


Figure 6.2: **Asset Sale Protection by Amount Outstanding (USD)** Sources: Bloomberg, bank prospectuses, annual reports, and Author's calculations.

convertible CoCos than in permanent write-down CoCos. In fact, it runs contrary to the risk borne by convertible CoCo investors relative to permanent write-down CoCo investors.

Restrictions on Asset Substitution

If their actions are unobservable, bank employees could reduce a bank's CET1 by replacing, low risk assets with high risk assets: this is known as 'asset substitution'.⁷⁰ For instance, employees can choose to invest in a negative net present value project where adverse outcomes decrease the value of debt but successful outcomes increase the value of bank equity.⁷¹ This investment can take the form of a merger or acquisition of a firm with characteristics where adverse outcomes lead to a trigger and a successful outcome increases the value of equity.

Convertible CoCos that increase in value when triggered (relative to their value at

⁷⁰For an empirical analysis of asset substitution see: Assaf Eisdorfer, 'Empirical Evidence of Risk Shifting in Financially Distressed Firms' (2008) 63 J Fin 609.

⁷¹Smith and Warner (n 50) 118-9. 'If a firm sells bonds for the stated purpose of engaging in low variance projects and the bonds are valued at prices commensurate with that low risk, the value of the stockholders' equity rises and the value of the bondholders' claim is reduced by substituting projects which increase the firm's variance rate.'

CHAPTER 6. MONITORING

issue) impose losses on shareholders and can influence bank employees to not invest in projects with the characteristics just described. However, as previously argued, most CoCos entail a loss to investors. Therefore, investors in convertible and write-down CoCos alike have an incentive to include contractual mechanisms that restrict asset substitution. If triggered, permanent write-down investors would lose their total investment whilst convertible investors might receive equity. Therefore, both will have an incentive to restrict asset substitution but permanent write-down investors will have a greater incentive than every other type of investor to avoid investment in such a project—indeed even if it is accomplished by a merger or an acquisition.

Consistent with our analysis, Figure 6.3 shows that there are more permanent write-down CoCos with a restriction on mergers and changes in business than convertible CoCos. This consistency might be explained by the lack of empirical data about \$10 billion of convertible and write-down CoCos. Another reason, for the lack of asset substitution terms is that investors in convertible CoCos might rely on regulators to take action against banks if they obtain information about asset substitution. However, it is possible that by the time a regulator observes asset substitution the bank may be distressed. Therefore, if CoCo investors are better monitors of asset substitution than regulators, then it might be beneficial for them to monitor asset substitution.

In summary, CoCo investors can monitor using at least three different types of restrictive terms: restrictions on dividends which reduce the cash available to pay CoCo investors, restrictions on asset sales, and restrictions on asset substitutions through mergers and acquisitions. In general, most CoCos, convertible and write-down, do not contain terms that influence the behaviour of bank employees. However, when restrictive terms are included in CoCo contracts, they are more likely to be included in permanent write-down CoCos than other CoCo formats. One explanation for the lack of restrictive terms in CoCos is that investors rely on either shareholders or regulators to undertake monitoring. Another explanation is that monitoring takes place in an informal way—such as through jaw-boning,

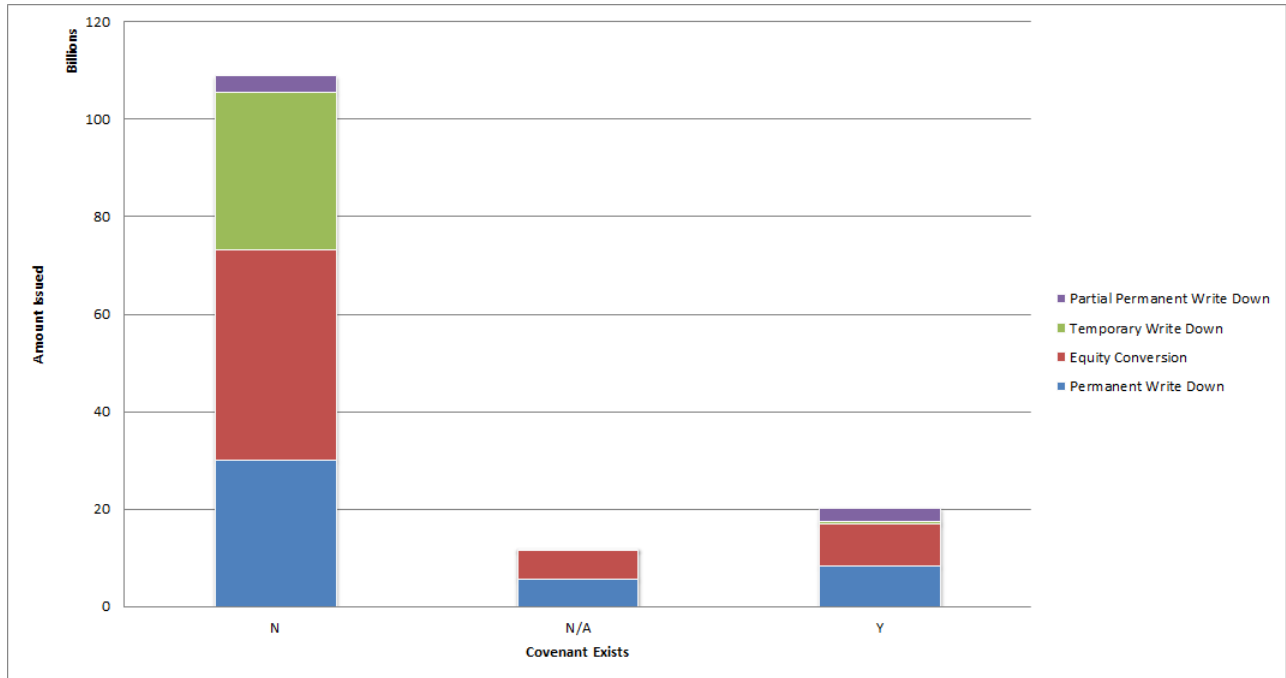


Figure 6.3: **Restrictions on Business Changes and Mergers by Amount Outstanding (USD)** Sources: Bloomberg, bank prospectuses, annual reports, and Author’s calculations.

for which there is little empirical evidence available.⁷² The next sub-sections discuss active monitoring by shareholders and by regulators.

2.2 Active Monitoring by Shareholders

This sub-section very briefly discusses active monitoring by shareholders. Shareholders can nominate and elect directors.⁷³ The purpose of this power of election is to ensure that the board remains responsive to the interests of shareholders.⁷⁴ At least in the UK, there is an absence of legal constraints on what type of vote is required to elect a director, the type of meeting necessary for the appointment to be made, or the requirements for reelection.

⁷²Edmans (n 41).

⁷³Kraakman *et al.* (n 6) 58. ‘All of our core jurisdictions apart from the U.S. allow shareholders to nominate directors. Ordinarily the board proposes the company’s sale of nominees, which is rarely opposed at the annual shareholders meeting. But in most jurisdictions, a qualified minority (usually a small percentage) of shareholders can contest the board’s slate by adding additional nominees to the agenda of the shareholders’ meeting.’

⁷⁴ibid 14. ‘[T]he board of a corporation is elected—at least in substantial part—by the firm’s shareholders. The obvious utility of this approach is to help assure that the board remains responsive to the interests of the firm’s owners, who bear the costs and benefits of the firm’s decisions’

CHAPTER 6. MONITORING

In addition, shareholders can remove directors.⁷⁵ Indeed, directors can be removed by ordinary resolution of the shareholders at any time.⁷⁶ There are at least three factors that relate to directors being removed: first, if they are elected for short terms there are more opportunities to remove them; second, they can be removed before the end of their term without cause; and third, they can fail to receive the required number of votes to be re-elected.⁷⁷ Shareholders could align the incentives of directors with their own by shortening the length of time for which directors are elected, refusing to nominate directors known to favour excessive risk-taking, removing directors prior to the end of their term, and refusing to re-electing directors inclined to take excessive risk. Removal of directors is linked to aspects of their trustworthiness and reputation. Directors that are no longer considered trustworthy and those with a reputation inconsistent with the incentives of shareholders may be removed. This means that directors are likely to be responsive to the behind the scenes pressure exerted by shareholders.

Further, shareholders can sell their shares, write public letters to bank managers, or write private letters to bank managers to reduce their risk-taking.⁷⁸ These are the usual mechanisms available to blockholders in firms. However, the market capitalisation of banks as well as their complexity makes it difficult for shareholders to utilise these methods to reduce risk-taking at a bank. The market capitalisation of banks, particularly those that are systemically important, increases the free-rider problem because an atomistic shareholder bears the cost of the intervention but only a fraction of the benefits.⁷⁹ Likewise, the complexity of banks increases the absolute costs of acquiring information about bank risk-taking.

⁷⁵ibid 60-1. ‘Removal rights follow appointment rights. Indeed, one might say that directors are normally “removed” by dropping their names from the company’s slate or by failing to reelect them. It follows that the length of directorial terms can be critical. Longer terms provide insulation from proxy contests, temporary shareholder majorities, and even powerful CEOs.’

⁷⁶Davies (n 32) 389. ‘[U]nder what is now section 168 of the Companies Act 2006, a director can be removed by ordinary resolution of the shareholders at any time.’

⁷⁷Kraakman *et al.* (n 6) 60-1. ‘... A second aspect of removal rights is the power to removed directors *before* the end of their terms.

⁷⁸See generally, Andrei Shleifer and Robert W Vishny, ‘Large Shareholders and Corporate Control’ (1986) 94 J Political Econ 461. See also, Edmans (n 41).

⁷⁹ibid 25.

2.3 *Active Monitoring Facilitated by Regulators*

This sub-section discusses how regulators can influence monitoring by CoCo investors and shareholders by requiring certain terms in CoCo contracts, restricting certain terms from being included in CoCo contracts, or by creating obligations between bank employees and other stakeholder groups. In sub-section 2.1, we highlighted that a small proportion of CoCos include restrictive terms which is inconsistent with what we might expect. One reason for this might be that monitoring by CoCo investors is facilitated by regulatory requirements. However, this explanation is limited by the fact that some regulatory requirements work against the interests of CoCo investors such as the prohibition on CoCos mandating interest payments to CoCo investors if securities ranking *parri passu* or junior receive a distribution.⁸⁰

With respect to CoCo investors, we have seen that the CRR requires contracts to contain certain information revelation terms to facilitate passive and active monitoring. The CRR facilitates active monitoring by prohibiting the inclusion of three types of terms in AT1 capital.⁸¹ The restrictions incentivise monitoring consistent with maintaining bank CET1 levels by prohibiting terms that are inconsistent with regulatory objectives.

First, AT1 capital cannot contain a contractual mechanism mandating interest payments if a different security ranking *parri passu* or junior receives a distribution.⁸² This prohibition permits banks to make distributions to junior security investors but not to CoCo investors. This reduces the amount of interest that a bank has to pay in order to avoid insolvency.

Second, AT1 capital cannot contain a contractual term canceling payments on non-AT1 forms of capital because of the failure to pay interest on an AT1 instrument.⁸³ Such a term

⁸⁰Capital Requirements Regulation - 2013/575, art 53(a).

⁸¹These restrictions on contractual terms apply to AT1 CoCos and not Tier 2 CoCos. *ibid* art 63. See also, *ibid* art 53.

⁸²*ibid* art 53(a). ‘[T]he provisions governing Additional Tier 1 instruments shall, in particular, not include the following ... a requirement for distributions on the instruments to be made in the event of a distribution being made on an instrument issued by the institution that ranks to the same degree as, or more junior than, an Additional Tier 1 instrument, including a Common Equity Tier 1 instrument’.

⁸³*ibid* art 53(b). ‘[T]he provisions governing Additional Tier 1 instruments shall, in particular, not include the following ... a requirement for the payment of distributions on Common Equity Tier 1, Additional Tier 1 or Tier 2 instruments to be canceled in the event that distributions are not made on those Additional Tier 1 instruments’.

CHAPTER 6. MONITORING

attempts to avoid a situation where a bank is placed into insolvency because it does not pay interest on its CoCos which forces it to not pay other creditors such as Tier 2 subordinated debt investors. This requirement is directed at ensuring that a bank does not breach other payment terms because of an inability to pay CoCo investors.⁸⁴

Third, AT1 capital cannot contain a contractual term replacing the payment of interest or a dividend with payment in any other form.⁸⁵ Such a term preserves the freedom of the bank to suspend coupon payments.

These three requirements have two effects. First, the requirements curtail investor freedom; specifically, the ability of investors to incorporate terms that benefit them to the detriment of regulatory objectives. Second, the requirements ensure that the CET1 ratio is maintained and distributions are not made to CoCo investors in circumstances where this is contrary to regulatory objectives. Therefore, these requirements incentivise investors to develop other means to actively monitor management. This makes it more surprising that CoCos contain so few restrictive contractual terms. At the same time, CoCos disincentivise the inclusion of contractual terms designed to maintain a high level of CET1 in order to avoid the trigger, because of an expectation that the regulator will do this job.

Regulators possess an additional power to restrict or prohibit interest payments on AT1 CoCos. This is in addition to a requirement that coupons are discretionary and need only be made if the issuer has distributable items.⁸⁶ Article 52 of the CRR allows issuers to restrict the payment of interest on AT1 CoCos by requiring distributions to be discretionary and based on profits from the current year.⁸⁷ Specifically Article 52(1)(l) provides:⁸⁸

⁸⁴Terms such as these are often referred to as *ipso facto* clauses.

⁸⁵ibid art 53(c). '[T]he provisions governing Additional Tier 1 instruments shall, in particular, not include the following ... an obligation to substitute the payment of interest or dividend by a payment in any other form. The institution shall not otherwise be subject to such an obligation'.

⁸⁶See ibid pp 128 and ibid art 52.

⁸⁷Distributable items are set out in the preamble of the CRR: ibid pp 128. '“distributable items” means the amount of the profits at the end of the last financial year plus any profits brought forward and reserves available for that purpose before distributions to holders of own funds instruments less any losses brought forward, profits which are non-distributable pursuant to provisions in legislation or the institutions’ bye-laws and sums placed to non-distributable reserves in accordance with applicable national law or the statutes of the institution, those losses and reserves being determined on the basis of the individual accounts of the institution and not on the basis of the consolidated accounts.’ The discretion on the payment of interest is set out in ibid art 52(1)(l).

⁸⁸ibid art 52(1)(l).

CHAPTER 6. MONITORING

Capital instruments shall qualify as Additional Tier 1 instruments only if the following conditions are met:

- (1) distributions under the instruments meet the following conditions:
 - (i) they are paid out of distributable items;
 - (ii) the level of distributions made on the instruments will not be amended on the basis of the credit standing of the institution or its parent undertaking;
 - (iii) the provisions governing the instruments give the institution full discretion at all times to cancel the distributions on the instruments for an unlimited period and on a non-cumulative basis, and the institution may use such canceled payments without restriction to meet its obligations as they fall due;
 - (iv) cancellation of distributions does not constitute an event of default of the institution;
 - (v) the cancellation of distributions imposes no restrictions on the institution;

The discretion afforded to banks not to make coupon payments is a significant term that militates against the interests of investors. It is perhaps only matched by a requirement that AT1 CoCos are subject to discretionary coupon cancellation by regulators. CRD IV gives regulators the power to restrict or prohibit interest payments on AT1 CoCo investors.⁸⁹ Article 104(1) says:⁹⁰

For the purposes of Article 97, Article 98(4), Article 101(4) and Articles 102 and 103 and the application of Regulation (EU) No 575/2013, competent

⁸⁹Directive 2013/36/EU of the European Parliament and of the Council of 26 June 2013 on Access to the Activity of Credit Institutions and the Prudential Supervision of Credit Institutions and Investment Firms amending Directive 2002/87/EC and repealing Directives 2006/48/EC and 2006/49/EC [2013] OJ L176/338 (Capital Requirements Directive - 2013/36/EU), art 104. At least in the UK, the Prudential Regulatory Authority has not waived its right to exercise those powers in its rule book. See PRA Rulebook CRR Firms Instrument 2013 2013/6 (U.K.).

⁹⁰Capital Requirements Directive - 2013/36/EU, art 104.

CHAPTER 6. MONITORING

authorities shall have at least the following powers:

- (i) to restrict or prohibit distributions or interest payments by an institution to shareholders, members or holders of Additional Tier 1 instruments where the prohibition does not constitute an event of default of the institution.

Together, the discretion afforded to banks and regulators to restrict payments to investors is detrimental to investor interests. These coupon cancellation provisions incentivise investor monitoring and to that extent these regulatory requirements facilitate monitoring. Indeed, the additional risk borne by CoCo investors might instead sharpen their incentives to use other mechanisms to monitor—such as simply selling the CoCo.⁹¹

With respect to shareholders, directors' duties are likely to influence the behaviour of bank employees by creating a right for shareholders to sue directors for not taking due care, not acting in good faith, or for a proper purpose. In addition, if the trigger for the CoCo is close to the point of insolvency of the bank then a trustee or liquidator⁹² (on behalf of CoCo investors), other creditors, or their representatives, may have the right to also sue directors.⁹³ Directors' duties are a general requirement for all companies that have the effect of influencing the behaviour of bank employees. These duties can allow shareholders to bring a suit against directors and consequently reinforce their appointment and removal rights by providing shareholders with a right to sue.⁹⁴ Directors' duties are enshrined in statute but developed in the courts. The duties operate to constrain their centralised power—and to ensure that the interests of the company are protected.⁹⁵

Directors' duties influence the behaviour of bank employees, namely managers. Of course, we understand that there is a separation between the owners and managers of banks.⁹⁶

⁹¹For reasons discussed in section 3 this may not be an effective strategy because unsophisticated investors are more likely to hold CoCos in this case.

⁹²Depending on whether the bank is solvent, or placed into an insolvency process.

⁹³See generally, Paul L Davies, 'Directors' Creditor-Regarding Duties in Respect of Trading Decisions Taken in the Vicinity of Insolvency' (2006) 1 European Business Organisation Review 301. Such an action is likely to be brought by a trustee on behalf of the CoCo investors.

⁹⁴This is subject to the derivative claim rules. In the UK, see: Davies (n 32) 609. '[P]rovision is made for giving individual shareholders, subject to appropriate safeguards, standing to pursue litigation on behalf of the company against the alleged wrongdoing directors.'

⁹⁵*ibid* 476.

⁹⁶Adolf A Berle & Gardiner Coit Means, *The Modern Corporate and Private Property* (Macmillan 1932).

CHAPTER 6. MONITORING

This separation between ownership and control is relevant to two conflicts: first, the shareholder and director conflict,⁹⁷ and, second, the CoCo investor and shareholder conflict.⁹⁸

Bank directors have a common law and statutory duty of care to *the bank*.⁹⁹ The duty requires directors to guide and monitor the management of the company.¹⁰⁰ A finding that a director has breached their statutory or common law duties gives rise to requirement to a “recompense the company for the harm caused to it by the director’s breach.”¹⁰¹

Similarly, bank directors owe a fiduciary duty to the *company* and are sometimes regarded as acting in breach of trust when they deal improperly with the company’s assets.¹⁰² There are two sub-groups of fiduciary duties. First, duties which set a positive requirements to discharge their duties such as act within the powers conferred, act in good faith, and exercise independent judgment.¹⁰³ Second, duties which militate against directors “putting themselves in a position in which their interests (or duties to others) conflict with their duty to the company.”¹⁰⁴ A finding that a director has breached their fiduciary duty means that the director or person “into whose hands those assets come may find that they are required to restore the value of the misapplied assets to the company.”¹⁰⁵ In addition to the legal remedies, a finding of breach of fiduciary or statutory duty is likely to have reputational consequences for directors and limit their ability to obtain subsequent employment. In addition,

Indeed, investment banks were the last financial institutions to move from a private partnership framework to a publicly listed company. See, Lisa J Endlich, *The Culture of Success* (1999).

⁹⁷Michael C Jensen and William H Meckling, ‘Theory of the Firm: Managerial Behavior, Agency Costs, and Ownership Structure’ (1976) 3 J Fin Econ 305.

⁹⁸Kraakman *et al.* (n 6) 116-9.

⁹⁹Davies (n 32) 479. ‘Before turning to the substance of directors’ duties, we need to ask who are their beneficiaries, i.e. to whom are they owed? The answer in British law is clear: the common law formulation was that the duties of the directors were owed to “the company” and that is repeated in section 170(1) in respect of the statutory duties.’

¹⁰⁰*Daniels v Anderson* (1995) 16 ACSR 607 (NSWCA) at 664. Non-executive directors are required, as a minimum, to ‘take reasonable steps to place themselves in a position to guide and monitor the management of the company.’ See also, Davies (n 32) 491.

¹⁰¹*ibid* 495. There is a question about whether the remedies for a fiduciary breach are available for statutory and common law duty breaches. This is a vexed issue addressed in: J D Heydon, *Meagher, Gummow and Lehane’s Equity: Doctrines and Remedies* (5th edn, Butterworths 2014).

¹⁰²Davies (n 32) 496. ‘Perhaps all that needs to be established, which is indisputable, is that directors individually owe fiduciary duties to their company and sometimes are regarded as acting in breach of trust when they deal improperly with the company’s assets.’

¹⁰³*ibid* 497.

¹⁰⁴*ibid* 497.

¹⁰⁵*ibid* 496.

the mere fact that an action is brought against a director for breach of fiduciary duty might give rise to reputational sanctions.

In addition, directors may be subject to a specialised monitoring duty to protect the interests of shareholders.¹⁰⁶ These duties extend to a requirement that adequate audit checks and risk management controls are in place in banks.¹⁰⁷

These statutory and fiduciary duties influence the behaviour of directors. They create a baseline level of behaviour and allow, in specific circumstances, shareholders and CoCo investors (or an insolvency practitioner on their behalf) to bring a suit against bank directors.¹⁰⁸ This level of influence is a function of third parties granting legal rights to shareholders and investors and creating obligations for directors. Ultimately, they reduce the risk borne by shareholders and CoCo investors vis-a-vis bank managers. However, empirical observations show that there is very low, if not non-existent, levels of litigation against public directors in the UK by shareholders.¹⁰⁹ Ultimately, this observation militates against the conclusion that shareholder suits against bank directors is a plausible monitoring mechanism.

3. Investor Sophistication

Investor sophistication is relevant to the ability of CoCo investors to monitor banks passively or actively. Investor sophistication also affects the choice to actively or passively monitor

¹⁰⁶Kraakman *et al.* (n 6) 80. ‘In addition to the global duty of care, many jurisdictions impose specialized monitoring duties on corporate officers and directors, which play into corporate governance and serve in part to protect shareholder interests.’

¹⁰⁷*ibid* 80. ‘EU and Japanese law task supervisory boards, audit committees, and statutory auditors with ensuring that publicly traded companies have adequate auditing checks and risk management controls in place.’

¹⁰⁸*ibid* 79. ‘[A]ll of our core jurisdictions impose a very broad duty on corporate directors and officers to take reasonable care in the exercise of their offices (duty of care). This duty, while difficult to enforce, is truly part of the wider corporate governance system, and intended to benefit shareholders as a class insofar as their interests are identified with the corporation’s interests.’

¹⁰⁹John Armour *et al.*, ‘Private Enforcement of Corporate Law: An Empirical Comparison of the United Kingdom and the United States’ (2001) 6 J Corporate L Stud 21, 699-700. ‘If we do not discount the one case brought against directors of a publicly traded companies as frivolous, this means the per-year likelihood of directors of a publicly traded firm being sued in English courts for damages under U.K. companies legislation was 1 out of nearly 6,000 or 0.017 percent. Hence, the annualized number of lawsuits filed seeking damages against directors of publicly traded companies in the United Kingdom is effectively *zero* over our sample period.’

CHAPTER 6. MONITORING

banks.¹¹⁰ In this context, we consider passive monitoring to be selling a CoCo while active monitoring is influencing bank employees through renegotiation of contract terms. Investors will choose the cheapest option between (or mix of) passive and active monitoring. Active monitoring is likely to be, relatively speaking, more expensive for unsophisticated investors than passive monitoring. Therefore, unsophisticated investors are likely to use passive monitoring rather than active monitoring.

The capacity for sophisticated investors to actively monitor is dependent on their influence over bank employees.¹¹¹ We would expect that a sophisticated investor is more likely to include terms that allow them to renegotiate with bank employees prior to a CoCo being triggered. On the other hand, we would expect that less sophisticated investors would be less likely to include terms that allow them to renegotiate with bank employees prior to a CoCo being triggered. The capacity to actively monitor can be measured by two variables: first, the amount of time between the breach of contract that allows investors to renegotiate and the trigger of the CoCo; and, second, how specific the term is that allows them to renegotiate. Investors have more opportunity to renegotiate if there is a greater amount of time between breach and the trigger. In addition, the less ambiguous the term the more certain are the rights of investors and their ability to assess the benefits of renegotiating.¹¹² Consequently, we can surmise that monitoring is more likely to occur when the time between breach and trigger is maximised and when the rights of investors are unambiguous.

The proportion of sophisticated and unsophisticated investors is also relevant to an analysis of monitoring.¹¹³ Sophisticated investors gather, process, and reveal information

¹¹⁰Triantis and Daniels (n 20) 1096.

¹¹¹*ibid* 1103-4. 'Voice is a somewhat more complex reaction than exit. It can be measured along three dimensions: (i) time, (ii) specificity, and (iii) force. ... Once the ambit of a stakeholder's voice options is defined, the stakeholder uses a self-interested cost-benefit analysis to choose between exit and voice, and among voice options. Exit is usually the option that carries the most certainty; the value of voice, however, depends on the responsiveness of managers and their ability to effect change. This responsiveness, in turn, is a function of the quality of the information held by the actor, the boundaries of its voice options, and its expertise in choosing the most cost-effective configuration of voice.'

¹¹²A risk averse investor is less likely to renegotiate if there is ambiguity in the term that allows them to renegotiate.

¹¹³Hirschman (n 20) 24. Naturally, there are other factors that affect monitoring and the selling of securities to that end. These include: the responsiveness of bank employees and their ability to effect a change in the bank's CET1 level.

more quickly and effectively than unsophisticated investors. Employees respond to bad information being revealed about the bank i.e. that the bank is distressed. Employees are likely to expect sophisticated investors to reveal information more quickly than unsophisticated investors.¹¹⁴ Therefore, having unsophisticated investors might not sharpen the minds of bank employees to the task of rectifying the problems at the bank.¹¹⁵ Consequently, effective monitoring, particularly with respect to giving employees time to resolve problems, is likely to occur when there is some mix of both sophisticated and unsophisticated CoCo investors.¹¹⁶

With those caveats in mind this section has four sub-sections. In the first sub-section, it discusses the limitations of the ownership data and how this might affect its reliability. In the second sub-section, it describes the ownership data and shows that fund managers and banks are the largest types of CoCo investors. In the third sub-section, it talks about creating incentives for sophisticated investors to monitor and recommends additional capital requirements or reporting requirements for banks that hold CoCos. In the fourth sub-section, it discusses the potential to prohibit unsophisticated investors, basically shareholders, from owning CoCos and the implications this might have for monitoring.

3.1 *Limited Ownership Information*

There is limited ownership data available for CoCos. Ownership information is unreliable in three ways. First, as a proportion of the amount outstanding, ownership data is available for about 14.7622% of the total amount of CoCos in the sample. Figure 6.4 provides a breakdown of the reported ownership of CoCos by issuer. It shows that for a number of issuers, there is actually no ownership information available. While for most, very limited information is available about owners.

Second, ownership information is based on regulatory filings. This means that the data

¹¹⁴ibid 24. ‘But if demand is very elastic, the recuperation process will not take place either, this time because the firm will be wiped out before it will have had time to find out what hit it much less to do something about it. This is a case of “too much, too soon.”’

¹¹⁵ibid 24. ‘Evidently if demand is highly inelastic with respect to quality change, revenue losses will be quite small and the firm will not get the message that something is amiss.’

¹¹⁶ibid 24. ‘For competition (exit) to work as a mechanism of recuperation from performance lapses, it is generally best for a firm to have a mixture of *alert* and *inert* customers.’

CHAPTER 6. MONITORING

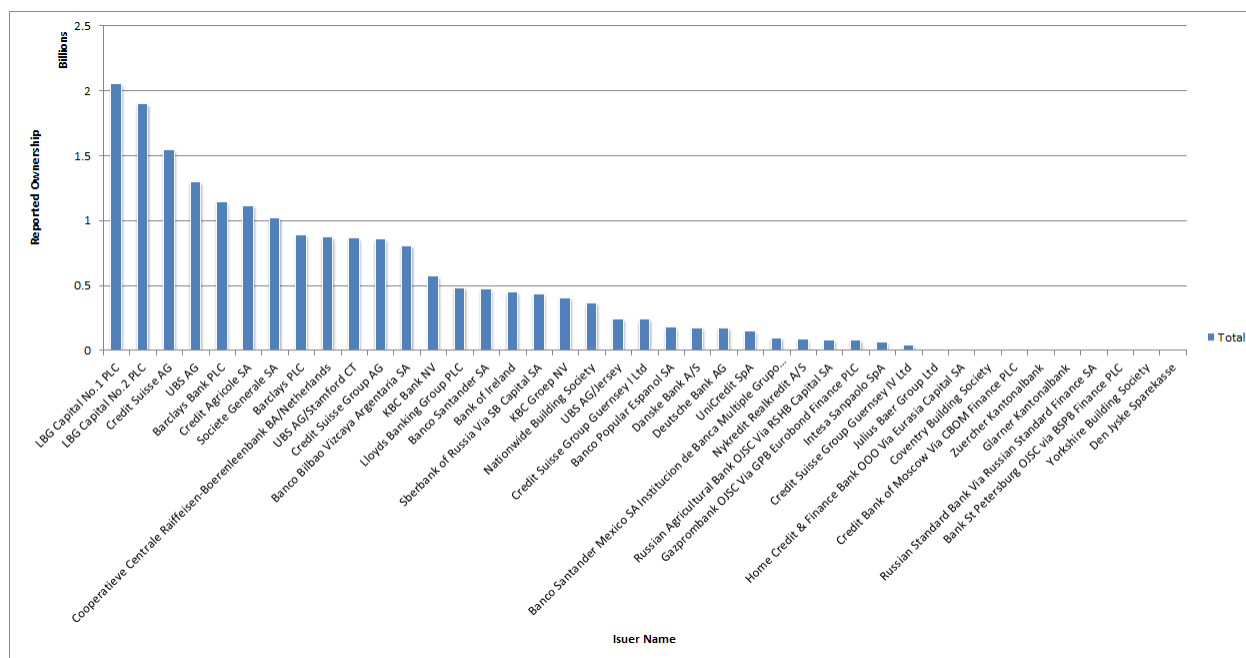


Figure 6.4: **Reported Ownership of CoCos by Issuer (USD)** Sources: Bloomberg, bank prospectuses, annual reports, and Author's calculations. This figure shows by issuer the reported ownership of CoCos. It highlights that there is significant variation in reported ownership numbers. The ownership of Lloyds CoCos is the highest and a number of Russian and Nordic banks have no reported ownership details.

may be stale before it is analysed. Figure 6.5 shows the dates when regulatory filings were made. It shows that on 31 March 2014, ownership information was made available for about £6 billion of CoCos. Although the information may be accurate on 31 March 2014, it is uncertain and indeed unlikely, that months later the ownership structure would remain the same. A consequence of this information being stale is that we cannot correlate the ownership data with the proximity of the bank to the trigger point.

Third, there is also a risk of a sample selection bias. A particular type of investor might be disproportionately represented in the data because of their reporting requirements. This might explain the lack of data about CoCos being owned by retail investors for instance. Given those data limitations, this section analyses the ownership structure of CoCos to determine whether losses can be credibly imposed on investors.

In terms of analysing the sophistication of CoCo investors and their capacity to gather, process, and coordinate their responses to changes in bank asset risk, the limited ownership data has three implications. First, the limited proportion and the staleness of available own-

CHAPTER 6. MONITORING

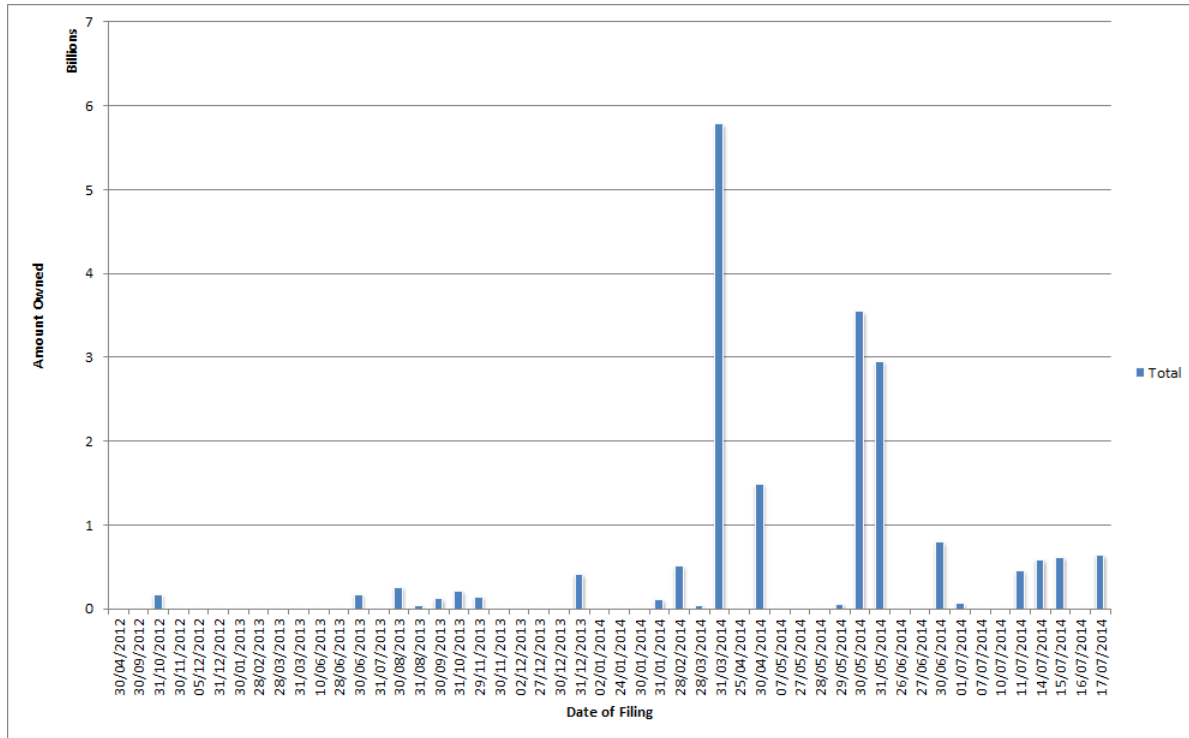


Figure 6.5: **Date Ownership Data Filed (USD)** Sources: Bloomberg, bank prospectuses, annual reports, and Author's calculations. This figure shows by date when investors reported their ownership stakes in CoCos. It illustrates that much of the ownership data was reported in early 2014 and might be stale once analysed.

ership data reduces the credibility of the data as representing the true distribution of CoCo owners. Consequently, any conclusion reached using the ownership data is subject to the assumption that the available data is representative of the true distribution of CoCo ownership. This problem might be overcome by requiring disclosure of the ownership information on CoCos. However, this is likely to entail costs that might either increase the cost of CoCos or dissuade some investors from purchasing CoCos altogether.

Second, even if the data is representative, any analysis is subject to a changing composition if a bank approaches the trigger. The analysis that follows is primarily concerned with whether investors are sophisticated or unsophisticated. However, sophisticated investors are likely to sell their CoCos before unsophisticated CoCos. Third, the implication of the proportion of sophisticated investors decreasing as a bank hits its trigger is that prices will become less accurate just when regulators may become reliant on them to determine whether a bank needs to be placed into resolution. This problem is caused by the decrease in shareholder wealth that often follows a CoCo being triggered. If the value of a CoCo increased after a trigger, for instance, then sophisticated investors might be more likely to purchase CoCos and the price might reflect more accurately the likelihood of the CoCo being triggered.¹¹⁷

3.2 Investor Types

This sub-section discusses the different types of CoCo investors and uses the data collected to argue that CoCo investors are sophisticated investors. We know that most CoCos involve a decrease in the value of the CoCo when triggered (relative to the value at issue) and therefore sophisticated investors are less likely to hold these CoCos than their unsophisticated counterparts immediately prior to trigger.¹¹⁸ However, there are other mechanisms that affect investor sophistication or their incentive to discipline bank managers: the credibility of the threat to impose losses on investors, sales restrictions and other prohibitions on ownership, and investor location. These mechanisms are discussed in subsequent sub-sections.

¹¹⁷In this situation, we would expect that ownership composition would change from less sophisticated to more sophisticated investors. Of course, this cannot be tested based on available data.

¹¹⁸See Chapter 6.

CHAPTER 6. MONITORING

Table 6.1 shows that, by far, the largest investor type are fund managers. The term fund manager is used instead of “investment adviser” which comes from the *Investment Advisers Act of 1940*¹¹⁹ and refers to a person who advises about the value of securities or the advisability of investing in securities for compensation.¹²⁰ The largest fund managers with regulatory filings include Pimco, Carmignac Gestion, Blackrock, Alliance Bernstein, Invesco Ltd, Goldman Sachs Group, Credit Agricole SA, and UBS AG.

When banks appear as fund managers, this does not necessarily mean they are investing their own capital in CoCos. The data does not set out whether banks that appear as fund managers are investing their own cash or investing the cash of other legal persons. If banks are trading on their own account then a triggered CoCo would cause contagion. If banks are investing the cash of other persons then a triggered CoCo would not cause contagion to the bank.¹²¹

Separately, banks trading on their own account are the second largest type of investor in CoCos. In absolute terms, their reported ownership of outstanding CoCos is 1.09%. Although there is a risk of contagion, imposing losses on banks holding such a small proportion of the total amount of CoCos outstanding may not lead to a systemic crisis. There are, however, two caveats. First, reporting occurs infrequently and it is possible for a bank to sell its CoCos just prior to reporting and to rebuild positions shortly thereafter. Second, a market for CoCo CDS has been developed which would allow banks to take an economic exposure to CoCos without holding the underlying instrument and having the same reporting requirements. In terms of sophistication, the largest fund managers named above are *prima facie* some of the best known names in the financial services sector. They are likely to be sophisticated enough to analyse and price the risk of a CoCo being triggered or coupons being canceled in a more thorough manner than most other types of investors.

¹¹⁹Investment Advisers Act of 1940 15 USC sec80b1-80b21 (2009).

¹²⁰ibid sec80b-2.

¹²¹Stan Maes & Wim Schoutens, ‘Contingent Capital: An In-Depth Discussion’ (2012) 41 Rev of Banking, Fin and Monetary Econ 59, 70. ‘One incentive would be to protect and support the value of their investment portfolios more generally. If sufficient insurance is given to a sufficient amount of banks, it may avert the banking distress and the resulting general loss of portfolio value we have observed. However, free rider problems and coordination failures are obvious in this setting and regulation will be required to resolve them.’

CHAPTER 6. MONITORING

Table 6.1: Ownership of CoCos by Investor Type (USD)

Source: Bloomberg, author's calculations. This table sets out the ownership of CoCos by investor type based on collected data. It shows that investment advisors are the largest investor type. It also shows that banks and insurance companies hold the second and third highest proportion of CoCos respectively.

Investor Type	Amount Owned	Percentage of Outstanding CoCos
Fund managers	\$16,379,362,045	12.662%
Banks	\$1,415,809,016	1.094%
Insurance Companies	\$1,389,223,215	1.074%
Pension Funds	\$57,956,881	0.045%
Unclassified	\$8,706,647	0.007%
Hedge Funds	\$6,451,117	0.005%
Governments	\$1,000,000	0.001%
Other	\$843,071	0.001%

CoCos are predominantly held by sophisticated investors. Consequently, we would expect the prices of CoCos to reflect their value. However, we only have a snapshot of CoCo ownership and this may have changed from the date of issuance or indeed as a CoCo approaches the trigger level. If owners are now more sophisticated than at issue then prices now are more likely to reflect the value of CoCos than they did at issue. In addition, if owners are less sophisticated then prices will be less accurate as a CoCo approaches the trigger.

Table 6.2 shows the proportional ownership of convertible CoCos and permanent write-down CoCos. There are differences in the ownership of convertible and permanent write-down CoCos. Fund managers are the largest investor types and there is almost no difference in their ownership of convertible and write-down CoCos. However, hedge funds, one of the most sophisticated investor types, tend to hold significantly more permanent write-down CoCos than convertible CoCos. If we assume that this ownership composition is unchanged from issuance then we would expect more monitoring mechanisms in permanent write-down CoCos than convertible CoCos. This is consistent with our findings about active monitoring in sub-section 2.1 which showed slightly more active monitoring in permanent write-down CoCos than convertible CoCos.

CHAPTER 6. MONITORING

Table 6.2: Ownership of Convertible and Write-Down CoCos by Investor Type (USD)

Source: Bloomberg, author's calculations. This table sets out the ownership of CoCos by investor type based on collected data. It shows the proportion of equity convertible and permanent write-down CoCos held by each investor type. The percentages are calculated as a proportion of the total ownership of the sum of equity conversion and permanent write-down CoCos. The bigger differences in ownership arise in government, unclassified, and hedge funds respectively.

Investor Type	Equity Conversion	Permanent Write-Down
Fund Manager	51%	49%
Bank	57%	43%
Insurance Company	63%	37%
Pension Fund	63%	37%
Unclassified	16%	84%
Hedge Fund	20%	80%
Government	0%	100%
Other	68%	32%

3.3 *Incentivising Sophisticated Investors: Credible Bailout Commitments*

This sub-section highlights, using two examples, that the incentive for sophisticated investors to monitor banks is linked to the credibility of the commitment of regulators and the government to not bail them out when they are CoCo investors. The first example relates to the identity of a CoCo investor. In our analysis, we focus on a bank as a CoCo investor.

If the cost of allowing a bank to fail is greater than bailing it out, then it is not credible to commit to not bailing out the investor. For instance, it is less credible to impose losses on a bank than on an institutional investor. Imposing losses on a bank could transmit the solvency problems described in Chapter 3. On the other hand, imposing losses on an institutional investor may not cause contagion and credit rationing.

If banks invested in CoCos, then there is a risk that a trigger would lead to contagion and cause the insolvency of investing banks. In turn, this can cause a systemic crisis and lead to credit rationing. That CoCos could lead to credit rationing runs contrary to their purpose. However, this is a risk that arises when CoCos are held by banks. A bank that invests in CoCos might anticipate that any losses incurred by owning the CoCo would result

CHAPTER 6. MONITORING

in its insolvency and yet still invest in the CoCo.¹²²

Prior to the CoCo being issued, the optimal policy for the regulator would be to allow CoCo investors to bear losses.¹²³ However, at the point of trigger and with the risk of contagion and credit rationing, it might be optimal to bailout banks that have invested in CoCos.¹²⁴ Anticipating this bailout policy, banks might invest in CoCos to receive the implicit support of taxpayers.¹²⁵ Banks are sophisticated investors and this analysis might lead to banks holding CoCos. In addition, non-bank sophisticated investors may be more likely to buy CoCos if they know or believe a large proportion of CoCos are held by banks. These non-bank investors would essentially be betting that the government will bail out all CoCo investors—bank and non-bank alike. This expectation would reduce their incentive to monitor bank employees.

One way to overcome the credibility problem is to require banks to hold additional capital if their CoCos are held by other banks or institutions that might receive a bailout. CRD IV allows regulators to require banks to hold CET1 capital above the regulatory minimum.¹²⁶ Article 104(1) allows regulators to hold more capital if they consider a bank is taking risks not covered by the capital requirements.¹²⁷ This power might be used by regulators to require banks that hold CoCos to hold more capital. However, in order to be effective, it may need to be coupled with a reporting requirement so that regulators know which banks invest in CoCos. Article 104 says:¹²⁸

For the purposes of Article 97, Article 98(4), Article 101(4) and Articles 102 and 103 and the application of Regulation (EU) No 575/2013, competent authorities shall have at least the following powers:

¹²²William W Lang & Douglas D Robertson, ‘Analysis of Proposals for A Minimum Subordinated Debt Requirement’ (2002) 54 *Journal of Economics and Business* 115, 119.

¹²³*ibid* 119.

¹²⁴*ibid* 119.

¹²⁵*ibid* 119.

¹²⁶Capital Requirements Directive - 2013/36/EU, art 104. At least in the UK, the Prudential Regulatory Authority has not waived its right to exercise this power in its rule book. See PRA Rulebook CRR Firms (n 89).

¹²⁷Capital Requirements Directive - 2013/36/EU, art 104.

¹²⁸*ibid* art 104.

CHAPTER 6. MONITORING

- (a) to require institutions to hold own funds in excess of the requirements set out in Chapter 4 of this Title and in Regulation (EU) No 575/2013 relating to elements of risks and risks not covered by Article 1 of that Regulation;
- ...

In order to increase capital requirements commensurate to the amount of CoCos held by a bank, regulators need to know which banks invest in CoCos. Section 3.1 sets out the limits of publicly available information about CoCos. Without overcoming the dearth of ownership information, increasing capital requirements is likely to be ineffective. Consequently, there might be a need for a reporting requirement to regulators¹²⁹ on banks that hold CoCos.

The second example of credible bailout commitments arises when a resolution authority can impose losses on foreign investors in order to help a local bank or local investors. It is more likely that losses will be imposed by regulators of the home jurisdiction on investors in foreign jurisdictions than investors in the home jurisdiction. In essence, if losses are imposed on investors in the home jurisdiction, this could cause domestic contagion and lead to a bailout using home taxpayer funds. However, losses imposed on investors in foreign jurisdictions causes contagion to foreign investors and is unlikely to lead to a bailout by the central bank or government of the home jurisdiction. A regulator only concerned with their home jurisdiction is likely to impose losses on investors in outside jurisdictions. Interestingly, imposing losses on foreign investors may alleviate too big to fail problems because regulators can commit to imposing losses to foreign investors without direct domestic consequences.

The single resolution mechanism (**SRM**)¹³⁰ is directed at overcoming the externalisation of the cost of bank failure to foreign investors by empowering the EU single resolution board,¹³¹ as a single resolution authority, to resolve banks within the EU.¹³² The SRM may overcome coordination problems that arise when multiple resolution authorities in different

¹²⁹As distinct from the disclosure requirements to the general public.

¹³⁰Regulation (EU) No 806/2014 of the European Parliament and of the Council of 15 July 2014 Establishing Uniform Rules and a Uniform Procedure for the Resolution of Credit Institutions and Certain Investment Firms in the Framework of a Single Resolution Mechanism and a Single Resolution Fund and Amending Regulation (EU) No 1093/2010 [2014] OJ L225/1 (EC Single Resolution Mechanism Regulation).

¹³¹*ibid* arts 42-3.

¹³²*ibid* pp 12.

jurisdictions are required to resolve a bank and have incentives to act in their national interests.¹³³ With respect to investors in non-EU countries, the BRRD requires group level resolution authorities (consolidating supervisors) to establish resolution colleges¹³⁴ with resolution authorities in third countries such as the US.¹³⁵

The mechanisms created by the SRM and the BRRD create a framework that might reduce the likelihood that a resolution authority acts in the interests of individual EU states. However, they do not ensure that a non-EU resolution authority acts in a way that imposes disproportionate losses on EU investors. Instead, it is hoped that resolution colleges¹³⁶ are able to coordinate their actions in order to ensure that the cost of bank failure in non-EU countries are not disproportionately borne by EU investors. In addition, the SRM is limited to euro-area countries whilst the BRRD applies to the whole of the EU. This might exacerbate the misaligned incentives of resolution authorities and allow them to favour their home jurisdiction or a small number jurisdictions to the detriment of other investors.

3.4 Prohibiting CoCo Ownership by Unsophisticated Investors

This sub-section sets out the role of sales restrictions and other ownership prohibitions can ensure that certain unsophisticated investors, particularly retail investors, do not invest in CoCos. Although CoCos have only been issued in the EU, they can be sold to investors around the world. Consequently, the rules about the sale of securities to investors in non-EU jurisdictions are important to understand who can hold CoCos. This part focuses on two types of US and EU rules: first, rules that directly restrict the distribution of CoCos to retail investors and second, rules that indirectly restrict the distribution of CoCos to retail investors.

¹³³ibid pp 12.

¹³⁴Recovery and Resolution Directive - 2014/59/EU, art 88.

¹³⁵See, Bank of England & Federal Deposit Insurance Corporation, *Resolving Globally Active, Systemically Important, Financial Institutions* (10 Dec 2012) 12: ‘A key part of the work undertaken by the U.S. and the U.K. has been to identify the regulatory obligations of foreign authorities in response to a resolution originated by a home authority. Where any impediments to effective whole group resolution have been identified, authorities are in the process of exploring methods to overcome them.’ See also, Recovery and Resolution Directive - 2014/59/EU, arts 93-8.

¹³⁶ibid art 88.

CHAPTER 6. MONITORING

Certain EU and the US rules indirectly the likelihood that retail investors can own CoCos. If a bank wishes to avoid making a prospectus available, the EU's €50,000¹³⁷ minimum denomination requirement creates a practical barrier to entry for retail investors to purchase CoCos. They simply may not have the available cash to purchase the minimum allotment of CoCos. In the US, Rule 144A¹³⁸ eliminates the registration requirements for qualified institutional buyers. In order to sell CoCos to US retail investors, issuers would have to satisfy the registration requirements in the US. The costs associated with registration disincentivise the sale of CoCos to retail investors in the US. Consequently, the rules in the EU and the US reduce, but do not eliminate, the chances that retail investors own CoCos.

Table 6.3 sets out selling restrictions to retail investors based on rules deriving from or analogous to those in the Prospectus Directive and Rule 144A. Table 6.3 highlights, the proportion of CoCos with sales restrictions in the US, an EU country, or both as a proportion of the amount of CoCos outstanding. The vast majority of CoCos that have been issued have restrict the sale of CoCos to retail investors in either the US or an EU country. We can therefore conclude that it is highly unlikely that retail investors purchase a large proportion of CoCos. This is important because retail investors are unlikely to be able to analyse and price trigger risk. The restrictions on retail investors holding CoCos increases the likelihood that the investors that do hold CoCos are sophisticated enough to analyse and price trigger risk.

Table 6.3: Sales Restrictions in the US and EU (USD)

Source: Bloomberg, author's calculations. This table shows the sales restrictions included in CoCos: these restrictions limit the sale of CoCos to certain investors in certain jurisdictions because the accompanying documentation does not satisfy the rules for those jurisdictions.

Jurisdiction	Total Amount of CoCos Outstanding	Percentage with Sales Restrictions
United States	\$93,620,931,700	88%
European Union Country	\$94,683,131,100	89%
US & EU Country	\$105,029401,400	99%

¹³⁷Prospectus Regulation 809/2004, art 12 and 16.

¹³⁸Securities Exchange Commission Rules, 17 C.F.R. (2013).

CHAPTER 6. MONITORING

In the UK, there is a direct prohibition on retail investors holding CoCos. From 1 October 2014, the FCA prohibited the distribution of CoCos to retail investors.¹³⁹ The effect of EU and US regulation reduces the likelihood that CoCos are sold to retail investors. In the UK, the explicit prohibition of the distribution of CoCos to retail investors ensures that retail investors do not own CoCos.

Together, the legal rules that reduce the likelihood that retail investors purchase CoCos and the empirical evidence in Table 6.1 suggest that relatively sophisticated investors own CoCos. These investors may be able to gather and process information more effectively than regulators and consequently monitor and discipline bank managers. In order to increase the likelihood that this is the case, rules, analogous to the FCA's ban in the UK,¹⁴⁰ should be adopted in the EU and the US registration requirements which creates a barrier for selling CoCos to retail investors.

4. Legal Framework

This section begins the second part of the chapter. The focus now fully shifts from defining and analysing monitoring to a more focused analysis of which stakeholders have incentives to monitor. This part begins with an analysis of the legal framework governing convertible and write-down CoCos. The next section describes the different CoCo formats that have been issued. The next section then discusses the payoffs from different CoCo formats. The next section sets out the empirical facts affect the incentives of different stakeholders to monitor. The final section in this part discusses the assumption in the model in Chapter 2 that either shareholders or CoCo investors monitor.

This section sets out the legal framework governing convertible and write-down CoCos.

¹³⁹Financial Conduct Authority, *Temporary Product Intervention Rules: Restrictions in Relation to the retail Distribution of Contingent Convertible Instruments* (Aug 2014) 6. 'CoCos are highly complex, hybrid capital instruments with loss-absorbency features written into their contractual terms. One key characteristic is that they feature an equity conversion or writing down trigger, set with reference to the issuer's capital position in relation to regulatory requirements. ... Overall, these are securities that are inappropriate for distribution to ordinary retail investors.' See also, Temporary Marketing Restriction (Contingent Convertible Securities) Instrument 2014 2014/47 (U.K.).

¹⁴⁰FCA: Restrictions on Retail Distribution of CoCos (n 139) 6.

CHAPTER 6. MONITORING

The CRR sets out that in order for CoCos to constitute AT1 capital they need to contain either a conversion or write-down term. Article 52(1)(n) says:¹⁴¹

Capital instruments shall qualify as Additional Tier 1 instruments only if the following conditions are met:

(n) the provisions governing the instruments require that, upon the occurrence of a trigger event, the principal amount of the instruments be written down on a permanent or temporary basis or the instruments be converted to Common Equity Tier 1 instruments.

If a bank wants to issue an AT1 convertible CoCo then the rate of conversion becomes important because the extent of governance dilution and the possibility of financial dilution. The CRR sets out the requirements for a conversion rate.¹⁴² Specifically, Article 54(1)(c) requires that either a rate of conversion or a range of conversion rates is set *ex-ante*.¹⁴³

If, on the other hand, a bank wants to issue an AT1 write-down CoCo then the specifics of that write-down become important because they determine the extent of the financial windfall to shareholders from the CoCo being triggered. Article 54(1)(d) sets out the requirements of a write-down and says that a write-down must reduce the value of the claim on the CoCo if the bank is insolvent, the amount required to be paid in case of a call, and, the distributions made on the instrument.¹⁴⁴

Overall, the CRR sets out the framework for issuing convertible and write-down CoCos. The regulations contemplate a range of potential CoCo formats. To the extent that the

¹⁴¹Capital Requirements Regulation - 2013/575, (art 52(1)(n)).

¹⁴²*ibid* (art 54(1)(c)). For the purposes of point (n) of Article 52(1), the following provisions shall apply to Additional Tier 1 instruments:

(c) where the provisions governing the instruments require them to be converted into Common Equity Tier 1 instruments upon the occurrence of a trigger event, those provisions shall specify either of the following:

- (i) the rate of such conversion and a limit on the permitted amount of conversion;
- (ii) a range within which the instruments will convert into Common Equity Tier 1 instruments.

¹⁴³*ibid* (art 54(1)(c)).

¹⁴⁴*ibid* (art 54(1)(d)). For the purposes of point (n) of Article 52(1), the following provisions shall apply to Additional Tier 1 instruments:

(d) where the provisions governing the instruments require their principal amount to be written down upon the occurrence of a trigger event, the write down shall reduce all the following:

- (i) the claim of the holder of the instrument in the insolvency or liquidation of the institution;
- (ii) the amount required to be paid in the event of the call or redemption of the instrument;
- (iii) the distributions made on the instrument.

real world comports with the model then write-down CoCo formats will incentivise CoCo investor monitoring. On the other hand, the flexibility in setting the conversion rate means that either CoCo investors or shareholders could be incentivised to monitor. If shareholders are completely diluted from conversion then they will monitor. This incentive to monitor will be strengthened by the governance dilution that occurs when CoCos are converted into shares. If shareholders are not completely diluted by CoCo conversion then it is possible that shareholders will not be incentivised to monitor. However, the dilution of shareholder governance rights might militate to shareholders monitoring. The next sub-sections discuss how market participants have responded to the requirements of the CRR and identifies the different formats of CoCos that have been developed.

5. Description of CoCo Formats

This section analyses the economic framework of different CoCo formats. It describes the different types of CoCos. There are two broad CoCo formats: convertibles and write-downs.

Convertible CoCos have two characteristics. First, when convertible CoCos are triggered the obligation to repay investors is converted into a share in the bank and this obligation is set out in the contract. This means that a bank can raise \$100 of CoCos and if the CoCo is triggered then they are converted into shares worth, for example, \$90 or \$110. Second, the conversion of the CoCos into shares dilutes existing shareholders' governance rights by increasing the total number of shares that are outstanding.

Write-down CoCos are different to convertible CoCos. They can, however, be assessed along the same two lines that convertibles were analysed in the previous paragraph. First, when they are triggered the obligation to repay investors is canceled rather than the obligation being converted into a share. Second and consequently, when they are triggered there is no financial or governance dilution of original shareholders.

There are three types of write-downs, which all have the potential for the financial dilution of CoCo investors: first, total and permanent in which case a bank raises a \$100 CoCo and if triggered the obligation to repay is reduced to \$0, second, a temporary write-

down where a bank raises a \$100 CoCo and the obligation to repay is suspended if the trigger level is breached and reinstated if the bank recovers, and, third, a staged write-down where if the CoCo is triggered a portion of the obligation is canceled and therefore if a bank raises \$100 as the CET1 level deteriorates there is a staged write-down. For instance, the obligation can be reduced to \$75 then \$50 then \$25 then \$0 as the CET1 level of the bank deteriorates. Write-down CoCos do not lead to governance or financial dilution of shareholders. However, write-down CoCos have the potential, in their permanent and staged write-down formats, to financially dilute CoCo investors.¹⁴⁵

6. Payoffs of CoCo Formats

This section discusses changes in the value of a CoCo and corresponding shares as a bank approaches the trigger level; and how these changes affect shareholder and CoCo investor incentives to monitor. The analysis is restricted to two types of CoCos: permanent write-down CoCos and convertible CoCos.¹⁴⁶ Two distinct price related questions arise in our discussion. First, how do market prices evolve in light of the expectation of financial dilution? Second, if we assume that the price of a CoCo at issue reflects a commitment to monitor, then how is this commitment incorporated into prices?

The analysis of prices compares the issue price of the CoCo with the market value of shares when the CoCo is converted. We refer to the conversion rate of a CoCo as the ratio between the initial investment of CoCo investors and the market value of the shares they receive upon conversion: a low rate leaves the original shareholders with proportionately less equity while a high rate leaves the original shareholders with proportionately more equity.¹⁴⁷

¹⁴⁵Temporary write-down CoCos have the potential financially to dilute investors because the bank may not recover or may not recover for a protracted period.

¹⁴⁶There are four distinct types of CoCos that have been issued and these are set out in Chapter 6: convertible, permanent write-down, staged write-down, and temporary write-down.

¹⁴⁷Wulf A Kaal and Christoph K Henkel, ‘Contingent Capital With Sequential Triggers’ (2012) 49 San Diego L Rev 221, 236 explores this idea from a legal perspective. ‘The threat of loss due to conversion of CCs and the implicit dilution of stock holdings could reduce incentives for shareholders to encourage management to take higher risks for higher returns. Dilution of shareholders creates an incentive for bank managers to “manage not only for good outcomes on the upside of the boom, but also against bad outcomes on the downsides.” Should conversion have a negative effect on the stock price, management could be further incentivized to maintain and manage risk to avoid reputational loss and income reduction due

CHAPTER 6. MONITORING

At issue, a bank raises cash from CoCo investors, the face value of which counts towards regulatory capital. When triggered, the amount of shares tends to have a different market value to the amount of cash paid at issue.

The model in Chapter 2 provides two useful insights: first, shareholders will monitor if they are completely diluted by the conversion of CoCos into shares and, second, CoCo investors will monitor if the value of their converted shares is less than the amount they paid for the CoCos on the date of issue.

We observed in Chapter 2 that when CoCo investors received shares worth less than what they initially paid for their CoCos they are more likely to monitor.¹⁴⁸ On the other hand, when CoCo investors receive what they paid for their CoCos at issue and, by design, shareholders receive nothing, then shareholders are more likely to monitor.¹⁴⁹

This section argues that the initial price of CoCos reflects a commitment on the part of either shareholders or CoCo investors to monitor. The initial price of CoCos reflects this commitment to monitor in two distinct ways. First, monitoring reduces the probability of the

to losses in stock options.’ Jens Hilscher and Alon Raviv ‘Bank Stability and Market Discipline: The Effect of Contingent Capital on Risk Taking and Default Probability’ (unpublished manuscript, Sep 2012) <<http://www.brandeis.edu/departments/economics/RePEc/brd/doc/Brandeis-WP53.pdf>> provides a similar analysis from an economic perspective. ‘These results have important effects on the optimal behavior of an equity holder who tries to maximize the value of stock by controlling asset risk. For a relatively low conversion ratio the equity holder will choose the maximum possible level of asset risk; faced with a high conversion ratio, management will do the opposite. For some intermediate level of the conversion ratio the stockholder may be indifferent to asset risk, since the components that affect the value of equity, as presented above, offset each other. From the point of view of a regulator, intermediate levels of the conversion ratio may be preferable. Strong risk-shifting incentives may lead to either very high or very low levels of asset risk, both of which are likely undesirable since they may lead either to excessive risk or sub-optimally low levels of risky lending. A lack of strong risk-shifting incentives may therefore be optimal and, as we show, also achievable if the bank issues contingent capital.’ See also, Paul Glasserman and Behzad Nouri, ‘Contingent Capital With a Capital-Ratio Trigger’ (2012) 58 *Management Science* 1816.

¹⁴⁸A salient aspect of the model is that when CoCo investors receive less than what they initially paid for their CoCos then the excess value is transferred to shareholders. In other words, there is a windfall to shareholders in this case. This windfall arises because of a shortfall in the value of shares given to converted CoCo investors relative to what they initially paid. The ‘loss’ from conversion can be framed as a type of financial dilution of CoCo investors which creates the incentive for them to monitor. This is enough in the model to increase the likelihood of monitoring by CoCo investors. Of course, in the real world there would be governance dilution because there are more outstanding shares. Therefore, there is a question about whether the gain from the financial dilution might outweigh the costs of the governance dilution. See related, Hilscher (n 147) 20-1.

¹⁴⁹In this situation, CoCo investors do not suffer financial dilution i.e. a ‘loss’ from conversion. At the same time, shareholders do not receive a windfall from conversion. In the model, this is enough to increase the probability that shareholders monitor in the failure state i.e. when the bank approaches distress. Of course, in the real world, governance dilution would strengthen the incentives of the original shareholders to monitor. See related, Kaal and Henkel (n 147) 236.

CHAPTER 6. MONITORING

bank becoming insolvent and therefore reduces the risk of investing in the bank and the return to shareholders and CoCo investors from investing. Second, sophisticated shareholders and investors are able to monitor more cheaply than less sophisticated shareholders and investors and therefore their expected return is higher i.e. they are paid more, in expectation, for monitoring.

To be sure, passive monitoring might arise when market participants anticipate that a CoCo will be triggered, assess the level of governance and financial dilution, and price these as the bank's capital position deteriorates and its CET1 ratio approaches the trigger level. Figure 6.6, Figure 6.7, and Figure 6.8 provide a visual representation of the intuition from the model in Chapter 2. The figures illustrate changes in the value of different CoCos as CET1 levels deteriorate and corresponding firm values, shares, and CoCos.

In general, in each figure, increases in the value of the firm correspond with an equivalent increase in the CET1 level of a bank. The horizontal axis of each figure is the CET1 level of the bank whilst the vertical axis of each figure is the value of the firm or the claim of shareholders and CoCo investors. In all cases, after the CoCo is triggered the value of shares is the same as the value of the firm because the bank's capital structure is only comprised of shares and CoCos. The concavity or convexity of the value of each claim determines the incentive of different stakeholders to monitor: concavity in the value of a claim sharpens incentives to monitor whilst convexity dulls the incentives to monitor.

Chapter 6 sub-section 7.3 discusses the \$44bn permanent write-down CoCos in the sample. Figure 6.6 shows the value of a bank, a permanent write-down CoCo, and shares. At a CET1 level of 7% the CoCo is written down. The concavity of the value of CoCos captures a behavioural assumption that as the trigger point is approached a 1% loss of CET1 leads to a greater than 1% loss of CoCo value. In essence, the investors loss and consequently the incentive to monitor is sharpened as the CET1 value approaches the trigger point.

The value of shares increases as the CET1 level approaches the trigger point. The convex shape of the value of shares is the inverse of the concave shape of the value of CoCos. As CET1 levels decrease initially there is a symmetrical decrease in the value of equity. As

CHAPTER 6. MONITORING

CET1 levels decrease further, the decrease in the value of equity is smaller. In other words, the expectation of a write-down helps shareholders because it insulates them from losses. Indeed, this insulation from losses might facilitate gambling by shareholders.

Chapter 6 sub-section 7.2 discusses the approximately \$50bn in convertible CoCos that have been issued. Figure 6.7 shows the value of a bank, a convertible CoCo that increases in value when it is converted, and shares. As the CoCo approaches the trigger point its value increases in a convex manner. This creates an incentive for investors to seek a trigger. Thereafter, their returns become that of shareholders.

In addition, as the CoCo approaches the trigger point, the value of equity becomes lower which creates an incentive for shareholders to monitor. In this particular description of CoCo values, the value of equity falls below the value of the CoCo. As the CET1 level approaches the trigger point, there is a greater incentive for shareholders to monitor. Upon conversion, only equity exists in the capital structure and consequently the equity value is the same as the value of the firm.

Figure 6.8 shows the value of a bank, a convertible CoCo that decreases in value when it is converted, and shares. As the CoCo approaches the trigger point its value decreases similar to a permanent write-down CoCo. However, the value of the CoCo doesn't reach \$0. Instead, the CoCo is converted into equity and thereafter the value of equity is equal to the value of the firm. As the CET1 level approaches the trigger point, initially the value of equity falls. However, at some point close to the trigger, the value of equity increases. In other words, as the CET1 level decreases the equity value approaches \$0 and at some point close to the trigger, the equity value starts increasing because of the expectation that the CoCo will be converted.

In summary, this section has analysed the economic framework of different CoCo formats. It has described convertible CoCos and the three types of write-down CoCos. It has also defined conversion rates and how financial dilution and to a lesser extent governance dilution and how these can reinforce or undermine incentives for monitoring.

Value of Firm, Permanent Write-Down CoCo, and Equity

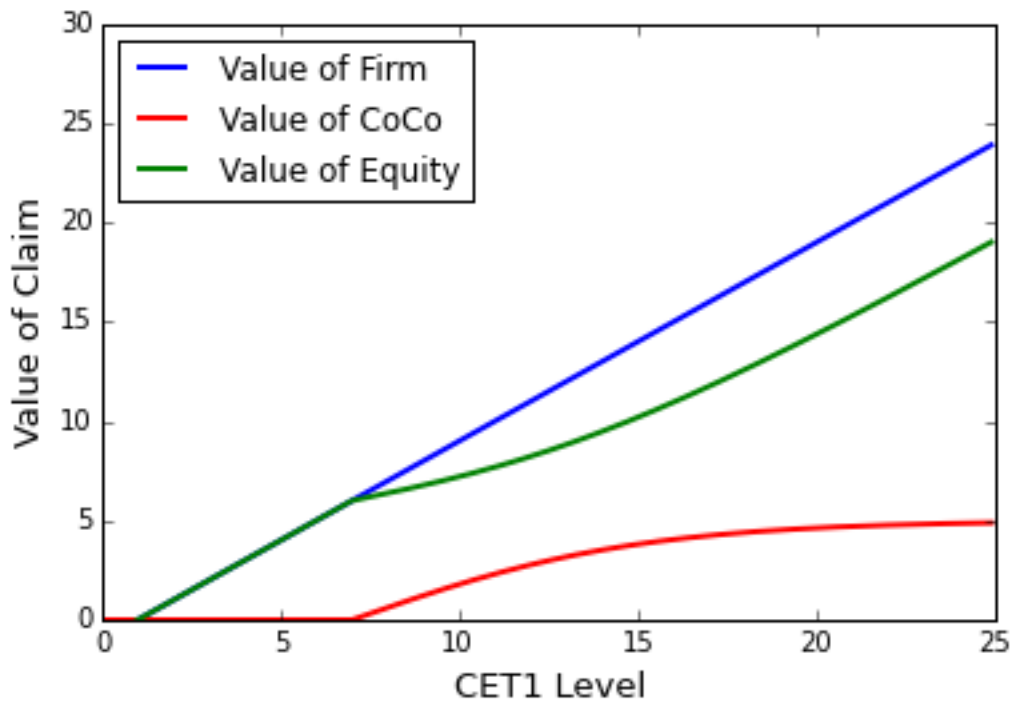


Figure 6.6: Expected Value of Permanent Write-Down CoCo

Value of Firm, Convertible CoCo, and Equity

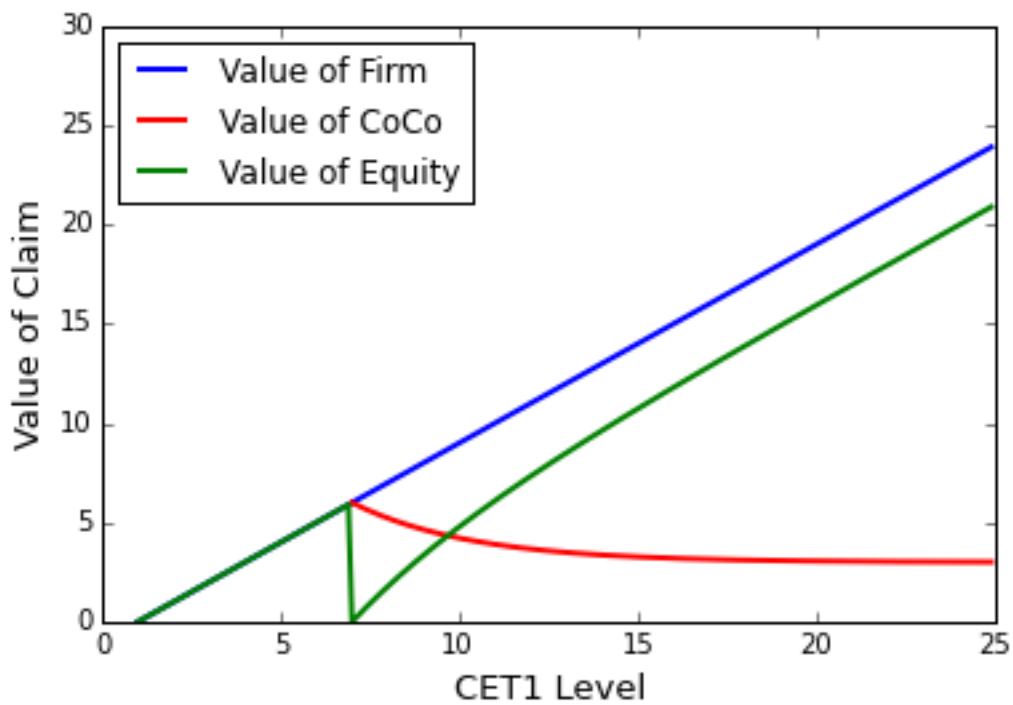


Figure 6.7: Expected Value of Convertible CoCo With Increased Value on Conversion

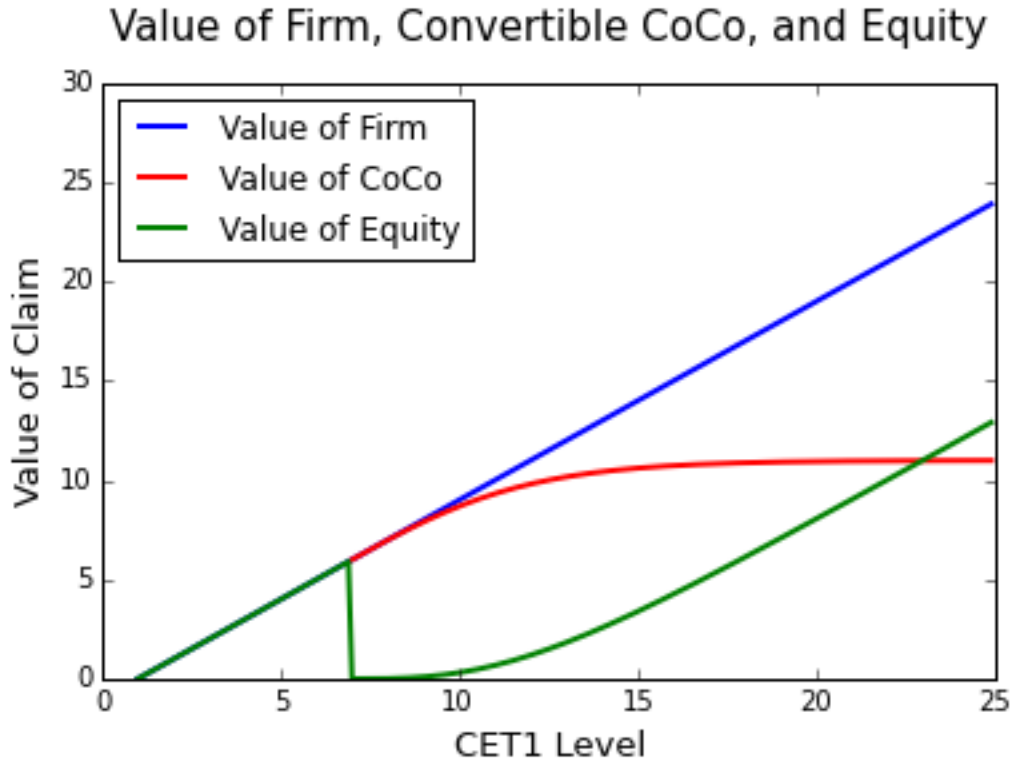


Figure 6.8: Expected Value of Convertible CoCo With Decreased Value on Conversion

7. Empirical Evidence: Formats of CoCos

This section describes empirical data that might relate to whether CoCo investors and / or shareholders monitor banks. It analyses two broad types of CoCos and the incentives that they are likely to create for CoCo investors. First, it discusses convertible CoCos which dilute shareholders whilst simultaneously reducing obligations to repay CoCo investors. Second, it discusses write-down CoCos which are different to convertibles because there is no governance or financial dilution for shareholders. Financial losses in write-down CoCos are imposed on a staged, permanent, or temporary basis.

7.1 Overview of Convertibles and Write-Downs

This sub-section provides an overview of the breakdown of convertible CoCos and write-down CoCos over time. The majority of CoCos, about \$80bn, are write-down CoCos which

incentivise CoCo investor monitoring. There are three types of write-down CoCos.¹⁵⁰ First, permanent write-down CoCos which cancel the claim of CoCo investors when triggered. Second, staged write-downs which involve the incremental cancellation of CoCo investor claims. Third, temporary write-down CoCos which involve a temporary cancellation of CoCo investor claims. The temporary nature of this transfer is interesting because it may undermine the incentives that ought to be created by CoCos.¹⁵¹ Together, these three types of write-down CoCos represent 63.67% of CoCos that have been issued. Figure 6.9 shows the proportion of each type of CoCo issued over time.

Subsequent sub-sections analyse the trigger levels and ownership of CoCos. An analysis of trigger levels was undertaken in Chapter 5 where it was recommended that CoCo triggers be set at a higher level than the 5.125% in the CRR. As previously discussed, there are two limitations to the ownership data in the sample: first, ownership data is available for about 15% of CoCos and second, the data is subject to reporting requirements on a specific date. Almost as soon as CoCo ownership is reported it might be out of date. Despite those limitations, it is useful to get an insight into the ownership of CoCo data.

7.2 *Convertible CoCos*

This sub-section presents data about convertible CoCos and their implications for shareholders and CoCo investors.¹⁵² There are four issues addressed in this data. First, convertible CoCos are slightly more likely to convert into shares worth less than the amount initially paid for the CoCos. For CoCo investors this means financial dilution. For shareholders, any conversion causes governance dilution. The net effect of these two forms of dilution is uncertain. The ‘voice’ of the original shareholders is reduced because of governance dilution.¹⁵³ At the same time, the voice of converted investors is greater as shareholders than with their

¹⁵⁰The Basel Committee initially proposed that a permanent write-down and a permanent conversion be the only methods of imposing losses. They argued that a temporary write-off would give investors a contingent claim with a higher priority than a subsequent equity injection by the central bank or government to bailout the distressed bank. Basel Comm, *Progress Report* (n 1) 5.

¹⁵¹Temporary write-down CoCos are discussed later in this Chapter.

¹⁵²Capital Requirements Regulation - 2013/575, art 52(1)(n).

¹⁵³See generally, Hirschman (n 20).

CHAPTER 6. MONITORING

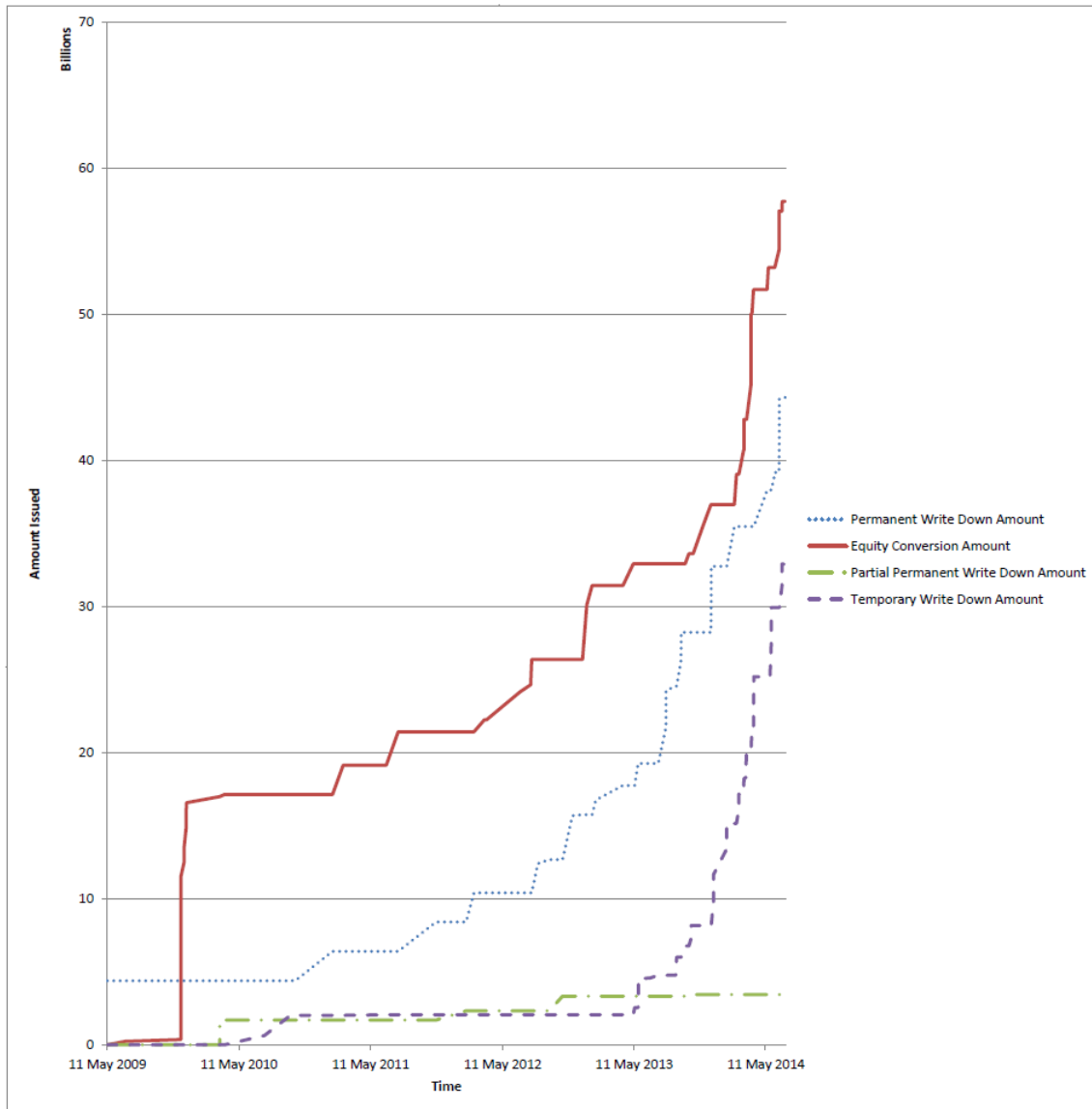


Figure 6.9: Cumulative Amount of CoCos Issued by Loss Type (USD)
Sources: Bloomberg, bank prospectuses, annual reports, and Author's calculations.

CHAPTER 6. MONITORING

limited contractual rights.¹⁵⁴ In sum, we would expect that shareholders benefit from the financial dilution of CoCo investors. At the same time, governance dilution reduces the voice of the original shareholders. However, to the extent that reality comports with the model, the financial dilution of CoCo investors creates an incentive for them to monitor.

Second, all other things being equal, the greater the amount of convertible CoCos the greater the potential for governance and financial dilution. This will increase the coordination costs of shareholders upon conversion and increase the relative appeal of passive monitoring by selling CoCos and shares. In addition, the greater the amount of convertible CoCos the greater the reduction in leverage if they are triggered. This additional buffer of capital might give more time to shareholders and CoCo investors to use active monitoring to reduce the probability of entry into resolution.

Third, the probability of loss is reduced when CoCo triggers are set close to the 5.125% CET1 level. Therefore, in expectation, the proportion of financial and governance dilution is related to trigger levels. A higher trigger level can create more financial dilution of CoCo investors and more governance dilution of shareholders. Contrastingly, a lower trigger level can create less financial dilution of CoCo investors and less governance dilution of shareholders.

Fourth, sophisticated investors are likely to invest in CoCos with the highest expected return. Our discussion of monitoring identified two distinct price effects on CoCos. First, monitoring reduces the probability of failure, riskiness of a bank, and therefore the return on the bank. Second, a more sophisticated investor is better able to reduce the probability of trigger than a less sophisticated investor. Based on this second effect, sophisticated investors will invest where their return for their monitoring is highest.¹⁵⁵

This sub-section begins by setting out the amount of convertible CoCos outstanding in different countries within the sample. It continues by discussing the conversion terms included included in the CoCos. Finally, it sets out the amount of outstanding CoCos based

¹⁵⁴ibid.

¹⁵⁵In a competitive market, these opportunities may not exist but when investors are less sophisticated and have bounded rationality there might be opportunities for sophisticated investors to profit. See, Zoshar Goshen and Gideon Parchomovsky, 'The Essential Role of Securities Regulation' (2006) 55 Duke L Rev 711. See also, Daniel Kahneman, 'Maps of Bounded Rationality: A Perspective on Intuitive Judgment and Choice' (8 Dec 2002) Nobel Committee Nobel Prize Lecture .

on the trigger level.

Conversion Rate Terms

This part sets out the usual terms in convertible CoCos that affect the conversion rate. There are four types of terms that affect the conversion rate. First, the conversion rate is fixed at issuance at a discount to the then market price of the shares. At issuance this ensures that the conversion rate is lower than the market price and there is a transfer from shareholders to investors. However, when a bank approaches resolution or insolvency the conversion rate might have become higher than the then prevailing market price and we would expect that there would normally be a transfer from shareholders to investors.

Second, anti-dilution provisions are frequently paired with fixed conversion provisions—these anti-dilution provisions adjust the fixed conversion rate for prescribed actions taken by bank managers that reduce the book value of the issuer’s assets. In practice, this mechanism is likely to reduce the conversion rate to the benefit of shareholders. Basically, it limits wealth transfers from CoCo investors to shareholders. CoCos combining the first and second conversion rate terms can involve either a transfer of wealth from investors to shareholders or rarely from shareholders to investors. If the terms transfer investor wealth to shareholders then they are similar to the CoCos in the model that incentivise CoCo investors. On the other hand, if they transfer *all* shareholder wealth to CoCo investors by severely diluting shareholders then they are similar to the CoCos in the model that incentivise shareholders. Overall, CoCos with the first two terms represent about 20% of all convertible CoCos.

Third, banks in the UK have started including shareholder call provisions that give shareholders the option of purchasing converted CoCos at the conversion rate without trading on the open market. The call options allows existing shareholders to avoid financial and governance dilution. Shareholders will choose to exercise the call option if the conversion rate allows them to purchase CoCos at a cheaper price than on the open market. Shareholders will not choose to exercise the call option if the conversion rate requires them to purchase CoCos at a more expensive price than on the open market. Put another way, shareholders will

CHAPTER 6. MONITORING

exercise their call option when they are in the money. For instance, the conversion rate in the contract might give an existing shareholder the option to buy CoCos that will convert into shares with a market value of \$100 for \$90 from CoCo investors. Shareholders will exercise this option provided that the cost is less than \$100 and will not exercise the option if the cost is more than \$100.

Fourth, some CoCos have a conversion rate that is the greater of the market price at conversion or a discounted fixed rate. This mechanism ensures that shareholders are never diluted. If the market price is greater then shareholders are indifferent¹⁵⁶ between the CoCo being converted and not converted. On the other hand, if the fixed rate is greater than the market price then this would lead to a transfer of wealth from investors to shareholders. In essence, CoCos including this feature also ensure that there is no wealth transfer from shareholders to CoCo investors. For instance, the conversion rate is either the greater of a fixed rate where \$110 of CoCos becomes \$90 of shares or the market price of the CoCo. If the CoCo converts into \$100 of shares then in an efficient market the market price will be \$100. The contract would stipulate that the CoCo fixed rate of \$110 of CoCos for \$100 of shares should be used instead of the market price of \$100. In other words, CoCo investors always lose.

The data in Table 6.4 shows the breakdown of these four types of terms in convertible CoCos. It shows, first, approximately 50% of convertible CoCos rely on the fixed rate mechanism. For the 20.02% without a shareholder call, this means that investors will receive shares whose value at conversion may be more or less than the issue price of the CoCo. If conversion is above the issue price then shareholders suffer financial and governance dilution. This is likely to create incentives for them to monitor. If conversion is at the issue price, then neither shareholders or CoCo investors suffer financial dilution but shareholders might suffer governance dilution. Consequently, shareholders might have an incentive to monitor. If conversion is below the issue price then CoCo investors suffer financial dilution and share-

¹⁵⁶Of course, the control rights of shareholders might have some value in this situation. See Andrew G Haldane, ‘Control Rights (and Wrongs)’ (Wincott Annual Memorial Lecture, London, UK, 24 Oct 2011) <<http://www.bis.org/review/r111026a.pdf>>.

CHAPTER 6. MONITORING

holders receive a windfall. This creates an incentive for CoCo investors to monitor. However, this may be partially or completely offset by governance dilution.

For the 31.71% with a shareholder call, we expect shareholders to exercise the call if they expect the converted CoCo value to be greater than the issue price. The existence of this call option means that shareholders can avoid all financial and / or governance dilution. The capacity to avoid both forms of dilution significantly limits shareholder incentive to monitor. Contrastingly, if the conversion rate is below the issue price then shareholders are unlikely to exercise their call, subject of course to the call option being in the money. Consequently, if CoCo investors experience financial dilution, shareholders are unlikely to exercise a call to share in a potential loss. Accordingly, CoCo investors will have an incentive to monitor unaffected by the existence of the call option.

The 25.14% of CoCos with a conversion rate that is greater of the market price (at conversion) or a discounted rate (from the issue price) ensure; at best CoCo investor claims are not higher than the issue price, and otherwise CoCo investor claims will be lower than the issue price. In other words, these CoCos either involve financial dilution of CoCo investors and a windfall to shareholders or a conversion that does not involve any financial dilution but does result in governance dilution. If the market price is used then the governance dilution might create an incentive for shareholders to monitor. On the other hand, the discounted rate will involve the financial dilution of CoCo investors and the governance dilution of shareholders. The governance dilution creates an incentive for shareholders to monitor whilst the financial dilution of CoCo investors creates an incentive for CoCo investors to monitor.

Overall, the conversion rate provision of more than 55% of CoCos ensures that CoCo investor claims are less than the issue price. In general, we expect financial dilution of CoCo investors, a windfall to shareholders, and governance dilution of shareholders. To be sure, the financial dilution of CoCo investors creates an incentive for them to monitor passively or actively. As we have discussed, given their limited contractual protections, this will likely involve investors selling their CoCos or jawboning.¹⁵⁷ On the hand, the governance dilution

¹⁵⁷See, Edmans (n 41). See also, Shleifer (n 78) 474. ‘Our analysis suggests that the jawboning mechanism will be used to make less valuable improvements [than a takeover].’

CHAPTER 6. MONITORING

of shareholders creates a marginal incentive for shareholders to monitor. For shareholders, passive monitoring by selling shares does not involve the same coordination problems as active monitoring and may therefore be preferred to using voice to monitor.

Table 6.4: CoCo Conversion Terms (USD)

Source: Bloomberg, author's calculations. This table shows the different types of conversion rates in convertible CoCos. It shows that in general, the rate of conversion is less than the amount initially paid by CoCo investors.

Conversion Price	Amount Outstanding	Percentage of Outstanding
Fixed with Anti-Dilution & Shareholder Call	\$12,762,950,000	31.71%
Market Price or Discounted Floor Price	\$10,117,478,000	25.14%
Unknown	\$9,309,446,000	23.13%
Fixed with Anti-Dilution	\$8,056,737,300	20.02%

Amount of Convertible CoCos

This part shows the amount of convertible CoCos issued in each country in the sample. A slight majority of convertible CoCos avoid financial dilution of shareholders but all convertibles involve governance dilution of shareholders. When convertible CoCos are triggered the leverage of the issuing bank is decreased. The greater the amount of convertible CoCos issued the greater the reduction in leverage when they are triggered.

Table 6.5 shows the amount of convertible CoCos issued in each country. It shows that the largest amount of outstanding convertible CoCos have been issued in Great Britain followed by Spain, Guernsey, Ireland, Portugal, and Denmark.

In absolute terms, banks in Great Britain have issued the largest amount of CoCos. Accordingly, we would expect them to have the greatest capacity for governance dilution of shareholders, financial dilution of CoCo investors, and the reduction of bank leverage. Broadly, the issuance of convertible CoCos is consistent with the size of the banking sector in different countries.

CHAPTER 6. MONITORING

Table 6.5: Amount of Convertible CoCos by Country (USD)

Source: Bloomberg, author's calculations. This table shows the amount of convertible CoCos that are outstanding in the sample by country. The size of the banking system was calculated by gathering data from the ECB's Statistical Data Warehouse for 2014 and the IMF's Financial Sector Stability Assessment for Switzerland published in 2014. The amounts were converted to \$US using the 31 December 2014 exchange rate.

Country	Amount Outstand- ing	Amount with Owner- ship Details	Size of Banking Sector
Great Britain	\$25,312,879,480	\$5,710,212,860	\$9,273,429,564,000
Spain	\$11,554,147,000	\$1,465,874,278	\$4,049,823,469,000
Guernsey	\$4,545,031,000	\$284,887,621	NA
Ireland	\$4,122,050,000	\$449,122,800	\$314,822,033,000
Portugal	\$1,265,110,000	N/A	\$408,753,721,500
Denmark	\$238,666,000	N/A	\$969,470,444,000

Trigger Levels of Convertible CoCos

This part argues that higher trigger levels create more financial dilution of CoCo investors and governance dilution of shareholders. Contrastingly, a lower trigger level creates less financial dilution of CoCo investors and less governance of shareholders. In Chapter 5 we argued that CoCo investors benefit from their priority in resolution relative to their contractual rights and may consequently prefer resolution to a trigger outside of insolvency. To the extent that forbearance increases the likelihood of bank insolvency, CoCo investors also have an incentive for managers and regulators to forbear. Consequently, these stakeholder groups may have incentives consistent with CoCos being triggered as part of insolvency or resolution. Based on this reasoning, we suggested that higher trigger level CoCos reduced the likelihood of forbearance. Accordingly, the probability of a successful recapitalisation outside of resolution is increased with higher trigger level CoCos.

In this chapter, a higher trigger level increases the likelihood of a successful recapitalisation outside of resolution which has two effects. First, it increases expected financial dilution of CoCo investors and second, it increases governance dilution of shareholders. Contrastingly, a lower trigger level, which reduces the likelihood of a successful recapitalisation outside of resolution creates less financial dilution of CoCo investors and less governance dilution of shareholders. Table 5.5 shows that CoCo trigger levels in the United Kingdom, Denmark,

CHAPTER 6. MONITORING

Ireland, Netherlands, and Belgium are relatively higher than trigger levels in Switzerland, France, Spain, Luxembourg, Germany, Italy, and the Faroe Islands.

In the countries with relatively high trigger levels there is greater scope for financial dilution of CoCo investors and governance dilution of shareholders. In countries with relatively low trigger levels there is less scope for financial dilution of CoCo investors and governance dilution of shareholders.

Ownership of Convertible CoCos

We argued in Chapter 5 that higher trigger levels increased the likelihood that a CoCo would be triggered in time to avoid the resolution or insolvency of the issuing bank. Table 6.6 links that discussion of trigger levels to the ownership of convertible CoCos. It shows which investors own which convertible CoCos at different trigger levels. It highlights that fund managers own the largest amount of convertible CoCos with a 5% trigger level than any other reported investor type. In addition, proportionately speaking, every investor type that is reported other than unclassified and other hold proportionately more low trigger (5% or 5.125%) CoCos than higher trigger CoCos (7% or 8.25%).

We argue that sophisticated investors will invest where their return for monitoring or shirking is highest. Consequently, sophisticated investors might invest in low trigger CoCos for two reasons. First, low trigger CoCos are less risky than high trigger CoCos and this reduction in risk isn't priced by other market participants. Second, their return from monitoring is higher in low trigger CoCos than the return from monitoring for less sophisticated investors.

Table 6.6 shows that sophisticated investors such as investment managers tend to invest in low trigger CoCos. There are two possible reasons for this: first, they have identified a mispricing of these securities, second, their return from monitoring is higher when they invest in low trigger CoCos. Low trigger CoCos have a higher expected return to investors. If returns from monitoring are correlated to or caused by higher expected returns then this might support the monitoring hypothesis. In addition, if the issue and market price for low

CHAPTER 6. MONITORING

trigger CoCos isn't different from the price of higher trigger CoCos then this might suggest a mispricing which is exploited by sophisticated investors.

Table 6.6: Amount of Convertible CoCos by Investor Type and Trigger Level (USD)
Source: Bloomberg, author's calculations. This table shows the amount of convertible CoCos that are outstanding in the sample by investor type.

Investor Type and Trigger Level	Amount Outstanding
Fund Managers	\$6,511,771,790
5%	\$3,032,481,364
5.125%	\$1,317,255,238
7%	\$1,744,249,638
8.25%	\$417,785,550
Insurance Companies	\$752,348,596
5%	\$562,502,879
5.125%	\$55,085,536
7%	\$125,825,731
8.25%	\$8,934,450
Banks	\$613,374,929
5%	\$346,234,432
5.125%	\$81,471,450
7%	\$163,266,248
8.25%	\$22,402,800
Pension Funds	\$29,607,397
5%	\$17,356,740
5.125%	\$11,385,937
7%	\$864,720
Hedge Fund Managers	\$1,276,117
5.125%	\$676,117
7%	\$600,000
Unclassified	\$1,144,707
5%	\$544,707
7%	\$600,000
Other	\$574,022
7%	\$574,022

Table 6.7 shows the amount of convertible CoCos by investor. The largest type of investor in the sample are investment managers who own \$6.5bn of convertible CoCos. Other prominent investors include insurance companies, banks, and pension funds. These investors are likely to be more sophisticated than retail investors. In absolute terms, sophisticated investors own the largest proportion of convertible CoCos.

CHAPTER 6. MONITORING

Table 6.7: Amount of Convertible CoCos by Investor Type (USD)

Source: Bloomberg, author’s calculations. This table shows the amount of convertible CoCos that are outstanding in the sample by investor type.

Investor Type	Amount Outstanding with Ownership Details
Fund Managers	\$6,511,771,790
Insurance Companies	\$752,348,596
Banks	\$613,374,929
Pension Funds	\$29,607,397
Hedge Fund Managers	\$1,276,117
Unclassified	\$1,144,707
Other	\$574,022

7.3 Write-Down CoCos

This sub-section presents data about write-down CoCos and their implications for shareholders and CoCo investors. Whereas the analysis in the previous sub-section was developed by discussing financial dilution of CoCo investors and governance dilution of shareholders only financial dilution is relevant in the context of write-down CoCos. This is because write-downs do not involve the issuance of new shares. Consequently, shareholders do not experience a dilution of their governance rights.

There are four issues addressed in this data in this sub-section.¹⁵⁸ First, there are different formats of write-down CoCos issued in different countries in the sample. This means that there are different levels of financial dilution to CoCo investors depending on how losses are incurred.

Second, the financial dilution of temporary write-down investors is potentially limited depending on the interaction between the ‘temporary’ nature of the write-down and how this is treated if a bank is subsequently placed into resolution. It is possible that temporary write-down investors will benefit from a functional priority over other debt investors if a bank is placed into resolution after the CoCo is triggered.

Third, like convertible CoCos, with write-down CoCos the probability of loss is reduced when CoCo triggers are set close to the 5.125% CET1 level. Therefore, in expectation, the

¹⁵⁸Capital Requirements Regulation - 2013/575, art 52(1)(n).

CHAPTER 6. MONITORING

proportion of financial and governance dilution is related to trigger levels. A higher trigger level can create more financial dilution of CoCo investors. Contrastingly, a lower trigger level can create less financial dilution of CoCo investors.

Fourth, sophisticated investors are likely to invest in CoCos with the highest expected return. Our discussion of monitoring identified two distinct price effects on CoCos. First, monitoring reduces the probability of failure, riskiness of a bank, and therefore the return on the bank. Second, a more sophisticated investor is better able to reduce the probability of trigger than a less sophisticated investor. Based on this second effect, sophisticated investors will invest where their return from monitoring is highest.

This sub-section begins by setting out the different types of write-down CoCos and the operation of each type of CoCo. It then discusses the ownership of different CoCos at different trigger levels. empirical data about the ownership of each.

Types of Write-Down and Issuance

This part sets out the issuance of different types of write-downs. It then explains how each type of write-down operates.

Table 6.8 shows the different types of write-down CoCos and from which jurisdictions that they are issued. There are seven salient features in the table. First, most write-down CoCos are permanent write-down CoCos. Second, the second most prominent type of write-down is the Temporary Write-down Format. Third, staged write-down are the least frequently issued type of write-down. Fourth, no country has had all three different types of CoCos issued. Instead, there appears to be a tendency for different types of CoCos to be issued in different countries. Fifth, permanent write-downs have been issued in Switzerland, Denmark, Netherlands, Great Britain, France, and Belgium. Sixth, temporary write-downs have been issued in France, Luxembourg, Germany, Italy, Belgium, and the Faroe Islands. Seventh, staged write-downs have been issued in the Netherlands, Ireland, and Switzerland.

To be sure, there are three types of write-down CoCos: first, permanent write-down CoCos, second, temporary write-down CoCos, and third, staged write-down CoCos. Permanent

CHAPTER 6. MONITORING

Table 6.8: Amount of Write-Down CoCos by Country (USD)

Source: Bloomberg, author's calculations. This table shows the amount of convertible CoCos that are outstanding in the sample by country. The size of the banking system was calculated by gathering data from the ECB's Statistical Data Warehouse for 2014 and the IMF's Financial Sector Stability Assessment for Switzerland published in 2014. The amounts were converted to \$US using the 31 December 2014 exchange rate.

Country	Permanent Write-Down	Staged Write-Down	Write-Temporary Write-Down	Size of Banking System
Switzerland	\$28,074,443,100	\$640,469,000	\$0	\$2,913,817,500,000
France	\$2,000,000,000	\$0	\$14,840,370,000	\$8,184,672,692,000
Denmark	\$5,226,854,980	\$0	\$1,051,498,710	\$969,470,444,000
Luxembourg	\$0	\$0	\$5,800,000,000	\$113,674,716,300
Netherlands	\$4,000,000,000	\$1,692,880,000	\$0	\$2,856,437,688,000
Germany	\$0	\$0	\$4,723,830,000	\$8,172,100,480,000
Great Britain	\$4,000,000,000	\$0	\$0	\$9,273,429,564,000
Belgium	\$1,000,000,000	\$0	\$1,948,280,000	\$599,158,227,200
Italy	\$0	\$0	\$2,341,847,000	\$2,997,587,845,000
Ireland	\$0	\$1,100,000,000	\$0	\$314,822,033,000
Faroe Islands	\$0	\$0	\$34,204,900	NA

write-down CoCos involve a total loss to investors which means a CoCo that promises to pay \$100 will be canceled if it is triggered. Consequently, investors in permanent write-down CoCos face a significant risk. The first permanent write-down CoCo raised \$4.3*bn* and was issued by Danske Bank A/S on 11 May 2009. Since then, permanent write-down CoCos have been issued by banks in Switzerland, Denmark, Great Britain, the Netherlands, and France amongst others. In the sample, \$44*bn* of permanent write-down CoCos were issued.

Staged write-down CoCos impose partial losses on CoCo investors as the CET1 level falls. For instance, the obligation to be repaid might be reduced by 25% if the CET1 level falls below 8%, a further 25% of the obligation to be repaid might be reduced if the CET1 levels falls further to say 7% and so on until the obligation to repay is completely canceled. This staged process ensures that as a bank's situation deteriorates further more losses are imposed on investors. For CoCo investors it has the advantage of ensuring that total losses are suffered in stages as the bank's position deteriorates.

The first staged write-down CoCo was issued by Cooperatieve Centrale Raiffeisen-

CHAPTER 6. MONITORING

Boerenleenbank BA/Netherlands on 19 March 2010 and there have only been three further staged write-down CoCos issued since in the sample. Overall, about \$3*bn* of staged write-down CoCos have been issued in the sample. They have been issued in the Netherlands, Ireland, and Switzerland. The issues from Ireland were mostly completed by Russian banks.

With temporary write-down CoCos, the obligation to repay investors is suspended when the CET1 level of the bank falls below the trigger level. Coupon payments are reinstated when the CET1 position of the bank rises above the trigger level. For instance, if the trigger is at 5.125% then when the CET1 level falls below that amount coupon payments to investors are canceled and if the CET1 ratio rises above 5.125% then coupon payments are reinstated.¹⁵⁹ For investors, the trigger means the suspension of their coupon payments. For shareholders, the coupon cancellation has two benefits: first, shareholder residual claim is increased as the bank approaches resolution or distress and, second, shareholders are not diluted when the CoCo is triggered. For investors, when the CET1 level of the bank improves coupon payments are reinstated.

The first temporary write-down CoCo was issued by UniCredit SpA on 21 July 2010 and only two further temporary write-down CoCos were issued before 13 May 2013 when issuance increased significantly.¹⁶⁰ Figure 6.9 shows that from just before CRD IV and the CRR were published, the rate of issuance of temporary write-down CoCos increased and they are within the sample seeing the greatest rate of issuance. The largest number of temporary write-down CoCos in the sample have been issued in France and total \$14*bn*. Temporary write-down CoCos have also been issued in Luxembourg (\$5.8*bn*), Germany (\$4.7*bn*), Italy (\$2.3*bn*), Belgium (\$1.9*bn*), Denmark (\$1.1*bn*), and the Faroe Islands (\$0.03*bn*).

¹⁵⁹However, even then, the bank might choose not to make the coupon payment or the regulator might forbid it. See, Capital Requirements Directive - 2013/36/EU, art 104. See also, Capital Requirements Regulation - 2013/575, art 52(1)(l).

¹⁶⁰CRD IV and the CRR were published in the Official Journal of the EU on 27 June 2013. The timing of the increased issuance of temporary write-down is extremely close to the date where EU capital requirements were released.

CHAPTER 6. MONITORING

Trigger Levels and Ownership

This part sets out that expected losses on write-down CoCos are higher when trigger levels are higher and lower when trigger levels are lower. It then discusses the ownership of different types of CoCos issued with different trigger levels.

Part 7.2 discussed the trigger level of CoCos issued in different countries. It noted that higher trigger levels increase the expected loss of CoCo investors. It also noted that lower trigger level creates less loss for CoCo investors. It highlighted that in Chapter 5 Table 5.5 we showed that trigger levels in the United Kingdom, Denmark, Ireland, Netherlands, and Belgium are relatively higher than trigger levels in Switzerland, France, Spain, Luxembourg, Germany, Italy, and the Faroe Islands. We would expect losses to be higher where CoCo trigger levels are higher and lower where CoCo trigger levels are lower.

Part 7.2 discussed a hypothesis for the ownership of low trigger CoCos by sophisticated investors. It argued that sophisticated investors invest in low trigger CoCos because, first, they have identified that they are mispriced securities, or, second, because their return from monitoring is higher when they invest in low trigger CoCos.

Table 6.9 sets out the ownership of permanent write-down CoCos and the trigger level for the instruments. Permanent write-down CoCos in the sample are predominantly owned by fund managers who own around \$6.3bn of the reported CoCos. Other prominent investors include insurance companies, banks, and pension funds. These investors are likely to be more sophisticated than their retail counterparts. These sophisticated investors tend to invest in low trigger CoCos.

Table 6.10 sets out the the ownership of temporary write-down CoCos and the trigger level for the instruments. It identifies similar characteristics as permanent write-down CoCos. Sophisticated investors such as fund managers, insurance companies, banks, and pension funds tend to hold the majority of the reported CoCos. In addition, they tend to invest in low trigger CoCos.

A similar pattern is reveal in Table 6.11 which sets out the ownership of staged write-down CoCos. Like their permanent and temporary write-down counterparts, most of the

reported ownership is by sophisticated investors. In addition, those investors acquire low trigger level CoCos. Finally, the range of investors in staged write-downs appears smaller than other write-down formats.

Overall, this empirical is similar to the evidence about convertible CoCos. We argue that sophisticated invest in low trigger CoCos because, first, they have identified that they are mispriced securities, or, second, because their return from monitoring is higher when they invest in low trigger CoCos.

8. Model Assumption and Interpretation

This section explains the monitoring assumption in Chapter 2 and discusses its limitations and implications. It then uses this analysis to interpret the data described in the previous section.

8.1 *Assumption*

The model assumes that either shareholders or CoCo investors will monitor. In reality, neither might monitor or indeed both might simultaneously monitor. If one stakeholder does monitor, the model can be interpreted as predicting some types of CoCo contracts that create the incentives to monitor. We can interpret a convertible CoCo as consistent with the contract in the model that incentivises CoCo investor monitoring if the value of their equity claim is lower than what they initially paid for their CoCos. Contrastingly, we can interpret a convertible CoCo as consistent with shareholder monitoring if it significantly diluted existing shareholders so that the value of their claim was virtually \$0. On the other hand, we can interpret a permanent write-down and a staged write-down CoCo as consistent with the contract in the model that incentivises CoCo investor monitoring.

Temporary write-down CoCos can be interpreted as somewhat inconsistent with either the shareholder or CoCo investor monitoring because of the possibility that coupons are

reinstated.¹⁶¹ In other words, temporary write-down CoCos cannot be readily reconciled with the assumption that either shareholders or CoCo investors monitor. Temporary write-down CoCos cannot be interpreted as being predicted by Chapter 2 because they include the possibility, even if marginal, of, first, value transfers to CoCo investors from taxpayers and, second, value transfers from higher priority debt investors to CoCo investors.

8.2 *Limitations*

The model assumes that either shareholders or CoCo investors monitor. The assumption that either CoCo investors or shareholders monitor has two possible limitations.

First, the model does not consider a situation where both CoCos investors and shareholders monitor. In reality, both shareholders and CoCo investors have a marginal incentive to monitor with the empirically observed convertible CoCos. Those CoCos convert below par and therefore the payment to CoCo investors is reduced by the CoCo being triggered. In addition, the original shareholders suffer governance dilution when new shares are issued.¹⁶² However, the effect of this governance dilution might be offset by the windfall from the financial dilution of CoCo investors on conversion. The dilution though, might reduce the non-financial influence of shareholders.

Second, the model also does not consider a situation where neither stakeholder monitors. It might be the case that the threat of reducing the claim of investors and diluting shareholders governance rights is not enough to induce either stakeholder group to monitor. Intuitively, it is not difficult to imagine a situation where a permanent write-down, which punishes CoCo investors and rewards shareholders, does not induce CoCo investors to monitor. The costs to an individual CoCo investor of monitoring might simply outweigh the

¹⁶¹One possible argument is that because in certain states of nature within resolution temporary write-down CoCos have value despite shares being written-down to zero they might incentivise shareholder monitoring.

¹⁶²For instance, by reducing their private benefits of control. See, Kraakman *et al.* (n 6) 107-10. It might also come as a function of the dilution of their shares and therefore their control of the firm. See Mark J Roe, *Strong Managers Weak Owners: The Political Roots of American Corporate Finance* (Princeton UP 1994) 10. 'Weak monitoring and low shareholder involvement depend partly on Berle-Means fragmentation. It's just not worthwhile for a shareholder with a small block to incur the expenses of involvement. It's easier to sit the crisis out, or sell off the stockholding.'

financial benefits and therefore they do not monitor. Consequently, the interpretation of the model in Chapter 2 ought to be made in light of two facts. First, the model assumes someone monitors. Second, the model assumes that only one person monitors. In reality, no one could monitor. In addition, both shareholders and investors could monitor.

8.3 *Analysis - Issuance*

Our empirical evidence shows that convertible CoCos, which we interpret as *on balance*¹⁶³ creating financial dilution of CoCo investors and governance dilution of shareholders create the following marginal incentives: first, they incentivise shareholders to monitor because of governance dilution, and, second, they incentivise CoCo investors to monitor because of financial dilution. These effects are marginal and so in reality, they may be insufficient to motivate shareholders or CoCo investors to actually monitor. Alternatively, only one effect might be enough to incentivise monitoring. For instance, financial dilution might motivate CoCo investors to monitor and governance dilution may be an insufficient motivation to engage shareholder monitoring.¹⁶⁴ Finally, the effects might be sufficient to motivate both shareholders and CoCo investors to monitor. Most convertible CoCos have been mostly issued by banks in Great Britain.¹⁶⁵

Permanent write-down CoCos financially dilute CoCo investors and therefore create a marginal incentive for them to monitor. These CoCos have been mostly issued in Switzerland.¹⁶⁶ Staged write-down CoCos also financially dilute CoCo investors and therefore create a marginal incentive for them to monitor. These types of CoCos have been mostly issued in the Netherlands.¹⁶⁷

Temporary write-down CoCos, which temporarily financially dilute CoCo investors and may give them functional priority over other types of debt we argue may not create incentives

¹⁶³Indeed, 55% of CoCos appear to have the effect described here.

¹⁶⁴*ibid* 10.

¹⁶⁵The country of issuance of convertible CoCos is set out in Table 6.5.

¹⁶⁶The country of issuance of permanent write-down CoCos is set out in Table 6.8.

¹⁶⁷The country of issuance of staged write-down CoCos is set out in Table 6.8.

for CoCo investor monitoring and have been mostly issued in France.¹⁶⁸ It is relatively rare, amongst the different types of write-down CoCos, to have banks issue two different types of write-downs. For instance, from France, \$15bn in temporary write-down CoCos have been issued and only \$2bn of permanent write-down CoCos have been issued. Consequently, it is clear that the issuance of different types of CoCos is mainly along national lines.

8.4 *Analysis - Political Economy*

In the political economy literature there are several theories about what motivates regulation: first, regulation is supplied in response to the demand of the public for the correction of inefficient or inequitable market practices,¹⁶⁹ and, second, the capture theory where regulation is supplied in response to the demands of interest groups struggling among themselves to maximize the incomes of their members.¹⁷⁰ The public interest theory proceeds on the basis that ‘regulation is an honest but frequently an unsuccessful attempt to promote the public interest.’¹⁷¹ On the other hand, Posner develops an economic theory which views ‘regulation as a product allocated in accordance with basic principles of supply and demand.’¹⁷² Ultimately, the economic theory is that groups organise to exert pressure on the political process to grant themselves benefits or exempt themselves from paying benefits to others.¹⁷³

If we accept that either shareholders or CoCo investors will monitor then the differences in trigger levels and ownership of CoCos may be explained based on political economy considerations. For instance, we might be able to explain variations in CoCo levels in one or a combination of three ways.

First, regulators might require banks to have trigger levels in countries that made

¹⁶⁸The country of issuance of temporary write-down CoCos is set out in Table 6.8.

¹⁶⁹Richard A Posner, ‘Theories of Economic Regulation’ (1974) 5 Bell Journal of Economics and Management Science 335, 335. ‘This theory holds that regulation is supplied in response to the demand of the public for the correction of inefficient or inequitable market practices.’

¹⁷⁰ibid 335-6. ‘[T]his theory holds that regulation is supplied in response to the demands of interest groups struggling among themselves to maximize the incomes of their members.’

¹⁷¹ibid 339.

¹⁷²ibid 344.

¹⁷³Sam Peltzman, Michael E Levine, and Roger G Noll, ‘The Economic Theory of Regulation After a Decade of Deregulation’ (1989) 1989 Brookings Papers on Economic Activity 1, 11-2.

CHAPTER 6. MONITORING

greater bailouts relative to their GDP. This is a measure of historic costs of bank failure to taxpayers. Second, regulators may require higher triggers because their banks are larger (relative to GDP) than banks in other countries. This is measure of the expected cost to taxpayer of bank failure. Third, regulators might require banks to have higher trigger levels in order to avoid the reputational damage (with taxpayers and with the government) that would follow from the failure of regulated banks.

Each of these explanations is correlated and is a source of greater pressure on regulators. The economic theory supports the view that ‘[c]ompact, well-organized groups will tend to benefit more from regulation than broad, diffuse groups.’¹⁷⁴ There are two groups that can exert pressure on the regulatory process and the types of CoCos issued in different countries in the sample: first, shareholders and debt investors who are affected by the cost of capital, and, second, taxpayers who fund bailouts. Specifically, taxpayers in countries where bailouts were a large proportion of GDP might exert more pressure leading to the issuance of CoCos with greater monitoring incentives.

From the perspective of shareholders and CoCo investors, the incentive to monitor is priced at the issuance date of CoCos. In other words, as soon as a contract is written that incentivises monitoring, this is incorporated into the cost of funding of the bank. From the perspective of taxpayers, incentivising monitoring reduces the expected costs of future bailouts because the probability of bank insolvency is lower. In the language of the economic theory, banks can receive the benefit of a lower cost of capital if they do not monitor and the probability of a bailout increases. If the probability of a bailout increases then the expected costs to taxpayers also increases.

Table 6.12 shows the size of bank bailouts to GDP. It shows, consistent with our hypothesis that banks in countries that committed a larger amount to bailouts issue CoCos with a greater incentive for stakeholders to monitor. In particular, The United Kingdom committed 32.1% of GDP to bailouts, Switzerland committed 26.6% of GDP to bailouts, and the Netherlands committed 25.4% of GDP to bailouts. Banks in these three countries have

¹⁷⁴ibid 13.

CHAPTER 6. MONITORING

issued CoCos with a greater incentive to monitor. On the other hand, France committed 2.7% of GDP to bailouts and Germany committed 4.2% of GDP to bailouts. Relatively speaking the amounts committed by France and Germany were much lower than the amounts committed by Switzerland, the Netherlands, and the UK. Consistent with our hypothesis, the CoCos issued in France and Germany create less of an incentive for stakeholders to monitor.

Contrastingly, applying the public interest theory, the hypothesis is that countries, like Great Britain, Switzerland, and the Netherlands, that issue CoCos with a higher probability of incentivising monitoring have more inefficient or inequitable market prices and therefore more rigorous regulation is supplied. On the other hand, countries, like France and Germany, that issue CoCos with a lower probability of incentivising monitoring have less inefficient or inequitable market prices and therefore there is less need to supply rigorous regulation.

The hypothesis that CoCos with a greater incentive for stakeholders to monitor are issued in countries that had higher proportional bailout costs is borne out in Table 6.12. That finding offers support to the economic theory developed by Posner.

9. Conclusion

This chapter has done two things. First, it has defined how CoCo investors and shareholders can monitor banks. It has distinguished between passive and active monitoring and drawn on empirical evidence about contractual terms to assess monitoring of banks by CoCo investors. Monitoring was defined and analysed in a number of ways in the first part. First, we discussed the methods of monitoring available to different stakeholders and how those methods arise. Second, we discussed the sophistication and location of investors which affects their incentives and capacity to monitor.

The first thing done by this chapter is setting out two types of monitoring: passive and active. Passive monitoring occurs when prices are used to reveal information about a bank. Passive monitoring includes the inclusion of information revelation terms in CoCo prospectuses. It was shown that regulatory requirements deal with information revelation

CHAPTER 6. MONITORING

in the context of CoCos. In particular, there is a requirement in Article 54(5) of the CRR for banks to notify regulators and investors if a CoCo is triggered.¹⁷⁵ In addition, there is a requirement for banks to convert or write-down the CoCo in accordance with its terms once it has been triggered.¹⁷⁶ These regulatory requirements are a substitute to terms in a prospectus and also supplement them because they cannot be waived by the mutual consent of the parties.

Active monitoring was defined as a stakeholder influencing the behaviour of bank employees. We argued that active monitoring occurs in three ways: first, CoCo investors can use prospectus terms to influence the behaviour of bank managers, second shareholders can use their control rights, and, third, shareholders and CoCo investors can rely on rights created by statute or in the courts. There was limited empirical support for the use of contract terms to influence bank employee behaviour. However, there was a tendency for permanent write-down CoCos to contain more terms that influenced bank employee behaviour than convertible CoCos.

We then argued that investor sophistication affected the capacity of stakeholders to monitor banks. We focused on four threads in this discussion. First, we set out two ways that investor sophistication affects monitoring: first, as the proportion of sophisticated investors increases prices are more likely to reflect the value of CoCos, and, second, as the proportion of sophisticated investors increases we expect their to be more monitoring terms in CoCos. We argued that CoCo investors are sophisticated and therefore posit that the prices of CoCos reflect their value. The argument that CoCo investors are sophisticated is inconsistent with the general lack of monitoring terms in CoCo prospectuses but consistent with the tendency for those terms to be included in permanent write-down CoCos instead of convertible CoCos.

Second, we noted that the ownership of CoCos affected the incentives to monitor. We used banks as an example of a group that may have a diminished incentive to monitor because any decrease in the value of their CoCo when triggered could cause contagion, a systemic crisis, and possibly a bailout.

¹⁷⁵Capital Requirements Regulation - 2013/575, art 54(5).

¹⁷⁶ibid art 54(5).

CHAPTER 6. MONITORING

Third, we highlighted the role of regulatory restrictions on the ownership of CoCos by retail investors, sales restrictions in different jurisdictions, and minimum denominations in limiting the ownership of CoCos by unsophisticated retail investors. We argued that these regulatory requirements and prospectus terms facilitated the ownership of CoCos by sophisticated investors.

Fourth, we discussed the role of investor location to the question of credible losses. We argued that regulators are more likely to impose losses on investors in foreign jurisdictions than investors domiciled within their home jurisdiction. We argued that this created a credible commitment problem which in turn slackens the incentives of investors in the home jurisdiction of the issuer to discipline.

The second thing done by this chapter is to draw on empirical data about different types of CoCos to discuss the incentives of these stakeholder groups to monitor. It has framed this analysis in terms of different types of CoCos. It has explained that there are two broad types of CoCos: convertibles and write-downs. It has further explained that there are three types of write-down CoCos: permanent write-down, temporary write-down, and staged write-down.

This chapter has then provided an overview of the empirical data relating to each type of CoCo. It has provided information about which countries issue which type of CoCos, and what types of investors own those CoCos—including the trigger level at which those CoCos are owned.

It has analysed the assumption that either shareholders or CoCo investors monitor. It sets out the limitations of this assumption: that both could monitor simultaneously or indeed that neither could monitor. It then discussed the implications of the data for the interpretation of the conditions derived in the model. It highlighted that the types of CoCos that have been issued could be interpreted as being consistent with the conditions derived in the model. It also noted that temporary write-down CoCos could be interpreted as falling outside the conditions derived in the model. Specifically, it argued that temporary write-down CoCos do not create an incentive for either (or both) shareholders or CoCo investors to monitor.

CHAPTER 6. MONITORING

This chapter has made two empirical observations: first, that sophisticated investors tend to invest in low trigger CoCos (with trigger levels of 5% or 5.125%), second, that different types of CoCos are issued in different countries. It has then generated hypotheses from a political economy perspective to explain these issuance patterns.

This chapter has defined monitoring in the context of this thesis. It began with an explanation of the payoffs to CoCo investors and shareholders of a CoCo. It highlighted that the incentive to monitor is sharpened by changes in the value of CoCos and shares as a CoCo approaches its trigger. For most CoCos, the incentive for CoCo investors to monitor is sharpened as a bank approaches its CET1 trigger level.

Table 6.9: Amount of Permanent Write-Down CoCos by Investor Type and Trigger Level (USD)

Source: Bloomberg, author's calculations. This table shows the amount of permanent write-down CoCos that are outstanding in the sample by investor type.

Investor Type and Trigger Level	Amount Outstanding
Fund Managers	\$6,296,790,972
5%	\$3,308,482,610
5.125%	\$751,911,372
7%	\$2,021,796,991
8%	\$214,600,000
Insurance Company	\$440,106,900
5%	\$265,206,900
5.125%	\$66,700,000
7%	\$107,400,000
8%	\$800,000
Bank	\$461,131,722
5%	\$369,210,036
5.125%	\$45,721,686
7%	\$27,200,000
8%	\$19,000,000
Pension Fund	\$17,194,760
5%	\$10,369,760
5.125%	\$225,000
7%	\$2,200,000
8%	\$4,400,000
Hedge Fund Manager	\$5,175,000
5%	\$2,700,000
5.125%	\$2,475,000
Unclassified	\$6,000,000
5%	\$3,900,000
5.125%	\$900,000
7%	\$1,200,000
Government	\$1,000,000
5%	\$1,000,000
Other	\$269,049
5.125%	\$269,049

CHAPTER 6. MONITORING

Table 6.10: Amount of Temporary Write-Down CoCos by Investor Type and Trigger Level (USD)

Source: Bloomberg, author's calculations. This table shows the amount of temporary write-down CoCos that are outstanding in the sample by investor type.

Investor Type and Trigger Level	Amount Outstanding
Fund Managers	\$2,816,375,136
2%	\$433,060,000
5.125%	\$2,142,052,873
6%	\$64,749,991
7%	\$156,512,272
Insurance Company	\$184,429,143
2%	\$24,100,000
5.125%	\$150,062,753
6%	\$9,745,030
7%	\$521,360
Bank	\$333,570,845
2%	\$116,800,000
5.125%	\$182,037,783
6%	\$15,129,926
7%	\$19,603,136
Pension Fund	\$10,477,572
5.125%	\$5,472,351
6%	\$4,796,677
7%	\$208,544
Unclassified	\$1,561,940
5.125%	\$1,561,940

Table 6.11: Staged

Partial Permanent Write-Down CoCos by Investor Type and Trigger Level (USD)]Amount of Staged Write-Down CoCos by Investor Type and Trigger Level (USD)

Source: Bloomberg, author's calculations. This table shows the amount of staged write-down CoCos that are outstanding in the sample by investor type.

Investor Type and Trigger Level	Amount Outstanding
Fund Managers	\$665,894,146
2%	\$36,500,000
7%	\$629,394,146
Bank	\$7,471,520
2%	\$700,000
7%	\$6,771,520
Pension Fund	\$677,152
7%	\$6,771,520
Insurance Company	\$638,576
2%	\$300,000
7%	\$338,576

Table 6.12: Capital Injections, Asset Purchases and Lending from Treasury, and Liquidity Provision Relative to GDP (%)

Source: Horton et al, ‘*The State of Public Finances: A Cross-Country Fiscal Monitor*’ (IMF Staff Position Note, SPN/09/21, 30 June, 2009) at Appendix Table 3 (p 28). This table shows the amount of support provided by the state through capital injections, purchases of assets and lending by treasury, and liquidity and other support by central banks as of June 2009.

Country	Capital Injection	Treasury Asset Purchases and Lending	Liquidity Support	Total Support
Austria	5.3	-	-	5.3
Belgium	4.8	-	-	4.8
France	1.4	1.3	-	2.7
Germany	3.8	0.4	-	4.2
Greece	2.1	3.3	-	5.4
Ireland	5.9	-	-	5.9
Italy	0.7	-	-	0.7
Netherlands	3.4	10.3	-	13.7
Norway	2	15.8	14.7	32.5
Portugal	2.4	-	-	2.4
Spain	-	3.9	-	3.9
Sweden	2.1	4.8	13.6	20.5
Switzerland	1.1	-	25.5	26.6
United Kingdom	3.9	13.8	14.4	32.1

7

Conclusion Of The Thesis

1	Incentives to Monitor	216
2	Impediments to Monitoring	218
3	Strengthening Monitoring Incentives	219
4	Future Research	222

CHAPTER 7. CONCLUSION

This thesis has assessed the incentives to monitor created by CoCos. It has discussed and highlighted that CoCos do create incentives for CoCo stakeholders to monitor. There are two primary ways that these incentives are created: first, through financial dilution of stakeholders, and second, through governance dilution whenever CoCos are converted into equity. In addition, there are a number of characteristics in the CoCo markets that militate against the incentive to monitor: first, it is uncertain whether enough CoCos are issued, second, regulatory triggers are subject to forbearance, trigger levels might be set too close to the point of resolution, and temporary write-down CoCos might not create appropriate monitoring incentives.

This conclusion sets out the dynamics that create incentives for stakeholders to monitor using CoCos. It also discusses how these incentives to monitor might be strengthened. In particular, requiring higher minimum trigger levels, creating stronger incentives and powers for stakeholders and CoCo trustees to monitor, and restricting ownership of CoCos to sophisticated investors and requiring their ownership of CoCos to be reported to a regulator.

Finally, we set out avenues for future research about CoCos. Specifically, analyses of the differences in the EU and US issuance of CoCos and a comparison of the tax cost and the bailout benefits of CoCos.

1. Incentives to Monitor

There are a number of characteristics that create incentives for stakeholders to monitor. First, the nature of losses when the CoCo is triggered. Second, discretionary coupon cancellation by the regulator or the bank. Third, minimum trigger levels. Fourth, the relative sophistication of investors.

A key insight from Chapter 2 was the permanent write-down CoCos may create incentives for monitoring by CoCo investors. On the other hand, convertible CoCos may create incentives for shareholder monitoring. This idea was further developed in Chapter 6 when distinguishing financial and governance dilution. The financial dilution that follows from a write-down are broadly in line with the write-down discussed in Chapter 2. However, Chap-

CHAPTER 7. CONCLUSION

ter 2 doesn't contain any parameter that is analogous to governance dilution. Instead, the model suggests that conversion at the market price creates incentives for shareholders to monitor. This incentive is sharpened by governance dilution because their control rights are reduced by a conversion of CoCos. Accordingly, what happens when a CoCo is triggered is key to creating incentives for stakeholders to monitor.

In addition to the losses that are incurred when a CoCo is triggered, losses can be incurred because of discretionary and mandatory coupon cancellation. Regulators can cancel CoCo coupons under CRD IV.¹ In addition, coupons can only be paid out of distributable items and so managers are required to cancel coupon payments if there are no distributable items.² The prospect of missed coupon payments can supplement the incentive of CoCo investors to monitor. Forbearance incentives might make discretionary coupon cancellation by a regulator less credible.³ However, the requirement to only make coupon payments from distributable items is not subject to the same forbearance incentives. Consequently, subject to forbearance, discretionary and mandatory coupon cancellation create incentives to monitor.

Minimum trigger levels reduce the likelihood that a CoCo is triggered just before resolution or indeed as part of resolution. A regulator can revoke a banking license when a bank's CET1 ratio falls below 4.5%.⁴ Accordingly, this is also the point at which a regulator is likely to face the greatest pressure to place a bank into resolution. The minimum trigger level for EU CoCos is 5.125%.⁵ The minimum trigger level is above the point where a regulator will face pressure to place a bank into resolution. The purpose of the minimum level is so that CoCos are triggered outside of resolution and the threat of loss outside of resolution can supplement incentives to monitor.

¹Directive 2013/36/EU of the European Parliament and of the Council of 26 June 2013 on Access to the Activity of Credit Institutions and the Prudential Supervision of Credit Institutions and Investment Firms amending Directive 2002/87/EC and repealing Directives 2006/48/EC and 2006/49/EC [2013] OJ L176/338 (Capital Requirements Directive - 2013/36/EU), art 104.

²Regulation (EU) No 575/2013 of the European Parliament and of the Council of 26 June 2013 on Prudential Requirements for Credit Institutions and Investment Firms and Amending Regulation (EU) No 648/2012 [2013] OJ L176/1 (Capital Requirements Regulation - 2013/575), art 52(1)(l).

³See Edward J Kane, 'How Incentive-Incompatible Deposit-Insurance Funds Fail' (Feb 1989) Nat'l Bureau of Econ Research Working Paper 2836 . See also, Edward J Kane, 'Changing Incentives Facing Financial-Services Regulators' (1989) J Fin Services Research 265.

⁴Capital Requirements Directive - 2013/36/EU, art 18(d).

⁵Capital Requirements Regulation - 2013/575, art 54.

Rational and sophisticated investors are better able to monitor than bounded rationally and unsophisticated investors. For instance, a hedge fund manager is probably a better monitor than a retail investor. Consequently, who holds CoCos is important to assessing the level of monitoring one might expect from the instruments. There is a dearth of information about the holders of CoCos. However, from the data that is available, CoCos are held by relatively sophisticated investors. This supports the proposition that CoCos that incentivise monitoring may result in monitoring actually taking place.

2. Impediments to Monitoring

Monitoring by CoCo stakeholders is hampered by at least five distinct factors: the ability for banks to issue temporary write-down CoCos, the relatively limited amount of CoCos that banks are required to issue, the low trigger levels, the use of regulatory triggers, and the lack of transparency in CoCo ownership. Each is discussed in turn.

Banks have the choice to issue a range of write-down instruments including temporary write-down CoCos.⁶ When a temporary write-down CoCo is triggered, coupon payments are canceled.⁷ If the bank's CET1 ratio then rises above the trigger level then coupons are reinstated.⁸ There is a risk that the CET1 level rises above the trigger level because of a bailout or as part of resolution. This risk reduces the incentive of temporary write-down investors to monitor banks.

The CRR sets a minimum trigger level of 5.125% of CET1 for AT1 CoCos.⁹ This level is above 4.5% i.e. the minimum CET1 level, in normal circumstances, for a bank to retain its license.¹⁰ In the UK, the Prudential Regulation Authority has suggested that 'an instrument with a trigger of 5.125% CET1 may not convert in time to prevent the failure of a firm.'¹¹ A minimum trigger level of 5.125% is close to where a bank where lose its license and the thesis

⁶ibid art 52(1)(n).

⁷ibid art 54(1)(a).

⁸ibid art 54(1)(a).

⁹ibid art 54.

¹⁰Capital Requirements Directive - 2013/36/EU, art 18(d).

¹¹Prudential Regulation Authority, 'CRD IV and Capital' (Dec 2013) PRA Supervisory Statement - SS7/13 , 3.

argues that this might be too low. A higher trigger level, subject to forbearance, strengthens incentives to monitor in order to avoid the CoCo being triggered.

The CRR requires that AT1 CoCos use accounting triggers.¹² Article 54(1)(b) allows banks to specify, in addition to regulatory triggers, market based triggers.¹³ This means that regulatory triggers provide a minimum standard for when a CoCo should be triggered. However, these triggers are subject to regulatory forbearance. Regulators might change what counts towards capital in order to avoid CoCos being triggered and damage to their reputation. At the same time, bank managers and CoCo investors do not have incentives to require market based triggers that they do not control. In general, shareholders benefit from CoCos being triggered but the negative news revealed by a CoCo being triggered might be more hurtful than any increase in the value of their shares because of conversion. These forbearance incentives might be overcome by requiring banks to include market based triggers in their CoCos.

We show that there is limited ownership information available and the information that is available might not represent the dynamics in the market. We argued that sophisticated investors will invest where their return for monitoring or shirking is highest. For instance, when they expect their CoCos to be triggered; sophisticated investors might sell their CoCos to unsophisticated investors who are boundedly rational. This might mean that prices do not react in a timely way to increased risks at banks. We argue that this problem can be overcome by restricting ownership by unsophisticated investors and by requiring ownership information to be made available to regulators.

3. Strengthening Monitoring Incentives

There are several parts of the CoCo framework that could be changed in order to strengthen the incentives for CoCo stakeholders to monitor: first, higher levels could be required, second, incentives and powers for CoCo investors and their trustees should be strengthened, and there

¹²Capital Requirements Regulation - 2013/575, art 54(1)(a).

¹³ibid art 54(1)(b).

CHAPTER 7. CONCLUSION

should be a reporting requirement to regulators about the ownership of CoCos. Each of these points is briefly set out below.

If CoCos are triggered in accordance with their contractual terms then they will absorb losses before CET1 is completely depleted.¹⁴ On the other hand, if losses are imposed on CoCos as part of resolution then it absorbs losses after CET1 has been written-down.¹⁵ Consequently, CoCo investors would prefer to absorb losses as part of resolution than based on their contractual obligations. This incentive runs contrary one potential effect of CoCos; to create incentives for CoCo investors to monitor. Of course, CoCos can be designed to create incentives for shareholders to monitor. In this situation, the difference between capital and resolution rules would be complementary to the contractual structure of CoCos. However, this difference undermines CoCos that purport to incentivise investors to monitor banks. To overcome the difference between the CRR and the BRRD, the BRRD could be amended so that what happens in resolution comports with the incentives created by a CoCo contract. In essence, the BRRD could require that losses be imposed in the priority order envisioned by the CoCo contract.

Minimum trigger levels reduce the likelihood that a CoCo is triggered before or as part of resolution. However, where the minimum is set affects how much of an effect that CoCo monitoring will have on the bank avoiding distress. Setting the minimum too high may mean that CoCos are triggered when a bank is not distressed. However, setting the trigger too low may mean that monitoring by CoCo investors has a minimal effect on returning a distressed bank to viability. A regulator can revoke a banking license when a bank's CET1 ratio falls below 4.5%.¹⁶ The minimum trigger level is set at 5.125%.¹⁷ The minimum trigger level is 62 basis points more than the point of resolution. However, there is evidence that

¹⁴ibid art 54(5).

¹⁵Directive 2014/59/EU of the European Parliament and of the Council of 15 May 2014 Establishing a Framework for the Recovery and Resolution of Credit Institutions and Investment Firms and Amending Council Directive 82/891/EC, and Directives 2001/24/EC, 2002/47/EC, 2004/25/EC, 2005/56/EC, 2007/36/EC and 2011/35/EU, 2012/30/EU and 2013/36/EU, and Regulations (EU) No 1093/2010 and (EU) No 648/2012, of the European Parliament and of the Council [2014] OJ L173/190 (Recovery and Resolution Directive - 2014/59/EU), art 48(1).

¹⁶Capital Requirements Directive - 2013/36/EU, art 18(d).

¹⁷Capital Requirements Regulation - 2013/575, art 54.

CHAPTER 7. CONCLUSION

in most countries the distance to trigger is generally more than 500 basis points above the trigger level.¹⁸ Consequently, the minimum trigger level could and perhaps should be set above 5.125% and indeed the 7% level mandated by the PRA in the UK appears to be reasonable.¹⁹

The CRR gives discretion to issuers to set conversion and write-down terms.²⁰ This means that CoCos can be designed that incentivise either shareholders or CoCo investors to monitor. This discretion implies that there is no clear regulatory direction about which stakeholder group might be better placed to monitor banks. However, this thesis provides an assessment of the monitoring technologies available to shareholders and CoCo investors. The contractual nature of CoCos allows stakeholders, subject to regulatory requirements,²¹ to negotiate terms that can facilitate monitoring by either stakeholder group. However, both groups face coordination problems: shareholders because they tend to be dispersed and therefore tend to rely on proxy voting at meetings to coordinate their actions,²² and CoCo investors for a similar reason who overcome this problem by relying on a trustee.²³ Given that shares are more likely to be held by unsophisticated investors than CoCos, it may be better to bolster the incentives of CoCo investors and their trustees to monitor.

In fact, it was argued, on the basis of the available data that CoCo investors are relatively sophisticated. However, CoCo ownership data is sparse and indeed it is uncertain whether the data is representative. Consequently, there is a risk that CoCos are held by unsophisticated investors. This problem can be overcome by rules restricting the ownership of CoCos such as the temporary ban of ownership by retail investors in the UK.²⁴ However,

¹⁸The trigger level may of course be greater than 5.125% of CET1 capital.

¹⁹Supervisory Statement SS3/13: Capital and Leverage Ratios for Major UK Banks and Building Societies Nov 2013 SS3/13 , 3 (U.K.).

²⁰Capital Requirements Regulation - 2013/575, art 52(1)(n).

²¹These restrictions on contractual terms apply to AT1 CoCos and not Tier 2 CoCos. *ibid* art 63. See also, *ibid* art 53.

²²Reinier Kraakman *et al.*, *The Anatomy of Corporate Law: A Comparative and Functional Approach* (OUP 2009) 62. '[O]nly the U.S. and the UK rely exclusively on proxy voting among our core jurisdictions. In the UK proxy fights are relatively rare, since prior negotiation among institutional investors often resolves conflicts.

²³Paul L Davies, 'Directors' Creditor-Regarding Duties in Respect of Trading Decisions Taken in the Vicinity of Insolvency' (2006) 1 European Business Organisation Review 301.

²⁴Temporary Marketing Restriction (Contingent Convertible Securities) Instrument 2014 2014/47 (U.K.).

the ban is limited in the UK and it is legally possible for retail investors to hold CoCos issued in other jurisdictions. A practical limit on the ownership of CoCos by retail investors is a minimum denomination rule of €50,000.²⁵ However, this rule does not guarantee that CoCos are not held by retail investors. A better sense of who holds CoCos could be achieved by establishing a reporting requirement to regulators who would then be able to track the composition of CoCo ownership over time.

4. Future Research

There are at least two further areas for research: differences in the EU and US issuance of CoCos and a comparison of the tax cost and the bailout benefits of CoCos.

First, exploring the differences between the US and the EU when it comes to the regulatory capital treatment of CoCos. In the US, CoCos are not treated as regulatory capital whilst in the EU they are. Empirically, CoCos have been issued in the EU and not in the US. At first blush, this suggests that CoCos reduce expected taxpayer bailouts and therefore increase a bank's cost of capital.²⁶ With the aid of a richer analysis of the regulatory framework in the US and the EU and empirical data from both, this difference can be analysed in more detail.

Second, for debt investors in banks there are two ways to benefit from taxpayer funds: first, through the deductibility of interest rates, and, second, by being bailed out when a bank becomes distressed. The deductibility of interest on CoCos exists whilst the bank is solvent. On the other hand, a bailout occurs when a bank becomes distressed. However, both are priced when debt securities are issued. If we assume that CoCos do not benefit from taxpayer bailouts then the issuance of CoCos might reflect the relative magnitude of the two sources of taxpayer funds. If banks issue CoCos then they consider that the tax

²⁵Commission Regulation 809/2004/EC of 29 April 2004 Implementing Directive 2003/71/EC of the European Parliament and of the Council as Regards Information Contained in Prospectuses as well as the Format, Incorporation by Reference and Publication of Such Prospectuses and Dissemination of Advertisements [2004] OJ L149/1 (Prospectus Regulation 809/2004), art 12 and 16.

²⁶This is consistent with the Admati et al view. See, Anat R Admati *et al.*, 'Fallacies, Irrelevant Facts, and Myths in the Discussion of Capital Regulation: Why Bank Equity is not Expensive' (2011) Rock Ctr Corp Governance at Stan Univ Working Paper No 86 .

benefit of CoCos is greater than the loss of future bailout funds. If, on the other hand, banks do not issue CoCos then they consider that the tax benefit of CoCos is not greater than the loss of future bailout funds.

In reality, banks have a choice to issue CoCos. In the EU, banks have to issue either CoCos and CET1 capital. In addition, coupons on EU CoCos tend to be tax deductible. In the US, banks can issue CoCos but the instruments do not count as regulatory capital. Moreover, coupons on US CoCos are not tax deductible. There is scope in this context to map and analyse questions about whether CoCos reduce expected taxpayer payouts to banks and whether CoCos have a benefit above subordinated debt or CET1 capital. The answers to these questions will show that CoCos either induce a wonderful concentration of the minds of bank management or allow bank stakeholders to expropriate taxpayer wealth.

Appendix A: Summary of CoCos

Table 7.1: Summary of Empirical Data About CoCo Issuance. Sources: Bloomberg & Prospectuses This table provides a summary of the data that is presented and analysed in this thesis. It highlights the spread of countries where CoCos have been issued, the entities issuing CoCos, and important design characteristics.

Country / Bank	Number of Cos	Amount Raised (US \$ bn)	Amount Outstanding (US \$ bn)	Range of Triggers (%)	Loss Type x # Issued	Regulatory Call	Tax Call	Restrictions on Sales	Restrictions on Asset	Restrictions on Mergers and Business Changes	Restrictions on Additional Debt	Restrictions on Dividends
Belgium / KBC Bank NV	1	1	1	7	Permanent	Y	Y	N	N	N	N	N
Belgium / KBC Groep NV	1	1.95	1.95	5.125	Temporary	Y	Y	N/A	N	N	N	N
Switzerland / Banque Cantonale de Geneve	1	0.12	0.12	5.125	Permanent	N/A	N	N/A	N	N/A	Y	Y
Switzerland / Credit Suisse AG	3	6.67	6.67	5	Permanent	Y x 3	Y x 3	N x 3	N x 3	N x 3	N x 3	N x 3
Switzerland / Credit Suisse Group AG	5	9.81	9.81	5.125	Permanent	Y x 5	Y x 5	N x 3 and x 2	Y	N x 5	N x 5	N x 5
Switzerland / Glarner Kantonalbank	1	0.08	0.08	5.125	Permanent	N/A	N	N/A	N/A	N/A	N/A	N/A
Switzerland / Julius Baer Group Ltd	2	0.66	0.66	5.125	Permanent	Y x 2	Y x 1 and N x 1	N x 2	N x 2	N x 2	N x 2	N x 2
Switzerland / UBS AG	3	6.73	6.73	5	Permanent	Y x 3	Y x 3	N x 3	N x 3	N x 3	N x 3	N x 3

Summary of Empirical Data About CoCo Issuance

Switzerland / UBS AG/Jersey	1	2	2	5	Permanent Write-Down	Y	Y	N	N	N
Switzerland / UBS AG/Stamford CT	1	2	2	5	Permanent Write-Down	Y	Y	N	N	N
Switzerland / Zuercher Kanton- albank	1	0.64	0.64	7	Staged Write-Down	Y	Y	N	N	N
Germany / Deutsche Bank AG	3	4.72	4.72	5.125	Temporary Write-Down x 3	Y	Y	N	N	N
Denmark / Danske Bank A/S	2	5.42	5.42	7-12	Permanent Write-Down x 1 and Temporary Write-Down x 1	Y	Y	N	N	N
Denmark / Den Jyske Sparekasse	1	0.009	0.009	5	Permanent Write-Down	N/A	N	N/A	N/A	N/A
Denmark / Nytkredit Re- alkredit A/S	1	0.82	0.82	7	Permanent Write-Down	Y	Y	N	N	N/A
Denmark / Os- tjydsdsk Bank A/S	1	0.009	0.009	5.125	Temporary Write-Down	N/A	N	N/A	N/A	N/A
Denmark / Spar Nord Bank A/S	1	0.24	0.24	3.5	Equity Con- version	N/A	Y	N/A	N/A	N/A

Summary of Empirical Data About CoCo Issuance

Denmark / Sparekassen Sjælland	2	0.03	0.02	5-7	Permanent Write-Down x 2	N/A x 2	N x 1 and Y x 1	N x 1 and N/A x 1	N/A x 2	N/A x 2	N/A x 2
Spain / Banco Bilbao Vizcaya Argentaria SA	2	3.56	3.56	5.125	Equity Conversion version x 2	Y x 2	Y x 2	N x 2	N x 1 and Y x 1	N x 2	N x 2
Spain / Banco Popular Espanol SA	1	0.68	0.68	5.125	Equity Conversion version	Y	Y	N	N	N	N
Spain / Banco Santander SA	2	3.59	3.59	5.125	Equity Conversion version	Y x 2	Y x 2	N x 2	N x 2	N x 2	N x 2
Spain / Sociedad de gestion de Activos procedentes de la Reestructuracion Bancaria	1	3.73	3.73	0	Equity Conversion version	N/A	N	N/A	N/A	N/A	N/A
Faroe Islands / BankNordik P/F	1	0.03	0.03	5	Temporary Write-Down	N/A	N	N/A	N/A	N/A	N/A
France / Credit Agricole SA	6	7.72	7.72	5.125-7	Permanent Write-Down x 2 and Temporary Write-Down x 4	Y x 6	Y x 6	N x 6	N x 6	N x 5 and Y x 1	N x 6
France / Societe Generale SA	6	9.12	9.12	5.125	Temporary Write-Down x 6	Y x 6	Y x 6	N x 6	N x 6	N x 6	N x 6

Summary of Empirical Data About CoCo Issuance

Great Britain / Barclays Bank PLC	2	4	4	7	Permanent Write-Down	Y x 2	Y x 2	Y x 2	Y x 2	N x 2
Great Britain / Barclays PLC	5	7.23	7.23	7-9	Equity Con- version x 5	Y x 5	Y x 5	Y x 5	N x 3 and Y x 2	N x 5
Great Britain / Coventry Building Society	1	0.68	0.68	7	Equity Con- version	Y	N	N	N	N
Great Britain / LBG Capital No.1 PLC	16	10.84	2.96	5	Equity Con- version x 16	N x 2 and Y x 14	N x 16	N x 16	N x 15 and N/A x 1	N x 13 and N/A x 3
Great Britain / LBG Capital No.2 PLC	20	5.91	3.83	5	Equity Con- version x 20	Y x 20	N x 18 and Y x 2	N x 20	N x 20	N x 20
Great Britain / Lloyds Banking Group PLC	5	8.91	8.91	7	Equity Con- version x 5	Y x 5	Y x 5	N x 5	N x 5	N x 5
Great Britain / Na- tionwide Building Society	1	1.66	1.66	7	Equity Con- version	Y	N	N	N	N
Great Britain / Yorkshire Building Society	1	0.15	0.04	5	Equity Con- version	Y	N	N	N	Y
Guernsey / Credit Suisse Group Guernsey I Ltd	1	2	2	7	Equity Con- version	Y	N	N	N	N

Summary of Empirical Data About CoCo Issuance

Guernsey / Credit Suisse Group Guernsey II Ltd	1	1.73	1.73	5	Equity Con- version	Y	Y	N	N	N
Guernsey / Credit Suisse Group Guernsey IV Ltd	1	0.82	0.82	7	Equity Con- version	Y	Y	N	N	N
Ireland / Allied Irish Banks PLC	1	2.30	2.30	8.25	Equity Con- version	N	Y	N	N	N
Ireland / Bank of Ireland	1	1.33	1.33	8.25	Equity Con- version	N	N	N	N	N
Ireland / Bank St Petersburg OJSC via BSPB Finance PLC	1	0.1	0.1	2	Staged Write-Down	Y	Y	N/A	N/A	N/A
Ireland / Credit Bank of Moscow via CBOM Finance PLC	1	0.5	0.5	2	Temporary Write-Down	Y	N	N/A	Y	Y
Ireland / Gazprombank OJSC via GPB Eurobond Finance PLC	2	1.75	1.75	2	StagedPartial Permanent Write-Down x 1 and Temporary Write-Down x 1	N x 2	Y x 2	N x 2	N x 2	N x 2
Ireland / Permanent TSB	1	0.49	0.49	8.25	Equity Con- version	N	N	N	N	Y

Summary of Empirical Data About CoCo Issuance

Italy / Intesa Sanpaolo SpA	1	1.37	0.66	6	Temporary	Y	Y	N	N	N
Italy / UniCredit SpA	2	1.89	1.68	5.125-6	Temporary	Y x 2	Y x 2	N x 2	N x 2	N x 2
Luxembourg / Home Credit & Finance Bank OOO via Eurasia Capital SA	2	0.40	0.40	2	Temporary	N x 2	N x 2	N x 2	N x 2	N x 2
Luxembourg / Promsvyazbank OJSC via RSHB Capital SA	2	0.20	0.20	2	Temporary	Y x 2	Y x 2	N x 2	N x 2	N x 2
Luxembourg / Russian Agricultural Bank OJSC via RSHB Capital SA	2	1	1	2	Temporary	N x 2	Y x 2	N x 2	N x 2	N x 2
Luxembourg / Russian Standard Bank via Russian Standard Finance SA	1	0.20	0.20	2	Temporary	Y	Y	N	N	N
Luxembourg / Sberbank of Russia via SB Capital SA	4	4	4	2	Temporary	N x 2 and	N x 1 and	N x 4	N x 4	N x 4
					Write-Down	Y x 2	Y x 3			
					x 4					

Summary of Empirical Data About CoCo Issuance

Netherlands / 3	5.69	5.69	7-8	Staged	N x 1 and Y x 3	N x 3	N x 3 N x 2 N x 3 and Y x 1
Cooperative Centrale Raiffeisen-Boerenleenbank BA/Netherlands				Write-Down x 1 and Permanent Write-Down x 1	Y x 2		
Portugal / Banco BPI SA	1	1.90	0	Equity Con- version	N/A	N	N/A N/A N/A

Appendix B: Summary of Ownership of CoCos

Table 7.2: Summary of Empirical Data About CoCo Ownership. Sources: Bloomberg & Prospectuses. This table provides a summary of the ownership data that is presented and analysed in this thesis according to investor type.

Investor Type & Trigger Level	Equity Conversion (US \$ mn)	Permanent Write-Down (US \$ mn)	Temporary Write-Down (US \$ mn)	Staged Write-Down (US \$ mn)
Bank 5%	\$346	\$369	-	-
Bank 5.125%	\$81	\$45.7	\$182	-
Bank 6%	-	-	\$15.1	-
Bank 7%	\$163	\$27.2	\$19.6	\$6.77
Bank 8%	-	\$19.0	-	-
Bank 8.25%	\$22	-	-	-
Government 5%	-	\$1	-	-
Hedge Fund Manager 5%	-	\$2.70	-	-
Hedge Fund Manager 5.125%	\$0.68	\$2.48	-	-
Hedge Fund Manager 7%	\$0.60	-	-	-
Insurance Company 5%	\$563	\$265	-	-
Insurance Company 5.125%	\$55.1	\$66.7	\$150	-
Insurance Company 6%	-	-	\$9.75	-
Insurance Company 7%	\$126	\$107	\$0.52	\$0.34
Insurance Company 8%	-	\$0.80	-	-
Insurance Company 8.25%	\$8.93	-	-	-
Fund Manager 5%	\$3,032	\$3,308	-	-
Fund Manager 5.125%	\$1,317	\$752	\$2,142	-
Fund Manager 6%	-	-	\$84.7	-
Fund Manager 7%	\$1,744	\$2,022	\$157	\$629
Fund Manager 8%	-	\$215	-	-
Fund Manager 8.25%	\$418	-	-	-
Other 5.125%	-	\$0.27	-	-
Other 7%	\$0.574	-	-	-
Pension Fund 5%	\$17.4	\$10.4	-	-

Summary of Empirical Data About CoCo Ownership

Pension Fund 5.125%	\$11.4	\$0.23	\$5.47	-
Pension Fund 6%	-	-	\$4.80	-
Pension Fund 7%	\$0.865	\$2.20	\$0.21	\$0.68
Pension Fund 8%	-	\$4.40	-	-
Unclassified 5%	\$0.54	\$3.90	-	-
Unclassified 5.125%	-	\$0.90	\$1.56	-
Unclassified 7%	\$0.60	\$1.20	-	-

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